

Management of Carpal Tunnel Syndrome

Evidence-Based Clinical Practice Guideline

Adopted by:

The American Academy of Orthopaedic Surgeons Board of Directors
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Endorsed by:



AMERICAN COLLEGE OF SURGEONS
*Inspiring Quality:
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American Society of
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Disclosure Requirement

In accordance with AAOS policy, all individuals whose names appear as authors or contributors to Clinical Practice Guideline filed a disclosure statement as part of the submission process. All panel members provided full disclosure of potential conflicts of interest prior to voting on the recommendations contained within this Clinical Practice Guidelines.

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I. SUMMARY OF RECOMMENDATIONS

The following is a summary of the recommendations of the AAOS Clinical Practice Guideline on the Management of Carpal Tunnel Syndrome. All readers of this summary are strongly urged to consult the full guideline and evidence report for this information. We are confident that those who read the full guideline and evidence report will see that the recommendations were developed using systematic evidence-based processes designed to combat bias, enhance transparency, and promote reproducibility.

This summary of recommendations is not intended to stand alone. Treatment decisions should be made in light of all circumstances presented by the patient. Treatments and procedures applicable to the individual patient rely on mutual communication between patient, physician, and other healthcare practitioners.

Strength of Recommendation Descriptions

Strength	Overall Strength of Evidence	Description of Evidence Quality	Strength Visual
Strong	Strong	Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention.	
Moderate	Moderate	Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.	
Limited	Low Strength Evidence or Conflicting Evidence	Evidence from two or more “Low” quality studies with consistent findings or evidence from a single “Moderate” quality study recommending for against the intervention or diagnostic or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.	
Consensus	No Evidence	There is no supporting evidence. In the absence of reliable evidence, the guideline development group is making a recommendation based on their clinical opinion. Consensus statements are published in a separate, complimentary document.	

OBSERVATION

Strong evidence supports Thenar atrophy is strongly associated with ruling-in carpal tunnel syndrome, but poorly associated with ruling-out carpal tunnel syndrome.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” strength studies with consistent findings for recommending for or against the intervention.

PHYSICAL SIGNS

Strong evidence supports not using the Phalen Test, Tinel Sign, Flick Sign, or Upper limb neurodynamic/nerve tension test (ULNT) criterion A/B as independent physical examination maneuvers to diagnose carpal tunnel syndrome, because alone, each has a poor or weak association with ruling-in or ruling-out carpal tunnel syndrome.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” strength studies with consistent findings for recommending for or against the intervention.

MANEUVERS

Moderate evidence supports not using the following as independent physical examination maneuvers to diagnose carpal tunnel syndrome, because alone, each has a poor or weak association with ruling-in or ruling-out carpal tunnel syndrome:

- Carpal Compression test
- Reverse Phalen Test
- Thenar Weakness or Thumb Abduction Weakness or Abductor Pollicis Brevis Manual Muscle Testing
- 2-point discrimination
- Semmes-Weinstein Monofilament Test
- CTS-Relief Maneuver (CTS-RM)
- Pin Prick Sensory Deficit; thumb or index or middle finger
- ULNT Criterion C
- Tethered median nerve stress test
- Vibration perception – tuning fork
- Scratch collapse test
- Luthy sign
- Pinwheel

Strength of Recommendation: Moderate Evidence ★★★★★

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

HISTORY INTERVIEW TOPICS

Moderate evidence supports not using the following as independent history interview topics to diagnose carpal tunnel syndrome, because alone, each has a poor or weak association with ruling-in or ruling-out carpal tunnel syndrome:


- Sex/gender
- Ethnicity
- Bilateral symptoms
- Diabetes mellitus
- Worsening symptoms at night
- Duration of symptoms
- Patient localization of symptoms
- Hand dominance
- Symptomatic limb
- Age
- BMI

Strength of Recommendation: Moderate Evidence 

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

PATIENT REPORTED NUMBNESS OR PAIN


Limited evidence supports that patients who do not report frequent numbness or pain might not have carpal tunnel syndrome.

Strength of Recommendation: Limited Evidence 

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

HAND-HELD NERVE CONDUCTION STUDY (NCS)

Limited evidence supports that a hand-held nerve conduction study (NCS) device might be used for the diagnosis of carpal tunnel syndrome.

Strength of Recommendation: Limited Evidence 

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

MRI


Moderate evidence supports not routinely using MRI for the diagnosis of carpal tunnel syndrome.

Strength of Recommendation: Moderate Evidence 

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

DIAGNOSTIC ULTRASOUND

Limited evidence supports not routinely using ultrasound for the diagnosis of carpal tunnel syndrome.

Strength of Recommendation: Limited Evidence 

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

DIAGNOSTIC SCALES


Moderate evidence supports that diagnostic questionnaires and/or electrodiagnostic studies could be used to aid the diagnosis of carpal tunnel syndrome.

Strength of Recommendation: Moderate Evidence 

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

INCREASED RISK OF CTS

A. Strong evidence supports that BMI and high hand/wrist repetition rate are associated with the increased risk of developing carpal tunnel syndrome (CTS).

Strength of Recommendation: Strong Evidence 

Description: Evidence from two or more “High” strength studies with consistent findings for recommending for or against the intervention.

B. Moderate evidence supports that the following factors are associated with the increased risk of developing carpal tunnel syndrome (CTS)


- a. Peri-menopausal
- b. Wrist Ratio/Index
- c. Rheumatoid Arthritis
- d. Psychosocial factors
- e. Distal upper extremity tendinopathies
- f. Gardening
- g. ACGIH Hand Activity Level at or above threshold
- h. Assembly line work
- i. Computer work
- j. Vibration
- k. Tendonitis
- l. Workplace forceful grip/exertion

Strength of Recommendation: Moderate Evidence 

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

C. Limited evidence supports that the following factors are associated with the increased risk of developing carpal tunnel syndrome (CTS):

- a. Dialysis
- b. Fibromyalgia
- c. Varicosis
- d. Distal radius fracture

Strength of Recommendation: Limited Evidence 

Description: Evidence from two or more “Low” strength studies with consistent findings **or** evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

DECREASED RISK OF CTS

Moderate evidence supports that physical activity/exercise is associated with the decreased risk of developing carpal tunnel syndrome (CTS).

Strength of Recommendation: Moderate Evidence 

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.


FACTORS SHOWING NO ASSOCIATED RISK OF CTS

- A. Moderate evidence supports that the use of oral contraception and female hormone replacement therapy (HRT) are not associated with increased or decreased risk of developing carpal tunnel syndrome (CTS).

Strength of Recommendation: Moderate Evidence 

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

- B. Limited evidence supports that race/ethnicity and female education level are not associated with increased or decreased risk of developing carpal tunnel syndrome (CTS).


Strength of Recommendation: Limited Evidence 

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

FACTORS SHOWING CONFLICTING RISK OF CTS

Limited evidence supports that the following factors have conflicting results regarding the development of carpal tunnel syndrome (CTS):


- Diabetes
- Age
- Gender/Sex
- Genetics
- Comorbid drug use
- Smoking
- Wrist bending
- Workplace

Strength of Recommendation: Limited Evidence 

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

IMMOBILIZATION

Strong evidence supports that the use of immobilization (brace/splint/orthosis) should improve patient reported outcomes.

Strength of Recommendation: Strong Evidence 

Description: Evidence from two or more “High” strength studies with consistent findings for recommending for or against the intervention.

STEROID INJECTIONS

Strong evidence supports that the use of steroid (methylprednisolone) injection should improve patient reported outcomes.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” strength studies with consistent findings for recommending for or against the intervention.

MAGNET THERAPY

Strong evidence supports not using magnet therapy for the treatment of carpal tunnel syndrome.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” strength studies with consistent findings for recommending for or against the intervention.

ORAL TREATMENTS

Moderate evidence supports no benefit of oral treatments (diuretic, gabapentin, astaxanthin capsules, NSAIDs, or pyridoxine) compared to placebo.

Strength of Recommendation: Moderate Evidence ★★★☆☆

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

ORAL STEROIDS

Moderate evidence supports that oral steroids could improve patient reported outcomes as compared to placebo.

Strength of Recommendation: Moderate Evidence ★★★☆☆

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

KETOPROFEN PHONOPHORESIS


Moderate evidence supports that ketoprofen phonophoresis could provide reduction in pain compared to placebo.

Strength of Recommendation: Moderate Evidence ★★★☆☆

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

THERAPEUTIC ULTRASOUND


Limited evidence supports that therapeutic ultrasound might be effective compared to placebo.

Strength of Recommendation: Limited Evidence 

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

LASER THERAPY


Limited evidence supports that laser therapy might be effective compared to placebo.

Strength of Recommendation: Limited Evidence 

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

SURGICAL RELEASE LOCATION


Strong evidence supports that surgical release of the transverse carpal ligament should relieve symptoms and improve function.

Strength of Recommendation: Strong Evidence 

Description: Evidence from two or more “High” strength studies with consistent findings for recommending for or against the intervention.

SURGICAL RELEASE PROCEDURE


Limited evidence supports that if surgery is chosen, a practitioner might consider using endoscopic carpal tunnel release based on possible short term benefits. Strength of Strength of

Recommendation: Limited Evidence 

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

SURGICAL VERSUS NONOPERATIVE

Strong evidence supports that surgical treatment of carpal tunnel syndrome should have a greater treatment benefit at 6 and 12 months as compared to splinting, NSAIDs/therapy, and a single steroid injection.

Strength of Recommendation: Strong Evidence 

Description: Evidence from two or more “High” strength studies with consistent findings for recommending for or against the intervention.

ADJUNCTIVE TECHNIQUES


Moderate evidence supports that there is no benefit to routine inclusion of the following adjunctive techniques: epineurotomy, neurolysis, flexor tenosynovectomy, and lengthening/reconstruction of the flexor retinaculum (transverse carpal ligament).

Strength of Recommendation: Moderate Evidence 

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

BILATERAL VERSUS STAGED CARPAL TUNNEL RELEASE


Limited evidence supports that simultaneous bilateral or staged endoscopic carpal tunnel release might be performed based on patient and surgeon preference. No evidence meeting the inclusion criteria was found addressing bilateral simultaneous open carpal tunnel release.

Strength of Recommendation: Limited Evidence 

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

LOCAL VERSUS IV REGIONAL ANESTHESIA

Limited evidence supports the use of local anesthesia rather than intravenous regional anesthesia (bier block) because it might offer longer pain relief after carpal tunnel release; no evidence meeting our inclusion criteria was found comparing general anesthesia to either regional or local anesthesia for carpal tunnel surgery.

Strength of Recommendation: Limited Evidence 

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

BUFFERED VERSUS PLAIN LIDOCAINE

Moderate evidence supports the use of buffered lidocaine rather than plain lidocaine for local anesthesia because it could result in less injection pain.

Strength of Recommendation: Moderate Evidence 

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

ASPIRIN USE

Limited evidence supports that the patient might continue the use of aspirin perioperatively; no evidence meeting our inclusion criteria addressed other anticoagulants.

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

PREOPERATIVE ANTIBIOTICS

Limited evidence supports that there is no benefit for routine use of prophylactic antibiotics prior to carpal tunnel release because there is no demonstrated reduction in postoperative surgical site infection.

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from two or more “Low” strength studies with consistent findings or evidence from a single study for recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

SUPERVISED VERSUS HOME THERAPY

Moderate evidence supports no additional benefit to routine supervised therapy over home programs in the immediate postoperative period. No evidence meeting the inclusion criteria was found comparing the potential benefit of exercise versus no exercise after surgery.

Strength of Recommendation: Moderate Evidence ★★★☆☆

Description: Evidence from two or more “Moderate” strength studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

POSTOPERATIVE IMMOBILIZATION

Strong evidence supports no benefit to routine postoperative immobilization after carpal tunnel release.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” strength studies with consistent findings for recommending for or against the intervention.

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III.INTRODUCTION

Overview

This clinical practice guideline is based on a systematic review of published studies with regard to the diagnosis and treatment of carpal tunnel syndrome (CTS). In addition to providing practice recommendations, this guideline also highlights limitations in the literature and areas that require future research.

This guideline is intended to be used by all qualified and appropriately trained physicians and surgeons involved in the diagnosis and treatment of CTS. It is also intended to serve as an information resource for decision makers and developers of practice guidelines and recommendations.

The following definition of carpal tunnel syndrome has been added to the introduction section: “For the purpose of this guideline, Carpal Tunnel Syndrome (CTS) is defined as follows: Carpal Tunnel Syndrome is a symptomatic compression neuropathy of the median nerve at the level of the wrist, characterized physiologically by evidence of increased pressure within the carpal tunnel and decreased function of the nerve at that level. Carpal Tunnel Syndrome can be caused by many different diseases, conditions and events. It is characterized by patients as producing numbness, tingling, hand and arm pain and muscle dysfunction. The disorder is not restricted by age, gender, ethnicity, or occupation and is associated with or caused by systemic disease and local mechanical and disease factors.

Goals and Rationale

The purpose of this clinical practice guideline is to help improve treatment based on the current best evidence. Current evidence-based medicine (EBM) standards demand that physicians use the best available evidence in their clinical decision making. To assist them, this clinical practice guideline consists of a systematic review of the available literature regarding the diagnosis and treatment of CTS. The systematic review detailed herein was conducted between February 2013 and February 2015 and demonstrates where there is good evidence, where evidence is lacking, and what topics future research must target in order to improve the diagnosis and treatment of CTS. AAOS staff and the physician work group systematically reviewed the available literature and subsequently wrote the following recommendations based on a rigorous, standardized process.

Musculoskeletal care is provided in many different settings by many different providers. We created this guideline as an educational tool to guide qualified physicians through a series of treatment decisions in an effort to improve the quality and efficiency of care. This guideline should not be construed as including all proper methods of care or excluding methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding any specific procedure or treatment must be made in light of all circumstances presented by the patient and the needs and resources particular to the locality or institution.

Intended Users

This guideline is intended to be used by orthopaedic surgeons and physicians managing carpal tunnel syndrome. Typically, orthopaedic surgeons will have completed medical training, a qualified residency in orthopaedic surgery, and some may have completed additional sub-

specialty training. General surgeons, plastic surgeons, neurosurgeons, primary care physicians, hospital-based and outpatient adult internal medicine specialists, including neurologists, psychiatrists and occupational health medicine specialists, physical therapists, occupational therapists, nurse practitioners, physician assistants, and other healthcare professionals who routinely see this type of patient in various practice settings may also benefit from this guideline.

This guideline is not intended for use as a benefits determination document.

The care of CTS is based on the assumption that decisions are predicated on the patient and / or the patient's qualified health care advocate having physician communication with discussion of available treatments and procedures applicable to the individual patient. Once the patient and or their advocate have been informed of available therapies and have discussed these options with his/her physician, an informed decision can be made. Clinician input based on experience with conservative management and the clinician's surgical experience and skills increases the probability of identifying patients who will benefit from specific treatment options.

Patient Population

This document addresses the diagnosis and treatment of adult patients presenting with complaints which may be attributable to CTS.

Burden of Disease

CTS is the most common compressive neuropathy affecting the upper extremity and is an important cause of lost workplace productivity. The prevalence of CTS is estimated to be 0.7/10,000 workers. Between 1997 and 2010 CTS was the second most common cause of days lost from the workplace. Throughout this period the median time lost per case of CTS varied between 21 and 32 days.

Etiology

CTS is caused by compression of the median nerve under the transverse carpal ligament. Although pressure on the median nerve is clearly the pathophysiologic basis for the symptoms observed clinically, the etiology of elevated pressure within the carpal canal is unknown.

Risk Factors

Conditions which occupy volume within the carpal canal may increase the risk of symptomatic compression of the median nerve. Diseases affecting the synovium of the flexor tendons, such as rheumatoid arthritis, or rare tumors or anomalous muscles in the carpal canal are example of uncommonly encountered medical conditions associated with an increased risk of CTS. Given that the cause of increased pressure within the carpal canal is unknown in the majority of cases, there is little known about risk factors for developing CTS, although a number of associations both with medical conditions and workplace exposures have been described. For more information regarding risk factors, please see the recommendations concerning risk factors for CTS.

Emotional and Physical Impact

The principal impact of CTS on patients relates to the sensory disturbance which may disrupt sleep and, during non-sleeping hours, impair strength and the ability to carry out fine manipulation. CTS may also be associated with pain in the wrist and digits. These symptoms may have a substantial effect on an individual's ability to accomplish activities of daily living and to perform work-related duties.

Potential Benefits, Harms, and Contraindications

The main benefit of a guideline focused on diagnosis is the emphasis on standardized diagnostic criteria which reduce variability in the case definition for CTS. This could have an important impact on the care of CTS, by minimizing the risk of incorrect diagnosis, and also help in the design of studies seeking to identify associations with specific workplace exposures, an area of interest for workers.

Future Research

A significant obstacle to evaluating pathways to the treatment of CTS is the absence of a widely accepted reference standard for the diagnosis. An effort to achieve consensus among the many clinical disciplines which evaluate and treat CTS is an important goal of future research in this area. If consensus of this nature can be established, then a clear and consistent case definition should allow a comparison of treatment options as well as an evaluation of the impact of workplace exposures on the development of CTS symptoms.

IV.METHODS

The methods used to perform this systematic review were employed to minimize bias and enhance transparency in the selection, appraisal, and analysis of the available evidence. These processes are vital to the development of reliable, transparent, and accurate clinical recommendations for treating carpal tunnel syndrome.

This clinical practice guideline and the systematic review upon which it is based evaluate the effectiveness of treatments for carpal tunnel syndrome. This section describes the methods used to prepare this guideline and systematic review, including search strategies used to identify literature, criteria for selecting eligible articles, determining the strength of the evidence, data extraction, methods of statistical analysis, and the review and approval of the guideline. The AAOS approach incorporates practicing physicians (clinical experts) and methodologists who are free of potential conflicts of interest as recommended by guideline development experts.^{M10}

The AAOS understands that only high-quality guidelines are credible, and we go to great lengths to ensure the integrity of our evidence analyses. The AAOS addresses bias beginning with the selection of guideline development group members. Applicants with financial conflicts of interest (COI) related to the guideline topic cannot participate if the conflict occurred within one year of the start date of the guideline's development or if an immediate family member has, or has had, a relevant financial conflict. Additionally, all guideline development group members sign an attestation form agreeing to remain free of relevant financial conflicts for two years following the publication of the guideline.

This guideline and systematic review were prepared by the AAOS Management of Carpal Tunnel Syndrome Guideline physician guideline development group (clinical experts) with the assistance of the AAOS Evidence-Based Medicine (EBM) Unit in the Department of Research and Scientific Affairs (methodologists) at the AAOS. To develop this guideline, the guideline development group held an introductory meeting on February 1, 2013 to establish the scope of the guideline and the systematic reviews. As the physician experts, the guideline development group defined the scope of the guideline by creating PICO Questions (i.e. population, intervention, comparison, and outcome) that directed the literature search. When necessary, these clinical experts also provided content help, search terms and additional clarification for the AAOS Medical Librarian. The Medical Librarian created and executed the search(s). The supporting group of methodologists (AAOS EBM Unit) reviewed all abstracts, recalled pertinent full-text articles for review and evaluated the quality of studies meeting the inclusion criteria. They also abstracted, analyzed, interpreted, and/or summarized the relevant evidence for each recommendation and prepared the initial draft for the final meeting. Upon completion of the systematic reviews, the physician guideline development group participated in a three-day recommendation meeting on May 15-17, 2015. At this meeting, the physician experts and methodologists evaluated and integrated all material to develop the final recommendations. The final recommendations and rationales were edited, written and voted on at the final meeting. The draft guideline recommendations and rationales received final review by the methodologists to ensure that these recommendations and rationales were consistent with the data. The draft was then completed and submitted for peer review on September 8th, 2015.

The resulting draft guidelines were then peer-reviewed, edited in response to that review and subsequently sent for public commentary, where after additional edits were made. Thereafter, the draft guideline was sequentially approved by the AAOS Committee on Evidence-Based Quality and Value, AAOS Council on Research and Quality, and the AAOS Board of Directors (see Appendix II for a description of the AAOS bodies involved in the approval process). All AAOS guidelines are reviewed and updated or retired every five years in accordance with the criteria of the National Guideline Clearinghouse.

Thus the process of AAOS guideline development incorporates the benefits from clinical physician expertise as well as the statistical knowledge and interpretation of non-conflicted methodologists. The process also includes an extensive review process offering the opportunity for over 200 clinical physician experts to provide input into the draft prior to publication. This process provides a sound basis for minimizing bias, enhancing transparency and ensuring the highest level of accuracy for interpretation of the evidence.

FORMULATING PICO QUESTIONS

The guideline development group began work on this guideline by constructing a set of PICO questions. These questions specify the patient population of interest (P), the intervention of interest (I), the comparisons of interest (C), and the patient-oriented outcomes of interest (O). They function as questions for the systematic review, not as final recommendations or conclusions. Once established, these *a priori* PICO questions cannot be modified until the final guideline development group meeting.

STUDY SELECTION CRITERIA

We developed *a priori* article inclusion criteria for our review. These criteria are our “rules of evidence” and articles that did not meet them are, for the purposes of this guideline, not evidence.

To be included in our systematic reviews (and hence, in this guideline) an article had to meet the following criteria:

- Study must be of an CTS injury or prevention thereof
- Study must be published in or after 1966 for *surgical treatment, rehabilitation, bracing, prevention and MRI*
- Study must be published in or after 1966 for *x rays and non-operative treatment*
- Study must be published in or after 1966 for all others non specified
- Study should have 10 or more patients per group
- For surgical treatment a minimum of 3 months follow up duration.
- Antibiotic prophylaxis, anticoagulations, mode of anesthesia: all follow-ups
- For *non-operative treatment* a minimum of 1 month.

Standard Criteria for all CPGs

Article must be a full article report of a clinical study.

Retrospective non-comparative case series, medical records review, meeting abstracts, historical articles, editorials, letters, and commentaries are *excluded*.

Confounded studies (i.e. studies that give patients the treatment of interest AND another treatment) are *excluded*.

Case series studies that have non-consecutive enrollment of patients are *excluded*.
Controlled trials in which patients were not stochastically assigned to groups AND in which there was either a difference in patient characteristics or outcomes at baseline AND where the authors did not statistically adjust for these differences when analyzing the results are *excluded*.
All studies of “Very Weak” strength of evidence are *excluded*.
All studies evaluated as Level V will be *excluded*.
Composite measures or outcomes are *excluded* even if they are patient-oriented.
Study must appear in a peer-reviewed publication
For any included study that uses “paper-and-pencil” outcome measures (e.g., SF-36), only those outcome measures that have been validated will be included
For any given follow-up time point in any included study, there must be $\geq 50\%$ patient follow-up (if the follow-up is $>50\%$ but $<80\%$, the study quality will be downgraded by one Level)
Study must be of humans
Study must be published in English
Study results must be quantitatively presented
Study must not be an in vitro study
Study must not be a biomechanical study
Study must not have been performed on cadavers

We will only evaluate surrogate outcomes when no patient oriented outcomes are available.

BEST EVIDENCE SYNTHESIS

We included only the best available evidence for any given outcome addressing a recommendation. Accordingly, we first included the highest quality evidence for any given outcome if it was available. In the absence of two or more occurrences of an outcome at this quality, we considered outcomes of the next lowest quality until at least two or more occurrences of an outcome had been acquired. For example, if there were two ‘moderate’ quality occurrences of an outcome that addressed a recommendation, we did not include ‘low’ quality occurrences of this outcome. A summary of the evidence that met the inclusion criteria, but was not best available evidence was created and can be viewed by recommendation in Appendix XII.

MINIMALLY CLINICALLY IMPORTANT IMPROVEMENT

Wherever possible, we consider the effects of treatments in terms of the minimally clinically important difference (MCID) in addition to whether their effects are statistically significant. The MCID is the smallest clinical change that is important to patients, and recognizes the fact that there are some treatment-induced statistically significant improvements that are too small to matter to patients. However, there were no occurrences of validated MCID outcomes in the studies included in this clinical practice guideline.

When MCID values from the specific guideline patient population are not available, we use the following measures listed in order of priority:

- 1) MCID/MID
- 2) PASS or Impact
- 3) Another validated measure
- 4) Statistical Significance

LITERATURE SEARCHES

We begin the systematic review with a comprehensive search of the literature. Articles we consider were published prior to February 27, 2015 in four electronic databases; PubMed, EMBASE, CINAHL, and The Cochrane Central Register of Controlled Trials. The medical librarian conducts the search using key terms determined from the guideline development group's preliminary recommendations.

We supplement the electronic search with a manual search of the bibliographies of all retrieved publications, recent systematic reviews, and other review articles for potentially relevant citations. Recalled articles are evaluated for possible inclusion based on the study selection criteria and are summarized for the guideline development group who assist with reconciling possible errors and omissions.

The study attrition diagram in [Appendix IV](#) provides a detailed description of the numbers of identified abstracts and recalled and selected studies that were evaluated in the systematic review of this guideline. The search strategies used to identify the abstracts are contained in [Appendix V](#).

METHODS FOR EVALUATING EVIDENCE

As noted earlier, we judge quality based on *a priori* PICO questions and use an automated numerical scoring process to arrive at final ratings. Extensive measures are taken to determine quality ratings so that they are free of bias.

We evaluate the quality of evidence separately for each study using modified versions of the GRADE and QUADAS instruments. Depending on the type of study (i.e. diagnostic, prognostic, randomized control trial, or observational) the study design is evaluated using a list of standardized questions (see below for the domains evaluated for each type of study design).

DIAGNOSTIC STUDY QUALITY APPRAISAL QUESTIONS

The following questions are used to evaluate the study quality of diagnostic study designs.

1. Was the patient spectrum representative of the patients who will receive the test in practice?
2. Were the selection criteria clearly described?
3. Was the execution of the index and reference tests described in sufficient detail to permit its replication?
4. Is the reference standard likely to correctly classify the target condition?
5. Are the index test(s) results interpreted by an examiner without the knowledge of the reference tests results (or vice versa)?
6. Other Bias?

Diagnostic Study Design Quality Key

High Quality Study	<1 Flaw
Moderate Quality Study	≥ 1 and < 2 Flaws
Low Quality Study	≥ 2 and < 3 Flaws
Very Low Quality Study	≥ 3 Flaws

PROGNOSTIC STUDY QUALITY APPRAISAL QUESTIONS

The following questions are used to evaluate the study quality of prognostic study designs.

1. Was the spectrum of patients studied for this prognostic variable representative of the patient spectrum seen in actual clinical practice?
2. Was loss to follow up unrelated to key characteristics?
3. Was the prognostic factor of interest adequately measured in the study to limit potential bias?
4. Was the outcome of interest adequately measured in study participants to sufficiently limit bias?
5. Were all important confounders adequately measured in study participants to sufficiently limit potential bias?
6. Was the statistical analysis appropriate for the design of the study, limiting potential for presentation of invalid results?

Prognostic Study Design Quality Key

High Quality Study	<1 Flaw
Moderate Quality Study	≥ 1 and < 2 Flaws
Low Quality Study	≥ 2 and < 3 Flaws
Very Low Quality Study	≥ 3 Flaws

RANDOMIZED STUDY QUALITY APPRAISAL QUESTIONS

The following domains are evaluated to determine the study quality of randomized study designs.

1. Random Sequence Generation
2. Allocation Concealment
3. Blinding of Participants and Personnel
4. Incomplete Outcome Data
5. Selective Reporting
6. Other Bias

Upgrading Randomized Study Quality Questions

1. Is there a large magnitude of effect?
2. Influence of All Plausible Residual Confounding
3. Dose-Response Gradient

Randomized Study Design Quality Key

High Quality Study	<2 Flaw
Moderate Quality Study	≥ 2 and < 4 Flaws
Low Quality Study	≥ 4 and < 6 Flaws
Very Low Quality Study	≥ 6 Flaws

OBSERVATIONAL STUDY DESIGN QUALITY APPRAISAL QUESTIONS

The following questions are used to evaluate the study quality of observational study designs. Note that all observation studies begin the appraisal process at “low quality” due to design flaws inherent in observational studies.

1. Is this observational study a prospective case series?
2. Does the strategy for recruiting participants into the study differ across groups?
3. Did the study fail to balance the allocation between the groups or match groups (e.g., through stratification, matching, propensity scores)?
4. Were important confounding variables not taken into account in the design and/or analysis (e.g., through matching, stratification, interaction terms, multivariate analysis, or other statistical adjustment such as instrumental variables)?
5. Was the length of follow-up different across study groups?
6. Other Bias?

Upgrading Observational Study Quality Questions

1. Is there a large magnitude of effect?
2. Influence of All Plausible Residual Confounding
3. Dose-Response Gradient

Observational Study Design Quality Key

High Quality Study	<2 Flaw
Moderate Quality Study	≥ 2 and < 4 Flaws
Low Quality Study	≥ 4 and < 6 Flaws
Very Low Quality Study	≥ 6 Flaws

DEFINING THE STRENGTH OF THE RECOMMENDATIONS



Judging the strength of evidence is only a stepping stone towards arriving at the strength of a guideline recommendation. The strength of recommendation also takes into account the quality, quantity, and the trade-off between the benefits and harms of a treatment, the magnitude of a treatment’s effect, and whether there is data on critical outcomes.

Strength of recommendation expresses the degree of confidence one can have in a recommendation. As such, the strength expresses how possible it is that a recommendation will be overturned by future evidence. It is very difficult for future evidence to overturn a recommendation that is based on many high quality randomized controlled trials that show a

large effect. It is much more likely that future evidence will overturn recommendations derived from a few small case series. Consequently, recommendations based on the former kind of evidence are given a high strength of recommendation and recommendations based on the latter kind of evidence are given a low strength.

To develop the strength of a recommendation, AAOS staff first assigned a preliminary strength for each recommendation that took only the final strength of evidence (including quality and applicability) and the quantity of evidence (see Table 1).

Table 1. Strength of Recommendation Descriptions

Strength	Overall Strength of Evidence	Description of Evidence Quality	Strength Visual
Strong	Strong	Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention.	
Moderate	Moderate	Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.	
Limited	Low Strength Evidence or Conflicting Evidence	Evidence from two or more “Low” quality studies with consistent findings or evidence from a single “Moderate” quality study recommending for against the intervention or diagnostic or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.	
Consensus	No Evidence	There is no supporting evidence. In the absence of reliable evidence, the guideline development group is making a recommendation based on their clinical opinion. Consensus statements are published in a separate, complimentary document.	

WORDING OF THE FINAL RECOMMENDATIONS

To prevent bias in the way recommendations are worded, the AAOS uses specific predetermined language stems that are governed by the evidence strengths. Each recommendation was written using language that accounts for the final strength of the recommendation. This language, and the corresponding strength, is shown in Table 2.

Table 2. AAOS Guideline Language Stems

Guideline Language	Strength of Recommendation
Strong evidence supports that the practitioner should/should not do X, because...	Strong
Moderate evidence supports that the practitioner could/could not do X, because...	Moderate
Limited evidence supports that the practitioner might/might not do X, because...	Limited
In the absence of reliable evidence, it is the <i>opinion</i> of this guideline development group that...*	Consensus*

*Consensus based recommendations are made according to specific criteria. These criteria can be found in Appendix VII.

APPLYING THE RECOMMENDATIONS TO CLINICAL PRACTICE

To increase the practicality and applicability of the guideline recommendations in this document, the information listed in Table 3 provides assistance in interpreting the correlation between the strength of a recommendation and patient counseling time, use of decision aids, and the impact of future research

Table 3. Clinical Applicability: Interpreting the Strength of a Recommendation

Strength of Recommendation	Patient Counseling (Time)	Decision Aids	Impact of Future Research
Strong	Least	Least Important, unless the evidence supports no difference between two alternative interventions	Not likely to change
Moderate	Less	Less Important	Less likely to change
Limited	More	Important	Change possible/anticipated
Consensus	Most	Most Important	Impact unknown

VOTING ON THE RECOMMENDATIONS

The recommendations and their strength were voted on by the guideline development group members during the final meeting. If disagreement between the guideline development group occurred, there was further discussion to see whether the disagreement(s) could be resolved. Recommendations were approved and adopted in instances where a simple majority (60%) of the guideline development group voted to approve.

STATISTICAL METHODS

ANALYSIS OF DIAGNOSTIC DATA

Likelihood ratios, sensitivity, specificity and 95% confidence intervals were calculated to determine the accuracy of diagnostic modalities based on two by two diagnostic contingency tables extracted from the included studies. When summary values of sensitivity, specificity, or other diagnostic performance measures were reported, estimates of the diagnostic contingency table were used to calculate likelihood ratios.

Likelihood ratios (LR) indicate the magnitude of the change in probability of disease due to a given test result. For example, a positive likelihood ratio of 10 indicates that a positive test result is 10 times more common in patients with disease than in patients without disease. Likelihood ratios are interpreted according to previously published values, as seen in Table 4 below.

Table 4. Interpreting Likelihood Ratios

Positive Likelihood Ratio	Negative Likelihood Ratio	Interpretation
>10	<0.1	Large and conclusive change in probability
5-10	0.1-0.2	Moderate change in probability
2-5	0.2-0.5	Small (but sometimes important change in probability)
1-2	0.5-1	Small (and rarely important) change in probability

ANALYSIS OF INTERVENTION/PREVENTION DATA

When possible, we recalculate the results reported in individual studies and compile them to answer the recommendations. The results of all statistical analysis conducted by the AAOS Clinical Practice Guidelines Unit are conducted using SAS 9.4. SAS was used to determine the magnitude, direction, and/or 95% confidence intervals of the treatment effect. For data reported as means (and associated measures of dispersion) the mean difference between groups and the 95% confidence interval was calculated and a two-tailed t-test of independent groups was used to determine statistical significance. When published studies report measures of dispersion other than the standard deviation the value was estimated to facilitate calculation of the treatment effect. In studies that report standard errors or confidence intervals the standard deviation was back-calculated. In some circumstances statistical testing was conducted by the authors and measures of dispersion were not reported. In the absence of measures of dispersion, the results of the statistical analyses conducted by the authors (i.e. the p-value) are considered as evidence. For proportions, we report the proportion of patients that experienced an outcome along with the percentage of patients that experienced an outcome. The variance of the arcsine difference was used to determine statistical significance.^{M7} P-values < 0.05 were considered statistically significant.

When the data was available, we performed meta-analyses using the random effects method of DerSimonian and Laird.^{M8} A minimum of three studies was required for an outcome to be considered by meta-analysis. Heterogeneity was assessed with the I-squared statistic. Meta-analyses with I-squared values less than 50% were considered as evidence. Those with I-squared

larger than 50% were not considered as evidence for this guideline. All meta-analyses were performed using SAS 9.4. The arcsine difference was used in meta-analysis of proportions. In order to overcome the difficulty of interpreting the magnitude of the arcsine difference, a summary odds ratio is calculated based on random effects meta-analysis of proportions and the number needed to treat (or harm) is calculated. The standardized mean difference was used for meta-analysis of means and magnitude was interpreted using Cohen's definitions of small, medium, and large effect.

PEER REVIEW

Following the final meeting, the guideline draft undergoes peer review for additional input from external content experts. Written comments are provided on the structured review form (see Appendix VII). All peer reviewers are required to disclose their conflicts of interest. To guide who participates, the guideline development group identifies specialty societies at the introductory meeting. *Organizations*, not *individuals*, are specified.

The specialty societies are solicited for nominations of individual peer reviewers approximately six weeks before the final meeting. The peer review period is announced as it approaches and others interested are able to volunteer to review the draft. The chair of the AAOS committee on Evidence Based Quality and Value reviews the draft of the guideline prior to dissemination.

Some specialty societies (both orthopaedic and non-orthopaedic) ask their evidence-based practice (EBP) committee to provide review of the guideline. The organization is responsible for coordinating the distribution of our materials and consolidating their comments onto one form. The chair of the external EBP committees provides disclosure of their conflicts of interest (COI) and manages the potential conflicts of their members.

Again, the AAOS asks for comments to be assembled into a single response form by the specialty society and for the individual submitting the review to provide disclosure of potentially conflicting interests. The peer review stage gives external stakeholders an opportunity to provide evidence-based direction for modifications that they believe have been overlooked. Since the draft is subject to revisions until its approval by the AAOS Board of Directors as the final step in the guideline development process, confidentiality of all working drafts is essential.

The manager of the evidence-based medicine unit drafts the initial responses to comments that address methodology. These responses are then reviewed by the guideline development group chair and vice-chair, who respond to questions concerning clinical practice and techniques. The director of the Department of Research and Scientific Affairs provides input as well. All comments received and the initial drafts of the responses are also reviewed by all members of the guideline development group. All changes to a recommendation as a result of peer review are based on the evidence and undergoes majority vote by the guideline development group members via teleconference. Final revisions are summarized in a detailed report that is made part of the guideline document throughout the remainder of the review and approval processes.

The AAOS believes in the importance of demonstrating responsiveness to input received during the peer review process and welcomes the critiques of external specialty societies. Following final approval of the guideline, all individual responses are posted on our website

<http://www.aaos.org/guidelines> with a point-by-point reply to each non-editorial comment. Reviewers who wish to remain anonymous notify the AAOS to have their names de-identified; their comments, our responses, and their COI disclosures are still posted.

Review of the Management of Carpal tunnel syndrome guideline was requested of 18 organizations. Seven returned comments on the structured review form (see Appendix IX).

PUBLIC COMMENTARY

After modifying the draft in response to peer review, the guideline was subjected to a thirty day period of “Public Commentary.” Commentators consist of members of the AAOS Board of Directors (BOD), members of the Council on Research and Quality (CORQ), members of the Board of Councilors (BOC), and members of the Board of Specialty Societies (BOS). The guideline is automatically forwarded to the AAOS BOD and CORQ so that they may review it and provide comment prior to being asked to approve the document. Members of the BOC and BOS are solicited for interest. If they request to see the document, it is forwarded to them for comment. Based on these bodies, over 200 commentators have the opportunity to provide input into this guideline. Three members returned public comments.

THE AAOS GUIDELINE APPROVAL PROCESS

This final guideline draft must be approved by the AAOS Committee on Evidence Based Quality and Value Committee, the AAOS Council on Research and Quality, and the AAOS Board of Directors. These decision-making bodies are described in Appendix II and are not designated to modify the contents. Their charge is to approve or reject its publication by majority vote.

REVISION PLANS

This guideline represents a cross-sectional view of current treatment and may become outdated as new evidence becomes available. This guideline will be revised in accordance with new evidence, changing practice, rapidly emerging treatment options, and new technology. This guideline will be updated or withdrawn in five years in accordance with the standards of the National Guideline Clearinghouse.

GUIDELINE DISSEMINATION PLANS

The primary purpose of the present document is to provide interested readers with full documentation about not only our recommendations, but also about how we arrived at those recommendations.



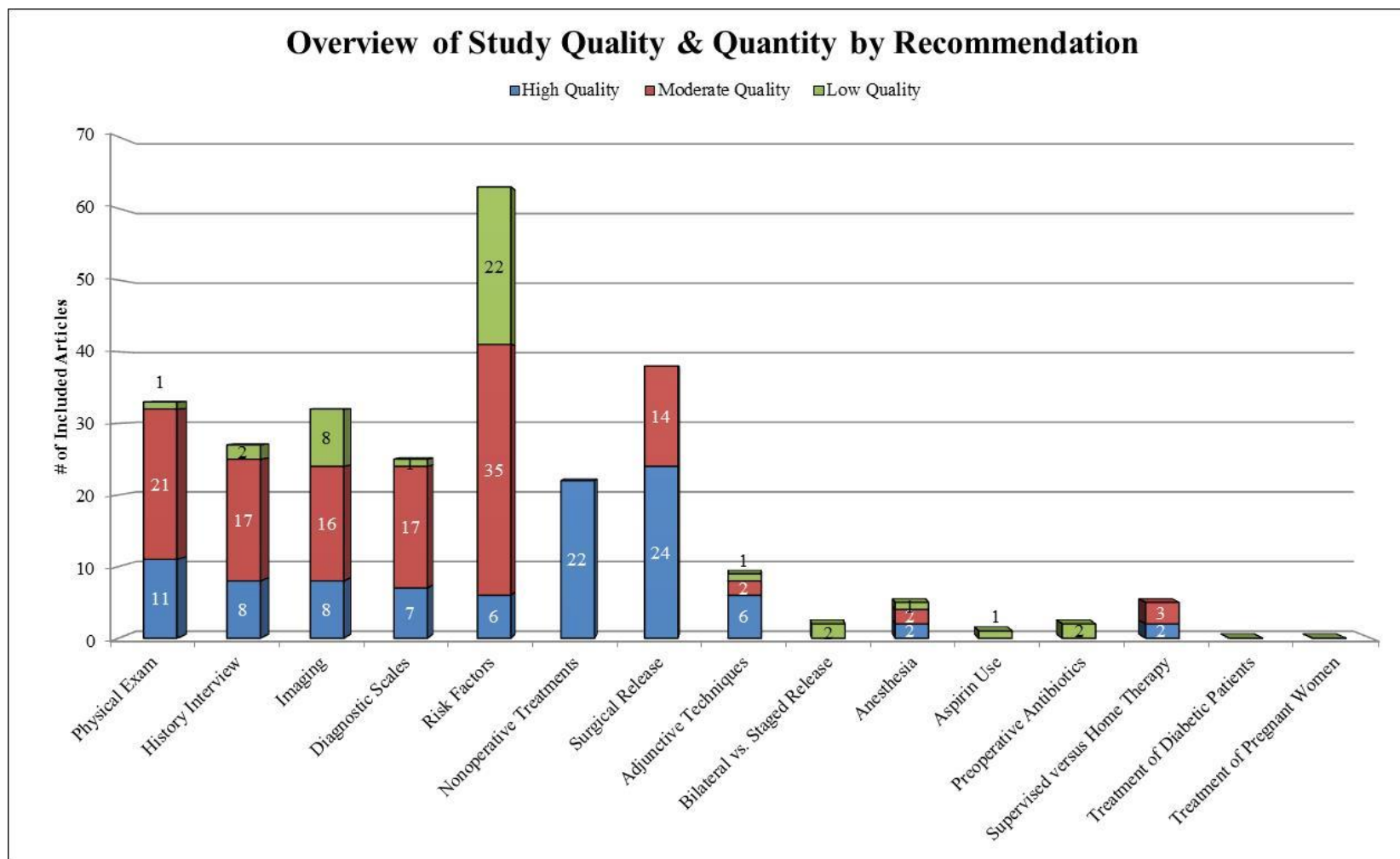
To view all AAOS published guideline recommendations in a user-friendly app, please visit www.orthoguidelines.org.

Shorter versions of the guideline are available in other venues. Publication of most guidelines is announced by an Academy press release, articles authored by the guideline development group and published in the *Journal of the American Academy of Orthopaedic Surgeons*, and articles published in *AAOS Now*. Most guidelines are also distributed at the AAOS Annual Meeting in various venues such as on Academy Row and at Committee Scientific Exhibits.

Selected guidelines are disseminated by webinar, an Online Module for the Orthopaedic Knowledge Online website, Radio Media Tours, Media Briefings, and by distributing them at relevant Continuing Medical Education (CME) courses and at the AAOS Resource Center.

Other dissemination efforts outside of the AAOS will include submitting the guideline to the National Guideline Clearinghouse and distributing the guideline at other medical specialty societies' meetings.

V. Overview of Articles by Recommendation*



**Note, some articles were applicable to multiple recommendations*

VI. FULL GUIDELINE RECOMMENDATIONS

PHYSICAL EXAM GUIDELINE RECOMMENDATIONS

A. OBSERVATION

Strong evidence supports Thenar atrophy is strongly associated with ruling-in carpal tunnel syndrome, but poorly associated with ruling-out carpal tunnel syndrome.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention.

There were two high quality (Claes, 2013; Naranjo, 2007) and two moderate quality studies (Gomes, 2006; Mekanji, 2014) with strong evidence that the presence of thenar atrophy can rule in the diagnosis of CTS. Pooling the results into a meta-analysis demonstrated a strong association with electrodiagnostic studies (EDS) that used the criteria for the diagnosis of CTS established by the American Association of Electrodiagnostic Medicine (AANEM). The individual studies, as well as the meta-analysis, showed that the absence of thenar atrophy did not rule out the diagnosis of CTS. The meta-analysis did not include two moderate quality studies (De Krom, 1990 or Gerr, 1998) because of variations in the electrodiagnostic test methods and also because of the availability of higher quality evidence examining the utility of thenar atrophy. The study by Claes was somewhat limited by its exclusion of the patients with severe thenar atrophy. The studies also did not clearly differentiate loss of thenar muscle bulk on a neurogenic basis versus disuse atrophy, for example in cases of trapeziometacarpal joint osteoarthritis.

B. PHYSICAL SIGNS

Strong evidence supports not using the Phalen Test, Tinel Sign, Flick Sign, or Upper limb neurodynamic/nerve tension test (ULNT) criterion A/B as independent physical examination maneuvers to diagnose carpal tunnel syndrome, because alone, each has a poor or weak association with ruling-in or ruling-out carpal tunnel syndrome.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention.

Rationale

Evidence from five high quality studies (Gok, 2008; Naranjo, 2007; Vanti, 2011; Vanti, 2012; Wainner, 2005) and one moderate quality study (Tan, 2012) supports not using the Phalen Test, Tinel Sign, Flick Sign, or ULNT criterion A/B as independent physical examination maneuvers

to rule in or rule out the diagnosis of carpal tunnel syndrome. Each of these studies showed poor agreement with electrodiagnostic tests as the reference standard. The EDS criteria in some instances used the AANEM criteria and in others general EDS methods. A meta-analysis of the performance of the Tinel sign and Phalen test also demonstrated poor agreement to this reference standard.

C. MANEUVERS

Moderate evidence supports not using the following as independent physical examination maneuvers to diagnose carpal tunnel syndrome, because alone, each has a poor or weak association with ruling-in or ruling-out carpal tunnel syndrome:

- Carpal Compression test
- Reverse Phalen Test
- Thenar Weakness or Thumb Abduction Weakness or Abductor Pollicis Brevis Manual Muscle Testing
- 2-point discrimination
- Semmes-Weinstein Monofilament Test
- CTS-Relief Maneuver (CTS-RM)
- Pin Prick Sensory Deficit; thumb or index or middle finger
- ULNT Criterion C
- Tethered median nerve stress test
- Vibration perception – tuning fork
- Scratch collapse test
- Luthy sign
- Pinwheel

Strength of Recommendation: Moderate Evidence 

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

Rationale

Several moderate and high quality studies provided a moderate level of evidence to suggest that the various tests listed above were not found to have been used as individual tests to rule in or rule out the diagnosis of CTS. CTS-RM had a moderate association to the reference standard when ruling-in CTS according to one high quality study (Gok, 2008) however the generalizability of these results is unclear because the study sample only contained female subjects. Meta-analysis could not be performed on any of these studies due to inconsistent reporting or lack of sufficient evidence. The reference standard for comparison was the use of either electrodiagnostic studies (EDS) following AANEM criteria or other general EDS methods. There is conflicting evidence of whether or not combining tests helps to rule in or rule out the diagnosis of CTS, as the test combinations were not validated or weighted to ensure reliability,

accuracy, and/or clinical relevance; any valid scales are evaluated in the [diagnostic scales recommendation](#).

Risks and Harms of Implementing the Physical Exam and History Interview Recommendations

There are no known harms associated with implementing these recommendations.

Future Research

Future studies should define diagnostic reference standard. The development of standardized diagnostic scales and stand-alone maneuvers or tests should be evaluated against a reference standard. Studies should include appropriate blinding as well as timing between tests to allow for unbiased and accurate assessments.

STUDY QUALITY TABLE OF PHYSICAL EXAM AND HISTORY INTERVIEW RECOMMENDATIONS

Table 5. Diagnostic Quality Evaluations

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Bilkis,S., 2012	●	○	●	○	●	○	Include	Moderate Quality
Bland,J.D., 2000	●	●	●	○	○	●	Include	Moderate Quality
Boland,R.A., 2009	●	●	●	○	○	○	Include	Moderate Quality
Claes,F., 2013	●	●	●	○	●	●	Include	High Quality
Dale,A.M., 2011	●	●	●	○	○	●	Include	Moderate Quality
De Krom,M.C., 1990	●	●	●	○	●	○	Include	Moderate Quality
De,Smet L., 1995	●	●	●	○	○	●	Include	Moderate Quality
El,Miedany Y., 2008	●	○	●	○	●	●	Include	Moderate Quality
Gerr,F., 1998	●	●	●	○	○	○	Include	Moderate Quality
Gok,H., 2008	●	●	●	○	●	●	Include	High Quality
Gomes,I., 2006	●	●	●	○	○	○	Include	Moderate Quality
Hansen,P.A., 2004	●	●	●	○	○	●	Include	Moderate Quality
Heller,L., 1986	●	●	●	○	○	●	Include	Moderate Quality
Karl,A.I., 2001	●	●	●	○	○	●	Include	Moderate Quality
Katz,J.N., 1990	●	●	●	○	●	●	Include	High Quality
Katz,J.N., 1991	●	●	●	○	●	○	Include	Moderate Quality
Kaul,M.P., 2000	●	●	●	○	●	●	Include	High Quality
Kaul,M.P., 2001	●	●	●	○	○	●	Include	Moderate Quality
Khosrawi,S., 2012	●	●	○	○	○	●	Include	Low Quality
Kuhlman,K.A., 1997	●	●	●	○	○	●	Include	Moderate Quality
MacDermid,J.C., 1997	●	○	●	○	●	●	Include	Moderate Quality
Makanji,H.S., 2014	●	○	●	○	○	●	Include	Moderate Quality
Naranjo,A., 2007	●	●	●	○	●	●	Include	High Quality
Ntani,G., 2013	●	●	●	○	●	●	Include	High Quality
Padua,L., 1999	●	●	●	○	○	○	Include	Moderate Quality
Pagel,K.J., 2002	●	●	●	○	●	●	Include	High Quality
Raudino,F., 2000	●	○	●	○	○	●	Include	Moderate Quality

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Tan,S.V., 2012	●	●	●	◐	●	○	Include	Moderate Quality
Vanti,C., 2011	●	●	●	◐	●	●	Include	High Quality
Vanti,C., 2012	●	●	●	◐	●	●	Include	High Quality
Wainner,R.S., 2005	●	●	●	◐	●	●	Include	High Quality
Weber,R.A., 2000	●	◐	●	◐	●	●	Include	Moderate Quality
Witt,J.C., 2004	●	●	●	◐	○	●	Include	Moderate Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 6: SUMMARY OF FINDINGS- INDEX TEST VERSUS AANEM REFERENCED EDS

	LR +	LR -	
●	≥10	<0.1	In "STRONG" agreement with the reference standard
◐	≥5 but <10	>0.1 but ≤0.2	In "MODERATE" agreement with the reference standard
◑	>2 and <5	>0.2 but <0.5	In "WEAK" agreement with the reference standard
○	≤2	≥0.5	In "POOR" agreement with the reference standard

Index Test	Rule In/Out	High Quality							Moderate Quality										Meta-Analysis				
		Claes, F., 2013	Gok, H., 2008	Naranjo, A., 2007	Tan, S. V., 2012	Vantj, C., 2011	Vantj, C., 2012	Wainner, R. S., 2005	*Bland, J. D., 2000	Boland, R. A., 2009	*De Krom, M. C., 1990	El, Miedany Y., 2008	*Gerr, F., 1998	Gomes, I., 2006	*Hansen, P. A., 2004	Makanji, H. S., 2014	Padua, L., 1999	Raudino, F., 2000		Witt, J. C., 2004			
Carpal Compression Test (CCT)	RULE IN							○															NA
	RULE OUT							○															NA
Flick Sign	RULE IN		◑					○	○						○								NA
	RULE OUT		◑					◑	○						○								NA
Phalen Test	RULE IN			○	○			○		◑			◑		○	○							○
	RULE OUT			○	○			○		◑			○		○	○							○
Reverse Phalen Test	RULE IN														◑								NA
	RULE OUT														○								NA
Thenar Weakness	RULE IN	◑																			◑		NA
	RULE OUT	○													○						○		NA
Thumb Abduction Weakness	RULE IN															○							NA
	RULE OUT															○							NA
Thenar Atrophy	RULE IN	◑		●									◑		●								●
	RULE OUT	○		○									○		○								○
Tinel Sign	RULE IN			○	◑			○						◑		○					◑	○	○
	RULE OUT			○	○			○						○		○					○	○	○
ULNT1; criterion A	RULE IN					○	○	○															NA
	RULE OUT					○	○	○															NA
ULNT1; criterion B	RULE IN					○	○	○															NA
	RULE OUT					○	○	○															NA

Table only displays index tests with more than one article of supporting evidence

*EDS method used in the study does not directly reference AAEM criteria and cannot be included in meta-analysis

TABLE 7: SUMMARY OF FINDINGS- INDEX TEST VERSUS GENERAL EDS METHODS

	LR +	LR -	
●	≥10	≤0.1	In "STRONG" agreement with the reference standard
◐	≥5 but <10	>0.1 but ≤0.2	In "MODERATE" agreement with the reference standard
◑	>2 and <5	>0.2 but <0.5	In "WEAK" agreement with the reference standard
○	≤2	≥0.5	In "POOR" agreement with the reference standard

Index Test	Rule In/Out	High Quality			Moderate Quality													Low Quality	Meta-Analysis							
		Katz,J.N., 1990 (B)	Ntani,G., 2013	Page,K.J., 2002	Bilkis,S., 2012	Dale,A.M., 2011 (1)	Dale,A.M., 2011 (2)	Dale,A.M., 2011 (3)	Dale,A.M., 2011 (4)	Dale,A.M., 2011 (5)	Dale,A.M., 2011 (6)	De Krom,M.C., 1990	De,Smet L., 1995	Gerr,F., 1998	Hansen,P.A., 2004	Heller,L., 1986	Katz,J.N., 1991	Kaul,M.P., 2001		Kuhlman,K.A., 1997	MacDermid,J.C., 1997 (1)	MacDermid,J.C., 1997 (2)	Khosrawi,S., 2012			
2 Point Discrimination	RULE IN	○																							NA	
	RULE OUT	○												○												NA
Carpal Compression Test (CCT)	RULE IN																	○	○							NA
	RULE OUT																	○	○							NA
Phalen Test (PT)	RULE IN	○	○		●	○	○	○	◐	○	○	○	○	○	○	○	○		○	◐	●	●				○
	RULE OUT	○	○		◐	○	○	○	○	○	○	○	○	○	○	○	○		○	○	○	○	○			○
Tinel Sign (TS)	RULE IN	○	○			◐	○	○	◐	○	○	○	○	○	○	○	○		○	○	○	○				○
	RULE OUT	○	○			○	○	○	○	○	○	○	○	○	○	○	○		○	○	○	○				○
Phalen Test and Tinel Sign	RULE IN	○				◐	○	○	◐	○	○	○	○			●										○
	RULE OUT	○				○	○	○	○	○	○	○	○			○										○
Phalen Test or Tinel Sign	RULE IN	○														○										NA
	RULE OUT	◐														○										NA
Semmes-Weinstein Monofilament Test (SWMF)	RULE IN			○		◐	○	○	◐	○	○	○									○	○				NA
	RULE OUT			●		○	○	○	◐	○	○	○									○	○				NA
Thenar Weakness	RULE IN		○											○												NA
	RULE OUT		○											○												NA

Table only displays index tests with more than one article of supporting evidence

Authors with parenthetical numbers indicate a change in method of EDS, alternate limbs, or alternate examiner

Authors with parenthetical letters indicate a unique study with the same author and year as another study listed in the guideline

DETAILED DATA FINDINGS

TABLE 8: HIGH QUALITY STUDIES- PICO 1 (PHYSICAL TESTS VERSUS REFERENCE STANDARD)

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Claes,F., 2013	High Quality	CTS Positive (2 Point Discrimination)	clinically diagnosed CTS suspects	at least 2 of 4 abnormal EDS parameters	Subjects	index pos; 2point; SWMF; both (Nerve Conduction Studies (NCS); AANEM referenced)	99	index neg; 2point; SWMF; both (Nerve Conduction Studies (NCS); AANEM referenced)	57	0.82 0.14	0.62 0.31	0.90 1.22	POOR	POOR
Claes,F., 2013	High Quality	CTS Positive (2 Point Discrimination and Semmes-Weinstein Monofilament Test (SWMF) 1)	clinically diagnosed CTS suspects	at least 2 of 4 abnormal EDS parameters	Subjects	index pos; 2point; SWMF; both (Nerve Conduction Studies (NCS); AANEM referenced)	119	index neg; 2point; SWMF; both (Nerve Conduction Studies (NCS); AANEM referenced)	37	0.82 0.11	0.75 0.15	0.88 1.65	POOR	POOR
Claes,F., 2013	High Quality	CTS Positive (Semmes-Weinstein Monofilament Test (SWMF) 1)	clinically diagnosed CTS suspects	at least 2 of 4 abnormal EDS parameters	Subjects	index pos; 2point; SWMF; both (Nerve Conduction Studies (NCS); AANEM referenced)	65	index neg; 2point; SWMF; both (Nerve Conduction Studies (NCS); AANEM referenced)	91	0.83 0.16	0.42 0.58	0.98 1.01	POOR	POOR
Claes,F., 2013	High Quality	CTS Positive (Thenar Atrophy)	clinically diagnosed CTS suspects	at least 2 of 4 abnormal EDS parameters	Subjects	index pos; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	36	index neg; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	120	0.97 0.21	0.27 0.96	7.00 0.76	MODERATE	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Claes,F., 2013	High Quality	CTS Positive (Thenar Weakness)	clinically diagnosed CTS suspects	at least 2 of 4 abnormal EDS parameters	Subjects	index pos; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	46	index neg; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	110	0.96 0.22	0.34 0.92	4.40 0.72	WEAK	POOR
Gok,H., 2008	High Quality	CTS Positive (CTS-RM: Relief maneuver)	all female subjects with CTS symptoms		Subjects	index pos; flick sign; relief maneuver (Nerve Conduction Studies (NCS); AANEM referenced)	51	index neg; flick sign; relief maneuver (Nerve Conduction Studies (NCS); AANEM referenced)	36	0.92 0.69	0.81 0.86	5.88 0.22	MODERATE	WEAK
Gok,H., 2008	High Quality	CTS Positive (CTS-RM: Relief maneuver and Flick Sign)	all female subjects with CTS symptoms		Subjects	index pos; flick sign; relief maneuver (Nerve Conduction Studies (NCS); AANEM referenced)	40	index neg; flick sign; relief maneuver (Nerve Conduction Studies (NCS); AANEM referenced)	47	0.95 0.57	0.66 0.93	9.50 0.37	MODERATE	WEAK
Gok,H., 2008	High Quality	CTS Positive (Flick Sign)	all female subjects with CTS symptoms		Subjects	index pos; flick sign; relief maneuver (Nerve Conduction Studies (NCS); AANEM referenced)	46	index neg; flick sign; relief maneuver (Nerve Conduction Studies (NCS); AANEM referenced)	41	0.87 0.56	0.69 0.79	3.33 0.39	WEAK	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Katz,J.N., 1990 (B)	High Quality	CTS Positive (2 Point Discrimination)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	27	index neg; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	83	0.52 0.64	0.32 0.80	1.62 0.85	POOR	POOR
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Phalen Test)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	68	index neg; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	42	0.49 0.74	0.75 0.47	1.41 0.53	POOR	POOR
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Phalen Test and Katz Hand Diagram; classic or probable)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	33	index neg; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	77	0.67 0.71	0.50 0.83	3.00 0.60	WEAK	POOR
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Phalen Test and Tinel Sign)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	42	index neg; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	68	0.71 0.47	0.45 0.73	1.67 0.75	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Phalen Test or Katz Hand Diagram; classic or probable)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	77	index neg; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	33	0.47 0.76	0.82 0.38	1.32 0.48	POOR	WEAK
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Phalen Test or Tinel Sign)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	78	index neg; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	32	0.50 0.84	0.89 0.41	1.50 0.28	POOR	WEAK
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Tinel Sign)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	48	index neg; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	62	0.54 0.71	0.59 0.67	1.77 0.61	POOR	POOR
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Tinel Sign and Katz Hand Diagram; classic or probable)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	25	index neg; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	85	0.68 0.68	0.39 0.88	3.19 0.70	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Tinel Sign or Katz Hand Diagram; classic or probable)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	69	index neg; PT; TS; 2 point; combinations; combinations with katz (Nerve Conduction Studies (NCS))	41	0.52 0.80	0.82 0.50	1.64 0.36	POOR	WEAK
Kaul,M.P., 2000	High Quality	CTS Positive (Tethered Median Stress Test (TMST))	CTS suspected veterans	multiple parameters used within NCS	Subjects	index pos; TMST (Nerve Conduction Studies (NCS); AANEM referenced)	47	index neg; TMST (Nerve Conduction Studies (NCS); AANEM referenced)	55	0.62 0.47	0.50 0.59	1.22 0.85	POOR	POOR
Naranjo,A., 2007	High Quality	CTS Positive (Phalen Test)	68 patients with suspected CTS	determined NCS and US cutoffs	Extremities	index pos; PT, TS, PT/TS (Nerve Conduction Studies (NCS); AANEM referenced)	78	index neg; PT, TS, PT/TS (Nerve Conduction Studies (NCS); AANEM referenced)	27	0.78 0.30	0.76 0.32	1.12 0.74	POOR	POOR
Naranjo,A., 2007	High Quality	CTS Positive (Phalen Test and Tinel Sign)	68 patients with suspected CTS	determined NCS and US cutoffs	Extremities	index pos; PT, TS, PT/TS (Nerve Conduction Studies (NCS); AANEM referenced)	81	index neg; PT, TS, PT/TS (Nerve Conduction Studies (NCS); AANEM referenced)	24	0.83 0.46	0.84 0.44	1.50 0.37	POOR	WEAK
Naranjo,A., 2007	High Quality	CTS Positive (Thenar Atrophy)	68 patients with suspected CTS	determined NCS and US cutoffs	Extremities	index pos; thenar atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	4	index neg; thenar atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	101	1.00 0.25	0.05 1.00	10.00 0.95	STRONG	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Naranjo,A., 2007	High Quality	CTS Positive (Tinel Sign)	68 patients with suspected CTS	determined NCS and US cutoffs	Extremities	index pos; PT, TS, PT/TS (Nerve Conduction Studies (NCS); AANEM referenced)	74	index neg; PT, TS, PT/TS (Nerve Conduction Studies (NCS); AANEM referenced)	31	0.80 0.32	0.74 0.40	1.23 0.66	POOR	POOR
Ntani,G., 2013	High Quality	CTS Positive (Phalen Test)	responders from all suspected CTS out-patients	SNC abnormality	Extremities	index pos; TS; PT (Nerve Conduction Studies (NCS); Sensory Nerve Conduction (SNC))	865	index neg; TS; PT (Nerve Conduction Studies (NCS); Sensory Nerve Conduction (SNC))	696	0.89 0.18	0.57 0.56	1.32 0.76	POOR	POOR
Ntani,G., 2013	High Quality	CTS Positive (Thenar Weakness)	responders from all suspected CTS out-patients	SNC abnormality	Extremities	index pos; thenar weakness; pain (Nerve Conduction Studies (NCS); Sensory Nerve Conduction (SNC))	162	index neg; thenar weakness; pain (Nerve Conduction Studies (NCS); Sensory Nerve Conduction (SNC))	1403	0.81 0.13	0.10 0.86	0.70 1.05	POOR	POOR
Ntani,G., 2013	High Quality	CTS Positive (Tinel Sign)	responders from all suspected CTS out-patients	SNC abnormality	Extremities	index pos; TS; PT (Nerve Conduction Studies (NCS); Sensory Nerve Conduction (SNC))	451	index neg; TS; PT (Nerve Conduction Studies (NCS); Sensory Nerve Conduction (SNC))	1110	0.88 0.15	0.29 0.74	1.14 0.95	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Pagel,K.J., 2002	High Quality	CTS Positive (Semmes-Weinstein Monofilament Test (SWMF) 1)	symptoms of suspected CTS	two cutoff values for each SWMF method; NCS by palm diff median to ulnar latency	Subjects	index pos; SWMF 1, 2 (Nerve Conduction Studies (NCS))	104	index neg; SWMF 1, 2 (Nerve Conduction Studies (NCS))	9	0.57 0.89	0.98 0.15	1.16 0.11	POOR	MODERATE
Pagel,K.J., 2002	High Quality	CTS Positive (Semmes-Weinstein Monofilament Test (SWMF) 2)	symptoms of suspected CTS	two cutoff values for each SWMF method; NCS by palm diff median to ulnar latency	Subjects	index pos; SWMF 1, 2 (Nerve Conduction Studies (NCS))	15	index neg; SWMF 1, 2 (Nerve Conduction Studies (NCS))	98	0.53 0.47	0.13 0.87	1.01 1.00	POOR	POOR
Tan,S.V., 2012	Moderate Quality	CTS Positive (Phalen Test)	limbs of 100 CTS suspects	at least 2 abnormal EDS parameters	Extremities	index pos; PT; TS (Nerve Conduction Studies (NCS); AANEM referenced)	65	index neg; PT; TS (Nerve Conduction Studies (NCS); AANEM referenced)	135	0.65 0.58	0.42 0.77	1.86 0.75	POOR	POOR
Tan,S.V., 2012	Moderate Quality	CTS Positive (Tinel Sign)	limbs of 100 CTS suspects	at least 2 abnormal EDS parameters	Extremities	index pos; PT; TS (Nerve Conduction Studies (NCS); AANEM referenced)	39	index neg; PT; TS (Nerve Conduction Studies (NCS); AANEM referenced)	161	0.72 0.56	0.28 0.89	2.60 0.80	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Vanti,C., 2011	High Quality	CTS Positive (ULNT1; criterion A)	47 clinical CTS suspects; 3 did not complete tests	symptoms and reduced scv-wp	Subjects	index pos; ULNT1, A, A/B/C (Nerve Conduction Studies (NCS); AANEM referenced)	19	index neg; ULNT1, A, A/B/C (Nerve Conduction Studies (NCS); AANEM referenced)	25	0.68 0.56	0.54 0.70	1.81 0.65	POOR	POOR
Vanti,C., 2011	High Quality	CTS Positive (ULNT1; criterion A, B, and C)	47 clinical CTS suspects; 3 did not complete tests	symptoms and reduced scv-wp	Subjects	index pos; ULNT1, A, A/B/C (Nerve Conduction Studies (NCS); AANEM referenced)	39	index neg; ULNT1, A, A/B/C (Nerve Conduction Studies (NCS); AANEM referenced)	5	0.56 0.60	0.92 0.15	1.08 0.56	POOR	POOR
Vanti,C., 2012	High Quality	CTS Positive (ULNT1; criterion A)	limbs of 47 patients		Extremities	index pos; ULNT1, A, B, C (Nerve Conduction Studies (NCS); AANEM referenced)	24	index neg; ULNT1, A, B, C (Nerve Conduction Studies (NCS); AANEM referenced)	60	0.58 0.65	0.40 0.80	1.96 0.75	POOR	POOR
Vanti,C., 2012	High Quality	CTS Positive (ULNT1; criterion B)	limbs of 47 patients		Extremities	index pos; ULNT1, A, B, C (Nerve Conduction Studies (NCS); AANEM referenced)	18	index neg; ULNT1, A, B, C (Nerve Conduction Studies (NCS); AANEM referenced)	62	0.56 0.60	0.29 0.82	1.61 0.87	POOR	POOR
Vanti,C., 2012	High Quality	CTS Positive (ULNT1; criterion C)	limbs of 47 patients		Extremities	index pos; ULNT1, A, B, C (Nerve Conduction Studies (NCS); AANEM referenced)	5	index neg; ULNT1, A, B, C (Nerve Conduction Studies (NCS); AANEM referenced)	75	0.40 0.56	0.06 0.93	0.86 1.01	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Wainner,R.S., 2005	High Quality	CTS Positive (Abductor Pollicis Brevis Manual Muscle Testing)	CTS and cervical radiculopathy suspects		Subjects	index pos; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	11	index neg; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	71	0.45 0.68	0.18 0.89	1.61 0.92	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Carpal Compression Test (CCT))	CTS and cervical radiculopathy suspects		Subjects	index pos; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	56	index neg; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	26	0.32 0.62	0.64 0.30	0.91 1.21	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Flick Sign)	CTS and cervical radiculopathy suspects		Subjects	index pos; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	46	index neg; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	36	0.50 0.86	0.82 0.57	1.93 0.31	POOR	WEAK
Wainner,R.S., 2005	High Quality	CTS Positive (Phalen Test)	CTS and cervical radiculopathy suspects		Subjects	index pos; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	54	index neg; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	28	0.41 0.79	0.79 0.41	1.33 0.53	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Wainner,R.S., 2005	High Quality	CTS Positive (Sensory Deficit; pin prick; index finger)	CTS and cervical radiculopathy suspects		Subjects	index pos; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	33	index neg; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	49	0.45 0.73	0.54 0.67	1.61 0.70	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Sensory Deficit; pin prick; middle finger)	CTS and cervical radiculopathy suspects		Subjects	index pos; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	26	index neg; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	56	0.46 0.71	0.43 0.74	1.65 0.77	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Sensory Deficit; pin prick; thumb)	CTS and cervical radiculopathy suspects		Subjects	index pos; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	34	index neg; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	48	0.53 0.79	0.64 0.70	2.17 0.51	WEAK	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Tinel Sign)	CTS and cervical radiculopathy suspects		Subjects	index pos; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	34	index neg; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	48	0.32 0.65	0.39 0.57	0.92 1.06	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Wainner,R.S., 2005	High Quality	CTS Positive (Tinel Sign 2)	CTS and cervical radiculopathy suspects		Subjects	index pos; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	31	index neg; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	51	0.42 0.71	0.46 0.67	1.39 0.80	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (ULNT1; criterion A)	CTS and cervical radiculopathy suspects		Subjects	index pos; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	68	index neg; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	14	0.31 0.50	0.75 0.13	0.86 1.93	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (ULNT1; criterion B)	CTS and cervical radiculopathy suspects		Subjects	index pos; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	56	index neg; ULNT1, A, B; TS, TS 2; CCT; PT; Flick (Nerve Conduction Studies (NCS); AANEM referenced)	26	0.32 0.62	0.64 0.30	0.91 1.21	POOR	POOR

TABLE 9: MODERATE QUALITY STUDIES- PICO 1 (PHYSICAL TESTS VERSUS REFERENCE STANDARD)

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Bilkis,S., 2012	Moderate Quality	CTS Positive (Modified Phalen Test)	37 patients with comorbidities excluded	determined mixed nerve NCS cutoffs	Extremities	index pos; PT; MPT (Nerve Conduction Studies (NCS))	39	index neg; PT; MPT (Nerve Conduction Studies (NCS))	27	1.00 0.74	0.85 1.00	10.00 0.15	STRONG	MODERATE
Bilkis,S., 2012	Moderate Quality	CTS Positive (Phalen Test)	37 patients with comorbidities excluded	determined mixed nerve NCS cutoffs	Extremities	index pos; PT; MPT (Nerve Conduction Studies (NCS))	23	index neg; PT; MPT (Nerve Conduction Studies (NCS))	43	1.00 0.47	0.50 1.00	10.00 0.50	STRONG	WEAK
Bland,J.D., 2000	Moderate Quality	CTS Positive (Flick Sign)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Flick (Nerve Conduction Studies (NCS))	4093	index neg; Flick (Nerve Conduction Studies (NCS))	4130	0.64 0.50	0.56 0.59	1.37 0.74	POOR	POOR
Boland,R.A., 2009	Moderate Quality	CTS Positive (Modified Carpal Compression Test (MCCT))	43 hands of CTS suspects	referenced median and mixed nerve cutoffs	Extremities	index pos; PT; MCCT; PT or MCCT with no thenar sensory deficit (Nerve Conduction Studies (NCS); AANEM referenced)	10	index neg; PT; MCCT; PT or MCCT with no thenar sensory deficit (Nerve Conduction Studies (NCS); AANEM referenced)	76	1.00 0.16	0.14 1.00	10.00 0.86	STRONG	POOR
Boland,R.A., 2009	Moderate Quality	CTS Positive (Modified Carpal Compression Test (MCCT) and no thenar sensory deficit)	43 hands of CTS suspects	referenced median and mixed nerve cutoffs	Extremities	index pos; PT; MCCT; PT or MCCT with no thenar sensory deficit (Nerve Conduction Studies (NCS); AANEM referenced)	9	index neg; PT; MCCT; PT or MCCT with no thenar sensory deficit (Nerve Conduction Studies (NCS); AANEM referenced)	77	1.00 0.16	0.12 1.00	10.00 0.88	STRONG	POOR
Boland,R.A., 2009	Moderate Quality	CTS Positive (Phalen Test)	43 hands of CTS suspects	referenced median and mixed nerve cutoffs	Extremities	index pos; PT; MCCT; PT or MCCT with no thenar sensory deficit (Nerve Conduction Studies (NCS); AANEM referenced)	50	index neg; PT; MCCT; PT or MCCT with no thenar sensory deficit (Nerve Conduction Studies (NCS); AANEM referenced)	36	0.94 0.25	0.64 0.75	2.54 0.49	WEAK	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Boland,R.A., 2009	Moderate Quality	CTS Positive (Phalen Test and no thenar sensory deficit)	43 hands of CTS suspects	referenced median and mixed nerve cutoffs	Extremities	index pos; PT; MCCT; PT or MCCT with no thenar sensory deficit (Nerve Conduction Studies (NCS); AANEM referenced)	44	index neg; PT; MCCT; PT or MCCT with no thenar sensory deficit (Nerve Conduction Studies (NCS); AANEM referenced)	42	0.93 0.21	0.55 0.75	2.22 0.59	WEAK	POOR
Dale,A.M., 2011 (1)	Moderate Quality	CTS Positive (At least Phalen Test, Tinel Sign, or Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	423	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	685	0.02 0.99	0.64 0.62	1.68 0.59	POOR	POOR
Dale,A.M., 2011 (1)	Moderate Quality	CTS Positive (Phalen Test)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	102	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1006	0.02 0.99	0.18 0.91	1.99 0.90	POOR	POOR
Dale,A.M., 2011 (1)	Moderate Quality	CTS Positive (Phalen Test and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	32	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1076	0.06 0.99	0.18 0.97	6.65 0.84	MODERATE	POOR
Dale,A.M., 2011 (1)	Moderate Quality	CTS Positive (Phalen Test and Tinel Sign)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	25	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1083	0.04 0.99	0.09 0.98	4.16 0.93	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dale,A.M., 2011 (1)	Moderate Quality	CTS Positive (Phalen Test, Tinel Sign, and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	8	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1100	0.13 0.99	0.09 0.99	14.25 0.91	STRONG	POOR
Dale,A.M., 2011 (1)	Moderate Quality	CTS Positive (Semmes-Weinstein Monofilament Test (SWMF) 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	291	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	817	0.02 0.99	0.55 0.74	2.10 0.61	WEAK	POOR
Dale,A.M., 2011 (1)	Moderate Quality	CTS Positive (Tinel Sign)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	120	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	988	0.03 0.99	0.27 0.89	2.56 0.81	WEAK	POOR
Dale,A.M., 2011 (1)	Moderate Quality	CTS Positive (Tinel Sign and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	39	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1069	0.05 0.99	0.18 0.97	5.39 0.85	MODERATE	POOR
Dale,A.M., 2011 (2)	Moderate Quality	CTS Positive (At least Phalen Test, Tinel Sign, or Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	421	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	687	0.30 0.80	0.49 0.65	1.40 0.79	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dale,A.M., 2011 (2)	Moderate Quality	CTS Positive (Phalen Test)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	101	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	1007	0.30 0.77	0.11 0.92	1.36 0.97	POOR	POOR
Dale,A.M., 2011 (2)	Moderate Quality	CTS Positive (Phalen Test and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	31	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	1077	0.39 0.77	0.05 0.98	2.03 0.98	WEAK	POOR
Dale,A.M., 2011 (2)	Moderate Quality	CTS Positive (Phalen Test and Tinel Sign)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	25	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	1083	0.24 0.76	0.02 0.98	1.01 1.00	POOR	POOR
Dale,A.M., 2011 (2)	Moderate Quality	CTS Positive (Phalen Test, Tinel Sign, and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	7	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	1101	0.14 0.76	0.00 0.99	0.54 1.00	POOR	POOR
Dale,A.M., 2011 (2)	Moderate Quality	CTS Positive (Semmes-Weinstein Monofilament Test (SWMF) 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	290	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	818	0.32 0.79	0.36 0.77	1.54 0.84	POOR	POOR
Dale,A.M., 2011 (2)	Moderate Quality	CTS Positive (Tinel Sign)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	120	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	988	0.29 0.77	0.13 0.90	1.32 0.96	POOR	POOR
Dale,A.M., 2011 (2)	Moderate Quality	CTS Positive (Tinel Sign and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	39	index neg; LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	1069	0.36 0.77	0.05 0.97	1.80 0.98	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dale,A.M., 2011 (3)	Moderate Quality	CTS Positive (At least Phalen Test, Tinel Sign, or Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	443	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	665	0.37 0.79	0.54 0.65	1.57 0.70	POOR	POOR
Dale,A.M., 2011 (3)	Moderate Quality	CTS Positive (Phalen Test)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	104	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	1004	0.36 0.73	0.12 0.92	1.45 0.96	POOR	POOR
Dale,A.M., 2011 (3)	Moderate Quality	CTS Positive (Phalen Test and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	51	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	1057	0.49 0.73	0.08 0.97	2.52 0.95	WEAK	POOR
Dale,A.M., 2011 (3)	Moderate Quality	CTS Positive (Phalen Test and Tinel Sign)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	35	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	1073	0.37 0.73	0.04 0.97	1.55 0.98	POOR	POOR
Dale,A.M., 2011 (3)	Moderate Quality	CTS Positive (Phalen Test, Tinel Sign, and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	20	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	1088	0.35 0.73	0.02 0.98	1.41 0.99	POOR	POOR
Dale,A.M., 2011 (3)	Moderate Quality	CTS Positive (Semmes-Weinstein Monofilament Test (SWMF) 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	340	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	768	0.41 0.78	0.45 0.75	1.79 0.73	POOR	POOR
Dale,A.M., 2011 (3)	Moderate Quality	CTS Positive (Tinel Sign)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	127	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	981	0.40 0.74	0.17 0.91	1.76 0.92	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dale,A.M., 2011 (3)	Moderate Quality	CTS Positive (Tinel Sign and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	59	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS))	1049	0.49 0.74	0.09 0.96	2.53 0.94	WEAK	POOR
Dale,A.M., 2011 (4)	Moderate Quality	CTS Positive (At least Phalen Test, Tinel Sign, or Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	445	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	663	0.04 0.99	0.67 0.60	1.68 0.55	POOR	POOR
Dale,A.M., 2011 (4)	Moderate Quality	CTS Positive (Phalen Test)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	105	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1003	0.07 0.98	0.29 0.91	3.23 0.78	WEAK	POOR
Dale,A.M., 2011 (4)	Moderate Quality	CTS Positive (Phalen Test and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	51	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1057	0.14 0.98	0.29 0.96	7.19 0.74	MODERATE	POOR
Dale,A.M., 2011 (4)	Moderate Quality	CTS Positive (Phalen Test and Tinel Sign)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	36	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1072	0.06 0.98	0.08 0.97	2.66 0.95	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dale,A.M., 2011 (4)	Moderate Quality	CTS Positive (Phalen Test, Tinel Sign, and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	19	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1089	0.11 0.98	0.08 0.98	5.31 0.93	MODERATE	POOR
Dale,A.M., 2011 (4)	Moderate Quality	CTS Positive (Semmes-Weinstein Monofilament Test (SWMF) 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	342	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	766	0.05 0.99	0.67 0.70	2.22 0.48	WEAK	WEAK
Dale,A.M., 2011 (4)	Moderate Quality	CTS Positive (Tinel Sign)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	127	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	981	0.05 0.98	0.25 0.89	2.24 0.84	WEAK	POOR
Dale,A.M., 2011 (4)	Moderate Quality	CTS Positive (Tinel Sign and Semmes-Weinstein Monofilament Test 1)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	60	index neg; RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1048	0.10 0.98	0.25 0.95	5.02 0.79	MODERATE	POOR
Dale,A.M., 2011 (5)	Moderate Quality	CTS Positive (At least Phalen Test, Tinel Sign, or Semmes-Weinstein Monofilament Test 1)	76 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	44	index neg; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	32	0.16 0.88	0.64 0.43	1.12 0.84	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dale,A.M., 2011 (5)	Moderate Quality	CTS Positive (Phalen Test)	76 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	20	index neg; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	56	0.10 0.84	0.18 0.72	0.66 1.13	POOR	POOR
Dale,A.M., 2011 (5)	Moderate Quality	CTS Positive (Phalen Test and Semmes-Weinstein Monofilament Test 1)	76 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	8	index neg; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	68	0.25 0.87	0.18 0.91	1.97 0.90	POOR	POOR
Dale,A.M., 2011 (5)	Moderate Quality	CTS Positive (Phalen Test and Tinel Sign)	76 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	6	index neg; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	70	0.17 0.86	0.09 0.92	1.18 0.98	POOR	POOR
Dale,A.M., 2011 (5)	Moderate Quality	CTS Positive (Phalen Test, Tinel Sign, and Semmes-Weinstein Monofilament Test 1)	76 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	2	index neg; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	74	0.50 0.86	0.09 0.98	5.91 0.92	MODERATE	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dale,A.M., 2011 (5)	Moderate Quality	CTS Positive (Semmes-Weinstein Monofilament Test (SWMF) 1)	76 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	30	index neg; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	46	0.20 0.89	0.55 0.63	1.48 0.72	POOR	POOR
Dale,A.M., 2011 (5)	Moderate Quality	CTS Positive (Tinel Sign)	76 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	14	index neg; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	62	0.21 0.87	0.27 0.83	1.61 0.88	POOR	POOR
Dale,A.M., 2011 (5)	Moderate Quality	CTS Positive (Tinel Sign and Semmes-Weinstein Monofilament Test 1)	76 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	8	index neg; SYMPT: LEFT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	68	0.25 0.87	0.18 0.91	1.97 0.90	POOR	POOR
Dale,A.M., 2011 (6)	Moderate Quality	CTS Positive (At least Phalen Test, Tinel Sign, or Semmes-Weinstein Monofilament Test 1)	113 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	73	index neg; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	40	0.19 0.83	0.67 0.36	1.04 0.93	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dale,A.M., 2011 (6)	Moderate Quality	CTS Positive (Phalen Test)	113 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	28	index neg; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	85	0.21 0.82	0.29 0.76	1.19 0.94	POOR	POOR
Dale,A.M., 2011 (6)	Moderate Quality	CTS Positive (Phalen Test and Semmes-Weinstein Monofilament Test 1)	113 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	19	index neg; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	94	0.32 0.84	0.29 0.86	2.02 0.83	WEAK	POOR
Dale,A.M., 2011 (6)	Moderate Quality	CTS Positive (Phalen Test and Tinel Sign)	113 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	9	index neg; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	104	0.22 0.82	0.10 0.92	1.25 0.98	POOR	POOR
Dale,A.M., 2011 (6)	Moderate Quality	CTS Positive (Phalen Test, Tinel Sign, and Semmes-Weinstein Monofilament Test 1)	113 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	5	index neg; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	108	0.40 0.82	0.10 0.97	2.92 0.94	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dale,A.M., 2011 (6)	Moderate Quality	CTS Positive (Semmes-Weinstein Monofilament Test (SWMF) 1)	113 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	59	index neg; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	54	0.24 0.87	0.67 0.51	1.36 0.65	POOR	POOR
Dale,A.M., 2011 (6)	Moderate Quality	CTS Positive (Tinel Sign)	113 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	26	index neg; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	87	0.19 0.82	0.24 0.77	1.04 0.99	POOR	POOR
Dale,A.M., 2011 (6)	Moderate Quality	CTS Positive (Tinel Sign and Semmes-Weinstein Monofilament Test 1)	113 clinically suspected symptomatic hands	sensory, motor, and MUDS cutoffs	Extremities	index pos; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	17	index neg; SYMPT: RIGHT HAND; PT; TS; SWMF1; combinations (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	96	0.29 0.83	0.24 0.87	1.83 0.88	POOR	POOR
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Abductor Pollicis Brevis Paresis)	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; Flick; PT; TS; RPT; CCT; Luthy; Hypalgasia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	27	index neg; Flick; PT; TS; RPT; CCT; Luthy; Hypalgasia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	66	0.63 0.59	0.39 0.80	1.89 0.77	POOR	POOR
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Carpal Compression Test (CCT))	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; Flick; PT; TS; RPT; CCT; Luthy; Hypalgasia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	5	index neg; Flick; PT; TS; RPT; CCT; Luthy; Hypalgasia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	88	0.40 0.52	0.05 0.94	0.74 1.02	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Flick Sign)	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	41	index neg; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	52	0.54 0.58	0.50 0.61	1.29 0.82	POOR	POOR
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Hypalgalsia; pinwheel)	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	37	index neg; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	56	0.46 0.52	0.39 0.59	0.95 1.04	POOR	POOR
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Hyperpathia; pinwheel)	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	16	index neg; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	77	0.69 0.57	0.25 0.90	2.45 0.84	WEAK	POOR
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Luthy Sign)	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	32	index neg; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	61	0.59 0.59	0.43 0.73	1.63 0.77	POOR	POOR
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Opponents Pollicis Paresis)	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	12	index neg; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	81	0.42 0.52	0.11 0.86	0.80 1.03	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Phalen Test)	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	43	index neg; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	48	0.49 0.52	0.48 0.53	1.02 0.98	POOR	POOR
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Reverse Phalen Test)	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	40	index neg; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	53	0.45 0.51	0.41 0.55	0.91 1.07	POOR	POOR
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Thenar Atrophy)	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; thenar atrophy (Nerve Conduction Studies (NCS))	10	index neg; thenar atrophy (Nerve Conduction Studies (NCS))	83	0.70 0.55	0.16 0.94	2.60 0.90	WEAK	POOR
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Tinel Sign)	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	31	index neg; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	62	0.35 0.47	0.25 0.59	0.61 1.27	POOR	POOR
De Krom,M.C., 1990	Moderate Quality	CTS Positive (Tourniquet Test)	random selection of general pop with 50 that admitted to persistent CTS symptoms	DML and DSL with referenced normal values	Extremities	index pos; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	70	index neg; Flick; PT; TS; RPT; CCT; Luthy; Hypalgalsia; Hyperpathia; Thenar; OP; APB; tourniquet (Nerve Conduction Studies (NCS))	21	0.44 0.38	0.70 0.17	0.85 1.74	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
De,Smet L., 1995	Moderate Quality	CTS Positive (Durkan Test)	54 confirmed CTS limbs; 12 symptomatic unconfirmed	Slowing conduction velocity and DML	Extremities	index pos; PT; Durkan (Nerve Conduction Studies (NCS) and Electromyography (EMG))	42	index neg; PT; Durkan (Nerve Conduction Studies (NCS) and Electromyography (EMG))	24	0.81 0.17	0.63 0.33	0.94 1.11	POOR	POOR
De,Smet L., 1995	Moderate Quality	CTS Positive (Phalen Test)	54 confirmed CTS limbs; 12 symptomatic unconfirmed	Slowing conduction velocity and DML	Extremities	index pos; PT; Durkan (Nerve Conduction Studies (NCS) and Electromyography (EMG))	57	index neg; PT; Durkan (Nerve Conduction Studies (NCS) and Electromyography (EMG))	9	0.86 0.44	0.91 0.33	1.36 0.28	POOR	WEAK
El,Miedany Y., 2008	Moderate Quality	CTS Positive (Carpal Compression Test (CCT))	clinically diagnosed CTS suspects; large tenosynovitis prevalence	comparative, sensory, or motor abnormality	Subjects	index pos; PT; TS; RPT; CCT (Nerve Conduction Studies (NCS); AANEM referenced)	120	index neg; PT; TS; RPT; CCT (Nerve Conduction Studies (NCS); AANEM referenced)	112	0.70 0.11	0.46 0.25	0.61 2.17	POOR	POOR
El,Miedany Y., 2008	Moderate Quality	CTS Positive (Phalen Test)	clinically diagnosed CTS suspects; large tenosynovitis prevalence	comparative, sensory, or motor abnormality	Subjects	index pos; PT; TS; RPT; CCT (Nerve Conduction Studies (NCS); AANEM referenced)	127	index neg; PT; TS; RPT; CCT (Nerve Conduction Studies (NCS); AANEM referenced)	105	0.69 0.08	0.47 0.17	0.57 3.16	POOR	POOR
El,Miedany Y., 2008	Moderate Quality	CTS Positive (Reverse Phalen Test)	clinically diagnosed CTS suspects; large tenosynovitis prevalence	comparative, sensory, or motor abnormality	Subjects	index pos; PT; TS; RPT; CCT (Nerve Conduction Studies (NCS); AANEM referenced)	108	index neg; PT; TS; RPT; CCT (Nerve Conduction Studies (NCS); AANEM referenced)	124	0.71 0.14	0.42 0.35	0.65 1.64	POOR	POOR
El,Miedany Y., 2008	Moderate Quality	CTS Positive (Tinel Sign)	clinically diagnosed CTS suspects; large tenosynovitis prevalence	comparative, sensory, or motor abnormality	Subjects	index pos; PT; TS; RPT; CCT (Nerve Conduction Studies (NCS); AANEM referenced)	72	index neg; PT; TS; RPT; CCT (Nerve Conduction Studies (NCS); AANEM referenced)	160	0.76 0.19	0.30 0.65	0.84 1.09	POOR	POOR
Gerr,F., 1998	Moderate Quality	CTS Positive (2 Point Discrimination)	60 symptomatic patient hands suspected of CTS	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; PT; TS; vib perception; 2point (Nerve Conduction Studies (NCS) and Electromyography (EMG))	21	index neg; PT; TS; vib perception; 2point (Nerve Conduction Studies (NCS) and Electromyography (EMG))	94	0.43 0.49	0.16 0.79	0.76 1.06	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Gerr,F., 1998	Moderate Quality	CTS Positive (Phalen Test)	60 symptomatic patient hands suspected of CTS	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; PT; TS; vib perception; 2point (Nerve Conduction Studies (NCS) and Electromyography (EMG))	48	index neg; PT; TS; vib perception; 2point (Nerve Conduction Studies (NCS) and Electromyography (EMG))	67	0.52 0.52	0.44 0.60	1.11 0.93	POOR	POOR
Gerr,F., 1998	Moderate Quality	CTS Positive (Thenar Atrophy)	60 symptomatic patient hands suspected of CTS	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; thenar weakness; thenar atrophy (Nerve Conduction Studies (NCS) and Electromyography (EMG))	15	index neg; thenar weakness; thenar atrophy (Nerve Conduction Studies (NCS) and Electromyography (EMG))	100	0.60 0.52	0.16 0.90	1.53 0.94	POOR	POOR
Gerr,F., 1998	Moderate Quality	CTS Positive (Thenar Weakness)	60 symptomatic patient hands suspected of CTS	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; thenar weakness; thenar atrophy (Nerve Conduction Studies (NCS) and Electromyography (EMG))	34	index neg; thenar weakness; thenar atrophy (Nerve Conduction Studies (NCS) and Electromyography (EMG))	81	0.62 0.56	0.37 0.78	1.64 0.81	POOR	POOR
Gerr,F., 1998	Moderate Quality	CTS Positive (Tinel Sign)	60 symptomatic patient hands suspected of CTS	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; PT; TS; vib perception; 2point (Nerve Conduction Studies (NCS) and Electromyography (EMG))	19	index neg; PT; TS; vib perception; 2point (Nerve Conduction Studies (NCS) and Electromyography (EMG))	96	0.42 0.49	0.14 0.81	0.74 1.06	POOR	POOR
Gerr,F., 1998	Moderate Quality	CTS Positive (Vibration Perception; tuning fork; index finger)	60 symptomatic patient hands suspected of CTS	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; PT; TS; vib perception; 2point (Nerve Conduction Studies (NCS) and Electromyography (EMG))	30	index neg; PT; TS; vib perception; 2point (Nerve Conduction Studies (NCS) and Electromyography (EMG))	85	0.67 0.56	0.35 0.83	2.04 0.78	WEAK	POOR
Gomes,I., 2006	Moderate Quality	CTS Positive (At least Phalen Test, Tinel Sign, or Reverse Phalen Test)	subset of total 3907 limbs examined from NCS referred patients	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; PT; TS; RPT; PT, RPT, or TS (Nerve Conduction Studies (NCS); AANEM referenced)	442	index neg; PT; TS; RPT; PT, RPT, or TS (Nerve Conduction Studies (NCS); AANEM referenced)	485	0.59 0.73	0.66 0.66	1.94 0.51	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Gomes,I., 2006	Moderate Quality	CTS Positive (Phalen Test)	subset of total 3907 limbs examined from NCS referred patients	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; PT; TS; RPT; PT, RPT, or TS (Nerve Conduction Studies (NCS); AANEM referenced)	366	index neg; PT; TS; RPT; PT, RPT, or TS (Nerve Conduction Studies (NCS); AANEM referenced)	561	0.60 0.70	0.56 0.73	2.07 0.60	WEAK	POOR
Gomes,I., 2006	Moderate Quality	CTS Positive (Reverse Phalen Test)	subset of total 3907 limbs examined from NCS referred patients	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; PT; TS; RPT; PT, RPT, or TS (Nerve Conduction Studies (NCS); AANEM referenced)	279	index neg; PT; TS; RPT; PT, RPT, or TS (Nerve Conduction Studies (NCS); AANEM referenced)	648	0.64 0.67	0.46 0.81	2.42 0.67	WEAK	POOR
Gomes,I., 2006	Moderate Quality	CTS Positive (Thenar Atrophy)	2535 patients referred for NCS from 5 facilities	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	54	index neg; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	873	0.91 0.61	0.13 0.99	13.43 0.88	STRONG	POOR
Gomes,I., 2006	Moderate Quality	CTS Positive (Thenar Weakness)	2535 patients referred for NCS from 5 facilities	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	1482	index neg; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	2425	0.43 0.63	0.42 0.64	1.17 0.90	POOR	POOR
Gomes,I., 2006	Moderate Quality	CTS Positive (Tinel Sign)	subset of total 3907 limbs examined from NCS referred patients	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; PT; TS; RPT; PT, RPT, or TS (Nerve Conduction Studies (NCS); AANEM referenced)	215	index neg; PT; TS; RPT; PT, RPT, or TS (Nerve Conduction Studies (NCS); AANEM referenced)	712	0.62 0.64	0.34 0.85	2.27 0.77	WEAK	POOR
Hansen,P.A., 2004	Moderate Quality	CTS Positive (Flick Sign)	referred CTS suspects	CSI digit diff result and DML cutoffs	Subjects	index pos; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	47	index neg; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	95	0.74 0.37	0.37 0.74	1.44 0.85	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Hansen,P.A., 2004	Moderate Quality	CTS Positive (Flick Sign or Phalen Test)	referred CTS suspects	CSI digit diff result and DML cutoffs	Subjects	index pos; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	65	index neg; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	77	0.72 0.38	0.49 0.62	1.29 0.82	POOR	POOR
Hansen,P.A., 2004	Moderate Quality	CTS Positive (Flick Sign or Tinel Sign)	referred CTS suspects	CSI digit diff result and DML cutoffs	Subjects	index pos; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	59	index neg; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	83	0.75 0.39	0.46 0.68	1.45 0.79	POOR	POOR
Hansen,P.A., 2004	Moderate Quality	CTS Positive (Phalen Test)	referred CTS suspects	CSI digit diff result and DML cutoffs	Subjects	index pos; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	44	index neg; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	98	0.73 0.36	0.34 0.74	1.32 0.89	POOR	POOR
Hansen,P.A., 2004	Moderate Quality	CTS Positive (Phalen Test or Tinel Sign)	referred CTS suspects	CSI digit diff result and DML cutoffs	Subjects	index pos; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	52	index neg; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	90	0.75 0.38	0.41 0.72	1.48 0.81	POOR	POOR
Hansen,P.A., 2004	Moderate Quality	CTS Positive (Tinel Sign)	referred CTS suspects	CSI digit diff result and DML cutoffs	Subjects	index pos; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	30	index neg; Flick sign; PT; TS; combinations (Nerve Conduction Studies (NCS))	112	0.87 0.38	0.27 0.91	3.22 0.79	WEAK	POOR
Heller,L., 1986	Moderate Quality	CTS Positive (Phalen Test)	60 referrals of CTS suspects	EMG motor latency measure	Extremities	index pos; PT, TS, PT/TS, PT or TS (Electromyography (EMG))	48	index neg; PT, TS, PT/TS, PT or TS (Electromyography (EMG))	32	0.81 0.41	0.67 0.59	1.64 0.55	POOR	POOR
Heller,L., 1986	Moderate Quality	CTS Positive (Phalen Test and Tinel Sign)	60 referrals of CTS suspects	EMG motor latency measure	Extremities	index pos; PT, TS, PT/TS, PT or TS (Electromyography (EMG))	29	index neg; PT, TS, PT/TS, PT or TS (Electromyography (EMG))	51	0.93 0.39	0.47 0.91	5.12 0.59	MODERATE	POOR
Heller,L., 1986	Moderate Quality	CTS Positive (Phalen Test or Tinel Sign)	60 referrals of CTS suspects	EMG motor latency measure	Extremities	index pos; PT, TS, PT/TS, PT or TS (Electromyography (EMG))	59	index neg; PT, TS, PT/TS, PT or TS (Electromyography (EMG))	21	0.80 0.48	0.81 0.45	1.49 0.42	POOR	WEAK
Heller,L., 1986	Moderate Quality	CTS Positive (Tinel Sign)	60 referrals of CTS suspects	EMG motor latency measure	Extremities	index pos; PT, TS, PT/TS, PT or TS (Electromyography (EMG))	40	index neg; PT, TS, PT/TS, PT or TS (Electromyography (EMG))	40	0.88 0.43	0.60 0.77	2.66 0.51	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Karl,A.I., 2001	Moderate Quality	CTS Positive (Lumbrical Provocation Test (LPT))	96 veterans; 90 men and 6 women with median symptoms	palm diff median to ulnar latency; D2-D5 latency; or motor diff	Subjects	index pos; LPT (Nerve Conduction Studies (NCS))	32	index neg; LPT (Nerve Conduction Studies (NCS))	64	0.59 0.50	0.37 0.71	1.29 0.88	POOR	POOR
Katz,J.N., 1991	Moderate Quality	CTS Positive (2 Point Discrimination)	CTS symptomatic subjects at one hospital	referenced motor and sensory latency cutoffs	Subjects	index pos; PT; TS; 2point (Nerve Conduction Studies (NCS))	16	index neg; PT; TS; 2point (Nerve Conduction Studies (NCS))	62	0.44 0.63	0.23 0.81	1.24 0.94	POOR	POOR
Katz,J.N., 1991	Moderate Quality	CTS Positive (Phalen Test)	CTS symptomatic subjects at one hospital	referenced motor and sensory latency cutoffs	Subjects	index pos; PT; TS; 2point (Nerve Conduction Studies (NCS))	53	index neg; PT; TS; 2point (Nerve Conduction Studies (NCS))	25	0.42 0.68	0.73 0.35	1.14 0.75	POOR	POOR
Katz,J.N., 1991	Moderate Quality	CTS Positive (Tinel Sign)	CTS symptomatic subjects at one hospital	referenced motor and sensory latency cutoffs	Subjects	index pos; PT; TS; 2point (Nerve Conduction Studies (NCS))	35	index neg; PT; TS; 2point (Nerve Conduction Studies (NCS))	43	0.54 0.74	0.63 0.67	1.90 0.55	POOR	POOR
Kaul,M.P., 2001	Moderate Quality	CTS Positive (Carpal Compression Test (CCT))	consecutive veterans with CTS symptoms	motor, sensory, and mixed nerve latencies and digit diff	Subjects	index pos; PPT; CCT (Nerve Conduction Studies (NCS))	63	index neg; PPT; CCT (Nerve Conduction Studies (NCS))	72	0.67 0.47	0.53 0.62	1.37 0.77	POOR	POOR
Kaul,M.P., 2001	Moderate Quality	CTS Positive (Pressure Provocative Test (PPT))	consecutive veterans with CTS symptoms	motor, sensory, and mixed nerve latencies and digit diff	Subjects	index pos; PPT; CCT (Nerve Conduction Studies (NCS))	60	index neg; PPT; CCT (Nerve Conduction Studies (NCS))	74	0.70 0.53	0.55 0.68	1.73 0.66	POOR	POOR
Kuhlman,K.A., 1997	Moderate Quality	CTS Positive (Carpal Compression Test (CCT))	143 clinical CTS suspects	referenced sensory and motor cutoffs	Extremities	index pos; PT; TS; Hypesthesia; APB weakness; median compression (Nerve Conduction Studies (NCS))	62	index neg; PT; TS; Hypesthesia; APB weakness; median compression (Nerve Conduction Studies (NCS))	166	0.65 0.39	0.28 0.74	1.10 0.97	POOR	POOR
Kuhlman,K.A., 1997	Moderate Quality	CTS Positive (Hypesthesia; pinwheel)	143 clinical CTS suspects	referenced sensory and motor cutoffs	Extremities	index pos; PT; TS; Hypesthesia; APB weakness; median compression (Nerve Conduction Studies (NCS))	86	index neg; PT; TS; Hypesthesia; APB weakness; median compression (Nerve Conduction Studies (NCS))	142	0.85 0.51	0.51 0.85	3.40 0.57	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Kuhlman,K.A., 1997	Moderate Quality	CTS Positive (Phalen Test)	143 clinical CTS suspects	referenced sensory and motor cutoffs	Extremities	index pos; PT; TS; Hypesthesia; APB weakness; median compression (Nerve Conduction Studies (NCS))	94	index neg; PT; TS; Hypesthesia; APB weakness; median compression (Nerve Conduction Studies (NCS))	134	0.78 0.49	0.51 0.76	2.11 0.64	WEAK	POOR
Kuhlman,K.A., 1997	Moderate Quality	CTS Positive (Thenar Weakness)	143 clinical CTS suspects	referenced sensory and motor cutoffs	Extremities	index pos; PT; TS; Hypesthesia; APB weakness; median compression (Nerve Conduction Studies (NCS))	123	index neg; PT; TS; Hypesthesia; APB weakness; median compression (Nerve Conduction Studies (NCS))	105	0.76 0.54	0.66 0.66	1.96 0.51	POOR	POOR
Kuhlman,K.A., 1997	Moderate Quality	CTS Positive (Tinel Sign)	143 clinical CTS suspects	referenced sensory and motor cutoffs	Extremities	index pos; PT; TS; Hypesthesia; APB weakness; median compression (Nerve Conduction Studies (NCS))	44	index neg; PT; TS; Hypesthesia; APB weakness; median compression (Nerve Conduction Studies (NCS))	184	0.75 0.41	0.23 0.87	1.82 0.88	POOR	POOR
MacDermid,J.C., 1997 (1)	Moderate Quality	CTS Positive (Phalen Test (Examiner 1))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	81	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	81	AR	0.87 0.90	8.70 0.14	MODERATE	MODERATE
MacDermid,J.C., 1997 (1)	Moderate Quality	CTS Positive (Pinch Test (Examiner 1))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	77	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	77	AR	0.72 0.88	6.00 0.32	MODERATE	WEAK
MacDermid,J.C., 1997 (1)	Moderate Quality	CTS Positive (Reverse Phalen Test (Examiner 1))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	80	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	80	AR	0.65 0.96	16.25 0.36	STRONG	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
MacDermid,J.C., 1997 (1)	Moderate Quality	CTS Positive (Semmes-Weinstein Monofilament Test (SWMF) 1 (Examiner 1))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	79	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	79	AR	0.86 0.60	2.15 0.23	WEAK	WEAK
MacDermid,J.C., 1997 (1)	Moderate Quality	CTS Positive (Tethered Median Stress Test (TMST) (Examiner 1))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	80	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	80	AR	0.52 0.92	6.50 0.52	MODERATE	POOR
MacDermid,J.C., 1997 (1)	Moderate Quality	CTS Positive (Tinel Sign (Examiner 1))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	78	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	78	AR	0.59 0.92	7.38 0.45	MODERATE	WEAK
MacDermid,J.C., 1997 (1)	Moderate Quality	CTS Positive (Vibration Perception; tuning fork; index finger (Examiner 1))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	73	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	73	AR	0.77 0.80	3.85 0.29	WEAK	WEAK
MacDermid,J.C., 1997 (2)	Moderate Quality	CTS Positive (Phalen Test (Examiner 2))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	77	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	77	AR	0.86 0.86	6.14 0.16	MODERATE	MODERATE

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
MacDermid,J.C., 1997 (2)	Moderate Quality	CTS Positive (Pinch Test (Examiner 2))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	73	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	73	AR	0.70 0.78	3.18 0.38	WEAK	WEAK
MacDermid,J.C., 1997 (2)	Moderate Quality	CTS Positive (Reverse Phalen Test (Examiner 2))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	76	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	76	AR	0.75 0.85	5.00 0.29	MODERATE	WEAK
MacDermid,J.C., 1997 (2)	Moderate Quality	CTS Positive (Semmes-Weinstein Monofilament Test (SWMF) 1 (Examiner 2))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	70	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	70	AR	0.85 0.32	1.25 0.47	POOR	WEAK
MacDermid,J.C., 1997 (2)	Moderate Quality	CTS Positive (Tethered Median Stress Test (TMST) (Examiner 2))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	76	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	76	AR	0.36 0.95	7.20 0.67	MODERATE	POOR
MacDermid,J.C., 1997 (2)	Moderate Quality	CTS Positive (Tinel Sign (Examiner 2))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	74	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	74	AR	0.41 0.94	6.83 0.63	MODERATE	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
MacDermid,J.C., 1997 (2)	Moderate Quality	CTS Positive (Vibration Perception; tuning fork; index finger (Examiner 2))	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	77	index neg; PT; Vibration; Pinch; RPT; TS; TMST; SWMF (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	77	AR	0.77 0.72	2.75 0.32	WEAK	WEAK
Makanji,H.S., 2014	Moderate Quality	CTS Positive (Durkan Test)	referred CTS suspects	DML and DSL with referenced normal values	Subjects	index pos; Durkan; PT; Scratch Collapse (Nerve Conduction Studies (NCS); AANEM referenced)	69	index neg; Durkan; PT; Scratch Collapse (Nerve Conduction Studies (NCS); AANEM referenced)	19	0.72 0.21	0.77 0.17	0.93 1.33	POOR	POOR
Makanji,H.S., 2014	Moderate Quality	CTS Positive (Phalen Test)	referred CTS suspects	DML and DSL with referenced normal values	Subjects	index pos; Durkan; PT; Scratch Collapse (Nerve Conduction Studies (NCS); AANEM referenced)	59	index neg; Durkan; PT; Scratch Collapse (Nerve Conduction Studies (NCS); AANEM referenced)	29	0.75 0.28	0.68 0.35	1.04 0.93	POOR	POOR
Makanji,H.S., 2014	Moderate Quality	CTS Positive (Scratch Collapse Test)	referred CTS suspects	DML and DSL with referenced normal values	Subjects	index pos; Durkan; PT; Scratch Collapse (Nerve Conduction Studies (NCS); AANEM referenced)	31	index neg; Durkan; PT; Scratch Collapse (Nerve Conduction Studies (NCS); AANEM referenced)	57	0.71 0.25	0.34 0.61	0.86 1.09	POOR	POOR
Makanji,H.S., 2014	Moderate Quality	CTS Positive (Thenar Atrophy)	referred CTS suspects	DML and DSL with referenced normal values	Subjects	index pos; Gender/Sex F, M; tobacco use (yes); thenar atrophy; thumb abduction weakness (Nerve Conduction Studies (NCS); AANEM referenced)	13	index neg; Gender/Sex F, M; tobacco use (no); thenar atrophy; thumb abduction weakness (Nerve Conduction Studies (NCS); AANEM referenced)	75	0.92 0.29	0.18 0.96	4.25 0.85	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Makanji,H.S., 2014	Moderate Quality	CTS Positive (Thumb Abduction Weakness)	referred CTS suspects	DML and DSL with referenced normal values	Subjects	index pos; Gender/Sex F, M; tobacco use (yes); thenar atrophy; thumb abduction weakness (Nerve Conduction Studies (NCS); AANEM referenced)	30	index neg; Gender/Sex F, M; tobacco use (no); thenar atrophy; thumb abduction weakness (Nerve Conduction Studies (NCS); AANEM referenced)	58	0.80 0.29	0.37 0.74	1.42 0.85	POOR	POOR
Makanji,H.S., 2014	Moderate Quality	CTS Positive (Tinel Sign)	referred CTS suspects	DML and DSL with referenced normal values	Subjects	index pos; Durkan; PT; Scratch Collapse (Nerve Conduction Studies (NCS); AANEM referenced)	27	index neg; Durkan; PT; Scratch Collapse (Nerve Conduction Studies (NCS); AANEM referenced)	36	0.74 0.25	0.43 0.56	0.97 1.02	POOR	POOR
Padua,L., 1999	Moderate Quality	CTS Positive (Phalen Test)	clinically suspected idiopathic CTS patients	clinical and NCS from AANEM considered; min of clinical diagnosis and various severities of NCS testing results	Extremities	index pos; PT (Nerve Conduction Studies (NCS) and clinical diagnosis; AANEM referenced)	752	index neg; PT (Nerve Conduction Studies (NCS) and clinical diagnosis; AANEM referenced)	371	0.96 0.08	0.68 0.49	1.33 0.66	POOR	POOR
Raudino,F., 2000	Moderate Quality	CTS Positive (Hypoaesthesia; pin prick)	symptomatic and asymptomatic limbs of 83 suspected CTS patients that were NCS confirmed	sensory and motor as compared to control group	Extremities	index pos; PT; TS; stress test; hypoaesthesia (Nerve Conduction Studies (NCS); AANEM referenced)	45	index neg; PT; TS; stress test; hypoaesthesia (Nerve Conduction Studies (NCS); AANEM referenced)	121	1.00 0.21	0.32 1.00	10.00 0.68	STRONG	POOR
Raudino,F., 2000	Moderate Quality	CTS Positive (Phalen Test)	symptomatic and asymptomatic limbs of 83 suspected CTS patients that were NCS confirmed	sensory and motor as compared to control group	Extremities	index pos; PT; TS; stress test; hypoaesthesia (Nerve Conduction Studies (NCS); AANEM referenced)	85	index neg; PT; TS; stress test; hypoaesthesia (Nerve Conduction Studies (NCS); AANEM referenced)	81	0.93 0.25	0.56 0.77	2.45 0.57	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Raudino,F., 2000	Moderate Quality	CTS Positive (Stress Test; hyperextended wrist)	symptomatic and asymptomatic limbs of 83 suspected CTS patients that were NCS confirmed	sensory and motor as compared to control group	Extremities	index pos; PT; TS; stress test; hypoaesthesia (Nerve Conduction Studies (NCS); AANEM referenced)	72	index neg; PT; TS; stress test; hypoaesthesia (Nerve Conduction Studies (NCS); AANEM referenced)	94	0.96 0.24	0.49 0.88	4.27 0.57	WEAK	POOR
Raudino,F., 2000	Moderate Quality	CTS Positive (Thenar Weakness)	symptomatic and asymptomatic limbs of 83 suspected CTS patients that were NCS confirmed	sensory and motor as compared to control group	Extremities	index pos; thenar weakness (Nerve Conduction Studies (NCS); AANEM referenced)	18	index neg; thenar weakness (Nerve Conduction Studies (NCS); AANEM referenced)	148	0.94 0.17	0.12 0.96	3.16 0.91	WEAK	POOR
Raudino,F., 2000	Moderate Quality	CTS Positive (Tinel Sign)	symptomatic and asymptomatic limbs of 83 suspected CTS patients that were NCS confirmed	sensory and motor as compared to control group	Extremities	index pos; PT; TS; stress test; hypoaesthesia (Nerve Conduction Studies (NCS); AANEM referenced)	63	index neg; PT; TS; stress test; hypoaesthesia (Nerve Conduction Studies (NCS); AANEM referenced)	103	0.94 0.21	0.42 0.85	2.74 0.68	WEAK	POOR
Weber,R.A., 2000	Moderate Quality	CTS Positive (Pressure Specified Sensory Device (PSSD))	53 patients with suspected CTS from one hosp	history and physical signs and symptoms	Extremities	index pos; PSSD (Clinical Diagnosis)	67	index neg; PSSD (Clinical Diagnosis)	39	0.73 0.87	0.91 0.65	2.62 0.14	WEAK	MODERATE
Witt,J.C., 2004	Moderate Quality	CTS Positive (Phalen Test)	referred CTS suspects	various NCS parameters as needed	Subjects	index pos; PT; TS (Nerve Conduction Studies (NCS); AANEM referenced)	46	index neg; PT; TS (Nerve Conduction Studies (NCS); AANEM referenced)	38	0.24 0.66	0.46 0.42	0.79 1.30	POOR	POOR
Witt,J.C., 2004	Moderate Quality	CTS Positive (Tinel Sign)	referred CTS suspects	various NCS parameters as needed	Subjects	index pos; PT; TS (Nerve Conduction Studies (NCS); AANEM referenced)	32	index neg; PT; TS (Nerve Conduction Studies (NCS); AANEM referenced)	52	0.19 0.65	0.25 0.57	0.58 1.32	POOR	POOR

TABLE 10: LOW QUALITY STUDIES- PICO 1 (PHYSICAL TESTS VERSUS REFERENCE STANDARD)

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Khosrawi,S., 2012	Low Quality	CTS Positive (Phalen Test and Tinel Sign)	ALL PREGNANT WOMEN	median to ulnar cutoffs referenced	Subjects	index pos; PT/TS (Nerve Conduction Studies (NCS))	29	index neg; PT/TS (Nerve Conduction Studies (NCS))	71	0.34 0.87	0.53 0.77	2.24 0.62	WEAK	POOR

META-ANALYSES

FIGURE 1: GENERAL EDS VERSUS PHALEN TEST AND TINEL SIGN

Log likelihood = -56.726103 Number of studies =

	Coef.	Std. Err.	z	P> z	[95% Conf. Inte:
Bivariate					
E(logitSe)	-1.904242	.4749008			-2.83503 -1.973
E(logitSp)	2.644346	.3662139			1.92658 3.36
Var(logitSe)	1.725536	.895593			.6239226 4.77
Var(logitSp)	1.102201	.5594671			.4075664 2.98
Corr(logits)	-.9883017	.0732835			-.9999999 .998
HSROC					
Lambda	1.255525	.4344391			.4040402 2.1
Theta	-2.330142	.4091338			-3.132029 -1.52
beta	-.2241145	.1566844	-1.43	0.153	-.5312104 .082
s2alpha	.0322659	.2011202			1.60e-07 6523
s2theta	1.371023	.6772774			.520662 3.61
Summary pt.					
Se	.1296291	.0535809			.0554603 .274
Sp	.9336616	.0226824			.8728704 .966
DOR	2.096153	.5041219			1.308309 3.38
LR+	1.95406	.4028568			1.30452 2.92
LR-	.9322123	.0393812			.8581357 1.01
1/LR-	1.072717	.0453168			.9874754 1.16

Covariance between estimates of E(logitSe) & E(logitSp) -0.1509019

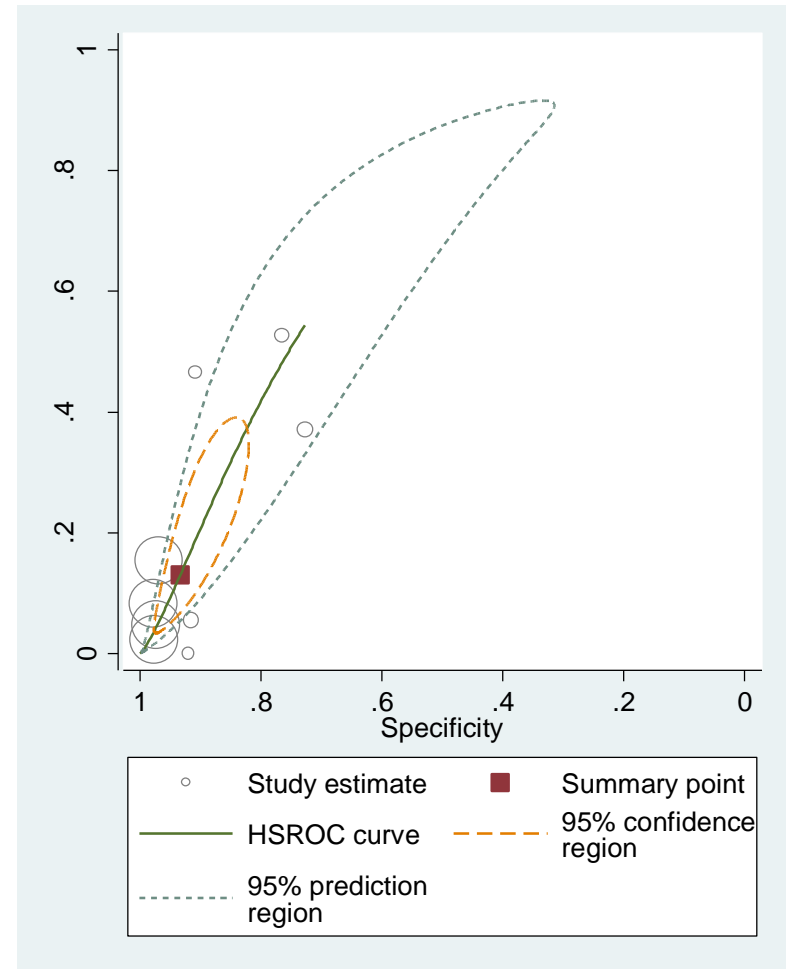


FIGURE 2: GENERAL EDS VERSUS PHALEN TEST

Log likelihood = -123.4579 Number of studies =

	Coef.	Std. Err.	z	P> z	[95% Conf. Inte
Bivariate					
E(logitSe)	-.331514	.3084354			-.9360362 .27
E(logitSp)	.9292007	.2584313			.4226845 1.4
Var(logitSe)	1.446609	.5460617			.690307 3.0
Var(logitSp)	1.003736	.3760415			.4816412 2.0
Corr(logits)	-1	.			.
HSROC					
Lambda	.7155396	.1102342			.4994846 .93
Theta	-.660335	.2800746			-1.209271 -.11
beta	-.1827468	.0796934	-2.29	0.022	-.338943 -.02
s2alpha	0	.			.
s2theta	1.204995	.442861			.5863418 2.4
Summary pt.					
Se	.4178723	.0750285			.2817017 .56
Sp	.7169131	.0524483			.6041255 .80
DOR	1.817908	.1791003			1.498689 2.2
LR+	1.476127	.0813879			1.324927 1.6
LR-	.811992	.0510847			.7177948 .91
1/LR-	1.231539	.0774796			1.088671 1.3

Covariance between estimates of E(logitSe) & E(logitSp) -.0761065

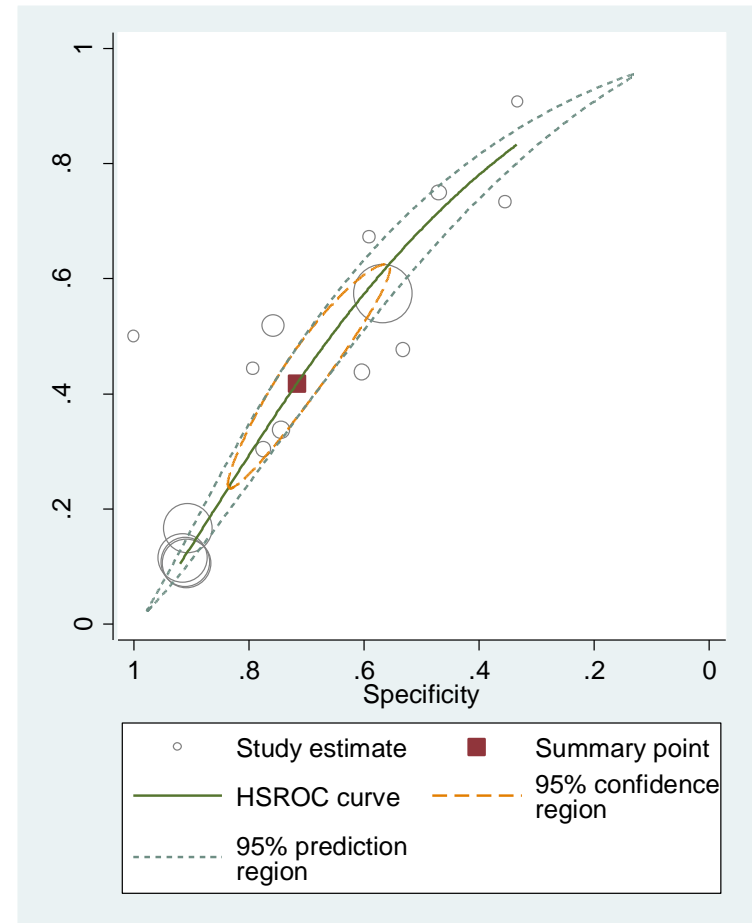


FIGURE 3: GENERAL EDS VERSUS TINEL SIGN

Log likelihood = -106.74462 Number of studies =

	Coef.	Std. Err.	z	P> z	[95% Conf. Interv
Bivariate					
E(logitSe)	-.9110982	.2160646			-1.334577 - .4874
E(logitSp)	1.558536	.1706321			1.224103 1.892
Var(logitSe)	.5645056	.247452			.2390796 1.332
Var(logitSp)	.3324116	.1495127			.1376643 .8024
Corr(logits)	-.6888283	.2052935			-.9233645 -.075
HSROC					
Lambda	.9810407	.3875646			.221428 1.740
Theta	-1.288639	.1837007			-1.648685 -.9281
beta	-.2647881	.2537217	-1.04	0.297	-.7620735 .2324
s2alpha	.2695891	.1738387			.076177 .9540
s2theta	.3657865	.1533225			.1608568 .8317
Summary pt.					
Se	.2867752	.0441928			.2084033 .3804
Sp	.8261431	.024508			.7727848 .8690
DOR	1.910638	.346459			1.339149 2.720
LR+	1.64949	.2233262			1.265041 2.150
LR-	.8633188	.0438471			.7815189 .9530
1/LR-	1.158321	.05883			1.048569 1.27
Covariance between estimates of E(logitSe) & E(logitSp)					-.021459

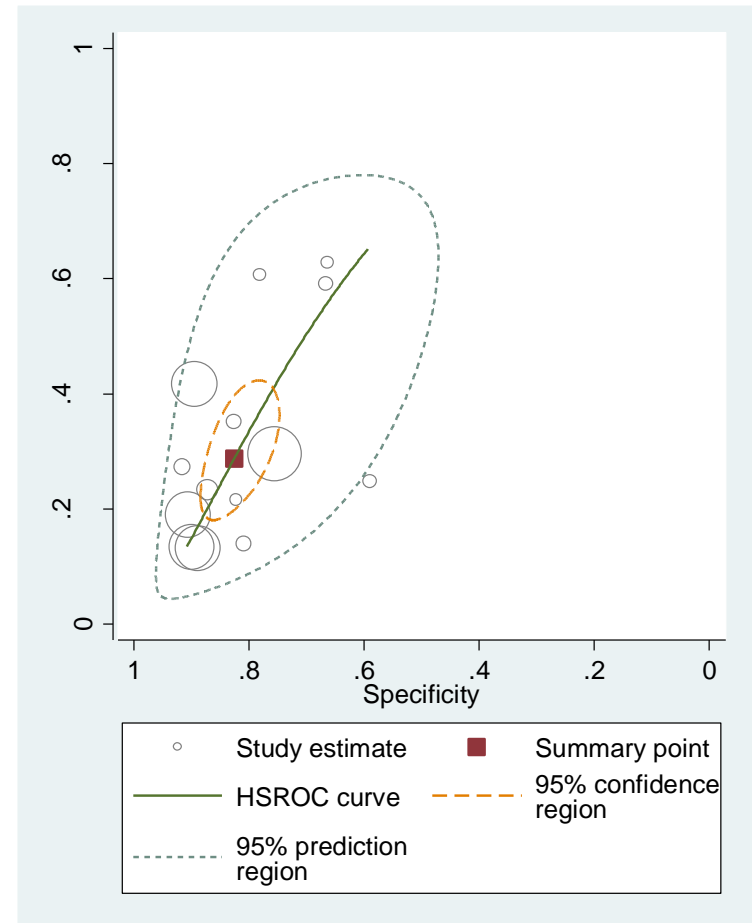


FIGURE 4: EDS AANEM VERSUS PHALEN TEST

Log likelihood = -85.441458 Number of studies =

	Coef.	Std. Err.	z	P> z	[95% Conf. Interv
Bivariate					
E(logitSe)	.3728075	.1464646			.0857422 .6598
E(logitSp)	.1383053	.2722567			-.3953079 .6719
Var(logitSe)	.1852699	.1042231			.0615125 .5580
Var(logitSp)	.6993077	.3531992			.2598676 1.881
Corr(logits)	-.3575437	.315771			-.7945605 .3234
HSROC					
Lambda	.6188629	.2442934			.1400567 1.097
Theta	.210206	.1684798			-.1200084 .5404
beta	.6641385	.3621484	1.83	0.067	-.0456594 1.373
s2alpha	.4624984	.2597837			.1538131 1.39
s2theta	.2443208	.1214063			.0922544 .647
Summary pt.					
Se	.5921372	.0353728			.5214224 .6592
Sp	.5345213	.0677397			.4024402 .6619
DOR	1.667145	.4473547			.9852936 2.820
LR+	1.272104	.17813			.9667865 1.673
LR-	.7630431	.0997372			.5905935 .9858
1/LR-	1.310542	.1713007			1.014356 1.693

Covariance between estimates of E(logitSe) & E(logitSp) -.0117857

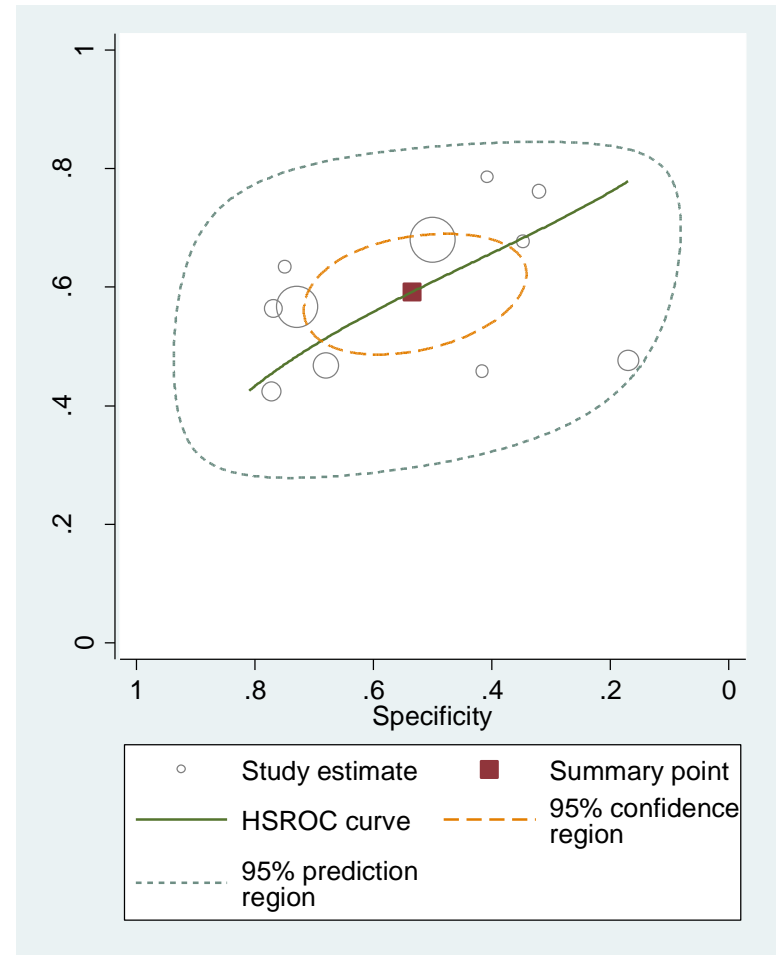


FIGURE 5: EDS AANEM VERSUS TINEL SIGN

Log likelihood = -67.652379 Number of studies =

	Coef.	Std. Err.	z	P> z	[95% Conf. Inte.
Bivariate					
E(logitSe)	-.5802556	.2556809			-1.081381 - .07
E(logitSp)	.9389121	.2909014			.3687558 1.5
Var(logitSe)	.5190716	.2716917			.186077 1.4
Var(logitSp)	.6507669	.3574124			.2217843 1.9
Corr(logits)	-.7047918	.2188155			-.9389292 -.02
HSROC					
Lambda	.2733093	.3371336			-.3874603 .9
Theta	-.7506554	.2463341			-1.233461 -.26
beta	.1130548	.2974207	0.38	0.704	-.4698791 .69
s2alpha	.3431506	.2385044			.0878745 1.3
s2theta	.4954134	.2534966			.1817268 1.3
Summary pt.					
Se	.3588738	.0588279			.2532448 .48
Sp	.7188799	.0587887			.5911583 .81
DOR	1.431405	.3463615			.8908296 2.3
LR+	1.276585	.2153497			.9171891 1.7
LR-	.8918406	.0683958			.7673758 1.0
1/LR-	1.121277	.0859913			.9647919 1.3
Covariance between estimates of E(logitSe) & E(logitSp)					-.0457227

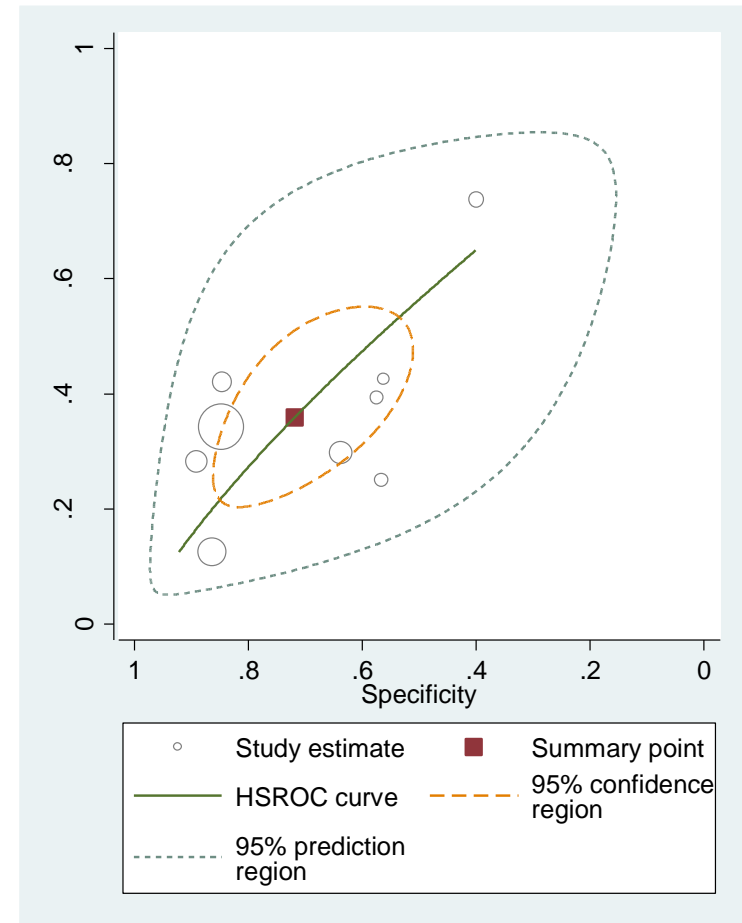
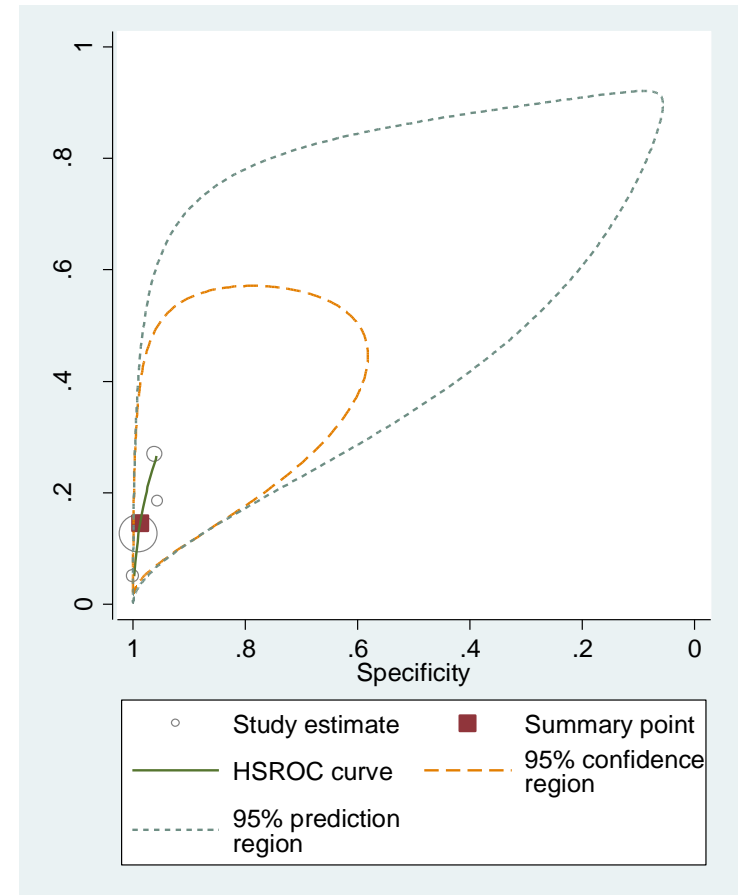


FIGURE 6: EDS AANEM VERSUS THENAR ATROPHY

Log likelihood = -19.192495 Number of studies

	Coef.	Std. Err.	z	P> z	[95% Conf.
Bivariate					
E(logitSe)	-1.773041	.3342435			-2.428146
E(logitSp)	4.339152	.6502999			3.064588
Var(logitSe)	.3597945	.3425524			.055673
Var(logitSp)	.9250373	1.491163			.0392663
Corr(logits)	-1	.			.
HSROC					
Lambda	1.181573	2.000774			-2.739871
Theta	-2.835934	.4848601			-3.786242
beta	.4721506	.7019157	0.67	0.501	-.9035789
s2alpha	0	.			.
s2theta	.5769084	.6475311			.06393
Summary pt.					
Se	.1451646	.0414769			.0810515
Sp	.9871205	.0082677			.9554082
DOR	13.01512	5.911865			5.343261
LR+	11.27095	5.246634			4.526116
LR-	.8659889	.0368488			.7966963
1/LR-	1.154749	.0491358			1.062351

Covariance between estimates of E(logitSe) & E(logitSp) = -.1641416



HISTORY INTERVIEW GUIDELINE RECOMMENDATIONS

A. HISTORY INTERVIEW TOPICS

Moderate evidence supports not using the following as independent history interview topics to diagnose carpal tunnel syndrome, because alone, each has a poor or weak association with ruling-in or ruling-out carpal tunnel syndrome:

- Sex/gender
- Ethnicity
- Bilateral symptoms
- Diabetes mellitus
- Worsening symptoms at night
- Duration of symptoms
- Patient localization of symptoms
- Hand dominance
- Symptomatic limb
- Age
- BMI

Strength of Recommendation: Moderate Evidence 

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

Rationale

Two high quality studies (Claes, 2013; Katz, 1990) and several moderate quality studies investigated the relationship between history interview topics and CTS as compared to a reference standard which was the use of either EDS following AANEM criteria or general EDS methods. When examined individually, each of the factors listed above had a poor or weak association with EDS based on the likelihood ratio. Sex/gender data pooled in a meta-analysis, also showed a poor association with electrodiagnostic testing.

Risks and Harms of Implementing this Recommendation

There are no known harms associated with implementing these recommendations.

Future Research

Future studies should evaluate and use standardized language for describing symptoms and their severity. Standardized scales and stand-alone history interview topics should be evaluated against a reference standard.

B. PATIENT REPORTED NUMBNESS AND PAIN

Limited evidence supports that patients who do not report frequent numbness or pain might not have carpal tunnel syndrome.

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

One moderate quality study (MacDermid, 1997) found a strong or moderate association between CTS and patient reporting of frequent numbness or frequent pain.

Risks and Harms of Implementing this Recommendation

There are no known harms associated with implementing these recommendations.

Future Research

Future studies should evaluate and use standardized language for describing symptoms and their severity. Standardized scales and stand-alone history interview topics should be evaluated against a reference standard.

STUDY QUALITY TABLE OF HISTORY INTERVIEW GUIDELINE RECOMMENDATIONS

Table 11. Diagnostic Quality Evaluations

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Becker,J., 2002	●	●	●	⦿	⦿	●	Include	Moderate Quality
Bland,J.D., 2000	●	●	●	⦿	⦿	●	Include	Moderate Quality
Claes,F., 2013	●	●	●	⦿	●	●	Include	High Quality
Coggon,D., 2013	●	●	●	⦿	⦿	●	Include	Moderate Quality
Dale,A.M., 2011	●	●	●	⦿	⦿	●	Include	Moderate Quality
De Krom,M.C., 1990	●	●	●	⦿	●	⦿	Include	Moderate Quality
El,Miedany Y., 2008	●	⦿	●	⦿	●	●	Include	Moderate Quality
Franzblau,A., 1994	●	⦿	●	⦿	●	⦿	Include	Moderate Quality
Gerr,F., 1998	●	●	●	⦿	⦿	⦿	Include	Moderate Quality
Glowacki,K.A., 1996	●	●	●	○	⦿	⦿	Include	Low Quality
Gomes,I., 2006	●	●	●	⦿	⦿	⦿	Include	Moderate Quality
Katz,J.N., 1990	●	●	●	⦿	●	●	Include	High Quality
Katz,J.N., 1991	●	●	●	⦿	●	⦿	Include	Moderate Quality
Khosrawi,S., 2012	●	●	○	⦿	⦿	●	Include	Low Quality
Lo,J.K., 2002	●	●	●	⦿	○	⦿	Include	Low Quality
MacDermid,J.C., 1997	●	⦿	●	⦿	●	●	Include	Moderate Quality
Makanji,H.S., 2014	●	⦿	●	⦿	⦿	●	Include	Moderate Quality

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Naranjo,A., 2007	●	●	●	⦿	●	●	Include	High Quality
Ntani,G., 2013	●	●	●	⦿	●	●	Include	High Quality
Raudino,F., 2000	●	⦿	●	⦿	⦿	●	Include	Moderate Quality
Tan,S.V., 2012	●	●	●	⦿	●	○	Include	Moderate Quality
Taylor-Gjevre,R.M., 2010	●	⦿	●	⦿	●	●	Include	Moderate Quality
Wainner,R.S., 2005	●	●	●	⦿	●	●	Include	High Quality
Witt,J.C., 2004	●	●	●	⦿	○	●	Include	Moderate Quality
Yagci,I., 2010	●	●	●	⦿	●	⦿	Include	Moderate Quality
Ziswiler,H.R., 2005	●	●	●	⦿	●	●	Include	High Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 12: SUMMARY OF FINDINGS- INDEX TEST VERSUS AANEM REFERENCED EDS

	LR +	LR -				
●	≥10	≤0.1	In "STRONG" agreement with the reference standard			
◐	>5 but <10	>0.1 but <0.2	In "MODERATE" agreement with the reference standard			
◑	>2 and <5	>0.2 but <0.5	In "WEAK" agreement with the reference standard			
○	≤2	≥0.5	In "POOR" agreement with the reference standard			
		High Quality		Moderate Quality		
Index Test	Rule In/Out	Claes, F., 2013	Gomes, I., 2006	Makanji, H.S., 2014	Yagci, I., 2010	Meta-Analysis
Gender/Sex Female	RULE IN	○	○	○	◐	○
	RULE OUT	○	◐	○	○	○
Gender/Sex Male	RULE IN	◐	○	○	○	○
	RULE OUT	○	○	○	○	○
Table only displays index tests with more than one article of supporting evidence						

TABLE 13: SUMMARY OF FINDINGS- INDEX TEST VERSUS GENERAL EDS METHODS

	LR +	LR -								
●	≥10	≤0.1	In "STRONG" agreement with the reference standard							
◐	≥5 but <10	>0.1 but ≤0.2	In "MODERATE" agreement with the reference standard							
◑	>2 and <5	>0.2 but <0.5	In "WEAK" agreement with the reference standard							
○	≤2	≥0.5	In "POOR" agreement with the reference standard							

Index Test	Rule In/Out	High Quality	Moderate Quality							Meta-Analysis	
		Katz, J.N., 1990 (B)	Becker, J., 2002	Bland, J.D., 2000	Coggon, D., 2013	Dale, A.M., 2011 (1)	Dale, A.M., 2011 (2)	MacDermid, J.C., 1997	Taylor-Gjevrev, R.M., 2010		
Bilateral Symptoms	RULE IN	○								○	NA
	RULE OUT	○								○	NA
Diabetes Mellitus	RULE IN		○		○						NA
	RULE OUT		○		○						NA
Gender/Sex Female	RULE IN		○	○	○					○	NA
	RULE OUT		◐	○	○					○	NA
Gender/Sex Male	RULE IN		○	○	○					○	NA
	RULE OUT		○	○	○					○	NA
Hand Left	RULE IN					○	○			○	NA
	RULE OUT					○	○			○	NA
Hand Right	RULE IN			○		○	○			○	NA
	RULE OUT			○		○	○			○	NA
Worsening symptoms at night	RULE IN			○					◐		NA
	RULE OUT			○					◐		NA

Table only displays index tests with more than one article of supporting evidence

Authors with parenthetical numbers indicate a change in EDS method/threshold, alternate limbs, or alternate examiner

Authors with parenthetical letters indicate a unique study with the same author and year as another study listed in the guideline

DETAILED DATA FINDINGS

TABLE 14: HIGH QUALITY STUDIES- PICO 2 (HISTORY INTERVIEW TOPICS VERSUS REFERENCE STANDARD)

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Claes,F., 2013	High Quality	CTS Positive (Gender/Sex Female)	clinically diagnosed CTS suspects	at least 2 of 4 abnormal EDS parameters	Subjects	index pos; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	121	index neg; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	35	0.79 0.03	0.74 0.04	0.77 6.80	POOR	POOR
Claes,F., 2013	High Quality	CTS Positive (Gender/Sex Male)	clinically diagnosed CTS suspects	at least 2 of 4 abnormal EDS parameters	Subjects	index pos; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	35	index neg; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	121	0.97 0.21	0.26 0.96	6.80 0.77	MODERATE	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Claes,F., 2013	High Quality	CTS Positive (Opponens Pollicis Weakness)	clinically diagnosed CTS suspects	at least 2 of 4 abnormal EDS parameters	Subjects	index pos; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	10	index neg; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	146	0.90 0.17	0.07 0.96	1.80 0.97	POOR	POOR
Claes,F., 2013	High Quality	CTS Positive (Wrist Left)	clinically diagnosed CTS suspects	at least 2 of 4 abnormal EDS parameters	Subjects	index pos; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	71	index neg; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	85	0.82 0.15	0.45 0.50	0.89 1.11	POOR	POOR
Claes,F., 2013	High Quality	CTS Positive (Wrist Right)	clinically diagnosed CTS suspects	at least 2 of 4 abnormal EDS parameters	Subjects	index pos; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	85	index neg; Gender/Sex F, M; Hand R, L; thenar atrophy; weakness; OP weakness (Nerve Conduction Studies (NCS); AANEM referenced)	71	0.85 0.18	0.55 0.50	1.11 0.89	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Age; 40+)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; neurologist assessment; age 40+; nocturnal symptoms; bilateral symptoms (Nerve Conduction Studies (NCS))	73	index neg; neurologist assessment; age 40+; nocturnal symptoms; bilateral symptoms (Nerve Conduction Studies (NCS))	37	0.48 0.76	0.80 0.42	1.38 0.48	POOR	WEAK
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Bilateral Symptoms)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; neurologist assessment; age 40+; nocturnal symptoms; bilateral symptoms (Nerve Conduction Studies (NCS))	55	index neg; neurologist assessment; age 40+; nocturnal symptoms; bilateral symptoms (Nerve Conduction Studies (NCS))	55	0.49 0.69	0.61 0.58	1.45 0.67	POOR	POOR
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Neurologist Assessment; probable or possible)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; neurologist assessment; age 40+; nocturnal symptoms; bilateral symptoms (Nerve Conduction Studies (NCS))	55	index neg; neurologist assessment; age 40+; nocturnal symptoms; bilateral symptoms (Nerve Conduction Studies (NCS))	55	0.67 0.87	0.84 0.73	3.08 0.22	WEAK	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Nocturnal Symptoms)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; neurologist assessment; age 40+; nocturnal symptoms; bilateral symptoms (Nerve Conduction Studies (NCS))	81	index neg; neurologist assessment; age 40+; nocturnal symptoms; bilateral symptoms (Nerve Conduction Studies (NCS))	29	0.42 0.66	0.77 0.29	1.09 0.79	POOR	POOR
Ntani,G., 2013	High Quality	CTS Positive (Pain; hand)	responders from all suspected CTS out-patients	SNC abnormality	Extremities	index pos; thenar weakness; pain (Nerve Conduction Studies (NCS); Sensory Nerve Conduction (SNC))	893	index neg; thenar weakness; pain (Nerve Conduction Studies (NCS); Sensory Nerve Conduction (SNC))	913	0.91 0.20	0.53 0.69	1.69 0.69	POOR	POOR
Tan,S.V., 2012	Moderate Quality	CTS Positive (Clinical symptoms)	limbs of 100 CTS suspects	at least 2 abnormal EDS parameters	Extremities	index pos; clinical symptoms (Nerve Conduction Studies (NCS); AANEM referenced)	160	index neg; clinical symptoms (Nerve Conduction Studies (NCS); AANEM referenced)	40	0.55 0.73	0.89 0.29	1.25 0.39	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Wainner,R.S., 2005	High Quality	CTS Positive (Age; 45+)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	40	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	42	0.45 0.76	0.64 0.59	1.58 0.60	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Behavior of symptoms is constant)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	70	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	12	0.31 0.50	0.79 0.11	0.88 1.93	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Behavior of symptoms is intermittent, variable)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	12	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	70	0.50 0.69	0.21 0.89	1.93 0.88	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Wainner,R.S., 2005	High Quality	CTS Positive (Do symptoms wake you up at night)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	57	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	25	0.35 0.68	0.71 0.31	1.04 0.91	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Does grasping or hand use tasks worsen symptoms)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	56	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	26	0.39 0.77	0.79 0.37	1.25 0.58	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Entire affected limb or hand feels numb)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	22	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	60	0.50 0.72	0.39 0.80	1.93 0.76	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Wainner,R.S., 2005	High Quality	CTS Positive (Hand feels fat or swollen)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	31	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	51	0.35 0.67	0.39 0.63	1.06 0.96	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Loss of feeling is the most bothersome symptom)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	76	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	6	0.36 0.83	0.96 0.09	1.06 0.39	POOR	WEAK
Wainner,R.S., 2005	High Quality	CTS Positive (Pain, Numbness, Tingling are most bothersome symptoms)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	6	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	76	0.17 0.64	0.04 0.91	0.39 1.06	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Wainner,R.S., 2005	High Quality	CTS Positive (Symptoms are most bothersome in the hand, finger)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	40	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	42	0.45 0.76	0.64 0.59	1.58 0.60	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Symptoms are most bothersome in the neck, shoulder/blade, arm)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	42	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	40	0.24 0.55	0.36 0.41	0.60 1.58	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Trouble fumbling or dropping objects)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	43	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	39	0.47 0.79	0.71 0.57	1.68 0.50	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Ziswiler,H.R., 2005	High Quality	CTS Positive (Hand Left)	71 CTS suspects referred to outpatient clinic in Switzerland	motor and sensory latency cutoff values	Extremities	index pos; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	49	index neg; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	52	0.76 0.21	0.47 0.48	0.91 1.10	POOR	POOR
Ziswiler,H.R., 2005	High Quality	CTS Positive (Hand Right)	71 CTS suspects referred to outpatient clinic in Switzerland	motor and sensory latency cutoff values	Extremities	index pos; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	52	index neg; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	49	0.79 0.24	0.53 0.52	1.10 0.91	POOR	POOR

TABLE 15: MODERATE QUALITY STUDIES- PICO 2 (HISTORY INTERVIEW TOPICS VERSUS REFERENCE STANDARD)

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Becker,J., 2002	Moderate Quality	CTS Positive (Age; 41-60)	CTS symptomatic subjects referred for NCS and EMG from 5 Brazil facilities	sensory, motor, and mixed nerve cutoffs	Subjects	index pos; Gender/Sex F, M; BMI; Age; Diabetes (Nerve Conduction Studies (NCS) and Electromyography (EMG))	944	index neg; Gender/Sex F, M; BMI; Age; Diabetes (Nerve Conduction Studies (NCS) and Electromyography (EMG))	828	0.52 0.64	0.62 0.54	1.34 0.70	POOR	POOR
Becker,J., 2002	Moderate Quality	CTS Positive (BMI; >30)	CTS symptomatic subjects referred for NCS and EMG from 5 Brazil facilities	sensory, motor, and mixed nerve cutoffs	Subjects	index pos; Gender/Sex F, M; BMI; Age; Diabetes (Nerve Conduction Studies (NCS) and Electromyography (EMG))	322	index neg; Gender/Sex F, M; BMI; Age; Diabetes (Nerve Conduction Studies (NCS) and Electromyography (EMG))	1450	0.66 0.60	0.27 0.89	2.39 0.82	WEAK	POOR
Becker,J., 2002	Moderate Quality	CTS Positive (Diabetes Mellitus)	CTS symptomatic subjects referred for NCS and EMG from 5 Brazil facilities	sensory, motor, and mixed nerve cutoffs	Subjects	index pos; Gender/Sex F, M; BMI; Age; Diabetes (Nerve Conduction Studies (NCS) and Electromyography (EMG))	61	index neg; Gender/Sex F, M; BMI; Age; Diabetes (Nerve Conduction Studies (NCS) and Electromyography (EMG))	1711	0.59 0.56	0.05 0.97	1.79 0.98	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Becker,J., 2002	Moderate Quality	CTS Positive (Gender/Sex Female)	CTS symptomatic subjects referred for NCS and EMG from 5 Brazil facilities	sensory, motor, and mixed nerve cutoffs	Subjects	index pos; Gender/Sex F, M; BMI; Age; Diabetes (Nerve Conduction Studies (NCS) and Electromyography (EMG))	1354	index neg; Gender/Sex F, M; BMI; Age; Diabetes (Nerve Conduction Studies (NCS) and Electromyography (EMG))	418	0.51 0.78	0.88 0.33	1.32 0.36	POOR	WEAK
Becker,J., 2002	Moderate Quality	CTS Positive (Gender/Sex Male)	CTS symptomatic subjects referred for NCS and EMG from 5 Brazil facilities	sensory, motor, and mixed nerve cutoffs	Subjects	index pos; Gender/Sex F, M; BMI; Age; Diabetes (Nerve Conduction Studies (NCS) and Electromyography (EMG))	418	index neg; Gender/Sex F, M; BMI; Age; Diabetes (Nerve Conduction Studies (NCS) and Electromyography (EMG))	1354	0.22 0.49	0.12 0.67	0.36 1.32	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Does a splint relieve symptoms)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	822	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	984	0.68 0.47	0.52 0.64	1.43 0.76	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Bland,J.D., 2000	Moderate Quality	CTS Positive (Duration of Symptoms 0-3 months)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	665	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	7558	0.51 0.42	0.07 0.91	0.79 1.02	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Duration of Symptoms 12+ months)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	3611	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	4612	0.60 0.45	0.46 0.59	1.13 0.91	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Duration of Symptoms 3-6 months)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	2001	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	6222	0.54 0.42	0.23 0.74	0.90 1.04	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Bland,J.D., 2000	Moderate Quality	CTS Positive (Duration of Symptoms 6-12 months)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	1946	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	6277	0.56 0.43	0.23 0.76	0.97 1.01	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Gender/Sex Female)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	5392	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	2376	0.56 0.43	0.69 0.31	1.00 1.00	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Gender/Sex Male)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	2376	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	5392	0.57 0.44	0.31 0.69	1.00 1.00	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Bland,J.D., 2000	Moderate Quality	CTS Positive (Hand Left or Ambidextrous)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	786	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	7437	0.54 0.43	0.09 0.90	0.90 1.01	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Hand Right)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	7437	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	786	0.57 0.46	0.91 0.10	1.01 0.90	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Symptoms equal in both hands)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	1612	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	6611	0.54 0.42	0.18 0.79	0.87 1.03	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Bland,J.D., 2000	Moderate Quality	CTS Positive (Symptoms worse in Left Hand)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	2573	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	5650	0.52 0.41	0.29 0.65	0.83 1.09	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Symptoms worse in Right Hand)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	4038	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	4185	0.61 0.47	0.53 0.56	1.20 0.85	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Worse symptoms in all fingers excluding the thumb)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	715	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	7508	0.46 0.42	0.07 0.89	0.64 1.04	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Bland,J.D., 2000	Moderate Quality	CTS Positive (Worse symptoms in all fingers including the thumb)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	2594	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	5629	0.54 0.42	0.30 0.66	0.89 1.06	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Worse symptoms in middle and ring)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	709	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	7514	0.65 0.44	0.10 0.93	1.39 0.97	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Worse symptoms in ring and pinky)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	327	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	7896	0.20 0.41	0.01 0.93	0.19 1.07	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Bland,J.D., 2000	Moderate Quality	CTS Positive (Worse symptoms in thumb, index, and middle)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	3088	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	5135	0.68 0.50	0.45 0.72	1.64 0.76	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Worsening symptoms at night)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	5717	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	2506	0.63 0.57	0.77 0.40	1.28 0.58	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Worsening symptoms during hand work)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	6267	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	1956	0.57 0.44	0.77 0.24	1.01 0.97	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Bland,J.D., 2000	Moderate Quality	CTS Positive (Worsening symptoms first thing in the morning)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	5465	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	2758	0.62 0.52	0.72 0.41	1.21 0.70	POOR	POOR
Bland,J.D., 2000	Moderate Quality	CTS Positive (Worsening symptoms while driving)	7768 East Kent referrals to NCS lab for suspected CTS	sensory and motor latency cutoffs	Extremities	index pos; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	3024	index neg; Gender/Sex F, M; Hand R, L/A; symptoms; history; fingers; duration; Gender/Sex (Nerve Conduction Studies (NCS))	5199	0.58 0.44	0.38 0.64	1.06 0.97	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (<6 months since free of numbness, tingling, or pain in the hands for 4+ weeks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	325	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	520	0.50 0.43	0.35 0.58	0.84 1.12	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (<7 days in the past 4 weeks when numbness, tingling, or pain in the hands disturbed sleep)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	166	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	659	0.54 0.47	0.20 0.80	1.01 1.00	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (<7 days in the past 4 weeks with numbness, tingling, or pain in the hands)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	49	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	733	0.43 0.45	0.05 0.92	0.63 1.03	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (0 days in the past 4 weeks when numbness, tingling, or pain in the hands disturbed sleep)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	157	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	668	0.35 0.42	0.13 0.74	0.47 1.19	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (0 somatic symptoms at least moderately distressing in the past week)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	223	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	661	0.58 0.48	0.27 0.77	1.20 0.94	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (1 somatic symptom at least moderately distressing in the past week)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	233	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	651	0.53 0.46	0.26 0.73	0.96 1.01	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (1+ years since free of numbness, tingling, or pain in the hands for 4+ weeks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	450	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	395	0.56 0.49	0.56 0.50	1.11 0.89	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (14-28 days in the past 4 weeks when numbness, tingling, or pain in the hands disturbed sleep)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	341	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	484	0.62 0.53	0.48 0.67	1.46 0.77	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (14-28 days in the past 4 weeks with numbness, tingling, or pain in the hands)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	631	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	151	0.56 0.54	0.83 0.23	1.08 0.73	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (2+ somatic symptoms at least moderately distressing in the past week)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	428	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	456	0.52 0.45	0.47 0.50	0.93 1.07	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (6+ months to <1 year since free of numbness, tingling, or pain in the hands for 4+ weeks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	70	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	775	0.59 0.46	0.09 0.93	1.21 0.98	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (7-13 days in the past 4 weeks when numbness, tingling, or pain in the hands disturbed sleep)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	161	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	664	0.52 0.46	0.19 0.80	0.93 1.02	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (7-13 days in the past 4 weeks with numbness, tingling, or pain in the hands)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	102	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	680	0.48 0.45	0.12 0.85	0.78 1.04	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (Age; 20-29)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	55	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	829	0.44 0.46	0.05 0.92	0.67 1.03	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Age; 30-39)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	172	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	712	0.53 0.46	0.19 0.80	0.97 1.01	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Age; 40-49)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	281	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	603	0.56 0.47	0.33 0.70	1.09 0.96	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Age; 50-59)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	281	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	603	0.53 0.46	0.32 0.68	0.99 1.01	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (Age; 60+)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	95	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	789	0.56 0.47	0.11 0.90	1.09 0.99	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Being very clumsy due to hand symptoms in the past 4 weeks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	106	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	778	0.51 0.46	0.11 0.87	0.89 1.02	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (BMI; <25)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; symptoms (Nerve Conduction Studies (NCS))	272	index neg; symptoms (Nerve Conduction Studies (NCS))	590	0.43 0.41	0.25 0.61	0.66 1.22	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (BMI; 25+ but <30)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; symptoms (Nerve Conduction Studies (NCS))	313	index neg; symptoms (Nerve Conduction Studies (NCS))	549	0.52 0.45	0.35 0.62	0.92 1.05	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (BMI; 30+)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; symptoms (Nerve Conduction Studies (NCS))	277	index neg; symptoms (Nerve Conduction Studies (NCS))	585	0.66 0.52	0.40 0.77	1.70 0.79	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Current smoker)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	184	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	693	0.45 0.44	0.18 0.75	0.71 1.10	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Diabetes Mellitus)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	55	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	829	0.67 0.47	0.08 0.96	1.77 0.96	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Difficulty fastening buttons or zips due to hand symptoms in the past 4 weeks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	111	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	773	0.51 0.46	0.12 0.87	0.91 1.01	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (Difficulty turning taps, using kitchen gadgets, sewing, or doing repairs due to hand symptoms in the past 4 weeks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	196	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	688	0.54 0.46	0.22 0.78	1.01 1.00	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Ethnicity; Other)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	26	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	858	0.73 0.47	0.04 0.98	2.34 0.98	WEAK	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Ethnicity; South Asian)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	32	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	852	0.75 0.47	0.05 0.98	2.58 0.97	WEAK	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Ethnicity; White)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	826	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	58	0.52 0.26	0.91 0.04	0.94 2.47	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (Ex-smoker)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	233	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	644	0.58 0.48	0.29 0.76	1.21 0.93	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Gender/Sex Female)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	594	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	290	0.54 0.47	0.68 0.33	1.01 0.98	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Gender/Sex Male)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	290	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	594	0.53 0.46	0.32 0.67	0.98 1.01	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Having minor accidents (e.g. dropping things) due to hand symptoms in the past 4 weeks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	120	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	764	0.45 0.45	0.11 0.84	0.70 1.06	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (Job dissatisfaction)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	121	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	763	0.49 0.45	0.12 0.85	0.82 1.03	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Lifting/carrying weights 5+ kg in one hand in a working day)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	355	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	529	0.55 0.47	0.41 0.61	1.05 0.97	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Little choice in how or what work is done or in timetable and breaks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	212	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	672	0.55 0.47	0.24 0.77	1.04 0.99	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Little support from supervisor or colleagues)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	156	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	728	0.50 0.45	0.16 0.81	0.86 1.03	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (Mental Health; Good)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	324	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	556	0.52 0.46	0.36 0.62	0.95 1.03	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Mental Health; Intermediate)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	297	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	583	0.52 0.45	0.33 0.65	0.94 1.03	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Mental Health; Poor)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	256	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	624	0.58 0.48	0.31 0.73	1.18 0.94	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Never smoked)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	460	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	417	0.55 0.47	0.53 0.49	1.04 0.96	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (Other Arthritis)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	184	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	700	0.50 0.45	0.19 0.78	0.86 1.04	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Other repeated movements of wrist/fingers for >4 hours per working day)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	449	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	435	0.55 0.47	0.52 0.50	1.04 0.96	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Pain in the elbow in the past 4 weeks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; symptoms (Nerve Conduction Studies (NCS))	351	index neg; symptoms (Nerve Conduction Studies (NCS))	533	0.53 0.46	0.39 0.59	0.96 1.03	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Pain in the neck in the past 4 weeks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; symptoms (Nerve Conduction Studies (NCS))	439	index neg; symptoms (Nerve Conduction Studies (NCS))	445	0.50 0.43	0.47 0.47	0.87 1.15	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (Pain in the shoulder in the past 4 weeks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; symptoms (Nerve Conduction Studies (NCS))	431	index neg; symptoms (Nerve Conduction Studies (NCS))	453	0.50 0.42	0.45 0.47	0.85 1.17	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Repeated bending/straightening of elbow for >1 hour per working day)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	547	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	337	0.54 0.46	0.62 0.38	0.99 1.01	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Rheumatoid Arthritis)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	42	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	842	0.55 0.46	0.05 0.95	1.04 1.00	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Targets, bonuses, or deadlines provided by work)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	454	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	430	0.54 0.47	0.52 0.49	1.03 0.97	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (Trouble writing or typing due to hand symptoms in the past 4 weeks)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; demographics and symptoms (Nerve Conduction Studies (NCS))	132	index neg; demographics and symptoms (Nerve Conduction Studies (NCS))	752	0.53 0.46	0.15 0.85	0.97 1.00	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Use of keyboard or mouse for >4 hours per working day)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	265	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	619	0.45 0.43	0.25 0.65	0.71 1.16	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Work for >1 hour per working day with tools that made the hands/arms vibrate)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	129	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	755	0.60 0.47	0.16 0.87	1.28 0.96	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Work with hand above shoulder height for >1 hour per working day)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	144	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	740	0.60 0.47	0.18 0.86	1.28 0.95	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Coggon,D., 2013	Moderate Quality	CTS Positive (Work with neck bent forward for >2 hours per working day)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	369	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	515	0.52 0.45	0.41 0.57	0.94 1.04	POOR	POOR
Coggon,D., 2013	Moderate Quality	CTS Positive (Work with neck twisted for >.05 hours per working day)	CTS suspected adults from one hosp referred to neurophysiology	sensory nerve conduction in index and between index and pinky >8ms	Subjects	index pos; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	226	index neg; occupational and non-occupational factors (Nerve Conduction Studies (NCS))	658	0.55 0.47	0.26 0.75	1.07 0.98	POOR	POOR
Dale,A.M., 2011 (1)	Moderate Quality	CTS Positive (Hand Left)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS))	1108	index neg; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS))	1108	0.24 0.72	0.46 0.49	0.90 1.10	POOR	POOR
Dale,A.M., 2011 (1)	Moderate Quality	CTS Positive (Hand Right)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS))	1108	index neg; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS))	1108	0.28 0.76	0.54 0.51	1.10 0.90	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dale,A.M., 2011 (2)	Moderate Quality	CTS Positive (Hand Left)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1108	index neg; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1108	0.01 0.98	0.31 0.50	0.62 1.38	POOR	POOR
Dale,A.M., 2011 (2)	Moderate Quality	CTS Positive (Hand Right)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1108	index neg; Hand RIGHT, Hand LEFT (Nerve Conduction Studies (NCS) and Katz Hand Diagram; classic or probable)	1108	0.02 0.99	0.69 0.50	1.38 0.62	POOR	POOR
El,Miedany Y., 2008	Moderate Quality	CTS Positive (Tenosynovitis)	clinically diagnosed CTS suspects; large tenosynovitis prevalence	tenosynovitis diagnosed with US; CTS by NCS abnormalities in sensory, motor, or comparative	Subjects	index pos; tenosynovitis (Nerve Conduction Studies (NCS); AANEM referenced)	119	index neg; tenosynovitis (Nerve Conduction Studies (NCS); AANEM referenced)	113	0.68 0.09	0.44 0.21	0.56 2.69	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Franzblau,A., 1994 (1)	Moderate Quality	CTS Positive (Distal extremity symptoms and nocturnal symptoms)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.5ms)	106	index neg; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.5ms)	703	0.35 0.85	0.26 0.90	2.52 0.82	WEAK	POOR
Franzblau,A., 1994 (1)	Moderate Quality	CTS Positive (Dominant Hand)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.5ms)	408	index neg; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.5ms)	408	0.20 0.85	0.56 0.51	1.15 0.86	POOR	POOR
Franzblau,A., 1994 (1)	Moderate Quality	CTS Positive (Non-Dominant Hand)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.5ms)	408	index neg; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.5ms)	408	0.15 0.80	0.44 0.49	0.86 1.15	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Franzblau, A., 1994 (2)	Moderate Quality	CTS Positive (Distal extremity symptoms and nocturnal symptoms)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.8ms)	74	index neg; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.8ms)	735	0.32 0.89	0.23 0.93	3.18 0.83	WEAK	POOR
Franzblau, A., 1994 (2)	Moderate Quality	CTS Positive (Dominant Hand)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.8ms)	408	index neg; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.8ms)	408	0.10 0.92	0.56 0.51	1.13 0.87	POOR	POOR
Franzblau, A., 1994 (2)	Moderate Quality	CTS Positive (Non-Dominant Hand)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.8ms)	408	index neg; Handed dom, non-dom; distal and nocturnal sympt (Nerve Conduction Studies (NCS); >.8ms)	408	0.08 0.90	0.44 0.49	0.87 1.13	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Gomes,I., 2006	Moderate Quality	CTS Positive (Age; 40-60)	2535 patients referred for NCS from 5 facilities	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	2130	index neg; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	1777	0.45 0.68	0.62 0.51	1.26 0.74	POOR	POOR
Gomes,I., 2006	Moderate Quality	CTS Positive (BMI; 30+)	2535 patients referred for NCS from 5 facilities	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	762	index neg; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	3145	0.60 0.66	0.30 0.87	2.31 0.81	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Gomes,I., 2006	Moderate Quality	CTS Positive (Gender/Sex Female)	2535 patients referred for NCS from 5 facilities	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	2948	index neg; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	959	0.44 0.77	0.85 0.31	1.23 0.48	POOR	WEAK
Gomes,I., 2006	Moderate Quality	CTS Positive (Gender/Sex Male)	2535 patients referred for NCS from 5 facilities	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	959	index neg; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	2948	0.23 0.56	0.15 0.69	0.48 1.23	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Gomes,I., 2006	Moderate Quality	CTS Positive (Pain; upper limb)	2535 patients referred for NCS from 5 facilities	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	3092	index neg; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	815	0.42 0.71	0.85 0.24	1.12 0.63	POOR	POOR
Gomes,I., 2006	Moderate Quality	CTS Positive (Paresthesia; upper limb)	2535 patients referred for NCS from 5 facilities	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	3006	index neg; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	901	0.45 0.81	0.89 0.31	1.28 0.37	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Gomes,I., 2006	Moderate Quality	CTS Positive (Sensory Symptoms; hand)	2535 patients referred for NCS from 5 facilities	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	3161	index neg; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	746	0.44 0.83	0.92 0.26	1.24 0.32	POOR	WEAK
Gomes,I., 2006	Moderate Quality	CTS Positive (Worsening symptoms at night)	2535 patients referred for NCS from 5 facilities	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	1926	index neg; Gender/Sex F, M; BMI30+; Age40-60; Paresthesia; Pain; Sensory sympt; weak; night; atrophy (Nerve Conduction Studies (NCS); AANEM referenced)	1981	0.52 0.74	0.66 0.61	1.69 0.56	POOR	POOR
Katz,J.N., 1991	Moderate Quality	CTS Positive (Occupation; exposed to pinching, grasping, wrist flexion, or vibration)	CTS symptomatic subjects at one hospital	referenced motor and sensory latency cutoffs	Subjects	index pos; Occupation (Nerve Conduction Studies (NCS))	54	index neg; Occupation (Nerve Conduction Studies (NCS))	24	0.46 0.79	0.83 0.40	1.38 0.42	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Lo,J.K., 2002	Moderate Quality	CTS Positive (Employment; Disability)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	17	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	331	0.35 0.51	0.04 0.94	0.58 1.03	POOR	POOR
Lo,J.K., 2002	Moderate Quality	CTS Positive (Employment; Employed)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	220	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	128	0.45 0.45	0.58 0.32	0.85 1.32	POOR	POOR
Lo,J.K., 2002	Moderate Quality	CTS Positive (Employment; Homemaker)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	35	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	313	0.40 0.50	0.08 0.88	0.71 1.04	POOR	POOR
Lo,J.K., 2002	Moderate Quality	CTS Positive (Employment; Retired)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	56	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	292	0.77 0.57	0.25 0.93	3.50 0.80	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Lo,J.K., 2002	Moderate Quality	CTS Positive (Employment; Student)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	7	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	341	0.14 0.51	0.01 0.97	0.18 1.03	POOR	POOR
Lo,J.K., 2002	Moderate Quality	CTS Positive (Employment; Unemployed)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	3	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	345	0.33 0.51	0.01 0.99	0.53 1.01	POOR	POOR
Lo,J.K., 2002	Moderate Quality	CTS Positive (Employment; Unknown)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	10	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	338	0.60 0.52	0.04 0.98	1.59 0.99	POOR	POOR
Lo,J.K., 2002	Moderate Quality	CTS Positive (Referral; Family Physician)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	50	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	298	0.56 0.53	0.17 0.88	1.35 0.95	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Lo,J.K., 2002	Moderate Quality	CTS Positive (Referral; Hand Clinic)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	69	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	279	0.45 0.51	0.18 0.79	0.86 1.04	POOR	POOR
Lo,J.K., 2002	Moderate Quality	CTS Positive (Referral; Neurology)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	4	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	344	0.00 0.51	0.00 0.98	0.00 1.02	POOR	POOR
Lo,J.K., 2002	Moderate Quality	CTS Positive (Referral; Other)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	10	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	338	0.20 0.51	0.01 0.96	0.26 1.03	POOR	POOR
Lo,J.K., 2002	Moderate Quality	CTS Positive (Referral; Physiatry)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	5	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	343	0.40 0.51	0.01 0.98	0.71 1.01	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Lo, J.K., 2002	Moderate Quality	CTS Positive (Referral; Rheumatology)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	10	index neg; employment; referral source (Nerve Conduction Studies (NCS); AANEM referenced)	338	0.60 0.52	0.04 0.98	1.59 0.99	POOR	POOR
MacDermid, J.C., 1997	Moderate Quality	CTS Positive (Hand Symptoms Only)	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; numb; pain; night sympt; hand only (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	42	index neg; numb; pain; night sympt; hand only (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	42	0.36 0.50	0.42 0.44	0.74 1.33	POOR	POOR
MacDermid, J.C., 1997	Moderate Quality	CTS Positive (Numbness; frequent)	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; numb; pain; night sympt; hand only (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	48	index neg; numb; pain; night sympt; hand only (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	36	0.75 1.00	1.00 0.75	4.00 0.00	WEAK	STRONG

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
MacDermid, J.C., 1997	Moderate Quality	CTS Positive (Pain; frequent)	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; numb; pain; night sympt; hand only (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	71	index neg; numb; pain; night sympt; hand only (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	13	0.49 0.92	0.97 0.25	1.30 0.11	POOR	MODERATE
MacDermid, J.C., 1997	Moderate Quality	CTS Positive (Worsening symptoms at night)	referred to clinic for CTS symptoms	various nerves and compression measurements	Extremities	index pos; numb; pain; night sympt; hand only (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	39	index neg; numb; pain; night sympt; hand only (Nerve Conduction Studies (NCS), Electromyography (EMG), and Clinical Diagnosis)	45	0.69 0.80	0.75 0.75	3.00 0.33	WEAK	WEAK
Makanji, H.S., 2014	Moderate Quality	CTS Positive (Gender/Sex Female)	referred CTS suspects	DML and DSL with referenced normal values	Subjects	index pos; Gender/Sex F, M; tobacco use (yes); thenar atrophy; thumb abduction weakness (Nerve Conduction Studies (NCS); AANEM referenced)	55	index neg; Gender/Sex F, M; tobacco use (no); thenar atrophy; thumb abduction weakness (Nerve Conduction Studies (NCS); AANEM referenced)	33	0.69 0.18	0.58 0.26	0.79 1.59	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Makanji,H.S., 2014	Moderate Quality	CTS Positive (Gender/Sex Male)	referred CTS suspects	DML and DSL with referenced normal values	Subjects	index pos; Gender/Sex F, M; tobacco use (yes); thenar atrophy; thumb abduction weakness (Nerve Conduction Studies (NCS); AANEM referenced)	33	index neg; Gender/Sex F, M; tobacco use (no); thenar atrophy; thumb abduction weakness (Nerve Conduction Studies (NCS); AANEM referenced)	55	0.82 0.31	0.42 0.74	1.59 0.79	POOR	POOR
Makanji,H.S., 2014	Moderate Quality	CTS Positive (Tobacco Use)	referred CTS suspects	DML and DSL with referenced normal values	Subjects	index pos; Gender/Sex F, M; tobacco use (yes); thenar atrophy; thumb abduction weakness (Nerve Conduction Studies (NCS); AANEM referenced)	5	index neg; Gender/Sex F, M; tobacco use (no); thenar atrophy; thumb abduction weakness (Nerve Conduction Studies (NCS); AANEM referenced)	83	0.80 0.27	0.06 0.96	1.42 0.98	POOR	POOR
Pastare,D., 2009	Moderate Quality	CTS Positive (Clinical Diagnosis; 2 or more symptoms)	66 CTS suspected patients referred to Neuro lab in Singapore hosp	sensory, motor, and LINT cutoffs	Extremities	index pos; clinical diagnosis, 2+ sympt (Nerve Conduction Studies (NCS); AANEM referenced)	66	index neg; clinical diagnosis, 2+ sympt (Nerve Conduction Studies (NCS); AANEM referenced)	31	0.82 0.45	0.76 0.54	1.65 0.44	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Taylor-Gjevre,R.M., 2010	Moderate Quality	CTS Positive (Bilateral Symptoms)	clinically diagnosed CTS suspects referred for NCS	motor, mixed, sensory nerve latency cutoffs referenced	Subjects	index pos; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	139	index neg; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	72	0.57 0.42	0.65 0.33	0.98 1.04	POOR	POOR
Taylor-Gjevre,R.M., 2010	Moderate Quality	CTS Positive (Dominant Hand; Left)	clinically diagnosed CTS suspects referred for NCS	motor, mixed, sensory nerve latency cutoffs referenced	Subjects	index pos; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	20	index neg; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	191	0.60 0.43	0.10 0.91	1.12 0.99	POOR	POOR
Taylor-Gjevre,R.M., 2010	Moderate Quality	CTS Positive (Dominant Hand; Right)	clinically diagnosed CTS suspects referred for NCS	motor, mixed, sensory nerve latency cutoffs referenced	Subjects	index pos; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	191	index neg; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	20	0.57 0.40	0.90 0.09	0.99 1.12	POOR	POOR
Taylor-Gjevre,R.M., 2010	Moderate Quality	CTS Positive (Gender/Sex Female)	clinically diagnosed CTS suspects referred for NCS	motor, mixed, sensory nerve latency cutoffs referenced	Subjects	index pos; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	156	index neg; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	55	0.56 0.40	0.73 0.24	0.96 1.12	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Taylor-Gjevre,R.M., 2010	Moderate Quality	CTS Positive (Gender/Sex Male)	clinically diagnosed CTS suspects referred for NCS	motor, mixed, sensory nerve latency cutoffs referenced	Subjects	index pos; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	55	index neg; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	156	0.60 0.44	0.27 0.76	1.12 0.96	POOR	POOR
Taylor-Gjevre,R.M., 2010	Moderate Quality	CTS Positive (Hand Left)	clinically diagnosed CTS suspects referred for NCS	motor, mixed, sensory nerve latency cutoffs referenced	Subjects	index pos; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	29	index neg; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	182	0.69 0.45	0.17 0.90	1.65 0.93	POOR	POOR
Taylor-Gjevre,R.M., 2010	Moderate Quality	CTS Positive (Hand Right)	clinically diagnosed CTS suspects referred for NCS	motor, mixed, sensory nerve latency cutoffs referenced	Subjects	index pos; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	43	index neg; Gender/Sex; bilateral; dominance; hand (Nerve Conduction Studies (NCS))	168	0.51 0.41	0.18 0.77	0.78 1.07	POOR	POOR
Taylor-Gjevre,R.M., 2010	Moderate Quality	CTS Positive (Non-Symptomatic Hand)	clinically diagnosed CTS suspects referred for NCS	motor, mixed, sensory nerve latency cutoffs referenced	Extremities	index pos; symptomatic hands (Nerve Conduction Studies (NCS))	72	index neg; symptomatic hands (Nerve Conduction Studies (NCS))	350	0.38 0.51	0.14 0.80	0.67 1.08	POOR	POOR
Taylor-Gjevre,R.M., 2010	Moderate Quality	CTS Positive (Symptomatic Hand)	clinically diagnosed CTS suspects referred for NCS	motor, mixed, sensory nerve latency cutoffs referenced	Extremities	index pos; symptomatic hands (Nerve Conduction Studies (NCS))	350	index neg; symptomatic hands (Nerve Conduction Studies (NCS))	72	0.49 0.63	0.86 0.20	1.08 0.67	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Witt,J.C., 2004	Moderate Quality	CTS Positive (Clinical diagnosis)	referred CTS suspects	various NCS parameters as needed	Subjects	index pos; clinical diagnosis (Nerve Conduction Studies (NCS); AANEM referenced)	65	index neg; clinical diagnosis (Nerve Conduction Studies (NCS); AANEM referenced)	19	0.22 0.47	0.58 0.15	0.69 2.78	POOR	POOR
Yagci,I., 2010	Moderate Quality	CTS Positive (Gender/Sex Female)	DPN PATIENT POPULATION referred to EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; Gender/Sex F, M (Nerve Conduction Studies (NCS); AANEM referenced)	14	index neg; Gender/Sex F, M (Nerve Conduction Studies (NCS); AANEM referenced)	33	0.79 0.67	0.50 0.88	4.17 0.57	WEAK	POOR
Yagci,I., 2010	Moderate Quality	CTS Positive (Gender/Sex Male)	DPN PATIENT POPULATION referred to EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; Gender/Sex F, M (Nerve Conduction Studies (NCS); AANEM referenced)	33	index neg; Gender/Sex F, M (Nerve Conduction Studies (NCS); AANEM referenced)	14	0.33 0.21	0.50 0.12	0.57 4.17	POOR	POOR

TABLE 16: LOW QUALITY STUDIES- PICO 2 (HISTORY INTERVIEW TOPICS VERSUS REFERENCE STANDARD)

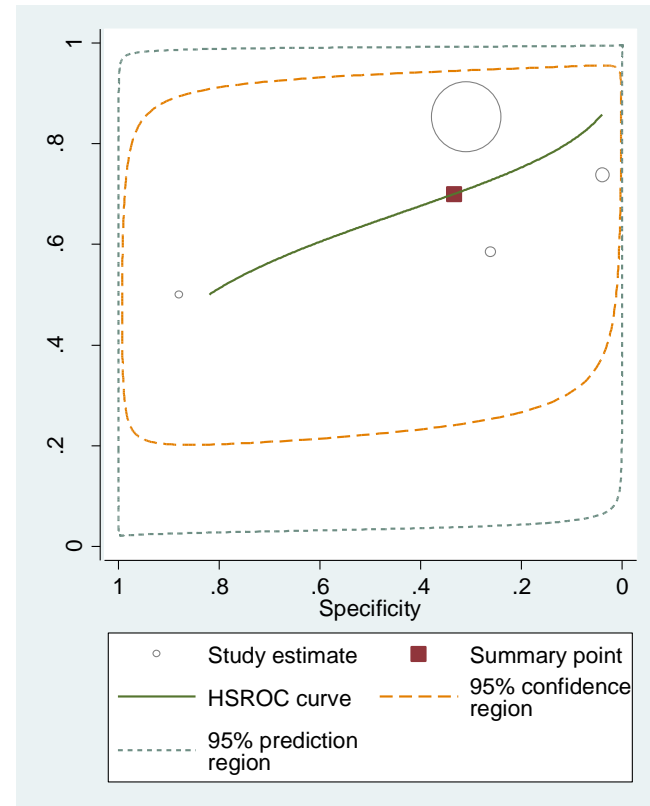
Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Glowacki,K. A., 1996	Low Quality	CTS Positive (Workers' Compensation)	167 clinically diagnosed CTS surgical patients	motor and sensory latency cutoff values	Extremities	index pos; workers comp (Surgical Relief of Symptoms; resolved or improved)	136	index neg; non-workers comp (Surgical Relief of Symptoms; resolved or improved)	91	0.90 0.03	0.58 0.19	0.72 2.22	POOR	POOR
Khosrawi,S., 2012	Low Quality	CTS Positive (Clinical Symptoms)	ALL PREGNANT WOMEN	median to ulnar cutoffs referenced	Subjects	index pos; clinical symptoms (Nerve Conduction Studies (NCS))	40	index neg; clinical symptoms (Nerve Conduction Studies (NCS))	60	0.28 0.87	0.58 0.64	1.62 0.66	POOR	POOR

META-ANALYSES

FIGURE 7: EDS AANEM VERSUS FEMALE GENDER/SEX

Log likelihood = -34.112581 Number of studies

	Coef.	Std. Err.	z	P> z	[95% Conf.]
Bivariate					
E(logitSe)	.8485862	.3609094			.1412169
E(logitSp)	-.6914771	.9139812			-2.482847
Var(logitSe)	.4443972	.3624095			.089869
Var(logitSp)	3.015878	2.550025			.5750351
Corr(logits)	-.4972435	.4296675			-.9308049
HSROC					
Lambda	.941223	.7981893			-.6231993
Theta	.899029	.5154443			-.1112234
beta	.9574637	.5343576	1.79	0.073	-.0898579
s2alpha	1.164073	.9703896			.2271983
s2theta	.8666724	.6903656			.1818918
Summary pt.					
Se	.7002705	.0757519			.5352457
Sp	.3337046	.2032199			.0770694
DOR	1.170123	.9609265			.2339966
LR+	1.050991	.2889723			.6131394
LR-	.8981882	.4910178			.3076352
1/LR-	1.113352	.6086428			.3813303
Covariance between estimates of E(logitSe) & E(logitSp)					-.145609



IMAGING GUIDELINE RECOMMENDATIONS

A. HAND-HELD NERVE CONDUCTION STUDY (NCS)

Limited evidence supports that a hand-held nerve conduction study (NCS) device might be used for the diagnosis of carpal tunnel syndrome.

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

There was one moderate quality study (Tan, 2012) evaluating the use of a hand-held NCS device for the diagnosis of CTS. This study showed that a handheld NCS device can rule in or rule out the diagnosis of CTS, in patients with typical symptoms of CTS, using EDS following AANEM criteria as the reference standard. The hand-held NCS device closely parallels the severity of disease compared with the neurological assessment as well.

Risks and Harms of Implementing this Recommendation

The user should be aware of the limitations and specific utility of these devices. They should not be used in patients that have symptoms or signs that might suggest an alternative diagnosis or in patients who have weakness or atrophy. Use of the hand-held NCS device in those with alternative diagnosis to CTS or motor deficit may result in missed or delayed diagnosis.

Future Research

More high quality studies are needed to confirm the utility of this method in comparison to electrodiagnostic studies.

B. MRI

Moderate evidence supports not routinely using MRI for the diagnosis of carpal tunnel syndrome.

Strength of Recommendation: Moderate Evidence ★★★☆

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

Rationale

There was one high quality study (Jarvik, 2002) evaluating MRI for the diagnosis of CTS. Findings on MRI had a weak or poor association as a rule out test for CTS as compared to a classic or probable hand pain diagram and nerve conduction study. Only severe fascicular swelling, severe flexor tenosynovitis, or severe increased muscle signal had a strong association with CTS, suggesting that MRI would be insensitive in identifying the diagnosis of CTS in the majority of patients in whom these findings would be unlikely to be present.

Risks and Harms of Implementing this Recommendation

There are no known harms associated with implementing these recommendations.

Future Research

In order for imaging modalities to be effective in diagnosis of CTS consensus on the optimal location for the measurements and threshold values for parameters such as cross-sectional area are required.

C. DIAGNOSTIC ULTRASOUND

Limited evidence supports not routinely using ultrasound for the diagnosis of carpal tunnel syndrome.

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

There were five high quality (Naranjo, 2007; Moran, 2009; Ziswiler, 2005; Wong, 2004; Claes, 2013) and seven moderate quality studies (Abdel Ghaffar, 2012; Dejaco, 2013; Fowler, 2014; Hashemi, 2009; Moghtaderi, 2012; Nakamichi, 2002; Pastare, 2009) evaluating ultrasound for the diagnosis of CTS compared with EDS as the reference standard. These studies showed conflicting results regarding the utility of ultrasound (US) as either a rule in or rule out test in the diagnosis of CTS. In general, there was variation between the studies for the cut-off value for making the diagnosis or for exclusion of CTS. The ideal location for measuring the cross-sectional area (CSA) of the median nerve for indicating the diagnosis of CTS also varied between studies. There is a general agreement that a CSA greater than 12-13 mm is strongly correlated with EDS. As a rule out study for CTS, there is a strong correlation with CSA below 8 mm. One moderate quality (Abdel Ghaffar, 2012) and one low quality study (Mallouhi, 2006) suggest that a US measurement of nerve hypervascularity may have a strong association as a rule out study for CTS.

Risks and Harms of Implementing this Recommendation

There are no known harms associated with implementing these recommendations.

Future Research

In order for imaging modalities to be effective in diagnosis of CTS consensus on the optimal location for the measurements and threshold values for parameters such as cross-sectional area are required. Further high quality studies are needed to determine the utility of hypervascularity of the median nerve by ultrasound in the diagnosis of CTS.

STUDY QUALITY TABLE OF IMAGING MODALITIES

TABLE 17. DIAGNOSTIC QUALITY EVALUATIONS

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Abdel Ghaffar,M.K., 2012	●	●	●	◐	◐	●	Include	Moderate Quality
Beckenbaugh,R.D., 1995	●	◐	●	◐	◐	◐	Include	Low Quality
Claes,F., 2013	●	●	●	◐	●	●	Include	High Quality
Dejaco,C., 2013	●	●	●	◐	●	◐	Include	Moderate Quality
Deniz,F.E., 2012	●	◐	●	○	●	◐	Include	Low Quality
Fowler,J.R., 2014	●	●	●	◐	●	◐	Include	Moderate Quality
Franzblau,A., 1994	●	●	●	◐	●	●	Include	High Quality
Glowacki,K.A., 1996	●	●	●	○	◐	◐	Include	Low Quality
Hashemi,A.-H., 2009	●	●	○	◐	●	●	Include	Moderate Quality
Jarvik,J.G., 2002	●	●	●	◐	●	●	Include	High Quality
Kang,E.K., 2008	●	●	●	◐	◐	●	Include	Moderate Quality
Kaul,M.P., 2002	●	●	●	◐	○	◐	Include	Low Quality
Lo,J.K., 2002	●	●	●	◐	○	◐	Include	Low Quality
Mallouhi,A., 2006	●	●	◐	◐	●	○	Include	Low Quality
Missere,M., 1999	●	◐	●	◐	◐	◐	Include	Low Quality
Moghtaderi,A., 2012	●	◐	●	◐	●	●	Include	Moderate Quality

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Moran,L., 2009	●	●	●	◐	●	●	Include	High Quality
Nakamichi,K., 2002	●	◐	●	◐	●	◐	Include	Moderate Quality
Naranjo,A., 2007	●	●	●	◐	●	●	Include	High Quality
Pastare,D., 2009	●	●	●	◐	○	●	Include	Moderate Quality
Sheean,G.L., 1995	●	◐	●	◐	◐	◐	Include	Low Quality
Smith,T., 1998	●	●	●	◐	○	◐	Include	Low Quality
Stalberg,E., 2000	●	●	●	◐	●	◐	Include	Moderate Quality
Swen,W.A., 2001	●	●	●	○	●	●	Include	Moderate Quality
Szopinski,K., 2011	●	◐	●	◐	●	◐	Include	Moderate Quality
Tan,S.V., 2012	●	●	●	◐	●	○	Include	Moderate Quality
Weber,R.A., 2000	●	◐	●	◐	●	●	Include	Moderate Quality
Werner,R.A., 1994	●	●	●	◐	●	◐	Include	Moderate Quality
Werner,R.A., 1995	●	◐	●	◐	●	◐	Include	Moderate Quality
Wong,S.M., 2004	●	●	●	◐	●	●	Include	High Quality
Yazdchi,M., 2012	●	◐	●	◐	●	◐	Include	Moderate Quality

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Ziswiler,H.R., 2005	●	●	●	●	●	●	Include	High Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 18: SUMMARY OF FINDINGS- INDEX TEST VERSUS AANEM REFERENCED EDS

	LR +	LR -	
●	≥10	≤0.1	In " STRONG " agreement with the reference standard
◐	≥5 but <10	>0.1 but ≤0.2	In " MODERATE " agreement with the reference standard
◑	>2 and <5	>0.2 but <0.5	In " WEAK " agreement with the reference standard
○	≤2	≥0.5	In " POOR " agreement with the reference standard

Index Test	Rule In/Out	High Quality				Moderate Quality		Meta-Analysis
		Naranjo, A., 2007 (1)	Tan, S.V., 2012 (1)	Tan, S.V., 2012 (2)	Wong, S.M., 2004 (1)	Fowler, J.R., 2014	Pastare, D., 2009	
Hand held NCS	RULE IN		◐	◐				NA
	RULE OUT		◐	◐				NA
Ultrasound; CSA inlet; >9mm sq	RULE IN	○					◐	NA
	RULE OUT	◐					◑	NA
Ultrasound; CSA proximal inlet; >10mm sq	RULE IN				◑	◐		NA
	RULE OUT				◑	◐		NA

Table only displays index tests with more than one article of supporting evidence

Authors with parenthetical numbers indicate a change in EDS method/threshold, alternate limbs, or alternate examiner

TABLE 19: SUMMARY OF FINDINGS- INDEX TEST VERSUS GENERAL EDS METHODS

	LR +	LR -	
●	≥10	≤0.1	In " STRONG " agreement with the reference standard
◐	≥5 but <10	>0.1 but ≤0.2	In " MODERATE " agreement with the reference standard
◑	>2 and <5	>0.2 but <0.5	In " WEAK " agreement with the reference standard
○	≤2	≥0.5	In " POOR " agreement with the reference standard

		Moderate Quality	Low Quality	
		Abdel Ghaffar, M.K., 2012	Mallouhi, A., 2006	
Index Test	Rule In/Out			Meta-Analysis
Ultrasound; nerve edema	RULE IN	◑	◑	NA
	RULE OUT	◑	◑	NA
Ultrasound; nerve hypervascularization	RULE IN	◑	◑	NA
	RULE OUT	●	●	NA
<i>Table only displays index tests with more than one article of supporting evidence</i>				

DETAILED DATA FINDINGS

TABLE 20: HIGH QUALITY STUDIES- PICO 3 (IMAGING MODALITIES VERSUS REFERENCE STANDARD)

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Claes,F., 2013	High Quality	CTS Positive (Ultrasound; CSA inlet)	clinically diagnosed CTS suspects	at least 2 of 4 abnormal EDS parameters	Subjects	index pos; CSA (Nerve Conduction Studies (NCS); AANEM referenced)	89	index neg; CSA (Nerve Conduction Studies (NCS); AANEM referenced)	67	0.97 0.34	0.66 0.88	5.73 0.38	MODERATE	WEAK
Franzblau,A., 1994 (1)	High Quality	CTS Positive (Current Perception Threshold (CPT))	manufacturing workers in Michigan with complaints of CTS	confirmed median mononeuropathy by NCS only	Subjects	index pos; CPT (Nerve Conduction Studies (NCS); >.5ms)	34	index neg; CPT (Nerve Conduction Studies (NCS); >.5ms)	48	0.26 0.88	0.60 0.63	1.61 0.64	POOR	POOR
Franzblau,A., 1994 (2)	High Quality	CTS Positive (Current Perception Threshold (CPT))	manufacturing workers in Michigan with complaints of CTS	median to ulnar sensory peak latency of >.5ms	Subjects	index pos; CPT (Nerve Conduction Studies (NCS); >.5ms and Clinical Symptoms)	35	index neg; CPT (Nerve Conduction Studies (NCS); >.5ms and Clinical Symptoms)	48	0.11 0.96	0.67 0.60	1.66 0.56	POOR	POOR
Jarvik,J.G., 2002	High Quality	CTS Positive (Any MRI abnormality)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.92 0.28	1.28 0.29	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Jarvik,J.G., 2002	High Quality	CTS Positive (Any severe MRI abnormality)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.58 0.72	2.07 0.58	WEAK	POOR
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Bowing of flexor retinaculum)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.45 0.76	1.88 0.72	POOR	POOR
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Deep palmar bursitis)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.77 0.00	0.77 0.60	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Fascicular swelling)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.74 0.44	1.32 0.59	POOR	POOR
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Fat in the carpal tunnel)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.43 0.16	0.51 3.56	POOR	POOR
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Flattening of median nerve)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.59 0.33	0.88 1.24	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Flexor tenosynovitis)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.60 0.54	1.30 0.74	POOR	POOR
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Increased median nerve signal)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.88 0.39	1.44 0.31	POOR	WEAK
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Increased muscle signal)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.10 0.96	2.50 0.94	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Severe bowing of flexor retinaculum)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.03 0.98	1.50 0.99	POOR	POOR
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Severe deep palmar bursitis)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.09 0.88	0.75 1.03	POOR	POOR
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Severe fascicular swelling)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.11 1.00	10.00 0.89	STRONG	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Severe flattening of median nerve)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.08 0.89	0.73 1.03	POOR	POOR
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Severe flexor tenosynovitis)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.00 1.00	10.00 1.00	STRONG	POOR
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Severe level of fat in the carpal tunnel)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.02 0.92	0.25 1.07	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Severely increased median nerve signal)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.30 0.85	2.00 0.82	WEAK	POOR
Jarvik,J.G., 2002	High Quality	CTS Positive (MRI; Severely increased muscle signal)	CTS suspects from 5 sites in Seattle	median to ulnar sensory peak and mixed nerve latency	Subjects	index pos; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	index neg; MRI parameters (Nerve Conduction Studies (NCS); AANEM referenced and Katz Hand Diagram; classic or probable)	.	AR	0.01 1.00	10.00 0.99	STRONG	POOR
Moran,L., 2009	High Quality	CTS Positive (Ultrasound; CSA inlet; Automatic Tracing; >11mm sq)	46 CTS suspected manual workers (catering and cleaning) referred to ortho dept	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; CSA via 2 formulas and cutoffs (Nerve Conduction Studies (NCS); AANEM referenced)	55	index neg; CSA via 2 formulas and cutoffs (Nerve Conduction Studies (NCS); AANEM referenced)	15	0.78 0.53	0.86 0.40	1.43 0.35	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Moran,L., 2009	High Quality	CTS Positive (Ultrasound; CSA inlet; Automatic Tracing; >13mm sq)	46 CTS suspected manual workers (catering and cleaning) referred to ortho dept	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; CSA via 2 formulas and cutoffs (Nerve Conduction Studies (NCS); AANEM referenced)	32	index neg; CSA via 2 formulas and cutoffs (Nerve Conduction Studies (NCS); AANEM referenced)	38	0.94 0.47	0.60 0.90	6.00 0.44	MODERATE	WEAK
Moran,L., 2009	High Quality	CTS Positive (Ultrasound; CSA inlet; Elipse Formula; >12.3mm sq)	46 CTS suspected manual workers (catering and cleaning) referred to ortho dept	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; CSA via 2 formulas and cutoffs (Nerve Conduction Studies (NCS); AANEM referenced)	32	index neg; CSA via 2 formulas and cutoffs (Nerve Conduction Studies (NCS); AANEM referenced)	38	0.97 0.50	0.62 0.95	12.40 0.40	STRONG	WEAK
Moran,L., 2009	High Quality	CTS Positive (Ultrasound; CSA inlet; Elipse Formula; >9.8mm sq)	46 CTS suspected manual workers (catering and cleaning) referred to ortho dept	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; CSA via 2 formulas and cutoffs (Nerve Conduction Studies (NCS); AANEM referenced)	57	index neg; CSA via 2 formulas and cutoffs (Nerve Conduction Studies (NCS); AANEM referenced)	13	0.81 0.69	0.92 0.45	1.67 0.18	POOR	MODERATE
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; bowing of flexor retinaculum)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	75	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	30	0.84 0.43	0.79 0.52	1.64 0.41	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; compression in longitudinal view)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	17	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	88	0.76 0.24	0.16 0.84	1.02 1.00	POOR	POOR
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >10mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	75	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	30	0.84 0.43	0.79 0.52	1.64 0.41	POOR	WEAK
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >11mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	58	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	47	0.88 0.38	0.64 0.72	2.28 0.50	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >12mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	47	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	58	0.94 0.38	0.55 0.88	4.58 0.51	WEAK	POOR
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >13mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	33	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	72	1.00 0.35	0.41 1.00	10.00 0.59	STRONG	POOR
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >14mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	22	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	83	1.00 0.30	0.28 1.00	10.00 0.73	STRONG	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >15mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	22	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	83	1.00 0.30	0.28 1.00	10.00 0.73	STRONG	POOR
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >16mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	11	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	94	1.00 0.27	0.14 1.00	10.00 0.86	STRONG	POOR
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >8mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	99	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	6	0.80 0.83	0.99 0.20	1.23 0.06	POOR	STRONG

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >9.7mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	82	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	23	0.84 0.52	0.86 0.48	1.66 0.29	POOR	WEAK
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >9.7mm sq and BCTQ >3)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	AR	0.86 0.40	1.44 0.34	POOR	WEAK
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >9.7mm sq and bowing of flexor retinaculum)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	AR	0.94 0.40	1.56 0.16	POOR	MODERATE

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >9.7mm sq and compression in longitudinal view)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	AR	1.00 0.25	1.33 0.00	POOR	STRONG
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >9.7mm sq and Phalen Test)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	AR	0.84 0.38	1.34 0.43	POOR	WEAK
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >9.7mm sq and symptom duration >24 months)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	AR	0.93 0.43	1.62 0.18	POOR	MODERATE

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >9.7mm sq and Tinel Sign)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	AR	0.86 0.40	1.43 0.36	POOR	WEAK
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >9.7mm sq, neg Tinel Sign, and neg Phalen Test)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	AR	1.00 0.67	2.99 0.00	WEAK	STRONG
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >9.7mm sq, pos Tinel Sign, and pos Phalen Test)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	.	AR	0.87 0.36	1.35 0.38	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA inlet; >9mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	93	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	12	0.83 0.75	0.96 0.36	1.50 0.10	POOR	MODERATE
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA max; >11.5mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	65	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	40	0.89 0.45	0.73 0.72	2.59 0.38	WEAK	WEAK
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA outlet; >11.5mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	56	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	49	0.91 0.41	0.64 0.80	3.19 0.45	WEAK	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; CSA proximal inlet; >10.1mm sq)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	70	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	35	0.86 0.43	0.75 0.60	1.88 0.42	POOR	WEAK
Naranjo,A., 2007	High Quality	CTS Positive (Ultrasound; flattening index)	68 patients with suspected CTS	ROC curve determined cutoffs	Extremities	index pos; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	65	index neg; US locations; nerve swelling combinations to physical tests (Nerve Conduction Studies (NCS); AANEM referenced)	40	0.80 0.30	0.65 0.48	1.25 0.73	POOR	POOR
Tan,S.V., 2012 (1)	Moderate Quality	CTS Positive (Hand held NCS (Examiner 1))	limbs of 100 CTS suspects	at least 2 abnormal EDS parameters	Extremities	index pos; hand held NCS (Nerve Conduction Studies (NCS); AANEM referenced)	.	index neg; hand held NCS (Nerve Conduction Studies (NCS); AANEM referenced)	.	AR	0.85 0.90	8.50 0.17	MODERATE	MODERATE
Tan,S.V., 2012 (2)	Moderate Quality	CTS Positive (Hand held NCS (Examiner 2))	limbs of 100 CTS suspects	at least 2 abnormal EDS parameters	Extremities	index pos; hand held NCS (Nerve Conduction Studies (NCS); AANEM referenced)	.	index neg; hand held NCS (Nerve Conduction Studies (NCS); AANEM referenced)	.	AR	0.84 0.89	7.64 0.18	MODERATE	MODERATE

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Wong,S.M., 2004	High Quality	CTS Positive (Ultrasound; CSA proximal inlet; >10mm sq)	120 CTS suspects referred to one hospital	sensory and motor latency cutoffs	Extremities	index pos; US CSA >.9 (Nerve Conduction Studies (NCS); AANEM referenced)	121	index neg;US CSA >.9 (Nerve Conduction Studies (NCS); AANEM referenced)	72	0.92 0.68	0.83 0.83	4.89 0.21	WEAK	WEAK
Wong,S.M., 2004	High Quality	CTS Positive (Ultrasound; CSA proximal inlet; >9mm sq)	120 CTS suspects referred to one hospital	sensory and motor latency cutoffs	Extremities	index pos; US CSA >.9 (Nerve Conduction Studies (NCS); AANEM referenced)	150	index neg;US CSA >.9 (Nerve Conduction Studies (NCS); AANEM referenced)	43	0.83 0.77	0.93 0.56	2.10 0.13	WEAK	MODERATE
Ziswiler,H.R., 2005	High Quality	CTS Positive (Ultrasound; CSA max; >10mm sq)	71 CTS suspects referred to outpatient clinic in Switzerland	motor and sensory latency cutoff values	Extremities	index pos; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	67	index neg; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	34	0.94 0.59	0.82 0.83	4.91 0.22	WEAK	WEAK
Ziswiler,H.R., 2005	High Quality	CTS Positive (Ultrasound; CSA max; >11mm sq)	71 CTS suspects referred to outpatient clinic in Switzerland	motor and sensory latency cutoff values	Extremities	index pos; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	43	index neg; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	58	0.98 0.38	0.54 0.96	12.38 0.48	STRONG	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Ziswiler,H.R., 2005	High Quality	CTS Positive (Ultrasound; CSA max; >12mm sq)	71 CTS suspects referred to outpatient clinic in Switzerland	motor and sensory latency cutoff values	Extremities	index pos; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	34	index neg; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	67	1.00 0.34	0.44 1.00	10.00 0.56	STRONG	POOR
Ziswiler,H.R., 2005	High Quality	CTS Positive (Ultrasound; CSA max; >13mm sq)	71 CTS suspects referred to outpatient clinic in Switzerland	motor and sensory latency cutoff values	Extremities	index pos; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	24	index neg; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	77	1.00 0.30	0.31 1.00	10.00 0.69	STRONG	POOR
Ziswiler,H.R., 2005	High Quality	CTS Positive (Ultrasound; CSA max; >14mm sq)	71 CTS suspects referred to outpatient clinic in Switzerland	motor and sensory latency cutoff values	Extremities	index pos; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	20	index neg; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	81	1.00 0.28	0.26 1.00	10.00 0.74	STRONG	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Ziswiler,H.R., 2005	High Quality	CTS Positive (Ultrasound; CSA max; >6mm sq)	71 CTS suspects referred to outpatient clinic in Switzerland	motor and sensory latency cutoff values	Extremities	index pos; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	96	index neg; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	5	0.80 0.80	0.99 0.17	1.20 0.07	POOR	STRONG
Ziswiler,H.R., 2005	High Quality	CTS Positive (Ultrasound; CSA max; >7mm sq)	71 CTS suspects referred to outpatient clinic in Switzerland	motor and sensory latency cutoff values	Extremities	index pos; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	93	index neg; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	8	0.82 0.75	0.97 0.26	1.32 0.10	POOR	STRONG
Ziswiler,H.R., 2005	High Quality	CTS Positive (Ultrasound; CSA max; >8mm sq)	71 CTS suspects referred to outpatient clinic in Switzerland	motor and sensory latency cutoff values	Extremities	index pos; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	80	index neg; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	21	0.88 0.62	0.90 0.57	2.06 0.18	WEAK	MODERATE

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Ziswiler,H.R., 2005	High Quality	CTS Positive (Ultrasound; CSA max; >9mm sq)	71 CTS suspects referred to outpatient clinic in Switzerland	motor and sensory latency cutoff values	Extremities	index pos; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	74	index neg; CSA max; various cutoff levels (Nerve Conduction Studies (NCS); AANEM referenced and Rated Signs and Symptoms)	27	0.91 0.59	0.86 0.70	2.82 0.20	WEAK	WEAK

TABLE 21: MODERATE QUALITY STUDIES- PICO 3 (IMAGING MODALITIES VERSUS REFERENCE STANDARD)

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Abdel Ghaffar,M.K., 2012	Moderate Quality	CTS Positive (Ultrasound; bowing of flexor retinaculum)	41 suspected CTS patients from one hosp	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; US factors (Nerve Conduction Studies (NCS))	40	index neg; US factors (Nerve Conduction Studies (NCS))	13	0.95 0.23	0.79 0.60	1.98 0.35	POOR	WEAK
Abdel Ghaffar,M.K., 2012	Moderate Quality	CTS Positive (Ultrasound; CSA inlet; >11mm sq)	41 suspected CTS patients from one hosp	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; US factors (Nerve Conduction Studies (NCS))	48	index neg; US factors (Nerve Conduction Studies (NCS))	5	0.94 0.40	0.94 0.40	1.56 0.16	POOR	MODERATE
Abdel Ghaffar,M.K., 2012	Moderate Quality	CTS Positive (Ultrasound; nerve edema)	41 suspected CTS patients from one hosp	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; US factors (Nerve Conduction Studies (NCS))	42	index neg; US factors (Nerve Conduction Studies (NCS))	11	0.95 0.27	0.83 0.60	2.08 0.28	WEAK	WEAK
Abdel Ghaffar,M.K., 2012	Moderate Quality	CTS Positive (Ultrasound; nerve hypervascularization)	41 suspected CTS patients from one hosp	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; US factors (Nerve Conduction Studies (NCS))	49	index neg; US factors (Nerve Conduction Studies (NCS))	4	0.96 0.75	0.98 0.60	2.45 0.03	WEAK	STRONG
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA difference between CsL and CsP; >2.5mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.94 0.55	2.09 0.12	WEAK	MODERATE

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA difference between CsL and CsP; >6.5mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.42 0.93	5.89 0.63	MODERATE	POOR
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA difference between CsR and CsP; >1.5mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.96 0.32	1.41 0.11	POOR	MODERATE
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA difference between CsR and CsP; >5.5mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.52 0.93	7.30 0.52	MODERATE	POOR
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA difference between CsS and CsP; >.5mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.93 0.17	1.11 0.44	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA difference between CsS and CsP; >5.5mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.36 0.95	7.74 0.67	MODERATE	POOR
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA Inlet (CsS); >12.8mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.36 0.92	4.33 0.70	WEAK	POOR
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA Inlet (CsS); >8.8mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.90 0.45	1.63 0.22	POOR	WEAK
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA max (CsL); >13.8mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.38 0.92	4.66 0.67	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA max (CsL); >9.8mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.92 0.60	2.30 0.14	WEAK	MODERATE
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA proximal inlet (CsR); >13.8mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.32 0.92	3.88 0.74	WEAK	POOR
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA proximal inlet (CsR); >9.8mm sq)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.91 0.61	2.34 0.15	WEAK	MODERATE
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA ratio between CsL and CSA proximal pronator quadrus (CsP); >1.3)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.91 0.51	1.84 0.18	POOR	MODERATE

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA ratio between CsL and CSA proximal pronator quadrus (CsP); >1.81)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.51 0.92	6.21 0.53	MODERATE	POOR
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA ratio between CsR and CsP; >1.25)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.91 0.45	1.64 0.20	POOR	WEAK
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA ratio between CsR and CsP; >1.68)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.56 0.92	6.88 0.47	MODERATE	WEAK
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA ratio between CsS and CsP; >1.07)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.91 0.21	1.15 0.43	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dejaco,C., 2013	Moderate Quality	CTS Positive (Ultrasound; CSA ratio between CsS and CsP; >1.66)	135 patients with suspected CTS; asymptomatic hands included	ranked as CTS by neurologist based on NCS and clinical assessment	Extremities	index pos; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	index neg; US CSA levels (Clinical Diagnosis and Nerve Conduction Studies (NCS); >90% neurologist confidence)	.	AR	0.46 0.92	5.66 0.58	MODERATE	POOR
Fowler,J.R., 2014	Moderate Quality	CTS Positive (Ultrasound; CSA proximal inlet; >10mm sq)	referred for EDS	DML 4.2ms+ or DSL 3.2ms+	Subjects	index pos; US CSA (Nerve Conduction Studies (NCS); AANEM referenced)	52	index neg; US CSA (Nerve Conduction Studies (NCS); AANEM referenced)	33	0.90 0.76	0.85 0.83	5.13 0.17	MODERATE	MODERATE
Hashemi,A.-H., 2009	Moderate Quality	CTS Positive (Ultrasound; CSA max; >10mm sq)	50 CTS suspects referred to the hospital	NCV of median nerve in carpal tunnel and ring finger	Extremities	index pos; US (Nerve Conduction Studies (NCS))	60	index neg; US (Nerve Conduction Studies (NCS))	40	0.80 0.88	0.91 0.74	3.55 0.13	WEAK	MODERATE
Kang,E.K., 2008	Moderate Quality	CTS Positive (Current Perception Threshold (CPT))	all women; 31 patients referred for NCS	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; CPT (Nerve Conduction Studies (NCS); AANEM referenced)	34	index neg; CPT (Nerve Conduction Studies (NCS); AANEM referenced)	26	0.59 0.65	0.69 0.55	1.53 0.57	POOR	POOR
Lo,J.K., 2002	Moderate Quality	CTS Positive (Electromyography (EMG); APB deinnervation potentials)	charts of all patients suspected of CTS referred to outpatient EDS lab	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; EMG (Nerve Conduction Studies (NCS); AANEM referenced)	48	index neg; EMG (Nerve Conduction Studies (NCS); AANEM referenced)	300	0.92 0.58	0.26 0.98	11.65 0.76	STRONG	POOR
Moghtaderi, A., 2012	Moderate Quality	CTS Positive (Ultrasound; CSA distal outlet; >13.5mm sq)	CTS moderate or severe patients from one clinic vs upper limb pain controls	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; CSA prox and distal (Nerve Conduction Studies (NCS); AANEM referenced)	16	index neg; CSA prox and distal (Nerve Conduction Studies (NCS); AANEM referenced)	63	0.81 0.63	0.36 0.93	5.18 0.69	MODERATE	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Moghtaderi, A., 2012	Moderate Quality	CTS Positive (Ultrasound; CSA proximal inlet; >11.5mm sq)	CTS moderate or severe patients from one clinic vs upper limb pain controls	motor, mixed, sensory nerve cutoffs referenced	Subjects	index pos; CSA prox and distal (Nerve Conduction Studies (NCS); AANEM referenced)	34	index neg; CSA prox and distal (Nerve Conduction Studies (NCS); AANEM referenced)	45	0.88 0.87	0.83 0.91	8.96 0.18	MODERATE	MODERATE
Nakamichi, K., 2002	Moderate Quality	CTS Positive (Ultrasound; CSA inlet)	275 clinically diagnosed CTS patients	sensory and motor latency cutoffs	Extremities	index pos; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	47	index neg; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	367	0.85 0.29	0.13 0.94	2.15 0.92	WEAK	POOR
Nakamichi, K., 2002	Moderate Quality	CTS Positive (Ultrasound; CSA mid)	275 clinically diagnosed CTS patients	sensory and motor latency cutoffs	Extremities	index pos; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	20	index neg; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	394	0.45 0.26	0.03 0.90	0.31 1.07	POOR	POOR
Nakamichi, K., 2002	Moderate Quality	CTS Positive (Ultrasound; CSA mid and CSA inlet)	275 clinically diagnosed CTS patients	sensory and motor latency cutoffs	Extremities	index pos; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	14	index neg; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	400	0.86 0.28	0.04 0.98	2.25 0.98	WEAK	POOR
Nakamichi, K., 2002	Moderate Quality	CTS Positive (Ultrasound; CSA outlet)	275 clinically diagnosed CTS patients	sensory and motor latency cutoffs	Extremities	index pos; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	59	index neg; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	355	0.66 0.26	0.13 0.82	0.73 1.06	POOR	POOR
Nakamichi, K., 2002	Moderate Quality	CTS Positive (Ultrasound; CSA outlet and CSA inlet)	275 clinically diagnosed CTS patients	sensory and motor latency cutoffs	Extremities	index pos; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	29	index neg; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	385	0.90 0.29	0.09 0.97	3.25 0.94	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Nakamichi,K., 2002	Moderate Quality	CTS Positive (Ultrasound; CSA outlet and CSA mid)	275 clinically diagnosed CTS patients	sensory and motor latency cutoffs	Extremities	index pos; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	60	index neg; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	354	0.75 0.28	0.15 0.87	1.13 0.98	POOR	POOR
Nakamichi,K., 2002	Moderate Quality	CTS Positive (Ultrasound; CSA outlet, CSA mid, and CSA inlet)	275 clinically diagnosed CTS patients	sensory and motor latency cutoffs	Extremities	index pos; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	87	index neg; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	327	0.92 0.32	0.27 0.94	4.29 0.78	WEAK	POOR
Nakamichi,K., 2002	Moderate Quality	CTS Positive (Ultrasound; no CSA abnormality at distal, mid, or proximal)	275 clinically diagnosed CTS patients	sensory and motor latency cutoffs	Extremities	index pos; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	98	index neg; US CSA locations (Nerve Conduction Studies (NCS); AANEM referenced)	316	0.51 0.21	0.17 0.58	0.39 1.45	POOR	POOR
Pastare,D., 2009	Moderate Quality	CTS Positive (Ultrasound; CSA inlet; >9mm sq)	66 CTS suspected patients referred to Neuro lab in Singapore hosp	sensory, motor, and LINT cutoffs	Extremities	index pos; CSA proximal (Nerve Conduction Studies (NCS); AANEM referenced)	50	index neg; CSA proximal (Nerve Conduction Studies (NCS); AANEM referenced)	47	0.96 0.51	0.68 0.92	8.79 0.35	MODERATE	WEAK
Stalberg,E., 2000	Moderate Quality	CTS Positive (Automatic Carpal Tunnel Tester)	Only 178 hands readable on CT tester; 136 patients with presumptive CTS diagnosis	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; CT tester (Nerve Conduction Studies (NCS); AANEM referenced)	49	index neg; CT tester (Nerve Conduction Studies (NCS); AANEM referenced)	129	0.90 0.97	0.92 0.96	23.83 0.09	STRONG	STRONG

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Swen,W.A., 2001	Moderate Quality	CTS Positive (Distal Sensory Latency (DSL) difference from Ulnar; digit 4)	63 symptomatic patients visiting neuro clinic	Surgical relief on VAS scale; motor, mixed, sensory nerve cutoffs referenced for NCS	Subjects	index pos; NCS; DSL; CSA (Surgical Relief of Symptoms; 90+ percent improvement on VAS scale after 3 months)	58	index neg; NCS; DSL; CSA (Surgical Relief of Symptoms; 90+ percent improvement on VAS scale after 3 months)	5	0.78 0.60	0.96 0.19	1.18 0.23	POOR	WEAK
Swen,W.A., 2001	Moderate Quality	CTS Positive (Nerve Conduction Studies (NCS); AANEM referenced)	63 symptomatic patients visiting neuro clinic	Surgical relief on VAS scale; motor, mixed, sensory nerve cutoffs referenced for NCS	Subjects	index pos; NCS; DSL; CSA (Surgical Relief of Symptoms; 90+ percent improvement on VAS scale after 3 months)	59	index neg; NCS; DSL; CSA (Surgical Relief of Symptoms; 90+ percent improvement on VAS scale after 3 months)	4	0.78 0.75	0.98 0.19	1.20 0.11	POOR	MODERATE
Swen,W.A., 2001	Moderate Quality	CTS Positive (Ultrasound; CSA inlet; Elipse Formula; >10mm sq)	63 symptomatic patients visiting neuro clinic	Surgical relief on VAS scale; motor, mixed, sensory nerve cutoffs referenced for NCS	Subjects	index pos; NCS; DSL; CSA (Surgical Relief of Symptoms; 90+ percent improvement on VAS scale after 3 months)	39	index neg; NCS; DSL; CSA (Surgical Relief of Symptoms; 90+ percent improvement on VAS scale after 3 months)	24	0.85 0.42	0.70 0.63	1.87 0.48	POOR	WEAK
Szopinski,K., 2011	Moderate Quality	CTS Positive (Ultrasound; cross sectional shape; non-triangular)	76 patients with clinical diagnosis of CTS	motor and sensory latency and velocity cutoff values	Extremities	index pos; CS shape triangular, non triangular (Nerve Conduction Studies (NCS); AANEM referenced)	124	index neg; CS shape triangular, non triangular (Nerve Conduction Studies (NCS); AANEM referenced)	15	0.85 0.13	0.89 0.10	0.98 1.16	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Szopinski,K., 2011	Moderate Quality	CTS Positive (Ultrasound; cross sectional shape; triangular)	76 patients with clinical diagnosis of CTS	motor and sensory latency and velocity cutoff values	Extremities	index pos; CS shape triangular, non triangular (Nerve Conduction Studies (NCS); AANEM referenced)	15	index neg; CS shape triangular, non triangular (Nerve Conduction Studies (NCS); AANEM referenced)	124	0.87 0.15	0.11 0.90	1.16 0.98	POOR	POOR
Weber,R.A., 2000	Moderate Quality	CTS Positive (Nerve Conduction Studies (NCS); AANEM referenced)	53 patients with suspected CTS from one hosp	history and physical signs and symptoms	Extremities	index pos; NCS (Clinical Diagnosis)	67	index neg; NCS (Clinical Diagnosis)	39	0.64 0.72	0.80 0.54	1.73 0.38	POOR	WEAK
Werner,R.A., 1994	Moderate Quality	CTS Positive (Vibratory Threshold)	130 line workers at a company with complaints of symptoms; 1 was unable to get NCS due to cast	median to ulnar sensory peak latency of >.5ms	Subjects	index pos; VT (Nerve Conduction Studies (NCS))	8	index neg; VT (Nerve Conduction Studies (NCS))	121	0.13 0.79	0.04 0.93	0.57 1.03	POOR	POOR
Werner,R.A., 1995	Moderate Quality	CTS Positive (Vibratory Threshold; Jetzer Index)	patients recruited from 2 manufacturing plants; current symptoms not required	median to ulnar sensory peak latency of >.5ms	Subjects	index pos; VT Jetzer (Nerve Conduction Studies (NCS))	80	index neg; VT Jetzer (Nerve Conduction Studies (NCS))	87	0.31 0.82	0.61 0.56	1.40 0.69	POOR	POOR
Yazdchi,M., 2012	Moderate Quality	CTS Positive (Ultrasound; CSA inlet; >12.5mm sq)	90 CTS suspected patients	motor and sensory latency responses	Extremities	index pos; US variations (Nerve Conduction Studies (NCS) and Electromyography (EMG))	121	index neg; US variations (Nerve Conduction Studies (NCS) and Electromyography (EMG))	59	0.92 0.25	0.72 0.60	1.79 0.47	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Yazdchi,M., 2012	Moderate Quality	CTS Positive (Ultrasound; CSA outlet; >11.5mm sq)	90 CTS suspected patients	motor and sensory latency responses	Extremities	index pos; US variations (Nerve Conduction Studies (NCS) and Electromyography (EMG))	129	index neg; US variations (Nerve Conduction Studies (NCS) and Electromyography (EMG))	51	0.91 0.27	0.76 0.56	1.73 0.43	POOR	WEAK
Yazdchi,M., 2012	Moderate Quality	CTS Positive (Ultrasound; CSA proximal inlet; >11.5mm sq)	90 CTS suspected patients	motor and sensory latency responses	Extremities	index pos; US variations (Nerve Conduction Studies (NCS) and Electromyography (EMG))	129	index neg; US variations (Nerve Conduction Studies (NCS) and Electromyography (EMG))	51	0.91 0.27	0.76 0.56	1.73 0.43	POOR	WEAK

TABLE 22: LOW QUALITY STUDIES- PICO 3 (IMAGING MODALITIES VERSUS REFERENCE STANDARD)

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Beckenbaugh,R. D., 1995	Low Quality	CTS Positive (Hand Held Electroneurometer; motor latency >2.8ms)	45 CTS suspected patients	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; hand held EMG; ML cutoffs (Electromyography (EMG))	63	index neg; hand held EMG; ML cutoffs (Electromyography (EMG))	1	0.89 1.00	1.00 0.13	1.14 0.00	POOR	STRONG
Beckenbaugh,R. D., 1995	Low Quality	CTS Positive (Hand Held Electroneurometer; motor latency >3.2ms)	45 CTS suspected patients	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; hand held EMG; ML cutoffs (Electromyography (EMG))	59	index neg; hand held EMG; ML cutoffs (Electromyography (EMG))	5	0.93 0.80	0.98 0.50	1.96 0.04	POOR	STRONG
Beckenbaugh,R. D., 1995	Low Quality	CTS Positive (Hand Held Electroneurometer; motor latency >3.7ms)	45 CTS suspected patients	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; hand held EMG; ML cutoffs (Electromyography (EMG))	55	index neg; hand held EMG; ML cutoffs (Electromyography (EMG))	9	0.96 0.67	0.95 0.75	3.79 0.07	WEAK	STRONG
Beckenbaugh,R. D., 1995	Low Quality	CTS Positive (Hand Held Electroneurometer; motor latency >3.9ms)	45 CTS suspected patients	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; hand held EMG; ML cutoffs (Electromyography (EMG))	49	index neg; hand held EMG; ML cutoffs (Electromyography (EMG))	15	0.98 0.47	0.86 0.88	6.86 0.16	MODERATE	MODERATE
Beckenbaugh,R. D., 1995	Low Quality	CTS Positive (Hand Held Electroneurometer; motor latency >4.3ms)	45 CTS suspected patients	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; hand held EMG; ML cutoffs (Electromyography (EMG))	39	index neg; hand held EMG; ML cutoffs (Electromyography (EMG))	25	0.97 0.28	0.68 0.88	5.43 0.37	MODERATE	WEAK
Beckenbaugh,R. D., 1995	Low Quality	CTS Positive (Hand Held Electroneurometer; motor latency >4.7ms)	45 CTS suspected patients	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; hand held EMG; ML cutoffs (Electromyography (EMG))	29	index neg; hand held EMG; ML cutoffs (Electromyography (EMG))	35	1.00 0.23	0.52 1.00	10.00 0.48	STRONG	WEAK
Deniz,F.E., 2012	Low Quality	CTS Positive (CT; Distal Area)	patients referred to Neuro services for suspected CTS		Subjects	index pos; MRI; CT; EMG (Clinical Diagnosis)	39	index neg; MRI; CT; EMG (Clinical Diagnosis)	39	AR	0.68 0.87	5.08 0.37	MODERATE	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Deniz,F.E., 2012	Low Quality	CTS Positive (CT; Distal Density)	patients referred to Neuro services for suspected CTS		Subjects	index pos; MRI; CT; EMG (Clinical Diagnosis)	39	index neg; MRI; CT; EMG (Clinical Diagnosis)	39	AR	0.71 0.75	2.82 0.39	WEAK	WEAK
Deniz,F.E., 2012	Low Quality	CTS Positive (CT; Proximal Area)	patients referred to Neuro services for suspected CTS		Subjects	index pos; MRI; CT; EMG (Clinical Diagnosis)	39	index neg; MRI; CT; EMG (Clinical Diagnosis)	39	AR	0.97 0.47	1.82 0.06	POOR	STRONG
Deniz,F.E., 2012	Low Quality	CTS Positive (CT; Proximal Density)	patients referred to Neuro services for suspected CTS		Subjects	index pos; MRI; CT; EMG (Clinical Diagnosis)	39	index neg; MRI; CT; EMG (Clinical Diagnosis)	39	AR	0.68 0.80	3.38 0.41	WEAK	WEAK
Deniz,F.E., 2012	Low Quality	CTS Positive (Electromyography (EMG))	patients referred to Neuro services for suspected CTS		Subjects	index pos; MRI; CT; EMG (Clinical Diagnosis)	69	index neg; MRI; CT; EMG (Clinical Diagnosis)	69	AR	0.91 0.81	4.84 0.11	WEAK	MODERATE
Deniz,F.E., 2012	Low Quality	CTS Positive (MRI; Distal Area)	patients referred to Neuro services for suspected CTS		Subjects	index pos; MRI; CT; EMG (Clinical Diagnosis)	50	index neg; MRI; CT; EMG (Clinical Diagnosis)	50	AR	0.65 0.80	3.25 0.44	WEAK	WEAK
Deniz,F.E., 2012	Low Quality	CTS Positive (MRI; Distal Intensity)	patients referred to Neuro services for suspected CTS		Subjects	index pos; MRI; CT; EMG (Clinical Diagnosis)	50	index neg; MRI; CT; EMG (Clinical Diagnosis)	50	AR	0.88 0.40	1.46 0.31	POOR	WEAK
Deniz,F.E., 2012	Low Quality	CTS Positive (MRI; Proximal Area)	patients referred to Neuro services for suspected CTS		Subjects	index pos; MRI; CT; EMG (Clinical Diagnosis)	50	index neg; MRI; CT; EMG (Clinical Diagnosis)	50	AR	0.43 1.00	10.00 0.58	STRONG	POOR
Deniz,F.E., 2012	Low Quality	CTS Positive (MRI; Proximal Intensity)	patients referred to Neuro services for suspected CTS		Subjects	index pos; MRI; CT; EMG (Clinical Diagnosis)	50	index neg; MRI; CT; EMG (Clinical Diagnosis)	50	AR	0.88 0.60	2.19 0.21	WEAK	WEAK
Glowacki,K.A., 1996	Low Quality	CTS Positive (Electrodiagnostic Studies; NCS/EMG; AANEM referenced)	93 clinically diagnosed CTS surgical patients undergoing EDS	motor and sensory latency and velocity cutoff values	Extremities	index pos; EDS; emg/ncs (Surgical Relief of Symptoms; resolved or improved)	99	index neg; EDS; emg/ncs (Surgical Relief of Symptoms; resolved or improved)	27	0.93 0.07	0.79 0.22	1.01 0.96	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Kaul,M.P., 2002	Low Quality	CTS Positive (2L-INT)	obtainable responses from 158 subjects	palm diff rates referenced	Subjects	index pos; 2L-INT (Nerve Conduction Studies (NCS); palm-diff)	78	index neg; 2L-INT (Nerve Conduction Studies (NCS); palm-diff)	51	0.92 0.88	0.92 0.88	7.85 0.09	MODERATE	STRONG
Mallouhi,A., 2006	Low Quality	CTS Positive (Ultrasound; nerve edema)	clinically suspected CTS suspects from database	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; US edema; US hypervascular (Nerve Conduction Studies (NCS))	149	index neg; US edema; US hypervascular (Nerve Conduction Studies (NCS))	57	0.92 0.39	0.80 0.65	2.26 0.31	WEAK	WEAK
Mallouhi,A., 2006	Low Quality	CTS Positive (Ultrasound; nerve hypervascularization)	clinically suspected CTS suspects from database	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; US edema; US hypervascular (Nerve Conduction Studies (NCS))	174	index neg; US edema; US hypervascular (Nerve Conduction Studies (NCS))	32	0.94 0.75	0.95 0.71	3.24 0.07	WEAK	STRONG
Missere,M., 1999	Low Quality	CTS Positive (Ultrasound; M Index)	45 workers recruited for potential job risk of CTS	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; US M index (M space decrease) (Electromyography (EMG))	61	index neg; US M index (M space increase) (Electromyography (EMG))	29	0.36 0.86	0.85 0.39	1.39 0.39	POOR	WEAK
Sheean,G.L., 1995	Low Quality	CTS Positive (2L-INT; DML)	virtually consecutive suspected CTS patients	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; 2L-INT-DML (Nerve Conduction Studies (NCS); AANEM referenced)	49	index neg; 2L-INT-DML (Nerve Conduction Studies (NCS); AANEM referenced)	17	0.98 0.94	0.98 0.94	16.65 0.02	STRONG	STRONG
Smith,T., 1998	Low Quality	CTS Positive (Electromyography (EMG); Sensory Nerve Conduction (SNC); Needle; AANEM referenced)	CTS suspected patients referred to neuro dept	SCN cutoffs	Subjects	index pos; EMG SNC (Nerve Conduction Studies (NCS); Sensory Nerve Conduction (SNC); Surface; AANEM referenced)	44	index neg; EMG SNC (Nerve Conduction Studies (NCS); Sensory Nerve Conduction (SNC); Surface; AANEM referenced)	38	0.84 0.92	0.93 0.83	5.55 0.09	MODERATE	STRONG

DIAGNOSTIC SCALES

Moderate evidence supports that diagnostic questionnaires and/or electrodiagnostic studies could be used to aid the diagnosis of carpal tunnel syndrome.

Strength of Recommendation: Moderate Evidence 

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

Rationale

The evaluation of diagnostic tools, either scales based on clinically acquired information from the history and physical examination, or electrodiagnostic tests, requires a clear consensus on a reference standard against which the performance of these diagnostic tests can be compared. This type of consensus still does not exist with respect to carpal tunnel syndrome. It is recognized that electrodiagnostic testing has long been considered to represent a reference standard but this assumption is untenable because these tests clearly have false positive and negative results. Beyond this there simply is no consensus supporting any single diagnostic tool as a reference standard. Where clinical diagnostic scales are taken as the reference standard, electrodiagnostic tests may demonstrate poor sensitivity and specificity. The same is true of clinical diagnostic scales when electrodiagnostic tests are taken as the reference standard. Agreement between electrodiagnostic tests and clinical diagnostic tests, regardless of which is taken as the reference standard, is also complicated by the binary nature of the comparison. Electrodiagnostic data is, by and large, continuous in nature and so establishing a hard cutoff point to compare to clinical diagnostic scales seems potentially arbitrary. At least one of the clinical diagnostic scales, the CTS-6, attempts to address this by defining the diagnosis in probabilistic terms as a continuous variable. Given this set of circumstances the Workgroup sought to evaluate the role of clinical diagnostic tests and electrodiagnostic testing in the evaluation of CTS in the context in which they are used, in other words, in clinical settings where a patient presents with complaints that might be attributable to this condition.

There were two clinical diagnostic tests studied in high quality investigations, the Katz Hand Diagram and the CTS-6. The Boston Carpal Tunnel Scale, a status instrument most frequently used to measure outcomes of treatment for CTS was also evaluated in two high quality studies.

In comparison to electrodiagnostic testing Katz et al demonstrated high sensitivity (0.96) and good negative predictive value (0.91) for the “classic”, “probable” or “possible” designations however, positive predictive value and specificity were low. This indicates that, using electrodiagnostic testing as a reference standard, the Katz Hand Diagram used in this way had more value as a “rule out test”. Sensitivity decreased and specificity increased if comparison to electrodiagnostic tests was made only using “classic” or “probable” results. Sensitivity decreased further and specificity was commensurately increased when only “classic” results were compared to electrodiagnostic testing. Defined using only “classic” or “probable” results the Katz Hand Diagram was considered weak or poor as either a “rule in” or “rule out” test. Vanti made similar observations using AANEM electrodiagnostic definitions for CTS in demonstrating that the “classic” or “probable” results functioned as a strong “rule out” test.

Graham took a different approach to evaluating the respective roles of electrodiagnostic testing and the CTS-6, an instrument that expresses the probability of CTS. The pre-test probability of CTS was established using the CTS-6 and then the post-test probability after electrodiagnostic testing was estimated using likelihood ratios established with two electrodiagnostic standards for CTS, one lax (with higher sensitivity and lower specificity) and one stringent (with lower sensitivity and higher specificity). This study showed that the changes in probability after electrodiagnostic testing, using either electrodiagnostic definition, were small and probably below a clinically relevant standard. This suggests that the most appropriate setting for electrodiagnostic testing is where there is uncertainty about the clinical diagnosis.

There were two high quality studies evaluating the Boston Carpal Tunnel Syndrome Questionnaire (Wainner, Naranjo). Both of these studies used electrodiagnostic tests as the reference standard. The results were consistent in both studies in showing that this instrument functioned as either a weak or poor “rule in” or “rule out” test. This may have been due to the fact that the scale was actually developed as a status instrument rather than as a diagnostic scale.

Risks and Harms of Implementing this Recommendation

While diagnostic scales/questionnaires can be used for the clinical assessment of CTS, they may be unable to exclude other etiologies that could mimic CTS (such as cervical radiculopathy), or identify other disorders (such as polyneuropathy) that may affect the decision making process regarding therapy. Where indicated, appropriate clinical evaluation for alternative diagnoses should be carried out. Electrodiagnostic testing may be of most value when the clinical diagnosis is unclear or when atypical features exist.

Future Research

Establishing consensus on a reference standard for the diagnosis for CTS is the most important research goal in this area.

QUALITY TABLE OF DIAGNOSTIC SCALES

Table 23. Diagnostic Quality Evaluations

Study	Representative Population	Clear Selection Criteria	Detailed Enough to Replicate	Reference Standard Identifies Target Condition	Blinding	Other Bias?	Inclusion	Strength
Atroschi,I., 2003	●	●	●	○	●	●	Include	Moderate Quality
Bland,J.D., 2014	●	●	●	●	○	●	Include	Low Quality
Bonauto,D.K., 2008	●	●	●	●	●	●	Include	Moderate Quality
Calfee,R.P., 2012	●	●	●	●	●	●	Include	Moderate Quality
Cartwright,M.S., 2013	●	●	●	●	●	●	Include	Moderate Quality
Dale,A.M., 2011	●	●	●	●	●	●	Include	Moderate Quality
Dhong,E.S., 2000	●	●	●	●	●	●	Include	Moderate Quality
Fowler,J.R., 2014	●	●	●	●	●	●	Include	Moderate Quality
Franzblau,A., 1994	●	●	●	●	●	●	Include	Moderate Quality
Gomes,I., 2006	●	●	●	●	●	●	Include	Moderate Quality
Graham,B., 2008	●	●	●	●	●	●	Include	High Quality
Hems,T.E., 2009	●	●	●	●	●	●	Include	Moderate Quality
Katz,J.N., 1990 (A)	●	●	○	●	●	●	Include	Moderate Quality
Katz,J.N., 1990 (B)	●	●	●	●	●	●	Include	High Quality
Katz,J.N., 1990 (C)	●	●	●	●	●	●	Include	High Quality
Katz,J.N., 1991	●	●	●	●	●	●	Include	Moderate Quality
Kuhlman,K.A., 1997	●	●	●	●	●	●	Include	Moderate Quality
Lo,J.K., 2009	●	●	●	●	●	●	Include	High Quality
Makanji,H.S., 2014	●	●	●	●	●	●	Include	Moderate Quality
Naranjo,A., 2007	●	●	●	●	●	●	Include	High Quality
Padua,L., 1999	●	●	●	●	●	●	Include	Moderate Quality
Stevens,J.C., 1997	●	●	●	●	●	●	Include	Moderate Quality
Vanti,C., 2012	●	●	●	●	●	●	Include	High Quality
Wainner,R.S., 2005	●	●	●	●	●	●	Include	High Quality
Westerman,D., 2012	●	●	●	●	●	●	Include	High Quality
Yagci,I., 2010	●	●	●	●	●	●	Include	Moderate Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 24: SUMMARY OF FINDINGS- INDEX TEST VERSUS AANEM REFERENCED EDS

	LR +	LR -	
●	≥10	≤0.1	In " STRONG " agreement with the reference standard
◐	≥5 but <10	>0.1 but ≤0.2	In " MODERATE " agreement with the reference standard
◑	>2 and <5	>0.2 but <0.5	In " WEAK " agreement with the reference standard
○	≤2	≥0.5	In " POOR " agreement with the reference standard

Index Test	Rule In/Out	High Quality		Moderate Quality				Meta-Analysis
		Vanti, C., 2012	Wainner, R.S., 2005	Bonauto, D.K., 2008	Fowler, J.R., 2014	Gomes, I., 2006	Makanji, H.S., 2014	
**CTS-6; Stringent; 80+%	RULE IN				◐		○	NA
	RULE OUT				●		○	NA
Katz Hand Diagram; classic or probable	RULE IN	○	○	○		○		○
	RULE OUT	●	○	○		◐		◐
Katz Hand Diagram; classic	RULE IN			◐				●
	RULE OUT			○				◐
<i>Table only displays index tests with more than one article of supporting evidence</i>								
<i>**As displayed in the full data sheet, Graham, B., 2008 presents a high quality article with varying methodology to evaluate the utility of CTS-6 as compared to EDS AAEM as well</i>								

TABLE 25: SUMMARY OF FINDINGS- INDEX TEST VERSUS GENERAL EDS METHODS

	LR +	LR -	
●	≥10	≤0.1	In "STRONG" agreement with the reference standard
◐	≥5 but <10	>0.1 but ≤0.2	In "MODERATE" agreement with the reference standard
◑	>2 and <5	>0.2 but <0.5	In "WEAK" agreement with the reference standard
○	≤2	≥0.5	In "POOR" agreement with the reference standard

Index Test	Rule In/Out	High Quality		Moderate Quality								Meta-Analysis		
		Katz, J.N., 1990 (B)	Katz, J.N., 1990 (C)	Calfee, R.P., 2012 (1)	Calfee, R.P., 2012 (2)	Calfee, R.P., 2012 (3)	Cartwright, M.S., 2013 (1)	Cartwright, M.S., 2013 (2)	Cartwright, M.S., 2013 (3)	Dale, A.M., 2011	Katz, J.N., 1990 (A)		Katz, J.N., 1991	
Katz Hand Diagram; classic	RULE IN		◑											NA
	RULE OUT		○											NA
Katz Hand Diagram; classic or probable	RULE IN	◑	◑	○	○	○	◑	◑	◑	○	◐	○		○
	RULE OUT	○	◑	○	○	○	○	○	○	○	◑	◑		○
Katz Hand Diagram; classic, probable, or possible	RULE IN		○								○			NA
	RULE OUT		●								●			NA

Table only displays index tests with more than one article of supporting evidence

Authors with parenthetical numbers indicate a change in EDS method/threshold, alternate limbs, or alternate examiner

Authors with parenthetical letters indicate a unique study with the same author and year as another study listed in the guideline

DETAILED DATA FINDINGS

TABLE 26: HIGH QUALITY STUDIES: PICO 4 (DIAGNOSTIC SCALES VERSUS REFERENCE STANDARD)

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes reported by:	Group1 (Reference Standard)	Group 1 N	Group2 (Reference Standard)	Group 2 N	Coefficient of Average Change in Probability (Pre-Post Test)	SD
Graham,B., 2008	High Quality	CTS Positive (CTS-6; Stringent; 80+%)	patients referred to EDS lab in a tertiary care center	Stringent Sensory Latency 2.27+ms	Subjects	index pos; CTS 6 stringent (Nerve Conduction Studies (NCS); AAEM referenced)	104	index neg; CTS 6 stringent (Nerve Conduction Studies (NCS); AAEM referenced)	39	-0.02	0.1
Graham,B., 2008	High Quality	CTS Positive (CTS-6; Very Stringent; 90+%)	patients referred to EDS lab in a tertiary care center	Stringent Sensory Latency 2.27+ms	Subjects	index pos; CTS 6 very stringent (Nerve Conduction Studies (NCS); AAEM referenced)	84	index neg; CTS 6 very stringent (Nerve Conduction Studies (NCS); AAEM referenced)	59	-0.02	0.1
Graham,B., 2008	High Quality	CTS Positive (CTS-6; Stringent; 80+%)	patients referred to EDS lab in a tertiary care center	Lax Sensory Latency >2ms	Subjects	index pos; CTS 6 stringent (Nerve Conduction Studies (NCS); AAEM referenced)	104	index neg; CTS 6 stringent (Nerve Conduction Studies (NCS); AAEM referenced)	39	-0.06	0.2
Graham,B., 2008	High Quality	CTS Positive (CTS-6; Very Stringent; 90+%)	patients referred to EDS lab in a tertiary care center	Lax Sensory Latency >2ms	Subjects	index pos; CTS 6 very stringent (Nerve Conduction Studies (NCS); AAEM referenced)	84	index neg; CTS 6 very stringent (Nerve Conduction Studies (NCS); AAEM referenced)	59	-0.01	0.1

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Katz,J.N., 1990 (B)	High Quality	CTS Positive (Katz Hand Diagram; classic or probable)	discomfort patients suspected of CTS	referenced sensory and motor cutoffs	Subjects	index pos; katz (Nerve Conduction Studies (NCS))	46	index neg; katz (Nerve Conduction Studies (NCS))	64	0.59 0.73	0.61 0.71	2.13 0.54	WEAK	POOR
Katz,J.N., 1990 (C)	High Quality	CTS Positive (Katz Hand Diagram; classic)	110 suspected CTS patients referred to one hosp	motor latency, sensory latency, and sensory velocity cutoffs	Extremities	index pos; katz levels (Nerve Conduction Studies (NCS))	30	index neg; katz levels (Nerve Conduction Studies (NCS))	115	0.60 0.70	0.34 0.87	2.60 0.76	WEAK	POOR
Katz,J.N., 1990 (C)	High Quality	CTS Positive (Katz Hand Diagram; classic or probable)	110 suspected CTS patients referred to one hosp	motor latency, sensory latency, and sensory velocity cutoffs	Extremities	index pos; katz levels (Nerve Conduction Studies (NCS))	59	index neg; katz levels (Nerve Conduction Studies (NCS))	86	0.58 0.78	0.64 0.73	2.36 0.49	WEAK	WEAK
Katz,J.N., 1990 (C)	High Quality	CTS Positive (Katz Hand Diagram; classic, probable, or possible)	110 suspected CTS patients referred to one hosp	motor latency, sensory latency, and sensory velocity cutoffs	Extremities	index pos; katz levels (Nerve Conduction Studies (NCS))	122	index neg; katz levels (Nerve Conduction Studies (NCS))	23	0.42 0.91	0.96 0.23	1.25 0.17	POOR	MODERATE
Lo,J.K., 2009	High Quality	CTS Positive (Clinical point-score system; >10)	all CTS suspects chosen from a group of 348 as the patients with highest risk factors for CTS	sensory, motor, or combination of abnormalities	Subjects	index pos; clinical point-score system; >10 = CTS (Nerve Conduction Studies (NCS); AANEM referenced)	164	index neg; clinical point-score system; >10 = CTS (Nerve Conduction Studies (NCS); AANEM referenced)	114	0.32 0.16	0.36 0.14	0.41 4.62	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Naranjo,A., 2007	High Quality	CTS Positive (Boston Carpal Tunnel Questionnaire (BCTQ); Functional severity scale)	68 patients with suspected CTS	BCTQ cutoff at >3	Extremities	index pos; BCTQ FSS, SSS (Nerve Conduction Studies (NCS); AANEM referenced)	37	index neg; BCTQ FSS, SSS (Nerve Conduction Studies (NCS); AANEM referenced)	68	0.76 0.24	0.35 0.64	0.97 1.02	POOR	POOR
Naranjo,A., 2007	High Quality	CTS Positive (Boston Carpal Tunnel Questionnaire (BCTQ); Symptom severity scale)	68 patients with suspected CTS	BCTQ cutoff at >3	Extremities	index pos; BCTQ FSS, SSS (Nerve Conduction Studies (NCS); AANEM referenced)	49	index neg; BCTQ FSS, SSS (Nerve Conduction Studies (NCS); AANEM referenced)	56	0.80 0.27	0.49 0.60	1.22 0.85	POOR	POOR
Vanti,C., 2012	High Quality	CTS Positive (Katz Hand Diagram; classic or probable)	limbs of 47 patients		Extremities	index pos; katz (Nerve Conduction Studies (NCS); AANEM referenced)	62	index neg; katz (Nerve Conduction Studies (NCS); AANEM referenced)	22	0.56 1.00	1.00 0.45	1.81 0.00	POOR	STRONG
Wainner,R.S., 2005	High Quality	CTS Positive (Boston Carpal Tunnel Questionnaire (BCTQ); Functional severity scale; >2.5)	CTS and cervical radiculopathy suspects		Subjects	index pos; BCTQ FSS, SSS; katz; wrist ratio (Nerve Conduction Studies (NCS); AANEM referenced)	20	index neg; BCTQ FSS, SSS; katz; wrist ratio (Nerve Conduction Studies (NCS); AANEM referenced)	62	0.50 0.71	0.36 0.81	1.93 0.79	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Wainner,R.S., 2005	High Quality	CTS Positive (Boston Carpal Tunnel Questionnaire (BCTQ); Symptom severity scale; >1.9)	CTS and cervical radiculopathy suspects		Subjects	index pos; BCTQ FSS, SSS; katz; wrist ratio (Nerve Conduction Studies (NCS); AANEM referenced)	60	index neg; BCTQ FSS, SSS; katz; wrist ratio (Nerve Conduction Studies (NCS); AANEM referenced)	22	0.42 0.86	0.89 0.35	1.38 0.30	POOR	WEAK
Wainner,R.S., 2005	High Quality	CTS Positive (Katz Hand Diagram; classic or probable)	CTS and cervical radiculopathy suspects		Subjects	index pos; BCTQ FSS, SSS; katz; wrist ratio (Nerve Conduction Studies (NCS); AANEM referenced)	68	index neg; BCTQ FSS, SSS; katz; wrist ratio (Nerve Conduction Studies (NCS); AANEM referenced)	14	0.31 0.50	0.75 0.13	0.86 1.93	POOR	POOR
Wainner,R.S., 2005	High Quality	CTS Positive (Wrist Ratio Index; >.67)	CTS and cervical radiculopathy suspects		Subjects	index pos; BCTQ FSS, SSS; katz; wrist ratio (Nerve Conduction Studies (NCS); AANEM referenced)	66	index neg; BCTQ FSS, SSS; katz; wrist ratio (Nerve Conduction Studies (NCS); AANEM referenced)	16	0.39 0.88	0.93 0.26	1.25 0.28	POOR	WEAK
Wainner,R.S., 2005	High Quality	CTS Positive (Clinical Prediction Rule; 2 or more pos tests)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	70	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	8	0.36 0.88	0.96 0.13	1.11 0.29	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Wainner,R.S., 2005	High Quality	CTS Positive (Clinical Prediction Rule; 3 or more pos tests)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	49	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	29	0.51 0.97	0.96 0.54	2.08 0.07	WEAK	STRONG
Wainner,R.S., 2005	High Quality	CTS Positive (Clinical Prediction Rule; 4 or more pos tests)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	29	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	49	0.69 0.88	0.77 0.83	4.44 0.28	WEAK	WEAK
Wainner,R.S., 2005	High Quality	CTS Positive (Clinical Prediction Rule; all 5 pos tests; sympt improve by shaking, WR >.67, SSS >1.9, thumb deficit, age >45)	CTS and cervical radiculopathy suspects		Subjects	index pos; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	6	index neg; history questions; age; clinical combinations (Nerve Conduction Studies (NCS); AANEM referenced)	72	0.83 0.71	0.19 0.98	10.00 0.82	STRONG	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Westerman,D., 2012	High Quality	CTS Positive (Clinical Prediction; History and Physical; CTS vs Uncertain or No CTS)	CTS suspected referrals; 3 did not receive reference standard evaluation	2 of 3 abnormalities among sensory, motor and mixed nerve evals	Subjects	index pos; clinical prediction (ranked by case history and physical exam) (Nerve Conduction Studies (NCS); AANEM referenced)	84	index neg; clinical prediction (ranked by case history and physical exam) (Nerve Conduction Studies (NCS); AANEM referenced)	35	0.94 0.57	0.84 0.80	4.20 0.20	WEAK	MODERATE

TABLE 27: MODERATE QUALITY STUDIES: PICO 4 (DIAGNOSTIC SCALES VERSUS REFERENCE STANDARD)

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Atroshi,I., 2003	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	254 symptomatic responders to a mass survey mailing completed the hand diagram	physical tests, signs, and history	Subjects	index pos; katz (Clinical Diagnosis)	188	index neg; katz (Clinical Diagnosis)	66	0.44 0.86	0.90 0.35	1.39 0.28	POOR	WEAK
Bonauto,D. K., 2008	Moderate Quality	CTS Positive (Katz Hand Diagram; classic)	workers from various sites with current hand symptoms	motor and sensory latency cutoff values	Subjects	index pos; katz levels (Nerve Conduction Studies (NCS); AANEM referenced)	24	index neg; katz levels (Nerve Conduction Studies (NCS); AANEM referenced)	229	0.63 0.59	0.14 0.94	2.24 0.92	WEAK	POOR
Bonauto,D. K., 2008	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	workers from various sites with current hand symptoms	motor and sensory latency cutoff values	Subjects	index pos; katz levels (Nerve Conduction Studies (NCS); AANEM referenced)	56	index neg; katz levels (Nerve Conduction Studies (NCS); AANEM referenced)	197	0.48 0.59	0.25 0.80	1.25 0.94	POOR	POOR
Bonauto,D. K., 2008	Moderate Quality	CTS Positive (Katz Hand Diagram; classic, probable, or possible)	workers from various sites with current hand symptoms	motor and sensory latency cutoff values	Subjects	index pos; katz levels (Nerve Conduction Studies (NCS); AANEM referenced)	127	index neg; katz levels (Nerve Conduction Studies (NCS); AANEM referenced)	126	0.52 0.67	0.61 0.58	1.45 0.67	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Calfee,R.P., 2012 (1)	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Motor Latency (DML))	57	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Motor Latency (DML))	162	0.30 0.79	0.33 0.76	1.40 0.88	POOR	POOR
Calfee,R.P., 2012 (1)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); 2 digits)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Motor Latency (DML))	78	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Motor Latency (DML))	141	0.36 0.84	0.55 0.70	1.84 0.64	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Calfee,R.P., 2012 (1)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); Index finger)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Motor Latency (DML))	84	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Motor Latency (DML))	135	0.33 0.83	0.55 0.67	1.65 0.68	POOR	POOR
Calfee,R.P., 2012 (1)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); Long finger)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Motor Latency (DML))	93	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Motor Latency (DML))	126	0.37 0.87	0.67 0.65	1.90 0.51	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Calfee,R.P., 2012 (1)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); Thumb)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Motor Latency (DML))	57	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Motor Latency (DML))	162	0.32 0.80	0.35 0.77	1.52 0.84	POOR	POOR
Calfee,R.P., 2012 (2)	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Sensory Latency (DSL))	57	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Sensory Latency (DSL))	159	0.54 0.69	0.38 0.81	1.99 0.76	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Calfee,R.P., 2012 (2)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); 2 digits)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Sensory Latency (DSL))	76	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Sensory Latency (DSL))	140	0.58 0.74	0.54 0.76	2.29 0.60	WEAK	POOR
Calfee,R.P., 2012 (2)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); Index finger)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Sensory Latency (DSL))	80	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Sensory Latency (DSL))	136	0.55 0.73	0.54 0.73	2.04 0.62	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Calfee,R.P., 2012 (2)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); Long finger)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Sensory Latency (DSL))	91	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Sensory Latency (DSL))	126	0.59 0.79	0.67 0.73	2.45 0.46	WEAK	WEAK
Calfee,R.P., 2012 (2)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); Thumb)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Sensory Latency (DSL))	53	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Distal Sensory Latency (DSL))	163	0.47 0.66	0.31 0.79	1.49 0.87	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Calfee,R.P., 2012 (3)	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Median-Ulnar Sensory Difference (MUD))	57	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Median-Ulnar Sensory Difference (MUD))	156	0.51 0.72	0.40 0.80	1.99 0.75	POOR	POOR
Calfee,R.P., 2012 (3)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); 2 digits)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Median-Ulnar Sensory Difference (MUD))	77	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Median-Ulnar Sensory Difference (MUD))	136	0.55 0.77	0.58 0.75	2.30 0.57	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Calfee,R.P., 2012 (3)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); Index finger)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Median-Ulnar Sensory Difference (MUD))	81	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Median-Ulnar Sensory Difference (MUD))	132	0.53 0.77	0.59 0.73	2.17 0.56	WEAK	POOR
Calfee,R.P., 2012 (3)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); Long finger)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Median-Ulnar Sensory Difference (MUD))	91	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Median-Ulnar Sensory Difference (MUD))	122	0.54 0.80	0.67 0.70	2.24 0.47	WEAK	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Calfee,R.P., 2012 (3)	Moderate Quality	CTS Positive (Median Nerve Digit Score (MNDS); Thumb)	CTS suspects with hand symptoms from a group of workers		Subjects	index pos; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Median-Ulnar Sensory Difference (MUD))	53	index neg; katz; MNDS total, long, index, thumb (Nerve Conduction Studies (NCS); Median-Ulnar Sensory Difference (MUD))	160	0.45 0.69	0.33 0.79	1.59 0.85	POOR	POOR
Cartwright, M.S., 2013 (1)	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	Latino manual workers community sampled from 4 counties	median to ulnar sensory peak latency of >.8ms, >.5ms, or >.6ms	Subjects	index pos; katz (Nerve Conduction Studies (NCS); >.5ms)	34	index neg; katz (Nerve Conduction Studies (NCS); >.5ms)	479	0.50 0.69	0.10 0.95	2.11 0.94	WEAK	POOR
Cartwright, M.S., 2013 (2)	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	Latino manual workers community sampled from 4 counties	median to ulnar sensory peak latency of >.8ms, >.5ms, or >.6ms	Subjects	index pos; katz (Nerve Conduction Studies (NCS); >.6ms)	34	index neg; katz (Nerve Conduction Studies (NCS); >.6ms)	479	0.47 0.75	0.12 0.95	2.46 0.93	WEAK	POOR
Cartwright, M.S., 2013 (3)	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	Latino manual workers community sampled from 4 counties	median to ulnar sensory peak latency of >.8ms, >.5ms, or >.6ms	Subjects	index pos; katz (Nerve Conduction Studies (NCS); >.8ms)	34	index neg; katz (Nerve Conduction Studies (NCS); >.8ms)	479	0.38 0.83	0.14 0.95	2.76 0.91	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Dale,A.M., 2011	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	1108 recruits from 11 occupations of potential CTS risk	sensory, motor, and MUDS cutoffs	Extremities	index pos; katz (Nerve Conduction Studies (NCS))	62	index neg; katz (Nerve Conduction Studies (NCS))	2154	0.56 0.33	0.02 0.96	0.65 1.01	POOR	POOR
Dhong,E.S., 2000	Moderate Quality	CTS Positive (Modified Boston Carpal Tunnel Questionnaire (BCTQ); Functional severity scale)	138 patients; 95% housewives who failed splint treatment and had clinical diagnosis	sensory latency and amplitude	Extremities	index pos; BCTQ FSS, SSS (Nerve Conduction Studies (NCS); AANEM referenced)	222	index neg; 0 INDEX NEG CASES; BCTQ FSS, SSS (Nerve Conduction Studies (NCS); AANEM referenced)	0	0.93	1.00 0.00	1.00 0.60	POOR	POOR
Dhong,E.S., 2000	Moderate Quality	CTS Positive (Modified Boston Carpal Tunnel Questionnaire (BCTQ); Symptom severity scale)	138 patients; 95% housewives who failed splint treatment and had clinical diagnosis	sensory latency and amplitude	Extremities	index pos; BCTQ FSS, SSS (Nerve Conduction Studies (NCS); AANEM referenced)	222	index neg; 0 INDEX NEG CASES; BCTQ FSS, SSS (Nerve Conduction Studies (NCS); AANEM referenced)	0	0.93	1.00 0.00	1.00 0.60	POOR	POOR
Fowler,J.R., 2014	Moderate Quality	CTS Positive (CTS-6; Stringent; 80+%)	referred to EDS	80 percent prob; score of 12+	Subjects	index pos; CTS 6 stringent (Nerve Conduction Studies (NCS); AANEM referenced)	55	index neg; CTS 6 stringent (Nerve Conduction Studies (NCS); AANEM referenced)	30	0.89 0.80	0.89 0.80	4.45 0.14	WEAK	MODERATE

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Franzblau, A., 1994 (1)	Moderate Quality	CTS Positive (Modified Katz Hand Diagram; classic)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; modified katz variations (Nerve Conduction Studies (NCS); >.8ms)	59	index neg; modified katz variations (Nerve Conduction Studies (NCS); >.8ms)	757	0.27 0.83	0.11 0.94	1.75 0.95	POOR	POOR
Franzblau, A., 1994 (1)	Moderate Quality	CTS Positive (Modified Katz Hand Diagram; classic or probable)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; modified katz variations (Nerve Conduction Studies (NCS); >.8ms)	91	index neg; modified katz variations (Nerve Conduction Studies (NCS); >.8ms)	725	0.21 0.83	0.13 0.89	1.24 0.97	POOR	POOR
Franzblau, A., 1994 (1)	Moderate Quality	CTS Positive (Modified Katz Hand Diagram; classic, probable, or possible)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; modified katz variations (Nerve Conduction Studies (NCS); >.8ms)	159	index neg; modified katz variations (Nerve Conduction Studies (NCS); >.8ms)	657	0.16 0.82	0.17 0.80	0.88 1.03	POOR	POOR
Franzblau, A., 1994 (2)	Moderate Quality	CTS Positive (Modified Katz Hand Diagram; classic)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; modified Katz variations (Nerve Conduction Studies (NCS); >.5ms)	59	index neg; modified Katz variations (Nerve Conduction Studies (NCS); >.5ms)	757	0.42 0.84	0.17 0.95	3.46 0.87	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Franzblau, A., 1994 (2)	Moderate Quality	CTS Positive (Modified Katz Hand Diagram; classic or probable)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; modified Katz variations (Nerve Conduction Studies (NCS); >.5ms)	91	index neg; modified Katz variations (Nerve Conduction Studies (NCS); >.5ms)	725	0.33 0.84	0.21 0.91	2.31 0.87	WEAK	POOR
Franzblau, A., 1994 (2)	Moderate Quality	CTS Positive (Modified Katz Hand Diagram; classic, probable, or possible)	408 at risk workers from various facilities	median to ulnar sensory peak latency of >.8ms or >.5ms	Extremities	index pos; modified Katz variations (Nerve Conduction Studies (NCS); >.5ms)	159	index neg; modified Katz variations (Nerve Conduction Studies (NCS); >.5ms)	657	0.28 0.85	0.31 0.83	1.86 0.83	POOR	POOR
Gomes, I., 2006	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	2535 patients referred for NCS from 5 facilities	sensory, motor, and mixed nerve cutoffs	Extremities	index pos; katz (Nerve Conduction Studies (NCS); AANEM referenced)	2436	index neg; katz (Nerve Conduction Studies (NCS); AANEM referenced)	1471	0.50 0.79	0.80 0.49	1.55 0.42	POOR	WEAK
Hems, T.E., 2009	Moderate Quality	CTS Positive (Bland Questionnaire; 6+)	group of patients with clinically unconfirmed CTS among a group of suspected patients	motor and sensory latency cutoffs	Subjects	index pos; Bland Questionnaire (Nerve Conduction Studies (NCS))	74	index neg; Bland Questionnaire (Nerve Conduction Studies (NCS))	17	0.91 0.65	0.92 0.61	2.36 0.13	WEAK	MODERATE

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Hems,T.E., 2009	Moderate Quality	CTS Positive (Bland Questionnaire; 7+)	group of patients with clinically unconfirmed CTS among a group of suspected patients	motor and sensory latency cutoffs	Subjects	index pos; Bland Questionnaire (Nerve Conduction Studies (NCS))	66	index neg; Bland Questionnaire (Nerve Conduction Studies (NCS))	25	0.91 0.48	0.82 0.67	2.47 0.27	WEAK	WEAK
Hems,T.E., 2009	Moderate Quality	CTS Positive (Bland Questionnaire; 8+)	group of patients with clinically unconfirmed CTS among a group of suspected patients	motor and sensory latency cutoffs	Subjects	index pos; Bland Questionnaire (Nerve Conduction Studies (NCS))	57	index neg; Bland Questionnaire (Nerve Conduction Studies (NCS))	34	0.91 0.38	0.71 0.72	2.56 0.40	WEAK	WEAK
Hems,T.E., 2009	Moderate Quality	CTS Positive (Bland Questionnaire; Symptom Score Only; 6+)	group of patients with clinically unconfirmed CTS among a group of suspected patients	motor and sensory latency cutoffs	Subjects	index pos; Bland Questionnaire (Nerve Conduction Studies (NCS))	59	index neg; Bland Questionnaire (Nerve Conduction Studies (NCS))	32	0.88 0.34	0.71 0.61	1.83 0.47	POOR	WEAK
Katz,J.N., 1990 (A)	Moderate Quality	CTS Positive (Katz Hand Diagram; classic)	63 random patients from a group with upper extremity symptoms	no threshold for NCS evidence; one clinical confirmation (response to treatment)	Extremities	index pos; katz levels (Nerve Conduction Studies (NCS) and Clinical Diagnosis)	32	index neg; katz levels (Nerve Conduction Studies (NCS) and Clinical Diagnosis)	53	1.00 0.19	0.43 1.00	10.00 0.57	STRONG	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Katz,J.N., 1990 (A)	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	63 random patients from a group with upper extremity symptoms	no threshold for NCS evidence; one clinical confirmation (response to treatment)	Extremities	index pos; katz levels (Nerve Conduction Studies (NCS) and Clinical Diagnosis)	61	index neg; katz levels (Nerve Conduction Studies (NCS) and Clinical Diagnosis)	24	0.98 0.38	0.80 0.90	8.00 0.22	MODERATE	WEAK
Katz,J.N., 1990 (A)	Moderate Quality	CTS Positive (Katz Hand Diagram; classic, probable, or possible)	63 random patients from a group with upper extremity symptoms	no threshold for NCS evidence; one clinical confirmation (response to treatment)	Extremities	index pos; katz levels (Nerve Conduction Studies (NCS) and Clinical Diagnosis)	79	index neg; katz levels (Nerve Conduction Studies (NCS) and Clinical Diagnosis)	6	0.94 0.83	0.99 0.50	1.97 0.03	POOR	STRONG
Katz,J.N., 1991	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	CTS symptomatic subjects at one hospital	sensory, motor, and mixed nerve cutoffs	Subjects	index pos; katz; niosh case definition (Nerve Conduction Studies (NCS))	64	index neg; katz; niosh case definition (Nerve Conduction Studies (NCS))	14	0.44 0.86	0.93 0.25	1.24 0.27	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Katz,J.N., 1991	Moderate Quality	CTS Positive (NIOSH Case Definition; symptoms, work relatedness, objective evidence)	CTS symptomatic subjects at one hospital	sensory, motor, and mixed nerve cutoffs	Subjects	index pos; katz; niosh case definition (Nerve Conduction Studies (NCS))	40	index neg; katz; niosh case definition (Nerve Conduction Studies (NCS))	38	0.50 0.74	0.67 0.58	1.60 0.57	POOR	POOR
Kuhlman,K. A., 1997	Moderate Quality	CTS Positive (Wrist Ratio)	143 clinical CTS suspects	referenced sensory and motor cutoffs	Extremities	index pos; wrist ratio (Nerve Conduction Studies (NCS))	121	index neg; wrist ratio (Nerve Conduction Studies (NCS))	107	0.81 0.59	0.69 0.73	2.58 0.42	WEAK	WEAK
Makanji,H.S ., 2014	Moderate Quality	CTS Positive (CTS-6; Lax; 50+%)	referred CTS suspects	DML and DSL with referenced normal values		index pos; CTS 6 lax, stringent (Nerve Conduction Studies (NCS); AANEM referenced)	77	index neg; CTS 6 lax, stringent (Nerve Conduction Studies (NCS); AANEM referenced)	11	0.74 0.27	0.88 0.13	1.01 0.94	POOR	POOR
Makanji,H.S ., 2014	Moderate Quality	CTS Positive (CTS-6; Stringent; 80+%)	referred CTS suspects	DML and DSL with referenced normal values		index pos; CTS 6 lax, stringent (Nerve Conduction Studies (NCS); AANEM referenced)	47	index neg; CTS 6 lax, stringent (Nerve Conduction Studies (NCS); AANEM referenced)	41	0.74 0.27	0.54 0.48	1.03 0.97	POOR	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Padua,L., 1999	Moderate Quality	CTS Positive (Modified Hi-Ob Scale; Pain)	clinically suspected idiopathic CTS patients	clinical and NCS from AANEM considered ; min of clinical diagnosis and various severities of NCS testing results	Extremities	index pos; Modified Hi-Ob Scale; Pain (Nerve Conduction Studies (NCS) and clinical diagnosis; AANEM referenced)	623	index neg; Modified Hi-Ob Scale; Pain (Nerve Conduction Studies (NCS) and clinical diagnosis; AANEM referenced)	500	0.95 0.05	0.55 0.40	0.93 1.11	POOR	POOR
Stevens,J.C., 1997 (1)	Moderate Quality	CTS Positive (Hand Symptom Diagram (HSD) and Hand Symptom Questionnaire (HSQ); Examiner 1)	100 CTS diagnosed patients and 50 with upper extremity problems other than CTS	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; HSD; HSQ (Nerve Conduction Studies (NCS))	175	index neg; HSD; HSQ (Nerve Conduction Studies (NCS))	52	0.83 0.73	0.91 0.56	2.07 0.16	WEAK	MODERATE
Stevens,J.C., 1997 (1)	Moderate Quality	CTS Positive (Hand Symptom Diagram (HSD); Examiner 1)	100 CTS diagnosed patients and 50 with upper extremity problems other than CTS	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; HSD; HSQ (Nerve Conduction Studies (NCS))	111	index neg; HSD; HSQ (Nerve Conduction Studies (NCS))	116	0.86 0.46	0.60 0.78	2.74 0.51	WEAK	POOR

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Stevens,J.C., 1997 (1)	Moderate Quality	CTS Positive (Hand Symptom Questionnaire (HSQ); Examiner 1)	100 CTS diagnosed patients and 50 with upper extremity problems other than CTS	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; HSD; HSQ (Nerve Conduction Studies (NCS))	163	index neg; HSD; HSQ (Nerve Conduction Studies (NCS))	64	0.83 0.64	0.86 0.60	2.15 0.24	WEAK	WEAK
Stevens,J.C., 1997 (2)	Moderate Quality	CTS Positive (Hand Symptom Diagram (HSD) and Hand Symptom Questionnaire (HSQ); Examiner 2)	100 CTS diagnosed patients and 50 with upper extremity problems other than CTS	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; HSD; HSQ (Nerve Conduction Studies (NCS))	197	index neg; HSD; HSQ (Nerve Conduction Studies (NCS))	30	0.76 0.67	0.94 0.29	1.33 0.21	POOR	WEAK
Stevens,J.C., 1997 (2)	Moderate Quality	CTS Positive (Hand Symptom Diagram (HSD); Examiner 2)	100 CTS diagnosed patients and 50 with upper extremity problems other than CTS	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; HSD; HSQ (Nerve Conduction Studies (NCS))	161	index neg; HSD; HSQ (Nerve Conduction Studies (NCS))	66	0.79 0.52	0.80 0.50	1.60 0.40	POOR	WEAK
Stevens,J.C., 1997 (2)	Moderate Quality	CTS Positive (Hand Symptom Questionnaire (HSQ); Examiner 2)	100 CTS diagnosed patients and 50 with upper extremity problems other than CTS	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; HSD; HSQ (Nerve Conduction Studies (NCS))	168	index neg; HSD; HSQ (Nerve Conduction Studies (NCS))	59	0.78 0.53	0.82 0.46	1.51 0.39	POOR	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Stevens,J.C., 1997 (3)	Moderate Quality	CTS Positive (Hand Symptom Diagram (HSD) and Hand Symptom Questionnaire (HSQ); Examiner 3)	100 CTS diagnosed patients and 50 with upper extremity problems other than CTS	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; HSD; HSQ (Nerve Conduction Studies (NCS))	149	index neg; HSD; HSQ (Nerve Conduction Studies (NCS))	78	0.85 0.58	0.79 0.66	2.34 0.31	WEAK	WEAK
Stevens,J.C., 1997 (3)	Moderate Quality	CTS Positive (Hand Symptom Diagram (HSD); Examiner 3)	100 CTS diagnosed patients and 50 with upper extremity problems other than CTS	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; HSD; HSQ (Nerve Conduction Studies (NCS))	138	index neg; HSD; HSQ (Nerve Conduction Studies (NCS))	89	0.85 0.53	0.74 0.69	2.38 0.38	WEAK	WEAK
Stevens,J.C., 1997 (3)	Moderate Quality	CTS Positive (Hand Symptom Questionnaire (HSQ); Examiner 3)	100 CTS diagnosed patients and 50 with upper extremity problems other than CTS	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; HSD; HSQ (Nerve Conduction Studies (NCS))	101	index neg; HSD; HSQ (Nerve Conduction Studies (NCS))	126	0.85 0.42	0.54 0.78	2.45 0.59	WEAK	POOR
Yagci,I., 2010	Moderate Quality	CTS Positive (Katz Hand Diagram; classic)	DPN PATIENT POPULATION referred to EDS lab	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; katz; clinical diagnosis via lax katz (Nerve Conduction Studies (NCS); AANEM referenced)	22	index neg; katz; clinical diagnosis via lax katz (Nerve Conduction Studies (NCS); AANEM referenced)	72	1.00 0.69	0.50 1.00	10.00 0.50	STRONG	WEAK

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Yagci,I., 2010	Moderate Quality	CTS Positive (Katz Hand Diagram; classic or probable)	DPN PATIENT POPULATION referred to EDS lab	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; katz; clinical diagnosis via lax katz (Nerve Conduction Studies (NCS); AANEM referenced)	36	index neg; katz; clinical diagnosis via lax katz (Nerve Conduction Studies (NCS); AANEM referenced)	58	1.00 0.86	0.82 1.00	10.00 0.18	STRONG	MODERATE
Yagci,I., 2010	Moderate Quality	CTS Positive (Katz Hand Diagram; classic, probable, and possible)	DPN PATIENT POPULATION referred to EDS lab	motor, mixed, sensory nerve cutoffs referenced	Extremities	index pos; katz; clinical diagnosis via lax katz (Nerve Conduction Studies (NCS); AANEM referenced)	43	index neg; katz; clinical diagnosis via lax katz (Nerve Conduction Studies (NCS); AANEM referenced)	51	1.00 0.98	0.98 1.00	10.00 0.02	STRONG	STRONG

TABLE 28: LOW QUALITY STUDIES- PICO 4 (DIAGNOSTIC SCALES VERSUS REFERENCE STANDARD)

Reference Title	Quality	Outcome (Index Test)	Patient Characteristics	Threshold Notes	Outcomes Reported By	Group1 (Reference Standard)	Group1 N	Group2 (Reference Standard)	Group2 N	PPV NPV	Sens Spec	LR+ LR-	Rule In Test	Rule Out Test
Bland,J.D., 2014	Low Quality	CTS Positive (CTS Web Questionnaire; 40+ score)	all neurology referred patients who completed the web questionnaire	NCS graded on Canterbury severity scale	Subjects	index pos; Web Questionnaire (Nerve Conduction Studies (NCS); AANEM referenced)	1430	index neg; Web Questionnaire (Nerve Conduction Studies (NCS); AANEM referenced)	1225	0.78 0.68	0.74 0.73	2.71 0.36	WEAK	WEAK

META-ANALYSES

FIGURE 9: GENERAL EDS VERSUS KATZ HAND DIAGRAM (CLASSIC OR PROBABLE)

Meta-analysis of diagnostic accuracy

Log likelihood = -74.101479 Number of studies =

	Coef.	Std. Err.	z	P> z	[95% Conf.]
Bivariate					
E(logitSe)	-.2659417	.4716623			-1.190383
E(logitSp)	1.409396	.3899879			.6450337
Var(logitSe)	2.130157	1.023938			.8303295
Var(logitSp)	1.453846	.6875566			.5753951
Corr(logits)	-1	.			.
HSROC					
Lambda	1.308903	.1824796			.9512494
Theta	-.8961718	.4255965			-1.730326
beta	-.1909915	.112976	-1.69	0.091	-.4124203
s2alpha	0	.			.
s2theta	1.759807	.8152183			.7098261
Summary pt.					
Se	.4339037	.115855			.2331905
Sp	.8036706	.0615339			.6558904
DOR	3.137587	.4701593			2.339082
LR+	2.21008	.2135354			1.828799
LR-	.7043885	.0938493			.5425032
1/LR-	1.419671	.18915			1.093397

Covariance between estimates of E(logitSe) & E(logitSp) -.1760508

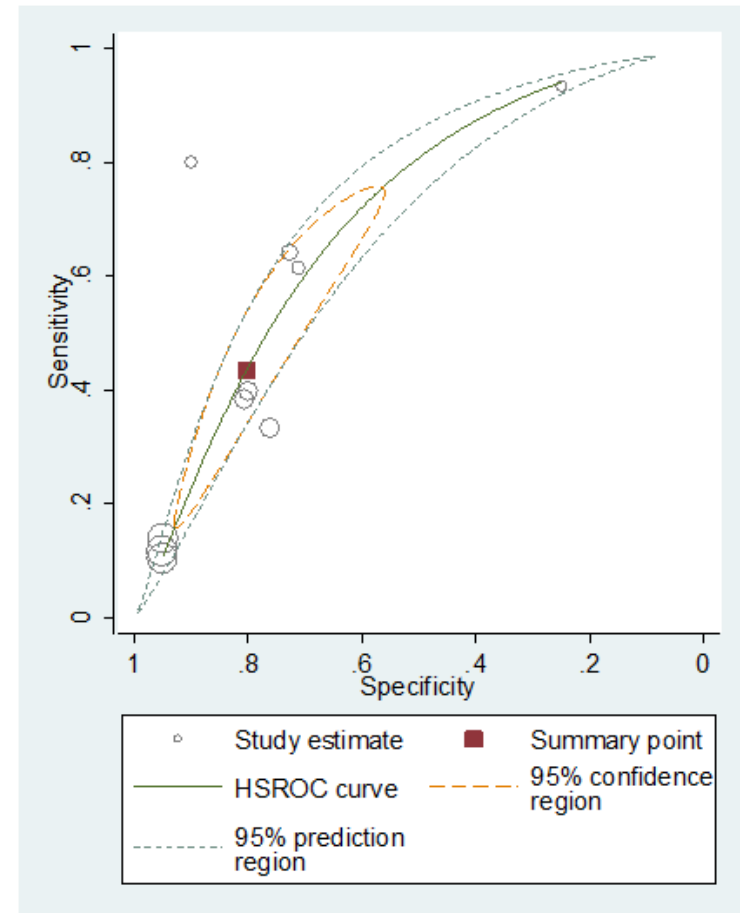


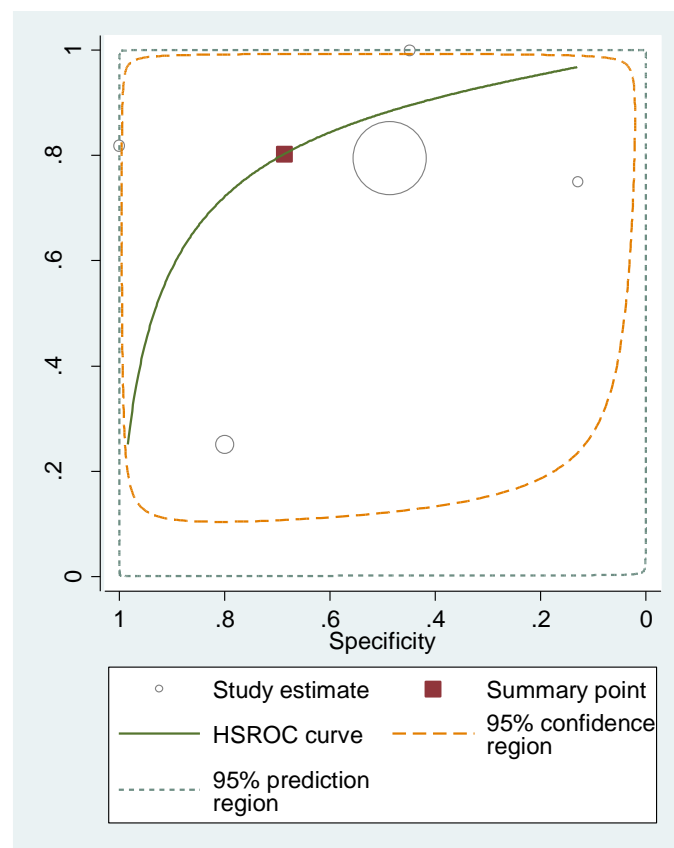
FIGURE 10: EDS AANEM VERSUS KATZ HAND DIAGRAM (CLASSIC OR PROBABLE)

Meta-analysis of diagnostic accuracy

Log likelihood = -46.077342 Number of studies

	Coef.	Std. Err.	z	P> z	[95% Conf.
Bivariate					
E(logitSe)	1.404512	.8147543			-.1923771
E(logitSp)	.7850249	1.061397			-1.295275
Var(logitSe)	2.875086	2.435385			.546547
Var(logitSp)	5.116747	4.237196			1.009511
Corr(logits)	-.1592222	.4554671			-.7919005
HSROC					
Lambda	2.301895	1.243203			-.1347381
Theta	.4712781	.7229318			-.9456421
beta	.2882182	.5871028	0.49	0.623	-.8624821
s2alpha	6.449612	4.989029			1.416105
s2theta	2.2231	1.647305			.5202634
Summary pt.					
Se	.8028989	.1289367			.4520535
Sp	.6867621	.2283277			.2149613
DOR	8.931076	11.10768			.7802874
LR+	2.563224	1.855735			.620197
LR-	.2870006	.1982613			.0741086
1/LR-	3.484314	2.40698			.8997116

Covariance between estimates of E(logitSe) & E(logitSp) -.121785



RISK FACTOR GUIDELINE RECOMMENDATIONS

INCREASED RISK OF CTS

A. Strong evidence supports that BMI and high hand/wrist repetition rate are associated with the increased risk of developing carpal tunnel syndrome (CTS).

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention.

B. Moderate evidence supports that the following factors are associated with the increased risk of developing carpal tunnel syndrome (CTS):

- Peri-menopausal
- Wrist Ratio/Index
- Rheumatoid Arthritis
- Psychosocial factors
- Distal upper extremity tendinopathies
- Gardening
- ACGIH Hand Activity Level at or above threshold
- Assembly line work
- Computer work
- Vibration
- Tendonitis
- Workplace forceful grip/exertion

Strength of Recommendation: Moderate Evidence ★★★★☆

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

C. Limited evidence supports that the following factors are associated with the increased risk of developing carpal tunnel syndrome (CTS):

- Dialysis
- Fibromyalgia
- Varicosis
- Distal radius fracture

Strength of Recommendation: Limited Evidence ★★☆☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

BMI evaluated as a continuous variable was shown to be associated with development of CTS in four high quality (Armstrong, 2008; Bonfiglioli, 2013; Evanoff, 2014; Garg, 2012) and three moderate quality studies (Burt, 2011; Hlebs, 2014; Nordstrom, 1997). Only one moderate quality study (Goodson, 2014) found an insignificant result for the relationship between BMI and CTS. When evaluated as a categorical variable, five moderate quality studies (Becker, 2002; Burt, 2011; Burt, 2013; Coggon, 2013; Geoghegan, 2004) found a correlation between increasing BMI and development of CTS, while one high quality study (Hakim, 2002) and two moderate quality (Mondelli, 2006; Violante, 2007) studies found no significance.

High hand/wrist repetition rate at work was significantly associated to an increased risk of CTS by two high quality (Armstrong, 2008; Evanoff, 2014) and four moderate quality studies (Chiang, 1990; Coggon, 2013; Goodson, 2014; Silverstein, 1987). In all studies, the hand/wrist repetition involved moderate to high hand forces. One of the high quality studies (Armstrong, 2008) showed an insignificant association in two of the categories of repetition, but still showed a significant increase between the high and low quartile categories.

Peri-menopausal status was shown in one high quality study (Hakim, 2002) to be associated with an increased risk of CTS development, but no association was found between CTS and post-menopausal status.

Wrist ratio/index (ratio of wrist depth to width >0.7mm) was significantly associated with an increased risk of CTS in one high (Armstrong, 2008) and six moderate quality studies (Boz, 2004; Gordon, 1988; Hlebs, 2014; Moghtaderi, 2005; Sabry, 2009; Shariff-Mollayousefi, 2008).

Rheumatoid arthritis was associated with an increased risk of CTS in one high quality (Garg, 2012) and one moderate quality study (Burt, 2011). One moderate quality study (Geoghegan, 2004) showed an association between osteoarthritis and CTS.

Mood (“felt down, blue or depressed always/never, compared to seldom”) was associated with increased risk of CTS in one high quality study (Garg, 2012). One moderate quality study (Coggon, 2013) showed an association with increased risk based on self-rated mental health.

Hand, wrist or elbow tendinopathies (musculoskeletal conditions) were associated with increased risk of CTS in one high quality (Garg, 2012) and two moderate quality studies (Aktas, 2008; Nordstrom, 1997).

Gardening was associated with an increased risk of developing CTS in one high quality study (Garg, 2012).

The American Conference of Governmental Industrial Hygienists (ACGIH) hand activity level (HAL) is a standardized method for evaluating jobs that involves expert observation, direct measurement or video analysis to assess both pinch/grip force and hand/wrist repetition rate. There was one high quality (Bonfiglioli, 2013) and three moderate quality (Burt, 2011; Burt, 2013; Violante, 2007) studies, showing significant associations to increased risk of CTS when the ACGIH HAL was at or above the threshold limit. In addition, there was one high quality study (Garg, 2012) that showed an association with CTS by hazard ratio but this finding was limited by a wide confidence interval that included a value of 1.0 (HR: 2.01, CI: 0.8-5.0).

Assembly line work was associated with increased risk for the development of CTS in one high quality (Armstrong, 2008) and two low quality studies (Bonfiglioli, 2006; Lecler, 1998).

Computer work was significantly associated with increased risk of CTS by three moderate quality studies (Ali, 2006; Coggon, 2013; Eleftheriou, 2012). One study found an increased association with an average of greater than eight hours of computer use per day and more than four years of computer work (Ali, 2006). Another study found an association between an increased risk of CTS and working on a keyboard or mouse for more than four hours per day (Coggon, 2013). The third study found an association with a very high number of keystrokes typed per year and a higher risk of CTS (Eletheriou, 2012). There was one moderate quality study (Ali, 2006) evaluating internet use for leisure, which also found a significant result for increasing risk of CTS.

The use of vibrating hand-held tools was associated with an increased risk of CTS in one high quality (Armstrong, 2008) and three moderate quality studies (Coggon, 2013; Dale, 2014; Nordstrom, 1997).

Tendonitis in the shoulder, hand, finger, or wrist was shown to increase risk of CTS by one high quality (Armstrong, 2008) and one low quality study (Werner, 2005).

Workplace forceful grip/exertion was found to be significantly associated with increased risk of CTS by one high quality (Armstrong, 2008) and four moderate quality studies (Burt, 2011; Burt, 2013; Dale, 2014; Evanoff, 2012).

Comorbidities including dialysis, fibromyalgia, and varicosis each had one moderate quality study (Shin, 2008; Fahmi, 2013; De Krom, 1990) showing that each has a significantly increased risk of CTS.

Wrist fracture showed an increased risk of CTS in two moderate quality studies (Geoghegan, 2004; Dyer, 2008). One moderate quality study (Morgenstern, 1991) showed an insignificant relationship, but that study included only female participants and therefore the findings may not be generalizable.

Risks and Harms of Implementing this Recommendation

There are no known harms associated with implementing these recommendations.

Future Research

Studies should be conducted to identify objective methods for assessing workplace physical factors in order to improve the precision of risk estimation and improve confidence in thresholds of injury. Workplace intervention studies should be conducted to confirm that modifications in work activities may improve symptoms and functional deficits in workers with CTS. Studies of risk should include proper control for confounding as in a logistic regression analysis with appropriate population sizes and associated odds ratios.

DECREASED RISK OF CTS

Moderate evidence supports that physical activity/exercise is associated with a decreased risk of developing carpal tunnel syndrome (CTS).

Strength of Recommendation: Moderate Evidence ★★★★★

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention

Rationale

Vigorous exercise was associated with reduced risk of CTS in one moderate quality study (Goodson, 2014). In the same study, increased risk of CTS was associated with wrist straining exercise (e.g., weight lifting, mountain biking, racquet sports), but that risk was reduced if there was also vigorous exercise. Another moderate quality study (Eleftheriou, 2012) found an association between regular physical activity (e.g., basketball, football, tennis, jogging, and swimming) and reduced risk of CTS.

Risks and Harms of Implementing this Recommendation

There are no known harms associated with implementing these recommendations.

Future Research

The moderate quality studies finding that found a reduction in risk for CTS with vigorous exercise are intriguing. There should be additional research to confirm these findings and identify the specific types and amount of exercise that may be effective. There should be studies to investigate apportionment of risk between personal and workplace factors.

FACTORS SHOWING NO ASSOCIATED RISK OF CTS

A. Moderate evidence supports that the use of oral contraception and female hormone replacement therapy (HRT) are not associated with increased or decreased risk of developing carpal tunnel syndrome (CTS).

Strength of Recommendation: Moderate Evidence ★★★★★

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

B. Limited evidence supports that race/ethnicity and female education level are not associated with increased or decreased risk of developing carpal tunnel syndrome (CTS).

Strength of Recommendation: Limited Evidence ★★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

Oral contraception use among females was shown to have no significant relationship to the development of CTS in three moderate quality studies (Geoghehan, 2004; Mondelli, 2006; Morgenstern, 1991). Oral HRT use among females was shown to have no significant relationship to the development of CTS in one high quality and one moderate quality study (Hakim, 2002; Geoghehan, 2004). Education level among females showed no significant relationship to the development of CTS in one moderate quality (Bonfiglioli, 2007) and two low quality studies (Kaplan, 2008; Wright, 2014). Race/ethnicity showed no significant relationship to the development of CTS in one moderate quality study (Nathan, 2002).

Risks and Harms of Implementing this Recommendation

There are no known harms associated with implementing these recommendations.

Future Research

The moderate quality studies finding that found a reduction in risk for CTS with vigorous exercise are intriguing. There should be additional research to confirm these findings and identify the specific types and amount of exercise that may be effective. There should be studies to investigate apportionment of risk between personal and workplace factors. Studies should be conducted to identify objective methods for assessing workplace physical factors in order to improve the precision of risk estimation and improve confidence in thresholds of injury. Workplace intervention studies should be conducted to confirm that modifications in work activities may improve symptoms and functional deficits in workers with CTS. More research into the relationship between diabetes and CTS should be done, as the conflicting results indicate a possible association between these conditions. Studies of risk should include proper control for confounding as in a logistic regression analysis with appropriate population sizes and associated odds ratios.

FACTORS SHOWING CONFLICTING RISK OF CTS

Limited evidence supports that the following factors have conflicting results regarding the development of carpal tunnel syndrome (CTS):

- Diabetes
- Age
- Gender/Sex
- Genetics
- Comorbid drug use
- Smoking
- Wrist bending
- Workplace

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

Diabetes showed a conflicting relationship to CTS development. One high quality study (Armstrong, 2008) did not demonstrate a significant association with CTS. The odds ratio was elevated but there was a wide confidence interval that included a value of 1.0 (OR 2.45, CI: 0.92-6.53). Three moderate quality studies (Becker, 2002; Geoghegan, 2004; Plastino, 2011) found significant associations between diabetes and an increased risk of CTS and one (Coggon, 2013) did not find an association.

Age showed a conflicting relationship to CTS development. Two high quality studies (Armstrong, 2008; Bonfiglioli, 2013) showed increased risk in older workers on a continuous scale. Two other high quality studies (Evanoff, 2014; Garg, 2012) measuring age on a continuous scale showed insignificant results but with slightly increased risk ratios and narrow confidence limits. Two moderate quality studies (Morgenstern, 1991; Shin, 2008) also found a significantly increased risk of CTS when measuring age continuously and one moderate quality study (Silverstein, 1987) found an insignificant relationship. When measured categorically, one high quality study (Hakim, 2002) showed an increasing association at age >46 and one moderate quality study (Violante, 2007) found an increasing association among all categories. Two moderate quality studies (Eleftheriou, 2012; Mondelli, 2006) did not find a significant association between categories of age and CTS development.

Female gender/sex was associated with increased risk of CTS in one high quality (Bonfiglioli, 2013) and three moderate quality studies (Burt, 2011; Eleftheriou, 2012; Violante, 2007), while two high quality (Armstrong, 2008; Evanoff, 2014) and two moderate quality studies (Shin, 2008; Silverstein, 1987) showed no significant association.

Family history/genetics was associated with increased risk of CTS in one high quality (Hakim, 2002) and two moderate quality studies (Bonfiglioli, 2007; Burt 2011), while two moderate quality studies (Nordstrom, 1997; Violante, 2007) showed no significant correlation. The studies used varying diagnostic methods, and two of the studies evaluated female populations, which may have contributed to the conflicting results.

Comorbid drug use showed a conflicting relationship to CTS development. One high quality study (Hakim, 2002) found no association with thyroxine replacement. One moderate quality study (Geoghegan, 2004) reported an increasing risk of CTS with insulin, sulphonyl, or thyroxine. Two moderate quality studies reported no association to CTS when using diuretics (Morgenstern, 1991) or metformin (Geoghegan, 2004).

Smoking had a conflicting relationship to CTS development. Two moderate quality studies (Eleftheriou, 2012; Violante, 2007) found an association of increasing risk, one moderate quality study (Coggon, 2013) found an inverse association, and one moderate quality study (Geoghegan, 2004) found no association.

Wrist bending had a conflicting relationship to CTS development. One high (Armstrong, 2008) and one moderate quality study (De Krom, 1990) showed an increased risk while two moderate quality studies (Dale, 2014; Evanoff, 2012) displayed an insignificant association. One moderate quality study (Nordstrom, 1997) showed an insignificant result with a short duration of wrist bending and an increased risk of CTS with more frequent wrist bending.

Many recent high and moderate quality studies were identified and provide new insights into workplace factors associated with CTS. However, the studies did not consider the relative contributions of personal and work-related factors on CTS, so it is difficult to calculate risk attributable to different risk factors from the data. Some occupational factors and workplace exposures were evaluated by single studies with weak designs or relatively weak exposure assessment methods. The findings from those studies, therefore, did not contribute to the conclusions. Workplace categories include: clerical/office work, industrial, construction, farming, hospital, professional, technical, managerial, sales, skilled trades (agriculture, fabrication, machining, transporter techs, electricians, plumbers, construction), and other jobs.

Risks and Harms of Implementing this Recommendation

There are no known risks or harms.

Future Research

There should be studies to investigate apportionment of risk between personal and workplace factors. Studies should be conducted to identify objective methods for assessing workplace physical factors in order to improve the precision of risk estimation and improve confidence in thresholds of injury.

Workplace intervention studies should be conducted to confirm that modifications in work activities may improve symptoms and functional deficits in workers with CTS. More research into the relationship between diabetes and CTS should be done, as the conflicting results indicate a possible association between these conditions. Studies of risk should include proper control for confounding as in a logistic regression analysis with appropriate population sizes and associated odds ratios.

STUDY QUALITY TABLES FOR RISK FACTOR RECOMMENDATIONS

QUALITY TABLE FOR ASSOCIATED RISK FACTORS FOR CTS

Table 29. Prognostic Quality Evaluations

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Akbar,M., 2014	●	●	●	○	○	●	Include	Low Quality
Aktas,I., 2008	●	●	●	●	○	●	Include	Moderate Quality
Ali,K.M., 2006	●	●	●	●	●	●	Include	Moderate Quality
Armstrong,T., 2008	●	●	●	●	●	●	Include	High Quality
Bayrak,I.K., 2008	●	●	●	●	○	●	Include	Low Quality
Becker,J., 2002	●	●	●	●	●	●	Include	Moderate Quality
Bland,J.D., 2005	●	●	●	○	○	●	Include	Low Quality
Bonfiglioli,R., 2006	●	●	●	●	○	●	Include	Low Quality
Bonfiglioli,R., 2007	●	●	●	●	○	●	Include	Moderate Quality
Bonfiglioli,R., 2013	●	●	●	●	●	●	Include	High Quality
Boz,C., 2004	●	●	●	●	●	●	Include	Moderate Quality
Burt,S., 2011	●	●	●	●	●	●	Include	Moderate Quality
Burt,S., 2013	●	●	●	●	●	○	Include	Moderate Quality
Cartwright,M.S., 2012	●	●	●	●	●	●	Include	Moderate Quality
Cartwright,M.S., 2014	●	●	●	●	●	●	Include	Moderate Quality
Chiang,H.C., 1990	●	●	●	●	○	●	Include	Moderate Quality

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Coggon,D., 2013	●	●	◐	●	◐	◐	Include	Moderate Quality
Dale,A.M., 2014	●	●	●	●	●	○	Include	Moderate Quality
de Krom,M.C., 1990	◐	●	●	●	◐	◐	Include	Moderate Quality
Dyer,G., 2008	◐	◐	◐	●	○	◐	Include	Low Quality
Eleftheriou,A., 2012	●	●	○	●	●	◐	Include	Moderate Quality
Estirado de,Cabo E., 2003	◐	◐	●	○	●	◐	Include	Low Quality
Evanoff,B., 2012	●	◐	●	●	○	◐	Include	Moderate Quality
Evanoff,B., 2014	●	●	●	●	●	◐	Include	High Quality
Fahmi,D.S., 2013	◐	●	●	●	○	●	Include	Moderate Quality
Forst,L., 2006	●	●	●	○	◐	○	Include	Low Quality
Garg,A., 2012	◐	◐	●	●	●	●	Include	High Quality
Gell,N., 2005	●	◐	●	●	◐	○	Include	Low Quality
Geoghegan,J.M., 2004	◐	●	●	●	◐	◐	Include	Moderate Quality
Goodson,J.T., 2014	◐	●	●	●	●	●	Include	High Quality
Gordon,C., 1988	●	●	◐	●	◐	◐	Include	Moderate Quality
Hakim,A.J., 2002	◐	●	●	●	●	◐	Include	High Quality
Hlebs,S., 2014	◐	●	●	○	●	●	Include	Moderate Quality
Jenkins,P.J., 2013	●	●	●	●	○	○	Include	Low Quality
Kaplan,Y., 2008	●	●	●	○	○	◐	Include	Low Quality

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Keese,G.R., 2006	●	●	●	○	●	●	Include	Low Quality
Kopec,J., 2011	●	●	●	●	○	○	Include	Low Quality
Leclerc,A., 1998	●	●	●	○	●	●	Include	Low Quality
Lo,J.K., 2002	●	●	●	●	●	●	Include	Moderate Quality
Matias,A.C., 1998	●	●	●	●	●	●	Include	Moderate Quality
Moghtaderi,A., 2005	●	●	●	●	●	●	Include	Moderate Quality
Mondelli,M., 2006	●	●	●	●	●	●	Include	Moderate Quality
Morgenstern,H., 1991	●	●	●	○	●	●	Include	Moderate Quality
Nathan,P.A., 2002	●	●	●	●	●	●	Include	Moderate Quality
Nathan,P.A., 2005	●	●	●	●	●	●	Include	Moderate Quality
Nordstrom,D.L., 1997	●	●	●	○	●	●	Include	Moderate Quality
Petit,A., 2015	●	●	●	●	●	○	Include	Moderate Quality
Plastino,M., 2011	●	●	●	●	●	●	Include	Moderate Quality
Roquelaure,Y., 2001	●	●	●	●	●	○	Include	Low Quality
Roquelaure,Y., 2008	●	●	●	●	○	●	Include	Moderate Quality
Sabry,M.M., 2009	●	●	●	●	○	●	Include	Moderate Quality
Sharifi-Mollayousefi,A., 2008	●	●	●	●	●	●	Include	Moderate Quality

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Shin,J., 2008	●	●	◐	●	◐	◐	Include	Moderate Quality
Silverstein,B.A., 1987	◐	●	◐	●	●	●	Include	Moderate Quality
Tang,X., 1999	◐	●	◐	●	○	◐	Include	Low Quality
Tsai,N.W., 2013	●	●	●	●	◐	○	Include	Moderate Quality
Violante,F.S., 2007	●	◐	●	●	◐	○	Include	Moderate Quality
Vogelsang,L.M., 1994	●	●	●	○	◐	○	Include	Low Quality
Werner,R.A., 2005	●	●	●	○	●	○	Include	Low Quality
Winn,F.J.,Jr., 1989	●	●	●	●	○	○	Include	Low Quality
Wolf,J.M., 2009	●	●	●	○	○	◐	Include	Low Quality
Wright,C., 2014	●	●	◐	●	◐	◐	Include	Moderate Quality
Yagev,Y., 2001	◐	●	●	●	○	○	Include	Low Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 30: SUMMARY OF FINDINGS- FEMALE GENDER/SEX RELATED RISK FACTORS



Increases Odds  Decreases Odds  Not Significant 	High Quality	Moderate Quality				Low Quality	
	Hakim, A.J. 2002	De Krom, M.C. 1990	Geoghegan, J.M. 2004	Mondelli, M. 2006	Morgenstern, H. 1991	Kaplan, Y. 2008	Wright, C. 2014
Female Gender/Sex Related Risk Factors							
Normal pre-pregnancy BMI with excessive gestational weight gain							○
Obese pre-pregnancy with excessive gestational weight gain							○
Obese pre-pregnancy with normal gestational weight gain							▲
Overweight pre-pregnancy with excessive gestational weight gain							○
Contraception			○	○	○		
HRT use	○		○				
Hysterectomy							
Hysterectomy vs premenopausal		○					
Hysterectomy vs menopause more than 5 years ago		▲					
Hysterectomy after controlling for menopause	○						
Number of pregnancies						▲	○
Number of prenatal care visits							○
Perimenopause	▲						
Post-menopause	○						
Time since menopause		○					

TABLE 31: SUMMARY OF FINDINGS- JOB RELATED FACTORS


Increases Odds 	High Quality					Moderate Quality					Low Quality									
	Armstrong, T. 2008	Bonfiglioli, R. 2013	Evanoff, B. 2014	Garg, A. 2012	Hakim, A.J. 2002	Ali, K.M. 2006	Burt, S. 2011	Burt, S. 2013	Chiang, H.C. 1990	Coggon, D. 2013	Dale, A.M. 2014	Eleftheriou, A. 2012	Evanoff, B. 2012	Nordstrom, D.L. 1997	Petit, A. 2015	Roquelaure, Y. 2008	Violante, F.S. 2007	Bonfiglioli, R. 2006	Jenkins, P.J. 2013	Leclerc, A. 1998
Job Related Risk Factors																				
ACGIH Hand Activity between action limit and threshold limit value		▲		○			○										○			
ACGIH Hand Activity level above threshold limit																				
ACGIH above threshold limit value (TLV) versus at or below acceptable limit		▲																		
ACGIH HAL above TLV vs acceptable level or below				○																
Biomechanical load above threshold limit value versus below action limit																	▲			
Previous exposure to biomechanical overload																○				
Threshold limit ratio																				
Threshold limit value and above vs below action limit							▲													
Assembly Line	▲																		▲	▲
Automatic work pace																○				
Chemicals																				
Contact with solvents 0.08-0.75 hours/day vs none																				
Contact with solvents 1-11 hours/day vs none															○					
Clerical																				
Administrative/secretarial jobs vs. Associate professional/technical jobs																				
Matched all females																				
Matched all males						○														
Cold Exposure																				
Computer Work							▲													
Construction Work	▲																			
Dexterity (ONET)																				
Dexterity derived from factor analysis 4th vs 1st quartile		▲																		
Dexterity derived from factor analysis 2nd vs 1st quartile		○																		
Dexterity derived from factor analysis 3rd vs 1st quartile		○																		
Dynamic Strength (ONET)			○																	
Exertion																				
Exerts/min cat 2 versus 1 if BMI<30																				
Exerts/min cat 2 versus 1 if BMI>=30																				
Exerts/min cat 3 versus 1 if BMI<30																				
Exerts/min cat 3 versus 1 if BMI>=30																				
Peak worker perceived exertion rating (0-10)																				
Time in forceful exertion between 20 and 60% vs <20%																				
Time in forceful exertion between greater than 60% vs <20%																				
Farming																				
Finger pinch grip	○																			
Force																				
Forceful gripping in most recent job																				
Peak force match cat 2 versus 1																				
Peak force match cat 3 versus 1																				
Peak force, unitary increase (1-7)																				
Upper extremity force derived from factor analysis 2nd quartile vs 1st quartile	▲	○																		
Upper extremity force derived from factor analysis 3rd quartile vs 1st quartile	▲																			
Forearm Rotation	▲																			
Grip	▲																			
Hospital Work vs Clerical	○																			
Industrial (blue collar, process, plant, machine, clothing, and shoe industries)																				
Blue collar, process, plant, machine, clothing, and shoe industries																				
Job Strain																				
Strain index above 6.1 vs less than or equal to 6.1				▲																

TABLE 32: SUMMARY OF FINDINGS- JOB RELATED FACTORS CONT'D

Job Related Risk Factors	High Quality		Moderate Quality												Low Quality												
	* † Armstrong, T. 2008	Evanoff, B. 2014	Ali, K.M. 2006	Bonfiglioli, R. 2007	Cartwright, M.S. 2012	Cartwright, M.S. 2014	Chiang, H.C. 1990	† Coggon, D. 2013	Dale, A.M. 2014	de Krom, M.C. 1990	Evanoff, B. 2012	Goodson, J.T. 2014	Matias, A.C. 1998	Mondelli, M. 2006	Morgenstern, H. 1991	Nathan, P.A. 2005	† Nordstrom, D.L. 1997	Pettit, A. 2015	Roquelaure, Y. 2008	* Silverstein, B.A. 1987	Forst, L. 2006	Jenkins, P.J. 2013	Kaplan, Y. 2008	Werner, R.A. 2005	Wolf, J.M. 2009	* Yagev, Y. 2001	
Lack of Coworker Support																											
Length of employment																											
Previously worked at risk jobs				○																							
Level of Job Control																											
IOSH Job control (0=least) 2.8-3.4 vs1-2.7																		○									
IOSH Job control (0=least) 3.6-3.8 vs1-2.7																											
IOSH Job control (0=least) 4.6-4.8 vs1-2.7																											
IOSH Job control (0=least) 4-4.4 vs1-2.7																											
Job includes targets, bonuses or deadlines								○																			
Little job control in work done, in timetables, or breaks								▼																			
Level of Satisfaction																											
Lifting	▲																										
Managerial Jobs																							○				
Military Rank																											
Office Work																											
Lower-grade white-collar workers vs unemployed																											
Among men																											
Among women																											
Other Jobs																											
Craftswomen/sales/managerial versus unemployed																											
Elementary occupations versus technical/professional																											
Home maker vs employed																											
Poultry work																											
System Administrator vs other computer jobs																											
Piecework Payment																											
Pressing with the thumb	○																										
Professional Jobs																											
Being a surgeon who uses the Kerrison rongeur tool versus not using the tool																											
Practicing professionally for greater or equal to 5 years																											
Professional jobs vs. Associate professional/technical jobs																											
Professional Jobs vs Unemployed																											
Repetition	▲	▲																									
Sales																											
Service Occupations																											
Caring, leisure, and other service jobs vs. Associate professional/technical jobs																											
Full-time cashiers vs office workers																											
CTS diagnosed with symptoms																											
CTS diagnosed with symptoms and EDS																											
Load and lift groceries after checking																											
Part-time cashiers vs office worker																											
Unload basket before checking																											
Use of laser scanner to check items																											
Skilled Trades																											
Static Strength (ONET)																											
Technical Jobs versus Unemployed																											
Vibration	▲																										
Work Length																											
Wrist Bending																											
Bending wrist frequently	▲																										
1 hour increase in extension																											
1 hour increase in flexion																											

* Significance may conflict among Repetition categories
 † Significance may conflict among Vibration categories

TABLE 33: SUMMARY OF FINDINGS- COMORBID DISEASE RISK FACTORS

	High Quality				Moderate Quality										Low Quality														
	Armstrong, T. 2008	Bontfiglioli, R. 2013	Garg, A. 2012	Hakim, A.J. 2002	Aktas, I. 2008	Becker, J. 2002	Burt, S. 2011	Coggon, D. 2013	De Krom, M.C. 1990	Fahmi, D.S. 2013	Geoghegan, J.M. 2004	Mondelli, M. 2006	Morgenstern, H. 1991	Nathan, P. A. 2002	Nordstrom, D.L. 1997	Plastino, M. 2011	Shin, J. 2008	Violante, F.S. 2007	Akbar, M., 2014	Bayrak, I.K. 2008	Dyer, G. 2008	Estirado de Cabo E. 2003	Keese, G.R. 2006	Kopeck, J. 2011	Roque-laure, Y. 2001	Vogelsang, L.M. 1994	Werner, R.A. 2005	Winn, F.J., Jr., 1989	
Comorbidity Risk Factors																													
Any facilitating comorbidities		▲																	▲										
Arthritis			▲				▲	○			▲																		
Comorbidity Drug Use																													
Corticosteroid											○																		
Current thyroxine replacement therapy				○																									
Thyroxine											▲																		
Diuretics												○																	
Diabetes		○				▲		○			▲					▲													
Diabetes		○				▲		○			▲					▲													
Insulin use											▲																		
Metformin use											○																		
Sulphonyl use											▲																		
Female gender/sex and diabetes interaction effect						○					▲																		
Dialysis																	▲								▲				
Endocrine Condition														○															
Fibromyalgia											▲																		
Fracture											▲		○								▲								
General Comorbidities												○																	
1 or more predisposing disease (female floor cleaners)												○																	
Bilateral agenesis vs none																							○						
High blood pressure vs no							▲																						
Suspected Medical Risk factors related to cts																											○		
Presence of Anti-HCV antibodies																													
Related Medical Conditions (RMC instrument)																													
TOS patients with fibrositis vs TOS patients without Fibrositis																							○						
TOS women who had miscarriages versus women with TOS who did not have a miscarriage																							▲						
TOS women with fibrositis vs TOS women without Fibrositis																							▲						
TOS with concomitant neuropathy vs TOS alone																							▲						
TOS with concomitant scleroderma vs TOS alone																							▲						
TOS with concomitant Thromboembolic events vs TOS alone																							▲						
Unilateral agenesis vs none																							▲						
Mental Health																													
Feeling down or blue or depressed always vs seldom			▲																										
Feeling down or blue or depressed never vs seldom			▲																										
Feeling down or blue or depressed often vs seldom			○																										
Intermediate mental health vs good mental health								○																					
Poor mental health vs good mental health								▲																					
Psychological distress measured by General Health Questionnaire (GHQ-12) greater or equal to 90th percentile																										▲			
Musculoskeletal Conditions			▲		▲										▲									▲					
Paraplegic																				▲									
Raynaud's Syndrome																													
Tendonitis	▲																												
Varicosis								▲																			▲		

TABLE 35: SUMMARY OF FINDINGS- ANTHROPOMETRIC MEASURE RISK FACTORS

Anthropometric Risk Factors	High Quality	Moderate Quality							Low Quality			
	Armstrong, T. 2008	*Boz, C. 2004	Gordon, C. 1988	Hlebs, S. 2014	Matias, A.C. 1998	Moghtaderi, A. 2005	Sabry, M.M. 2009	Sharifi-Mollayousefi, A. 2008	Violante, F.S. 2007	Kopec, J. 2011	Tsai, N.W. 2013	Werner, R.A. 2005
Arm Length									○			
Cross Sectional Area of Median Nerve											▲	
Digit Index		▲		○				○				
Elbow Posture Rating												▲
Hand Length- Body Height ratio		○		▼				▲				
Hand Shape Index				○								
Location of AV fistula										○		
Overall anthropometric measures					▲							
Shape Index		○						▲				
Trunk Incline					▼							
Wrist Circumference						▼			○			
Wrist Deviation					▲							
Wrist Extension					○							
Wrist Index	▲	▲		▲								
Wrist Ratio			▲			▲	▲	▲				
Wrist-Palm-Ratio							▲					

*Significant at digit index only for matched females; insignificant for matched male population

DETAILED DATA FINDINGS

TABLE 36 RISK FACTOR: ACGIH HAND ACTIVITY

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Bonfiglioli,R. 2013	High	N= 2492 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms at 3 years	ACGIH between acceptable level and threshold limit value versus at or below acceptable limit	sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	2.43 (1.77, 3.33)	having rating between acceptable and threshold levels is associated with higher risk of symptoms
Bonfiglioli,R. 2013	High	N= 2492 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms at 3 years	ACGIH above threshold limit value versus at or below acceptable limit	sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	3.32 (2.34, 4.72)	having rating above threshold level is associated with higher risk of symptoms

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Bonfiglioli,R. 2013	High	N= 2299 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms and NCS test at 3 years	ACGIH between acceptable level and threshold limit value versus at or below acceptable limit	sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	1.95 (1.21, 3.16)	having rating between acceptable and threshold levels is associated with higher risk of CTS
Bonfiglioli,R. 2013	High	N= 2299 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms and NCS test at 3 years	ACGIH above threshold limit value versus at or below acceptable limit	sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	2.70 (1.48, 4.91)	having rating above threshold level is associated with higher risk of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	ACGIH HAL between AL and TLV vs acceptable level or below	Model1: ACGIH Hand Activity Level (HAL) ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	1.44 (0.55–3.76)	NS
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	ACGIH HAL above TLV vs acceptable level or below	Model1: ACGIH Hand Activity Level (HAL) ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	2.01 (0.80–5.04)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Burt,S. 2011	Moderate	N= 455 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Between the action limit and the TLV vs below action limit	Model 3: peak worker perceived exertion rating (0-10), BMI, Hand Activity Level among females, Hand Activity Level among males, Gender/Sex female vs male at the mean hand activity level	logistic regression odds ratio	2.28 (0.58-8.88)	NS
Burt,S. 2011	Moderate	N= 455 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Threshold limit value and above vs below action limit	Model 3: peak worker perceived exertion rating (0-10), BMI, Hand Activity Level among females, Hand Activity Level among males, Gender/Sex female vs male at the mean hand activity level	logistic regression odds ratio	2.96 (1.51-5.80)	having a hand action level above the TLV increases CTS odds
Burt,S. 2013	Moderate	N= 347 ; workers from hospital, school bus manufacturing plant, and engine assembly plant	electrodiagnostic test, symptoms, hand diagram at 2 years	Threshold limit ratio	model 2: threshold limit value, BMI, Job strain	hazard ratios	1.4 (1.11, 1.78)	higher amount of time in spent threshold limit value is associated with higher risk of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/ probable” or “possible” symptoms of CTS	Biomechanical load between action limit and threshold limit value versus below action limit	sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	1.5 (0.9 –2.5)	NS
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/ probable” or “possible” symptoms of CTS	Biomechanical load above threshold limit value versus below action limit	sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	3.0 (2.0 – 4.5)	Biomechanical loads above the threshold limit value increases odds of CTS compared to biomechanical loads under the action limit

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/probable” or “possible” symptoms of CTS	Previous exposure to biomechanical overload	sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	1.4(.9-2.1)	NS

TABLE 37 RISK FACTOR: AGE

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong,T. 2008	High	N= 1071; following worker populations: carpenters, floor layers, sheet metal workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	Age per 10 year increase	model 2 best fitting model: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	1.58 (1.32, 1.89)	older have significantly higher odds of median neuropathy
Bonfiglioli,R. 2013	High	N= 2492 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms at 3 years	Age	sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	1.03 (1.02, 1.04)	older age increases CTS symptom risk

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Bonfiglioli,R. 2013	High	N= 2299 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms and NCS test at 3 years	Age	sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	1.06 (1.05, 1.08)	older age increases CTS risk
Evanoff,B. 2014	High	711 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	Age	adjusted for age, Gender/Sex, and BMI; past diagnosis of CTS or other upper extremity peripheral neuropathy, had a pacemaker or internal defibrillator, or were pregnant at the time of enrollment excluded	Multivariable mixed logistic regression models OR	1.03 (1.00-1.05)	NS
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	Age	Model1: ACGIH Hand Activity Level (HAL) ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	1.077 (.99,1.17)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	Age	Model 2: strain index ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	1.076 (0.99–1.17)	NS
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Age 46–50 vs Age 45 or below	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	2.01 (1.44–2.81)	age 46 to 50 has higher odds of CTS than 45 or younger
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Age 51–55 vs Age 45 or below	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	1.3 (0.92–1.83)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Age 56–59 vs Age 45 or below	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	1.33 (0.92–1.92)	NS
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Age 60 vs 45	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	1.28 (0.94–1.75)	NS
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	In age quintile 2 vs 1st	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	1.52 (0.53,4.39)	NS
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	In age quintile 3 vs 1st	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	5.29 (1.79,15.66)	older age is associated with higher odds of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	In age quintile 4 vs 1st	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	7.42 (2.34,23.5)	older age is associated with higher odds of CTS
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	In age quintile 5 vs 1st	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	38.33(12.11,121.29)	older age is associated with higher odds of CTS
Wright, C. 2014	Low	(3155 w/o CTS diagnosis and 91 with CTS diagnosis); EMR of a cohort of pregnant women receiving prenatal care at a large obstetrics unit; representative of those served by the urban academic center, with a large proportion of black patients	clinically diagnosed with ICD 9 diagnosis code for CTS	Age <30 versus older	age, race/ethnicity, education, smoking, parity, hypertension, diabetes, maternal weight category (constructed variable including information about maternal BMI and GWG), and number prenatal care visits	Logistical Regression OR	0.99 (0.59-1.69)	NS
Eleftheriou,A. 2012	Moderate	N= 441 ; 548 workers of a Governmental data entry & processing unit	personal history of CTS	Age at least 45	Keyboard strokes, age, physical activity, smoking	logistic regression OR	1.16 (0.53 to 2.55)	NS
Eleftheriou,A. 2012	Moderate	N= 441 ; 548 workers of a Governmental data entry & processing unit	personal history of CTS or newly diagnosed CTS with CTS-7 algorithm score of 12 or more	Age at least 45	Keyboard strokes, sex, physical activity, age	logistic regression OR	1.48 (0.90 to 2.43)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Mondelli,M. 2006	Moderate	N= 145 ; female hospital floor cleaners in Italy	diagnosed according to AAN criteria: population of hospital floor cleaners	Age 2nd vs 1st quartile	Age, BMI, duration of occupational exposure to current job, occupational exposure to the same job for previous employers, manual hobbies (including motorcycle use, diseases known to be associated with CTS (diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma), hospital (to adjust for center effects)	logistic regression OR	1.32 (0.44-4.00)	NS
Mondelli,M. 2006	Moderate	N= 145 ; female hospital floor cleaners in Italy	diagnosed according to AAN criteria: population of hospital floor cleaners	Age 3rd vs 1st quartile	Age, BMI, duration of occupational exposure to current job, occupational exposure to the same job for previous employers, manual hobbies (including motorcycle use, diseases known to be associated with CTS (diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma), hospital (to adjust for center effects)	logistic regression OR	1.50 (0.45-4.96)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Mondelli,M. 2006	Moderate	N= 145 ; female hospital floor cleaners in Italy	diagnosed according to AAN criteria: population of hospital floor cleaners	Age 4th vs 1st quartile	Age, BMI, duration of occupational exposure to current job, occupational exposure to the same job for previous employers, manual hobbies (including motorcycle use, diseases known to be associated with CTS (diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma), hospital (to adjust for center effects)	logistic regression OR	1.69 (0.50-5.75)	NS
Morgenstern,H. 1991	Moderate	N= 1058 ; grocery store checkers belonging to local California union	symptoms of CTS indicated in questionnaire	Age	matched by: all members were members of union food and commercial workers union ; covariates: age, hours per work week, years worked, age*years worked interaction, use of laser scanner to check items, unload basket before checking, load and lift grocery bags after checking, currently pregnant, contraceptive use, use of exogenous estrogen, use of diuretics, history of broken wrist	logistic regression odds ratio	1.07(P=.002)	odds of CTS are greater in older patients
Shin,J. 2008	Moderate	N= 123 ; All were hemodialysis patients	pain or pain in median nerve distribution and Tinel's sign	Age	age, sex, predialysis plasma BMG level in 1990, duration of dialysis	logistic regression OR	1.43(1.09,1.89)	age is positively associated with CTS odds

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Silverstein,B.A. 1987	Moderate	N= 652 ; workers form seven different industrial sites	based on phalen and tinel's signs and symptoms mentioned in interview	Age	Gender/Sex, age, years on job, work repetition, level of force involved in job, dummy variables controlling for job center effects	logistic regression OR	1.05(0.99,1.11)	NS
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/ probable” or “possible” symptoms of CTS	Age 31 to 35 versus 30 or younger	sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	1.1 (0.6 –2.1)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/ probable” or “possible” symptoms of CTS	Age 36 to 40 versus 30 or younger	sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	1.4 (0.8 –2.6)	NS
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/ probable” or “possible” symptoms of CTS	Age 41 to 45 versus 30 or younger	sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	2.2 (1.2– 4.1)	41 to 45 year olds had greater odds of CTS than people at age 30 or younger

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/ probable” or “possible” symptoms of CTS	Age 46 to 50 versus 30 or younger	sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	1.3 (0.7–2.5)	NS
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/ probable” or “possible” symptoms of CTS	Age 50 or older versus 30 or younger	sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	1.7 (0.9 –3.3)	NS

TABLE 38 RISK FACTOR: ANTHROPOMETRIC MEASURES

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	Wrist index ≥ 7 (depth/width of wrist in cm)	model 2 best fitting model: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	2.54 (1.69, 3.82)	wrist index is significantly correlated with median neuropathy
Kopec, J. 2011	Low	N= 386 ; all patients were on hemodialysis	signs and symptoms verified by nerve conduction studies	location of AV fistula	location of AV fistula	none	none	NS
Tsai, N.W. 2013	Low	N= 120 (80 non-DM and 40 DM patients); Patients with clinically suspicious CTS at the out-patient clinics of the Department of Neurology of Kaohsiung Chang Gung Memorial Hospital were evaluated.	clinically and electromyography-confirmed CTS	Cross sectional area of the median nerve at the wrist crease (CSA W)	Gender/Sex, BMI, body weight, CSA outlet, CSA W; clinical and electrophysiologic diagnosis of diabetic polyneuropathy, prior surgery for CTS, and those with gout, rheumatoid arthritis, or abnormal thyroid function related to peripheral neuropathy	Stepwise logistic regression OR	1.21 (1.07-1.38)	In DM patients, increased CSA W increases odds of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Werner,R.A. 2005	Low	N= 189 ; all were automobile assembly line workers	hand diagram symptoms, and median sensory evoked response that .5 msec longer than ipsilateral ulnar sensory response at 1 year	Elbow posture rating (1–10 scale)	Gender/Sex, wrist/hand tendonitis, diabetes, coworker support, median ulnar peak latency on dominant side, elbow posture rating	logistic regression odds ratio	8.08(1.48–44.22)	higher elbow posture rating was associated with higher odds of CTS
Boz,C. 2004	Moderate	N= 304 ; cases were selected and controls were relatives or people accompanying CTS patients	clinical and electrodiagnostic tests	wrist index	matched by: age matched females ; covariates: BMI, wrist index, shape index, digit index, hand length/body height ratio	logistic regression odds ratio	1.157(1.099-1.219)	higher wrist index is associated with higher CTS odds
Boz,C. 2004	Moderate	N= 304 ; cases were selected and controls were relatives or people accompanying CTS patients	clinical and electrodiagnostic tests	Shape index [hand width(mm)/hand length (mm) × 100]	matched by: age matched females ; covariates: BMI, wrist index, shape index, digit index, hand length/body height ratio	logistic regression odds ratio	1.362(1.207-1.537)	higher hand shape index is correlated with higher CTS odds
Boz,C. 2004	Moderate	N= 304 ; cases were selected and controls were relatives or people accompanying CTS patients	clinical and electrodiagnostic tests	digit index [third finger length (mm)/hand length (mm) × 100]	matched by: age matched females ; covariates: BMI, wrist index, shape index, digit index, hand length/body height ratio	logistic regression odds ratio	1.375(1.164-1.624)	higher digit index shape index is correlated with higher CTS odds
Boz,C. 2004	Moderate	N= 304 ; cases were selected and controls were relatives or people accompanying CTS patients	clinical and electrodiagnostic tests	Hand length/body height ratio	matched by: age matched females ; covariates: BMI, wrist index, shape index, digit index, hand length/body height ratio	logistic regression odds ratio	1.246(0.650-2.287)	NS
Boz,C. 2004	Moderate	N= 304 ; cases were selected and controls were relatives or people accompanying CTS patients	clinical and electrodiagnostic tests	wrist index	matched by: aged matched males ; covariates: BMI, wrist index, shape index, digit index, hand length/body height ratio	logistic regression odds ratio	1.047(0.966-1.135)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Boz,C. 2004	Moderate	N= 304 ; cases were selected and controls were relatives or people accompanying CTS patients	clinical and electrodiagnostic tests	Shape index [hand width(mm)/hand length (mm) × 100]	matched by: aged matched males ; covariates: BMI, wrist index, shape index, digit index, hand length/body height ratio	logistic regression odds ratio	1.041(0.878-1.233)	NS
Boz,C. 2004	Moderate	N= 304 ; cases were selected and controls were relatives or people accompanying CTS patients	clinical and electrodiagnostic tests	digit index [third finger length (mm)/hand length (mm) × 100]	matched by: aged matched males ; covariates: BMI, wrist index, shape index, digit index, hand length/body height ratio	logistic regression odds ratio	1.177(0.880-1.574)	NS
Boz,C. 2004	Moderate	N= 304 ; cases were selected and controls were relatives or people accompanying CTS patients	clinical and electrodiagnostic tests	Hand length/body height ratio	matched by: aged matched males ; covariates: BMI, wrist index, shape index, digit index, hand length/body height ratio	logistic regression odds ratio	1.069(0.381-2.998)	NS
Gordon,C. 1988	Moderate	N= 80 ; Midwestern car manufacturing workers	median motor and sensory latencies at 3 years	Wrist ratio	age, sex	regression p value	0.001	wrist ratio predicted median motor latency
Hlebs,S. 2014	Moderate	convenience and random sampling of N= 100 (50 with CTS and 50 healthy controls); subjects performed various occupations, but the groups were balanced regarding Gender/Sex and age	clinically and electromyography (EMG) confirmed CTS; controls had no signs or symptoms of CTS	Mean wrist index >0.695	diabetes mellitus, rheumatoid arthritis, thyroid disease, neuropathy, infections, thoracic outlet syndrome, neck pain or paresthesia (tingling) in upper limbs, pregnancy, past injury or surgery of the wrist or the neck, BMI, ratio of hand length to body height, mean wrist index >0.695, mean hand shape index, mean digit index	Multiple logistic regression OR	42.89 (9.22, 199.60)	Wrist ratio is associated with increased odds of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Hlebs,S. 2014	Moderate	convenience and random sampling of N= 100 (50 with CTS and 50 healthy controls); subjects performed various occupations, but the groups were balanced regarding Gender/Sex and age	clinically and electromyography (EMG) confirmed CTS; controls had no signs or symptoms of CTS	mean ratio of hand length to body height	diabetes mellitus, rheumatoid arthritis, thyroid disease, neuropathy, infections, thoracic outlet syndrome, neck pain or paresthesia (tingling) in upper limbs, pregnancy, past injury or surgery of the wrist or the neck, BMI, ratio of hand length to body height, mean wrist index >0.695, mean hand shape index, mean digit index	Multiple logistic regression OR	0.18 (0.04, 0.92)	Hand length-body height ratio decreased odds of CTS
Hlebs,S. 2014	Moderate	convenience and random sampling of N= 100 (50 with CTS and 50 healthy controls); subjects performed various occupations, but the groups were balanced regarding Gender/Sex and age	clinically and electromyography (EMG) confirmed CTS; controls had no signs or symptoms of CTS	Mean digit index	diabetes mellitus, rheumatoid arthritis, thyroid disease, neuropathy, infections, thoracic outlet syndrome, neck pain or paresthesia (tingling) in upper limbs, pregnancy, past injury or surgery of the wrist or the neck, BMI, ratio of hand length to body height, mean wrist index >0.695, mean hand shape index, mean digit index	Multiple logistic regression OR	1.12 (0.64, 1.96)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Hlebs,S. 2014	Moderate	convenience and random sampling of N= 100 (50 with CTS and 50 healthy controls); subjects performed various occupations, but the groups were balanced regarding Gender/Sex and age	clinically and electromyography (EMG) confirmed CTS; controls had no signs or symptoms of CTS	Mean hand shape index	diabetes mellitus, rheumatoid arthritis, thyroid disease, neuropathy, infections, thoracic outlet syndrome, neck pain or paresthesia (tingling) in upper limbs, pregnancy, past injury or surgery of the wrist or the neck, BMI, ratio of hand length to body height, mean wrist index >0.695, mean hand shape index, mean digit index	Multiple logistic regression OR	1.22 (0.93, 1.61)	NS
Matias,A.C. 1998	Moderate	N= 100 ; video display terminal operators at Midwestern university	"medically diagnosed" CTS	Trunk incline	work day duration	logistic regression odds ratio	.898(p=.03)	trunk incline is negatively associated with CTS
Matias,A.C. 1998	Moderate	N= 100 ; video display terminal operators at Midwestern university	"medically diagnosed" CTS	Wrist extension	work day duration	logistic regression odds ratio	1.057(p=.09)	NS
Matias,A.C. 1998	Moderate	N= 100 ; video display terminal operators at Midwestern university	"medically diagnosed" CTS	Wrist deviation	work day duration	logistic regression odds ratio	1.098(p=.009)	wrist deviation is positively associated with CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Matias,A.C. 1998	Moderate	N= 100 ; video display terminal operators at Midwestern university	"medically diagnosed" CTS	overall anthropometric measure factor consisting of measures of wrist circumference, wrist diameter, upper arm length, forearm length, and hand length	work day duration	logistic regression odds ratio	1.406(P=.07)	Overall anthropometric measures are associated with higher CTS odds
Moghtaderi,A. 2005	Moderate	N= 237 ; cases and controls recruited from same urban area	clinical and electrodiagnostic tests	Wrist ratio	matched by: age ; covariates: sex, BMI, wrist ratio, wrist circumference	logistic regression odds ratio	1.12(1.03, 1.21)	higher wrist ratio is positively associated with CTS
Moghtaderi,A. 2005	Moderate	N= 237 ; cases and controls recruited from same urban area	clinical and electrodiagnostic tests	Wrist circumference	matched by: age ; covariates: sex, BMI, wrist ratio, wrist circumference	logistic regression odds ratio	.82(.76, .88)	higher wrist circumference is negatively associated with CTS
Sabry,M.M. 2009	Moderate	N= 78 ; cases presented to neurophysiological laboratory unclear which population controls were recruited from	wrist ratio	CTS symptoms with mild nerve conduction abnormality vs health controls	none	mean difference	0.02(0, 0.04)	wrist ratio is higher in CTS patients with mild conduction abnormality
Sabry,M.M. 2009	Moderate	N= 69 ; cases presented to neurophysiological laboratory unclear which population controls were recruited from	wrist ratio	CTS symptoms with moderate nerve conduction abnormality vs health controls	none	mean difference	0.03(0.01, 0.05)	wrist ratio is higher in CTS patients with moderate conduction abnormality

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Sabry,M.M. 2009	Moderate	N= 68 ; cases presented to neurophysiological laboratory unclear which population controls were recruited from	wrist ratio	CTS symptoms with severe nerve conduction abnormality vs health controls	none	mean difference	0.04(0.02, 0.06)	wrist ratio is higher in CTS patients with severe conduction abnormality
Sabry,M.M. 2009	Moderate	N= 78 ; cases presented to neurophysiological laboratory unclear which population controls were recruited from	wrist palm ratio	CTS symptoms with mild nerve conduction abnormality vs health controls	none	mean difference	0.01(0, 0.02)	wrist palm ratio is higher in CTS patients with mild conduction abnormality
Sabry,M.M. 2009	Moderate	N= 69 ; cases presented to neurophysiological laboratory unclear which population controls were recruited from	wrist palm ratio	CTS symptoms with moderate nerve conduction abnormality vs health controls	none	mean difference	0.02(0, 0.04)	wrist palm ratio is higher in CTS patients with moderate conduction abnormality
Sabry,M.M. 2009	Moderate	N= 68 ; cases presented to neurophysiological laboratory unclear which population controls were recruited from	wrist palm ratio	CTS symptoms with severe nerve conduction abnormality vs health controls	none	mean difference	0.03(0.01, 0.05)	wrist palm ratio is higher in CTS patients with severe conduction abnormality
Sharifi-Mollayousefi,A. 2008	Moderate	N= 262 ; cases were from same urban area, and controls were their relatives	clinical and electrodiagnostic tests	Digit index [third finger length (mm)/hand length (mm) × 100]	matched by: age ; covariates: digit index, shape index, wrist ratio, hand length/hand height ratio, BMI	logistic regression odds ratio	1	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Sharifi-Mollayousefi,A. 2008	Moderate	N= 262 ; cases were from same urban area, and controls were their relatives	clinical and electrodiagnostic tests	Shape index [hand width(mm)/hand length (mm) × 100]	matched by: age ; covariates: digit index, shape index, wrist ratio, hand length/hand height ratio, BMI	logistic regression odds ratio	1.058	odds of CTS increases as shape index increases
Sharifi-Mollayousefi,A. 2008	Moderate	N= 262 ; cases were from same urban area, and controls were their relatives	clinical and electrodiagnostic tests	Wrist ratio[wrist depth(mm)/wrist width (mm)]	matched by: age ; covariates: digit index, shape index, wrist ratio, hand length/hand height ratio, BMI	logistic regression odds ratio	1.351	odds of CTS increases as wrist ratio index increases
Sharifi-Mollayousefi,A. 2008	Moderate	N= 262 ; cases were from same urban area, and controls were their relatives	clinical and electrodiagnostic tests	Hand length/height ratio[hand length (cm)/height(m)]	matched by: age ; covariates: digit index, shape index, wrist ratio, hand length/hand height ratio, BMI	logistic regression odds ratio	1.002	odds of CTS increases as hand length/height ratio index increases
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/ probable” or “possible” symptoms of CTS	BMI under 25 with a robust wrist versus BMI under 25 with a slim wrist	sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	1.1 (0.7–1.7)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/ probable” or “possible” symptoms of CTS	short height with long forearm length versus short height and short forearm length (tall/long=50th percentile or higher)	sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	0.7 (0.4 –1.1)	NS

TABLE 39 RISK FACTOR: ANY FACILITATING COMORBIDITIES

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Bonfiglioli,R. 2013	High	N= 2492 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms at 3 years	1 or more predisposing disease (diabetes, amyloidosis, gout, thyroid disorders, scleroderma, rheumatoid arthritis, systemic lupus erythematosus, and digital flexor tendonitis)	gender/sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	1.60 (1.31, 1.94)	having predisposing diseases increase risk of symptoms
Bonfiglioli,R. 2013	High	N= 2299 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms and NCS test at 3 years	1 or more predisposing disease (diabetes, amyloidosis, gout, thyroid disorders, scleroderma, rheumatoid arthritis, systemic lupus erythematosus, and digital flexor tendonitis)	gender/sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	1.91 (1.26, 2.91)	predisposing conditions increase CTS risk

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/probable” or “possible” symptoms of CTS	Presence of pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	2.3 (1.5–3.6)	presence pathologies facilitating CTS onset increases odds of CTS

TABLE 40 RISK FACTOR: ARTHRITIS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	Rheumatoid Arthritis	Model1: ACGIH Hand Activity Level (HAL) ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	4.07 (1.43–11.58)	RA is a risk factor for CTS
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	Rheumatoid Arthritis	Model 2: strain index ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	4.14 (1.48–11.59)	RA is a risk factor for CTS
Burt,S. 2011	Moderate	N= 455 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	arthritis yes versus no	Model 3: peak worker perceived exertion rating (0-10), BMI, Hand Activity Level among females, Hand Activity Level among males, Gender/Sex female vs male at the mean hand activity level	logistic regression odds ratio	2.03 (1.02-4.04)	arthritis increases CTS odds

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Coggon,D. 2013	Moderate	N= 855; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs negatively tested patients	other arthritis present	matched by: sex, age ; covariates: ethnicity, BMI, smoking habits, diabetes, other arthritis present, number of moderately distressing somatic symptoms per week, use of keyboard 4 or more hours per day, use of vibrating tools, job includes bonuses/targets/deadlines	logistic regression OR	0.7 (0.5-1.0)	NS
Geoghegan,J.M. 2004	Moderate	N= 134 ; patients from the UK General Practice Research Database	diagnosed CTS	rheumatoid arthritis	matched by: age, sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	2.23 (1.57 – 3.17)	odds are greater in patients with RA

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Geoghegan, J.M. 2004	Moderate	N= 1233 ; patients from the UK General Practice Research Database	diagnosed CTS	Arthritis	matched by: age, sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	1.89 (1.65–2.17)	arthritis patients have greater odds of CTS

TABLE 41 RISK FACTOR: ASSEMBLY LINE

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	working on assembly line	model 1: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, using vibrating tools, assembly line work, twisting forearm work, bending wrist work, using forceful hand grip, using fingers/thumb as pressing tool, using fingers in a pinch grip	logistic regression OR	2.86 (1.64, 5.01)	working on assembly line is associated with higher odds of median neuropathy
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	working on assembly line	model 2 best fitting model: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	2.57 (1.46, 4.54)	working on assembly line is associated with higher odds of median neuropathy
Bonfiglioli, R. 2006	Low	N= 212 ; electric-power tool plant workers	abnormal NCS test and symptoms	assembly line workers versus non-assembly line workers	matched by: all employed at company that manufactures electric-powered tools ; covariates: assembly line vs. non-assembly line work	odds ratio	7.22(2.858, 18.237)	odds of abnormal NCS and symptoms is higher in assembly line workers than in non-assembly line workers

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Leclerc,A. 1998	Low	N= 816 ; assembly line workers and non-repetitive workers(cleaning, maintenance or catering jobs)	Tinel or phalen test positive or nerve condition velocity had been established before medical examination	assembly line work vs non repetitive work (cleaning, maintenance and catering)	matched by: all were of similar education level ; covariates: sex, age, psychological problems, BMI	logistic regression odds ratio	4.54 (2.27 to 9.09)	odds of CTS are significantly higher in assembly line workers

TABLE 42 RISK FACTOR: AUTOMATIC WORK PACE

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Petit,A. 2015	Moderate	French salaried workers working in manufacturing industry and services sector as skilled and unskilled blue collar workers	CTS symptoms on the day of medical exam (or for at least 4 days during the preceding 7 days)	work pace dependent on automatic rate	Gender/Sex, age, use of vibrating hand tools, exposure to cold temperature, holding objects in pinch grip, extreme wrist bending posture, pressing with palm base, force, and work organization factors	Logistical Regression OR	1.9 (0.9-4.1)	NS

TABLE 43 RISK FACTOR: BMI

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	BMI per 5 point increase	model 2 best fitting model: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	1.28 (1.12, 1.49)	BMI is significantly correlated with greater odds of median neuropathy
Bonfiglioli, R. 2013	High	N= 2492 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms at 3 years	BMI	sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	1.03 (1.00, 1.06)	NS
Bonfiglioli, R. 2013	High	N= 2299 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms and NCS test at 3 years	BMI	sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	1.09 (1.04, 1.14)	BMI increases CTS risk

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Evanoff,B. 2014	High	711 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	BMI	adjusted for age, Gender/Sex, and BMI; past diagnosis of CTS or other upper extremity peripheral neuropathy, had a pacemaker or internal defibrillator, or were pregnant at the time of enrollment excluded	Multivariable mixed logistic regression models OR	1.07(1.01-1.12)	Higher BMI significantly increases odds of CTS
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	BMI continuous	Model1: ACGIH Hand Activity Level (HAL) ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	1.070 (1.02–1.12)	BMI is significantly associated with CTS risk
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	BMI (continuous)	Model 2: strain index ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	1.063 1.02–1.11 0.005)	BMI is significantly associated with CTS risk

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	BMI 21.1–23.0 vs 21	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	0.91(0.69–1.22)	NS
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	BMI 23.1–25.0 vs 21	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	0.89(0.65–1.23)	NS
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	BMI 25.1–28.0 vs 21	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	0.84(0.59–1.21)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	BMI Greater than 28.1 vs 21	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	0.84(0.57–1.23)	NS
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	BMI in age quintile 1	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	1.09(1.06,1.12)	Higher BMI is a significant risk factor in the first age quintile
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	BMI in age quintile 2	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	1.09(1.06,1.12)	Higher BMI is a significant risk factor in the second age quintile
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	BMI in age quintile 3	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	1.05(1.02,1.08)	Higher BMI is a significant risk factor in the third age quintile
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	BMI in age quintile 4	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	1.05(1.01,1.08)	Higher BMI is a significant risk factor in the first fourth age quintile

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	BMI in age quintile 5	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	1.01(0.98,1.04)	NS in fifth age quintile
Becker,J. 2002	Moderate	N= 1772; cases and controls consisted of patients referred for nerve conduction studies and electromyography.	nerve conduction and electromyography	BMI Gender/Sex interaction effect	BMI over 30, Gender/Sex, age between 41 and 60, diabetes, BMI*Gender/Sex interaction effect, Gender/Sex*diabetes interaction effect	logistic regression odds ratio	1.25(1.07,1.46)	although the overall effect of BMI remained significant in the model(for both Gender/Sex) the effect of BMI was significantly greater in males than in females
Burt,S. 2011	Moderate	N= 448 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	BMI \geq 30 versus $<$ 30 if exerts/min cat ¹ / ₄ 1	Model 1 Peak force match cat 2 versus 1, Peak force match cat 3 versus 1, Exerts/min cat 2 versus 1 if BMI $<$ 30, Exerts/min cat 3 versus 1 if BMI $<$ 30, Exerts/min cat 2 versus 1 if BMI \geq 30, Exerts/min cat 3 versus 1 if BMI \geq 30, BMI \geq 30 versus $<$ 30 if exerts/min cat ¹ / ₄ 1, BMI \geq 30 versus $<$ 30 if exerts/min cat ¹ / ₄ 2 1.60, BMI \geq 30 versus $<$ 30 if exerts/min cat ¹ / ₄ 3	logistic regression odds ratio	0.77 (0.24-2.48)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Burt,S. 2011	Moderate	N= 448 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	BMI \geq 30 versus $<$ 30 if exerts/min cat \neq 2 1.60	Model 1 Peak force match cat 2 versus 1, Peak force match cat 3 versus 1, Exerts/min cat 2 versus 1 if BMI $<$ 30, Exerts/min cat 3 versus 1 if BMI $<$ 30, Exerts/min cat 2 versus 1 if BMI \geq 30, Exerts/min cat 3 versus 1 if BMI \geq 30, BMI \geq 30 versus $<$ 30 if exerts/min cat \neq 1, BMI \geq 30 versus $<$ 30 if exerts/min cat \neq 2 1.60, BMI \geq 30 versus $<$ 30 if exerts/min cat \neq 3	logistic regression odds ratio	1.60 (0.52-5.00)	NS
Burt,S. 2011	Moderate	N= 448 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	BMI \geq 30 versus $<$ 30 if exerts/min cat \neq 3	Model 1 Peak force match cat 2 versus 1, Peak force match cat 3 versus 1, Exerts/min cat 2 versus 1 if BMI $<$ 30, Exerts/min cat 3 versus 1 if BMI $<$ 30, Exerts/min cat 2 versus 1 if BMI \geq 30, Exerts/min cat 3 versus 1 if BMI \geq 30, BMI \geq 30 versus $<$ 30 if exerts/min cat \neq 1, BMI \geq 30 versus $<$ 30 if exerts/min cat \neq 2 1.60, BMI \geq 30 versus $<$ 30 if exerts/min cat \neq 3	logistic regression odds ratio	2.26 (1.01-5.10)	obesity increases the odds of CTS among patients with highest category of exertions per minute (\geq 15/minute)
Burt,S. 2011	Moderate	N= 456 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	BMI	Model 2: peak worker perceived exertion rating (0-10), BMI, Hand Activity Level among females, Hand Activity Level among males, Gender/Sex	logistic regression odds ratio	1.07 (1.03-1.11)	BMI increases CTS odds

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Burt,S. 2013	Moderate	N= 347 ; workers from hospital, school bus manufacturing plant, and engine assembly plant	electrodiagnostic test, symptoms, hand diagram at 2 years	BMI of at least 30 vs less than 30	model1: time in forceful exertion, BMI \geq 30, threshold limit value, job strain	hazard ratios	3.19(1.28,7.98)	having a BMI of 30 or greater is associated with higher risk of CTS
Coggon,D. 2013	Moderate	N= 1230; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs healthy controls	BMI between 25 and 29.9 vs <25	matched by: sex, age ; covariates: ethnicity, BMI, smoking, mental health, repeated movements, vibrating tools, job control, level of supervisor/colleague support	logistic regression OR	1.6 (1.1-2.1)	odds higher in high BMI group
Coggon,D. 2013	Moderate	N= 1230; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs healthy controls	BMI of 30 or above vs <25	matched by: sex, age ; covariates: ethnicity, BMI, smoking, mental health, repeated movements, vibrating tools, job control, level of supervisor/colleague support	logistic regression OR	2.1 (1.6-2.9)	odds higher in high BMI group

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Coggon,D. 2013	Moderate	N= 855; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs negatively tested patients	BMI between 25 and 29.9 vs <25	matched by: sex, age ; covariates: ethnicity, BMI, smoking habits, diabetes, other arthritis present, number of moderately distressing somatic symptoms per week, use of keyboard 4 or more hours per day, use of vibrating tools, job includes bonuses/targets/deadlines	logistic regression OR	1.3 (0.9-1.9)	NS
Coggon,D. 2013	Moderate	N= 855; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs negatively tested patients	BMI of 30 or above vs <25	matched by: sex, age ; covariates: ethnicity, BMI, smoking habits, diabetes, other arthritis present, number of moderately distressing somatic symptoms per week, use of keyboard 4 or more hours per day, use of vibrating tools, job includes bonuses/targets/deadlines	logistic regression OR	2.7 (1.9-3.9)	BMI is associated with greater risk of median neuropathy
Geoghegan,J.M. 2004	Moderate	N= 171 ; patients from the UK General Practice Research Database	diagnosed CTS	BMI <18.5 vs BMI 18.5–25	matched by: age, sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	0.64 (0.40–1.01)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Geoghegan,J.M. 2004	Moderate	N= 3127 ; patients from the UK General Practice Research Database	diagnosed CTS	BMI 25.1–30 vs BMI 18.5–25	matched by: age, sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	1.63 (1.45–1.84)	odds of CTS are greater in higher BMI group
Geoghegan,J.M. 2004	Moderate	N= 1422 ; patients from the UK General Practice Research Database	diagnosed CTS	BMI 30–40 vs BMI 18.5–25	matched by: age, sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	2.06 (1.79–2.38)	odds of CTS are greater in higher BMI group

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Geoghegan, J.M. 2004	Moderate	N= 140 ; patients from the UK General Practice Research Database	diagnosed CTS	BMI >40 vs BMI 18.5–25	matched by: age, sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	2.22 (1.53–3.21)	odds of CTS are greater in higher BMI group
Goodson, J.T. 2014	Moderate	87 CTS and 74 sex-matched general orthopedic patients from an outpatient orthopedic clinic in the Western US.	(1)Electrodiagnostic (EDX) testing results suggestive of abnormal slowing of the median nerve, (2) the presence of clinical symptoms of CTS, and (3) no confounding syndromes/disorders	BMI	excluded confounding conditions; sex, age, education levels, ethnicity, and EDX testing results	Logistical Regression OR	1.09(0.99,1.19)	NS
Hlebs, S. 2014	Moderate	convenience and random sampling of N= 100 (50 with CTS and 50 healthy controls); subjects performed various occupations, but the groups were balanced regarding Gender/Sex and age	clinically and electromyography (EMG) confirmed CTS; controls had no signs or symptoms of CTS	BMI	diabetes mellitus, rheumatoid arthritis, thyroid disease, neuropathy, infections, thoracic outlet syndrome, neck pain or paresthesia (tingling) in upper limbs, pregnancy, past injury or surgery of the wrist or the neck, BMI, ratio of hand length to body height, mean wrist index >0.695, mean hand shape index, mean digit index	Multiple logistic regression OR	1.43 (1.16, 1.76)	high BMI is associated with increased odds of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Mondelli,M. 2006	Moderate	N= 145 ; female hospital floor cleaners in Italy	diagnosed according to AAN criteria: population of hospital floor cleaners	BMI over 25 vs 25 or less	Age, BMI, duration of occupational exposure to current job, occupational exposure to the same job for previous employers, manual hobbies (including motorcycle use, diseases known to be associated with CTS (diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma), hospital (to adjust for center effects)	logistic regression OR	1.73 (0.68-4.44)	NS
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Body mass index (kg/m2)	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	1.08 (1.03, 1.14)	higher BMI increases odds of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/ probable” or “possible” symptoms of CTS	Overweight BMI over 24.9 with a slim wrist versus BMI under 25 with a slim wrist	sex, age, biomechanical load, BMI* ² wrist interaction effect, height* ² forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	1.5 (0.7–3.4)	NS
de Krom,M.C. 1990	Moderate	N= 629; 28 cases and all controls were identified through random sample of patients in the Netherlands. An additional 128 cases were added from a single hospital in the area	clinical history and neurophysiologic testing	slimming courses yes vs no	matched by: age and sex stratified random sample ; covariates: height, weight(kg), slimming courses(yes/no), Hours/week in flexion activities, hours/week for extension activities, Varicosis (for men only), for women: years since menopause onset vs pre-menopausal, hysterectomy vs premenopausal	logistic regression odds ratio	1.57(0.92, 2.66)	NS

TABLE 44 RISK FACTOR: BENDING

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	bending wrist frequently	model 1: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, using vibrating tools, assembly line work, twisting forearm work, bending wrist work, using forceful hand grip, using fingers/thumb as pressing tool, using fingers in a pinch grip	logistic regression OR	1.72 (1.07, 2.76)	bending wrist frequently is associated with higher odds of median neuropathy
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	peak exposure to Wrist bending	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	0.98 (0.46, 2.10)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	Wrist bending in most recent job	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	1.48 (0.71, 3.12)	NS
Evanoff, B. 2012	Moderate	N= 745 ; newly employed workers	symptoms and NCS at 3 years	hand wrist bending	age, Gender/Sex, lifting at least 1kg, forceful grip, finger/thumb pressing, using vibrating tools, pinch grip, forearm rotation, hand/wrist bending	NR	NR	NS
Nordstrom, D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Bending/twisting hand 0.25-1.75 hours/day vs none	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	2.42 (0.88, 6.62)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Bending/twisting hand 2-3 hours/day vs none hours/day vs none	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	1.27 (0.50, 3.26)	NS
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Bending/twisting hand 3.5-6 hours/day vs none	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	2.65 (1.83, 5.92)	higher in workers who bend/twist hand 3.5-6 hours/day
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Bending/twisting hand -16 hours/day vs none	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	2.11 (0.98, 4.52)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
de Krom,M.C. 1990	Moderate	N= 629; 28 cases and all controls were identified through random sample of patients in the Netherlands. An additional 128 cases were added from a single hospital in the area	clinical history and neurophysiologic testing	increased CTS odds for 1 hour increase in flexion	matched by: age and sex stratified random sample ; covariates: height, weight(kg), slimming courses(yes/no), Hours/week in flexion activities, hours/week for extension activities, Varicosis (for men only), for women: years since menopause onset vs pre-menopausal, hysterectomy vs premenopausal	logistic regression odds ratio	1.05(1.02, 1.08)	working longer hours in activities requiring wrist flexion is associated with higher CTS odds
de Krom,M.C. 1990	Moderate	N= 629; 28 cases and all controls were identified through random sample of patients in the Netherlands. An additional 128 cases were added from a single hospital in the area	clinical history and neurophysiologic testing	increased CTS odds for 1 hour increase in extension	matched by: age and sex stratified random sample ; covariates: height, weight(kg), slimming courses(yes/no), Hours/week in flexion activities, hours/week for extension activities, Varicosis (for men only), for women: years since menopause onset vs pre-menopausal, hysterectomy vs premenopausal	logistic regression odds ratio	1.04(1, 1.09)	working longer hours in activities requiring wrist extension is associated with higher CTS odds

TABLE 45 RISK FACTOR: CHEMICALS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Contact with solvents 0.08-0.75 hours/day vs none	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	0.44 (0.21, 0.90)	odds lower in workers with .08 to .75 hours of contact with solvents
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Contact with solvents 1-11 hours/day vs none	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	0.80 (0.36, 1.79)	NS

TABLE 46 RISK FACTOR: CLERICAL

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Occupation (clerical vs. non-clerical)	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	1.13(0.90–1.43)	NS
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Administrative and secretarial occupations vs. Associate professional and technical occupations	matched by: all males ; covariates: Administrative and secretarial occupations vs. Associate professional and technical occupations	univariate odds ratios	2.21 (1.00–4.73)	NS
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Administrative and secretarial occupations vs. Associate professional and technical occupations	matched by: all females ; covariates: Administrative and secretarial occupations vs. Associate professional and technical occupations	univariate odds ratios	1.76 (1.14–2.81)	odds are higher than in associate professional and technical occupations

TABLE 47 RISK FACTOR: COLD EXPOSURE

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Chiang,H.C. 1990	Moderate	N= 269 ; workers at frozen food plants	neurological examinations and electrophysiological tests	work exposure to cold vs no exposure to cold	Age, sex, length of employment, exposure to cold(frozen food packers), repetitive movement (frozen and non-frozen food packers), and cold*repetitious movement interaction	logistic regression odds ratio	1.85 (1.10, 3.13)	exposure to cold is a significant predictor of CTS

TABLE 48 RISK FACTOR: COMORBIDITY DRUG USE

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Current thyroxine replacement therapy	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	1.13(0.72–1.78)	NS
Geoghegan,J.M. 2004	Moderate	N= 766 ; patients from the UK General Practice Research Database	diagnosed CTS	Corticosteroid	matched by: age, sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	1.07 (0.90–1.27)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Geoghegan,J.M. 2004	Moderate	N= 415 ; patients from the UK General Practice Research Database	diagnosed CTS	Thyroxine	matched by: age, sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	1.36 (1.08–1.70)	odds are greater in patients who use Thyroxine
Morgenstern,H. 1991	Moderate	N= 1049 ; grocery store checkers belonging to local California union	symptoms of CTS indicated in questionnaire	use of diuretics	matched by: all members were members of union food and commercial workers union ; covariates: age, hours per work week, years worked, age*years worked interaction, use of laser scanner to check items, unload basket before checking, load and lift grocery bags after checking, currently pregnant, contraceptive use, use of exogenous estrogen, use of diuretics, history of broken wrist	logistic regression odds ratio	2.66 (1.00, 7.04)	NS

TABLE 49 RISK FACTOR: COMPUTER WORK

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Ali,K.M. 2006	Moderate	N= 648 ; computer professionals from 21 companies	Phalen's and Tinel's test	4-8 years of computer work vs <4 years	age, Gender/Sex, smoking, alcohol use, BMI, years of computer work, hours of computer work per day, system administrator job vs other job functions, and internet use in leisure time	logistic regression odds ratio	2.1(1.3,3.6)	Years of computer use is associated with greater CTS odds
Ali,K.M. 2006	Moderate	N= 648 ; computer professionals from 21 companies	Phalen's and Tinel's test	8 or more years of computer work vs <4 years	age, Gender/Sex, smoking, alcohol use, BMI, years of computer work, hours of computer work per day, system administrator job vs other job functions, and internet use in leisure time	logistic regression odds ratio	2.7(1.3,5.8)	Years of computer use is associated with greater CTS odds
Ali,K.M. 2006	Moderate	N= 648 ; computer professionals from 21 companies	Phalen's and Tinel's test	computer used 8 to 12 hours vs less than 8 hours	age, Gender/Sex, smoking, alcohol use, BMI, years of computer work, hours of computer work per day, system administrator job vs other job functions, and internet use in leisure time	logistic regression odds ratio	3.6(1.3,10.3)	using a computer more hours per day is associated with greater CTS odds
Ali,K.M. 2006	Moderate	N= 648 ; computer professionals from 21 companies	Phalen's and Tinel's test	computer used more than 12 hours vs less than 8 hours	age, Gender/Sex, smoking, alcohol use, BMI, years of computer work, hours of computer work per day, system administrator job vs other job functions, and internet use in leisure time	logistic regression odds ratio	4.4(1.3, 14.9)	using a computer more hours per day is associated with greater CTS odds

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Ali,K.M. 2006	Moderate	N= 648 ; computer professionals from 21 companies	Phalen's and Tinel's test	system administrator vs other job functions	age, Gender/Sex, smoking, alcohol use, BMI, years of computer work, hours of computer work per day, system administrator job vs other job functions, and internet use in leisure time	logistic regression odds ratio	2.4(1.2, 4.8)	being a system administrator increases odds of CTS compared to other job functions
Coggon,D. 2013	Moderate	N= 855; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs negatively tested patients	use of keyboard >4 hours per day	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking habits, diabetes, other arthritis present, number of moderately distressing somatic symptoms per week, use of keyboard 4 or more hours per day, use of vibrating tools, job includes bonuses/targets/deadlines	logistic regression OR	0.6 (0.4-0.8)	patients testing positive were less likely to use keyboard or mouse more than 4 hours per day
Eleftheriou,A. 2012	Moderate	N= 441 ; 548 workers of a Governmental data entry & processing unit	personal history of CTS	at least 240,500,000 vs <240,500,000 keyboard strokes	Keyboard strokes, age, physical activity, smoking	logistic regression OR	2.23 (1.09 to 4.52)	higher key strokes associated with higher CTS odds
Eleftheriou,A. 2012	Moderate	N= 441 ; 548 workers of a Governmental data entry & processing unit	personal history of CTS or newly diagnosed CTS with CTS-7 algorithm score of 12 or more	at least 240,500,000 vs <240,500,000	Keyboard strokes, gender/sex, physical activity, age	logistic regression OR	2.41 (1.36 to 4.25)	higher key strokes associated with higher CTS odds

TABLE 50 RISK FACTOR: CONSTRUCTION WORK

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	construction vs clerical work	model 2 best fitting model: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	7.01 (2.65, 18.54)	construction workers are at significantly higher odds of median neuropathy

TABLE 51 RISK FACTOR: DEXTERITY

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	dexterity derived from factor analysis (O*NET subscales: manual and finger dexterity, wrist finger speed, and time spent handling objects) 2nd vs 1st quartile	Model 3 with O*NET factor variables: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	1.48 (0.80, 2.74)	NS
Armstrong, T. 2008	High	N= 1071; follow worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	dexterity derived from factor analysis (O*NET subscales: manual and finger dexterity, wrist finger speed, and time spent handling objects) 3rd vs 1st quartile	Model 3 with O*NET factor variables: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	1.11 (0.61, 2.00)	NS
Armstrong, T. 2008	High	N= 1071; follow worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	dexterity derived from factor analysis (O*NET subscales: manual and finger dexterity, wrist finger speed, and time spent handling objects) 4th vs 1st quartile	Model 3 with O*NET factor variables: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	1.79 (1.01, 3.18)	Workers in the highest quartile are at significantly higher odds of median neuropathy than workers in the lowest quartile

TABLE 52 RISK FACTOR: DIABETES

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	diabetes history	model 2 best fitting model: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	2.45 (0.92, 6.53)	NS
Becker, J. 2002	Moderate	N= 1772; cases and controls consisted of patients referred for nerve conduction studies and electromyography.	nerve conduction and electromyography	female Gender/Sex and diabetes interaction effect	BMI over 30, Gender/Sex, age between 41 and 60, diabetes, BMI*Gender/Sex interaction effect, Gender/Sex*diabetes interaction effect	logistic regression odds ratio	1.15(0.84,1.57)	no significant interaction between diabetes and Gender/Sex
Becker, J. 2002	Moderate	N= 1772; cases and controls consisted of patients referred for nerve conduction studies and electromyography.	nerve conduction and electromyography	Diabetes	BMI over 30, Gender/Sex, age between 41 and 60, diabetes, BMI*Gender/Sex interaction effect, Gender/Sex*diabetes interaction effect	logistic regression odds ratio	1.49(1.09,2.04)	Diabetes increases odds of CTS
Coggon, D. 2013	Moderate	N= 855; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs negatively tested patients	diabetes vs no diabetes	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking habits, diabetes, other arthritis present, number of moderately distressing somatic symptoms per week, use of keyboard 4 or more hours per day, use of vibrating tools, job includes bonuses/targets/deadlines	logistic regression OR	1.6 (0.9-3.1)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Geoghegan,J.M. 2004	Moderate	N= 494 ; patients from the UK General Practice Research Database	diagnosed CTS	Diabetes	matched by: age, gender/sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	1.51 (1.24–1.84)	odds are greater in diabetic patients
Geoghegan,J.M. 2004	Moderate	N= 137 ; patients from the UK General Practice Research Database	diagnosed CTS	Insulin use	matched by: age, gender/sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	1.52 (1.06–2.18)	odds are greater in patients who use insulin
Geoghegan,J.M. 2004	Moderate	N= 149 ; patients from the UK General Practice Research Database	diagnosed CTS	Metformin use	matched by: age, gender/sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	1.2 (0.84–1.72)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Geoghegan,J.M. 2004	Moderate	N= 197 ; patients from the UK General Practice Research Database	diagnosed CTS	Sulphonyl use	matched by: age, gender/sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	1.45 (1.07–1.97)	odds are greater in patients who use sulphonyl
Plastino,M. 2011	Moderate	N= 245 ; CTS patients from a single hospital, and controls from patients friends or non-blood relatives	confirmed by electrodiagnostic exam	abnormal glucose metabolism abnormalities by 2h_ OGTT	weight circumference, BMI, age	p value	0.001	odds are higher in patients with glucose metabolism abnormalities

TABLE 53 RISK FACTOR: DIALYSIS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Kopec,J. 2011	Low	N= 386 ; all patients were on hemodialysis	signs and symptoms verified by nerve conduction studies	number of years on hemodialysis	hemodialysis	p value from chi squared test	<.00001	CTS patients have been on hemodialysis significantly longer than non-CTS hemodialysis patients
Shin,J. 2008	Moderate	N= 123 ; All were hemodialysis patients	pain or pain in median nerve distribution and Tinel's sign	duration of dialysis	age, gender/sex, predialysis plasma BMG level in 1990, duration of dialysis	logistic regression OR	1.06(1.01,1.11)	Duration of Dialysis is associated with increased CTS odds
Shin,J. 2008	Moderate	N= 123 ; All were hemodialysis patients	pain or pain in median nerve distribution and Tinel's sign	predialysis plasma BMG level in 1990	age, gender/sex, predialysis plasma BMG level in 1990, duration of dialysis	logistic regression OR	1.65(1.13,2.41)	higher BMG levels were associated with higher CTS odds

TABLE 54 RISK FACTOR: DYNAMIC STRENGTH

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Evanoff,B. 2014	High	711 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	Dynamic strength importance in current job	adjusted for age, Gender/Sex, and BMI; past diagnosis of CTS or other upper extremity peripheral neuropathy, had a pacemaker or internal defibrillator, or were pregnant at the time of enrollment excluded	Multivariable mixed logistic regression models OR	2.14(.56-8.22)	NS

TABLE 55 RISK FACTOR: EDUCATION

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Kaplan, Y. 2008	Low	N= 221 ; all were postmenopausal women	NCS	education	matched by: age matched females ; covariates: education level	p-value	>.05	NS
Wright, C. 2014	Low	(3155 w/o CTS diagnosis and 91 with CTS diagnosis); EMR of a cohort of pregnant women receiving prenatal care at a large obstetrics unit; representative of those served by the urban academic center, with a large proportion of black patients	clinically diagnosed with ICD 9 diagnosis code for CTS	Maternal Education (finished high school) versus some high school	age, race/ethnicity, education, smoking, parity, hypertension, diabetes, maternal weight category (constructed variable including information about maternal BMI and GWG), and number prenatal care visits	Logistical Regression OR	1.58 (0.4-9.94)	NS
Wright, C. 2014	Low	(3155 w/o CTS diagnosis and 91 with CTS diagnosis); EMR of a cohort of pregnant women receiving prenatal care at a large obstetrics unit; representative of those served by the urban academic center, with a large proportion of black patients	clinically diagnosed with ICD 9 diagnosis code for CTS	Maternal Education (college or above) versus some high school	age, race/ethnicity, education, smoking, parity, hypertension, diabetes, maternal weight category (constructed variable including information about maternal BMI and GWG), and number prenatal care visits	Logistical Regression OR	10.4 (1-148)	NS
Bonfiglioli, R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS symptoms	Education >8 years	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	1.48(0.77-2.86)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS diagnosis with clinical and electrodiagnostic examinations	Education >8 years	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	2.15(0.75–6.17)	NS

TABLE 56 RISK FACTOR: ENDOCRINE

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Nathan,P.A. 2002	Moderate	N= 256; workers at 4 industrial sites (a steel mill, meat/food packaging, electronics, and plastics).	electrodiagnostic test and symptoms at 11 years	endocrine condition	repetitious movement, heavy lifting, keyboard use, vibration tools, force, cigarette use, Gender/Sex, age, BMI, avocational activities, hormone use, race/ethnicity, endocrine condition, years on job	logistic regression odds ratio	.23 (.04–1.24)	NS

TABLE 57 RISK FACTOR: EXERTION

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Burt,S. 2011	Moderate	N= 448 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Exerts/min cat 2 versus 1 if BMI<30	Model 1 Peak force match cat 2 versus 1, Peak force match cat 3 versus 1, Exerts/min cat 2 versus 1 if BMI<30, Exerts/min cat 3 versus 1 if BMI<30, Exerts/min cat 2 versus 1 if BMI>=30, Exerts/min cat 3 versus 1 if BMI>=30, BMI>=30 versus <30 if exerts/min cat ¹ / ₄ 1, BMI>=30 versus <30 if exerts/min cat ¹ / ₄ 2 1.60, BMI>=30 versus <30 if exerts/min cat ¹ / ₄ 3	logistic regression odds ratio	1.40 (0.45-4.34)	NS
Burt,S. 2011	Moderate	N= 448 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Exerts/min cat 3 versus 1 if BMI<30	Model 1 Peak force match cat 2 versus 1, Peak force match cat 3 versus 1, Exerts/min cat 2 versus 1 if BMI<30, Exerts/min cat 3 versus 1 if BMI<30, Exerts/min cat 2 versus 1 if BMI>=30, Exerts/min cat 3 versus 1 if BMI>=30, BMI>=30 versus <30 if exerts/min cat ¹ / ₄ 1, BMI>=30 versus <30 if exerts/min cat ¹ / ₄ 2 1.60, BMI>=30 versus <30 if exerts/min cat ¹ / ₄ 3	logistic regression odds ratio	1.13 (0.44-2.93)	NS
Burt,S. 2011	Moderate	N= 448 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Exerts/min cat 2 versus 1 if BMI>=30	Model 1 Peak force match cat 2 versus 1, Peak force match cat 3 versus 1, Exerts/min cat 2 versus 1 if BMI<30, Exerts/min cat 3 versus 1 if BMI<30, Exerts/min cat 2 versus 1 if BMI>=30, Exerts/min cat 3 versus 1 if BMI>=30, BMI>=30 versus <30 if exerts/min cat ¹ / ₄ 1, BMI>=30 versus <30 if exerts/min cat ¹ / ₄ 2 1.60, BMI>=30 versus <30 if exerts/min cat ¹ / ₄ 3	logistic regression odds ratio	2.92 (0.90-9.46)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Burt,S. 2011	Moderate	N= 448 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Exerts/min cat 3 versus 1 if BMI>=30	Model 1 Peak force match cat 2 versus 1, Peak force match cat 3 versus 1, Exerts/min cat 2 versus 1 if BMI<30, Exerts/min cat 3 versus 1 if BMI>=30, Exerts/min cat 3 versus 1 if BMI>=30, BMI>=30 versus <30 if exerts/min cat ¹ /41, BMI>=30 versus <30 if exerts/min cat ² /42 1.60, BMI>=30 versus <30 if exerts/min cat ³ /43	logistic regression odds ratio	3.35 (1.14-9.87)	the highest frequency of exertions per minute(>= 15) increases the odds of CTS among obese workers
Burt,S. 2011	Moderate	N= 456 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	peak worker perceived exertion rating (0-10)	Model 2: peak worker perceived exertion rating (0-10), BMI, Hand Activity Level among females, Hand Activity Level among males, Gender/Sex	logistic regression odds ratio	1.14 (1.01-1.29)	worker perceived exertion rating increases odds of CTS
Burt,S. 2013	Moderate	N= 347 ; workers from hospital, school bus manufacturing plant, and engine assembly plant	electrodiagnostic test, symptoms, hand diagram at 2 years	time in forceful exertion between 20 and 60% vs <20%	modell: time in forceful exertion, BMI>=30, threshold limit value, job strain	hazard ratios	2.83(1.18,6.79)	Having between 20% and 60% of work time involve forceful exertion is associated with higher risk of CTS than workers with <20% forceful exertion time

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Burt,S. 2013	Moderate	N= 347 ; workers from hospital, school bus manufacturing plant, and engine assembly plant	electrodiagnostic test, symptoms, hand diagram at 2 years	time in forceful exertion between greater than 60% vs <20%	modell: time in forceful exertion, BMI>=30, threshold limit value, job strain	hazard ratios	19.57(5.96,64.24)	Having greater than 60% of work time involve forceful exertion is associated with higher risk of CTS than workers with <20% forceful exertion time

TABLE 58 RISK FACTOR: FARMING

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Roquelaure, Y. 2008	Moderate	N= 193802 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Farmers vs unemployed	matched by: among men ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	1.3 [0.8-2.3]	NS
Roquelaure, Y. 2008	Moderate	N= 194276 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Farmers vs unemployed	matched by: among women ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	1.2 [0.8-2.0]	NS

TABLE 59 RISK FACTOR: FEMALE RISK FACTORS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Perimenopause vs premenopausal	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	1.53(1.01–2.32)	perimenopausal at higher odds of CTS than premenopausal
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Postmenopausal vs premenopausal	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	1.43(0.89–2.29)	NS
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Hysterectomy After controlling for menopause	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	1.2(0.89–1.63)	NS
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Current use of HRT	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	0.85(0.62–1.16)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Kaplan, Y. 2008	Low	N= 221 ; all were postmenopausal women	NCS	number of pregnancies	matched by: age matched females ; covariates: number of pregnancies	mean difference	1.07(0.67, 1.47)	number of pregnancies was higher in postmenopausal CTS women than postmenopausal healthy controls
Wright, C. 2014	Low	(3155 w/o CTS diagnosis and 91 with CTS diagnosis); EMR of a cohort of pregnant women receiving prenatal care at a large obstetrics unit; representative of those served by the urban academic center, with a large proportion of black patients	clinically diagnosed with ICD 9 diagnosis code for CTS	Second or Third live birth versus first live birth	age, race/ethnicity, education, smoking, parity, hypertension, diabetes, maternal weight category (constructed variable including information about maternal BMI and GWG), and number prenatal care visits	Logistical Regression OR	1.22 (1.05-1.75)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Wright, C. 2014	Low	(3155 w/o CTS diagnosis and 91 with CTS diagnosis); EMR of a cohort of pregnant women receiving prenatal care at a large obstetrics unit; representative of those served by the urban academic center, with a large proportion of black patients	clinically diagnosed with ICD 9 diagnosis code for CTS	10+ prenatal care visits versus <10 prenatal care visits	age, race/ethnicity, education, smoking, parity, hypertension, diabetes, maternal weight category (constructed variable including information about maternal BMI and GWG), and number prenatal care visits	Logistical Regression OR	2.95 (1.88-4.62)	NS
Wright, C. 2014	Low	(3155 w/o CTS diagnosis and 91 with CTS diagnosis); EMR of a cohort of pregnant women receiving prenatal care at a large obstetrics unit; representative of those served by the urban academic center, with a large proportion of black patients	clinically diagnosed with ICD 9 diagnosis code for CTS	Normal BMI 18.5+ kg/m sq (excessive Gestational Weight Gain) versus Normal BMI 18.5+ kg/m sq (adequate Gestational Weight Gain)	age, race/ethnicity, education, smoking, parity, hypertension, diabetes, maternal weight category (constructed variable including information about maternal BMI and GWG), and number prenatal care visits	Logistical Regression OR	1.33 (0.41-3.86)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Wright, C. 2014	Low	(3155 w/o CTS diagnosis and 91 with CTS diagnosis); EMR of a cohort of pregnant women receiving prenatal care at a large obstetrics unit; representative of those served by the urban academic center, with a large proportion of black patients	clinically diagnosed with ICD 9 diagnosis code for CTS	Overweight BMI 25+ to 29.9 kg/m sq (excessive Gestational Weight Gain) versus Normal BMI 18.5+ kg/m sq (adequate Gestational Weight Gain)	age, race/ethnicity, education, smoking, parity, hypertension, diabetes, maternal weight category (constructed variable including information about maternal BMI and GWG), and number prenatal care visits	Logistical Regression OR	1.75 (0.38-12.48)	NS
Wright, C. 2014	Low	(3155 w/o CTS diagnosis and 91 with CTS diagnosis); EMR of a cohort of pregnant women receiving prenatal care at a large obstetrics unit; representative of those served by the urban academic center, with a large proportion of black patients	clinically diagnosed with ICD 9 diagnosis code for CTS	Obese BMI 30+ kg/m sq (normal Gestational Weight Gain) versus Normal BMI 18.5+ kg/m sq (adequate Gestational Weight Gain)	age, race/ethnicity, education, smoking, parity, hypertension, diabetes, maternal weight category (constructed variable including information about maternal BMI and GWG), and number prenatal care visits	Logistical Regression OR	2.99 (1.81-16.79)	BMI of 30 or more increases odds of CTS even with normal gestational weight gain

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Wright, C. 2014	Low	(3155 w/o CTS diagnosis and 91 with CTS diagnosis); EMR of a cohort of pregnant women receiving prenatal care at a large obstetrics unit; representative of those served by the urban academic center, with a large proportion of black patients	clinically diagnosed with ICD 9 diagnosis code for CTS	Obese BMI 30+ kg/m sq (excessive Gestational Weight Gain)	age, race/ethnicity, education, smoking, parity, hypertension, diabetes, maternal weight category (constructed variable including information about maternal BMI and GWG), and number prenatal care visits	Logistical Regression OR	1.27 (0.11-12.74)	NS
Geoghegan, J.M. 2004	Moderate	N= 2355 ; patients from the UK General Practice Research Database	diagnosed CTS	hormone replacement therapy use	matched by: age, gender/sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	0.95 (0.84-1.08)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Geoghegan,J.M. 2004	Moderate	N= 1932 ; patients from the UK General Practice Research Database	diagnosed CTS	combined oral contraceptive pill use	matched by: age, gender/sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	0.82 (0.71–0.95)	NS
Mondelli,M. 2006	Moderate	N= 145 ; female hospital floor cleaners in Italy	diagnosed according to AAN criteria: population of hospital floor cleaners	Oral contraceptive yes vs no	Age, BMI, duration of occupational exposure to current job, occupational exposure to the same job for previous employers, manual hobbies (including motorcycle use, diseases known to be associated with CTS (diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma), hospital (to adjust for center effects)	logistic regression OR	1.52 (0.58-4.04)	NS
Morgenstern,H. 1991	Moderate	N= 1049 ; grocery store checkers belonging to local California union	symptoms of CTS indicated in questionnaire	Use of oral contraceptives	matched by: all members were members of union food and commercial workers union ; covariates: age, hours per work week, years worked, age*years worked interaction, use of laser scanner to check items, unload basket before checking, load and lift grocery bags after checking, currently pregnant, contraceptive use, use of exogenous estrogen, use of diuretics, history of broken wrist	logistic regression odds ratio	0.84 (0.46, 1.56)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
de Krom,M.C. 1990	Moderate	N= 629; 28 cases and all controls were identified through random sample of patients in the Netherlands. An additional 128 cases were added from a single hospital in the area	clinical history and neurophysiologic testing	menopause in last year vs premenopausal	matched by: age and gender/sex stratified random sample ; covariates: height, weight(kg), slimming courses(yes/no), Hours/week in flexion activities, hours/week for extension activities, Varicosis (for men only), for women: years since menopause onset vs premenopausal, hysterectomy vs premenopausal	logistic regression odds ratio	2.32(0.79, 6.81)	NS
de Krom,M.C. 1990	Moderate	N= 629; 28 cases and all controls were identified through random sample of patients in the Netherlands. An additional 128 cases were added from a single hospital in the area	clinical history and neurophysiologic testing	menopause 2 to 5 years ago vs premenopausal	matched by: age and gender/sex stratified random sample ; covariates: height, weight(kg), slimming courses(yes/no), Hours/week in flexion activities, hours/week for extension activities, Varicosis (for men only), for women: years since menopause onset vs premenopausal, hysterectomy vs premenopausal	logistic regression odds ratio	0.87(0.26, 2.93)	NS
de Krom,M.C. 1990	Moderate	N= 629; 28 cases and all controls were identified through random sample of patients in the Netherlands. An additional 128 cases were added from a single hospital in the area	clinical history and neurophysiologic testing	menopause more than 5 years ago vs premenopausal	matched by: age and gender/sex stratified random sample ; covariates: height, weight(kg), slimming courses(yes/no), Hours/week in flexion activities, hours/week for extension activities, Varicosis (for men only), for women: years since menopause onset vs premenopausal, hysterectomy vs premenopausal	logistic regression odds ratio	0.49(0.17, 1.39)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
de Krom,M.C. 1990	Moderate	N= 629; 28 cases and all controls were identified through random sample of patients in the Netherlands. An additional 128 cases were added from a single hospital in the area	clinical history and neurophysiologic testing	hysterectomy vs premenopausal	matched by: age and gender/sex stratified random sample ; covariates: height, weight(kg), slimming courses(yes/no), Hours/week in flexion activities, hours/week for extension activities, Varicosis (for men only), for women: years since menopause onset vs premenopausal, hysterectomy vs premenopausal	logistic regression odds ratio	1.8(0.87, 3.73)	NS
de Krom,M.C. 1990	Moderate	N= 629; 28 cases and all controls were identified through random sample of patients in the Netherlands. An additional 128 cases were added from a single hospital in the area	clinical history and neurophysiologic testing	hysterectomy vs menopause more than 5 years ago	matched by: age and gender/sex stratified random sample ; covariates: height, weight(kg), slimming courses(yes/no), Hours/week in flexion activities, hours/week for extension activities, Varicosis (for men only), for women: years since menopause onset vs premenopausal, hysterectomy vs premenopausal	logistic regression odds ratio		women who have had a hysterectomy are significantly more likely to get CTS than greater than 5 year post-menopausal women

TABLE 60 RISK FACTOR: FIBROMYALGIA

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Fahmi,D.S. 2013	Moderate	N= 100 ; all are housewives with moderate socio-economic standing	electrophysiologically diagnosed	fibromyalgia	fibromyalgia	risk ratio	6.65(2.33, 19.027)	odds higher in fibromyalgia patients

TABLE 61 RISK FACTOR: FORCE

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	upper extremity force derived from factor analysis(includes Occupational Information Network(O*NET): general physical activity, static strength, explosive strength on) 2nd quartile vs 1st quartile	Model 3 with O*NET factor variables: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	2.15 (1.10, 4.18)	Workers who use more upper extremity force are at higher odds of median neuropathy
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	upper extremity force derived from factor analysis(includes Occupational Information Network(O*NET): general physical activity, static strength, explosive strength on) 2nd quartile vs 1st quartile	Model 3 with O*NET factor variables: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	3.48 (1.81, 6.66)	Workers who use more upper extremity force are at higher odds of median neuropathy

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong,T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	upper extremity force derived from factor analysis(includes Occupational Information Network(O*NET): general physical activity, static strength, explosive strength on) 3rd quartile vs 1st quartile	Model 3 with O*NET factor variables: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	2.48 (1.19, 5.15)	Workers who use more upper extremity force are at higher odds of median neuropathy
Bonfiglioli,R. 2013	High	N= 2299 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms and NCS test at 3 years	peak force, unitary increase (1-7)	Gender/sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)		1.09(.97, 1.22)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Burt,S. 2011	Moderate	N= 448 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Peak force match cat 2 versus 1	Model 1 Peak force match cat 2 versus 1, Peak force match cat 3 versus 1, Exerts/min cat 2 versus 1 if BMI<30, Exerts/min cat 3 versus 1 if BMI<30, Exerts/min cat 2 versus 1 if BMI>=30, Exerts/min cat 3 versus 1 if BMI>=30, BMI>=30 versus <30 if exerts/min cat ¹ /41, BMI>=30 versus <30 if exerts/min cat ² /42 1.60, BMI>=30 versus <30 if exerts/min cat ³ /43	logistic regression odds ratio	1.33 (0.58-3.04)	NS
Burt,S. 2011	Moderate	N= 448 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Peak force match cat 3 versus 1	Model 1 Peak force match cat 2 versus 1, Peak force match cat 3 versus 1, Exerts/min cat 2 versus 1 if BMI<30, Exerts/min cat 3 versus 1 if BMI<30, Exerts/min cat 2 versus 1 if BMI>=30, Exerts/min cat 3 versus 1 if BMI>=30, BMI>=30 versus <30 if exerts/min cat ¹ /41, BMI>=30 versus <30 if exerts/min cat ² /42 1.60, BMI>=30 versus <30 if exerts/min cat ³ /43	logistic regression odds ratio	2.74 (1.32-5.68)	highest level of peak force increases the odds of CTS versus the lowest level of peak force

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	Forceful gripping in most recent job	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	2.70 (1.26, 5.78)	increased odds of CTS for those conducting forceful activities (lifting and gripping)

TABLE 62 RISK FACTOR: FRACTURE

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Dyer,G. 2008	Low	N= 100 ; all had fractures associated with the distal radius	progressive numbness in the median nerve distribution with or without weakness of palmar abduction	fracture translation percentage	matched by: age and Gender/Sex ; covariates: all bivariate associations with P values over .08 were excluded from multivariate model	logistic regression odds ratio and p value	.26 p=.02	percent distal radius fracture translation increases the odds of CTS
Geoghegan,J.M. 2004	Moderate	N= 190 ; patients from the UK General Practice Research Database	diagnosed CTS	Wrist fracture	matched by: age, gender/sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	2.29 (1.67–3.12)	wrist fracture patients at higher odds of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Morgenstern,H. 1991	Moderate	N= 1049 ; grocery store checkers belonging to local California union	symptoms of CTS indicated in questionnaire	history of broken wrist	matched by: all members were members of union food and commercial workers union ; covariates: age, hours per work week, years worked, age*years worked interaction, use of laser scanner to check items, unload basket before checking, load and lift grocery bags after checking, currently pregnant, contraceptive use, use of exogenous estrogen, use of diuretics, history of broken wrist	logistic regression odds ratio	1.13 (0.54, 2.37)	NS

TABLE 63 RISK FACTOR: GENDER/SEX (F)

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	Gender/Sex: male vs female	model 2 best fitting model: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	1.13(.64-2.02)	NS
Bonfiglioli, R. 2013	High	N= 2492 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms at 3 years	being female vs male	Gender/sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	2.37 (1.83, 3.06)	females are at higher risk of CTS symptoms
Bonfiglioli, R. 2013	High	N= 2299 ; part of Observational Prospective Unified Study (OCTOPUS), enrolled workers in large and small domestic appliance, underwear, ceramic tile and shoe factories	CTS symptoms and NCS test at 3 years	being female vs male	Gender/sex, age, BMI personal history of diseases predisposing to CTS (diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure)	incident rate ratio from Poisson regression	2.85 (1.51, 5.37)	being female increases risk of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Evanoff,B. 2014	High	711 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	Female Gender/Sex	adjusted for age, Gender/Sex, and BMI; past diagnosis of CTS or other upper extremity peripheral neuropathy, had a pacemaker or internal defibrillator, or were pregnant at the time of enrollment excluded	Multivariable mixed logistic regression models OR	1.09 (0.49,2.43)	NS
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	Gender/Sex: female vs male	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	1.11(0.96,1.27)	NS
Burt,S. 2011	Moderate	N= 456 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Gender/Sex female vs male at the mean hand activity level	Model 2: peak worker perceived exertion rating (0-10), BMI, Hand Activity Level among females, Hand Activity Level among males, Gender/Sex	logistic regression odds ratio	2.21 (1.17-4.15)	females are at higher CTS odds
Burt,S. 2011	Moderate	N= 455 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Gender/Sex female vs male at the mean hand activity level	Model 3: peak worker perceived exertion rating (0-10), BMI, Hand Activity Level among females, Hand Activity Level among males, Gender/Sex female vs male at the mean hand activity level	logistic regression odds ratio	1.77 (0.99-3.17)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Eleftheriou,A. 2012	Moderate	N= 441 ; 548 workers of a Governmental data entry & processing unit	personal history of CTS or newly diagnosed CTS with CTS-7 algorithm score of 12 or more	Gender/sex (female vs male)	Keyboard strokes, gender/sex, physical activity, age	logistic regression OR	4.08 (1.51 to 11.04)	females have greater odds of CTS
Shin,J. 2008	Moderate	N= 123 ; All were hemodialysis patients	pain or pain in median nerve distribution and Tinel's sign	Gender/Sex	age, gender/sex, predialysis plasma BMG level in 1990, duration of dialysis	logistic regression OR	0.89(0.05,15.51)	NS
Silverstein,B.A. 1987	Moderate	N= 652 ; workers form seven different industrial sites	based on phalen and tinel's signs and symptoms mentioned in interview	Gender/Sex	Gender/Sex, age, years on job, work repetition, level of force involved in job, dummy variables controlling for job center effects	logistic regression OR	1.17(0.29,4.69)	NS
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of "classic/probable" or "possible" symptoms of CTS	Female Gender/Sex	gender/sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	4.0 (2.3– 6.7)	Odds of CTS were significantly greater in Females

TABLE 64 RISK FACTOR: GENERAL COMORBIDITIES

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Estirado de, Cabo E. 2003	Low	N= 727 ; all patients had toxic oil syndrome	some were previously diagnosed by physician, others were diagnosed with electrodiagnostic tests and Tinel's and/or Phalen's sign at 9 years	Toxic Oil Syndrome (TOS) with concomitant neuropathy vs toxic oil syndrome alone	Model1 (all patients):TOS with Neuropathy, TOS with Thromboembolic events, TOS with scleroderma, smoking	logistic regression odds ratio	3.32(1.47-7.5)	TOS patients with Neuropathy were at higher odds of CTS than TOS patients without neuropathy
Estirado de, Cabo E. 2003	Low	N= 727 ; all patients had toxic oil syndrome	some were previously diagnosed by physician, others were diagnosed with electrodiagnostic tests and Tinel's and/or Phalen's sign at 9 years	Toxic Oil Syndrome (TOS) with concomitant Thromboembolic events vs toxic oil syndrome alone	Model1 (all patients):TOS with Neuropathy, TOS with Thromboembolic events, TOS with scleroderma, smoking	logistic regression odds ratio	2.85(1.14-7.13)	TOS patients with thromboembolic events were at higher odds of CTS than TOS patients without thromboembolic events
Estirado de, Cabo E. 2003	Low	N= 727 ; all patients had toxic oil syndrome	some were previously diagnosed by physician, others were diagnosed with electrodiagnostic tests and Tinel's and/or Phalen's sign at 9 years	Toxic Oil Syndrome (TOS) with concomitant scleroderma vs toxic oil syndrome alone	Model1 (all patients):TOS with Neuropathy, TOS with Thromboembolic events, TOS with scleroderma, smoking	logistic regression odds ratio	.43(.24-.8)	TOS patients with scleroderma were at lower odds of CTS than TOS patients without scleroderma
Estirado de, Cabo E. 2003	Low	N= 727 ; all patients had toxic oil syndrome	some were previously diagnosed by physician, others were diagnosed with electrodiagnostic tests and Tinel's and/or Phalen's sign at 9 years	TOS patients with fibrositis vs TOS patients without Fibrositis	Model1 (all patients):TOS with Neuropathy, TOS with Thromboembolic events, TOS with scleroderma, smoking	logistic regression odds ratio	NR	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Estirado de, Cabo E. 2003	Low	N= 495 ; all female patients had toxic oil syndrome	some were previously diagnosed by physician, others were diagnosed with electrodiagnostic tests and Tinel's and/or Phalen's sign at 9 years	TOS women with fibrositis vs TOS women without Fibrositis	Model 2: female patients (with fibrosis as covariate)TOS with Neuropathy, TOS with Thromboembolic events, TOS with scleroderma, smoking, fibrosis	logistic regression odds ratio	2.53(1.06-3.2)	women with fibrositis and TOS are at higher odds of CTS than TOS women patients without fibrositis
Estirado de, Cabo E. 2003	Low	N= 495 ; all female patients had toxic oil syndrome	some were previously diagnosed by physician, others were diagnosed with electrodiagnostic tests and Tinel's and/or Phalen's sign at 9 years	TOS women who had miscarriages versus women with TOS who did not have a miscarriage	Model 3: female TOS (with miscarriages as a covariate) with Neuropathy, TOS with Thromboembolic events, TOS with scleroderma, smoking, miscarriages	logistic regression odds ratio	1.84(1.04-3.2)	women who had miscarriages and have TOS are at higher odds of CTS than TOS women who did not have a miscarriage
Keese,G.R. 2006	Low	N= 72 ; CTS cases and control patients selected from one clinic	symptoms and neurodiagnostic test at 6 months	bilateral agenesis vs none	matched by: age, Gender/Sex, industrial exposures, diabetes, thyroid disease, alcohol abuse and rheumatoid arthritis ; covariates: bilateral agenesis vs none	odds ratio	0.23(0.024, 2.167)	ns
Keese,G.R. 2006	Low	N= 72 ; CTS cases and control patients selected from one clinic	symptoms and neurodiagnostic test at 6 months	unilateral agenesis vs none	matched by: age, Gender/Sex, industrial exposures, diabetes, thyroid disease, alcohol abuse and rheumatoid arthritis ; covariates: unilateral agenesis vs none	odds ratio	.099(.005, 1.909)	odds are higher in patients with unilateral agenesis

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Kopec,J. 2011	Low	N= 386 ; all patients were on hemodialysis	signs and symptoms verified by nerve conduction studies	presence of Anti-HCV antibodies	presence of Anti-HCV antibodies	p value from chi squared test	<.00001	presence of anti-hcv antibodies increased the odds of CTS
Vogelsang,L.M. 1994	Low	N= 100 ; all were worked in what were considered high risk occupations(automotive parts or assembly workers, keyboard operators, electronics industry workers, and garment industry workers from East Tennessee, and sign language interpreters). Each case was matched by age, Gender/Sex, race/ethnicity, height, weight, body type, length of time, job duties	diagnosed by orthopaedist	RMC, Related Medical Conditions	social readjustment scale, self-control schedule, life style approaches scale, self-control questionnaire, perceived stress scales, Cohen-Hoberman Inventory of Physical Symptoms, related medical condition, suspected medical risk, related musculoskeletal problems	p value logistic regression	<.05	patients with CTS were more likely to have related medical conditions

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Vogelsang,L.M. 1994	Low	N= 100 ; all were worked in what were considered high risk occupations(automotive parts or assembly workers, keyboard operators, electronics industry workers, and garment industry workers from East Tennessee, and sign language interpreters). Each case was matched by age, Gender/Sex, race/ethnicity, height, weight, body type, length of time, job duties	diagnosed by orthopaedist	MR, Suspected Medical Risk factors related to CTS	social readjustment scale, self-control schedule, life style approaches scale, self-control questionnaire, perceived stress scales, Cohen-Hoberman Inventory of Physical Symptoms, related medical condition, suspected medical risk, related musculoskeletal problems	p value logistic regression	>.05	NS
Burt,S. 2011	Moderate	N= 455 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	High blood pressure vs no	Model 3: peak worker perceived exertion rating (0-10), BMI, Hand Activity Level among females, Hand Activity Level among males, Gender/Sex female vs male at the mean hand activity level	logistic regression odds ratio	1.89 (1.01-3.53)	High blood pressure increases CTS odds

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Mondelli,M. 2006	Moderate	N= 145 ; female hospital floor cleaners in Italy	diagnosed according to AAN criteria: population of hospital floor cleaners	other diseases(diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma) vs none	Age, BMI, duration of occupational exposure to current job, occupational exposure to the same job for previous employers, manual hobbies (including motorcycle use, diseases known to be associated with CTS (diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma), hospital (to adjust for center effects)	logistic regression OR	1.47 (0.45-4.79)	NS

TABLE 65 RISK FACTOR: GENETICS/FAMILY HISTORY

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	monozygotic vs dizygotic twins(supposed to be a measure of genetic risk of CTS)	matched by: pairs of twins ; covariates: age, height, weight, menopausal status, and physical activity	heritability statistic	.47(.34, .59)	47 percent of the variation in CTS diagnoses was attributable to whether the twins in this population were monozygotic as opposed to dizygotic
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	Family history	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	1.11(0.91,1.34)	NS
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS symptoms	CTS familiar history	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	1.68(0.74–3.82)	NS
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS diagnosis with clinical and electrodiagnostic examinations	CTS familiar history	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	3.6(1.20–10.75)	CTS family history increases risk

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Burt,S. 2011	Moderate	N= 456 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Hand Activity Level among females	Model 2: peak worker perceived exertion rating (0-10), BMI, Hand Activity Level among females, Hand Activity Level among males, Gender/Sex	logistic regression odds ratio	1.03 (0.83-1.28)	NS
Burt,S. 2011	Moderate	N= 456 ; healthcare and manufacturing workers	electrodiagnostic tests, hand diagram and symptoms	Hand Activity Level among males	Model 2: peak worker perceived exertion rating (0-10), BMI, Hand Activity Level among females, Hand Activity Level among males, Gender/Sex	logistic regression odds ratio	1.38 (1.05-1.81)	Higher hand activity level increases the odds of CTS
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Parent, child, or sibling had CTS	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	1.87 (0.97, 3.60)	NS
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/probable” or “possible” symptoms of CTS	family history (yes versus no)	gender/sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	1.2 (0.7–2.0)	NS

TABLE 66 RISK FACTOR: GRIP

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	using forceful hand grip	model 1: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, using vibrating tools, assembly line work, twisting forearm work, bending wrist work, using forceful hand grip, using fingers/thumb as pressing tool, using fingers in a pinch grip	logistic regression OR	1.68 (1.12, 2.53)	using forceful hand grip is associated with higher odds of median neuropathy
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	using fingers in pinch grip	model 1: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, using vibrating tools, assembly line work, twisting forearm work, bending wrist work, using forceful hand grip, using fingers/thumb as pressing tool, using fingers in a pinch grip	logistic regression OR	1.24 (0.82, 1.86)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	peak exposure to Forceful gripping	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	2.21 (1.03, 4.73)	increased risk of CTS for those conducting forceful activities (lifting and gripping)
Evanoff,B. 2012	Moderate	N= 745 ; newly employed workers	symptoms and NCS at 3 years	pinch grip	age, Gender/Sex, lifting at least 1kg, forceful grip, finger/thumb pressing, using vibrating tools, pinch grip, forearm rotation, hand/wrist bending	NR	NR	NS
Evanoff,B. 2012	Moderate	N= 745 ; newly employed workers	symptoms and NCS at 3 years	forceful gripping	age, Gender/Sex, lifting at least 1kg, forceful grip, finger/thumb pressing, using vibrating tools, pinch grip, forearm rotation, hand/wrist bending	logistic regression odds ratio	2.59(1.12-5.99)	forceful gripping increases CTS odds

TABLE 67 RISK FACTOR: HEIGHT

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/probable” or “possible” symptoms of CTS	tall height with short forearm length versus short height and short forearm length (tall/long=50th percentile or higher)	gender/sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	0.5 (0.3– 0.9)	being tall with a short forearm significantly decreases odds of CTS compared to short stature with short forearm

TABLE 68 RISK FACTOR: HOBBIES

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	Gardening	Model1: ACGIH Hand Activity Level (HAL) ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	3.02 (1.28–7.15)	gardening is a risk factor for CTS
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	Gardening	Model 2: strain index ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	3.17 (1.34–7.46)	gardening is a risk factor for CTS
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Leisure activity (low vs. high level)	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	1(0.80–1.26)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Tang,X. 1999	Low	N= 122 ; female cases and controls recruited from one hospital neurology department	CTS signs and symptoms with selective abnormalities of the MN conduction distal to the wrist that showed slowing compared to a separately cited average values from another population	duration knitting hours per week	matched by: age and diabetes ; covariates: duration knitting hours per week	odds ratio	1	NS
Tang,X. 1999	Low	N= 122 ; female cases and controls recruited from one hospital neurology department	CTS signs and symptoms with selective abnormalities of the MN conduction distal to the wrist that showed slowing compared to a separately cited average values from another population	knitting more than 2 hours per week	matched by: age and diabetes ; covariates: knitting more than 2 hours per week	odds ratio	1.13(.57,2.22)	NS
Ali,K.M. 2006	Moderate	N= 648 ; computer professionals from 21 companies	Phalen's and Tinel's test	internet use	age, Gender/Sex, smoking, alcohol use, BMI, years of computer work, hours of computer work per day, system administrator job vs other job functions, and internet use in leisure time	logistic regression odds ratio	1.7(1.2,2.7)	internet use increases odds of CTS
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS symptoms	Hand-knitting/needlework	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	2.21(1.09-4.47)	people who hand-knit/do needle work are at higher odds for CTS symptoms

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS diagnosis with clinical and electrodiagnostic examinations	Hand-knitting/needlework	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	2(0.68–5.87)	NS
Eleftheriou,A. 2012	Moderate	N= 441 ; 548 workers of a Governmental data entry & processing unit	personal history of CTS	history of physical sports activity (yes vs no)	Keyboard strokes, age, physical activity, smoking	logistic regression OR	0.38 (0.16 to 0.87)	history of physical activity is associated with lower risk of CTS
Eleftheriou,A. 2012	Moderate	N= 441 ; 548 workers of a Governmental data entry & processing unit	personal history of CTS or newly diagnosed CTS with CTS-7 algorithm score of 12 or more	history of physical sports activity (yes vs no)	Keyboard strokes, gender/sex, physical activity, age	logistic regression OR	0.72 (0.44 to 1.20)	NS
Goodson, J.T. 2014	Moderate	87 CTS and 74 sex-matched general orthopedic patients from an outpatient orthopedic clinic in the Western US.	(1)Electrodiagnostic (EDX) testing results suggestive of abnormal slowing of the median nerve, (2) the presence of clinical symptoms of CTS, and (3) no confounding syndromes/disorders	vigorous exercise	excluded confounding conditions; gender/sex, age, education levels, ethnicity, and EDX testing results	Logistical Regression OR	0.997(0.995,0.999)	Vigorous exercise decreases odds
Goodson, J.T. 2014	Moderate	87 CTS and 74 sex-matched general orthopedic patients from an outpatient orthopedic clinic in the Western US.	(1)Electrodiagnostic (EDX) testing results suggestive of abnormal slowing of the median nerve, (2) the presence of clinical symptoms of CTS, and (3) no confounding syndromes/disorders	physical activities with wrist strain	excluded confounding conditions; gender/sex, age, education levels, ethnicity, and EDX testing results	Logistical Regression OR	1.002(1,1.004)	physical activity that involves wrist strain increases odds of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Mondelli,M. 2006	Moderate	N= 145 ; female hospital floor cleaners in Italy	diagnosed according to AAN criteria: population of hospital floor cleaners	hobbies (including motorcycle riding) vs none	Age, BMI, duration of occupational exposure to current job, occupational exposure to the same job for previous employers, manual hobbies (including motorcycle use, diseases known to be associated with CTS (diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma), hospital (to adjust for center effects)	logistic regression OR	1.73 (0.75-3.98)	NS

TABLE 69 RISK FACTOR: HOSPITAL WORK

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	hospital vs clerical work	model 2 best fitting model: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	2.42 (0.96, 6.09)	NS

TABLE 70 RISK FACTOR: HOUSEWORK

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Hakim,A.J. 2002	High	N= 3674 ; twins from the UK Adult Twin Registry	hand diagram: classic or probable CTS	Home activity (low vs. high level)	matched by: pairs of twins ; covariates: age, BMI, home activity level, leisure activity level, clerical vs not clerical occupation, menopausal status, hysterectomy, use of hormone replacement therapy, current use of thyroxine replacement therapy	logit regression odds ratio with adjustment for pair codependency	1.21(0.95–1.55)	NS
Tang,X. 1999	Low	N= 122 ; female cases and controls recruited from one hospital neurology department	CTS signs and symptoms with selective abnormalities of the MN conduction distal to the wrist that showed slowing compared to a separately cited average values from another population	washing clothes manually more than 2 hours per week	matched by: age and diabetes ; covariates: washing clothes manually more than 2 hours per week	odds ratio	3.86(1.79,8.33)	washing clothes manually more than 2 hours per week increase odds of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Tang,X. 1999	Low	N= 122 ; female cases and controls recruited from one hospital neurology department	CTS signs and symptoms with selective abnormalities of the MN conduction distal to the wrist that showed slowing compared to a separately cited average values from another population	continuous duration of washing clothes per week	matched by: age and diabetes ; covariates: continuous duration of washing clothes per week	odds ratio	2.33(.63-8.64)	NS
Tang,X. 1999	Low	N= 122 ; female cases and controls recruited from one hospital neurology department	CTS signs and symptoms with selective abnormalities of the MN conduction distal to the wrist that showed slowing compared to a separately cited average values from another population	kneading or rolling dough manually more than 2 hours per week	matched by: age and diabetes ; covariates: kneading or rolling dough manually more than 2 hours per week	odds ratio	6.25(2.5,15.63)	kneading or rolling dough more than 2 hours per week increases odds of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Tang,X. 1999	Low	N= 122 ; female cases and controls recruited from one hospital neurology department	CTS signs and symptoms with selective abnormalities of the MN conduction distal to the wrist that showed slowing compared to a separately cited average values from another population	continuous duration of kneading or rolling dough per week	matched by: age and diabetes ; covariates: continuous duration of kneading or rolling dough per week	odds ratio	1.88(.81,4.38)	NS
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS symptoms	Children	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	1.61(0.83–3.13)	NS
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS diagnosis with clinical and electrodiagnostic examinations	Children	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	2.16(0.67–6.95)	the presence of children increases odds of CTS

TABLE 71 RISK FACTOR: INDUSTRIAL

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Process, plant, and machine operatives vs. Associate professional and technical occupations	matched by: all males ; covariates: Process, plant, and machine operatives vs. Associate professional and technical occupations	univariate odds ratios	2.69 (1.58–4.76)	odds are higher than in associate professional and technical occupations
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Process, plant, and machine operatives vs. Associate professional and technical occupations	matched by: all females ; covariates: Process, plant, and machine operatives vs. Associate professional and technical occupations	univariate odds ratios	1.99 (1.12–3.51)	odds are higher than in associate professional and technical occupations
Leclerc,A. 1998	Low	N= 601 ; clothing and shoe (non packaging) workers and non-repetitive workers(cleaning, maintenance or catering jobs)	Tinel or phalen test positive or nerve condition velocity had been established before medical examination	clothing and shoe industry (non-packaging) vs non repetitive work (cleaning, maintenance and catering)	matched by: all were of similar education level ; covariates: gender/sex, age, psychological problems, BMI	logistic regression odds ratio	4.12 (1.95 to 8.71)	odds of CTS are significantly higher in clothing and shoe industry workers
Leclerc,A. 1998	Low	N= 644 ; food industry (non-packaging) workers and non-repetitive workers(or catering jobs)	Tinel or phalen test positive or nerve condition velocity had been established before medical examination	food industry workers (non-packaging) vs non repetitive work (cleaning, maintenance and catering)	matched by: all were of similar education level ; covariates: gender/sex, age, psychological problems, BMI	logistic regression odds ratio	3.14 (1.38 to 7.15)	odds of CTS are significantly higher in food (non-packaging) workers

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Leclerc,A. 1998	Low	N= 497 ; packaging workers and non-repetitive workers(or catering jobs)	Tinel or phalen test positive or nerve condition velocity had been established before medical examination	packaging workers vs non repetitive work (cleaning, maintenance and catering)	matched by: all were of similar education level ; covariates: gender/sex, age, psychological problems, BMI	logistic regression odds ratio	6.55 (3.02 to 14.2)	odds of CTS are significantly higher in packaging workers
Roquelaure,Y. 2008	Moderate	N= 194276 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Blue-collar workers vs unemployed	matched by: among women ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	3.0 [2.5-3.6]	risk significantly higher than in the unemployed
Roquelaure,Y. 2008	Moderate	N= 193802 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Blue-collar workers vs unemployed	matched by: among men ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	4.2 [3.3-5.5]	risk significantly higher than in the unemployed

TABLE 72 RISK FACTOR: JOB CONTROL

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Coggon,D. 2013	Moderate	N= 1230; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs healthy controls	little job control in work done, in timetables, or breaks	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking, mental health, repeated movements, vibrating tools, job control, level of supervisor/colleague support	logistic regression OR	1.4 (1.1-2.0)	odds higher in patients with little job control
Coggon,D. 2013	Moderate	N= 855; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs negatively tested patients	job includes targets, bonuses or deadlines	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking habits, diabetes, other arthritis present, number of moderately distressing somatic symptoms per week, use of keyboard 4 or more hours per day, use of vibrating tools, job includes bonuses/targets/deadlines	logistic regression OR	1.2 (0.9-1.7)	NS
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	IOSH Job control (0=least) 2.8-3.4 vs1-2.7	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	1.05 (0.48, 2.27)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	IOSH Job control (0=least) 3.6-3.8 vs1-2.7	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	0.34 (0.14, 0.82)	higher job control associated with lower CTS odds
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	IOSH Job control (0=least) 4-4.4 vs1-2.7	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	0.64 (0.29, 1.42)	NS
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	IOSH Job control (0=least) 4.6-4.8 vs1-2.7	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	0.35 (0.14, 0.91)	higher job control associated with lower CTS odds

TABLE 73 RISK FACTOR: LACK OF COWORKER SUPPORT

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Werner,R.A. 2005	Low	N= 189 ; all were automobile assembly line workers	hand diagram symptoms, and median sensory evoked response that .5 msec longer than ipsilateral ulnar sensory response at 1 year	coworker support level	Gender/Sex, wrist/hand tendonitis, diabetes, coworker support, median ulnar peak latency on dominant side, elbow posture rating	logistic regression odds ratio	.69(.48,.99)	higher levels of coworker support was associated with lower odds of CTS
Coggon,D. 2013	Moderate	N= 1230; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs healthy controls	little level of support from supervisors or colleagues	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking, mental health, repeated movements, vibrating tools, job control, level of supervisor/colleague support	logistic regression OR	1.6 (1.1-2.3)	odds higher in patients with little level of support

TABLE 74 RISK FACTOR: LENGTH OF EMPLOYMENT

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS symptoms	Previous at-risk jobs	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	1.01(0.94–1.09)	NS
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS diagnosis with clinical and electrodiagnostic examinations	Previous at-risk jobs	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	0.95(0.84–1.07)	NS
Mondelli,M. 2006	Moderate	N= 145 ; female hospital floor cleaners in Italy	diagnosed according to AAN criteria: population of hospital floor cleaners	same job with previous employers yes vs no	Age, BMI, duration of occupational exposure to current job, occupational exposure to the same job for previous employers, manual hobbies (including motorcycle use, diseases known to be associated with CTS (diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma), hospital (to adjust for center effects)	logistic regression OR	12.15 (2.96-49.93)	patients who had same floor cleaner job with a previous employer had greater odds of CTS than those who did not have same job at previous employer

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Worked 4880-5383 vs 2954 hours	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	0.29 (0.12, 0.72)	more hours worked since 1993 was associated with lower odds of CTS
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Worked 6647-15510 vs 2954 hours	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	0.29 (0.10, 0.78)	more hours worked since 1993 was associated with lower odds of CTS

TABLE 75 RISK FACTOR: LEVEL OF SATISFACTION

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Goodson, J.T. 2014	Moderate	87 CTS and 74 gender/sex-matched general orthopedic patients from an outpatient orthopedic clinic in the Western US.	(1)Electrodiagnostic (EDX) testing results suggestive of abnormal slowing of the median nerve, (2) the presence of clinical symptoms of CTS, and (3) no confounding syndromes/disorders	Job Satisfaction	excluded confounding conditions; gender/sex, age, education levels, ethnicity, and EDX testing results	Logistical Regression OR	0.66(0.5,0.88)	Job satisfaction decreases odds of CTS

TABLE 76 RISK FACTOR: LIFTING

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	lifting 2 or more pounds/day	model 1: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, using vibrating tools, assembly line work, twisting forearm work, bending wrist work, using forceful hand grip, using fingers/thumb as pressing tool, using fingers in a pinch grip	logistic regression OR	3.31(1.54, 7.12)	lifting 2 or more pounds/day significantly increases CTS odds
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	lifting 2 or more pounds/day	model 2 best fitting model: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	2.67 (1.21, 5.88)	lifting 2 or more pounds/day is associated with higher odds of median neuropathy
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	peak exposure to Lifting objects	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	3.61 (1.41, 9.24)	Peak exposure to lifting increases odds of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	Lifting objects in most recent job	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	2.98 (1.41, 6.31)	Lifting increases odds
Evanoff, B. 2012	Moderate	N= 745 ; newly employed workers	symptoms and NCS at 3 years	lifting more than 1 kg/day	age, Gender/Sex, lifting at least 1kg, forceful grip, finger/thumb pressing, using vibrating tools, pinch grip, forearm rotation, hand/wrist bending	logistic regression odds ratio	3.27(1.27, 8.44)	lifting at least 1 kg increases CTS odds
Nathan, P.A. 2005	Moderate	N= 148 ; industrial workers in Portland Oregon area	clinical and electrodiagnostic tests at 15-16 years	heavy lifting	repetitious movement, heavy lifting, keyboard use, vibration tools, force, cigarette use, Gender/Sex, age, BMI	logistic regression odds ratio	1.31 (p-value=.63)	NS

TABLE 77 RISK FACTOR: MANAGERIAL JOBS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Managers, directors, and senior officials vs. Associate professional and technical occupations	matched by: all males ; covariates: Managers, directors, and senior officials vs. Associate professional and technical occupations	univariate odds ratios	0.88 (0.43– 1.77)	NS
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Managers, directors, and senior officials vs. Associate professional and technical occupations	matched by: all females ; covariates: Managers, directors, and senior officials vs. Associate professional and technical occupations	univariate odds ratios	1.69 (0.99– 2.91)	NS

TABLE 78 RISK FACTOR: MARITAL STATUS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Kaplan, Y. 2008	Low	N= 221 ; all were postmenopausal women	NCS	marital status-married versus other	matched by: age matched females ; covariates: marital status	p-value	>.05	NS

TABLE 79 RISK FACTOR: MENTAL

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the mid-west	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	feeling down or blue or depressed never vs seldom	Model1: ACGIH Hand Activity Level (HAL) ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	0.08 (.01–0.62)	depression/feeling down is associated with CTS
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	feeling down or blue or depressed often vs seldom	Model1: ACGIH Hand Activity Level (HAL) ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	0.99 0.44–2.24)	NS
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	feeling down or blue or depressed always vs seldom	Model1: ACGIH Hand Activity Level (HAL) ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	8.19 1.69–39.72)	depression/feeling down is associated with CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	feeling down or blue or depressed never vs seldom	Model 2: strain index ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	0.10 (0.01–0.71)	depression/feeling down is associated with CTS
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	feeling down or blue or depressed often vs seldom	Model 2: strain index ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	0.94 (0.42–2.12)	NS
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	feeling down or blue or depressed always vs seldom	Model 2: strain index ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	8.44 1.73–41.16)	depression/feeling down is associated with CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Roquelaure, Y. 2001	Low	N= 162 ; footwear factory workers	psychological distressed measured by G at 2 year	psychological distress measured by General Health Questionnaire (GHQ-12) greater or equal to 90th percentile	BMI over 30, GHQ-12 score, rapid trigger movements, work strongly controlled by superiors	logistic regression odds ratio	4.3 (1.0-18.6)	having high levels of psychological distress on the GHQ-12 (90th percentile) was associated with greater odds of CTS
Coggon, D. 2013	Moderate	N= 1230; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs healthy controls	intermediate mental health vs good mental health	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking, mental health, repeated movements, vibrating tools, job control, level of supervisor/colleague support	logistic regression OR	1.3 (0.9-1.7)	NS
Coggon, D. 2013	Moderate	N= 1230; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs healthy controls	poor mental health vs good mental health	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking, mental health, repeated movements, vibrating tools, job control, level of supervisor/colleague support	logistic regression OR	1.4 (1.0-1.9)	odds higher in patients with poor mental health

TABLE 80 RISK FACTOR: MODERATE ALCOHOL USE

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/probable” or “possible” symptoms of CTS	Moderate alcohol consumption (defined as 2 to 4 drinks per week)	gender/sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	0.2 (0.1–1.0)	Moderate alcohol consumption decreases odds of CTS. Greater alcohol consumption did not significantly affect odds of CTS

TABLE 81 RISK FACTOR: MUSCULOSKELETAL

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	1 to 2 distal upper extremity musculoskeletal disorders vs zero disorders	Model1: ACGIH Hand Activity Level (HAL) ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	2.45 (1.21–5.08)	more distal upper extremity musculoskeletal disorders is associated with higher CTS risk
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	3 or more distal upper extremity musculoskeletal disorders vs zero disorders	Model1: ACGIH Hand Activity Level (HAL) ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	3.85 (1.08–13.8)	more distal upper extremity musculoskeletal disorders is associated with higher CTS risk

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	1 to 2 distal upper extremity musculoskeletal disorders vs zero disorders	Model 2: strain index ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	2.66 (1.30–5.45)	more distal upper extremity musculoskeletal disorders is associated with higher CTS risk
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	3 or more distal upper extremity musculoskeletal disorders vs zero disorders	Model 2: strain index ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	3.70 (1.02–13.46)	more distal upper extremity musculoskeletal disorders is associated with higher CTS risk
Bayrak,I.K. 2008	Low	N= 290 ; CTS patients were from electrophysiology clinic, and controls were selected from patients who underwent ultrasound for other reasons	clinically and electrophysiologically	bifid median nerve	bifid median nerve	chi squared p value	<.01	bifid median nerve was more frequent in CTS case patients than in control patients

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Keese,G.R. 2006	Low	N= 72 ; CTS cases and control patients selected from one clinic	symptoms and neurodiagnostic test at 6 months	Palmaris long us present vs Absent	matched by: age, Gender/Sex, industrial exposures, diabetes, thyroid disease, alcohol abuse and rheumatoid arthritis ; covariates: Palmaris long us present vs Absent	odds ratio	10(1.18, 84.779)	odds of CTS is significantly higher when Palmaris long us is present
Vogelsang,L.M. 1994	Low	N= 100 ; all were worked in what were considered high risk occupations(automotive parts or assembly workers, keyboard operators, electronics industry workers, and garment industry workers from East Tennessee, and sign language interpreters). Each case was matched by age, Gender/Sex, race/ethnicity, height, weight, body type, length of time, job duties	diagnosed by orthopaedist	GMP, Generic Musculoskeletal Problems.	social readjustment scale, self-control schedule, life style approaches scale, self-control questionnaire, perceived stress scales, Cohen-Hoberman Inventory of Physical Symptoms, related medical condition, suspected medical risk, related musculoskeletal problems	p value logistic regression	<.05	patients with CTS were more likely to have related generic musculoskeletal problems besides CTS
Aktas,I. 2008	Moderate	N= 90 ; patients referred to electrophysiological laboratory	electrophysiologically diagnosed	benign joint hypermobility	benign joint hypermobility	Pearson's correlation	0.59	joint hypermobility increases CTS risk
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Musculoskeletal condition	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	2.54 (1.03, 6.23)	Odds are greater in patients with musculoskeletal conditions

TABLE 82 RISK FACTOR: OFFICE WORK

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Roquelaure, Y. 2008	Moderate	N= 194276 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Lower-grade white-collar workers vs unemployed	matched by: among women ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	2.5 [2.2-3.0]	risk significantly higher than in the unemployed
Roquelaure, Y. 2008	Moderate	N= 193802 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Lower-grade white-collar workers vs unemployed	matched by: among men ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	1.3 [0.8-2.1]	NS

TABLE 83 RISK FACTOR: OTHER

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Elementary occupations vs. Associate professional and technical occupations	matched by: all males ; covariates: Elementary occupations vs. Associate professional and technical occupations	univariate odds ratios	3.08 (1.78–5.51)	odds are higher than in associate professional and technical occupations
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Elementary occupations vs. Associate professional and technical occupations	matched by: all females ; covariates: Elementary occupations vs. Associate professional and technical occupations	univariate odds ratios	4.85 (3.21–7.55)	odds are higher than in associate professional and technical occupations
Kaplan,Y. 2008	Low	N= 221 ; all were postmenopausal women	NCS	home maker versus employed outside of home	matched by: age matched females ; covariates: homemaker versus employed	odds ratio	1.10 (0.64, 1.89)	NS
Wolf,J.M. 2009	Low	N= ; all were in military	method of diagnosis not explained and done by multiple physicians and specialists	rank junior enlisted vs junior officer	age, Gender/Sex, and race/ethnicity	Poisson regression rate ratio	1.53 (1.47, 1.59)	junior enlisted soldiers had a significantly higher rate of CTS than junior officers
Wolf,J.M. 2009	Low	N= ; all were in military	method of diagnosis not explained and done by multiple physicians and specialists	rank senior enlisted vs junior officer	age, Gender/Sex, and race/ethnicity	Poisson regression rate ratio	3.18 (3.06, 3.30)	senior enlisted soldiers had a significantly higher rate of CTS than junior officers

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Wolf,J.M. 2009	Low	N= ; all were in military	method of diagnosis not explained and done by multiple physicians and specialists	rank senior officer vs junior officer	age, Gender/Sex, and race/ethnicity	Poisson regression rate ratio	2.72 (2.60, 2.85)	senior officer soldiers had a significantly higher rate of CTS than junior officers
Cartwright,M.S. 2012	Moderate	N= 287 ; Latino manual labor workers in 4 North Carolina counties	diagnosed with a combination of symptoms reported through Katz hand diagram, and nerve conduction studies	poultry worker vs not a poultry worker	age, BMI, Gender/Sex, accounting for center and within person wrist correlation	logistic regression	2.51(1.8, 3.5)	odds higher in poultry workers
Cartwright,M.S. 2014	Moderate	N= 173 ; Latino poultry and non-poultry manual workers	diagnosed with a combination of symptoms reported through Katz hand diagram, and nerve conduction studies at 1 year	poultry worker vs not a poultry worker	age, BMI, Gender/Sex, accounting for center and within person wrist correlation	logistic regression odds ratio	1.81(.83, 3.98)	NS
Roquelaure,Y. 2008	Moderate	N= 193802 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Craftswomen, saleswomen, and managers vs unemployed	matched by: among men ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	0.8 [0.4-1.6]	NS
Roquelaure,Y. 2008	Moderate	N= 194276 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Craftswomen, saleswomen, and managers vs unemployed	matched by: among women ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	0.5 [0.3-1.2]	NS

TABLE 84 RISK FACTOR: PARAPLEGIC

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Akbar,M., 2014	Low	N= 112 ; paraplegic recruited from hospital database, and controls recruited through advertisements in the community	history, phalen and Tinel	paraplegic vs healthy controls	matched by: age, Gender/Sex ; covariates: paraplegic vs not	odds ratio	21.67 (6.85, 68.56)	odds higher in paraplegics
Akbar,M., 2014	Low	N= 112 ; paraplegic recruited from hospital database, and controls recruited through advertisements in the community	electrodiagnostic	paraplegic vs healthy controls	matched by: age, Gender/Sex ; covariates: paraplegic vs not	odds ratio	7.14 (3.07, 16.62)	odds higher in paraplegics

TABLE 85 RISK FACTOR: PIECEWORK PAYMENT

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Petit,A. 2015	Moderate	French salaried workers working in manufacturing industry and services sector as skilled and unskilled blue collar workers	CTS symptoms on the day of medical exam (or for at least 4 days during the preceding 7 days)	payment on a piecework basis	Gender/Sex, age, use of vibrating hand tools, exposure to cold temperature, holding objects in pinch grip, extreme wrist bending posture, pressing with palm base, force, and work organization factors	Logistical Regression OR	2 (1.1-3.5)	payment on a piecework basis rather than according to working hours increases odds of CTS

TABLE 86 RISK FACTOR: PRESSING

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	using fingers/thumbs as pressing tool	model 1: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, using vibrating tools, assembly line work, twisting forearm work, bending wrist work, using forceful hand grip, using fingers/thumb as pressing tool, using fingers in a pinch grip	logistic regression OR	1.19 (0.80, 1.76)	NS
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	peak exposure to Thumb pressing	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	1.12 (0.54, 2.35)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	Thumb pressing in most recent job	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	1.71 (0.76, 3.86)	NS

TABLE 87 RISK FACTOR: PROFESSIONAL JOBS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Forst,L. 2006	Low	N= 371 ; physician and non physician members of North American Spine Society (NASS)	Varied. Based on modified version of questionnaire, and self-diagnosis by physicians	practicing professionally for greater or equal to 5 years	age, ethnicity, surgical specialty, obesity (body mass index [BMI] ≥ 30), working as a surgeon for 5 years, use of the Kerrison rongeur (an instrument used for bone removal)	logistic regression odds ratio	4.24(1.54,4.81)	surgeons with greater than or equal to 5 years experience had significantly greater odds of CTS than those with less experience
Forst,L. 2006	Low	N= 371 ; physician and non-physician members of North American Spine Society (NASS)	Varied. Based on modified version of questionnaire, and self-diagnosis by physicians	being a surgeon who uses the Kerrison rongeur tool versus not using the tool	age, ethnicity, surgical specialty, obesity (body mass index [BMI] ≥ 30), working as a surgeon for 5 years, use of the Kerrison rongeur (an instrument used for bone removal)	logistic regression odds ratio	2.72(1.54, 11.69)	surgeons who used the Kerrison rongeur tool had significantly higher odds of CTS
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Professional occupations vs. Associate professional and technical occupations	matched by: all males ; covariates: Professional occupations vs. Associate professional and technical occupations	univariate odds ratios	2.45 (1.38–4.56)	odds are higher than in associate professional and technical occupations
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Professional occupations vs. Associate professional and technical occupations	matched by: all females ; covariates: Professional occupations vs. Associate professional and technical occupations	univariate odds ratios	4.85 (3.16–7.64)	odds are higher than in associate professional and technical occupations

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Roquelaure, Y. 2008	Moderate	N= 194276 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Professionals vs unemployed	matched by: among women ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	0.9 [0.6-1.4]	NS
Roquelaure, Y. 2008	Moderate	N= 193802 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Professionals vs unemployed	matched by: among men ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	0.6 [0.4-1.0]	NS

TABLE 88 RISK FACTOR: RACE/ETHNICITY (WHITE VS NON-WHITE)

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Wright, C. 2014	Low	(3155 w/o CTS diagnosis and 91 with CTS diagnosis); EMR of a cohort of pregnant women receiving prenatal care at a large obstetrics unit; representative of those served by the urban academic center, with a large proportion of black patients	clinically diagnosed with ICD 9 diagnosis code for CTS	Race/Ethnicity Black versus White	age, race/ethnicity, education, smoking, parity, hypertension, diabetes, maternal weight category (constructed variable including information about maternal BMI and GWG), and number prenatal care visits	Logistical Regression OR	1.2 (0.7-2)	NS
Nathan,P.A. 2002	Moderate	N= 256; workers at 4 industrial sites (a steel mill, meat/food packaging, electronics, and plastics).	electrodiagnostic test and symptoms at 11 years	Race/Ethnicity white vs nonwhite	repetitious movement, heavy lifting, keyboard use, vibration tools, force, cigarette use, Gender/Sex, age, BMI, avocational activities, hormone use, race/ethnicity, endocrine condition, years on job	logistic regression odds ratio	1.11 (.25–4.89)	NS

TABLE 89 RISK FACTOR: RAYNAUD'S

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Winn,F.J.,Jr., 1989	Low	N= 58 ; cases were seen at Baltimore neurology clinic, healthy controls were selected by those who responded to advertisements in the same area	median nerve or motor sensory symptoms	Raynaud's Symptoms	matched by: age and gender/sex ; covariates: Raynaud's symptoms and median nerve motor function	logistic regression odds ratio	20.19(4.1,99.33)	Raynaud's Symptoms result in higher CTS diagnosis odds

TABLE 90 RISK FACTOR: REPETITION

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong,T. 2008	High	N= 1071; follow worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	factor analysis	repetition (O*NET subscales: time spent making repetitive motions and time spent handling objects) 4th quartile vs 1st	Model 3 with O*NET factor variables: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	1.79 (1.01-3.18)	Work with high hand repetition increases odds of CTS
Armstrong,T. 2008	High	N= 1071; follow worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	factor analysis	repetition (O*NET subscales: time spent making repetitive motions and time spent handling objects) 3rd quartile vs 1st	Model 3 with O*NET factor variables: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	1.11 (0.61-2)	NS
Armstrong,T. 2008	High	N= 1071; follow worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	factor analysis	repetition (O*NET subscales: time spent making repetitive motions and time spent handling objects) 2nd quartile vs 1st	Model 3 with O*NET factor variables: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	1.48 (0.8-2.74)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Evanoff,B. 2014	High	711 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDES, DSL) at 3 years	Repetitive Motion required	adjusted for age, Gender/Sex, and BMI; past diagnosis of CTS or other upper extremity peripheral neuropathy, had a pacemaker or internal defibrillator, or were pregnant at the time of enrollment excluded	Multivariable mixed logistic regression models OR	2.48(1.05-5.86)	Repetitive Motion in Current Job increases odds of CTS
Yagev,Y. 2001	Low	N= 145 ; all male patients from one electrophysiological lab at one hospital	electrodiagnostically diagnosed	low force-high repetitive motion jobs vs low force-low repetitive jobs	matched by: all males ; covariates: job force-repetition level, age, ethnic origin, education, obesity, smoking habits,	logistic regression odds ratio	2.2(0.5,9.9)	NS
Yagev,Y. 2001	Low	N= 120 ; all female patients from one electrophysiological lab at one hospital	electrodiagnostically diagnosed	low force-high repetitive motion jobs vs low force-low repetitive jobs	matched by: all females ; covariates: job force-repetition level, age, ethnic origin, education, obesity, smoking habits,	logistic regression odds ratio	7.4(1.9,28)	odds of CTS were significantly greater among females with low force-higher repetitive jobs than those low force low repetitive jobs

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Yagev, Y. 2001	Low	N= 265 ; all patients from one electrophysiological lab at one hospital	electrodiagnostically diagnosed	low force-high repetitive motion jobs vs low force-low repetitive jobs	job force-repetition level, age, ethnic origin, education, obesity, smoking habits,	logistic regression odds ratio	4.72(1.8,12.5)	odds of CTS were significantly greater among people with low force-high repetitive jobs than those low force low repetitive jobs
Yagev, Y. 2001	Low	N= 102 ; all male patients from one electrophysiological lab at one hospital	electrodiagnostically diagnosed	high force-low repetitive motion jobs vs low force-low repetitive jobs	matched by: all males ; covariates: job force-repetition level, age, ethnic origin, education, obesity, smoking habits,	logistic regression odds ratio	2.8(1.1,6.9)	odds of CTS were significantly greater among males with high force-low repetitive jobs than those low force low repetitive jobs
Yagev, Y. 2001	Low	N= 138 ; all female patients from one electrophysiological lab at one hospital	electrodiagnostically diagnosed	high force-low repetitive motion jobs vs low force-low repetitive jobs	matched by: all females ; covariates: job force-repetition level, age, ethnic origin, education, obesity, smoking habits,	logistic regression odds ratio	7.0(0.8,6.2)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Yagev, Y. 2001	Low	N= 240 ; all patients from one electrophysiological lab at one hospital	electrodiagnostically diagnosed	high force-low repetitive motion jobs vs low force-low repetitive jobs	job force-repetition level, age, ethnic origin, education, obesity, smoking habits,	logistic regression odds ratio	3.21(1.5,6.9)	odds of CTS were significantly greater among people with high force-low repetitive jobs than those low force low repetitive jobs
Chiang, H.C. 1990	Moderate	N= 269 ; workers at frozen food plants	neurological examinations and electrophysiological tests	job requires repetitive movement (frozen food packers and non-frozen food packers) vs no repetitive movement (office work)	Age, gender/sex, length of employment, exposure to cold (frozen food packers), repetitive movement (frozen and non-frozen food packers), and cold*repetitious movement interaction	logistic regression odds ratio	1.87 (1.11, 3.16)	repetitious movement is associated with CTS
Chiang, H.C. 1990	Moderate	N= 269 ; workers at frozen food plants	neurological examinations and electrophysiological tests	combined effect of repetitive movement and working in the cold (interaction term)	, length of employment, exposure to cold (frozen food packers), repetitive movement (frozen and non-frozen food packers), and cold*repetitious movement interaction	logistic regression odds ratio	1.83 (1.35, 2.48)	exposure to cold increases the effect of repetitious movement on CTS odds

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Coggon,D. 2013	Moderate	N= 1230; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs healthy controls	use of other repeated movements of the wrist/fingers>4 hours per day	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking, mental health, repeated movements, vibrating tools, job control, level of supervisor/colleague support	logistic regression OR	1.5 (1.1-1.9)	odds higher in patients with repeated movements >4 hours per day
Goodson, J.T. 2014	Moderate	87 CTS and 74 gender/sex-matched general orthopedic patients from an outpatient orthopedic clinic in the Western US.	(1)Electrodiagnostic (EDX) testing results suggestive of abnormal slowing of the median nerve, (2) the presence of clinical symptoms of CTS, and (3) no confounding syndromes/disorders	occupational repetition	excluded confounding conditions; gender/sex, age, BMI, education levels, ethnicity, and EDX testing results	Logistical Regression OR	1.84(1.27,2.67)	occupational repetition increases odds
Silverstein,B.A. 1987	Moderate	N= 652 ; workers form seven different industrial sites	based on phalen and tinel's signs and symptoms mentioned in interview	high force-low repetitive motion jobs vs low force-low repetitive jobs	Gender/Sex, age, years on job, work repetition, level of force involved in job, dummy variables controlling for job center effects	logistic regression OR	1.8(0.16,20.59)	NS
Silverstein,B.A. 1987	Moderate	N= 652 ; workers form seven different industrial sites	based on phalen and tinel's signs and symptoms mentioned in interview	low force-high repetitive motion jobs vs low force-low repetitive jobs	Gender/Sex, age, years on job, work repetition, level of force involved in job, dummy variables controlling for job center effects	logistic regression OR	2.7(0.26,28.36)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Silverstein,B.A. 1987	Moderate	N= 652 ; workers form seven different industrial sites	based on phalen and tinel's signs and symptoms mentioned in interview	high force-high repetitive motion jobs vs low force-low repetitive jobs	Gender/Sex, age, years on job, work repetition, level of force involved in job, dummy variables controlling for job center effects	logistic regression OR	15.52(1.7,141.52)	working in a high force-High repetition job was associated with higher odds of CTS than Low force-low repetition jobs

TABLE 91 RISK FACTOR: ROTATION

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	twisting forearm	model 1: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, using vibrating tools, assembly line work, twisting forearm work, bending wrist work, using forceful hand grip, using fingers/thumb as pressing tool, using fingers in a pinch grip	logistic regression OR	1.78 (1.18, 2.69)	twisting forearm is associated with higher odds of median neuropathy
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	peak exposure to Forearm rotation	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	1.36 (0.66, 2.83)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	Forearm rotation in most recent job	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	1.23 (0.51, 2.94)	NS
Evanoff, B. 2012	Moderate	N= 745 ; newly employed workers	symptoms and NCS at 3 years	forearm rotation	age, Gender/Sex, lifting at least 1kg, forceful grip, finger/thumb pressing, using vibrating tools, pinch grip, forearm rotation, hand/wrist bending	NR	NR	NS

TABLE 92 RISK FACTOR: SF-36 PHYSICAL COMPONENT

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Goodson, J.T. 2014	Moderate	87 CTS and 74 gender/sex-matched general orthopedic patients from an outpatient orthopedic clinic in the Western US.	(1)Electrodiagnostic (EDX) testing results suggestive of abnormal slowing of the median nerve, (2) the presence of clinical symptoms of CTS, and (3) no confounding syndromes/disorders	Physical component summary scores (subset of SF-36)	excluded confounding conditions; gender/sex, age, education levels, ethnicity, and EDX testing results	Logistical Regression OR	0.94(0.9,0.99)	Better SF-36 scores are associated with decreased odds of CTS

TABLE 93 RISK FACTOR: SALES

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Sales and customer service occupations vs. Associate professional and technical occupations	matched by: all males ; covariates: Sales and customer service occupations vs. Associate professional and technical occupations	univariate odds ratios	2.26 (1.024– 4.83)	odds are higher than in associate professional and technical occupations
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Sales and customer service occupations vs. Associate professional and technical occupations	matched by: all females ; covariates: Sales and customer service occupations vs. Associate professional and technical occupations	univariate odds ratios	2.17 (1.38– 3.48)	odds are higher than in associate professional and technical occupations

TABLE 94 RISK FACTOR: SERVICE OCCUPATIONS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Caring, leisure, and other service occupations vs. Associate professional and technical occupations	matched by: all males ; covariates: Caring, leisure, and other service occupations vs. Associate professional and technical occupations	univariate odds ratios	5.64 (2.77–11.42)	odds are higher than in associate professional and technical occupations
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Caring, leisure, and other service occupations vs. Associate professional and technical occupations	matched by: all females ; covariates: Caring, leisure, and other service occupations vs. Associate professional and technical occupations	univariate odds ratios	4.21 (2.77–6.56)	odds are higher than in associate professional and technical occupations
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS symptoms	Part-time cashiers vs office worker	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	1.26(0.59–2.67)	NS
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS symptoms	Full-time cashiers vs office worker	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	2.74(1.18–6.32)	full time cashiers are at higher odds than office workers

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS diagnosis with clinical and electrodiagnostic examinations	Part-time cashiers vs office worker	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	1.06(0.35–3.21)	NS
Bonfiglioli,R. 2007	Moderate	N= 269 ; cashiers and office workers from 4 big supermarket stores	CTS diagnosis with clinical and electrodiagnostic examinations	Full-time cashiers vs office worker	work(cashiers vs office workers), BMI, age, previous at risk jobs, CTS family history, presence of children, do hand-knitting/needle work, over 8 years of education,	logistic regression odds ratio	1.81(0.52–6.34)	NS
Morgenstern,H. 1991	Moderate	N= 1052 ; grocery store checkers belonging to local California union	symptoms of CTS indicated in questionnaire	use of laser scanner to check items	matched by: all members were members of union food and commercial workers union ; covariates: age, hours per work week, years worked, age*years worked interaction, use of laser scanner to check items, unload basket before checking, load and lift grocery bags after checking, currently pregnant, contraceptive use, use of exogenous estrogen, use of diuretics, history of broken wrist	logistic regression odds ratio	0.99(0.65, 1.49)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Morgenstern,H. 1991	Moderate	N= 1054 ; grocery store checkers belonging to local California union	symptoms of CTS indicated in questionnaire	unload basket before checking	matched by: all members were members of union food and commercial workers union ; covariates: age, hours per work week, years worked, age*years worked interaction, use of laser scanner to check items, unload basket before checking, load and lift grocery bags after checking, currently pregnant, contraceptive use, use of exogenous estrogen, use of diuretics, history of broken wrist	logistic regression odds ratio	0.97(0.66, 1.44)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Morgenstern,H. 1991	Moderate	N= 1049 ; grocery store checkers belonging to local California union	symptoms of CTS indicated in questionnaire	load and lift groceries after checking	matched by: all members were members of union food and commercial workers union ; covariates: age, hours per work week, years worked, age*years worked interaction, use of laser scanner to check items, unload basket before checking, load and lift grocery bags after checking, currently pregnant, contraceptive use, use of exogenous estrogen, use of diuretics, history of broken wrist	logistic regression odds ratio	0.94(0.35, 2.57)	NS

TABLE 95 RISK FACTOR: SKILLED TRADES

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Skilled trades occupations vs. Associate professional and technical occupations	matched by: all males ; covariates: Skilled trades occupations vs. Associate professional and technical occupations	univariate odds ratios	4.19 (2.57–7.18)	odds are higher than in associate professional and technical occupations
Jenkins,P.J. 2013	Low	N= unclear ; prospective audit database of General Registrar Office for Scotland	symptoms and phalen and tinel's sign at 66 months	Skilled trades occupations vs. Associate professional and technical occupations	matched by: all females ; covariates: Skilled trades occupations vs. Associate professional and technical occupations	univariate odds ratios	8.26 (4.98–13.86)	odds are higher than in associate professional and technical occupations

TABLE 96 RISK FACTOR: SMOKING

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Bland,J.D. 2005	Low	N= 4155 ; all patients referred to the neurophysiology service at hospital for suspicion of CTS	NCS confirmed CTS	Smoking	Gender/Sex, smoking, age, BMI*age interaction	logistic regression OR	1.11(0.94,1.29)	NS
Wright, C. 2014	Low	(3155 w/o CTS diagnosis and 91 with CTS diagnosis); EMR of a cohort of pregnant women receiving prenatal care at a large obstetrics unit; representative of those served by the urban academic center, with a large proportion of black patients	clinically diagnosed with ICD 9 diagnosis code for CTS	Non-Smoking versus smoker	age, race/ethnicity, education, smoking, parity, hypertension, diabetes, maternal weight category (constructed variable including information about maternal BMI and GWG), and number prenatal care visits	Logistical Regression OR	1.32 (0.37-5.85)	NS
Coggon,D. 2013	Moderate	N= 1230; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs healthy controls	ex-smoker vs non smoker	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking, mental health, repeated movements, vibrating tools, job control, level of supervisor/colleague support	logistic regression OR	1.1 (0.8-1.4)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Coggon,D. 2013	Moderate	N= 1230; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs healthy controls	current smoker vs non smoker	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking, mental health, repeated movements, vibrating tools, job control, level of supervisor/colleague support	logistic regression OR	0.6 (0.4-0.8)	odds lower in smokers than non-smokers
Coggon,D. 2013	Moderate	N= 855; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs negatively tested patients	ex-smoker vs non smoker	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking habits, diabetes, other arthritis present, number of moderately distressing somatic symptoms per week, use of keyboard 4 or more hours per day, use of vibrating tools, job includes bonuses/targets/deadlines	logistic regression OR	1.2 (0.9-1.7)	NS
Coggon,D. 2013	Moderate	N= 855; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs negatively tested patients	current smoker vs non smoker	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking habits, diabetes, other arthritis present, number of moderately distressing somatic symptoms per week, use of keyboard 4 or more hours per day, use of vibrating tools, job includes bonuses/targets/deadlines	logistic regression OR	0.8 (0.5-1.1)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Eleftheriou,A. 2012	Moderate	N= 441 ; 548 workers of a Governmental data entry & processing unit	personal history of CTS	ever smoked(yes vs no)	Keyboard strokes, age, physical activity, smoking	logistic regression OR	1.99 (1.01 to 3.54)	having ever smoked is associated with CTS
Geoghegan,J.M. 2004	Moderate	N= 3350 ; patients from the UK General Practice Research Database	diagnosed CTS	Smoker	matched by: age, gender/sex, and general practice ; covariates: consulting rate, BMI, smoking, diabetes, insulin use, metformin use, sulphonyl use, hormone replacement therapy, corticosteroid use, combined oral contraceptive pill use, Thyroxine use, Rheumatoid arthritis, wrist fracture, arthritis, also adjusted for missing data on smoking and BMI	logistic regression OR	1.03 (0.93–1.13)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Violante,F.S. 2007	Moderate	Blue-collar workers of several factories (producing large and small domestic appliances, underwear, ceramic tiles, and shoes and workers employed in all municipal nursery schools.	occurrence within last month of “classic/ probable” or “possible” symptoms of CTS	Smoking (ever smoked versus not)	gender/sex, age, biomechanical load, BMI*wrist interaction effect, height*forearm interaction effect, family history of CTS, pathologies facilitating CTS onset(diabetes mellitus, amyloidosis, gout, progressive systemic sclerosis, rheumatoid arthritis, systemic lupus erythematosus, thyroid disorders, tendonitis of the finger flexors, and chronic renal failure) alcohol consumption, smoking status, previous exposure to biomechanical overload	Logistic Regression OR	1.7(1.2-1.4)	having ever smoked increases odds of CTS

TABLE 97 RISK FACTOR: STATIC STRENGTH

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Evanoff,B. 2014	High	711 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	Static strength importance in current job	adjusted for age, Gender/Sex, and BMI; past diagnosis of CTS or other upper extremity peripheral neuropathy, had a pacemaker or internal defibrillator, or were pregnant at the time of enrollment excluded	Multivariable mixed logistic regression models OR	2.7(.85- 8.55)	NS

TABLE 98 RISK FACTOR: STRAIN

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Garg,A. 2012	High	N= 536 ; workers from a wide range of manufacturing facilities in the Midwest	symptoms (tingling and/or numbness) in at least 2 median nerve served digits, symptoms at least 25% of days in previous month, symptoms for at least 2 or more consecutive monthly follow ups, abnormal NCS at 6 years	Strain index above 6.1 vs less than or equal to 6.1	Model 2: strain index ,age, BMI (continuous), number of other distal upper extremity musculoskeletal disorders, gardening, feeling down, blue or depressed, rheumatoid arthritis	cox proportional hazard ratio	2.5 (1.00–6.13)	having high job strain is associated with higher risk of CTS
Burt,S. 2013	Moderate	N= 347 ; workers from hospital, school bus manufacturing plant, and engine assembly plant	electrodiagnostic test, symptoms, hand diagram at 2 years	Job Strain(Job Content Questionnaire)	model 2: threshold limit value, BMI, Job strain	hazard ratios	2.13 (1.001, 4.54)	having high job strain is associated with higher risk of CTS

TABLE 99 RISK FACTOR: SYMPTOMS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Gell,N. 2005	Low	N= 414 ; workers from 4 industrial and 3 clerical work sites	numbness, tingling, burning, or pain in the distribution of the median nerve (based on a hand diagram score of “probable” or “definite”) with ipsilateral median nerve conduction slowing at average 5.4 years	median ulnar peak latency difference	BMI>27,median ulnar peak latency difference, numbness tingling, burning, pain in the hand at baseline	logistic regression odds ratio	1.29(1.2,1.4)	for each one unit increase in median ulnar peak latency difference, CTS odds are increase by a factor of 1.29
Vogelsang,L.M. 1994	Low	N= 100 ; all were worked in what were considered high risk occupations(automotive parts or assembly workers, keyboard operators, electronics industry workers, and garment industry workers from East Tennessee, and sign language interpreters). Each case was matched by age, Gender/Sex, race/ethnicity, height, weight, body type, length of time, job duties	diagnosed by orthopaedist	CHIPS, Cohen-Hoberman Inventory of Physical Symptoms	social readjustment scale, self-control schedule, life style approaches scale, self-control questionnaire, perceived stress scales, Cohen-Hoberman Inventory of Physical Symptoms, related medical condition, suspected medical risk, related musculoskeletal problems	p value logistic regression	<.05	higher scores on the physical symptoms inventory increased the odds of CTS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Werner,R.A. 2005	Low	N= 189 ; all were automobile assembly line workers	hand diagram symptoms, and median sensory evoked response that .5 msec longer than ipsilateral ulnar sensory response at 1 year	Median–ulnar peak latency at least 0.8 msec	Gender/Sex, wrist/hand tendonitis, diabetes, coworker support, median ulnar peak latency on dominant side, elbow posture rating	logistic regression odds ratio	7.75(1.3, 45.84)	having a median–ulnar peak latency at least 0.8 msec significantly increased the odds of CTS
Winn,F.J.,Jr., 1989	Low	N= 58 ; cases were seen at Baltimore neurology clinic, healthy controls were selected by those who responded to advertisements in the same area	median nerve or motor sensory symptoms	median nerve motor function	matched by: age and gender/sex ; covariates: Raynaud’s symptoms and median nerve motor function	logistic regression odds ratio	0.31(0.13,0.73)	better median nerve motor function is associated with decreased CTS odds
Coggon,D. 2013	Moderate	N= 855; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs negatively tested patients	1 moderately distressing somatic symptom vs no distressing somatic symptoms in past week	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking habits, diabetes, other arthritis present, number of moderately distressing somatic symptoms per week, use of keyboard 4 or more hours per day, use of vibrating tools, job includes bonuses/targets/deadlines	logistic regression OR	0.7 (0.4-1.0)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Coggon,D. 2013	Moderate	N= 855; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs negatively tested patients	2 or more moderately distressing somatic symptom vs no distressing somatic symptoms in past week	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking habits, diabetes, other arthritis present, number of moderately distressing somatic symptoms per week, use of keyboard 4 or more hours per day, use of vibrating tools, job includes bonuses/targets/deadlines	logistic regression OR	0.6 (0.4-0.9)	positive tested patients were less likely to have 2 or more moderately distressing somatic symptoms than negative tested patients

TABLE 100 RISK FACTOR: TECHNICAL JOBS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Roquelaure, Y. 2008	Moderate	N= 194276 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Technicians associate professionals vs unemployed	matched by: among women ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	0.6 [0.5-0.8]	risk significantly lower than in the unemployed
Roquelaure, Y. 2008	Moderate	N= 193802 ; French prospectively CTS surveillance system	clinical and electrodiagnostic tests at 3 years	Technicians associate professionals vs unemployed	matched by: among men ; covariates: controlled for age, stratified by gender/sex	relative risk ratio	0.6 [0.4-0.8]	risk significantly lower than in the unemployed

TABLE 101 RISK FACTOR: TENDONITIS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong,T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	shoulder tendonitis history	model 2 best fitting model: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	2.66 (0.97, 7.29)	NS
Armstrong,T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	shoulder tendonitis history	Model 3 with O*NET factor variables: age, gender, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	2.95 (1.09, 7.95)	History of shoulder tendonitis increases odds of CTS
Werner,R.A. 2005	Low	N= 189 ; all were automobile assembly line workers	hand diagram symptoms, and median sensory evoked response that .5 msec longer than ipsilateral ulnar sensory response at 1 year	Wrist/hand/finger tendonitis at baseline	Gender/Sex, wrist/hand tendonitis, diabetes, coworker support, median ulnar peak latency on dominant side, elbow posture rating	logistic regression odds ratio	4.74(1.09–20.43)	wrist/hand/finger tendonitis significantly increased the odds of CTS

TABLE 102 RISK FACTOR: VARICOSIS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
de Krom, M.C. 1990	Moderate	N= 629; 28 cases and all controls were identified through random sample of patients in the Netherlands. An additional 128 cases were added from a single hospital in the area	clinical history and neurophysiologic testing	varicosis	matched by: age and gender/sex stratified random sample ; covariates: height, weight(kg), slimming courses(yes/no), Hours/week in flexion activities, hours/week for extension activities, Varicosis (for men only), for women: years since menopause onset vs pre-menopausal, hysterectomy vs premenopausal	logistic regression odds ratio	9.78(2.73, 34.95)	varicosis is significantly associated with increased odds of CTS in males

TABLE 103 RISK FACTOR: VIBRATION

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	using vibrating hand tools	model 1: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, using vibrating tools, assembly line work, twisting forearm work, bending wrist work, using forceful hand grip, using fingers/thumb as pressing tool, using fingers in a pinch grip	logistic regression OR	1.88(1.23, 2.85)	using vibrating hand tools is associated with higher odds of median neuropathy
Armstrong, T. 2008	High	N= 1071; following worker populations: carpenters, workers, engineers, laboratory workers, computer workers, and hospital support staff.	median neuropathy cases	using vibrating hand tools	model 2 best fitting model: age, Gender/Sex, body mass index, wrist index, history of diabetes, and history of shoulder tendonitis, lifting more than 2lbs/day, assembly line work, hospital vs clerical work, construction vs clerical work	logistic regression OR	1.50 (0.98, 2.31)	NS
Coggon, D. 2013	Moderate	N= 1230; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs healthy controls	Work for > 1 hour per day with vibrating tools.	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking, mental health, repeated movements, vibrating tools, job control, level of supervisor/colleague support	logistic regression OR	2.4 (1.6-3.8)	odds higher in patients using vibrating tools

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Coggon,D. 2013	Moderate	N= 855; cases were selected from the neurophysiology department and controls for the accident and emergency services at Southampton general hospital. All were aged 20-64	neurophysiologically positive patients vs negatively tested patients	work with vibrating tools >1 hours per day	matched by: gender/sex, age ; covariates: ethnicity, BMI, smoking habits, diabetes, other arthritis present, number of moderately distressing somatic symptoms per week, use of keyboard 4 or more hours per day, use of vibrating tools, job includes bonuses/targets/deadlines	logistic regression OR	1.4 (0.9-2.2)	NS
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	peak exposure to Using vibrating tools	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	2.24 (1.02, 4.92)	increased odds of CTS for those using vibrating tool use at work
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	Using vibrating tools in most recent job	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	2.04 (0.82, 5.09)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Power tool use 0.08-0.75 hours/day vs none	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	0.53 (0.17, 1.64)	NS
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Power tool use 1-2 hours/day vs none	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	1.43 (0.52, 3.90)	NS
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Power tool use 2.5-5.5 hours/day vs none	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	1.58 (0.63, 4.00)	NS
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Power tool use 6-11 hours/day vs none	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	3.30(1.11, 9.8)	odds higher in workers who use power tools 6-11 hours/day

TABLE 104 RISK FACTOR: WORK LENGTH

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Matias,A.C. 1998	Moderate	N= 100 ; video display terminal operators at Midwestern university	"medically diagnosed" CTS	work day duration	work day duration	logistic regression odds ratio	1.015(.0479)	longer work day is associated with increased CTS odds
Mondelli,M. 2006	Moderate	N= 145 ; female hospital floor cleaners in Italy	diagnosed according to AAN criteria: population of hospital floor cleaners	current job length 2nd vs 1st quartile	Age, BMI, duration of occupational exposure to current job, occupational exposure to the same job for previous employers, manual hobbies (including motorcycle use, diseases known to be associated with CTS (diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma), hospital (to adjust for center effects)	logistic regression OR	0.83 (0.26-2.69)	NS
Mondelli,M. 2006	Moderate	N= 145 ; female hospital floor cleaners in Italy	diagnosed according to AAN criteria: population of hospital floor cleaners	current job length 3rd vs 1st quartile	Age, BMI, duration of occupational exposure to current job, occupational exposure to the same job for previous employers, manual hobbies (including motorcycle use, diseases known to be associated with CTS (diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma), hospital (to adjust for center effects)	logistic regression OR	0.77 (0.24-2.43)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Mondelli,M. 2006	Moderate	N= 145 ; female hospital floor cleaners in Italy	diagnosed according to AAN criteria: population of hospital floor cleaners	current job length 4th vs 1st quartile	Age, BMI, duration of occupational exposure to current job, occupational exposure to the same job for previous employers, manual hobbies (including motorcycle use, diseases known to be associated with CTS (diabetes connective tissue diseases, hypothyroidism, and wrist/hand trauma), hospital (to adjust for center effects)	logistic regression OR	1.75 (0.54-5.65)	NS
Morgenstern,H. 1991	Moderate	N= 1058 ; grocery store checkers belonging to local California union	symptoms of CTS indicated in questionnaire	hours worked per week	matched by: all members were members of union food and commercial workers union ; covariates: age, hours per work week, years worked, age*years worked interaction, use of laser scanner to check items, unload basket before checking, load and lift grocery bags after checking, currently pregnant, contraceptive use, use of exogenous estrogen, use of diuretics, history of broken wrist	logistic regression odds ratio	1.03(p=.0081)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Morgenstern,H. 1991	Moderate	N= 1058 ; grocery store checkers belonging to local California union	symptoms of CTS indicated in questionnaire	years worked	matched by: all members were members of union food and commercial workers union ; covariates: age, hours per work week, years worked, age*years worked interaction, use of laser scanner to check items, unload basket before checking, load and lift grocery bags after checking, currently pregnant, contraceptive use, use of exogenous estrogen, use of diuretics, history of broken wrist	logistic regression odds ratio	.1238(p=.055)	NS
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	worked 3048-4857 vs 2954 hours	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	1.54 (0.74, 3.20)	NS
Nordstrom,D.L. 1997	Moderate	N= 417 ; only incident cases diagnosed between 1994 and 1995 were eligible as cases in Marshfield Wisconsin, and controls were a random sample from this area	Diagnosed by physician, or had explicit treatment for CTS and hand symptoms within one month of date of diagnosis.	Worked 5464-6507 vs 2954 hours	matched by: age ; covariates: musculoskeletal condition, BMI, Parent/sibling/child has CTS, power tool use, hours bending or twisting wrists, hours contacted with solvents per day, IOSH job control measure, cumulative hours worked since 1993	logistic regression OR	0.43 (0.18, 1.05)	NS

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Silverstein,B.A. 1987	Moderate	N= 652 ; workers from seven different industrial sites	based on phalen and tinels signs and symptoms mentioned in interview	years on job	Gender/Sex, age, years on job, work repetition, level of force involved in job, dummy variables controlling for job center effects	logistic regression OR	0.9(0.8,1.02)	NS

TABLE 105 RISK FACTOR: FINGER PINCH

Study	Quality	Population	CTS Diagnostics	Risk Factor	Confounding Adjustment	Stat. Type	Results	Significance
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	peak exposure to Finger pinching	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	0.87 (0.39, 1.93)	NS
Dale, A.M. 2014	Moderate	710 clerical, service, and construction workers from eight participating employers and three construction trade unions between July 2004 and October 2006 into the PrediCTS study	Presence of specific nerve symptoms in survey and median neuropathy by NCS (DML, MUDS, DSL) at 3 years	Finger pinching in most recent job	age, BMI, Gender/Sex, med history, pregnancy, history of CTS or peripheral neuropathy, or other contraindication to receiving nerve conduction studies (NCS), lifting objects, vibrating tools, forearm rotation, wrist bending, forceful gripping, thumb pressing, finger pinching	Logistical Regression OR	0.62 (0.18, 2.08)	NS

NONOPERATIVE TREATMENTS FOR CARPAL TUNNEL SYNDROME

A. IMMOBILIZATION

Strong evidence supports that the use of immobilization (brace/splint/orthosis) should improve patient reported outcomes.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention.

Rationale

There are two high quality studies (Hall 2013 and Manente 2001) that directly compare the use of brace/splint to no use of brace/splint to treat carpal tunnel syndrome. Hall 2013 compared 8 weeks of full-time splinting versus no splinting. The authors showed statistically significant improvement in pain and function (Boston Questionnaire for assessment of carpal tunnel symptom functional status scale, Boston Questionnaire for assessment of carpal tunnel symptom severity, AS, phalens, grip strength, Purdue Pegboard Test score, Semmes Weinstein monofilaments). The authors describe statistically significant differences when comparing percent change in these factors from pre to post treatment. There were some baseline/pretreatment differences between the groups, such that it calls into question whether these factors were actually statistically different after treatment. Manente 2001 compared four weeks of night bracing to no intervention. The treated group showed a reduction in the Boston Carpal Tunnel Questionnaire symptomatic score (from 2.75 to 1.54 at 4 weeks; $p < 0.001$) and functional score (from 1.89 to 1.48 at 4 weeks; $p < 0.001$). Subjects’ Global Impression of Change Questionnaire documented improvement in the braced group at 4 weeks ($p = 0.006$). Subjects’ Global Impression of Change Questionnaire documented improvement in the braced group at 4 weeks ($p = 0.006$).

Risks and Harms of Implementing this Recommendation

No harm in implementation of brace/splint use, if tolerated by patient.

B. STEROID INJECTIONS

Strong evidence supports that the use of steroid (methylprednisolone) injection should improve patient reported outcomes.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention.

Rationale

There is one high quality study (Atroshi 2013) that directly compares the use of steroid injection to placebo to treat carpal tunnel syndrome. In a prospective, randomized, double-blinded, placebo controlled study, the efficacies of 40mg methylprednisolone and 80mg

methylprednisolone were compared to placebo injection at various time lines (10 weeks and 1 year). At 10 weeks, there was greater improvement in the CTS symptom severity score in the group receiving injections of 40mg or 80mg methylprednisolone ($p < 0.003$) versus placebo injections; but there was no difference amongst the groups at 1 year. However, patients receiving 80mg methylprednisolone injection were less likely to go on to need surgery than placebo injection ($p = 0.04$). A small p-value ($p < .05$) indicates that this difference was not observed due to chance, subsequently favoring the alternative hypothesis of methylprednisolone injection improving patient outcomes.

Several high quality studies (Dammers 2006[1-3], Wong 2001, and Wong 2005) compare various doses of injected or routes of administration of methylprednisolone to treat carpal tunnel syndrome. In a double blinded, randomized study, Dammers 2006 compare the efficacy of 20, 40, and 60mg methylprednisolone injections to treat carpal tunnel syndrome. There was no significant difference in treatment response at 1 year. In a randomized double blind controlled trial, Wong 2005 compare a the effects of a single 80mg methylprednisolone injection with saline injection at 8 weeks versus two 80mg methylprednisolone injections 8 weeks apart. There was no significant difference between groups respect to Global Symptom Score, electrophysiological study, or functional outcomes ($p = 0.26$). In a prospective randomized double-blind study, Wong 2001 compared 25mg methylprednisolone orally for 10 days and placebo injection to 15mg methylprednisolone injection with oral placebo. The steroid injection provided significant improvement based on Global Symptom Score at 12 weeks.

Risks and Harms of Implementing this Recommendation

There is potential harm of corticosteroid injection in the vicinity of flexor tendons and neurovascular structures.

C. MAGNET THERAPY

Strong evidence supports not using magnet therapy for the treatment of carpal tunnel syndrome.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention.

Rationale

Several high quality studies (Colbert 2010, Weintraub 2008) evaluated the use of magnets in treating carpal tunnel syndrome. In a prospective randomized double-blinded controlled trial, Weintraub 2008 evaluated the efficacy of a magnet (simultaneous static and time-varying dynamic magnetic field stimulation 4 hours/day for two months). No significant measures of improvement were noted. In a randomized, double-blind controlled trial, Colbert 2010 evaluated the efficacy of magnet (wore nightly for 6 weeks a neodymium magnet of 15 or 45mTesla) versus placebo magnet on the treatment of carpal tunnel syndrome. No significant measures of improvement were noted.

Risks and Harms of Implementing this Recommendation

Magnet use may lead to sleep disturbance.

D. ORAL TREATMENTS

Moderate evidence supports no benefit of oral treatments (diuretic, gabapentin, astaxanthin capsules, NSAIDs, or pyridoxine) compared to placebo.

Strength of Recommendation: Moderate Evidence ★★★★★

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

Rationale

Two high quality studies (Chang 1998 and Hui 2011) compare various oral regimens to treat carpal tunnel syndrome. In a prospective randomized double-blind study placebo controlled study, Chang 1993 compare various 4 week oral medication regimens (diuretic [trichlormethiazide 2mg daily] versus NSAID [tenoxicam-SR 20mg daily] versus steroid [2 weeks of prednisolone 20mg daily followed by 2 weeks of 10mg daily]) to placebo. No significant changes from baseline were noted in the placebo, diuretic, or NSAID arms. However, the steroid arm improved significantly at 4 weeks, based on GSS Questionnaire. A review of the data provided indicates that at 4 weeks, the steroid arm had statistically significant improvement over the NSAID and diuretic arms based on GSS Questionnaire. Hui 2011 failed to show any significance when comparing oral Gabapentin to placebo.

Risks and Harms of Implementing this Recommendation

There is potential harm of oral NSAID or steroid use.

E. ORAL STEROIDS

Moderate evidence supports that oral steroids could improve patient reported outcomes as compared to placebo.

Strength of Recommendation: Moderate Evidence ★★★★★

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

Rationale

Two high quality studies (Chang 1998 and Hui 2011) compare various oral regimens to treat carpal tunnel syndrome. In a prospective randomized double-blind study placebo controlled study, Chang 1993 compare various 4 week oral medication regimens (diuretic [trichlormethiazide 2mg daily] versus NSAID [tenoxicam-SR 20mg daily] versus steroid [2 weeks of prednisolone 20mg daily followed by 2 weeks of 10mg daily]) to placebo. No significant changes from baseline were noted in the placebo, diuretic, or NSAID arms. However, the steroid arm improved significantly at 4 weeks, based on GSS Questionnaire. A review of the data provided indicates that at 4 weeks, the steroid arm had statistically significant improvement over the NSAID and diuretic arms based on GSS Questionnaire. Hui 2011 failed to show any significance when comparing oral Gabapentin to placebo.

Risks and Harms of Implementing this Recommendation

There is potential harm of oral NSAID or steroid use.

F. KETOPROFEN PHONOPHORESIS

Moderate evidence supports that ketoprofen phonophoresis could provide reduction in pain compared to placebo.

Strength of Recommendation: Moderate Evidence ★★☆☆

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

Rationale

In a randomized controlled trial, Soyupek 2012 compared phonophoresis with corticosteroid versus phonophoresis with nonsteroidal anti-inflammatory drug use. Phonophoresis with corticosteroid showed statistically significant improved in VAS score. In a prospective, randomized, double-blinded controlled trial, Yildiz 2011 compared the efficacy of 2 weeks of treatment with placebo ultrasound, ultrasound, or ketoprofen phonophoresis. The group that underwent ketoprofen phonophoresis for two weeks demonstrated significant improvement in VAS score over the sham ultrasound and the ultrasound group at two weeks and eight weeks.

Risks and Harms of Implementing this Recommendation

No known harm in use of phonophoresis.

G. THERAPEUTIC ULTRASOUND

Limited evidence supports that therapeutic ultrasound might be effective compared to placebo.

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

One high quality study (Ebenbichler 1998) evaluated the use of ultrasound in treating carpal tunnel syndrome. In a randomized controlled trial, Ebenbichler 1998 evaluated the efficacy of ultrasound (20 sessions of 15 minute interventions of 1MHz, 1.0 W/cm, pulse mode 1:4 at 5 sessions/week for 2 weeks followed by 2 sessions/week) versus placebo ultrasound on the treatment of carpal tunnel syndrome. Multiple measures showed significant improvement in the ultrasound group: grip strength, motor distal latency ($p < 0.001$), and pinch strength.

Risks and Harms of Implementing this Recommendation

No known harm in use of ultrasound.

H. LASER THERAPY

Limited evidence supports that laser therapy might be effective compared to placebo.

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

Several high quality studies (Chang 2008, Evcik 2007, Fusakul 2014) evaluated the use of laser therapy in treating carpal tunnel syndrome. In a randomized, controlled trial, Chang 2008 evaluated the efficacy of a laser (830nm diode with 10Hz, 50% duty cycle, 60 mW, 9.7J/cm) versus placebo laser on the treatment of carpal tunnel syndrome. The treatment was rendered for 10 minutes daily for 5 days a week for two weeks. After 4 weeks, the laser treatment provided significantly improved grip strengths, digital prehension, and lateral prehension ($p<0.05$). In a randomized controlled trial, Evcik 2007 evaluated the efficacy of laser (7J/2min) versus placebo laser. The treatment was rendered five times per week for two weeks. After four weeks, significant improvement in grip strength and pinch strength was noted ($p<0.001$); there was also significant improvement in sensory nerve velocity, sensory distal latency, and motor distal latency ($p<0.001$). In a randomized double-blinded controlled trial, Fusakul 2014 evaluated the efficacy of laser (gallium-aluminum-arsenide at a dose of 18J/session) versus placebo laser. Grip strength and pinch strength was significantly improved. At 12 weeks follow up, distal motor latency was significantly improved ($p<0.05$).

Risks and Harms of Implementing this Recommendation

Potential harm of laser therapy is unknown.

Future Research for Nonoperative Treatments

Further research in acupuncture is warranted. In a prospective randomized double-blind controlled study, Yao et al evaluated the efficacy of acupuncture (weekly sessions for 6 weeks) versus placebo to treat carpal tunnel syndrome. No significant measures of improvement were noted. Soft tissue manipulation: further research in manipulation is warranted. Many different techniques are utilized and the terminology distinguishing them is loosely utilized. Further research into linseed oil’s biological mechanism of action, along with technical refinements and specifics in its manufacture are warranted.

STUDY QUALITY TABLE OF CONSERVATIVE TREATMENTS

Table 106. Intervention Quality Evaluations

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Atroschi,I., 2013	●	●	●	●	◐	●	●	●	●	Include	High Quality
Bakhtiary,A.H., 2004	●	◐	◐	●	●	●	●	●	●	Include	High Quality
Burke,J., 2007	●	◐	●	●	◐	◐	●	●	●	Include	High Quality
Chang,M.H., 1998	◐	●	●	●	●	◐	●	●	●	Include	High Quality
Chang,W.D., 2008	●	◐	●	●	◐	◐	●	●	●	Include	High Quality
Chang,Y.W., 2014	◐	●	◐	●	●	●	●	●	●	Include	High Quality
Colbert,A.P., 2010	●	◐	●	●	●	○	●	●	●	Include	High Quality
Dammers,J.W., 2006	●	●	●	●	◐	●	●	●	●	Include	High Quality
Ebenbichler,G.R., 1998	●	●	●	●	◐	●	●	●	●	Include	High Quality
Evcik,D., 2007	◐	◐	●	●	◐	●	●	●	●	Include	High Quality
Fusakul,Y., 2014	◐	●	◐	●	◐	●	●	●	●	Include	High Quality
Hall,B., 2013	●	◐	○	●	●	●	●	●	●	Include	High Quality
Hui,A.C., 2011	●	◐	●	●	◐	◐	●	●	●	Include	High Quality

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Madjdinasab,N., 2008	●	●	●	●	●	●	●	●	●	Include	High Quality
Manente,G., 2001	●	●	●	●	●	●	●	●	●	Include	High Quality
Pratelli,E., 2015	●	●	●	●	●	●	●	●	●	Include	High Quality
Saeed,F.-U., 2012	●	●	○	●	●	●	●	●	●	Include	High Quality
Soyupek,F., 2012	●	●	●	●	●	●	●	●	●	Include	High Quality
Weintraub,M.I., 2008	●	●	●	●	●	○	●	●	●	Include	High Quality
Wong,S.M., 2001	●	●	●	●	●	●	●	●	●	Include	High Quality
Wong,S.M., 2005	●	●	●	●	●	●	●	●	●	Include	High Quality
Yagci,I., 2009	●	●	●	●	●	●	●	●	●	Include	High Quality
Yang,C.P., 2011	●	●	●	●	●	●	●	●	●	Include	High Quality
Yildiz,N., 2011	●	●	●	●	●	○	●	●	●	Include	High Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 107: SUMMARY OF FINDINGS PICO 6 PART 1 IMMOBILIZATION (EARLY FOLLOW-UP (<90DAYS))























































Outcomes	High Quality						Meta-Analysis
	Hall, B., 2013	Madjinasab, N., 2008	Manente, G., 2001	Soyupek, F., 2012 (1)	Soyupek, F., 2012 (2)	Yagci, I., 2009	
Favors treatment 1 							
Favors treatment 2 							
Not significant 							
Function							
Grip Strength							NA
NCS (CMAP)							NA
NCS (DML)							
NCS (DSL)							NA
NCS (MCV)							NA
NCS (NCV)							NA
NCS (SNAP)							NA
NCS (SNCV)							
Phalen's test score							NA
Questionnaire (Boston-FSS)							NA
Semmes-Weinstein Monofilaments Test (SW test)							NA
Tinel's Sign/Test							NA
Ultrasound (US)							
Anterior-posterior diameter of median nerve							NA
Cross-sectional area of median nerve							NA
Transverse diameter of median nerve							NA
Other							
Purdue Pegboard test score							NA
Questionnaire (GICQ)							
Global Impression Change Questionnaire							NA
Pain							
Questionnaire/Scale (VAS-pain)							NA
Symptoms							
Questionnaire (Boston-SSS)							NA

TABLE 108: SUMMARY OF FINDINGS PICO 6 PART 2 STEROID INJECTION (EARLY FOLLOW-UP (<90DAYS))
































Outcomes	High Quality					Meta-Analysis
	Atroschi, I., 2013 (1)	Atroschi, I., 2013 (2)	Atroschi, I., 2013 (3)	Wong, S.M., 2001	Wong, S.M., 2005	
Favors treatment 1 						
Favors treatment 2 						
Not significant 						
Function						
Grip Strength						NA
NCS (DML)						NA
Pinch Strength						NA
Two-point discrimination						NA
Other						
Questionnaire (General/Undefined)						
SF-6D score						
35 days						NA
70 days						NA
Pain						
Questionnaire (General/Undefined)						
SF-36 bodily pain score						NA
Symptoms						
Questionnaire (General/Undefined)						
CTS symptom severity score						NA
Questionnaire (DASH-Quick DASH)						NA
Questionnaire/Scale (GSS)						NA

TABLE 109: SUMMARY OF FINDINGS PICO 6 PART 2 STEROID INJECTION (LATE FOLLOW-UP (>90DAYS))













































Outcomes	High Quality							Meta-Analysis
	Atroschi, I., 2013 (1)	Atroschi, I., 2013 (2)	Atroschi, I., 2013 (3)	Dammers, J.W., 2006 (1)	Dammers, J.W., 2006 (2)	Dammers, J.W., 2006 (3)	Wong, S.M., 2005	
Favors treatment 1 								
Favors treatment 2 								
Not significant 								
Complications								
Treatment Failure								NA
Second Injection								
180 days								NA
365 days								NA
Function								
Grip Strength								NA
Kilograms (left hand)								NA
Kilograms (right hand)								NA
NCS (DML)								
Distal motor latency (left hand)								NA
Distal motor latency (right hand)								NA
Pinch Strength								NA
Two-point discrimination								NA
Other								
Questionnaire (General/Undefined)								
SF-6D score								NA
Pain								
Questionnaire (General/Undefined)								
SF-36 bodily pain score								NA
Symptoms								
Questionnaire (General/Undefined)								
CTS symptom severity score								NA
Questionnaire (DASH-Quick DASH)								NA
Questionnaire/Scale (GSS)								NA
Symptom relief (general)								NA

TABLE 110: SUMMARY OF FINDINGS PICO 6 PART 4 ORAL TREATMENT (EARLY FOLLOW-UP (<90DAYS))






























Outcomes	High Quality							Meta-Analysis	
	Chang, M. H., 1998 (1)	Chang, M. H., 1998 (2)	Chang, M. H., 1998 (3)	Chang, M. H., 1998 (4)	Chang, M. H., 1998 (5)	Chang, M. H., 1998 (6)	Hui, A. C., 2011		MacDermid, J. C., 2012
Favors treatment 1 									
Favors treatment 2 									
Not significant 									
Function									
Grip Strength									NA
Hand dexterity									NA
NCS (DML)									NA
NCS (MA)									NA
NCS (MCV)									NA
Phalen's test score									NA
Questionnaire (General/Undefined) CTS Functional Scale, no mention of Boston or Levine									NA
Questionnaire (DASH)									NA
SF-36 (physical functioning) Physical Component Summary Score (US norm=50)									NA
42 days									NA
84 days									NA
Tactile perception threshold									NA
Tinel's Sign/Test									NA
Vibrometry									NA
Other									
SF-36 (mental health)									NA
Symptoms									
Questionnaire (General/Undefined) Not questionnaire, incidence of movement discomfort									
Not questionnaire, incidence of night discomfort									
Not questionnaire, incidence of poor coordination									
Not questionnaire, incidence of swelling									
Questionnaire (Boston-SSS)									NA
Questionnaire/Scale (GSS)									NA

TABLE 111: SUMMARY OF FINDINGS PICO 6 PART 5 TOPICAL TREATMENT (EARLY FOLLOW-UP (<90DAYS))





















































































	High Quality				Meta-Analysis
	Chang, Y.W., 2014	Soyupek, F., 2012 (3)	Yildiz, N., 2011 (1)	Yildiz, N., 2011 (2)	
Favors treatment 1 					
Favors treatment 2 					
Not significant 					
Outcomes					
Function					
Questionnaire (Boston-FSS)					NA
Questionnaire (General/Undefined) CTS Functional Scale, no mention of Boston or Levine					NA
NCS (CMAP)					NA
NCS (DML)					NA
NCS (DSL)					NA
NCS (NCV)					NA
NCS (SNAP)					NA
Phalen's test score					NA
Pinch Strength					NA
Questionnaire (Boston-FSS)					NA
Semmes-Weinstein Monofilaments Test (SW test)					NA
Tinel's Sign/Test					NA
Ultrasound (US)					NA
Pain					
Questionnaire/Scale (VAS-pain)					NA
Symptoms					
Questionnaire (Boston-SSS)					NA




































TABLE 112: SUMMARY OF FINDINGS PICO 6 PART 6 OTHER TREATMENTS (EARLY FOLLOW-UP (<90DAYS))

Outcomes	High Quality										Meta-Analysis		
	Bakhtyari,A.H., 2004	Chang,W.D., 2008	Colbert,A.P., 2010 (1)	Colbert,A.P., 2010 (2)	Colbert,A.P., 2010 (3)	Ebenbichler,G.R., 1998	Evciik,D., 2007	Fusakul,Y., 2014	Saeed,F.-U., 2012	Weintraub,M.I., 2008		Yang,C.P., 2011	Yildiz,N., 2011 (3)
Favors treatment 1 													
Favors treatment 2 													
Not significant 													
Function													
Grip Strength													
Kilograms													
0 days												NA	
28 days												NA	
49 days												NA	
84 days												NA	
Kilograms (digital prehension) (at 28 days)												NA	
Kilograms (lateral prehension)													
28 days												NA	
Units not reported													
35 days												NA	
49 days												NA	
84 days												NA	
NCS													
Index SAP amplitude												NA	
Motor nerve velocity, (m/sn)												NA	
Sensory peak latency of the median nerve (ms)												NA	
Thumb SAP amplitude												NA	
NCS (CMAP)												NA	
NCS (DML)													
Distal motor latency (ms)													
0 days												NA	
28 days												NA	
30 days												NA	
42 days												NA	
49 days												NA	
84 days												NA	
90 days												NA	
Median motor distal latency												NA	
NCS (DSL)													NA
NCS (Motor amplitude (uV))													NA
NCS (MCV)													NA
NCS (Sensory amplitude, (uV))													NA
NCS (SNAP)													NA
NCS (SNCV)													
Sensory nerve conduction velocity (antidromic)													
0 days													NA
49 days													NA
Sensory nerve conduction velocity (prolonged antidromic wristpalm)													NA
Sensory nerve velocity, (m/sn)													NA
Pinch Strength													
Kilograms													
0 days													NA
28 days													NA
49 days													NA
84 days													NA
Units not reported													
35 days													NA
49 days													NA
84 days													NA
Questionnaire (Boston-FSS)													NA

CONT'D SUMMARY OF FINDINGS PICO 6 PART 6 OTHER TREATMENTS (EARLY FOLLOW-UP (<90DAYS))

Outcomes	High Quality										Meta-Analysis		
	Bakhtyary,A.H., 2004	Chang,W.D., 2008	Colbert,A.P., 2010 (1)	Colbert,A.P., 2010 (2)	Colbert,A.P., 2010 (3)	Ebenbichler,G.R., 1998	Evcik,D., 2007	Fusakul,Y., 2014	Saeed,F.-U., 2012	Weintraub,M.I., 2008		Yang,C.P., 2011	Yildiz,N., 2011 (3)
Pain													
Questionnaire (General/Undefined)													
NPS 10. Neuropathic pain scale (NPS)										○			NA
NPS 4. Neuropathic pain scale (NPS)										○			NA
NPS 8. Neuropathic pain scale (NPS)										○			NA
NPS NA. Neuropathic pain scale (NPS)										○			NA
Questionnaire/Scale (VAS-pain)													
VAS pain (day): 0-10 scale	●	●						●	●	○		○	NA
28 days							○						NA
84 days							○						NA
VAS pain (night): 0-10 scale							○						NA
28 days							○						NA
84 days							○						NA
Questionnaire/Scale (VAS-patient satisfaction)													
Sleep interference										●			NA
Symptoms													
Questionnaire (General/Undefined)													
Not a questionnaire, worst complaint (cm)													
0 days						○							NA
49 days						●							NA
No mention of Boston scale, rather merely "symptom severity scale"		●							●			○	NA
Questionnaire (Boston-SSS)													
35 days								●					NA
42 days			○	○	○								NA
84 days								○					NA
Questionnaire/Scale (GSS)													
Sensory loss											○		NA
0 days						○							NA
49 days						●							NA
Complications													
Complications (general)													
Pain or paraesthesia complaints													
0 days						●							NA
49 days						●							NA

TABLE 113: SUMMARY OF FINDINGS PICO 6 PART 6 OTHER TREATMENTS (LATE FOLLOW-UP (>90DAYS))

Outcomes	High Quality					Meta-Analysis
	Colbert,A.P., 2010 (1)	Colbert,A.P., 2010 (2)	Colbert,A.P., 2010 (3)	Ebenbichler,G.R., 1998	Yang,C.P., 2011	
Favors treatment 1 						
Favors treatment 2 						
Not significant 						
Complications						
Complications (general)						
Pain or paraesthesia complaints						NA
Function						
Grip strength (kilograms)						NA
NCS (CMAP)						NA
NCS (DML)						NA
NCS (DSL)						NA
NCS (MCV)						NA
NCS (SNAP)						NA
NCS (SNCV)						NA
Pinch Strength (kilograms)						NA
Questionnaire (Boston-FSS)						NA
Symptoms						
Questionnaire (General/Undefined)						
Not questionnaire, worst complaint (cm)						NA
Questionnaire (Boston-SSS)						NA
Questionnaire/Scale (GSS)						NA
Sensory loss						NA

DETAILED DATA FINDINGS

TABLE 114: PICO 6 PART 1- IMMOBILIZATION: FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Hall,B., 2013	High Quality	Grip strength(Kilograms)	1.8 months	Splint (Splint)	30	25.01(9.37)	No splint (No splint)	24	23.9(8.88)	Mean Difference	1.11(-3.78, 5.995145)	Not Significant (P-value>.05)
Hall,B., 2013	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	1.8 months	Splint (Splint)	30	2.04(0.74)	No splint (No splint)	24	2.08(0.70)	Mean Difference	-0.04(-0.43, 0.345427)	Not Significant (P-value>.05)
Hall,B., 2013	High Quality	Semmes-Weinstein Monofilaments Test (SW test)(swm score, palmar side)	1.8 months	Splint (Splint)	30	89.78(78.98)	No splint (No splint)	24	99.68(87.96)	Mean Difference	-9.9(-55.04, 35.23541)	Not Significant (P-value>.05)
Hall,B., 2013	High Quality	Grip strength(Kilograms)	1.8 months	Splint (Splint)	30	Mean change= 1.07 (p value = 0.018)	No splint (No splint)	24	Mean change= 1.85 (p value = 0.107)	Difference between Mean Changes	0.78 (p value = 0.02)	Splint (Splint) (P-value>.05)
Hall,B., 2013	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	1.8 months	Splint (Splint)	30	Mean change = -0.20 (p value = 0.013)	No splint (No splint)	24	Mean change= 0.08 (p value = 0.413)	Difference between Mean Changes	0.28 (p value = 0.015)	Splint (Splint) (P-value>.05)
Hall,B., 2013	High Quality	Semmes-Weinstein Monofilaments Test (SW test)(swm score, palmar side)	1.8 months	Splint (Splint)	30	Mean change= -11.13 (p value = 0.073)	No splint (No splint)	24	Mean change= -9.63 (p value = 0.313)	Difference between Mean Changes	1.52 (p value <0.001)	Splint (Splint) (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Madjdinasab, N., 2008	High Quality	NCS (DML)(Distal motor latency (ms))	1.4 months	Splint (Splint-splint for six weeks)	21	5.21(1.17)	Steroid (Steroid (no splint)-daily for two weeks)	22	4.92(0.91)	Mean Difference	0.29(-0.34,0.918505)	Not Significant (P-value>.05)
Madjdinasab, N., 2008	High Quality	NCS (DSL)(Distal sensory latency (ms))	1.4 months	Splint (Splint-splint for six weeks)	21	3.51(0.78)	Steroid (Steroid (no splint)-daily for two weeks)	22	3.31(0.45)	Mean Difference	0.2(-0.18,0.582957)	Not Significant (P-value>.05)
Madjdinasab, N., 2008	High Quality	NCS (MCV)(Motor nerve conduction velocity (ms))	1.4 months	Splint (Splint-splint for six weeks)	21	52.04(4.46)	Steroid (Steroid (no splint)-daily for two weeks)	22	49.97(4.95)	Mean Difference	2.07(-0.74,4.883790)	Not Significant (P-value>.05)
Madjdinasab, N., 2008	High Quality	NCS (SNCV)(Sensor y conduction velocity)	1.4 months	Splint (Splint-splint for six weeks)	21	41.46(12.51)	Steroid (Steroid (no splint)-daily for two weeks)	22	44.38(8.47)	Mean Difference	-2.92(-9.34,3.495321)	Not Significant (P-value>.05)
Manente,G., 2001	High Quality	NCS (DML)(Distal motor latency (ms))	1 month	Brace (Immobilizati on-brace)	40	4.45(1.30)	No brace (Non-immobilizatio n-no brace)	.	4.47(0.80)	Mean Difference	-0.02(-.49,.45)	Not Significant (P-value>.05)
Manente,G., 2001	High Quality	NCS (SNAP)(Sensory nerve action potential (?V))	1 month	Brace (Immobilizati on-brace)	40	18.74(15.80)	No brace (Non-immobilizatio n-no brace)	40	12.44(9.40)	Mean Difference	6.3(0.60,11.99)	Brace (Immobilizati on-brace) (P-value<.05)
Manente,G., 2001	High Quality	NCS (SNCV)(Sensor y conduction velocity)	1 month	Brace (Immobilizati on-brace)	40	37.2(11.70)	No brace (Non-immobilizatio n-no brace)	40	37.92(11.70)	Mean Difference	-0.72(-5.85,4.4)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Manente,G., 2001	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	1 month	Brace (Immobilization-brace)	40	1.48(0.50)	No brace (Non-immobilization-no brace)	40	2.03(0.70)	Mean Difference	-0.55(-0.82,-0.28)	Brace (Immobilization-brace) (P-value<.05)
Soyupek,F., 2012	High Quality	NCS (CMAP)(Compound muscle action potential)	3 months	Splinting (Splinting)	23	11.92(3.01)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	9.97(3.34)	Mean Difference	1.95(0.11,3.78)	Splinting (Splinting) (P-value<.05)
Soyupek,F., 2012	High Quality	NCS (CMAP)(Compound muscle action potential)	3 months	Splinting (Splinting)	23	11.92(3.01)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	10.36(2.57)	Mean Difference	1.56(0.00,3.11)	Splinting (Splinting) (P-value<.05)
Soyupek,F., 2012	High Quality	NCS (DML)(Distal motor latency (ms))	3 months	Splinting (Splinting)	23	4.28(0.80)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	4.39(0.87)	Mean Difference	-0.11(-0.57,0.349067)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Soyupek,F., 2012	High Quality	NCS (DML)(Distal motor latency (ms))	3 months	Splinting (Splinting)	23	4.28(0.80)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	4.5(1.15)	Mean Difference	-0.22(-0.79,0.352528)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	NCS (DSL)(Distal sensory latency (ms))	3 months	Splinting (Splinting)	23	3.47(1.00)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	3.08(0.96)	Mean Difference	0.39(-0.15,0.931728)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	NCS (DSL)(Distal sensory latency (ms))	3 months	Splinting (Splinting)	23	3.47(1.00)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	3.52(1.02)	Mean Difference	-0.05(-0.63,0.533780)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Soyupek,F., 2012	High Quality	NCS (NCV)(Motor nerve conduction velocity)	3 months	Splinting (Splinting)	23	52.28(3.27)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	53.12(5.04)	Mean Difference	-0.84(-3.30,1.615345)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	NCS (NCV)(Motor nerve conduction velocity)	3 months	Splinting (Splinting)	23	52.28(3.27)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	52.26(4.00)	Mean Difference	0.02(-1.98,2.015292)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	NCS (NCV)(Sensory nerve conduction velocity)	3 months	Splinting (Splinting)	23	37.65(10.50)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	36.91(10.16)	Mean Difference	0.74(-5.23,6.711264)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Soyupek,F., 2012	High Quality	NCS (NCV)(Sensory nerve conduction velocity)	3 months	Splinting (Splinting)	23	37.65(10.50)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	40.44(12.83)	Mean Difference	-2.79(-9.19,3.613043)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	NCS (SNAP)(Sensory nerve action potential amplitude)	3 months	Splinting (Splinting)	23	16.86(8.56)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	17.95(11.27)	Mean Difference	-1.09(-6.87,4.693862)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	NCS (SNAP)(Sensory nerve action potential amplitude)	3 months	Splinting (Splinting)	23	16.86(8.56)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	17.7(9.04)	Mean Difference	-0.84(-5.68,4.002603)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	Phalen's test score(% positive)	3 months	Splinting (Splinting)	23	52.17%	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	50.00%	RR	1.04(0.61,1.79)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Soyupek,F., 2012	High Quality	Phalen's test score(% positive)	3 months	Splinting (Splinting)	23	52.17%	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	39.13%	RR	1.33(0.70,2.54)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	3 months	Splinting (Splinting)	23	12.86(3.74)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	15.86(5.65)	Mean Difference	-3(-5.77,-0.23085)	Splinting (Splinting) (P-value<.05)
Soyupek,F., 2012	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	3 months	Splinting (Splinting)	23	12.86(3.74)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	15.6(6.37)	Mean Difference	-2.74(-5.55,0.071306)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Soyupek,F., 2012	High Quality	Tinel's Sign/Test(% positive)	3 months	Splinting (Splinting)	23	60.87%	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	65.22%	RR	0.93(0.60,1.45)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	Tinel's Sign/Test(% positive)	3 months	Splinting (Splinting)	23	60.87%	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	50.00%	RR	1.22(0.74,2.00)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	Ultrasound (US)(anterior-posterior diameter of median nerve)	3 months	Splinting (Splinting)	23	2.45(0.35)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	2.13(0.42)	Mean Difference	0.32(0.10,0.543437)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI)) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Soyupek,F., 2012	High Quality	Ultrasound (US)(anterior-posterior diameter of median nerve)	3 months	Splinting (Splinting)	23	2.45(0.35)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	2.07(0.41)	Mean Difference	0.38(0.17,0.588624)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group")) (P-value<.05)
Soyupek,F., 2012	High Quality	Ultrasound (US)(cross-sectional area of median nerve)	3 months	Splinting (Splinting)	23	0.12(0.03)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	0.1(0.03)	Mean Difference	0.02(0.00,0.036547)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group")) (P-value<.05)
Soyupek,F., 2012	High Quality	Ultrasound (US)(cross-sectional area of median nerve)	3 months	Splinting (Splinting)	23	0.12(0.03)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	0.11(0.02)	Mean Difference	0.01(-0.00,0.024735)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	Ultrasound (US)(transverse diameter of median nerve)	3 months	Splinting (Splinting)	23	6.82(1.03)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	6.61(1.20)	Mean Difference	0.21(-0.40,0.822181)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Soyupek,F., 2012	High Quality	Ultrasound (US)(transverse diameter of median nerve)	3 months	Splinting (Splinting)	23	6.82(1.03)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	6.74(0.91)	Mean Difference	0.08(-0.48,0.641704)	Not Significant (P-value>.05)
Yagci,I., 2009	High Quality	Grip strength(Kilograms)	3 months	Splinting (Splinting)	24	26.83(7.16)	Laser (w/ splinting) (Splinting + Low-Level Laser Therapy)	21	30.49(6.93)	Mean Difference	-3.66(-7.78,0.462046)	Not Significant (P-value>.05)
Yagci,I., 2009	High Quality	NCS (CMAP)(Compound muscle action potential)	3 months	Splinting (Splinting)	24	11.94(2.83)	Laser (w/ splinting) (Splinting + Low-Level Laser Therapy)	21	10.3(2.15)	Mean Difference	1.64(0.18,3.098618)	Splinting (Splinting) (P-value<.05)
Yagci,I., 2009	High Quality	NCS (DML)(Median motor nerve distal latency)	3 months	Splinting (Splinting)	24	3.41(0.45)	Laser (w/ splinting) (Splinting + Low-Level Laser Therapy)	21	3.55(0.53)	Mean Difference	-0.14(-0.43,0.149481)	Not Significant (P-value>.05)
Yagci,I., 2009	High Quality	NCS (SNAP)(Sensory nerve action potential (palm-wrist median))	3 months	Splinting (Splinting)	24	31.64(5.36)	Laser (w/ splinting) (Splinting + Low-Level Laser Therapy)	21	32.7(7.41)	Mean Difference	-1.06(-4.89,2.766639)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Yagci,I., 2009	High Quality	NCS (SNAP)(Sensory nerve action potential amplitude (3rd digit-wrist median))	3 months	Splinting (Splinting)	24	34.27(8.27)	Laser (w/ splinting) (Splinting + Low-Level Laser Therapy)	21	35.52(12.49)	Mean Difference	-1.25(-7.53,5.033712)	Not Significant (P-value>.05)
Yagci,I., 2009	High Quality	NCS (SNCV)(Sensor y nerve conduction velocity (3rd digit-wrist))	3 months	Splinting (Splinting)	24	43.16(5.06)	Laser (w/ splinting) (Splinting + Low-Level Laser Therapy)	21	43.47(6.09)	Mean Difference	-0.31(-3.61,2.988929)	Not Significant (P-value>.05)
Yagci,I., 2009	High Quality	NCS (SNCV)(Sensor y nerve conduction velocity (Palm-wrist))	3 months	Splinting (Splinting)	24	38.86(4.49)	Laser (w/ splinting) (Splinting + Low-Level Laser Therapy)	21	38.54(7.01)	Mean Difference	0.32(-3.18,3.815185)	Not Significant (P-value>.05)
Yagci,I., 2009	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	3 months	Splinting (Splinting)	24	2.38(0.71)	Laser (w/ splinting) (Splinting + Low-Level Laser Therapy)	21	2.1(0.63)	Mean Difference	0.28(-0.11,0.671530)	Not Significant (P-value>.05)

TABLE 115: PICO 6 PART 1- IMMOBILIZATION: OTHER

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Hall,B., 2013	High Quality	Purdue pegboard test score(t (minutes))	1.8 months	Splint (Splint)	30	51.4(15.30)	No splint (No splint)	24	53.72(11.29)	Mean Difference	-2.32(-9.42,4.777799)	Not Significant (P-value>.05)
Hall,B., 2013	High Quality	Purdue pegboard test score(t (minutes))	1.8 months	Splint (Splint)	30	Mean change= 4.53 (p value = 0.477)	No splint (No splint)	24	Mean change= 12.91 (p value = 0.582)	Difference between Mean Changes	8.38 (p value =0.021)	Splint (Splint) (P-value>.05)
Manente,G., 2001	High Quality	Questionnaire (GICQ)(Global Impression Change Questionnaire)	1 month	Brace (Immobilization-brace)	40	. %	No brace (Non-immobilization-no brace)	.	. %	Author Reported	NA	Brace (Immobilization-brace) (P-value<.05)

TABLE 116: PICO 6 PART 1- IMMOBILIZATION: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Hall,B., 2013	High Quality	Questionnaire/Scale (VAS-pain)(VAS pain)	1.8 months	Splint (Splint)	30	4.26(2.67)	No splint (No splint)	24	5.65(2.54)	Mean Difference	-1.39(-2.78,0.004835)	Not Significant (P-value>.05)
Hall,B., 2013	High Quality	Questionnaire/Scale (VAS-pain)(VAS pain)	1.8 months	Splint (Splint)	30	Mean change=-1.58 (p value = 0.001)	No splint (No splint)	24	Mean change= 0.65 (p value = 0.118)	Difference between Mean Changes	2.23 (p value =0.001)	Splint (Splint) (P-value>.05)
Soyupek,F., 2012	High Quality	Questionnaire/Scale (VAS-pain)()	3 months	Splinting (Splinting)	23	37.91(23.94)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	45.65(23.65)	Mean Difference	-7.74(-21.49,6.013110)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	Questionnaire/Scale (VAS-pain)()	3 months	Splinting (Splinting)	23	37.91(23.94)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	30.35(18.15)	Mean Difference	7.56(-4.31,19.43111)	Not Significant (P-value>.05)

TABLE 117: PICO 6 PART 1- IMMOBILIZATION: SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Hall,B., 2013	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	1.8 months	Splint (Splint)	30	2.38(0.77)	No splint (No splint)	24	2.6(0.62)	Mean Difference	-0.22(-0.59,0.150745)	Not Significant (P-value>.05)
Hall,B., 2013	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	1.8 months	Splint (Splint)	30	Mean change=-0.42 (p value <0.001)	No splint (No splint)	24	Mean change=0.03 (p value = 0.749)	Difference between Mean Changes	0.45 (p value <0.001)	Splint (Splint) (P-value>.05)
Manente,G., 2001	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	1 month	Brace (Immobilization -brace)	40	1.54(0.40)	No brace (Non-immobilization -no brace)	40	2.61(0.60)	Mean Difference	-1.07(-1.29,-0.84652)	Brace (Immobilization -brace) (P-value<.05)
Soyupek,F., 2012	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	3 months	Splinting (Splinting)	23	14.08(6.67)	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	26(5.43)	Mean Difference	-11.92(-15.44,-8.40495)	Splinting (Splinting) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Soyupek,F., 2012	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	3 months	Splinting (Splinting)	23	14.08(6.67)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	23.46(5.95)	Mean Difference	-9.38(-12.89,-5.87457)	Splinting (Splinting) (P-value<.05)
Yagci,I., 2009	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	3 months	Splinting (Splinting)	24	2.35(0.65)	Laser (w/ splinting) (Splinting + Low-Level Laser Therapy)	21	2.25(0.79)	Mean Difference	0.1(-0.33,0.527054)	Not Significant (P-value>.05)

TABLE 118: PICO 6 PART 2- INJECTION (STEROID): COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Treatment Failure(Rate of surgery @ 1 year)	1 years	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	81.08%	No steroid (placebo) (Placebo injection)	37	72.97%	RR	1.11(0.87,1.43)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Treatment Failure(Rate of surgery @ 1 year)	1 years	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	81.08%	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	37	72.97%	RR	1.11(0.87,1.43)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Treatment Failure(Rate of surgery @ 1 year)	1 years	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	37	72.97%	No steroid (placebo) (Placebo injection)	37	72.97%	RR	1.00(0.76,1.32)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Treatment Failure(Referred to surgery)	5.9 months	Steroid (injection)-20mg (20mg Methylprednisol one injection)	45	13.33%	Steroid (injection)-40mg (40mg Methylprednisol one injection)	43	6.98%	RR	1.91(0.51,7.16)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Treatment Failure(Referred to surgery)	5.9 months	Steroid (injection)-20mg (20mg Methylprednisol one injection)	45	13.33%	Steroid (injection)-60mg (60mg Methylprednisol one injection)	44	6.82%	RR	1.96(0.52,7.34)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Dammers,J. W., 2006	High Quality	Treatment Failure(Second Injection)	5.9 months	Steroid (injection)-20mg (20mg Methylprednisolone injection)	45	28.89%	Steroid (injection)-40mg (40mg Methylprednisolone injection)	43	39.53%	RR	0.73(0.41,1.32)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Treatment Failure(Second Injection)	5.9 months	Steroid (injection)-20mg (20mg Methylprednisolone injection)	45	28.89%	Steroid (injection)-60mg (60mg Methylprednisolone injection)	44	18.18%	RR	1.59(0.73,3.45)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Treatment Failure(Referred to surgery)	1 years	Steroid (injection)-20mg (20mg Methylprednisolone injection)	45	13.33%	Steroid (injection)-40mg (40mg Methylprednisolone injection)	43	9.30%	RR	1.43(0.43,4.73)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Treatment Failure(Referred to surgery)	1 years	Steroid (injection)-20mg (20mg Methylprednisolone injection)	45	13.33%	Steroid (injection)-60mg (60mg Methylprednisolone injection)	44	9.09%	RR	1.47(0.44,4.85)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Treatment Failure(Second Injection)	1 years	Steroid (injection)-20mg (20mg Methylprednisolone injection)	45	37.78%	Steroid (injection)-40mg (40mg Methylprednisolone injection)	43	48.84%	RR	0.77(0.48,1.26)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Treatment Failure(Second Injection)	1 years	Steroid (injection)-20mg (20mg Methylprednisolone injection)	45	37.78%	Steroid (injection)-60mg (60mg Methylprednisolone injection)	44	36.36%	RR	1.04(0.60,1.79)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Treatment Failure(Referred to surgery)	5.9 months	Steroid (injection)-40mg (40mg Methylprednisolone injection)	43	6.98%	Steroid (injection)-60mg (60mg Methylprednisolone injection)	44	6.82%	RR	1.02(0.22,4.79)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Dammers,J. W., 2006	High Quality	Treatment Failure(Second Injection)	5.9 months	Steroid (injection)-40mg (40mg Methylprednisolone injection)	43	39.53%	Steroid (injection)-60mg (60mg Methylprednisolone injection)	44	18.18%	RR	2.17(1.05,4.50)	Steroid (injection)-60mg (60mg Methylprednisolone injection) (P-value<.05)
Dammers,J. W., 2006	High Quality	Treatment Failure(Referred to surgery)	1 years	Steroid (injection)-40mg (40mg Methylprednisolone injection)	43	9.30%	Steroid (injection)-60mg (60mg Methylprednisolone injection)	44	9.09%	RR	1.02(0.27,3.83)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Treatment Failure(Second Injection)	1 years	Steroid (injection)-40mg (40mg Methylprednisolone injection)	43	48.84%	Steroid (injection)-60mg (60mg Methylprednisolone injection)	44	36.36%	RR	1.34(0.82,2.21)	Not Significant (P-value>.05)

TABLE 119: PICO 6 PART 2- INJECTION (STEROID): FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Grip strength(Kilograms)	2.3 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	2.3(4.40)	No steroid (placebo) (Placebo injection)	35	0.1(6.00)	Mean Difference	2.2(-0.24,4.64)1608)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Grip strength(Kilograms)	2.3 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	2.3(4.40)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	36	2.8(4.10)	Mean Difference	-0.5(-2.45,1.45)0360)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Grip strength(Kilograms)	1 years	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	1.6(8.70)	No steroid (placebo) (Placebo injection)	37	0.6(5.10)	Mean Difference	1(-2.25,4.24)9493)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Grip strength(Kilograms)	1 years	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	1.6(8.70)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	37	1.9(7.50)	Mean Difference	-0.3(-4.00,3.40)1207)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Grip strength(Kilograms)	2.3 months	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	36	2.8(4.10)	No steroid (placebo) (Placebo injection)	35	0.1(6.00)	Mean Difference	2.7(0.30,5.09)6909)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid)) Significant (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Grip strength(Kilograms)	1 years	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	37	1.9(7.50)	No steroid (placebo) (Placebo injection)	37	0.6(5.10)	Mean Difference	1.3(-1.62,4.222466)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Pinch Strength(Kilograms)	2.3 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	0.7(1.50)	No steroid (placebo) (Placebo injection)	35	0.3(1.40)	Mean Difference	0.4(-0.27,1.069880)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Pinch Strength(Kilograms)	2.3 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	0.7(1.50)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	36	1.2(1.10)	Mean Difference	-0.5(-1.10,0.102271)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Pinch Strength(Kilograms)	1 years	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	1.3(1.90)	No steroid (placebo) (Placebo injection)	37	1.1(1.50)	Mean Difference	0.2(-0.58,0.980016)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Pinch Strength(Kilograms)	1 years	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	1.3(1.90)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	37	1.5(1.80)	Mean Difference	-0.2(-1.04,0.643335)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Pinch Strength(Kilograms)	2.3 months	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	36	1.2(1.10)	No steroid (placebo) (Placebo injection)	35	0.3(1.40)	Mean Difference	0.9(0.31,1.486728)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid)) (P-value<.05)
Atroshi,I., 2013	High Quality	Pinch Strength(Kilograms)	1 years	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	37	1.5(1.80)	No steroid (placebo) (Placebo injection)	37	1.1(1.50)	Mean Difference	0.4(-0.35,1.154990)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Two-point discrimination(Millimeters)	2.3 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	-0.06(1.00)	No steroid (placebo) (Placebo injection)	35	0.02(0.90)	Mean Difference	-0.08(-0.52,0.359013)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Two-point discrimination(Millimeters)	2.3 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	-0.06(1.00)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	36	-0.07(1.50)	Mean Difference	0.01(-0.58,0.596452)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Two-point discrimination(Millimeters)	1 years	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	-0.26(0.90)	No steroid (placebo) (Placebo injection)	37	-0.47(0.90)	Mean Difference	0.21(-0.20,0.620121)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Two-point discrimination(Millimeters)	1 years	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 0.26(0.90)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	37	- 0.34(0.70)	Mean Difference	0.08(-0.29,0.447389)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Two-point discrimination(Millimeters)	2.3 months	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	- 0.07(1.50)	No steroid (placebo) (Placebo injection)	35	0.02(0.90)	Mean Difference	-0.09(-0.66,0.483590)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Two-point discrimination(Millimeters)	1 years	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	37	- 0.34(0.70)	No steroid (placebo) (Placebo injection)	37	- 0.47(0.90)	Mean Difference	0.13(-0.24,0.497389)	Not Significant (P-value>.05)
Wong,S.M., 2005	High Quality	Grip strength(Kilograms (left hand))	1.8 months	Steroid (single injection) (Single injection (methylprednisolone acetate))	20	20.4(5.10)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	20.6(6.20)	Mean Difference	-0.2(-3.72,3.318459)	Not Significant (P-value>.05)
Wong,S.M., 2005	High Quality	Grip strength(Kilograms (right hand))	1.8 months	Steroid (single injection) (Single injection (methylprednisolone acetate))	20	20.9(6.20)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	21.9(7.20)	Mean Difference	-1(-5.16,3.164250)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Wong,S.M., 2005	High Quality	Grip strength(Kilograms (left hand))	9.2 months	Steroid (single injection) (Single injection (methylprednisolone acetate))	20	20.2(6.60)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	18.2(6.60)	Mean Difference	2(-2.09,6.090722)	Not Significant (P-value>.05)
Wong,S.M., 2005	High Quality	Grip strength(Kilograms (right hand))	9.2 months	Steroid (single injection) (Single injection (methylprednisolone acetate))	.	21.4(6.60)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	20(7.00)	Mean Difference	1.4(.,)	Not Significant (P-value>.05)
Wong,S.M., 2005	High Quality	NCS (DML)(Distal motor latency (right hand))	NA	Steroid (single injection) (Single injection (methylprednisolone acetate))	20	4.5(1.00)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	5.4(1.90)	Mean Difference	-0.9(-1.84,0.041004)	Not Significant (P-value>.05)
Wong,S.M., 2005	High Quality	NCS (DML)(Distal motor latency (left hand))	1.8 months	Steroid (single injection) (Single injection (methylprednisolone acetate))	20	4.4(0.90)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	4.3(1.10)	Mean Difference	0.1(-0.52,0.722897)	Not Significant (P-value>.05)
Wong,S.M., 2005	High Quality	NCS (DML)(Distal motor latency (right hand))	1.8 months	Steroid (single injection) (Single injection (methylprednisolone acetate))	20	4.5(1.00)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	5(1.50)	Mean Difference	-0.5(-1.29,0.290101)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Wong,S.M., 2005	High Quality	NCS (DML)(Distal motor latency (left hand))	9.2 months	Steroid (single injection) (Single injection (methylprednisolone acetate))	20	4.2(1.10)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	4.5(1.00)	Mean Difference	-0.3(-0.95,0.351534)	Not Significant (P-value>.05)
Wong,S.M., 2005	High Quality	NCS (DML)(Distal motor latency (right hand))	9.2 months	Steroid (single injection) (Single injection (methylprednisolone acetate))	20	4.3(1.00)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	5.2(1.50)	Mean Difference	-0.9(-1.69,-0.10989)	Steroid (single injection) (Single injection (methylprednisolone acetate)) (P-value<.05)

TABLE 120: PICO 6 PART 2- INJECTION (STEROID): OTHER

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	1.2 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	0.14(0.14)	No steroid (placebo) (Placebo injection)	37	0.06(0.10)	Mean Difference	0.08(0.02,0.135437)	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid)) (P-value<.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	1.2 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	0.14(0.14)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	0.1(0.10)	Mean Difference	0.04(-0.02,0.095696)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	2.3 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	0.08(0.15)	No steroid (placebo) (Placebo injection)	35	0(0.11)	Mean Difference	0.08(0.02,0.140532)	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid)) (P-value<.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	2.3 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	0.08(0.15)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	0.06(0.10)	Mean Difference	0.02(-0.04,0.078337)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	5.5 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	0.07(0.12)	No steroid (placebo) (Placebo injection)	35	0.09(0.16)	Mean Difference	-0.02(-0.09,0.045612)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	5.5 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	0.07(0.12)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	0.08(0.12)	Mean Difference	-0.01(-0.07,0.045061)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	1 years	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	0.11(0.13)	No steroid (placebo) (Placebo injection)	37	0.1(0.17)	Mean Difference	0.01(-0.06,0.078958)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	1 years	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	0.11(0.13)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	37	0.12(0.15)	Mean Difference	-0.01(-0.07,0.053959)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	1.2 months	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	0.1(0.10)	No steroid (placebo) (Placebo injection)	37	0.06(0.10)	Mean Difference	0.04(-0.01,0.085884)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	2.3 months	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	0.06(0.10)	No steroid (placebo) (Placebo injection)	35	0(0.11)	Mean Difference	0.06(0.01,0.108940)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid)) (P-value<.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	5.5 months	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	0.08(0.12)	No steroid (placebo) (Placebo injection)	35	0.09(0.16)	Mean Difference	-0.01(-0.08,0.055927)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-6D score)	1 years	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	37	0.12(0.15)	No steroid (placebo) (Placebo injection)	37	0.1(0.17)	Mean Difference	0.02(-0.05,0.093052)	Not Significant (P-value>.05)

TABLE 121: PICO 6 PART 2- INJECTION (STEROID): PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroschi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	1.2 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	30(32.60)	No steroid (placebo) (Placebo injection)	37	8.8(18.90)	Mean Difference	21.2(9.06,33.34212)	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid)) (P-value<.05)
Atroschi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	1.2 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	30(32.60)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	36	34.3(29.50)	Mean Difference	-4.3(-18.56,9.955123)	Not Significant (P-value>.05)
Atroschi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	2.3 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	24.6(29.90)	No steroid (placebo) (Placebo injection)	35	3.3(25.00)	Mean Difference	21.3(8.59,34.00521)	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid)) (P-value<.05)
Atroschi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	2.3 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	24.6(29.90)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	36	23.4(28.50)	Mean Difference	1.2(-12.20,14.59770)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	5.5 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	19.6(28.40)	No steroid (placebo) (Placebo injection)	35	25.3(27.40)	Mean Difference	-5.7(-18.59,7.189768)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	5.5 months	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	19.6(28.40)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	36	28.8(30.10)	Mean Difference	-9.2(-22.63,4.232202)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	1 years	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	30(32.60)	No steroid (placebo) (Placebo injection)	37	29.3(33.00)	Mean Difference	0.7(-14.25,15.64693)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	1 years	40mg Methylprednisol one injection (40mg Methylprednisol one injection (corticosteroid))	37	30(32.60)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	37	34.3(29.50)	Mean Difference	-4.3(-18.47,9.866816)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	1.2 months	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	36	34.3(29.50)	No steroid (placebo) (Placebo injection)	37	8.8(18.90)	Mean Difference	25.5(14.10,36.89971)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid)) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	2.3 months	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	36	23.4(28.50)	No steroid (placebo) (Placebo injection)	35	3.3(25.00)	Mean Difference	20.1(7.64,32.56098)	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid)) (P-value<.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	5.5 months	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	36	28.8(30.10)	No steroid (placebo) (Placebo injection)	35	25.3(27.40)	Mean Difference	3.5(-9.88,16.88225)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(SF-36 bodily pain score)	1 years	80mg Methylprednisol one injection (80mg Methylprednisol one injection (corticosteroid))	37	34.3(29.50)	No steroid (placebo) (Placebo injection)	37	29.3(33.00)	Mean Difference	5(-9.26,19.26264)	Not Significant (P-value>.05)

TABLE 122: PICO 6 PART 2- INJECTION (STEROID): SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroschi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	1.2 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 1.33(0.98)	No steroid (placebo) (Placebo injection)	37	- 0.47(0.60)	Mean Difference	-0.86(-1.23,-0.48973)	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid)) (P-value<.05)
Atroschi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	1.2 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 1.33(0.98)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	- 1.12(0.93)	Mean Difference	-0.21(-0.65,0.228189)	Not Significant (P-value>.05)
Atroschi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	2.3 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 1.17(0.95)	No steroid (placebo) (Placebo injection)	35	- 0.3(0.66)	Mean Difference	-0.87(-1.25,-0.49381)	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid)) (P-value<.05)
Atroschi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	2.3 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 1.17(0.95)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	- 0.9(1.00)	Mean Difference	-0.27(-0.72,0.177677)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	5.5 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 1.16(0.86)	No steroid (placebo) (Placebo injection)	35	- 1.49(0.82)	Mean Difference	0.33(-0.06,0.718063)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	5.5 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 1.16(0.86)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	- 1.22(0.93)	Mean Difference	0.06(-0.35,0.471199)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	1 years	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 1.52(1.08)	No steroid (placebo) (Placebo injection)	37	- 1.55(0.79)	Mean Difference	0.03(-0.40,0.461163)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	1 years	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 1.52(1.08)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	37	- 1.37(0.86)	Mean Difference	-0.15(-0.59,0.294853)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	1.2 months	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	- 1.12(0.93)	No steroid (placebo) (Placebo injection)	37	- 0.47(0.60)	Mean Difference	-0.65(-1.01,-0.28989)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid)) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	2.3 months	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	- 0.9(1.00)	No steroid (placebo) (Placebo injection)	35	- 0.3(0.66)	Mean Difference	-0.6(-0.99,-0.20690)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid)) (P-value<.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	5.5 months	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	- 1.22(0.93)	No steroid (placebo) (Placebo injection)	35	- 1.49(0.82)	Mean Difference	0.27(-0.14,0.677550)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (General/undefined)(CTS symptom severity score)	1 years	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	37	- 1.37(0.86)	No steroid (placebo) (Placebo injection)	37	- 1.55(0.79)	Mean Difference	0.18(-0.20,0.556283)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	1.2 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 22.6(20.50)	No steroid (placebo) (Placebo injection)	37	- 9.8(12.90)	Mean Difference	-12.8(-20.60,-4.99543)	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid)) (P-value<.05)
Atroshi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	1.2 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 22.6(20.50)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	- 20.2(17.60)	Mean Difference	-2.4(-11.16,6.357176)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	2.3 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	-19.4(24.70)	No steroid (placebo) (Placebo injection)	35	-4.1(14.50)	Mean Difference	-15.3(-24.60,-6.00371)	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid)) (P-value<.05)
Atroshi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	2.3 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	-19.4(24.70)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	-15.5(19.40)	Mean Difference	-3.9(-14.07,6.27371)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	5.5 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	-16.8(17.60)	No steroid (placebo) (Placebo injection)	35	-25.3(22.80)	Mean Difference	8.5(-0.95,17.94558)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	5.5 months	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	-16.8(17.60)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	-19.2(22.10)	Mean Difference	2.4(-6.78,11.58042)	Not Significant (P-value>.05)
Atroshi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	1 years	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	-27.3(20.90)	No steroid (placebo) (Placebo injection)	37	-28.7(21.90)	Mean Difference	1.4(-8.35,11.15444)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroschi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	1 years	40mg Methylprednisolone injection (40mg Methylprednisolone injection (corticosteroid))	37	- 27.3(20.90)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	37	- 26(18.40)	Mean Difference	-1.3(-10.27,7.672422)	Not Significant (P-value>.05)
Atroschi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	1.2 months	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	- 20.2(17.60)	No steroid (placebo) (Placebo injection)	37	- 9.8(12.90)	Mean Difference	-10.4(-17.49,-3.30544)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid)) (P-value<.05)
Atroschi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	2.3 months	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	- 15.5(19.40)	No steroid (placebo) (Placebo injection)	35	- 4.1(14.50)	Mean Difference	-11.4(-19.35,-3.44771)	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid)) (P-value<.05)
Atroschi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	5.5 months	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	36	- 19.2(22.10)	No steroid (placebo) (Placebo injection)	35	- 25.3(22.80)	Mean Difference	6.1(-4.35,16.54875)	Not Significant (P-value>.05)
Atroschi,I., 2013	High Quality	Questionnaire (DASH-Quick DASH)(Primarily symptomatic domain but includes a functional component as well)	1 years	80mg Methylprednisolone injection (80mg Methylprednisolone injection (corticosteroid))	37	- 26(18.40)	No steroid (placebo) (Placebo injection)	37	- 28.7(21.90)	Mean Difference	2.7(-6.52,11.91673)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Dammers,J. W., 2006	High Quality	Symptom relief (general)(No or only minor symptoms requiring no further treatment)	5.9 months	Steroid (injection)-20mg (20mg Methylprednisolone injection)	45	55.56%	Steroid (injection)-60mg (60mg Methylprednisolone injection)	44	72.73%	RR	0.76(0.56,1.05)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Symptom relief (general)(No or only minor symptoms requiring no further treatment)	5.9 months	Steroid (injection)-20mg (20mg Methylprednisolone injection)	45	55.56%	Steroid (injection)-40mg (40mg Methylprednisolone injection)	43	53.49%	RR	1.04(0.71,1.52)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Symptom relief (general)(No or only minor symptoms requiring no further treatment)	1 years	Steroid (injection)-20mg (20mg Methylprednisolone injection)	45	46.67%	Steroid (injection)-60mg (60mg Methylprednisolone injection)	44	52.27%	RR	0.89(0.59,1.36)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Symptom relief (general)(No or only minor symptoms requiring no further treatment)	1 years	Steroid (injection)-20mg (20mg Methylprednisolone injection)	45	46.67%	Steroid (injection)-40mg (40mg Methylprednisolone injection)	43	41.86%	RR	1.11(0.70,1.79)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Symptom relief (general)(No or only minor symptoms requiring no further treatment)	5.9 months	Steroid (injection)-40mg (40mg Methylprednisolone injection)	43	53.49%	Steroid (injection)-60mg (60mg Methylprednisolone injection)	44	72.73%	RR	0.74(0.53,1.03)	Not Significant (P-value>.05)
Dammers,J. W., 2006	High Quality	Symptom relief (general)(No or only minor symptoms requiring no further treatment)	1 years	Steroid (injection)-40mg (40mg Methylprednisolone injection)	43	41.86%	Steroid (injection)-60mg (60mg Methylprednisolone injection)	44	52.27%	RR	0.80(0.51,1.26)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Wong,S.M., 2001	High Quality	Questionnaire/Scale (GSS)()	1.8 months	Steroid (injection) (prednisolone 25 mg daily for 10 days and the same volume of saline injection into the carpal tunnel)	30	13.67(8.27)	Steroid (oral) (oral placebo daily for 10 days and a single 15-mg methylprednisolone acetate injection3 locally into the carpal tunnel)	30	20.83(8.73)	Mean Difference	-7.16(-11.46,-2.85683)	Steroid (injection) (prednisolone 25 mg daily for 10 days and the same volume of saline injection into the carpal tunnel) (P-value<.05)
Wong,S.M., 2001	High Quality	Questionnaire/Scale (GSS)()	2.8 months	Steroid (injection) (prednisolone 25 mg daily for 10 days and the same volume of saline injection into the carpal tunnel)	30	14.3(8.42)	Steroid (oral) (oral placebo daily for 10 days and a single 15-mg methylprednisolone acetate injection3 locally into the carpal tunnel)	30	21.4(9.64)	Mean Difference	-7.1(-11.68,-2.51977)	Steroid (injection) (prednisolone 25 mg daily for 10 days and the same volume of saline injection into the carpal tunnel) (P-value<.05)
Wong,S.M., 2005	High Quality	Questionnaire/Scale (GSS)(Both hands)	1.8 months	Steroid (single injection) (Single injection (methylprednisolone acetate))	20	15.2(9.90)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	11.4(7.60)	Mean Difference	3.8(-1.67,9.269945)	Not Significant (P-value>.05)
Wong,S.M., 2005	High Quality	Questionnaire/Scale (GSS)(Both hands)	5.5 months	Steroid (single injection) (Single injection (methylprednisolone acetate))	20	15.9(10.60)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	13(9.70)	Mean Difference	2.9(-3.40,9.197214)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Wong,S.M., 2005	High Quality	Questionnaire/Scale (GSS)(Both hands)	9.2 months	Steroid (single injection) (Single injection (methylprednisolone acetate))	20	12.6(9.10)	Steroid (double injection) (Double injection (methylprednisolone acetate+saline))	20	14.1(11.00)	Mean Difference	-1.5(-7.76,4.756822)	Not Significant (P-value>.05)

TABLE 123: PICO 6 PART 4- ORAL TREATMENTS: SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Chang,M.H., 1998	High Quality	Questionnaire/Scale (GSS)(Global symptom score)	1 month	Steroid (Steroid)	23	10(7.50)	Placebo (Placebo)	16	20.8(6.60)	Mean Difference	-10.8(-15.26,-6.34422)	Steroid (Steroid) (P-value<.05)
Chang,M.H., 1998	High Quality	Questionnaire/Scale (GSS)(Global symptom score)	1 month	Diuretic (oral treatment) (Diuretic (oral treatment))	16	21.6(6.30)	Steroid (Steroid)	23	10(7.50)	Mean Difference	11.6(7.25,15.95026)	Steroid (Steroid) (P-value<.05)
Chang,M.H., 1998	High Quality	Questionnaire/Scale (GSS)(Global symptom score)	1 month	Diuretic (oral treatment) (Diuretic (oral treatment))	16	21.6(6.30)	Placebo (Placebo)	16	20.8(6.60)	Mean Difference	0.8(-3.67,5.270830)	Not Significant (P-value>.05)
Chang,M.H., 1998	High Quality	Questionnaire/Scale (GSS)(Global symptom score)	1 month	Diuretic (oral treatment) (Diuretic (oral treatment))	16	21.6(6.30)	NSAID (NSAID)	18	24(9.70)	Mean Difference	-2.4(-7.84,3.041549)	Not Significant (P-value>.05)
Chang,M.H., 1998	High Quality	Questionnaire/Scale (GSS)(Global symptom score)	1 month	NSAID (NSAID)	18	24(9.70)	Steroid (Steroid)	23	10(7.50)	Mean Difference	14(8.57,19.42919)	Steroid (Steroid) (P-value<.05)
Chang,M.H., 1998	High Quality	Questionnaire/Scale (GSS)(Global symptom score)	1 month	Placebo (Placebo)	16	20.8(6.60)	NSAID (NSAID)	18	24(9.70)	Mean Difference	-3.2(-8.73,2.326269)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Hui,A.C., 2011	High Quality	Questionnaire/Scale (GSS)(Global symptom score)	1.8 months	Oral treatment (Gabapentin) (300 mg once daily for 1 week, 300 mg twice daily for 1 week, and from then on three times daily)	71	13.4(9.70)	Oral treatment (placebo) (Same as active treatment group, but a placebo)	69	12.5(8.90)	Mean Difference	0.9(-2.18,3.982365)	Not Significant (P-value>.05)

TABLE 124: PICO 6 PART 5- TOPICAL TREATMENTS: FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Chang, Y.W., 2014	High Quality	NCS (DML)(Distal motor latency (ms))	1.8 months	Paraffin therapy (Paraffin & splint)	43	4.98(1.51)	Ultrasound (Ultrasound & splint)	37	5.08(1.30)	Mean Difference	-0.1(-0.72,0.515768)	Not Significant (P-value>.05)
Chang, Y.W., 2014	High Quality	NCS (DSL)(Distal sensory latency (ms))	1.8 months	Paraffin therapy (Paraffin & splint)	43	3.4(0.80)	Ultrasound (Ultrasound & splint)	37	3.6(1.40)	Mean Difference	-0.2(-0.71,0.310566)	Not Significant (P-value>.05)
Chang, Y.W., 2014	High Quality	Pinch Strength(Kilograms)	1.8 months	Paraffin therapy (Paraffin & splint)	43	3.6(1.50)	Ultrasound (Ultrasound & splint)	37	3.6(1.10)	Mean Difference	0(-0.57,0.571528)	Not Significant (P-value>.05)
Chang, Y.W., 2014	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	1.8 months	Paraffin therapy (Paraffin & splint)	23	1.8(0.90)	Ultrasound (Ultrasound & splint)	24	1.6(0.70)	Mean Difference	0.2(-0.26,0.662302)	Not Significant (P-value>.05)
Chang, Y.W., 2014	High Quality	Semmes Weinstein Monofilaments Test (SW test)()	1.8 months	Paraffin therapy (Paraffin & splint)	43	30.7(3.00)	Ultrasound (Ultrasound & splint)	37	30.9(2.70)	Mean Difference	-0.2(-1.45,1.049381)	Not Significant (P-value>.05)
Soyupek, F., 2012	High Quality	NCS (CMAP)(Compound muscle action potential)	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	9.97(3.34)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	10.36(2.57)	Mean Difference	-0.39(-2.05,1.274172)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Soyupek,F., 2012	High Quality	NCS (DML)(Distal motor latency (ms))	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	4.5(1.15)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	4.39(0.87)	Mean Difference	0.11(-0.46,0.679858)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	NCS (DSL)(Distal sensory latency (ms))	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	3.52(1.02)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	3.08(0.96)	Mean Difference	0.44(-0.11,0.987921)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	NCS (NCV)(Motor nerve conduction velocity)	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	53.12(5.04)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	52.26(4.00)	Mean Difference	0.86(-1.68,3.397307)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	NCS (NCV)(Sensory nerve conduction velocity)	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	36.91(10.16)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	40.44(12.83)	Mean Difference	-3.53(-9.84,2.780761)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	NCS (SNAP)(Sensory nerve action potential amplitude)	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	17.95(11.27)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	17.7(9.04)	Mean Difference	0.25(-5.44,5.944442)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Soyupek,F., 2012	High Quality	Phalen's test score(% positive)	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	39.13%	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	50.00%	RR	0.78(0.42,1.47)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	15.86(5.65)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	15.6(6.37)	Mean Difference	0.26(-3.04,3.561369)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	Tinel's Sign/Test(% positive)	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	65.22%	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	50.00%	RR	1.30(0.81,2.10)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	Ultrasound (US)(anterior-posterior diameter of median nerve)	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	2.13(0.42)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	2.07(0.41)	Mean Difference	0.06(-0.17,0.289187)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	Ultrasound (US)(cross-sectional area of median nerve)	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	0.11(0.02)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	0.1(0.03)	Mean Difference	0.01(-0.00,0.023794)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Soyupek,F., 2012	High Quality	Ultrasound (US)(transverse diameter of median nerve)	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	6.74(0.91)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	6.61(1.20)	Mean Difference	0.13(-0.45,0.709553)	Not Significant (P-value>.05)
Yildiz,N., 2011	High Quality	NCS (DML)(Median motor distal latency)	1.8 months	Sham ultrasound (w/ splinting) (Sham ultrasound+splinting. Included the intention-intention-to-treat analysis data)	17	4.32(0.60)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data)	17	4.15(0.34)	Mean Difference	0.17(-0.16,0.497832)	Not Significant (P-value>.05)
Yildiz,N., 2011	High Quality	NCS (DML)(Median motor distal latency)	1.8 months	Ultrasound (w/ splinting) (Ultrasound+splinting . Included the intention-intention-to-treat analysis data (Group 2))	17	4.43(0.55)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data)	17	4.15(0.34)	Mean Difference	0.28(-0.03,0.587377)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Yildiz,N., 2011	High Quality	NCS (DSL)(Median sensory distal latency)	1.8 months	Sham ultrasound (w/ splinting) (Sham ultrasound+splinting. Included the intention-intention-to-treat analysis data)	17	3.94(0.47)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data)	17	3.79(0.33)	Mean Difference	0.15(-0.12,0.422996)	Not Significant (P-value>.05)
Yildiz,N., 2011	High Quality	NCS (DSL)(Median sensory distal latency)	1.8 months	Ultrasound (w/ splinting) (Ultrasound+splinting . Included the intention-intention-to-treat analysis data (Group 2))	17	3.87(0.29)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data)	17	3.79(0.33)	Mean Difference	0.08(-0.13,0.288838)	Not Significant (P-value>.05)
Yildiz,N., 2011	High Quality	Questionnaire (General/undefined)(FSS)	1.8 months	Sham ultrasound (w/ splinting) (Sham ultrasound+splinting. Included the intention-intention-to-treat analysis data)	17	2.19(0.89)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data)	17	1.79(0.80)	Mean Difference	0.4(-0.17,0.968876)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Yildiz,N., 2011	High Quality	Questionnaire (General/undefined)(FSS)	1.8 months	Ultrasound (w/ splinting) (Ultrasound+splinting . Included the intention-intention-to-treat analysis data (Group 2))	17	1.98(0.78)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data)	17	1.79(0.80)	Mean Difference	0.19(-0.34,0.721139)	Not Significant (P-value>.05)

TABLE 125: PICO 6 PART 5- TOPICAL TREATMENTS: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Chang,Y. W., 2014	High Quality	Questionnaire /Scale (VAS-pain)(0-100)	1.8 months	Paraffin therapy (Paraffin & splint)	23	50.7(22.70)	Ultrasound (Ultrasound & splint)	24	54.2(22.60)	Mean Difference	-3.5(-16.45,9.454633)	Not Significant (P-value>.05)
Soyupek,F., 2012	High Quality	Questionnaire /Scale (VAS-pain)()	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	45.65(23.65)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	30.35(18.15)	Mean Difference	15.3(3.53,27.07362)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group")) (P-value<.05)
Yildiz,N., 2011	High Quality	Questionnaire /Scale (VAS-pain)()	1.8 months	Sham ultrasound (w/ splinting) (Sham ultrasound+splinting. Included the intention-intention-to-treat analysis data)	17	3.28(2.74)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data)	17	0.98(1.65)	Mean Difference	2.3(0.78,3.820447)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Yildiz,N., 2011	High Quality	Questionnaire /Scale (VAS-pain)()	1.8 months	Ultrasound (w/ splinting) (Ultrasound+splinting. Included the intention-intention-to-treat analysis data (Group 2))	17	2.77(2.74)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data)	17	0.98(1.65)	Mean Difference	1.79(0.27,3.310447)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data) (P-value<.05)

TABLE 126: PICO 6 PART 5- TOPICAL TREATMENTS: SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Chang, Y.W., 2014	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	1.8 months	Paraffin therapy (Paraffin & splint)	23	1.9(0.70)	Ultrasound (Ultrasound & splint)	24	2.1(0.80)	Mean Difference	-0.2(-0.63,0.229284)	Not Significant (P-value>.05)
Soyupek, F., 2012	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	3 months	NSAID with ultrasound (Phonophoresis (ultrasound) with nonsteroid anti-inflammatory drug (PNSAI))	23	26(5.43)	Steroid with ultrasound (Phonophoresis (ultrasound) with corticosteroid ("PCS group"))	28	23.46(5.95)	Mean Difference	2.54(-0.59,5.667614)	Not Significant (P-value>.05)

TABLE 127: PICO 6 PART 6- OTHER TREATMENTS: COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Complications (general)(Pain or paraesthesia complaints)	NA	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm ² , pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	3.3(2.80)	Sham ultrasound (No ultrasound)	34	2(1.90)	Mean Difference	1.3(0.16,2.437416)	Sham ultrasound (No ultrasound) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Complications (general)(Pain or paraesthesia complaints)	1.6 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	- 2.14(3.03)	Sham ultrasound (No ultrasound)	34	- 0.17(2.20)	Mean Difference	-1.97(-3.23,-0.71)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Complications (general)(Pain or paraesthesia complaints)	7.9 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	- 2.76(3.06)	Sham ultrasound (No ultrasound)	34	- 0.08(2.92)	Mean Difference	-2.68(-4.10,-1.26)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Yildiz,N., 2011	High Quality	Questionnaire (General/undefined)(SSS)	1.8 months	Sham ultrasound (w/ splinting) (Sham ultrasound+splinting. Included the intention-intention-to-treat analysis data)	17	2.08(0.82)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data)	17	1.63(0.73)	Mean Difference	0.45(-0.07,0.971890)	Not Significant (P-value>.05)
Yildiz,N., 2011	High Quality	Questionnaire (General/undefined)(SSS)	1.8 months	Ultrasound (w/ splinting) (Ultrasound+splinting. Included the intention-intention-to-treat analysis data (Group 2))	17	1.97(0.65)	Ketoprofen phonophoresis (w/ splinting) (Ketoprofen phonophoresis (w/ splinting). Included the intention-intention-to-treat analysis data)	17	1.63(0.73)	Mean Difference	0.34(-0.12,0.804648)	Not Significant (P-value>.05)

TABLE 128: PICO 6 PART 6- OTHER TREATMENTS: FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bakhtiary,A. H., 2004	High Quality	Grip strength(Units not reported)	1.6 months	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session))	.	. %	Laser (15 daily treatment sessions (5 sessions/week).)	.	. %	Author Reported	NA	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session)) (P-value<.05)
Bakhtiary,A. H., 2004	High Quality	NCS(Index SAP amplitude (?A))	1.6 months	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session))	.	. %	Laser (15 daily treatment sessions (5 sessions/week).)	.	. %	Author Reported	NA	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session)) (P-value<.05)
Bakhtiary,A. H., 2004	High Quality	NCS(Thumb SAP amplitude (?A))	1.6 months	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session))	.	. %	Laser (15 daily treatment sessions (5 sessions/week).)	.	. %	Author Reported	NA	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session)) (P-value<.05)
Bakhtiary,A. H., 2004	High Quality	NCS (CMAP)(Compound muscle action potential (mV))	1.6 months	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session))	.	. %	Laser (15 daily treatment sessions (5 sessions/week).)	.	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bakhtiary,A. H., 2004	High Quality	NCS (DML)(Distal motor latency (ms))	1.6 months	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session))	.	. %	Laser (15 daily treatment sessions (5 sessions/week).)	.	. %	Author Reported	NA	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session)) (P-value<.05)
Bakhtiary,A. H., 2004	High Quality	NCS (DSL)(Antidromic index sensory latency (ms))	1.6 months	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session))	.	. %	Laser (15 daily treatment sessions (5 sessions/week).)	.	. %	Author Reported	NA	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session)) (P-value<.05)
Bakhtiary,A. H., 2004	High Quality	NCS (DSL)(Antidromic thumb sensory latency (ms))	1.6 months	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session))	.	. %	Laser (15 daily treatment sessions (5 sessions/week).)	.	. %	Author Reported	NA	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session)) (P-value<.05)
Bakhtiary,A. H., 2004	High Quality	Pinch Strength(Units not reported)	1.6 months	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session))	.	. %	Laser (15 daily treatment sessions (5 sessions/week).)	.	. %	Author Reported	NA	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session)) (P-value<.05)
Chang,W.D., 2008	High Quality	Grip strength(Digital prehension (kilograms))	1 month	Laser (Laser treatment)	20	5.2(0.83)	Placebo (Sham laser (placebo))	20	4.43(1.06)	Mean Difference	0.77(0.18,1.360038)	Laser (Laser treatment) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Chang, W.D., 2008	High Quality	Grip strength(Kilograms)	1 month	Laser (Laser treatment)	20	21.19(4.12)	Placebo (Sham laser (placebo))	20	17.38(3.56)	Mean Difference	3.81(1.42,6.196375)	Laser (Laser treatment) (P-value<.05)
Chang, W.D., 2008	High Quality	Grip strength(Kilograms (lateral prehension))	1 month	Laser (Laser treatment)	20	5.33(1.33)	Placebo (Sham laser (placebo))	20	4.35(1.09)	Mean Difference	0.98(0.23,1.733644)	Laser (Laser treatment) (P-value<.05)
Chang, W.D., 2008	High Quality	NCS(Sensory peak latency of the median n. (ms))	1 month	Laser (Laser treatment)	20	3.67(0.21)	Placebo (Sham laser (placebo))	20	3.8(0.11)	Mean Difference	-0.13(-0.23,-0.02610)	Laser (Laser treatment) (P-value<.05)
Chang, W.D., 2008	High Quality	NCS (DML)(Distal motor latency (ms))	1 month	Laser (Laser treatment)	20	3.87(0.30)	Placebo (Sham laser (placebo))	20	4.1(0.21)	Mean Difference	-0.23(-0.39,-0.06950)	Laser (Laser treatment) (P-value<.05)
Chang, W.D., 2008	High Quality	Questionnaire (General/undefined)(Functional Status Scale)	1 month	Laser (Laser treatment)	20	11.04(0.43)	Placebo (Sham laser (placebo))	20	19.6(1.02)	Mean Difference	-8.56(-9.05,-8.07486)	Laser (Laser treatment) (P-value<.05)
Colbert, A.P., 2010	High Quality	NCS (CMAP)(Compound muscle action potential (mV))	1.4 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	5.1(2.60)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	5.6(2.70)	Mean Difference	-0.5(-2.19,1.185456)	Not Significant (P-value>.05)
Colbert, A.P., 2010	High Quality	NCS (CMAP)(Compound muscle action potential (mV))	4.1 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	4.8(2.10)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	4.3(0.70)	Mean Difference	0.5(-0.50,1.495353)	Not Significant (P-value>.05)
Colbert, A.P., 2010	High Quality	NCS (CMAP)(Compound muscle action potential (mV))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	5.9(1.90)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	5.1(2.60)	Mean Difference	0.8(-0.64,2.235343)	Not Significant (P-value>.05)
Colbert, A.P., 2010	High Quality	NCS (CMAP)(Compound muscle action potential (mV))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	5.9(1.90)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	5.6(2.70)	Mean Difference	0.3(-1.17,1.772199)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Colbert,A.P., 2010	High Quality	NCS (CMAP)(Compound muscle action potential (mV))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	5.9(3.00)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	4.3(0.70)	Mean Difference	1.6(0.25,2.951958)	Sham magnet therapy (No magnet therapy (sham 0mT)) (P-value<.05)
Colbert,A.P., 2010	High Quality	NCS (CMAP)(Compound muscle action potential (mV))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	5.9(3.00)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	4.8(2.10)	Mean Difference	1.1(-0.52,2.718757)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (DML)(Distal motor latency (ms))	1.4 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	5.1(1.60)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	5(0.80)	Mean Difference	0.1(-0.70,0.904367)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (DML)(Distal motor latency (ms))	4.1 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	5.2(1.00)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	5.2(2.40)	Mean Difference	0(-1.17,1.169102)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (DML)(Distal motor latency (ms))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	5(1.30)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	5.1(1.60)	Mean Difference	-0.1(-1.02,0.817725)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (DML)(Distal motor latency (ms))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	5(1.30)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	5(0.80)	Mean Difference	0(-0.67,0.673807)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (DML)(Distal motor latency (ms))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	5.1(1.30)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	5.2(1.00)	Mean Difference	-0.1(-0.83,0.625813)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (DML)(Distal motor latency (ms))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	5.1(1.30)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	5.2(2.40)	Mean Difference	-0.1(-1.32,1.120338)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Colbert,A.P., 2010	High Quality	NCS (DSL)(Distal sensory latency (ms))	1.4 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	4.2(0.50)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	4.7(1.00)	Mean Difference	-0.5(-1.00,0.002729)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (DSL)(Distal sensory latency (ms))	4.1 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	4.3(0.70)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	4.8(1.20)	Mean Difference	-0.5(-1.12,0.124680)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (DSL)(Distal sensory latency (ms))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	4.2(0.90)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	4.2(0.50)	Mean Difference	0(-0.45,0.454017)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (DSL)(Distal sensory latency (ms))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	4.2(0.90)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	4.7(1.00)	Mean Difference	-0.5(-1.10,0.098142)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (DSL)(Distal sensory latency (ms))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	4.3(0.90)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	4.3(0.70)	Mean Difference	0(-0.50,0.504636)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (DSL)(Distal sensory latency (ms))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	4.3(0.90)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	4.8(1.20)	Mean Difference	-0.5(-1.17,0.168384)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (SNAP)(Sensory nerve action potential (uV))	1.4 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	18.5(8.30)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	16(8.80)	Mean Difference	2.5(-2.94,7.939336)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (SNAP)(Sensory nerve action potential (uV))	4.1 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	16.9(6.30)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	16.2(10.30)	Mean Difference	0.7(-4.73,6.129105)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (SNAP)(Sensory nerve action potential (uV))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	18.2(7.70)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	16(8.80)	Mean Difference	2.2(-3.00,7.400574)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Colbert,A.P., 2010	High Quality	NCS (SNAP)(Sensory nerve action potential (uV))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	18.2(7.70)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	18.5(8.30)	Mean Difference	-0.3(-5.33,4.731625)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (SNAP)(Sensory nerve action potential (uV))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	18.3(7.90)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	16.2(10.30)	Mean Difference	2.1(-3.68,7.882559)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	NCS (SNAP)(Sensory nerve action potential (uV))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	18.3(7.90)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	16.9(6.30)	Mean Difference	1.4(-3.07,5.873545)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	1.4 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	1.7(0.50)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	1.8(0.60)	Mean Difference	-0.1(-0.45,0.251191)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	4.1 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	1.9(0.80)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	2(0.80)	Mean Difference	-0.1(-0.61,0.408726)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	1.7(0.40)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	1.7(0.50)	Mean Difference	0(-0.29,0.285096)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	1.7(0.40)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	1.8(0.60)	Mean Difference	-0.1(-0.42,0.221746)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	1.8(0.60)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	1.9(0.80)	Mean Difference	-0.1(-0.55,0.345589)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	1.8(0.60)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	2(0.80)	Mean Difference	-0.2(-0.65,0.245589)	Not Significant (P-value>.05)
Ebenbichler, G.R., 1998	High Quality	Grip strength(Kilograms)	NA	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	15.8(10.90)	Sham ultrasound (No ultrasound)	34	19.8(10.00)	Mean Difference	-4(-8.97,0.972218)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Grip strength(Kilograms)	1.6 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	3.87(5.35)	Sham ultrasound (No ultrasound)	34	-0.09(5.77)	Mean Difference	3.96(1.32,6.60)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Grip strength(Kilograms)	7.9 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	5.44(7.50)	Sham ultrasound (No ultrasound)	34	-1.99(6.19)	Mean Difference	7.43(4.16,10.70)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	NCS (DML)(Distal motor latency (ms))	NA	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm ² , pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	5.2(1.00)	Sham ultrasound (No ultrasound)	34	5.2(1.20)	Mean Difference	0(-0.53,0.525063)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	NCS (DML)(Distal motor latency (ms))	1.6 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm ² , pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	-0.55(0.48)	Sham ultrasound (No ultrasound)	34	0.06(0.45)	Mean Difference	-0.61(-0.83,-0.39)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm², pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	NCS (DML)(Distal motor latency (ms))	7.9 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm ² , pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	-0.31(0.39)	Sham ultrasound (No ultrasound)	34	0.04(0.45)	Mean Difference	-0.35(-0.55,-0.15)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm², pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	NCS (SNCV)(Sensory nerve conduction velocity (antidromic))	NA	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm ² , pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	40(7.20)	Sham ultrasound (No ultrasound)	34	42.1(7.20)	Mean Difference	-2.1(-5.52,1.322662)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	NCS (SNCV)(Sensory nerve conduction velocity (antidromic))	1.6 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm ² , pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	7.35(1.07)	Sham ultrasound (No ultrasound)	34	-0.89(0.68)	Mean Difference	8.24(7.81,8.67)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm², pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	NCS (SNCV)(Sensory nerve conduction velocity (antidromic))	7.9 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	2.69(0.89)	Sham ultrasound (No ultrasound)	34	-0.27(0.71)	Mean Difference	2.96(2.58,3.34)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Pinch Strength(Kilograms)	NA	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm ² , pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	5.5(1.80)	Sham ultrasound (No ultrasound)	34	5.8(1.80)	Mean Difference	-0.3(-1.16,0.555665)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Pinch Strength(Kilograms)	1.6 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	0.33(0.51)	Sham ultrasound (No ultrasound)	34	0.06(0.95)	Mean Difference	0.27(-0.09,0.63)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Pinch Strength(Kilograms)	7.9 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm ² , pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	0.49(0.62)	Sham ultrasound (No ultrasound)	34	-0.22(0.48)	Mean Difference	0.71(0.45,0.97)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm², pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Evcik,D., 2007	High Quality	Grip strength(Kilograms)	1 month	Laser (Low-level laser therapy (LLLT))	41	22.4(6.70)	Laser (sham) (No laser therapy (placebo))	40	19.7(6.50)	Mean Difference	2.7(-0.17,5.574677)	Not Significant (P-value>.05)
Evcik,D., 2007	High Quality	Grip strength(Kilograms)	2.8 months	Laser (Low-level laser therapy (LLLT))	41	22.8(6.90)	Laser (sham) (No laser therapy (placebo))	40	19.6(7.30)	Mean Difference	3.2(0.11,6.294981)	Laser (Low-level laser therapy (LLLT)) (P-value<.05)
Evcik,D., 2007	High Quality	NCS(Motor nerve velocity, (m/sn))	3 months	Laser (Low-level laser therapy (LLLT))	41	52(6.20)	Laser (sham) (No laser therapy (placebo))	40	50.3(6.30)	Mean Difference	1.7(-1.02,4.422785)	Not Significant (P-value>.05)
Evcik,D., 2007	High Quality	NCS (DML)(Distal motor latency (ms))	3 months	Laser (Low-level laser therapy (LLLT))	41	4.1(0.70)	Laser (sham) (No laser therapy (placebo))	40	4.2(1.08)	Mean Difference	-0.1(-0.50,0.297407)	Not Significant (P-value>.05)
Evcik,D., 2007	High Quality	NCS (DSL)(Sensory distal latency, (msn))	3 months	Laser (Low-level laser therapy (LLLT))	41	3(0.50)	Laser (sham) (No laser therapy (placebo))	40	3.1(0.60)	Mean Difference	-0.1(-0.34,0.140829)	Not Significant (P-value>.05)
Evcik,D., 2007	High Quality	NCS (MA)(Motor amplitude (uV))	3 months	Laser (Low-level laser therapy (LLLT))	41	6.9(3.40)	Laser (sham) (No laser therapy (placebo))	40	7.2(4.00)	Mean Difference	-0.3(-1.92,1.318574)	Not Significant (P-value>.05)
Evcik,D., 2007	High Quality	NCS (SA)(Sensory amplitude, (uV))	3 months	Laser (Low-level laser therapy (LLLT))	41	29.6(12.90)	Laser (sham) (No laser therapy (placebo))	40	27.9(13.40)	Mean Difference	1.7(-4.03,7.430371)	Not Significant (P-value>.05)
Evcik,D., 2007	High Quality	NCS (SNCV)(Sensory nerve velocity, (m/sn))	3 months	Laser (Low-level laser therapy (LLLT))	41	42.9(6.70)	Laser (sham) (No laser therapy (placebo))	40	41.1(7.10)	Mean Difference	1.8(-1.21,4.807899)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Evcik,D., 2007	High Quality	Pinch Strength(Kilograms)	1 month	Laser (Low-level laser therapy (LLLT))	41	5.2(1.50)	Laser (sham) (No laser therapy (placebo))	40	4.6(1.50)	Mean Difference	0.6(-0.05,1.253383)	Not Significant (P-value>.05)
Evcik,D., 2007	High Quality	Pinch Strength(Kilograms)	2.8 months	Laser (Low-level laser therapy (LLLT))	41	5.7(1.60)	Laser (sham) (No laser therapy (placebo))	40	4.8(1.50)	Mean Difference	0.9(0.22,1.575244)	Laser (Low-level laser therapy (LLLT)) (P-value<.05)
Fusakul,Y., 2014	High Quality	Grip strength(Units not reported)	1.2 months	Laser+splint (LLLT+splint (multiple treatments))	56	22.65(1.17)	Placebo+splint (Placebo+splint (multiple treatments))	56	23.25(0.99)	Mean Difference	-0.6(-1.00,-0.19857)	Placebo+splint (Placebo+splint (multiple treatments)) (P-value<.05)
Fusakul,Y., 2014	High Quality	Grip strength(Units not reported)	2.8 months	Laser+splint (LLLT+splint (multiple treatments))	56	24.49(1.15)	Placebo+splint (Placebo+splint (multiple treatments))	56	23.6(1.00)	Mean Difference	0.89(0.49,1.289153)	Laser+splint (LLLT+splint (multiple treatments)) (P-value<.05)
Fusakul,Y., 2014	High Quality	NCS (CMAP)(Compound muscle action potential (mV))	2.8 months	Laser+splint (LLLT+splint (multiple treatments))	56	9.95(0.33)	Placebo+splint (Placebo+splint (multiple treatments))	56	9.94(0.39)	Mean Difference	0.01(-0.12,0.143808)	Not Significant (P-value>.05)
Fusakul,Y., 2014	High Quality	NCS (DML)(Distal motor latency (ms))	2.8 months	Laser+splint (LLLT+splint (multiple treatments))	56	4.73(0.13)	Placebo+splint (Placebo+splint (multiple treatments))	56	6.63(1.10)	Mean Difference	-1.9(-2.19,-1.60988)	Laser+splint (LLLT+splint (multiple treatments)) (P-value<.05)
Fusakul,Y., 2014	High Quality	NCS (DSL)(Distal sensory latency (ms))	2.8 months	Laser+splint (LLLT+splint (multiple treatments))	56	4.48(0.13)	Placebo+splint (Placebo+splint (multiple treatments))	56	4.66(0.18)	Mean Difference	-0.18(-0.24,-0.12184)	Laser+splint (LLLT+splint (multiple treatments)) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fusakul, Y., 2014	High Quality	NCS (SNAP)(Sensory nerve action potential amplitude)	2.8 months	Laser+splint (LLLT+splint (multiple treatments))	56	23(1.74)	Placebo+splint (Placebo+splint (multiple treatments))	56	21.91(1.77)	Mean Difference	1.09(0.44,1.74084)	Laser+splint (LLLT+splint (multiple treatments)) (P-value<.05)
Fusakul, Y., 2014	High Quality	Pinch Strength(Units not reported)	1.2 months	Laser+splint (LLLT+splint (multiple treatments))	56	8(3.56)	Placebo+splint (Placebo+splint (multiple treatments))	56	4.65(0.30)	Mean Difference	3.35(2.41,4.285725)	Laser+splint (LLLT+splint (multiple treatments)) (P-value<.05)
Fusakul, Y., 2014	High Quality	Pinch Strength(Units not reported)	2.8 months	Laser+splint (LLLT+splint (multiple treatments))	56	5.4(0.28)	Placebo+splint (Placebo+splint (multiple treatments))	56	5.47(0.31)	Mean Difference	-0.07(-0.18,0.039410)	Not Significant (P-value>.05)
Fusakul, Y., 2014	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	1.2 months	Laser+splint (LLLT+splint (multiple treatments))	56	1.75(0.62)	Placebo+splint (Placebo+splint (multiple treatments))	56	1.54(0.62)	Mean Difference	0.21(-0.02,0.439651)	Not Significant (P-value>.05)
Fusakul, Y., 2014	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	2.8 months	Laser+splint (LLLT+splint (multiple treatments))	56	1.53(0.57)	Placebo+splint (Placebo+splint (multiple treatments))	56	1.37(0.49)	Mean Difference	0.16(-0.04,0.356873)	Not Significant (P-value>.05)
Saeed, F.-U., 2012	High Quality	NCS (DML)(Distal motor latency (ms))	1 month	Ultrasound (Ultrasound therapy)	50	-0.18(0.13)	Laser (Laser therapy)	50	-0.8(0.23)	Mean Difference	0.62(0.55,0.693231)	Laser (Laser therapy) (P-value<.05)
Saeed, F.-U., 2012	High Quality	NCS (DSL)(Distal sensory latency (ms))	1 month	Ultrasound (Ultrasound therapy)	50	-0.07(0.07)	Laser (Laser therapy)	50	-0.54(0.28)	Mean Difference	0.47(0.39,0.550000)	Laser (Laser therapy) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Saeed,F.-U., 2012	High Quality	Questionnaire (General/undefined)(No mention of Boston scale, rather merely "functional status scale")	1 month	Ultrasound (Ultrasound therapy)	50	- 0.4(0.17)	Laser (Laser therapy)	50	- 0.75(0.12)	Mean Difference	0.35(0.29,0.407678)	Laser (Laser therapy) (P-value<.05)
Yang,C.P., 2011	High Quality	NCS (CMAP)(Compound muscle action potential (mV))	1 month	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	7.2(2.70)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	7.6(2.80)	Mean Difference	-0.4(-1.63,0.828511)	Not Significant (P-value>.05)
Yang,C.P., 2011	High Quality	NCS (CMAP)(Compound muscle action potential (mV))	1.1 years	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	7.8(2.50)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	8(3.60)	Mean Difference	-0.2(-1.58,1.181461)	Not Significant (P-value>.05)
Yang,C.P., 2011	High Quality	NCS (DML)(Distal motor latency (ms))	1 month	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	4(0.70)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	4.7(1.00)	Mean Difference	-0.7(-1.08,-0.31524)	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1)) (P-value<.05)
Yang,C.P., 2011	High Quality	NCS (DML)(Distal motor latency (ms))	1.1 years	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	4.2(0.80)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	5.5(1.80)	Mean Difference	-1.3(-1.92,-0.68044)	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1)) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Yang,C.P., 2011	High Quality	NCS (DSL)(Distal sensory latency (ms))	1 month	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	3.3(0.70)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	3(0.60)	Mean Difference	0.3(0.01,0.591543)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2)) (P-value<.05)
Yang,C.P., 2011	High Quality	NCS (DSL)(Distal sensory latency (ms))	1.1 years	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	3.4(0.60)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	3.7(1.10)	Mean Difference	-0.3(-0.69,0.094439)	Not Significant (P-value>.05)
Yang,C.P., 2011	High Quality	NCS (MCV)(Motor nerve conduction velocity (ms))	1 month	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	53.7(3.80)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	52.4(3.60)	Mean Difference	1.3(-0.35,2.954207)	Not Significant (P-value>.05)
Yang,C.P., 2011	High Quality	NCS (MCV)(Motor nerve conduction velocity (ms))	1.1 years	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	52.7(4.00)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	49.7(4.60)	Mean Difference	3(1.08,4.924014)	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1)) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Yang,C.P., 2011	High Quality	NCS (SNAP)(Sensory nerve action potential amplitude)	1 month	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	18.4(9.80)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	20.8(9.90)	Mean Difference	-2.4(-6.80,2.000383)	Not Significant (P-value>.05)
Yang,C.P., 2011	High Quality	NCS (SNAP)(Sensory nerve action potential amplitude)	1.1 years	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	18.2(9.30)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	18.5(10.40)	Mean Difference	-0.3(-4.70,4.104284)	Not Significant (P-value>.05)
Yang,C.P., 2011	High Quality	NCS (SNCV)(Sensory nerve conduction velocity (prolonged antidromic wrist palm))	1 month	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	43.9(8.00)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	48.6(6.20)	Mean Difference	-4.7(-7.90,-1.49742)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2)) (P-value<.05)
Yang,C.P., 2011	High Quality	NCS (SNCV)(Sensory nerve conduction velocity (prolonged antidromic wrist palm))	1.1 years	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	44.7(7.00)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	45.6(8.70)	Mean Difference	-0.9(-4.42,2.622683)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Yildiz,N., 2011	High Quality	NCS (DML)(Median motor distal latency)	1.8 months	Ultrasound (w/ splinting) (Ultrasound+splinting. Included the intention-intention-to-treat analysis data (Group 2))	17	4.43(0.55)	Sham ultrasound (w/ splinting) (Sham ultrasound+splinting. Included the intention-intention-to-treat analysis data)	17	4.32(0.60)	Mean Difference	0.11(-0.28,0.496923)	Not Significant (P-value>.05)
Yildiz,N., 2011	High Quality	NCS (DSL)(Median sensory distal latency)	1.8 months	Ultrasound (w/ splinting) (Ultrasound+splinting. Included the intention-intention-to-treat analysis data (Group 2))	17	3.87(0.29)	Sham ultrasound (w/ splinting) (Sham ultrasound+splinting. Included the intention-intention-to-treat analysis data)	17	3.94(0.47)	Mean Difference	-0.07(-0.33,0.192531)	Not Significant (P-value>.05)
Yildiz,N., 2011	High Quality	Questionnaire (General/undefined)(FSS)	1.8 months	Ultrasound (w/ splinting) (Ultrasound+splinting. Included the intention-intention-to-treat analysis data (Group 2))	17	1.98(0.78)	Sham ultrasound (w/ splinting) (Sham ultrasound+splinting. Included the intention-intention-to-treat analysis data)	17	2.19(0.89)	Mean Difference	-0.21(-0.77,0.352565)	Not Significant (P-value>.05)

TABLE 129: PICO 6 PART 6- OTHER TREATMENTS: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Chang,W.D., 2008	high Quality	Questionnaire/Scale (VAS-pain)(VAS pain)	1 month	Laser (Laser treatment)	20	. %	Placebo (Sham laser (placebo))	20	. %	Author Reported	NA	Laser (Laser treatment) (P-value<.05)
Bakhtiary,A. H., 2004	High Quality	Questionnaire/Scale (VAS-pain)()	1.6 months	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session))	.	. %	Laser (15 daily treatment sessions (5 sessions/week).)	.	. %	Author Reported	NA	Ultrasound (Ultrasound treatment (1 MHz, 1.0 W/cm2, pulse 1:4, 15 min/session)) (P-value<.05)
Evcik,D., 2007	High Quality	Questionnaire/Scale (VAS-pain)(VAS pain (day): 0-10 scale)	1 month	Laser (Low-level laser therapy (LLLT))	41	3(0.98)	Laser (sham) (No laser therapy (placebo))	40	3(1.61)	Mean Difference	0(-0.58,0.58)	Not Significant (P-value>.05)
Evcik,D., 2007	High Quality	Questionnaire/Scale (VAS-pain)(VAS pain (night): 0-10 scale)	1 month	Laser (Low-level laser therapy (LLLT))	41	3.8(1.63)	Laser (sham) (No laser therapy (placebo))	40	3.5(2.26)	Mean Difference	0.3(-0.56,1.16)	Not Significant (P-value>.05)
Evcik,D., 2007	High Quality	Questionnaire/Scale (VAS-pain)(VAS pain (day): 0-10 scale)	2.8 months	Laser (Low-level laser therapy (LLLT))	41	2.2(0.98)	Laser (sham) (No laser therapy (placebo))	40	2.8(2.58)	Mean Difference	-0.6(-1.45,0.25)	Not Significant (P-value>.05)
Evcik,D., 2007	High Quality	Questionnaire/Scale (VAS-pain)(VAS pain (night): 0-10 scale)	2.8 months	Laser (Low-level laser therapy (LLLT))	41	2.7(1.96)	Laser (sham) (No laser therapy (placebo))	40	2.9(2.58)	Mean Difference	-0.2(-1.20,0.80)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fusakul,Y., 2014	High Quality	Questionnaire/Scale (VAS-pain)	1.2 months	Laser+splint (LLLT+splint (multiple treatments))	56	4.25(0.34)	Placebo+splint (Placebo+splint (multiple treatments))	56	3.15(0.30)	Mean Difference	1.1(0.98,1.218760)	Placebo+splint (Placebo+splint (multiple treatments)) (P-value<.05)
Fusakul,Y., 2014	High Quality	Questionnaire/Scale (VAS-pain)	2.8 months	Laser+splint (LLLT+splint (multiple treatments))	56	3.45(0.38)	Placebo+splint (Placebo+splint (multiple treatments))	56	2.48(0.36)	Mean Difference	0.97(0.83,1.107099)	Placebo+splint (Placebo+splint (multiple treatments)) (P-value<.05)
Saeed,F.-U., 2012	High Quality	Questionnaire/Scale (VAS-pain)	1 month	Ultrasound (Ultrasound therapy)	50	-2.6(1.07)	Laser (Laser therapy)	50	-4.9(1.46)	Mean Difference	2.3(1.80,2.801737)	Laser (Laser therapy) (P-value<.05)
Weintraub,M.I., 2008	High Quality	Questionnaire (General/undefined) (NPS 10. Neuropathic pain scale (NPS))	2 months	No magnet (sham) (Sham (no magnet therapy))	10	37.6(15.36)	Magnet (Magnet therapy)	11	36.27(19.61)	Mean Difference	1.33(-13.67,16.32780)	Not Significant (P-value>.05)
Weintraub,M.I., 2008	High Quality	Questionnaire (General/undefined) (NPS 4. Neuropathic pain scale (NPS))	2 months	No magnet (sham) (Sham (no magnet therapy))	10	43.75(18.15)	Magnet (Magnet therapy)	11	39.77(23.76)	Mean Difference	3.98(-14.01,21.97188)	Not Significant (P-value>.05)
Weintraub,M.I., 2008	High Quality	Questionnaire (General/undefined) (NPS 8. Neuropathic pain scale (NPS))	2 months	No magnet (sham) (Sham (no magnet therapy))	10	34.5(15.69)	Magnet (Magnet therapy)	11	32.95(19.04)	Mean Difference	1.55(-13.32,16.42201)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Weintraub, M.I., 2008	High Quality	Questionnaire (General/undefined) (NPS NA. Neuropathic pain scale (NPS))	2 months	No magnet (sham) (Sham (no magnet therapy))	10	38.75(14.31)	Magnet (Magnet therapy)	11	36.25(20.48)	Mean Difference	2.5(-12.50,17.50490)	Not Significant (P-value>.05)
Weintraub, M.I., 2008	High Quality	Questionnaire/Scale (VAS-pain)	2 months	No magnet (sham) (Sham (no magnet therapy))	10	3.78(2.27)	Magnet (Magnet therapy)	11	4.15(2.13)	Mean Difference	-0.37(-2.26,1.517852)	Not Significant (P-value>.05)
Yildiz, N., 2011	High Quality	Questionnaire/Scale (VAS-pain)	1.8 months	Ultrasound (w/ splinting) (Ultrasound+splinting. Included the intention-intention-to-treat analysis data (Group 2))	17	2.77(2.74)	Sham ultrasound (w/ splinting) (Sham ultrasound+splinting. Included the intention-intention-to-treat analysis data)	17	3.28(2.74)	Mean Difference	-0.51(-2.35,1.332032)	Not Significant (P-value>.05)

TABLE 130: PICO 6 PART 6- OTHER TREATMENTS: QUALITY OF LIFE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Weintraub,M.I., 2008	High Quality	Questionnaire/Scale (VAS-patient satisfaction)(Sleep interference)	2 months	No magnet (sham) (Sham (no magnet therapy))	10	1.1(1.37)	Magnet (Magnet therapy)	11	3.29(2.48)	Mean Difference	-2.19(-3.88,-0.49619)	No magnet (sham) (Sham (no magnet therapy)) (P-value<.05)

TABLE 131: PICO 6 PART 6- OTHER TREATMENTS: SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Chang,W.D., 2008	High Quality	Questionnaire (General/undefined) (Symptom Severity Scale)	1 month	Laser (Laser treatment)	20	19.35(0.63)	Placebo (Sham laser (placebo))	20	28.71(0.85)	Mean Difference	-9.36(-9.82,-8.89630)	Laser (Laser treatment) (P-value<.05)
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	1.4 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	2.1(0.70)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	2.2(0.50)	Mean Difference	-0.1(-0.49,0.286807)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	4.1 months	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	2.4(0.80)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	2.3(0.80)	Mean Difference	0.1(-0.41,0.608726)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	2(0.80)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	2.1(0.70)	Mean Difference	-0.1(-0.57,0.371173)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	1.4 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	2(0.80)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	2.2(0.50)	Mean Difference	-0.2(-0.62,0.216507)	Not Significant (P-value>.05)
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	2.3(0.70)	Magnet therapy (45mT) (Magnet therapy (45mT)-)	19	2.3(0.80)	Mean Difference	0(-0.47,0.472779)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Colbert,A.P., 2010	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	4.1 months	Sham magnet therapy (No magnet therapy (sham 0mT))	20	2.3(0.70)	Magnet therapy (15mT) (Magnet therapy (15mT)-)	19	2.4(0.80)	Mean Difference	-0.1(-0.57,0.372779)	Not Significant (P-value>.05)
Ebenbichler, G.R., 1998	High Quality	Questionnaire (General/undefined) (Not questionnaire, worst complaint (cm))	NA	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	6.5(2.60)	Sham ultrasound (No ultrasound)	34	5.8(2.80)	Mean Difference	0.7(-0.58,1.984378)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Questionnaire (General/undefined) (Not questionnaire, worst complaint (cm))	1.6 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	- 3.91(3.45)	Sham ultrasound (No ultrasound)	34	- 1.56(3.03)	Mean Difference	-2.35(-3.89,-0.81)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Questionnaire (General/undefined) (Not questionnaire, worst complaint (cm))	7.9 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	- 4.78(3.21)	Sham ultrasound (No ultrasound)	34	- 0.95(4.43)	Mean Difference	-3.83(-5.67,-1.99)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Sensory loss()	NA	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	2.4(2.40)	Sham ultrasound (No ultrasound)	34	2(2.40)	Mean Difference	0.4(-0.74,1.540887)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Sensory loss()	1.6 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	- 1.14(2.53)	Sham ultrasound (No ultrasound)	34	- 0.07(2.35)	Mean Difference	-1.07(-2.23,0.09)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ebenbichler, G.R., 1998	High Quality	Sensory loss()	7.9 months	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.)	34	- 1.6(2.83)	Sham ultrasound (No ultrasound)	34	- 0.08(2.50)	Mean Difference	-1.52(-2.79,-0.25)	Ultrasound (20 sessions of ultrasound (active) treatment (1 MHz, 1.0 W/cm2, pulsed mode 1:4, 15 minutes per session) applied to the area over the carpal tunnel of one wrist, and indistinguishable sham ultrasound treatment applied to the other. The first 10 treatments were performed daily (5 sessions/week); 10 further treatments were twice weekly for 5 weeks.) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fusakul,Y., 2014	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	1.2 months	Laser+splint (LLLT+splint (multiple treatments))	56	1.68(0.66)	Placebo+splint (Placebo+splint (multiple treatments))	56	1.43(0.49)	Mean Difference	0.25(0.03,0.465297)	Placebo+splint (Placebo+splint (multiple treatments)) (P-value<.05)
Fusakul,Y., 2014	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	2.8 months	Laser+splint (LLLT+splint (multiple treatments))	56	1.49(0.58)	Placebo+splint (Placebo+splint (multiple treatments))	56	1.35(0.51)	Mean Difference	0.14(-0.06,0.342286)	Not Significant (P-value>.05)
Saeed,F.-U., 2012	High Quality	Questionnaire (General/undefined) (No mention of Boston scale, rather merely "symptom severity scale")	1 month	Ultrasound (Ultrasound therapy)	50	-0.44(0.18)	Laser (Laser therapy)	50	-0.87(0.18)	Mean Difference	0.43(0.36,0.50056)	Laser (Laser therapy) (P-value<.05)
Yang,C.P., 2011	High Quality	Questionnaire/Scale (GSS)(Global symptom score (GSS))	1 month	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	4.4(3.10)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	5(3.70)	Mean Difference	-0.6(-2.12,0.923161)	Not Significant (P-value>.05)
Yang,C.P., 2011	High Quality	Questionnaire/Scale (GSS)(Global symptom score (GSS))	6.9 months	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	3.4(5.80)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	7.2(5.40)	Mean Difference	-3.8(-6.30,-1.29537)	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1)) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/ P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Yang,C.P., 2011	High Quality	Questionnaire/Scale (GSS)(Global symptom score (GSS))	1.1 years	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1))	38	4.5(7.70)	Steroid (2 weeks of prednisolone 20 mg daily followed by 2 weeks of prednisolone 10 mg daily (Group 2))	39	11(8.60)	Mean Difference	-6.5(-10.14,-2.85594)	Acupuncture (Acupuncture administered in 8 sessions over 4 weeks (Group 1)) (P-value<.05)
Yildiz,N., 2011	High Quality	Questionnaire (General/undefined) (SSS)	1.8 months	Ultrasound (w/ splinting) (Ultrasound+splinting. Included the intention-intention-to-treat analysis data (Group 2))	17	1.97(0.65)	Sham ultrasound (w/ splinting) (Sham ultrasound+splinting. Included the intention-intention-to-treat analysis data)	17	2.08(0.82)	Mean Difference	-0.11(-0.61,0.387414)	Not Significant (P-value>.05)

META-ANALYSES

FIGURE 11: PICO 6 PART 1 IMMOBILIZATION VERSUS NO IMMOBILIZATION: NCS DML-FUNCTION

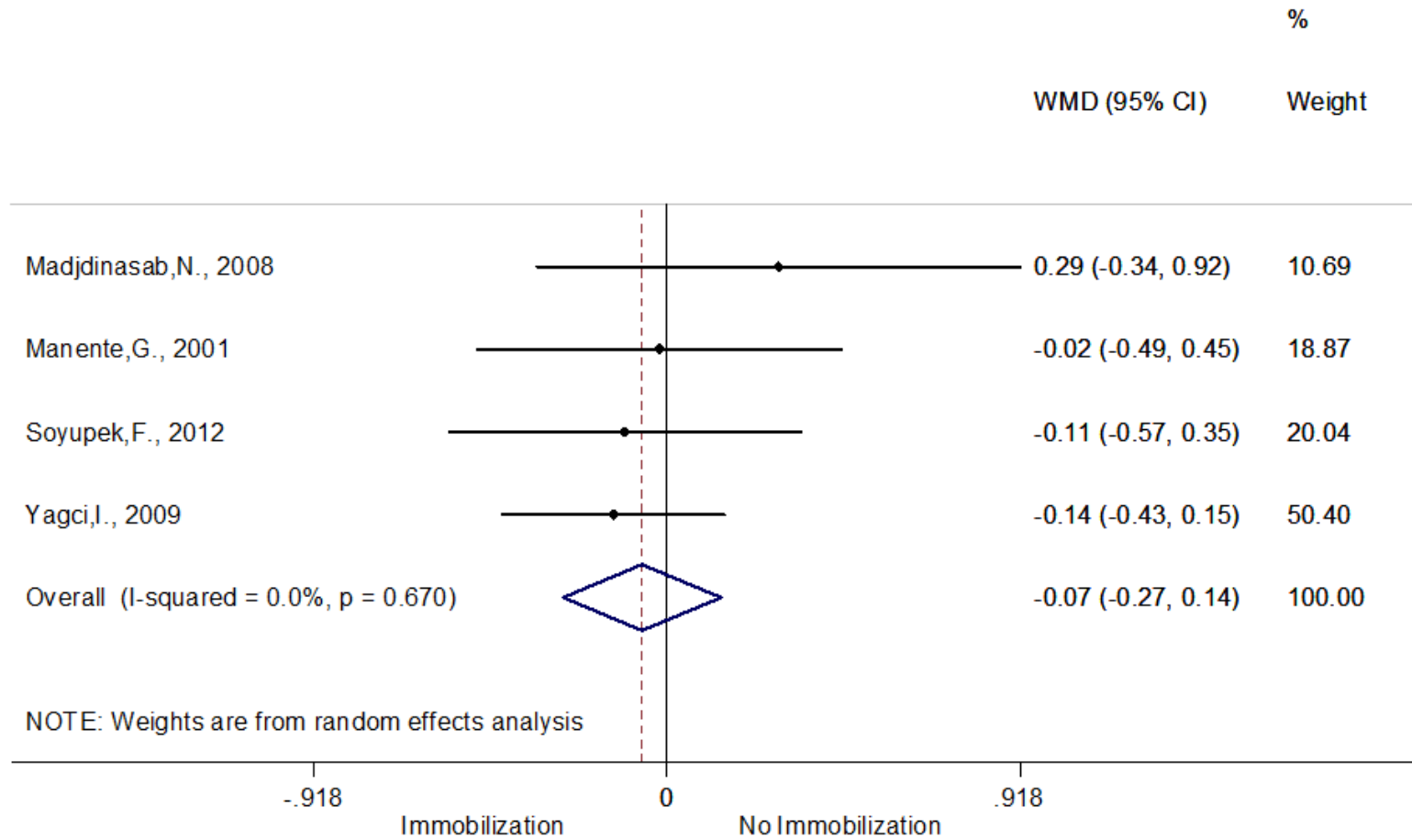
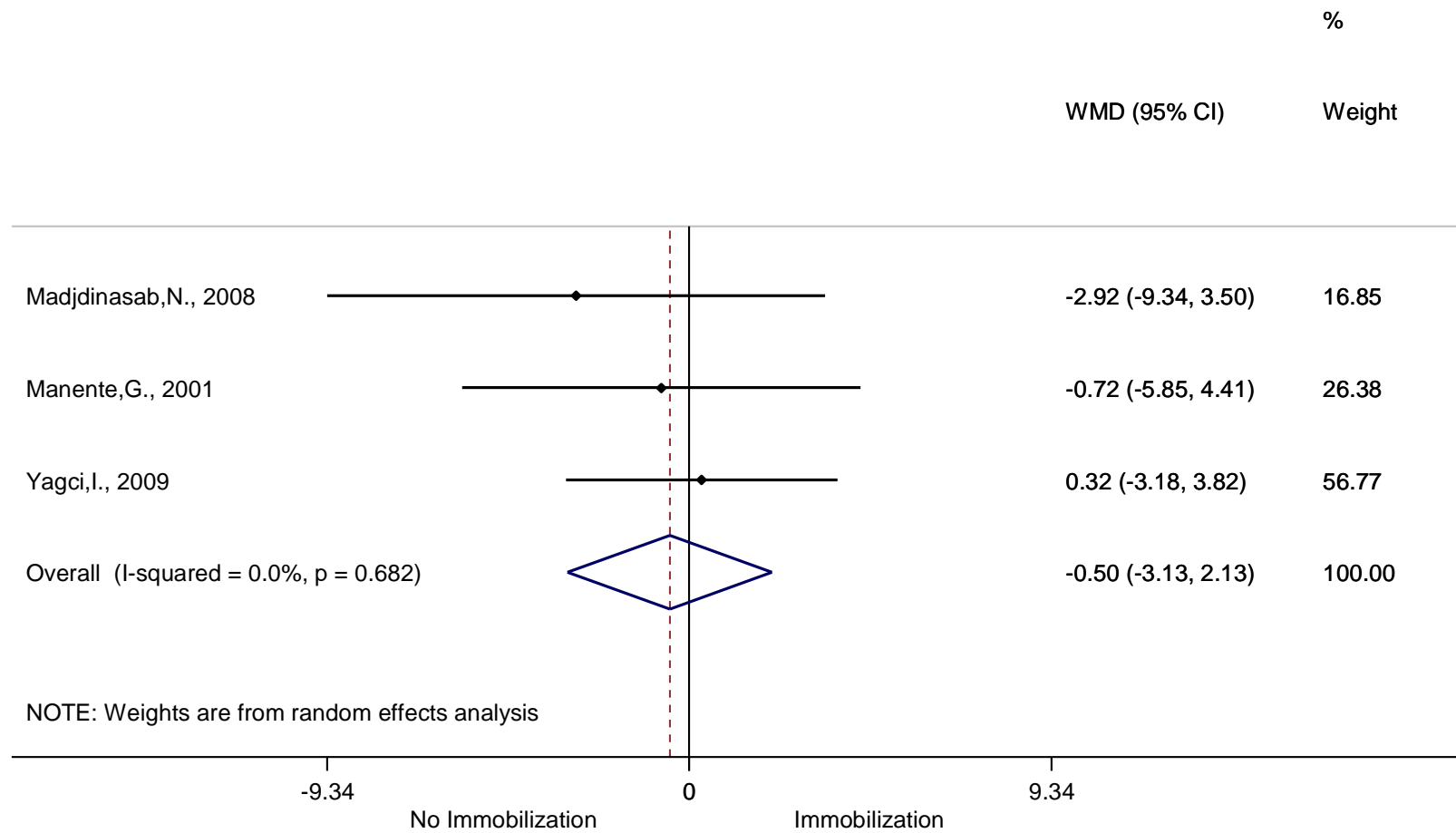


FIGURE 12: PICO 6 PART 1 IMMOBILIZATION VERSUS NO IMMOBILIZATION: NCS SNCV



SURGICAL RELEASE FOR CARPAL TUNNEL SYNDROME (CTS) GUIDELINE RECOMMENDATIONS

A. SURGICAL RELEASE LOCATION

Strong evidence supports that surgical release of the transverse carpal ligament should relieve symptoms and improve function.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention.

Rationale

There were 17 high quality (Atroshi 2006, Castillo 2014, Cellocco 2005, Cellocco 2009, Cresswell 2008, Gerritsen 2002, Hamed 2009, Hui 2005, Ismatullah 2013, Jarvik 2009, Larsen 2013, Malhotra 2007, Saw 2003, Sennwald 1995, Suppaphol 2012, Trumble 2002, and Zyluk 2006) and 10 moderate quality (Andreu 2013, Aslani 2012, Capa-Grasa 2014, Dumontier 1995, Elsharif 2014, Faraj 2012, Ly-Pen 2012, Tarallo 2014, Tian 2007, and Ucar 2012) studies demonstrating that release of the transverse carpal ligament is an effective treatment for patients with CTS.

Risks and Harms of Implementing this Recommendation

The risks associated with implementing this recommendation are those of a small outpatient operative procedure.

B. SURGICAL RELEASE PROCEDURE

Limited evidence supports that if surgery is chosen, a practitioner might consider using endoscopic carpal tunnel release based on possible short term benefits.

Strength of Recommendation: Limited Evidence ★★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

Eleven high quality (Atroshi 2006, Atroshi 2009, Ejiri 2012, Kang 2013, Larsen 2013, MacDermid 2003, Malhotra 2007, Saw 2003, Sennwald 1995, Trumble 2002, and Wong 2003) and 6 moderate quality (Agee 1992, Aslani 2012, Dumontier 1995, Ferdinand 2002, Jacobsen 1996, and Tian 2007) studies evaluated whether endoscopic carpal tunnel release provided any benefit over open or “mini-open” release at early follow up (3 months to one year). Three high quality studies (Atroshi 2009, Saw 2003 and Trumble 2002) favored endoscopic release for symptom relief in the first 3-6 months after surgery and one study (Saw 2003) demonstrated an earlier return to work. One high quality (Atroshi 2009) and one moderate quality study (Tian

2007) examined long term outcomes for endoscopic release versus open release and did not find any advantage of one method over the other. Studies comparing “mini-open” to standard release were inconclusive.

Risks and Harms of Implementing this Recommendation

The risks associated with implementing this recommendation are those of a small outpatient operative procedure.

C. SURGICAL PROCEDURES VERSUS NONOPERATIVE TREATMENTS

Strong evidence supports that surgical treatment of carpal tunnel syndrome should have a greater treatment benefit at 6 and 12 months as compared to splinting, NSAIDs/therapy, and a single steroid injection.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention.

Rationale

Four high quality (Gerritsen 2002, Hui 2005, Ismatullah 2013, and Jarvik 2009) and 3 moderate quality (Andreu 2013, Ly 2005, and Ly-Pen 2012) studies compared the effectiveness of surgical treatment to non-operative treatment for the relief of CTS symptoms. All three studies showed that surgery was superior for the relief of daytime and nocturnal paresthesias and return of grip strength. Of these, one high quality (Gerritson 2002) and one moderate quality study (Andreu 2013) examined the long term outcomes for surgery versus conservative treatment and found better results with surgery

Risks and Harms of Implementing this Recommendation

The risks associated with implementing this recommendation are those of a small outpatient operative procedure.

Future Research for Surgical Release of Carpal Tunnel Syndrome

Future research should focus on stratifying treatment outcomes based on preoperative symptom severity.

STUDY QUALITY TABLE FOR SURGICAL TREATMENTS

TABLE 132: INTERVENTION QUALITY EVALUATIONS

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Agee,J.M., 1992	●	●	○	●	●	●	●	●	●	Include	Moderate Quality
Andreu,J.L., 2013	●	●	○	○	○	●	●	●	●	Include	Moderate Quality
Aslani,H.R., 2012	●	●	○	●	●	●	●	●	●	Include	Moderate Quality
Atroschi,I., 2006	●	●	●	●	●	●	●	●	●	Include	High Quality
Atroschi,I., 2009	●	●	●	●	●	●	●	●	●	Include	High Quality
Capa-Grasa,A., 2014	●	●	○	●	●	●	●	●	●	Include	Moderate Quality
Castillo,T.N., 2014	●	●	●	●	●	○	●	●	●	Include	High Quality
Cellocco,P., 2005	●	●	●	●	●	●	●	●	●	Include	High Quality
Cellocco,P., 2009	●	○	●	●	●	●	●	●	●	Include	High Quality
Cresswell,T.R., 2008	●	●	●	○	●	●	●	●	●	Include	High Quality
Dumontier,C., 1995	●	●	●	●	●	●	●	●	●	Include	Moderate Quality
Ejiri,S., 2012	●	●	○	●	●	●	●	●	●	Include	High Quality
Elsharif,M., 2014	●	●	○	●	●	○	●	●	●	Include	Moderate Quality
Faraj,A.A., 2012	○	○	●	●	●	●	●	●	●	Include	Moderate Quality

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Ferdinand,R.D., 2002	●	●	●	●	●	●	●	●	●	Include	Moderate Quality
Gerritsen,A.A., 2002	●	●	○	●	●	●	●	●	●	Include	High Quality
Hamed,A.R., 2009	●	●	●	●	●	○	●	●	●	Include	High Quality
Hui,A.C., 2005	●	●	●	●	●	●	●	●	●	Include	High Quality
Ismatullah,I., 2013	●	●	○	●	●	●	●	●	●	Include	High Quality
Jacobsen,M.B., 1996	●	●	●	●	○	○	●	●	●	Include	Moderate Quality
Jarvik,J.G., 2009	●	●	●	●	●	●	●	●	●	Include	High Quality
Jugovac,I., 2002	●	●	●	●	●	●	●	●	●	Include	High Quality
Kang,H.J., 2013	●	●	●	●	●	●	●	●	●	Include	High Quality
Larsen,M.B., 2013	●	●	○	●	●	●	●	●	●	Include	High Quality
Ly, Pen D., 2005	●	●	○	●	●	○	●	●	●	Include	Moderate Quality
Ly-Pen,D., 2012	●	●	○	●	●	○	●	●	●	Include	Moderate Quality
MacDermid,J.C., 2003	●	●	●	●	●	●	●	●	●	Include	High Quality
Malhotra,R., 2007	●	●	●	●	●	●	●	●	●	Include	High Quality
Saw,N.L., 2003	●	●	●	●	●	●	●	●	●	Include	High Quality

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Sennwald,G.R., 1995	●	◐	○	●	●	●	●	●	●	Include	High Quality
Suppaphol,S., 2012	●	●	◐	●	●	○	●	●	●	Include	High Quality
Tarallo,M., 2014	◐	◐	○	●	●	●	●	●	●	Include	Moderate Quality
Tian,Y., 2007	◐	◐	●	●	●	○	●	●	●	Include	Moderate Quality
Trumble,T.E., 2002	●	●	●	●	●	●	●	●	●	Include	High Quality
Ucar,B.Y., 2012	○	○	●	●	●	●	●	●	●	Include	Moderate Quality
Wong,K.C., 2003	●	◐	●	●	○	●	●	●	●	Include	High Quality
Yucetas,S.C., 2013	◐	◐	◐	●	●	●	●	●	●	Include	High Quality
Zyluk,A., 2006	●	●	◐	●	●	●	●	●	●	Include	High Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 133: SUMMARY OF FINDINGS PICO 7 PART 1 ENDOSCOPIC (EARLY FOLLOW-UP (3 MONTHS UP TO 1 YEAR))

Outcomes	High Quality											Moderate Quality				Meta-Analysis			
	Atroshi, I., 2006	Atroshi, I., 2009	Ejiri, S., 2012	Kang, H.J., 2013	Larsen, M.B., 2013 (1)	Larsen, M.B., 2013 (2)	MacDermid, J.C., 2003	Malhotra, R., 2007	Saw, N.L., 2003	Sennwald, G.R., 1995	Trumble, T.E., 2002	Wong, K.C., 2003	Agee, J.M., 1992	Aslani, H.R., 2012 (1)	Aslani, H.R., 2012 (2)		Dumontier, C., 1995	Ferdinand, R.D., 2002	Jacobsen, M.B., 1996
Complications																			
Symptom occurrence (pillar pain)					○	○						○	○						NA
Symptom occurrence (scar tenderness)							●	○			○		○						NA
Function																			
Grip Strength	○		○							●	○		○			●	○		NA
Percentage of contralateral hand																			
84 days					○	●													NA
168 days					○	○													NA
Hand dexterity											○		○						NA
Jebsen taylor score													○				○		NA
Key pinch strength										○			○						NA
NCS (DML)								○					○						NA
NCS (NCV)								○					○						NA
Phalen's test score													○		○				NA
Pinch Strength	●											○	○						NA
Pinch Strength (key pinch)													○						NA
Pinch strength (pulp pinch)													○						NA
Pinch Strength (tripod pinch)																			NA
Questionnaire (Boston-FSS)				○															NA
Questionnaire (CTQ-functional status scale)		○																	NA
Questionnaire (Levine-FSS)									○										NA
84 days												●							NA
182 days												○	○						NA
364 days												○	○						NA
Range of motion																			
Manual motor testing for thumb abduction (patients testing normal)					○	○							○		○				NA
Semmes-Weinstein Monofilaments Test (SW test)				○									○		○				NA
Tinel's Sign/Test													○		○				NA
Two-point discrimination			○									○					○	○	NA
Other																			
Patient satisfaction (general-1=least satisfied to 5=most satisfied)																			
84 days												●							NA
182 days												○							NA
364 days												●							NA
Preferred Endoscopic CTR				○	○														NA
Questionnaire (DASH)				○															NA
Questionnaire (SF-36)						○													NA

CONT'D SUMMARY OF FINDINGS PICO 7 PART 1 ENDOSCOPIC (EARLY FOLLOW-UP (3 MONTHS UP TO 1 YEAR))

Outcomes	High Quality										Moderate Quality				Meta-Analysis			
	Atroshi, I., 2006	Atroshi, I., 2009	Ejiri, S., 2012	Kang, H.J., 2013	Larsen, M.B., 2013 (1)	Larsen, M.B., 2013 (2)	MacDermid, J.C., 2003	Malhotra, R., 2007	Saw, N.L., 2003	Trumble, T.E., 2002	Wong, K.C., 2003	Agee, J.M., 1992	Aslani, H.R., 2012 (1)	Aslani, H.R., 2012 (2)		Dumontier, C., 1995	Ferdinand, R.D., 2002	Jacobsen, M.B., 1996
Favors treatment 1 ● Favors treatment 2 ● Not significant ○																		
Outcomes																		
Pain																		
Questionnaire/Scale (VAS-pain)					○	○					○							NA
Symptom recurrence (general)																		
Night pain													○	○				NA
Wrist pain												●	○					NA
Symptom recurrence (pain)																		
Patients reporting pain in 4-6 range on 10cm VAS scale								○							○			NA
Symptom relief (pain)																		
50-75% improvement								○	○									NA
McGill pain questionnaire								○										NA
Patients reporting pain in 0-3 range on 10cm VAS scale								○										NA
Postoperative Pain Control																		
Analgesia (duration)																	○	NA
Quality Of Life																		
Activity of daily living (ADL)																		
Book Holding (100mm VAS)																		NA
Buttoning (100mm VAS)				○														NA
Carpal tunnel syndrome functional status	○																	NA
Chopstick use (100mm VAS)			○															NA
Receiver holding (100mm VAS)			○															NA
Writing (100mm VAS)			○															NA
Patient satisfaction (general)																		
Subjective improvement-excellent (Excellent, good, no improvement, or worse)									○									NA
Subjective improvement-good (Excellent, good, no improvement, or worse)									○									NA
Return to Work																		
										●					○			NA
Symptoms																		
Paresthesia (VAS scale)					○	○												NA
Questionnaire (Boston-SSS)				○														NA
Questionnaire (CTSQ symptoms severity scale)			○															NA
Questionnaire (Levine-SSS)								○		○								NA
84 days										○								NA
182 days										●								NA
364 days										○								NA
Semmes-Weinstein Monofilaments Test (SW test)																		
Thumb, patients testing normal												○						NA
Symptom recurrence (general)																		
Score range from 0 (no pain or tenderness in scar or proximal palm and no activity limitation) to 100 (severe pain in scar or proximal palm and severe activity limitation because of pain or tenderness)													○	○				NA
90 days	●																	NA
360 days	○																	NA
Score range; carpal tunnel syndrome, 1 (no symptoms or disability) to 5 (most severe symptoms or disability)																		
90 days	●																	NA
360 days	○																	NA
Symptom recurrence (numbness)								○				○	○	○				NA
Symptom recurrence (pain)								○				○	○	○				○
Symptom recurrence (tingling)								○				○	○	○				NA
Symptom recurrence (weakness)								○				○	○	○				NA
Symptom relief (general)																		
>75% improvement								○									○	NA
100% improvement								○			○							NA

TABLE 134: SUMMARY OF FINDINGS PICO 7 PART 1 ENDOSCOPIC (LATE FOLLOW-UP (> 1 YEAR))











	High Quality	Moderate Quality	
Favors treatment 1 			
Favors treatment 2 			
Not significant 			
Outcomes	Atroschi, I., 2009	Tian, Y., 2007	Meta-Analysis
Complications			
Surgery failure (reoperation)			NA
Symptom occurrence (scar tenderness)			NA
Function			
Questionnaire (CTSQ functional status scale)			NA
Two-point discrimination			NA
Other			
Patient satisfaction (general)			NA
Pain			
Symptom relief (pain)			
No scar or palm pain			NA
Symptoms			
Questionnaire (CTSQ symptoms severity scale)			NA
Symptom relief (general)			NA

TABLE 135: SUMMARY OF FINDINGS PICO 7 PART 2 MINI (EARLY FOLLOW-UP (3 MONTHS UP TO 1 YEAR))

Outcomes	High Quality						Moderate Quality		Meta-Analysis		
	Cresswell, T.R., 2008	Jugovac, I., 2002	Larsen, M.B., 2013 (3)	Suppaphol, S., 2012	Yucetas, S.C., 2013	Zyluk, A., 2006	Aslani, H.R., 2012 (3)	Capa-Grasa, A., 2014		Faraj, A.A., 2012	Tarallo, M., 2014
Favors treatment 1	●										
Favors treatment 2	●										
Not significant	○										
Complications											
Complications (general)	●				○						NA
Symptom occurrence (pillar pain)			○								NA
Symptom occurrence (scar length)								●			NA
Symptom occurrence (scar tenderness)	○	○									NA
Function											
Grip Strength	○			●		●		○			NA
Percentage of contralateral hand											NA
84 days			●								NA
168 days			○								NA
Key pinch strength											NA
90 days						●					NA
180 days						○					NA
360 days						○					NA
NCS (DML)		○							○		NA
NCS (EMG)					○						NA
NCS (SNCV)		○							○		NA
Phalen's test score							○				NA
Pinch Strength	○			○							NA
Pinch Strength (three-point pinch)											NA
90 days						●					NA
180 days						●					NA
360 days						○					NA
Pinch Strength (two-point pinch)						●					NA
Questionnaire (Boston-FSS)					○					●	NA
Questionnaire (DASH-Quick DASH)								●			NA
Questionnaire (Levine-FSS)				○		○					NA
Range of motion			○								NA
Semmes-Weinstein Monofilaments Test (SW test)						○					NA
Tinel's Sign/Test							○				NA
Two-point discrimination				○		○				○	NA
Other											
Patient satisfaction (general)									○		NA
Questionnaire/Scale (Vancouver scale)										●	NA
Pain											
Questionnaire/Scale (VAS-pain)	○		○		○						NA
Symptom recurrence (general)											NA
Night pain							○				NA
Wrist pain							●				NA
Quality Of Life											
Return to normal activities									●		NA
Return to work		○									NA
Symptoms											
Paresthesia (VAS scale)			○								NA
Questionnaire (Boston-SSS)					○					●	NA
Questionnaire (Levine-SSS)	○			○		○					NA
Symptom recurrence (general weakness)							●				NA
Symptom recurrence (general stiffness)							○				NA
Symptom recurrence (numbness)							○				NA
Symptom relief (general)		○									NA

TABLE 136: SUMMARY OF FINDINGS PICO 7 PART 2 MINI (LATE FOLLOW-UP (> 1 YEAR))

	High Quality			Moderate Quality		Meta-Analysis
	Cellocco, P., 2005	Cellocco, P., 2009	Cresswell, T. R., 2008	Eisharif, M., 2014	Ucar, B. Y., 2012	
Favors treatment 1	●					
Favors treatment 2	●					
Not significant	○					
Outcomes						
Complications						
Symptom occurrence (scar pain)					●	NA
Function						
Questionnaire (Boston-FSS)						
Boston CTS Questionnaire (functional status scale)-Italian modified version						
570 days	●	●				NA
900 days	○	○				NA
1800 days		○				NA
Questionnaire (DASH-Quick DASH)				●		NA
Two-point discrimination	○	●				NA
Other						
Patient satisfaction (general)	●					NA
Subjective satisfaction with their scar						
900 days		○				NA
1800 days		●				NA
Quality Of Life						
Return to Work		●				NA
Symptoms						
Questionnaire (Boston-SSS)						
Boston CTS Questionnaire (symptom severity scale)-Italian modified version						
570 days	●	●				NA
900 days	○	○				NA
1800 days		○				NA
Questionnaire (Levine-SSS)			●			NA
Symptom recurrence (general)		○				NA

TABLE 137: SUMMARY OF FINDINGS PICO 7 PART 3 OPEN (EARLY FOLLOW-UP (3 MONTHS UP TO 1 YEAR))
















	High Quality		Meta-Analysis
	Castillo, T.N., 2014	Hamed, A.R., 2009	
Favors treatment 1 			
Favors treatment 2 			
Not significant 			
Outcomes			
Complications			
Symptom occurrence (pillar pain)			
90 days			NA
180 days			NA
Symptom occurrence (scar tenderness)			
90 days			NA
180 days			NA
Function			
Grip Strength			NA
Pinch Strength			NA
Questionnaire (BWCTQ-FSS)			NA
Other			
Questionnaire (DASH)			NA
Symptoms			
Questionnaire (BWCTQ-SSS)			NA

TABLE 138: SUMMARY OF FINDINGS PICO 7 PART 4 SURGICAL VS. CONSERVATIVE (EARLY FOLLOW-UP (3 MONTHS UP TO 1 YEAR))

Outcomes	High Quality			Moderate Quality		Meta-Analysis
	Gerritsen, A., 2002	Hui, A.C., 2005	Ismatullah, I., 2013	Jarvik, J.G., 2009	Andreu, J.L., 2013	
Favors treatment 1 ●						
Favors treatment 2 ●						
Not significant ○						
Outcomes						
Complications						
Surgery Failure (success rate)	●					NA
Treatment Failure <20% VAS score improvement @ 3 months or worsening of symptoms						○
Function						
Grip Strength		●				NA
NCS (Motor amplitude)					○	NA
NCS (DML)		○			●	NA
NCS (DSL)	○					NA
NCS (SA)					○	NA
NCS (SNCV)		○				NA
NCS (SNCV)					●	NA
Questionnaire (General/Undefined)						
Visual analog scale of functional impairment (100cm VAS)						
90 days					●	NA
180 days					○	NA
360 days					●	NA
Questionnaire (CTSAQ)						
Function(1-5)				●		NA
Questionnaire (Levine-FSS)						
90 days	○					NA
180 days	●					NA
360 days	●					NA
Other						
Questionnaire (SF-36)						
MCS				○		NA
PCS						
180 days				●		NA
360 days				○		NA
Pain						
Questionnaire/Scale (VAS-pain 100cm)						
90 days					●	NA
180 days					○	NA
360 days					●	NA
Symptom recurrence (nocturnal pain)						
Number of nights waking up due to symptoms						
90 days	○					NA
180 days	●					NA
360 days	○					NA
Symptom recurrence (pain)						
Pain intensity(1-10)				○		NA
Pain interference(1-10)				○		NA
Quality Of Life						
Activity of daily living (ADL)						
Days of reduced work or housework						
180 days				○		NA
360 days				●		NA
Symptoms						
Paresthesia						
Daytime paresthesia	●					NA
Nighttime paresthesia	●					NA
Nocturnal paresthesia (100mm VAS scale)						
90 days					●	NA
180 days					○	NA
360 days					●	NA
Questionnaire (CTSAQ)						
Symptoms(1-5)				●		NA
Questionnaire (Levine-SSS)						
90 days	○					NA
180 days	●					NA
360 days	●					NA
Questionnaire/Scale (GSS)		●	●			NA

TABLE 139: SUMMARY OF FINDINGS PICO 7 PART 4 SURGICAL VS. CONSERVATIVE (LATE FOLLOW-UP (> 1 YEAR))

	High Quality	Moderate Quality	
Favors treatment 1 	Gerritsen, A.A., 2002	Ly-Pen, D., 2012	Meta-Analysis
Favors treatment 2 			
Not significant 			
Outcomes			
Complications			
Complications (general)			
Discomfort caused by splint			NA
Overall			NA
Reflex sympathetic dystrophy			NA
Scar pain			NA
Skin irritation			NA
Stiffness of wrist, hands, or fingers			NA
Swelling of the wrist, hand or fingers			NA
Complications (haematoma)			NA
Complications (infection)			NA
Surgery Failure (success rate)			NA
Symptom occurrence (pillar pain)			NA
Function			
Questionnaire (General/Undefined)			
Reached 20% improvement in functional impairment on 100mm VAS scale			NA
Reached 50% improvement in functional impairment on 100mm VAS scale			NA
Reached 70% improvement in functional impairment on 100mm VAS scale			NA
Questionnaire (Levine-FSS)			NA
Pain			
Symptom recurrence (nocturnal pain)			NA
Symptom relief (pain)			
Reached 20% improvement in pain on VAS 100mm scale			NA
Reached 50% improvement in pain on VAS 100mm scale			NA
Reached 70% improvement in pain on VAS 100mm scale			NA
Symptoms			
Paresthesia			
Daytime paresthesia			NA
Reached 20% improvement in nocturnal parthesia on VAS 100mm scale			NA
Reached 50% improvement in nocturnal parthesia on VAS 100mm scale			NA
Reached 70% improvement in nocturnal parthesia on VAS 100mm scale			NA
Questionnaire (Levine-SSS)			NA

DETAILED DATA FINDINGS

TABLE 140: PICO 7 PART 1- ENDOSCOPIC: COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroschi,I., 2009	High Quality	Surgery failure (reoperation)(Reoperation)	5 years	CT release (endoscopic) (2-portal endoscopic release)	63	4.76%	CT release (open) (Open carpal tunnel release)	65	4.62%	RR	1.03(0.22,4.92)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Symptom occurrence (pillar pain)()	3 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 15 mm arthroscope. After transection the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Symptom occurrence (pillar pain)()	3 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 15 mm arthroscope. After transection the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Symptom occurrence (pillar pain)()	5.5 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 15 mm arthroscope. After transection the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Symptom occurrence (pillar pain)()	5.5 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 15 mm arthroscope. After transection the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Malhotra,R., 2007	High Quality	Symptom occurrence (scar tenderness)()	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	0.00%	CT release (open) (short incision open release)	31	29.03%	RD	-0.29(-0.45,-0.13)	CT release (endoscopic) (single portal endoscopic release) (P-value<.05)
Saw,N.L., 2003	High Quality	Symptom occurrence (scar tenderness)(Anterior carpal tenderness)	3 months	CT release (endoscopic) (Endoscopic release)	74	22(7.00)	CT release (open) (Open CTR)	76	24(6.00)	Mean Difference	-2(-4.09,0.088891)	Not Significant (P-value>.05)
Trumble,T.E., 2002	High Quality	Symptom occurrence (scar tenderness)(Loads of pressure (in kg) able to withstand)	12 months	CT release (endoscopic) (single portal endoscopic release)	75	. %	CT release (open) (3-4cm incision)	75	. %	Author Reported	NA	Not Significant (P-value>.05)
Wong,K.C., 2003	High Quality	Symptom occurrence (pillar pain)(Radial pillar pain)	1 years	CT release (endoscopic) (two-portal endoscopic release)	30	. %	CT release (open-limited) (limited-open release)	29	. %	Author Reported	NA	Not Significant (P-value>.05)
Wong,K.C., 2003	High Quality	Symptom occurrence (pillar pain)(Ulnar pillar pain)	1 years	CT release (endoscopic) (two-portal endoscopic release)	30	. %	CT release (open-limited) (limited-open release)	29	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Agee,J.M., 1992	Moderate Quality	Symptom occurrence (pillar pain)(Radial pillar pain (0=none to 4=severe))	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	72	. %	CT release (open) (Conventional open surgery)	55	. %	Author Reported	NA	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Symptom occurrence (pillar pain)(Radial pillar pain (0=none to 4=severe))	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	65	. %	CT release (open) (Conventional open surgery)	47	. %	Author Reported	NA	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Symptom occurrence (scar tenderness)(0=none to 4=severe)	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	72	. %	CT release (open) (Conventional open surgery)	55	. %	Author Reported	NA	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Symptom occurrence (scar tenderness)(0=none to 4=severe)	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	65	. %	CT release (open) (Conventional open surgery)	47	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Tian, Y., 2007	Moderate Quality	Symptom occurrence (scar tenderness)(Rate of scar tenderness)	2 years	CT release (endoscopic) (one-portal endoscopies release)	30	. %	CT release (open) (traditional open release)	32	. %	Author Reported	NA	CT release (endoscopic) (one-portal endoscopies release) (P-value<.05)

TABLE 141: PICO 7 PART 1- ENDOSCOPIC: OTHER QUESTIONNAIRE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kang,H.J., 2013	High Quality	Questionnaire (DASH)()	3 months	CT release (endoscopic) (Endoscopic release using the Agee technique)	52	11(11.04)	CT release (mini) (1.5-cm incision was made in the prox-imal palm over the transverse carpal ligament)	52	11(11.04)	Mean Difference	0(-4.24,4.24)	Not Significant (P-value>.05)
MacDermid,J.C., 2003	High Quality	Questionnaire (SF-36)(Physical health- SF-36)	3 months	CT release (endoscopic) (2 portal Chow technique)	32	47(.)	CT release (open) (traditional long incision open release)	91	42(.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 142: PICO 7 PART 1- ENDOSCOPIC: FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroschi,I., 2006	High Quality	Grip strength(Units not reported)	3 months	CT release (endoscopic) (Endoscopic release injected subcutaneously at the proximal and distal portals)	63	31.5(11.00)	CT release (open) (Open carpal tunnel release along the length of the incision)	65	29.9(11.00)	Mean Difference	1.6(-2.21,5.411770)	Not Significant (P-value>.05)
Atroschi,I., 2006	High Quality	Pinch Strength(Units not reported)	3 months	CT release (endoscopic) (Endoscopic release injected subcutaneously at the proximal and distal portals)	63	6.7(2.20)	CT release (open) (Open carpal tunnel release along the length of the incision)	65	6(1.80)	Mean Difference	0.7(0.00,1.397582)	CT release (endoscopic) (Endoscopic release injected subcutaneously at the proximal and distal portals) (P-value<.05)
Atroschi,I., 2009	High Quality	Questionnaire (CTQ)(CTSQ functional status scale)	1 years	CT release (endoscopic) (2-portal endoscopic release)	63	1.25(0.50)	CT release (open) (Open carpal tunnel release)	65	1.19(0.40)	Mean Difference	0.06(-0.10,0.217164)	Not Significant (P-value>.05)
Atroschi,I., 2009	High Quality	Questionnaire (CTQ)(CTSQ functional status scale)	5 years	CT release (endoscopic) (2-portal endoscopic release)	63	1.3(0.50)	CT release (open) (Open carpal tunnel release)	63	1.29(0.50)	Mean Difference	0.01(-0.16,0.184610)	Not Significant (P-value>.05)
Ejiri,S., 2012	High Quality	Grip strength(Kilograms)	3 months	CT release (endoscopic) (Okutsu method)	40	. %	CT release (open) (3cm palmar incision)	39	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ejiri,S., 2012	High Quality	Semmes Weinstein Monofilaments Test (SW test)(lower scores=improvement)	3 months	CT release (endoscopic) (Okutsu method)	40	-0.49(.)	CT release (open) (3cm palmar incision)	39	-0.24(.)	Author Reported	NA	Not Significant (P-value>.05)
Ejiri,S., 2012	High Quality	Two-point discrimination(Millimeters)	3 months	CT release (endoscopic) (Okutsu method)	40	-3.3(.)	CT release (open) (3cm palmar incision)	39	-1.7(.)	Author Reported	NA	Not Significant (P-value>.05)
Kang,H.J., 2013	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	3 months	CT release (endoscopic) (Endoscopic release using the Agee technique)	52	1.5(0.37)	CT release (mini) (1.5-cm incision was made in the proximal palm over the transverse carpal ligament)	52	1.7(-0.74)	Mean Difference	-0.2(-0.42,0.02)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Grip strength(Percentage of contralateral hand)	3 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Grip strength(Percentage of contralateral hand)	3 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Grip strength(Percentage of contralateral hand)	5.5 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Grip strength(Percentage of contralateral hand)	5.5 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Range of motion()	3 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Range of motion()	3 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Range of motion()	5.5 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	.	. %	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Range of motion()	5.5 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	.	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
MacDermid,J. C., 2003	High Quality	Grip strength(Kilograms)	3 months	CT release (endoscopic) (2 portal Chow technique)	32	27(.)	CT release (open) (traditional long incision open release)	91	27(.)	Author Reported	NA	Not Significant (P-value>.05)
MacDermid,J. C., 2003	High Quality	Pinch Strength (key pinch)(Kilograms)	3 months	CT release (endoscopic) (2 portal Chow technique)	32	7(.)	CT release (open) (traditional long incision open release)	91	5.6(.)	Author Reported	NA	Not Significant (P-value>.05)
MacDermid,J. C., 2003	High Quality	Pinch Strength (tripod pinch)(Kilograms)	3 months	CT release (endoscopic) (2 portal Chow technique)	32	6.7(.)	CT release (open) (traditional long incision open release)	91	6.5(.)	Author Reported	NA	Not Significant (P-value>.05)
Malhotra,R., 2007	High Quality	NCS (DML)(Distal motor latency (ms))	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	. %	CT release (open) (short incision open release)	31	. %	Author Reported	NA	Not Significant (P-value>.05)
Malhotra,R., 2007	High Quality	NCS (NCV)(Nerve conduction velocity (ms))	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	. %	CT release (open) (short incision open release)	31	. %	Author Reported	NA	Not Significant (P-value>.05)
Saw,N.L., 2003	High Quality	Questionnaire (Levine-FSS)(Levine functional score)	3 months	CT release (endoscopic) (Endoscopic release)	74	. %	CT release (open) (Open CTR)	76	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Sennwald,G.R., 1995	High Quality	Grip strength(Kilograms)	3 months	CT release (endoscopic) (two-portal Chow technique)	25	. %	CT release (open) (traditional open release)	22	. %	Author Reported	NA	CT release (endoscopic) (two-portal Chow technique) (P-value<.05)
Sennwald,G.R., 1995	High Quality	Key pinch strength(Kilograms)	3 months	CT release (endoscopic) (two-portal Chow technique)	25	. %	CT release (open) (traditional open release)	22	. %	Author Reported	NA	Not Significant (P-value>.05)
Trumble,T.E., 2002	High Quality	Grip strength(Kilograms)	3 months	CT release (endoscopic) (single portal endoscopic release)	75	. %	CT release (open) (3-4cm incision)	72	. %	Author Reported	NA	Not Significant (P-value>.05)
Trumble,T.E., 2002	High Quality	Grip strength(Kilograms)	12 months	CT release (endoscopic) (single portal endoscopic release)	75	32(.)	CT release (open) (3-4cm incision)	72	34(.)	Author Reported	NA	Not Significant (P-value>.05)
Trumble,T.E., 2002	High Quality	Hand dexterity(Jebson-Taylor test)	3 months	CT release (endoscopic) (single portal endoscopic release)	75	44(.)	CT release (open) (3-4cm incision)	72	44(.)	Author Reported	NA	Not Significant (P-value>.05)
Trumble,T.E., 2002	High Quality	Hand dexterity(Purdue pegboard test)	3 months	CT release (endoscopic) (single portal endoscopic release)	75	20(.)	CT release (open) (3-4cm incision)	72	20(.)	Author Reported	NA	Not Significant (P-value>.05)
Trumble,T.E., 2002	High Quality	Pinch Strength(Kilograms)	3 months	CT release (endoscopic) (single portal endoscopic release)	75	7.9(.)	CT release (open) (3-4cm incision)	72	8.1(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Trumble,T.E., 2002	High Quality	Questionnaire (Levine-FSS)(CTS-FSS (1=least functional difficulty, 5=svere functional difficulty))	3 months	CT release (endoscopic) (single portal endoscopic release)	75	1.7(0.10)	CT release (open) (3-4cm incision)	72	2.4(0.10)	Mean Difference	-0.7(-0.73,-0.66766)	CT release (endoscopic) (single portal endoscopic release) (P-value<.05)
Trumble,T.E., 2002	High Quality	Questionnaire (Levine-FSS)(CTS-FSS (1=least functional difficulty, 5=svere functional difficulty))	6 months	CT release (endoscopic) (single portal endoscopic release)	75	1.8(0.13)	CT release (open) (3-4cm incision)	72	1.8(0.09)	Mean Difference	0(-0.04,0.036025)	Not Significant (P-value>.05)
Trumble,T.E., 2002	High Quality	Questionnaire (Levine-FSS)(CTS-FSS (1=least functional difficulty, 5=svere functional difficulty))	12 months	CT release (endoscopic) (single portal endoscopic release)	75	1.7(0.10)	CT release (open) (3-4cm incision)	72	1.7(0.11)	Mean Difference	0(-0.03,0.034026)	Not Significant (P-value>.05)
Trumble,T.E., 2002	High Quality	Semmes-Weinstein Monofilaments Test (SW test)()	12 months	CT release (endoscopic) (single portal endoscopic release)	75	3.26(.)	CT release (open) (3-4cm incision)	72	3.2(.)	Author Reported	NA	Not Significant (P-value>.05)
Wong,K.C., 2003	High Quality	Pinch Strength(% improvement from baseline (units not reported))	1 years	CT release (endoscopic) (two-portal endoscopic release)	30	. %	CT release (open-limited) (limited-open release)	29	. %	Author Reported	NA	Not Significant (P-value>.05)
Wong,K.C., 2003	High Quality	Two-point discrimination(Millimeters)	1 years	CT release (endoscopic) (two-portal endoscopic release)	30	. %	CT release (open-limited) (limited-open release)	29	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Agee,J.M., 1992	Moderate Quality	Grip strength(Jamar grip (mean percent change from baseline))	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	72	. %	CT release (open) (Conventional open surgery)	55	. %	Author Reported	NA	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Grip strength(Jamar grip (mean percent change from baseline))	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	64	. %	CT release (open) (Conventional open surgery)	48	. %	Author Reported	NA	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Hand dexterity(fine dexterity loss)	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	74	14.86%	CT release (open) (Conventional open surgery)	55	12.73%	RR	1.17(0.48,2.82)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Hand dexterity(fine dexterity loss)	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	65	12.31%	CT release (open) (Conventional open surgery)	48	12.50%	RR	0.98(0.37,2.65)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Agee,J.M., 1992	Moderate Quality	Key pinch strength(Mean % change from baseline)	1.1 weeks	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	64	. %	CT release (open) (Conventional open surgery)	55	. %	Author Reported	NA	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Key pinch strength(Mean % change from baseline)	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	72	. %	CT release (open) (Conventional open surgery)	48	. %	Author Reported	NA	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Phalen's test score(% negative)	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	64	92.19%	CT release (open) (Conventional open surgery)	46	93.48%	RR	0.99(0.89,1.09)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Pinch strength (pulp pinch)(Mean % change from pre-op value (units not reported))	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	72	. %	CT release (open) (Conventional open surgery)	55	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Agee,J.M., 1992	Moderate Quality	Pinch strength (pulp pinch)(Mean % change from pre-op value (units not reported))	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	64	. %	CT release (open) (Conventional open surgery)	48	. %	Author Reported	NA	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Range of motion(Manual motor testing for thumb abduction (patients testing normal))	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	74	81.08%	CT release (open) (Conventional open surgery)	74	74.32%	RR	1.09(0.92,1.30)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Range of motion(Manual motor testing for thumb abduction (patients testing normal))	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	63	80.95%	CT release (open) (Conventional open surgery)	83	83.13%	RR	0.97(0.83,1.14)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Semmes-Weinstein Monofilaments Test (SW test)(Thumb, patients testing normal)	1.1 weeks	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	57	71.93%	CT release (open) (Conventional open surgery)	27	48.15%	RR	1.49(0.98,2.28)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Agee,J.M., 1992	Moderate Quality	Semmes-Weinstein Monofilaments Test (SW test)(Index finger, Patients testing normal)	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	37	62.16%	CT release (open) (Conventional open surgery)	27	51.85%	RR	1.20(0.77,1.87)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Semmes-Weinstein Monofilaments Test (SW test)(Little finger, Patients testing normal)	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	37	75.68%	CT release (open) (Conventional open surgery)	27	85.19%	RR	0.89(0.70,1.13)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Semmes-Weinstein Monofilaments Test (SW test)(Long finger, Patients testing normal)	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	37	64.86%	CT release (open) (Conventional open surgery)	27	66.67%	RR	0.97(0.68,1.39)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Semmes-Weinstein Monofilaments Test (SW test)(Thumb, patients testing normal)	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	37	43.24%	CT release (open) (Conventional open surgery)	42	64.29%	RR	0.67(0.44,1.04)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Agee,J.M., 1992	Moderate Quality	Semmes-Weinstein Monofilaments Test (SW test)(Index finger, Patients testing normal)	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	57	73.68%	CT release (open) (Conventional open surgery)	42	80.95%	RR	0.91(0.74,1.13)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Semmes-Weinstein Monofilaments Test (SW test)(Little finger, Patients testing normal)	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	57	89.47%	CT release (open) (Conventional open surgery)	42	90.48%	RR	0.99(0.87,1.13)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Semmes-Weinstein Monofilaments Test (SW test)(Long finger, Patients testing normal)	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	57	89.47%	CT release (open) (Conventional open surgery)	42	76.19%	RR	1.17(0.97,1.42)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Tinel's Sign/Test(% negative)	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	64	87.50%	CT release (open) (Conventional open surgery)	46	82.61%	RR	1.06(0.90,1.25)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Aslani,H.R., 2012	Moderate Quality	Phalen's test score(% positive)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	6.25%	CT release (mini) (Mini palmer incision)	28	10.71%	RR	0.58(0.10,3.24)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Phalen's test score(% positive)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	6.25%	CT release (open) (large open incision)	36	13.89%	RR	0.46(0.10,2.22)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Tinel's Sign/Test(# positive)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	12.50%	CT release (mini) (Mini palmer incision)	28	10.71%	RR	1.17(0.29,4.77)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Tinel's Sign/Test(# positive)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	12.50%	CT release (open) (large open incision)	36	19.44%	RR	0.64(0.21,1.99)	Not Significant (P-value>.05)
Dumontier,C., 1995	Moderate Quality	Grip strength(Kilograms)	3 months	CT release (endoscopic) (two-portal endoscopic release)	28	. %	CT release (open) (Conventional palmar open release)	30	. %	Author Reported	NA	CT release (endoscopic) (two-portal endoscopic release) (P-value<.05)
Ferdinand,R.D., 2002	Moderate Quality	Grip strength(Pounds)	1 years	CT release (endoscopic) (single portal endoscopic release)	25	. %	CT release (open) (traditional open release)	25	. %	Author Reported	NA	Not Significant (P-value>.05)
Ferdinand,R.D., 2002	Moderate Quality	Jebsen Taylor score(Seconds)	1 years	CT release (endoscopic) (single portal endoscopic release)	25	. %	CT release (open) (traditional open release)	25	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ferdinand,R.D., 2002	Moderate Quality	Two-point discrimination(Millimeters)	1 years	CT release (endoscopic) (single portal endoscopic release)	25	. %	CT release (open) (traditional open release)	25	. %	Author Reported	NA	Not Significant (P-value>.05)
Jacobsen,M.B., 1996	Moderate Quality	Two-point discrimination(Millimeters)	5.9 months	CT release (endoscopic) (two-portal Chow technique)	16	2.94(0.56)	CT release (open) (traditional open release)	16	3.25(1.30)	Mean Difference	-0.31(-1.00,0.383588)	Not Significant (P-value>.05)
Tian,Y., 2007	Moderate Quality	Two-point discrimination(Units not specified)	2 years	CT release (endoscopic) (one-portal endoscopies release)	30	5.9(1.50)	CT release (open) (traditional open release)	32	5.3(1.70)	Mean Difference	0.6(-0.20,1.396909)	Not Significant (P-value>.05)

TABLE 143: PICO 7 PART 1- ENDOSCOPIC: OTHER

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroschi,I., 2009	High Quality	Patient satisfaction (general)(Completely or very satisfied)	5 years	CT release (endoscopic) (2-portal endoscopic release)	63	85.71%	CT release (open) (Open carpal tunnel release)	63	82.54%	RR	1.04(0.89,1.21)	Not Significant (P-value>.05)
Kang,H.J., 2013	High Quality	Patient satisfaction (general)(Preferred Endoscopic CTR)	3 months	CT release (endoscopic) (Endoscopic release using the Agee technique)	52	65.38%	CT release (mini) (1.5-cm incision was made in the prox-imal palm over the transverse carpal ligament)	52	65.38%	RR	1.00(0.76,1.32)	Not Significant (P-value>.05)
Trumble,T.E., 2002	High Quality	Patient satisfaction (general)(1=least satisfied to 5=most satisfied)	3 months	CT release (endoscopic) (single portal endoscopic release)	75	4.4(0.13)	CT release (open) (3-4cm incision)	72	4(0.14)	Mean Difference	0.4(0.36,0.443719)	CT release (endoscopic) (single portal endoscopic release) (P-value<.05)
Trumble,T.E., 2002	High Quality	Patient satisfaction (general)(1=least satisfied to 5=most satisfied)	6 months	CT release (endoscopic) (single portal endoscopic release)	75	4.5(0.12)	CT release (open) (3-4cm incision)	72	4.5(0.12)	Mean Difference	0(-0.04,0.038806)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Trumble, T.E., 2002	High Quality	Patient satisfaction (general)(1=least satisfied to 5=most satisfied)	12 months	CT release (endoscopic) (single portal endoscopic release)	75	4.6(0.11)	CT release (open) (3-4cm incision)	72	4.5(0.13)	Mean Difference	0.1(0.06,0.139006)	CT release (endoscopic) (single portal endoscopic release) (P-value<.05)

TABLE 144: PICO 7 PART 1- ENDOSCOPIC: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroschi,I., 2009	High Quality	Symptom relief (pain)(No scar or palm pain)	5 years	CT release (endoscopic) (2-portal endoscopic release)	63	84.13%	CT release (open) (Open carpal tunnel release)	63	82.54%	RR	1.02(0.87,1.19)	Not Significant (P-value>.05)
Larsen,M.B., 2013	High Quality	Questionnaire/Scale (VAS-pain)()	3 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Questionnaire/Scale (VAS-pain)()	3 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After transection the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Questionnaire/Scale (VAS-pain)()	5.5 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After transection the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Questionnaire/Scale (VAS-pain)()	5.5 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	Author Reported	NA	Not Significant (P-value>.05)
MacDermid,J.C., 2003	High Quality	Symptom relief (pain)(McGill pain questionnaire)	3 months	CT release (endoscopic) (2 portal Chow technique)	32	12(.)	CT release (open) (traditional long incision open release)	91	8(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Malhotra,R., 2007	High Quality	Symptom recurrence (pain)(Patients reporting pain in 4-6 range on 10cm VAS scale)	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	6.67%	CT release (open) (short incision open release)	31	6.45%	RR	1.03(0.16,6.87)	Not Significant (P-value>.05)
Malhotra,R., 2007	High Quality	Symptom relief (pain)(50-75% improvement)	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	3.33%	CT release (open) (short incision open release)	31	6.45%	RR	0.52(0.05,5.40)	Not Significant (P-value>.05)
Malhotra,R., 2007	High Quality	Symptom relief (pain)(Patients reporting pain in 0-3 range on 10cm VAS scale)	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	93.33%	CT release (open) (short incision open release)	31	93.55%	RR	1.00(0.87,1.14)	Not Significant (P-value>.05)
Wong,K.C., 2003	High Quality	Questionnaire/Scale (VAS-pain)()	1 years	CT release (endoscopic) (two-portal endoscopic release)	30	. %	CT release (open-limited) (limited-open release)	30	. %	Author Reported	NA	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Night pain)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	0.00%	CT release (mini) (Mini palmer incision)	28	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Night pain)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	0.00%	CT release (open) (large open incision)	36	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Wrist pain)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	12.50%	CT release (mini) (Mini palmer incision)	28	14.29%	RR	0.88(0.24,3.18)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Wrist pain)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	12.50%	CT release (open) (large open incision)	36	0.00%	RD	0.13(0.01,0.24)	CT release (open) (large open incision) (P-value<.05)
Dumontier,C., 1995	Moderate Quality	Symptom recurrence (pain)(Patients still reporting pain)	3 months	CT release (endoscopic) (two-portal endoscopic release)	28	39.29%	CT release (open) (Conventional palmar open release)	30	43.33%	RR	0.91(0.49,1.68)	Not Significant (P-value>.05)

TABLE 145: PICO 7 PART 1- ENDOSCOPIC: POSTOPERATIVE PAIN CONTROL

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jacobsen,M.B., 1996	Moderate Quality	Analgesia (duration)(Postoperative analgesia use)	5.9 months	CT release (endoscopic) (two-portal Chow technique)	16	5.5(.)	CT release (open) (traditional open release)	16	5.2(.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 146: PICO 7 PART 1- ENDOSCOPIC: QUALITY OF LIFE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroschi,I., 2006	High Quality	Activity of daily living (ADL)(Carpal tunnel syndrome functional status)	3 months	CT release (endoscopic) (Endoscopic release injected subcutaneously at the proximal and distal portals)	63	1.3(0.50)	CT release (open) (Open carpal tunnel release along the length of the incision)	65	1.3(0.40)	Mean Difference	0(-0.16,0.157164)	Not Significant (P-value>.05)
Atroschi,I., 2006	High Quality	Activity of daily living (ADL)(Carpal tunnel syndrome functional status)	11.8 months	CT release (endoscopic) (Endoscopic release injected subcutaneously at the proximal and distal portals)	63	1.3(0.50)	CT release (open) (Open carpal tunnel release along the length of the incision)	65	1.2(0.40)	Mean Difference	0.1(-0.06,0.257164)	Not Significant (P-value>.05)
Ejiri,S., 2012	High Quality	Activity of daily living (ADL)(Book Holding (100mm VAS))	3 months	CT release (endoscopic) (Okutsu method)	40	-23.7(.)	CT release (open) (3cm palmar incision)	39	-21.6(.)	Author Reported	NA	Not Significant (P-value>.05)
Ejiri,S., 2012	High Quality	Activity of daily living (ADL)(Buttoning (100mm VAS))	3 months	CT release (endoscopic) (Okutsu method)	40	-22.2(.)	CT release (open) (3cm palmar incision)	39	-31.6(.)	Author Reported	NA	Not Significant (P-value>.05)
Ejiri,S., 2012	High Quality	Activity of daily living (ADL)(Chopstick use (100mm VAS))	3 months	CT release (endoscopic) (Okutsu method)	40	-21.1(.)	CT release (open) (3cm palmar incision)	39	-15.6(.)	Author Reported	NA	Not Significant (P-value>.05)
Ejiri,S., 2012	High Quality	Activity of daily living (ADL)(Receiver holding (100mm VAS))	3 months	CT release (endoscopic) (Okutsu method)	40	-20.8(.)	CT release (open) (3cm palmar incision)	39	-22(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ejiri,S., 2012	High Quality	Activity of daily living (ADL)(Writing (100mm VAS))	3 months	CT release (endoscopic) (Okutsu method)	40	-16.2(.)	CT release (open) (3cm palmar incision)	39	-13.9(.)	Author Reported	NA	Not Significant (P-value>.05)
Malhotra,R., 2007	High Quality	Patient satisfaction (general)(Subjective improvement-excellent (Excellent, good, no improvement, or worse))	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	83.33%	CT release (open) (short incision open release)	31	67.74%	RR	1.23(0.92,1.65)	Not Significant (P-value>.05)
Malhotra,R., 2007	High Quality	Patient satisfaction (general)(Subjective improvement-good (Excellent, good, no improvement, or worse))	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	16.67%	CT release (open) (short incision open release)	31	29.03%	RR	0.57(0.22,1.52)	Not Significant (P-value>.05)
Saw,N.L., 2003	High Quality	Return to Work(Days off work)	3 months	CT release (endoscopic) (Endoscopic release)	74	18(11.00)	CT release (open) (Open CTR)	76	26(14.00)	Mean Difference	-8(-12.02,-3.97646)	CT release (endoscopic) (Endoscopic release) (P-value<.05)
Dumontier,C., 1995	Moderate Quality	Return to Work()	3 months	CT release (open) (Conventional palmar open release)	30	. %	CT release (endoscopic) (two-portal endoscopic release)	28	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 147: PICO 7 PART 1- ENDOSCOPIC: SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroshi,I., 2006	High Quality	Symptom recurrence (general)(Score range from 0 (no pain or tenderness in scar or proximal palm and no activity limitation) to 100 (severe pain in scar or proximal palm and severe activity limitation because of pain or tenderness))	3 months	CT release (endoscopic) (Endoscopic release injected subcutaneously at the proximal and distal portals)	63	23.5(26.00)	CT release (open) (Open carpal tunnel release along the length of the incision)	65	36.2(20.00)	Mean Difference	-12.7(-20.75,-4.64633)	CT release (endoscopic) (Endoscopic release injected subcutaneously at the proximal and distal portals) (P-value<.05)
Atroshi,I., 2006	High Quality	Symptom recurrence (general)(Score range; carpal tunnel syndrome, 1 (no symptoms or disability) to 5 (most severe symptoms or disability))	3 months	CT release (endoscopic) (Endoscopic release injected subcutaneously at the proximal and distal portals)	1.5	.(0.50)	CT release (open) (Open carpal tunnel release along the length of the incision)	65	1.5(0.50)	Mean Difference	.(.)	Not Significant (P-value>.05)
Atroshi,I., 2006	High Quality	Symptom recurrence (general)(Score range from 0 (no pain or tenderness in scar or proximal palm and no activity limitation) to 100 (severe pain in scar or proximal palm and severe activity limitation because of pain or tenderness))	11.8 months	CT release (endoscopic) (Endoscopic release injected subcutaneously at the proximal and distal portals)	63	8.7(21.00)	CT release (open) (Open carpal tunnel release along the length of the incision)	65	13.9(22.00)	Mean Difference	-5.2(-12.65,2.249586)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Atroschi,I., 2006	High Quality	Symptom recurrence (general)(Score range; carpal tunnel syndrome, 1 (no symptoms or disability) to 5 (most severe symptoms or disability))	11.8 months	CT release (endoscopic) (Endoscopic release injected subcutaneously at the proximal and distal portals)	63	1.4(0.60)	CT release (open) (Open carpal tunnel release along the length of the incision)	65	1.4(0.50)	Mean Difference	0(-0.19,0.191643)	Not Significant (P-value>.05)
Atroschi,I., 2009	High Quality	Questionnaire (CTQ)(CTSQ symptoms severity scale)	1 years	CT release (endoscopic) (2-portal endoscopic release)	63	1.4(0.60)	CT release (open) (Open carpal tunnel release)	65	1.38(0.50)	Mean Difference	0.02(-0.17,0.211643)	Not Significant (P-value>.05)
Atroschi,I., 2009	High Quality	Questionnaire (CTQ)(CTSQ symptoms severity scale)	5 years	CT release (endoscopic) (2-portal endoscopic release)	63	1.45(0.70)	CT release (open) (Open carpal tunnel release)	63	1.42(0.70)	Mean Difference	0.03(-0.21,0.274454)	Not Significant (P-value>.05)
Kang,H.J., 2013	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	3 months	CT release (endoscopic) (Endoscopic release using the Agee technique)	52	1.5(0.37)	CT release (mini) (1.5-cm incision was made in the proximal palm over the transverse carpal ligament)	52	1.4(0.74)	Mean Difference	0.1(-0.12,0.32)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Paresthesia(Paresthesia (VAS scale))	3 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Paresthesia(Paresthesia (VAS scale))	3 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Paresthesia(Paresthesia (VAS scale))	5.5 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Paresthesia(Paresthesia (VAS scale))	5.5 months	CT release (endoscopic) (Endoscopic procedure using the Linvatec system as described by Menon (1993), which is a one-portal technique with a short transverse incision at the wrist using a disposable set of endoscopic instruments and a conventional 5 mm arthroscope. After trans-section the skin was sutured and a soft dressing without splinting applied)	30	. %	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	Author Reported	NA	Not Significant (P-value>.05)
MacDermid,J.C., 2003	High Quality	Questionnaire (Levine-SSS)(Levine's symptom severity score)	3 months	CT release (endoscopic) (2 portal Chow technique)	91	1.8(.)	CT release (open) (traditional long incision open release)	32	2(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Malhotra,R., 2007	High Quality	Symptom recurrence (numbness)()	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	6.67%	CT release (open) (short incision open release)	31	12.90%	RR	0.52(0.10,2.61)	Not Significant (P-value>.05)
Malhotra,R., 2007	High Quality	Symptom recurrence (weakness)()	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	6.67%	CT release (open) (short incision open release)	31	16.13%	RR	0.41(0.09,1.97)	Not Significant (P-value>.05)
Malhotra,R., 2007	High Quality	Symptom relief (general)(>75% improvement)	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	20.00%	CT release (open) (short incision open release)	31	25.81%	RR	0.78(0.31,1.97)	Not Significant (P-value>.05)
Malhotra,R., 2007	High Quality	Symptom relief (general)(100% improvement)	5.9 months	CT release (endoscopic) (single portal endoscopic release)	30	76.67%	CT release (open) (short incision open release)	31	64.52%	RR	1.19(0.86,1.65)	Not Significant (P-value>.05)
Saw,N.L., 2003	High Quality	Questionnaire (Levine-SSS)()	3 months	CT release (endoscopic) (Endoscopic release)	74	. %	CT release (open) (Open CTR)	76	. %	Author Reported	NA	Not Significant (P-value>.05)
Trumble,T.E., 2002	High Quality	Questionnaire (Levine-SSS)(CTS-SSS (1=fewest symptoms, 5=severe))	3 months	CT release (endoscopic) (single portal endoscopic release)	75	1.8(0.14)	CT release (open) (3-4cm incision)	72	1.8(0.11)	Mean Difference	0(-0.04,0.040614)	Not Significant (P-value>.05)
Trumble,T.E., 2002	High Quality	Questionnaire (Levine-SSS)(CTS-SSS (1=fewest symptoms, 5=severe))	6 months	CT release (endoscopic) (single portal endoscopic release)	75	1.7(0.13)	CT release (open) (3-4cm incision)	72	1.8(0.10)	Mean Difference	-0.1(-0.14,-0.06259)	CT release (endoscopic) (single portal endoscopic release) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Trumble,T.E., 2002	High Quality	Questionnaire (Levine-SSS)(CTS-SSS (1=fewest symptoms, 5=severe))	12 months	CT release (endoscopic) (single portal endoscopic release)	75	1.8(0.15)	CT release (open) (3-4cm incision)	72	1.8(0.10)	Mean Difference	0(-0.04,0.041061)	Not Significant (P-value>.05)
Wong,K.C., 2003	High Quality	Symptom relief (general)(complete relief of symptoms)	1 years	CT release (endoscopic) (two-portal endoscopic release)	30	56.67%	CT release (open-limited) (limited-open release)	29	65.52%	RR	0.86(0.57,1.30)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Symptom recurrence (numbness)(Patients with symptoms still present)	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	74	21.62%	CT release (open) (Conventional open surgery)	55	12.73%	RR	1.70(0.75,3.84)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Symptom recurrence (numbness)(Patients with symptoms still present)	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	65	12.31%	CT release (open) (Conventional open surgery)	48	18.75%	RR	0.66(0.27,1.58)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Symptom recurrence (pain)(Nocturnal pain, patients with symptoms still present)	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	74	10.81%	CT release (open) (Conventional open surgery)	55	10.91%	RR	0.99(0.36,2.69)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Symptom recurrence (pain)(Nocturnal pain, patients with symptoms still present)	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	65	7.69%	CT release (open) (Conventional open surgery)	48	8.33%	RR	0.92(0.26,3.26)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Agee,J.M., 1992	Moderate Quality	Symptom recurrence (tingling)(Patients with symptoms still present)	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	74	20.27%	CT release (open) (Conventional open surgery)	55	9.09%	RR	2.23(0.86,5.77)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Symptom recurrence (tingling)(Patients with symptoms still present)	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	65	13.85%	CT release (open) (Conventional open surgery)	48	14.58%	RR	0.95(0.38,2.37)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Symptom recurrence (weakness)(Patients with symptoms still present)	3 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	74	32.43%	CT release (open) (Conventional open surgery)	55	43.64%	RR	0.74(0.48,1.16)	Not Significant (P-value>.05)
Agee,J.M., 1992	Moderate Quality	Symptom recurrence (weakness)(Patients with symptoms still present)	6 months	CT release (endoscopic w/ 3M device) (Endoscopic device inserted into incision at wrist)	65	20.00%	CT release (open) (Conventional open surgery)	48	35.42%	RR	0.56(0.30,1.05)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Stiffness)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	12.50%	CT release (mini) (Mini palmer incision)	28	0.00%	RD	0.13(0.01,0.24)	CT release (mini) (Mini palmer incision) (P-value<.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Stiffness)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	12.50%	CT release (open) (large open incision)	36	5.56%	RR	2.25(0.44,11.48)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Weakness)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	6.25%	CT release (mini) (Mini palmer incision)	28	0.00%	RD	0.06(-0.02,0.15)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Weakness)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	6.25%	CT release (open) (large open incision)	36	11.11%	RR	0.56(0.11,2.87)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (numbness)(Numbness)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	0.00%	CT release (mini) (Mini palmer incision)	28	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (numbness)(Numbness)	3.9 months	CT release (endoscopic) (Endoscopic release)	32	0.00%	CT release (open) (large open incision)	36	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)
Ferdinand,R.D., 2002	Moderate Quality	Symptom relief (general)()	1 years	CT release (endoscopic) (single portal endoscopic release)	25	. %	CT release (open) (traditional open release)	25	. %	Author Reported	NA	Not Significant (P-value>.05)
Tian,Y., 2007	Moderate Quality	Symptom relief (general)(Patient satisfaction: excellent to good)	2 years	CT release (endoscopic) (one-portal endoscopies release)	30	93.33%	CT release (open) (traditional open release)	32	90.63%	RR	1.03(0.89,1.19)	Not Significant (P-value>.05)

TABLE 148: PICO 7 PART 2- MINI: COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cresswell,T.R., 2008	High Quality	Complications (general)(Rate of complications)	3 months	CT release (open) (Standard limited open palmer release)	100	2.00%	CT release (mini-Indiana Tome) (Indiana Tome)	95	9.47%	RR	0.21(0.05,0.95)	CT release (open) (Standard limited open palmer release) (P-value<.05)
Cresswell,T.R., 2008	High Quality	Symptom occurrence (scar tenderness)()	3 months	CT release (open) (Standard limited open palmer release)	88	1.9(.)	CT release (mini-Indiana Tome) (Indiana Tome)	88	1.7(.)	Author Reported	NA	Not Significant (P-value>.05)
Jugovac,I., 2002	High Quality	Symptom occurrence (scar tenderness)(Tenderness)	3 months	CT release (open) (Traditional technique)	36	22.22%	CT release (mini-limited incision) (limited palmer incision)	36	8.33%	RR	2.67(0.77,9.25)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Symptom occurrence (pillar pain)()	3 months	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Symptom occurrence (pillar pain)()	5.5 months	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)
Yucetas,S.C., 2013	High Quality	Complications (general)(Complications or reoperation within 6 months)	5.9 months	CT release (open) (Standard open CTR)	37	18.92%	CT release (mini-open KnifeLight) (mini open KnifeLight instrument assisted)	38	5.26%	RR	3.59(0.80,16.19)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Faraj,A.A., 2012	Moderate Quality	Symptom occurrence (scar length)(Length of scar (cm))	3 months	CT release (open) (traditional open release)	20	5.15(0.26)	CT release (mini) (mini-transverse wrist incisions)	20	1.4(0.17)	Mean Difference	3.75(3.61,3.886145)	CT release (mini) (mini-transverse wrist incisions) (P-value<.05)
Ucar,B.Y., 2012	Moderate Quality	Symptom occurrence (scar pain)()	2.5 years	CT release (Mini-incision distal to flexor crease (group 1)) (2cm longitudinal incision made distal to flexor crease)	45	24.44%	CT release (Mini-incision proximal to flexor crease (group 2)) (2cm longitudinal incision made proximal to flexor crease)	45	6.67%	RR	3.67(1.10,12.27)	CT release (Mini-incision proximal to flexor crease (group 2)) (2cm longitudinal incision made proximal to flexor crease) (P-value<.05)

TABLE 149: PICO 7 PART 2- MINI: FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cellocco,P., 2005	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale)-Italian modified version)	1.6 years	CT release (open-limited open) (limited open CTR)	123	2.53(.)	CT release (mini-open blind technique) (mini-open blind technique)	99	2.02(.)	Author Reported	NA	CT release (mini-open blind technique) (mini-open blind technique) (P-value<.05)
Cellocco,P., 2005	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale)-Italian modified version)	2.5 years	CT release (open-limited open) (limited open CTR)	123	1.73(.)	CT release (mini-open blind technique) (mini-open blind technique)	99	1.87(.)	Author Reported	NA	Not Significant (P-value>.05)
Cellocco,P., 2005	High Quality	Two-point discrimination(Millimeters)	2.5 years	CT release (open-limited open) (limited open CTR)	123	4.3(.)	CT release (mini-open blind technique) (mini-open blind technique)	99	4.7(.)	Author Reported	NA	Not Significant (P-value>.05)
Cellocco,P., 2009	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale)-Italian modified version)	1.6 years	CT release (open) (3-4cm long limited-open palmar incision)	123	2.05(0.82)	CT release (mini-knifelight) (Knifelight surgery)	99	3.85(0.75)	Mean Difference	-1.8(-2.01,-1.59305)	CT release (open) (3-4cm long limited-open palmar incision) (P-value<.05)
Cellocco,P., 2009	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale)-Italian modified version)	2.5 years	CT release (open) (3-4cm long limited-open palmar incision)	123	1.39(0.72)	CT release (mini-knifelight) (Knifelight surgery)	99	1.28(0.52)	Mean Difference	0.11(-0.05,0.273351)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cellocco,P., 2009	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale)-Italian modified version)	4.9 years	CT release (open) (3-4cm long limited-open palmar incision)	123	1.38(0.83)	CT release (mini-knifelight) (Knifelight surgery)	99	1.33(0.64)	Mean Difference	0.05(-0.14,0.243417)	Not Significant (P-value>.05)
Cellocco,P., 2009	High Quality	Two-point discrimination(Millimeters)	4.9 years	CT release (open) (3-4cm long limited-open palmar incision)	99	4.5(.)	CT release (mini-knifelight) (Knifelight surgery)	99	4.6(.)	Author Reported	NA	CT release (mini-knifelight) (Knifelight surgery) (P-value<.05)
Cresswell,T. R., 2008	High Quality	Grip strength(Percentage of pre-op value)	3 months	CT release (open) (Standard limited open palmer release)	88	. %	CT release (mini-Indiana Tome) (Indiana Tome)	88	. %	Author Reported	NA	Not Significant (P-value>.05)
Cresswell,T. R., 2008	High Quality	Pinch Strength(% improvement from baseline (units not reported))	3 months	CT release (open) (Standard limited open palmer release)	88	. %	CT release (mini-Indiana Tome) (Indiana Tome)	88	. %	Author Reported	NA	Not Significant (P-value>.05)
Jugovac,I., 2002	High Quality	NCS (DML)(Distal motor latency (ms))	3 months	CT release (open) (Traditional technique)	36	4.08(0.80)	CT release (mini-limited incision) (limited palmer incision)	36	4.12(0.90)	Mean Difference	-0.04(-0.43,0.353358)	Not Significant (P-value>.05)
Jugovac,I., 2002	High Quality	NCS (SNCV)(Sensory nerve conduction velocity (m/s))	3 months	CT release (open) (Traditional technique)	36	43.67(9.00)	CT release (mini-limited incision) (limited palmer incision)	36	41.86(8.50)	Mean Difference	1.81(-2.23,5.853943)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Grip strength(Percentage of contralateral hand)	3 months	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Grip strength(Percentage of contralateral hand)	5.5 months	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Range of motion()	3 months	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Range of motion()	5.5 months	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Suppaphol,S., 2012	High Quality	Grip strength(Pounds)	3 months	CT release (open) (Standard open carpal tunnel release)	15	55.67(6.51)	CT release (mini) (Limited open carpal tunnel release direct vision and tunneling technique; 1.5 cm incision is made over the distal edge of transverse carpal ligament)	15	62.67(5.62)	Mean Difference	-7(-11.35,-2.64766)	CT release (mini) (Limited open carpal tunnel release direct vision and tunneling technique; 1.5 cm incision is made over the distal edge of transverse carpal ligament) (P-value<.05)
Suppaphol,S., 2012	High Quality	Pinch Strength(Pounds)	3 months	CT release (open) (Standard open carpal tunnel release)	15	12.47(1.55)	CT release (mini) (Limited open carpal tunnel release direct vision and tunneling technique; 1.5 cm incision is made over the distal edge of transverse carpal ligament)	15	13.6(1.84)	Mean Difference	-1.13(-2.35,0.087526)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Suppaphol,S., 2012	High Quality	Questionnaire (Levine-FSS)(Levine's functional score)	3 months	CT release (open) (Standard open carpal tunnel release)	15	1.45(0.50)	CT release (mini) (Limited open carpal tunnel release direct vision and tunneling technique; 1.5 cm incision is made over the distal edge of transverse carpal ligament)	15	1.28(0.31)	Mean Difference	0.17(-0.13,0.467722)	Not Significant (P-value>.05)
Suppaphol,S., 2012	High Quality	Two-point discrimination(Millimeters)	3 months	CT release (open) (Standard open carpal tunnel release)	15	2.63(0.69)	CT release (mini) (Limited open carpal tunnel release direct vision and tunneling technique; 1.5 cm incision is made over the distal edge of transverse carpal ligament)	15	2.75(0.62)	Mean Difference	-0.12(-0.59,0.349446)	Not Significant (P-value>.05)
Yucetas,S.C., 2013	High Quality	NCS (EMG)(Electromyographical motor latency (ms))	3 months	CT release (open) (Standard open CTR)	37	3.73(0.26)	CT release (mini-open KnifeLight) (mini open KnifeLight instrument assisted)	38	3.67(0.30)	Mean Difference	0.06(-0.07,0.186953)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Yucetas,S.C., 2013	High Quality	NCS (EMG)(Electromyographical motor latency (ms))	5.9 months	CT release (open) (Standard open CTR)	37	3.75(0.26)	CT release (mini-open KnifeLight) (mini open KnifeLight instrument assisted)	38	3.65(0.30)	Mean Difference	0.1(-0.03,0.226953)	Not Significant (P-value>.05)
Yucetas,S.C., 2013	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	3 months	CT release (open) (Standard open CTR)	37	2.22(0.63)	CT release (mini-open KnifeLight) (mini open KnifeLight instrument assisted)	38	2.15(0.56)	Mean Difference	0.07(-0.20,0.340022)	Not Significant (P-value>.05)
Yucetas,S.C., 2013	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	5.9 months	CT release (open) (Standard open CTR)	37	2.22(0.62)	CT release (mini-open KnifeLight) (mini open KnifeLight instrument assisted)	38	2.15(0.56)	Mean Difference	0.07(-0.20,0.337608)	Not Significant (P-value>.05)
Zyluk,A., 2006	High Quality	Grip strength(Kilograms)	3 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	CT release (mini-single incision) (Mini-open single incision release) (P-value<.05)
Zyluk,A., 2006	High Quality	Grip strength(Kilograms)	5.9 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	CT release (mini-single incision) (Mini-open single incision release) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Zyluk,A., 2006	High Quality	Grip strength(Kilograms)	11.8 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	CT release (mini-single incision) (Mini-open single incision release) (P-value<.05)
Zyluk,A., 2006	High Quality	Key pinch strength(Kilograms)	3 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	CT release (mini-single incision) (Mini-open single incision release) (P-value<.05)
Zyluk,A., 2006	High Quality	Key pinch strength(Kilograms)	5.9 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	Not Significant (P-value>.05)
Zyluk,A., 2006	High Quality	Key pinch strength(Kilograms)	11.8 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Zyluk,A., 2006	High Quality	Pinch Strength (three-point pinch)(Kilograms)	3 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	CT release (mini-single incision) (Mini-open single incision release) (P-value<.05)
Zyluk,A., 2006	High Quality	Pinch Strength (three-point pinch)(Kilograms)	5.9 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	CT release (mini-single incision) (Mini-open single incision release) (P-value<.05)
Zyluk,A., 2006	High Quality	Pinch Strength (three-point pinch)(Kilograms)	11.8 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	Not Significant (P-value>.05)
Zyluk,A., 2006	High Quality	Pinch Strength (two-point pinch)(Kilograms)	3 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	CT release (mini-single incision) (Mini-open single incision release) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Zyluk,A., 2006	High Quality	Pinch Strength (two-point pinch)(Kilograms)	5.9 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	CT release (mini-single incision) (Mini-open single incision release) (P-value<.05)
Zyluk,A., 2006	High Quality	Pinch Strength (two-point pinch)(Kilograms)	11.8 months	CT release (mini-double incision) (Mini-open double incision release)	33	. %	CT release (mini-single incision) (Mini-open single incision release)	40	. %	Author Reported	NA	CT release (mini-single incision) (Mini-open single incision release) (P-value<.05)
Zyluk,A., 2006	High Quality	Questionnaire (Levine-FSS)()	11.8 months	CT release (mini-double incision) (Mini-open double incision release)	33	1.2(.)	CT release (mini-single incision) (Mini-open single incision release)	40	1.2(.)	Author Reported	NA	Not Significant (P-value>.05)
Zyluk,A., 2006	High Quality	Semmes Weinstein Monofilaments Test (SW test)()	11.8 months	CT release (mini-double incision) (Mini-open double incision release)	33	1.4(.)	CT release (mini-single incision) (Mini-open single incision release)	40	1.3(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Zyluk,A., 2006	High Quality	Two-point discrimination(Millimeters)	11.8 months	CT release (mini-double incision) (Mini-open double incision release)	33	1.3(.)	CT release (mini-single incision) (Mini-open single incision release)	40	1.2(.)	Author Reported	NA	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Phalen's test score(% positive)	3.9 months	CT release (open) (large open incision)	36	13.89%	CT release (mini) (Mini palmer incision)	28	10.71%	RR	1.26(0.33,4.84)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Tinel's Sign/Test(# positive)	3.9 months	CT release (open) (large open incision)	36	19.44%	CT release (mini) (Mini palmer incision)	28	10.71%	RR	1.81(0.52,6.39)	Not Significant (P-value>.05)
Capa-Grasa,A., 2014	Moderate Quality	Grip strength(Grip strength rate (units not reported))	3 months	CT release (mini-open) (Mini-OCTR respectively performed through a 1 mm or a 2 cm incision.)	20	86.17(5.50)	CT release (Ultra-minimally invasive) (Sonographically guided technique for ultra-minimally-invasive (Ultra-MIS) CT release 1 mm or cm incision)	20	87.22(4.76)	Mean Difference	-1.05(-4.24,2.137866)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Capa-Grasa,A., 2014	Moderate Quality	Questionnaire (DASH-Quick DASH)()	3 months	CT release (mini-open) (Mini-OCTR respectively performed through a 1 mm or a 2 cm incision.)	20	14.54(3.12)	CT release (Ultra-minimally invasive) (Sonographically guided technique for ultra-minimally-invasive (Ultra-MIS) CT release 1 mm or cm incision)	20	7.39(1.84)	Mean Difference	7.15(5.56,8.737479)	CT release (Ultra-minimally invasive) (Sonographically guided technique for ultra-minimally-invasive (Ultra-MIS) CT release 1 mm or cm incision) (P-value<.05)
Elsharif,M., 2014	Moderate Quality	Questionnaire (DASH-Quick DASH)()	10 years	CT release (open) ()	.	34.1(23.27)	CT release (knifelight) ()	.	13.22(13.62)	Mean Difference	20.88(.,)	CT release (knifelight) (P-value<.05)
Faraj,A.A., 2012	Moderate Quality	NCS (DML)(Distal motor latency (ms))	3 months	CT release (open) (traditional open release)	20	4.08(0.80)	CT release (mini) (mini-transverse wrist incisions)	20	4.6(0.90)	Mean Difference	-0.52(-1.05,0.007746)	Not Significant (P-value>.05)
Faraj,A.A., 2012	Moderate Quality	NCS (SNCV)(Sensory nerve conduction velocity (m/s))	3 months	CT release (open) (traditional open release)	20	44.6(7.50)	CT release (mini) (mini-transverse wrist incisions)	20	42.52(8.70)	Mean Difference	2.08(-2.95,7.114186)	Not Significant (P-value>.05)
Tarallo,M., 2014	Moderate Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	5.9 months	CT release (open) (Traditional)	60	2.3(0.60)	CT release (mini) (2 cm long incision)	60	1.4(0.40)	Mean Difference	0.9(0.72,1.082466)	CT release (mini) (2 cm long incision) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Tarallo,M., 2014	Moderate Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	11.8 months	CT release (open) (Traditional)	60	1.5(0.20)	CT release (mini) (2 cm long incision)	60	1.1(0.10)	Mean Difference	0.4(0.34,0.456580)	CT release (mini) (2 cm long incision) (P-value<.05)
Tarallo,M., 2014	Moderate Quality	Two-point discrimination (2PD)()	11.8 months	CT release (open) (Traditional)	60	. %	CT release (mini) (2 cm long incision)	60	. %	Author Reported	NA	Not Significant (P-value>.05)
Ucar,B. Y., 2012	Moderate Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	2.5 years	CT release (Mini-incision distal to flexor crease (group 1)) (2cm longitudinal incision made distal to flexor crease)	45	2.16(0.68)	CT release (Mini-incision proximal to flexor crease (group 2)) (2cm longitudinal incision made proximal to flexor crease)	45	2.21(0.73)	Mean Difference	-0.05(-0.34,0.241492)	Not Significant (P-value>.05)

TABLE 150: PICO 7 PART 2- MINI: OTHER

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cellocco,P., 2005	High Quality	Patient satisfaction (general)(Patients satisfied results at final follow-up)	2.5 years	CT release (open-limited open) (limited open CTR)	123	74.80%	CT release (mini-open blind technique) (mini-open blind technique)	99	100.00%	RR	.(.,.)	CT release (mini-open blind technique) (mini-open blind technique) (P-value<.05)
Cellocco,P., 2009	High Quality	Patient satisfaction (general)(Subjective satisfaction with their scar)	2.5 years	CT release (open) (3-4cm long limited-open palmar incision)	96	85.42%	CT release (mini-knifelight) (Knifelight surgery)	99	77.78%	RR	1.10(0.96,1.26)	Not Significant (P-value>.05)
Cellocco,P., 2009	High Quality	Patient satisfaction (general)(Subjective satisfaction with their scar)	4.9 years	CT release (open) (3-4cm long limited-open palmar incision)	95	85.26%	CT release (mini-knifelight) (Knifelight surgery)	99	100.00%	RR	.(.,.)	CT release (mini-knifelight) (Knifelight surgery) (P-value<.05)
Faraj,A.A., 2012	Moderate Quality	Patient satisfaction (general)(Satisfaction of patients with postoperative symptomatic relieve: Good)	3 months	CT release (open) (traditional open release)	20	80.00%	CT release (mini) (mini-transverse wrist incisions)	20	60.00%	RR	1.33(0.88,2.03)	Not Significant (P-value>.05)
Tarallo,M., 2014	Moderate Quality	Questionnaire/Scale (Vancouver scale)(Patient satisfaction with scar - Good)	11.8 months	CT release (open) (Traditional)	60	30.00%	CT release (mini) (2 cm long incision)	60	53.33%	RR	0.56(0.36,0.89)	CT release (mini) (2 cm long incision) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Tarallo,M., 2014	Moderate Quality	Questionnaire/Scale (Vancouver scale)(Patient satisfaction with scar - Satisfactory)	11.8 months	CT release (open) (Traditional)	60	36.67%	CT release (mini) (2 cm long incision)	60	3.33%	RR	11.00(2.71,44.72)	CT release (mini) (2 cm long incision) (P-value<.05)
Tarallo,M., 2014	Moderate Quality	Questionnaire/Scale (Vancouver scale)(Patient satisfaction with scar - Unsatisfactory)	11.8 months	CT release (open) (Traditional)	60	26.67%	CT release (mini) (2 cm long incision)	60	3.33%	RR	8.00(1.92,33.29)	CT release (mini) (2 cm long incision) (P-value<.05)
Tarallo,M., 2014	Moderate Quality	Questionnaire/Scale (Vancouver scale)(Patient satisfaction with scar - Very good)	11.8 months	CT release (open) (Traditional)	60	6.67%	CT release (mini) (2 cm long incision)	60	40.00%	RR	0.17(0.06,0.45)	CT release (mini) (2 cm long incision) (P-value<.05)

TABLE 151: PICO 7 PART 2- MINI: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cresswell,T.R., 2008	High Quality	Questionnaire/Scale (VAS-pain)(visual analogue scale of 0 to 10)	3 months	CT release (open) (Standard limited open palmer release)	88	2(.)	CT release (mini-Indiana Tome) (Indiana Tome)	88	1.9(.)	Author Reported	NA	Not Significant (P-value>.05)
Larsen,M.B., 2013	High Quality	Questionnaire/Scale (VAS-pain)()	3 months	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Questionnaire/Scale (VAS-pain)()	5.5 months	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)
Yucetas,S.C., 2013	High Quality	Questionnaire/Scale (VAS-pain)()	3 months	CT release (open) (Standard open CTR)	37	3.35(1.74)	CT release (mini-open KnifeLight) (mini open KnifeLight instrument assisted)	38	3.11(1.80)	Mean Difference	0.24(-0.56,1.041182)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Yucetas,S.C., 2013	High Quality	Questionnaire/Scale (VAS-pain)()	5.9 months	CT release (open) (Standard open CTR)	37	3.16(1.48)	CT release (mini-open KnifeLight) (mini open KnifeLight instrument assisted)	38	2.84(1.53)	Mean Difference	0.32(-0.36,1.001230)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Night pain)	3.9 months	CT release (open) (large open incision)	36	0.00%	CT release (mini) (Mini palmer incision)	28	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Wrist pain)	3.9 months	CT release (open) (large open incision)	36	0.00%	CT release (mini) (Mini palmer incision)	28	14.29%	RD	-0.14(-0.27,-0.01)	CT release (open) (large open incision) (P-value<.05)

TABLE 152: PICO 7 PART 2- MINI: QUALITY OF LIFE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cellocco,P., 2009	High Quality	Return to Work()	4.9 years	CT release (open) (3-4cm long limited-open palmar incision)	.	. %	CT release (mini-knifelight) (Knifelight surgery)	99	. %	Author Reported	NA	CT release (mini-knifelight) (Knifelight surgery) (P-value<.05)
Jugovac,I., 2002	High Quality	Return to Normal Activities(Return to daily activities days)	3 months	CT release (open) (Traditional technique)	36	86.11%	CT release (mini-limited incision) (limited palmer incision)	36	. %	RR	.(,..)	CT release (open) (Traditional technique) (P-value<.05)
Jugovac,I., 2002	High Quality	Return to Work(Return to work days)	3 months	CT release (open) (Traditional technique)	36	. %	CT release (mini-limited incision) (limited palmer incision)	36	. %	Author Reported	NA	CT release (mini-limited incision) (limited palmer incision) (P-value<.05)
Faraj,A.A., 2012	Moderate Quality	Return to Normal Activities(Days)	3 months	CT release (open) (traditional open release)	20	12.55(4.03)	CT release (mini) (mini-transverse wrist incisions)	20	3.95(1.82)	Mean Difference	8.6(6.66,10.53798)	CT release (mini) (mini-transverse wrist incisions) (P-value<.05)

TABLE 153: PICO 7 PART 2- MINI: SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cellocco,P., 2005	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale)-Italian modified version)	1.6 years	CT release (open-limited open) (limited open CTR)	123	2.04(.)	CT release (mini-open blind technique) (mini-open blind technique)	99	1.46(.)	Author Reported	NA	CT release (mini-open blind technique) (mini-open blind technique) (P-value<.05)
Cellocco,P., 2005	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale)-Italian modified version)	2.5 years	CT release (open-limited open) (limited open CTR)	123	1.39(.)	CT release (mini-open blind technique) (mini-open blind technique)	99	1.28(.)	Author Reported	NA	Not Significant (P-value>.05)
Cellocco,P., 2009	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale)-Italian modified version)	1.6 years	CT release (open) (3-4cm long limited-open palmar incision)	123	2.54(0.88)	CT release (mini-knifelight) (Knifelight surgery)	99	2.02(0.82)	Mean Difference	0.52(0.30,0.744228)	CT release (mini-knifelight) (Knifelight surgery) (P-value<.05)
Cellocco,P., 2009	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale)-Italian modified version)	2.5 years	CT release (open) (3-4cm long limited-open palmar incision)	123	1.73(0.83)	CT release (mini-knifelight) (Knifelight surgery)	99	1.88(0.75)	Mean Difference	-0.15(-0.36,0.058190)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cellocco,P., 2009	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale)-Italian modified version)	4.9 years	CT release (open) (3-4cm long limited-open palmar incision)	123	1.75(0.97)	CT release (mini-knifelight) (Knifelight surgery)	99	1.8(0.78)	Mean Difference	-0.05(-0.28,0.180206)	Not Significant (P-value>.05)
Cellocco,P., 2009	High Quality	Symptom recurrence (general)(Recurrent CTS)	4.9 years	CT release (open) (3-4cm long limited-open palmar incision)	123	3.25%	CT release (mini-knifelight) (Knifelight surgery)	99	6.06%	RR	0.54(0.16,1.85)	Not Significant (P-value>.05)
Cresswell,T.R., 2008	High Quality	Questionnaire (Levine-SSS)()	3 months	CT release (open) (Standard limited open palmer release)	88	17.1(.)	CT release (mini-Indiana Tome) (Indiana Tome)	88	18.5(.)	Author Reported	NA	Not Significant (P-value>.05)
Cresswell,T.R., 2008	High Quality	Questionnaire (Levine-SSS)()	7 years	CT release (open) (Standard limited open palmer release)	62	13(.)	CT release (mini-Indiana Tome) (Indiana Tome)	53	16(.)	Author Reported	NA	CT release (mini-Indiana Tome) (Indiana Tome) (P-value<.05)
Jugovac,I., 2002	High Quality	Symptom relief (general)(Complete symptomatic relief after the procedure)	3 months	CT release (open) (Traditional technique)	36	86.11%	CT release (mini-limited incision) (limited palmer incision)	36	86.11%	RR	1.00(0.83,1.20)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen,M.B., 2013	High Quality	Paresthesia(Paresthesia (VAS scale))	3 months	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Larsen, M.B., 2013	High Quality	Paresthesia (Paresthesia (VAS scale))	5.5 months	CT release (open) (7 cm curved incision just ulnar to the thenar crease and angulated over the flexion crease of the wrist in order to release the flexor retinaculum and antebrachial fascia under direct vision)	30	. %	CT release (mini) (Short incision: an incision of 3 cm in the mid-palm distal to the flexion crease of the wrist in order to release the distal portion of the flexor retinaculum under direct vision, and the proximal portion of the flexor retinaculum and antebrachial fascia were then carefully divided using scissor dissection in a plane deep to subcutaneous fat and skin)	30	. %	Author Reported	NA	Not Significant (P-value > .05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Suppaphol,S., 2012	High Quality	Questionnaire (Levine-SSS)(Levine's symptom severity score)	3 months	CT release (open) (Standard open carpal tunnel release)	15	1.23(0.50)	CT release (mini) (Limited open carpal tunnel release direct vision and tunneling technique; 1.5 cm incision is made over the distal edge of transverse carpal ligament)	15	1.17(0.17)	Mean Difference	0.06(-0.21,0.327260)	Not Significant (P-value>.05)
Yucetas,S.C., 2013	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	3 months	CT release (open) (Standard open CTR)	37	1.89(0.33)	CT release (mini-open KnifeLight) (mini open KnifeLight instrument assisted)	38	1.95(0.42)	Mean Difference	-0.06(-0.23,0.110704)	Not Significant (P-value>.05)
Yucetas,S.C., 2013	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	5.9 months	CT release (open) (Standard open CTR)	37	1.87(0.35)	CT release (mini-open KnifeLight) (mini open KnifeLight instrument assisted)	38	1.95(0.41)	Mean Difference	-0.08(-0.25,0.092374)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Zyluk,A., 2006	High Quality	Questionnaire (Levine-SSS)()	11.8 months	CT release (mini-double incision) (Mini-open double incision release)	33	1.2(.)	CT release (mini-single incision) (Mini-open single incision release)	40	1.1(.)	Author Reported	NA	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Stiffness)	3.9 months	CT release (open) (large open incision)	36	5.56%	CT release (mini) (Mini palmer incision)	28	0.00%	RD	0.06(-0.02,0.13)	Not Significant (P-value>.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (general)(Weakness)	3.9 months	CT release (open) (large open incision)	36	11.11%	CT release (mini) (Mini palmer incision)	28	0.00%	RD	0.11(0.01,0.21)	CT release (mini) (Mini palmer incision) (P-value<.05)
Aslani,H.R., 2012	Moderate Quality	Symptom recurrence (numbness)(Numbness)	3.9 months	CT release (open) (large open incision)	36	0.00%	CT release (mini) (Mini palmer incision)	28	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)
Tarallo,M., 2014	Moderate Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	5.9 months	CT release (open) (Traditional)	60	2.7(0.60)	CT release (mini) (2 cm long incision)	60	1.4(0.30)	Mean Difference	1.3(1.13,1.469740)	CT release (mini) (2 cm long incision) (P-value<.05)
Tarallo,M., 2014	Moderate Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	11.8 months	CT release (open) (Traditional)	60	1.6(0.40)	CT release (mini) (2 cm long incision)	60	1.1(0.10)	Mean Difference	0.5(0.40,0.604328)	CT release (mini) (2 cm long incision) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ucar,B.Y., 2012	Moderate Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	2.5 years	CT release (Mini-incision distal to flexor crease (group 1)) (2cm longitudinal incision made distal to flexor crease)	45	2.42(0.75)	CT release (Mini-incision proximal to flexor crease (group 2)) (2cm longitudinal incision made proximal to flexor crease)	45	2.66(0.74)	Mean Difference	-0.24(-0.55,0.067844)	Not Significant (P-value>.05)

TABLE 154: PICO 7 PART 3- OPEN: COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Castillo,T.N., 2014	High Quality	Symptom occurrence (pillar pain)()	5.9 months	CT release (open-single incision) (Open single incision CTR)	13	. %	CT release (open-double incision) (Two-incision CTR)	11	. %	Author Reported	NA	Not Significant (P-value>.05)
Castillo,T.N., 2014	High Quality	Symptom occurrence (pillar pain)()	5.9 months	CT release (open-double incision) (Two-incision CTR)	11	. %	CT release (open-single incision) (Open single incision CTR)	13	. %	Author Reported	NA	Not Significant (P-value>.05)
Castillo,T.N., 2014	High Quality	Symptom occurrence (scar tenderness)()	5.9 months	CT release (open-single incision) (Open single incision CTR)	13	. %	CT release (open-double incision) (Two-incision CTR)	11	. %	Author Reported	NA	Not Significant (P-value>.05)
Castillo,T.N., 2014	High Quality	Symptom occurrence (scar tenderness)()	5.9 months	CT release (open-double incision) (Two-incision CTR)	11	. %	CT release (open-single incision) (Open single incision CTR)	13	. %	Author Reported	NA	Not Significant (P-value>.05)
Hamed,A.R., 2009	High Quality	Symptom occurrence (pillar pain)()	3 months	CT release (open-double incision) (Open double-incision technique)	19	21.05%	CT release (open-single incision) (Standard single-incision technique)	21	57.14%	RR	0.37(0.14,0.95)	CT release (open-double incision) (Open double-incision technique) (P-value<.05)
Hamed,A.R., 2009	High Quality	Symptom occurrence (pillar pain)()	5.9 months	CT release (open-double incision) (Open double-incision technique)	19	5.26%	CT release (open-single incision) (Standard single-incision technique)	21	38.10%	RR	0.14(0.02,1.00)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Hamed,A.R., 2009	High Quality	Symptom occurrence (scar tenderness)()	3 months	CT release (open-double incision) (Open double-incision technique)	19	10.53%	CT release (open-single incision) (Standard single-incision technique)	21	47.62%	RR	0.22(0.06,0.88)	CT release (open-double incision) (Open double-incision technique) (P-value<.05)
Hamed,A.R., 2009	High Quality	Symptom occurrence (scar tenderness)()	5.9 months	CT release (open-double incision) (Open double-incision technique)	19	5.26%	CT release (open-single incision) (Standard single-incision technique)	21	23.81%	RR	0.22(0.03,1.73)	Not Significant (P-value>.05)

TABLE 155: PICO 7 PART 3- OPEN: OTHER QUESTIONNAIRE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Castillo,T.N., 2014	High Quality	Questionnaire (DASH)()	5.9 months	CT release (open-double incision) (Two-incision CTR)	11	13.5(22.46)	CT release (open-single incision) (Open single incision CTR)	13	13.22(20.63)	Mean Difference	0.28(-17.10,17.65642)	Not Significant (P-value>.05)

TABLE 156: PICO 7 PART 3- OPEN: FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Castillo,T.N., 2014	High Quality	Grip strength(Pounds)	5.9 months	CT release (open-double incision) (Two-incision CTR)	11	43.6(14.15)	CT release (open-single incision) (Open single incision CTR)	13	42.81(22.15)	Mean Difference	0.79(-13.87,15.44973)	Not Significant (P-value>.05)
Castillo,T.N., 2014	High Quality	Pinch Strength(Pounds)	5.9 months	CT release (open-double incision) (Two-incision CTR)	11	16.6(3.27)	CT release (open-single incision) (Open single incision CTR)	13	12.25(6.04)	Mean Difference	4.35(0.54,8.159848)	CT release (open-double incision) (Two-incision CTR) (P-value<.05)
Castillo,T.N., 2014	High Quality	Questionnaire (BWCTQ-FSS)()	5.9 months	CT release (open-double incision) (Two-incision CTR)	11	1.6(0.87)	CT release (open-single incision) (Open single incision CTR)	13	1.57(0.88)	Mean Difference	0.03(-0.67,0.732266)	Not Significant (P-value>.05)
Hamed,A.R., 2009	High Quality	Grip strength(Pounds)	3 months	CT release (open-double incision) (Open double-incision technique)	19	65(12.00)	CT release (open-single incision) (Standard single-incision technique)	21	61(10.00)	Mean Difference	4(-2.89,10.88539)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Hamed,A.R., 2009	High Quality	Grip strength(Pounds)	5.9 months	CT release (open-double incision) (Open double-incision technique)	19	70(16.00)	CT release (open-single incision) (Standard single-incision technique)	21	65(16.00)	Mean Difference	5(-4.93,14.92932)	Not Significant (P-value>.05)

TABLE 157: PICO 7 PART 3- OPEN: SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Castillo,T.N., 2014	High Quality	Questionnaire (BWCTQ-SSS)()	5.9 months	CT release (open-double incision) (Two-incision CTR)	11	1.33(0.53)	CT release (open-single incision) (Open single incision CTR)	13	1.33(0.36)	Mean Difference	0(-0.37,0.369321)	Not Significant (P-value>.05)

TABLE 158: PICO 7 PART 4- SURGICAL VERSUS CONSERVATIVE: COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Gerritsen,A.A., 2002	High Quality	Complications (general)(Discomfort caused by splint)	1.5 years	Open CTR (traditional open release)	68	0.00%	Splinting (instructed to wear splint during the night for 6 weeks)	79	7.59%	RD	-0.08(-0.13,-0.02)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A.A., 2002	High Quality	Complications (general)(Overall)	1.5 years	Open CTR (traditional open release)	68	85.29%	Splinting (instructed to wear splint during the night for 6 weeks)	79	58.23%	RR	1.46(1.19,1.81)	Splinting (instructed to wear splint during the night for 6 weeks) (P-value<.05)
Gerritsen,A.A., 2002	High Quality	Complications (general)(Reflex sympathetic dystrophy)	1.5 years	Open CTR (traditional open release)	68	1.47%	Splinting (instructed to wear splint during the night for 6 weeks)	79	0.00%	RD	0.01(-0.01,0.04)	Not Significant (P-value>.05)
Gerritsen,A.A., 2002	High Quality	Complications (general)(Scar pain)	1.5 years	Open CTR (traditional open release)	68	77.94%	Splinting (instructed to wear splint during the night for 6 weeks)	79	25.32%	RR	3.08(2.07,4.59)	Splinting (instructed to wear splint during the night for 6 weeks) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Gerritsen,A.A., 2002	High Quality	Complications (general)(skin irritation)	1.5 years	Open CTR (traditional open release)	68	27.94%	Splinting (instructed to wear splint during the night for 6 weeks)	79	10.13%	RR	2.76(1.29,5.90)	Splinting (instructed to wear splint during the night for 6 weeks) (P-value<.05)
Gerritsen,A.A., 2002	High Quality	Complications (general)(stiffness of wrist, hands, or fingers)	1.5 years	Open CTR (traditional open release)	68	35.29%	Splinting (instructed to wear splint during the night for 6 weeks)	79	39.24%	RR	0.90(0.59,1.37)	Not Significant (P-value>.05)
Gerritsen,A.A., 2002	High Quality	Complications (general)(Swelling of the wrist, hand or fingers)	1.5 years	Open CTR (traditional open release)	68	0.00%	Splinting (instructed to wear splint during the night for 6 weeks)	79	5.06%	RD	-0.05(-0.10,-0.00)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A.A., 2002	High Quality	Complications (hematoma)(wound hematoma)	1.5 years	Open CTR (traditional open release)	68	14.71%	Splinting (instructed to wear splint during the night for 6 weeks)	79	1.27%	RR	11.62(1.53,88.45)	Splinting (instructed to wear splint during the night for 6 weeks) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Gerritsen,A.A., 2002	High Quality	Complications (infection)(wound infection)	1.5 years	Open CTR (traditional open release)	68	7.35%	Splinting (instructed to wear splint during the night for 6 weeks)	79	2.53%	RR	2.90(0.58,14.49)	Not Significant (P-value>.05)
Gerritsen,A.A., 2002	High Quality	Surgery Failure(Success Rate)	3 months	Open CTR (traditional open release)	78	79.49%	Splinting (instructed to wear splint during the night for 6 weeks)	86	53.49%	RR	1.49(1.18,1.86)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A.A., 2002	High Quality	Surgery Failure(Success Rate)	5.9 months	Open CTR (traditional open release)	77	93.51%	Splinting (instructed to wear splint during the night for 6 weeks)	84	67.86%	RR	1.38(1.18,1.61)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A.A., 2002	High Quality	Surgery Failure(Success Rate)	11.8 months	Open CTR (traditional open release)	73	91.78%	Splinting (instructed to wear splint during the night for 6 weeks)	83	72.29%	RR	1.27(1.09,1.47)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A.A., 2002	High Quality	Surgery Failure(Success Rate)	1.5 years	Open CTR (traditional open release)	68	89.71%	Splinting (instructed to wear splint during the night for 6 weeks)	79	74.68%	RR	1.20(1.03,1.40)	Open CTR (traditional open release) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Gerritsen,A.A., 2002	High Quality	Symptom occurrence (pillar pain)(severe pillar pain)	1.5 years	Open CTR (traditional open release)	68	2.94%	Splinting (instructed to wear splint during the night for 6 weeks)	79	0.00%	RD	0.03(-0.01,0.07)	Not Significant (P-value>.05)
Ly,Pen D., 2005	Moderate Quality	Treatment Failure(<20% VAS score improvement @ 3 months or worsening of symptoms)	3 months	CT release (mini) (Limited palmar incision technique)	69	2.90%	Steroid (injection) (22-gauge needle used)	82	1.22%	RR	2.38(0.22,25.66)	Not Significant (P-value>.05)
Ly,Pen D., 2005	Moderate Quality	Treatment Failure(<20% VAS score improvement @ 3 months or worsening of symptoms)	5.9 months	CT release (mini) (Limited palmar incision technique)	67	4.48%	Steroid (injection) (22-gauge needle used)	80	3.75%	RR	1.19(0.25,5.72)	Not Significant (P-value>.05)
Ly,Pen D., 2005	Moderate Quality	Treatment Failure(<20% VAS score improvement @ 3 months or worsening of symptoms)	11.8 months	CT release (mini) (Limited palmar incision technique)	63	3.17%	Steroid (injection) (22-gauge needle used)	77	10.39%	RR	0.31(0.07,1.39)	Not Significant (P-value>.05)

TABLE 159: PICO 7 PART 4- SURGICAL VERSUS CONSERVATIVE: OTHER QUESTIONNAIRE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jarvik,J.G., 2009	High Quality	Questionnaire (SF-36)(MCS)	5.9 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	50	47(16.00)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	54	47(14.00)	Mean Difference	0(-5.80,5.797635)	Not Significant (P-value>.05)
Jarvik,J.G., 2009	High Quality	Questionnaire (SF-36)(PCS)	5.9 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	50	39(12.00)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	54	47(14.00)	Mean Difference	-8(-13.00,-2.99926)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks) (P-value<.05)
Jarvik,J.G., 2009	High Quality	Questionnaire (SF-36)(MCS)	11.8 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	49	45(15.00)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	52	47(15.00)	Mean Difference	-2(-7.85,3.853401)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jarvik,J.G., 2009	High Quality	Questionnaire (SF-36)(PCS)	11.8 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	49	39(14.00)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	52	37(12.00)	Mean Difference	2(-3.10,7.099478)	Not Significant (P-value>.05)

TABLE 160: PICO 7 PART 4- SURGICAL VERSUS CONSERVATIVE: FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Gerritsen,A .A., 2002	High Quality	NCS (DSL)()	11.8 months	Open CTR (traditional open release)	56	1(1.00)	Splinting (instructed to wear splint during the night for 6 weeks)	59	0.7(0.80)	Mean Difference	0.3(-0.03,0.632071)	Not Significant (P-value>.05)
Gerritsen,A .A., 2002	High Quality	Questionnaire (Levine-FSS)(Functional status scale)	3 months	Open CTR (traditional open release)	78	0.6(0.90)	Splinting (instructed to wear splint during the night for 6 weeks)	86	0.4(0.70)	Mean Difference	0.2(-0.05,0.448559)	Not Significant (P-value>.05)
Gerritsen,A .A., 2002	High Quality	Questionnaire (Levine-FSS)(Functional status scale)	5.9 months	Open CTR (traditional open release)	77	1(0.90)	Splinting (instructed to wear splint during the night for 6 weeks)	84	0.5(0.80)	Mean Difference	0.5(0.24,0.763971)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A .A., 2002	High Quality	Questionnaire (Levine-FSS)(Functional status scale)	11.8 months	Open CTR (traditional open release)	73	1(0.90)	Splinting (instructed to wear splint during the night for 6 weeks)	83	0.7(0.80)	Mean Difference	0.3(0.03,0.568789)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A .A., 2002	High Quality	Questionnaire (Levine-FSS)(Functional status scale)	1.5 years	Open CTR (traditional open release)	68	0.9(0.90)	Splinting (instructed to wear splint during the night for 6 weeks)	79	0.7(0.80)	Mean Difference	0.2(-0.08,0.477276)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Hui,A.C., 2005	High Quality	Grip strength(Kilograms)	4.6 months	CT release (open) (traditional open release)	25	21.8(7.90)	No surgery (steroid injection) (15 mg of methylprednisolone acetate injected into carpal tunnel)	25	26.6(7.40)	Mean Difference	-4.8(-9.04,-0.55679)	No surgery (steroid injection) (15 mg of methylprednisolone acetate injected into carpal tunnel) (P-value<.05)
Hui,A.C., 2005	High Quality	NCS (DML)(Distal motor latency (ms))	4.6 months	CT release (open) (traditional open release)	25	4.2(0.90)	No surgery (steroid injection) (15 mg of methylprednisolone acetate injected into carpal tunnel)	25	4.4(0.90)	Mean Difference	-0.2(-0.70,0.298934)	Not Significant (P-value>.05)
Hui,A.C., 2005	High Quality	NCS (SNCV)(Sensory nerve conduction velocity (m/s))	4.6 months	CT release (open) (traditional open release)	25	42.2(8.00)	No surgery (steroid injection) (15 mg of methylprednisolone acetate injected into carpal tunnel)	25	40.5(6.30)	Mean Difference	1.7(-2.29,5.691668)	Not Significant (P-value>.05)
Jarvik,J.G., 2009	High Quality	Questionnaire (CTSAQ)(Function(1-5))	5.9 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	50	1.91(0.88)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	54	2.44(0.87)	Mean Difference	-0.53(-0.87,-0.19333)	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jarvik,J.G., 2009	High Quality	Questionnaire (CTSAQ)(Function(1-5))	11.8 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	49	1.74(0.79)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	52	2.17(0.96)	Mean Difference	-0.43(-0.77,-0.08792)	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference) (P-value<.05)
Andreu,J.L., 2013	Moderate Quality	NCS(Motor amplitude)	11.8 months	CT release (open) ()	45	8.06(3.80)	No surgery (steroid injection) ()	50	9.75(9.62)	Mean Difference	-1.69(-4.58,1.198442)	Not Significant (P-value>.05)
Andreu,J.L., 2013	Moderate Quality	NCS (DML)()	11.8 months	CT release (open) ()	45	4.74(1.30)	No surgery (steroid injection) ()	50	5.39(1.67)	Mean Difference	-0.65(-1.25,-0.05120)	CT release (open) (P-value<.05)
Andreu,J.L., 2013	Moderate Quality	NCS (SA)()	11.8 months	CT release (open) ()	45	32.28(17.44)	No surgery (steroid injection) ()	50	28.72(18.82)	Mean Difference	3.56(-3.73,10.85236)	Not Significant (P-value>.05)
Andreu,J.L., 2013	Moderate Quality	NCS(SNCV)()	11.8 months	CT release (open) ()	45	43.74(7.64)	No surgery (steroid injection) ()	50	36.9(11.74)	Mean Difference	6.84(2.89,10.78620)	No surgery (steroid injection) (P-value<.05)
Andreu,J.L., 2013	Moderate Quality	Questionnaire (General/undefined)(Visual analog scale of functional impairment (100cm VAS))	3 months	CT release (open) ()	67	17(23.00)	No surgery (steroid injection) ()	80	6(13.00)	Mean Difference	11(4.80,17.20054)	No surgery (steroid injection) (P-value<.05)
Andreu,J.L., 2013	Moderate Quality	Questionnaire (General/undefined)(Visual analog scale of functional impairment (100cm VAS))	5.9 months	CT release (open) ()	63	7(15.00)	No surgery (steroid injection) ()	77	8(15.00)	Mean Difference	-1(-5.99,3.994542)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Andreu,J.L., 2013	Moderate Quality	Questionnaire (General/undefined)(Visual analog scale of functional impairment (100cm VAS))	11.8 months	CT release (open) ()	45	3(11.00)	No surgery (steroid injection) ()	50	9(15.00)	Mean Difference	-6(-11.26,-0.74482)	CT release (open) (P-value<.05)
Ly-Pen,D., 2012	Moderate Quality	Questionnaire (General/undefined)(Reached 20% improvement in functional impairment on 100mm VAS scale)	2 years	CT release (mini) (limited palmar incision)	80	65.00%	No surgery (Steroid injection) (paramethasone acetoneide, 20mg in 1 ml)	83	53.01%	RR	1.23(0.95,1.59)	Not Significant (P-value>.05)
Ly-Pen,D., 2012	Moderate Quality	Questionnaire (General/undefined)(Reached 50% improvement in functional impairment on 100mm VAS scale)	2 years	CT release (mini) (limited palmar incision)	80	63.75%	No surgery (Steroid injection) (paramethasone acetoneide, 20mg in 1 ml)	60	53.33%	RR	1.20(0.90,1.60)	Not Significant (P-value>.05)
Ly-Pen,D., 2012	Moderate Quality	Questionnaire (General/undefined)(Reached 70% improvement in functional impairment on 100mm VAS scale)	2 years	CT release (mini) (limited palmar incision)	80	60.00%	No surgery (Steroid injection) (paramethasone acetoneide, 20mg in 1 ml)	83	44.58%	RR	1.35(1.00,1.82)	Not Significant (P-value>.05)

TABLE 161: PICO 7 PART 4- SURGICAL VERSUS CONSERVATIVE: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Gerritsen,A.A., 2002	High Quality	Symptom recurrence (nocturnal pain)(Number of nights waking up due to symptoms)	3 months	Open CTR (traditional open release)	78	2.6(3.50)	Splinting (instructed to wear splint during the night for 6 weeks)	86	2.2(3.10)	Mean Difference	0.4(-0.62,1.416171)	Not Significant (P-value>.05)
Gerritsen,A.A., 2002	High Quality	Symptom recurrence (nocturnal pain)(Number of nights waking up due to symptoms)	5.9 months	Open CTR (traditional open release)	77	3.6(2.80)	Splinting (instructed to wear splint during the night for 6 weeks)	84	2.6(3.10)	Mean Difference	1(0.09,1.911395)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A.A., 2002	High Quality	Symptom recurrence (nocturnal pain)(Number of nights waking up due to symptoms)	11.8 months	Open CTR (traditional open release)	73	3.6(2.90)	Splinting (instructed to wear splint during the night for 6 weeks)	83	2.9(3.00)	Mean Difference	0.7(-0.23,1.626893)	Not Significant (P-value>.05)
Gerritsen,A.A., 2002	High Quality	Symptom recurrence (nocturnal pain)(Number of nights waking up due to symptoms)	1.5 years	Open CTR (traditional open release)	68	3.6(2.90)	Splinting (instructed to wear splint during the night for 6 weeks)	79	3.2(3.10)	Mean Difference	0.4(-0.57,1.370787)	Not Significant (P-value>.05)
Jarvik,J.G., 2009	High Quality	Symptom recurrence (pain)(Pain intensity(1-10))	5.9 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	50	4.7(3.20)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	54	5.7(3.10)	Mean Difference	-1(-2.21,0.212609)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jarvik,J.G., 2009	High Quality	Symptom recurrence (pain)(Pain interference(1-10))	5.9 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	50	2.8(3.00)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	54	3.4(3.20)	Mean Difference	-0.6(-1.79,0.591624)	Not Significant (P-value>.05)
Jarvik,J.G., 2009	High Quality	Symptom recurrence (pain)(Pain intensity(1-10))	11.8 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	49	3.5(3.00)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	52	4.3(3.30)	Mean Difference	-0.8(-2.03,0.428869)	Not Significant (P-value>.05)
Jarvik,J.G., 2009	High Quality	Symptom recurrence (pain)(Pain interference(1-10))	11.8 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	49	2.1(6.90)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	52	3.1(3.30)	Mean Difference	-1(-3.13,1.130057)	Not Significant (P-value>.05)
Andreu,J.L., 2013	Moderate Quality	Questionnaire/Scale (VAS-pain)(100cm)	3 months	CT release (open) ()	67	15(22.00)	No surgery (steroid injection) ()	80	6(15.00)	Mean Difference	9(2.79,15.20932)	No surgery (steroid injection) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Andreu,J.L., 2013	Moderate Quality	Questionnaire/Scale (VAS-pain)(100cm)	5.9 months	CT release (open) ()	63	5(16.00)	No surgery (steroid injection) ()	77	8(18.00)	Mean Difference	-3(-8.64,2.636928)	Not Significant (P-value>.05)
Andreu,J.L., 2013	Moderate Quality	Questionnaire/Scale (VAS-pain)(100cm)	11.8 months	CT release (open) ()	45	2(10.00)	No surgery (steroid injection) ()	50	8(15.00)	Mean Difference	-6(-11.08,-0.91825)	CT release (open) (P-value<.05)
Ly-Pen,D., 2012	Moderate Quality	Symptom relief (pain)(Reached 20% improvement in pain on VAS 100mm scale)	2 years	CT release (mini) (limited palmar incision)	80	65.00%	No surgery (Steroid injection) (paramethasone acetonide, 20mg in 1 ml)	83	60.24%	RR	1.08(0.85,1.37)	Not Significant (P-value>.05)
Ly-Pen,D., 2012	Moderate Quality	Symptom relief (pain)(Reached 50% improvement in pain on VAS 100mm scale)	2 years	CT release (mini) (limited palmar incision)	80	63.75%	No surgery (Steroid injection) (paramethasone acetonide, 20mg in 1 ml)	83	57.83%	RR	1.10(0.86,1.41)	Not Significant (P-value>.05)
Ly-Pen,D., 2012	Moderate Quality	Symptom relief (pain)(Reached 70% improvement in pain on VAS 100mm scale)	2 years	CT release (mini) (limited palmar incision)	80	63.75%	No surgery (Steroid injection) (paramethasone acetonide, 20mg in 1 ml)	83	55.42%	RR	1.15(0.89,1.48)	Not Significant (P-value>.05)

TABLE 162: PICO 7 PART 4- SURGICAL VERSUS CONSERVATIVE: QUALITY OF LIFE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jarvik,J.G., 2009	High Quality	Activity of daily living (ADL)(Days of reduced work or housework)	5.9 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	50	4.3(8.80)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	54	6.3(9.40)	Mean Difference	-2(-5.50,1.497980)	Not Significant (P-value>.05)
Jarvik,J.G., 2009	High Quality	Activity of daily living (ADL)(Days of reduced work or housework)	11.8 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	49	2.2(5.60)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	52	5.2(8.80)	Mean Difference	-3(-5.86,-0.13999)	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference) (P-value<.05)

TABLE 163: PICO 7 PART 4- SURGICAL VERSUS CONSERVATIVE: SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/ P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Gerritsen,A. A., 2002	High Quality	Paresthesia(Daytime paresthesia)	3 months	Open CTR (traditional open release)	78	4.8(3.20)	Splinting (instructed to wear splint during the night for 6 weeks)	86	2.2(3.20)	Mean Difference	2.6(1.62,3.580689)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A. A., 2002	High Quality	Paresthesia(Nighttime paresthesia)	3 months	Open CTR (traditional open release)	78	4.6(3.80)	Splinting (instructed to wear splint during the night for 6 weeks)	86	3.5(3.30)	Mean Difference	1.1(0.01,2.194368)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A. A., 2002	High Quality	Paresthesia(Daytime paresthesia)	5.9 months	Open CTR (traditional open release)	77	5.5(2.90)	Splinting (instructed to wear splint during the night for 6 weeks)	84	3.7(3.20)	Mean Difference	1.8(0.86,2.742280)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A. A., 2002	High Quality	Paresthesia(Nighttime paresthesia)	5.9 months	Open CTR (traditional open release)	77	5.4(3.50)	Splinting (instructed to wear splint during the night for 6 weeks)	84	4.1(3.70)	Mean Difference	1.3(0.19,2.412318)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A. A., 2002	High Quality	Paresthesia(Daytime paresthesia)	11.8 months	Open CTR (traditional open release)	73	5.5(2.90)	Splinting (instructed to wear splint during the night for 6 weeks)	83	4(3.40)	Mean Difference	1.5(0.51,2.488746)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A. A., 2002	High Quality	Paresthesia(Daytime paresthesia)	1.5 years	Open CTR (traditional open release)	68	5.3(3.00)	Splinting (instructed to wear splint during the night for 6 weeks)	79	4(3.60)	Mean Difference	1.3(0.23,2.367081)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A. A., 2002	High Quality	Questionnaire (Levine-SSS)(Symptom severity scale)	3 months	Open CTR (traditional open release)	78	1(0.90)	Splinting (instructed to wear splint during the night for 6 weeks)	83	0.9(0.90)	Mean Difference	0.1(-0.18,0.378179)	Not Significant (P-value>.05)

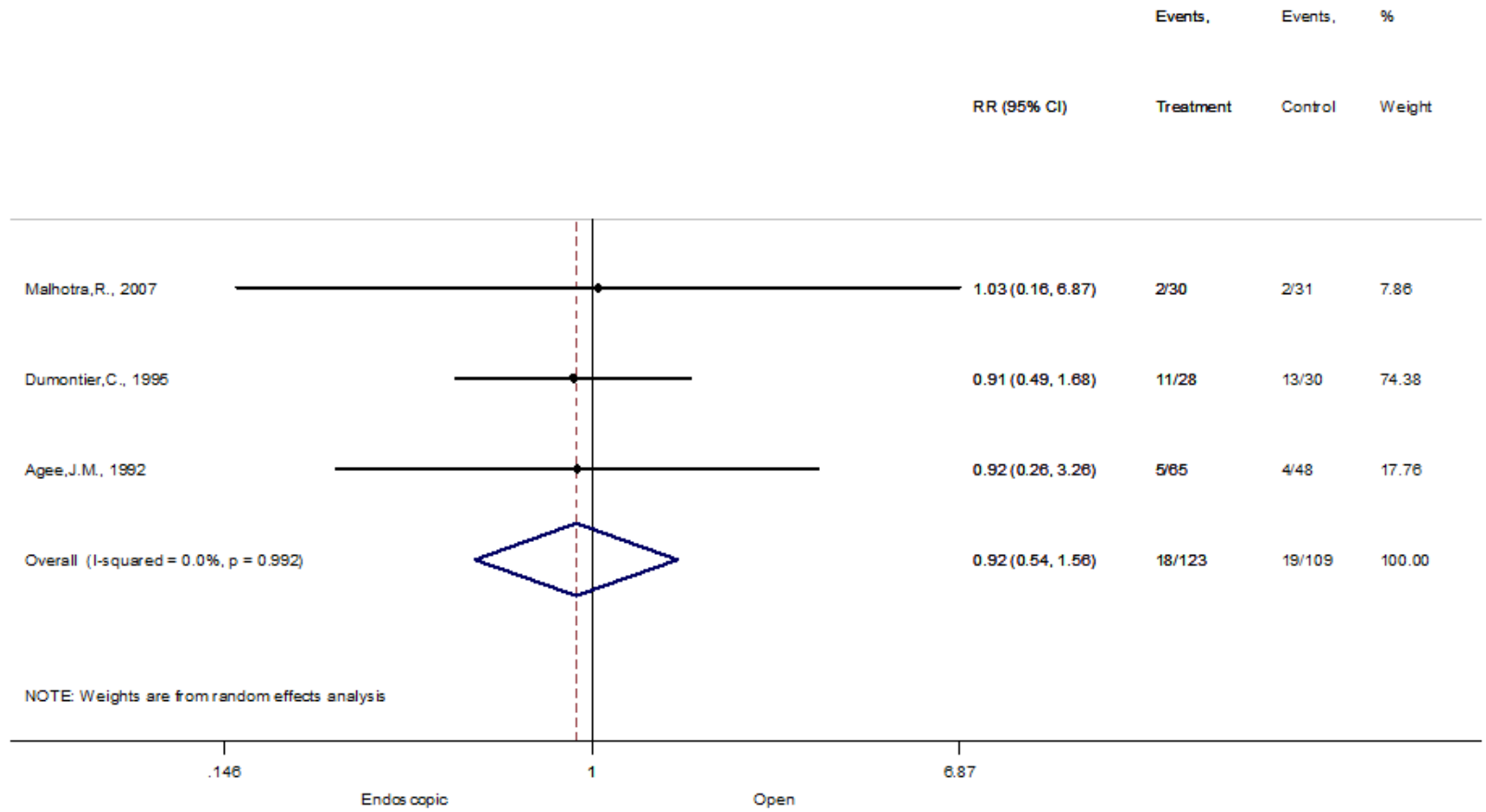
Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Gerritsen,A. A., 2002	High Quality	Questionnaire (Levine-SSS)(Symptom severity scale)	5.9 months	Open CTR (traditional open release)	77	1.3(0.80)	Splinting (instructed to wear splint during the night for 6 weeks)	86	0.6(0.70)	Mean Difference	0.7(0.47,0.931987)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A. A., 2002	High Quality	Questionnaire (Levine-SSS)(Symptom severity scale)	11.8 months	Open CTR (traditional open release)	73	1.3(0.80)	Splinting (instructed to wear splint during the night for 6 weeks)	84	0.9(0.80)	Mean Difference	0.4(0.15,0.650896)	Open CTR (traditional open release) (P-value<.05)
Gerritsen,A. A., 2002	High Quality	Questionnaire (Levine-SSS)(Symptom severity scale)	1.5 years	Open CTR (traditional open release)	68	1.3(0.80)	Splinting (instructed to wear splint during the night for 6 weeks)	79	0.9(0.90)	Mean Difference	0.4(0.13,0.674854)	Open CTR (traditional open release) (P-value<.05)
Hui,A.C., 2005	High Quality	Questionnaire/Scale (GSS)(0 (no symptoms) to 50 (most severe))	4.6 months	CT release (open) (traditional open release)	25	4.3(5.60)	No surgery (steroid injection) (15 mg of methylprednisolone acetate injected into carpal tunnel)	25	16.6(12.30)	Mean Difference	-12.3(-17.60,-7.00219)	CT release (open) (traditional open release) (P-value<.05)
Ismatullah,I., 2013	High Quality	Questionnaire/Scale (GSS)()	3 months	CT release (open) (traditional open release)	20	5.45(6.90)	No surgery (Steroid injection) (local steroid injection)	20	22.1(6.90)	Mean Difference	-16.65(-20.93,-12.3738)	CT release (open) (traditional open release) (P-value<.05)
Jarvik,J.G., 2009	High Quality	Questionnaire (CTSAQ)(Symptoms(1-5))	5.9 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	50	2.02(1.03)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	54	2.42(0.80)	Mean Difference	-0.4(-0.76,-0.04357)	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jarvik,J.G., 2009	High Quality	Questionnaire (CTSAQ)(Symptoms(1-5))	11.8 months	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference)	49	1.74(0.76)	No surgery (NSAIDs w/ hand therapy) (Non-steroidal anti-inflammatory drugs and 6 hand therapy sessions over 6 weeks)	52	2.07(0.88)	Mean Difference	-0.33(-0.65,-0.00985)	CT release (Open/Endoscopic) (Open or Endoscopic CTR based on surgeon preference) (P-value<.05)
Andreu,J.L., 2013	Moderate Quality	Paresthesia(Nocturnal paresthesia (100mm VAS scale))	3 months	CT release (open) ()	67	16(25.00)	No surgery (steroid injection) ()	80	8(17.00)	Mean Difference	8(0.95,15.05078)	No surgery (steroid injection) (P-value<.05)
Andreu,J.L., 2013	Moderate Quality	Paresthesia(Nocturnal paresthesia (100mm VAS scale))	5.9 months	CT release (open) ()	63	7(17.00)	No surgery (steroid injection) ()	77	13(21.00)	Mean Difference	-6(-12.29,0.294796)	Not Significant (P-value>.05)
Andreu,J.L., 2013	Moderate Quality	Paresthesia(Nocturnal paresthesia (100mm VAS scale))	11.8 months	CT release (open) ()	45	3(11.00)	No surgery (steroid injection) ()	50	12(19.00)	Mean Difference	-9(-15.17,-2.83023)	CT release (open) (P-value<.05)
Ly-Pen,D., 2012	Moderate Quality	Paresthesia(Reached 20% improvement in nocturnal parthesia on VAS 100mm scale)	2 years	CT release (mini) (limited palmar incision)	80	68.75%	No surgery (Steroid injection) (paramethasone acetonide, 20mg in 1 ml)	83	60.24%	RR	1.14(0.91,1.43)	Not Significant (P-value>.05)
Ly-Pen,D., 2012	Moderate Quality	Paresthesia(Reached 50% improvement in nocturnal parthesia on VAS 100mm scale)	2 years	CT release (mini) (limited palmar incision)	80	67.50%	No surgery (Steroid injection) (paramethasone acetonide, 20mg in 1 ml)	83	56.63%	RR	1.19(0.94,1.52)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ly-Pen,D., 2012	Moderate Quality	Paresthesia(Reached 70% improvement in nocturnal parthesia on VAS 100mm scale)	2 years	CT release (mini) (limited palmar incision)	80	67.50%	No surgery (Steroid injection) (paramethasone acetonide, 20mg in 1 ml)	83	50.60%	RR	1.33(1.03,1.73)	CT release (mini) (limited palmar incision) (P-value<.05)

META-ANALYSES

FIGURE 13: PICO 7 PART 1 ENDOSCOPIC VERSUS OPEN: SYMPTOM RECURRENCE: PAIN



ADJUNCTIVE TECHNIQUES

Moderate evidence supports that there is no benefit to routine inclusion of the following adjunctive techniques: epineurotomy, neurolysis, flexor tenosynovectomy, and lengthening/reconstruction of the flexor retinaculum (transverse carpal ligament).

Strength of Recommendation: Moderate Evidence ★★☆☆

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

Rationale

Epineurotomy: There are two high quality studies (Leinberry 1997 and Crnkovic 2012) and one moderate quality study (Blair 1996) that evaluated carpal tunnel release alone versus the addition of epineurotomy of the median nerve. The Leinberry (1997) evaluated patients at 11.8 months after surgery. There was no significant difference found in clinical evaluation (Boston Questionnaire, APB strength, Phalen’s, Tinel’s, or two-point discrimination) or in symptom recurrence. Crnkovic (2012) studied nerve volume measured by MRI as an index of nerve recovery. Patients were evaluated at 3 and 6 months after surgery and no significant differences were noted at either time point. There were also no differences found for the symptoms of pain between the groups. Blair (1996) found no differences in post-operative two-point discrimination, pain, or ability to complete activities of daily living at a minimum of two years following surgery. There were also no differences electrodiagnostic parameters.

Neurolysis: There was one high quality study (Mackinnon 1991) and one moderate quality study (Lowry 1988) which evaluated the addition of neurolysis of the median nerve to a standard carpal tunnel release. The Mackinnon study focused on internal neurolysis and found no differences in thenar atrophy, muscle strength, pressure threshold, vibration threshold and static two-point discrimination at 12 months after surgery. No difference was noted in pinch or grip strength. The Lowry study evaluated the NCS findings at 3 months after surgery and did not find a difference in nerve conduction velocity or distal motor and sensory latency. Neither study found a difference in symptom relief or recurrence.

Flexor Tenosynovectomy: There was one high quality study (Shum 2002) evaluating flexor tenosynovectomy as an adjunct to carpal tunnel release. There was no difference in surgical site infection, scar sensitivity, wrist motion, finger motion, or Boston Carpal Tunnel Questionnaire at 12 months following surgery.

Flexor Retinaculum Reconstruction/Lengthening: There was one high quality study (Dias 2004) that evaluated flexor retinaculum lengthening/reconstruction. Six months following surgery there were no differences in grip strength, Jebsen Taylor score, Phalen test, pinch strength, Boston Carpal Tunnel Questionnaire score or symptom recurrence.

Risks and Harms of Implementing this Recommendation

There are no known harms with implementation of this recommendation

Future Research

Future research should be directed on conducting studies with larger sample sizes. There may also be certain subsets of patients who would benefit from regular inclusion of these adjunctive procedures, and future research can focus on such subsets.

STUDY QUALITY TABLE OF ADJUNCTIVE SURGICAL TECHNIQUES

TABLE 164: OBSERVATIONAL STUDY QUALITY

Study	Design	Participant Recruitment	Allocation	Confounding Variables	Follow-Up Length	Other Bias? (If retrospective comparative, mark Yes)	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Shiota,E., 2001	○	●	●	●	●	○	●	●	●	Include	Low Quality

TABLE 165: RANDOMIZED TRIAL QUALITY

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Crnkovi?-T, 2012	●	●	●	●	●	●	●	●	●	Include	High Quality
Blair,W.F., 1996	○	○	●	◐	○	●	●	●	●	Include	Moderate Quality
Dias,J.J., 2004	●	●	●	●	●	●	●	●	●	Include	High Quality
Kharwadkar,N., 2005	●	●	◐	●	●	○	●	●	●	Include	High Quality
Leinberry,C.F., 1997	●	●	●	●	○	●	●	●	●	Include	High Quality
Lowry,W.E.,Jr., 1988	●	●	●	●	○	○	●	●	●	Include	Moderate Quality
Mackinnon,S.E., 1991	●	●	●	●	●	●	●	●	●	Include	High Quality
Shum,C., 2002	●	○	●	●	●	●	●	●	●	Include	High Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 166: SUMMARY OF FINDINGS PICO 8 ADJUNCTIVE/ALTERNATIVE SURGICAL TECHNIQUES (EARLY FOLLOW-UP (3 MONTHS UP TO 6 MONTHS))

	High Quality			Moderate Quality	Low Quality	Meta-Analysis
	-Crnkovi?T, 2012	Dias,J.J., 2004	Kharwadkar,N., 2005	Lowry,W.E.,Jr., 1988	Shiota,E., 2001	
Favors treatment 1	●					
Favors treatment 2	●					
Not significant	○					
Outcomes						
Complications						
Symptom occurrence (scar tenderness)			○			NA
Function						
Grip Strength		○			●	NA
Jebsen Taylor score		○				NA
NCS (DML)	○			○		NA
NCS (DSL)	○			○		NA
NCS (NCV)				○		NA
Phalen's test score		○				NA
Pinch Strength		○				NA
Questionnaire (Boston-FSS)			○			NA
Questionnaire (Levine-FSS)		○				NA
Pain						
Questionnaire/Scale (VAS-pain)						
VAS for pillar pain (SD not provided for all subgroups)			○			NA
Symptoms						
Questionnaire (Boston-SSS)			○			NA
Questionnaire (Levine-SSS)		○				NA
Symptom recurrence (general)		○		○		NA

TABLE 167: SUMMARY OF FINDINGS PICO 8 ADJUNCTIVE/ALTERNATIVE SURGICAL TECHNIQUES (LATEFOLLOW-UP (> 6 MONTHS))

	High Quality			Moderate Quality	Low Quality	Meta-Analysis
	Leinberry, C.F., 1997	Mackinnon, S.E., 1991	Shum, C., 2002	Blair, W.F., 1996	Shiota, E., 2001	
Favors treatment 1	●					
Favors treatment 2	●					
Not significant	○					
Outcomes						
Complications						
Surgical site infection			○			NA
Function						
Grip Strength					○	NA
Improvement of strength						
Average strength of the abductor pollicis brevis muscle	○				●	NA
NCS (motor conduction latency)					●	NA
NCS (DML)				●		NA
NCS (motor amplitude)				●		NA
Phalen's test score	○					NA
Questionnaire (Levine-FSS)			○			NA
Thenar Atrophy		○				NA
Tinel's Sign/Test	○					NA
Two-point discrimination	○	○				NA
Pain						
Questionnaire (General/Undefined)						
General pain (non-questionnaire)				○		NA
Quality Of Life						
Activity of daily living (ADL)						
Difficulty in lifting				○		NA
Symptoms						
Questionnaire (Levine-SSS)			○			NA
Symptom recurrence (general)	○				●	NA
Symptom recurrence (numbness)				●		NA
Symptom relief (general)		○				NA

DETAILED DATA FINDINGS

TABLE 168: PICO 8 PART 1- ADJUNCTIVE/ALTERNATIVE SURGICAL TECHNIQUES: COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kharwadkar,N., 2005	High Quality	Symptom occurrence (scar tenderness)(Mild, moderate, or severe)	3 months	CT release-open (w/ absorbable sutures) (CT release (w/ absorbable sutures))	18	33.33%	CT release-open (w/ non-absorbable sutures) (CT release (w/ non-absorbable sutures))	18	44.44%	RR	0.75(0.33,1.72)	Not Significant (P-value>.05)
Shum,C., 2002	High Quality	Surgical site infection()	11.8 months	CT release (w/ no flexor tenosynovectomy) (Wrists treated by open CT release w/ no flexor tenosynovectomy)	44	0.00%	CT release (w/ flexor tenosynovectomy) (Wrists treated by open CT release with a flexor tenosynovectomy)	44	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)

TABLE 169: PICO 8 PART 1- ADJUNCTIVE/ALTERNATIVE SURGICAL TECHNIQUES: FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Crnkovi-T, 2012	High Quality	NCS (DML)(Distal motor latency (ms) (# of patients not improved))	3 months	CT release (w/ no epineurotomy)-control (Open-field release without epineurotomy)	25	32.00%	CT release (w/ epineurotomy)-test (Open-field surgical carpal tunnel release followed by a longitudinal epineurotomy of the nerve)	25	24.00%	RR	1.33(0.54,3.29)	Not Significant (P-value>.05)
Crnkovi-T, 2012	High Quality	NCS (DML)(Distal motor latency (ms) (# of patients not improved))	5.9 months	CT release (w/ no epineurotomy)-control (Open-field release without epineurotomy)	25	32.00%	CT release (w/ epineurotomy)-test (Open-field surgical carpal tunnel release followed by a longitudinal epineurotomy of the nerve)	25	16.00%	RR	2.00(0.69,5.80)	Not Significant (P-value>.05)
Crnkovi-T, 2012	High Quality	NCS (DSL)(Distal sensory latency (ms) (# of patients not improved))	3 months	CT release (w/ no epineurotomy)-control (Open-field release without epineurotomy)	25	52.00%	CT release (w/ epineurotomy)-test (Open-field surgical carpal tunnel release followed by a longitudinal epineurotomy of the nerve)	24	54.17%	RR	0.96(0.57,1.63)	Not Significant (P-value>.05)
Crnkovi-T, 2012	High Quality	NCS (DSL)(Distal sensory latency (ms) (# of patients not improved))	5.9 months	CT release (w/ no epineurotomy)-control (Open-field release without epineurotomy)	25	36.00%	CT release (w/ epineurotomy)-test (Open-field surgical carpal tunnel release followed by a longitudinal epineurotomy of the nerve)	24	41.67%	RR	0.86(0.43,1.75)	Not Significant (P-value>.05)
Dias,J.J., 2004	High Quality	Grip strength(Kilograms)	5.8 months	CT release-open (divide) (CT release (flexor retinaculum divided))	26	21.2(8.85)	CT release-open (lengthen) ()	26	21.5(9.11)	Mean Difference	-0.3(-5.18,4.58)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Dias,J.J., 2004	High Quality	Jebsen Taylor score(Seconds)	3 months	CT release-open (divide) (CT release (flexor retinaculum divided))	26	67.6(22.37)	CT release-open (lengthen) ()	26	66.3(21.85)	Mean Difference	1.3(-10.72,13.32)	Not Significant (P-value>.05)
Dias,J.J., 2004	High Quality	Phalen's test score(# positive)	5.8 months	CT release-open (divide) (CT release (flexor retinaculum divided))	26	3.85%	CT release-open (lengthen) ()	26	3.85%	RR	1.00(0.07,15.15)	Not Significant (P-value>.05)
Dias,J.J., 2004	High Quality	Pinch Strength(Kilograms)	5.8 months	CT release-open (divide) (CT release (flexor retinaculum divided))	26	6.4(1.82)	CT release-open (lengthen) ()	26	6.5(1.82)	Mean Difference	-0.1(-1.09,0.89)	Not Significant (P-value>.05)
Dias,J.J., 2004	High Quality	Questionnaire (Levine-FSS)()	5.8 months	CT release-open (divide) (CT release (flexor retinaculum divided))	26	1.2(0.26)	CT release-open (lengthen) ()	26	1.3(0.52)	Mean Difference	-0.1(-0.32,0.12)	Not Significant (P-value>.05)
Kharwadkar,N., 2005	High Quality	Questionnaire (Boston-FSS)(Boston CTS Questionnaire (functional status scale))	3 months	CT release-open (w/ absorbable sutures) (CT release (w/ absorbable sutures))	18	1.1(0.39)	CT release-open (w/ non-absorbable sutures) (CT release (w/ non-absorbable sutures))	18	1.1(0.69)	Mean Difference	0(-0.37,0.366158)	Not Significant (P-value>.05)
Leinberry,C.F., 1997	High Quality	Improvement of strength(Average strength of the abductor pollicis brevis muscle)	11.8 months	CT release (w/ no epineurotomy) (release of the transverse carpal ligament alone,)	25	4.3(.)	CT release (w/ epineurotomy) (release and adjuvant epineurotomy of the median nerve.)	25	4.2(.)	Author Reported	NA	Not Significant (P-value>.05)
Leinberry,C.F., 1997	High Quality	Phalen's test score(% positive)	11.8 months	CT release (w/ no epineurotomy) (release of the transverse carpal ligament alone,)	25	8.00%	CT release (w/ epineurotomy) (release and adjuvant epineurotomy of the median nerve.)	25	16.00%	RR	0.50(0.10,2.49)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Leinberry,C.F., 1997	High Quality	Tinel's Sign/Test(% positive)	11.8 months	CT release (w/ no epineurotomy) (release of the transverse carpal ligament alone,)	25	24.00%	CT release (w/ epineurotomy) (release and adjuvant epineurotomy of the median nerve.)	25	44.00%	RR	0.55(0.24,1.25)	Not Significant (P-value>.05)
Leinberry,C.F., 1997	High Quality	Two-point discrimination(Millimeters)	11.8 months	CT release (w/ no epineurotomy) (release of the transverse carpal ligament alone,)	25	5.1(.)	CT release (w/ epineurotomy) (release and adjuvant epineurotomy of the median nerve.)	25	4.7(.)	Author Reported	NA	Not Significant (P-value>.05)
Mackinnon,S.E., 1991	High Quality	Thenar Atrophy((0-5 scale))	11.8 months	CT release (w/ no neurolysis) ()	32	40.63%	CT release (w/ neurolysis) ()	31	35.48%	RR	1.14(0.61,2.16)	Not Significant (P-value>.05)
Mackinnon,S.E., 1991	High Quality	Two-point discrimination(>3 millimeters)	11.8 months	CT release (w/ no neurolysis) ()	32	28.13%	CT release (w/ neurolysis) ()	31	25.81%	RR	1.09(0.48,2.46)	Not Significant (P-value>.05)
Shum,C., 2002	High Quality	Questionnaire (Levine-FSS)(Mean functional status score)	11.8 months	CT release (w/ no flexor tenosynovectomy) (Wrists treated by open CT release w/ no flexor tenosynovectomy)	44	1.6(0.62)	CT release (w/ flexor tenosynovectomy) (Wrists treated by open CT release with a flexor tenosynovectomy)	44	1.7(0.71)	Mean Difference	-0.1(-0.38,0.178521)	Not Significant (P-value>.05)
Blair,W.F., 1996	Moderate Quality	NCS (DML)(Wrist motor latency)	2 years	CT release (w/ no Epineurotomy) (CT release (w/o epineurotomy))	27	. %	CT release (w/ Epineurotomy) (CT release (w/ epineurotomy))	48	. %	Author Reported	NA	CT release (w/ Epineurotomy) (CT release (w/ epineurotomy)) (P-value<.05)
Blair,W.F., 1996	Moderate Quality	NCS (MA)(Motor amplitude)	2 years	CT release (w/ no Epineurotomy) (CT release (w/o epineurotomy))	24	. %	CT release (w/ Epineurotomy) (CT release (w/ epineurotomy))	48	. %	Author Reported	NA	CT release (w/ Epineurotomy) (CT release (w/ epineurotomy)) (P-value<.05)
Lowry,W.E., Jr., 1988	Moderate Quality	NCS (DML)(Distal motor latency (ms))	3 months	CT release (w/ no neurolysis) (Standard ligament release w/ no neurolysis)	23	5(1.10)	CT release (w/ neurolysis) (Standard ligament release w/ neurolysis)	23	4.8(0.90)	Mean Difference	0.2(-0.38,0.780855)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Lowry,W.E.,Jr., 1988	Moderate Quality	NCS (DSL)(Distal sensory latency (ms))	3 months	CT release (w/ no neurolysis) (Standard ligament release w/ no neurolysis)	23	. %	CT release (w/ neurolysis) (Standard ligament release w/ neurolysis)	24	. %	Author Reported	NA	Not Significant (P-value>.05)
Lowry,W.E.,Jr., 1988	Moderate Quality	NCS (NCV)(Nerve conduction velocity)	3 months	CT release (w/ no neurolysis) (Standard ligament release w/ no neurolysis)	23	48(6.50)	CT release (w/ neurolysis) (Standard ligament release w/ neurolysis)	23	50(6.60)	Mean Difference	-2(-5.79,1.785829)	Not Significant (P-value>.05)
Shiota,E., 2001	Low Quality	Grip strength(Kilograms)	3.9 months	CT release (w/ no synovectomy) (CT release alone)	43	. %	CT release (w/ synovectomy) (Enlargement reconstruction of the flexor retinaculum with synovectomy)	70	. %	Author Reported	NA	CT release (w/ synovectomy) (Enlargement reconstruction of the flexor retinaculum with synovectomy) (P-value<.05)
Shiota,E., 2001	Low Quality	Grip strength(Kilograms)	6 months	CT release (w/ no synovectomy) (CT release alone)	43	13.5(.)	CT release (w/ synovectomy) (Enlargement reconstruction of the flexor retinaculum with synovectomy)	70	15(.)	Author Reported	NA	Not Significant (P-value>.05)
Shiota,E., 2001	Low Quality	NCS(Motor conduction latency (msec))	2 years	CT release (w/ no synovectomy) (CT release alone)	43	3.7(1.60)	CT release (w/ synovectomy) (Enlargement reconstruction of the flexor retinaculum with synovectomy)	70	4.6(1.50)	Mean Difference	-0.9(-1.49,-0.30654)	CT release (w/ no synovectomy) (CT release alone) (P-value<.05)

TABLE 170: PICO 8 PART 1- ADJUNCTIVE/ALTERNATIVE SURGICAL TECHNIQUES: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kharwadkar,N., 2005	High Quality	Questionnaire/Scale (VAS-pain)(VAS for pillar pain (SD not provided for all subgroups))	3 months	CT release-open (w/ absorbable sutures) (CT release (w/ absorbable sutures))	18	0(.)	CT release-open (w/ non-absorbable sutures) (CT release (w/ non-absorbable sutures))	18	0.67(0.50)	Author Reported	NA	Not Significant (P-value>.05)
Blair,W.F., 1996	Moderate Quality	Questionnaire (General/undefined)(General pain (non-questionnaire))	2 years	CT release (w/ no Epineurotomy) (CT release (w/o epineurotomy))	27	29.63%	CT release (w/ Epineurotomy) (CT release (w/ epineurotomy))	48	12.50%	RR	2.37(0.92,6.12)	Not Significant (P-value>.05)

TABLE 171: PICO 8 PART 1- ADJUNCTIVE/ALTERNATIVE SURGICAL TECHNIQUES: QUALITY OF LIFE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Blair, W.F., 1996	Moderate Quality	Activity of daily living (ADL)(Difficulty in lifting)	2 years	CT release (w/ no Epineurotomy) (CT release (w/o epineurotomy))	27	25.93%	CT release (w/ Epineurotomy) (CT release (w/ epineurotomy))	48	18.75%	RR	1.38(0.58,3.29)	Not Significant (P-value>.05)

TABLE 172: PICO 8 PART 1- ADJUNCTIVE/ALTERNATIVE SURGICAL TECHNIQUES: SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Dias,J.J., 2004	High Quality	Questionnaire (Levine-SSS)()	5.8 months	CT release-open (divide) (CT release (flexor retinaculum divided))	26	1.3(0.52)	CT release-open (lengthen) ()	26	1.3(0.52)	Mean Difference	0(-0.28,0.28)	Not Significant (P-value>.05)
Dias,J.J., 2004	High Quality	Symptom recurrence (general)(Wrist stiffness (mild or moderate))	5.8 months	CT release-open (divide) (CT release (flexor retinaculum divided))	26	3.85%	CT release-open (lengthen) ()	26	0.00%	RD	0.04(-0.04,0.11)	Not Significant (P-value>.05)
Kharwadkar,N., 2005	High Quality	Questionnaire (Boston-SSS)(Boston CTS Questionnaire (symptom severity scale))	3 months	CT release-open (w/ absorbable sutures) (CT release (w/ absorbable sutures))	18	1.1(0.25)	CT release-open (w/ non-absorbable sutures) (CT release (w/ non-absorbable sutures))	18	1.1(0.21)	Mean Difference	0(-0.15,0.150833)	Not Significant (P-value>.05)
Leinberry,C.F., 1997	High Quality	Symptom recurrence (general)(@ 12 month post-op)	11.8 months	CT release (w/ no epineurotomy) (release of the transverse carpal ligament alone.)	25	40.00%	CT release (w/ epineurotomy) (release and adjuvant epineurotomy of the median nerve.)	25	44.00%	RR	0.91(0.47,1.75)	Not Significant (P-value>.05)
Mackinnon,S.E., 1991	High Quality	Symptom relief (general)(# of events=patients' symptoms not relieving)	11.8 months	CT release (w/ no neurolysis) ()	32	12.50%	CT release (w/ neurolysis) ()	31	19.35%	RR	0.65(0.20,2.07)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Shum,C., 2002	High Quality	Questionnaire (Levine-SSS)(Mean symptom-severity score)	11.8 months	CT release (w/ no flexor tenosynovectomy) (Wrists treated by open CT release w/ no flexor tenosynovectomy)	44	1.6(0.70)	CT release (w/ flexor tenosynovectomy) (Wrists treated by open CT release with a flexor tenosynovectomy)	44	1.6(0.68)	Mean Difference	0(-0.29,0.288362)	Not Significant (P-value>.05)
Blair,W.F., 1996	Moderate Quality	Symptom recurrence (numbness)(Numbness (pre-op numbness, and post-op numbness))	2 years	CT release (w/ no Epineurotomy) (CT release (w/o epineurotomy))	27	44.44%	CT release (w/ Epineurotomy) (CT release (w/ epineurotomy))	48	20.83%	RR	2.13(1.07,4.27)	CT release (w/ Epineurotomy) (CT release (w/ epineurotomy)) (P-value<.05)
Lowry,W.E.,Jr., 1988	Moderate Quality	Symptom recurrence (general)()	3 months	CT release (w/ no neurolysis) (Standard ligament release w/ no neurolysis)	23	8.70%	CT release (w/ neurolysis) (Standard ligament release w/ neurolysis)	24	4.17%	RR	2.09(0.20,21.48)	Not Significant (P-value>.05)
Shiota,E., 2001	Low Quality	Symptom recurrence (general)(With mean follow-up of 1.6 years)	2 years	CT release (w/ no synovectomy) (CT release alone)	43	25.58%	CT release (w/ synovectomy) (Enlargement reconstruction of the flexor retinaculum with synovectomy)	70	10.00%	RR	2.56(1.07,6.10)	CT release (w/ synovectomy) (Enlargement reconstruction of the flexor retinaculum with synovectomy) (P-value<.05)

BILATERAL VERSUS STAGED CARPAL TUNNEL RELEASE

Limited evidence supports that simultaneous bilateral or staged endoscopic carpal tunnel release might be performed based on patient and surgeon preference. No evidence meeting the inclusion criteria was found addressing bilateral simultaneous open carpal tunnel release.

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

There were two low strength studies (Fehringer 2002, Nesbitt 2006) which looked at simultaneous and staged endoscopic carpal tunnel releases. There were no studies that met our inclusion criteria which evaluated open release. The results of these studies were conflicting. For example, grip strength in short term follow-up was better in the staged group, but return to work was faster in the simultaneous group. Patient-specific factors, such as quality of life, non-employment work, care-giving, family and community responsibilities were not addressed. Both studies were limited in that there was no randomization of treatment protocols. Patients selected simultaneous or staged procedures, and both groups were satisfied with their choices. At 6 month follow up, there was no difference between the two groups.

Because no studies comparing simultaneous versus staged procedures for open release were considered, there are no data to support concurrent or sequential bilateral open carpal tunnel releases. This does not constitute a mandate that bilateral simultaneous carpal tunnel releases should be performed endoscopically.

Implications of two versus one surgical experience such as two anesthetics, total analgesic consumption, costs of two OR and perioperative nursing unit visits were not addressed.

Risks and Harms of Implementing this Recommendation

There are no known harms associated with implementing this recommendation.

Future Research

Studies of simultaneous versus staged open carpal tunnel releases with adequate follow up would be helpful in elucidating whether simultaneous open release should be considered as a treatment option.

Studies which define return to work status by rigorous, objective criteria would be helpful to define the strength of the recommendation regarding simultaneous releases.

STUDY QUALITY TABLE OF BILATERAL CARPAL TUNNEL RELEASE

TABLE 173. INTERVENTION QUALITY EVALUATIONS

Study	Design	Participant Recruitment	Allocation	Confounding Variables	Follow-Up Length	Other Bias? (If retrospective comparative, mark Yes)	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Fehringer, E. V., 2002	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Include	Low Quality
Nesbitt, K.S., 2006	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Include	Low Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 174: SUMMARY OF FINDINGS PICO 9 SIMULTANEOUS BI-LATERAL RELEASE (EARLY FOLLOW-UP (3 MONTHS UP TO 6 MONTHS))


































	Low Quality			Meta-Analysis
	Nesbitt, K.S., 2006 (1)	Nesbitt, K.S., 2006 (2)	Nesbitt, K.S., 2006 (3)	
Favors treatment 1				
Favors treatment 2				
Not significant				
Outcomes				
Function				
Grip Strength				NA
Phalen's test score				NA
Pinch Strength				NA
Questionnaire (General/Undefined)				
Functional severity				NA
Semmes-Weinstein Monofilaments Test (SW test)				NA
Tinel's Sign/Test				NA
Quality Of Life				
Return to Work (weeks)				NA
Symptoms				
Questionnaire (General/Undefined)				
Symptom severity				NA

TABLE 175: SUMMARY OF FINDINGS PICO 9 SIMULTANEOUS BI-LATERAL RELEASE TECHNIQUES (LATEFOLLOW-UP (> 6 MONTHS))

	Low Quality	
Favors treatment 1  Favors treatment 2  Not significant 	Fehringer, E. V., 2002	Meta-Analysis
Outcomes		
Quality Of Life		
Patient satisfaction (general)		NA
Return to normal activities		
Average number of days before return to light duty		NA
Average number of days before return to return to Regular Duty		NA

DETAILED DATA FINDINGS

TABLE 176: PICO 9- CT RELEASE (SIMULTANEOUS VERSUS STAGED): FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Nesbitt,K.S., 2006	Low Quality	Grip strength(Kilograms)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	32(.)	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	27(.)	Author Reported	NA	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands)) (P-value<.05)
Nesbitt,K.S., 2006	Low Quality	Grip strength(Kilograms)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	32(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	30(.)	Author Reported	NA	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands)) (P-value<.05)
Nesbitt,K.S., 2006	Low Quality	Grip strength(Kilograms)	5.9 months	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	27(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	30(.)	Author Reported	NA	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands)) (P-value<.05)
Nesbitt,K.S., 2006	Low Quality	Phalen's test score(% positive)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	8.33%	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	3.57%	RR	2.33(0.16,34.31)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Nesbitt,K.S., 2006	Low Quality	Phalen's test score(% positive)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	8.33%	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	0.00%	RD	0.08(-0.07,0.24)	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Phalen's test score(% positive)	5.9 months	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	0.00%	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	3.57%	RD	-0.04(-0.10,0.03)	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Pinch Strength(Kilograms)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	8.1(.)	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	7.6(.)	Author Reported	NA	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Pinch Strength(Kilograms)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	8.1(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	7.6(.)	Author Reported	NA	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Pinch Strength(Kilograms)	5.9 months	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	7.6(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	7.6(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Nesbitt,K.S., 2006	Low Quality	Questionnaire (General/undefined)(Functional severity)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	1.3(.)	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	1.3(.)	Author Reported	NA	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Questionnaire (General/undefined)(Functional severity)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	1.3(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	1.3(.)	Author Reported	NA	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Questionnaire (General/undefined)(Functional severity)	5.9 months	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	1.3(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	1.3(.)	Author Reported	NA	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Semmes Weinstein Monofilaments Test (SW test)()	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	1.7(.)	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	1.8(.)	Author Reported	NA	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Semmes Weinstein Monofilaments Test (SW test)()	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	1.7(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	1.7(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Nesbitt,K.S., 2006	Low Quality	Semmes Weinstein Monofilaments Test (SW test)()	5.9 months	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	1.8(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	1.7(.)	Author Reported	NA	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Tinel's Sign/Test(% positive)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	8.33%	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	3.57%	RR	2.33(0.16,34.31)	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Tinel's Sign/Test(% positive)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	8.33%	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	6.45%	RR	1.29(0.13,12.96)	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Tinel's Sign/Test(% positive)	5.9 months	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	6.45%	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	3.57%	RR	1.81(0.17,18.86)	Not Significant (P-value>.05)

TABLE 177: PICO 9- CT RELEASE (SIMULTANEOUS VERSUS STAGED): QUALITY OF LIFE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fehringer,E.V., 2002	Low Quality	Patient satisfaction (general)(Patient satisfaction (event=those who were not satisfied)	11.8 months	CT release (simultaneous-endoscopic) (Group 2)	48	4.17%	CT release (staged-endoscopic) (Group 1)	48	10.42%	RR	0.40(0.08,1.96)	Not Significant (P-value>.05)
Fehringer,E.V., 2002	Low Quality	Return to Normal Activities(average number of days before return to light duty)	11.8 months	CT release (simultaneous-endoscopic) (Group 2)	48	17.8(.)	CT release (staged-endoscopic) (Group 1)	48	33.7(.)	Author Reported	NA	Not Significant (P-value>.05)
Fehringer,E.V., 2002	Low Quality	Return to Normal Activities(average number of days before return to return to Regular Duty)	11.8 months	CT release (simultaneous-endoscopic) (Group 2)	48	82.2(.)	CT release (staged-endoscopic) (Group 1)	48	112.6(.)	Author Reported	NA	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Return to Work(weeks)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	2.25(.)	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	8(.)	Author Reported	NA	CT release (simultaneous-endoscopic) (12 (24 hands)) (P-value<.05)
Nesbitt,K.S., 2006	Low Quality	Return to Work(weeks)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	2.25(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	6(.)	Author Reported	NA	CT release (simultaneous-endoscopic) (12 (24 hands)) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Nesbitt,K.S., 2006	Low Quality	Return to Work(weeks)	5.9 months	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	8(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	6(.)	Author Reported	NA	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands)) (P-value<.05)

TABLE 178: PICO 9- CT RELEASE (SIMULTANEOUS VERSUS STAGED): SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Nesbitt,K.S., 2006	Low Quality	Questionnaire (General/undefined)(Symptom severity)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	1.4(.)	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	1.4(.)	Author Reported	NA	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Questionnaire (General/undefined)(Symptom severity)	5.9 months	CT release (simultaneous-endoscopic) (12 (24 hands))	12	1.4(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	1.4(.)	Author Reported	NA	Not Significant (P-value>.05)
Nesbitt,K.S., 2006	Low Quality	Questionnaire (General/undefined)(Symptom severity)	5.9 months	CT release (staged-endoscopic [1-3 weeks apart]) (31 (62 hands))	31	1.4(.)	CT release (staged-endoscopic [>3weeks apart]) (28 (56 hands))	28	1.4(.)	Author Reported	NA	Not Significant (P-value>.05)

ANESTHESIA GUIDELINE RECOMMENDATIONS

A. LOCAL VERSUS INTRAVENOUS (IV) REGIONAL ANESTHESIA

Limited evidence supports the use of local anesthesia rather than intravenous regional anesthesia (Bier block) because it might offer longer pain relief after carpal tunnel release; no evidence meeting our inclusion criteria was found comparing general anesthesia to either regional or local anesthesia for carpal tunnel surgery.

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

RATIONALE

There were two moderate quality studies comparing local anesthesia to intravenous regional anesthesia. Nabhan (2011) studied 43 patients randomized to receive either local anesthesia or intravenous regional anesthesia using prilocaine. Three patients in the intravenous regional anesthesia group and one patient in the local anesthesia group required supplementation with additional local infiltration at the surgery site. The tourniquet was inflated longer in the intravenous regional anesthesia group but the operating time was the same in both groups. There were no other differences between the groups.

Sorensen et al (2013) randomized 38 patients to have endoscopic carpal tunnel release under either local anesthesia with ropivacaine or intravenous regional anesthesia with mepivacaine. The group treated with local anesthesia had less pain at the end of the procedure as well as two hours after surgery was completed although pain during the procedure was equal in the two groups.

Risks and Harms of Implementing this Recommendation

The main concern with the local infiltration of anesthetic agents is the well-documented cardiotoxicity of bupivacaine³.

FUTURE RESEARCH STATEMENT

No evidence meeting our inclusion criteria was found specifically comparing local anesthesia to either general anesthesia or regional anesthesia using brachial plexus blocks. Studies evaluating the role of regional anesthesia administered via brachial plexus block might be valuable given the post-operative analgesia conferred by these methods. In the existing literature the main advantage of local infiltration compared with intravenous regional anesthesia was post-operative pain relief for up to two hours.

B. BUFFERED VERSUS PLAIN LIDOCAINE

Moderate evidence supports the use of buffered lidocaine rather than plain lidocaine for local anesthesia because it could result in less injection pain.

Strength of Recommendation: Moderate Evidence ★★☆☆

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

RATIONALE

There were two high quality studies evaluating the use of buffered lidocaine for local anesthesia. Vossinakis et al (2004) studied 21 patients undergoing sequential, bilateral carpal tunnel release under local anesthesia. In each case one hand was anesthetized with lidocaine buffered with sodium bicarbonate and the other hand with plain lidocaine. Following infiltration the patients reported pain on a 100 mm visual analog scale. Those receiving the buffered solution reported less pain and the difference between the groups was statistically significant.

Watts et al (2004) randomized 64 patients to have a carpal tunnel release under local anesthesia using either plain lidocaine or lidocaine buffered with sodium bicarbonate. One minute after infiltration, and before application of a tourniquet, pain was measured on a 100 mm visual analog scale. Although patients who received buffered lidocaine reported less pain, the difference from those receiving the plain lidocaine was not statistically significant.

Risks and Harms of Implementing this Recommendation

The main concern with the local infiltration of anesthetic agents is the well-documented cardiotoxicity of bupivacaine.

FUTURE RESEARCH STATEMENT

No evidence meeting our inclusion criteria was found specifically comparing local anesthesia to either general anesthesia or regional anesthesia using brachial plexus blocks. Studies evaluating the role of regional anesthesia administered via brachial plexus block might be valuable given the post-operative analgesia conferred by these methods. In the existing literature the main advantage of local infiltration compared with intravenous regional anesthesia was post-operative pain relief for up to two hours.

STUDY QUALITY TABLE OF SURGICAL ANESTHETIC

TABLE 179: OBSERVATIONAL STUDY QUALITY

Study	Design	Participant Recruitment	Allocation	Confounding Variables	Follow-Up Length	Other Bias? (If retrospective comparative, mark Yes)	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Tomaino, M.M., 2001	○	●	●	●	○	●	●	●	●	Include	Low Quality

TABLE 180: RANDOMIZED TRIAL QUALITY

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Nabhan, A., 2011	●	●	●	●	○	●	●	●	●	Include	Moderate Quality
Sorensen, A.M., 2013	●	●	●	●	●	○	●	●	●	Include	Moderate Quality
Vossinakis, I.C., 2004	●	●	●	●	●	●	●	●	●	Include	High Quality
Watts, A.C., 2004	●	●	●	●	●	●	●	●	●	Include	High Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 181: SUMMARY OF FINDINGS PICO 11 PART 1 MODES OF ANALGESIA: LOCAL VS LOCAL (EARLY FOLLOW-UP (PRE-OP/INTRA-OP))









	High Quality		Meta-Analysis
	Vossinakis, I.C., 2004	Watts, A.C., 2004	
Favors treatment 1			
Favors treatment 2			
Not significant			
Outcomes			
Pain			
Questionnaire/Scale (VAS-pain)			
0-10 (at 0.5 minutes)			NA
Burning pain, 0-10 (at 0.5 minutes)			NA
Pain 1 minute after injection, (0-100) (at 2 minutes)			NA
Stinging pain, 0-10 (at 0.5 minutes)			NA
Tension pain, 0-10 (at 0.5 minutes)			NA

TABLE 182: SUMMARY OF FINDINGS PICO 11 PART 2 MODES OF ANALGESIA: LOCAL VS REGIONAL (EARLY FOLLOW-UP (PRE-OP/INTRA-OP))
































	Moderate Quality		Low Quality	Meta-Analysis
	Nabhan, A., 2011	Sorensen, A.M., 2013	Tomaino, M.M., 2001	
Favors treatment 1 				
Favors treatment 2 				
Not significant 				
Outcomes				
Function				
Questionnaire (MHQ-hand function)				
Hand function (Michigan Hand Outcomes Questionnaire, 0-100)				
0				NA
Other				
Anxiety				
Anxiety during anesthetic administration, 0-10				
0				NA
Pain				
Questionnaire (MHQ-pain)				
Pain (Michigan Hand Outcomes Questionnaire, 0-100)				
0				NA
Questionnaire/Scale (VAS-pain)				
0-10				
0min				NA
20min				NA
Pain during anesthetic administration, 0-10				
0				NA
Pain during surgery, 0-10				
30min				NA
Pain related to tourniquet, 0-10				
0				NA
Quality Of Life				
Questionnaire (MHQ-activity of daily living)				
Activity of daily living (Michigan Hand Outcomes Questionnaire, 0-100)				
0				NA
Questionnaire (MHQ-patient satisfaction)				
Patient satisfaction (Michigan Hand Outcomes Questionnaire, 0-100)				
0				NA
Questionnaire (MHQ-work performance)				
Work performance (Michigan Hand Outcomes Questionnaire, 0-100)				
0				NA

TABLE 183: SUMMARY OF FINDINGS PICO 11 PART 2 MODES OF ANALGESIA: LOCAL VS REGIONAL (LATE FOLLOW-UP (POST-OP))

	Moderate Quality		Low Quality	Meta-Analysis
	Nabhan, A., 2011	Sorensen, A. M., 2013	Tomaino, M. M., 2001	
Favors treatment 1 				
Favors treatment 2 				
Not significant 				
Outcomes				
Function				
Questionnaire (MHQ-hand function)				
Hand function (Michigan Hand Outcomes Questionnaire, 0-100)				
14 days				NA
180 days				NA
Pain				
Questionnaire (MHQ-pain)				
Pain (Michigan Hand Outcomes Questionnaire, 0-100)				
14 days				NA
180 days				NA
Questionnaire/Scale (VAS-pain)				
0-10				
40mins				NA
2hrs				NA
24hrs				NA
Quality Of Life				
Questionnaire (MHQ-activity of daily living)				
Activity of daily living (Michigan Hand Outcomes Questionnaire, 0-100)				
14 days				NA
180 days				NA
Questionnaire (MHQ-patient satisfaction)				
Patient satisfaction (Michigan Hand Outcomes Questionnaire, 0-100)				
14 days				NA
180 days				NA
Questionnaire (MHQ-work performance)				
Work performance (Michigan Hand Outcomes Questionnaire, 0-100)				
14 days				NA
180 days				NA
Questionnaire/Scale (VAS-patient satisfaction)				
Patient satisfaction with anesthesia				
90 days				NA

DETAILED DATA FINDINGS

TABLE 184: PICO 11 PART 1- LOCAL VERSUS LOCAL: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Vossinakis,I.C., 2004	High Quality	Questionnaire/Scale (VAS-pain)(0-10)	0.5 min (Intra-Op)	Local (lidocaine) (15mL 1% lidocaine + adrenaline 1:200,000)	21	7.6(0.80)	Local (lidocaine-buffered) (15mL 1% lidocaine + adrenaline 1:200,000 buffered 8.4% sodium bicarbonate)	21	3.6(0.50)	Mean Difference	4(3.60,4.403498)	Local (lidocaine-buffered) (15mL 1% lidocaine + adrenaline 1:200,000 buffered 8.4% sodium bicarbonate) (P-value<.05)
Vossinakis,I.C., 2004	High Quality	Questionnaire/Scale (VAS-pain)(burning pain, 0-10)	0.5 min (Intra-Op)	Local (lidocaine) (15mL 1% lidocaine + adrenaline 1:200,000)	21	7.5(2.30)	Local (lidocaine-buffered) (15mL 1% lidocaine + adrenaline 1:200,000 buffered 8.4% sodium bicarbonate)	21	2.3(1.30)	Mean Difference	5.2(4.07,6.329988)	Local (lidocaine-buffered) (15mL 1% lidocaine + adrenaline 1:200,000 buffered 8.4% sodium bicarbonate) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Vossinakis,I.C., 2004	High Quality	Questionnaire/Scale (VAS-pain)(stinging pain, 0-10)	0.5 min (Intra-Op)	Local (lidocaine) (15mL 1% lidocaine + adrenaline 1:200,000)	21	2.3(1.00)	Local (lidocaine-buffered) (15mL 1% lidocaine + adrenaline 1:200,000 buffered 8.4% sodium bicarbonate)	21	2.4(0.80)	Mean Difference	-0.1(-0.65,0.447732)	Not Significant (P-value>.05)
Vossinakis,I.C., 2004	High Quality	Questionnaire/Scale (VAS-pain)(Tension pain, 0-10)	0.5 min (Intra-Op)	Local (lidocaine) (15mL 1% lidocaine + adrenaline 1:200,000)	21	3.6(0.70)	Local (lidocaine-buffered) (15mL 1% lidocaine + adrenaline 1:200,000 buffered 8.4% sodium bicarbonate)	21	3.5(0.50)	Mean Difference	0.1(-0.27,0.467927)	Not Significant (P-value>.05)
Watts,A.C., 2004	High Quality	Questionnaire/Scale (VAS-pain)(Pain 1 minute after injection, (0-100))	2 min (Intra-Op)	Local (lidocaine-buffered) (2% lidocaine buffered with sodium bicarbonate)	32	17.3(2.70)	Local (lidocaine-not buffered) (2% plain lidocaine + sodium chloride)	32	20(2.30)	Mean Difference	-2.7(-3.93,-1.47108)	Local (lidocaine-buffered) (2% lidocaine buffered with sodium bicarbonate) (P-value<.05)

TABLE 185: PICO 11 PART 2- LOCAL VERSUS REGIONAL: FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-hand function)(Hand function (Michigan Hand Outcomes Questionnaire, 0-100))	NA (Pre-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	58(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	56(.)	Author Reported	NA	Not Significant (P-value>.05)
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-hand function)(Hand function (Michigan Hand Outcomes Questionnaire, 0-100))	2 weeks (Post-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	75(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	74(.)	Author Reported	NA	Not Significant (P-value>.05)
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-hand function)(Hand function (Michigan Hand Outcomes Questionnaire, 0-100))	6 months (Post-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	94(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	91(.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 186: PICO 11 PART 2- LOCAL VERSUS REGIONAL: OTHER

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Tomaino,M.M., 2001	Low Quality	Anxiety(Anxiety during anesthetic administration, 0-10)	0 (Pre-Op)	Regional (lidocaine) (IVRA with lidocaine)	15	1(.)	Local (lidocaine) (LA with lidocaine)	15	0(.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 187: PICO 11 PART 2- LOCAL VERSUS REGIONAL: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-pain)(Pain (Michigan Hand Outcomes Questionnaire, 0-100))	NA (Pre-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	56(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	66(.)	Author Reported	NA	Not Significant (P-value>.05)
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-pain)(Pain (Michigan Hand Outcomes Questionnaire, 0-100))	2 weeks (Post-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	15(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	17(.)	Author Reported	NA	Not Significant (P-value>.05)
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-pain)(Pain (Michigan Hand Outcomes Questionnaire, 0-100))	6 months (Post-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	11(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	15(.)	Author Reported	NA	Not Significant (P-value>.05)
Nabhan,A., 2011	Moderate Quality	Questionnaire/Scale (VAS-pain)(pain related to tourniquet, 0-10)	Intra-Op	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	4.6(0.90)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	4.5(1.60)	Mean Difference	0.1(-0.68,0.880864)	Not Significant (P-value>.05)
Sorensen,A.M., 2013	Moderate Quality	Questionnaire/Scale (VAS-pain)(0-10)	0 min (Intra-Op)	Local (ropivacain) (7.5mg/ml Ropivacaine 10ml total)	19	1.2(2.00)	Regional (mepivacaine) (1% Mepivacaine)	19	1.4(2.30)	Mean Difference	-0.2(-1.57,1.170525)	Not Significant (P-value>.05)
Sorensen,A.M., 2013	Moderate Quality	Questionnaire/Scale (VAS-pain)(0-10)	40 min (Post-Op)	Local (ropivacain) (7.5mg/ml Ropivacaine 10ml total)	19	0.2(0.60)	Regional (mepivacaine) (1% Mepivacaine)	19	1.4(1.80)	Mean Difference	-1.2(-2.05,-0.34683)	Local (ropivacain) (7.5mg/ml Ropivacaine 10ml total) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Sorensen,A.M., 2013	Moderate Quality	Questionnaire/Scale (VAS-pain)(0-10)	20 min (Peri-Op)	Local (ropivacain) (7.5mg/ml Ropivacaine 10ml total)	19	2.9(1.40)	Regional (mepivacaine) (1% Mepivacaine)	19	3.6(2.70)	Mean Difference	-0.7(-2.07,0.667571)	Not Significant (P-value>.05)
Sorensen,A.M., 2013	Moderate Quality	Questionnaire/Scale (VAS-pain)(0-10)	2 hours (Post-Op)	Local (ropivacain) (7.5mg/ml Ropivacaine 10ml total)	19	0.2(0.50)	Regional (mepivacaine) (1% Mepivacaine)	19	1.4(1.80)	Mean Difference	-1.2(-2.04,-0.35997)	Local (ropivacain) (7.5mg/ml Ropivacaine 10ml total) (P-value<.05)
Sorensen,A.M., 2013	Moderate Quality	Questionnaire/Scale (VAS-pain)(0-10)	24 hours (Post-Op)	Local (ropivacain) (7.5mg/ml Ropivacaine 10ml total)	19	1.3(2.30)	Regional (mepivacaine) (1% Mepivacaine)	19	1.1(1.70)	Mean Difference	0.2(-1.09,1.486044)	Not Significant (P-value>.05)
Tomaino,M.M., 2001	Low Quality	Questionnaire/Scale (VAS-pain)(pain during anesthetic administration, 0-10)	0 (Pre-Op)	Regional (lidocaine) (IVRA with lidocaine)	15	1(.)	Local (lidocaine) (LA with lidocaine)	15	2(.)	Author Reported	NA	Not Significant (P-value>.05)
Tomaino,M.M., 2001	Low Quality	Questionnaire/Scale (VAS-pain)(Pain during surgery, 0-10)	30 min (Intra-Op)	Regional (lidocaine) (IVRA with lidocaine)	15	1(.)	Local (lidocaine) (LA with lidocaine)	15	3(.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 188: PICO 11 PART 2- LOCAL VERSUS REGIONAL: QUALITY OF LIFE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-activity of daily living)(Activity of daily living (Michigan Hand Outcomes Questionnaire, 0-100))	NA (Pre-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	67(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	63(.)	Author Reported	NA	Not Significant (P-value>.05)
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-activity of daily living)(Activity of daily living (Michigan Hand Outcomes Questionnaire, 0-100))	2 weeks (Post-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	85(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	89(.)	Author Reported	NA	Not Significant (P-value>.05)
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-activity of daily living)(Activity of daily living (Michigan Hand Outcomes Questionnaire, 0-100))	6 months (Post-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	95(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	95(.)	Author Reported	NA	Not Significant (P-value>.05)
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-patient satisfaction)(Patient satisfaction (Michigan Hand Outcomes Questionnaire, 0-100))	NA (Pre-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	32(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	36(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-patient satisfaction)(Patient satisfaction (Michigan Hand Outcomes Questionnaire, 0-100))	2 weeks (Post-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	85(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	79(.)	Author Reported	NA	Not Significant (P-value>.05)
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-patient satisfaction)(Patient satisfaction (Michigan Hand Outcomes Questionnaire, 0-100))	6 months (Post-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	88(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	85(.)	Author Reported	NA	Not Significant (P-value>.05)
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-work performance)(Work performance (Michigan Hand Outcomes Questionnaire, 0-100))	NA (Pre-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	55(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	52(.)	Author Reported	NA	Not Significant (P-value>.05)
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-work performance)(Work performance (Michigan Hand Outcomes Questionnaire, 0-100))	2 weeks (Post-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	78(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	80(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Nabhan,A., 2011	Moderate Quality	Questionnaire (MHQ-work performance)(Work performance (Michigan Hand Outcomes Questionnaire, 0-100))	6 months (Post-Op)	Local (10ml of 1% prilocaine) (LA-20ml prilocaine)	22	89(.)	Regional (30 ml of 1% prilocaine) (IVRA-30mL 1% prilocaine)	21	87(.)	Author Reported	NA	Not Significant (P-value>.05)
Tomaino,M.M., 2001	Low Quality	Questionnaire/Scale (VAS-patient satisfaction)(patient satisfaction with anesthesia)	90 days (Post-Op)	Regional (lidocaine) (IVRA with lidocaine)	15	1(.)	Local (lidocaine) (LA with lidocaine)	15	3(.)	Author Reported	NA	Not Significant (P-value>.05)

ASPIRIN USE

Limited evidence supports that the patient might continue the use of aspirin perioperatively; no evidence meeting our inclusion criteria addressed other anticoagulants.

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

One low quality study (Brunetti 2013) met our inclusion criteria. This study examined only aspirin use that was either continued or stopped five days before surgery and resumed three days postoperatively. Compared with controls that were not on aspirin, there were no differences in either hematoma formation or other general complications. There is no evidence meeting our criteria on any other anticoagulant therapies.

Risks and Harms of Implementing this Recommendation

There is a potential risk of bleeding in patients who undergo surgical procedures while on anticoagulants.

Future Research

Investigate anticoagulant use in carpal tunnel surgery using different types of anesthesia and with and without the use of a tourniquet as well. More data is needed on other anticoagulant types including NSAIDs.

STUDY QUALITY TABLE OF PERI-OPERATIVE ANTICOAGULATION CESSATION




TABLE 189. INTERVENTION QUALITY EVALUATIONS

Study	Design	Participant Recruitment	Allocation	Confounding Variables	Follow-Up Length	Other Bias? (If retrospective comparative, mark Yes)	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Brunetti,S., 2013	○	●	●	●	●	●	●	●	●	Include	Low Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 190: SUMMARY OF FINDINGS PICO 12 PERI-OPERATIVE ANTICOAGULATION CESSATION

	Low Quality			
Favors treatment 1 				Meta-Analysis
Favors treatment 2 				
Not significant 				
Outcomes	Brunetti, S., 2013 (1)	Brunetti, S., 2013 (2)	Brunetti, S., 2013 (3)	
Complications				
Complications (general)				NA
Complications (haematoma)				NA

DETAILED DATA FINDINGS

TABLE 191: PICO 12- ANTICOAGULATION: COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Brunetti,S., 2013	Low Quality	Complications (general)(Combination of major+minor complications)	3 months	Group 2 (stop aspirin) (Aspirin stopped at least 5 d before surgery and resumed 3 d after)	50	2.00%	Group 3 (never antiaggregated) (Patients did not take aspirin)	50	2.00%	RR	1.00(0.06,15.55)	Not Significant (P-value>.05)
Brunetti,S., 2013	Low Quality	Complications (general)(Combination of major+minor complications)	3 months	Anticoagulation (continued) (Non-stop Aspirin for 1 year)	50	2.00%	Anticoagulation (cessation) (Aspirin stopped at least 5 d before surgery and resumed 3 d after)	50	2.00%	RR	1.00(0.06,15.55)	Not Significant (P-value>.05)
Brunetti,S., 2013	Low Quality	Complications (general)(Combination of major+minor complications)	3 months	Anticoagulation (continued) (Non-stop Aspirin for 1 year)	50	2.00%	No anticoagulation (Patients did not take aspirin)	50	2.00%	RR	1.00(0.06,15.55)	Not Significant (P-value>.05)
Brunetti,S., 2013	Low Quality	Complications (haematoma)(Major+minor Haematoma combined)	3 months	Group 2 (stop aspirin) (Aspirin stopped at least 5 d before surgery and resumed 3 d after)	50	18.00%	Group 3 (never antiaggregated) (Patients did not take aspirin)	50	16.00%	RR	1.13(0.47,2.68)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Brunetti,S., 2013	Low Quality	Complications (haematoma)(Major+minor Haematoma combined)	3 months	Anticoagulation (continued) (Non-stop Aspirin for 1 year)	50	20.00%	Anticoagulation (cessation) (Aspirin stopped at least 5 d before surgery and resumed 3 d after)	50	18.00%	RR	1.11(0.49,2.50)	Not Significant (P-value>.05)
Brunetti,S., 2013	Low Quality	Complications (haematoma)(Major+minor Haematoma combined)	3 months	Anticoagulation (continued) (Non-stop Aspirin for 1 year)	50	20.00%	No anticoagulation (Patients did not take aspirin)	50	16.00%	RR	1.25(0.54,2.90)	Not Significant (P-value>.05)

PREOPERATIVE ANTIBIOTICS

Limited evidence supports that there is no benefit for routine use of prophylactic antibiotics prior to carpal tunnel release because there is no demonstrated reduction in postoperative surgical site infection.

Strength of Recommendation: Limited Evidence ★★☆☆

Description: Evidence from one or more “Low” quality studies with consistent findings **or** evidence from a single “Moderate” quality study recommending for or against the intervention or diagnostic test or the evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention.

Rationale

There were two low quality studies (Harness, Tosti) which evaluated the use of prophylactic antibiotics in carpal tunnel release. Neither study showed a statistically significant difference between the groups receiving prophylactic antibiotics and those not receiving antibiotics. There is insufficient evidence to support the routine use of prophylactic antibiotics to prevent surgical site infections in carpal tunnel release.

Risks and Harms of Implementing this Recommendation

Routine use of prophylactic antibiotics is not without consequence. Financial cost, anaphylaxis, development of antibiotic resistance, and changes in microbiome population are all factors

Future Research

Future research should consider reporting on the associated cost, value, and quality of life as they relate to antibiotics. Future research should also focus on the efficacy of preoperative antibiotic treatment in diabetics and/or other immunocompromised populations.

STUDY QUALITY TABLE OF PREOPERATIVE ANTIBIOTICS






TABLE 192. INTERVENTION QUALITY EVALUATIONS

Study	Design	Participant Recruitment	Allocation	Confounding Variables	Follow-Up Length	Other Bias? (If retrospective comparative, mark Yes)	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Harness,N.G., 2010	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Include	Low Quality
Tosti,R., 2012	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Include	Low Quality

RESULTS

SUMMARY OF DATA FINDINGS

TABLE 193: SUMMARY OF FINDINGS PICO 13 PROPHYLACTIC ANTIBIOTICS

	Low Quality		
Favors treatment 1 	Harness, N.G., 2010	Tosti, R., 2012	Meta-Analysis
Favors treatment 2 			
Not significant 			
Outcomes			
Complications			
Surgical site infection			NA

DETAILED DATA FINDINGS

TABLE 194: PICO 13- PROPHYLACTIC ANTIBIOTICS: COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Harness,N.G., 2010	Low Quality	Surgical site infection()	1 month	Patients Without Prophylactic Antibiotics (No prophylactic antibiotics)	917	0.65%	Patients With Prophylactic Antibiotics (Prophylactic antibiotics)	1419	0.35%	RR	1.86(0.57,6.07)	Not Significant (P-value>.05)
Tosti,R., 2012	Low Quality	Surgical site infection()	1 month	Patients Without Prophylactic Antibiotics ()	198	1.01%	Patients With Prophylactic Antibiotics ()	102	0.98%	RR	1.03(0.09,11.23)	Not Significant (P-value>.05)

SUPERVISED VERSUS HOME THERAPY

Moderate evidence supports no additional benefit to routine supervised therapy over home programs in the immediate postoperative period. No evidence meeting the inclusion criteria was found comparing the potential benefit of exercise versus no exercise after surgery.

Strength of Recommendation: Moderate Evidence

Description: Evidence from two or more “Moderate” quality studies with consistent findings, or evidence from a single “High” quality study for recommending for or against the intervention.

Rationale

Routine post-operative therapy after carpal tunnel release was examined in 6 high quality studies. From these, two studies (Hochberg 2001 and Jerosch-Herold 2012) addressed interventions not relevant to current core practices of postoperative rehabilitation. The remaining four studies (Alves 2011, Fagan 2004, Pomerance 2007, and Provinciali 2000) addressed the need for supervised therapy in addition to a home program in the early postoperative period, the early use of laser, or the role of sensory reeducation in the later stages of recovery.

One high quality study (Alves 2011) evaluated the use of laser administered to the carpal tunnel in 10 daily consecutive sessions at a 3J dosage and found no difference in pain/symptom reoccurrence in comparison to placebo.

Two moderate quality studies (Pomerance 2007 and Provinciali 2000) compared in-clinic or therapist supervised exercise programs in addition to a home program to a home program alone. The studies were somewhat limited by an incomplete description of who delivered home programs, exercise/education content and dosage, and treatment progression. Pomerance (2007) compared a two week program directed by a therapist combined with a home program alone and found no additional benefit in terms of grip or pinch strength in comparison to the home program alone. Provinciali (2000) compared one hour sessions over 10 consecutive days of in-clinic physiotherapy comprising a multimodal program with a home program that was progressed in terms of strength/endurance. No benefit was found in outcome when measured by a CTS-specific patient reported instrument.

Risks and Harms of Implementing this Recommendation

There is no known harm to implementing this recommendation.

Future Research

More trials comparing different approaches are needed. These studies should include validated measures of patient-reported outcomes, impairment, adherence and costs. Better description of the characteristics of the exercise and education content, provider and delivery are needed. Studies that address how to identify subsets that need different approaches (treatment-based prediction rules) or targeting of interventions based on different surgical approaches, patient presentations or individual circumstances are also needed.

STUDY QUALITY TABLE OF POST-OPERATIVE THERAPY

TABLE 195. INTERVENTION QUALITY EVALUATIONS

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Alves,M.P.T., 2011	●	●	●	●	●	●	●	●	●	Include	Moderate Quality
Fagan,D.J., 2004	●	●	●	●	●	●	●	●	●	Include	High Quality
Jerosch-Herold,C., 2012	●	●	○	●	●	○	●	●	●	Include	Moderate Quality
Pomerance,J., 2007	●	●	●	●	●	●	●	●	●	Include	High Quality
Provinciali,L., 2000	●	●	●	●	●	●	●	●	●	Include	Moderate Quality
































RESULTS

SUMMARY OF DATA FINDINGS

TABLE 196: SUMMARY OF FINDINGS PICO 14 POST-OP THERAPY (EARLY FOLLOW-UP (< 1 MONTH))

	High Quality		Moderate Quality		Meta-Analysis
	Fagan,D.J., 2004	Pomerance,J., 2007	Alves,M.P.T., 2011	Provinciali,L., 2000	
Favors treatment 1	●				
Favors treatment 2	●				
Not significant	○				
Outcomes					
Complications					
Symptom occurrence (pillar pain)			○		NA
Symptom occurrence (scar pain)			○		NA
Function					
Grip Strength		○			NA
Pinch Strength		○			NA
Questionnaire (General/Undefined)					
Boston CT score-walking with numbness				○	NA
Functional sensibility (Iocognosia test)					NA
Functional sensibility (Shape-Texture Identification (STI) test)					
0 days					NA
28 days					NA
Functional sensibility (Weinstein Enhanced Sensory Test (WEST))					
0 days					NA
28 days					NA
Moberg pick-up test					
0 days					NA
28 days					NA
Two-point discrimination					
Functional sensibility (static two point discrimination (2PD))					
0 days					NA
28 days					NA
56 days					NA
Other					
Median nerve swelling	○				NA
Questionnaire (General/undefined)					
Boston CT score-duration of episode				○	NA
Questionnaire (DASH)					NA
Pain					
Questionnaire (General/undefined)					
Boston CT score-daytime pain				○	NA
Boston CT score-recurrence of pain				○	NA
Boston CT score-severity of pain				○	NA
Boston CT score-waking with pain				○	NA
VAS, 0-10					
0 days					NA
3 days					NA
Questionnaire/Scale (VAS-pain)	○				NA
Symptom recurrence (palmar pain)			○		NA
Quality Of Life					
Return to Work		○			NA
Symptoms					
Questionnaire (General/undefined)					
Boston CT score-numbness				○	NA
Boston CT score-severity of numbness				○	NA
Boston CT score-tingling sensation				○	NA
Boston CT score-weakness				○	NA
Symptom recurrence (Night time pain)			○		NA
Symptom recurrence (numbness)			○		NA

TABLE 197: SUMMARY OF FINDINGS PICO 14 POST-OP THERAPY (LATE FOLLOW-UP (> 1 MONTH))

Favors treatment 1  Favors treatment 2  Not significant 	High Quality	Moderate Quality			Meta-Analysis
	Pomerance, J., 2007	Alves, M.P.T., 2011	Jerosch-Herold, C., 2012	Provinciali, L., 2000	
Outcomes					
Complications					
Symptom occurrence (pillar pain)					
60 days					NA
90 days					NA
180 days					NA
Symptom occurrence (scar pain)					
60 days					NA
90 days					NA
180 days					NA
Function					
Grip strength					NA
Pinch Strength					NA
Questionnaire (General/Undefined)					
Boston CT score-walking with numbness					NA
Functional sensibility (locognosia test)					NA
Functional sensibility (Shape-Texture Identification (STI) test)					NA
17.5 months					
18.5 months					
19.5 months					
Functional sensibility (Weinstein Enhanced Sensory Test (WEST))					NA
17.5 months					
18.5 months					
19.5 months					
Moberg pick-up test					NA
17.5 months					
18.5 months					
19.5 months					
Two-point discrimination					NA
17.5 months					
18.5 months					
19.5 months					
Other					
Questionnaire (General/Undefined)					
Boston CT score-duration of episode					NA
Questionnaire (DASH)					NA
Pain					
Questionnaire (General/Undefined)					
Boston CT score-daytime pain					NA
Boston CT score-recurrence of pain					NA
Boston CT score-severity of pain					NA
Boston CT score-waking with pain					NA
Symptom recurrence (palmar pain)					
60 days					NA
90 days					NA
180 days					NA
Quality Of Life					
Return to Work					NA
Symptoms					
Questionnaire (General/Undefined)					
Boston CT score-numbness					NA
Boston CT score-severity of numbness					NA
Boston CT score-tingling sensation					NA
Boston CT score-weakness					NA
Symptom recurrence (night time pain)					NA
Symptom recurrence (numbness)					NA

DETAILED DATA FINDINGS

TABLE 198: PICO 14- POST-OP THERAPY: COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom occurrence (pillar pain)()	1 month	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	27.59%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	20.69%	RR	1.33(0.53,3.36)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom occurrence (pillar pain)()	2 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	13.79%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	24.14%	RR	0.57(0.19,1.74)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom occurrence (pillar pain)()	3 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	13.79%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	20.69%	RR	0.67(0.21,2.12)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom occurrence (pillar pain)()	5.9 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	3.45%	RD	-0.03(-0.10,0.03)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom occurrence (scar pain)()	1 month	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	31.03%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	55.17%	RR	0.56(0.30,1.06)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom occurrence (scar pain)()	2 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	10.34%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	20.69%	RR	0.50(0.14,1.81)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom occurrence (scar pain)()	3 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	3.45%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	10.34%	RR	0.33(0.04,3.02)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom occurrence (scar pain)()	5.9 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	3.45%	RD	-0.03(-0.10,0.03)	Not Significant (P-value>.05)

TABLE 199: PICO 14- POST-OP THERAPY: FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Pomerance, J., 2007	High Quality	Grip strength(Kilograms)	2 weeks	Home therapy exercises (Post-op 2 week therapist-directed program)	73	19.1(10.60)	No therapy (No therapist-directed program (received instructions))	77	19.8(10.00)	Mean Difference	-0.7(-4.00,2.601817)	Not Significant (P-value>.05)
Pomerance, J., 2007	High Quality	Grip strength(Kilograms)	1 month	Home therapy exercises (Post-op 2 week therapist-directed program)	73	24(9.00)	No therapy (No therapist-directed program (received instructions))	77	23.8(9.90)	Mean Difference	0.2(-2.83,3.225294)	Not Significant (P-value>.05)
Pomerance, J., 2007	High Quality	Grip strength(Kilograms)	1.4 months	Home therapy exercises (Post-op 2 week therapist-directed program)	73	24.8(9.20)	No therapy (No therapist-directed program (received instructions))	77	24.7(9.00)	Mean Difference	0.1(-2.81,3.014672)	Not Significant (P-value>.05)
Pomerance, J., 2007	High Quality	Grip strength(Kilograms)	3 months	Home therapy exercises (Post-op 2 week therapist-directed program)	73	26(8.90)	No therapy (No therapist-directed program (received instructions))	77	26.6(8.80)	Mean Difference	-0.6(-3.43,2.234069)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Pomerance, J., 2007	High Quality	Grip strength(Kilograms)	5.9 months	Home therapy exercises (Post-op 2 week therapist-directed program)	73	26.2(10.0)	No therapy (No therapist-directed program (received instructions))	77	26.6(9.90)	Mean Difference	-0.4(-3.59,2.786263)	Not Significant (P-value>.05)
Pomerance, J., 2007	High Quality	Pinch Strength(Kilograms)	2 weeks	Home therapy exercises (Post-op 2 week therapist-directed program)	73	4.1(2.30)	No therapy (No therapist-directed program (received instructions))	77	4.8(2.20)	Mean Difference	-0.7(-1.42,0.021010)	Not Significant (P-value>.05)
Pomerance, J., 2007	High Quality	Pinch Strength(Kilograms)	1 month	Home therapy exercises (Post-op 2 week therapist-directed program)	73	5.6(2.00)	No therapy (No therapist-directed program (received instructions))	77	5.6(2.20)	Mean Difference	0(-0.67,0.672287)	Not Significant (P-value>.05)
Pomerance, J., 2007	High Quality	Pinch Strength(Kilograms)	1.4 months	Home therapy exercises (Post-op 2 week therapist-directed program)	73	6.9(2.50)	No therapy (No therapist-directed program (received instructions))	77	7(2.40)	Mean Difference	-0.1(-0.89,0.685032)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Pomerance,J., 2007	High Quality	Pinch Strength(Kilograms)	3 months	Home therapy exercises (Post-op 2 week therapist-directed program)	73	7.5(2.30)	No therapy (No therapist-directed program (received instructions))	77	7.7(2.50)	Mean Difference	-0.2(-0.97,0.568246)	Not Significant (P-value>.05)
Pomerance,J., 2007	High Quality	Pinch Strength(Kilograms)	5.9 months	Home therapy exercises (Post-op 2 week therapist-directed program)	73	7.6(2.30)	No therapy (No therapist-directed program (received instructions))	77	7.8(2.30)	Mean Difference	-0.2(-0.94,0.536415)	Not Significant (P-value>.05)
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (General/undefined)(Functional sensibility (Iocognosia test))	17.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	16	41(12.94)	No further treatment (No further treatment)	15	42.8(8.14)	Mean Difference	-1.8(-9.36,5.761265)	Not Significant (P-value>.05)
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (General/undefined)(Functional sensibility (Shape-Texture Identification (STI) test))	17.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	16	3.38(1.69)	No further treatment (No further treatment)	15	2.67(1.99)	Mean Difference	0.71(-0.59,2.013824)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (General/undefined)(Functional sensibility (Weinstein Enhanced Sensory Test (WEST)))	17.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	16	2.53(0.94)	No further treatment (No further treatment)	15	2.37(0.40)	Mean Difference	0.16(-0.34,0.663119)	Not Significant (P-value>.05)
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (General/undefined)(Moberg pick-up test)	17.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	16	3.72(0.57)	No further treatment (No further treatment)	15	3.88(0.53)	Mean Difference	-0.16(-0.55,0.227232)	Not Significant (P-value>.05)
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (General/undefined)(Functional sensibility (Iocognosia test))	18.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	13	48.85(6.91)	No further treatment (No further treatment)	13	43.15(8.05)	Mean Difference	5.7(-0.07,11.46711)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jerosch-Herold, C., 2012	Moderate Quality	Questionnaire (General/undefined)(Functional sensibility (Shape-Texture Identification (STI) test))	18.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	13	4.92(1.38)	No further treatment (No further treatment)	13	3.31(1.93)	Mean Difference	1.61(0.32, 2.899767)	4-week sensory relearning home program (Post-op 4-week sensory relearning home program) (P-value < .05)
Jerosch-Herold, C., 2012	Moderate Quality	Questionnaire (General/undefined)(Functional sensibility (Weinstein Enhanced Sensory Test (WEST)))	18.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	13	3.08(0.64)	No further treatment (No further treatment)	13	2.54(0.52)	Mean Difference	0.54(0.09, 0.988269)	4-week sensory relearning home program (Post-op 4-week sensory relearning home program) (P-value < .05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (General/undefined)(Moberg pick-up test)	18.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	13	3.36(0.22)	No further treatment (No further treatment)	13	3.97(0.37)	Mean Difference	-0.61(-0.84,-0.37599)	4-week sensory relearning home program (Post-op 4-week sensory relearning home program) (P-value<.05)
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (General/undefined)(Functional sensibility (locognosia test))	19.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	11	49.46(5.05)	No further treatment (No further treatment)	13	43.39(11.08)	Mean Difference	6.07(-0.65,12.79196)	Not Significant (P-value>.05)
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (General/undefined)(Functional sensibility (Shape-Texture Identification (STI) test))	19.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	11	5.09(1.30)	No further treatment (No further treatment)	13	3.15(1.91)	Mean Difference	1.94(0.65,3.231607)	4-week sensory relearning home program (Post-op 4-week sensory relearning home program) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (General/undefined)(Functional sensibility (Weinstein Enhanced Sensory Test (WEST)))	19.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	11	2.95(0.65)	No further treatment (No further treatment)	13	2.58(0.67)	Mean Difference	0.37(-0.16,0.899344)	Not Significant (P-value>.05)
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (General/undefined)(Moberg pick-up test)	19.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	11	3.33(0.37)	No further treatment (No further treatment)	13	3.68(0.49)	Mean Difference	-0.35(-0.69,-0.00538)	4-week sensory relearning home program (Post-op 4-week sensory relearning home program) (P-value<.05)
Jerosch-Herold,C., 2012	Moderate Quality	Two-point discrimination (2PD)(Functional sensibility (static two point discrimination (2PD)))	17.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	16	5.19(3.24)	No further treatment (No further treatment)	15	6.3(3.38)	Mean Difference	-1.11(-3.44,1.223739)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jerosch-Herold,C., 2012	Moderate Quality	Two-point discrimination (2PD)(Functional sensibility (static two point discrimination (2PD)))	18.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	13	3.42(1.38)	No further treatment (No further treatment)	13	5.81(2.89)	Mean Difference	-2.39(-4.13,-0.64905)	4-week sensory relearning home program (Post-op 4-week sensory relearning home program) (P-value<.05)
Jerosch-Herold,C., 2012	Moderate Quality	Two-point discrimination (2PD)(Functional sensibility (static two point discrimination (2PD)))	19.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	11	4.18(1.74)	No further treatment (No further treatment)	13	6.35(4.09)	Mean Difference	-2.17(-4.62,0.279618)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali, L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-walking with numbness)	NA	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	3.84(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	3.8(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali, L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-walking with numbness)	1 month	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali, L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-walking with numbness)	3 months	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 200: PICO 14- POST-OP THERAPY: OTHER

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fagan,D.J., 2004	High Quality	Median nerve swelling(Swelling: volume of operated hand)	Peri-Op	Elevation device (Post-op day-case-4 hour Home elevation device+Bradford Sling with high elevation)	21	370(78.00)	Simple sling (Post-op day-case-4 hour Crepe sling held with low elevation (below 90 degrees))	22	363(68.00)	Mean Difference	7(-36.82,50.82237)	Not Significant (P-value>.05)
Fagan,D.J., 2004	High Quality	Median nerve swelling(Swelling: volume of operated hand)	5 Days	Elevation device (Post-op day-case-4 hour Home elevation device+Bradford Sling with high elevation)	21	380(77.00)	Simple sling (Post-op day-case-4 hour Crepe sling held with low elevation (below 90 degrees))	22	376(67.00)	Mean Difference	4(-39.23,47.22583)	Not Significant (P-value>.05)
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (DASH)(DASH addresses symptoms as well as function)	17.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	16	38.94(22.29)	No further treatment (No further treatment)	15	47(19.88)	Mean Difference	-8.06(-22.91,6.789555)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (DASH)(DASH addresses symptoms as well as function)	18.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	13	38.7(23.38)	No further treatment (No further treatment)	13	46.28(18.90)	Mean Difference	-7.58(-23.92,8.762888)	Not Significant (P-value>.05)
Jerosch-Herold,C., 2012	Moderate Quality	Questionnaire (DASH)(DASH addresses symptoms as well as function)	19.5 months	4-week sensory relearning home program (Post-op 4-week sensory relearning home program)	11	32.28(23.10)	No further treatment (No further treatment)	13	45.14(23.86)	Mean Difference	-12.86(-31.69,5.970518)	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-duration of episode)	NA	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	2.7(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	3.02(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-duration of episode)	1 month	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	2.04(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	2.02(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-duration of episode)	3 months	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 201: PICO 14- POST-OP THERAPY: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fagan,D.J., 2004	High Quality	Questionnaire/Scale (VAS-pain)()	5 Days	Elevation device (Post-op day-case-4 hour Home elevation device+Bradford Sling with high elevation)	21	2.2(1.30)	Simple sling (Post-op day-case-4 hour Crepe sling held with low elevation (below 90 degrees))	22	2.7(1.50)	Mean Difference	-0.5(-1.34,0.337883)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (pain)(Palmar pain)	1 month	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	27.59%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	37.93%	RR	0.73(0.34,1.54)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (pain)(Palmar pain)	2 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	3.45%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	20.69%	RR	0.17(0.02,1.30)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (pain)(Palmar pain)	3 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	3.45%	RD	-0.03(-0.10,0.03)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (pain)(Palmar pain)	5.9 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	3.45%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	3.45%	RR	1.00(0.07,15.24)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-daytime pain)	NA	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	2.66(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	2.72(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-recurrence of pain)	NA	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	2.82(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	2.9(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-severity of pain)	NA	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	2.98(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	2.9(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-waking with pain)	NA	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	2.9(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	3.04(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-daytime pain)	1 month	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1.64(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1.5(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-recurrence of pain)	1 month	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1.78(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1.62(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-severity of pain)	1 month	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1.1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1.08(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-waking with pain)	1 month	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1.12(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1.18(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-daytime pain)	3 months	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-recurrence of pain)	3 months	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-severity of pain)	3 months	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-waking with pain)	3 months	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 202: PICO 14- POST-OP THERAPY: QUALITY OF LIFE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Pomerance,J., 2007	High Quality	Return to Work(after each interval, same number of patients included from previous interval (# is # not returning to work))	NR	Home therapy exercises (Post-op 2 week therapist-directed program)	73	30.14%	No therapy (No therapist-directed program (received instructions))	77	27.27%	RR	1.11(0.67,1.83)	Not Significant (P-value>.05)
Pomerance,J., 2007	High Quality	Return to Work(after each interval, same number of patients included from previous interval (# is # not returning to work))	1.4 months	Home therapy exercises (Post-op 2 week therapist-directed program)	73	15.07%	No therapy (No therapist-directed program (received instructions))	77	16.88%	RR	0.89(0.43,1.86)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Pomerance,J., 2007	High Quality	Return to Work(after each interval, same number of patients included from previous interval (# is # not returning to work))	1.8 months	Home therapy exercises (Post-op 2 week therapist-directed program)	73	2.74%	No therapy (No therapist-directed program (received instructions))	77	6.49%	RR	0.42(0.08,2.11)	Not Significant (P-value>.05)

TABLE 203: PICO 14- POST-OP THERAPY: SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (general) (Nighttime pain)	1 month	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (general)(Nighttime pain)	2 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (general)(Nighttime pain)	3 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (general)(Nighttime pain)	5.9 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	RD	0.00(0.00,0.00)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (numbness)(May not completely be a recurrence for all patients)	1 month	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	10.34%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	27.59%	RR	0.38(0.11,1.27)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (numbness)(May not completely be a recurrence for all patients)	2 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	20.69%	RD	-0.21(-0.35,-0.06)	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).) Significant (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (numbness)(May not completely be a recurrence for all patients)	3 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	10.34%	RD	-0.10(-0.21,0.01)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Alves,M.P.T., 2011	Moderate Quality	Symptom recurrence (numbness)(May not completely be a recurrence for all patients)	5.9 months	Low-level laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	0.00%	Placebo laser therapy (The treatment was performed in 10 daily, consecutive sessions, with an interval of two days (weekend), using a total of three Joules, at three points of the carpal tunnel (in the topography of the pisiform bone, in the middle of the carpal tunnel and at the distal limit of the carpal tunnel).)	29	6.90%	RD	-0.07(-0.16,0.02)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-numbness)	NA	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	3.02(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	2.78(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-severity of numbness)	NA	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	3.68(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	3.62(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-tingling sensation)	NA	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	3.5(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	3.38(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-weakness)	NA	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	3.96(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	3.9(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-numbness)	1 month	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1.02(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1.08(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-severity of numbness)	1 month	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1.12(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-tingling sensation)	1 month	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1.04(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-weakness)	1 month	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1.12(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-numbness)	3 months	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-severity of numbness)	3 months	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-tingling sensation)	3 months	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)
Provinciali,L., 2000	Moderate Quality	Questionnaire (General/undefined)(Boston CT score-weakness)	3 months	Rehabilitation program (Post-op 10 day 1-hour sessions of physiotherapy 12 days after surgery (multimodal rehabilitative treatment))	50	1(.)	Progressive home exercise program (Post-op non-splinting progressive home exercise program designed to gradually increase strength and endurance)	50	1(.)	Author Reported	NA	Not Significant (P-value>.05)

POSTOPERATIVE IMMOBILIZATION

Strong evidence supports no benefit to routine postoperative immobilization after carpal tunnel release.

Strength of Recommendation: Strong Evidence ★★★★★

Description: Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention.

Rationale

There were two high quality studies (Bury et al, Finsen et al) and four moderate quality studies (Cebesay et al, Cook et al, Huemer et al, Martins et al) that evaluated post-operative splinting in comparison to no splinting. These studies did not identify any clear benefit to immediate post-operative splinting.

One high quality study (Bury et al) showed no short or long-term difference in regards to grip strength, pinch strength, and range of motion between patients splinted for 2 weeks post-operatively and patients who had no splinting. A second high quality study (Finsen et al) also showed no difference in grip strength and pinch at 1.4 and 5.9 months between the splinted and unsplinted groups.

A moderate strength study (Cook et al) did show a statistically significant improvement in grip and pinch strength at 2 weeks and 4 weeks in patients who were not splinted and allowed to begin early range of motion exercises compared with patients splinted for 2 weeks. A treatment effect of allowing early range of motion exercises may have contributed to the increase in the improvement in motion in the short term. At three months after surgery, there was no difference between the splinted and unsplinted groups in regards to grip and pinch strength.

One moderate strength study (Martins et al) did show a short-term benefit to post-operative splinting in regards to 2-point discrimination at 2 weeks in patients that were splinted, but this effect was not present at the 3 month follow-up.

One high quality study (Ritting et al) showed no difference in wound complications between patients who removed a bulky, post-operative dressing at 48-72 hours and patients who kept their dressing on for 2 weeks. At two weeks follow-up, the group who removed their dressing early had better grip and 3-point pinch strength, however, there was no difference in 3-point pinch strength between the groups at week follow up six and 12 weeks after surgery. Of note, the patients randomized to early dressing removal had better grip strength pre-operatively, compared to the group randomized to maintaining the dressing for 2 weeks, which may have accounted for the differences observed.

Risks and Harms of Implementing This Recommendation

There are no known harms associated with implementing this recommendation.

Future Research

Future research should focus on determining if there is a benefit to beginning early range of motion exercises and when a patient may return to unrestricted activities.

STUDY QUALITY TABLE OF POST-OPERATIVE IMMOBILIZATION

TABLE 204. INTERVENTION QUALITY EVALUATIONS

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias	Is there a large magnitude of effect?	Influence of All Plausible Residual Confounding	Dose-Response Gradient	Inclusion	Strength
Bury, T.F., 1995	●	◐	◐	●	●	◐	●	●	●	Include	High Quality
Cebesoy, O., 2007	◐	◐	●	●	◐	◐	●	●	●	Include	Moderate Quality
Cook, A.C., 1995	◐	◐	●	●	◐	◐	●	●	●	Include	Moderate Quality
Finsen, V., 1999	●	◐	●	●	◐	◐	●	●	●	Include	High Quality
Huemer, G.M., 2007	◐	◐	●	●	◐	◐	●	●	●	Include	Moderate Quality
Martins, R.S., 2006	◐	◐	◐	●	◐	◐	●	●	●	Include	Moderate Quality
Ritting, A.W., 2012	●	◐	●	●	◐	◐	●	●	●	Include	High Quality



























RESULTS

SUMMARY OF DATA FINDINGS

TABLE 205: SUMMARY OF FINDINGS PICO 15 POST-OP IMMOBILIZATION (EARLY FOLLOW-UP (< 1 MONTH))

	High Quality		Moderate Quality			Meta-Analysis
	Bury, T.F., 1995	Ritting, A.W., 2012	Cebesoy, O., 2007	Cook, A.C., 1995	Martins, R.S., 2006	
Favors treatment 1	●					
Favors treatment 2	●					
Not significant	○					
Outcomes						
Complications						
Symptom occurrence (pillar pain)				○		NA
Symptom occurrence (scar tenderness)				○		NA
Function						
Durkan's results					○	NA
Grip strength						
0 days		●				NA
14 days		○		●		NA
30 days				●		NA
Phalen's test score					○	NA
Pinch Strength				●		NA
Pinch Strength (three-point pinch)						
0 days		○				NA
14 days		●				NA
Questionnaire (General/Undefined)						
DI, discrimination index (equivalent to pre-op - post-op 2PD)					○	NA
Functional Status Scale			○			NA
Range of motion						
Average wrist range of motion in flexion/extension (degrees)	○					NA
ROM-degrees (extension)						
0 days		●				NA
14 days		○				NA
ROM-degrees (flexion)		○				NA
ROM-degrees (supination)		○				NA
Tinel's Sign/Test					○	NA
Two-point discrimination					●	NA
Other						
Questionnaire (General/Undefined)						
Levine-Katz score-Mean difference between both groups		○				NA
Pain						
Questionnaire (General/Undefined)						
Subjective pain (10 point scale)				●		NA
Quality Of Life						
Return to normal activities				●		NA
Return to work				●		NA
Symptoms						
Questionnaire (General/Undefined)						
SSI, symptom severity index (equivalent to pre-op - post-op SSS)					○	NA
Symptom intensity index (equivalent to preop - postop SIS)					○	NA
Symptom Intensity Scale (SIS)					○	NA
Symptom severity scale			○			NA
Questionnaire (Levine-SSS)					○	NA

TABLE 206: SUMMARY OF FINDINGS PICO 15 POST-OP IMMOBILIZATION (LATE FOLLOW-UP (> 1 MONTH))

	High Quality			Moderate Quality			Meta-Analysis
	Bury, T.F., 1995	Finsen, V., 1999	Ritting, A.W., 2012	Cebesoy, O., 2007	Cook, A.C., 1995	Huemer, G.M., 2007	
Favors treatment 1							
Favors treatment 2							
Not significant							
Outcomes							
Complications							
Questionnaire (General/Undefined)							
Subjective patient score							NA
Symptom occurrence (scar pain)							NA
Function							
Grip Strength							NA
Lifting							
Pick-up test (mean)							NA
NCS (DML)							NA
Pinch Strength							NA
Pinch Strength (three-point pinch)							NA
Questionnaire (General/Undefined)							
Functional Status Scale							NA
Range of motion							
ROM-degrees (extension)							NA
ROM-degrees (flexion)							NA
ROM-degrees (supination)							NA
Two-point discrimination							NA
Other							
Questionnaire (General/Undefined)							
Levine-Katz score-Mean difference between both groups							NA
Pain							
Hypothenar pain							NA
Questionnaire (General/Undefined)							
Subjective pain (10 point scale)							NA
Questionnaire/Scale (VAS-pain)							NA
Thenar Atrophy							NA
Symptoms							
Questionnaire (General/Undefined)							
Symptom severity scale							NA

DETAILED DATA FINDINGS

TABLE 207: PICO 15 PART 1- POST-OP IMMOBILIZATION: COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bury, T.F., 1995	High Quality	Questionnaire (General/undefined)(subjective patient score)	5.9 months	Splint (Bulky dressing and splint in a 0-degree or neutral wrist position for 2 weeks)	26	8.1(.)	Bulky dress (Bulky dressing for 2 weeks)	17	8(.)	Author Reported	NA	Not Significant (P-value>.05)
Finsen, V., 1999	High Quality	Symptom occurrence (scar pain)(Scar discomfort/pain)	1.4 months	Splint (Bulky dressing removed at day 2 and well-padded plaster of Paris splint with the wrist in slight dorsiflexion for 4 weeks)	36	44.44%	Bulky bandage (Bulky dressing removed at day 2 and light dressings for 4 weeks)	45	46.67%	RR	0.95(0.59,1.54)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Finsen, V., 1999	High Quality	Symptom occurrence (scar pain)(Scar discomfort/pain)	5.9 months	Splint (Bulky dressing removed at day 2 and well-padded plaster of Paris splint with the wrist in slight dorsiflexion for 4 weeks)	37	16.22%	Bulky bandage (Bulky dressing removed at day 2 and light dressings for 4 weeks)	44	13.64%	RR	1.19(0.42,3.38)	Not Significant (P-value>.05)
Cook, A.C., 1995	Moderate Quality	Symptom occurrence (pillar pain)()	1 month	Splint (Splint for 2 weeks)	25	48.00%	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	20.00%	RR	2.40(0.99,5.81)	Not Significant (P-value>.05)
Cook, A.C., 1995	Moderate Quality	Symptom occurrence (scar tenderness)()	1 month	Splint (Splint for 2 weeks)	25	56.00%	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	32.00%	RR	1.75(0.90,3.42)	Not Significant (P-value>.05)

TABLE 208: PICO 15 PART 1- POST-OP IMMOBILIZATION: FUNCTION

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bury,T.F., 1995	High Quality	Grip strength(Kilograms)	5.9 months	Splint (Bulky dressing and splint in a 0-degree or neutral wrist position for 2 weeks)	26	26.1(.)	Bulky dress (Bulky dressing for 2 weeks)	17	29.4(.)	Author Reported	NA	Not Significant (P-value>.05)
Bury,T.F., 1995	High Quality	Pinch Strength(Kilograms)	5.9 months	Splint (Bulky dressing and splint in a 0-degree or neutral wrist position for 2 weeks)	26	3.9(.)	Bulky dress (Bulky dressing for 2 weeks)	17	3.8(.)	Author Reported	NA	Not Significant (P-value>.05)
Bury,T.F., 1995	High Quality	Range of motion(Average wrist range of motion in flexionextension (degrees))	Post-Op	Splint (Bulky dressing and splint in a 0-degree or neutral wrist position for 2 weeks)	26	131.5(.)	Bulky dress (Bulky dressing for 2 weeks)	17	129(.)	Author Reported	NA	Not Significant (P-value>.05)
Finsen,V., 1999	High Quality	Grip strength(Units not reported)	1.4 months	Splint (Bulky dressing removed at day 2 and well-padded plaster of Paris splint with the wrist in slight dorsiflexion for 4 weeks)	36	. %	Bulky bandage (Bulky dressing removed at day 2 and light dressings for 4 weeks)	45	. %	Author Reported	NA	Not Significant (P-value>.05)
Finsen,V., 1999	High Quality	Grip strength(Units not reported)	5.9 months	Splint (Bulky dressing removed at day 2 and well-padded plaster of Paris splint with the wrist in slight dorsiflexion for 4 weeks)	37	. %	Bulky bandage (Bulky dressing removed at day 2 and light dressings for 4 weeks)	44	. %	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Finsen,V., 1999	High Quality	Pinch strength(Key pinch strength (units not reported))	1.4 months	Splint (Bulky dressing removed at day 2 and well-padded plaster of Paris splint with the wrist in slight dorsiflexion for 4 weeks)	36	. %	Bulky bandage (Bulky dressing removed at day 2 and light dressings for 4 weeks)	45	. %	Author Reported	NA	Not Significant (P-value>.05)
Finsen,V., 1999	High Quality	Pinch strength(Key pinch strength (units not reported))	5.9 months	Splint (Bulky dressing removed at day 2 and well-padded plaster of Paris splint with the wrist in slight dorsiflexion for 4 weeks)	37	. %	Bulky bandage (Bulky dressing removed at day 2 and light dressings for 4 weeks)	44	. %	Author Reported	NA	Not Significant (P-value>.05)
Ritting,A.W., 2012	High Quality	Grip strength(Kilograms)	Peri-Op	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	22.3(11.60)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	16.6(6.80)	Mean Difference	5.7(1.81,9.587473)	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (P-value<.05)
Ritting,A.W., 2012	High Quality	Grip strength(Kilograms)	2 weeks	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	13.9(9.90)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	10.3(7.90)	Mean Difference	3.6(-0.04,7.241421)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ritting,A.W., 2012	High Quality	Grip strength(Kilograms)	2.8 months	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	30	24.2(13.90)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	36	8.2(7.70)	Mean Difference	16(10.43,21.57387)	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (P-value<.05)
Ritting,A.W., 2012	High Quality	Pinch Strength (three-point pinch)(Units not reported)	Peri-Op	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	5.8(3.10)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	5(2.10)	Mean Difference	0.8(-0.28,1.879879)	Not Significant (P-value>.05)
Ritting,A.W., 2012	High Quality	Pinch Strength (three-point pinch)(Units not reported)	2 weeks	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	4.9(2.10)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	3.9(1.90)	Mean Difference	1(0.19,1.812096)	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (P-value<.05)
Ritting,A.W., 2012	High Quality	Pinch Strength (three-point pinch)(Units not reported)	2.8 months	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	30	6.4(2.80)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	36	5.3(1.90)	Mean Difference	1.1(-0.08,2.278628)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ritting,A.W., 2012	High Quality	Range of motion(RoM-degrees (extension))	Peri-Op	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	70(10.00)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	61(11.00)	Mean Difference	9(4.75,13.24538)	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (P-value<.05)
Ritting,A.W., 2012	High Quality	Range of motion(RoM-degrees (flexion))	Peri-Op	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	59(12.00)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	60(13.00)	Mean Difference	-1(-6.05,4.053980)	Not Significant (P-value>.05)
Ritting,A.W., 2012	High Quality	Range of motion(RoM-degrees (supination))	Peri-Op	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	74(11.00)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	74(8.00)	Mean Difference	0(-3.92,3.917554)	Not Significant (P-value>.05)
Ritting,A.W., 2012	High Quality	Range of motion(RoM-degrees (extension))	2 weeks	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	65(10.00)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	61(10.00)	Mean Difference	4(-0.05,8.046836)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ritting,A.W., 2012	High Quality	Range of motion(RoM-degrees (flexion))	2 weeks	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	55(11.00)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	56(14.00)	Mean Difference	-1(-6.07,4.069125)	Not Significant (P-value>.05)
Ritting,A.W., 2012	High Quality	Range of motion(RoM-degrees (supination))	2 weeks	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	72(9.00)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	75(9.00)	Mean Difference	-3(-6.64,0.642153)	Not Significant (P-value>.05)
Ritting,A.W., 2012	High Quality	Range of motion(RoM-degrees (extension))	2.8 months	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	30	66(10.00)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	36	65(8.00)	Mean Difference	1(-3.43,5.431122)	Not Significant (P-value>.05)
Ritting,A.W., 2012	High Quality	Range of motion(RoM-degrees (flexion))	2.8 months	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	30	60(12.00)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	36	62(13.00)	Mean Difference	-2(-8.04,4.039359)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ritting,A.W., 2012	High Quality	Range of motion(RoM-degrees (supination))	2.8 months	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	30	71(13.00)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	36	74(11.00)	Mean Difference	-3(-8.88,2.878184)	Not Significant (P-value>.05)
Cebesoy,O., 2007	Moderate Quality	Questionnaire (General/undefined) (functional status scale.)	1 month	Splint (Splint at day 10 followed by exercises at 3 weeks)	20	13.5(.)	Bulky dressing (Immediate exercise followed by bulky bandage at day 10)	20	12.9(.)	Author Reported	NA	Not Significant (P-value>.05)
Cebesoy,O., 2007	Moderate Quality	Questionnaire (General/undefined) (functional status scale.)	3 months	Splint (Splint at day 10 followed by exercises at 3 weeks)	20	10.65(.)	Bulky dressing (Immediate exercise followed by bulky bandage at day 10)	20	10.26(.)	Author Reported	NA	Not Significant (P-value>.05)
Cook,A.C., 1995	Moderate Quality	Grip strength(Kilograms)	2 weeks	Splint (Splint for 2 weeks)	25	10(.)	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	15(.)	Author Reported	NA	No splint (exercises) (Range-of-motion exercises for 2 weeks) (P-value<.05)
Cook,A.C., 1995	Moderate Quality	Grip strength(Kilograms)	1 month	Splint (Splint for 2 weeks)	25	14(.)	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	18(.)	Author Reported	NA	No splint (exercises) (Range-of-motion exercises for 2 weeks) (P-value<.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cook,A.C., 1995	Moderate Quality	Pinch Strength(Kilograms)	2 weeks	Splint (Splint for 2 weeks)	25	4(.)	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	6(.)	Author Reported	NA	No splint (exercises) (Range-of-motion exercises for 2 weeks) (P-value<.05)
Cook,A.C., 1995	Moderate Quality	Pinch Strength(Kilograms)	1 month	Splint (Splint for 2 weeks)	25	5(.)	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	7(.)	Author Reported	NA	No splint (exercises) (Range-of-motion exercises for 2 weeks) (P-value<.05)
Cook,A.C., 1995	Moderate Quality	Pinch Strength(Kilograms)	3 months	Splint (Splint for 2 weeks)	25	. %	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	. %	Author Reported	NA	Not Significant (P-value>.05)
Huemer,G.M., 2007	Moderate Quality	Grip strength(Kilograms)	3 months	Splinted (Bulky dressing with volar splint for 2 days)	25	44(.)	Non-splinted (Light bandage for 2 days)	25	40(.)	Author Reported	NA	Not Significant (P-value>.05)
Huemer,G.M., 2007	Moderate Quality	Lifting(Pick-up test (mean))	3 months	Splinted (Bulky dressing with volar splint for 2 days)	25	19(.)	Non-splinted (Light bandage for 2 days)	25	17(.)	Author Reported	NA	Not Significant (P-value>.05)
Huemer,G.M., 2007	Moderate Quality	NCS (DML)(Distal motor latency (ms) (improvement))	3 months	Splinted (Bulky dressing with volar splint for 2 days)	25	2.47(.)	Non-splinted (Light bandage for 2 days)	25	2.48(.)	Author Reported	NA	Not Significant (P-value>.05)
Huemer,G.M., 2007	Moderate Quality	Two-point discrimination(Millimeters)	3 months	Splinted (Bulky dressing with volar splint for 2 days)	25	6(.)	Non-splinted (Light bandage for 2 days)	25	6(.)	Author Reported	NA	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Martins,R.S., 2006	Moderate Quality	Durkan's results(+durken's test)	2 weeks	Splint (Neutral-position wrist splint continuously for two weeks)	26	96.15%	No splint (No wrist immobilization)	26	100.00%	RR	(.,.)	Not Significant (P-value>.05)
Martins,R.S., 2006	Moderate Quality	Phalen's test score(# positive)	2 weeks	Splint (Neutral-position wrist splint continuously for two weeks)	26	92.31%	No splint (No wrist immobilization)	26	96.15%	RR	0.96(0.84,1.10)	Not Significant (P-value>.05)
Martins,R.S., 2006	Moderate Quality	Questionnaire (General/undefined)(DI, discrimination index (equivalent to pre-op - post-op 2PD))	2 weeks	Splint (Neutral-position wrist splint continuously for two weeks)	26	0.27(0.27)	No splint (No wrist immobilization)	26	0.29(0.28)	Mean Difference	-0.02(-0.17,0.129516)	Not Significant (P-value>.05)
Martins,R.S., 2006	Moderate Quality	Tinel's Sign/Test(# positive)	2 weeks	Splint (Neutral-position wrist splint continuously for two weeks)	26	80.77%	No splint (No wrist immobilization)	26	88.46%	RR	0.91(0.72,1.15)	Not Significant (P-value>.05)
Martins,R.S., 2006	Moderate Quality	Two-point discrimination(Millimeters)	2 weeks	Splint (Neutral-position wrist splint continuously for two weeks)	26	3.69(1.19)	No splint (No wrist immobilization)	26	5.12(2.53)	Mean Difference	-1.43(-2.50,-0.35529)	Splint (Neutral-position wrist splint continuously for two weeks) (P-value<.05)

TABLE 209: PICO 15 PART 1- POST-OP IMMOBILIZATION: OTHER

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ritting,A.W., 2012	High Quality	Questionnaire (General/undefined)(Levine-Katz score-Mean difference between both groups)	Peri-Op	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	34(34.23)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	38(28.57)	Mean Difference	-4(-16.81,8.81)	Not Significant (P-value>.05)
Ritting,A.W., 2012	High Quality	Questionnaire (General/undefined)(Levine-Katz score-Mean difference between both groups)	2 weeks	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	45	19(20.54)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	49	20(25.00)	Mean Difference	-1(-10.22,8.22)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Ritting,A.W., 2012	High Quality	Questionnaire (General/undefined)(Levine-Katz score-Mean difference between both groups)	2.8 months	Bulky dressing removed at 48-72 hours with placement of an adhesive strip (Bulky dressing removed at 48-72 hours with placement of an adhesive strip)	30	16(13.97)	Bulky dressing removed at 2 weeks (Bulky dressing removed at 2 weeks)	36	17(18.37)	Mean Difference	-1(-8.81,6.81)	Not Significant (P-value>.05)

TABLE 210: PICO 15 PART 1- POST-OP IMMOBILIZATION: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Finsen,V., 1999	High Quality	Hypothenar pain()	1.4 months	Splint (Bulky dressing removed at day 2 and well-padded plaster of Paris splint with the wrist in slight dorsiflexion for 4 weeks)	36	13.89%	Bulky bandage (Bulky dressing removed at day 2 and light dressings for 4 weeks)	45	11.11%	RR	1.25(0.39,3.99)	Not Significant (P-value>.05)
Finsen,V., 1999	High Quality	Hypothenar pain()	5.9 months	Splint (Bulky dressing removed at day 2 and well-padded plaster of Paris splint with the wrist in slight dorsiflexion for 4 weeks)	37	8.11%	Bulky bandage (Bulky dressing removed at day 2 and light dressings for 4 weeks)	44	2.27%	RR	3.57(0.39,32.87)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P 1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Finsen, V., 1999	High Quality	Thenar Atrophy(Thenar pain)	1.4 months	Splint (Bulky dressing removed at day 2 and well-padded plaster of Paris splint with the wrist in slight dorsiflexion for 4 weeks)	36	5.56%	Bulky bandage (Bulky dressing removed at day 2 and light dressings for 4 weeks)	45	2.22%	RR	2.50(0.24,26.48)	Not Significant (P-value>.05)
Finsen, V., 1999	High Quality	Thenar Atrophy(Thenar pain)	5.9 months	Splint (Bulky dressing removed at day 2 and well-padded plaster of Paris splint with the wrist in slight dorsiflexion for 4 weeks)	37	2.70%	Bulky bandage (Bulky dressing removed at day 2 and light dressings for 4 weeks)	44	2.27%	RR	1.19(0.08,18.36)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cook,A.C., 1995	Moderate Quality	Questionnaire (General/undefined)(Subjective pain (10 point scale))	2 weeks	Splint (Splint for 2 weeks)	25	2.4(.)	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	0.9(.)	Author Reported	NA	No splint (exercises) (Range-of-motion exercises for 2 weeks) (P-value<.05)
Cook,A.C., 1995	Moderate Quality	Questionnaire (General/undefined)(Subjective pain (10 point scale))	1 month	Splint (Splint for 2 weeks)	25	1.5(.)	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	0.5(.)	Author Reported	NA	No splint (exercises) (Range-of-motion exercises for 2 weeks) (P-value<.05)
Cook,A.C., 1995	Moderate Quality	Questionnaire (General/undefined)(Subjective pain (10 point scale))	5.9 months	Splint (Splint for 2 weeks)	25	. %	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	. %	Author Reported	NA	Not Significant (P-value>.05)
Huemer,G.M., 2007	Moderate Quality	Questionnaire/Scale (VAS-pain)()	3 months	Splinted (Bulky dressing with volar splint for 2 days)	25	1(.)	Non-splinted (Light bandage for 2 days)	25	1(.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 211: PICO 15 PART 1- POST-OP IMMOBILIZATION: QUALITY OF LIFE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cook,A.C., 1995	Moderate Quality	Return to Normal Activities()	Post-Op	Splint (Splint for 2 weeks)	25	12(.)	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	6(.)	Author Reported	NA	No splint (exercises) (Range-of-motion exercises for 2 weeks) (P-value<.05)
Cook,A.C., 1995	Moderate Quality	Return to Work(Full duty work)	Post-Op	Splint (Splint for 2 weeks)	25	27(.)	No splint (exercises) (Range-of-motion exercises for 2 weeks)	25	17(.)	Author Reported	NA	No splint (exercises) (Range-of-motion exercises for 2 weeks) (P-value<.05)

TABLE 212: PICO 15 PART 1- POST-OP IMMOBILIZATION: SYMPTOMS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Cebesoy,O., 2007	Moderate Quality	Questionnaire (General/undefined)(symptom severity scale)	1 month	Splint (Splint at day 10 followed by exercises at 3 weeks)	20	16.5(.)	Bulky dressing (Immediate exercise followed by bulky bandage at day 10)	20	16.84(.)	Author Reported	NA	Not Significant (P-value>.05)
Cebesoy,O., 2007	Moderate Quality	Questionnaire (General/undefined)(symptom severity scale)	3 months	Splint (Splint at day 10 followed by exercises at 3 weeks)	20	13.5(.)	Bulky dressing (Immediate exercise followed by bulky bandage at day 10)	20	11.9(.)	Author Reported	NA	Bulky dressing (Immediate exercise followed by bulky bandage at day 10) (P-value<.05)
Martins,R.S., 2006	Moderate Quality	Questionnaire (General/undefined)(SSI, symptom severity index (equivalent to pre-op - post-op SSS))	2 weeks	Splint (Neutral-position wrist splint continuously for two weeks)	26	0.64(0.15)	No splint (No wrist immobilization)	26	0.61(0.12)	Mean Difference	0.03(-0.04,0.103838)	Not Significant (P-value>.05)
Martins,R.S., 2006	Moderate Quality	Questionnaire (General/undefined)(symptom intensity index (equivalent to preop - postop SIS))	2 weeks	Splint (Neutral-position wrist splint continuously for two weeks)	26	0.91(0.15)	No splint (No wrist immobilization)	26	0.8(0.27)	Mean Difference	0.11(-0.01,0.228725)	Not Significant (P-value>.05)
Martins,R.S., 2006	Moderate Quality	Questionnaire (General/undefined) (Symptom Intensity Scale - SIS.)	2 weeks	Splint (Neutral-position wrist splint continuously for two weeks)	26	0.77(1.31)	No splint (No wrist immobilization)	26	1.54(1.96)	Mean Difference	-0.77(-1.68,0.136185)	Not Significant (P-value>.05)
Martins,R.S., 2006	Moderate Quality	Questionnaire (Levine-SSS)(Symptom Severity Score)	2 weeks	Splint (Neutral-position wrist splint continuously for two weeks)	26	11.38(4.57)	No splint (No wrist immobilization)	26	12.33(4.77)	Mean Difference	-0.95(-3.49,1.589222)	Not Significant (P-value>.05)

VII.APPENDIXES

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APPENDIX II

AAOS BODIES THAT APPROVED THIS CLINICAL PRACTICE GUIDELINE

Committee on Evidence Based Quality and Value

The committee on Evidence Based Quality and Value (EBQV) consists of twenty AAOS members who implement evidence-based quality initiatives such as clinical practice guidelines (CPGs) and appropriate use criteria (AUCs). They also oversee the dissemination of related educational materials and promote the utilization of orthopaedic value products by the Academy's leadership and its members.

Council on Research and Quality

The Council on Research and Quality promotes ethically and scientifically sound clinical and translational research to sustain patient care in musculoskeletal disorders. The Council also serves as the primary resource for educating its members, the public, and public policy makers regarding evidenced-based medical practice, orthopaedic devices and biologics, regulatory pathways and standards development, patient safety, occupational health, technology assessment, and other related important errors.

The Council is comprised of the chairs of the committees on Biological Implants, Biomedical Engineering, Occupational Health and Workers' Compensation, Patient Safety, Research Development, U.S. Bone and Joint Decade, and chair and Appropriate Use Criteria and Clinical Practice Guideline section leaders of the Evidence Based Quality and Value committee. Also on the Council are the second vice-president, three members at large, and representatives of the Diversity Advisory Board, Women's Health Issues Advisory Board, Board of Specialty Societies (BOS), Board of Councilors (BOC), Communications Cabinet, Orthopaedic Research Society (ORS), Orthopedic Research and Education Foundation (OREF).

Board of Directors

The 17 member Board of Directors manage the affairs of the AAOS, set policy, and oversee the Strategic Plan.

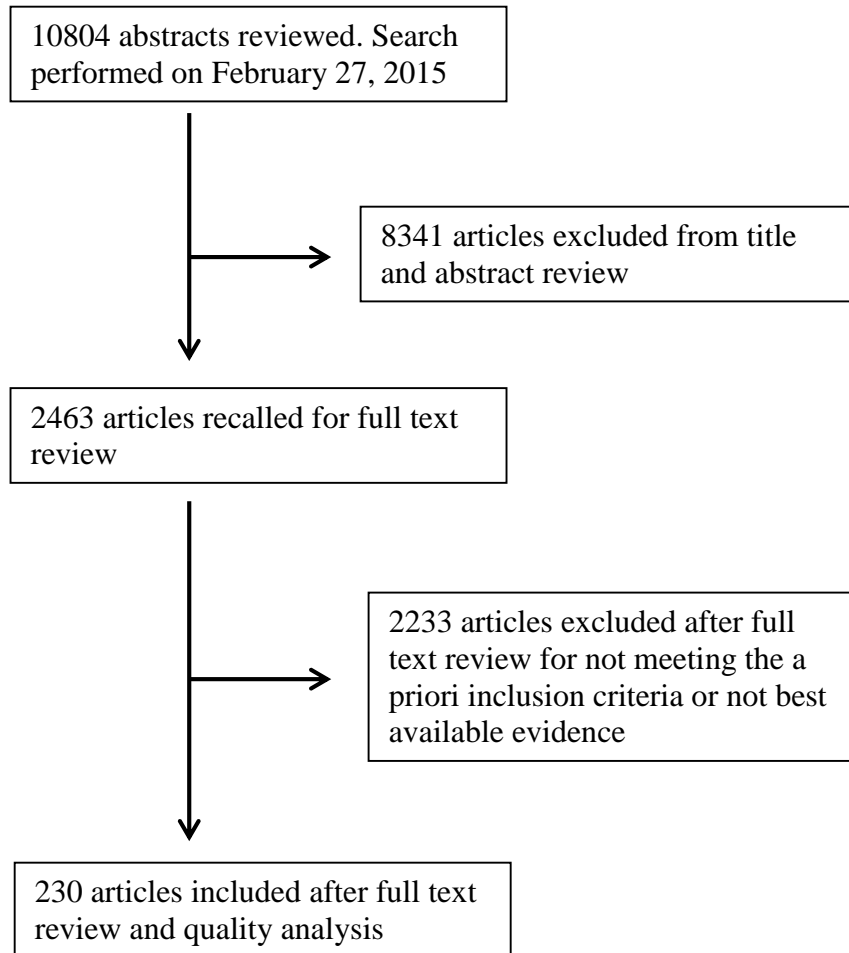
APPENDIX III

A Priori Pico Questions and Additional Details Regarding Pico Questions

1. For patients with symptoms consistent with CTS (median nerve involvement at the level of the wrist) what physical examination maneuvers lead to an accurate diagnosis of CTS?
 - *Additional Information regarding this PICO question and the resulting recommendation: One member of the guideline development group chose not to approve the rationale that accompanied recommendation 1C: Maneuvers.*
2. For patients with symptoms consistent with CTS (median nerve involvement at the level of the wrist) what topics should be addressed in the history interview lead to an accurate diagnosis of CTS?
3. For patients with symptoms consistent with CTS (median nerve involvement at the level of the wrist) are imaging modalities necessary to aid the diagnosis, management, and prognosis of CTS?
4. For patients with symptoms consistent with CTS (median nerve involvement at the level of the wrist) are diagnostic scales necessary to aid the diagnosis, management, and prognosis of CTS?
 - *Additional Information regarding PICO question or resulting recommendation: One member of the guideline development group chose not to approve the guideline recommendation and the rationale that accompanied this recommendation.*
5. Are there specific activities or exposures that can be correlated with the development of carpal tunnel syndrome?
6. Do any of the selected conservative treatments result in relief of symptoms and/or functional improvement while resulting in minimal complications? Or do they play a role in diagnosis or prediction of prognosis (injections)?
7. For patients with symptoms consistent with CTS, does surgical carpal tunnel release relieve symptoms and/or improve function?
8. For patients with symptoms consistent with CTS, do adjunctive/alternative surgical techniques relieve symptoms and/or improve function?
9. For patients with symptoms consistent with CTS (median nerve involvement at the level of the wrist) with bilateral involvement, does simultaneous bilateral surgical release relieve symptoms and/or improve function without negative consequence?
10. For pregnant women with symptoms consistent with CTS (median nerve involvement at the level of the wrist) are the selected conservative treatments safe and do they relive symptoms and/or improve function with minimum complications?

11. For patients undergoing surgical treatment for CTS (median nerve involvement at the level of the wrist) do patient oriented outcomes differ between various modes of anesthesia?
12. For patients undergoing surgical treatment for CTS (median nerve involvement at the level of the wrist), do various post-operative complications significantly differ between those who undergo peri-operative anticoagulation cessation only, with those who undergo continued anti-coagulation treatment.
13. For patients undergoing surgical treatment for CTS (median nerve involvement at the level of the wrist), are there significant differences in infection rates between those treated with prophylactic antibiotics and those not treated with prophylactic antibiotics peri-operatively.
14. For patients who have been treated with a surgical intervention for CTS, is therapy indicated? If so, who, when, what (certain treatments), and how long (duration of therapy)?
15. For patients who have been treated with a surgical intervention for CTS, does post-operative immobilization result in significant differences in symptom relief and functional improvement, as compared to those who undergo early mobilization or unrestricted movement.
16. For diabetic patients who have been treated with a surgical intervention for CTS, which post-operative management modalities are safe and effective?

APPENDIX IV
STUDY ATTRITION FLOWCHART



APPENDIX V LITERATURE SEARCH STRATEGIES

Guideline: Diagnosis and Treatment of Carpal Tunnel Syndrome

Total citations added to the database: 691

Ref IDs: 14542-15449

Date: 02/27/2015

Database: PubMed (<http://www.pubmed.gov>) Date searched: 02/27/2015

Search Results: 314 De-duplicated: 305 Ref IDs: 14542-14855

Search Strategy

#1

“carpal tunnel syndrome”[mh] OR “carpal tunnel”[tw] OR (carpal[tiab] AND tunnel[tiab])

#2

(Median entrapment neuropathy[tw] OR Median nerve neuropathy[tw] OR “median neuropathy”[mh:noexp] OR (“nerve compression syndromes”[mh:noexp] AND “median nerve”[tw])) AND (“carpal”[tw] OR “wrist”[tw] OR “distal”[tw])

#3

(animals[mh] NOT humans[mh]) OR cadaver[mh] OR cadaver*[ti] OR ((comment[pt] OR editorial[pt] OR letter[pt] OR "historical article"[pt]) NOT "clinical trial"[pt]) OR addresses[pt] OR news[pt] OR "newspaper article"[pt] OR "case report"[ti] OR pmcbook

#4

(#1 OR #2) NOT #3

#5

#4 AND English[lang] AND 1966[dp]:2015[dp]

#6

("2014/02/27"[Date - Entrez] : "3000"[Date - Entrez])

#7

#5 AND #6

PubMed Search Results

	<i>Search Results</i>	<i>De-duplicated*</i>	<i>Ref IDs</i>
	314	305	14542-14855

*De-duplication also removes retracted articles.

Database: Embase (<http://www.embase.com>) Date searched: 02/27/2015

Search Results: 560 De-duplicated:376Ref IDs: 14861-15415

Search Strategy

#1

'carpal tunnel syndrome'/exp OR 'carpal tunnel questionnaire'/exp OR 'carpal tunnel':ab,ti OR ('median neuropathy':ab,ti OR 'median entrapment':ab,ti OR 'median nerve':ab,ti AND ('carpal':ab,ti OR 'wrist':ab,ti OR 'distal':ab,ti))

#2

[english]/lim AND [Embase]/lim AND [1966-2015]/py

#3

cadaver/de OR 'in vitro study'/exp OR 'abstract report'/de OR book/de OR editorial/de OR note/de OR letter/de OR 'case report':ti

#4

(#1 AND #2) NOT #3

Embase Search Results

	<i>Search Results</i>	<i>De-duplicated*</i>	<i>Ref IDs</i>
	560	376	14861-15415

Database: The Cochrane Library (Wiley interface) Date searched: 02/27/2015

Search Results:37De-duplicated:10Ref IDs: 15416-15449

Search Strategy

#1

"carpal tunnel":ti,ab,kw (Word variations have been searched)

#2

MeSH descriptor: [Carpal Tunnel Syndrome] explode all trees

#3

#1 or #2 from 1966 to 2015

Cochrane Search Results

	<i>Search Results</i>	<i>De-duplicated*</i>	<i>Ref IDs</i>
	37	10	15416-15449

*Foreign language also removed.

Database: PEDro (<http://pedro.org.au>) Date searched: 02/27/2015
Search Results: 6De-duplicated:0Ref IDs: --
Search Strategy

Abstract & Title: carpal tunnel
Published since: 1966

PEDro Search Results

	<i>Search Results</i>	<i>De-duplicated*</i>	<i>Ref IDs</i>
	6	0	--

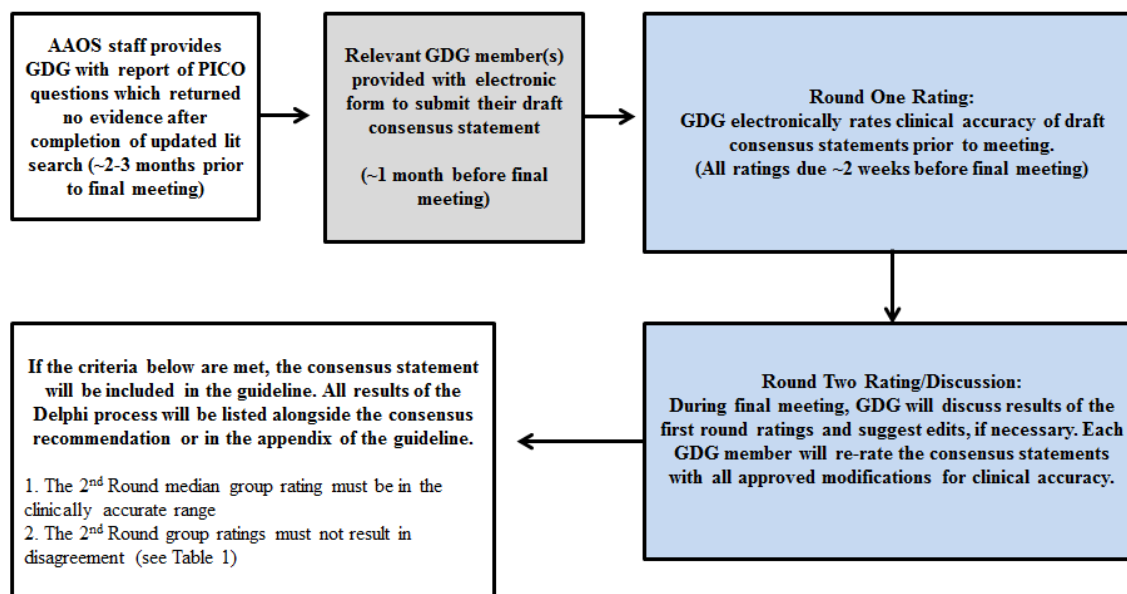
**Foreign language also removed.*

APPENDIX VI COMPANION CONSENSUS STATEMENTS

For PICO questions which returned no evidence, the guideline development group is given the option to form a consensus statement. PICO questions which did not have supporting evidence can be found in [Appendix III](#). If the guideline development group makes the decision to construct consensus statements, they participate in a modified Delphi method designed to help target the most clinically applicable consensus statement (see [Companion Consensus Statement Protocol](#)). All consensus statements will be published in a separate document in an effort to clearly distinguish between the evidence-based recommendations in this document and the complimentary consensus statements. All companion consensus statements can be found on the AAOS website (www.aaos.org). Although expert opinion is a form of evidence, it is also important to avoid liberal use in a guideline since research shows that expert opinion can be incorrect.

Sometimes guideline development group members change their views. At any time during the discussion of the consensus statements, any member of the guideline development group can make a motion to withdraw a statement. [Appendix III](#) of the guideline will list all PICO questions, including those that returned no evidence/have consensus statements.

COMPANION CONSENSUS STATEMENT PROTOCOL



Appendix VIII

APPENDIX VII

PARTICIPATING PEER REVIEW ORGANIZATIONS

Peer review of the guideline is completed by interested external organizations. The AAOS solicits reviewers for each guideline. They consist of experts in the topic area and represent professional societies other than AAOS. Review organizations are nominated by the guideline development group at the introductory meeting. For this guideline, AAOS contacted 18 organizations with content expertise to review a draft of the clinical practice guideline during the peer review period from September 8th, 2015 to October 8th, 2015. Eleven individuals provided comments via the electronic structured peer review form, representing seven professional medical organizations (listed below).

Participating Societies

American Academy of Physical Medicine and Rehabilitation (AAPM&R)

American Society of Plastic Surgeons (ASPS)

American Association for Hand Surgery (AAHS)

American Society of Hand Therapists (ASHT)

American Academy of Neurology (AAN)

American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM)

American Society for Surgery of the Hand (ASSH)

Peer review comments will be available on www.aaos.org/guidelinepeerreview.

Participation in the AAOS guideline peer review process does not constitute an endorsement nor does it imply that the reviewer supports this document.

STRUCTURED PEER REVIEW FORM

Peer reviewers are asked to read and review the draft of the clinical practice guideline with a particular focus on their area of expertise. Their responses to the answers below are used to assess the validity, clarity, and accuracy of the interpretation of the evidence.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. The overall objective(s) of the guideline is (are) specifically described.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The health question(s) covered by the guideline is (are) specifically described.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The guideline's target audience is clearly described.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The guideline development group includes individuals from all the relevant professional groups.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. There is an explicit link between the recommendations and the supporting evidence.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Given the nature of the topic and the data, all clinically important outcomes are considered.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The patients to whom this guideline is meant to apply are specifically described.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. The criteria used to select articles for inclusion are appropriate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. The reasons why some studies were excluded are clearly described.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. All important studies that met the article inclusion criteria are included.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. The validity of the studies is appropriately appraised.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. The methods are described in such a way as to be reproducible.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. The statistical methods are appropriate to the material and the objectives of this guideline.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Important parameters (e.g., setting, study population, study design) that could affect study results are systematically addressed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Health benefits, side effects, and risks are adequately addressed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. The writing style is appropriate for health care professionals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. The grades assigned to each recommendation are appropriate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please provide a brief explanation of both your positive and negative answers in the preceding section. If applicable, please specify the draft page and line numbers in your comments. Please feel free to also comment on the overall structure and content of the Guideline.

Would you recommend these guidelines for use in clinical practice?*

- Strongly Recommend
- Recommend
- Would Not Recommend
- Unsure

Additional Comments:

To view an example of the structured peer review form, please select the following link:
[Structured Peer Review Form](#)

APPENDIX VIII

INTERPRETING THE FOREST PLOTS

We use descriptive diagrams known as forest plots to present data from studies comparing the differences in outcomes between two treatment groups when a meta-analysis has been performed (combining results of multiple studies into a single estimate of overall effect). The overall effect is shown at the bottom of the graph as a diamond to illustrate the confidence intervals. The standardized mean difference or odds ratio are measures used to depict differences in outcomes between treatment groups. The horizontal line running through each point represents the 95% confidence interval for that point estimate. The solid vertical line represents “no effect” and is where the standardized mean difference = 0 or odds ratio = 1.

APPENDIX IX CONFLICT OF INTEREST

Prior to the development of this guideline, guideline development group members disclose conflicts of interest (COI). They disclose COIs in writing to the American Academy of Orthopaedic Surgeons via a private on-line reporting database and also verbally at the recommendation approval meeting.

Brent Graham, MD, Work Group Chair: Journal of Bone and Joint Surgery - American: Editorial or governing board; Publishing royalties, financial or material support (Submitted on: 05/06/2015)

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Robert Afra, MD: (This individual reported nothing to disclose); Submitted on: 05/07/2015

Mickey S Cho, MD: American Society for Surgery of the Hand: Board or committee member (Submitted on: 05/07/2015)

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Kyle Mullen: No disclosure available

Anne Woznica: (This individual reported nothing to disclose); Submitted on: 10/01/2015

Peter Shores: (This individual reported nothing to disclose); Submitted on: 10/01/2015

Erica Linskey: (This individual reported nothing to disclose); Submitted on: 10/01/2015

Yasseline Martinez: (This individual reported nothing to disclose); Submitted on: 04/02/2015

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APPENDIX X BIBLIOGRAPHIES

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EXCLUDED STUDIES

Authors	Year	Article Title	Periodical	Reason for Exclusion
Abbas,M.A.; Afifi,A.A.; Zhang,Z.W.; Kraus,J.F.	1998	Meta-analysis of published studies of work-related carpal tunnel syndrome	Int.J Occup.Environ.Health	meta-analysis
Abbas,M.F.; Faris,R.H.; Harber,P.I.; Mishriky,A.M.; El-Shahaly,H.A.; Waheeb,Y.H.; Kraus,J.F.	2001	Worksite and personal factors associated with carpal tunnel syndrome in an Egyptian electronics assembly factory	Int.J Occup.Environ.Health	very low quality
Abbotts,J.; McIntosh,H.	2013	Can wrist splints or steroid injections reduce the need for decompression surgery in carpal tunnel syndrome? (Structured abstract)	Health Technology Assessment Database	Narrative review
Abbruzzese,M.; Loeb,C.; Ratto,S.; Sacco,G.	1977	A comparative electrophysiological and histological study of sensory conduction velocity and Meissner corpuscles of the median nerve in pneumatic tool workers	Eur.Neurol.	review; not exclusive to CTS
Abdulrazzaq,Y.M.; Nan,Z.; Xin,G.K.	2003	Acupuncture in the management of pain	Emirates Medical Journal	Background article
Aberg,M.; Ljungberg,C.; Edin,E.; Millqvist,H.; Nordh,E.; Theorin,A.; Terenghi,G.; Wiberg,M.	2009	Clinical evaluation of a resorbable wrap-around implant as an alternative to nerve repair: a prospective, assessor-blinded, randomised clinical study of sensory, motor and functional recovery after peripheral nerve repair	J Plast.Reconstr.Aesthet.Surg	Does not address question of interest
Abichandani,S.; Shaikh,S.; Nadiger,R.	2013	Carpal tunnel syndrome - an occupational hazard facing dentistry	Int.Dent.J	literature review
Ablove,R.H.; Ablove,T.S.	2009	Prevalence of carpal tunnel syndrome in pregnant women	WMJ	narrative review
Abu-Ali,M.; Purswell,J.L.; Schlegel,R.E.	1996	Psychophysically determined work-cycle parameters for repetitive hand gripping	International Journal of Industrial Ergonomics	review; recommendations
Acharya,A.D.; Auchincloss,J.M.	2005	Return to functional hand use and work following open carpal tunnel surgery	J Hand Surg Br	
Adams,B.D.	1994	Endoscopic Carpal Tunnel Release	J Am Acad Orthop Surg	Background article

Authors	Year	Article Title	Periodical	Reason for Exclusion
Adams,J.; Wood,V.E.	1981	Tendon transfers for irreparable nerve damage in the hand	Orthop.Clin.North Am.	Background article
Adams,M.L.; Franklin,G.M.; Barnhart,S.	1994	Outcome of carpal tunnel surgery in Washington State workers' compensation	Am J Ind.Med	medical records review; insufficient data
Adamson,J.E.; Srouji,S.J.; Horton,C.E.; Mladick,R.A.	1971	The acute carpal tunnel syndrome	Plast.Reconstr.Surg	case reports
Afifi,M.; Santello,M.; Johnston,J.A.	2012	Effects of carpal tunnel syndrome on adaptation of multi-digit forces to object texture	Clin Neurophysiol.	+Does not answer a question of interest
Agabegi,S.S.; Freiberg,R.A.; Plunkett,J.M.; Stern,P.J.	2007	Thumb abduction strength measurement in carpal tunnel syndrome	J Hand Surg Am	insufficient data; very low study design
Agarwal,V.; Singh,R.; Sachdev,A.; Wiclaff; Shekhar,S.; Goel,D.	2005	A prospective study of the long-term efficacy of local methyl prednisolone acetate injection in the management of mild carpal tunnel syndrome	Rheumatology (Oxford)	Very Low Quality
Agarwal,V.; Singh,R.; Sachdev,A.; Wiclaff; Shekhar,S.; Goel,D.	2007	Long term efficacy of local methyl prednisolone acetate injection in the management of carpal tunnel syndrome	Indian Journal of Rheumatology	Very Low Quality
Agee,J.M.; McCarroll,H.R.; North,E.R.	1994	Endoscopic carpal tunnel release using the single proximal incision technique	Hand Clin	Background article
Agee,J.M.; Peimer,C.A.; Pyrek,J.D.; Walsh,W.E.	1995	Endoscopic carpal tunnel release: a prospective study of complications and surgical experience	J Hand Surg Am	very low quality
Ahan,U.; Arne,Z.M.; Bajrovi,F.; Zorman,P.	2002	Surgical technique to reduce scar discomfort after carpal tunnel surgery	Journal of Hand Surgery	duplicate of PM:12239671
Ahcan,U.; Arnez,Z.M.; Bajrovic,F.; Zorman,P.	2002	Surgical technique to reduce scar discomfort after carpal tunnel surgery	J Hand Surg Am	very low quality
Ahmed,M.S.; Ali,R.; Mojaddidi,M.; Thomsen,N.; Dahlin,L.; Jeziorska,M.; Malik,R.	2010	Carpal tunnel syndrome in patients with diabetes is associated with increased expression of VEGF and its receptors	Diabet.Med.	summary report; abstract
Ahn,D.S.	2001	Hand elevation: a new test for carpal tunnel syndrome	Ann.Plast.Surg	insufficient data; very low study design
Aiache,A.E.	1978	An early sign of carpal tunnel syndrome	Plast.Reconstr.Surg	case report

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Aird,J.; Cady,R.; Nagi,H.; Kullar,S.; MacDermid,J.C.	2006	The impact of wrist extension provocation on current perception thresholds in patients with carpal tunnel syndrome: a pilot study	J Hand Ther	<10 patients in CTS group; very low study design
Ajeena,I.M.; Al-Saad,R.H.; Al-Mudhafar,A.; Hadi,N.R.; Al-Aridhy,S.H.	2013	Ultrasonic assessment of females with carpal tunnel syndrome proved by nerve conduction study	Neural Plast.	insufficient data; very low study design
Akcar,N.; Ozkan,S.; Mehmetoglu,O.; Calisir,C.; Adapinar,B.	2010	Value of power Doppler and gray-scale US in the diagnosis of carpal tunnel syndrome: contribution of cross-sectional area just before the tunnel inlet as compared with the cross-sectional area at the tunnel	Korean J Radiol.	insufficient data; very low study design
Akkus,S.; Kutluhan,S.; Akhan,G.; Tunc,E.; Ozturk,M.; Koyuncuoglu,H.R.	2002	Does fibromyalgia affect the outcomes of local steroid treatment in patients with carpal tunnel syndrome?	Rheumatol.Int.	Does not answer a question of interest; no assessment of risk factors
Aktas,I.; Sunter,G.; Uluc,K.; Isak,B.; Tanridag,T.; Akyuz,G.; Us,O.	2012	Does the provocation maneuvers increase the sensitivity of sensory nerve conduction studies in diagnosis of carpal tunnel syndrome?	Turkiye Fiziksel Tip ve Rehabilitasyon Dergisi	insufficient data; no true reference standard
al Qattan,M.M.; Manktelow,R.T.; Bowen,C.V.	1994	Pregnancy-induced carpal tunnel syndrome requiring surgical release longer than 2 years after delivery	Obstet.Gynecol.	no comparison group; very low study design
Al-Benna,S.; Nano,P.G.; El-Enin,H.	2012	Extended open-carpal tunnel release in renal dialysis patients	Saudi J Kidney Dis Transpl.	Retrospective case series
Alderson,M.; McGall,D.	1999	The Alderson-McGall hand function questionnaire for patients with Carpal Tunnel syndrome: a pilot evaluation of a future outcome measure	J Hand Ther	Does not address question of interest
Alderson,M.K.; Petajan,J.H.	1987	Relative refractory period: A measure to detect early neuropathy in alcoholics	Muscle Nerve	Not relevant to CTS
Aldridge,J.W.; Bruno,R.J.; Strauch,R.J.; Rosenwasser,M.P.	2001	Nerve entrapment in athletes	Clin.Sports Med.	background
Aleman,L.; Berna,J.D.; Reus,M.; Martinez,F.	2008	Reproducibility of sonographic measurements of the median nerve	J Ultrasound Med	+Does not answer a question of interest

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Domenech-Ratto,G.; Campos,M.				
Alexanian,R.; Frascini,G.; Smith,L.	1984	Amyloidosis in multiple myeloma or without apparent cause	Arch Intern.Med	not relevant to CTS; bio-study
Alfonso,M.I.; Dzwierzynski,W.	1998	Hoffman-Tinel sign: The realities	Phys.Med.Rehabil.Clin.N.Am.	Background Information; case reports
Aljahlan,M.; Lee,K.-C.; Toth,E.	1999	Limited joint mobility in diabetes. Diabetic cheiroarthropathy may be a clue to more serious complications	Postgrad.Med.	Background Information
Aljure,J.; Eltorai,I.; Bradley,W.E.; Lin,J.E.; Johnson,B.	1985	Carpal tunnel syndrome in paraplegic patients		Not relevant,does not answer the PICO question
Allen,C.W.,Jr.	1993	Weight of evidence links obesity, fitness to carpal tunnel syndrome. Companies implementing wellness programs experience a reduction in CTS incidence	Occup.Health Saf	Background Information
Allmann,K.H.; Horch,R.; Uhl,M.; Gufler,H.; Althoefer,C.; Stark,G.B.; Langer,M.	1997	MR imaging of the carpal tunnel	Eur.J Radiol.	insufficient data; very low study design
Almeyda,J.R.; Thorne,N.; Russell,B.	1969	Myxoedema--carpal tunnel syndrome	Br J Dermatol.	notes
Al-Qattan,M.M.	2010	Variations in the course of the thenar motor branch of the median nerve and their relationship to the hypertrophic muscle overlying the transverse carpal ligament	J Hand Surg Am	very low quality
Altinok,M.T.; Baysal,O.; Karakas,H.M.; Firat,A.K.	2004	Sonographic evaluation of the carpal tunnel after provocative exercises	J Ultrasound Med	+not best available evidence
Altinok,T.; Baysal,O.; Karakas,H.M.; Sigirci,A.; Alkan,A.; Kayhan,A.; Yologlu,S.	2004	Ultrasonographic assessment of mild and moderate idiopathic carpal tunnel syndrome	Clin Radiol.	insufficient data; very low study design
Amadio,P.C.	2003	Management of nerve compression syndrome in musicians	Hand Clin.	Background Information; review

Authors	Year	Article Title	Periodical	Reason for Exclusion
Amadio,P.C.	2003	What's new in hand surgery	Journal of Bone and Joint Surgery - Series A	background
Amayyreh,I.; Almutaseb,N.	2011	Grip strength as a predictor for the severity of carpal tunnel syndrome in female patients	Jordan Medical Journal	insufficient data; very low study design
Amick III,B.C.; Habeck,R.V.; Ossmann,J.; Fossel,A.H.; Keller,R.; Katz,J.N.	2004	Predictors of Successful Work Role Functioning after Carpal Tunnel Release Surgery	J.Occup.Environ.Med.	Does not address question of interest
Amirfeyz,R.; Clark,D.; Parsons,B.; Melotti,R.; Bhatia,R.; Leslie,I.; Bannister,G.	2011	Clinical tests for carpal tunnel syndrome in contemporary practice	Arch Orthop Trauma Surg	insufficient data; very low study design
Amirfeyz,R.; Gozzard,C.; Leslie,I.J.	2005	Hand elevation test for assessment of carpal tunnel syndrome	J Hand Surg Br	+not best available evidence
Amirfeyz,R.; Mehendale,S.; Tyrrell,S.; Bhatia,R.; Leslie,I.; Bannister,G.	2010	Katz and Stirrat hand diagram revisited	Hand Surg	insufficient data; very low study design
Amirjani,N.; Ashworth,N.L.; Olson,J.L.; Morhart,M.; Chan,K.M.	2011	Discriminative validity and test-retest reliability of the Dellon-modified Moberg pick-up test in carpal tunnel syndrome patients	J Peripher.Nerv.Syst.	insufficient data; very low study design
Amirjani,N.; Ashworth,N.L.; Olson,J.L.; Morhart,M.; Chan,K.M.	2011	Validity and reliability of the Purdue Pegboard Test in carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Ammer,K.; Mayr,H.; Thur,H.	1993	Self-administered diagram for diagnosing carpal tunnel syndrome	European Journal of Physical Medicine and Rehabilitation	Not best evidence for hand diagram
Andary,M.T.; Fankhauser,M.J.; Ritson,J.L.; Spiegel,N.; Hulce,V.; Yosef,M.; Stanton,D.F.	1996	Comparison of sensory mid-palm studies to other techniques in carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Andersen,J.H.; Thomsen,J.F.; Overgaard,E.; Lassen,C.F.; Brandt,L.P.; Vilstrup,I.; Kryger,A.I.; Mikkelsen,S.	2003	Computer use and carpal tunnel syndrome: a 1-year follow-up study		Does not answer a question of interest; no diagnosis of CTS
Andersen,K.	1985	Surface recording of orthodromic sensory nerve action potentials in	Muscle Nerve	only normal subjects used

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		median and ulnar nerves in normal subjects		
Anderson,L.P.	1986	Carpal tunnel syndrome	Orthop Nurs.	background
Andreu,J.L.; Ly-Pen,D.; Millan,I.; de,Blas G.; Sanchez-Olaso,A.	2014	Local injection versus surgery in carpal tunnel syndrome: Neurophysiologic outcomes of a randomized clinical trial	Clin.Neurophysiol.	Duplicate study (duplicate to AAOS ID 137)
Andrew,C.Y.H.; Hua,L.K.; Kiong,P.B.; Dennis,K.	2005	Carpal tunnel syndrome - Splinting or surgery? A systematic review	Singapore General Hospital Proceedings	Systematic review
Angelis,M.V.; Pierfelice,F.; Giovanni,P.; Staniscia,T.; Uncini,A.	2009	Efficacy of a soft hand brace and a wrist splint for carpal tunnel syndrome: a randomized controlled study	Acta Neurol.Scand.	Duplicate article (duplicate with AAOS ID 455)
Ansari,N.N.; Adelmanesh,F.; Naghdi,S.; Mousavi,S.	2009	The relationship between symptoms, clinical tests and nerve conduction study findings in carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	insufficient data; not best evidence
Aoki,T.; Oshige,T.; Matsuyama,A.; Oki,H.; Kinoshita,S.; Yamashita,Y.; Takahashi,H.; Hayashida,Y.; Sakai,A.; Hisaoka,M.; Korogi,Y.	2014	High-resolution MRI predicts steroid injection response in carpal tunnel syndrome patients	Eur.Radiol.	Very Low Quality
Aoki,T.; Oshige,T.; Matsuyama,A.; Oki,H.; Kinoshita,S.; Yamashita,Y.; Takahashi,H.; Hayashida,Y.; Sakai,A.; Hisaoka,M.; Korogi,Y.	2013	High-resolution MRI predicts steroid injection response in carpal tunnel syndrome patients	Eur.Radiol.	Duplicate article (duplicate with AAOS ID 1637)
Apfelberg,D.B.; Maser,M.R.; Lash,H.; Kaye,R.L.; Britton,M.C.; Bobrove,A.	1978	Rheumatoid hand deformities: pathophysiology and treatment	West J Med	Background article
Appleby,M.A.; Neville-Smith,M.; Parrott,M.W.	2009	Functional outcomes post carpal tunnel release: a modified replication of a previous study	J Hand Ther	+Does not answer a question of interest; not best available evidence
Araki,S.; Murata,K.; Aono,H.	1986	Subclinical cervico-spino-bulbar effects of lead: A study of short-latency somatosensory evoked potentials in	Am.J.Ind.Med.	Not relevant to CTS

Authors	Year	Article Title	Periodical	Reason for Exclusion
		workers exposed to lead, zinc, and copper		
Arendt-Nielsen,L.; Gregersen,H.; Toft,E.; Bjerring,P.	1991	Involvement of thin afferents in carpal tunnel syndrome: evaluated quantitatively by argon laser stimulation	Muscle Nerve	Does not answer a question of interest
Argyriou,A.A.; Karanasios,P.; Makridou,A.; Makris,N.	2009	The significance of second lumbrical-interosseous latency comparison in the diagnosis of carpal tunnel syndrome	Acta Neurol Scand.	insufficient data; very low study design
Argyriou,A.A.; Polychronopoulos,P.; Moutopoulou,E.; Aplada,M.; Chroni,E.	2006	The significance of intact sympathetic skin responses in carpal tunnel syndrome	Eur.J Neurol	insufficient data; very low study design
Ariyan,S.; Watson,H.K.	1977	The palmar approach for the visualization and release of the carpal tunnel. An analysis of 429 cases	Plast.Reconstr.Surg	Retrospective case series
Arminio,J.A.	1986	Etiology of carpal: tunnel syndrome	Del Med J	background
Armstong,A.P.; Flynn,J.R.; Davies,D.M.	1997	Endoscopic carpal tunnel release. A review of 208 consecutive cases	Journal of Hand Surgery	Retrospective case series
Armstrong,M.B.; Villalobos,R.E.	1997	Surgical treatment of carpal tunnel syndrome	Phys.Med.Rehabil.Clin.N.Am.	Background article
Armstrong,T.; Devor,W.; Borschel,L.; Contreras,R.	2004	Intracarpal steroid injection is safe and effective for short-term management of carpal tunnel syndrome	Muscle Nerve	Does not meet inclusion criteria (follow-up<1 month)
Armstrong,T.J.; Castelli,W.A.; Evans,F.G.; Diaz-Perez,R.	1984	Some histological changes in carpal tunnel contents and their biomechanical implications	J Occup.Med	cadaver study
Armstrong,T.J.; Chaffin,D.B.	1979	Carpal tunnel syndrome and selected personal attributes	J Occup.Med	no comparison group; very low study design
Armstrong,T.J.; Chaffin,D.B.	1979	Some biomechanical aspects of the carpal tunnel	J Biomech.	biomechanical study
Arner,M.; Hagberg,L.; Rosen,B.	1994	Sensory disturbances after two-portal endoscopic carpal tunnel release: a preliminary report	J Hand Surg Am	Retrospective case series
Arnold,W.D.; Elsheikh,B.H.	2013	Entrapment neuropathies	Neurol.Clin.	background

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Arons,J.A.; Collins,N.; Arons,M.S.	1999	Results of treatment of carpal tunnel syndrome with associated hourglass deformity of the median nerve	J Hand Surg Am	+Does not answer a question of interest
Aroori,S.; Spence,R.A.	2008	Carpal tunnel syndrome	Ulster Med J	background
Ashe,M.	2004	Carpal tunnel syndrome in the pharmacy	Can.Pharm.J.	Background article
Ashraf,A.; Daghighzadeh,A.; Naseri,M.; Nasiri,A.; Fakheri,M.	2013	A study of interpolation method in diagnosis of carpal tunnel syndrome	Ann.Indian Acad Neurol	insufficient data; very low study design
Ashraf,A.R.; Jali,R.; Moghtaderi,A.R.; Yazdani,A.H.	2009	The diagnostic value of ultrasonography in patients with electrophysiologically confirmed carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Ashworth,N.	2005	Carpal tunnel syndrome	Clin Evid.	background
Ashworth,N.	2007	Carpal tunnel syndrome	Am Fam Physician	background
Ashworth,N.L.	2011	Carpal tunnel syndrome	Clin Evid.(Online)	systematic review
Ashworth,N.L.	2010	Carpal tunnel syndrome	Clin Evid.(Online)	systematic review
Ashworth,N.L.	2007	Carpal tunnel syndrome	Clin Evid.(Online)	systematic review
Ashworth,N.L.; Bland,J.D.	2013	Effectiveness of second corticosteroid injections for carpal tunnel syndrome	Muscle Nerve	Incorrect patient population (2nd treatment)
Aslam,U.; Afzal,S.; Syed,S.	2012	Hyperventilation provokes symptoms of carpal tunnel syndrome	Hand Surg	+Does not answer a question of interest
Aszmann,O.C.; Dellon,A.L.	1998	Relationship between cutaneous pressure threshold and two-point discrimination	J Reconstr.Microsurg.	<10 patients per group
Aszmann,O.C.; Kress,K.M.; Dellon,A.L.	2000	Results of decompression of peripheral nerves in diabetics: a prospective, blinded study	Plast.Reconstr.Surg	Does not address question of interest
Aszmann,O.C.; Lee,Dellon A.	2001	Decompression of multiple peripheral nerves in the treatment of diabetic neuropathy: A prospective, blinded study	Acta Chirurgica Austriaca	Incorrect patient population (<10 patients/group)
Atcheson,S.G.	1999	Erratum: Carpal Tunnel syndrome: Is it work-related (Hospital Practice (March 15) (52))	Hosp.Pract.	abstract correction; no text

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Atcheson,S.G.; Ward,J.R.; Lowe,W.	1998	Concurrent medical disease in work-related carpal tunnel syndrome	Arch Intern.Med	+not best available evidence
Athar,P.; Jilani,A.; Nguyen,T.T.	2013	Comparison of ring versus disposable disk electrodes in recording antidromic sensory median nerve conduction study for diagnosis of carpal tunnel syndrome	J Clin Neurophysiol.	insufficient data; very low study design
Atherton,W.G.; Faraj,A.A.; Riddick,A.C.; Davis,T.R.	1999	Follow-up after carpal tunnel decompression - general practitioner surgery or hand clinic? A randomized prospective study	J Hand Surg Br	Insufficient data
Atisook,R.; Benjapibal,M.; Sunsaneevithayakul,P.; Roongpisuthipong,A.	1995	Carpal tunnel syndrome during pregnancy: prevalence and blood level of pyridoxine	J Med Assoc Thai.	Does not address question of interest
Atroshi,I.; Breidenbach,W.C.; McCabe,S.J.	1997	Assessment of the carpal tunnel outcome instrument in patients with nerve-compression symptoms	J Hand Surg Am	+insufficient data; does not answer question of interest
Atroshi,I.; Gummesson,C.	2009	Non-surgical treatment in carpal tunnel syndrome	The Lancet	Commentary
Atroshi,I.; Gummesson,C.; Johnsson,R.; McCabe,S.J.; Ornstein,E.	2003	Severe carpal tunnel syndrome potentially needing surgical treatment in a general population	J Hand Surg Am	+Does not answer a question of interest; very low study design
Atroshi,I.; Gummesson,C.; McCabe,S.J.; Ornstein,E.	2007	The SF-6D health utility index in carpal tunnel syndrome	J Hand Surg Eur.Vol.	+Does not answer a question of interest
Atroshi,I.; Gummesson,C.; Ornstein,E.; Johnsson,R.; Ranstam,J.	2007	Carpal tunnel syndrome and keyboard use at work: a population-based study	Arthritis Rheum.	Not relevant, prevalence study
Atroshi,I.; Johnsson,R.	1996	Evaluation of portable nerve conduction testing in the diagnosis of carpal tunnel syndrome	J Hand Surg Am	insufficient data; very low study design
Atroshi,I.; Johnsson,R.; Nouhan,R.; Crain,G.; McCabe,S.J.	1997	Use of outcome instruments to compare workers' compensation and non-workers' compensation carpal tunnel syndrome	J Hand Surg Am	+Does not answer a question of interest

Authors	Year	Article Title	Periodical	Reason for Exclusion
Atroshi,I.; Johnsson,R.; Ornstein,E.	1997	Endoscopic carpal tunnel release: prospective assessment of 255 consecutive cases	J Hand Surg Br	Insufficient data (results not stratified by anaesthetic type))
Atroshi,I.; Lyren,P.E.; Gummesson,C.	2009	The 6-item CTS symptoms scale: a brief outcomes measure for carpal tunnel syndrome	Qual.Life Res.	Insufficient data (no post-op findings)
Atroshi,I.; Lyren,P.E.; Ornstein,E.; Gummesson,C.	2011	The six-item CTS symptoms scale and palmar pain scale in carpal tunnel syndrome	J Hand Surg Am	very low quality
Atterbury,M.R.; Limke,J.C.; Lemasters,G.K.; Li,Y.; Forrester,C.; Stinson,R.; Applegate,H.	1996	Nested case-control study of hand and wrist work-related musculoskeletal disorders in carpenters	Am J Ind.Med	not exclusive to CTS
Aulicino,P.L.	1990	Neurovascular injuries in the hands of athletes	Hand Clin.	Background information
Aurora,S.K.; Ahmad,B.K.; Aurora,T.K.	1998	Silent period abnormalities in carpal tunnel syndrome	Muscle Nerve	+Does not answer a question of interest; very low study design
Austad,W.R.	1968	The carpal tunnel syndrome	Med Times	background
Awada,A.A.; Bashi,S.A.; Aljumah,M.A.; Heffernan,L.P.	2000	Carpal Tunnel Syndrome in type 2 diabetic patients	Neurosciences (Riyadh.)	Not relevant, prevalence study
Aydin,G.; Keles,I.; Ozbudak,Demir S.; Baysal,A.I.	2004	Sensitivity of median sensory nerve conduction tests in digital branches for the diagnosis of carpal tunnel syndrome	Am J Phys Med Rehabil.	insufficient data; very low study design
Aydin,K.; Cokluk,C.; Piskin,A.; Kocabicak,E.	2007	Ultrasonographically checking the sectioning of the transverse carpal ligament during carpal tunnel surgery with limited uni skin incisions	Turk Neurosurg.	Does not address question of interest
Ayeni,O.; Thoma,A.; Haines,T.; Sprague,S.	2005	Analysis of reporting return to work in studies comparing open with endoscopic carpal tunnel release: A review of randomized controlled trials	Can J Plast.Surg	systematic review
Aygül,R.; Ulvi,H.; Karatay,S.; Deniz,O.; Varoglu,A.O.	2005	Determination of sensitive electrophysiologic parameters at follow-up of different steroid treatments of carpal tunnel syndrome	Journal of clinical neurophysiology : official publication of the American Electroencephalographic Society	Duplicate article (duplicate with AAOS ID 676)

Authors	Year	Article Title	Periodical	Reason for Exclusion
Aygul,R.; Ulvi,H.; Kotan,D.; Kuyucu,M.; Demir,R.	2009	Sensitivities of conventional and new electrophysiological techniques in carpal tunnel syndrome and their relationship to body mass index	J Brachial.Plex.Peripher.Nerve Inj.	this is more of a diagnostic study of NCS parameters, but for diagnostic it would be very low quality due to spectrum bias. for BMI this would be not best available evidence
Ayhan-Ardic,F.F.; Erdem,H.R.	2000	Long-term clinical and electrophysiological results of local steroid injection in patients with carpal tunnel syndrome	Funct.Neurol	Very Low Quality
Ayhan-Ardic,F.F.; Erdem,H.R.; Karaoglan,B.; Yorgancioglu,Z.R.; Ayhan,O.	1997	Short term results of local steroid injection in carpal tunnel syndrome	Turkish Journal of Medical Sciences	Very Low Quality
Azadeh,H.; Dehghani,M.; Zarezadeh,A.	2010	Incidence of trapezius myofascial trigger points in patients with the possible carpal tunnel syndrome	J Res.Med Sci	+Does not answer a question of interest
Azami,A.; Maleki,N.; Anari,H.; Iranparvar,Alamdari M.; Kalantarhormozi,M.; Tavosi,Z.	2014	The diagnostic value of ultrasound compared with nerve conduction velocity in carpal tunnel syndrome	International Journal of Rheumatic Diseases	insufficient data; very low study design
Azmy,R.M.; Labib,A.A.; Elkholy,S.H.	2013	Axonal degeneration of the ulnar nerve secondary to carpal tunnel syndrome: Fact or fiction?	Neural Regeneration Research	+Does not answer a question of interest
Babu,S.R.; Britton,J.M.	1994	The role of steroid injection in the management of carpal tunnel syndrome	Journal of Orthopaedic Rheumatology	Very Low Quality
Backhouse,K.M.; Kay,A.	1969	Carpal-tunnel syndrome		letter
Badalamente,M.; Coffelt,L.; Elfar,J.; Gaston,G.; Hammert,W.; Huang,J.; Lattanza,L.; MacDermid,J.; Merrell,G.; Netscher,D.; Panthaki,Z.; Rafijah,G.; Trezinski,D.; Graham,B.	2013	Measurement scales in clinical research of the upper extremity, part 2: Outcome measures in studies of the hand/wrist and shoulder/elbow	Journal of Hand Surgery	background information

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Badarny,S.; Rawashdeh,H.; Meer,J.; Abed,S.; Habib,G.	2011	Repeated electrophysiologic studies in patients with carpal tunnel syndrome following local corticosteroid injection using a novel approach	Isr.Med Assoc J	Very Low Quality
Bader,A.M.	1999	Neurologic and neuromuscular disease in the obstetric patient	Problems in Anesthesia	Background article
Bagatur,A.E.; Zorer,G.	2001	The carpal tunnel syndrome is a bilateral disorder	J Bone Joint Surg Br	all confirmed CTS cases; no comparison groups
Baguneid,M.S.; Sochart,D.H.; Dunlop,D.; Kenny,N.W.	1997	Carpal tunnel decompression under local anaesthetic and tourniquet control	J Hand Surg Br	Survey study
Bahou,Y.G.	2002	Carpal tunnel syndrome: a series observed at Jordan University Hospital (JUH), June 1999-December 2000	Clin Neurol Neurosurg.	records review
Bahrami,M.H.; Rayegani,S.M.; Fereidouni,M.; Baghbani,M.	2005	Prevalence and severity of carpal tunnel syndrome (CTS) during pregnancy	Electromyogr.Clin Neurophysiol.	Does not address question of interest
Bak,L.; Bak,S.; Gaster,P.; Mathiesen,F.; Ellemann,K.; Bertheussen,K.; Zeeberg,I.	1997	MR imaging of the wrist in carpal tunnel syndrome	Acta Radiol.	insufficient data
Baker,E.L.; Ehrenberg,R.L.	1990	Preventing the work-related carpal tunnel syndrome: physician reporting and diagnostic criteria	Ann.Intern.Med	review
Baker,N.A.; Livengood,H.M.	2014	Symptom severity and conservative treatment for carpal tunnel syndrome in association with eventual carpal tunnel release	J Hand Surg Am	Does not address question of interest
Baker,R.H.; Gill,K.; Davey,P.A.	2008	A simple way to reduce neurovascular complications in open carpal tunnel decompression	Plast.Reconstr.Surg	Narrative review
Bakhsh,H.; Ibrahim,I.; Khan,W.; Smitham,P.; Goddard,N.	2012	Assessment of validity, reliability, responsiveness and bias of three commonly used patient-reported outcome measures in carpal tunnel syndrome	Ortop.Traumatol.Rehabil.	very low quality
Balakrishnan,C.; Mussman,J.L.; Balakrishnan,A.; Khalil,A.J.	2009	Acute carpal tunnel syndrome from burns of the hand and wrist	Can J Plast.Surg	case report

Authors	Year	Article Title	Periodical	Reason for Exclusion
Balci,K.; Utku,U.	2007	Carpal tunnel syndrome and metabolic syndrome	Acta Neurol Scand.	all CTS cases; no comparison group
Ball,C.; Pearse,M.; Kennedy,D.; Hall,A.; Nanchahal,J.	2011	Validation of a one-stop carpal tunnel clinic including nerve conduction studies and hand therapy	Ann.R Coll Surg Engl.	very low quality
Bande,S.; De,Smet L.; Fabry,G.	1994	The results of carpal tunnel release: open versus endoscopic technique	J Hand Surg Br	very low quality
Bandinelli,F.; Kaloudi,O.; Candelieri,A.; Conforti,M.L.; Casale,R.; Cammarata,S.; Grassiri,G.; Miniati,I.; Melchiorre,D.; Matucci-Cerinic,M.	2010	Early detection of median nerve syndrome at the carpal tunnel with high-resolution 18 MHz ultrasonography in systemic sclerosis patients	Clin Exp.Rheumatol.	Does not answer a question of interest; no CTS development
Banerjee,T.; Meagher,J.N.	1974	Carpal desmotomy: a technical note	N.C Med J	Background article
Banta,C.A.	1994	A prospective, nonrandomized study of iontophoresis, wrist splinting, and antiinflammatory medication in the treatment of early-mild carpal tunnel syndrome	J Occup.Med	Very Low Quality
Barbosa,R.I.; da Silva Rodrigues,E.K.; Tamanini,G.; Marcolino,A.M.; Elui,V.M.; de Jesus Guirro,R.R.; Mazzer,N.; de Cassia Registro,Fonseca M.	2012	Effectiveness of low-level laser therapy for patients with carpal tunnel syndrome: design of a randomized single-blinded controlled trial	BMC Musculoskelet.Disord.	Review
Barcenilla,A.; March,L.; Chen,J.; Sambrook,P.	2011	Carpal tunnel syndrome and its relationship to occupation: A meta-analysis	Internal Medicine Journal	meta-analysis
Barcenilla,A.; March,L.M.; Chen,J.S.; Sambrook,P.N.	2012	Carpal tunnel syndrome and its relationship to occupation: a meta-analysis	Rheumatology (Oxford)	meta-analysis
Barnes,D.E.	1992	MRI's role uncertain in carpal tunnel syndrome	Diagn.Imaging (San.Franc.)	Commentary/review
Barnes,L.; Rodnan,G.P.; Medsger,T.A.; Short,D.	1979	Eosinophilic fasciitis. A pathologic study of twenty cases	Am J Pathol.	Not relevant to CTS
Barnhart,S.; Daniell,W.	1988	Occupational medicine: carpal tunnel syndrome-a cumulative trauma disorder	West J Med	Background Information

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Barnhart,S.; Demers,P.A.; Miller,M.; Longstreth,W.T.,Jr.; Rosenstock,L.	1991	Carpal tunnel syndrome among ski manufacturing workers	Scand.J Work Environ.Health	Not relevant, prevalence study
Barrer,S.J.	1991	Gaining the upper hand on carpal tunnel syndrome	Occup.Health Saf	background
Bartkowiak,Z.; Zgorzalewicz-Stachowiak,M.; Nowicka,A.	2011	The effectiveness of particular physiotherapy techniques in the treatment of carpal tunnel syndrome - Application of low-level laser therapy based on a review of the literature	Fizjoterapia	literature review
Bastian,F.O.	1974	Amyloidosis and the carpal tunnel syndrome	Am J Clin Pathol.	biopsy study
Batteson,R.; Hammond,A.; Burke,F.; Sinha,S.	2008	The de Quervain's screening tool: validity and reliability of a measure to support clinical diagnosis and management	Musculoskeletal Care	not exclusive to CTS
Batur Caglayan,H.Z.; Nazliel,B.; Irkec,C.	2013	Nerve conduction velocities in hyperlipidemic patients	Neuroendocrinology Letters	not relevant; CTS patients excluded
Bauer,M.E.	1985	Carpal tunnel syndrome. An occupational risk to the dental hygienist	Dent.Hyg.(Chic.)	Background Information
Bayrak,A.O.; Tilki,H.E.; Coskun,M.	2007	Sympathetic skin response and axon count in carpal tunnel syndrome	J Clin Neurophysiol.	insufficient data; very low study design
Bayrak,I.K.; Bayrak,A.O.; Tilki,H.E.; Nural,M.S.; Sunter,T.	2007	Ultrasonography in carpal tunnel syndrome: comparison with electrophysiological stage and motor unit number estimate	Muscle Nerve	insufficient data; very low study design
Bear-Lehman,J.	1997	Upper extremity cumulative trauma disorder and return to work assessment	Work	Background Information
Beck,J.D.; Jones,R.B.; Malone,W.J.; Heimbach,J.L.; Ebbitt,T.; Klana,J.C.	2013	Magnetic resonance imaging after endoscopic carpal tunnel release	J Hand Surg Am	Not relevant
Becker,S.J.; Makanji,H.S.; Ring,D.	2014	Changes in treatment plan for carpal tunnel syndrome based on electrodiagnostic test results	J Hand Surg Eur.Vol.	Does not answer a question of interest
Becker,S.J.; Makanji,H.S.; Ring,D.	2012	Expected and actual improvement of symptoms with carpal tunnel release	J Hand Surg Am	very low quality

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Becton,J.L.	1969	Carpal tunnel syndrome--diagnosis and management	J Med Assoc Ga	background
Beekman,R.; Visser,L.H.	2004	High-resolution sonography of the peripheral nervous system -- a review of the literature	Eur.J Neurol	literature review
Beekman,R.; Visser,L.H.	2003	Sonography in the diagnosis of carpal tunnel syndrome: a critical review of the literature	Muscle Nerve	literature review
Beer,T.C.; Memon,N.	1976	Letter: Carpal tunnel syndrome and tennis elbow	Br Med J	letter
Bekkelund,S.I.; Torbergsen,T.; Rom,A.K.; Mellgren,S.I.	2001	Increased risk of median nerve dysfunction in floor cleaners: a controlled clinical and neurophysiological study	Scand.J Plast.Reconstr.Surg Hand Surg	Not relevant, CTS diagnosis not made
Bell,D.S.H.; Clements,Jr	1983	Reversal of the carpal tunnel syndrome after change of insulin injection sites		Case report
Bell-Krotoski,J.	1994	'Pocket filaments' and specifications for the Semmes-Weinstein monofilaments	Star	review; background information
Belsole,R.J.; Greeley,J.M.	1988	Surgeon's acute carpal tunnel syndrome: an occupational hazard?	J Fla Med Assoc	case report
Beltran,J.; Rosenberg,Z.S.	1994	Diagnosis of compressive and entrapment neuropathies of the upper extremity: Value of MR imaging	Am.J.Roentgenol.	Background Information
Bendler,E.M.; Greenspun,B.; Yu,J.; Erdman,W.J.	1977	The bilaterality of carpal tunnel syndrome	Arch Phys Med Rehabil.	records review
Benson,L.S.; Bare,A.A.; Nagle,D.J.; Harder,V.S.; Williams,C.S.; Visotsky,J.L.	2006	Complications of endoscopic and open carpal tunnel release		systematic review
Berger,M.; Vermeulen,M.; Koelman,J.H.; van Schaik,I.N.; Roos,Y.B.	2013	The long-term follow-up of treatment with corticosteroid injections in patients with carpal tunnel syndrome. When are multiple injections indicated?	J Hand Surg Eur.Vol.	Very Low Quality
Berger,M.R.; Froimson,A.I.	1979	Hands that hurt: carpal tunnel syndrome	Am J Nurs.	not relevant
Bergfield,T.G.; Aulicino,P.L.; DePuy,T.E.	1983	The carpal tunnel syndrome	Orthop.Rev.	background

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Bernaards,C.M.; Ariens,G.A.; Hildebrandt,V.H.	2006	The (cost-)effectiveness of a lifestyle physical activity intervention in addition to a work style intervention on the recovery from neck and upper limb symptoms in computer workers	BMC Musculoskelet.Disord.	Not relevant
Bernard,J.M.; Macaire,P.	1997	Dose-range effects of clonidine added to lidocaine for brachial plexus block		Insufficient data (Mean scores to relevant outcomes not reported)
Bernard,M.L.	1979	Carpal tunnel syndrome: identification and control	Occup.Health Nurs.	background
Bernstein,R.A.	1994	Endoscopic carpal tunnel release	Conn.Med	Narrative review
Bessette,L.; Keller,R.B.; Lew,R.A.; Simmons,B.P.; Fossel,A.H.; Mooney,N.; Katz,J.N.	1997	Prognostic value of a hand symptom diagram in surgery for carpal tunnel syndrome	J Rheumatol.	very low strength of evidence
Bessette,L.; Sangha,O.; Kuntz,K.M.; Keller,R.B.; Lew,R.A.; Fossel,A.H.; Katz,J.N.	1998	Comparative responsiveness of generic versus disease-specific and weighted versus unweighted health status measures in carpal tunnel syndrome	Med Care	+Does not answer a question of interest
Bhala,R.P.; Thoppil,E.	1981	Early detection of carpal tunnel syndrome by sensory nerve conduction	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Bhatia,R.; Field,J.; Grote,J.; Huma,H.	2000	Does splintage help pain after carpal tunnel release?	J Hand Surg Br	Insufficient data (conference poster)
Bhattacharya,R.; Birdsall,P.D.; Finn,P.; Stothard,J.	2004	A randomized controlled trial of knifelight and open carpal tunnel release	J Hand Surg Br	Does not meet inclusion criteria (invasive follow-up<3 month)
Bialosky,J.E.; Bishop,M.D.; Price,D.D.; Robinson,M.E.; Vincent,K.R.; George,S.Z.	2009	A randomized sham-controlled trial of a neurodynamic technique in the treatment of carpal tunnel syndrome	J Orthop Sports Phys Ther	Manuscript
Bialosky,J.E.; Bishop,M.D.; Robinson,M.E.; Price,D.D.; George,S.Z.	2011	Heightened pain sensitivity in individuals with signs and symptoms of carpal tunnel syndrome and the relationship to clinical outcomes following a manual therapy intervention	Man.Ther	Manuscript
Bianchi,S.; Martinoli,C.; Abdelwahab,I.F.	1999	High-frequency ultrasound examination of the wrist and hand	Skeletal Radiol.	Background Information

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Bianchi,S.; Montet,X.; Martinoli,C.; Bonvin,F.; Fasel,J.	2004	High-resolution sonography of compressive neuropathies of the wrist	J.Clin.Ultrasound	Background Information; review
Bidwai,A.S.; Benjamin-Laing,H.E.; Shaw,D.A.; Iqbal,S.; Jones,W.A.; Brown,D.J.	2013	Patient satisfaction with tourniquet application and local anaesthesia infiltration in carpal tunnel decompression and the relationship with overall satisfaction	J Plast.Surg Hand Surg	Very low quality
Bienek,T.; Kusz,D.; Cielinski,L.	2006	Peripheral nerve compression neuropathy after fractures of the distal radius	J Hand Surg Br	insufficient data; no comparison group
Bigat,Z.; Boztug,N.; Hadimioglu,N.; Cete,N.; Coskunfirat,N.; Ertok,E.	2006	Does dexamethasone improve the quality of intravenous regional anesthesia and analgesia? A randomized, controlled clinical study	Anesth.Analg.	Deemed clinically irrelevant
Bigat,Z.; Karsli,B.; Boztug,N.; Cete,N.; Ertok,E.	2005	Comparison of the effect of low-dose ropivacaine and lidocaine in intravenous regional anaesthesia: A randomised, double-blind clinical study	Clinical Drug Investigation	Deemed clinically irrelevant
Biondi,R.	1997	Practice standards, guidelines and options for Carpal Tunnel Syndrome: Usefulness and limitations	Europa Medicophysica	systematic review
Birkbeck,M.Q.; Beer,T.C.	1975	Occupation in relation to the carpal tunnel syndrome	Rheumatol.Rehabil.	+not best available evidence; confounding comorbidities
Bischoff,C.; Isenberg,C.; Conrad,B.	1991	Lack of hyperlipidemia in carpal tunnel syndrome	Eur.Neurol	insufficient data; very low study design
Biyani,A.; Downes,E.M.	1993	An open twin incision technique of carpal tunnel decompression with reduced incidence of scar tenderness	J Hand Surg Br	very low quality
Blair,S.J.	1988	Avoiding complications of surgery for nerve compression syndromes	Orthop Clin North Am	Background article
Blanc,P.D.; Faucett,J.; Kennedy,J.J.; Cisternas,M.; Yelin,E.	1996	Self-reported carpal tunnel syndrome: predictors of work disability from the National Health Interview Survey Occupational Health Supplement	Am J Ind.Med	very low quality

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Bland,J.D.	2001	Do nerve conduction studies predict the outcome of carpal tunnel decompression?	Muscle Nerve	Retrospective case series
Bland,J.D.	2000	A neurophysiological grading scale for carpal tunnel syndrome	Muscle Nerve	report
Bland,J.D.P.; Rudolfer,S.M.	2014	Ultrasound imaging of the median nerve as a prognostic factor for carpal tunnel decompression	Muscle Nerve	Very low strength
Bleecker,M.L.	1986	Vibration perception thresholds in entrapment and toxic neuropathies	J Occup.Med	review; background information
Bleecker,M.L.; Agnew,J.	1987	New techniques for the diagnosis of carpal tunnel syndrome	Scand.J Work Environ.Health	Background Information
Bloem,J.J.; Pradjarahardja,M.C.; Vuursteen,P.J.	1986	The post-carpal tunnel syndrome. Causes and prevention	Neth.J Surg	Retrospective case series
Blumberg,A.; Burgi,W.	1987	Behavior of beta 2-microglobulin in patients with chronic renal failure undergoing hemodialysis, hemodiafiltration and continuous ambulatory peritoneal dialysis (CAPD)	Clin Nephrol.	Not relevant to CTS
Bodavula,V.K.; Burke,F.D.; Dubin,N.H.; Bradley,M.J.; Wilgis,E.F.	2007	A prospective, longitudinal outcome study of patients with carpal tunnel surgery and the relationship of body mass index	Hand (N.Y)	+Does not answer a question of interest
Boden,B.P.; Kozin,S.H.; Berlet,A.C.	1995	Wrist arthroscopy	Am.J.Orthop.	Background article
Bodofsky,E.B.	2003	A mathematical model for peripheral nerve conduction velocity	Electromyogr.Clin Neurophysiol.	+Does not answer a question of interest; not best available evidence
Bodofsky,E.B.; Campellone,J.V.; Wu,K.D.; Greenberg,W.M.	2004	Age and the severity of carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Bodofsky,E.B.; Greenberg,W.M.; Wu,K.D.	2001	Median nerve compression at the wrist: is it ever unilateral?	Electromyogr.Clin Neurophysiol.	Does not answer a question of interest; insufficient data

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Bodofsky,E.B.; Wu,K.D.; Campellone,J.V.; Greenberg,W.M.; Tomaiolo,A.C.	2005	A sensitive new median-ulnar technique for diagnosing mild Carpal Tunnel Syndrome	Electromyogr.Clin Neurophysiol.	+not best available evidence; very low study design
Boeckstyns,M.E.; Sorensen,A.I.	1999	Does endoscopic carpal tunnel release have a higher rate of complications than open carpal tunnel release? An analysis of published series	J Hand Surg Br	Systematic review
Boggins-Magill,M.K.	1994	Carpal tunnel release: scoping out the carpal tunnel	Today's OR Nurse	Background article
Bogner,R.H.; Banga,A.K.	1994	Iontophoresis and phonophoresis	U.S.Pharmacist	Background information
Boland,R.A.; Adams,R.D.	2002	Vascular factors in carpal tunnel syndrome	J Hand Ther	+Does not answer a question of interest
Bonebrake,A.R.	1994	A treatment for carpal tunnel syndrome: results of follow-up study	J Manipulative Physiol Ther	Letter
Bonebrake,A.R.; Fernandez,J.E.; Marley,R.J.; Dahalan,J.B.; Kilmer,K.J.	1990	A treatment for carpal tunnel syndrome: evaluation of objective and subjective measures	J Manipulative Physiol Ther	+not best available evidence
Bonel,H.M.; Heuck,A.; Frei,K.A.; Herrmann,K.; Scheidler,J.; Srivastav,S.; Reiser,M.	2001	Carpal tunnel syndrome: assessment by turbo spin echo, spin echo, and magnetization transfer imaging applied in a low-field MR system	J Comput.Assist.Tomogr.	insufficient data; very low study design
Bonfiglioli,R.; Botter,A.; Calabrese,M.; Mussoni,P.; Violante,F.S.; Merletti,R.	2012	Surface electromyography features in manual workers affected by carpal tunnel syndrome	Muscle Nerve	+Does not answer a question of interest
Boninger,M.L.; Cooper,R.A.; Baldwin,M.A.; Shimada,S.D.; Koontz,A.	1999	Wheelchair pushrim kinetics: body weight and median nerve function	Arch Phys Med Rehabil.	biomechanical case series
Boogaarts,H.D.; Verbeek,A.L.; Bartels,R.H.	2010	Surgery for carpal tunnel syndrome under antiplatelet therapy	Clin Neurol Neurosurg.	
Boonyapisit,K.; Katirji,B.; Shapiro,B.E.; Preston,D.C.	2002	Lumbrical and interosseus recording in severe carpal tunnel syndrome	Muscle Nerve	no comparison group; very low study design
Booth-Jones,A.D.; Lemasters,G.K.; Succop,P.; Atterbury,M.R.; Bhattacharya,A.	1998	Reliability of questionnaire information measuring musculoskeletal symptoms and work histories	Am.Ind.Hyg.Assoc.J.	not exclusive to CTS; does not answer a question of interest

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Bora,Jr; Osterman,A.L.; Zielinski,C.J.	1984	Osteotomy of the distal radius with a biplanar iliac bone graft for malunion	Bull.Hosp.Jt.Dis.Orthop.Inst.	Incorrect patient population (does not include CTS patients)
Borg,K.; Lindblom,U.	1988	Diagnostic value of quantitative sensory testing (QST) in carpal tunnel syndrome	Acta Neurol Scand.	insufficient data; very low study design
Borg,K.; Lindblom,U.	1986	Increase of vibration threshold during wrist flexion in patients with carpal tunnel syndrome		not best available evidence; very low study design
Borg,K.; Lindblom,U.	1984	Provoked changes in vibratory perception threshold versus stationary impairment of sensibility in carpal tunnel syndrom	Acta Neurol.Scand.	+not best available evidence
Borgman,M.F.	1978	Carpal tunnel syndrome	Nurse Pract.	background
Borisch,N.; Haussmann,P.	2003	Neurophysiological recovery after open carpal tunnel decompression: comparison of simple decompression and decompression with epineurotomy	J Hand Surg Br	No patient oriented outcomes or clinical outcomes of interest reported.
Boshes,B.; Brumlik,J.; Blonsky,E.R.	1968	Clinical neurology	Prog.Neurol Psychiatry	book chapter
Bostrom,L.; Gothe,C.J.; Hansson,S.; Lugnégard,H.; Nilsson,B. Y.	1994	Surgical treatment of carpal tunnel syndrome in patients exposed to vibration from handheld tools	Scand.J Plast.Reconstr.Surg Hand Surg	the outcome is successful response after CTS surgery
Bouaziz,H.; Kinirons,B.P.; Macalou,D.; Heck,M.; Dap,F.; Benhamou,D.; Laxenaire,M.C.	2000	Sufentanil does not prolong the duration of analgesia in a mepivacaine brachial plexus block: a dose response study	Anesth.Analg.	Deemed clinically irrelevant
Bourke,H.E.; Read,J.; Kampa,R.; Hearnden,A.; Davey,P.A.	2011	Clinic-based nerve conduction studies reduce time to surgery and are cost effective: a comparison with formal electrophysiological testing	Ann.R Coll Surg Engl.	+Does not answer a question of interest
Bovenzi,M.	1994	Hand-arm vibration syndrome and dose-response relation for vibration induced white finger among quarry drillers and stonecarvers. Italian Study Group on Physical Hazards in the Stone Industry	Occup.Environ.Med	Not exclusive to CTS; not sufficient number of CTS diagnoses

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Bovenzi,M.; Della,Vedova A.; Nataletti,P.; Alessandrini,B.; Poian,T.	2005	Work-related disorders of the upper limb in female workers using orbital sanders	Int.Arch Occup.Environ.Health	very low quality
Bovenzi,M.; Giannini,F.; Rossi,S.	2000	Vibration-induced multifocal neuropathy in forestry workers: electrophysiological findings in relation to vibration exposure and finger circulation	Int.Arch Occup.Environ.Health	<10 patients per group; not exclusive to CTS
Bovenzi,M.; Zadini,A.; Franzinelli,A.; Borgogni,F.	1991	Occupational musculoskeletal disorders in the neck and upper limbs of forestry workers exposed to hand-arm vibration		Not relevant, prevalence study
Bowens,B.A.	1981	Carpal tunnel syndrome	J Neurosurg.Nurs.	background
Bowie,E.A.; Brimer,K.M.; Kidder,M.S.; Wallis,M.L.; Darr,N.S.; Halle,J.S.; Greathouse,D.G.	2000	Median and ulnar nerve conduction studies in young adult violinists	Medical Problems of Performing Artists	Not relevant, CTS diagnosis not made
Boya,H.; Ozcan,O.; Oztekin,H.H.	2008	Long-term complications of open carpal tunnel release	Muscle Nerve	Retrospective case series
Boyer,K.; Wies,J.; Turkelson,C.M.	2009	Effects of bias on the results of diagnostic studies of carpal tunnel syndrome	J Hand Surg Am	systematic review
Boyer,M.I.	2008	Corticosteroid injection for carpal tunnel syndrome	J Hand Surg Am	Narrative review
Braddom,R.L.; Johnson,E.W.; Trzebiatowski,G.	1974	Curriculum objectives in rehabilitation medicine: Results of a survey	Arch Phys Med Rehabil.	not relevant
Brahme,S.K.; Hodler,J.; Braun,R.M.; Sebrechts,C.; Jackson,W.; Resnick,D.	1997	Dynamic MR imaging of carpal tunnel syndrome	Skeletal Radiol.	insufficient data; very low study design
Braithwaite,B.D.; Robinson,G.J.; Burge,P.D.	1993	Haemostasis during carpal tunnel release under local anaesthesia: a controlled comparison of a tourniquet and adrenaline infiltration	J Hand Surg Br	Very low quality
Brannegan,R.; Bartt,R.	2007	Second lumbrical muscle recordings improve localization in severe carpal tunnel syndrome	Arch Phys Med Rehabil.	no comparison group or reference standard

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Brantingham,J.W.; Cassa,T.K.; Bonnefin,D.; Pribicevic,M.; Robb,A.; Pollard,H.; Tong,V.; Korporaal,C.	2013	Manipulative and multimodal therapy for upper extremity and temporomandibular disorders: a systematic review	J Manipulative Physiol Ther	systematic review
Braun,R.M.; Davidson,K.; Doehr,S.	1989	Provocative testing in the diagnosis of dynamic carpal tunnel syndrome	J Hand Surg Am	+Does not answer a question of interest
Braun,R.M.; Jackson,W.J.	1994	Electrical studies as a prognostic factor in the surgical treatment of carpal tunnel syndrome	J Hand Surg Am	very low quality
Bravaccio,F.; Trabucco,M.; Ammendola,A.; Cantore,R.	1990	Carpal tunnel syndrome: a clinical electrophysiological study of 84 cases	Neurophysiol.Clin	all CTS cases; no comparison group
Breuer,B.; Sperber,K.; Wallenstein,S.; Kiproviski,K.; Calapa,A.; Snow,B.; Pappagallo,M.	2006	Clinically significant placebo analgesic response in a pilot trial of botulinum B in patients with hand pain and carpal tunnel syndrome	Pain Med	Very Low Quality
Brezinova,V.	1988	Cutaneomuscular reflex in a peripheral nerve lesion	Electromyogr.Clin.Neurophysiol.	insufficient data; very low study design
Brick,J.E.; Brick,J.F.; Elnicki,D.M.	1991	Musculoskeletal disorders. When are they caused by hormone imbalance?	Postgrad.Med	review; background information
Bridges,M.J.; Robertson,D.C.; Chuck,A.J.	2011	Predicting the result of nerve conduction tests in carpal tunnel syndrome using a questionnaire	Hand Surg	insufficient data; does not answer question of interest
Briemberg,H.R.	2007	Neuromuscular diseases in pregnancy	Semin.Neurol.	background
Bril,V.; Fuglsang-Frederiksen,A.	1984	Number of potential reversals (turns) and amplitude of the pattern of electrical activity of the abductor pollicis brevis muscle in patients with neurogenic diseases	Acta Neurol Scand.	not exclusive to CTS; very low study design
Brismar,T.	1985	Changes in electrical threshold in human peripheral neuropathy	J Neurol Sci	<10 patients per group
Brismar,T.; Ekenvall,L.	1992	Nerve conduction in the hands of vibration exposed workers	Electroencephalogr.Clin Neurophysiol.	Not relevant
Britz,G.W.; Haynor,D.R.; Kuntz,C.; Goodkin,R.; Gitter,A.; Kliot,M.	1995	Carpal tunnel syndrome: correlation of magnetic resonance imaging, clinical, electrodiagnostic, and intraoperative findings		insufficient data; very low study design

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Bromberg,M.B.; Albers,J.W.	1993	Patterns of sensory nerve conduction abnormalities in demyelinating and axonal peripheral nerve disorders	Muscle Nerve	Not relevant to CTS
Bronson,J.; Beck,J.; Gillet,J.	1997	Provocative motor nerve conduction testing in presumptive carpal tunnel syndrome unconfirmed by traditional electrodiagnostic testing	J Hand Surg Am	+Does not answer a question of interest; very low study design
Brown,F.E.; Morgan,G.J.,Jr.; Taylor,T.; O'Connor,G.T.	1984	Coexistence of muscle anomalies and rheumatoid arthritis in patients with carpal tunnel syndrome	Clin Exp.Rheumatol.	case reports
Brown,M.G.; Keyser,B.; Rothenberg,E.S.	1992	Endoscopic carpal tunnel release	J Hand Surg Am	very low quality
Brown,M.G.; Rothenberg,E.S.; Keyser,B.; Woloszyn,T.T.; Wolford,A.	1993	Results of 1236 endoscopic carpal tunnel release procedures using the Brown technique	Contemp Orthop	no control group
Brown,M.J.; Baringer,J.R.	1994	Differentiating the diabetic neuropathies	Hosp.Pract.	Case reports
Brown,R.A.; Gelberman,R.H.; Seiler,J.G.,III; Abrahamsson,S.O.; Weiland,A.J.; Urbaniak,J.R.; Schoenfeld,D.A.; Furcolo,D.	1993	Carpal tunnel release. A prospective, randomized assessment of open and endoscopic methods	J Bone Joint Surg Am	Does not meet inclusion criteria (invasive follow-up<3 month)
Brown,W.F.; Feasby,T.E.	1974	Estimates of functional motor axon loss in diabetics	J.Neurol.Sci.	not exclusive to CTS; does not answer a question of interest
Brown,W.F.; Ferguson,G.G.; Jones,M.W.; Yates,S.K.	1976	The location of conduction abnormalities in human entrapment neuropathies	Can J Neurol Sci	+Does not answer a question of interest; insufficient data
Browne,D.L.; McCrae,F.C.; Shaw,K.M.	2001	Musculoskeletal disease in diabetes	Practical Diabetes International	review
Browne,E.Z.,Jr.; Snyder,C.C.	1975	Carpal tunnel syndrome caused by hand injuries	Plast.Reconstr.Surg	insufficient data; no comparison group
Brumfield,Jr	1983	Carpal tunnel syndrome in rheumatoid arthritis	Orthop.Rev.	Retrospective case series
Bruner,J.M.	1973	Surgical exposure of flexor tendons in the hand	Ann.R Coll Surg Engl.	Commentary

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Bruser,P.; Richter,M.; Larkin,G.; Lefering,R.	1999	The operative treatment of carpal tunnel syndrome and its relevance to endoscopic release	European Journal of Plastic Surgery	Does not meet inclusion criteria (invasive follow-up<3 month)
Bruske,J.; Bednarski,M.; Grzelec,H.; Zyluk,A.	2002	The usefulness of the Phalen test and the Hoffmann-Tinel sign in the diagnosis of carpal tunnel syndrome	Acta Orthop Belg.	insufficient data; very low study design
Bryar,G.E.	1984	Multiple nerve entrapments associated with carpal tunnel syndrome. A four year prospective study of 97 surgically treated patients	Int.Angiol.	Does not address question of interest
Buchan,S.; Amirfeyz,R.	2013	Cochrane corner: ergonomic positioning or equipment for treating carpal tunnel syndrome	J Hand Surg Eur.Vol.	systematic review
Buchberger,W.; Judmaier,W.; Birbamer,G.; Lener,M.; Schmidauer,C.	1992	Carpal tunnel syndrome: diagnosis with high-resolution sonography	AJR Am J Roentgenol.	insufficient data; very low study design
Buchberger,W.; Schon,G.; Strasser,K.; Jungwirth,W.	1991	High-resolution ultrasonography of the carpal tunnel	J Ultrasound Med	insufficient data; very low study design
Buch-Jaeger,N.; Foucher,G.	1994	Correlation of clinical signs with nerve conduction tests in the diagnosis of carpal tunnel syndrome	J Hand Surg Br	not best available evidence
Buchthal,F.; Rosenfalck,A.	1971	Sensory conduction from digit to palm and from palm to wrist in the carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	very low study design; <10 patients per group
Buchthal,F.; Rosenfalck,A.; Trojaborg,W.	1974	Electrophysiological findings in entrapment of the median nerve at wrist and elbow	J Neurol Neurosurg.Psychiatry	no comparison of modalities; very low study design
Buckle,P.W.	1997	Work factors and upper limb disorders	Br.Med.J.	clinical review
Bulut,H.T.; Yildirim,A.; Ekmekci,B.; Gunbey,H.P.	2014	The diagnostic and grading value of diffusion tensor imaging in patients with carpal tunnel syndrome	Acad Radiol	case control; CTS and healthy
Burg,E.W.; Bathala,L.; Visser,L.H.	2013	Difference in normal values of median nerve cross sectional area between Dutch and Indian subjects	Muscle Nerve	only healthy study subjects

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Burke,D.T.; Burke,M.A.; Bell,R.; Stewart,G.W.; Mehdi,R.S.; Kim,H.J.	1999	Subjective swelling: a new sign for carpal tunnel syndrome	Am J Phys Med Rehabil.	not best available evidence
Burke,F.D.; Ellis,J.; McKenna,H.; Bradley,M.J.	2003	Primary care management of carpal tunnel syndrome	Postgrad.Med J	Background article
Burke,F.D.; Hasham,S.	2005	The management of carpal tunnel syndrome	Minerva Ortopedica e Traumatologica	background
Burke,F.D.; Wilgis,E.F.; Dubin,N.H.; Bradley,M.J.; Sinha,S.	2006	Relationship between the duration and severity of symptoms and the outcome of carpal tunnel surgery	J Hand Surg Am	Does not address question of interest
Burke,J.; Buchberger,D.J.; Carey-Loghmani,M.T.; Dougherty,P.E.; Greco,D.S.; Dishman,J.D.	2007	A pilot study comparing two manual therapy interventions for carpal tunnel syndrome	J Manipulative Physiol Ther	deemed clinically irrelevant
Burnet,S.; McNeil,J.	2001	Musculoskeletal disorders in diabetes mellitus	Medicine Today	Background Information
Burnham,R.S.; Burnham,T.R.	2009	Effect of hand warming on electrodiagnostic testing results and diagnosis in patients with suspected carpal tunnel syndrome	Arch Phys Med Rehabil.	+Does not answer a question of interest
Burt,S.	1991	Carpal tunnel syndrome among employees at a window hardware manufacturing plant. Health hazard evaluation series	AAOHN J	evaluation narrative
Burton,N.C.; MacDonald,L.; Estill,C.F.	1998	Ergonomic assessment of trimming jobs at a shoe manufacturing plant	Applied Occupational and Environmental Hygiene	not exclusive to CTS
Busch,M.; Schwenzky,A.; Franke,S.; Stein,G.; Wolf,G.	2012	Advanced glycation end products and beta(2)-microglobulin as predictors of carpal tunnel syndrome in hemodialysis patients	Blood Purif.	Not relevant, predictors of CTS in hemodialysis patients
Butterfield,P.G.	1997	Clinical and employment outcomes of carpal tunnel syndrome in oregon workers' compensation recipients	Journal of Occupational Rehabilitation	all CTS cases; no comparison group
Byers,C.M.; DeLisa,J.A.; Frankel,D.L.; Kraft,G.H.	1984	Pyridoxine metabolism in carpal tunnel syndrome with and without peripheral neuropathy	Arch Phys Med Rehabil.	<10 patients per group

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Caccia,M.R.; Galimberti,V.; Valla,P.L.; Salvaggio,A.; Dezuanni,E.; Mangoni,A.	1993	Peripheral autonomic involvement in the carpal tunnel syndrome	Acta Neurol Scand.	insufficient data; very low study design
Caetano,M.R.	2003	Axonal degeneration in association with carpal tunnel syndrome	Arq Neuropsiquiatr.	insufficient data; very low study design
Cai,D.F.	2010	Warm-needling plus Tuina relaxing for the treatment of carpal tunnel syndrome	J Tradit.Chin Med	Very Low Quality
Caliandro,P.; Giannini,F.; Pazzaglia,C.; Aprile,I.; Minciotti,I.; Granata,G.; Tonali,P.; Padua,L.	2010	A new clinical scale to grade the impairment of median nerve in carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; no comparison group
Cambi,V.; Nizzoli,M.; Paganelli,E.; David,S.; Bono,F.	1986	Danger of an unnecessarily prolonged dialysis session: carpal tunnel syndrome	Artif.Organs	not best available evidence; very low study design
Candelise,L.; Cantisani,T.A.; Celani,M.G.; Incorvaia,B.; Righetti,E.; Salinas,R.; Schoenhuber,R.; Altissimi,M.; Azzara,A.; Pecorelli,F.; Luchetti,R.; Padua,L.; Perticoni,G.; Ricci,S.	2004	Carpal tunnel syndrome: One flew over the surgeon's nest. The Cochrane Neurological Network	Journal of Orthopaedics and Traumatology	literature review
Cannon,L.J.; Bernacki,E.J.; Walter,S.D.	1981	Personal and occupational factors associated with carpal tunnel syndrome	J Occup.Med	very low quality
Cantatore,F.P.; Dell'Accio,F.; Lapadula,G.	1997	Carpal tunnel syndrome: a review	Clin Rheumatol.	background
Capasso,M.; Manzoli,C.; Uncini,A.	2009	Management of extreme carpal tunnel syndrome: evidence from a long-term follow-up study	Muscle Nerve	Retrospective case series
Capone,L.; Pentore,R.; Lunazzi,C.; Schonhuber,R.	1998	Pitfalls in using the ring finger test alone for the diagnosis of carpal tunnel syndrome	Ital.J Neurol Sci	no comparison group; very low study design
Cappellari,M.; Cavallaro,T.; Ferrarini,M.; Cabrini,I.; Taioli,F.; Ferrari,S.; Merlini,G.; Obici,L.; Briani,C.; Fabrizi,G.M.	2011	Variable presentations of TTR-related familial amyloid polyneuropathy in seventeen patients	J Peripher.Nerv.Syst.	Not relevant to CTS

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Carneiro,R.S.	1999	Carpal tunnel syndrome: the cause dictates the treatment	Cleve.Clin J Med	Background article
Carragee,E.J.; Hentz,V.R.	1988	Repetitive trauma and nerve compression	Orthop Clin North Am	background
Carroll,G.J.	1987	Comparison of median and radial nerve sensory latencies in the electrophysiological diagnosis of carpal tunnel syndrome	Electroencephalogr.Clin Neurophysiol.	insufficient data; no comparison of modalities
Carroll,M.P.; Montero,C.	1980	Rare anomalous muscle cause of carpal tunnel syndrome	Orthop.Rev.	case report
Carroll,R.E.; Hurst,L.C.	1982	The relationship of thoracic outlet syndrome and carpal tunnel syndrome	Clin Orthop Relat Res.	+Does not answer a question of interest
Carter,R.; Aspy,C.B.; Mold,J.	2002	The effectiveness of magnet therapy for treatment of wrist pain attributed to carpal tunnel syndrome	J Fam Pract.	Does not meet inclusion criteria (conservative treatment follow-up at <1 month)
Carter,T.; Jordan,R.; Cummins,C.	2000	Electrodiagnostic techniques in the pre-surgical assessment of patients with carpal tunnel syndrome (Structured abstract)	Health Technology Assessment Database	background info
Cartwright,M.S.; Hobson-Webb,L.D.; Boon,A.J.; Alter,K.E.; Hunt,C.H.; Flores,V.H.; Werner,R.A.; Shook,S.J.; Thomas,T.D.; Primack,S.J.; Walker,F.O.	2012	Evidence-based guideline: neuromuscular ultrasound for the diagnosis of carpal tunnel syndrome	Muscle Nerve	systematic review
Cartwright,M.S.; Walker,F.O.; Newman,J.C.; Arcury,T.A.; Mora,D.C.; Chen,H.; Quandt,S.A.	2014	Muscle Intrusion as a Potential Cause of Carpal Tunnel Syndrome	Muscle Nerve	very low strength
Cartwright,M.S.; White,D.L.; Demar,S.; Wiesler,E.R.; Sarlikiotis,T.; Chloros,G.D.; Yoon,J.S.; Won,S.J.; Molnar,J.A.; Defranzo,A.J.; Walker,F.O.	2011	Median nerve changes following steroid injection for carpal tunnel syndrome	Muscle Nerve	Very Low Quality

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Casale,R.; Damiani,C.; Maestri,R.; Wells,C.D.	2013	Pain and electrophysiological parameters are improved by combined 830-1064 high-intensity LASER in symptomatic carpal tunnel syndrome versus Transcutaneous Electrical Nerve Stimulation. A randomized controlled study	Eur.J Phys Rehabil.Med	Does not meet inclusion criteria (follow-up <1 month)
Case,W.S.	1995	Carpal tunnel syndrome: Relief for a common wrist problem	Physician and Sportsmedicine	background
Casey,E.B.; Le Quesne,P.M.	1972	Digital nerve action potentials in healthy subjects, and in carpal tunnel and diabetic patients	J Neurol Neurosurg.Psychiatry	no comparison of modalities; very low study design
Cassvan,A.; Ralescu,S.; Shapiro,E.; Moshkovski,F.G.; Weiss,J.	1988	Median and radial sensory latencies to digit I as compared with other screening tests in carpal tunnel syndrome	Am J Phys Med Rehabil.	no reference standard; very low study design
Cassvan,A.; Rosenberg,A.; Rivera,L.F.	1986	Ulnar nerve involvement in carpal tunnel syndrome	Arch Phys Med Rehabil.	+Does not answer a question of interest
Castillo,T.N.; Yao,J.	2010	Comparison of longitudinal open incision and two-incision techniques for carpal tunnel release	J Hand Surg Am	very low quality
Cederlund,R.I.; Dahlin,L.B.; Thomsen,N.O.	2012	Activity limitations before and after surgical carpal tunnel release among patients with and without diabetes	J Rehabil.Med	Does not address question of interest
Celik,B.; Guven,Z.	2008	Review of different electrodiagnostic studies in mild carpal tunnel syndrome	Neurosurgery Quarterly	no true comparison; does not answer a question of interest
Cerimagic,D.; Bilic,E.	2010	Carpal tunnel syndrome reverse Phalen's versus Phalen's maneuver	Translational Neuroscience	review; background information
Cevik,M.U.; Altun,Y.; Uzar,E.; Acar,A.; Yucel,Y.; Arikanoglu,A.; Varol,S.; Sariyildiz,M.A.; Tahtasiz,M.; Tasdemir,N.	2012	Diagnostic value of F-wave inversion in patients with early carpal tunnel syndrome	Neurosci.Lett.	insufficient data; very low study design
Cha,J.G.; Han,J.K.; Im,S.B.; Kang,S.J.	2013	Median nerve T2 assessment in the wrist joints: Preliminary study in	J.Magn.Reson.Imaging	insufficient data; very low study design

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		patients with carpal tunnel syndrome and healthy volunteers		
Chacko,J.P.; Chand,R.P.; Bulusu,S.; Tharakan,J.J.	2000	Clinical profile of Carpal Tunnel Syndrome in Oman	Neurosciences (Riyadh.)	Does not answer a question of interest; no assessment of risk factors
Chalidis,B.E.; Dimitriou,C.G.	2013	One portal simultaneous bilateral endoscopic carpal tunnel release under local anaesthesia. Do the results justify the effort?	Int.Orthop	Very low quality
Champion,D.	1969	Gouty tenosynovitis and the carpal tunnel syndrome	Med J Aust.	case reports
Chan,K.-Y.; George,J.; Goh,K.-J.; Ahmad,T.S.	2011	Ultrasonography in the evaluation of carpal tunnel syndrome: Diagnostic criteria and comparison with nerve conduction studies	Neurology Asia	insufficient data; very low study design
Chan,L.; Turner,J.A.; Comstock,B.A.; Levenson,L.M.; Hollingworth,W.; Heagerty,P.J.; Kliot,M.; Jarvik,J.G.	2007	The relationship between electrodiagnostic findings and patient symptoms and function in carpal tunnel syndrome	Arch Phys Med Rehabil.	+not best available evidence
Chan,Z.H.; Balakrishnan,V.; McDonald,A.	2013	Short versus long-acting local anaesthetic in open carpal tunnel release: which provides better preemptive analgesia in the first 24 hours?	Hand Surg	Deemed clinically irrelevant
Chandra,P.S.; Singh,P.K.; Goyal,V.; Chauhan,A.K.; Thakkur,N.; Tripathi,M.	2013	Early versus delayed endoscopic surgery for carpal tunnel syndrome: prospective randomized study	World Neurosurg.	Comparison is for timing of surgery and not comparing different CTR tecjniques. Does not answer question of interest.
Chang,C.W.; Lee,W.J.; Liao,Y.C.; Chang,M.H.	2013	Which nerve conduction parameters can predict spontaneous electromyographic activity in carpal tunnel syndrome?	Clin Neurophysiol.	insufficient data; healthy controls used for comparison

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Chang,C.W.; Lien,I.N.	1991	Comparison of sensory nerve conduction in the palmar cutaneous branch and first digital branch of the median nerve: a new diagnostic method for carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Chang,C.W.; Wang,Y.C.; Chang,K.F.	2008	A practical electrophysiological guide for non-surgical and surgical treatment of carpal tunnel syndrome	J Hand Surg Eur.Vol.	very low quality
Chang,M.	1998	Oral drugs of choice in carpal tunnel syndrome [abstract]	Muscle Nerve	Abstract/conference poster
Chang,M.H.; Chiang,H.T.; Ger,L.P.; Yang,D.A.; Lo,Y.K.	2000	The cause of slowed forearm median conduction velocity in carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; very low study design
Chang,M.H.; Lee,Y.C.; Hsieh,P.F.	2008	The role of forearm mixed nerve conduction study in the evaluation of proximal conduction slowing in carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; very low study design
Chang,M.H.; Lee,Y.C.; Hsieh,P.F.	2008	The real role of forearm mixed nerve conduction velocity in the assessment of proximal forearm conduction slowing in carpal tunnel syndrome	J Clin Neurophysiol.	insufficient data; very low study design
Chang,M.H.; Liao,Y.C.; Lee,Y.C.; Hsieh,P.F.; Liu,L.H.	2009	Electrodiagnosis of carpal tunnel syndrome: which transcarpal conduction technique is best?	J Clin Neurophysiol.	insufficient data; very low study design
Chang,M.H.; Liu,L.H.; Lee,Y.C.; Wei,S.J.; Chiang,H.L.; Hsieh,P.F.	2006	Comparison of sensitivity of transcarpal median motor conduction velocity and conventional conduction techniques in electrodiagnosis of carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; very low study design
Chang,M.H.; Wei,S.J.; Chiang,H.L.; Wang,H.M.; Hsieh,P.F.; Huang,S.Y.	2002	Comparison of motor conduction techniques in the diagnosis of carpal tunnel syndrome		insufficient data; no comparison group
Chang,M.H.; Wei,S.J.; Chiang,H.L.; Wang,H.M.; Hsieh,P.F.; Huang,S.Y.	2002	Does direct measurement of forearm mixed nerve conduction velocity reflect actual nerve conduction velocity through the carpal tunnel?	Clin Neurophysiol.	insufficient data; very low study design

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Changulani,M.; Okonkwo,U.; Keswani,T.; Kalairajah,Y.	2008	Outcome evaluation measures for wrist and hand: which one to choose?	Int.Orthop	systematic review
Chapell,R.; Coates,V.; Turkelson,C.	2003	Poor outcome for neural surgery (epineurotomy or neurolysis) for carpal tunnel syndrome compared with carpal tunnel release alone: a meta-analysis of global outcomes	Plast.Reconstr.Surg	Meta-analysis
Chaplin,E.; Kasdan,M.L.	1985	Carpal tunnel syndrome and routine blood chemistries	Plast.Reconstr.Surg	+Does not answer a question of interest
Chari,R.; Hamed,A.; Packer,G.	2004	Single versus double incision technique in carpal tunnel decompression. A randomised controlled trial	The Journal of Bone and Joint Surgery	Abstract/conference poster
Chassin,S.L.; Little,J.W.; DeLisa,J.A.	1987	Compound nerve action potentials from the median and ulnar nerves	Arch Phys Med Rehabil.	only healthy study subjects
Chaudhuri,K.R.; Davidson,A.R.; Morris,I.M.	1989	Limited joint mobility and carpal tunnel syndrome in insulin-dependent diabetes	Br J Rheumatol.	insufficient data; very low study design
Chauhan,A.; Bowlin,T.C.; Mih,A.D.; Merrell,G.A.	2012	Patient-reported outcomes after acute carpal tunnel release in patients with distal radius open reduction internal fixation	Hand (N.Y)	very low quality
Checkosky,C.M.; Bolanowski,S.J.; Cohen,J.C.	1996	Assessment of vibrotactile sensitivity in patients with carpal tunnel syndrome	J Occup.Environ.Med	insufficient data; very low study design
Chell,J.; Stevens,A.; Davis,T.R.	1999	Work practices and histopathological changes in the tenosynovium and flexor retinaculum in carpal tunnel syndrome in women	J Bone Joint Surg Br	cadavers used as reference; biopsies
Chen,C.H.; Wu,T.; Sun,J.S.; Lin,W.H.; Chen,C.Y.	2012	Unusual causes of carpal tunnel syndrome: space occupying lesions	J Hand Surg Eur.Vol.	retrospective chart review; no comparison group
Chen,C.K.; Chung,C.B.; Yeh,L.; Pan,H.B.; Yang,C.F.; Lai,P.H.; Liang,H.L.; Resnick,D.	2000	Carpal tunnel syndrome caused by tophaceous gout: CT and MR imaging features in 20 patients	AJR Am J Roentgenol.	retrospective records review; no comparison group

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Chen,G.S.	1990	The effect of acupuncture treatment on Carpal Tunnel Syndrome	American Journal of Acupuncture	incorrect patient population (post-op vs. pre-op patients not stratified)
Chen,H.T.; Chen,H.C.; Wei,F.C.	1999	Endoscopic carpal tunnel release	Changgeng Yi Xue Za Zhi	Very Low Quality
Chen,L.; Duan,X.; Huang,X.; Lv,J.; Peng,K.; Xiang,Z.	2014	Effectiveness and safety of endoscopic versus open carpal tunnel decompression	Arch Orthop Trauma Surg	Meta-analysis
Chen,S.F.; Lu,C.H.; Huang,C.R.; Chuang,Y.C.; Tsai,N.W.; Chang,C.C.; Chang,W.N.	2011	Ultrasonographic median nerve cross-section areas measured by 8-point "inching test" for idiopathic carpal tunnel syndrome: a correlation of nerve conduction study severity and duration of clinical symptoms	BMC Med Imaging	insufficient data; very low study design
Cheng,C.J.; Mackinnon-Patterson,B.; Beck,J.L.; Mackinnon,S.E.	2008	Scratch collapse test for evaluation of carpal and cubital tunnel syndrome	J Hand Surg Am	insufficient data; very low study design
Cherington,M.	1974	Proximal pain in carpal tunnel syndrome	Arch Surg	insufficient data; summary document
Cherniack,M.G.; Let,R.; Gerr,F.; Brammer,A.; Pace,P.	1990	Detailed clinical assessment of neurological function in symptomatic shipyard workers	Br.J.Ind.Med.	+Does not answer a question of interest; not best available evidence
Cherniack,M.G.; Moalli,D.; Viscolli,C.	1996	A comparison of traditional electrodiagnostic studies, electroneurometry, and vibrometry in the diagnosis of carpal tunnel syndrome	J Hand Surg Am	insufficient data; very low study design
Chia,J.; Pho,R.W.H.	1997	Surgical release of carpal tunnel syndrome under local anaesthesia	Journal of Orthopaedic Surgery	Retrospective case series
Chiang,H.C.; Ko,Y.C.; Chen,S.S.; Yu,H.S.; Wu,T.N.; Chang,P.Y.	1993	Prevalence of shoulder and upper-limb disorders among workers in the fish-processing industry	Scand.J Work Environ.Health	Prevalence study; not best evidence
Chidgey,L.K.	1992	Chronic wrist pain	Orthop.Clin.North Am.	background
Chin,S.H.; Tom,L.K.; Thomson,J.G.	2011	Does the severity of bilateral carpal tunnel syndrome influence the timing of staged bilateral release?	Ann.Plast.Surg	Retrospective case series

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Chin,Y.H.; Lim,K.H.; Poh,B.K.; Koh,D.	2005	Carpal tunnel syndrome: splinting or surgery? A systematic review (Provisional abstract)	Singapore General Hospital Proceedings	systematic review
Chiotis,K.; Dimisianos,N.; Rigopoulou,A.; Chrysanthopoulou,A.; Chroni,E.	2013	Role of anthropometric characteristics in idiopathic carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design
Chmielewska,D.; Skeczek-Urbaniak,A.; Kubacki,J.; Blaszczak,E.; Kwasna,K.	2013	Effectiveness of carpal tunnel syndrome rehabilitation after endoscopic versus open surgical release	Ortop.Traumatol.Rehabil.	
Cho,D.S.; Cho,M.J.	1989	The electrodiagnosis of the carpal tunnel syndrome	S.D J Med	review; background information
Chow,J.C.	1993	The Chow technique of endoscopic release of the carpal ligament for carpal tunnel syndrome: four years of clinical results		Retrospective case series
Chow,J.C.	1989	Endoscopic release of the carpal ligament: a new technique for carpal tunnel syndrome		Does not address question of interest
Chow,J.C.Y.; Papachristos,A.A.	2006	Endoscopic carpal tunnel release: Chow technique	Techniques in Orthopaedics	Background article
Christensen,J.E.; Peter,P.J.; Nielsen,V.K.; Mai,J.	1998	Prevalence of carpal tunnel syndrome among individuals with Down syndrome	Am J Ment.Retard.	Not relevant, prevalence study
Chroni,E.; Paschalis,C.; Arvaniti,C.; Zotou,K.; Nikolakopoulou,A.; Papapetropoulos,T.	2001	Carpal tunnel syndrome and hand configuration	Muscle Nerve	insufficient data; very low study design
Chrysopoulo,M.T.; Greenberg,J.A.; Kleinman,W.B.	2006	The hypothenar fat pad transposition flap: a modified surgical technique	Tech.Hand Up Extrem.Surg	Background information
Chuang,Y.-M.; Chiou,H.-J.	2001	Sonography in the evaluation of carpal tunnel syndrome	Acta Neurologica Taiwanica	case report
Chung,B.; Morris,S.F.	2013	Factors influencing prioritization for carpal tunnel syndrome consultation	Can J Plast.Surg	+Does not answer a question of interest
Chung,K.C.	2006	Current status of outcomes research in carpal tunnel surgery	Hand (N.Y)	review

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Chung,K.C.; Pillsbury,M.S.; Walters,M.R.; Hayward,R.A.	1998	Reliability and validity testing of the Michigan Hand Outcomes Questionnaire	J Hand Surg Am	+Does not answer a question of interest
Chung,M.S.; Gong,H.S.; Baek,G.H.	1999	Prevalence of Raynaud's phenomenon in patients with idiopathic carpal tunnel syndrome	J Bone Joint Surg Br	+Does not answer a question of interest
Ciftdemir,M.; Copuroglu,C.; Ozcan,M.; Cavdar,L.	2013	Carpal tunnel syndrome in manual tea harvesters	Ekleml.Hastalik.Cerrahisi.	all CTS cases; no comparison group
Cimmino,M.A.; Bountis,C.; Silvestri,E.; Garlaschi,G.; Accardo,S.	2000	An appraisal of magnetic resonance imaging of the wrist in rheumatoid arthritis	Semin.Arthritis Rheum.	Not relevant to CTS
Cioni,R.; Passero,S.; Paradiso,C.; Giannini,F.; Battistini,N.; Rushworth,G.	1989	Diagnostic specificity of sensory and motor nerve conduction variables in early detection of carpal tunnel syndrome	J Neurol	insufficient data; very low study design
Citron,N.D.; Bendall,S.P.	1997	Local symptoms after open carpal tunnel release. A randomized prospective trial of two incisions	J Hand Surg Br	Insufficient data (missing N at each follow-up time point)
Claes,F.; Bernsen,H.; Meulstee,J.; Verhagen,W.I.	2012	Carpal tunnel syndrome diagnosed by general practitioners: an observational study	Neurol Sci	+Does not answer a question of interest
Clayburgh,R.H.; Beckenbaugh,R.D.; Dobyns,J.H.	1987	Carpal tunnel release in patients with diffuse peripheral neuropathy	J Hand Surg Am	Retrospective case series
Clayton,M.L.; Linscheid,R.L.	1988	Carpal tunnel surgery: should the incision be above or below the wrist?		Background article
Clifford,J.C.; Israels,H.	1994	Provocative exercise maneuver: its effect on nerve conduction studies in patients with carpal tunnel syndrome	Arch Phys Med Rehabil.	Does not answer a question of interest
Clinchot,D.M.	1997	Motor conduction studies and needle electromyography in carpal tunnel syndrome	Phys.Med.Rehabil.Clin.N.Am.	Background Information
Cobb,T.K.; Dalley,B.K.; Posteraro,R.H.; Lewis,R.C.	1992	The carpal tunnel as a compartment. An anatomic perspective	Orthop Rev.	cadaver study

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Cocito,D.; Ciaramitaro,P.; Tavella,A.; Poglio,F.; Paolasso,I.; Bergamasco,B.; Isoardo,G.	2005	The occurrence of carpal tunnel syndrome in chronic inflammatory demyelinating polyneuropathy	Clin Neurophysiol.	letter to the editor
Cocito,D.; Tavella,A.; Ciaramitaro,P.; Costa,P.; Poglio,F.; Paolasso,I.; Duranda,E.; Cossa,F.M.; Bergamasco,B.	2006	A further critical evaluation of requests for electrodiagnostic examinations	Neurol Sci	+Does not answer a question of interest
Cohen,M.S.; Garfin,S.R.	1997	Nerve compression syndromes: Finding the cause of upper-extremity symptoms		Background Information
Cokluk,C.; Aydin,K.; Iyigun,O.; Rakunt,C.; Celik,F.	2006	The changes of the sectional surface area of the median nerve compartment in hands with symptomatic carpal tunnel syndrome and normal hands	Turkish Neurosurgery	insufficient data; very low study design
Colak,A.; Kutlay,M.; Pekkafali,Z.; Saracoglu,M.; Demircan,N.; Simsek,H.; Akin,O.N.; Kibici,K.	2007	Use of sonography in carpal tunnel syndrome surgery. A prospective study	Neurol Med Chir (Tokyo)	for rec 7, this would not be best available evidence. if used as a diagnostic study of ultrasound, quality would be very low due to the use of health controls
Coldham,F.; Lewis,J.; Lee,H.	2006	The reliability of one vs. three grip trials in symptomatic and asymptomatic subjects	J Hand Ther	+Does not answer a question of interest
Comi,G.; Lozza,L.; Galardi,G.; Ghilardi,M.F.; Medaglini,S.; Canal,N.	1985	Presence of carpal tunnel syndrome in diabetics: effect of age, sex, diabetes duration and polyneuropathy	Acta Diabetol.Lat.	Not relevant, not a CTS correlational study
Concannon,M.J.; Brownfield,M.L.; Puckett,C.L.	2000	The incidence of recurrence after endoscopic carpal tunnel release	Plast.Reconstr.Surg	very low strength of evidence
Concannon,M.J.; Gainor,B.; Petroski,G.F.; Puckett,C.L.	1997	The predictive value of electrodiagnostic studies in carpal tunnel syndrome	Plast.Reconstr.Surg	insufficient data; very low study design
Conforti,G.; Capone,L.; Corra,S.	2014	Intradermal therapy (mesotherapy) for the treatment of acute pain in carpal tunnel syndrome: a preliminary study	Korean J Pain	Very Low Quality

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Conington,K.A.; Fields,K.; Nashelsky,J.	2002	What is the best diagnostic approach to paresthesias of the hand?	J.Fam.Pract.	letter
Conlon,C.F.; Krause,N.; Rempel,D.M.	2009	A randomized controlled trial evaluating an alternative mouse or forearm support on change in median and ulnar nerve motor latency at the wrist	Am.J.Ind.Med.	+not best available evidence; no diagnosis of CTS
Conlon,C.F.; Rempel,D.M.	2005	Upper extremity mononeuropathy among engineers	J.Occup.Environ.Med.	no diagnosis of CTS; no unexposed group
Conolly,W.B.	1978	Pitfalls in carpal tunnel decompression	Aust.N.Z.J Surg	Does not address question of interest
Conrad,J.C.; Osborn,J.B.; Conrad,K.J.; Jetzer,T.C.	1990	Peripheral nerve dysfunction in practicing dental hygienists	J Dent.Hyg.	insufficient data; no diagnosis of CTS
Conway,R.R.	1999	Needle EMG is often unnecessary	Muscle Nerve	background information; commentary
Cook,T.M.; Rosecrance,J.C.; Brokman,S.J.; Rulon,A.S.; Wise,C.A.	1991	Reliability of a digital electroneurometer for the determination of motor latency of the median nerve	J Occup.Rehabil.	insufficient data; very low study design
Cooney,W.P.	1995	The future of arthroscopic surgery in the hand and wrist	Hand Clin.	Editorial
Cooper,C.; Baker,P.D.	1996	Upper limb disorders	Occup.Med.	background
Copeland,D.A.; Stoukides,C.A.	1994	Pyridoxine in carpal tunnel syndrome	Ann.Pharmacother.	Narrative review
Corbin,D.E.	2000	Carpal tunnel syndrome recovery	Occup.Health Saf	background
Cornwall,M.W.; Nelson,C.	1984	Median nerve F-wave conduction in healthy subjects	Phys.Ther.	only healthy study subjects
Corradi,M.; Paganelli,E.; Pavesi,G.	1989	Carpal tunnel syndrome in long-term hemodialyzed patients	J Reconstr.Microsurg.	insufficient data; no comparison group
Cosgrove,J.L.	2000	Magnetic resonance imaging in the a literature review	J Clin Neuromuscul.Dis	lit review
Cosgrove,J.L.; Chase,P.M.; Mast,N.J.	2002	Thenar motor syndrome: median mononeuropathy of the hand	Am J Phys Med Rehabil.	Does not answer a question of interest; no comparison group
Costa,V.V.; Oliveira,S.B.; Fernandes,Mdo C.; Saraiva,R.Ã?	2011	Incidence of regional pain syndrome after carpal tunnel release. Is there a	Rev.Bras.Anesthesiol.	Duplicate study (duplicate with AAOS ID 302)

Authors	Year	Article Title	Periodical	Reason for Exclusion
		correlation with the anesthetic technique?		
Courts,R.B.	1995	Splinting for symptoms of carpal tunnel syndrome during pregnancy	J Hand Ther	Very low quality
Cracchiolo,A.,III; Marmor,L.	1968	Peripheral entrapment neuropathies		Incorrect patient population (not exclusive to CTS patients)
Cracchiolo,III A.; Namerow,N.S.; Campion,D.S.	1977	Peripheral nerve entrapments	West.J.Med.	background
Cramer,H.; Lauche,R.; Langhorst,J.; Dobos,G.	2013	Yoga for rheumatic diseases: a systematic review	Rheumatology (Oxford)	Systematic review
Crawford,J.O.; Laiou,E.	2007	Conservative treatment of work-related upper limb disorders: a review	Occup.Med (Lond)	Systematic review
Crispin,J.C.; Alcocer-Varela,J.	2003	Rheumatologic manifestations of diabetes mellitus	Am.J.Med.	review
Cruz,Martinez A.; Perez Conde,M.C.; Ferrer,M.T.	1980	Effect of ischaemia on sensory evoked potentials. 2. Study in patients with diabetes mellitus, alcoholism, chronic renal failure, carpal tunnel syndrome and hyperparathyroidism	Electromyogr.Clin Neurophysiol.	+Does not answer a question of interest; very low study design
Cuevas-Trisan,R.L.; Ojeda-Rodriguez,A.G.	2006	Relation of wrist angles to median nerve conduction studies	Bol.Asoc.Med P R	<10 patients per group
Cullum,D.E.; Molloy,C.J.	1994	Occupation and the carpal tunnel syndrome	Med J Aust.	Background Information
Cullum,D.E.; Molloy,C.J.	1994	Corrigenda: Occupation and the carpal tunnel syndrome (Medical Journal of Australia (1994) 161 (552-554))	Med.J.Aust.	Background Information; review
da Costa,V.V.; de Oliveira,S.B.; Fernandes,Mdo C.; Saraiva,R.A.	2011	Incidence of regional pain syndrome after carpal tunnel release. Is there a correlation with the anesthetic technique?	Rev.Bras.Anesthesiol.	Deemed clinically irrelevant
Dahlin,L.B.	1991	Aspects on pathophysiology of nerve entrapments and nerve compression injuries	Neurosurg.Clin N.Am	Background Information

Authors	Year	Article Title	Periodical	Reason for Exclusion
Dahlin,L.B.; Lekholm,C.; Kardum,P.; Holmberg,J.	2002	Coverage of the median nerve with free and pedicled flaps for the treatment of recurrent severe carpal tunnel syndrome	Scand.J Plast.Reconstr.Surg Hand Surg	Incorrect patient population (prior surgical intervention prior to study)
Dahlin,L.B.; Salo,M.; Thomsen,N.; Stutz,N.	2010	Carpal tunnel syndrome and treatment of recurrent symptoms	Scand.J Plast.Reconstr.Surg Hand Surg	background
Dakowicz,A.; Latosiewicz,R.	2005	The value of iontophoresis combined with ultrasound in patients with the carpal tunnel syndrome	Rocz.Akad.Med Bialymst.	Very Low Quality
Dale,A.M.; Agboola,F.; Yun,A.; Zeringue,A.; Al-Lozi,M.T.; Evanoff,B.	2014	Comparison of Automated Versus Traditional Nerve Conduction Study Methods for Median Nerve Testing in a General Worker Population	PM R	insufficient data; not best evidence
Dale,A.M.; Gardner,B.T.; Zeringue,A.; Werner,R.; Franzblau,A.; Evanoff,B.	2014	The effectiveness of post-offer pre-placement nerve conduction screening for carpal tunnel syndrome	J Occup Environ Med	not best evidence
Dale,A.M.; Harris-Adamson,C.; Rempel,D.; Gerr,F.; Hegmann,K.; Silverstein,B.; Burt,S.; Garg,A.; Kapellusch,J.; Merlino,L.; Thiese,M.S.; Eisen,E.A.; Evanoff,B.	2013	Prevalence and incidence of carpal tunnel syndrome in US working populations: pooled analysis of six prospective studies	Scand.J Work Environ.Health	pooled data and varying methods, designs, and data types
Dale,W.A.; Lewis,M.R.	1975	Management of thoracic outlet syndrome	Ann.Surg	Incorrect patient population (does not include CTS patients)
Dammers,H.J.; Veering,M.M.	2001	Two injections with steroids close to the carpal tunnel are a greater help in CTS than one injection: 76.5% and 50% success	Journal of the Peripheral Nervous System : JPNS.	Abstract/conference poster
Dammers,J.W.; Veering,M.M.; Vermeulen,M.	1999	Injection with methylprednisolone proximal to the carpal tunnel: randomised double blind trial		Very Low Quality
Dammers,J.W.; Veering,M.M.; Vermeulen,M.	2000	Methylprednisolone injection improved symptoms for 1 year in patients with the carpal tunnel syndrome	Evidence-Based Medicine	Insufficient data
Dan,N.G.	1976	Entrapment syndromes	Med J Aust.	background

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Dandy,D.J.	1992	The present state of arthroscopy	Minimally Invasive Therapy	Background article
Daniell,W.E.; Fulton-Kehoe,D.; Franklin,G.M.	2009	Work-related carpal tunnel syndrome in Washington State workers' compensation: utilization of surgery and the duration of lost work	Am J Ind.Med	Does not answer a question of interest; not best available evidence
Danner,R.	1990	Referral diagnosis versus electroneurophysiological finding. Two years electroneuromyographic consultation in a rehabilitation clinic	Electromyogr.Clin Neurophysiol.	no comparison of modalities; not CTS exclusive
Danoff,J.R.; Birman,M.V.; Rosenwasser,M.P.	2014	Transfer of the flexor carpi radialis to the abductor pollicis brevis tendon for the restoration of tip-pinch in severe carpal tunnel syndrome	J Hand Surg Eur.Vol.	Retrospective case series
D'Arcy,C.A.; McGee,S.	2000	The rational clinical examination. Does this patient have carpal tunnel syndrome?		systematic review
D'Arcy,C.A.; McGee,S.	2000	Clinical diagnosis of carpal tunnel syndrome		letters to the editor
D'Arcy,C.A.; McGee,S.	2001	Review: Hand symptom diagrams, weak thumb abduction, and hypalgesia are helpful in diagnosing carpal tunnel syndrome	Evidence-Based Medicine	literature review
Davis,L.; Wellman,H.; Punnett,L.	2001	Surveillance of work-related carpal tunnel syndrome in Massachusetts, 1992-1997: a report from the Massachusetts Sentinel Event Notification System for Occupational Risks (SENSOR)	Am J Ind.Med	review of case reports
Davis,P.T.; Hulbert,J.R.	1998	Carpal tunnel syndrome: conservative and nonconservative treatment. A chiropractic physician's perspective	J Manipulative Physiol Ther	systematic review
Davison,P.G.; Cobb,T.; Lalonde,D.H.	2013	The patient's perspective on carpal tunnel surgery related to the type of anesthesia: a prospective cohort study	Hand (N.Y)	Deemed clinically irrelevant
Davne,A.	1982	Practical considerations in the treatment of carpal tunnel syndrome	J Med Soc.N.J	Retrospective case series

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Daw,E.; Ogbonna,B.	1984	Recurrent Bell's palsy, carpal tunnel syndrome and meralgia in pregnancy	J.Obstet.Gynaecol.	Case report
Dawson,W.J.	1999	Carpal tunnel syndrome in instrumentalists: A review of 15 years' clinical experience	Medical Problems of Performing Artists	all CTS cases; no comparison group
Dayan,A.D.; Urich,H.; Gardner-Thorpe,C.	1971	Peripheral neuropathy and myeloma	J Neurol Sci	case reports
de Campos,C.C.; Manzano,G.M.; Leopoldino,J.F.; Nobrega,J.A.; Sanudo,A.; de Araujo,Peres C.; Castelo,A.	2004	The relationship between symptoms and electrophysiological detected compression of the median nerve at the wrist	Acta Neurol Scand.	not best available evidence
de la Llave-Rincon AI; Fernandez-de-las-Penas,C.; Fernandez-Carnero,J.; Padua,L.; Arendt-Nielsen,L.; Pareja,J.A.	2009	Bilateral hand/wrist heat and cold hyperalgesia, but not hypoesthesia, in unilateral carpal tunnel syndrome	Exp.Brain Res.	insufficient data; very low study design
de la Llave-Rincon AI; Fernandez-de-las-Penas,C.; Laguarda-Val,S.; Alonso-Blanco,C.; Martinez-Perez,A.; Arendt-Nielsen,L.; Pareja,J.A.	2011	Increased pain sensitivity is not associated with electrodiagnostic findings in women with carpal tunnel syndrome	Clin J Pain	insufficient data; very low study design
de Moraes,V.Y.; Godin,K.; Dos Santos,J.B.; Faloppa,F.; Bhandari,M.; Belloti,J.C.	2013	Influence of compensation status on time off work after carpal tunnel release and rotator cuff surgery: a meta-analysis	Patient Saf Surg	meta-analysis
De,Lean J.	1988	Transcarpal median sensory conduction: detection of latent abnormalities in mild carpal tunnel syndrome	Can J Neurol Sci	insufficient data; very low study design
De,Smet L.; De,Kesel R.; Degreef,I.; Debeer,P.	2007	Responsiveness of the Dutch version of the DASH as an outcome measure for carpal tunnel syndrome	J Hand Surg Eur.Vol.	the pupose of this article is to study the responsiveness of the DASH. we could use results as a case series, this would be not best available evidence

Authors	Year	Article Title	Periodical	Reason for Exclusion
De,Smet L.; Vandeputte,G.	2002	Pedicated fat flap coverage of the median nerve after failed carpal tunnel decompression	J Hand Surg Br	Retrospective case series/Incorrect patient population (existing invasive intervention prior to study)
Dehghani,M.; Zarezadeh,A.; Shemshaki,H.; Moezi,M.; Nourbakhsh,M.	2013	Hour glass constriction in advanced carpal tunnel syndrome	Int.J Prev.Med	Not in English
Dejaco,C.; Stradner,M.; Zauner,D.; Seel,W.; Simmet,N.E.; Klammer,A.; Brickmann,K.; Gretler,J.; Moazed-Furst,F.; Thonhofer,R.; Husic,R.; Hermann,J.; Quasthoff,S.	2012	Ultrasound for diagnosis of carpal tunnel syndrome - Comparison of different methods to determine median nerve volume and value of power Doppler sonography	Arthritis Rheum.	abstract; summary document
Dekel,S.; Papaioannou,T.; Rushworth,G.; Coates,R.	1980	Idiopathic carpal tunnel syndrome caused by carpal stenosis	Br Med J	Not relevant,does not answer the PICO question
Delaere,O.; Bouffieux,N.; Hoang,P.	2000	Endoscopic treatment of the carpal tunnel syndrome: review of the recent literature	Acta Chir Belg.	Narrative review
de-la-Llave-Rincon AI; Puentedura,E.J.; Fernandez-de-las-Penas,C.	2012	New advances in the mechanisms and etiology of carpal tunnel syndrome	Discov.Med	Narrative review
Delgrosso,I.; Boillat,M.A.	1991	Carpal tunnel syndrome: role of occupation	Int.Arch Occup.Environ.Health	insufficient data; no comparison group
Dellon,A.L.	1999	Current guidelines for management of peripheral nerve problems using quantitative sensory testing	Journal of Orthopaedic Surgery	review; background information
Dellon,A.L.	1993	Clinical assessment of peripheral nerve injuries	Current Orthopaedics	background
Demir,H.; Kirnap,M.; Utas,C.; Ersoy,A.O.; Ozugul,Y.; Aksu,M.	1998	Carpal tunnel syndrome in hemodialysis patients	European Journal of Physical Medicine and Rehabilitation	Not relevant,does not answer the PICO question
Demirci,S.; Sonel,B.	2004	Comparison of sensory conduction techniques in the diagnosis of mild	Rheumatol.Int.	insufficient data; very low study design

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		idiopathic carpal tunnel syndrome: which finger, which test?		
Denbeigh,K.; Slot,T.R.; Dumas,G.A.	2013	Wrist postures and forces in tree planters during three tree unloading conditions		Does not answer a question of interest; not relevant to CTS
Deniz,O.; Aygul,R.; Kotan,D.; Ozdemir,G.; Odabas,F.O.; Kaya,M.D.; Ulvi,H.	2012	The effect of local corticosteroid injection on F-wave conduction velocity and sympathetic skin response in carpal tunnel syndrome	Rheumatol.Int.	Very Low Quality
Derchi,L.E.; Martinoli,C.	1998	High resolution US of peripheral nerves	Journal d'Echographie et de Medecine par Ultrasons	Commentary/review
Deryani,E.; Aki,S.; Muslumanoglu,L.; Rozanes,I.	2003	MR imaging and electrophysiological evaluation in carpal tunnel syndrome	Yonsei Med J	insufficient data; very low study design
Descatha,A.; Dale,A.M.; Franzblau,A.; Coomes,J.; Evanoff,B.	2010	Diagnostic strategies using physical examination are minimally useful in defining carpal tunnel syndrome in population-based research studies	Occup.Environ.Med	+not best available evidence
Descatha,A.; Dale,A.M.; Franzblau,A.; Evanoff,B.	2013	Natural history and predictors of long-term pain and function among workers with hand symptoms	Arch Phys Med Rehabil.	the outcome is not CTS, but rather how baseline CTS predicts future functional limitation
Descatha,A.; Huard,L.; Aubert,F.; Barbato,B.; Gorand,O.; Chastang,J.F.	2012	Meta-analysis on the performance of sonography for the diagnosis of carpal tunnel syndrome	Semin.Arthritis Rheum.	meta-analysis
Desjardes,P.; Egloff-Baer,S.; Roth,G.	1980	Lumbrical muscles and the carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	doesn't answer question of interest
Deutinger,M.; Girsch,W.; Burggasser,G.; Windisch,A.; Mayr,N.; Freilinger,G.	1993	Clinical and electroneurographic evaluation of sensory/motor-differentiated nerve repair in the hand	J.Neurosurg.	Retrospective case series
Devany,A.J.; Musonda,P.; Blake,J.C.	2010	A retrospective insight into the roles of nerve conduction studies and symptom severity questionnaire scores in patients with carpal tunnel syndrome	Rheumatology (Oxford).	insufficient data
Devathasan,G.; Teo,W.L.; Mylvaganam,A.	1986	Methylcobalamin (CH(3)-B(12); Methycobal) in chronic diabetic	Clin.Trials J.	Incorrect patient population

Authors	Year	Article Title	Periodical	Reason for Exclusion
		neuropathy. A double-blind clinical and electrophysiological study		
Dheerendra,S.K.; Ibrahim,I.W.; Khan,W.S.; Smitham,P.; Goddard,N.J.	2011	Measurement of skin capacitance: A novel method of diagnosing autonomic dysfunction in carpal tunnel syndrome level 3 evidence	Journal of Hand Surgery	summary document
Dhond,R.P.; Ruzich,E.; Witzel,T.; Maeda,Y.; Malatesta,C.; Morse,L.R.; Audette,J.; Hamalainen,M.; Kettner,N.; Napadow,V.	2012	Spatio-temporal mapping cortical neuroplasticity in carpal tunnel syndrome		insufficient data; very low study design
Di,Guglielmo G.; Torrieri,F.; Repaci,M.; Uncini,A.	1997	Conduction block and segmental velocities in carpal tunnel syndrome	Electroencephalogr.Clin Neurophysiol.	insufficient data; very low study design
Diabalova,V.	1995	Our experience with reoperations for the diagnosis of the Carpal Tunnel Syndrome	Acta Chir.Plast.	Retrospective case series
Diamond,M.R.	1989	Carpal tunnel syndrome: A review	Chiropractic Sports Medicine	review
Diaz,J.H.	2001	Carpal tunnel syndrome in female nurse anesthetists versus operating room nurses: prevalence, laterality, and impact of handedness	Anesth.Analg.	Not relevant, prevalence study
Dick,E.A.; Burnett,C.; Gedroyc,W.M.W.	2008	MRI of the wrist		review; background information
Dick,F.D.; Graveling,R.A.; Munro,W.; Walker-Bone,K.	2011	Workplace management of upper limb disorders: a systematic review	Occup.Med (Lond)	systematic review
Dickson,D.R.; Boddice,T.; Collier,A.M.	2013	A comparison of the functional difficulties in staged and simultaneous open carpal tunnel decompression	J Hand Surg Eur.Vol.	Does not meet inclusion criteria (follow-up<3 month minimum)
Dieleman,J.P.; Kerklaan,J.; Huygen,F.J.; Bouma,P.A.; Sturkenboom,M.C.	2008	Incidence rates and treatment of neuropathic pain conditions in the general population		Does not address question of interest
Dillon,J.P.; Laing,A.; Hussain,M.; Macey,A.	2008	Improved tolerability of open carpal tunnel release under local anaesthetic: a patient satisfaction survey	Arch Orthop Trauma Surg	Very low quality

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Dimitrova,A.; Lou,J.S.; Andrea,S.; Luo,Y.; Murchison,C.; Oken,B.	2014	Local effects of acupuncture on the median and ulnar nerves in patients with carpal tunnel syndrome (CTS): Study design and preliminary results	J.Altern.Complement.Med.	Conference poster
Ditmars,D.M.,Jr.; Houin,H.P.	1986	Carpal tunnel syndrome	Hand Clin	background
Dlabal,K.	1989	A new technique of operation for opposition of the thumb in thenar muscle paralysis	Acta Chir.Plast.	Incorrect patient population (not exclusive to CTS patients)
Dlabalova,V.	1995	Our long-term experience and results of surgical management of the carpal tunnel syndrome	Acta Chir Plast.	Background article
Dodds,S.D.; Trumble,T.E.	2006	Management of complications related to carpal tunnel release	Techniques in Orthopaedics	Background article
Doesburg,M.H.; Henderson,J.; Yoshii,Y.; -Mink-van-der- Molen-AB; Cha,S.S.; An,K.N.; Amadio,P.C.	2012	Median nerve deformation in differential finger motions: ultrasonographic comparison of carpal tunnel syndrome patients and healthy controls	Journal of orthopaedic research : official.publication.of the Orthopaedic Research Society	duplicate
Dogan,S.K.; Ay,S.; Evcik,D.; Baser,O.	2011	Adaptation of Turkish version of the questionnaire Quick Disability of the Arm, Shoulder, and Hand (Quick DASH) in patients with carpal tunnel syndrome	Clin.Rheumatol.	+Does not answer a question of interest
Dolhanty,Dorothy	1986	Effectiveness of Splinting for Carpal Tunnel Syndrome		Very low quality
Doll,D.C.; Weiss,R.B.	1977	Unusual presentations of multiple myeloma	Postgrad.Med	Not relevant to CTS; case reports
Domanasiewicz,A.; Koszewicz,M.; Jablecki,J.	2009	Comparison of the diagnostic value of ultrasonography and neurography in carpal tunnel syndrome	Neurol Neurochir.Pol.	insufficient data; very low study design
Donahue; Raynor; Rutkove	1998	Erratum: Forearm velocity in Carpal Tunnel syndrome: When is slow too slow? (Archives of Physical Medicine and Rehabilitation (1998) 79 (181-183))	Arch.Phys.Med.Rehabil.	abstract; no text

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Donaldson,C.C.; Nelson,D.V.; Skubick,D.L.; Clasby,R.G.	1998	Potential contributions of neck muscle dysfunctions to initiation and maintenance of carpal tunnel syndrome	Appl Psychophysiol.Biofeedback	biomechanical review
Dorin,D.; Mann,R.J.	1984	Carpal tunnel syndrome associated with abnormal palmaris longus muscle	South Med J	case report
Dorwart,B.B.	1984	Carpal tunnel syndrome: a review	Semin.Arthritis Rheum.	review
Doyle,J.J.; Parry,G.J.	1995	Entrapment neuropathies	Current Opinion in Orthopaedics	Not relevant to CTS
Doyle,J.R.; Carroll,R.E.	1968	The carpal tunnel syndrome. A review of 100 patients treated surgically	Calif.Med	Retrospective case series
Dray,G.J.; Jablon,M.	1987	Clinical and radiologic features of primary osteoarthritis of the hand	Hand Clin	Background Information
Driskell,J.A.; Wesley,R.L.; Hess,I.E.	1985	Effectiveness of pyridoxine hydrochloride treatment on carpal tunnel syndrome patients	Fed.Proc.	Conference abstract/poster
Drosos,G.I.; Ververidis,A.; Stavropoulos,N.I.; Mavropoulos,R.; Tripsianis,G.; Kazakos,K.	2013	Silicone ring tourniquet versus pneumatic cuff tourniquet in carpal tunnel release: a randomized comparative study	J Orthop Traumatol.	Does not meet inclusion criteria (invasive follow-up<3 month)
Dubert,T.; Racasan,O.	2006	A reliable technique for avoiding the median nerve during carpal tunnel injections	Joint Bone Spine	Does not address question of interest
Duche,R.; Trabelsi,A.	2010	The Canaletto(R) implant for reconstructing transverse carpal ligament in carpal tunnel surgery. Surgical technique and cohort prospective study about 400 Canaletto cases versus 400 cases with open carpal tunnel surgery	Chir Main	very low quality
Duckworth,A.D.; Jenkins,P.J.; Roddam,P.; Watts,A.C.; Ring,D.; McEachan,J.E.	2013	Pain and carpal tunnel syndrome	J Hand Surg Am	+Does not answer a question of interest
Duman,I.; Aydemir,K.; Ozgul,A.; Kalyon,T.A.	2008	Assessment of the efficacy of gabapentin in carpal tunnel syndrome	J Clin Rheumatol.	Very Low Quality
Dunbar,A.H.; Bauman,B.B.	1996	Soft tissue disorders: Women in the work force	Orthopaedic Physical Therapy Clinics of North America	Background Information

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Duncan,I.; Sullivan,P.; Lomas,F.	1999	Sonography in the diagnosis of carpal tunnel syndrome	AJR Am J Roentgenol.	insufficient data; very low study design
Duncan,K.H.; Lewis,R.C.,Jr.; Foreman,K.A.; Nordyke,M.D.	1987	Treatment of carpal tunnel syndrome by members of the American Society for Surgery of the Hand: results of a questionnaire	J Hand Surg Am	Irrelevant
Dunnan,J.B.; Waylonis,G.W.	1991	Wrist flexion as an adjunct to the diagnosis of carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design
Dunne,C.A.; Thompson,P.W.; Cole,J.; Dunning,J.; Martyn,C.N.; Coggon,D.; Cooper,C.	1996	Carpal tunnel syndrome: evaluation of a new method of assessing median nerve conduction at the wrist	Ann.Rheum.Dis	insufficient data; limited control group
Durakoglugil,M.E.; Cicek,Y.; Kocaman,S.A.; Sabri,Balik M.; Kirbas,S.; Cetin,M.; Erdogan,T.; Canga,A.	2013	Increased pulse wave velocity and carotid intima-media thickness in patients with carpal tunnel syndrome	Muscle Nerve	Does not answer a question of interest
Durkan,J.A.	1994	The carpal-compression test. An instrumented device for diagnosing carpal tunnel syndrome	Orthop Rev.	insufficient data; very low study design
Durkan,J.A.	1991	A new diagnostic test for carpal tunnel syndrome	J Bone Joint Surg Am	insufficient data; very low study design
Duymus,M.; Orman,G.; Ozben,S.; Huseyinoglu,N.; Ulasli,A.M.	2014	The association between bifid median nerve and carpal tunnel syndrome: Is it really a risk factor?	Turkish Journal of Rheumatology	prevalence study; low design
Dyck,P.J.; Kratz,K.M.; Lehman,K.A.; Karnes,J.L.; Melton III,L.J.; O'Brien,P.C.; Litchy,W.J.; Windebank,A.J.; Smith,B.E.; Low,P.A.; Service,F.J.; Rizza,R.A.; Zimmerman,B.R.	1991	The Rochester Diabetic Neuropathy Study: Design, criteria for types of neuropathy, selection bias, and reproducibility of neuropathic tests		Does not answer a question of interest; not relevant to CTS
Dyer,G.S.M.; Simmons,B.P.	2010	Therapy: Surgery or nonsurgical therapy for carpal tunnel syndrome?	Nature Reviews Rheumatology	Narrative review
Dyro,F.M.	1977	Carpal tunnel syndrome after brachial plexus lesions	Electroencephalogr.Clin.Neurophysiol.	summary report; commentary

Authors	Year	Article Title	Periodical	Reason for Exclusion
Eason,S.Y.; Belsole,R.J.; Greene,T.L.	1985	Carpal tunnel release: analysis of suboptimal results	J Hand Surg Br	Retrospective case series
Eaton,R.G.	1993	Predictors identified for outcome of carpal tunnel syndrome	Am.Fam.Physician	Commentary/review
Ebrahimzadeh,M.H.; Mashhadinejad,H.; Moradi,A.; Kachooei,A.R.	2013	Carpal tunnel release in diabetic and non-diabetic patients	Arch Bone Jt.Surg	Does not address question of interest
Edgington,E.	1983	Carpal tunnel syndrome - an occupational risk	Can Dent.Hyg.	Commentary/review
Edwards,A.	2002	Phalen's test with carpal compression: testing in diabetics for the diagnosis of carpal tunnel syndrome		not best available evidence
Edwards,A.J.; Sill,B.J.; MacFarlane,I.	1984	Carpal tunnel syndrome due to dystrophic calcification	Aust.N.Z.J Surg	case report
Edwards,K.S.	1990	Square wrists and carpal tunnel syndrome	Ohio Med	Commentary
Eisen,A.; Schomer,D.; Melmed,C.	1977	The application of F-wave measurements in the differentiation of proximal and distal upper limb entrapments		insufficient data; very low study design
Ekenvall,L.; Nilsson,B.Y.; Gustavsson,P.	1986	Temperature and vibration thresholds in vibration syndrome	Br J Ind.Med	not exclusive to CTS; no controls
Ekim,A.; Armagan,O.; Tascioglu,F.; Oner,C.; Colak,M.	2007	Effect of low level laser therapy in rheumatoid arthritis patients with carpal tunnel syndrome	Swiss Med Wkly.	Very low quality
Eklund,G.	1975	A new electrodiagnostic procedure for measuring sensory nerve conduction across the carpal tunnel	Ups.J Med Sci	insufficient data; very low study design
Ekman-Ordeberg,G.; Salgeback,S.; Ordeberg,G.	1987	Carpal tunnel syndrome in pregnancy. A prospective study	Acta Obstet.Gynecol.Scand.	Very low quality
El Miedany,Y.M.; Aty,S.A.; Ashour,S.	2004	Ultrasonography versus nerve conduction study in patients with carpal tunnel syndrome: substantive or complementary tests?	Rheumatology (Oxford)	insufficient data; very low study design
Elfar,J.C.; Yaseen,Z.; Stern,P.J.; Kiefhaber,T.R.	2010	Individual finger sensibility in carpal tunnel syndrome	J Hand Surg Am	+Does not answer a question of interest

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El-Habashy,H.R.; Ahmed,A.F.	2010	Second Lumbrical versus abductor pollicis brevis muscle's latency in carpal tunnel syndrome diagnosis	Egyptian Journal of Neurology, Psychiatry and Neurosurgery	insufficient data; very low study design
El-Hajj,T.; Tohme,R.; Sawaya,R.	2010	Changes in electrophysiological parameters after surgery for the carpal tunnel syndrome	J Clin Neurophysiol.	very low quality
Elkowitz,S.J.; Dubin,N.H.; Richards,B.E.; Wilgis,E.F.	2005	Clinical utility of portable versus traditional electrodiagnostic testing for diagnosing, evaluating, and treating carpal tunnel syndrome	Am J Orthop (Belle.Mead NJ)	+insufficient data; not best evidence
Elliott,J.M.	2007	Ultrasound evaluation of patients with carpal tunnel syndrome before and after endoscopic release of the transverse carpal ligament	Clin.Radiol.	Narrative review
Elliott,R.; Burkett,B.	2013	Massage therapy as an effective treatment for carpal tunnel syndrome	J Bodyw.Mov Ther	Very Low Quality
Ellis,H.	2008	The carpal tunnel		background info
Ellis,J.; Folkers,K.; Watanabe,T.; Kaji,M.; Saji,S.; Caldwell,J.W.; Temple,C.A.; Wood,F.S.	1979	Clinical results of a cross-over treatment with pyridoxine and placebo of the carpal tunnel syndrome	Am J Clin Nutr.	Case report
Ellis,J.M.	1987	Treatment of carpal tunnel syndrome with vitamin B6	South Med J	Insufficient data (missing methods & results)
Ellis,J.M.; Azuma,J.; Watanabe,T.; Fokers,K.; Lowell,J.R.; Hurst,G.A.; Ho,Ahn C.; Shuford,E.H.,Jr.; Ulrich,R.F.	1977	Survey and new data on treatment with pyridoxine of patients having a clinical syndrome including the carpal tunnel and other defects	Res.Commun.Chem.Pathol.Pharmacol.	Incorrect patient population (intervention not exclusive to CTS patients)
Ellis,J.M.; Folkers,K.; Levy,M.; Shizukuishi,S.; Lewandowski,J.; Nishii,S.; Schubert,H.A.; Ulrich,R.	1982	Response of vitamin B-6 deficiency and the carpal tunnel syndrome to pyridoxine	Proc.Natl.Acad Sci U.S.A	Incorrect patient population (<10 patients)
Ellis,J.M.; Kishi,T.; Azuma,J.; Folkers,K.	1976	Therapy of the carpal tunnel syndrome with vitamin B(6)	IRCS Medical Science	Very Low Quality
Ellis,J.R.C.; Mcnally,E.G.; Scott,P.M.	2002	Ultrasound of peripheral nerves	Imaging	Background Information

Authors	Year	Article Title	Periodical	Reason for Exclusion
El-Shahaly,H.A.; el-Sherif,A.K.	1991	Is the benign joint hypermobility syndrome benign?	Clin Rheumatol.	Does not answer a question of interest; not CTS exclusive
Elstraete,A.C.; Pastureau,F.; Lebrun,T.; Mehdaoui,H.	2001	Neostigmine added to lidocaine axillary plexus block for postoperative analgesia	Eur.J.Anaesthesiol.	Deemed clinically irrelevant
Emad,M.R.; Najafi,S.H.; Sepehrian,M.H.	2010	The effect of provocative tests on electrodiagnosis criteria in clinical carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Emad,M.R.; Najafi,S.H.; Sepehrian,M.H.	2009	The effect of provocative tests on electrodiagnosis criteria in clinical carpal tunnel syndrome	J Electromyogr.Kinesiol.	insufficient data; very low study design
Embury,S.P.	1980	The carpal tunnel syndrome in family practice	Nebr.Med J	background
Entin,M.A.	1968	Carpal tunnel syndrome and its variants	Surg Clin North Am	background
Erdemoglu,A.K.	2009	The efficacy and safety of gabapentin in carpal tunnel patients: open label trial	Neurol India	Insufficient data
Erdmann,M.W.	1994	Endoscopic carpal tunnel decompression	J Hand Surg Br	Very low strength
Erhard,L.; Ozalp,T.; Citron,N.; Foucher,G.	1999	Carpal tunnel release by the Agee endoscopic technique. Results at 4 year follow-up	J Hand Surg Br	very low quality
Erselcan,T.; Topalkara,K.; Nacitarhan,V.; Akyuz,A.; Dogan,D.	2001	Carpal tunnel syndrome leads to significant bone loss in metacarpal bones	J Bone Miner.Metab	Does not answer a question of interest; very low study design
Ersoz,M.	2003	Nerve conduction tests in patients with fibromyalgia: comparison with normal controls	Rheumatol.Int.	<10 patients in CTS group; not CTS exclusive
Escobar,P.L.; Goka,R.S.	1985	Carpal tunnel syndrome. Palmar sensory latencies to 3rd digit and wrist	Orthop.Rev.	insufficient data; very low study design
Eskandary,H.; Shahabi,M.; Asadi,A.R.	2002	Evaluation of carpal tunnel syndrome by laser Doppler flowmetry	Iranian Journal of Medical Sciences	no comparison group; very low study design
Eslamian,F.; Bahrami,A.; Aghamohammadzadeh,N.; Niafar,M.; Salekzamani,Y.; Behkamrad,K.	2011	Electrophysiologic changes in patients with untreated primary hypothyroidism	J Clin Neurophysiol.	insufficient data; not exclusive to CTS

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Estébe, J.P.; Gentili, M.E.; Langlois, G.; Moulleron, P.; Bernard, F.; Ecoffey, C.	2003	Lidocaine priming reduces tourniquet pain during intravenous regional anesthesia: A preliminary study	Reg. Anesth. Pain Med.	Deemed clinically irrelevant
Estébe, J.P.; Gentili, M.E.; Langlois, G.; Moulleron, P.; Bernard, F.; Ecoffey, C.	2003	Lidocaine priming reduces tourniquet pain during intravenous regional anesthesia: A preliminary study	Reg Anesth. Pain Med	Duplicate study (duplicate with AAOS ID 14055)
Ettema, A.M.; Amadio, P.C.; Cha, S.S.; Harrington, J.R.; Harris, A.M.; Offord, K.P.	2006	Surgery versus conservative therapy in carpal tunnel syndrome in people aged 70 years and older	Plast. Reconstr. Surg	the study stratifies does a good job stratifying by symptom severity, but the stratification results in less than 10 patients per group for each severity level.
Faber, W.J.	1990	Carpal tunnel syndrome (CTS): An alternative view and treatment approach	Journal of Neurological and Orthopaedic Medicine and Surgery	Background article
Fagarasanu, M.; Kumar, S.	2003	Carpal tunnel syndrome due to keyboarding and mouse tasks: A review	International Journal of Industrial Ergonomics	literature review/background
Faithfull, D.K.; Moir, D.H.; Ireland, J.	1986	The micropathology of the typical carpal tunnel syndrome	J Hand Surg Br	+Does not answer a question of interest
Falck, B.; Aarnio, P.	1983	Left-sided carpal tunnel syndrome in butchers	Scand. J Work Environ. Health	Not relevant, prevalence study
Falkenburg, S.A.	1987	Choosing hand splints to aid carpal tunnel syndrome recovery	Occup. Health Saf	Background article
Fansa, M.R.; Helal, B.	1976	Carpal tunnel syndrome. Surgical treatment	Nurs. Mirror Midwives J	Background article
Faour-Martin, O.; Martin-Ferrero, M.A.; Almaraz-Gomez, A.; Vega-Castrillo, A.	2012	The long-term post-operative electromyographic evaluation of patients who have undergone carpal tunnel decompression	J Bone Joint Surg Br	Retrospective case series
Faour-Martin, O.; Martin-Ferrero, M.A.; Vega, Castrillo A.; Almaraz-Gomez, A.; Valverde-Garcia, J.A.; Amigo, Linares L.; Red-Gallego, M.A.	2013	Long-term effects of preserving or splitting the carpal ligament in carpal tunnel operation	J Plast. Surg Hand Surg	Narrative review (analysis of prior study)

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Farhat,S.M.; Kahn,E.A.; Child,M.A.	1974	The carpal tunnel syndrome	Surg Neurol	background
Farkkila,M.; Pyykko,I.; Jantti,V.; Aatola,S.; Starck,J.; Korhonen,O.	1988	Forestry workers exposed to vibration: a neurological study	Br J Ind.Med	Not relevant, prevalence study
Farouk,S.; Aly,A.	2010	Quality of lidocaine analgesia with and without midazolam for intravenous regional anesthesia	Journal of Anesthesia	Deemed clinically irrelevant
Feathers,D.J.; Rollings,K.; Hedge,A.	2013	Alternative computer mouse designs: performance, posture, and subjective evaluations for college students aged 18-25	Work	Does not answer a question of interest; no diagnosis of CTS
Feffer,H.L.	1975	Regional use of steroids in the management of lumbar intervertebral disc disease	Orthop.Clin.North Am.	Background information
Feierstein,M.S.	1988	The performance and usefulness of nerve conduction studies in the orthopedic office	Orthop Clin North Am	review; background information
Feldman,R.G.; Goldman,R.; Keyserling,W.M.	1983	Classical syndromes in occupational medicine. Peripheral nerve entrapment syndromes and ergonomic factors	Am J Ind.Med	Background Information
Feldman,R.G.; Goldman,R.; Keyserling,W.M.	1983	Peripheral nerve entrapment syndromes and ergonomic factors	Am.J.Ind.Med.	Background Information
Feldman,R.G.; Travers,P.H.; Chirico-Post,J.; Keyserling,W.M.	1987	Risk assessment in electronic assembly workers: carpal tunnel syndrome	J Hand Surg Am	Does not answer a question of interest; no diagnosis of CTS
Feldon,P.; Terrono,A.L.	2006	Carpal tunnel syndrome in rheumatoid arthritis	Techniques in Orthopaedics	Background Information
Felsenthal,G.	1978	Comparison of evoked potentials in the same hand in normal subjects and in patients with carpal tunnel syndrome	Am J Phys Med	insufficient data; very low study design
Felsenthal,G.; McIvor,M.E.	1984	Reappraisal of the electroneurographic and electromyographic diagnosis of diabetic peripheral neuropathy	Am J Phys Med	Does not answer a question of interest; not CTS exclusive

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Felsenthal,G.; Spindler,H.	1979	Palmar conduction time of median and ulnar nerves of normal subjects and patients with carpal tunnel syndrome	Am J Phys Med	insufficient data; very low study design
Fernandes,C.H.; Nakachima,L.R.; Hirakawa,C.K.; Gomes Dos Santos,J.B.; Faloppa,F.	2014	Carpal tunnel release using the Paine retinaculotome inserted through a palmar incision	Hand (N.Y)	Background article
Fernandez,E.; Pallini,R.; Lauretti,L.; Scogna,A.; La,Marca F.	1997	Carpal tunnel syndrome	Surg Neurol	background
Fernandez-de-las-Penas,C.; Cleland,J.A.; Ortega-Santiago,R.; de-la-Llave-Rincon AI; Martinez-Perez,A.; Pareja,J.A.	2010	Central sensitization does not identify patients with carpal tunnel syndrome who are likely to achieve short-term success with physical therapy	Exp.Brain Res.	all CTS cases; no comparison group
Fernandez-de-las-Penas,C.; Madeleine,P.; Martinez-Perez,A.; Arendt-Nielsen,L.; Jimenez-Garcia,R.; Pareja,J.A.	2010	Pressure pain sensitivity topographical maps reveal bilateral hyperalgesia of the hands in patients with unilateral carpal tunnel syndrome	Arthritis Care Res.(Hoboken.)	+Does not answer a question of interest; very low study design
Fernandez-de-las-Penas,C.; Perez-de-Heredia-Torres,M.; Martinez-Piedrola,R.; de la Llave-Rincon AI; Cleland,J.A.	2009	Bilateral deficits in fine motor control and pinch grip force in patients with unilateral carpal tunnel syndrome	Exp.Brain Res.	insufficient data; very low study design
Fernandez-De-Las-Penas,C.; De La Llave-Rincon,A.I.; Fernandez-Carnero,J.; Cuadrado,M.L.; Arendt-Nielsen,L.; Pareja,J.A.	2009	Bilateral widespread mechanical pain sensitivity in carpal tunnel syndrome: Evidence of central processing in unilateral neuropathy		insufficient data; very low study design
Ferrara,M.A.; Marcelis,S.	1997	Continuing education: Ultrasound examination of the wrist	J.Belge Radiol.	Background Information
Ferry,S.; Hannaford,P.; Warskyj,M.; Lewis,M.; Croft,P.	2000	Carpal tunnel syndrome: a nested case-control study of risk factors in women	Am J Epidemiol.	very low quality
Ferry,S.; Pritchard,T.; Keenan,J.; Croft,P.; Silman,A.J.	1998	Is delayed nerve conduction associated with increased self-reported disability in individuals with hand symptoms? A population based study	J Rheumatol.	+Does not answer a question of interest

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Fertl,E.; Wober,C.; Zeitlhofer,J.	1998	The serial use of two provocative tests in the clinical diagnosis of carpal tunnel syndrome	Acta Neurol Scand.	insufficient data; very low study design
Feuerstein,M.; Burrell,L.M.; Miller,V.I.; Lincoln,A.; Huang,G.D.; Berger,R.	1999	Clinical management of carpal tunnel syndrome: a 12-year review of outcomes	Am J Ind.Med	systematic review
Feuerstein,M.; Carosella,A.M.; Burrell,L.M.; Marshall,L.; DeCaro,J.	1997	Occupational upper extremity symptoms in sign language interpreters: Prevalence and correlates of pain, function, and work disability	Journal of Occupational Rehabilitation	Not relevant, prevalence study
Field,T.; Diego,M.; Cullen,C.; Hartshorn,K.; Gruskin,A.; Hernandez-Reif,M.; Sunshine,W.	2004	Carpal tunnel syndrome symptoms are lessened following massage therapy	Journal of Bodywork and Movement Therapies	Incorrect patient population (<10 patients/group)
Filius,A.; Korstanje,J.W.; Selles,R.W.; Hovius,S.E.; Slijper,H.P.	2013	Dynamic sonographic measurements at the carpal tunnel inlet: reliability and reference values in healthy wrists	Muscle Nerve	only healthy study subjects
Finestone,H.M.; Woodbury,G.M.; Collavini,T.; Marchuk,Y.; Maryniak,O.	1996	Severe carpal tunnel syndrome: clinical and electrodiagnostic outcome of surgical and conservative treatment	Muscle Nerve	Retrospective case series
Finger,D.; Vogel,P.	1998	Carpal tunnel syndrome	Arthritis Rheum.	background
Finkel,M.L.	1985	The effects of repeated mechanical trauma in the meat industry	Am J Ind.Med	Background Information
Finsen,V.; Russwurm,H.	2001	Neurophysiology not required before surgery for typical carpal tunnel syndrome	J Hand Surg Br	not best available evidence
Fisher,D.L.; Andres,R.O.; Airth,D.; Smith,S.S.	1993	Repetitive motion disorders: The design of optimal rate-rest profiles	Hum.Factors	Does not address question of interest
Fisher,T.F.	1998	Preventing upper extremity cumulative trauma disorders: An approach to employee wellness	AAOHN J.	Background info
Fisette,J.; Onkelinx,A.; Fandi,N.	1981	Carpal and Guyon tunnel syndrome in burns at the wrist	J Hand Surg Am	<10 patients per group; no comparison group
Fitz,W.R.; Mysiw,W.J.; Johnson,E.W.	1990	First lumbrical latency and amplitude. Control values and findings in carpal tunnel syndrome	Am J Phys Med Rehabil.	+Does not answer a question of interest; no comparison of modalities

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Flak,M.; Durmala,J.; Czernicki,K.; Dobosiewicz,K.	2006	Double crush syndrome evaluation in the median nerve in clinical, radiological and electrophysiological examination	Stud.Health Technol.Inform.	Does not answer a question of interest; very low study design
Flaschka,G.; Eder,H.; Mullegger,G.; Gindl,H.K.	1991	Follow-up results of surgery for carpal tunnel syndrome in local anesthesia	Zentralbl.Neurochir.	does not answer a question of interest; no comparison group
Fleck,H.; Feldman,M.E.	1982	Compression syndromes at wrist. Precise diagnostic procedures	N.Y State J Med	background
Fleming,A.; Dodman,S.; Crown,J.M.; Corbett,M.	1976	Extra-articular features in early rheumatoid disease	Br Med J	+not exclusive to CTS; not best available evidence
Fletcher,S.J.; Hulgur,M.D.; Varma,S.; Lawrence,E.; Boome,R.S.; Oswal,S.	2011	Use of a temporary forearm tourniquet for intravenous regional anaesthesia: A randomised controlled trial	Eur.J.Anaesthesiol.	Incorrect patient population (not exclusive to CTS patients)
Flinn,S.R.; Pease,W.S.; Freimer,M.L.	2012	Score reliability and construct validity of the Flinn Performance Screening Tool for adults with symptoms of carpal tunnel syndrome	Am J Occup.Ther	insufficient data
Flondell,M.; Hofer,M.; Bjork,J.; Atroshi,I.	2010	Local steroid injection for moderately severe idiopathic carpal tunnel syndrome: protocol of a randomized double-blind placebo-controlled trial (NCT 00806871)	BMC Musculoskelet.Disord.	Study protocol/insufficient data
Florack,T.M.; Miller,R.J.; Pellegrini,V.D.; Burton,R.I.; Dunn,M.G.	1992	The prevalence of carpal tunnel syndrome in patients with basal joint arthritis of the thumb	J Hand Surg Am	no comparison group; not best available evidence
Flores,L.P.; Cavalcante,T.F.; Neto,O.R.; Alcantara,F.S.	2009	Quantitative analysis of the variation in angles of the carpal arch after open and endoscopic carpal tunnel release. Clinical article	J Neurosurg.	no patient oriented outcomes
Fodor,J.,III; Malott,J.C.; Merhar,G.L.	1987	Carpal tunnel syndrome: the role of radiography	Radiol.Technol.	Background Information
Folkers,K.; Ellis,J.	1990	Successful therapy with vitamin B6 and vitamin B2 of the carpal tunnel syndrome and need for determination of	Ann.N.Y Acad Sci	Narrative review

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		the RDAs for vitamins B6 and B2 for disease states		
Folkers,K.; Saji,S.; Kaji,M.; Ellis,J.	1977	Biochemical evidence for a deficiency of vitamin B(6) in the carpal tunnel syndrome	Acta Pharm.Suec.	Background article
Folkers,K.; Willis,R.; Takamura,K.	1981	Biochemical correlations of a deficiency of vitamin B(6), the carpal tunnel syndrome and the Chinese restaurant syndrome	IRCS Medical Science	Does not answer a question of interest; very low study design
Follmar,K.E.; Chetelat,M.D.; Lifchez,S.D.	2012	Outcome of endoscopic carpal tunnel release in patients with chronic nonhand pain compared with those without chronic pain	J Hand Surg Am	very low quality
Foresti,C.; Quadri,S.; Rasella,M.; Tironi,F.; Viscardi,M.; Ubiali,E.	1996	Carpal tunnel syndrome: which electrodiagnostic path should we follow? A prospective study of 100 consecutive patients	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Forward,D.P.; Singh,A.K.; Lawrence,T.M.; Sithole,J.S.; Davis,T.R.; Oni,J.A.	2006	Preservation of the ulnar bursa within the carpal tunnel: does it improve the outcome of carpal tunnel surgery? A randomized, controlled trial	J Bone Joint Surg Am	Does not meet inclusion criteria (invasive follow-up<3 month)
Foster,R.J.	1984	Wrist pain. How to identify the cause and treat it	Postgrad.Med	background
Foulkes,G.D.; Atkinson,R.E.; Beuchel,C.; Doyle,J.R.; Singer,D.I.	1994	Outcome following epineurotomy in carpal tunnel syndrome: a prospective, randomized clinical trial	J Hand Surg Am	Not 10 patients in each group at any follow up.
Fowler,J.R.; Gaughan,J.P.; Ilyas,A.M.	2011	The sensitivity and specificity of ultrasound for the diagnosis of carpal tunnel syndrome: a meta-analysis	Clin Orthop Relat Res.	meta-analysis
Franklin,G.M.; Haug,J.; Heyer,N.; Checkoway,H.; Peck,N.	1991	Occupational carpal tunnel syndrome in Washington State, 1984-1988	Am J Public Health	all CTS patients; no comparison group
Franzblau,A.; Rock,C.L.; Werner,R.A.; Albers,J.W.; Kelly,M.P.; Johnston,E.C.	1996	The relationship of vitamin B6 status to median nerve function and carpal tunnel syndrome among active industrial workers	J Occup.Environ.Med	Not relevant, not a risk study

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Franzblau,A.; Werner,R.; Valle,J.; Johnston,E.	1993	Workplace surveillance for carpal tunnel syndrome: A comparison of methods	J Occup.Rehabil.	not best available evidence; very low study design
Freiberg,A.	2006	The now popular and 'fashionable' carpal tunnel syndrome - revisited	Can J Plast.Surg	editorial
Freilich,A.M.; Chhabra,A.B.	2007	Diagnosis and pathophysiology of carpal tunnel syndrome	Current Opinion in Orthopaedics	background
Freshwater,M.F.; Arons,M.S.	1978	The effect of various adjuncts on the surgical treatment of carpal tunnel syndrome secondary to chronic tenosynovitis	Plast.Reconstr.Surg	was relevant to rec 8 because the treatment group gets neurolysis, but they also get concomitant corticosteroids. would be unable to tell if the neurolysis or steroids cause the effect.
Frost,P.; Andersen,J.H.; Nielsen,V.K.	1998	Occurrence of carpal tunnel syndrome among slaughterhouse workers	Scand.J Work Environ.Health	very low study design; not best evidence
Fry,H.J.H.	1989	Overuse syndromes in instrumental musicians	Semin.Neurol.	Background Information
Fuchs,P.C.; Nathan,P.A.; Myers,L.D.	1991	Synovial histology in carpal tunnel syndrome	J Hand Surg Am	cadavers included in study
Fuhr,J.E.; Farrow,A.; Nelson,H.S.,Jr.	1989	Vitamin B6 levels in patients with carpal tunnel syndrome	Arch Surg	+Does not answer a question of interest
Fung,B.K.; Chan,K.Y.; Lam,L.Y.; Cheung,S.Y.; Choy,N.K.; Chu,K.W.; Chung,L.Y.; Liu,W.W.; Tai,K.C.; Yung,S.Y.; Yip,S.L.	2007	Study of wrist posture, loading and repetitive motion as risk factors for developing carpal tunnel syndrome	Hand Surg	very low quality
Futami,T.; Kubodera,D.; Tsumamoto,Y.	1989	Subcutaneous division of the transverse carpal ligament by the use of a teflon tube and an arthroscopy	Journal of the Western Pacific Orthopaedic Association	Retrospective case series
Galea,L.A.; Mercieca,A.; Sciberras,C.; Gatt,R.; Schembri,M.	2006	Evaluation of sympathetic vasomotor fibres in carpal tunnel syndrome using continuous wave Doppler ultrasonography	J Hand Surg Br	insufficient data; very low study design

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Ganeriwal,A.A.; Biswas,D.A.; Srivastava,T.K.	2013	The effects of working hours on nerve conduction test in computer operators	Malaysian Orthopaedic Journal	not best available evidence; no diagnosis of CTS
Gangopadhyay,S.; Chakrabarty,S.; Sarkar,K.; Dev,S.; Das,T.; Banerjee,S.	2014	An ergonomics study on the evaluation of carpal tunnel syndrome among Chikan embroidery workers of West Bengal, India	Int J Occup Environ Health	no diagnosis of CTS; regression model for wrist/forearm pain
Gannon,C.; Baratz,K.; Baratz,M.E.	2007	The Synovial Flap in Recurrent and Failed Carpal Tunnel Surgery	Operative Techniques in Orthopaedics	Retrospective case series
Gannon,C.R.; Harlan,J.; Baratz,M.E.	2011	Safe limited-open carpal tunnel release in the presence of aberrant anatomy	Hand (N.Y)	Retrospective case series
Ganske,J.G.	1986	Enlarged median nerve of macrodactyly associated with carpal tunnel syndrome	Iowa Med	case report
Garcia,Mas R.; Veja,J.; Golano,P.	2006	Non-endoscopic double-incision approach for median nerve decompression in idiopathic carpal tunnel syndrome. A comparative study of 155 hands	The Journal of Bone and Joint Surgery	Insufficient data
Garfinkel,M.	2006	Yoga as a complementary therapy	Geriatrics and Aging	Background article
Garg,A.; Hegmann,K.T.; Wertsch,J.J.; Kapellusch,J.; Thiese,M.S.; Bloswick,D.; Merryweather,A.; Sesek,R.; Deckow-Schaefer,G.; Foster,J.; Wood,E.; Kendall,R.; Sheng,X.; Holubkov,R.	2012	The WISTAH hand study: a prospective cohort study of distal upper extremity musculoskeletal disorders	BMC Musculoskelet.Disord.	insufficient data
Gay,R.E.; Amadio,P.C.; Johnson,J.C.	2003	Comparative responsiveness of the disabilities of the arm, shoulder, and hand, the carpal tunnel questionnaire, and the SF-36 to clinical change after carpal tunnel release	J Hand Surg Am	+not best available evidence
Gebhard,R.E.; Al-Samsam,T.; Greger,J.; Khan,A.; Chelly,J.E.	2002	Distal nerve blocks at the wrist for outpatient carpal tunnel surgery offer intraoperative cardiovascular stability and reduce discharge time	Anesth.Analg.	Very low quality

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Gedizlioglu,M.; Arpaci,E.; Cevher,D.; Ce,P.; Kulan,C.A.; Colak,I.; Duzgun,B.	2008	Carpal tunnel syndrome in the Turkish steel industry	Occup.Med (Lond)	Not relevant, prevalence study
Geere,J.; Chester,R.; Kale,S.; Jerosch-Herold,C.	2007	Power grip, pinch grip, manual muscle testing or thenar atrophy - which should be assessed as a motor outcome after carpal tunnel decompression? A systematic review	BMC Musculoskelet.Disord.	systematic review
Gelberman,R.H.; Aronson,D.; Weisman,M.H.	1980	Carpal-tunnel syndrome. Results of a prospective trial of steroid injection and splinting	J Bone Joint Surg Am	Very Low Quality
Gelberman,R.H.; Hergenroeder,P.T.; Hargens,A.R.; Lundborg,G.N.; Akeson,W.H.	1981	The carpal tunnel syndrome. A study of carpal canal pressures	J Bone Joint Surg Am	+not best available evidence; confounding comorbidities
Gelberman,R.H.; Rydevik,B.L.; Pess,G.M.; Szabo,R.M.; Lundborg,G.	1988	Carpal tunnel syndrome. A scientific basis for clinical care	Orthop Clin North Am	Narrative review
Gellman,H.; Chandler,D.R.; Petrusek,J.; Sie,I.; Adkins,R.; Waters,R.L.	1988	Carpal tunnel syndrome in paraplegic patients	J Bone Joint Surg Am	<10 patients per group
Gellman,H.; Gelberman,R.H.; Tan,A.M.; Botte,M.J.	1986	Carpal tunnel syndrome. An evaluation of the provocative diagnostic tests	J Bone Joint Surg Am	insufficient data; very low study design
Gelmers,H.J.	1981	Primary carpal tunnel stenosis as a cause of entrapment of the median nerve	Acta Neurochir.(Wien.)	insufficient data; baseline patients with CTS
Gelmers,H.J.	1979	The significance of Tinel's sign in the diagnosis of carpal tunnel syndrome	Acta Neurochir.(Wien.)	insufficient data; very low study design
Gentili,M.; Bernard,J.-M.; Bonnet,F.	1999	Adding clonidine to lidocaine for intravenous regional anesthesia prevents tourniquet pain	Anesth.Analg.	Insufficient data (data reported in medians)
Georgiew,F.; Maciejczak,A.; Florek,J.	2014	Results of surgical treatment of carpal tunnel syndrome	Ortop.Traumatol.Rehabil	Foreign language
Geronimo,G.; Caccese,A.F.; Caruso,L.; Soldati,A.; Passaretti,U.	2009	Treatment of carpal tunnel syndrome with alpha-lipoic acid	Eur.Rev.Med.Pharmacol.Sci.	Duplicate article (duplicate with AAOS ID 445)

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Gerr,F.; Letz,R.; Harris-Abbott,D.; Hopkins,L.C.	1995	Sensitivity and specificity of vibrometry for detection of carpal tunnel syndrome	J Occup.Environ.Med	insufficient data; very low study design
Gerr,F.; Marcus,M.; Ensor,C.; Kleinbaum,D.; Cohen,S.; Edwards,A.; Gentry,E.; Ortiz,D.J.; Monteilh,C.	2002	A prospective study of computer users: I. Study design and incidence of musculoskeletal symptoms and disorders	Am.J.Ind.Med.	Not relevant to CTS
Gerritsen,A.A.; de Krom,M.C.; Struijs,M.A.; Scholten,R.J.; de Vet,H.C.; Bouter,L.M.	2002	Conservative treatment options for carpal tunnel syndrome: a systematic review of randomised controlled trials	J Neurol	Systematic review
Gerritsen,A.A.; Scholten,R.J.; Assendelft,W.J.; Kuiper,H.; de Vet,H.C.; Bouter,L.M.	2001	Splinting or surgery for carpal tunnel syndrome? Design of a randomized controlled trial [ISRCTN18853827]	BMC Neurol	Does not answer question of interest (study protocol)
Gerritsen,A.A.; Uitdehaag,B.M.; van,Geldere D.; Scholten,R.J.; de Vet,H.C.; Bouter,L.M.	2001	Systematic review of randomized clinical trials of surgical treatment for carpal tunnel syndrome	Br J Surg	systematic review
Gerwatowski,L.J.; McFall,D.B.; Stach,D.J.	1992	Carpal tunnel syndrome. Risk factors and preventive strategies for the dental hygienist	J Dent.Hyg.	literature review; background information
Ghaly,R.F.; Saban,K.L.; Haley,D.A.; Ross,R.E.	2000	Endoscopic carpal tunnel release surgery: report of patient satisfaction	Neurol Res.	Retrospective case series
Ghasemi-Esfe,A.R.; Khalilzadeh,O.; Mazloumi,M.; Vaziri-Bozorg,S.M.; Niri,S.G.; Kahnouji,H.; Rahmani,M.	2011	Combination of high-resolution and color Doppler ultrasound in diagnosis of carpal tunnel syndrome	Acta Radiol.	insufficient data; very low study design
Ghasemi-Esfe,A.R.; Khalilzadeh,O.; Vaziri-Bozorg,S.M.; Jajroudi,M.; Shakiba,M.; Mazloumi,M.; Rahmani,M.	2011	Color and power Doppler US for diagnosing carpal tunnel syndrome and determining its severity: a quantitative image processing method		insufficient data; very low study design
Ghasemi-Esfe,A.R.; Morteza,A.; Khalilzadeh,O.; Mazloumi,M.; Ghasemi-Esfe,M.; Rahmani,M.	2012	Color Doppler ultrasound for evaluation of vasomotor activity in patients with carpal tunnel syndrome	Skeletal Radiol.	insufficient data; very low study design
Ghavanini,M.R.; Haghighat,M.	1998	Carpal tunnel syndrome: reappraisal of five clinical tests	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design

Authors	Year	Article Title	Periodical	Reason for Exclusion
Ghavanini,M.R.; Kazemi,B.; Jazayeri,M.; Khosrawi,S.	1996	Median-radial sensory latencies comparison as a new test in carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	no comparison of modalities; very low study design
Gheorghiu,N.; Orban,H.B.; Adam,R.; Popescu,D.	2010	Hand disorders in pregnancy: De Quervain's tenosynovitis and carpal tunnel syndrome	Gineco.ro	Background article
Giannini,F.; Cioni,R.; Mondelli,M.; Padua,R.; Gregori,B.; D'Amico,P.; Padua,L.	2002	A new clinical scale of carpal tunnel syndrome: validation of the measurement and clinical-neurophysiological assessment	Clin Neurophysiol.	+Does not answer a question of interest/insufficient data
Giannini,F.; Passero,S.; Cioni,R.; Paradiso,C.; Battistini,N.; Giordano,N.; Vaccai,D.; Marcolongo,R.	1991	Electrophysiologic evaluation of local steroid injection in carpal tunnel syndrome	Arch Phys Med Rehabil.	Very Low Quality
Gibbs,K.E.; Rand,W.; Ruby,L.K.	1996	Open vs endoscopic carpal tunnel release		very low quality
Gibson,M.	1990	Outpatient carpal tunnel decompression without tourniquet: a simple local anaesthetic technique	Ann.R Coll Surg Engl.	Very low quality
Giele,H.	2001	Evidence-based treatment of carpal tunnel syndrome	Current Orthopaedics	background
Giersiepen,K.; Eberle,A.; Pohlabein,H.	2000	Gender differences in carpal tunnel syndrome? occupational and non-occupational risk factors in a population-based case-control study	Ann.Epidemiol.	insufficient data
Giersiepen,K.; Spallek,M.	2011	Carpal tunnel syndrome as an occupational disease	Dtsch.Arztbl.Int.	systematic review
Gilbert,M.S.; Robinson,A.; Baez,A.; Gupta,S.; Glabman,S.; Haimov,M.	1988	Carpal tunnel syndrome in patients who are receiving long-term renal hemodialysis	J Bone Joint Surg Am	all CTS cases; no comparison group
Gilliatt,R.W.; Meer,J.	1990	The refractory period of transmission in patients with carpal tunnel syndrome	Muscle Nerve	no comparison of modalities; very low study design
Ginanneschi,F.; Dominici,F.; Milani,P.; Biasella,A.; Rossi,A.	2007	Evidence of altered motor axon properties of the ulnar nerve in carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; very low study design

Authors	Year	Article Title	Periodical	Reason for Exclusion
Ginanneschi,F.; Filippou,G.; Bonifazi,M.; Frediani,B.; Rossi,A.	2013	Effects of Local Corticosteroid Injection on Electrical Properties of Abeta-Fibers in Carpal Tunnel Syndrome	J Mol.Neurosci.	Very Low Quality
Ginanneschi,F.; Filippou,G.; Bonifazi,M.; Frediani,B.; Rossi,A.	2014	Effects of local corticosteroid injection on electrical properties of A(beta)-fibers in carpal tunnel syndrome	J.Mol.Neurosci.	Very low quality
Ginanneschi,F.; Milani,P.; Filippou,G.; Mondelli,M.; Frediani,B.; Melcangi,R.C.; Rossi,A.	2012	Evidences for antinociceptive effect of 17-alpha-hydroxyprogesterone caproate in carpal tunnel syndrome	J Mol.Neurosci.	Incorrect patient population (<10 patients/group)
Ginanneschi,F.; Milani,P.; Mondelli,M.; Dominici,F.; Biasella,A.; Rossi,A.	2008	Ulnar sensory nerve impairment at the wrist in carpal tunnel syndrome	Muscle Nerve	+Does not answer a question of interest
Ginanneschi,F.; Mondelli,M.; Dominici,F.; Rossi,A.	2006	Changes in motor axon recruitment in the median nerve in mild carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; very low study design
Giordano,N.; Battisti,E.; Franci,A.; Magaro,L.; Marcucci,P.; Ceconami,L.; Marcolongo,R.	1992	Telethermographic assessment of carpal tunnel syndrome	Scand.J Rheumatol.	insufficient data; very low study design
Girlanda,P.; Quartarone,A.; Sinicropi,S.; Pronesti,C.; Nicolosi,C.; Macaione,V.; Picciolo,G.; Messina,C.	1998	Electrophysiological studies in mild idiopathic carpal tunnel syndrome	Electroencephalogr.Clin Neurophysiol.	insufficient data; very low study design
Glass,I.; Ring,H.	1995	Median nerve conduction tests and Phalen's sign in carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	+not best available evidence
Glynn,A.; Strunk,S.; Reidy,D.; Hynes,D.E.	2005	Carpal tunnel release using local anaesthetic and a forearm tourniquet	Ir.Med J	Retrospective case series
Gnatz,S.M.	1999	The role of needle electromyography in the evaluation of patients with carpal tunnel syndrome: Needle EMG is important	Muscle Nerve	background information; commentary
Gnatz,S.M.; Conway,R.R.	1999	The role of needle electromyography in the evaluation of patients with carpal tunnel syndrome	Muscle Nerve	Commentary/review

Authors	Year	Article Title	Periodical	Reason for Exclusion
Goadsby,P.J.; Burke,D.	1994	Deficits in the function of small and large afferent fibers in confirmed cases of carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Goddard,D.H.; Barnes,C.G.; Berry,H.; Evans,S.	1983	Measurement of nerve conduction--a comparison of orthodromic and antidromic methods	Clin Rheumatol.	insufficient data; very low study design
Goetz,J.E.; Kunze,N.M.; Main,E.K.; Thedens,D.R.; Baer,T.E.; Lawler,E.A.; Brown,T.D.	2013	MRI-apparent localized deformation of the median nerve within the carpal tunnel during functional hand loading	Ann.Biomed Eng	insufficient data; very low study design
Gohl,A.P.; Clayton,S.Z.; Strickland,K.; Bufford,Y.D.; Halle,J.S.; Greathouse,D.G.	2006	Median and ulnar neuropathies in University Pianists	Medical Problems of Performing Artists	insufficient data; no comparison group
Goldfarb,A.R.; Saadeh,P.B.; Sander,H.W.	2005	Effect of amplifier gain setting on distal motor latency in normal subjects and CTS patients	Clin Neurophysiol.	insufficient data; very low study design
Golding,D.; Wilson,P.	1989	Rheumatism and the menopause		Background Information
Golding,D.N.	1990	Vibration white finger associated with carpal tunnel syndrome	Journal of Orthopaedic Rheumatology	case report
Golding,D.N.; Rose,D.M.; Selvarajah,K.	1986	Clinical tests for carpal tunnel syndrome: an evaluation	Br J Rheumatol.	not best available evidence
Goldman,A.B.; Bansal,M.	1996	Amyloidosis and silicone synovitis: Updated classification, updated pathophysiology, and synovial articular abnormalities	Radiol.Clin.North Am.	Background Information
Goldman,R.L.	1970	Amyloidosis and carpal-tunnel syndrome	N.Engl.J Med	letter to the editor
Golik,A.; Modai,D.; Pervin,R.; Marcus,E.L.; Fried,K.	1988	Autosomal dominant carpal tunnel syndrome in a Karaite family	Isr.J Med Sci	Not relevant
Goloborod'ko,S.A.	2004	Provocative test for carpal tunnel syndrome	J Hand Ther	insufficient data; very low study design
Gomes,I.; Becker,J.; Ehlers,J.A.; Kapczinski,F.; Nora,D.B.	2004	Seasonal distribution and demographical characteristics of carpal tunnel syndrome in 1039 patients	Arq Neuropsiquiatr.	all CTS cases; no comparison group
Gominak,S.; Cros,D.; Shahani,B.	1990	Magnetic stimulation F-responses	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design

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Gong,H.S.; Oh,J.H.; Bin,S.W.; Kim,W.S.; Chung,M.S.; Baek,G.H.	2008	Clinical features influencing the patient- based outcome after carpal tunnel release	J Hand Surg Am	insufficient data; no comparison group
Gong,H.S.; Oh,J.H.; Kim,W.S.; Kim,S.H.; Rhee,S.H.; Baek,G.H.	2011	The effect of dividing muscles superficial to the transverse carpal ligament on carpal tunnel release outcomes	J Hand Surg Am	very low quality
Gonzalez del,Pino J.; Delgado- Martinez,A.D.; Gonzalez,Gonzalez,I; Lovic,A.	1997	Value of the carpal compression test in the diagnosis of carpal tunnel syndrome	J Hand Surg Br	insufficient data; very low study design
Gonzalez,M.H.; Bylak,J.	2001	Steroid injection and splinting in the treatment of carpal tunnel syndrome		Very Low Quality
Goodman,C.M.; Steadman,A.K.; Meade,R.A.; Bodenheimer,C.; Thornby,J.; Netscher,D.T.	2001	Comparison of carpal canal pressure in paraplegic and nonparaplegic subjects: clinical implications	Plast.Reconstr.Surg	<10 patients per group; very low study design
Goodyear-Smith,F.; Arroll,B.	2004	What can family physicians offer patients with carpal tunnel syndrome other than surgery? A systematic review of nonsurgical management	Ann.Fam Med	Systematic review
Gordon,C.; Bowyer,B.L.; Johnson,E.W.	1987	Electrodiagnostic characteristics of acute carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; no comparison group
Gordon,T.; Amirjani,N.; Edwards,D.C.; Chan,K.M.	2010	Brief post-surgical electrical stimulation accelerates axon regeneration and muscle reinnervation without affecting the functional measures in carpal tunnel syndrome patients	Exp.Neurol	Very low strength
Gorsche,R.G.; Wiley,J.P.; Brant,R.; Renger,R.F.; Sasyniuk,T.M.; Burke,N.	2002	Comparison of outcomes of untreated carpal tunnel syndrome and asymptomatic controls in meat packers	Occup.Med (Lond)	+Does not answer a question of interest
Gossett,J.G.; Chance,P.F.	1998	Is there a familial carpal tunnel syndrome? An evaluation and literature review	Muscle Nerve	literature review
Gould,J.S.; Wissinger,H.A.	1978	Carpal tunnel syndrome in pregnancy	South Med J	Does not address question of interest

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Gousheh,J.; Iranpour,A.	2005	Association between carpal tunnel syndrome and arteriovenous fistula in hemodialysis patients	Plast.Reconstr.Surg	very low study design
Goyal,V.; Bhatia,M.; Padma,M.V.; Jain,S.; Maheshwari,M.C.	2001	Electrophysiological evaluation of 140 hands with carpal tunnel syndrome	J Assoc Physicians India	insufficient data; no comparison of modalities
Graeber,M.C.; Lucas,A.B.	2000	Management of pregnancy related carpal tunnel syndrome	J Miss.State Med Assoc	Case reports
Graham,B.	2009	Nonsurgical treatment of carpal tunnel syndrome	J Hand Surg Am	Background article
Graham,B.; Dvali,L.; Regehr,G.; Wright,J.G.	2006	Variations in diagnostic criteria for carpal tunnel syndrome among Ontario specialists	Am J Ind.Med	Does not answer a question of interest
Graham,B.; Regehr,G.; Naglie,G.; Wright,J.G.	2006	Development and validation of diagnostic criteria for carpal tunnel syndrome	J Hand Surg Am	case series; expert panel
Graham,B.; Regehr,G.; Wright,J.G.	2003	Delphi as a method to establish consensus for diagnostic criteria	J Clin Epidemiol.	background
Graham,B.A.	2003	Two weeks of prednisolone was as effective as four weeks in improving carpal tunnel syndrome symptoms	J Bone Joint Surg Am	Review
Graham,J.G.	1982	Neurological complications of pregnancy and anaesthesia	Clin Obstet.Gynaecol.	Background article
Graham,R.A.	1983	Carpal tunnel syndrome. A statistical analysis of 214 cases		Retrospective case series
Grant,A.J.; Buckels,J.A.; Neuberger,J.	1998	Symptomatic carpal tunnel syndrome after orthotopic liver transplantation: a retrospective analysis		no comparison group; very low study design
Grant,G.A.; Goodkin,R.; Maravilla,K.R.; Kliot,M.	2004	MR neurography: Diagnostic utility in the surgical treatment of peripheral nerve disorders	Neuroimaging Clin.N.Am.	review; background information
Grant,K.A.; Congleton,J.J.; Koppa,R.J.; Lessard,C.S.; Huchingson,R.D.	1992	Use of motor nerve conduction testing and vibration sensitivity testing as screening tools for carpal tunnel syndrome in industry	J Hand Surg Am	insufficient data; very low study design
Gray,R.G.; Gottlieb,N.L.	1977	Hand flexor tenosynovitis in rheumatoid arthritis. Prevalence,	Arthritis Rheum.	Not relevant to CTS

Authors	Year	Article Title	Periodical	Reason for Exclusion
		distribution, and associated rheumatic features		
Gray,R.G.; Gottlieb,N.L.	1976	Rheumatic disorders associated with diabetes mellitus: literature review	Semin.Arthritis Rheum.	literature review
Gray,R.G.; Poppo,M.J.; Gottlieb,N.L.	1979	Primary familial bilateral carpal tunnel syndrome	Ann.Intern.Med	Not relevant
Grayzel,E.F.; Finegan,A.M.; Ponchak,R.E.	1997	The value of in-house physical therapy	J.Occup.Environ.Med.	Incorrect patient population (<10 patients/CTS group)
Green,T.P.; Tolonen,E.U.; Clarke,M.R.; Pathak,P.; Newey,M.L.; Kershaw,C.J.; Kallio,M.A.	2012	The relationship of pre- and postoperative median and ulnar nerve conduction measures to a self-administered questionnaire in carpal tunnel syndrome	Neurophysiol.Clin	very low quality
Greenan,T.; Zlatkin,M.B.	1990	Magnetic resonance imaging of the wrist	Seminars in Ultrasound CT and MRI	Background Information
Greenhouse,A.H.	1981	The carpal tunnel syndrome in neurologic practice	Nebr.Med J	background
Greenspan,J.	1988	Carpal tunnel syndrome. A common but treatable cause of wrist pain	Postgrad.Med	Background article
Greenwald,D.; Blum,L.C.,III; Adams,D.; Mercantonio,C.; Moffit,M.; Cooper,B.	2006	Effective surgical treatment of cubital tunnel syndrome based on provocative clinical testing without electrodiagnostics	Plast.Reconstr.Surg	Not relevant to CTS
Grieve,E.F.	1993	A study of wrist pain in industry - Theories of causation	Clin.Rehabil.	Not relevant to CTS
Gross,A.S.; Louis,D.S.; Carr,K.A.; Weiss,S.A.	1995	Carpal tunnel syndrome: a clinicopathologic study	J Occup.Environ.Med	bio-study/ biopsy
Grossman,R.S.	1991	CTS	Dent.Off	background
Grossman,R.S.	1990	CTS		background
Groves,R.J.; Goldner,J.L.	1975	Restoration of strong opposition after median nerve or brachial plexus paralysis	Journal of Bone and Joint Surgery - Series A	Does not address question of interest
Grundberg,A.B.	1983	Carpal tunnel decompression in spite of normal electromyography	J Hand Surg Am	Does not address question of interest

Authors	Year	Article Title	Periodical	Reason for Exclusion
Grundberg,A.B.	1979	Atypical carpal tunnel syndrome	J Iowa Med Soc.	case report
Grunwald,T.; Corsbie-Massay,C.	2006	Surgical Multimedia Academic, Research and Training (S.M.A.R.T.) tool: a comparative analysis of cognitive efficiency for two multimedia learning interfaces that teach the pre-procedural processes for carpal tunnel release	Stud.Health Technol.Inform.	background info
Guan,J.; Ji,F.; Chen,W.; Chu,H.; Lu,Z.	2011	Sonographic and electrophysiological detection in patients with carpal tunnel syndrome	Neurol Res.	insufficient comparison data; very low study design
Gulabi,D.; Cecen,G.; Guclu,B.; Cecen,A.	2014	Carpal tunnel release in patients with diabetes result in poorer outcome in long-term study	Eur.J Orthop Surg Traumatol.	very low quality
Gulati,A.; Whitaker,I.S.; Jaggard,M.; Arch,B.N.; Hopkinson-Woolley,J.	2005	Carpal tunnel decompression. The impact of tourniquet, anaesthesia type, and operating team on patient satisfaction scores	Br J Plast.Surg	Retrospective case series
Guldmann,R.; Pourtales,M.C.; LIVERNEAUX,P.	2010	Is it possible to use robots for carpal tunnel release?	J Orthop Sci	Case report
Gunetti,R.; Bonicalzi,V.; Riolo,C.; Pagni,C.A.	2000	Peri- and postoperative pain valuation in carpal tunnel release of median nerve compression	J Neurosurg.Sci	Very low quality
Gunnarsson,L.G.; Amilon,A.; Hellstrand,P.; Leissner,P.; Philipson,L.	1997	The diagnosis of carpal tunnel syndrome. Sensitivity and specificity of some clinical and electrophysiological tests	J Hand Surg Br	not best available evidence
Gupta,A.; Bjornsson,A.; Sjoberg,F.; Bengtsson,M.	1993	Lack of peripheral analgesic effect of low-dose morphine during intravenous regional anesthesia	Reg Anesth.	Deemed clinically irrelevant
Gupta,A.; Rawal,N.; Magnuson,A.; Alnehill,H.; Pettersson,K.	2011	Patient controlled regional analgesia after carpal tunnel release: a double-blind study using distal perineural catheters	J Hand Surg Eur.Vol.	Does not address question of interest

Authors	Year	Article Title	Periodical	Reason for Exclusion
Gupta,S.; Tewari,A.K.; Nair,V.; Gupta,A.	2013	Reliability of motor parameters for follow-up after local steroid injection in carpal tunnel syndrome	J Neurosci.Rural Pract.	Not in English
Gura,Taylor S.	2002	Yoga for stress reduction and injury prevention at work	Work	Cross-sectional study/background information
Gursoy,A.E.; Kolukisa,M.; Yildiz,G.B.; Kocaman,G.; Celebi,A.; Kocer,A.	2013	Relationship between electrodiagnostic severity and neuropathic pain assessed by the LANSS pain scale in carpal tunnel syndrome	Neuropsychiatr.Dis Treat.	insufficient data; very low study design
Gursoy,A.E.; Kolukisa,M.; Yildiz,G.B.; Kocaman,G.; Celebi,A.; Kocer,A.	2012	Relationship between electrodiagnostic severity and neuropathic pain assessed by the LANSS pain scale in carpal tunnel syndrome	Neuropsychiatric Disease and Treatment	+Does not answer a question of interest
Gutmann,L.	1977	Median--ulnar nerve communications and carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	insufficient data; no comparison group
Gutmann,L.; Nance,C.	2010	The illusion of severe carpal tunnel syndrome (CTS)	Muscle Nerve	case report
Haase,J.	2007	Carpal tunnel syndrome--a comprehensive review	Adv.Tech.Stand.Neurosurg.	background
Hagberg,M.; Morgenstern,H.; Kelsh,M.	1992	Impact of occupations and job tasks on the prevalence of carpal tunnel syndrome	Scand.J Work Environ.Health	systematic review
Hagebeuk,E.E.; de Weerd,A.W.	2004	Clinical and electrophysiological follow-up after local steroid injection in the carpal tunnel syndrome	Clin Neurophysiol.	Very Low Quality
Haghighat,A.; Khosrawi,S.; Kelishadi,A.; Sajadieh,S.; Badrian,H.	2012	Prevalence of clinical findings of carpal tunnel syndrome in Isfahanian dentists	Adv.Biomed Res.	Prevalence study; no comparison group
Hale,M.S.; Ruderman,J.E.	1973	Carpal tunnel syndrome associated with rubella immunization	Am J Phys Med	case report
Hales,T.R.; Bertsche,P.K.	1992	Management of upper extremity cumulative trauma disorders	AAOHN J.	background
Hall,S.; Luthra,H.S.	1983	Rheumatologic manifestations of amyloid disease	Minn.Med	background information

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Hallett,M.	1985	Electrophysiologic approaches to the diagnosis of entrapment neuropathies	Neurol Clin	Background Information
Halperin,J.J.; Volkman,D.J.; Luft,B.J.; Dattwyler,R.J.	1989	Carpal tunnel syndrome in Lyme borreliosis	Muscle Nerve	Not relevant,does not answer the PICO question
Hamamoto Filho,P.T.; Leite,F.V.; Ruiz,T.; Resende,L.A.	2009	A systematic review of anti-inflammatory for mild to moderate carpal tunnel syndrome	J Clin Neuromuscul.Dis	systematic review
Hamann,C.; Werner,R.A.; Franzblau,A.; Rodgers,P.A.; Siew,C.; Gruninger,S.	2001	Prevalence of carpal tunnel syndrome and median mononeuropathy among dentists	J Am Dent.Assoc	Not relevant, prevalence study
Hammer,H.B.; Hovden,I.A.; Haavardsholm,E.A.; Kvien,T.K.	2006	Ultrasonography shows increased cross-sectional area of the median nerve in patients with arthritis and carpal tunnel syndrome	Rheumatology (Oxford)	+not best available evidence; not CTS exclusive
Hampel,G.A.	1992	Hand-arm vibration isolation materials: A range of performance evaluation	Applied Occupational and Environmental Hygiene	Background Information
Hankin,F.M.; Louis,D.S.	1988	Symptomatic relief following carpal tunnel decompression with normal electroneuromyographic studies		letter
Hankins,C.L.	2008	A 12-year experience using the brown two-portal endoscopic procedure of transverse carpal ligament release in 14,722 patients: Defining a new paradigm in the treatment of carpal tunnel syndrome (Plastic and Reconstructive Surgery (2007) 120, (1911))	Plast.Reconstr.Surg.	Insufficient data
Hankins,C.L.; Brown,M.G.; Lopez,R.A.; Lee,A.K.; Dang,J.; Harper,R.D.	2007	A 12-year experience using the Brown two-portal endoscopic procedure of transverse carpal ligament release in 14,722 patients: defining a new paradigm in the treatment of carpal tunnel syndrome	Plast.Reconstr.Surg	Retrospective case series
Hanrahan,L.P.; Higgins,D.; Anderson,H.; Haskins,L.; Tai,S.	1991	Project SENSOR: Wisconsin surveillance of occupational carpal tunnel syndrome	Wis.Med J	review; commentary

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Hansen,T.B.; Dalsgaard,J.; Meldgaard,A.; Larsen,K.	2009	A prospective study of prognostic factors for duration of sick leave after endoscopic carpal tunnel release	BMC Musculoskelet.Disord.	very low quality
Hansen,T.B.; Kirkeby,L.; Fisker,H.; Larsen,K.	2009	Randomised controlled study of two different techniques of skin suture in endoscopic release of carpal tunnel	Scand.J Plast.Reconstr.Surg Hand Surg	Insufficient data
Hanssen,A.D.; Amadio,P.C.; DeSilva,S.P.; Ilstrup,D.M.	1989	Deep postoperative wound infection after carpal tunnel release	J Hand Surg Am	Insufficient data (antibiotic prophylaxis not stratified)
Hansson,S.	1995	Segmental median nerve conduction measurements discriminate carpal tunnel syndrome from diabetic polyneuropathy	Muscle Nerve	Does not answer a question of interest; no assessment of risk factors
Hansson,S.; Nilsson,B.Y.	1995	Median sensory nerve conduction block during wrist flexion in the carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	no comparison of modalities; very low study design
Harber,P.; Pena,L.; Bland,G.; Beck,J.	1992	Upper extremity symptoms in supermarket workers	Am.J.Ind.Med.	Not relevant, CTS diagnosis not made
Harle,J.-R.; Aubert,J.-P.; Andrac,L.; Disdier,P.; Weiller-Merli,C.; Pellissier,J.-F.; Magalon,G.	1991	Carpal tunnel syndrome with sarcoidosis of median nerve	European Journal of Internal Medicine	case report
Harrell,L.E.; Massey,E.W.	1983	Hand weakness in the elderly	J.Am.Geriatr.Soc.	background
Harris,C.M.; Tanner,E.; Goldstein,M.N.; Pettee,D.S.	1979	The surgical treatment of the carpal-tunnel syndrome correlated with preoperative nerve-conduction studies	J Bone Joint Surg Am	insufficient data; not best evidence
Harris-Adamson,C.; Eisen,E.A.; Dale,A.M.; Evanoff,B.; Hegmann,K.T.; Thiese,M.S.; Kapellusch,J.M.; Garg,A.; Burt,S.; Bao,S.; Silverstein,B.; Gerr,F.; Merlino,L.; Rempel,D.	2013	Personal and workplace psychosocial risk factors for carpal tunnel syndrome: a pooled study cohort	Occup.Environ.Med	pooled data and varying methods, designs, and data types
Harris-Adamson,C.; Eisen,E.A.; Kapellusch,J.; Garg,A.; Hegmann,K.T.; Thiese,M.S.; Dale,A.M.; Evanoff,B.; Burt,S.;	2014	Biomechanical risk factors for carpal tunnel syndrome: A pooled study of 2474 workers	Occup.Environ.Med.	pooled data and varying methods, designs, and data types

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Bao,S.; Silverstein,B.; Merlino,L.; Gerr,F.; Rempel,D.				
Harris-Adamson,C.; Eisen,E.A.; Kapellusch,J.; Garg,A.; Hegmann,K.T.; Thiese,M.S.; Dale,A.M.; Evanoff,B.; Burt,S.; Bao,S.; Silverstein,B.; Merlino,L.; Gerr,F.; Rempel,D.	2015	Biomechanical risk factors for carpal tunnel syndrome: a pooled study of 2474 workers	Occup Environ Med	duplicate of AAOS ID 15187
Harrison,M.J.	1978	Lack of evidence of generalised sensory neuropathy in patients with carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	no comparison of modalities; very low study design
Harter,B.T.,Jr.; McKiernan,J.E.,Jr.; Kirzinger,S.S.; Archer,F.W.; Peters,C.K.; Harter,K.C.	1993	Carpal tunnel syndrome: surgical and nonsurgical treatment	J Hand Surg Am	Retrospective comparative. Very Low Quality. Comparison groups not relevant for any questions of interest.
Harwin,S.F.; Stern,R.E.	1980	Carpal tunnel syndrome caused by an anomalous muscle belly	Orthop.Rev.	case report
Hashempur,M.H.; Homayouni,K.; Ashraf,A.; Salehi,A.; Taghizadeh,M.; Heydari,M.	2014	Effect of Linum usitatissimum L. (linseed) oil on mild and moderate carpal tunnel syndrome: a randomized, double-blind, placebo-controlled clinical trial	Daru	Lack of dosage standardization
Hassanpour,S.E.; Gousheh,J.	2006	Mycobacterium tuberculosis-induced carpal tunnel syndrome: management and follow-up evaluation	J Hand Surg Am	Retrospective case series
Hayashig,M.; Makoto,M.; Kato,H.	2013	Carpal tunnel syndrome associated with underlying Kienbock's disease	J Hand Surg Eur.Vol.	letter/summary document
Heathfield,K.	1973	Neurological complications of the rheumatic diseases	Rheumatol.Rehabil.	review
Hedge,A.; Powers,J.R.	1995	Wrist postures while keyboarding: effects of a negative slope keyboard		Does not answer a question of interest; no comparison group

Authors	Year	Article Title	Periodical	Reason for Exclusion
		system and full motion forearm supports		
Heidarian,A.; Abbasi,H.; Hasanzadeh,Hoseinabadi M.; Hajialibeyg,A.; Kalantar Motamedi,S.M.; Seifirad,S.	2013	Comparison of Knifelight Surgery versus Conventional Open Surgery in the Treatment of Carpal Tunnel Syndrome	Iran Red Crescent Med J	Does not meet inclusion criteria (invasive follow-up<3 month)
Helm,R.H.; Vaziri,S.	2003	Evaluation of carpal tunnel release using the Knifelight instrument	J Hand Surg Br	Does not meet inclusion criteria (invasive follow-up<3 month)
Helm,R.H.; Vaziri,S.	2003	Evaluation of carpal tunnel release using the Knifelight(registered trademark) instrument	Journal of Hand Surgery	duplicate of PM:12809659
Helwig,A.L.	2000	Treating carpal tunnel syndrome	J Fam Pract.	Insufficient data
Hennessey,W.J.; Kuhlman,K.A.	1997	The anatomy, symptoms, and signs of carpal tunnel syndrome	Phys.Med.Rehabil.Clin.N.Am.	background
Henry,S.L.; Hubbard,B.A.; Concannon,M.J.	2008	Splinting after carpal tunnel release: current practice, scientific evidence, and trends	Plast.Reconstr.Surg	survey
Hentz,V.R.	1977	Common hand problems	Surg Clin North Am	background
Herbison,G.J.; Teng,C.; Martin,J.H.; Ditunno,J.F.,Jr.	1973	Carpal tunnel syndrome in rheumatoid arthritis	Am J Phys Med	insufficient data; very low study design
Herman,G.E.; Schork,M.A.; Shyr,Y.; Elfont,E.A.; Arbit,S.	1995	Histologists, microtomy, chronic repetitive trauma, and techniques to avoid injury: I. A statistical evaluation of the job functions performed by histologists	Journal of Histotechnology	not exclusive to CTS; very low study design
Herrick,R.T.; Herrick,S.K.	1987	Thermography in the detection of carpal tunnel syndrome and other compressive neuropathies	J Hand Surg Am	not exclusive to CTS; confounded design
Herrmann,D.N.; Logigian,E.L.	2002	Electrodiagnostic approach to the patient with suspected mononeuropathy of the upper extremity	Neurol.Clin.	background information; commentary

Authors	Year	Article Title	Periodical	Reason for Exclusion
Herskovitz,S.; Berger,A.R.; Lipton,R.B.	1995	Low-dose, short-term oral prednisone in the treatment of carpal tunnel syndrome		Incorrect patient population (<10 patients/group)
Heybeli,N.; Kutluhan,S.; Demirci,S.; Kerman,M.; Mumcu,E.F.	2002	Assessment of outcome of carpal tunnel syndrome: a comparison of electrophysiological findings and a self-administered Boston questionnaire	J Hand Surg Br	Does not answer any question of interest.
Heywood,J.T.; Morley,J.W.	1992	Texture discrimination in carpal tunnel syndrome		+Does not answer a question of interest
Higgs,P.E.; Young,V.L.	1996	Cumulative trauma disorders	Clin.Plast.Surg.	background
Hiltunen,J.; Kirveskari,E.; Numminen,J.; Lindfors,N.; Goransson,H.; Hari,R.	2012	Pre- and post-operative diffusion tensor imaging of the median nerve in carpal tunnel syndrome	Eur.Radiol.	insufficient data; very low study design
Hirasawa,Y.; Ogura,T.	2000	Carpal tunnel syndrome in patients on long-term haemodialysis	Scand.J Plast.Reconstr.Surg Hand Surg	inadequate presentation of the effect of haemodialysis length on CTS to permit use for this pico question
Hirooka,T.; Hashizume,H.; Senda,M.; Nagoshi,M.; Inoue,H.; Nagashima,H.	1999	Adequacy and long-term prognosis of endoscopic carpal tunnel release	Acta Med Okayama	very low quality
Hobby,J.L.; Venkatesh,R.; Motkur,P.	2005	The effect of age and gender upon symptoms and surgical outcomes in carpal tunnel syndrome	J Hand Surg Br	Does not address question of interest
Hobson-Webb,L.D.; Massey,J.M.; Juel,V.C.; Sanders,D.B.	2008	The ultrasonographic wrist-to-forearm median nerve area ratio in carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; very low study design
Hochberg,J.	2001	A randomized prospective study to assess the efficacy of two cold-therapy treatments following carpal tunnel release	J Hand Ther	deemed clinically irrelevant
Hoffman,D.E.	1975	Carpal tunnel syndrome. Importance of sensory nerve conduction studies in diagnosis		case report
Hoffman,J.; Hoffman,P.L.	1985	Staple gun carpal tunnel syndrome	J Occup.Med	case report

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Holmgren,H.; Rabow,L.	1987	Internal neurolysis or ligament division only in carpal tunnel syndrome. II. A 3 year follow-up with an evaluation of various neurophysiological parameters for diagnosis	Acta Neurochir.(Wien.)	
Holmgren-Larsson,H.; Leszniewski,W.; Linden,U.; Rabow,L.; Thorling,J.	1985	Internal neurolysis or ligament division only in carpal tunnel syndrome--results of a randomized study	Acta Neurochir.(Wien.)	No outcomes of interest.
Holt,J.B.; Van Heest,A.E.; Shah,A.S.	2013	Hand disorders in children with mucopolysaccharide storage diseases	Journal of Hand Surgery	Background Information
Holtzhausen,T.	1985	Carpal tunnel syndrome: a "new" occupational hazard for the oral hygienist	J Dent.Assoc S.Afr.	Background Information
Homan,M.M.; Franzblau,A.; Werner,R.A.; Albers,J.W.; Armstrong,T.J.; Bromberg,M.B.	1999	Agreement between symptom surveys, physical examination procedures and electrodiagnostic findings for the carpal tunnel syndrome	Scand.J Work Environ.Health	+not best available evidence
Horiguchi,G.; Aoki,T.; Ito,H.	2011	Characteristics of the electrophysiological activity of muscles attached to the transverse carpal ligament in carpal tunnel syndrome	J Nippon Med Sch	insufficient data; very low study design
Horiuchi,Y.	1991	Entrapment neuropathy	Asian Medical Journal	background
Hornng,Y.S.; Chang,H.C.; Lin,K.E.; Guo,Y.L.; Liu,D.H.; Wang,J.D.	2012	Accuracy of ultrasonography and magnetic resonance imaging in diagnosing carpal tunnel syndrome using rest and grasp positions of the hands	J Hand Surg Am	insufficient data; very low study design
Hough,A.D.; Moore,A.P.; Jones,M.P.	2007	Reduced longitudinal excursion of the median nerve in carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design
Howard,F.M.	1986	Compression neuropathies in the anterior forearm	Hand Clin	Narrative review
Hsieh,Y.-H.; Shih,J.-T.; Lee,H.-M.; Ho,Y.-J.	2010	Ultrasonography of median nerve mobility in the diagnosis of carpal tunnel syndrome	Formosan Journal of Musculoskeletal Disorders	insufficient data; very low study design

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Hsu,H.Y.; Kuo,L.C.; Jou,I.M.; Chen,S.M.; Chiu,H.Y.; Su,F.C.	2013	Establishment of a proper manual tactile test for hands with sensory deficits	Arch Phys Med Rehabil.	insufficient data; very low study design
Hsu,H.Y.; Kuo,L.C.; Kuo,Y.L.; Chiu,H.Y.; Jou,I.M.; Wu,P.T.; Su,F.C.	2013	Feasibility of a novel functional sensibility test as an assisted examination for determining precision pinch performance in patients with carpal tunnel syndrome	PLoS One	insufficient data; very low study design
Hsu,H.Y.; Kuo,Y.L.; Jou,I.M.; Su,F.C.; Chiu,H.Y.; Kuo,L.C.	2013	Diagnosis From Functional Perspectives: Usefulness of a Manual Tactile Test for Predicting Precision Pinch Performance and Disease Severity in Subjects With Carpal Tunnel Syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design
Hughes,Jr; Baratz,M.	2006	Limited open carpal tunnel syndrome using the safeguard system	Techniques in Orthopaedics	Narrative review
Hughes,R.A.	2003	Treating nerves: from anecdote to systematic review	J R Soc.Med	systematic review
Hui,A.C.; Wong,S.M.; Wong,K.S.; Li,E.; Kay,R.; Yung,P.; Hung,L.K.; Yu,L.M.	2001	Oral steroid in the treatment of carpal tunnel syndrome	Ann.Rheum.Dis	background
Huisstede,B.M.	2010	Carpal tunnel syndrome. Part I: effectiveness of nonsurgical treatments -- a systematic review		systematic review
Huisstede,B.M.; Randsdorp,M.S.; Coert,J.H.; Glerum,S.; van,Middelkoop M.; Koes,B.W.	2010	Carpal tunnel syndrome. Part II: effectiveness of surgical treatments--a systematic review	Arch Phys Med Rehabil.	systematic review
Hunderfund,A.N.; Boon,A.J.; Mandrekar,J.N.; Sorenson,E.J.	2011	Sonography in carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Hunt,K.J.; Hung,S.K.; Boddy,K.; Ernst,E.	2009	Chiropractic manipulation for carpal tunnel syndrome: a systematic review (Provisional abstract)	Hand Therapy	systematic review
Hunter,J.	2001	Physical symptoms and signs and chronic pain	Clin J Pain	literature review

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Hunter,J.M.	1991	Recurrent carpal tunnel syndrome, epineural fibrous fixation, and traction neuropathy	Hand Clin	Background article
Huntley,D.E.; Shannon,S.A.	1988	Carpal tunnel syndrome: a review of the literature	Dent.Hyg.(Chic.)	literature review
Huracek,J.; Heising,T.; Wanner,M.; Troeger,H.	2001	Recovery after carpal tunnel syndrome operation: the influence of the opposite hand, if operated on in the same session	Arch Orthop Trauma Surg	Very low quality
Hurst,L.C.; Weissberg,D.; Carroll,R.E.	1985	The relationship of the double crush to carpal tunnel syndrome (an analysis of 1,000 cases of carpal tunnel syndrome)	J Hand Surg Br	insufficient data; very low study design
Husain,A.; Omar,S.A.; Habib,S.S.; Al-Drees,A.M.; Hammad,D.	2009	F-ratio, a surrogate marker of carpal tunnel syndrome	Neurosciences (Riyadh.)	insufficient data; very low study design
Huskisson,E.C.	1974	Arthritis as a sign of another disease	Curr.Med Res.Opin.	not relevant
Hutchinson,D.T.; Wang,A.A.	2010	Releasing the tourniquet in carpal tunnel surgery	Hand (N.Y)	Very low quality
Hybbinette,C.H.; Mannerfelt,L.	1975	The carpal tunnel syndrome. A retrospective study of 400 operated patients	Acta Orthop Scand.	Retrospective case series
Iannicelli,E.; Chianta,G.A.; Salvini,V.; Almerger,M.; Monacelli,G.; Passariello,R.	2000	Evaluation of bifid median nerve with sonography and MR imaging	J Ultrasound Med	<10 patients per group
Ibrahim,I.; Khan,W.S.; Dheerendra,S.; Smitham,P.; Goddard,N.	2012	A novel method of diagnosing autonomic dysfunction in carpal tunnel syndrome: measuring skin capacitance	Ortop.Traumatol.Rehabil.	insufficient data; very low study design
Ibrahim,T.; Majid,I.; Clarke,M.; Kershaw,C.J.	2009	Outcome of carpal tunnel decompression: the influence of age, gender, and occupation	Int.Orthop	very low quality
Idler,R.S.	1996	Persistence of symptoms after surgical release of compressive neuropathies and subsequent management	Orthop.Clin.North Am.	Background article
Idler,R.S.; Strickland,J.W.; Creighton,J.J.,Jr.	1990	Flexor carpi radialis tunnel syndrome	Indiana Med	background

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Ilbay,K.; Ubeyli,E.D.; Ilbay,G.; Budak,F.	2010	Recurrent neural networks for diagnosis of carpal tunnel syndrome using electrophysiologic findings	J Med Syst.	not best available evidence; retrospective data review
Ilkhani,M.; Jahanbakhsh,S.M.; Eghtesadi-Araghi,P.; Moayyeri,A.	2005	Accuracy of somatosensory evoked potentials in diagnosis of mild idiopathic carpal tunnel syndrome	Clin Neurol Neurosurg.	insufficient data; very low study design
Imaeda,T.; Uchiyama,S.; Toh,S.; Wada,T.; Okinaga,S.; Sawaizumi,T.; Nishida,J.; Kusunose,K.; Omokawa,S.	2007	Validation of the Japanese Society for Surgery of the Hand version of the Carpal Tunnel Syndrome Instrument	J Orthop Sci	+Does not answer a question of interest
Imai,H.; Tajima,T.; Natsuma,Y.	1989	Interpretation of cutaneous pressure threshold (Semmes-Weinstein monofilament measurement) following median nerve repair and sensory reeducation in the adult		Does not address question of interest
Imai,T.; Matsumoto,H.; Minami,R.	1990	Asymptomatic ulnar neuropathy in carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design
Imaoka,H.; Yorifuji,S.; Takahashi,M.; Nakamura,Y.; Kitaguchi,M.; Tarui,S.	1992	Improved inching method for the diagnosis and prognosis of carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Impelmans,B.E.; Miles,J.; Burke,F.D.	2001	The use of free fat grafts in recalcitrant carpal tunnel: A retrospective study	European Journal of Plastic Surgery	Incorrect patient population (patients received previous invasive treatment)
Impink,B.G.; Gagnon,D.; Collinger,J.L.; Boninger,M.L.	2010	Repeatability of ultrasonographic median nerve measures	Muscle Nerve	+Does not answer a question of interest
Incebiyik,S.; Boyaci,A.; Tutoglu,A.	2014	Short-term effectiveness of short-wave diathermy treatment on pain, clinical symptoms, and hand function in patients with mild or moderate idiopathic carpal tunnel syndrome	J Back Musculoskelet.Rehabil	Does not meet inclusion criteria (follow-up<1 month)
Incoll,I.W.; Bateman,E.; Myers,A.	2004	Endoscopic vs. open carpal tunnel release	The Journal of Bone and Joint Surgery	Insufficient data
Ingram,D.A.; Davis,G.R.; Swash,M.	1987	The double collision technique: A new method for measurement of the motor	Electroencephalogr.Clin.Neurophysiol.	only healthy study subjects

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		nerve refractory period distribution in man		
Ingram,D.A.; Davis,G.R.; Swash,M.	1987	Motor nerve conduction velocity distributions in man: Results of a new computer-based collision technique	Electroencephalogr.Clin.Neurophysiol.	only healthy study subjects
Inukai,T.; Uchida,K.; Kubota,C.; Takamura,T.; Nakajima,H.; Baba,H.	2013	Second lumbrical-interossei nerve test predicts clinical severity and surgical outcome of carpal tunnel syndrome	J Clin Neurosci.	+Does not answer a question of interest
Inukai,T.; Uchida,K.; Kubota,C.; Takamura,T.; Nakajima,H.; Baba,H.	2013	Additional method for diagnosis of carpal tunnel syndrome: value of the second lumbrical-interossei test (2L-INT)	Hand Surg	insufficient data
Iob,I.; Battaglia,C.; Rossetto,L.; Ermani,M.	2000	The carpal tunnel syndrome. Anatomoclinical correlations	Neurochirurgie	Retrospective case series; clinical review
Ionescu,D.; Ionescu,A.	1984	Results of microsurgical suture in 200 nerves	Acta Chir.Plast.	Retrospective case series
Ireland,D.C.	1986	The hand. Part one	Aust.Fam Physician	background
Irvine,J.; Chong,S.L.; Amirjani,N.; Chan,K.M.	2004	Double-blind randomized controlled trial of low-level laser therapy in carpal tunnel syndrome	Muscle Nerve	Incorrect patient population (<10 patients/group)
Isernhagen,S.	2000	Grip related upper extremity cumulative trauma: New information	Work	Background Information; review
Ishikawa,K.; Kondo,M.; Vainio,K.; Patiala,H.; Lehtimaki,M.; Raunio,P.	1987	Atrophy of the thumb web space in rheumatoid arthritis: clinical and electrodiagnostic studies	Arch Orthop Trauma Surg	Not relevant to CTS
Isik,C.; Uslu,M.; Inanmaz,M.E.; Karabekmez,F.E.; Kose,K.C.	2013	The effects of diabetes on symptoms of carpal tunnel syndrome treated with mini-open surgery	Acta Orthop Belg.	Does not address question of interest
Isik,H.S.; Bostanci,U.	2011	Experience of Carpal Tunnel Syndrome that operated using a limited uni skin incision	Turk Neurosurg.	Retrospective case series
Isoardo,G.; Stella,M.; Cocito,D.; Risso,D.; Migliaretti,G.; Cauda,F.; Palmitessa,A.; Faccani,G.; Ciaramitaro,P.	2012	Neuropathic pain in post-burn hypertrophic scars: a psychophysical and neurophysiological study	Muscle Nerve	<10 patients per group; insufficient data

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Isolani,L.; Bonfiglioli,R.; Raffi,G.B.; Violante,F.S.	2002	Different case definitions to describe the prevalence of occupational carpal tunnel syndrome in meat industry workers	Int.Arch Occup.Environ.Health	Not relevant, prevalence study
Itsubo,T.; Uchiyama,S.; Momose,T.; Yasutomi,T.; Imaeda,T.; Kato,H.	2009	Electrophysiological responsiveness and quality of life (QuickDASH, CTSI) evaluation of surgically treated carpal tunnel syndrome	J Orthop Sci	Retrospective case series
Ivie,C.S.; Viscomi,C.M.; Adams,D.C.; Friend,A.F.; Murphy,T.R.; Parker,C.	2011	Clonidine as an adjunct to intravenous regional anesthesia: A randomized, double-blind, placebo-controlled dose ranging study	J Anaesthesiol.Clin Pharmacol.	Deemed clinically irrelevant
Iwatsuki,K.; Nishikawa,K.; Chaki,M.; Sato,A.; Morita,A.; Hirata,H.	2014	Comparative responsiveness of the Hand 20 and the DASH-JSSH questionnaires to clinical changes after carpal tunnel release	J Hand Surg Eur.Vol.	
Jaberzadeh,S.; Zoghi,M.	2013	Mechanosensitivity of the median nerve in patients with chronic carpal tunnel syndrome	J Bodyw.Mov Ther	+Does not answer a question of interest
Jablecki,C.K.; Andary,M.T.; Ball,R.D.; Cherington,M.; Fisher,M.A.; Phillips,L.H.; So,Y.T.; Tulloch,J.W.; Turk,M.A.; Wiechers,D.O.; Wilbourn,A.J.; Williams,F.H.; Ysla,R.G.; Rosenberg,J.H.; Alter,M.; Daube,J.R.; Franklin,G.; Frishberg,B.M.; Greenberg,M.K.	1993	Practice parameter for electrodiagnostic studies in carpal tunnel syndrome: Summary statement	Muscle Nerve	summary document
Jablecki,C.K.; Andary,M.T.; Floeter,M.K.; Miller,R.G.; Quartly,C.A.; Vennix,M.J.; Wilson,J.R.	2002	Practice parameter: Electrodiagnostic studies in carpal tunnel syndrome. Report of the American Association of Electrodiagnostic Medicine, American Academy of Neurology, and the American Academy of Physical Medicine and Rehabilitation		summary document

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Jablecki,C.K.; Andary,M.T.; So,Y.T.; Wilkins,D.E.; Williams,F.H.	1993	Literature review of the usefulness of nerve conduction studies and electromyography for the evaluation of patients with carpal tunnel syndrome	Muscle Nerve	review
Jablecki,C.K.; Andary,M.T.; So,Y.T.; Wilkins,D.E.; Williams,F.H.; Ball,R.D.; Cherington,M.; Fisher,M.A.; Phillips II,L.H.; Tulloch,J.W.; Turk,M.A.; Wiechers,D.O.; Wilbourn,A.J.; Ysla,R.G.	1999	Literature review of the usefulness of nerve conduction studies and needle electromyography for the evaluation of patients with carpal tunnel syndrome	Muscle Nerve	literature review
Jackson,D.A.; Clifford,J.C.	1989	Electrodiagnosis of mild carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design
Jacobson,M.D.; Plancher,K.D.; Kleinman,W.B.	1996	Vitamin B6 (pyridoxine) therapy for carpal tunnel syndrome	Hand Clin	Narrative review
Jakab,E.; Ganos,D.; Cook,F.W.	1991	Transverse carpal ligament reconstruction in surgery for carpal tunnel syndrome: a new technique	J Hand Surg Am	Case series. Very Low Quality.
Jamal,G.A.; Carmichael,H.	1990	The effect of (gamma)-linolenic acid on human diabetic peripheral neuropathy: A double-blind placebo-controlled trial	Diabet.Med.	Incorrect patient population (Not inclusive of CTS patients)
Janssen,R.G.; Schwartz,D.A.; Velleman,P.F.	2009	A randomized controlled study of contrast baths on patients with carpal tunnel syndrome	J Hand Ther	Insufficient data
Janz,C.; Hammersen,S.; Brock,M.	2001	Carpal tunnel syndrome: A review of endoscopic release of the transverse carpal ligament compared with open carpal tunnel release	Neurosurgery Quarterly	Narrative review
Jarvik,J.G.; Comstock,B.A.; Heagerty,P.J.; Haynor,D.R.; Fulton-Kehoe,D.; Kliot,M.; Franklin,G.M.	2008	Magnetic resonance imaging compared with electrodiagnostic studies in patients with suspected carpal tunnel syndrome: predicting symptoms, function, and surgical benefit at 1 year	J Neurosurg.	Does not specify what kind of surgery or nonsurgical treatment is given.
Jazayeri,S.M.; Azizi,S.; Moghtaderi,A.R.	2009	Autologous blood injection in carpal tunnel syndrome (CTS)	Electromyogr.Clin Neurophysiol.	Very Low Quality

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Jeffrey,S.L.; Belcher,H.J.	2002	Use of Arnica to relieve pain after carpal-tunnel release surgery	Altern.Ther Health Med	Not relevant
Jeng,O.J.; Radwin,R.G.; Rodriquez,A.A.	1994	Functional psychomotor deficits associated with carpal tunnel syndrome		+Does not answer a question of interest
Jenkins,P.J.; Duckworth,A.D.; Watts,A.C.; McEachan,J.E.	2012	The outcome of carpal tunnel decompression in patients with diabetes mellitus	J Bone Joint Surg Br	Does not address question of interest
Jenkins,P.J.; Duckworth,A.D.; Watts,A.C.; McEachan,J.E.	2012	Corticosteroid injection for carpal tunnel syndrome: a 5-year survivorship analysis	Hand (N.Y)	does not answer the question. it is a survival analysis of time to reintervention for patients who get steroid treatment. it could be used as a case series, but would be very low quality evidence
Jensen,M.P.; Gammaitoni,A.R.; Olaleye,D.O.; Oleka,N.; Nalamachu,S.R.; Galer,B.S.	2006	The pain quality assessment scale: assessment of pain quality in carpal tunnel syndrome	J Pain	+Does not answer a question of interest
Jeong,D.H.; Kim,C.H.	2014	The quantitative relationship between physical examinations and the nerve conduction of the carpal tunnel syndrome in patients with and without a diabetic polyneuropathy	Ann Rehabil Med	>10 patients per group; only 9 non-CTS hands
Jeong,J.S.; Yoon,J.S.; Kim,S.J.; Park,B.K.; Won,S.J.; Cho,J.M.; Byun,C.W.	2011	Usefulness of ultrasonography to predict response to injection therapy in carpal tunnel syndrome	Ann.Rehabil.Med	Very Low Quality
Jerosch,Herold C.; Carvalho-Leite,J.C.; Song,F.	2006	A systematic review of outcomes assessed in randomized controlled trials of surgical interventions for carpal tunnel syndrome using the International Classification of Functioning, Disability and Health (ICF) as a reference tool		systematic review

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Jerosch-Herold,C.; Leite,J.C.; Song,F.	2006	A systematic review of outcomes assessed in randomized controlled trials of surgical interventions for carpal tunnel syndrome using the International Classification of Functioning, Disability and Health (ICF) as a reference tool	BMC Musculoskelet.Disord.	systematic review
Jerosch-Herold,C.; Shepstone,L.; Wilson,E.C.; Dyer,T.; Blake,J.	2014	Clinical course, costs and predictive factors for response to treatment in carpal tunnel syndrome: the PALMS study protocol	BMC Musculoskelet.Disord.	+Does not answer a question of interest
Jesensek,Papez B.; Palfy,M.; Mertik,M.; Turk,Z.	2009	Infrared thermography based on artificial intelligence as a screening method for carpal tunnel syndrome diagnosis	J Int.Med Res.	insufficient data; very low study design
Jetzer,T.; Dellon,L.A.; Mitterhauser,M.D.	1995	The use of PSSD testing in comparison to vibrotactile testing of vibration exposed workers	Cent.Eur.J Public Health	+not best available evidence; very low study design
Jetzer,T.; Haydon,P.; Reynolds,D.	2003	Effective intervention with ergonomics, antivibration gloves, and medical surveillance to minimize hand-arm vibration hazards in the workplace	J Occup.Environ.Med	Does not answer a question of interest; not CTS exclusive
Jetzer,T.C.	1991	Use of vibration testing in the early evaluation of workers with carpal tunnel syndrome	J Occup.Med	+Does not answer a question of interest
Jhattu,H.; Klaassen,S.; Ying,C.; Ali,Hussain M.	2012	Acute carpal tunnel syndrome in trauma	European Journal of Plastic Surgery	systematic review
Jhee,W.H.; Oryshkevich,R.S.; Wilcox,R.	1986	Severe carpal tunnel syndrome with sparing of sensory fibers	Orthop Rev.	case reports
Jimenez,D.F.; Gibbs,S.R.; Clapper,A.T.	1998	Endoscopic treatment of carpal tunnel syndrome: a critical review	J Neurosurg.	systematic review
Jimenez,D.F.; Gibbs,S.R.; Clapper,A.T.	1997	Endoscopic treatment of carpal tunnel syndrome: a critical review	Neurosurg.Focus	Narrative review
Jimenez,J.; Carson,G.	1970	The carpal tunnel syndrome	Appl Ther	background
Jitraphai,C.; Prachathomrong,P.; Chira-Adisai,W.	1994	Subclinical carpal tunnel syndrome in hospital staff	J Med Assoc Thai.	insufficient data; no comparison group

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Johnson,D.S.	2003	Low-level laser therapy in the treatment of carpal tunnel syndrome	Athletic Therapy Today	Background article
Johnson,E.W.	1995	Should immediate surgery be done for carpal tunnel syndrome?--no!	Muscle Nerve	opinion
Johnson,E.W.; Gatens,T.; Poindexter,D.; Bowers,D.	1983	Wrist dimensions: correlation with median sensory latencies	Arch Phys Med Rehabil.	insufficient data; summary of trend evaluation
Johnson,E.W.; Kukla,R.D.; Wongsam,P.E.; Piedmont,A.	1981	Sensory latencies to the ring finger: normal values and relation to carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design
Johnson,E.W.; Sipski,M.; Lammertse,T.	1987	Median and radial sensory latencies to digit I: normal values and usefulness in carpal tunnel syndrome	Arch Phys Med Rehabil.	only healthy study subjects
Johnson,E.W.; Terebuh,B.M.	1997	Sensory and mixed nerve conduction studies in carpal tunnel syndrome	Phys.Med.Rehabil.Clin.N.Am.	Background Information
Johnson,J.; Kilgore,E.; Newmeyer,W.	1985	Tumorous lesions of the hand	J Hand Surg Am	+Does not answer a question of interest
Johnson,R.	1987	Relieving your patient's peripheral neuropathy	Current Therapeutics	background
Johnston,V.	1997	When pain brings no gain: Repetition, force, pressure: Culprits in work-related pain	Laboratory Medicine	Background Information
Joist,A.; Joosten,U.; Wetterkamp,D.; Neuber,M.; Probst,A.; Rieger,H.	1999	Anterior interosseous nerve compression after supracondylar fracture of the humerus: a metaanalysis	J Neurosurg.	Not relevant to CTS
Jones,K.G.	1978	Carpal tunnel syndrome	J Ark.Med Soc.	background
Jones,S.M.; Stuart,P.R.; Stothard,J.	1997	Open carpal tunnel release. Does a vascularized hypothenar fat pad reduce wound tenderness?	J Hand Surg Br	Very low quality
Jordan,R.; Carter,T.; Cummins,C.	2002	A systematic review of the utility of electrodiagnostic testing in carpal tunnel syndrome	Br J Gen.Pract.	systematic review
Jordan,S.E.; Greider,J.L.,Jr.	1987	Autonomic activity in the carpal tunnel syndrome	Orthop Rev.	insufficient data; very low study design

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Joseph,A.W.; Shoemaker,A.H.; Germain-Lee,E.L.	2011	Increased prevalence of carpal tunnel syndrome in albright hereditary osteodystrophy	J Clin Endocrinol.Metab	Does not answer a question of interest; prevalence study
Joshi,A.G.; Gargate,A.R.	2013	Diagnostic utility of F waves in clinically diagnosed patients of carpal tunnel syndrome	Indian J.Physiol.Pharmacol.	insufficient data; very low study design
Joshy,S.; Thomas,B.; Ghosh,S.; Haidar,S.G.; Deshmukh,S.C.	2007	Patient satisfaction following carpal-tunnel decompression: a comparison of patients with and without osteoarthritis of the wrist	Int.Orthop	
Journee,H.L.; De Jonge,A.B.	1995	Design of a myo-seismic transducer for non-invasive transcutaneous vectorial recording of locally fast muscle-fibre micro-contractions	Electromyogr.Clin.Neurophysiol.	review; background information
Journee,H.L.; De Jonge,A.B.	1993	Ultrasound myography: Application in nerve conduction velocity assessment and muscle cooling	Ultrasound Med.Biol.	only healthy study subjects
Kabiraj,M.M.; al-Rajeh,S.; al-Tahan,A.R.; Abduljabbar,M.; al-Bunyan,M.	1999	Motor terminal latency index in carpal tunnel syndrome	East Mediterr.Health J	insufficient data; very low study design
Kabiraj,M.M.U.; Al,Rajeh S.; Al Tahan,A.R.; Abduljabbar,M.; Al,Bunyan M.; Daif,A.K.; Awada,A.	1998	Carpel tunnel syndrome: A clinico-electrophysiological study	Medical Science Research	records review; does not answer a question of interest
Kachel,H.G.; Altmeyer,P.; Kuhn,K.W.	1984	Deposition of nonamyloid material in connective tissue in uraemia	Blood Purif.	Not relevant
Kamanli,A.; Bezginca,M.; Kaya,A.	2011	Comparison of local steroid injection into carpal tunnel via proximal and distal approach in patients with carpal tunnel syndrome	Bratisl.Lek.Listy	Incorrect patient population (<10 patients/group)
Kamil,Oge H.; Basaran,Demirkazik F.; Nurlu,G.; Inci,S.; Erbeni,A.	1994	Carpal tunnel cross sectional area measurement in carpal tunnel syndrome	Turkish Neurosurgery	<10 patients per group
Kanatani,T.; Fujioka,H.; Kurosaka,M.; Nagura,I.; Sumi,M.	2013	Delayed electrophysiological recovery after carpal tunnel release for advanced carpal tunnel syndrome: a two-year follow-up study	J Clin Neurophysiol.	Retrospective case series

Authors	Year	Article Title	Periodical	Reason for Exclusion
Kang,H.J.; Koh,I.H.; Lee,W.Y.; Choi,Y.R.; Hahn,S.B.	2012	Does carpal tunnel release provide long-term relief in patients with hemodialysis-associated carpal tunnel syndrome?	Clin Orthop Relat Res.	Does not address question of interest
Kang,S.; Kwon,H.K.; Kim,K.H.; Yun,H.S.	2012	Ultrasonography of median nerve and electrophysiologic severity in carpal tunnel syndrome	Ann.Rehabil.Med	insufficient data; very low study design
Kang,Y.K.; Kim,D.H.; Lee,S.H.; Hwang,M.; Han,M.S.	2003	Tenelectrodes: a new stimulator for inching technique in the diagnosis of carpal tunnel syndrome	Yonsei Med J	insufficient data; very low study design
Kantarci,F.; Ustabasioglu,F.E.; Delil,S.; Olgun,D.C.; Korkmazer,B.; Dikici,A.S.; Tutar,O.; Nalbantoglu,M.; Uzun,N.; Mihmanli,I.	2014	Median nerve stiffness measurement by shear wave elastography: a potential sonographic method in the diagnosis of carpal tunnel syndrome	Eur.Radiol.	insufficient data; very low study design
Kanzato,N.; Komine,Y.; Kanaya,F.; Fukiyama,K.	2000	Preserved sympathetic skin response at the distal phalanx in patients with carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; very low study design
Kapellusch Jm,J.M.; Gerr,F.E.; Malloy,E.J.; Garg,A.; Harris-Adamson,C.; Bao,S.S.; Burt,S.E.; Dale,A.M.; Eisen,E.A.; Evanoff,B.A.; Hegmann,K.T.; Silverstein,B.A.; Theise,M.S.; Rempel,D.M.	2014	Exposure-response relationships for the ACGIH threshold limit value for hand-activity level: results from a pooled data study of carpal tunnel syndrome	Scand.J Work Environ Health	pooled data and varying methods, designs, and data types
Kaplan,P.; Sahgal,V.	1978	Residual latency: new applications of an old technique	Arch Phys Med Rehabil.	<10 patients per group; very low study design
Kaplan,S.J.; Glickel,S.Z.; Eaton,R.G.	1990	Predictive factors in the non-surgical treatment of carpal tunnel syndrome	J Hand Surg Br	Very Low Quality
Karabay,N.; Kayalar,M.; Ada,S.	2013	Sonographic assessment of transverse carpal ligament after open surgical release of the carpal tunnel	Acta Orthop Traumatol.Turc.	Does not address question of interest

Authors	Year	Article Title	Periodical	Reason for Exclusion
-Karada?-Ã?; Tok,F.; Akarsu,S.; Tekin,L.; Balaban,B.	2012	Triamcinolone acetonide vs procaine hydrochloride injection in the management of carpal tunnel syndrome: randomized placebo-controlled study	Journal of rehabilitation medicine : official journal of the UEMS.European Board of Physical and Rehabilitation Medicine	Duplicate study (duplicate with AAOS ID 236)
-Karada?-O; Tok,F.; -Ula?-UH; -Odaba?-i-Z	2011	The effectiveness of triamcinolone acetonide vs. procaine hydrochloride injection in the management of carpal tunnel syndrome: a double-blind randomized clinical trial	American journal of physical medicine & rehabilitation / Association of Academic Physiatrists	Duplicate study (duplicate with AAOSID 313)
Karadag,Y.S.; Karadag,O.; Cicekli,E.; Ozturk,S.; Kiraz,S.; Ozbakir,S.; Filippucci,E.; Grassi,W.	2010	Severity of Carpal tunnel syndrome assessed with high frequency ultrasonography	Rheumatol.Int.	not best evidence; does not answer question of interest
Karadas,O.; Omac,O.K.; Tok,F.; Ozgul,A.; Odabasi,Z.	2012	Effects of steroid with repetitive procaine HCl injection in the management of carpal tunnel syndrome: an ultrasonographic study	J Neurol Sci	Very Low Quality
Kasdan,M.L.; Millender,L.H.	1996	Occupational soft-tissue and tendon disorders	Orthop.Clin.North Am.	Background Information
Kasdan,M.L.; Wolens,D.; Leis,V.M.; Kasdan,A.S.; Stallings,S.P.	1994	Carpal tunnel syndrome not always work related	J Ky.Med Assoc	medical records review; insufficient data
Kasius,K.M.; Claes,F.; Meulstee,J.; Weinstein,H.C.; Verhagen,W.I.	2014	Comparison of peak versus onset latency measurements in electrodiagnostic tests for carpal tunnel syndrome	J Clin Neurophysiol	all CTS confirmed; comparing digits
Kasius,K.M.; Claes,F.; Verhagen,W.I.; Meulstee,J.	2012	The segmental palmar test in diagnosing carpal tunnel syndrome reassessed	Clin Neurophysiol.	insufficient data; very low study design
Kasius,K.M.; Claes,F.; Verhagen,W.I.; Meulstee,J.	2012	Ultrasonography in severe carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Kastlunger,M.; Miyamoto,H.; Jaschke,W.; Klauser,A.	2013	Elasticity of the median nerve in carpal tunnel syndrome: Sonoelastography findings	Skeletal Radiol.	summary document
Katims,J.J.; Rouvelas,P.; Sadler,B.T.; Weseley,S.A.	1989	Current perception threshold. Reproducibility and comparison with	ASAIO Trans	insufficient data; not best evidence for CPT

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		nerve conduction in evaluation of carpal tunnel syndrome		
Katirji,B.; Preston,D.C.	2003	Vibration-induced median neuropathy		case report
Katz,J.N.; Gelberman,R.H.; Wright,E.A.; Lew,R.A.; Liang,M.H.	1994	Responsiveness of self-reported and objective measures of disease severity in carpal tunnel syndrome	Med Care	the study measures the responsiveness of the the outcome instrument, without showing how outcomes differ between treatment groups.
Katz,J.N.; Keller,R.B.; Simmons,B.P.; Rogers,W.D.; Bessette,L.; Fossel,A.H.; Mooney,N.A.	1998	Maine Carpal Tunnel Study: outcomes of operative and nonoperative therapy for carpal tunnel syndrome in a community-based cohort	J Hand Surg Am	Very low strength
Katz,J.N.; Punnett,L.; Simmons,B.P.; Fossel,A.H.; Mooney,N.; Keller,R.B.	1996	Workers' compensation recipients with carpal tunnel syndrome: the validity of self-reported health measures	Am J Public Health	+Does not answer a question of interest
Katz,J.N.; Simmons,B.P.	2002	Carpal tunnel syndrome	N.Engl.J.Med.	background
Katz,R.T.	1994	Carpal tunnel syndrome: a practical review	Am Fam Physician	background
Kaul,M.P.; Pagel,K.J.	2002	Median sensory nonresponders in carpal tunnel syndrome workup	Arch Phys Med Rehabil.	insufficient data; no comparison of modalities
Kayamori,R.	1987	Electrophysiological study of chronic intractable shoulder pain	Nihon Seikeigeka Gakkai Zasshi	Not relevant,does not answer the PICO question
Kaye,J.J.; Reynolds,J.M.	2007	Carpal tunnel syndrome: using self-report measures of disease to predict treatment response	Am J Orthop (Belle.Mead NJ)	+Does not answer a question of interest/not best available evidence
Kaymak,B.; Ozcakar,L.; Cetin,A.; Candan,Cetin M.; Akinci,A.; Hascelik,Z.	2008	A comparison of the benefits of sonography and electrophysiologic measurements as predictors of symptom severity and functional status in patients with carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design

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Kearns,J.; Gresch,E.E.; Weichel,C.Y.; Eby,P.; Pallapothu,S.R.	2000	Pre- and post-employment median nerve latency in pork processing employees	J.Occup.Environ.Med.	Does not answer a question of interest; no diagnosis of CTS or comparison group
Keberle,M.; Jenett,M.; Kenn,W.; Reiners,K.; Peter,M.; Haerten,R.; Hahn,D.	2000	Technical advances in ultrasound and MR imaging of carpal tunnel syndrome	Eur.Radiol.	<10 patients per group; very low study design
Keiner,D.; Gaab,M.R.; Schroeder,H.W.; Oertel,J.	2009	Long-term follow-up of dual-portal endoscopic release of the transverse ligament in carpal tunnel syndrome: an analysis of 94 cases		very low quality
Keith,M.W.; Masear,V.; Chung,K.C.; Amadio,P.C.; Andary,M.; Barth,R.W.; Maupin,K.; Graham,B.; Watters,W.C.,III; Turkelson,C.M.; Haralson,R.H.,III; Wies,J.L.; McGowan,R.	2010	American Academy of Orthopaedic Surgeons clinical practice guideline on the treatment of carpal tunnel syndrome	J Bone Joint Surg Am	recommendations
Keith,M.W.; Masear,V.; Chung,K.C.; Maupin,K.; Andary,M.; Amadio,P.C.; Watters,W.C.,III; Goldberg,M.J.; Haralson,R.H.,III; Turkelson,C.M.; Wies,J.L.; McGowan,R.	2009	American Academy of Orthopaedic Surgeons Clinical Practice Guideline on diagnosis of carpal tunnel syndrome	J Bone Joint Surg Am	summary of recommendations
Kele,H.; Verheggen,R.; Bittermann,H.J.; Reimers,C.D.	2003	The potential value of ultrasonography in the evaluation of carpal tunnel syndrome		insufficient data; very low study design
Keles,I.; Karagulle Kendi,A.T.; Aydin,G.; Zog,S.G.; Orkun,S.	2005	Diagnostic precision of ultrasonography in patients with carpal tunnel syndrome	Am J Phys Med Rehabil.	insufficient data; very low study design
Kemble,F.	1968	Electrodiagnosis of the carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	insufficient data; very low study design

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Kemble,F.	1968	Clinical manifestations related to electro-physiological measurements in the carpal tunnel syndrome		all CTS cases; no comparison group
Keramettin,A.; Cengiz,C.; Nilgun,C.; Ayhan,B.	2006	Microsurgical open mini uniskin incision technique in the surgical treatment of carpal tunnel syndrome	Neurol India	very low quality
Kern,B.C.; Brock,M.; Rudolph,K.H.; Logemann,H.	1993	The recurrent carpal tunnel syndrome	Zentralbl.Neurochir.	Incorrect patient population (previous invasive treatment)
Kerr,C.D.; Gittins,M.E.; Sybert,D.R.	1994	Endoscopic versus open carpal tunnel release: clinical results		
Kerrigan,J.J.; Bertoni,J.M.; Jaeger,S.H.	1988	Ganglion cysts and carpal tunnel syndrome	J Hand Surg Am	case reports. no control groups
Kessler,F.B.	1986	Complications of the management of carpal tunnel syndrome	Hand Clin	background
Kessler,M.; Netter,P.; Azoulay,E.; Mayeux,D.; Pere,P.; Gaucher,A.	1992	Dialysis-associated arthropathy: a multicentre survey of 171 patients receiving haemodialysis for over 10 years. The Co-operative Group on Dialysis-associated Arthropathy	Br J Rheumatol.	Not relevant
Ketchum,L.D.	2004	A comparison of flexor tenosynovectomy, open carpal tunnel release, and open carpal tunnel release with flexor tenosynovectomy in the treatment of carpal tunnel syndrome	Plast.Reconstr.Surg	Very Low Quality
Keyserling,W.M.; Armstrong,T.J.; Punnett,L.	1991	Ergonomic job analysis: A structured approach for identifying risk factors associated with overexertion injuries and disorders	Applied Occupational and Environmental Hygiene	not exclusive to CTS; no comparison groups
Khalil,C.; Hancart,C.; Le,Thuc,V; Chantelot,C.; Chechin,D.; Cotten,A.	2008	Diffusion tensor imaging and tractography of the median nerve in carpal tunnel syndrome: preliminary results	Eur.Radiol.	insufficient data; very low study design
Khan,R.; Macey,A.	2000	Open carpal tunnel release under local anaesthesia: a patient satisfaction survey	Ir.Med J	Retrospective case series

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Khan,U.D.	2008	An assessment of symptomatic relief after carpal tunnel release in patients on haemodialysis	Nephron Clin Pract.	very low quality
Khosrawi,S.; Dehghan,F.	2013	Determination of the median nerve residual latency values in the diagnosis of carpal tunnel syndrome in comparison with other electrodiagnostic parameters	J Res.Med Sci	insufficient data; very low study design
Kihlberg,S.; Hagberg,M.	1997	Hand-arm symptoms related to impact and nonimpact hand-held power tools	Int.Arch.Occup.Environ.Health	not exclusive to CTS; no diagnosis of CTS
Killough,M.K.; Crumpton,L.L.	1996	An investigation of cumulative trauma disorders in the construction industry	International Journal of Industrial Ergonomics	Not relevant to CTS
Kim,D.H.; Jang,J.E.; Park,B.K.	2013	Anatomical basis of ulnar approach in carpal tunnel injection	Pain Physician	Does not address question of interest
Kim,H.S.	2014	Carpal tunnel syndrome caused by tophaceous gout	Korean J Intern.Med	case report
Kim,H.S.; Joo,S.H.; Cho,H.K.; Kim,Y.W.	2013	Comparison of proximal and distal cross-sectional areas of the median nerve, carpal tunnel, and nerve/tunnel index in subjects with carpal tunnel syndrome	Arch Phys Med Rehabil.	<10 patients per group; insufficient data
Kim,J.K.; Jeon,S.H.	2013	Minimal clinically important differences in the Carpal Tunnel Questionnaire after carpal tunnel release	J Hand Surg Eur.Vol.	
Kim,J.K.; Kim,Y.K.	2011	Predictors of scar pain after open carpal tunnel release	J Hand Surg Am	Does not address question of interest
Kim,J.K.; Yi,J.W.; Kook,S.H.	2011	The minimal clinical important difference of the carpal tunnel syndrome questionnaire in surgically treated patients level 1 evidence	Journal of Hand Surgery	Abstract/conference poster
Kim,J.M.; Kim,M.W.; Ko,Y.J.	2013	Correlating ultrasound findings of carpal tunnel syndrome with nerve conduction studies	Muscle Nerve	insufficient data; very low study design
Kim,J.Y.; Kim,J.I.; Son,J.E.; Yun,S.K.	2004	Prevalence of carpal tunnel syndrome in meat and fish processing plants	J Occup.Health	very low quality

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Kim,J.Y.; Yoon,J.S.; Kim,S.J.; Won,S.J.; Jeong,J.S.	2012	Carpal tunnel syndrome: Clinical, electrophysiological, and ultrasonographic ratio after surgery	Muscle Nerve	very low quality
Kim,L.Y.S.	1983	Palmar digital nerve stimulation to diagnose Carpal Tunnel Syndrome	Orthop.Rev.	no comparison of modalities; very low study design
Kim,W.K.; Kwon,S.H.; Lee,S.H.; Sunwoo,I.N.	2000	Asymptomatic electrophysiologic carpal tunnel syndrome in diabetics: entrapment or polyneuropathy	Yonsei Med J	insufficient data; insufficient comparisons
Kimura,I.; Ayyar,D.R.	1985	The carpal tunnel syndrome: electrophysiological aspects of 639 symptomatic extremities	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Kimura,J.	1979	The carpal tunnel syndrome: localization of conduction abnormalities within the distal segment of the median nerve		no comparison of modalities; very low study design
Kimura,J.	1978	A method for determining median nerve conduction velocity across the carpal tunnel	J Neurol Sci	Does not answer a question of interest
Kindstrand,E.	1992	Antibodies to Borrelia burgdorferi in patients with carpal tunnel syndrome	Acta Neurol Scand.	insufficient data; very low study design
King,P.M.	1997	Sensory function assessment. A pilot comparison study of touch pressure threshold with texture and tactile discrimination	J Hand Ther	+Does not answer a question of interest; very low study design
King,T.	1976	Carpal tunnel syndrome. Nursing care	Nurs.Mirror Midwives J	background
Kinugasa,E.; Akizawa,T.; Kitaoka,T.; Koshikawa,S.	1988	Evaluation of beta 2-microglobulin removal with high-performance hemodiafiltration	Artif.Organs	Not relevant to CTS
Kipp,D.E.; Wilson,J.K.	2001	Carpal tunnel syndrome: A critical review	Critical Reviews in Physical and Rehabilitation Medicine	background
Kitsis,C.K.; Savvidou,O.; Alam,A.; Cherry,R.J.	2002	Carpal tunnel syndrome despite negative neurophysiological studies	Acta Orthop Belg.	very low quality
Kiylioglu,N.; Akyildiz,U.O.; Ozkul,A.; Akyol,A.	2011	Carpal tunnel syndrome and ulnar neuropathy at the wrist: comorbid disease or not?	J Clin Neurophysiol.	Does not answer a question of interest

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Kiylioglu,N.; Bicerol,B.; Ozkul,A.; Akyol,A.	2009	Natural course and treatment efficacy: one-year observation in diabetic and idiopathic carpal tunnel syndrome	J Clin Neurophysiol.	
Kjuus,H.; Goffeng,L.O.; Heier,M.S.; Sjolholm,H.; Ovrebo,S.; Skaug,V.; Paulsson,B.; Tornqvist,M.; Brudal,S.	2004	Effects on the peripheral nervous system of tunnel workers exposed to acrylamide and N-methylolacrylamide	Scand.J.Work.Envirn.Health	+Does not answer a question of interest
Klauser,A.S.; Halpern,E.J.; Faschingbauer,R.; Guerra,F.; Martinoli,C.; Gabl,M.F.; Arora,R.; Bauer,T.; Sojer,M.; Loscher,W.N.; Jaschke,W.R.	2011	Bifid median nerve in carpal tunnel syndrome: assessment with US cross-sectional area measurement		Does not answer a question of interest; very low study design
Kleindienst,A.; Hamm,B.; Hildebrandt,G.; Klug,N.	1996	Diagnosis and staging of carpal tunnel syndrome: comparison of magnetic resonance imaging and intra-operative findings	Acta Neurochir.(Wien.)	not best available evidence; insufficient data
Kleindienst,A.; Hamm,B.; Lanksch,W.R.	1998	Carpal tunnel syndrome: staging of median nerve compression by MR imaging	J Magn Reson.Imaging	Insufficient data
Ko,H.J.; Kim,Y.R.; Park,K.S.; Cho,C.S.; Kim,H.Y.	2009	Clinical images: Kienbock disease resulting from local corticosteroid injections	Arthritis Rheum.	Case report
Kobayashi,S.; Hayakawa,K.; Nakane,T.; Meir,A.; Mwaka,E.S.; Yayama,T.; Uchida,K.; Shimada,S.; Inukai,T.; Nakajima,H.; Baba,H.	2009	Visualization of intraneural edema using gadolinium-enhanced magnetic resonance imaging of carpal tunnel syndrome	J Orthop Sci	insufficient data; very low study design
Koc,F.; Yerdelen,D.; Sarica,Y.; Sertdemir,Y.	2006	Motor unit number estimation in cases with Carpal Tunnel Syndrome	Int.J Neurosci.	insufficient data; very low study design
Kocer,A.; Gozke,E.; Dortcan,N.; Us,O.	2005	A comparison of F waves in peripheral nerve disorders	Electromyogr.Clin Neurophysiol.	no comparison group; very low study design
Kocer,B.; Sucak,G.; Kuruoglu,R.; Aki,Z.; Haznedar,R.; Erdogmus,N.I.	2009	Clinical and electrophysiological evaluation of patients with thalidomide-induced neuropathy	Acta Neurol Belg.	Not relevant to CTS

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Kodama,M.; Tochikura,M.; Sasao,Y.; Kasahara,T.; Koyama,Y.; Aono,K.; Fujii,C.; Shimoda,N.; Kurihara,Y.; Masakado,Y.	2014	What is the most sensitive test for diagnosing carpal tunnel syndrome?	Tokai J Exp.Clin Med	case control; very low design
Kohanzadeh,S.; Herrera,F.A.; Dobke,M.	2012	Outcomes of open and endoscopic carpal tunnel release: a meta-analysis	Hand (N.Y)	meta-analysis
Komurcu,H.F.; Kilic,S.; Anlar,O.	2014	Relationship of age, body mass index, wrist and waist circumferences to carpal tunnel syndrome severity	Neurol.Med.Chir.(Tokyo).	study was downgraded to very low quality because it is unclear if their CTS severity scale is validated and lack of statistical adjustment for other factors (beyond BMI) that could confound results (such as comorbidities)
Konchalard,K.; Suputtitada,A.; Sastravaha,N.	2011	Vibrometry in carpal tunnel syndrome: correlations with electrodiagnostic parameters and disease severity	J Med Assoc Thai.	+Does not answer a question of interest
Koo,J.T.; Szabo,R.M.	2004	Compression neuropathies of the median nerve	Journal of the American Society for Surgery of the Hand	background
Koo,Y.S.; Park,H.R.; Joo,B.E.; Choi,J.Y.; Jung,K.Y.; Park,K.W.; Cho,S.C.; Kim,B.J.	2010	Utility of the cutaneous silent period in the evaluation of carpal tunnel syndrome	Clin Neurophysiol.	+Does not answer a question of interest/insufficient data
Kopell,H.P.; Goodgold,J.	1968	Clinical and electrodiagnostic features of carpal tunnel syndrome	Arch Phys Med Rehabil.	records review
Koris,M.; Gelberman,R.H.; Duncan,K.; Boublick,M.; Smith,B.	1990	Carpal tunnel syndrome. Evaluation of a quantitative provocative diagnostic test	Clin Orthop Relat Res.	insufficient data; very low study design
Korkmaz,M.; Ekici,M.A.; Cepoglu,M.C.; Ozturk,H.	2013	Mini transverse versus longitudinal incision in carpal tunnel syndrome	J Coll Physicians Surg Pak.	very low quality
Korrick,S.A.; Rest,K.M.; Davis,L.K.; Christiani,D.C.	1994	Use of state workers' compensation data for occupational carpal tunnel syndrome surveillance: a feasibility study in Massachusetts	Am J Ind.Med	Does not answer a question of interest

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Korstanje,J.W.; Van,Balen R.; Scheltens-De,Boer M.; Blok,J.H.; Slijper,H.P.; Stam,H.J.; Hovius,S.E.; Selles,R.W.	2013	Assessment of transverse ultrasonographic parameters to optimize carpal tunnel syndrome diagnosis in a case-control study	Muscle Nerve	insufficient data; very low study design
Korthals,de Bos,I; Gerritsen,A.A.; Tulder,M.W.; Rutten-van-Mooren,M.P.; Adriaens, H.J.; Vet,H.C.; Bouter,L.M.	2006	Surgery is more cost-effective than splinting for carpal tunnel syndrome in the Netherlands: results of an economic evaluation alongside a randomized controlled trial	BMC Musculoskeletal Disorders	Extension of study. PM:12215131 already included.
Koskimies,K.; Farkkila,M.; Pyykko,I.; Jantti,V.; Aatola,S.; Starck,J.; Inaba,R.	1990	Carpal tunnel syndrome in vibration disease	Br J Ind.Med	Not relevant, prevalence study
Kostopoulos,D.	2004	Treatment of carpal tunnel syndrome: A review of the non-surgical approaches with emphasis in neural mobilization	Journal of Bodywork and Movement Therapies	background
Kotevoglu,N.; Gulbahce-Saglam,S.	2005	Ultrasound imaging in the diagnosis of carpal tunnel syndrome and its relevance to clinical evaluation	Joint Bone Spine	insufficient data; very low study design
Kothari,M.J.; Blakeslee,M.A.; Reichwein,R.; Simmons,Z.; Logigian,E.L.	1998	Electrodiagnostic studies: Are they useful in clinical practice?	Arch.Phys.Med.Rehabil.	not exclusive to CTS
Kothari,M.J.; Rutkove,S.B.; Caress,J.B.; Hinchey,J.; Logigian,E.L.; Preston,D.C.	1995	Comparison of digital sensory studies in patients with carpal tunnel syndrome	Muscle Nerve	+Does not answer a question of interest
Kothari,M.J.; Rutkove,S.B.; Logigian,E.L.; Shefner,J.M.	1996	Coexistent entrapment neuropathies in patients with amyotrophic lateral sclerosis	Arch.Phys.Med.Rehabil.	Not relevant to CTS
Kouyoumdjian,J.A.; de Araujo,R.G.	2006	Carpal tunnel syndrome and manual milking: nerve conduction studies in 43 cases	Arq Neuropsiquiatr.	not best available evidence; no comparison group
Kouyoumdjian,J.A.; Morita,M.D.; Rocha,P.R.; Miranda,R.C.; Gouveia,G.M.	2000	Body mass index and carpal tunnel syndrome	Arq Neuropsiquiatr.	not best available evidence
Kouyoumdjian,J.A.; Morita,M.P.; Molina,A.F.	2002	Usefulness of additional nerve conduction techniques in mild carpal tunnel syndrome	Arq Neuropsiquiatr.	insufficient data; not best evidence

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Kouyoumdjian,J.A.; Morita,M.P.; Rocha,P.R.; Miranda,R.C.; Gouveia,G.M.	2000	Wrist and palm indexes in carpal tunnel syndrome	Arq Neuropsiquiatr.	insufficient data; very low study design
Kouyoumdjian,J.A.; Morita,Mda P.	1999	Comparison of nerve conduction techniques in 95 mild carpal tunnel syndrome hands	Arq Neuropsiquiatr.	insufficient information
Kownacki,J.; Fellenberg,J.V.; Rosler,K.; Schneider,V.; Bettecken,T.; Moser,H.; Burgunder,J.-M.	1996	The 17p11.2 locus in hereditary neuropathy with liability to pressure palsies, in juvenile and familial carpal tunnel syndrome and in hereditary neuralgic amyotrophy	Eur.J.Neurol.	biopsy study; insufficient data
Koyuncuoglu,H.R.; Kutluhan,S.; Yesildag,A.; Oyar,O.; Guler,K.; Ozden,A.	2005	The value of ultrasonographic measurement in carpal tunnel syndrome in patients with negative electrodiagnostic tests	Eur.J Radiol.	insufficient data; very low study design
Kozakiewicz,R.T.; Bowyer,B.L.	1997	Quantitative testing and thermography in carpal tunnel syndrome	Phys.Med.Rehabil.Clin.N.Am.	Background Information
Kraft,G.H.	1997	Carpal tunnel syndrome in patients with peripheral neuropathy: It can be evaluated and treated	Phys.Med.Rehabil.Clin.N.Am.	Background Information; review
Krasteva,W.	2001	Anomalous hand innervation in carpal tunnel syndrome: Electromyographic studies	Acta Medica Bulgarica	+Does not answer a question of interest
Krieg,N.A.	1989	Complications after a carpal tunnel release	Plast.Surg Nurs.	case report
Kroemer,K.H.E.	1989	Cumulative trauma disorders: their recognition and ergonomics measures to avoid them	Appl.Ergon.	background
Kruger,V.L.; Kraft,G.H.; Deitz,J.C.; Ameis,A.; Polissar,L.	1991	Carpal tunnel syndrome: objective measures and splint use	Arch Phys Med Rehabil.	Retrospective case series
Kumar,P.; Chakrabarti,I.	2009	Idiopathic carpal tunnel syndrome and trigger finger: is there an association?	J Hand Surg Eur.Vol.	insufficient data; assessing prevalence rather than risk factors

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Kummel,B.M.; Zazanis,G.A.	1973	Shoulder pain as the presenting complaint in carpal tunnel syndrome	Clin Orthop Relat Res.	+Does not answer a question of interest; very low study design
Kuntzer,T.	1994	Carpal tunnel syndrome in 100 patients: sensitivity, specificity of multi-neurophysiological procedures and estimation of axonal loss of motor, sensory and sympathetic median nerve fibers	J Neurol Sci	insufficient data; very low study design
Kurca,E.; Nosal,V.; Grofik,M.; Sivak,S.; Turcanova-Koprusakova,M.; Kucera,P.	2008	Single parameter wrist ultrasonography as a first-line screening examination in suspected carpal tunnel syndrome patients	Bratisl.Lek.Listy	insufficient data; very low study design
Kurt,S.; Kisacik,B.; Kaplan,Y.; Yildirim,B.; Etikan,I.; Karaer,H.	2008	Obesity and carpal tunnel syndrome: is there a causal relationship?	Eur.Neurol	Very Low Quality
Kuschner,S.H.; Brien,W.W.; Johnson,D.; Gellman,H.	1991	Complications associated with carpal tunnel release	Orthop Rev.	Narrative review
Kuschner,S.H.; Lane,C.S.	1997	Endoscopic versus open carpal tunnel release: big deal or much ado about nothing?	Am J Orthop (Belle.Mead NJ)	Narrative review
Kutluhan,S.; Akhan,G.; Demirci,S.; Duru,S.; Koyuncuoglu,H.R.; Ozturk,M.; Cirak,B.	2001	Carpal tunnel syndrome in carpet workers	Int.Arch Occup.Environ.Health	Not relevant, prevalence study
Kutluhan,S.; Tufekci,A.; Kilbas,S.; Erten,N.; Koyuncuoglu,H.R.; Ozturk,M.	2009	Manual milking: A risk factor for carpal tunnel syndrome	Biomedical Research	Not relevant, prevalence study of manual milking
Kwon,B.C.; Jung,K.I.; Baek,G.H.	2008	Comparison of sonography and electrodiagnostic testing in the diagnosis of carpal tunnel syndrome	J Hand Surg Am	insufficient data; very low study design
Kwon,H.K.; Hwang,M.; Yoon,D.W.	2006	Frequency and severity of carpal tunnel syndrome according to level of cervical radiculopathy: double crush syndrome?	Clin Neurophysiol.	+Does not answer a question of interest

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Kwon,J.Y.; Ko,K.; Sohn,Y.B.; Kim,S.J.; Park,S.W.; Kim,S.H.; Cho,S.Y.; Jin,D.K.	2011	High prevalence of carpal tunnel syndrome in children with mucopolysaccharidosis type II (Hunter syndrome)	Am J Med Genet.A	Does not answer a question of interest; prevalence study
Kyle,R.A.; Eilers,S.G.; Linscheid,R.L.; Gaffey,T.A.	1989	Amyloid localized to tenosynovium at carpal tunnel release. Natural history of 124 cases	Am J Clin Pathol.	Does not answer a question of interest; biostudy not relevant to CTS
LaBan,M.M.; Friedman,N.A.; Zemenick,G.A.	1986	"Tethered" median nerve stress test in chronic carpal tunnel syndrome	Arch Phys Med Rehabil.	summary document; no comparison group or risk assessment
LaBan,M.M.; MacKenzie,J.R.; Zemenick,G.A.	1989	Anatomic observations in carpal tunnel syndrome as they relate to the tethered median nerve stress test	Arch Phys Med Rehabil.	cadaver study
LaBan,M.M.; Spiteri,D.J.	1997	History and differential diagnosis of carpal tunnel syndrome	Phys.Med.Rehabil.Clin.N.Am.	background
LaBan,M.M.; Zemenick,G.A.; Meerschaert,J.R.	1975	Neck and shoulder pain. Presenting symptoms of carpal tunnel syndrome	Mich.Med	insufficient data
Lagos,J.C.	1971	Compression neuropathy in childhood	Dev.Med Child Neurol	not relevant
Lahiri,A.; Liong,K.; Chia,D.; Lee,S.; Lim,A.; Biswas,A.; Lee,H.P.	2013	Functional compartmental space: The missing link in the pathogenesis of carpal tunnel syndrome	Computer Methods in Biomechanics and Biomedical Engineering	insufficient data; very low study design
LaJoie,A.S.; McCabe,S.J.; Thomas,B.; Edgell,S.E.	2005	Determining the sensitivity and specificity of common diagnostic tests for carpal tunnel syndrome using latent class analysis	Plast.Reconstr.Surg	+not best available evidence
Lakhanpal,S.; Ginsburg,W.W.; Michet,C.J.; Doyle,J.A.; Moore,S.B.	1988	Eosinophilic fasciitis: clinical spectrum and therapeutic response in 52 cases	Semin.Arthritis Rheum.	Does not answer a question of interest; not relevant to CTS
Lalumandier,J.A.; McPhee,S.D.	2001	Prevalence and risk factors of hand problems and carpal tunnel syndrome among dental hygienists	J Dent.Hyg.	Not relevant, prevalence study
Lalumandier,J.A.; McPhee,S.D.; Riddle,S.; Shulman,J.D.; Daigle,W.W.	2000	Carpal tunnel syndrome: effect on Army dental personnel	Mil.Med	Not relevant, prevalence study

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Lam,C.H.; Yeung,S.H.; Wong,T.C.	2010	Endoscopic carpal tunnel release: experience of surgical outcome in a Chinese population	Hong Kong Med J	Retrospective case series
Lam,H.S.; Cass,N.M.; Ng,K.C.	1981	Electromyographic monitoring of neuromuscular block	Br.J.Anaesth.	review; background information
Lam,N.; Thurston,A.	1998	Association of obesity, gender, age and occupation with carpal tunnel syndrome	Aust.N.Z.J Surg	not best available evidence
Lamberti,P.M.; Light,T.R.	2002	Carpal tunnel syndrome in children	Hand Clin	background
Lambird,P.A.; Hartmann,W.H.	1969	Hereditary amyloidosis, the flexor retinaculum, and the carpal tunnel syndrome	Am J Clin Pathol.	records review
Landi,A.; Luchetti,R.; Schoenhuber,R.	1989	Metabolic and neurophysiological correlations in carpal tunnel syndrome	Journal of the Western Pacific Orthopaedic Association	bio-study; does not answer a question of interest
Lang,E.; Claus,D.; Neundorfer,B.; Handwerker,H.O.	1995	Parameters of thick and thin nerve-fiber functions as predictors of pain in carpal tunnel syndrome		insufficient data; very low study design
Lange,H.	1999	Carpal tunnel syndrome caused by the palmaris profundus muscle	Scand.J.Plast.Reconstr.Surg.Hand Surg.	case report
Lange,J.	2013	Carpal tunnel syndrome diagnosed using ultrasound as a first-line exam by the surgeon	J Hand Surg Eur.Vol.	insufficient data; very low study design
Langlois,G.; Estebe,J.P.; Gentili,M.E.; Kerdiles,L.; Mouilleron,P.; Ecoffey,C.	2002	The addition of tramadol to lidocaine does not reduce tourniquet and postoperative pain during iv regional anesthesia	Can J Anaesth.	Deemed clinically irrelevant
Lanz,U.	1977	Anatomical variations of the median nerve in the carpal tunnel	J Hand Surg Am	Does not address question of interest
Lattmann,T.; Dietrich,M.; Meier,C.; Kilgus,M.; Platz,A.	2008	Comparison of 2 surgical approaches for volar locking plate osteosynthesis of the distal radius	J Hand Surg Am	Incorrect patient population (not exclusive to CTS patients)
Laureno,R.	1996	Neurologic manifestations of thyroid disease	Endocrinologist	Background Information; review

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Lauritzen,M.; Liguori,R.; Trojaborg,W.	1991	Orthodromic sensory conduction along the ring finger in normal subjects and in patients with a carpal tunnel syndrome	Electroencephalogr.Clin Neurophysiol.	insufficient data; very low study design
Laursen,L.H.; Jepsen,J.R.; Sjogaard,G.	2006	Vibrotactile sense in patients with different upper limb disorders compared with a control group	Int.Arch.Occup.Environ.Health	not exclusive to CTS; very low study design
Lawrence,T.M.; Desai,V.V.	2002	Topical anaesthesia to reduce pain associated with carpal tunnel surgery	J Hand Surg Br	Deemed clinically irrelevant
Lax,H.; Zochodne,D.W.	1995	'Causalgic' median mononeuropathies: Segmental rubror and edema	Muscle Nerve	case reports
Le Quesne,P.M.	1978	The carpal tunnel syndrome	Br J Hosp.Med	background
Le Quesne,P.M.; Casey,E.B.	1974	Recovery of conduction velocity distal to a compressive lesion	J Neurol Neurosurg.Psychiatry	Does not answer any question of interest.
Leach,R.E.; Odom,J.A.,Jr.	1968	Systemic causes of carpal tunnel syndrome	Postgrad.Med	Background Information
Leahy,P.M.	1995	Improved treatments for carpal tunnel and related syndromes	Chiropractic Sports Medicine	Background article
Leahy,P.M.; Mock III,L.E.	1992	Myofascial release technique and mechanical compromise of peripheral nerves of the upper extremity	Chiropractic Sports Medicine	Background article
Leblhuber,F.; Reisecker,F.; Witzmann,A.	1986	Carpal tunnel syndrome: neurographical parameters in different stages of median nerve compression	Acta Neurochir.(Wien.)	insufficient data; no comparison group or consistent reference standard
Leden,I.; Svensson,B.; Sturfelt,G.; Schersten,B.	1980	'Rheumatic' hand symptoms as a clue to undiagnosed diabetes mellitus	Scand.J.Rheumatol.	preliminary report
Lee,C.H.; Kim,T.K.; Yoon,E.S.; Dhong,E.S.	2005	Postoperative morphologic analysis of carpal tunnel syndrome using high-resolution ultrasonography	Ann.Plast.Surg	Does not answer a question of interest
Lee,C.H.; Kim,T.K.; Yoon,E.S.; Dhong,E.S.	2005	Correlation of high-resolution ultrasonographic findings with the clinical symptoms and electrodiagnostic data in carpal tunnel syndrome	Ann.Plast.Surg	insufficient information

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Lee,D.; van Holsbeeck,M.T.; Janevski,P.K.; Ganos,D.L.; Ditmars,D.M.; Darian,V.B.	1999	Diagnosis of carpal tunnel syndrome. Ultrasound versus electromyography	Radiol.Clin North Am	cadaver study
Lee,Dellon A.	2005	Measuring peripheral nerve function: Electrodiagnostic versus neurosensory testing	Atlas of Hand Clinics	Background Information
Lee,H.; Jackson,T.A.; Wood,D.J.	2002	Carpal tunnel release through a limited skin incision under direct visualization using a new instrument, the carposcope	Plast.Reconstr.Surg	Narrative review
Lee,H.J.; Kwon,H.K.; Kim,D.H.; Pyun,S.B.	2013	Nerve conduction studies of median motor nerve and median sensory branches according to the severity of carpal tunnel syndrome	Ann.Rehabil.Med	insufficient data; very low study design
Lee,J.H.; An,J.H.; Lee,S.H.; Hwang,E.Y.	2009	Effectiveness of steroid injection in treating patients with moderate and severe degree of carpal tunnel syndrome measured by clinical and electrodiagnostic assessment	Clin J Pain	Very Low Quality
Lee,J.J.; Hwang,S.M.; Jang,J.S.; Lim,S.Y.; Heo,D.H.; Cho,Y.J.	2010	Remifentanil-propofol sedation as an ambulatory anesthesia for carpal tunnel release	J Korean Neurosurg.Soc.	Deemed clinically irrelevant
Lee,K.Y.; Lee,Y.J.; Koh,S.H.	2009	Usefulness of the median terminal latency ratio in the diagnosis of carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; no comparison group
Lee,L.H.; Al-Maiyah,M.; Al-Bahrani,R.Z.; Bhargava,A.; Auyeung,J.; Stothard,J.	2014	Outcome of carpal tunnel release - Correlation with wrist and wrist-palm anthropomorphic measurements	J Hand Surg Eur.Vol.	Does not address question
Lee,W.J.; Liao,Y.C.; Wei,S.J.; Tsai,C.W.; Chang,M.H.	2011	How to make electrodiagnosis of carpal tunnel syndrome with normal distal conduction?	J Clin Neurophysiol.	insufficient data; very low study design
Lefebvre,J.; de,Seze S.; Lérique,J.L.; Hamonet,C.; Chaumont,P.; Bigot,B.; Dreyfus,P.	1969	Aetiology of the carpal tunnel syndrome	Electroencephalogr.Clin Neurophysiol.	not relevant
Leffler,C.T.; Gozani,S.N.; Nguyen,Z.Q.; Cros,D.	2000	An automated electrodiagnostic technique for detection of carpal tunnel syndrome	Neurology and Clinical Neurophysiology	insufficient data; very low study design

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Lehmann,H.J.; Tackmann,W.	1974	Neurographic analysis of trains of frequent electric stimuli in the diagnosis of peripheral nerve diseases. Investigations in the carpal tunnel syndrome	Eur.Neurol	<10 patients per group; very low study design
Leite,J.C.; Jerosch-Herold,C.; Song,F.	2006	A systematic review of the psychometric properties of the Boston Carpal Tunnel Questionnaire	BMC Musculoskelet.Disord.	systematic review
Leklem,J.E.; Roe,D.; Smith,J.C.; Raiten,D.; Forlano,A.J.; Colby,F.; Kooss,D.H.; Curtay,J.-P.; Hawrylewicz,E.J.	1992	Vitamin B(6): Reservoirs, receptors, and red-cell reactions	Ann.N.Y.Acad.Sci.	Background article
Leonard,L.; Rangan,A.; Doyle,G.; Taylor,G.	2003	Carpal tunnel syndrome - is high-frequency ultrasound a useful diagnostic tool?	J Hand Surg Br	insufficient data; very low study design
Leonard,M.H.; Stern,J.E.	1970	Electromyography (EMG) in surgery of the hand		case series; review of <10 patients
Lesser,R.P.	1986	Recommended standards for short-latency somatosensory evoked potentials	J.Clin.Neuropsychiol.	review; background information
Lester,D.K.; Helm,Jr	1995	The mini palm incision for carpal tunnel release	Journal of Orthopaedic Techniques	Background article
Levine,D.W.; Simmons,B.P.; Koris,M.J.; Daltroy,L.H.; Hohl,G.G.; Fossel,A.H.; Katz,J.N.	1993	A self-administered questionnaire for the assessment of severity of symptoms and functional status in carpal tunnel syndrome	J Bone Joint Surg Am	+Does not answer a question of interest
Lew,H.L.; Date,E.S.; Pan,S.S.; Wu,P.; Ware,P.F.; Kingery,W.S.	2005	Sensitivity, specificity, and variability of nerve conduction velocity measurements in carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design
Lew,H.L.; Wang,L.; Robinson,L.R.	2000	Test-retest reliability of combined sensory index: implications for diagnosing carpal tunnel syndrome	Muscle Nerve	<10 patients per group
Lewicky,R.T.	1994	Endoscopic carpal tunnel release: the guide tube technique		

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Li,Z.-M.	2005	Gender difference in carpal tunnel compliance	Journal of Musculoskeletal Research	Does not answer a question of interest; no diagnosis of CTS
Lian,B.T.; Urkude,R.; Verma,K.K.	2006	Clinical profile, electrodiagnosis and outcome in patients with carpal tunnel syndrome: A Singapore perspective	Singapore Med.J.	Retrospective case series
Liang,C.L.	1987	CT-scanning study of cross-sectional area of the carpal tunnel in cases of carpal tunnel syndrome	Nihon Seikeigeka Gakkai Zasshi	+Does not answer a question of interest; very low study design
Liao,Y.Y.; Wu,C.C.; Kuo,T.T.; Chen,J.P.; Hsu,Y.W.; Yeh,C.K.	2012	Carpal tunnel syndrome diagnosis by a self-normalization process and ultrasound compound imaging	Med Phys	insufficient data; very low study design
Lichtman,D.M.; Florio,R.L.; Mack,G.R.	1979	Carpal tunnel release under local anesthesia: evaluation of the outpatient procedure	J Hand Surg Am	Retrospective case series
Lieberman,J.S.; Taylor,R.G.	1982	Physical medicine and rehabilitation- epitomes of progress: electrodiagnostic evaluation of carpal tunnel syndrome	West J Med	Commentary/review
Lifchez,S.D.; Murphy,M.S.	2006	Endoscopic carpal tunnel release through a single distal portal	Techniques in Orthopaedics	Background article
Lillehei,K.O.	1996	A review of the management of peripheral nerve entrapment syndromes	Neurosurgery Quarterly	background
Lin,C.L.; Yang,C.W.; Chiang,C.C.; Chang,C.T.; Huang,C.C.	2001	Long-term on-line hemodiafiltration reduces predialysis beta-2-microglobulin levels in chronic hemodialysis patients	Blood Purif.	Not relevant
Lin,P.; Zhang,L.; Yu,Y.B.; Xu,X.L.; Liu,J.; Li,F.; Xu,J.	2007	Microsurgical decompression of the median nerves for treating diabetic peripheral neuropathy in the upper limbs: A 21-month follow-up	Neural Regeneration Research	Incorrect patient population (not exclusive to CTS)
Linscheid,R.L.; Peterson,L.F.; Juergens,J.L.	1967	Carpal-tunnel syndrome associated with vasospasm	J Bone Joint Surg Am	very low quality
Lisk,D.R.	1989	The carpal tunnel syndrome in the Sierra Leonean African	African Journal of Neurological Sciences	Confounding comorbidities

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Liss,G.M.; Armstrong,C.; Kusiak,R.A.; Gailitis,M.M.	1992	Use of provincial health insurance plan billing data to estimate carpal tunnel syndrome morbidity and surgery rates	Am J Ind.Med	retrospective records review; no comparison group
Litchman,H.M.; Triedman,M.H.; Silver,C.M.; Simon,S.D.	1968	The carpal tunnel syndrome. A clinical and electrodiagnostic study	Int.Surg	background
Liu,F.-C.; Liou,J.-T.; Tsai,Y.-F.; Li,A.H.; Day,Y.-Y.; Hui,Y.-L.; Lui,P.-W.	2005	Efficacy of ultrasound-guided axillary brachial plexus block: A comparative study with nerve stimulator-guided method	Chang Gung Medical Journal	Incorrect patient population (not exclusive to CTS patients)
Lo,Y.L.; Lim,S.H.; Fook-Chong,S.; Lum,S.Y.; Teoh,L.C.; Yong,F.C.	2012	Outcome prediction value of nerve conduction studies for endoscopic carpal tunnel surgery	J Clin Neuromuscul.Dis	very low quality
Lobardi,R.M.; Wood,M.B.; Linscheid,R.L.	1988	Symptomatic restrictive thumb-index flexor tenosynovitis: Incidence of musculotendinous anomalies and results of treatment	Journal of Hand Surgery	Not relevant to CTS
Logigian,E.L.; Busis,N.A.; Berger,A.R.; Bruyninckx,F.; Khalil,N.; Shahani,B.T.; Young,R.R.	1987	Lumbrical sparing in carpal tunnel syndrome: anatomic, physiologic, and diagnostic implications		insufficient data; very low study design
Logue,E.J.; Bluhm,S.; Johnson,M.C.; Mazer,R.; Halle,J.S.; Greathouse,D.G.	2005	Median and ulnar neuropathies in university cellists	Medical Problems of Performing Artists	Not relevant, prevalence study
Longstaff,L.; Milner,R.H.; O'Sullivan,S.; Fawcett,P.	2001	Carpal tunnel syndrome: the correlation between outcome, symptoms and nerve conduction study findings	J Hand Surg Br	Retrospective case series
Loong,S.C.	1977	The carpal tunnel syndrome: a clinical and electrophysiological study of 250 patients	Clin Exp.Neurol	insufficient data; no diagnosis of CTS
Loong,S.C.; Seah,C.S.	1971	Comparison of median and ulnar sensory nerve action potentials in the diagnosis of the carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	insufficient data; very low study design
Loong,S.C.; Seah,C.S.	1973	A sensitive diagnostic test for carpal tunnel syndrome	Neurol.India	insufficient data; no comparison group

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Lord,R.W.,Jr.	2000	How accurate are the history and physical examination in diagnosing carpal tunnel syndrome (CTS)?	J Fam Pract.	summary document
Loscher,W.N.; Auer-Grumbach,M.; Trinkka,E.; Ladurner,G.; Hartung,H.P.	2000	Comparison of second lumbrical and interosseus latencies with standard measures of median nerve function across the carpal tunnel: a prospective study of 450 hands	J Neurol	insufficient data; very low study design
Louda,L.; Hartlova,D.; Muff,V.; Smolikova,L.; Svoboda,L.	1994	Impulsive vibration and exposure limit	Nagoya J Med Sci	<10 patients in CTS group; not CTS exclusive
Louis,D.S.; Greene,T.L.; Noellert,R.C.	1985	Complications of carpal tunnel surgery	J Neurosurg.	Retrospective case series
Louis,D.S.; Hankin,F.M.	1987	Symptomatic relief following carpal tunnel decompression with normal electroneuromyographic studies		not best available evidence; very low study design
Lowe,S.A.; Sen,R.C.	2008	Neurological disease in pregnancy	Obstetrics, Gynaecology and Reproductive Medicine	Background article
Lowe,W.	2008	Suggested variations on standard carpal tunnel syndrome assessment tests	J Bodyw.Mov Ther	background
Lowery,C.L.	1995	Sudden joint and extremity pain in pregnancy	Obstet.Gynecol.Clin.North Am.	Background article
Lozano Calderon,S.A.; Paiva,A.; Ring,D.	2008	Patient satisfaction after open carpal tunnel release correlates with depression	J Hand Surg Am	Retrospective case series
lu,F.; lu,G.; lu,Z.R.; -Okumu?-M; Ceceli,E.; Lu,S.	2005	Evaluation of iontophoresis and local corticosteroid injection in the treatment of carpal tunnel syndrome	American journal of physical medicine & rehabilitation / Association of Academic Physiatrists	Duplicate study (duplicate with AAOSID 697)
Lublin,J.C.; Rojer,D.E.; Barron,O.A.	1998	Carpal tunnel syndrome: A review of initial diagnosis and treatment for the ob/gyn	Primary Care Update for Ob/Gyns	background
Luchetti,R.; Alfarano,M.; Montagna,G.; Soragni,O.	1996	Short palmar incision: a new surgical approach for carpal tunnel syndrome	Chir Organi Mov	Background article

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Luchetti,R.; Schoenhuber,R.; Alfarano,M.; Deluca,S.; De,Cicco G.; Landi,A.	1994	Serial overnight recordings of intra-carpal canal pressure in carpal tunnel syndrome patients with and without wrist splinting	J Hand Surg Br	Incorrect patients population (<10 patients/group)
Luchetti,R.; Schoenhuber,R.; De,Cicco G.; Alfarano,M.; Deluca,S.; Landi,A.	1989	Carpal-tunnel pressure	Acta Orthop Scand.	<10 patients per group
Luchetti,R.; Schoenhuber,R.; Landi,A.	1988	Localized nerve damage recorded intraoperatively in carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Luchetti,R.; Schoenhuber,R.; Landi,A.	1988	Assessment of sensory nerve conduction in carpal tunnel syndrome before, during and after operation	J Hand Surg Br	<10 patients per group
Luchetti,R.; Schoenhuber,R.; Nathan,P.	1998	Correlation of segmental carpal tunnel pressures with changes in hand and wrist positions in patients with carpal tunnel syndrome and controls	J Hand Surg Br	+Does not answer a question of interest
Luciano,C.A.; Gilliat,R.W.; Conwit,R.A.	1995	Mixed nerve action potentials in acquired demyelinating polyneuropathy	Muscle Nerve	not exclusive to CTS
Lue,Y.J.; Lu,Y.M.; Lin,G.T.; Liu,Y.F.	2014	Validation of the chinese version of the Boston carpal tunnel questionnaire	J Occup.Rehabil.	+Does not answer a question of interest; very low study design
Lum,P.B.; Kanakamedala,R.	1986	Conduction of the palmar cutaneous branch of the median nerve	Arch.Phys.Med.Rehabil.	only healthy study subjects
Lundborg,G.; Dahlin,L.B.	1996	Anatomy, function, and pathophysiology of peripheral nerves and nerve compression	Hand Clin.	background
Lundborg,G.; Lie- Stenstrom,A.K.; Sollerman,C.; Stromberg,T.; Pyykko,I.	1986	Digital vibrogram: a new diagnostic tool for sensory testing in compression neuropathy	J Hand Surg Am	insufficient data; very low study design
Lupski,J.R.	1997	Charcot-Marie-Tooth disease: a gene- dosage effect	Hosp.Pract.(1995.)	Background Information
Luria,S.; Waitayawinyu,T.; Trumble,T.E.	2008	Endoscopic revision of carpal tunnel release	Plast.Reconstr.Surg	Incorrect patient population (prior invasive intervention)

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Luyendijk,W.	1986	The carpal tunnel syndrome. The role of a persistent median artery	Acta Neurochir.(Wien.)	Background Information
Ly, Pen D.; Andr�u, J.L.; Mill�n, I.; Blas, G.; S�nchez, Olaso A.	2012	Comparison of surgical decompression and local steroid injection in the treatment of carpal tunnel syndrome: 2-year clinical results from a randomized trial	Rheumatology (Oxford).	duplicate reference
Lyall, J.M.; Gliner, J.; Hubbell, M.K.	2002	Treatment of worker's compensation cases of carpal tunnel syndrome: an outcome study	J Hand Ther	Retrospective case series
Lynch, R.M.; Mohr, S.N.; Gochfeld, M.	1997	Prediction of tendinitis and carpal tunnel syndrome among solderers	Applied Occupational and Environmental Hygiene	Not relevant
Ly-Pen, D.; Andreu, J.L.; de, Blas G.; Sanchez-Olaso, A.; Millan, I.	2005	Surgical decompression versus local steroid injection in carpal tunnel syndrome: a one-year, prospective, randomized, open, controlled clinical trial	Arthritis Rheum.	Duplicate patient cohort and data. Extracted from PMID:24321619.
Lyren, P.E.; Atroshi, I.	2012	Using item response theory improved responsiveness of patient-reported outcomes measures in carpal tunnel syndrome	J Clin Epidemiol.	very low quality
Ma, H.; Kim, I.	2012	The diagnostic assessment of hand elevation test in carpal tunnel syndrome	J Korean Neurosurg.Soc.	insufficient data; very low study design
Mabie, W.C.	2005	Peripheral neuropathies during pregnancy	Clin.Obstet.Gynecol.	Background article
Macaire, P.; Choquet, O.; Jochum, D.; Travers, V.; Capdevila, X.	2005	Nerve blocks at the wrist for carpal tunnel release revisited: the use of sensory-nerve and motor-nerve stimulation techniques	Reg Anesth.Pain Med	Very low quality
Macaire, P.; Singelyn, F.; Narchi, P.; Paqueron, X.	2008	Ultrasound- or nerve stimulation-guided wrist blocks for carpal tunnel release: a randomized prospective comparative study	Reg Anesth.Pain Med	Insufficient data (data reported in medians and ranges)
MacDermid, J.	2002	A hand brace improve symptoms and function in carpal tunnel syndrome	Aust.J Physiother.	Insufficient data

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MacDermid,J.C.; Kramer,J.F.; Roth,J.H.	1994	Decision making in detecting abnormal Semmes-Weinstein monofilament thresholds in carpal tunnel syndrome	J Hand Ther	+Does not answer a question of interest
MacDermid,J.C.; Vincent,J.I.; Gan,B.S.; Grewal,R.	2012	A blinded placebo-controlled randomized trial on the use of astaxanthin as an adjunct to splinting in the treatment of carpal tunnel syndrome	Hand (N.Y)	Deemed clinically irrelevant (multimodal approach utilized)
MacDermid,J.C.; Wessel,J.	2004	Clinical diagnosis of carpal tunnel syndrome: a systematic review	J Hand Ther	systematic review
Macdonald,G.; Robertson,M.M.; Erickson,J.A.	1988	Carpal tunnel syndrome among California dental hygienists	Dent.Hyg.(Chic.)	Not relevant, prevalence study
MacDonald,R.I.; Lichtman,D.M.; Hanlon,J.J.; Wilson,J.N.	1978	Complications of surgical release for carpal tunnel syndrome	J Hand Surg Am	Retrospective case series
Macdonell,R.A.; Schwartz,M.S.; Swash,M.	1990	Carpal tunnel syndrome: which finger should be tested? An analysis of sensory conduction in digital branches of the median nerve	Muscle Nerve	insufficient data; very low study design
Macfarlane,G.J.	2001	Identification and prevention of work-related carpal-tunnel syndrome		commentary
Mackinnon,S.E.	1991	Secondary carpal tunnel surgery	Neurosurg.Clin N.Am	Narrative review
Mackinnon,S.E.; Dellon,A.L.	1988	Anatomic investigations of nerves at the wrist: I. Orientation of the motor fascicle of the median nerve in the carpal tunnel	Ann.Plast.Surg	cadaver study
Macleod,W.N.	1987	Repeater F waves: a comparison of sensitivity with sensory antidromic wrist-to-palm latency and distal motor latency in the diagnosis of carpal tunnel syndrome		insufficient data; very low study design
Maddali,Bongi S.; Signorini,M.; Bassetti,M.; Del,Rosso A.; Orlandi,M.; De,Scisciolo G.	2013	A manual therapy intervention improves symptoms in patients with carpal tunnel syndrome: a pilot study	Rheumatol.Int.	Very Low Quality

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Maeda,Y.; Kettner,N.; Lee,J.; Kim,J.; Cina,S.; Malatesta,C.; Gerber,J.; McManus,C.; Im,J.; Libby,A.; Mezzacappa,P.; Morse,L.R.; Park,K.; Audette,J.; Napadow,V.	2013	Acupuncture evoked response in contralateral somatosensory cortex reflects peripheral nerve pathology of carpal tunnel syndrome	Medical Acupuncture	insufficient data; very low study design
Maeda,Y.; Kettner,N.; Sheehan,J.; Kim,J.; Cina,S.; Malatesta,C.; Gerber,J.; McManus,C.; Mezzacappa,P.; Morse,L.R.; Audette,J.; Napadow,V.	2013	Altered brain morphometry in carpal tunnel syndrome is associated with median nerve pathology	Neuroimage Clin	+Does not answer a question of interest
Maeda,Y.; Kim,J.; Cina,S.; McManus,C.; Malatesta,C.; Mezzacappa,P.; Morse,L.; Gerber,J.; Ogn-Sutherland,R.; Kuttner,N.; Audette,J.; Napadow,V.	2013	Altered brain response to acupuncture after a course of acupuncture therapy for CTS is associated with analgesia	J.Altern.Complement.Med.	Insufficient data
Magee,K.R.; Kahn,E.A.	1967	The carpal tunnel syndrome	Mich.Med	case reports
Maggard,M.A.; Harness,N.G.; Chang,W.T.; Parikh,J.A.; Asch,S.M.; Nuckols,T.K.	2010	Indications for performing carpal tunnel surgery: clinical quality measures	Plast.Reconstr.Surg	expert panel review
Maghsoudipour,M.; Moghimi,S.; Dehghaan,F.; Rahimpanah,A.	2008	Association of occupational and non-occupational risk factors with the prevalence of work related carpal tunnel syndrome	J Occup.Rehabil.	not best evidence for work and demographic exposures
Magora,F.; Stern,L.; Magora,A.	1980	Motor nerve conduction in intravenous regional anaesthesia with bupivacaine hydrochloride	Br.J.Anaesth.	Incorrect patient population (non-CTS patients)
Maher,H.K.	2007	Carpal tunnel syndrome: an update	AAOHN J	background
Mahoney,J.L.; Dagum,A.B.	1992	Carpal tunnel syndrome	Can.Fam.Physician	background
Makanji,H.S.; Zhao,M.; Mudgal,C.S.; Jupiter,J.B.; Ring,D.	2013	Correspondence between clinical presentation and electrophysiological testing for potential carpal tunnel syndrome	J Hand Surg Eur.Vol.	not best available evidence; insufficient data

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Malchaire,J.; Piette,A.; Cock,N.	2001	Associations between hand-wrist musculoskeletal and sensorineural complaints and biomechanical and vibration work constraints	Ann.Occup.Hyg.	Not relevant to CTS
Malone,D.G.; Clark,T.B.; Wei,N.	2010	Ultrasound-guided percutaneous injection, hydrodissection, and fenestration for carpal tunnel syndrome: Description of a new technique	Journal of Applied Research	Retrospective case series
Mandawat,M.K.	1985	Congestive heart failure and carpal tunnel syndrome: a rare association	J Indian Med Assoc	case report
Mandel,S.	1987	Neurologic syndromes from repetitive trauma at work	Postgrad.Med	Background Information
Manes,H.R.	2012	Prevalence of carpal tunnel syndrome in motorcyclists		Not relevant, prevalence study
Mangonon,M.L.; Moy,O.J.; Kelly,J.J.; Cowan,T.B.; Wheeler,D.R.	2014	Effects of corticosteroid injection on nerve conduction testing for the diagnosis of carpal tunnel syndrome	Am J Orthop (Belle.Mead NJ)	Very Low Quality
Mangus,B.C.	1988	Medical care for wheelchair athletes	Adapted Physical Activity Quarterly	Background Information
Manktelow,R.T.; Binhammer,P.; Tomat,L.R.; Bril,V.; Szalai,J.P.	2004	Carpal tunnel syndrome: cross-sectional and outcome study in Ontario workers	J Hand Surg Am	Not relevant
Margolis,W.; Kraus,J.F.	1987	The prevalence of carpal tunnel syndrome symptoms in female supermarket checkers	J Occup.Med	Not relevant, prevalence study
Mariano,E.R.; Lehr,M.K.; Loland,V.J.; Bishop,M.L.	2013	Choice of loco-regional anesthetic technique affects operating room efficiency for carpal tunnel release	J Anesth.	Very low quality
Marin,E.L.; Vernick,S.; Friedmann,L.W.	1983	Carpal tunnel syndrome: median nerve stress test	Arch Phys Med Rehabil.	<10 patients per group; insufficient data
Marras,W.S.; Marklin,R.W.; Greenspan,G.J.; Lehman,K.R.	1995	Quantification of wrist motions during scanning	Hum.Factors	<10 patients per group
Marsh,D.R.	1986	Use of a wheel aesthesiometer for testing sensibility in the hand. Results in patients with carpal tunnel syndrome	J Hand Surg Br	+Does not answer a question of interest; insufficient data

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Marshall,E.A.; Listinsky,J.J.; Ceckler,T.L.; Szumowski,J.; Bryant,R.G.; Hornak,J.P.	1989	Magnetic resonance imaging using a ribbonator: Hand and wrist	Magn.Reson.Med.	Background Information; review
Marshall,G.; Edelstein,G.; Hirshman,C.A.	1980	Median nerve compression following radial arterial puncture	Anesth.Analg.	case report
Marshall,S.; Tardif,G.; Ashworth,N.	2007	Local corticosteroid injection for carpal tunnel syndrome	Cochrane Database Syst.Rev.	Systematic review
Martin,B.I.; Levenson,L.M.; Hollingworth,W.; Kliot,M.; Heagerty,P.J.; Turner,J.A.; Jarvik,J.G.	2005	Randomized clinical trial of surgery versus conservative therapy for carpal tunnel syndrome [ISRCTN84286481]	BMC Musculoskelet.Disord.	Not a completed study. Methodology only. No results.
Martin,K.D.; Dutzmann,S.; Sobottka,S.B.; Rambow,S.; Mellerowicz,H.A.; Pinzer,T.; Schackert,G.; Krishnan,K.G.	2013	Retractor-Endoscopic Nerve Decompression in Carpal and Cubital Tunnel Syndromes: Outcomes in a Small Series	World Neurosurg.	very low quality
Martin,K.-D.; Dutzmann,S.; Sobottka,S.B.; Rambow,S.; Mellerowicz,H.A.; Pinzer,T.; Schackert,G.; Krishnan,K.G.	2014	Retractor-endoscopic nerve decompression in carpal and cubital tunnel syndromes: Outcomes in a small series	World Neurosurgery	Very low quality
Martin,S.	1991	Carpal tunnel syndrome: a job-related risk	Am Pharm.	Commentary/review
Martins,R.S.; Siqueira,M.G.; Simplicio,H.; Agapito,D.; Medeiros,M.	2008	Magnetic resonance imaging of idiopathic carpal tunnel syndrome: correlation with clinical findings and electrophysiological investigation	Clin Neurol Neurosurg.	insufficient information
Martyn,C.N.; Hughes,R.A.C.	1997	Epidemiology of peripheral neuropathy	Journal of Neurology Neurosurgery and Psychiatry	background
Marx,R.G.; Hudak,P.L.; Bombardier,C.; Graham,B.; Goldsmith,C.; Wright,J.G.	1998	The reliability of physical examination for carpal tunnel syndrome	J Hand Surg Br	<10 patients per group
Masear,V.R.; Hayes,J.M.; Hyde,A.G.	1986	An industrial cause of carpal tunnel syndrome	J Hand Surg Am	very low study design
Masini,M.; Tavares-da,Silva R.	1998	The carpal tunnel syndrome a comparative study of conventional and endoscopic surgical treatment: analysis of 50 cases	Zentralbl.Neurochir.	Conference abstract

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Masmejean,E.H.; Chavane,H.; Chantegret,A.; Issermann,J.J.; Alnot,J.Y.	1999	The wrist of the formula 1 driver	Br J Sports Med	Not relevant, prevalence study
Massey,E.W.	1980	Rectal biopsy in carpal tunnel syndrome in amyloidosis	N.C Med J	case reports
Massey,E.W.	1978	Carpal tunnel syndrome in pregnancy	Obstet.Gynecol.Surv.	Narrative review
Massey,E.W.	1988	Mononeuropathies in pregnancy	Semin.Neurol.	Background article
Massey,E.W.; Riley,T.L.	1981	Nontraumatic mononeuropathies: a review	Mil.Med	review
Massey,E.W.; Riley,T.L.; Pleet,A.B.	1981	Coexistent carpal tunnel syndrome and cervical radiculopathy (double crush syndrome)	South Med J	case reports
Massy-Westropp,N.; Grimmer,K.; Bain,G.	2000	A systematic review of the clinical diagnostic tests for carpal tunnel syndrome	J Hand Surg Am	systematic review
Matricali,B.; Mechelse,K.; Staal,A.	1969	Carpal-tunnel syndrome		letter
Mattioli,S.; Baldasseroni,A.; Bovenzi,M.; Curti,S.; Cooke,R.M.; Campo,G.; Barbieri,P.G.; Ghersi,R.; Broccoli,M.; Cancellieri,M.P.; Colao,A.M.; Dell'omo,M.; Fateh-Moghadam,P.; Franceschini,F.; Fucksia,S.; Galli,P.; Gobba,F.; Lucchini,R.; Mandes,A.; Marras,T.; Sgarrella,C.; Borghesi,S.; Fierro,M.; Zanardi,F.; Mancini,G.; Violante,F.S.	2009	Risk factors for operated carpal tunnel syndrome: a multicenter population-based case-control study	BMC Public Health	Does not address question of interest
Maxwell,J.A.; Clough,C.A.; Reckling,F.W.; Kelly,C.R.	1973	Carpal tunnel syndrome. A review of cases treated surgically	J Kans.Med Soc.	Retrospective case series
May,D.C.	2002	Results of an OSHA ergonomic intervention program in New Hampshire	Appl Occup.Environ.Hyg.	Does not answer a question of interest

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Mayr,H.	1996	Acroparaesthesiae and Carpal Tunnel Syndrome - A re-evaluation	European Journal of Physical Medicine and Rehabilitation	not best available evidence
McCann,V.J.; Davis,R.E.	1978	Carpal tunnel syndrome, diabetes and pyridoxal	Aust.N.Z.J Med	Does not answer a question of interest
McCarroll,J.R.; Gioe,T.J.	1982	Professional golfers and the price they pay	Physician and Sportsmedicine	insufficient data; no comparison group
McCartan,B.; Ashby,E.; Taylor,E.J.; Haddad,F.S.	2012	Carpal tunnel syndrome	Br J Hosp.Med (Lond)	background
McColl,G.J.; Dolezal,H.; Eizenberg,N.	2000	Common corticosteroid injections. An anatomical and evidence based review	Aust.Fam Physician	Narrative review
McDeavitt,J.T.; Graziani,V.; Kowalske,K.J.; Hays,R.M.	1995	Neuromuscular disease: Rehabilitation and electrodiagnosis. 2. Nerve disease	Arch.Phys.Med.Rehabil.	background
McDiarmid,M.; Oliver,M.; Ruser,J.; Gucer,P.	2000	Male and female rate differences in carpal tunnel syndrome injuries: personal attributes or job tasks?	Environ.Res.	Prevalence study
McDonough,J.W.; Gruenloh,T.J.	1993	A comparison of endoscopic and open carpal tunnel release	Wis.Med J	Retrospective case series
McGorry,R.W.; Fallentin,N.; Andersen,J.H.; Keir,P.J.; Hansen,T.B.; Pransky,G.; Lin,J.H.	2014	Effect of grip type, wrist motion, and resistance level on pressures within the carpal tunnel of normal wrists	J Orthop Res.	+Does not answer a question of interest
McGrath,M.H.; Polayes,I.M.	1979	Posttraumatic median neuroma: a cause of carpal tunnel syndrome	Ann.Plast.Surg	case reports
McLennan,H.G.; Oats,J.N.; Walstab,J.E.	1987	Survey of hand symptoms in pregnancy	Med J Aust.	Survey
McMinn,D.J.	1985	Carpal tunnel syndrome caused by a simple ganglion	J R Coll Surg Edinb.	case report
McNally,S.A.; Hales,P.F.	2003	Results of 1245 endoscopic carpal tunnel decompressions	Hand Surg	Retrospective case series
Mechelse,K.; Matricali,B.	1970	A study of the diseased nerve in the carpal tunnel syndrome	Electroencephalogr.Clin Neurophysiol.	not relevant
Mechelse,K.; Matricali,B.	1969	A study of the diseased nerve in carpal tunnel syndrome	Electroencephalogr.Clin Neurophysiol.	not relevant, one page full text

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Meder,M.A.; Lange,R.; Amtage,F.; Rijntjes,M.	2012	Proximal stimulus confirms carpal tunnel syndrome--a new test? --a clinical and electrophysiologic, multiple-blind, controlled study	J Clin Neurophysiol.	+Does not answer a question of interest; very low study design
Medina McKeon,J.M.; Yancosek,K.E.	2008	Neural gliding techniques for the treatment of carpal tunnel syndrome: a systematic review	J Sport Rehabil.	systematic review
Mediouni,Z.; de,Roquemaurel A.; Dumontier,C.; Becour,B.; Garrabe,H.; Roquelaure,Y.; Descatha,A.	2014	Is carpal tunnel syndrome related to computer exposure at work? A review and meta-analysis	J Occup.Environ.Med	meta-analysis
Meems,M.; Den,Oudsten B.; Meems,B.J.; Pop,V.	2014	Effectiveness of mechanical traction as a non-surgical treatment for carpal tunnel syndrome compared to care as usual: study protocol for a randomized controlled trial	Trials	Insufficient data
Meena,A.K.; Srinivasa,Rao B.; Sailaja,S.; Mallikarjuna,M.; Borgohain,R.	2008	Second lumbrical and interossei latency difference in Carpal Tunnel Syndrome	Clin Neurophysiol.	confounding comorbidities; very low study design
Megerian,J.T.; Kong,X.; Gozani,S.N.	2007	Utility of nerve conduction studies for carpal tunnel syndrome by family medicine, primary care, and internal medicine physicians	J Am Board Fam Med	+Does not answer a question of interest; not best available evidence
Melhorn,J.M.	1994	CTD: carpal tunnel syndrome, the facts and myths	Kans.Med	Background Information
Melli,G.; Chaudhry,V.; Dorman,T.; Cornblath,D.R.	2002	Perioperative bilateral median neuropathy		Case report
Melvin,J.L.; Burnett,C.N.; Johnson,E.W.	1969	Median nerve conduction in pregnancy	Arch Phys Med Rehabil.	Does not address question of interest
Melvin,J.L.; Johnson,E.W.; Duran,R.	1968	Electrodiagnosis after surgery for the carpal tunnel syndrome	Arch Phys Med Rehabil.	Retrospective case series
Melvin,J.L.; Schuchmann,J.A.; Lanese,R.R.	1973	Diagnostic specificity of motor and sensory nerve conduction variables in the carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design

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Memis,D.; Turan,A.; Karamanlioglu,B.; Pamukcu,Z.; Kurt,I.	2004	Adding Dexmedetomidine to Lidocaine for Intravenous Regional Anesthesia	Anesth.Analg.	Deemed clinically irrelevant
Mengi-Ozsarac,G.	2008	Erratum to "Carpal tunnel syndrome in Parkinson's disease" [Eur. J. Radiol. 67 (3) (2008) 550] (DOI:10.1016/j.ejrad.2008.02.017)	Eur.J.Radiol.	letter to the editor
Menon,J.	1993	Endoscopic carpal tunnel release: a single-portal technique	Contemp Orthop	Retrospective case series
Menon,J.; Etter,C.	1993	Endoscopic carpal tunnel release--current status	J Hand Ther	Background article
Menovsky,T.; Bartels,R.H.; van Lindert,E.L.; Grotenhuis,J.A.	2004	Skin closure in carpal tunnel surgery: a prospective comparative study between nylon, polyglactin 910 and stainless steel sutures	Hand Surg	Does not meet inclusion criteria (invasive follow-up<3 month)
Merchut,M.P.; Kelly,M.A.; Toleikis,S.C.	1990	Quantitative sensory thresholds in carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Merhar,G.L.; Clark,R.A.; Schneider,H.J.; Stern,P.J.	1986	High-resolution computed tomography of the wrist in patients with carpal tunnel syndrome	Skeletal Radiol.	insufficient data; very low study design
Merolli,A.; Lo,Monaco M.; Masciangelo,M.; Del,Regno C.; Catalano,F.	2011	Abnormal post-operative electrophysiological findings after carpal tunnel release: One-year follow-up	Journal of Orthopaedics and Traumatology	Insufficient data
Merolli,A.; Luigetti,M.; Modoni,A.; Masciullo,M.; Lucia,Mereu M.; Lo,Monaco M.	2013	Persistence of abnormal electrophysiological findings after carpal tunnel release	J Reconstr.Microsurg.	Does not address question of interest
Merrick,J.	2000	Musculoskeletal concerns in Down syndrome	International Journal of Adolescent Medicine and Health	review; background information
Meservy,D.; Suruda,A.J.; Bloswick,D.; Lee,J.; Dumas,M.	1997	Ergonomic risk exposure and upper-extremity cumulative trauma disorders in a maquiladora medical devices manufacturing plant	J.Occup.Environ.Med.	Not relevant
Mesgarzadeh,M.; Schneck,C.D.; Bonakdarpour,A.; Mitra,A.; Conaway,D.	1989	Carpal tunnel: MR imaging. Part II. Carpal tunnel syndrome		summary review; very low study design

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Meyerdierks,E.M.	1991	Upper extremity disorders commonly seen in women	N.C Med J	Background Information
Meyers,S.; Cros,D.; Sherry,B.; Vermeire,P.	1989	Liquid crystal thermography: quantitative studies of abnormalities in carpal tunnel syndrome		insufficient data; very low study design
Meys,V.; Thissen,S.; Rozeman,S.; Beekman,R.	2011	Prognostic factors in carpal tunnel syndrome treated with a corticosteroid injection	Muscle Nerve	Very Low Quality
Mhoon,J.T.; Juel,V.C.; Hobson-Webb,L.D.	2012	Median nerve ultrasound as a screening tool in carpal tunnel syndrome: correlation of cross-sectional area measures with electrodiagnostic abnormality	Muscle Nerve	confounded comparisons; not best available evidence
Michalsen,A.; Bock,S.; Ludtke,R.; Rampp,T.; Baecker,M.; Bachmann,J.; Langhorst,J.; Musial,F.; Dobos,G.J.	2009	Effects of traditional cupping therapy in patients with carpal tunnel syndrome: a randomized controlled trial	J Pain	Does not meet inclusion criteria (follow-up <1 month)
Michelotti,B.; Romanowsky,D.; Hauck,R.M.	2014	Prospective, randomized evaluation of endoscopic versus open carpal tunnel release in bilateral carpal tunnel syndrome: an interim analysis	Ann Plast Surg	Does not address question of interest
Micheo,W.F.; Rodriguez,R.A.; Amy,E.	1995	Joint and soft-tissue injections of the upper extremity	Phys.Med.Rehabil.Clin.N.Am.	Background information
Michlovitz,S.; Hun,L.; Erasala,G.N.; Hengehold,D.A.; Weingand,K.W.	2004	Continuous low-level heat wrap therapy is effective for treating wrist pain	Arch Phys Med Rehabil.	Does not meet inclusion criteria (follow-up <1 month)
Mick,G.; Correa-Illanes,G.	2012	Topical pain management with the 5% lidocaine medicated plaster--a review	Curr.Med Res.Opin.	systematic review
Mihalsky,S.	1998	Carpal tunnel syndrome: an overview	J Okla.Dent.Assoc	background
Millender,L.H.; Tromanhauser,S.G.; Gaynor,S.	1996	A team approach to reduce disability in work-related disorders	Orthop.Clin.North Am.	Background Information
Miller,B.K.	1980	How to spot - and treat - carpal tunnel syndrome - early	Nursing (Lond).	background
Miller,B.K.; Gregory,M.	1983	Carpal tunnel syndrome	AORN J	background

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Miller,R.S.; Iverson,D.C.; Fried,R.A.; Green,L.A.; Nutting,P.A.	1994	Carpal tunnel syndrome in primary care: a report from ASPN. Ambulatory Sentinel Practice Network	J Fam Pract.	Not relevant, prevalence study
Miller,R.S.; Iverson,D.C.; Fried,R.A.; Green,L.A.; Nutting,P.A.	1994	Carpal tunnel syndrome in primary care: A report from ASPN	J.Fam.Pract.	duplicate
Miller,S.A.; Freivalds,A.	1995	A stress-strength interference model for predicting CTD probabilities	International Journal of Industrial Ergonomics	prediction model; does not answer a question of interest
Miller,T.T.; Reinus,W.R.	2010	Nerve entrapment syndromes of the elbow, forearm, and wrist	Am.J.Roentgenol.	background
Millesi,H.	1981	Reappraisal of nerve repair	Surg Clin North Am	Background article
Mills,K.R.	1985	Orthodromic sensory action potentials from palmar stimulation in the diagnosis of carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	insufficient data; very low study design
Milo,R.; Kalichman,L.; Volchek,L.; Reitblat,T.	2009	Local corticosteroid treatment for carpal tunnel syndrome: a 6-month clinical and electrophysiological follow-up study	J Back Musculoskelet.Rehabil.	Very Low Quality
Ming,Z.; Zaproudina,N.	2003	Computer use related upper limb musculoskeletal (ComRULM) disorders	Pathophysiology	background
Mireles,M.C.; Miller,J.A.; Paske,W.C.	2009	Misdiagnosis of carpal tunnel syndrome: A systematic misclassification or error of omission	J.Clin.Eng.	literature review; background information
Mitz,M.; Gokulananda,T.; Di,Benedetto M.; Klingbeil,G.E.	1984	Median nerve determinations: Analysis of two techniques	Arch.Phys.Med.Rehabil.	only healthy study subjects
Miwa,T.; Miwa,H.	2011	Ultrasonography of carpal tunnel syndrome: clinical significance and limitations in elderly patients	Intern.Med	insufficient data; very low study design
Miyamoto,H.; Halpern,E.J.; Kastlunger,M.; Gabl,M.; Arora,R.; Bellmann-Weiler,R.; Feuchtner,G.M.; Jaschke,W.R.; Klauser,A.S.	2014	Carpal Tunnel Syndrome: Diagnosis by Means of Median Nerve Elasticity-Improved Diagnostic Accuracy of US with Sonoelastography		insufficient data; very low study design

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Miyamoto,H.; Siedentopf,C.; Kastlunger,M.; Martinoli,C.; Gabl,M.; Jaschke,W.R.; Klauser,A.S.	2014	Intracarpal tunnel contents: evaluation of the effects of corticosteroid injection with sonoelastography		Very Low Quality
Mizrak,A.; Bozgeyik,S.; Karakurum,G.; Kocamer,B.; Oner,U.	2010	The addition of low-dose mivacurium to lidocaine for intravenous regional anesthesia	Journal of Musculoskeletal Pain	Deemed clinically irrelevant
Mizrak,A.; Gul,R.; Erkutlu,I.; Alptekin,M.; Oner,U.	2010	Premedication with dexmedetomidine alone or together with 0.5% lidocaine for IVRA	J Surg Res.	Deemed clinically irrelevant
Mizrak,A.; Gul,R.; Ganidagli,S.; Karakurum,G.; Keskinilic,G.; Oner,U.	2011	Dexmedetomidine premedication of outpatients under IVRA	Middle East J Anesthesiol.	Deemed clinically irrelevant
Mlakar,M.; Ramstrand,N.; Burger,H.; Vidmar,G.	2013	Effect of custom-made and prefabricated orthoses on grip strength in persons with carpal tunnel syndrome	Prosthet.Orthot.Int.	Very Low Quality
Mock,L.E.	1997	Myofascial release treatment of specific muscles of the upper extremity (Levels 3 and 4): Part 3	Clinical Bulletin of Myofascial Therapy	Background article
Mody,G.N.; Anderson,G.A.; Thomas,B.P.; Pallapati,S.C.; Santoshi,J.A.; Antonisamy,B.	2009	Carpal tunnel syndrome in Indian patients: use of modified questionnaires for assessment	J Hand Surg Eur.Vol.	+Does not answer a question of interest
Moghtaderi,A.; Dahmardeh,M.; Dabiri,S.	2012	Subclinical carpal tunnel syndrome in patients with acute stroke	Iran J Neurol	confounding comorbidities without statistical control
Moghtaderi,A.R.; Moghtaderi,N.; Loghmani,A.	2011	Evaluating the effectiveness of local dexamethasone injection in pregnant women with carpal tunnel syndrome	J Res.Med Sci	Very low quality
Mohamed,R.E.; Amin,M.A.; Aboelsafa,A.A.; Elsayed,S.E.	2014	Contribution of power Doppler and gray-scale ultrasound of the median nerve in evaluation of carpal tunnel syndrome	Egyptian Journal of Radiology and Nuclear Medicine	insufficient data; very low study design
Mohammadi,A.; Afshar,A.; Etemadi,A.; Masoudi,S.; Baghizadeh,A.	2010	Diagnostic value of cross-sectional area of median nerve in grading severity of carpal tunnel syndrome	Arch Iran Med	very low study design

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Mohammadi,A.; Afshar,A.R.; Masudi,S.; Etemadi,A.	2009	Comparison of high resolution ultrasonography and nerve conduction study in the diagnosis of carpal tunnel syndrome: Diagnostic value of median nerve cross-sectional area	Iranian Journal of Radiology	insufficient data; very low study design
Mohammadi,A.; Ghasemi-Rad,M.; Mladkova-Suchy,N.; Ansari,S.	2012	Correlation between the severity of carpal tunnel syndrome and color Doppler sonography findings	AJR Am J Roentgenol.	insufficient data; very low study design
Mohanty,C.B.; Midha,R.	2014	Retractor-assisted endoscopic nerve decompression in entrapment neuropathy	World Neurosurgery	Narrative review
Mojaddidi,M.A.; Ahmed,M.S.; Ali,R.; Jeziorska,M.; Al-Sunni,A.; Thomsen,N.O.; Dahlin,L.B.; Malik,R.A.	2014	Molecular and pathological studies in the posterior interosseous nerve of diabetic and non-diabetic patients with carpal tunnel syndrome		Does not address question of interest
Molitor,P.	1985	Clinical revision series. 5. Carpal tunnel syndrome	Nurs.Mirror	background
Molitor,P.J.	1988	A diagnostic test for carpal tunnel syndrome using ultrasound	J Hand Surg Br	insufficient data; very low study design
Monacelli,G.; Rizzo,M.I.; Spagnoli,A.M.; Pardi,M.; Irace,S.	2008	The pillar pain in the carpal tunnel's surgery. Neurogenic inflammation? A new therapeutic approach with local anaesthetic	J Neurosurg.Sci	Insufficient data
Monagle,K.; Dai,G.; Chu,A.; Burnham,R.S.; Snyder,R.E.	1999	Quantitative MR imaging of carpal tunnel syndrome	AJR Am J Roentgenol.	<10 patients per group; very low study design
Mondelli,M.; Aprile,I.; Ballerini,M.; Ginanneschi,F.; Reale,F.; Romano,C.; Rossi,S.; Padua,L.	2005	Sex differences in carpal tunnel syndrome: comparison of surgical and non-surgical populations	Eur.J Neurol	+not best available evidence
Mondelli,M.; Aretini,A.	2015	Low sensitivity of F-wave in the electrodiagnosis of carpal tunnel syndrome	J.Electromyogr.Kinesiol.	insufficient data; unclear reference standard
Mondelli,M.; Baldasseroni,A.; Aretini,A.; Ginanneschi,F.; Padua,L.	2010	Prevalent involvement of thenar motor fibres in vineyard workers with carpal tunnel syndrome	Clin Neurophysiol.	Does not answer a question of interest; insufficient data

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Mondelli,M.; Filippou,G.; Gallo,A.; Frediani,B.	2008	Diagnostic utility of ultrasonography versus nerve conduction studies in mild carpal tunnel syndrome	Arthritis Rheum.	insufficient data; very low study design
Mondelli,M.; Giannini,F.; Giacchi,M.	2002	Carpal tunnel syndrome incidence in a general population		all CTS cases; no comparison group
Mondelli,M.; Padua,L.; Giannini,F.; Bibbo,G.; Aprile,I.; Rossi,S.	2006	A self-administered questionnaire of ulnar neuropathy at the elbow	Neurol Sci	Not relevant to CTS
Mondelli,M.; Padua,L.; Reale,F.	2004	Carpal tunnel syndrome in elderly patients: results of surgical decompression	J Peripher.Nerv.Syst.	very low quality
Mondelli,M.; Padua,L.; Reale,F.; Signorini,A.M.; Romano,C.	2004	Outcome of surgical release among diabetics with carpal tunnel syndrome	Arch Phys Med Rehabil.	Does not address question of interest
Mondelli,M.; Passero,S.; Giannini,F.	2001	Provocative tests in different stages of carpal tunnel syndrome	Clin Neurol Neurosurg.	insufficient data; very low study design
Mondelli,M.; Rossi,S.; Ballerini,M.; Mattioli,S.	2013	Factors influencing the diagnostic process of carpal tunnel syndrome	Neurol Sci	insufficient data; very low study design
Mondelli,M.; Rossi,S.; Monti,E.; Aprile,I.; Caliandro,P.; Pazzaglia,C.; Romano,C.; Padua,L.	2007	Long term follow-up of carpal tunnel syndrome during pregnancy: a cohort study and review of the literature	Electromyogr.Clin Neurophysiol.	Very low quality
Mondelli,M.; Rossi,S.; Monti,E.; Aprile,I.; Caliandro,P.; Pazzaglia,C.; Romano,C.; Padua,L.	2007	Prospective study of positive factors for improvement of carpal tunnel syndrome in pregnant women	Muscle Nerve	Very low quality
Monga,T.N.; Laidlow,D.M.	1982	Carpal tunnel syndrome. Measurement of sensory potentials using ring and index fingers	Am J Phys Med	insufficient data; very low study design
Monga,T.N.; Shanks,G.L.; Poole,B.J.	1985	Sensory palmar stimulation in the diagnosis of carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design
Monsivais,J.J.; Bucher,P.A.; Monsivais,D.B.	1994	Nonsurgically treated carpal tunnel syndrome in the manual worker	Plast.Reconstr.Surg	Very Low Quality
Montagna,P.; Liguori,R.	2000	The motor tinel sign: a useful sign in entrapment neuropathy?	Muscle Nerve	not exclusive to CTS

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Moon,H.I.; Kwon,H.K.; Kim,L.; Lee,H.J.; Lee,H.J.	2013	Ultrasonography of palm to elbow segment of median nerve in different degrees of diabetic polyneuropathy	Clin Neurophysiol.	insufficient data; very low study design
Moon,H.I.; Kwon,H.K.; Kim,L.; Lee,H.J.; Lee,H.J.	2014	Ultrasonography of palm to elbow segment of median nerve in different degrees of diabetic polyneuropathy	Clin.Neurophysiol.	not CTS specific; insufficient data for diagnostic conclusions
Moore,A.; Wells,R.; Ranney,D.	1991	Quantifying exposure in occupational manual tasks with cumulative trauma disorder potential		review; background information
Moore,J.S.	1992	Carpal tunnel syndrome	Occup.Med	Background Information
Moore,J.S.	1991	Clinical determination of work-relatedness in carpal tunnel syndrome	J Occup.Rehabil.	insufficient data; very low study design
Moore,J.S.; Garg,A.	1995	The strain index: A proposed method to analyze jobs for risk of distal upper extremity disorders	Am.Ind.Hyg.Assoc.J.	Background Information
Moran,E.; Naff,N.J.	2001	Endoscopic carpal tunnel release	Seminars in Neurosurgery	Background article
Morgan,M.H.; Read,A.E.; Campbell,M.J.	1979	Clinical and electrophysiological studies of peripheral nerve function in patients with chronic liver disease	Clin.Sci.	not exclusive to CTS; very low study design
Morgan,R.F.; Stuart,J.D.; Persing,J.A.; Edlich,R.F.	1989	Peripheral nerve compression in the upper extremity	Compr.Ther.	background
Morgan,S.	1991	Most factors contributing to CTS can be minimized, if not eliminated	Occup.Health Saf	Background article
Morgenlander,J.C.; Lynch,J.R.; Sanders,D.B.	1997	Surgical treatment of carpal tunnel syndrome in patients with peripheral neuropathy		Retrospective case series
Mortier,G.; Deckers,K.; Dijs,H.; Vander Auwera,J.C.	1988	Comparison of the distal motor latency of the ulnar nerve in carpal tunnel syndrome with a control group	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Mosher,Jr	2001	Mini open carpal tunnel release	Journal of the American Society for Surgery of the Hand	Background article
Mossman,S.S.; Blau,J.N.	1987	Tinel's sign and the carpal tunnel syndrome	Br Med J (Clin Res.Ed)	+not best available evidence

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Mouzakis,D.E.; Rachiotis,G.; Zaoutsos,S.; Eleftheriou,A.; Malizos,K.N.	2014	Finite element simulation of the mechanical impact of computer work on the carpal tunnel syndrome	J Biomech.	bio-study; CT image review
Muffly-Elsey,D.; Flinn-Wagner,S.	1987	Proposed screening tool for the detection of cumulative trauma disorders of the upper extremity	J Hand Surg Am	Not relevant to CTS
Muhlau,G.; Both,R.; Kunath,H.	1984	Carpal tunnel syndrome--course and prognosis	J Neurol	Not relevant to PICO question.
Muijser,H.; Hoogendijk,E.M.G.; Hooisma,J.; Twisk,D.A.M.	1987	Lead exposure during demolition of a steel structure coated with lead-based paints. II. Reversible changes in the conduction velocity of the motor nerves in transiently exposed workers	Scand.J.Work.Environ.Health	Not relevant to CTS
Muller,M.; Tsui,D.; Schnurr,R.; Biddulph-Deisroth,L.; Hard,J.; MacDermid,J.C.	2004	Effectiveness of hand therapy interventions in primary management of carpal tunnel syndrome: a systematic review	J Hand Ther	Systematic review
Muller-Felber,W.; Landgraf,R.; Reimers,C.D.; Scheuer,R.; Wagner,S.; Nusser,J.; Abendroth,A.; Illner,W.D.; Land,W.	1993	High incidence of carpal tunnel syndrome in diabetic patients after combined pancreas and kidney transplantation	Acta Diabetol.	no comparison group; uncontrolled confounders
Munirah,M.A.; Normastura,A.R.; Azizah,Y.; Aziah,D.	2014	Prevalence of probable carpal tunnel syndrome and its associated factors among dentists in Kelantan	International Journal of Collaborative Research on Internal Medicine and Public Health	no comparison group; prevalence study
Murata,K.; Araki,S.; Aono,H.	1987	Effects of lead, zinc and copper absorption on peripheral nerve conduction in metal workers	Int.Arch.Occup.Environ.Health	Does not answer a question of interest; no diagnosis of CTS
Murata,K.; Araki,S.; Okajima,F.; Saito,Y.	1996	Subclinical impairment in the median nerve across the carpal tunnel among female VDT operators	Int.Arch Occup.Environ.Health	insufficient data; no diagnosis of CTS
Murata,K.; Araki,S.; Okajima,F.; Saito,Y.	1996	Original Article: Subclinical impairment in the median nerve across the carnal tunnel among female VDT operators	Int.Arch.Occup.Environ.Health	Does not answer a question of interest; no diagnosis of CTS

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Murga,L.; Moreno,J.M.; Menendez,C.; Castilla,J.M.	1994	The carpal tunnel syndrome. Relationship between median distal motor latency and graded results of needle electromyography	Electromyogr.Clin Neurophysiol.	not best evidence; no true reference standard
Murga,Oporto L.; Moreno,J.M.; Menendez,C.; Castilla,J.M.	1994	The Carpal Tunnel Syndrome. Relationship between median distal motor latency and graded results of needle electromyography	Electromyogr.Clin.Neurophysiol.	Duplicate of AAOD ID 4675
Murphy,F.; Beetham,Jr; Torgerson Jr,W.R.	1974	Carpal tunnel syndrome caused by tophaceous gout: Report of two cases with review of the literature	Lahey Clin.Found.Bull.	n&t;10
Murtagh,J.	1990	The painful arm	Aust.Fam Physician	review; background information
Murtagh,J.	1990	Simple tests for carpal tunnel syndrome	Aust.Fam Physician	Background Information
Murthy,J.M.K.; Meena,A.K.	1995	Carpal tunnel syndrome - How common is the problem in South India	Neurol.India	not best available evidence; very low study design
Murthy,P.G.; Abzug,J.M.; Jacoby,S.M.; Culp,R.W.	2013	The tenosynovial flap for recalcitrant carpal tunnel syndrome	Tech.Hand Up Extrem.Surg	Does not address question of interest
Musluoglu,L.; Celik,M.; Tabak,H.; Forta,H.	2004	Clinical, electrophysiological and magnetic resonance imaging findings in carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	not best available evidence for any MRI abnormality
Myers,K.A.	2000	Utility of the clinical examination for carpal tunnel syndrome		literature review
Myles,A.B.; Casemore,V.A.; Coulthard,M.	1973	Management of the carpal tunnel syndrome with local corticosteroid injections	Rheumatol.Rehabil.	Very Low Quality
Nabhan,A.; Ishak,B.; Al-Khayat,J.; Steudel,W.I.	2008	Endoscopic Carpal Tunnel Release using a modified application technique of local anesthesia: safety and effectiveness	J Brachial.Plex.Peripher.Nerve Inj.	Very low quality
Nada,M.A.; Nawito,A.M.; Abd-Elhamid,Y.Z.; Fayed,E.N.	2012	Assessment of mixed forearm conduction velocity in carpal tunnel syndrome	Egyptian Journal of Neurology, Psychiatry and Neurosurgery	insufficient data; very low study design

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Naeser,M.A.; Hahn,K.A.; Lieberman,B.E.; Branco,K.F.	2002	Carpal tunnel syndrome pain treated with low-level laser and microamperes transcutaneous electric nerve stimulation: A controlled study	Arch Phys Med Rehabil.	Incorrect patient population (<10 patients/group)
Nagle,D.J.	1995	Endoscopic carpal tunnel release: Chow dual-portal technique	Instr.Course Lect.	Narrative review
Nagle,D.J.; Fischer,T.J.; Harris,G.D.; Hastings,H.; Osterman,A.L.; Palmer,A.K.; Viegas,S.F.; Whipple,T.L.; Foley,M.	1996	A multicenter prospective review of 640 endoscopic carpal tunnel releases using the transbursal and extrabursal chow techniques		very low quality
Nagpal,K.; Gossiel,M.; Kumar,H.	2007	The impact of tourniquet on patient satisfaction in carpal tunnel decompression	Central European Journal of Medicine	Retrospective case series
Nahra,M.E.	1999	Carpal tunnel syndrome in the workplace	Current Opinion in Orthopaedics	Background Information
Naito,K.; Lequint,T.; Zemirline,A.; Gouzou,S.; Facca,S.; Liverneaux,P.	2012	Should we stop oral anticoagulants in the surgical treatment of carpal tunnel syndrome?	Hand (N.Y)	Very low strength
Nakamichi,K.; Tachibana,S.	1997	Ultrasonographically assisted carpal tunnel release	J Hand Surg Am	Insufficient data (missing N at each follow-up time point)
Nakamichi,K.; Tachibana,S.	1995	Restricted motion of the median nerve in carpal tunnel syndrome	J Hand Surg Br	insufficient data; very low study design
Nakamichi,K.; Tachibana,S.	1995	Small hand as a risk factor for idiopathic carpal tunnel syndrome	Muscle Nerve	Short report
Nakamichi,K.; Tachibana,S.	1993	Unilateral carpal tunnel syndrome and space-occupying lesions	J Hand Surg Br	+Does not answer a question of interest
Nakamichi,K.; Tachibana,S.; Yamamoto,S.; Ida,M.	2010	Percutaneous carpal tunnel release compared with mini-open release using ultrasonographic guidance for both techniques	J Hand Surg Am	very low quality
Nakamichi,K.I.; Tachibana,S.	2000	Enlarged median nerve in idiopathic carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design

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Nakamura,Y.; Uchiyama,S.; Toriumi,H.; Nakagawa,H.; Miyasaka,Ta	1999	Longitudinal Median Nerve Conduction Studies After Endoscopic Carpal Tunnel Release	Hand Surg	does not address question of interest
Nakano,K.K.	1991	Peripheral nerve entrapments, repetitive strain disorder, occupation-related syndromes, bursitis, and tendonitis	Curr.Opin.Rheumatol.	Background Information
Nakano,K.K.	1978	The entrapment neuropathies	Muscle Nerve	background
Nakano,K.K.	1984	Liquid crystal contact thermography (LCT) in the evaluation of patients with upper limb entrapment neuropathies	Journal of Neurological and Orthopaedic Surgery	no comparison group; not CTS exclusive
Nakazumi,Y.; Hamasaki,M.	2001	Electrophysiological studies and physical examinations in entrapment neuropathy: sensory and motor functions compensation for the central nervous system in cases with peripheral nerve damage	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Nakladalova,M.; Fialova,J.; Korycanova,H.; Nakladal,Z.	1995	State of health in dental technicians with regard to vibration exposure and overload of upper extremities	Cent.Eur.J Public Health	Not relevant, prevalence study
Nalamachu,S.; Nalamasu,R.; Jenkins,J.; Marriott,T.	2013	An Open-Label Pilot Study Evaluating the Effectiveness of the Heated Lidocaine/Tetracaine Patch for the Treatment of Pain Associated with Carpal Tunnel Syndrome	Pain Pract.	Very Low Quality
Nalamachu,S.; Nalamasu,R.; Jenkins,J.; Marriott,T.	2014	An open-label pilot study evaluating the effectiveness of the heated lidocaine/tetracaine patch for the treatment of pain associated with carpal tunnel syndrome	Pain Practice	Does not meet inclusion criteria (follow-up<1 month)
Nam,K.P.; Gong,H.S.; Bae,K.J.; Rhee,S.H.; Lee,H.J.; Baek,G.H.	2014	The effect of patient involvement in surgical decision making for carpal tunnel release on patient-reported outcome	J Hand Surg Am	Does not address question of interest
Namazi,H.; Majd,Z.	2007	Carpal tunnel syndrome in patients who are receiving long-term renal hemodialysis	Arch Orthop Trauma Surg	Not relevant, hemodialysis patient

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Nandoe Tewarie,R.D.; Bartels,R.H.	2010	The perioperative use of oral anticoagulants during surgical procedures for carpal tunnel syndrome. A preliminary study	Acta Neurochir.(Wien.)	Very low quality
Nanthavanij,S.	1996	Body height-workstation settings matrix: A practical tool for ergonomic VDT workstation adjustment	International Journal of Industrial Ergonomics	review
Napadow,V.; Kettner,N.; Liu,J.; Li,M.; Kwong,K.K.; Vangel,M.; Makris,N.; Audette,J.; Hui,K.K.	2007	Hypothalamus and amygdala response to acupuncture stimuli in Carpal Tunnel Syndrome		Very Low Quality
Napadow,V.; Liu,J.; Li,M.; Kettner,N.; Ryan,A.; Kwong,K.K.; Hui,K.K.; Audette,J.F.	2007	Somatosensory cortical plasticity in carpal tunnel syndrome treated by acupuncture	Hum.Brain Mapp.	Very Low Quality
Naranjo,A.; Ojeda,S.; Arana,V.; Baeta,P.; Fernandez- Palacios,J.; Garcia-Duque,O.; Rodriguez-Lozano,C.; Carmona,L.	2009	Usefulness of clinical findings, nerve conduction studies and ultrasonography to predict response to surgical release in idiopathic carpal tunnel syndrome	Clin Exp.Rheumatol.	Does not address question of interest
Naranjo,A.; Ojeda,S.; Rua- Figueroa,I.; Garcia-Duque,O.; Fernandez-Palacios,J.; Carmona,L.	2010	Limited value of ultrasound assessment in patients with poor outcome after carpal tunnel release surgery	Scand.J Rheumatol.	very low quality
Narasimha,P.D.; Rajeev,D.; Dharmanand,B.G.	2001	Rheumatological manifestations in hypothyroidism	JK Science	Background Information
Nathan,P.A.; Keniston,R.C.	1993	Carpal tunnel syndrome and its relation to general physical condition	Hand Clin	inadequate presentation of data. data for risk factors presented as percent of variance explained by variable, without reporting if all of the variables were statistically significant predictors
Nathan,P.A.; Keniston,R.C.; Meadows,K.D.; Lockwood,R.S.	1993	Predictive value of nerve conduction measurements at the carpal tunnel	Muscle Nerve	Not relevant

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Nathan,P.A.; Keniston,R.C.; Myers,L.D.; Meadows,K.D.	1992	Obesity as a risk factor for slowing of sensory conduction of the median nerve in industry. A cross-sectional and longitudinal study involving 429 workers	J Occup.Med	insufficient data; no diagnosis of CTS
Nathan,P.A.; Meadows,K.D.; Doyle,L.S.	1988	Sensory segmental latency values of the median nerve for a population of normal individuals	Arch Phys Med Rehabil.	insufficient data; very low study design
Nathan,P.A.; Meadows,K.D.; Doyle,L.S.	1988	Occupation as a risk factor for impaired sensory conduction of the median nerve at the carpal tunnel	J Hand Surg Br	insufficient data; no diagnosis of CTS
Nathan,P.A.; Meadows,K.D.; Keniston,R.C.	1993	Rehabilitation of carpal tunnel surgery patients using a short surgical incision and an early program of physical therapy	J Hand Surg Am	Very low strength
Nathan,P.A.; Srinivasan,H.; Doyle,L.S.; Meadows,K.D.	1990	Location of impaired sensory conduction of the median nerve in carpal tunnel syndrome	J Hand Surg Br	+Does not answer a question of interest
Nathan,P.A.; Wilcox,A.; Emerick,P.S.; Meadows,K.D.; McCormack,A.L.	2001	Effects of an aerobic exercise program on median nerve conduction and symptoms associated with carpal tunnel syndrome	J Occup.Environ.Med	Very Low Quality
Nau,H.E.; Lange,B.; Lange,S.	1988	Prediction of outcome of decompression for carpal tunnel syndrome	J Hand Surg Br	Retrospective case series
Neal,N.C.; McManners,J.; Stirling,G.A.	1987	Pathology of the flexor tendon sheath in the spontaneous carpal tunnel syndrome	J Hand Surg Br	+Does not answer a question of interest; bio-study
Neary,D.	1980	Entrapment neuropathy	Br.J.Hosp.Med.	background
Nelson,K.H.; Briner,Jr; Cummins,J.	1995	Corticosteroid injection therapy for overuse injuries	Am.Fam.Physician	Background article
Netscher,D.T.	2003	The benefit of transverse carpal ligament reconstruction following open carpal tunnel release	Plast.Reconstr.Surg.	Commentary

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Neundorfer,B.; Jaspert,A.; Grehl,H.	1993	Nerve entrapment syndromes: Non-surgical treatment and postoperative care	European Journal of Physical Medicine and Rehabilitation	Background article
Neustadt,D.H.	1981	Complications of local corticosteroid injections	Journal of the American Medical Association	Letter
Nicholas,G.G.; Noone,R.B.; Graham,W.P.	1971	Carpal tunnel syndrome in pregnancy		Does not address question of interest
Nicholas,J.J.; Reidy,M.; Oleske,D.M.	1998	An epidemiologic survey of injury in golfers	Journal of Sport Rehabilitation	not exclusive to CTS; insufficient data
Niekel,M.C.; Lindenhovius,A.L.; Watson,J.B.; Vranceanu,A.M.; Ring,D.	2009	Correlation of DASH and QuickDASH with measures of psychological distress	J Hand Surg Am	insufficient data; very low study design
Niemer,G.W.; Bolster,M.B.; Buxbaum,L.; Judson,M.A.	2001	Carpal tunnel syndrome in sarcoidosis	Sarcoidosis Vasc.Diffuse Lung Dis	Not relevant, prevalence study
Niemi,T.T.; Neuvonen,P.J.; Rosenberg,P.H.	2006	Comparison of ropivacaine 2 mg ml(-1) and prilocaine 5 mg ml(-1) for i.v. regional anaesthesia in outpatient surgery	Br J Anaesth.	Not exclusive to CTS patients
Niempoog,S.; Sanguanjit,P.; Waitayawinyu,T.; Anghthong,C.	2007	Local injection of dexamethasone for the treatment of carpal tunnel syndrome in pregnancy	J Med Assoc Thai.	Very low quality
Nijsse,B.; Roks,G.	2012	Carpal tunnel syndrome caused by remitting seronegative symmetrical synovitis with pitting oedema	BMJ Case Rep.	case report
Nimigan,A.S.; Gan,B.S.	2011	Pain and efficacy rating of a microprocessor-controlled metered injection system for local anaesthesia in minor hand surgery	Pain Res.Treat.	Deemed clinically irrelevant
Nishimura,A.; Ogura,T.; Hase,H.; Makinodan,A.; Hojo,T.; Katsumi,Y.; Yagi,K.; Mikami,Y.; Kubo,T.	2003	Objective evaluation of sensory function in patients with carpal tunnel syndrome using the current perception threshold	J Orthop Sci	insufficient data; very low study design
Nissenbaum,M.; Kleinert,H.E.	1980	Treatment considerations in carpal tunnel syndrome with coexistent Dupuytren's disease	J Hand Surg Am	Does not answer a question of interest; not best available evidence

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Nitz,A.J.; Dobner,J.J.	1989	Upper extremity tourniquet effects in carpal tunnel release	J Hand Surg Am	Does not address question of interest
Noble,D.; Richards,T.; Mitchell,D.; Vaidya,A.C.	2005	Carpal tunnel syndrome following simultaneous kidney-pancreas transplant	Nephrol.Dial.Transplant	case report
Nobuta,S.; Sato,K.; Nakagawa,T.; Hatori,M.; Itoi,E.	2008	Effects of wrist splinting for Carpal Tunnel syndrome and motor nerve conduction measurements	Ups.J Med Sci	Very Low Quality
Nodera,H.; Herrmann,D.N.; Holloway,R.G.; Logigian,E.L.	2003	A Bayesian argument against rigid cut-offs in electrodiagnosis of median neuropathy at the wrist		insufficient data; very low study design
Nolan III,W.B.; Alkatis,D.; Glickel,S.Z.; Snow,S.	1992	Results of treatment of severe carpal tunnel syndrome	Journal of Hand Surgery	Retrospective case series
Noori,M.; Dhanjal,M.K.	2011	Neurological disease in pregnancy	Obstetrics, Gynaecology and Reproductive Medicine	Background article
Nora,D.B.; Becker,J.; Ehlers,J.A.; Gomes,I.	2004	Clinical features of 1039 patients with neurophysiological diagnosis of carpal tunnel syndrome	Clin Neurol Neurosurg.	Confounding comorbidities
Nord,K.M.; Kapoor,P.; Fisher,J.; Thomas,G.; Sundaram,A.; Scott,K.; Kothari,M.J.	2008	False positive rate of thoracic outlet syndrome diagnostic maneuvers	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Norgan,G.H.; Ettipio,A.M.; Lasome,C.E.M.	1995	A program plan addressing carpal tunnel syndrome	AAOHN J.	Background Information
Norwitz,E.R.; Repke,J.T.	1997	Obstetric issues in women with neurologic diseases	Current Problems in Obstetrics, Gynecology and Fertility	Background article
Novak,C.B.; Mackinnon,S.E.; Brownlee,R.; Kelly,L.	1992	Provocative sensory testing in carpal tunnel syndrome	J Hand Surg Br	not best available evidence
Novak,L.M.	2000	Carpal tunnel syndrome	Lippincotts.Prim.Care Pract.	background
Nowak,M.; Noszczyk,B.	2012	Simple clinical tests in severe carpal tunnel syndrome	Pol.Przegl.Chir	no comparison group; not best evidence
Nur,Saracgil S.; Karatas,M.; Yerli,H.; Isiklar,I.; Karadeli,E.	2009	Diagnostic significance of ultrasonography in carpal tunnel syndrome and comparison with electrodiagnostic tests	Turkiye Fiziksel Tip ve Rehabilitasyon Dergisi	insufficient data; very low study design

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Nygaard,I.E.; Saltzman,C.L.; Whitehouse,M.B.; Hankin,F.M.	1989	Hand problems in pregnancy	Am Fam Physician	Background Information
O'Brian,J.T.; Massey,E.W.	1979	Mononeuropathy in diabetes mellitus: a phenomenon easily overlooked	Postgrad.Med	Background Information
O'Brien,E.T.	1984	Acute fractures and dislocations of the carpus	Orthop.Clin.North Am.	Background Information
O'Brien,L.; Hardman,A.; Goldby,S.	2013	The impact of a hand therapy screening and management clinic for patients referred for surgical opinion in an Australian public hospital	J Hand Ther	Very low quality
O'Connor,D.; Marshall,S.; Massy-Westropp,N.	2003	Non-surgical treatment (other than steroid injection) for carpal tunnel syndrome	Cochrane Database Syst.Rev.	Systematic review
O'Connor,D.; Page,M.J.; Marshall,S.C.; Massy-Westropp,N.	2012	Ergonomic positioning or equipment for treating carpal tunnel syndrome	Cochrane Database Syst.Rev.	systematic review
Odabas,F.O.; Sayin,R.; Milanlioglu,A.; Tombul,T.; Cogen,E.E.; Yildirim,G.	2012	Electrophysiological analysis of entrapment neuropathies developed in acute and subacute period in paretic and non-paretic extremities in patients with stroke	J Pak.Med Assoc	<10 patients in CTS group; not CTS exclusive
O'Donnell,M.; Elio,R.; Day,D.	2010	Carpal tunnel syndrome: coping during pregnancy and breastfeeding	Nurs.Womens Health	Background article
O'Duffy,J.D.; Randall,R.V.; MacCarty,C.S.	1973	Median neuropathy (carpal-tunnel syndrome) in acromegaly. A sign of endocrine overactivity	Ann.Intern.Med	insufficient outcome data; case report included
Ogawa,H.; Saito,A.; Ono,M.	1989	Inflammation as the possible cause of cystic radiolucencies in carpal bones of patients on hemodialysis	ASAIO Trans	Does not answer a question of interest
Oge,H.K.; Acu,B.; Gucer,T.; Yanik,T.; Savlarli,S.; Firat,M.M.	2012	Quantitative MRI analysis of idiopathic carpal tunnel syndrome	Turk Neurosurg.	insufficient data; very low study design
O'Gradaigh,D.; Merry,P.	2000	A diagnostic algorithm for carpal tunnel syndrome based on Bayes's theorem	Rheumatology (Oxford)	insufficient data

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Ogura,T.; Kubo,T.; Okuda,Y.; Lee,K.; Kira,Y.; Aramaki,S.; Nakanishi,F.	2002	Power spectrum analysis of compound muscle action potential in carpal tunnel syndrome patients	J Orthop Surg (Hong Kong)	insufficient data; very low study design
Ogura,T.; Mori,M.; Mikami,Y.; Hase,H.; Hayashida,T.; Kubo,T.; Kira,Y.; Aramaki,S.	2004	Diagnostic utility of waveform analysis of compound muscle action potentials for carpal tunnel syndrome	J Orthop Surg (Hong Kong)	insufficient data; very low study design
Oguz,Akarsu E.; Acar,H.; Ozer,F.; Gunaydin,S.; Akarsu,O.; Aydemir,Ozcan T.; Ozben,S.; Mutlu,A.; Bedir,M.; Cinarli,Gul G.; Cokar,O.; Burak,Aktuglu M.	2013	Electromyographic findings in overt hypothyroidism and subclinical hypothyroidism	Turk Noroloji Dergisi	Not relevant, does not answer pico question
Oh,S.; Kim,H.K.; Kwak,J.; Kim,T.; Jang,S.H.; Lee,K.H.; Kim,M.J.; Park,S.B.; Han,S.H.	2013	Causes of hand tingling in visual display terminal workers	Ann.Rehabil.Med	<10 patients per group; not exclusive to CTS
Oldberg,S.	1971	The carpal tunnel syndrome and acromegaly	Acta Soc.Med Ups.	Background Information
Oliver,M.; Rickards,J.; Biden,E.	2000	Off-road machine controls: investigating the risk of carpal tunnel syndrome		Does not answer a question of interest; very low study design
Ollivere,B.J.; Logan,K.; Ellahee,N.; Miller-Jones,J.C.; Wood,M.; Nairn,D.S.	2009	Severity scoring in carpal tunnel syndrome helps predict the value of conservative therapy	J Hand Surg Eur.Vol.	Very Low Quality
O'Malley,M.J.; Evanoff,M.; Terrono,A.L.; Millender,L.H.	1992	Factors that determine reexploration treatment of carpal tunnel syndrome	J Hand Surg Am	+not best available evidence
Omdal,R.; Mellgren,S.I.; Husby,G.	1988	Clinical neuropsychiatric and neuromuscular manifestations in systemic lupus erythematosus	Scand.J Rheumatol.	<10 patients per group; not exclusive to CTS
Omer,S.R.; Ozcan,E.; Karan,A.; Ketenci,A.	2003	Musculoskeletal system disorders in computer users: Effectiveness of training and exercise programs	Journal of Back and Musculoskeletal Rehabilitation	Incorrect patient population (not exclusive to CTS patients)
Omori,K.; Kazama,J.J.; Song,J.; Goto,S.; Takada,T.; Saito,N.; Sakatsume,M.; Narita,I.; Gejyo,F.	2002	Association of the MCP-1 gene polymorphism A-2518G with carpal-tunnel syndrome in hemodialysis patients		not best available evidence; no CTS outcome comparison

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Oncel,C.; Bir,L.S.; Sanal,E.	2009	The relationship between electrodiagnostic severity and Washington Neuropathic Pain Scale in patients with carpal tunnel syndrome	Agri.	insufficient data; no comparison group
Ono,S.; Clapham,P.J.; Chung,K.C.	2010	Optimal management of carpal tunnel syndrome	Int.J Gen.Med	systematic review
Ooi,C.C.; Png,M.A.; Tan,B.H.A.; Chin,Y.H.A.; Abu,Bakar R.; Goh,S.Y.; Mohan,P.C.; Yap,T.J.R.; Wong,S.K.	2013	Diagnostic criteria of carpal tunnel syndrome using high resolution Ultrasonography	Skeletal Radiol.	insufficient data; very low study design
Ooi,C.C.; Wong,S.K.; Tan,A.B.; Chin,A.Y.; Abu,Bakar R.; Goh,S.Y.; Mohan,P.C.; Yap,R.T.; Png,M.A.	2014	Diagnostic criteria of carpal tunnel syndrome using high-resolution ultrasonography: correlation with nerve conduction studies	Skeletal Radiol	insufficient data; case control
Orman,G.; Ozben,S.; Huseyinoglu,N.; Duymus,M.; Orman,K.G.	2013	Ultrasound elastographic evaluation in the diagnosis of carpal tunnel syndrome: initial findings	Ultrasound Med Biol.	insufficient data; very low study design
Ortiz-Corredor,F.; Calambas,N.; Mendoza-Pulido,C.; Galeano,J.; Diaz-Ruiz,J.; Delgado,O.	2011	Factor analysis of carpal tunnel syndrome questionnaire in relation to nerve conduction studies	Clin Neurophysiol.	+very low study design; not best evidence
Osborn,J.B.; Newell,K.J.; Rudney,J.D.; Stoltenberg,J.L.	1990	Carpal tunnel syndrome among Minnesota dental hygienists	Northwest.Dent.	Not relevant, prevalence study
Osei,D.A.; Boyer,M.I.; Stepan,J.; Gelberman,R.H.; Goldfarb,C.A.; Calfee,R.P.	2013	Simultaneous bilateral versus unilateral carpal tunnel release: A prospective comparison of early functional and economic impact in patients with bilateral carpal tunnel syndrome	Journal of Hand Surgery	Abstract/conference poster
Osei,D.A.; Calfee,R.P.; Stepan,J.G.; Boyer,M.I.; Goldfarb,C.A.; Gelberman,R.H.	2014	Simultaneous Bilateral or Unilateral Carpal Tunnel Release? A Prospective Cohort Study of Early Outcomes and Limitations	J Bone Joint Surg Am	Does not meet inclusion criteria (follow-up<3 months)
Osorio,A.M.; Ames,R.G.; Jones,J.; Castorina,J.;	1994	Carpal tunnel syndrome among grocery store workers	Am J Ind.Med	not best evidence; confounded comparisons

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Rempel,D.; Estrin,W.; Thompson,D.				
Osterman,M.; Ilyas,A.M.; Matzon,J.L.	2012	Carpal tunnel syndrome in pregnancy	Orthop Clin North Am	Background article
Oswalt,C.E.	1977	Median nerve injuries and their management	South Med J	background
Owen,D.S.,Jr.; Leshner,R.T.; McDowell,C.L.	1987	Carpal tunnel syndrome	Va.Med	background
Owen,Jr; Leshner,R.T.; McDowell,C.L.	1987	Grand rounds: Carpal tunnel syndrome	Va.Med.	background
Owen,R.D.	1994	Carpal tunnel syndrome: A products liability prospective		background
Oyedele,O.O.; Shokunbi,M.T.; Malomo,A.O.	2002	The prevalence of hand pain in Ibadan-- implications for the carpal tunnel syndrome	West Afr.J Med	Does not answer a question of interest
Ozben,S.; Acar,H.; Gunaydin,S.; Genc,F.; Ozer,F.; Ozben,H.	2012	The second lumbrical-interosseous latency comparison in carpal tunnel syndrome	J Clin Neurophysiol.	insufficient data; very low study design
Ozcan,H.N.; Kara,M.; Ozcan,F.; Bostanoglu,S.; Karademir,M.A.; Erkin,G.; Ozcakar,L.	2011	Dynamic Doppler evaluation of the radial and ulnar arteries in patients with carpal tunnel syndrome	AJR Am J Roentgenol.	insufficient data; very low study design
Ozdolap,S.; Emre,U.; Karamercan,A.; Sarikaya,S.; Kokturk,F.	2013	Upper limb tendinitis and entrapment neuropathy in coal miners	Am J Ind.Med	prevalence study; insufficient data
Ozer,H.; Solak,S.; Oguz,T.; Ocguder,A.; Colakoglu,T.; Babacan,A.	2005	Alkalinisation of local anaesthetics prescribed for pain relief after surgical decompression of carpal tunnel syndrome	J Orthop Surg (Hong Kong)	Not relevant
Ozer,K.; Malay,S.; Toker,S.; Chung,K.C.	2013	Minimal clinically important difference of carpal tunnel release in diabetic and nondiabetic patients	Plast.Reconstr.Surg	very low quality
Ozge,A.; Atis,S.; Sevim,S.	2001	Subclinical peripheral neuropathy associated with chronic obstructive pulmonary disease	Electromyogr.Clin Neurophysiol.	insufficient data; not exclusive to CTS

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Ozge,A.; Comelekoglu,U.; Tataroglu,C.; Yalcinkaya,D.E.; Akyatan,M.N.	2002	Subtypes of carpal tunnel syndrome: median nerve F wave parameters	Clin Neurol Neurosurg.	insufficient data; very low study design
Ozkal,B.; Yaldiz,C.; Asil,K.; Selcuki,D.; Selcuki,M.	2014	Preoperative and postoperative evaluation of electromyography and magnetic resonance imaging findings in carpal tunnel syndrome	Journal of Neurological Sciences	Does not address question of interest
Ozoran,K.; Paker,N.; Basgoze,O.; Hascelik,Z.	1989	Nonsteroid antiinflammatory drug treatment in idiopathic carpal tunnel syndrome	Hacettepe Medical Journal	Very Low Quality
Oztas,O.; Turan,B.; Bora,I.; Karakaya,M.K.	1998	Ultrasound therapy effect in carpal tunnel syndrome	Arch Phys Med Rehabil.	Very Low Quality
Ozyurekoglu,T.; McCabe,S.J.; Goldsmith,L.J.; LaJoie,A.S.	2006	The minimal clinically important difference of the Carpal Tunnel Syndrome Symptom Severity Scale	J Hand Surg Am	Very Low Quality
Padua,L.; Di,Pasquale A.; Pazzaglia,C.; Liotta,G.A.; Librante,A.; Mondelli,M.	2010	Systematic review of pregnancy-related carpal tunnel syndrome	Muscle Nerve	Systematic review
Padua,L.; Lo,Monaco M.; Padua,R.; Gregori,B.; Tonali,P.	1997	Neurophysiological classification of carpal tunnel syndrome: assessment of 600 symptomatic hands	Ital.J Neurol Sci	Not relevant,does not answer the PICO question
Padua,L.; Lo,Monaco M.; Valente,E.M.; Tonali,P.A.	1996	A useful electrophysiologic parameter for diagnosis of carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Padua,L.; Lo,Monaco M.; Valente,E.M.; Tonali,P.A.	1996	Erratum: A useful electrophysiologic parameter for diagnosis of carpal tunnel syndrome (Muscle and Nerve (1996) 19 (48-53))	Muscle Nerve	abstract correction; no text
Padua,L.; LoMonaco,M.; Aulisa,L.; Tamburrelli,F.; Valente,E.M.; Padua,R.; Gregori,B.; Tonali,P.	1996	Surgical prognosis in carpal tunnel syndrome: usefulness of a preoperative neurophysiological assessment	Acta Neurol Scand.	Retrospective case series
Padua,L.; LoMonaco,M.; Gregori,B.; Valente,E.M.; Padua,R.; Tonali,P.	1997	Neurophysiological classification and sensitivity in 500 carpal tunnel syndrome hands	Acta Neurol Scand.	insufficient data; no true comparison group
Padua,L.; Padua,R.; Aprile,I.; Caliandro,P.; Tonali,P.	2005	Boston Carpal Tunnel Questionnaire: the influence of diagnosis on patient-oriented results	Neurol Res.	+Does not answer a question of interest

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Padua,L.; Padua,R.; Lo,Monaco M.; Aprile,I.; Tonali,P.	1999	Multiperspective assessment of carpal tunnel syndrome: A multicenter study		Duplicate results to AAOS ID 995
Padua,L.; Padua,R.; Moretti,C.; Nazzaro,M.; Tonali,P.	1999	Clinical outcome and neurophysiological results of low-power laser irradiation in carpal tunnel syndrome	Lasers in Medical Science	Very Low Quality
Padua,L.; Pazzaglia,C.; Caliandro,P.; Granata,G.; Foschini,M.; Briani,C.; Martinoli,C.	2008	Carpal tunnel syndrome: ultrasound, neurophysiology, clinical and patient-oriented assessment	Clin Neurophysiol.	insufficient data; <10 patients in comparison group
Padua,R.; Padua,L.; Bondi,R.; Campi,A.; Ceccarelli,E.; Padua,S.	2003	Intrasurgical use of steroids on carpal tunnel syndrome: A randomized, prospective, double-blind controlled study	Journal of Orthopaedics and Traumatology	Does not meet inclusion criteria (invasive follow-up<3 month)
Padua,R.; Padua,L.; Ceccarelli,E.; Romanini,E.; Zanoli,G.; Amadio,P.C.; Campi,A.	2003	Italian version of the disability of the arm, shoulder and hand (DASH) questionnaire. Cross-cultural adaptation and validation	Journal of Hand Surgery	+Does not answer a question of interest
Page,M.J.; Massy-Westropp,N.; O'Connor,D.; Pitt,V.	2012	Splinting for carpal tunnel syndrome	Cochrane Database Syst.Rev.	Systematic review
Page,M.J.; O'Connor,D.; Pitt,V.; Massy-Westropp,N.	2013	Therapeutic ultrasound for carpal tunnel syndrome	Cochrane Database Syst.Rev.	Systematic review
Page,M.J.; O'Connor,D.; Pitt,V.; Massy-Westropp,N.	2012	Exercise and mobilisation interventions for carpal tunnel syndrome	Cochrane Database Syst.Rev.	systematic review
Pagnanelli,D.M.; Barrer,S.J.	1991	Carpal tunnel syndrome: surgical treatment using the Paine retinaculotomy	J Neurosurg.	Very Low Quality. Prospective case series.
Pai,I.; Guy,N.J.; Nicholl,J.E.	2005	Carpal tunnel decompression: should the tourniquet be released before or after closure?	European Journal of Orthopaedic Surgery & Traumatology	Insufficient data (irrelevant outcomes)
Pajardi,G.; Bortot,P.; Ponti,V.; Novelli,C.	2014	Clinical usefulness of oral supplementation with alpha-lipoic Acid, curcumin phytosome, and B-group vitamins in patients with carpal tunnel	Evid.Based Complement Alternat.Med	Not relevant

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		syndrome undergoing surgical treatment		
Pajardi,G.; Pegoli,L.; Pivato,G.; Zerbini,P.	2008	Endoscopic carpal tunnel release: our experience with 12,702 cases	Hand Surg	Retrospective case series
Pal,B.	1996	Rheumatic disorders in diabetes with special reference to orthopaedic surgery in diabetics	Journal of Orthopaedic Rheumatology	Background article
Palazzi,S.; Palazzi,J.L.	1980	Neurolysis in compressive neuropathies	Int.Surg	Retrospective case series. Will be Very Low. Patient population is not specific to CTS.
Paley,D.; McMurtry,R.Y.	1985	Median nerve compression test in carpal tunnel syndrome diagnosis. Reproduces signs and symptoms in affected wrist	Orthop.Rev.	Background Information
Paliwal,P.R.; Therimadasamy,A.K.; Chan,Y.C.; Wilder-Smith,E.P.	2014	Does measuring the median nerve at the carpal tunnel outlet improve ultrasound CTS diagnosis?	J Neurol Sci	insufficient data; very low study design
Palliyath,S.K.; Holden,L.	1990	Refractory studies in early detection of carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Palma,G.	1983	Carpal tunnel syndrome and hyperparathyroidism	Ann.Neurol.	case report
Palmer,D.H.; Paulson,J.C.; Lane-Larsen,C.L.; Peulen,V.K.; Olson,J.D.	1993	Endoscopic carpal tunnel release: a comparison of two techniques with open release		very low quality
Palmer,K.; Smith,G.; Kellingray,S.; Cooper,C.	1999	Repeatability and validity of an upper limb and neck discomfort questionnaire: the utility of the standardized Nordic questionnaire	Occup.Med (Lond)	not exclusive to CTS
Palmer,K.T.; Harris,E.C.; Coggon,D.	2007	Carpal tunnel syndrome and its relation to occupation: a systematic literature review	Occup.Med (Lond)	systematic review
Palumbo,C.F.; Szabo,R.M.; Olmsted,S.L.	2000	The effects of hypothyroidism and thyroid replacement on the development of carpal tunnel syndrome	J Hand Surg Am	<10 patients per group; no comparison group

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Panahi,E.; O'Connor,C.R.; Checa,A.	2014	Sonographic assessment of the carpal tunnel syndrome secondary to a tenosynovitis of the flexor digitorum superficialis in a patient with rheumatoid arthritis	J Clin Rheumatol.	case report
Paoloni,M.; Tavernese,E.; Cacchio,A.; D'Orazi,V; Ioppolo,F.; Fini,M.; Santilli,V.; Mangone,M.	2015	Extracorporeal shock wave therapy and ultrasound therapy improve pain and function in patients with carpal tunnel syndrome. A randomized controlled trial	Eur J Phys Rehabil Med	Incorrect patient population (<10 patients/group)
Papaioannou,T.; Rushworth,G.; Atar,D.; Dekel,S.	1992	Carpal canal stenosis in men with idiopathic carpal tunnel syndrome	Clin Orthop Relat Res.	insufficient data; very low study design
Papez,B.J.; Palfy,M.; Turk,Z.	2008	Infrared thermography based on artificial intelligence for carpal tunnel syndrome diagnosis	J.Int.Med.Res.	insufficient data; very low study design
Papez,B.J.; Turk,Z.	2004	Clinical versus electrodiagnostic effectiveness of splinting in the conservative treatment of carpal-tunnel syndrome	Wien.Klin.Wochenschr.	Very Low Quality
Pappas,G.; Markoula,S.; Seitaridis,S.; Akritidis,N.; Tsianos,E.	2005	Brucellosis as a cause of carpal tunnel syndrome	Ann.Rheum.Dis.	case report
Pardal-Fernandez,J.M.; Vega- Gonzalez,G.; Rodriguez- Vazquez,M.; Iniesta-Lopez,I.	2012	A new median motor test: comparison with conventional motor studies in carpal tunnel syndrome	J Clin Neurophysiol.	insufficient data; very low study design
Parenmark,G.; Alffram,P.A.; Malmkvist,A.K.	1992	The significance of work tasks for rehabilitation outcome after carpal tunnel surgery	J Occup.Rehabil.	Does not address question of interest
Park,I.J.; Kim,H.M.; Lee,S.U.; Lee,J.Y.; Jeong,C.	2010	Opponensplasty using palmaris longus tendon and flexor retinaculum pulley in patients with severe carpal tunnel syndrome	Arch Orthop Trauma Surg	very low quality
Parkhad,S.; Palve,S.	2014	Utility of nerve conduction study in early diagnosis of Carpal Tunnel Syndrome (CTS)	National Journal of Physiology, Pharmacy and Pharmacology	insufficient data; very low study design
Parmet,S.	2002	JAMA patient page. Carpal tunnel syndrome		background

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Parry,G.J.; Sumner,A.J.	1989	Nerve conduction and electromyography	Curr.Opin.Neurol.Neurosurg.	Background Information
Pascual,E.; Giner,V.; Arostegui,A.; Conill,J.; Ruiz,M.T.; Pico,A.	1991	Higher incidence of carpal tunnel syndrome in oophorectomized women	Br J Rheumatol.	<10 patients per group; very low study design
Pascuzzi,R.M.	2003	Peripheral neuropathies in clinical practice	Med.Clin.North Am.	case reports
Pastan,R.S.; Cohen,A.S.	1978	The rheumatologic manifestations of diabetes mellitus	Med Clin North Am	Background Information
Pasternack,I.I.; Malmivaara,A.; Tervahartiala,P.; Forsberg,H.; Vehmas,T.	2003	Magnetic resonance imaging findings in respect to carpal tunnel syndrome	Scand.J Work Environ.Health	systematic review
Patel,M.R.; Bassini,L.	1999	A comparison of five tests for determining hand sensibility	J Reconstr.Microsurg.	insufficient data; very low study design
Patijn,J.; Vallejo,R.; Janssen,M.; Huygen,F.; Lataster,A.; van,Kleef M.; Mekhail,N.	2011	Carpal tunnel syndrome	Pain Pract.	background
Patijn,J.; Vallejo,R.; Janssen,M.; Huygen,F.; Lataster,A.; van,Kleef M.; Mekhail,N.	2011	19. Carpal Tunnel Syndrome	Pain Practice	Narrative review
Patil,A.; Rosecrance,J.; Douphrate,D.; Gilkey,D.	2012	Prevalence of carpal tunnel syndrome among dairy workers	Am J Ind.Med	Not relevant, prevalence study
Patil,S.; Ramakrishnan,M.; Stothard,J.	2006	Local anaesthesia for carpal tunnel decompression: a comparison of two techniques	J Hand Surg Br	
Pavesi,G.; Olivieri,M.F.; Misk,A.; Mancina,D.	1986	Clinical-electrophysiological correlations in the carpal tunnel syndrome	Ital.J Neurol Sci	insufficient data; no comparison group
Pazzaglia,C.; Caliandro,P.; Granata,G.; Tonali,P.; Padua,L.	2010	"Dropping objects": a potential index of severe carpal tunnel syndrome	Neurol Sci	Does not answer a question of interest
Pease,W.S.; Cannell,C.D.; Johnson,E.W.	1989	Median to radial latency difference test in mild carpal tunnel syndrome	Muscle Nerve	insufficient data; no comparison of modalities
Pease,W.S.; Cunningham,M.L.; Walsh,W.E.; Johnson,E.W.	1988	Determining neurapraxia in carpal tunnel syndrome	Am J Phys Med Rehabil.	Does not answer a question of interest

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Pease,W.S.; Lee,H.H.; Johnson,E.W.	1990	Forearm median nerve conduction velocity in carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Peer,S.; Gruber,H.; Loizides,A.	2012	Sonography of carpal tunnel syndrome: Why, when and how	Imaging in Medicine	review; background information
Perez-Ruiz,F.; Calabozo,M.; Alonso-Ruiz,A.; Herrero,A.; Ruiz-Lucea,E.; Otermin,I.	1995	High prevalence of undetected carpal tunnel syndrome in patients with fibromyalgia syndrome	J Rheumatol.	not best evidence; very low study design
Peric,Z.; Sinanovic,O.	2006	Sensory-motor index is useful parameter in electroneurographical diagnosis of carpal tunnel syndrome	Bosn.J Basic Med Sci	insufficient data; very low study design
Perkins,B.A.; Olaleye,D.; Bril,V.	2002	Carpal tunnel syndrome in patients with diabetic polyneuropathy		Does not answer a question of interest; prevalence study
Pernia,L.R.; Ronel,D.N.; Leeper,J.D.; Miller,H.L.	2000	Carpal tunnel syndrome in women undergoing reduction mammoplasty	Plast.Reconstr.Surg	Not relevant
Peters,S.; Page,M.J.; Coppieters,M.W.; Ross,M.; Johnston,V.	2013	Rehabilitation following carpal tunnel release	Cochrane Database Syst.Rev.	meta-analysis
Peters,Veluthamaningal C.; Winters,J.C.; Groenier,K.H.; Meyboom-de,Jong B.	2010	Randomised controlled trial of local corticosteroid injections for carpal tunnel syndrome in general practice	BMC family practice	Duplicate article (duplicate with AAOS ID 363)
Peters-Veluthamaningal,C.; Winters,J.C.; Groenier,K.H.; Meyboom-de,Jong B.	2010	Randomised controlled trial of local corticosteroid injections for carpal tunnel syndrome in general practice	BMC Fam Pract.	Insuff
Pfeiffer,N.	1993	Danish laser promises better treatment of carpal tunnel syndrome	J.Clin.Laser Med.Surg.	Narrative review
Phalen,G.S.	1972	The carpal-tunnel syndrome. Clinical evaluation of 598 hands	Clin Orthop Relat Res.	clinical review
Piazzini,D.B.; Aprile,I.; Ferrara,P.E.; Bertolini,C.; Tonali,P.; Maggi,L.; Rabini,A.; Piantelli,S.; Padua,L.	2007	A systematic review of conservative treatment of carpal tunnel syndrome	Clin Rehabil.	Systematic review
Pickett,J.B.	1984	The carpal tunnel syndrome	J S.C Med Assoc	background

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Pierce,R.O.	1976	A different surgical approach for carpal tunnel syndrome	J Natl.Med Assoc	Surgical technique/background article
Pierre-Jerome,C.; Bekkelund,S.I.; Mellgren,S.I.; Nordstrom,R.	1997	Quantitative MRI and electrophysiology of preoperative carpal tunnel syndrome in a female population		insufficient data; very low study design
Pierre-Jerome,C.; Bekkelund,S.I.; Mellgren,S.I.; Torbergesen,T.	1996	Quantitative magnetic resonance imaging and the electrophysiology of the carpal tunnel region in floor cleaners	Scand.J Work Environ.Health	Does not answer a question of interest
Pierre-Jerome,C.; Smitson,R.D.,Jr.; Shah,R.K.; Moncayo,V.; Abdelnoor,M.; Terk,M.R.	2010	MRI of the median nerve and median artery in the carpal tunnel: prevalence of their anatomical variations and clinical significance	Surg Radiol.Anat.	+Does not answer a question of interest
Pinilla,I.; Martin-Hervas,C.; Sordo,G.; Santiago,S.	2008	The usefulness of ultrasonography in the diagnosis of carpal tunnel syndrome	J Hand Surg Eur.Vol.	insufficient data; very low study design
Pinkham,J.	1988	Carpal tunnel syndrome sufferers find relief with ergonomic designs	Occup.Health Saf	Background article
Piravej,K.; Boonhong,J.	2004	Effect of ultrasound thermotherapy in mild to moderate carpal tunnel syndrome	J Med Assoc Thai.	Very Low Quality
Pitchford,T.	1985	Carpal tunnel syndrome: occupational hazard	Dent.Assist.(Waco.Tx.)	Background Information
Piza-Katzer,H.	2003	Carpal Tunnel Syndrome: Diagnosis and Treatment	European Surgery - Acta Chirurgica Austriaca	Background article
Plaja,J.	1971	Comparative value of the different electrodiagnostic methods in the carpal tunnel syndrome	Scand.J Rehabil.Med	insufficient data; very low study design
Pocekay,D.; McCurdy,S.A.; Samuels,S.J.; Hammond,S.K.; Schenker,M.B.	1995	A cross-sectional study of musculoskeletal symptoms and risk factors in semiconductor workers	Am.J.Ind.Med.	Not relevant, prevalence study
Podhorodecki,A.D.; Spielholz,N.I.	1993	Electromyographic study of overuse syndromes in sign language interpreters	Arch Phys Med Rehabil.	prevalence study; insufficient data

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Podnar,S.	2005	Critical reappraisal of referrals to electromyography and nerve conduction studies	Eur.J Neurol	not exclusive to CTS; insufficient data
Polykandriotis,E.; Premm,W.; Horch,R.E.	2007	Carpal tunnel syndrome in young adults--an ultrasonographic and neurophysiological study	Minim.Invasive Neurosurg.	<10 patients per group; no comparison group
Pomphrey,M.M.,Jr.	1998	Endoscopic carpal tunnel release: its time has come	Mo.Med	Retrospective case series
Ponrouch,M.; Bouic,N.; Bringuier,S.; Biboulet,P.; Choquet,O.; Kassim,M.; Bernard,N.; Capdevila,X.	2010	Estimation and pharmacodynamic consequences of the minimum effective anesthetic volumes for median and ulnar nerve blocks: a randomized, double-blind, controlled comparison between ultrasound and nerve stimulation guidance	Anesth.Analg.	Does not address question of interest
Porrata,H.; Porrata,A.; Sosner,J.	2007	New carpal ligament traction device for the treatment of carpal tunnel syndrome unresponsive to conservative therapy	J Hand Ther	Very Low Quality
Porter,P.; Venkateswaran,B.; Stephenson,H.; Wray,C.C.	2002	The influence of age on outcome after operation for the carpal tunnel syndrome	Journal of Bone and Joint Surgery - Series B	duplicate of PM:12188486
Pourmand,R.	1997	Diabetic neuropathy	Neurol.Clin.	
Pourmemari,M.H.; Viikari-Juntura,E.; Shiri,R.	2014	Smoking and carpal tunnel syndrome: A meta-analysis	Muscle Nerve	meta-analysis
Povlsen,B.	2010	High incidence of absent nerve conduction in older patients with bilateral carpal tunnel syndrome	Ann.R Coll Surg Engl.	does not address question of interest
Povlsen,B.; Bashir,M.; Wong,F.	2013	Long-term result and patient reported outcome of wrist splint treatment for Carpal Tunnel Syndrome	J Plast.Surg Hand Surg	Very Low Quality
Prakash,K.M.; Fook-Chong,S.; Leoh,T.H.; Dan,Y.F.; Nurjannah,S.; Tan,Y.E.; Lo,Y.L.	2006	Sensitivities of sensory nerve conduction study parameters in carpal tunnel syndrome	J Clin Neurophysiol.	insufficient data; very low study design
Pratelli,E.; Pintucci,M.; Cultrera,P.; Baldini,E.	2015	Conservative treatment of carpal tunnel syndrome: Comparison between laser therapy and fascial manipulation((R))	J Bodyw.Mov Ther	deemed clinically irrelevant

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Stecco,A.; Petrocelli,A.; Pasquetti,P.				
Pressman,A.; Doumit,G.; Rosaeg,O.; Bell,M.	2005	A double-blind randomized controlled trial showing the analgesic and anesthetic properties of lidocaine E to be equivalent to those of ropivacaine and bupivacaine in carpal tunnel release surgery	Can J Plast.Surg	Insufficient data
Priganc,V.W.; Henry,S.M.	2003	The relationship among five common carpal tunnel syndrome tests and the severity of carpal tunnel syndrome	J Hand Ther	insufficient data; very low study design
Pronicka,E.; Tylki-Szymanska,A.; Kwast,O.; Chmielik,J.; Maciejko,D.; Cedro,A.	1988	Carpal tunnel syndrome in children with mucopolysaccharidoses: needs for surgical tendons and median nerve release	J Ment.Defic.Res.	Incorrect patient population (non-CTS patients included)
Pryse-Phillips,W.E.	1984	Validation of a diagnostic sign in carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	+not best available evidence
Pujol,J.; Pascual-Leone,A.; Dolz,C.; Delgado,E.; Dolz,J.L.; Aldoma,J.	1998	The effect of repetitive magnetic stimulation on localized musculoskeletal pain		Incorrect patient population (not exclusive to CTS)
Pullopdisakul,S.; Ekpanyaskul,C.; Taptagaporn,S.; Bundhukul,A.; Thepchatri,A.	2013	Upper extremities musculoskeletal disorders: Prevalence and associated ergonomic factors in an electronic assembly factory	Int.J Occup.Med Environ.Health	Not relevant, prevalence study
Punnett,L.; Robins,J.M.; Wegman,D.H.; Keyserling,W.M.	1985	Soft tissue disorders in the upper limbs of female garment workers	Scand.J Work Environ.Health	not exclusive to CTS; <10 non-cases
Pyle,K.L.; Maholic,C.; Gainer,J.V.,Jr.	1984	Carpal tunnel syndrome: case data and nursing implications	J Neurosurg.Nurs.	background
Pyun,S.B.; Kang,C.H.; Yoon,J.S.; Kwon,H.K.; Kim,J.H.; Chung,K.B.; Oh,Y.W.	2011	Application of 3-dimensional ultrasonography in assessing carpal tunnel syndrome	J Ultrasound Med	insufficient data; very low study design
Qerama,E.; Kasch,H.; Fuglsang-Frederiksen,A.	2009	Occurrence of myofascial pain in patients with possible carpal tunnel syndrome - a single-blinded study	Eur.J Pain	Not relevant, not a CTS correlational study

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Rab,M.; Grunbeck,M.; Beck,H.; Haslik,W.; Schrogendorfer,K.F.; Schiefer,H.P.; Mittlbock,M.; Frey,M.	2006	Intra-individual comparison between open and 2-portal endoscopic release in clinically matched bilateral carpal syndrome	J Plast.Reconstr.Aesthet.Surg	Very low quality
Radecki,P.	1994	The familial occurrence of carpal tunnel syndrome	Muscle Nerve	reference standard not consistent; confounded results
Radecki,P.	1997	Carpal tunnel syndrome: Effects of personal factors and associated medical conditions	Phys.Med.Rehabil.Clin.N.Am.	Background Information
Radhakrishnan,K.; Thacker,A.K.; Maloo,J.C.; Ben,Dardef A.; Bibtana,A.G.	1989	Electrophysiologic evaluation for carpal tunnel syndrome in patients with angioaccess for haemodialysis	Int.Urol.Nephrol.	insufficient outcome data; no comparison group
Radwin,R.G.; Wertsch,J.J.; Jeng,O.J.; Casanova,J.	1991	Ridge detection tactility deficits associated with carpal tunnel syndrome	J Occup.Med	<10 patients in CTS group
Ragbir,M.; Devaraj,V.S.; Evans,D.	1997	The 'yellow fat sign' - a reliable indicator of the completeness of carpal tunnel release	European Journal of Plastic Surgery	Background article
Ragi,E.F.	1981	Carpal tunnel syndrome: a statistical review	Electromyogr.Clin Neurophysiol.	records review
Rahmani,M.; Ghasemi Esfe,A.R.; Vaziri-Bozorg,S.M.; Mazloumi,M.; Khalilzadeh,O.; Kahnouji,H.	2011	The ultrasonographic correlates of carpal tunnel syndrome in patients with normal electrodiagnostic tests	Radiol.Med	insufficient data; very low study design
Ralte,P.; Selvan,D.; Morapudi,S.; Kumar,G.; Waseem,M.	2010	Haemostasis in Open Carpal Tunnel Release: Tourniquet vs Local Anaesthetic and Adrenaline	Open Orthop J	Does not address question of interest
Randolph,J.A.	2000	Carpal tunnel syndrome. Testing the sensitivity and validity of four "localized discomfort" instruments	AAOHN J	+Does not answer a question of interest; very low study design
Rankin,E.A.	1995	Carpal tunnel syndrome: issues and answers	J Natl.Med Assoc	background
Rashid,M.; Sarwar,S.U.; Haq,E.U.; Islam,M.Z.	2006	Tuberculous tenosynovitis: a cause of Carpal Tunnel Syndrome	J Pak.Med Assoc	all CTS cases; no comparison group

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Rizvi,T.A.; Ahmad,M.; Shah,K.				
Rathakrishnan,R.; Therimadasamy,A.K.; Chan,Y.H.; Wilder-Smith,E.P.	2007	The median palmar cutaneous nerve in normal subjects and CTS	Clin Neurophysiol.	insufficient data; very low study design
Ratzon,N.; Schejter-Margalit,T.; Froom,P.	2006	Time to return to work and surgeons' recommendations after carpal tunnel release	Occup.Med (Lond)	very low quality
Read,R.L.	1991	Stress testing in nerve compression	Hand Clin	Background Information
Reddeppa,S.; Bulusu,K.; Chand,P.R.; Jacob,P.C.; Kalappurakkal,J.; Tharakan,J.	2000	The sympathetic skin response in carpal tunnel syndrome	Auton.Neurosci.	insufficient data; very low study design
Reddy,M.P.	1983	Peripheral nerve entrapment syndromes	Am Fam Physician	background
Redmond,M.D.; Rivner,M.H.	1988	False positive electrodiagnostic tests in carpal tunnel syndrome	Muscle Nerve	only healthy study subjects
Reinstein,L.	1981	Hand dominance in carpal tunnel syndrome	Arch Phys Med Rehabil.	all CTS cases; no comparison group
Reis,P.; Moro,A.	2012	Preventing Rsi/WruId: use of esthesiometry to assess hand tactile sensitivity of slaughterhouse workers	Work	Does not answer a question of interest
Remerand,F.; Laulan,J.; Couvret,C.; Palud,M.; Baud,A.; Velut,S.; Laffon,M.; Fuscuardi,J.	2010	Is the musculocutaneous nerve really in the coracobrachialis muscle when performing an axillary block? An ultrasound study	Anesth.Analg.	Incorrect patient population (not exclusive to CTS)
Rempel,D.; Tittiranonda,P.; Burastero,S.; Hudes,M.; So,Y.	1999	Effect of keyboard keyswitch design on hand pain	J Occup.Environ.Med	insufficient data; no diagnosis of CTS
Resende,L.A.; Adamo,A.S.; Bononi,A.P.; Castro,H.A.; Kimaid,P.A.; Fortinguerra,C.H.; Schelp,A.O.	2000	Test of a new technique for the diagnosis of carpal tunnel syndrome	J Electromyogr.Kinesiol.	insufficient data; very low study design
Resende,L.A.; Alves,R.P.; Castro,H.A.; Kimaid,P.A.; Fortinguerra,C.R.; Schelp,A.O.	2000	Silent period in carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	+Does not answer a question of interest
Rettig,A.C.	1994	Wrist problems in the tennis player	Med.Sci.Sports Exerc.	Background Information

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Rhode,J.	1990	Ambidextrous gloves--can they contribute to carpal tunnel syndrome?	Dent.Today	letter
Rhodes,K.E.	1992	Prescription of diuretic drugs and monitoring of long-term use in one general practice	Br.J.Gen.Pract.	Cross-sectional study
Richer,R.J.; Peimer,C.A.	2005	Flexor superficialis abductor transfer with carpal tunnel release for thenar palsy	J Hand Surg Am	Retrospective case series
Ritchie,J.R.	2003	Orthopedic considerations during pregnancy	Clin Obstet.Gynecol.	Background article
Ritting,A.W.; Leger,R.R.; Tucker,R.; Mogielnicki,L.H.; Rodner,C.M.	2011	Duration of postoperative dressing after mini-open carpal tunnel release: A randomized clinical control trial level 2 evidence	Journal of Hand Surgery	Conference poster
Rob,C.; May,A.G.	1975	Neurovascular compression syndromes	Adv.Surg	background
Robaux,S.; Blunt,C.; Viel,E.; Cuvillon,P.; Nouguier,P.; Dautel,G.; Boileau,S.; Girard,F.; Bouaziz,H.	2004	Tramadol added to 1.5% mepivacaine for axillary brachial plexus block improves postoperative analgesia dose-dependently	Anesth.Analg.	Deemed clinically irrelevant
Robertson,V.J.	2010	A review of therapeutic ultrasound: effectiveness studies		Systematic review
Robins,R.H.	1976	Letter: Carpal tunnel syndrome and tennis elbow	Br Med J	letter
Robinson,L.R.; Micklesen,P.J.; Wang,L.	1998	Strategies for analyzing nerve conduction data: superiority of a summary index over single tests	Muscle Nerve	insufficient data; very low study design
Robinson,L.R.; Strakowski,J.; Kennedy,D.J.	2013	Is the combined sensory (Robinson) index routinely indicated for all cases of suspected carpal tunnel syndrome undergoing electrodiagnostic evaluation?	PM R	case report; commentary
Rodriquez,A.A.; Radwin,R.G.; Jeng,O.J.	1993	Median nerve electrophysiologic parameters and psychomotor performance in carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	+Does not answer a question of interest

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Rojviroj,S.; Sirichativapee,W.; Kowsuwon,W.; Wongwiwattananon,J.; Tamnanthong,N.; Jeeravipoolvarn,P.	1990	Pressures in the carpal tunnel. A comparison between patients with carpal tunnel syndrome and normal subjects	J Bone Joint Surg Br	insufficient data; very low study design
Roll,S.C.; Case-Smith,J.; Evans,K.D.	2011	Diagnostic accuracy of ultrasonography vs. electromyography in carpal tunnel syndrome: a systematic review of literature	Ultrasound Med Biol.	systematic review
Roll,S.C.; Evans,K.D.; Li,X.; Freimer,M.; Sommerich,C.M.	2011	Screening for carpal tunnel syndrome using sonography	J Ultrasound Med	insufficient data; very low study design
Romeo,P.; d'Agostino,M.C.; Lazzarini,A.; Sansone,V.C.	2011	Extracorporeal shock wave therapy in pillar pain after carpal tunnel release: a preliminary study	Ultrasound Med Biol.	Very low quality
Roquelaure,Y.; Ha,C.; Rouillon,C.; Fouquet,N.; Leclerc,A.; Descatha,A.; Touranchet,A.; Goldberg,M.; Imbernon,E.	2009	Risk factors for upper-extremity musculoskeletal disorders in the working population	Arthritis Care Res.	not exclusive to CTS
Rosales,R.S.; Diez,de la Lastra,I; McCabe,S.; Ortega Martinez,J.I.; Hidalgo,Y.M.	2009	The relative responsiveness and construct validity of the Spanish version of the DASH instrument for outcomes assessment in open carpal tunnel release	J Hand Surg Eur.Vol.	+Does not answer a question of interest
Rose,E.H.; Norris,M.S.; Kowalski,T.A.; Lucas,A.; Flegler,E.J.	1991	Palmaris brevis turnover flap as an adjunct to internal neurolysis of the chronically scarred median nerve in recurrent carpal tunnel syndrome	J Hand Surg Am	Very Low Quality. Prospective case series.
Rosecrance,J.C.; Cook,T.M.; Anton,D.C.; Merlino,L.A.	2002	Carpal tunnel syndrome among apprentice construction workers	Am J Ind.Med	Not relevant, prevalence study
Rosen,I.	1993	Neurophysiological diagnosis of the carpal tunnel syndrome: evaluation of neurographic techniques	Scand.J Plast.Reconstr.Surg Hand Surg	insufficient data; very low study design
Rosen,I.; Stromberg,T.; Lundborg,G.	1993	Neurophysiological investigation of hands damaged by vibration: comparison with idiopathic carpal tunnel syndrome	Scand.J Plast.Reconstr.Surg Hand Surg	insufficient data; confounded comparison group

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Rosenbaum,R.B.; Donaldson,J.O.	1994	Peripheral nerve and neuromuscular disorders	Neurol.Clin.	Narrative review
Rosenberg,D.; Conolley,J.; Dellon,A.L.	2001	Thenar eminence quantitative sensory testing in the diagnosis of proximal median nerve compression	J Hand Ther	Not exclusive to CTS; <10 patients per group
Rosenbloom,A.L.	1989	Limitation of finger joint mobility in diabetes mellitus	J Diabet.Complications	review; background information
Rosenblum,A.	1995	Two simple, very useful nerve conduction tests for carpal tunnel syndrome	Am.J.EEG Technol.	Commentary/review
Rosenthal,E.A.	1987	Tenosynovitis: tendon and nerve entrapment	Hand Clin	background
Ross,P.	1994	Ergonomic hazards in the workplace: Assessment and prevention	AAOHN J.	background
Rossi,E.; Sighinolfi,E.; Bortolotti,P.; De,Santis G.; Schoenhuber,R.; Grandi,M.; Landi,A.	1984	Nocturnal prolactin secretion in carpal tunnel syndrome	Ital.J Neurol Sci	all CTS cases; no comparison group
Rossi,S.; Giannini,F.; Passero,S.; Paradiso,C.; Battistini,N.; Cioni,R.	1994	Sensory neural conduction of median nerve from digits and palm stimulation in carpal tunnel syndrome	Electroencephalogr.Clin Neurophysiol.	insufficient data; very low study design
Rosignol,M.; Stock,S.; Patry,L.; Armstrong,B.	1997	Carpal tunnel syndrome: what is attributable to work? The Montreal study	Occup.Environ.Med	Not relevant, incidence study of montreal population metal workers
Roth,J.H.; Richards,R.S.; MacLeod,M.D.	1994	Endoscopic carpal tunnel release	Can J Surg	very low quality
Rottgers,S.A.; Lewis,D.; Wollstein,R.A.	2009	Concomitant presentation of carpal tunnel syndrome and trigger finger	J Brachial.Plex.Peripher.Nerve Inj.	+Does not answer a question of interest
Rozali,Z.I.; Noorman,F.M.; De Cruz,P.K.; Feng,Y.K.; Razab,H.W.; Sapuan,J.; Singh,R.; Sikkandar,F.M.	2012	Impact of carpal tunnel syndrome on the expectant woman's life	Asia Pac.Fam Med	very low quality
Rozanski,M.; Neuhaus,V.; Reddy,R.; Jupiter,J.B.; Rathmell,J.P.; Ring,D.C.	2014	An open-label comparison of local anesthesia with or without sedation for minor hand surgery	Hand (N Y)	Incorrect patient population (not exclusive to CTS)

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Rozmaryn,L.M.	1997	Carpal tunnel syndrome: A comprehensive review	Current Opinion in Orthopaedics	background
Rozmaryn,L.M.; Dovellet,S.; Rothman,E.R.; Gorman,K.; Olvey,K.M.; Bartko,J.J.	1998	Nerve and tendon gliding exercises and the conservative management of carpal tunnel syndrome	J Hand Ther	Very Low Quality
Ruby,L.K.	1980	Common hand injuries in the athlete	Orthop Clin North Am	Background Information
Ruch,D.S.; Seal,C.N.; Bliss,M.S.; Smith,B.P.	2002	Carpal tunnel release: efficacy and recurrence rate after a limited incision release	J South Orthop Assoc	Retrospective case series
Rudman,D.; Feller,A.G.; Cohn,L.; Shetty,K.R.; Rudman,I.W.; Draper,M.W.	1991	Effects of human growth hormone on body composition in elderly men	Horm.Res.	not relevant to CTS; background information
Rudolfer,S.M.	1992	CTSS: an interactive microcomputer program for the clinical screening of carpal tunnel syndrome. II. Statistical and computational aspects	Electromyogr.Clin Neurophysiol.	database records review; statistical review
Rudolfer,S.M.	1988	CTSS: an interactive microcomputer program for the clinical screening of carpal tunnel syndrome. I. Clinical aspects	Electromyogr.Clin Neurophysiol.	review
Rudolph,R.; Jaffe,S.	1975	Painless fibro fatty hamartoma of the median nerve	Br.J.Plast.Surg.	case report
Sabeti-Aschraf,M.; Serek,M.; Pachtner,T.; Auner,K.; Machinek,M.; Geisler,M.; Goll,A.	2008	The Enduro motorcyclist's wrist and other overuse injuries in competitive Enduro motorcyclists: a prospective study	Scand.J Med Sci Sports	Not relevant, prevalence study
Sable,A.W.	1998	Median and ulnar nerves in the hand	Phys.Med.Rehabil.Clin.N.Am.	Background Information
Sailer,S.M.	1996	The role of splinting and rehabilitation in the treatment of carpal and cubital tunnel syndromes	Hand Clin	Background article
Sakakibara,H.; Kondo,T.; Miyao,M.; Yamada,S.	1994	Digital nerve conduction velocity as a sensitive indication of peripheral neuropathy in vibration syndrome	Am J Ind.Med	+Does not answer a question of interest
Sakellarides,H.T.	1983	The management of carpal tunnel compression syndrome. Follow-up of 500 cases over a 25-year period	Orthop.Rev.	+not best available evidence; summary document

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Sakthivel,K.; Madan,S.; O'Connor,D.; Samuel,A.W.	2006	Efficacy of a new provocative test for carpal tunnel syndrome: The straight arm raise (SAR) test	European Journal of Orthopaedic Surgery and Traumatology	insufficient data; very low study design
Salerno,D.F.; Franzblau,A.; Werner,R.A.; Bromberg,M.B.; Armstrong,T.J.; Albers,J.W.	1998	Median and ulnar nerve conduction studies among workers: normative values	Muscle Nerve	Does not answer a question of interest; assessment of thresholds
Salinas,M.; Blas,G.; Regidor,I.; LyPen,D.; Andreu,J.; Sanchez,Olaso A.	2003	An electro-clinical comparison of carpal tunnel syndrome therapy	Muscle Nerve	Abstract/conference poster
Sambandam,S.N.; Priyanka,P.; Gul,A.; Ilango,B.	2008	Critical analysis of outcome measures used in the assessment of carpal tunnel syndrome	Int.Orthop	systematic review
Sanati,K.A.; Mansouri,M.; Macdonald,D.; Ghafghazi,S.; Macdonald,E.; Yadegarfar,G.	2011	Surgical techniques and return to work following carpal tunnel release: a systematic review and meta-analysis	J Occup.Rehabil.	systematic review
Sander,H.W.; Quinto,C.; Saadeh,P.B.; Chokroverty,S.	1999	Sensitive median-ulnar motor comparative techniques in carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Sansone,J.M.; Gatzke,A.M.; Aslinia,F.; Rolak,L.A.; Yale,S.H.	2006	Jules Tinel (1879-1952) and Paul Hoffmann (1884-1962)	Clinical Medicine and Research	historical review; background information
Sarkar,S.D.	1968	Carpal tunnel syndrome	Br J Clin Pract.	background
Sarria,L.; Cabada,T.; Cozcolluela,R.; Martinez-Berganza,T.; Garcia,S.	2000	Carpal tunnel syndrome: usefulness of sonography	Eur.Radiol.	insufficient data; very low study design
Sarris,I.K.; Sotereanos,D.G.	2004	Vein wrapping for recurrent median nerve compression	Journal of the American Society for Surgery of the Hand	Background article
Sato,Y.; Honda,Y.; Iwamoto,J.; Kanoko,T.; Satoh,K.	2005	Amelioration by mecobalamin of subclinical carpal tunnel syndrome involving unaffected limbs in stroke patients	J Neurol Sci	Does not address question of interest
Satoh,K.; Nemoto,J.	1984	Sub-clinical carpal Tunnel syndrome: Electrophysiological study and natural course	Nihon University Journal of Medicine	not best available evidence; no comparison of modalities

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Sauni,R.; Paakkonen,R.; Virtema,P.; Jantti,V.; Kahonen,M.; Toppila,E.; Pyykko,I.; Uitti,J.	2009	Vibration-induced white finger syndrome and carpal tunnel syndrome among Finnish metal workers	Int.Arch Occup.Environ.Health	Not relevant
Sauzet,O.; Carvajal,A.; Escudero,A.; Molokhia,M.; Cornelius,V.R.	2013	Illustration of the weibull shape parameter signal detection tool using electronic healthcare record data	Drug Saf	Not relevant to CTS/ very low study design
Sawaya,R.A.; Sakr,C.	2009	When is the Phalen's test of diagnostic value: an electrophysiologic analysis?	J Clin Neurophysiol.	confounded comparisons; not best available evidence
Sawle,G.V.; Ramsay,M.M.	1998	The neurology of pregnancy	Journal of Neurology Neurosurgery and Psychiatry	Background article
Sayegh,E.T.; Strauch,R.J.	2014	Open versus Endoscopic Carpal Tunnel Release: A Meta-analysis of Randomized Controlled Trials	Clin.Orthop.	meta-analysis
Sayegh,E.T.; Strauch,R.J.	2015	Open versus Endoscopic Carpal Tunnel Release: A Meta-analysis of Randomized Controlled Trials	Clin Orthop Relat Res	Meta-analysis
Scalco,R.S.; Pietroski,F.; Celli,L.F.; Gomes,I.; Becker,J.	2013	Seasonal variation in prevalence of carpal tunnel syndrome	Muscle Nerve	Not relevant, prevalence study
Scanlon,A.; Maffei,J.	2009	Carpal tunnel syndrome	J Neurosci.Nurs.	background
Scelsa,S.N.; Herskovitz,S.; Bieri,P.; Berger,A.R.	1998	Median mixed and sensory nerve conduction studies in carpal tunnel syndrome	Electroencephalogr.Clin Neurophysiol.	insufficient data; very low study design
Scelsi,R.; Zanlungo,M.; Tenti,P.	1989	Carpal tunnel syndrome. Anatomical and clinical correlations and morphological and ultrastructural aspects of the tenosynovial sheath	Ital.J Orthop Traumatol.	biomechanical study
Schadel-Hopfner,M.; Windolf,J.; Antes,G.; Sauerland,S.; Diener,M.K.	2008	Evidence-based hand surgery: the role of Cochrane reviews	J Hand Surg Eur.Vol.	Narrative review
Schenck,R.R.	1989	Carpal tunnel syndrome: the new 'industrial epidemic'	AAOHN J	Background Information
Schenck,R.R.	1995	The role of endoscopic surgery in the treatment of carpal tunnel syndrome		Does not address question of interest

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Schierhout,G.H.; Myers,J.E.	1996	Is self-reported pain an appropriate outcome measure in ergonomic-epidemiologic studies of work-related musculoskeletal disorders?	Am.J.Ind.Med.	Background Information
Schlachter,L.B.; Tindall,G.T.	1981	Carpal tunnel syndrome--a disabling yet treatable condition	J Med Assoc Ga	background
Schmaus,D.C.	1990	The risk of carpal tunnel syndrome with computer use	AORN J	Commentary; letter
Schmid,A.B.; Elliott,J.M.; Strudwick,M.W.; Little,M.; Coppieters,M.W.	2012	Effect of splinting and exercise on intraneural edema of the median nerve in carpal tunnel syndrome--an MRI study to reveal therapeutic mechanisms	J Orthop Res.	Does not meet inclusion criteria (follow-up<1 month)
Schmid,A.B.; Kubler,P.A.; Johnston,V.; Coppieters,M.W.	2015	A vertical mouse and ergonomic mouse pads alter wrist position but do not reduce carpal tunnel pressure in patients with carpal tunnel syndrome	Appl Ergon.	all CTS patients; no regression analysis
Schnetzler,K.A.	2008	Acute carpal tunnel syndrome	J Am Acad Orthop Surg	background
Scholten,R.J.; Mink,van der Molen; Uitdehaag,B.M.; Bouter,L.M.; de Vet,H.C.	2007	Surgical treatment options for carpal tunnel syndrome	Cochrane Database Syst.Rev.	systematic review
Schorn,D.; Hoskinson,J.; Dickson,R.A.	1978	Bone density and the carpal tunnel syndrome		Does not address question of interest
Schottland,J.R.; Kirschberg,G.J.; Fillingim,R.; Davis,V.P.; Hogg,F.	1991	Median nerve latencies in poultry processing workers: an approach to resolving the role of industrial "cumulative trauma" in the development of carpal tunnel syndrome	J Occup.Med	insufficient data; no diagnosis of CTS
Schuchmann,J.A.; Melvin,J.L.; Duran,R.J.; Coleman,C.R.	1971	Evaluation of local steroid injection for carpal tunnel syndrome	Arch Phys Med Rehabil.	Very Low Quality
Schulman,R.A.; Liem,B.	2008	Treatment of carpal tunnel syndrome with medical acupuncture	Medical Acupuncture	Very low quality
Schulman,R.A.; Liem,B.; Moroz,A.	2008	Treatment of carpal tunnel syndrome with medical acupuncture (Medical Acupuncture 20, 3, (163-167))	Medical Acupuncture	Not a study (correction of a study)
Schwartz,M.S.; Gordon,J.A.; Swash,M.	1980	Slowed nerve conduction with wrist flexion in carpal tunnel syndrome	Ann.Neurol	+Does not answer a question of interest

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Schwarz,A.; Keller,F.; Seyfert,S.; Poll,W.; Molzahn,M.; Distler,A.	1984	Carpal tunnel syndrome: a major complication in long-term hemodialysis patients	Clin Nephrol.	insufficient data; no comparison groups
Schweitzer,G.; Miller,R.D.	1973	Carpal tunnel syndrome due to median nerve enlargement	S.Afr.Med J	case report
Scoggins,K.M.; Campbell,R.M.	1995	Impact of carpal tunnel education on changing dental hygienists knowledge, risk behaviors, symptoms and functional performance	Work	Does not answer a question of interest
Sebright,J.A.	1986	Gloves, behavior changes can reduce carpal tunnel syndrome	Occup.Health Saf	Background article
Sedal,L.; McLeod,J.G.; Walsh,J.C.	1973	Ulnar nerve lesions associated with the carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	+Does not answer a question of interest
See,D.H.	1980	Electromyography: when to consider it and what to expect from it	Med Times	Background Information; case reports
Sefcovic,A.D.; Tuason,E.J.; Asaad,T.J.; Dawson,A.M.; Lundberg,T.M.; Moreau,J.E.; Dale,L.M.	2000	Symptom severity, functional status, and preventive or palliative measures employed by hand therapists experiencing carpal tunnel syndrome	Work	Not relevant, prevalence study
Seiler III,J.G.	1997	Carpal tunnel syndrome: Update on diagnostic testing and treatment options		background
Seitz,Jr; Lall,A.	2013	Open carpal tunnel release with median neurolysis and Z-plasty reconstruction of the transverse carpal ligament	Current Orthopaedic Practice	very low quality
Seletz,E.	1968	Peripheral nerve surgery	Prog.Neurol Psychiatry	Narrative review
Semple,J.C.; Cargill,A.O.	1969	Carpal-tunnel syndrome		letter
Semple,J.C.; Cargill,A.O.	1969	Carpal-tunnel syndrome. Results of surgical decompression		Retrospective case series
Sener,H.O.; Tascilar,N.F.; Balaban,H.; Selcuki,D.	2000	Sympathetic skin response in carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; very low study design
Seneviratne,K.N.	1968	An electro-physiological study of 100 patients with the carpal tunnel syndrome	Ceylon Med J	case series; review
Sepp,N.; Schmutzhard,E.; Fritsch,P.	1988	Shulman syndrome associated with Borrelia burgdorferi and complicated by carpal tunnel syndrome	J.Am.Acad.Dermatol.	case report

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Sequeira,W.	1999	Yoga in treatment of carpal-tunnel syndrome		Background article
Seradge,H.; Jia,Y.C.; Owens,W.	1995	In vivo measurement of carpal tunnel pressure in the functioning hand	J Hand Surg Am	Does not address question of interest
Seradge,H.; Parker,W.; Baer,C.; Mayfield,K.; Schall,L.	2002	Conservative treatment of carpal tunnel syndrome: an outcome study of adjunct exercises	J Okla.State Med Assoc	Very Low Quality
Sernik,R.A.; Abicalaf,C.A.; Pimentel,B.F.; Braga-Baiak,A.; Braga,L.; Cerri,G.G.	2008	Ultrasound features of carpal tunnel syndrome: a prospective case-control study	Skeletal Radiol.	insufficient data; very low study design
Seror,P.	2001	Simplified orthodromic inching test in mild carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Seror,P.	2005	Frequency of neurogenic thoracic outlet syndrome in patients with definite carpal tunnel syndrome: an electrophysiological evaluation in 100 women	Clin Neurophysiol.	+Does not answer a question of interest
Seror,P.	2000	Comparative diagnostic sensitivities of orthodromic or antidromic sensory inching test in mild carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; very low study design
Seror,P.	1998	Orthodromic inching test in mild carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Seror,P.	1998	Pregnancy-related carpal tunnel syndrome	J Hand Surg Br	Insufficient data (included from unpublished data)
Seror,P.	1995	The value of special motor and sensory tests for the diagnosis of benign and minor median nerve lesion at the wrist	Am J Phys Med Rehabil.	+not best available evidence
Seror,P.	1994	Sensitivity of the various tests for the diagnosis of carpal tunnel syndrome	J Hand Surg Br	insufficient data; no comparison group
Seror,P.	1991	Carpal tunnel syndrome in the elderly. "Beware of severe cases"	Ann.Chir Main Memb.Super.	+Does not answer a question of interest
Seror,P.	1988	Phalen's test in the diagnosis of carpal tunnel syndrome	J Hand Surg Br	insufficient data; very low study design

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Seror,P.	1987	Tinel's sign in the diagnosis of carpal tunnel syndrome	J Hand Surg Br	insufficient data; very low study design
Seror,P.; Seror,R.	2012	Hand workload, computer use and risk of severe median nerve lesions at the wrist	Rheumatology (Oxford)	+Does not answer a question of interest
Serra,G.; Migliore,A.; Tugnoli,V.	1985	Raynaud's phenomenon and entrapment neuropathies	Ann.Neurol.	letter
Serra,L.; Panagiotopoulos,K.; Bucciero,A.; Mehrabi,F.K.; Pescatore,G.; Santangelo,M.; Vizioli,L.	2003	Endoscopic release in carpal tunnel syndrome: analysis of clinical results in 200 cases	Minim.Invasive Neurosurg.	very low quality
Serra-Renom,J.M.; Benito,J.; Rubio,J.M.	2002	Carpal tunnel release through a short incision: an update	Plast.Reconstr.Surg	followup note
Sesek,R.; Drinkaus,P.; Khalighi,M.; Tuckett,R.P.; Bloswick,D.S.	2008	Development of a carpal tunnel syndrome screening method using structured interviews and vibrotactile testing	Work	insufficient data; very low study design
Sesek,R.F.; Khalighi,M.; Bloswick,D.S.; Anderson,M.; Tuckett,R.P.	2007	Effects of prolonged wrist flexion on transmission of sensory information in carpal tunnel syndrome	J Pain	Does not answer a question of interest
Sever,C.; Kulahci,Y.; Oksuz,S.; Sahin,C.	2010	The mini incision technique for carpal tunnel decompression using nasal instruments	Turk Neurosurg.	very low quality
Seyfert,S.; Boegner,F.; Hamm,B.; Kleindienst,A.; Klatt,C.	1994	The value of magnetic resonance imaging in carpal tunnel syndrome	J Neurol	insufficient data; no comparison group
Shaafi S; Naimian S; Itomlou H; Sayyah Melli M	2006	Prevalence and severity of carpal tunnel syndrome (CTS) during pregnancy based on electrophysiologic studies		Very low quality
Shafer,S.W.; Koreerat,N.R.; Gordon,L.B.; Santillo,D.R.; Moore,J.H.; Greathouse,D.G.	2013	Median and ulnar neuropathies in u.s. Army medical command band members	Med Probl.Perform.Art.	Not relevant, prevalence study
Shaffer,S.W.; Moore,R.; Foo,S.; Henry,N.; Moore,J.H.; Greathouse,D.G.	2012	Clinical and electrodiagnostic abnormalities of the median nerve in US Army Dental Assistants at the onset of training	US.Army Med Dep.J	no CTS

Authors	Year	Article Title	Periodical	Reason for Exclusion
Shafshak,T.S.; el-Hinawy,Y.M.	1995	The anterior interosseous nerve latency in the diagnosis of severe carpal tunnel syndrome with unobtainable median nerve distal conduction	Arch Phys Med Rehabil.	insufficient data; very low study design; not exclusive to CTS
Shaheen,H.A.; Yossef,A.T.	2011	Ultrasound has supplementary diagnostic value to clinical and neurophysiological studies in Carpal tunnel syndrome	Egyptian Journal of Neurology, Psychiatry and Neurosurgery	insufficient data; very low study design
Shapiro,B.E.; Preston,D.C.	2009	Entrapment and Compressive Neuropathies	Med.Clin.North Am.	background
Shapiro,B.E.; Preston,D.C.	2003	Entrapment and compressive neuropathies	Med.Clin.North Am.	case report
Shapiro,S.	1995	Microsurgical carpal tunnel release		Insufficient data
Sharma,K.R.; Rotta,F.; Romano,J.; Ayyar,D.R.	2001	Early diagnosis of carpal tunnel syndrome: comparison of digit 1 with wrist and distoproximal ratio	Neurol Clin Neurophysiol.	+Does not answer a question of interest; very low study design
Sharma,V.; Wilder-Smith,E.P.	2004	Self-administered hand symptom diagram for carpal tunnel syndrome diagnosis	J Hand Surg Br	insufficient data; very low study design
Shellenbarger,T.	1991	When you're asked about carpal tunnel syndrome		background
Sheon,R.P.	1997	Repetitive strain injury 2. Diagnostic and treatment tips on six common problems	Postgrad.Med.	background
Shepherd,M.M.	2010	Clinical outcomes of electrodiagnostic testing conducted in primary care	J Am Board Fam Med	+Does not answer a question of interest; not CTS exclusive
Sheu,J.J.; Yuan,R.Y.; Chiou,H.Y.; Hu,C.J.; Chen,W.T.	2006	Segmental study of the median nerve versus comparative tests in the diagnosis of mild carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; very low study design
Shi,Q.; MacDermid,J.C.	2011	Is surgical intervention more effective than non-surgical treatment for carpal tunnel syndrome? A systematic review	J Orthop Surg Res.	Systematic Review

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Shih,Y.-C.; Ou,Y.-C.	2005	Influences of span and wrist posture on peak chuck pinch strength and time needed to reach peak strength	International Journal of Industrial Ergonomics	only healthy study subjects
Shikha,Gandhi M.; Redd,C.B.; Tuckett,R.P.; Sesek,R.F.; Bamberg,S.J.M.	2012	A Novel Device to Evaluate the Vibrotactile Threshold	Journal of Medical Devices, Transactions of the ASME	insufficient data; very low study design
Shim,H.; Shin,B.; Lee,M.; Jung,A.; Lee,H.; Ernst,E.	2012	Acupuncture for carpal tunnel syndrome: A systematic review of randomized controlled trials	BMC Complementary and Alternative Medicine	Presentation
Shin,A.Y.; Perlman,M.; Shin,P.A.; Garay,A.A.	2000	Disability outcomes in a worker's compensation population: surgical versus nonsurgical treatment of carpal tunnel syndrome	Am J Orthop (Belle.Mead NJ)	No critical outcomes
Shin,C.H.; Paik,N.J.; Lim,J.Y.; Kim,T.K.; Kim,K.W.; Lee,J.J.; Park,J.H.; Baek,G.H.; Gong,H.S.	2012	Carpal tunnel syndrome and radiographically evident basal joint arthritis of the thumb in elderly Koreans	J Bone Joint Surg Am	Not relevant, prevalence study
Ship,I.I.; Shapiro,I.M.	1983	Preventing mercury poisoning in dental practice	Anesth.Prog.	Not relevant
Shiri,R.	2014	Hypothyroidism and carpal tunnel syndrome: a meta-analysis	Muscle Nerve	meta-analysis
Shiri,R.; Falah-Hassani,K.	2015	Computer use and carpal tunnel syndrome: A meta-analysis	J Neurol Sci	meta-analysis
Shiri,R.; Miranda,H.; Heliovaara,M.; Viikari-Juntura,E.	2009	Physical work load factors and carpal tunnel syndrome: a population-based study	Occup.Environ.Med	Not relevant, prevalence study
Shivde,A.J.; Dreizin,I.; Fisher,M.A.	1981	The carpal tunnel syndrome. A clinical - electrodiagnostic analysis	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Shizukuishi,S.; Nishii,S.; Ellis,J.; Folkers,K.	1980	The carpal tunnel syndrome as a probable primary deficiency of vitamin B6 rather than a deficiency of a dependency state	Biochem.Biophys.Res.Commun.	<10 patients per group; does not answer a question of interest
Shizukuishi,S.; Nishii,S.; Folkers,K.	1981	Distribution of vitamin B6 deficiency in university students	J Nutr.Sci Vitaminol.(Tokyo)	not exclusive to CTS; does not answer a question of interest

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Short,W.H.; Palmer,A.K.	1981	Amyloidosis and the carpal tunnel syndrome	Orthop.Rev.	biopsy study; no comparison group
Shoushtari,M.J.; Shokri,A.; Shahab,S.	2007	Numerical correlation between nerve conduction velocity and compound nerve action potential of median nerve in patients with carpal tunnel syndrome and normal group	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
Shuman,L.H.; Hirsh,H.L.	1995	Acute compartment syndromes and entrapment neuropathies	Trauma	background
Shuman,S.; Osterman,L.; Bora,F.W.	1987	Compression neuropathies	Semin.Neurol	background
Sie,I.H.; Waters,R.L.; Adkins,R.H.; Gellman,H.	1992	Upper extremity pain in the postrehabilitation spinal cord injured patient	Arch Phys Med Rehabil.	prevalence study; not CTS exclusive
Siebenaler,M.J.; McGovern,P.	1992	Carpal tunnel syndrome. Priorities for prevention	AAOHN J	Background article
Siegmeth,A.W.; Hopkinson-Woolley,J.A.	2006	Standard open decompression in carpal tunnel syndrome compared with a modified open technique preserving the superficial skin nerves: a prospective randomized study	J Hand Surg Am	Very low quality
Sigmond,E.; Luthra,H.S.	1980	Carpal tunnel syndrome	Minn.Med	background
Sikka,A.; Kemmann,E.; Vrablik,R.M.; Grossman,L.	1983	Carpal tunnel syndrome associated with danazol therapy	Am J Obstet.Gynecol.	Case report
Silver,M.A.; Gelberman,R.H.; Gellman,H.; Rhoades,C.E.	1985	Carpal tunnel syndrome: associated abnormalities in ulnar nerve function and the effect of carpal tunnel release on these abnormalities	J Hand Surg Am	
Silverstein,B.; Fine,L.; Stetson,D.	1987	Hand-wrist disorders among investment casting plant workers	J Hand Surg Am	Not relevant, prevalence study
Silverstein,B.A.; Fan,Z.J.; Bonauto,D.K.; Bao,S.; Smith,C.K.; Howard,N.; Viikari-Juntura,E.	2010	The natural course of carpal tunnel syndrome in a working population	Scand.J Work Environ.Health	very low strength of evidence
Silverstein,B.A.; Hughes,R.E.	1996	Upper extremity musculoskeletal disorders at a pulp and paper mill	Appl.Ergon.	Not relevant, prevalence study

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Sim,H.; Shin,B.C.; Lee,M.S.; Jung,A.; Lee,H.; Ernst,E.	2011	Acupuncture for carpal tunnel syndrome: a systematic review of randomized controlled trials	J Pain	Systematic review
Sim,Hoseob; Choi,Gwang Ho; Wieland,L.Susan; Lee,Hyangsook; Lee,Myeong Soo; Shin,Byung Cheul	2014	Acupuncture and related interventions for the treatment of symptoms associated with carpal tunnel syndrome	Cochrane Database of Systematic Reviews	systematic review
Simesen,K.; Haase,J.; Bjerre,P.	1980	Interfascicular transplantation in median nerve injuries	Acta Orthop.Scand.	
Simmer,Beck M.; Bray,K.K.; Branson,B.; Glaros,A.; Weeks,J.	2006	Comparison of muscle activity associated with structural differences in dental hygiene mirrors	Journal of dental hygiene : JDH./ American Dental Hygienists' Association	+Does not answer a question of interest
Simoneau,G.G.; Marklin,R.W.; Berman,J.E.; Monroe,J.F.; Welsh,S.E.	2000	Computer keyboard slope and wrist extension angle on individuals with carpal tunnel syndrome	Arch.Physiol.Biochem.	<10 patients per group
Simovic,D.; Weinberg,D.H.	1999	The median nerve terminal latency index in carpal tunnel syndrome: a clinical case selection study	Muscle Nerve	insufficient data
Simovic,D.; Weinberg,D.H.	2000	Carpal tunnel syndrome	Arch.Neurol.	background
Simpson,J.A.; Thomaidis,T.	1988	Fasciculation and focal loss of nerve accommodation in peripheral neuropathies	Acta Neurol Scand.	<10 patients per group; very low study design
Simpson,R.L.; Fern,S.A.	1996	Multiple compression neuropathies and the double-crush syndrome	Orthop.Clin.North Am.	background
Singh,I.; Khoo,K.M.; Krishnamoorthy,S.	1994	The carpal tunnel syndrome: clinical evaluation and results of surgical decompression	Ann.Acad Med Singapore	Retrospective case series
Sipos,D.A.	1995	Carpal tunnel syndrome	Orthop Nurs.	background
Skandalakis,J.E.; Colborn,G.L.; Skandalakis,P.N.; McCollam,S.M.; Skandalakis,L.J.	1992	The carpal tunnel syndrome: Part III	Am Surg	background
Skandalakis,J.E.; Colborn,G.L.; Skandalakis,P.N.; McCollam,S.M.; Skandalakis,L.J.	1992	The carpal tunnel syndrome: Part II	Am Surg	background

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Skandalakis,J.E.; Colborn,G.L.; Skandalakis,P.N.; McCollam,S.M.; Skandalakis,L.J.	1992	The carpal tunnel syndrome: Part I	Am Surg	background
Skoff,H.D.; Sklar,R.	1994	Endoscopic median nerve decompression: early experience	Plast.Reconstr.Surg	very low quality
Slater,Jr; Bynum,D.K.	1993	Diagnosis and treatment of carpal tunnel syndrome	Orthop.Rev.	background
Slattery,P.G.	1994	Endoscopic carpal tunnel release. Use of the modified Chow technique in 215 cases	Med J Aust.	very low quality
Sluiter,J.K.; Rest,K.M.; Frings-Dresen,M.H.W.	2001	Criteria document for evaluating the work-relatedness of upper-extremity musculoskeletal disorders	Scand.J.Work.Environ.Health	Background Information
Slutsky,D.J.	2009	Use of nerve conduction studies and the pressure-specified sensory device in the diagnosis of carpal tunnel syndrome	J Hand Surg Eur.Vol.	insufficient data; very low study design
Slutsky,D.J.	2005	Electrodiagnostic testing in hand surgery	Atlas of Hand Clinics	Background Information
Slutsky,D.J.	2003	Nerve conduction studies in hand surgery	Journal of the American Society for Surgery of the Hand	Background Information
Smidt,M.H.; Visser,L.H.	2008	Carpal tunnel syndrome: clinical and sonographic follow-up after surgery	Muscle Nerve	
Smit,A.; Hooper,G.	2004	Elective hand surgery in patients taking warfarin	J Hand Surg Br	Very low quality
Smith,C.; O'Neill,J.; Parasu,N.; Finlay,K.	2009	The role of ultrasonography in the assessment of carpal tunnel syndrome	Can Assoc Radiol.J	background
Smith,D.L.; Wernick,R.	1994	Common nonarticular syndromes in the elbow, wrist, and hand	Postgrad.Med.	Background article
Smith,E.M.; Sonstegard,D.A.; Anderson,W.H.,Jr.	1977	Carpal tunnel syndrome: contribution of flexor tendons	Arch Phys Med Rehabil.	cadaver study
Smith,J.	1981	Radial nerve conduction in patients with carpal tunnel syndrome	Appl Neurophysiol.	+Does not answer a question of interest
Smith,N.J.	2002	Nerve conduction studies for carpal tunnel syndrome: essential prelude to surgery or unnecessary luxury?	J Hand Surg Br	

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Snell,N.J.; Coysh,H.L.; Snell,B.J.	1980	Carpal tunnel syndrome presenting in the puerperium		Case reports
So,Y.T.; Olney,R.K.; Aminoff,M.J.	1989	Evaluation of thermography in the diagnosis of selected entrapment neuropathies		insufficient data; very low study design
Socetti,A.; Raffaelli,P.; Giovagnoni,A.; Ercolani,P.; Mercante,O.; Pelliccioni,G.	1992	MR imaging in the diagnosis of carpal tunnel syndrome	Ital.J Orthop Traumatol.	no comparison group; very low study design
Sohn,M.K.; Jee,S.J.; Hwang,S.L.; Kim,Y.J.; Shin,H.D.	2011	Motor unit number estimation and motor unit action potential analysis in carpal tunnel syndrome	Ann.Rehabil.Med	insufficient data; very low study design
Sohn,S.Y.; Seo,J.H.; Min,Y.; Seo,M.H.; Eun,J.P.; Song,K.J.	2012	Changes in Dermatomal Somatosensory Evoked Potentials according to Stimulation Intensity and Severity of Carpal Tunnel Syndrome	J Korean Neurosurg.Soc.	insufficient data; very low study design
Soltani,A.M.; Allan,B.J.; Best,M.J.; Mir,H.S.; Panthaki,Z.J.	2013	Revision Decompression and Collagen Nerve Wrap for Recurrent and Persistent Compression Neuropathies of the Upper Extremity	Ann.Plast.Surg	systematic review
Soltani,A.M.; Allan,B.J.; Best,M.J.; Mir,H.S.; Panthaki,Z.J.	2013	A systematic review of the literature on the outcomes of treatment for recurrent and persistent carpal tunnel syndrome	Plast.Reconstr.Surg	systematic review
Somay,G.; Somay,H.; Cevik,D.; Sungur,F.; Berkman,Z.	2009	The pressure angle of the median nerve as a new magnetic resonance imaging parameter for the evaluation of carpal tunnel	Clin Neurol Neurosurg.	Does not address question of interest
Song,C.H.; Gong,H.S.; Bae,K.J.; Kim,J.H.; Nam,K.P.; Baek,G.H.	2014	Evaluation of female hormone-related symptoms in women undergoing carpal tunnel release	J Hand Surg Eur.Vol.	Does not answer question of interest
Sonohata,M.; Tsuruta,T.; Mine,H.; Morimoto,T.; Mawatari,M.	2013	The relationship between neuropathic pain, and the function of the upper limbs based on clinical severity according to electrophysiological studies in patients with carpal tunnel syndrome	Open Orthop J	+Does not answer a question of interest

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Sonoo,M.; Tsaiweichao-Shozawa,Y.; Oshimi-Sekiguchi,M.; Hatanaka,Y.; Shimizu,T.	2006	Spread of the radial SNAP: a pitfall in the diagnosis of carpal tunnel syndrome using standard orthodromic sensory conduction study	Clin Neurophysiol.	insufficient data; very low study design
Sorensen,A.A.; Howard,D.; Tan,W.H.; Ketchersid,J.; Calfee,R.P.	2013	Minimal clinically important differences of 3 patient-rated outcomes instruments	Journal of Hand Surgery	Incorrect patient population (not exclusive to CTS)
Southwick,G.	1984	Nerve entrapment syndromes in the upper limb	Aust.Fam Physician	Background article
Sozay,S.; Sarfakoglu,A.B.; Ayas,S.; Cetin,N.	2011	Diurnal variation in clinical and electrophysiologic parameters associated with carpal tunnel syndrome	Am J Phys Med Rehabil.	+Does not answer a question of interest
Spaans,F.	1982	Spontaneous rhythmic motor unit potentials in the carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	Does not answer a question of interest
Sparkes,R.S.; Spence,M.A.; Gottlieb,N.L.; Gray,R.G.; Crist,M.; Sparkes,M.C.; Marazita,M.	1985	Genetic linkage analysis of the carpal tunnel syndrome	Hum.Hered.	Does not answer a question of interest; biostudy of genetic markers
Spector,J.T.; Turner,J.A.; Fulton-Kehoe,D.; Franklin,G.	2012	Pre-surgery disability compensation predicts long-term disability among workers with carpal tunnel syndrome	Am J Ind.Med	Not relevant,does not answer the PICO question
Spertini,F.; Wauters,J.P.; Poulenas,I.	1984	Carpal tunnel syndrome: a frequent, invalidating, long-term complication of chronic hemodialysis	Clin Nephrol.	Not relevant, hemodialysis patient
Spickler,L.	1979	Carpal tunnel syndrome	ONA J	case report
Spindler,H.A.; Dellon,A.L.	1982	Nerve conduction studies and sensibility testing in carpal tunnel syndrome	J Hand Surg Am	insufficient data
Spinner,R.J.; Amadio,P.C.	2003	Compressive neuropathies of the upper extremity	Clin.Plast.Surg.	Background Information
Spooner,G.R.; Desai,H.B.; Angel,J.F.; Reeder,B.A.; Donat,J.R.	1993	Using pyridoxine to treat carpal tunnel syndrome. Randomized control trial	Can Fam Physician	Deemed clinically irrelevant (general nonvalidated subjective/symptom questionnaire)

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Spyropoulos,A.C.; Douketis,J.D.	2012	How I treat anticoagulated patients undergoing an elective procedure or surgery		Case reports
Sri-Ram,K.; Vellodi,A.; Pitt,M.; Eastwood,D.M.	2007	Carpal tunnel syndrome in lysosomal storage disorders: simple decompression or external neurolysis?	J Pediatr Orthop B	very low quality
Stack,R.E.	1973	Carpal tunnel syndrome	Am Fam Physician	not relevant
Stahl,S.; Ben-David,B.; Moscona,R.A.	1997	The effect of local infiltration with morphine before carpal tunnel release	J Bone Joint Surg Am	Deemed clinically irrelevant
Stahl,S.; Blumenfeld,Z.; Yarnitsky,D.	1996	Carpal tunnel syndrome in pregnancy: indications for early surgery	J Neurol Sci	Insufficient data
Stal,M.; Hansson,G.-A.; Moritz,U.	2000	Upper extremity muscular load during machine milking	International Journal of Industrial Ergonomics	insufficient data for comparable groups
Stanek III,E.J.; Pransky,G.	1996	Unilateral vs. bilateral carpal tunnel: Challenges and approaches	Am.J.Ind.Med.	Background article
Stapleton,M.J.	2006	Occupation and carpal tunnel syndrome	ANZ J Surg	retrospective review; summary document
Stark,H.; Amirfeyz,R.	2013	Cochrane corner: local corticosteroid injection for carpal tunnel syndrome	J Hand Surg Eur.Vol.	Systematic review
Stark,W.A.	1968	Carpal tunnel syndrome, failure of surgery	J Indiana State Med Assoc	background
Stasinopoulos,D.; Stasinopoulos,I.; Johnson,M.I.	2005	Treatment of carpal tunnel syndrome with polarized polychromatic noncoherent light (Biopton light): a preliminary, prospective, open clinical trial	Photomed.Laser Surg	Very Low Quality
Stedt,J.D.	1989	Carpal tunnel syndrome: the risk to educational interpreters	Am Ann.Deaf	Background Information
Stein,D.; Neufeld,A.; Pasternak,O.; Graif,M.; Patish,H.; Schwimmer,E.; Ziv,E.; Assaf,Y.	2009	Diffusion tensor imaging of the median nerve in healthy and carpal tunnel syndrome subjects	J Magn Reson.Imaging	<10 patients per group; very low study design
Stein,K.; Storkel,S.; Linke,R.P.; Goebel,H.H.	1987	Chemical heterogeneity of amyloid in the carpal tunnel syndrome	Virchows Arch A Pathol.Anat.Histopathol.	bio-study/ biopsy

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Steinberg,D.R.; Gelberman,R.H.; Rydevik,B.; Lundborg,G.	1992	The utility of portable nerve conduction testing for patients with carpal tunnel syndrome: a prospective clinical study	J Hand Surg Am	insufficient data; very low study design
Steinberg,R.B.; Reuben,S.S.; Gardner,G.	1998	The dose-response relationship of ketorolac as a component of intravenous regional anesthesia with lidocaine	Anesth.Analg.	Deemed clinically irrelevant
Stepic,N.; Novakovic,M.; Martic,V.; Peric,D.	2008	Effects of perineural steroid injections on median nerve conduction during the carpal tunnel release	Vojnosanit.Pregl.	Does not address question of interest
Sternbach,G.	1999	The carpal tunnel syndrome	J.Emerg.Med.	background
Stetson,D.S.; Silverstein,B.A.; Keyserling,W.M.; Wolfe,R.A.; Albers,J.W.	1993	Median sensory distal amplitude and latency: Comparisons between nonexposed managerial/professional employees and industrial workers	Am.J.Ind.Med.	Not relevant, not a risk study
Stevens,J.C.	1987	AAEE minimonograph #26: The electrodiagnosis of carpal tunnel syndrome	Muscle Nerve	Background Information
Stevens,J.C.	1997	AANEM minimonograph 26: The electrodiagnosis of carpal tunnel syndrome	Muscle Nerve	Background Information
Stevens,J.C.; Beard,C.M.; O'Fallon,W.M.; Kurland,L.T.	1992	Conditions associated with carpal tunnel syndrome	Mayo Clin Proc.	medical record review; no comparison group
Stewart,H.D.; Innes,A.R.; Burke,F.D.	1985	The hand complications of Colles' fractures	J Hand Surg Br	no comparison group; not CTS exclusive
Stewart,J.D.; Eisen,A.	1978	Tinel's sign and the carpal tunnel syndrome	Br Med J	insufficient data; very low study design
Steyers,C.M.	2002	Recurrent carpal tunnel syndrome	Hand Clin	background
Steyers,C.M.; Schelkun,P.H.	1995	Practical management of carpal tunnel syndrome	Physician and Sportsmedicine	pdf does not match abstract
Stock,S.R.	1991	Workplace ergonomic factors and the development of musculoskeletal disorders of the neck and upper limbs: a meta-analysis	Am J Ind.Med	meta-analysis

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Stockton,D.W.; Meade,R.A.; Netscher,D.T.; Epstein,M.J.; Shenaq,S.M.; Shaffer,L.G.; Lupski,J.R.	2001	Hereditary neuropathy with liability to pressure palsies is not a major cause of idiopathic carpal tunnel syndrome	Arch Neurol	all CTS cases; no comparison group
Stoehr,M.; Petruch,F.; Scheglmann,K.; Schilling,K.	1978	Retrograde changes of nerve fibers with the carpal tunnel syndrome. An electroneurographic investigation	J Neurol	insufficient data; no comparison group
Stolp-Smith,K.A.; Pascoe,M.K.; Ogburn,P.L.,Jr.	1998	Carpal tunnel syndrome in pregnancy: frequency, severity, and prognosis	Arch Phys Med Rehabil.	retrospective case series
Stransky,G.; Weis,S.; Neumuller,J.; Hakimzadeh,A.; Firneis,F.; Ammer,K.; Partsch,G.; Eberl,R.	1987	Morphometric analysis of collagen fibrils in idiopathic carpal tunnel syndrome	Exp.Cell Biol.	bio-study/ biopsy
Stransky,M.; Rubin,A.; Lava,N.S.; Lazaro,R.P.	1989	Treatment of carpal tunnel syndrome with vitamin B6: a double-blind study	South Med J	Incorrect patient population (<10 patients/group)
Street,E.R.; Eastwood,G.L.; Royle,S.G.	2013	Staged release of bilateral carpal tunnel syndrome: cancellation rates of the second side procedure	J Hand Surg Eur.Vol.	Letter
Strickland,J.W.; Gozani,S.N.	2011	Accuracy of in-office nerve conduction studies for median neuropathy: a meta-analysis	J Hand Surg Am	meta-analysis
Strickland,J.W.; Idler,R.S.; Creighton,J.C.	1991	Carpal tunnel syndrome	Indiana Med	background
Strohecker,J.; Piotrowski,W.; Lametschwandtner,A.	1985	Ultrastructural findings after the use of a CO2 laser in carpal tunnel surgery	Lasers Surg Med	Incorrect patient population (<10 patients)
Stromberg,T.; Dahlin,L.B.; Lundborg,G.	1996	Hand problems in 100 vibration-exposed symptomatic male workers	J Hand Surg Br	not assessing RF of CTS but if CTS causes other problems
Stromberg,T.; Dahlin,L.B.; Rosen,I.; Lundborg,G.	1999	Neurophysiological findings in vibration-exposed male workers	J Hand Surg Br	Not relevant, neurophysiological findings in exposed workers
Strong,D.R.; Lennartz,F.H.	1992	Carpal tunnel syndrome	J Calif.Dent.Assoc	background

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Stuart,R.M.; Koh,E.S.C.; Breidahl,W.H.	2004	Sonography of Peripheral Nerve Pathology	Am.J.Roentgenol.	Background Information
Stutz,N.; Gohritz,A.; van,Schoonhoven J.; Lanz,U.	2006	Revision surgery after carpal tunnel release--analysis of the pathology in 200 cases during a 2 year period	J Hand Surg Br	Incorrect patient population (prior invasive intervention)
Su,C.Y.; Liang,W.L.; Chen-Sea,M.J.; Liu,C.W.; Huang,M.H.; Lai,Y.C.	2004	Physician practices in the diagnosis of carpal tunnel syndrome at a medical center in southern Taiwan	Kaohsiung J Med Sci	records review
Su,P.H.; Chen,W.S.; Wang,T.G.; Liang,H.W.	2013	Correlation between subclinical median neuropathy and the cross-sectional area of the median nerve at the wrist	Ultrasound Med Biol.	insufficient data; very low study design
Sucher,B.M.	1994	Palpatory diagnosis and manipulative management of carpal tunnel syndrome	J Am Osteopath.Assoc	<10 patients per group; confounding previous treatments
Sucher,B.M.	2009	Ultrasound imaging of the carpal tunnel during median nerve compression	Curr.Rev.Musculoskelet.Med	<10 patients per group; very low study design
Sucher,B.M.; Glassman,J.H.	1996	Upper extremity syndromes	Phys.Med.Rehabil.Clin.N.Am.	Background information
Sucher,B.M.; Hinrichs,R.N.; Welcher,R.L.; Quiroz,L.D.; Laurent,B.F.; Morrison,B.J.	2005	Erratum: Manipulative treatment of carpal tunnel syndrome: Biomechanical and osteopathic intervention to increase the length of the transverse carpal ligament: Part 2. Effect of sex differences and manipulative "priming" (Journal of the American Osteopathic Association (March 2005) 105, 3 (135-143))	J.Am.Osteopath.Assoc.	abstract correction; no text
Sud,V.	2002	Nerve entrapment and gene therapy	J Long Term Eff.Med Implants	Background article
Sugimoto,H.; Miyaji,N.; Ohsawa,T.	1994	Carpal tunnel syndrome: evaluation of median nerve circulation with dynamic contrast-enhanced MR imaging		<10 patients per group
Sundar,S.; Gonzalez-Cueto,J.A.; Gilbert,C.S.	2008	Conduction velocity distribution estimation using the collision technique-Theory and simulation study	Biomedical Signal Processing and Control	Background Information
Sunderland,S.	1976	The nerve lesion in the carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	Background Information; review

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Sunderland,S.	1974	The restoration of median nerve function after destructive lesions which preclude end to end repair		Background article
Sungpet,A.; Suphachatwong,C.; Kawinwonggowit,V.	1999	The relationship between body mass index and the number of sides of carpal tunnel syndrome	J Med Assoc Thai.	Not relevant, patients with known CTS
Suresh,S.S.; Raniga,S.; Shanmugam,V.; George,M.; Zaki,H.	2013	Carpal tunnel syndrome due to hydroxyapatite crystal deposition disease	J Hand Microsurg.	case report
Sutro,C.J.	1969	Carpal tunnel syndrome caused by calcification in the deep or volar radio-carpal ligament	Bull Hosp.Joint Dis	case report
Swajian,G.R.	1981	Carpal tunnel syndrome: a five-year study	J Am Osteopath.Assoc	background
Swinton,N.W.,Jr.; Rosen,B.J.; Shefer,A.L.; Leach,R.E.	1970	The carpal tunnel syndrome and multiple myeloma	Lahey.Clin Found.Bull	case report
Szabo,R.M.	2010	Perioperative antibiotics for carpal tunnel surgery	J Hand Surg Am	Narrative review
Szabo,R.M.; Chidgey,L.K.	1989	Stress carpal tunnel pressures in patients with carpal tunnel syndrome and normal patients	J Hand Surg Am	insufficient data; very low study design
Szabo,R.M.; Madison,M.	1992	Carpal tunnel syndrome	Orthop Clin North Am	Background article
Szabo,R.M.; Slater,R.R.,Jr.; Farver,T.B.; Stanton,D.B.; Sharman,W.K.	1999	The value of diagnostic testing in carpal tunnel syndrome	J Hand Surg Am	insufficient data; very low study design
Szczechowicz,J.; Pieniazek,M.; Pelczar-Pieniazek,M.	2008	Restoration of hand function and ability to perform activities of daily living following surgery for carpal tunnel syndrome	Ortop.Traumatol.Rehabil.	Results not completely in English
Szyluk,K.; Koczy,B.; Jasinski,A.; Widuchowski,J.; Widuchowski,W.	2006	Evaluation of results of single portal endoscopic carpal tunnel release	Ortop.Traumatol.Rehabil.	not in english
Szyluk,K.; Widuchowski,J.; Jasinski,A.; Koczy,B.; Widuchowski,W.	2006	Early results of surgical treatment for carpal tunnel syndrome using a single-portal endoscopic method	Ortop.Traumatol.Rehabil.	Not in English

Authors	Year	Article Title	Periodical	Reason for Exclusion
Tackmann,W.; Kaeser,H.E.; Magun,H.G.	1981	Comparison of orthodromic and antidromic sensory nerve conduction velocity measurements in the carpal tunnel syndrome	J Neurol	insufficient data; very low study design
Tackmann,W.; Lehmann,H.J.	1974	Relative refractory period of median nerve sensory fibres in the carpal tunnel syndrome	Eur.Neurol	<10 patients per group
Tagliafico,A.; Rubino,M.; Autuori,A.; Bianchi,S.; Martinoli,C.	2007	Wrist and hand ultrasound	Seminars in Musculoskeletal Radiology	Background Information
Tahririan,M.A.; Moghtaderi,A.; Aran,F.	2012	Changes in electrophysiological parameters after open carpal tunnel release	Adv.Biomed Res.	very low quality
Tai,T.W.; Wu,C.Y.; Su,F.C.; Chern,T.C.; Jou,I.M.	2012	Ultrasonography for diagnosing carpal tunnel syndrome: a meta-analysis of diagnostic test accuracy	Ultrasound Med Biol.	meta-analysis
Tait,P.	1976	Carpal tunnel syndrome. The physiotherapist's role	Nurs.Mirror Midwives J	background
Tajika,T.; Kobayashi,T.; Yamamoto,A.; Kaneko,T.; Takagishi,K.	2013	Diagnostic utility of sonography and correlation between sonographic and clinical findings in patients with carpal tunnel syndrome	J Ultrasound Med	insufficient data; very low study design
Talebi,G.A.; Oskouei,A.E.; Shakori,S.K.	2012	Reliability of upper limb tension test 1 in normal subjects and patients with carpal tunnel syndrome	J Back Musculoskelet.Rehabil.	insufficient data; very low study design
Talia,B.	1977	Lesions of the intra-operative carpal tunnel	Acta Thermographica	Background Information
Talia,B.; Landi,A.	1976	Intraoperative thermography in micro surgery: physiopathologic study of the carpal tunnel syndrome	Acta Thermographica	Background article
Tan,M.; Tan,U.	1998	Correlation of carpal tunnel size and conduction velocity of the sensory median and ulnar nerves of male and female controls and carpet weavers	Percept.Mot.Skills	all healthy subjects; no CTS diagnosis determined
Tanaka,H.; Hashizume,H.; McCown,C.; Senda,M.; Nishida,K.; Inoue,H.	2005	Accuracy of a portable electroneurometer for measuring distal motor latency	J Orthop Sci	+does not answer a question of interest; very low study design

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Tanaka,S.; Wild,D.K.; Seligman,P.J.; Halperin,W.E.; Behrens,V.J.; Putz-Anderson,V.	1995	Prevalence and work-relatedness of self-reported carpal tunnel syndrome among U.S. workers: analysis of the Occupational Health Supplement data of 1988 National Health Interview Survey	Am J Ind.Med	Not relevant, prevalence study
Tanaka,Shiro; McGlothlin,James D.	1993	A conceptual quantitative model for prevention of work-related carpal tunnel syndrome (CTS)	International Journal of Industrial Ergonomics	Background Information
Tardif,G.S.	1995	Nerve injuries: Testing and treatment tactics	Physician and Sportsmedicine	background
Tascioglu,F.; Degirmenci,N.A.; Ozkan,S.; Mehmetoglu,O.	2012	Low-level laser in the treatment of carpal tunnel syndrome: clinical, electrophysiological, and ultrasonographical evaluation	Rheumatol.Int.	Does not meet inclusion criteria (follow-up <l month)
Tasdelen,N.; Gurses,B.; Kilickesmez,O.; Firat,Z.; Karlikaya,G.; Tercan,M.; Ulug,A.M.; Gurmen,A.N.	2012	Diffusion tensor imaging in carpal tunnel syndrome	Diagn.Interv.Radiol.	insufficient data; very low study design
Tat,J.; Kociolek,A.M.; Keir,P.J.	2013	Repetitive differential finger motion increases shear strain between the flexor tendon and subsynovial connective tissue	J Orthop Res.	Not relevant to CTS
Tawfik,E.A.; El Zohiery,A.K.; Abaza,N.M.	2013	The second lumbrical-interossei latency difference in carpal tunnel syndrome: Is it a mandatory or a dispensable test?	Alexandria Journal of Medicine	insufficient data; very low study design
Tay,L.B.; Urkude,R.; Verma,K.K.	2006	Clinical profile, electrodiagnosis and outcome in patients with carpal tunnel syndrome: a Singapore perspective	Singapore Med J	+Does not answer a question of interest
Taylor,N.	1970	Clinical diagnosis of the carpal tunnel syndrome	Am Fam Physician GP.	background
Tchou,S.; Costich,J.F.; Burgess,R.C.; Wexler,C.E.	1992	Thermographic observations in unilateral carpal tunnel syndrome: report of 61 cases	J Hand Surg Am	insufficient data; very low study design
Teasell,R.W.; McClure,J.A.; Walton,D.; Pretty,J.; Salter,K.;	2010	A research synthesis of therapeutic interventions for whiplash-associated disorder (WAD): part 5 - surgical and	Pain Res.Manag.	Not relevant to CTS

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Meyer,M.; Sequeira,K.; Death,B.		injection-based interventions for chronic WAD		
Teitz,C.C.; DeLisa,J.A.; Halter,S.K.	1985	Results of carpal tunnel release in renal hemodialysis patients	Clin Orthop Relat Res.	very low study design
Tekeoglu,I.; Dogan,A.; Demir,G.; Dolar,E.	2007	The pneumatic compression test and modified pneumatic compression test in the diagnosis of carpal tunnel syndrome	J Hand Surg Eur.Vol.	insufficient data; very low study design
Tekin,I.; Mirzai,H.; Ok,G.	2005	Carpal tunnel release under intravenous regional anaesthesia with ropivacaine or lidocaine	Pain Clinic	Deemed clinically irrelevant
Teli,M.; Bidwell,J.; Kinninmonth,A.; Zoccali,C.	2005	Prevalence and treatment of carpal tunnel syndrome in renal haemodialysis	Chir Organi Mov	insufficient data; very low study design
Tennent,T.D.; Goddard,N.J.	1997	Carpal tunnel decompression: open vs endoscopic	Br J Hosp.Med	Background article
Terrono,A.L.	2005	Carpal tunnel syndrome in rheumatoid or inflammatory arthritic patients	Atlas of Hand Clinics	Background Information
Terzis,S.; Paschalis,C.; Metallinos,I.C.; Papapetropoulos,T.	1998	Early diagnosis of carpal tunnel syndrome: comparison of sensory conduction studies of four fingers	Muscle Nerve	insufficient data; very low study design
Tetro,A.M.; Evanoff,B.A.; Hollstien,S.B.; Gelberman,R.H.	1998	A new provocative test for carpal tunnel syndrome. Assessment of wrist flexion and nerve compression	J Bone Joint Surg Br	insufficient data; very low study design
Tetro,A.M.; Evanoff,B.A.; Hollstien,S.B.; Gelberman,R.H.	1998	A new provocative test for carpal tunnel syndrome	Journal of Bone and Joint Surgery - Series B	insufficient data; very low study design
Tezel,E.; Imer,B.; Numanoglu,A.	2002	Carpal tunnel release via limited palmar incision using rhinoplasty instruments	Marmara Medical Journal	Retrospective case series
Thal,H.U.	1998	Advantages and pitfalls of endoscopic versus open surgery of carpal ligament in carpal tunnel syndrome	Zentralbl.Neurochir.	Abstract/conference poster
Thoma,A.	2014	Methylprednisolone injections reduced carpal tunnel syndrome symptoms at 10 weeks and surgery at 1 year	Ann.Intern.Med	Duplicate study (AAOS ID 146)
Thoma,A.; Chew,R.T.; Sprague,S.; Veltri,K.	2006	Application of the CONSORT statement to randomized controlled	Can J Plast.Surg	systematic review

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		trials comparing endoscopic and open carpal tunnel release		
Thoma,A.; Veltri,K.; Haines,T.; Duku,E.	2004	A meta-analysis of randomized controlled trials comparing endoscopic and open carpal tunnel decompression	Plast.Reconstr.Surg	meta-analysis
Thoma,A.; Veltri,K.; Haines,T.; Duku,E.	2004	A systematic review of reviews comparing the effectiveness of endoscopic and open carpal tunnel decompression	Plast.Reconstr.Surg	Systematic review
Thomas,J.E.; Lambert,E.H.; Cseuz,K.A.	1967	Electrodiagnostic aspects of the carpal tunnel syndrome	Arch Neurol	+very low study design; not best evidence
Thomas,M.; Heron,C.	2008	Imaging of common nerve entrapment syndromes	CPD Journal Radiology Update	Background Information
Thomas,R.E.; Butterfield,R.K.; Hool,J.N.; Herrick,R.T.	1993	Effects of exercise on carpal tunnel syndrome symptoms	Appl Ergon.	Incorrect patient population (<10 patients/group)
Thompson,J.S.; Phelps,T.H.	1990	Repetitive strain injuries. How to deal with 'the epidemic of the 1990s'	Postgrad.Med	Background Information
Thomsen,J.F.; Gerr,F.; Atroshi,I.	2008	Carpal tunnel syndrome and the use of computer mouse and keyboard: a systematic review	BMC Musculoskelet.Disord.	systematic review
Thomsen,J.F.; Mikkelsen,S.	2003	Interview data versus questionnaire data in the diagnosis of carpal tunnel syndrome in epidemiological studies	Occup.Med (Lond)	very low study design
Thomsen,N.O.; Bjork,J.; Cederlund,R.I.	2014	Health-related quality of life 5 years after carpal tunnel release among patients with diabetes: a prospective study with matched controls	BMC Endocr.Disord.	Does not address question of interest
Thomsen,N.O.; Cederlund,R.; Rosen,I.; Bjork,J.; Dahlin,L.B.	2009	Clinical outcomes of surgical release among diabetic patients with carpal tunnel syndrome: prospective follow-up with matched controls	J Hand Surg Am	Does not address question of interest
Thomsen,N.O.; Cederlund,R.; Speidel,T.; Dahlin,L.B.	2011	Vibrotactile sense in patients with diabetes and carpal tunnel syndrome	Diabet.Med	all CTS cases; no comparison group

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Thomsen,N.O.; Cederlund,R.I.; Andersson,G.S.; Rosen,I.; Bjork,J.; Dahlin,L.B.	2014	Carpal tunnel release in patients with diabetes: a 5-year follow-up with matched controls	J Hand Surg Am	Does not address question of interest
Thomsen,N.O.; Rosen,I.; Dahlin,L.B.	2010	Neurophysiologic recovery after carpal tunnel release in diabetic patients	Clin Neurophysiol.	Does not address question of interest
Thonnard,J.; Saels,P.; Van den Bergh,P.; Lejeune,T.	1999	Effects of chronic median nerve compression at the wrist on sensation and manual skills	Exp.Brain Res.	insufficient data; very low study design
Thungen,T.; Sadowski,M.; El,Kazzi W.; Schuind,F.	2012	Value of Gilliat's pneumatic tourniquet test for diagnosis of carpal tunnel syndrome	Chir Main	+Does not answer a question of interest; insufficient data
Thurston,A.J.; Krause,B.L.	1988	The possible role of vascular congestion in carpal tunnel syndrome	J Hand Surg Br	<10 patients after exclusions
Tittiranonda,P.; Rempel,D.; Armstrong,T.; Burastero,S.	1999	Effect of four computer keyboards in computer users with upper extremity musculoskeletal disorders	Am J Ind.Med	Not exclusive to CTS; not best available evidence
Tobin,S.M.	1967	Carpal tunnel syndrome in pregnancy	Am J Obstet.Gynecol.	Incorrect patient population (<10 patients/group)
Tobin,W.E.; Jeffreys,D.E.	1973	Detection of carpal tunnel syndrome	Arch Phys Med Rehabil.	+Does not answer a question of interest; insufficient data
Todnem,K.; Lundemo,G.	2000	Median nerve recovery in carpal tunnel syndrome	Muscle Nerve	no patient oriented outcomes
Tolonen,U.; Kallio,M.; Ryhanen,J.; Raatikainen,T.; Honkala,V.; Lesonen,V.	2007	A handheld nerve conduction measuring device in carpal tunnel syndrome	Acta Neurol Scand.	clinician deemed insufficient methods; lack of training and proper reporting
Tomaino,M.M.; Weiser,R.W.	2001	Carpal tunnel release for advanced disease in patients 70 years and older: does outcome from the patient's perspective justify surgery?	J Hand Surg Br	Retrospective case series

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Tomlinson,P.J.; Field,J.	2010	Warm or refrigerated local anaesthetic for open carpal tunnel release: a single blind randomized controlled study	J Hand Surg Eur.Vol.	Deemed clinically irrelevant
Tommaso,M.; Libro,G.; Difruscolo,O.; Sardaro,M.; Serpino,C.; Calabrese,R.; Vecchio,E.; Livrea,P.	2009	Laser evoked potentials in carpal tunnel syndrome	Clinical neurophysiology : official journal of the International Federation of Clinical Neurophysiology	+Does not answer a question of interest
Toosi,K.K.; Impink,B.G.; Baker,N.A.; Boninger,M.L.	2011	Effects of computer keyboarding on ultrasonographic measures of the median nerve	Am J Ind.Med	biomechanical study; no diagnosis of CTS
Torpy,J.M.; Lynn,C.; Golub,R.M.	2011	JAMA patient page. Carpal tunnel syndrome		background
Torrens,M.J.	1995	Endoscopic neurosurgery	Neurosurgery Quarterly	Background article
Tortland,P.D.	2003	Nonsurgical management of carpal tunnel syndrome	Techniques in Orthopaedics	background
Totten,P.A.; Hunter,J.M.	1991	Therapeutic techniques to enhance nerve gliding in thoracic outlet syndrome and carpal tunnel syndrome	Hand Clin	Background article
Tountas,C.P.; MacDonald,C.J.; Meyerhoff,J.D.; Bihrl,D.M.	1983	Carpal tunnel syndrome. A review of 507 patients	Minn.Med	Very Low Quality
Townshend,D.N.; Taylor,P.K.; Gwynne-Jones,D.P.	2005	The outcome of carpal tunnel decompression in elderly patients	J Hand Surg Am	Retrospective case series
Toyonaga,K.; DeFaria,C.R.	1978	Electromyographic diagnosis of the carpal tunnel syndrome	Arq Neuropsiquiatr.	insufficient data; very low study design
Tremblay,F.; Mireault,A.C.; Letourneau,J.; Pierrat,A.; Bourrassa,S.	2002	Tactile perception and manual dexterity in computer users	Somatosens.Mot.Res.	Not relevant, prevalence study
Trimm,A.; Evans,J.H.	1966	Carpal tunnel syndrome. A note on conservative treatment		Retrospective case series
Trumble,T.E.; Gilbert,M.; McCallister,W.V.	2001	Endoscopic versus open surgical treatment of carpal tunnel syndrome	Neurosurg.Clin N.Am	background
Tsai,C.P.; Liu,C.Y.; Lin,K.P.; Wang,K.C.	2006	Efficacy of botulinum toxin type a in the relief of Carpal tunnel syndrome: A preliminary experience	Clin Drug Investig.	Incorrect patient population (<10 patients)
Tseng,C.-H.; Wang,P.-Y.	2000	Electrophysiological study of carpal tunnel syndrome	Acta Neurologica Taiwanica	insufficient data; very low study design

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Tsou,I.Y.Y.; Khoo,J.N.	2012	Ultrasound of the wrist and hand	Ultrasound Clinics	Background Information
Tsujii,M.; Hirata,H.; Morita,A.; Uchida,A.	2009	Palmar bowing of the flexor retinaculum on wrist MRI correlates with subjective reports of pain in carpal tunnel syndrome	J Magn Reson.Imaging	insufficient data; very low study design
Tucker,A.T.; White,P.D.; Kosek,E.; Pearson,R.M.; Henderson,M.; Coldrick,A.R.; Cooke,E.D.; Kidd,B.L.	2007	Comparison of vibration perception thresholds in individuals with diffuse upper limb pain and carpal tunnel syndrome		+Does not answer a question of interest
Turgut,F.; Cetinsahinahin,M.; Turgut,M.; Bolukbasi,O.	2001	The management of carpal tunnel syndrome in pregnancy	J Clin Neurosci.	Not relevant,does not answer the PICO question
Turgut,S.T.; Icagasioglu,A.; Selimoglu,E.; Atlig,R.S.; Adatepe,T.; Mesci,E.	2013	The relationship between electrodiagnostic findings and the DN4 questionnaire in patients with carpal tunnel syndrome	Journal of Musculoskeletal Pain	insufficient data; no comparison group
Turhanoglu,A.D.; Beyazova,M.	2003	Reaction time and movement time in patients with carpal tunnel syndrome: an electromyographic study	Clin Biomech.(Bristol., Avon.)	not best available evidence
Tuzuner,S.; Inceoglu,S.; Bilen,F.E.	2008	Median nerve excursion in response to wrist movement after endoscopic and open carpal tunnel release	J Hand Surg Am	Incorrect patient population (<10 patients/group)
Tuzuner,S.; Ozkaynak,S.; Acikbas,C.; Yildirim,A.	2004	Median nerve excursion during endoscopic carpal tunnel release		very low quality
Tzamaloukas,A.H.; Kunzelman,C.L.; Carroll,L.L.; Scremin,A.E.; Merlin,T.L.; Avasthi,P.S.; Bicknell,J.M.	1988	Carpel tunnel syndrome in patients on chronic hemodialysis	Dialysis and Transplantation	insufficient data; no comparison group
Tzeng,S.S.; Wu,Z.A.; Chu,F.L.	1990	Proximal slowing of nerve conduction velocity in carpal tunnel syndrome	Zhonghua Yi Xue Za Zhi (Taipei)	insufficient data; very low study design
UÅşar,B.Y.; -Demirta?-A; Bulut,M.; Azboy,I.; UÅşar,D.	2012	Carpal tunnel decompression: two different mini-incision techniques	Eur.Rev.Med.Pharmacol.Sci.	duplicate of PM:22696883
Ubogü,E.E.; Benatar,M.	2006	Electrodiagnostic criteria for carpal tunnel syndrome in axonal polyneuropathy	Muscle Nerve	not exclusive to CTS

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Uchiyama,S.; Imaeda,T.; Toh,S.; Kusunose,K.; Sawaizumi,T.; Wada,T.; Okinaga,S.; Nishida,J.; Omokawa,S.	2007	Comparison of responsiveness of the Japanese Society for Surgery of the Hand version of the carpal tunnel syndrome instrument to surgical treatment with DASH, SF-36, and physical findings	J Orthop Sci	+not best available evidence
Uchiyama,S.; Itsubo,T.; Yasutomi,T.; Nakagawa,H.; Kamimura,M.; Kato,H.	2005	Quantitative MRI of the wrist and nerve conduction studies in patients with idiopathic carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	insufficient data; very low study design
Uchiyama,S.; Yasutomi,T.; Fukuzawa,T.; Nakagawa,H.; Kamimura,M.; Kato,H.	2007	Reducing neurologic and vascular complications of endoscopic carpal tunnel release using a modified chow technique		very low quality
Uemura,T.; Hidaka,N.; Nakamura,H.	2010	Clinical outcome of carpal tunnel release with and without opposition transfer	J Hand Surg Eur.Vol.	very low quality
Ugurlu,U.; Ozkan,M.; Ozdogan,A.H.	2007	Development of a "Neuro-orthosis" for the control of wrist movements in patients with carpal tunnel syndrome: preliminary results	Conf.Proc.IEEE Eng Med Biol.Soc.	background
Ugurlu,U.; Ozkan,M.; Ozdogan,H.	2008	The development of a new orthosis (neuro-orthosis) for patients with carpal tunnel syndrome: its effect on the function and strength of the hand	Prosthet.Orthot.Int.	Very Low Quality
Ulasli,A.M.; Duymus,M.; Nacir,B.; Rana,Erdem H.; Kosar,U.	2013	Reasons for using swelling ratio in sonographic diagnosis of carpal tunnel syndrome and a reliable method for its calculation	Muscle Nerve	insufficient data; very low study design
Umbach,I.; Parent,A.	1990	Median and cubital nerve compression in paraplegics	Journal of Rehabilitation Sciences	not exclusive to CTS; no unexposed group
Uncini,A.; Di,Muzio A.; Awad,J.; Manente,G.; Tafuro,M.; Gambi,D.	1993	Sensitivity of three median-to-ulnar comparative tests in diagnosis of mild carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Uncini,A.; Di,Muzio A.; Cutarella,R.; Awad,J.; Gambi,D.	1990	Orthodromic median and ulnar fourth digit sensory conductions in mild carpal tunnel syndrome	Neurophysiol.Clin	insufficient data; very low study design

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Uncini,A.; Lange,D.J.; Solomon,M.; Soliven,B.; Meer,J.; Lovelace,R.E.	1989	Ring finger testing in carpal tunnel syndrome: a comparative study of diagnostic utility	Muscle Nerve	insufficient data; very low study design
Upatham,S.; Kumnerddee,W.	2008	Reliability of Thai version Boston questionnaire	J Med Assoc Thai.	+Does not answer a question of interest
Upton,A.R.; McComas,A.J.	1973	The double crush in nerve entrapment syndromes		not relevant
Upton,J.; Littler,J.W.; Eaton,R.G.	1979	Primary care of the injured hand, part 2	Postgrad.Med	Background information
Urbaniak,J.R.; Roth,J.H.	1982	Office diagnosis and treatment of hand pain	Orthop Clin North Am	Background Information
Uygun,F.; Sever,C.; Yuksel,F.	2009	Comparing the results of limited incision technique and standard longitudinal incision technique for carpal tunnel decompression by numerical grading system	Turk Neurosurg.	very low quality
Uzar,E.; Tamam,Y.; Acar,A.; Yucel,Y.; Palanci,Y.; Cansever,S.; Cevik,M.U.; Tasdemir,N.	2011	Sensitivity and specificity of terminal latency index and residual latency in the diagnosis of carpal tunnel syndrome	Eur.Rev.Med Pharmacol.Sci	insufficient data; no comparison group
Vahdatpour,B.; Raissi,G.R.; Hollisaz,M.T.	2007	Study of the ulnar nerve compromise at the wrist of patients with carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	Not relevant, prevalence study
Vaile,J.H.; Mathers,D.M.; Ramos-Remus,C.; Russell,A.S.	1999	Generic health instruments do not comprehensively capture patient perceived improvement in patients with carpal tunnel syndrome	J Rheumatol.	Very Low Quality
Valenta,L.J.	1975	Hyperparathyroidism due to parathyroid adenoma and carpal tunnel syndrome	Ann.Intern.Med	case report
Valls,J.; Llanas,J.M.	1988	Orthodromic study of the sensory fibers innervating the fourth finger	Muscle Nerve	insufficient data; very low study design
Valls-Sole,J.; Alvarez,R.; Nunez,M.	1995	Limited longitudinal sliding of the median nerve in patients with carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Van Beek,A.L.; Lim,P.	2003	Nerve compressions syndromes	Operative Techniques in Plastic and Reconstructive Surgery	Background Information

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van den Bekerom,M.P.; Breemans,E.; Schaffer,K.	2006	Outcome of open versus endoscopic approach for the surgical treatment of carpal tunnel syndrome	Acta Orthop Belg.	very low quality
van Dijk,M.A.; Reitsma,J.B.; Fischer,J.C.; Sanders,G.T.	2003	Indications for requesting laboratory tests for concurrent diseases in patients with carpal tunnel syndrome: a systematic review	Clin Chem.	systematic review
van Doesburg,M.H.; Henderson,J.; Yoshii,Y.; Mink van der Molen AB; Cha,S.S.; An,K.N.; Amadio,P.C.	2012	Median nerve deformation in differential finger motions: ultrasonographic comparison of carpal tunnel syndrome patients and healthy controls	J Orthop Res.	insufficient data; very low study design
van Rijn,R.M.; Huisstede,B.M.; Koes,B.W.; Burdorf,A.	2009	Associations between work-related factors and the carpal tunnel syndrome- a systematic review	Scand.J Work Environ.Health	systematic review
Van Ypersele de,Strihou C.; Jadoul,M.; Malghem,J.; Maldague,B.; Jamart,J.	1991	Effect of dialysis membrane and patient's age on signs of dialysis-related amyloidosis	Kidney Int.	Does not answer a question of interest; no comparison group
Vanwijck,R.; Bouillenne,C.	1986	HL-A and carpal tunnel syndrome	Clin Rheumatol.	bio-study; no comparison group
Varitimidis,S.E.; Herndon,J.H.; Sotereanos,D.G.	1999	Failed endoscopic carpal tunnel release. Operative findings and results of open revision surgery	J Hand Surg Br	Incorrect patient population (pre-existing invasive treated patients)
Vasen,A.P.; Kuntz,K.M.; Simmons,B.P.; Katz,J.N.	1999	Open versus endoscopic carpal tunnel release: a decision analysis	J Hand Surg Am	Decision analysis study
Vasiliadis,H.S.; Georgoulas,P.; Shrier,I.; Salanti,G.; Scholten,R.J.	2014	Endoscopic release for carpal tunnel syndrome	Cochrane Database Syst.Rev.	Systematic review
Vasiliadis,H.S.; Xenakis,T.A.; Mitsionis,G.; Paschos,N.; Georgoulis,A.	2010	Endoscopic versus open carpal tunnel release		very low quality
Vasiliadis,Haris S.; Georgoulas,Petros; Shrier,Ian; Salanti,Georgia; Scholten-Rob,J.P.M.	2014	Endoscopic release for carpal tunnel syndrome	Cochrane Database of Systematic Reviews	systematic review

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Vasiliadis,Haris S.; Sakellariidou,Maria Eleni; Shrier,Ian; Salanti,Georgia; Scholten-Rob,J.P.M.	2014	Open release for carpal tunnel syndrome	Cochrane Database of Systematic Reviews	systematic review
Vaughan,N.M.; Pease,W.S.	1997	Postoperative complications of carpal tunnel surgery	Phys.Med.Rehabil.Clin.N.Am.	Case report
Vellani,G.; Dallari,D.; Fatone,F.; Martella,D.; Bonomini,V.; Gualtieri,G.	1993	Carpal tunnel syndrome in hemodialyzed patients	Chir Organi Mov	no control group
Verdugo,R.J.; Salinas,R.A.; Castillo,J.L.; Cea,J.G.	2008	Surgical versus non-surgical treatment for carpal tunnel syndrome	Cochrane Database Syst.Rev.	Systematic review
Vergheze,J.; Galanopoulou,A.S.; Herskovitz,S.	2000	Autonomic dysfunction in idiopathic carpal tunnel syndrome	Muscle Nerve	all CTS cases; no comparison group
Verhagen,A.P.; Karels,C.; Bierma-Zeinstra,S.M.; Feleus,A.; Dahaghin,S.; Burdorf,A.; de Vet,H.C.; Koes,B.W.	2007	Ergonomic and physiotherapeutic interventions for treating work-related complaints of the arm, neck or shoulder in adults. A Cochrane systematic review	Eura.Medicophys.	Not relevant to CTS
Verhagen,A.P.; Karels,C.; Bierma-Zeinstra,S.M.; Feleus,A.; Dahaghin,S.; Burdorf,A.; Koes,B.W.	2007	Exercise proves effective in a systematic review of work-related complaints of the arm, neck, or shoulder	J Clin Epidemiol.	systematic review
Viegas,S.F.; Pollard,A.; Kaminski,K.	1992	Carpal arch alteration and related clinical status after endoscopic carpal tunnel release	J Hand Surg Am	Does not address question of interest
Viera,A.J.	2003	Management of carpal tunnel syndrome	Am Fam Physician	Background article
Vinik,A.I.; Emley,M.S.; Megerian,J.T.; Gozani,S.N.	2004	Median and ulnar nerve conduction measurements in patients with symptoms of diabetic peripheral neuropathy using the NC-Stat(registered trademark) system	Diabetes Technology and Therapeutics	Not relevant to CTS
Virokannas,H.	1995	Dose-response relation between exposure to two types of hand-arm vibration and sensorineural perception of vibration	Occup.Environ.Med	Not relevant to CTS

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Virokannas,H.	1992	Vibration perception thresholds in workers exposed to vibration	Int.Arch Occup.Environ.Health	Does not answer a question of interest
Visser,L.H.; Smidt,M.H.; Lee,M.L.	2008	High-resolution sonography versus EMG in the diagnosis of carpal tunnel syndrome	J Neurol Neurosurg.Psychiatry	insufficient data; healthy controls used for comparison
Vogelin,E.; Nuesch,E.; Juni,P.; Reichenbach,S.; Eser,P.; Ziswiler,H.R.	2010	Sonographic follow-up of patients with carpal tunnel syndrome undergoing surgical or nonsurgical treatment: prospective cohort study	J Hand Surg Am	no patient oriented outcomes
Vogt,T.; Scholz,J.	2002	Clinical outcome and predictive value of electrodiagnostics in endoscopic carpal tunnel surgery	Neurosurg.Rev.	very low quality
Voitk,A.J.; Mueller,J.C.; Farlinger,D.E.; Johnston,R.U.	1983	Carpal tunnel syndrome in pregnancy	Can Med Assoc J	Does not address question of interest
Waddell,D.E.; Wyvill,C.; Gregor,R.J.	2003	Upper extremity kinetics in poultry processing: A comparison between two different cutting tasks	Journal of Applied Biomechanics	<10 patients per group; does not answer a question of interest
Wade,J.	1976	Carpal tunnel syndrome. A patient's view	Nurs.Mirror Midwives J	background
Wadstroem,J.; Nigst,H.	1986	Reoperation for carpal tunnel syndrome. A retrospective analysis of forty cases	Ann.Chir Main	Incorrect patient population (pre-existing surgical intervention)
Waegeneers,S.; Haentjens,P.; Wylock,P.	1993	Operative treatment of carpal tunnel syndrome	Acta Orthop Belg.	Retrospective case series
Waersted,M.; Hanvold,T.N.; Veiersted,K.B.	2010	Computer work and musculoskeletal disorders of the neck and upper extremity: a systematic review	BMC Musculoskelet.Disord.	Not relevant to CTS
Wahbeh,H.; Elsas,S.M.; Oken,B.S.	2008	Mind-body interventions: applications in neurology		Not relevant to CTS
Wainapel,S.F.; Davis,L.; Rogoff,J.B.	1981	Electrodiagnostic study of carpal tunnel syndrome after Colles fracture	Am J Phys Med	all CTS cases; no comparison group
Walker,F.O.; Cartwright,M.S.; Blocker,J.N.; Arcury,T.A.; Suk,J.I.; Chen,H.;	2013	Prevalence of bifid median nerves and persistent median arteries and their association with carpal tunnel syndrome	Muscle Nerve	Not relevant, prevalence study

Authors	Year	Article Title	Periodical	Reason for Exclusion
Schultz,M.R.; Grzywacz,J.G.; Mora,D.C.; Quandt,S.A.		in a sample of Latino poultry processors and other manual workers		
Walters,C.; Rice,V.	2002	An evaluation of provocative testing in the diagnosis of carpal tunnel syndrome	Mil.Med	+not best available evidence
Walters,J.L.; Murray,N.M.F.	2001	Transcarpal motor conduction velocity in carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Walters,R.J.; Murray,N.M.	2001	Transcarpal motor conduction velocity in carpal tunnel syndrome	Muscle Nerve	no comparison group or reference standard
Wand,J.S.	1990	Carpal tunnel syndrome in pregnancy and lactation	J Hand Surg Br	Very low quality
Wand,J.S.	1989	The natural history of carpal tunnel syndrome in lactation	J R Soc.Med	Retrospective case series
Wang,A.A.; Hutchinson,D.T.; Vanderhooft,J.E.	2003	Bilateral simultaneous open carpal tunnel release: a prospective study of postoperative activities of daily living and patient satisfaction	J Hand Surg Am	Very low quality
Wang,A.A.; Whitaker,E.; Hutchinson,D.T.; Coleman,D.A.	2003	Pain levels after injection of corticosteroid to hand and elbow	Am J Orthop (Belle.Mead NJ)	Not exclusive to CTS
Wang,A.K.; Raynor,E.M.; Blum,A.S.; Rutkove,S.B.	1999	Heat sensitivity of sensory fibers in carpal tunnel syndrome	Muscle Nerve	+Does not answer a question of interest
Wang,C.K.; Jou,I.M.; Huang,H.W.; Chen,P.Y.; Tsai,H.M.; Liu,Y.S.; Lin,C.C.	2012	Carpal tunnel syndrome assessed with diffusion tensor imaging: comparison with electrophysiological studies of patients and healthy volunteers	Eur.J Radiol.	insufficient data; very low study design
Wang,L.Y.; Leong,C.P.; Huang,Y.C.; Hung,J.W.; Cheung,S.M.; Pong,Y.P.	2008	Best diagnostic criterion in high-resolution ultrasonography for carpal tunnel syndrome	Chang Gung Med J	insufficient data; very low study design
Wang,Y.J.; Yan,S.H.	2013	Improvement of Diagnostic Rate of Carpal Tunnel Syndrome with Additional Median-to-ulnar Comparative Nerve Conduction Studies	Acta Neurol Taiwan	insufficient data; very low study design
Waring III,W.P.; Werner,R.A.	1989	Clinical management of carpal tunnel syndrome in patients with long-term sequelae of poliomyelitis	Journal of Hand Surgery	+not best available evidence

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Waring,W.P.,III; Werner,R.A.	1989	Clinical management of carpal tunnel syndrome in patients with long-term sequelae of poliomyelitis	J Hand Surg Am	very low study design
Watanabe,T.; Sakakibara,N.; Sugimori,H.; Yabumoto,T.; Takeyama,T.; Takemura,M.; Seishima,M.; Matsuoka,T.	2012	Effect of long-term physical exercise of peripheral nerve: comparison of nerve conduction study and ultrasonography	J Sports Med Phys Fitness	Does not answer a question of interest
Watson,B.V.; Brown,W.F.; Doherty,T.J.	2006	Frequency-dependent conduction block in carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Watson,J.; DiBenedetto,M.; Gale,S.D.	2002	Mixed median nerve forearm conduction velocity in the presence of focal compression neuropathy at the wrist versus peripheral neuropathy	Arch Phys Med Rehabil.	insufficient data; very low study design
Watson,J.; Zhao,M.; Ring,D.	2010	Predictors of normal electrodiagnostic testing in the evaluation of suspected carpal tunnel syndrome	J Hand Microsurg.	insufficient information; very low study design
Watson,Jr	1985	Nonarthritic inflammatory problems of the hand and wrist	Emerg.Med.Clin.North Am.	background
Watts,A.C.; McEachan,J.	2005	The use of a fine-gauge needle to reduce pain in open carpal tunnel decompression: a randomized controlled trial	J Hand Surg Br	Deemed clinically irrelevant
Webber,J.B.	1981	Common pain syndromes: upper extremities		background
Weber,R.A.; Boyer,K.M.	2005	Consecutive versus simultaneous bilateral carpal tunnel release	Ann.Plast.Surg	Very low quality
Weber,R.A.; DeSalvo,D.J.; Rude,M.J.	2010	Five-year follow-up of carpal tunnel release in patients over age 65	J Hand Surg Am	very low quality
Weber,R.A.; Rude,M.J.	2005	Clinical outcomes of carpal tunnel release in patients 65 and older	J Hand Surg Am	very low quality
Wee,A.S.	2006	Carpal tunnel syndrome: comparison of the compound muscle action potentials recorded at the thenar region from ulnar and median nerve stimulation	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design

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Wee,A.S.	2002	Needle electromyography in carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	very low study design; recruitment based on test results
Wee,A.S.	2001	Carpal tunnel syndrome: a system for categorizing and grading electrophysiologic abnormalities	Electromyogr.Clin Neurophysiol.	no CTS
Weintraub,M.I.	1997	Noninvasive laser neurolysis in carpal tunnel syndrome	Muscle Nerve	Very Low Quality
Weirich,S.D.; Gelberman,R.H.	1993	Changing concepts in the diagnosis and treatment of carpal tunnel syndrome	Current Orthopaedics	background
Weis,S.; Stransky,G.; Dimitrov,L.; Wenger,E.; Neumuller,J.; Hakimzadeh,A.; Firmeis,F.; Partsch,G.; Eberl,R.	1987	Morphometric analysis of collagen fibrils in idiopathic carpal tunnel syndrome: Part 2	Exp.Cell Biol.	biopsy; <10 patients
Weiss,A.P.; Akelman,E.	1992	Carpal tunnel syndrome: a review	R I Med	review
Weiss,A.P.; Sachar,K.; Gendreau,M.	1994	Conservative management of carpal tunnel syndrome: a reexamination of steroid injection and splinting	J Hand Surg Am	Very Low Quality
Weiss,K.L.; Beltran,J.; Lubbers,L.M.	1986	High-field MR surface-coil imaging of the hand and wrist. Part II. Pathologic correlations and clinical relevance		<10 patients per group
Wellman,H.; Davis,L.; Punnett,L.; Dewey,R.	2004	Work-related carpal tunnel syndrome (WR-CTS) in Massachusetts, 1992-1997: source of WR-CTS, outcomes, and employer intervention practices	Am J Ind.Med	all CTS cases; no comparison group
Werner,C.O.; Elmqvist,D.; Ohlin,P.	1983	Pressure and nerve lesion in the carpal tunnel	Acta Orthop Scand.	insufficient data; no comparison group
Werner,R.A.; Albers,J.W.	1995	Relation between needle electromyography and nerve conduction studies in patients with carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data
Werner,R.A.; Albers,J.W.; Franzblau,A.; Armstrong,T.J.	1994	The relationship between body mass index and the diagnosis of carpal tunnel syndrome	Muscle Nerve	Not relevant, prevalence study
Werner,R.A.; Bir,C.; Armstrong,T.J.	1994	Reverse Phalen's maneuver as an aid in diagnosing carpal tunnel syndrome	Arch Phys Med Rehabil.	insufficient data; no comparison group

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Werner,R.A.; Franzblau,A.; Albers,J.W.; Armstrong,T.J.	1997	Influence of body mass index and work activity on the prevalence of median mononeuropathy at the wrist	Occup.Environ.Med.	Not relevant, CTS diagnosis not made
Werner,R.A.; Franzblau,A.; Albers,J.W.; Buchele,H.; Armstrong,T.J.	1997	Use of screening nerve conduction studies for predicting future carpal tunnel syndrome	Occup.Environ.Med.	Very low study design
Werner,R.A.; Gell,N.; Franzblau,A.; Armstrong,T.J.	2001	Prolonged median sensory latency as a predictor of future carpal tunnel syndrome	Muscle Nerve	Does not answer a question of interest
Werner,R.A.; Jacobson,J.A.; Jamadar,D.A.	2004	Influence of body mass index on median nerve function, carpal canal pressure, and cross-sectional area of the median nerve	Muscle Nerve	Not relevant,does not answer the PICO question
Werner,R.A.; Spiegelberg,T.	2012	Does the presence of the palmaris longus tendon influence median nerve function?	Muscle Nerve	insufficient data; very low study design
Werner,R.A.; Waring,W.P.; Maynard,F.M.	1993	Compression mononeuropathies in the post-polio population: A cross-sectional study	European Journal of Physical Medicine and Rehabilitation	Not relevant, prevalence study
Wertsch,J.J.; Melvin,J.	1982	Median nerve anatomy and entrapment syndromes: a review	Arch Phys Med Rehabil.	Background Information
Westbrook,A.P.; Tredgett,M.W.; Davis,T.R.; Oni,J.A.	2002	The rapid exchange grip strength test and the detection of submaximal grip effort	J Hand Surg Am	Does not address question of interest
Westerman,R.A.; Delaney,C.A.	1991	Palmar cold threshold test and median nerve electrophysiology in carpal tunnel compression neuropathy	Clin Exp.Neurol	insufficient data; very low study design
White,J.C.	1997	On the use of upper extremity proximal nerve action potentials in the localization of focal nerve lesions producing axonotmesis	Electromyogr.Clin Neurophysiol.	insufficient data; very low study design
White,J.C.; Hansen,S.R.; Johnson,R.K.	1988	A comparison of EMG procedures in the carpal tunnel syndrome with clinical-EMG correlations	Muscle Nerve	insufficient data; no confirmed diagnosis
White,R.	1984	Pain in the upper limb	Aust.Fam Physician	background
Whitley,J.M.; McDonnell,D.E.	1995	Carpal tunnel syndrome. A guide to prompt intervention	Postgrad.Med	background

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Wi,S.M.; Gong,H.S.; Bae,K.J.; Roh,Y.H.; Lee,Y.H.; Baek,G.H.	2014	Responsiveness of the Korean version of the Michigan Hand Outcomes Questionnaire after carpal tunnel release	Clin Orthop Surg	already CTS patients; responsiveness not diagnosis
Wiederien,R.C.; Feldman,T.D.; Heusel,L.D.; Loro,W.A.; Moore,J.H.; Ernst,G.P.; Allison,S.C.	2002	The effect of the median nerve compression test on median nerve conduction across the carpal tunnel	Electromyogr.Clin Neurophysiol.	<10 patients per group
Wieslander,G.; Norback,D.; Gothe,C.J.; Juhlin,L.	1989	Carpal tunnel syndrome (CTS) and exposure to vibration, repetitive wrist movements, and heavy manual work: a case-referent study	Br J Ind.Med	not best available evidence
Wiesler,E.R.; Chloros,G.D.; Cartwright,M.S.; Smith,B.P.; Rushing,J.; Walker,F.O.	2006	The use of diagnostic ultrasound in carpal tunnel syndrome	J Hand Surg Am	insufficient data; very low study design
Wiesman,I.M.; Novak,C.B.; Mackinnon,S.E.; Winograd,J.M.	2003	Sensitivity and specificity of clinical testing for carpal tunnel syndrome	Can J Plast.Surg	+not best available evidence
Wigley,R.D.	2004	Desk-edge syndrome: Median nerve injury proximal to the carpal tunnel	APLAR Journal of Rheumatology	insufficient data; no comparison group
Wilder Smith,E.P.; Chan,Y.H.; Kannan,T.A.	2007	Medial thenar recording in normal subjects and carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; very low study design
Wilder-Smith,E.P.; Ng,E.S.; Chan,Y.H.; Therimadasamy,A.K.	2008	Sensory distribution indicates severity of median nerve damage in carpal tunnel syndrome	Clin Neurophysiol.	insufficient data; no comparison group
Wilkinson,M.; Grimmer,K.; Massy-Westropp,N.	2001	Ultrasound of the carpal tunnel and median nerve: A reproducibility study	Journal of Diagnostic Medical Sonography	only healthy study subjects
Williams,A.M.; Baker,P.A.; Platt,A.J.	2008	The impact of dressings on recovery from carpal tunnel decompression	J Plast.Reconstr.Aesthet.Surg	Very low quality
Williams,N.	1993	WRULDs: Encouraging an ergonomic approach	Occup.Health (Lond).	Background information
Williams,T.M.; Mackinnon,S.E.; Novak,C.B.; McCabe,S.; Kelly,L.	1992	Verification of the pressure provocative test in carpal tunnel syndrome	Ann.Plast.Surg	insufficient data; very low study design
Wilson,G.	1998	Upper extremity complications in hemodialysis patients:	Dialysis and Transplantation	Background Information; review

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		Recommendations and a review of the literature		
Wilson,J.R.; Sumner,A.J.	1995	Immediate surgery is the treatment of choice for carpal tunnel syndrome	Muscle Nerve	editorial
Wilson-MacDonald,J.; Caughey,M.A.; Myers,D.B.	1984	Diurnal variation in nerve conduction, hand volume, and grip strength in the carpal tunnel syndrome	Br Med J (Clin Res.Ed)	<10 patients per group
Winn,F.J.,Jr.; Putz-Anderson,V.	1990	Vibration thresholds as a function of age and diagnosis of carpal tunnel syndrome: a preliminary report	Exp.Aging Res.	insufficient data; very low study design
Winn,F.J.; Morrissey,S.J.; Huechtker,E.D.	2000	Cross-sectional comparison of nerve conduction and vibration threshold testing: do screening tools for occupationally induced cumulative trauma disorders result in differing outcomes?	Disabil.Rehabil.	insufficient data; very low study design
Winn,Jr; Habes,D.J.	1990	Carpal tunnel area as a risk factor for carpal tunnel syndrome	Muscle Nerve	Not relevant,does not answer the PICO question
Winn,Jr; Morrissey,S.J.; Huechtker,E.D.	1999	Cross-sectional differences in nerve conduction in the Carpal tunnel syndrome	Journal of Occupational Rehabilitation	Does not answer a question of interest
Winn,Jr; Putz-Anderson,V.	1990	Vibration thresholds as a function of age and diagnosis of carpal tunnel syndrome: A preliminary report	Exp.Aging Res.	examines the effect of CTS on vibration threshold, instead of the effect of vibration threshold on CTS risk
Winzeler,S.; Rosenstein,B.D.	1997	Orthopedic problems of the upper extremities: Assessment and diagnosis	AAOHN J.	background
Wipperman,J.; Potter,L.	2012	Carpal tunnel syndrome-try these diagnostic maneuvers	J Fam Pract.	Background Information; case reports
Wissinger,H.A.	1975	Resection of the hook of the hamate. Its place in the treatment of median and ulnar nerve entrapment in the hand	Plast.Reconstr.Surg	Does not address question of interest

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Wolfe,H.L.	1995	One approach to acumoxa therapy for pain due to tendinitis of the hand, wrist, and forearm	American Journal of Acupuncture	Case report
Won,S.J.; Kim,B.J.; Park,K.S.; Yoon,J.S.; Choi,H.	2013	Reference values for nerve ultrasonography in the upper extremity	Muscle Nerve	only healthy study subjects
Wong,E.; Lee,G.; Zucherman,J.; Mason,D.T.	1995	Successful management of female office workers with "repetitive stress injury" or "carpal tunnel syndrome" by a new treatment modality--application of low level laser	Int.J Clin Pharmacol.Ther	Very Low Quality
Wong,K.C.; Hung,L.K.; Ho,P.C.; Wong,J.M.W.	2003	Carpal tunnel release	Journal of Bone and Joint Surgery - Series B	duplicate of PM:12931807
Wong,K.H.; Huq,N.S.; Nakhoda,A.	2013	Hand surgery using local anesthesia	Clin Plast.Surg	Background article
Wong,S.M.; Griffith,J.F.; Hui,A.C.; Tang,A.; Wong,K.S.	2002	Discriminatory sonographic criteria for the diagnosis of carpal tunnel syndrome	Arthritis Rheum.	insufficient data; very low study design
Wongsam,P.E.; Johnson,E.W.; Weinerman,J.D.	1983	Carpal tunnel syndrome: use of palmar stimulation of sensory fibers	Arch Phys Med Rehabil.	insufficient data; very low study design
Wood,M.R.	1980	Hydrocortisone injections for carpal tunnel syndrome		Very Low Quality
Wood,V.E.; Biondi,J.	1990	Double-crush nerve compression in thoracic-outlet syndrome	J Bone Joint Surg Am	no comparison group; not CTS exclusive
Worseg,A.P.; Kuzbari,R.; Korak,K.; Hocker,K.; Wiederer,C.; Tschabitscher,M.; Holle,J.	1996	Endoscopic carpal tunnel release using a single-portal system	Br J Plast.Surg	very low quality
Wraith,J.E.; Alani,S.M.	1990	Carpal tunnel syndrome in the mucopolysaccharidoses and related disorders	Arch Dis Child	+Does not answer a question of interest; very low study design
Wulle,C.	1996	The synovial flap as treatment of the recurrent carpal tunnel syndrome	Hand Clin	Retrospective case series
Wulle,C.	1987	Treatment of recurrence of the carpal tunnel syndrome	Ann.Chir Main	Retrospective case series
Wyatt,M.C.; Gwynne-Jones,D.P.; Veale,G.A.	2013	Lamb boning -- an occupational cause of carpal tunnel syndrome?	J Hand Surg Eur.Vol.	confounded comparisons; conflict of interest

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Xu,L.; Huang,F.; Hou,C.	2011	Treatment for carpal tunnel syndrome by coronal Z-type lengthening of the transverse carpal ligament	J Pak.Med Assoc	Inadequate reporting and use of unvalidated scales.
Yalcin,E.; Onder,B.; Selcuk,B.; Ozer,N.; Kurtaran,A.; Yildirim,M.O.; Akyuz,M.	2013	The upper extremity neuropathies in turkish wheelchair users and the additive/alternative value of ultrasonography to the evaluation of entrapments	Neurosurgery Quarterly	Does not answer a question of interest
Yalcin,E.; Onder,B.; Selcuk,B.; Ozer,N.; Kurtaran,A.; Yildirim,M.O.; Akyuz,M.	2014	The upper extremity neuropathies in turkish wheelchair users and the additive/alternative value of ultrasonography to the evaluation of entrapments	Neurosurgery Quarterly	prevalence study; not CTS exclusive
Yao,L.; Gai,N.	2009	Median nerve cross-sectional area and MRI diffusion characteristics: normative values at the carpal tunnel	Skeletal Radiol.	only healthy study subjects
Yassi,A.	2000	Work-related musculoskeletal disorders	Curr.Opin.Rheumatol.	Background Information
Yates,S.K.; Hurst,L.N.; Brown,W.F.	1981	Physiological observations in the median nerve during carpal tunnel surgery	Ann.Neurol	Incorrect patient population (N<10 patients)
Yates,S.K.; Yaworski,R.; Brown,W.F.	1981	Relative preservation of lumbrical versus thenar motor fibres in neurogenic disorders	J Neurol Neurosurg.Psychiatry	+Does not answer a question of interest; not CTS exclusive
Yazgan,P.; Simsek,Z.; Orhan,I.; Beachy,L.; Ozul,Y.; Kurcer,M.A.	2009	The reliability and cross-cultured adaptation of the Boston questionnaire; in Turkish illiterate patients	Turkish Journal of Rheumatology	+Does not answer a question of interest
Yemisci,O.U.; Yalbuzzdag,S.A.; Cosar,S.N.; Oztop,P.; Karatas,M.	2011	Ulnar nerve conduction abnormalities in carpal tunnel syndrome	Muscle Nerve	insufficient data; very low study design
Yeo,K.Q.; Yeo,E.M.	2007	Comparison of the results of open carpal tunnel release and KnifeLight carpal tunnel release	Singapore Med J	very low quality
Yeo,K.Q.; Yeo,E.M.N.	2007	Comparison of the results of open carpal tunnel release and KnifeLight(registered trademark) carpal tunnel release	Singapore Med.J.	duplicate reference

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Yesildag,A.; Kutluhan,S.; Sengul,N.; Koyuncuoglu,H.R.; Oyar,O.; Guler,K.; Gulsoy,U.K.	2004	The role of ultrasonographic measurements of the median nerve in the diagnosis of carpal tunnel syndrome	Clin Radiol.	insufficient data; very low study design
Yiannakopoulos,C.K.	2004	Carpal ligament decompression under local anaesthesia: the effect of lidocaine warming and alkalinisation on infiltration pain	J Hand Surg Br	Deemed clinically irrelevant
Yii,N.W.; Elliot,D.	1994	A study of the dynamic relationship of the lumbrical muscles and the carpal tunnel	J Hand Surg Br	case report
Yilmaz,N.; Akdemir,G.; Gezici,A.R.; Basmaci,M.; Ergungor,M.F.; Asalanturk,Y.; Beskonakli,E.; Ucar,D.	2010	Electrophysiological and clinical assessment of response to surgery in carpal tunnel	Int.J Neurosci.	very low quality
Yoon,J.S.; Won,S.J.; Yang,S.N.; Kang,H.J.	2012	Nerve cross-sectional area reference values in upper extremity ultrasonography	Muscle Nerve	abstract; no text
Yorulmaz,S.; Turk,U.; Yorulmaz,F.	1994	Carpal tunnel syndrome in pregnancy: A prospective clinical study	Journal of Maternal-Fetal Investigation	Very low quality
Yoshida,A.; Okutsu,I.; Hamanaka,I.	2010	A new diagnostic provocation test for carpal tunnel syndrome: Okutsu test	Hand Surg	+Does not answer a question of interest; insufficient data
Yoshida,A.; Okutsu,I.; Hamanaka,I.; Motomura,T.	2004	Results of endoscopic management of primary versus recurrent carpal tunnel syndrome in long-term haemodialysis patients	Hand Surg	very low quality
Yoshii,Y.; Ishii,T.; Sakai,S.	2013	Median nerve deformation during finger motion in carpal tunnel syndrome: correlation between nerve conduction and ultrasonographic indices	Hand Surg	insufficient data; very low study design
Yoshii,Y.; Ishii,T.; Tung,W.L.; Sakai,S.; Amadio,P.C.	2013	Median nerve deformation and displacement in the carpal tunnel during finger motion	J Orthop Res.	insufficient data; very low study design
You,D.; Smith,A.H.; Rempel,D.	2014	Meta-analysis: association between wrist posture and carpal tunnel syndrome among workers	Saf Health Work	meta-analysis

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You,H.; Simmons,Z.; Freivalds,A.; Kothari,M.J.; Naidu,S.H.	1999	Relationships between clinical symptom severity scales and nerve conduction measures in carpal tunnel syndrome	Muscle Nerve	+Does not answer a question of interest
Young,V.L.; Seaton,M.K.; Feely,C.A.; Arfken,C.; Edwards,D.F.; Baum,C.M.; Logan,S.	1995	Detecting cumulative trauma disorders in workers performing repetitive tasks	Am.J.Ind.Med.	Not relevant to CTS
Younger,D.S.	2004	Entrapment neuropathies	Primary Care - Clinics in Office Practice	background
Ysla,R.; McAuley,R.	1985	Effects of low power infra-red laser stimulation on carpal tunnel syndrome: a double blind study	Archives of Physical Medicine and Rehab	Insufficient data (conference abstract)
Yu,J.; Bendler,E.M.; Mentari,A.	1979	Neurological disorders associated with carpal tunnel syndrome	Electromyogr.Clin Neurophysiol.	all CTS cases; no comparison group
Yucel,A.; Yilmaz,O.; Babaoglu,S.; Acar,M.; Degirmenci,B.	2008	Erratum to "Sonographic findings of the median nerve and prevalence of carpal tunnel syndrome in patients with Parkinson's disease" [Eur. J. Radiol. 67 (3) (2008) 546-550]	Eur.J Radiol.	Does not answer a question of interest; prevalence study
Yucel,A.; Yilmaz,O.; Babaoglu,S.; Acar,M.; Degirmenci,B.	2008	Erratum to "Sonographic findings of the median nerve and prevalence of carpal tunnel syndrome in patients with Parkinson's disease" [Eur. J. Radiol. 67 (3) (2008) 546-550] (DOI:10.1016/j.ejrad.2007.08.001)	Eur.J.Radiol.	duplicate of pmid 19189431
Yuen,A.; Dowling,G.; Johnstone,B.; Kornberg,A.; Coombs,C.	2007	Carpal tunnel syndrome in children with mucopolysaccharidoses	J Child Neurol	<10 patients per group; no comparison group
Zagnoli,F.; Andre,V.; Le,Dreff P.; Garcia,J.F.; Bellard,S.	1999	Idiopathic carpal tunnel syndrome. Clinical, electrodiagnostic, and magnetic resonance imaging correlations	Rev.Rhum.Engl.Ed	insufficient data; very low study design
Zaher,A.A.; Mattar,M.A.; Gomaa,M.; Zaher,A.A.	2012	Value of contemporary investigation tools in management of carpal tunnel syndrome	Egyptian Journal of Neurology, Psychiatry and Neurosurgery	insufficient data; no comparison group

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Zakaria,D.	2004	Rates of carpal tunnel syndrome, epicondylitis, and rotator cuff claims in Ontario workers during 1997	Chronic Dis Can	+Does not answer a question of interest
Zalaffi,A.; Mariottini,A.; Carangelo,B.; Buric,J.; Muzii,V.F.; Alexandre,A.; Palma,L.; Rovere,A.	2005	Wrist median nerve motor conduction after end range repeated flexion and extension passive movements in Carpal Tunnel Syndrome. Pilot study	Acta Neurochir.Suppl	+Does not answer a question of interest
Zambelis,T.; Tsigvoulis,G.; Karandreas,N.	2010	Carpal tunnel syndrome: associations between risk factors and laterality	Eur.Neurol	all CTS cases; no comparison group
Zambello,A.; Fumagalli,L.; Fara,B.; Bianchi,M.M.	2008	Oxygen-ozone treatment of carpal tunnel syndrome. Retrospective study and literature review of conservative and surgical techniques	International Journal of Ozone Therapy	Narrative review
Zanette,G.; Marani,S.; Tamburin,S.	2006	Extra-median spread of sensory symptoms in carpal tunnel syndrome suggests the presence of pain-related mechanisms		all CTS cases; no comparison group
Zavela	2011	Erratum: Acupuncture treatment for carpal tunnel syndrome (Medical Acupuncture (2010) 22: 4 (276) DOI: 10.1089/acu.2010.0752)	Medical Acupuncture	Not a study (correction of a study)
Zaza,C.; Fleischer,M.S.; Maine,F.W.; Mechefske,C.	2000	Beating injury with a different drumstick: A pilot study	Medical Problems of Performing Artists	review; not a full structured study
Zelouf,D.S.; Posner,M.A.	1995	Hand and wrist disorders: How to manage pain and improve function		Background Information
Zetterberg,C.; Ofverholm,T.	1999	Carpal tunnel syndrome and other wrist/hand symptoms and signs in male and female car assembly workers	International Journal of Industrial Ergonomics	not best available evidence for most risk factors. the workstation analysis for work risk factors was not adequately presented for inclusion in the guideline. this analysis was more fully presented in another paper

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Zhang,W.; Johnston,J.A.; Ross,M.A.; Sanniec,K.; Gleason,E.A.; Dueck,A.C.; Santello,M.	2013	Effects of carpal tunnel syndrome on dexterous manipulation are grip type-dependent	PLoS One	+Does not answer a question of interest; Investigates development of comorbidity rather than CTS development
Zidan,S.; Tantawy,H.; Fouda,N.; Ali,M.	2013	The value of power and pulsed Doppler in the diagnosis of CTS: Is a solution in sight	Egyptian Journal of Radiology and Nuclear Medicine	insufficient data; very low study design
Zimmerman,G.R.	1994	Carpal tunnel syndrome	J Athl.Train.	background
Zlatkin,M.B.; Greenan,T.	1992	Magnetic resonance imaging of the wrist	Magn Reson.Q.	background
Zuo,D.; Zhou,Z.; Wang,H.; Liao,Y.; Zheng,L.; Hua,Y.; Cai,Z.	2015	Endoscopic versus open carpal tunnel release for idiopathic carpal tunnel syndrome: a meta-analysis of randomized controlled trials	J Orthop Surg Res	Meta-analysis
Zyluk,A.	2013	Carpal tunnel syndrome in pregnancy: a review	Pol.Orthop Traumatol.	Narrative review
Zyluk,A.; Kosovets,L.	2010	An assessment of the sympathetic function within the hand in patients with carpal tunnel syndrome	J Hand Surg Eur.Vol.	+Does not answer a question of interest; very low study design
Zyluk,A.; Piotuch,B.	2011	A Comparison of DASH, PEM and Levine questionnaires in outcome measurement of carpal tunnel release	Handchir.Mikrochir.Plast.Chir	very low quality
Zyluk,A.; Puchalski,P.	2013	A comparison of outcomes of carpal tunnel release in diabetic and non-diabetic patients	J Hand Surg Eur.Vol.	Retrospective case series (exposure status irrelevant after CT release)
Zyluk,A.; Puchalski,P.	2013	A comparison of the results of carpal tunnel release in patients in different age groups	Neurol Neurochir.Pol.	Retrospective case series (age as comparison not applicable)
Zyluk,A.; Szlosser,Z.	2013	The results of carpal tunnel release for carpal tunnel syndrome diagnosed on clinical grounds, with or without electrophysiological investigations: a randomized study	J Hand Surg Eur.Vol.	very low quality

Authors	Year	Article Title	Periodical	Reason for Exclusion
Zyluk,A.; Walaszek,I.	2012	The effect of the involvement of the dominant or non-dominant hand on grip/pinch strengths and the Levine score in patients with carpal tunnel syndrome	J Hand Surg Eur.Vol.	Retrospective case series
Zyluk,A.; Walaszek,I.; Szlosser,Z.	2014	No correlation between sonographic and electrophysiological parameters in carpal tunnel syndrome	J Hand Surg Eur.Vol.	+Does not answer a question of interest; insufficient data
Zyluk,A.; Walaszek,I.; Szlosser,Z.	2014	Does ultrasonography contribute significantly to the diagnosis of carpal tunnel syndrome?	Handchir.Mikrochir.Plast Chir	case control; CTS and healthy

APPENDIX XIII

LETTERS OF ENDORSEMENT FROM EXTERNAL ORGANIZATIONS



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Chicago, IL

December 15, 2015

David Teuscher, MD

Dear Dr. Teuscher:

During the recent Council meeting of the ASSH last week, we considered the AAOS draft of the Clinical Practice Guidelines for Carpal Tunnel Syndrome. In addition to all the information provided by the Academy, Charles Goldfarb, MD, chair of our Evidence-based Practice Committee, provided a detailed evaluation of the guidelines.

After discussion, the ASSH Council approved endorsement of these guidelines. Please let us know if you need any other opinion or response from us.

Yours sincerely,

Neil F. Jones, MD
President

cc: Kevin Bozic, MD
Karen Hackett, FASAE, CAE
Deborah Cummins
Jeffrey Greenberg, MD, Practice Division Director
Mark C. Anderson, FASAE, CAE, EVP



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May 12, 2016

Kevin Shea, MD
American Academy of Orthopaedic Surgeons
Intermountain Orthopaedics
600 N. Robbins Rd., Ste. 400
Boise, ID 83702

Dear Dr. Shea,

The American Society of Plastic Surgeons has voted to endorse the AAOS Clinical Practice Guideline on the Management of Carpal Tunnel Syndrome. This endorsement implies permission for the AAOS to officially list our organization as an endorser of this guideline and reprint our logo in the introductory section of the guideline document.

Sincerely,

David H. Song, MD, MBA, FACS
President

cc: Andrea Pusic, MD, MHS, FACS, FRCSC
William Wooden, MD, FACS
Keith M. Hume, MA
Carol Sieck, RN, MSN
Lauren Loeding, MPH



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Chief Executive Officer

Phone: 703-648-8901
Fax: 703-648-3997
Email: wthorwarth@acr.org

March 15, 2016

Erica Linskey
Administrative Assistant, Evidence-Based Medicine Unit
American Academy of Orthopedic Surgeons
9400 West Higgins Road
Rosemont, Illinois 60018

Dear Ms. Linskey,

The Board of Chancellors of the American College of Radiology hereby endorses 2015 AAOS Clinical Practice Guideline on the Management of Carpal Tunnel Syndrome effective February 26, 2016. We look forward to working with you in the future.

Sincerely,

William T. Thorwarth Jr., MD, FACR
Chief Executive Officer

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March 2, 2016

American Academy of Orthopaedic Surgeons
9400 West Higgins Road
Rosemont, Illinois 60018-4976

ATTN: Kevin Shea, MD
AAOS Clinical Practice Guidelines Section Leader
of the Committee on Evidence-Based Quality and Value

Dear Kevin Shea, MD,

The American College of Surgeons has voted to endorse the AAOS Clinical Practice Guideline on the Management of Carpal Tunnel Syndrome. This endorsement implies permission for the AAOS to officially list our organization as an endorser of this guideline and reprint our logo in the introductory section of the guideline document.

Sincerely,

David B. Hoyt, MD, FACS
Executive Director

March 28, 2017

Kevin Shea, M.D.
American Academy of Orthopaedic Surgeons
Clinical Practice Guidelines Section Leader
of the Committee on Evidence-Based Quality and Value
9400 West Higgins Road
Rosemont, Illinois 60018

Dear Dr. Shea,

Thank you for providing the American Society of Anesthesiologists (ASA) the opportunity to review the American Academy of Orthopaedic Surgeons (AAOS) Clinical Practice Guideline on the *Management of Carpal Tunnel Syndrome*. I am pleased to share that ASA's leadership has approved ASA's endorsement of the Clinical Practice Guideline on the *Management of Carpal Tunnel Syndrome*.

The following parties reviewed the document: ASA's Committee on Regional Anesthesia, Administrative Council and Board of Directors.

ASA's Committee on Regional Anesthesia looks forward to providing input on subsequent versions of the guideline if requested. Thank you again for the opportunity to collaborate with AAOS and participate in the review of this Clinical Practice Guideline.

Sincerely,

A handwritten signature in cursive script, reading "Jeffrey Plagenhoef, M.D.", with a stylized flourish at the end.

Jeffrey Plagenhoef, M.D.
President
American Society of Anesthesiologists