AAOS
American Academy of Orthopaedic Surgeons

Management of Osteoarthritis of the Hip

Evidence-Based Clinical Practice Guideline

Adopted by:
The American Academy of Orthopaedic Surgeons Board of Directors
March 13, 2017

Endorsed by:

ACR® American College of Radiology
Quality is Our Image

POSNA Pediatric Orthopaedic Society of North America

APTA American Physical Therapy Association

American Society of Anesthesiologists®

Please cite this guideline as:
American Academy of Orthopaedic Surgeons Management of Osteoarthritis of the Hip Evidence-Based Clinical Practice Guideline. aaos.org/oahcpg Published March 13, 2017

Disclaimer

This Clinical Practice Guideline was developed by an AAOS physician volunteer Guideline development group based on a systematic review of the current scientific and clinical information and accepted approaches to treatment and/or diagnosis. This Clinical Practice Guideline is not intended to be a fixed protocol, as some patients may require more or less treatment or different means of diagnosis. Clinical patients may not necessarily be the same as those found in a clinical trial. Patient care and treatment should always be based on a clinician's independent medical judgment, given the individual patient's clinical circumstances.

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.

Funding Source

This Clinical Practice Guideline was funded exclusively by the American Academy of Orthopaedic Surgeons who received no funding from outside commercial sources to support the development of this document.

FDA Clearance

Some drugs or medical devices referenced or described in this Clinical Practice Guideline may not have been cleared by the Food and Drug Administration (FDA) or may have been cleared for a specific use only. The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or device he or she wishes to use in clinical practice.

Published 3/13/17 by the American Academy of Orthopaedic Surgeons
9400 West Higgins Rd.
Rosemont, IL 60018
First Edition

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SUMMARY OF RECOMMENDATIONS

The following is a summary of the recommendations of the AAOS Clinical Practice Guideline on the Management of Osteoarthritis of the Hip. 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.	

RISK ASSESSMENT TOOLS

Moderate strength evidence supports that the practitioner could use risk assessment tools to assist in predicting adverse events, assessing surgical risks and educating patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty.

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.

OBESITY AS A RISK FACTOR

a) **Moderate strength evidence supports that obese patients with symptomatic osteoarthritis of the hip, when compared to non-obese patients, may achieve lower absolute outcome scores but a similar level of patient satisfaction and relative improvement in pain and function after total hip arthroplasty.**

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 strength evidence supports that obese patients with symptomatic osteoarthritis of the hip, when compared to non-obese patients, have increased incidence of postoperative dislocation, superficial wound infection, and blood loss after total hip arthroplasty.**

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.*

AGE AS A RISK FACTOR

a) **Moderate strength evidence supports that increased age is associated with lower functional and quality of life outcomes in patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty.**

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 strength evidence supports that increased age may be associated with a higher risk of mortality in patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty.**

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.*

c) **Limited strength evidence supports that younger age may be associated with a higher risk of revision in patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty.**

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.*

MENTAL HEALTH DISORDER AS A RISK FACTOR

Moderate strength evidence supports that mental health disorders, such as depression, anxiety, and psychosis, are associated with decreased function, pain relief, and quality of life outcomes in patients with symptomatic osteoarthritis of the hip who undergo total hip arthroplasty (THA).

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.

TOBACCO USE

Limited strength evidence supports that patients who use tobacco products are at an increased risk for complications after total hip arthroplasty.

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.

NON-NARCOTIC MANAGEMENT

Strong evidence supports that NSAIDs improve short-term pain, function, or both in patients with symptomatic osteoarthritis of the hip.

Strength of Recommendation: Strong Evidence 

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

GLUCOSAMINE SULFATE

Moderate strength evidence does not support the use of glucosamine sulfate because it did not perform better than placebo for improving function, reducing stiffness and decreasing pain for patients with symptomatic osteoarthritis of the hip.

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.

INTRAARTICULAR INJECTABLES

a) Strong evidence supports the use of intraarticular corticosteroids to improve function and reduce pain in the short-term for patients with symptomatic osteoarthritis of the hip.

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) Strong evidence does not support the use of intraarticular hyaluronic acid because it does not perform better than placebo for function, stiffness, and pain in patients with symptomatic osteoarthritis of the hip.

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 THERAPY AS A CONSERVATIVE TREATMENT

Strong evidence supports the use of physical therapy as a treatment to improve function and reduce pain for patients with osteoarthritis of the hip and mild to moderate symptoms.

Strength of Recommendation: Strong Evidence 

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

PREOPERATIVE PHYSICAL THERAPY

Limited evidence supports the use of pre-operative physical therapy to improve early function in patients with symptomatic osteoarthritis of the hip following total hip arthroplasty.

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.*

ANESTHETIC TYPES

Limited evidence supports the use of neuraxial anesthesia compared to general anesthesia to reduce complications in patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty.

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.*

TRANEXAMIC ACID

Moderate strength evidence supports that the practitioner could use intravenous or topical tranexamic acid for patients with symptomatic osteoarthritis of the hip who are undergoing total hip arthroplasty (THA) as a part of the effort to reduce blood loss.

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.

APPROACH EXPOSURE

Moderate strength evidence supports that there were no clinically significant differences in patient oriented outcomes related to the surgical approach for patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty.

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 PHYSICAL THERAPY

Moderate evidence supports the use of post-operative physical therapy because it could improve early function to a greater extent than no physical therapy management for patients with symptomatic osteoarthritis of the hip who have undergone total hip arthroplasty.

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.

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INTRODUCTION

OVERVIEW

This clinical practice guideline is based on a systematic review of peer-reviewed articles published from January 1, 1990 to April 15th, 2016 with regard to the management of osteoarthritis of the hip in patients over the age of 18 years. The guideline development group opted to include more contemporary literature to make our conclusions as relevant as possible to the current practice of orthopaedic surgeons. 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 management of osteoarthritis of the hip. It is also intended to serve as an information resource for decision makers and developers of practice guidelines and recommendations.

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 management of hip osteoarthritis in adults. The systematic review detailed herein was conducted between January 1990 and April 2016 and demonstrates where there is good evidence, where evidence is lacking, and what topics future research must target in order to improve the management of adult patients (defined as age 18 years or older) with osteoarthritis of the hip. 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 a variety of 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 adult patients with osteoarthritis of the hip. Typically, orthopaedic surgeons will have completed medical training, a qualified residency in orthopaedic surgery, and some may have completed additional sub-specialty training. Anesthesiologists, rheumatologists, physiatrists, adult primary care physicians, geriatricians, hospital based adult medicine specialists, physical therapists, occupational therapists, nurse practitioners, physician assistants, emergency physicians, and other healthcare professionals who routinely see this type of patient in various practice settings may also benefit from this guideline. This guideline and its individual recommendations are not intended for use as a stand-alone benefits determination document. Making these determinations involves many factors not considered in the present document, including

available resources, business and ethical considerations, cost/benefit analysis, risk/harms analysis, and need.

Hip osteoarthritis management is based on the assumption that decisions are predicated on the patient and/or the patient's qualified heath care advocate having communication with the physician about 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.

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

PATIENT POPULATION

This document addresses the management osteoarthritis of the hip in adult patients defined as those 18 years of age and older. It is not intended to address management of pediatric patients with osteoarthritis or patients with inflammatory arthritis or osteonecrosis of the hip.

BURDEN OF DISEASE

The burden of osteoarthritis (OA) of the hip is largely attributable to the effects of disability, comorbid disease, and the expense of treatment. OA is the most frequent cause of disability among adults in the United States (US), and the burden is increasing both as the prevalence of OA increases and also as patient expectations for treatment rise. Twenty seven million adults (more than 10 percent) of the US adult population had clinical osteoarthritis (OA) in 2005, and in 2009 OA was the fourth most common cause of hospitalization (Murphy & Helmick, 2012).

OA is the leading indication for joint replacement surgery; 905,000 knee and hip replacements were performed in 2009 at a cost of 42.3 billion dollars (Murphy & Helmick, 2012). Estimated trends in hip replacement procedures from 1992 to 2010 or 2011 show a steady increase in all types of replacements, with total hip replacements more than doubling by 2010/2011 (USBJI, 2014).

Costs to be considered include:
1.Direct Medical Cost
2.Long-term Medical Cost
3.Home Modification Costs
4.Nursing Home Costs

ETIOLOGY

Patients who require surgical treatment for osteoarthritis of the hip have developed the condition naturally over time due to a variety of risk factors or in an accelerated fashion due to prior trauma about the hip. Osteoarthritis is the imbalance of breakdown and repair of tissues within a synovial joint. The etiology of osteoarthritis is varied and includes genetic factors, trauma, femoral and acetabular morphology, overuse, and infection.

INCIDENCE AND PREVALENCE

Twenty-seven million adults (more than 10 percent) of the US adult population had clinical osteoarthritis (OA) in 2005, and in 2009 OA was the fourth most common cause of hospitalization (Murphy & Helmick, 2012).

With rising life expectancy, it is estimated that the prevalence of hip osteoarthritis will continue to increase. The number of people older than age 65 years is expected to increase from 37.1 million to 77.2 million by the year 2040.

RISK FACTORS

Factors that increase the risk for developing osteoarthritis of the hip such that surgical treatment is required include joint degeneration over time due to hereditary vulnerability, femoral and acetabular bone morphology, large body mass, certain occupations, and past trauma affecting the joint or subchondral bone adjacent to the joint. For information regarding the evidence base behind various risk factors, please refer to the recommendations within this document regarding risk stratification.

EMOTIONAL AND PHYSICAL IMPACT

Older adults with self-reported osteoarthritis of the hip visit their physicians more frequently and experience greater functional limitations than others in the same age group. Pre-operatively patients who have moderate to severe osteoarthritis of the hip requiring surgery experience:

1. Inability to return to prior living circumstances
2. Need for increased level of care and supervision
3. Decreased quality of life
4. Decreased level of mobility and ambulation

POTENTIAL BENEFITS, HARMS, AND CONTRAINDICATIONS

The benefits of surgical treatment of osteoarthritis of the hip include relief of pain and improved function. Most invasive operative treatments, primarily arthroplasty, are associated with known risks.

Early postoperative complications include periprosthetic infection, venous thromboembolic disease, dislocation, fracture, and pain. Late postoperative complications include infection, aseptic component loosening, and pain. All can lead to a need for revision arthroplasty.

Contraindications are relative and require an in depth discussion with the patient and physician (surgeon, anesthesiologist) about their individual risk factors. Additional factors, such as the individual's co-morbidities, and/or specific patient characteristics may affect the physician's choice of treatment. Clinician input based on experience increases the probability of identifying patients who will benefit from specific treatment options. The individual patient and/or their decision surrogate dynamic will also influence treatment decisions, therefore, discussion of available treatments and procedures applicable to the individual patient rely on mutual communication between the patient and/or decision surrogate and physician, weighing the potential risks and benefits for that patient. Once the patient and/or their decision surrogate have been informed of available therapies and have discussed these options with the patient's physician, an informed and shared decision can be made.

FUTURE RESEARCH
Consideration for future research is provided for each recommendation within this document.

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 osteoarthritis of the hip.

This clinical practice guideline and the systematic review upon which it is based evaluate the effectiveness of surgical treatments for osteoarthritis of the hip. 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.

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 one year following the publication of the guideline.

This guideline and systematic review were prepared by the AAOS management of osteoarthritis of the hip guideline multidisciplinary clinician guideline development group with the assistance of the AAOS Evidence-Based Medicine (EBM) Unit in the Department of Research and Scientific Affairs (methodologists) at the AAOS. The guideline development group held an introductory meeting on February 27th, 2015 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. The original PICO questions developed at the introductory meeting can be viewed in Appendix III. 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(es). 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 data 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 August 27-28, 2016. 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. Additional edits to the rationales were approved by the guideline development group on webinars after the 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 July 6, 2015.

The resulting draft guidelines were then peer-reviewed, edited in response to that review and subsequently distributed for public commentary. 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. A full list of the original PICO questions can be viewed in Appendix III. 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:

Criteria to be customized by Work Group (by PICO question or stage of care, if necessary)

Study must be of an osteoarthritis-related injury or prevention thereof
Study must be published in or after **1990** for *surgical treatment, rehabilitation, bracing, prevention and MRI*
Study must be published in or after **1990** for *x-rays* and *non-operative treatment*
Study must be published in or after **1990** for all others non specified
Study should have 10 or more patients per group *(Work group may further define sample size)*
Study must have at least 90% OA Patients

Standard Criteria for all CPGs

Article must be a full peer-reviewed published 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 ≥ 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.

RECOMMENDING FOR OR AGAINST A PROCEDURE

The guideline work group considers the procedure of interest and comparison procedure when recommending or not recommending a procedure for clinical use. If the procedure of interest results in outcomes that are similar to the comparison procedure, the work group may recommend both procedures due to no statistical difference in outcomes. If the procedure of interest results in outcomes that are not statistically different than a placebo or no procedure, the work group may recommend against the procedure of interest, because it adds no measurable benefit to a patient's outcomes.

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:

MCID/MID
PASS or Impact
Another validated measure
Statistical Significance

LITERATURE SEARCHES

We begin the systematic review with a comprehensive search of the literature. Articles we consider were published between January 1, 1990 and April, 15 2016 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 PICO questions.

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

PROGNOSTIC STUDY QUALITY EVALUATION

Resources used to develop the Diagnostic Quality Appraisal System:

- GRADE Working Group. Grading quality of evidence and strength of recommendations. *BMJ 2004; (328)*: 1490-1494.

PROGNOSTIC STUDY QUALITY APPRAISAL QUESTIONS

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

Was the spectrum of patients studied for this prognostic variable representative of the patient spectrum seen in actual clinical practice?
Was loss to follow up unrelated to key characteristics?
Was the prognostic factor of interest adequately measured in the study to limit potential bias?

Was the outcome of interest adequately measured in study participants to sufficiently limit bias?
Were all important confounders adequately measured in study participants to sufficiently limit potential bias?
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 INTERVENTION STUDY QUALITY EVALUATION

Resources used to develop the Diagnostic Quality Appraisal System:

- GRADE Working Group. Grading quality of evidence and strength of recommendations. *BMJ 2004; (328)*: 1490-1494.

RANDOMIZED STUDY QUALITY APPRAISAL QUESTIONS

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

Random Sequence Generation
Allocation Concealment
Blinding of Participants and Personnel
Incomplete Outcome Data
Selective Reporting
Other Bias

Upgrading Randomized Study Quality Questions

Is there a large magnitude of effect?
Influence of All Plausible Residual Confounding
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 EVALUATION

Resources used to develop the Diagnostic Quality Appraisal System:

- GRADE Working Group. Grading quality of evidence and strength of recommendations. *BMJ 2004; (328)*: 1490-1494.

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.

Is this observational study a prospective case series?
Does the strategy for recruiting participants into the study differ across groups?
Did the study fail to balance the allocation between the groups or match groups (e.g., through stratification, matching, propensity scores)?
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)?
Was the length of follow-up different across study groups?
Other Bias?

Upgrading Observational Study Quality Questions
Is there a large magnitude of effect?
Influence of All Plausible Residual Confounding
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 quality 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 retrospective comparative studies. 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 quality 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.	
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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 ***opinion*** 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; however, the guideline development group had consensus (100% approval) when voting on every recommendation for this guideline.

STATISTICAL METHODS

ANALYSIS OF INTERVENTION/PREVENTION DATA

When possible, the AAOS EBM Unit recalculates the results reported in individual studies and compile them to answer the recommendations. The results of all statistical analysis conducted by the AAOS EBM 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.[M6] 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.[M1] 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. O*rganizations*, 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 chairs of the guideline development group and 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 chairs of the guideline development group and the manager of the AAOS evidence-based medicine unit drafts the initial responses to comments that address methodology. These responses are then reviewed by the chair and co-chair, who respond to questions concerning clinical practice and techniques. The director of the Department of Research and Scientific Affairs may provide 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 proposed changes to

recommendation language as a result of peer review are based on the evidence and undergoes majority vote by the guideline development group members. 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 osteoarthritis of the hip guideline was requested of 21 organizations. Seven individuals representing six organizations returned comments on the structured review form (see Appendix VII).

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. One organization returned public comments.

COST LITERATURE SEARCH METHODOLOGY

OVERVIEW OF COST LITERATURE REVIEW PROCESS

In December of 2015 the AAOS Board of Directors approved the integration of a systematic cost literature review into the appendices of a clinical practice guideline (CPG). To prevent bias when creating a CPG recommendation, the guideline work group is blinded to the cost literature review findings until after the final recommendations are constructed; it is important that the CPG is based on a systematic review of the comparative effectiveness research for each PICO question, rather than the cost savings of one procedure over another. All findings related to the cost literature review are presented in the appendices of each CPG, to help ensure that the recommendations and their supporting rationales are kept separate from the findings of the cost literature review. Additionally, cost statements will only be made if evidence regarding an item addressed in the CPG is available; if no cost literature is available, a statement will not be made.

SEARCH STRATEGY

A review of published systematic reviews addressing cost benefits of various procedures related to hip fractures was conducted to evaluate any cost-effectiveness literature findings supporting the recommendations made in the 2016 AAOS Clinical Practice Guideline on the Management of Osteoarthritis of the Hip. To identify possibly relevant cost-effectiveness literature, the AAOS medical librarian conducted a search on July 7th, 2016 for cost-effectiveness literature pulished

between January 1st, 1990 and July 7th, 2016. that addressed any topics included in the aforementioned guideline (see Appendix XI for literature search report). The search returned 1246 abstracts.

After the search results were returned, an AAOS Evidence-Based Medicine Unit research analyst reviewed the abstracts and recalled the full text articles for any abstracts that contained any of the key terms listed in Appendix XI in the article title or abstract. The articles not containing the key terms in the title or abstract were reviewed separately and their full text was recalled if deemed relevant. A total of 158 studies were recalled. After the full text articles were recalled, the EBM analyst included five studies relevant to the guideline recommendations under study. The author conclusions from each of the studies were extracted and categorized depending on the guideline recommendations that they supported (see Cost Literature Review Findings).

ECONOMIC EVALUATION STUDIES, CRITICAL APPRAISAL

AHRQ published a systematic review of economic evaluations to determine best practices. In their methods research report (Walker 2012), 10 different checklists are identified for critical appraisal of economic evaluations in health care. The strengths and weaknesses of each are discussed, and important domains are identified based on the common questions between them. The Evers 2005 and Drummond 1996 checklists were used to construct an assessment form to evaluate economic evaluation studies. These checklists were chosen because they are both recommended by the Cochrane Collaboration.

DETAILS REGARDING CHECKLIST APPRAISAL

The aforementioned checklists were amalgamated, added to the electronic PEER Tool's study quality appraisal functionality, and employed by AAOS staff to assess the relevant domains for each included economic evaluation study relevant to this report. The full checklist is presented in Appendix II. The checklist contains 20 questions, which have been categorized into 10 different domains considered important among health economists.

There is little research to show whether some domains are more important than others regarding quality of the economic article. With a large range of possible methodologies and study designs in economic evaluations, it is also unclear if every question will be relevant all of the time. An economic evaluation not reporting everything on the list may not necessarily invalidate its results. It is not recommended to use the checklist to try and assign quality or rank the studies based on the answers of these questions. Rather the checklist should be used as an information tool to assist the readers/users of guidelines to determine whether the results of a particular study are relevant and applicable to their own objectives (e.g. cost of one intervention versus another intervention that are both accessible to the user in his or her clinical setting.

ECONOMIC STUDY QUALITY EVALUATION

The study design and methodology for all included cost-effectiveness studies in this report were evaluated using the 20 domains/questions listed in below in Table 2.

TABLE 1. QUALITY VISUALS KEY

	No Flaw in Domain	Half Flaw in Domain (unclear)	Full Flaw in Domain
Quality Visual	●	◑	○

TABLE 2. ECONOMIC STUDY QUALITY EVALUATION CHECKLIST KEY

Question #	Domain	Question
Q1	Scope and Purpose	Is the study population clearly defined?
Q2	Scope and Purpose	Is a well-defined research question posed in answerable form?
Q3	Scope and Purpose	Is the economic study design appropriate to the stated objective?
Q4	Stakeholder Involvement	Is the time horizon appropriate to include all relevant costs and consequences?
Q5	Stakeholder Involvement	Is the actual perspective chosen appropriate?
Q6	Stakeholder Involvement	Was the effectiveness of the programs or services established?
Q7	Rigour of Development	Are competing alternatives clearly described?
Q8	Rigour of Development	Are all important relevant costs for each alternative identified?
Q9	Rigour of Development	Are all important relevant outcomes for each alternative identified?
Q10	Rigour of Development	Are all costs measured appropriately in physical units?
Q11	Rigour of Development	Are all outcomes measured appropriately?
Q12	Rigour of Development	Are all costs valued appropriately?
Q13	Rigour of Development	Are all outcomes valued appropriately?
Q14	Rigour of Development	Are all future costs and outcomes discounted appropriately?
Q15	Clarity of Presentation	Is an incremental analysis of costs and outcomes of alternatives performed?
Q16	Clarity of Presentation	Are all important variables, whose values are uncertain, appropriately subjected to sensitivity analysis?
Q17	Clarity of Presentation	Do conclusions follow from the data reported?
Q18	Applicability	Does the study discuss the generalizability of the results to other settings and patient/client groups?
Q19	Applicability	Does the article indicate that there is no potential conflict of interest of study researchers and funders?
Q20	Applicability	Are ethical and distributional issues discussed appropriately?

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.

POTENTIAL ORGANIZATIONAL BARRIERS IN APPLICATION OF THE GUIDELINE RECOMMENDATIONS

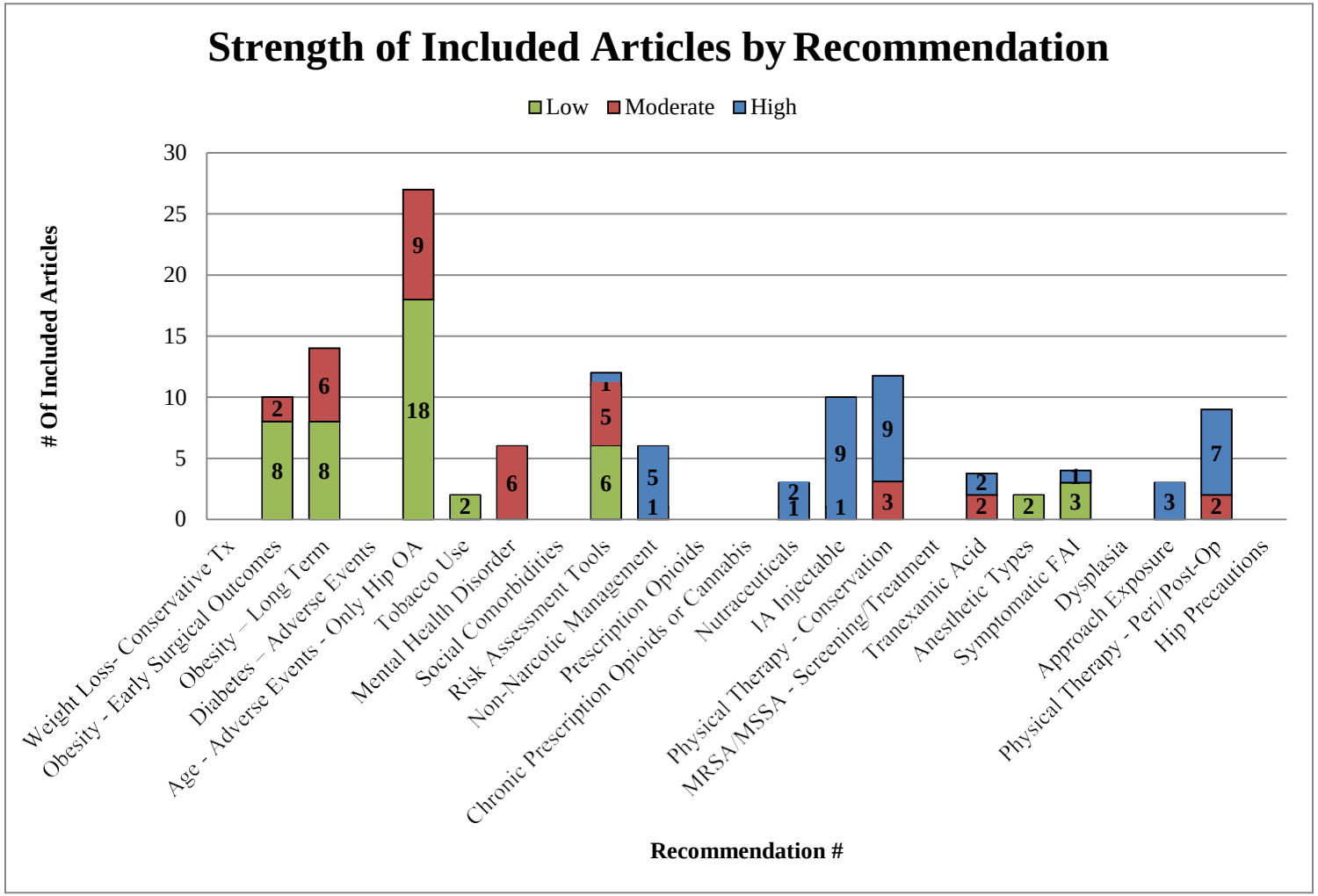
The potential barriers to implementing this guideline include educational challenges, awareness issues, finite resources for dissemination , and challenges in implementing the recommendations at the point of care. In an effort to increase the evidence-based education of orthopaedic surgeons, guideline recommendations are used in various examinations, which requires the surgeon completing the exam to be aware of the most current evidence-based findings for a particular orthopaedic disease. Awareness of clinical practice guidelines is a pervasive issue faced by all guideline developers.

The AAOS attempts to increase awareness of new clinical practice guidelines and other quality products via a number of tactics.One standard approach is to ensure that all guidelines are published to relevant journals (e.g. Journal of American Academy of Orthopaedic Surgeons, Journal of Bone and Joint Science, etc.). Additionally, case studies based on the guideline recommendations are assembled by guideline work group members and distributed via the aforementioned journals, as well as other member-specific publications, such as monthly AAOS Now publication, tri-weekly AAOS Headline News, and the monthly AAOS Quality Newsletter (click here to subscribe).

To improve point of care implementation, the AAOS has created the OrthoGuidelines application (www.orthoguidelines.org) which presents the guideline recommendations and appropriate use criteria (AUC) in a user-friendly format that can be natively added to smarthphones and tablets via the Apple and Google Play stores.

RECOMMENDATIONS

OVERVIEW OF ARTICLES BY RECOMMENDATION



No evidence was discovered to answer the following priori PICO questions: diabetes, social comorbidities, prescription opioids, cannibus, MRSA screening, and dysplasia. no evidence was discovered to answer these a priori PICO questions

RISK ASSESSMENT TOOLS

Moderate strength evidence supports that the practitioner could use risk assessment tools to assist in predicting adverse events, assessing surgical risks and educating patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty.

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.

RATIONALE

One high quality study (Gordon, Frumento, et al) employed the Charnley comorbidity classification and the EQ5D generic health outcome questionnaire in the Swedish Hip Registry of over 28,500 THA patients. Inferior THA results were demonstrated in a specific subset of patients: women with Charnley class C. Five moderate quality and five low quality studies further support the use of various risk assessment tools to predict outcomes and adverse events after THA. These include the EQ5D, SF-36, WOMAC, ASA classification, Charlson comorbidity index, and the Elixhauser score. Rolfson and Dahlberg, *et al* analyzed 6,158 Swedish Registry patients to determine that the EQ-5D anxiety/depression domain was highly predictive for pain relief and patient satisfaction after THA. Using the WOMAC and SF-36 Short Form, Gandhi, *et al* demonstrated that older age, year of followup, and greater comorbidity were negative prognostic indicators for THA function, and proposed that risk assessment data may be effectively utilized to set realistic patient expectations after THA. In another moderate quality study, Gordon and Frumento, *et al* studied over 134,000 patients from the Swedish registry. The Elixhauser comorbidity score was directly related to risk of re-operation within two years after THA. Martinez-Huedo, *et al* examined the effect of diabetes mellitus (DM) on 122,926 THA patients in the Spanish National Hospital Database. Immediate postoperative outcomes were worse among patients with DM, including increased length of hospital stay and in-hospital mortality. With respect to patients' preoperative expectations, Judge, *et al* investigated the use of ASA status, WOMAC score, and EQ-5D, to show that risk assessment tools can be effectively utilized for informed patient-clinician decision-making.

POSSIBLE HARMS OF IMPLEMENTATION

It is possible that patients deemed to be at significant risk for perioperative adverse events will be denied access to the potential benefits of THA, due to concerns regarding increased risk and/or increased cost of care.

FUTURE RESEARCH

Understanding the causes of adverse events and readmission to the hospital after THA is of paramount importance with respect to improving patient safety, managing patient expectations, and lowering cost of care. Identifying modifiable risk factors and then providing and optimizing patients' health prior to THA is recommended. Further multi-institutional studies are warranted to evaluate the efficacy of risk assessment tools with respect to managing patients' expectations and improving shared-decision making. Future studies should attempt to better delineate between clinical outcome tools and risk assessment tools which incorporate comorbidities such as diabetes, tobacco use, etc.

RESULTS

QUALITY EVALUATION TABLE: RISK ASSESSMENT TOOLS

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION -RISK ASSESSMENT TOOLS

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Gandhi,R., 2010	◑	◑	●	●	◑	◑	Include	Moderate Quality
Gordon, M., 2013	◑	●	◑	●	●	◑	Include	Moderate Quality
Gordon, M., 2013	●	◑	◑	●	◑	◑	Include	Low Quality
Gordon, M., 2014	◑	◑	●	●	●	●	Include	High Quality
Jameson,S.S., 2013	◑	●	◑	●	○	○	Include	Low Quality
Judge,A., 2011	●	◑	●	●	◑	◑	Include	Moderate Quality
Martinez-Huedo,M.A., 2013	●	●	◑	●	◑	◑	Include	Moderate Quality
McMinn, D.J., 2012	◑	◑	●	●	◑	○	Include	Low Quality
Quintana, J.M., 2009	◑	◑	●	●	◑	○	Include	Low Quality
Rolfson,O., 2009	●	◑	◑	●	◑	◑	Include	Moderate Quality
Schaller,G., 2015	◑	●	○	●	◑	○	Include	Low Quality
Vogl,M., 2014	●	◑	◑	●	◑	○	Include	Low Quality

SUMMARY OF FINDINGS TABLE 1

↑ Better Outcomes ↓ Worse Outcomes ● Not Significant		High Quality	Moderate Quality						Low Quality									
Outcome Type	**Outcome**	**Gordon2014**	**Gandhi2010**	**Gordon2013**	**Jamsen2013**	**Judge2011**	**Martinez-Huedo2013**	**Rolfson2009**	**Hunt2013**	**Jameson2013**	**Katz2012**	**Lawless2012**	**McMinn2012**	**Mears2009**	**Pedersen2011**	**Quintana2009**	**Schaller2015**	**Vogl2014**
Composite	EQ-5d(cha nge i n VAS s core)																	●
	overa l l compl i ca ti ons ()																●	
	overa l l compl i ca ti ons (i n-hos pi ta l compl i ca ti ons)																↓	
	WOMAC()		↓															
	WOMAC(cha nge from ba s el i ne)																	↓
	WOMAC(OMERACT-OARSI res ponders)					●												
Function	SF-36(menta l component s core)															●		
	SF-36(Phys i ca l Functi on)		↓													↓		
	SF-36(Rol e Li mi ta ti on: phys i ca l)		↓													●		
Length Of Stay	l ength of hos pi ta l s ta y()													↓				
Mortality	morta l i ty()								↓				↓		●			
	morta l i ty(i n-hos pi ta l)						↓											
Pain	SF-36(Pa i n)															●		
	VAS Pa i n()							↓										
Quality Of Life	EQ-5d(cha nge over ti me)											●						
	EQ-5d(i ndex s core)	↓		↓														
	EQ-5d(VAS s core)	↓		↓														
	SF-36(Genera l Hea l th)															↓		
Reoperation	i mpl a nt revi s i on()				↓					●	●		↓					
	Reopera ti on()			↓														
Symptoms	pa ti ent s a ti s fa cti on()							↓										

DETAILED DATA TABLES

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Gandhi, R., 2010	Moderate Quality	SF-36 (Physical Function)	6 Days	636	total hip arthroplasty	Cumulative Illness Rating Scale (continuous)	age, gender, year of follow up, BMI, Comorbidity(CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	–5.08 (–6.50, –3.67)	higher comorbidity associated with less sustained improvement
Gandhi, R., 2010	Moderate Quality	SF-36 (Role Limitation: physical)	6 Days	636	total hip arthroplasty	Cumulative Illness Rating Scale (continuous)	age, gender, year of follow up, BMI, Comorbidity(CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	–6.87 (–9.07, –4.66)	higher comorbidity associated with less sustained improvement
Gandhi, R., 2010	Moderate Quality	WOMAC	6 Days	636	total hip arthroplasty	Cumulative Illness Rating Scale (continuous)	age, gender, year of follow up, BMI, Comorbidity(CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	2.15 (0.66, 3.14)	higher comorbidity associated with less sustained improvement
Gordon, M., 2013	Low Quality	EQ-5d (index score)	1 Days	15192	total hip arthroplasty (from Swedish Hip Arthroplasty Register and Danish Hip Arthroplasty Register)	Charlson index score 2+ vs 0	age, sex, Charlson's index, country(Sweeden or Denmark)	regression coefficient (CI)	-13.1 (-16.8 to -9.3)	patients with worse comorbidity had worse quality of life scores
Gordon, M., 2013	Low Quality	EQ-5d (index score)	1 Days	15192	total hip arthroplasty (from Swedish Hip Arthroplasty Register and Danish Hip Arthroplasty Register)	Charlson index score 1 to 2 vs 0	age, sex, Charlson's index, country(Sweeden or Denmark)	regression coefficient (CI)	-5.1 (-6.1 to -4.1)	patients with worse comorbidity had worse quality of life scores

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Gordon, M., 2013	Low Quality	EQ-5d (VAS score)	1 Days	15192	total hip arthroplasty (from Swedish Hip Arthroplasty Register and Danish Hip Arthroplasty Register)	Charlson index score 1 to 2 vs 0	age, sex, Charlson's index, country(Sweeden or Denmark)	regression coefficient (CI)	-0.039 (-0.048 to -0.030)	patients with worse comorbidity had worse quality of life scores
Gordon, M., 2013	Low Quality	EQ-5d (VAS score)	1 Days	15192	total hip arthroplasty (from Swedish Hip Arthroplasty Register and Danish Hip Arthroplasty Register)	Charlson index score 2+ vs 0	age, sex, Charlson's index, country(Sweeden or Denmark)	regression coefficient (CI)	-0.092 (-0.123 to -0.062)	patients with worse comorbidity had worse quality of life scores
Gordon, M., 2013	Moderate Quality	reoperation	1.7 weeks	134423	total hip arthroplasty	Royal College of Surgeons Charlson score of 1 to 2 or 3+ vs score of 0	age, gender and whether it was the first or the second THR, fixation types(cemented/uncemented/hybrid/reverse hybrid),type of hospital, hospital volume, year of surgery	cox proportional model with death as a competing risk	none reported	NS
Gordon, M., 2013	Moderate Quality	reoperation	1.7 weeks	134423	total hip arthroplasty	Elixhauser score of 1 to 2 or 3+ vs score of 0	age, gender and whether it was the first or the second THR, fixation types(cemented/uncemented/hybrid/reverse hybrid),type of hospital, hospital volume, year of surgery	cox proportional model with death as a competing risk	none reported	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Gordon, M., 2013	Moderate Quality	reoperation	1.7 weeks	134423	total hip arthroplasty	Charlson index score of 1 to 2 or 3+ vs score of 0	age, gender and whether it was the first or the second THR, fixation types(cemented/uncemented/hybrid/reverse hybrid),type of hospital, hospital volume, year of surgery	cox proportional hazard model with death as a competing risk	none reported	NS
Gordon, M., 2013	Moderate Quality	reoperation	2 Days	134423	total hip arthroplasty	Charlson index score of 1 or 2 vs score of 0	age, gender and whether it was the first or the second THR, fixation types(cemented/uncemented/hybrid/reverse hybrid),type of hospital, hospital volume, year of surgery	cox proportional hazard ratio with death as a competing risk	1.3 (1.1 to 1.4)	reoperation risk higher with scores of 1 to 2.
Gordon, M., 2013	Moderate Quality	reoperation	2 Days	134423	total hip arthroplasty	Royal College of Surgeons Charlson score of 1 or 2 vs score of 0	age, gender and whether it was the first or the second THR, fixation types(cemented/uncemented/hybrid/reverse hybrid),type of hospital, hospital volume, year of surgery	cox proportional hazard ratio with death as a competing risk	1.1 (0.9 to 1.3)	NS
Gordon, M., 2013	Moderate Quality	reoperation	2 Days	134423	total hip arthroplasty	Charlson index score of 3 vs score of 0	age, gender and whether it was the first or the second THR, fixation types(cemented/uncemented/hybrid/reverse hybrid),type of hospital, hospital volume, year of surgery	cox proportional hazard ratio with death as a competing risk	1.3 (0.8 to 2.1)	NS
Gordon, M., 2013	Moderate Quality	reoperation	2 Days	134423	total hip arthroplasty	Royal College of Surgeons Charlson score of 3 vs score of 0	age, gender and whether it was the first or the second THR, fixation types(cemented/uncemented/hybrid/reverse hybrid),type of hospital, hospital volume, year of surgery	cox proportional hazard ratio with death as a competing risk	1.6 (0.7 to 4.0)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Gordon, M., 2013	Moderate Quality	reoperation	2 Days	134423	total hip arthroplasty	Elixhauser score of 3 vs score of 0	age, gender and whether it was the first or the second THR, fixation types(cemented/uncemented/hybrid/reverse hybrid),type of hospital, hospital volume, year of surgery	cox proportional hazard ratio with death as a competing risk	1.6 (1.2 to 2.1)	reoperation risk higher with scores of 3
Gordon, M., 2013	Moderate Quality	reoperation	2 Days	134423	total hip arthroplasty	Elixhauser score of 1 and 2 vs score of 0	age, gender and whether it was the first or the second THR, fixation types(cemented/uncemented/hybrid/reverse hybrid),type of hospital, hospital volume, year of surgery	cox proportional hazard ratio with death as a competing risk	1.2 (1.1 to 1.3)	reoperation risk higher with scores of 1 to 2.
Gordon, M., 2014	High Quality	EQ-5d (index score)	1 Days	26249	total hip arthroplasty	Charnley class 1 vs 2 vs 3; subgroup=men	age, pre-op quality of life, sex, baseline pain	none reported	none reported	men with worse charnley scores have worse EQ-5d scores
Gordon, M., 2014	High Quality	EQ-5d (index score)	1 Days	26249	total hip arthroplasty	Charnley class 1 vs 2 vs 3; subgroup=women	age, pre-op quality of life, sex, baseline pain	none reported	none reported	women with worse charnley scores have worse EQ-5d scores
Gordon, M., 2014	High Quality	EQ-5d (index score)	1 Days	26249	total hip arthroplasty	Charnley Class * gender interaction	age, pre-op quality of life, sex, baseline pain	p value	p<.001	women in class C have worse outcome then men in class C. outcome caused by better post-op mobility

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Gordon, M., 2014	High Quality	EQ-5d (VAS)	1 Days	26249	total hip arthroplasty	Charnley class 1 vs 2 vs 3; subgroup=men	age, pre-op quality of life, sex, baseline pain	not reported	not reported	men with worse charnley scores have worse EQ-5d scores
Gordon, M., 2014	High Quality	EQ-5d (VAS)	1 Days	26249	total hip arthroplasty	Charnley Class * gender interaction	age, pre-op quality of life, sex, baseline pain	p value	p=.008	women in class C have worse outcome then men in class C. outcome caused by better post-op mobility
Gordon, M., 2014	High Quality	EQ-5d (VAS)	1 Days	26249	total hip arthroplasty	Charnley class 1 vs 2 vs 3; subgroup=women	age, pre-op quality of life, sex, baseline pain	not reported	not reported	women with worse charnley scores have worse EQ-5d scores

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hunt, L.P., 2013	Low Quality	mortality	3 months	409096	total hip arthroplasty	ASA score 2 vs 1	Year of operation, ASA score, surgical approach (posterior vs other), mechanical prophylaxis, chemical prophylaxis, anesthetic type, hip replacement type/cementing, myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease or rheumatic disease, peptic ulcer disease, liver disease, diabetes without vs with vs no diabetes, Paraplegia or hemiplegia, renal disease, cancer	cox proportional hazard ratio (CI)	1.28 (1.02–1.60)	higher ASA score associated with increased risk of mortality
Hunt, L.P., 2013	Low Quality	mortality	3 months	409096	total hip arthroplasty	ASA score of 4 or 5 vs 1	Year of operation, ASA score, surgical approach (posterior vs other), mechanical prophylaxis, chemical prophylaxis, anesthetic type, hip replacement type/cementing, myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease or rheumatic disease, peptic ulcer disease, liver disease, diabetes without vs with vs no diabetes, Paraplegia or hemiplegia, renal disease, cancer	cox proportional hazard ratio(CI)	2.57 (1.77–3.75)	higher ASA score associated with increased risk of mortality

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hunt, L.P., 2013	Low Quality	mortality	3 months	409096	total hip arthroplasty	ASA score 3 vs 1	Year of operation, ASA score, surgical approach (posterior vs other), mechanical prophylaxis, chemical prophylaxis, anesthetic type, hip replacement type/cementing, myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease or rheumatic disease, peptic ulcer disease, liver disease, diabetes without vs with vs no diabetes, Paraplegia or hemiplegia, renal disease, cancer	cox proportional hazard ratio(CI)	2.08 (1.64–2.63)	higher ASA score associated with increased risk of mortality
Jameson, S.S., 2013	Low Quality	implant revision	5 Days	35386	total hip arthroplasty	ASA of 3 or more vs 1 or 2 in cementless THA subgroup	variables in final model: ASA grade, stem size, bearing group; variables excluded from final model due to univariate insignificance: sex, age, stem design, acetabular shell group, bearing category, head size, surgeon consultant vs other, consultant volume	cox proportional hazard ratio (99%CI ; P value)	1.39 (0.99 to 1.96 ; p=.013)	NS
Judge, A., 2011	Moderate Quality	WOMAC (OMERACT-OARSI responders)	1 Days	908	total hip arthroplasty	ASA score 2 versus 1	prior expectations, age, sex, education, ASA status, kellgreen lawrence grade, bmi, number of medications, preop WOMAC score, preop eq-5d	odds ratio (95% CI)	0.80 (0.51, 1.25)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Judge, A., 2011	Moderate Quality	WOMAC (OMERACT-OARSI responders)	1 Days	908	total hip arthroplasty	ASA score 3 or 4 versus 1	prior expectations, age, sex, education, ASA status, kellgreen lawrence grade, bmi, number of medications, preop WOMAC score, preop eq-5d	odds ratio (95% CI)	0.44 (0.19, 1.02)	NS
Katz, J.N., 2012	Low Quality	implant revision	1.7 weeks	51347	total hip arthroplasty	Charlson score over 1 vs less than 1	sex, age, race, medicaid eligibility,charlson score greater than 1 vs lower, hospital volume	Hazard ratio accounting for competing risk of death, fracture, myocardial infarction and stroke	0.90 (0.81, 1.00)	NS
Lawless, B.M., 2012	Low Quality	EQ-5d (change over time)	NR	1442	total hip arthroplasty - All THA (unclear diagnosis)	difference between Charnley classes	none	p value from repeated measures mixed model for change over time	p=0.272	NS
Martinez-Huedo, M.A., 2013	Moderate Quality	mortality (in hospital)	Post-Op	122926	total hip arthroplasty	Charlson index score of 1 vs score of 0	age, sex charlson score, elective vs emergency admission, year of operation, time of year	logistic regression odds ratio(CI)	4.63 (3.42–6.27)	The odds of in-hospital mortality were 4.63 times greater with a comorbidity score of 1 vs 0
Martinez-Huedo, M.A., 2013	Moderate Quality	mortality (in hospital)	Post-Op	122926	total hip arthroplasty	Charlson index score of 2 vs score of 0	age, sex charlson score, elective vs emergency admission, year of operation, time of year	logistic regression odds ratio(CI)	13.54 (9.57–19.16)	The odds of in-hospital mortality were 13.52 times greater with a comorbidity score of 2 vs 0

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
McMinn, D.J., 2012	Low Quality	implant revision	1.1 weeks	103938	total hip arthroplasty	ASA 3 vs 1	variables in final model: use of cement, age, ASA score, gender; variable excluded from final model:surgical complexity	cox proportional hazard ratio	1.38 (1.22 to 1.55)	higher ASA score is associated with increased revision risk
McMinn, D.J., 2012	Low Quality	implant revision	1.1 weeks	103938	total hip arthroplasty	ASA 4 vs 1	variables in final model: use of cement, age, ASA score, gender; variable excluded from final model:surgical complexity	cox proportional hazard ratio	0.60 (0.30 to 1.20)	NS
McMinn, D.J., 2012	Low Quality	implant revision	1.1 weeks	103938	total hip arthroplasty	ASA 2 vs 1	variables in final model: use of cement, age, ASA score, gender; variable excluded from final model:surgical complexity	cox proportional hazard ratio	1.09 (1.00 to 1.19)	NS
McMinn, D.J., 2012	Low Quality	implant revision	6 Days	103938	hip resurfacing	ASA 3 vs 1	variables in final model: use of cement, age, ASA score; variable excluded from final model:gender,surgical complexity	cox proportional hazard ratio	1.24 (1.04 to 1.48)	higher ASA score is associated with increased revision risk
McMinn, D.J., 2012	Low Quality	implant revision	6 Days	103938	hip resurfacing	ASA 2 vs 1	variables in final model: use of cement, age, ASA score; variable excluded from final model:gender,surgical complexity	cox proportional hazard ratio	1.10 (0.97 to 1.24)	NS
McMinn, D.J., 2012	Low Quality	implant revision	6 Days	103938	hip resurfacing	ASA 4 vs 1	variables in final model: use of cement, age, ASA score; variable excluded from final model:gender,surgical complexity	cox proportional hazard ratio	0.54 (0.20 to 1.45)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
McMinn, D.J., 2012	Low Quality	mortality	1.1 weeks	103938	total hip arthroplasty	ASA score 2 vs 1	use of cement, age, ASA score, gender, surgical complexity	cox proportional hazard ratio	1.19 (1.13 to 1.26)	Higher ASA score associated with higher mortality risk
McMinn, D.J., 2012	Low Quality	mortality	1.1 weeks	103938	total hip arthroplasty	ASA score 4 vs 1	use of cement, age, ASA score, gender, surgical complexity	cox proportional hazard ratio	3.52 (3.09 to 4.00)	Higher ASA score associated with higher mortality risk
McMinn, D.J., 2012	Low Quality	mortality	1.1 weeks	103938	total hip arthroplasty	ASA score 3 vs 1	use of cement, age, ASA score, gender, surgical complexity	cox proportional hazard ratio	2.15 (2.03 to 2.28)	Higher ASA score associated with higher mortality risk
McMinn, D.J., 2012	Low Quality	mortality	1.1 weeks	103938	total hip arthroplasty	ASA score 5 vs 1	use of cement, age, ASA score, gender, surgical complexity	cox proportional hazard ratio	2.94 (1.70 to 5.07)	Higher ASA score associated with higher mortality risk
McMinn, D.J., 2012	Low Quality	mortality	6 Days	103938	hip resurfacing	ASA score 3 vs 1	use of cement, age, ASA score, gender, surgical complexity	cox proportional hazard ratio	2.14 (1.97 to 2.33)	Higher ASA score associated with higher mortality risk
McMinn, D.J., 2012	Low Quality	mortality	6 Days	103938	hip resurfacing	ASA score 5 vs 1	use of cement, age, ASA score, gender, surgical complexity	cox proportional hazard ratio	0.54 (0.08 to 3.80)	NS
McMinn, D.J., 2012	Low Quality	mortality	6 Days	103938	hip resurfacing	ASA score 2 vs 1	use of cement, age, ASA score, gender, surgical complexity	cox proportional hazard ratio	1.17 (1.09 to 1.26)	Higher ASA score associated with higher mortality risk

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
McMinn, D.J., 2012	Low Quality	mortality	6 Days	103938	hip resurfacing	ASA score 4 vs 1	use of cement, age, ASA score, gender, surgical complexity	cox proportional hazard ratio	3.58 (2.98 to 4.30)	Higher ASA score associated with higher mortality risk
Mears, D.C., 2009	Low Quality	length of hospital stay	NA	665	total hip arthroplasty - All THA (minimally invasive THA for "osteoarthritis(0.34%),osteonecrosis(0.02%),posttraumatic arthritis(0.01%),dysplasia(0.01%),inflammatory arthritis(0.0011%))	continuous	age, gender, weight, duration of surgery in minutes (B 90 or[90), change in hemoglobin, estimated blood loss, ASA	p value from regression	p<.001	higher ASA score is associated with longer length of stay
Pedersen, A.B., 2011	Low Quality	mortality	1.7 weeks	178232	total hip arthroplasty	Charlson comorbidity index of 1 or 2 compared to carlson score matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.7 (0.6 to 0.7)	hip THA patients with Charlson score of 1 to 2 had lower mortality rates than healthy controls
Pedersen, A.B., 2011	Low Quality	mortality	1.7 weeks	178232	total hip arthroplasty	Charlson comorbidity index of 0 compared to carlson score matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.8 (0.7 to 0.8)	hip THA patients with Charlson score of 0 had lower mortality rates than healthy controls

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Pedersen, A.B., 2011	Low Quality	mortality	1.7 weeks	178232	total hip arthroplasty	Charlson comorbidity index of more than 2 compared to carlson score matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.6 (0.5 to 0.6)	hip THA patients with Charlson score over 2 had lower mortality rates than healthy controls
Pedersen, A.B., 2011	Low Quality	mortality	3 months	178232	total hip arthroplasty	Charlson comorbidity index of 1 or 2 compared to carlson score matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.8 (0.7 to 1.0)	NS
Pedersen, A.B., 2011	Low Quality	mortality	3 months	178232	total hip arthroplasty	Charlson comorbidity index of 0 compared to carlson score matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	1.1 (0.9 to 1.3)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Pedersen, A.B., 2011	Low Quality	mortality	3.2 months	178232	total hip arthroplasty	Charlson comorbidity index of more than 2 compared to carlson score matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.4 (0.3 to 0.6)	hip THA patients with Charlson score over 2 had lower mortality rates than healthy controls
Quintana, J.M., 2009	Low Quality	SF-36 (bodily pain)	6 Days	590	total hip arthroplasty	Charlson comorbidity score of 2 or more vs 0	preintervention score, pre intervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	3.01 (p=0.66)	NS
Quintana, J.M., 2009	Low Quality	SF-36 (bodily pain)	6 Days	590	total hip arthroplasty	Charlson comorbidity score of 1-2 vs 0	preintervention score, pre intervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	-3.91 (p=0.11)	NS
Quintana, J.M., 2009	Low Quality	SF-36 (General Health)	6 Days	590	total hip arthroplasty	Charlson comorbidity score of 2 or more vs 0	preintervention score, preintervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	-1.56 (p=0.71)	NS
Quintana, J.M., 2009	Low Quality	SF-36 (General Health)	6 Days	590	total hip arthroplasty	Charlson comorbidity score of 1-2 vs 0	preintervention score, preintervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	-3.92 (p=0.01)	improvement was greater in those with no comorbidity
Quintana, J.M., 2009	Low Quality	SF-36 (mental component score)	6 Days	590	total hip arthroplasty	Charlson comorbidity score of 2 or more vs 0	preintervention score, preintervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	-4.09 (p=0.16)	NS

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Quintana, J.M., 2009	Low Quality	SF-36 (mental component score)	6 Days	590	total hip arthroplasty	Charlson comorbidity score of 1-2 vs 0	preintervention score, preintervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	-1.59 (p=0.12)	NS
Quintana, J.M., 2009	Low Quality	SF-36 (physical function)	6 Days	590	total hip arthroplasty	Charlson comorbidity score of 1-2 vs 0	preintervention score, pre intervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	-5.34(p=0.01)	improvement was greater in those without comorbidity
Quintana, J.M., 2009	Low Quality	SF-36 (physical function)	6 Days	590	total hip arthroplasty	Charlson comorbidity score of 2 or more vs 0	preintervention score, pre intervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	-9.17 (p=0.12)	NS
Quintana, J.M., 2009	Low Quality	SF-36 (role physical)	6 Days	590	total hip arthroplasty	Charlson comorbidity score of 1-2 vs 0	preintervention score, pre intervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	-5.34 (p=0.20)	NS
Quintana, J.M., 2009	Low Quality	SF-36 (role physical)	6 Days	590	total hip arthroplasty	Charlson comorbidity score of 2 or more vs 0	preintervention score, pre intervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	11.84 (p=0.33)	NS
Rolfson, O., 2009	Moderate Quality	patient satisfaction (satisfaction reduction in VAS units)	1 Days	6158	total hip arthroplasty	Charnley category C versus lower	dimensions of EQ-5D pre-operatively, Charnley category, age, gender	ANCOVA adjusted difference between groups (SE) (p value)	5.6(SE 0.53)(p<.001)	higher comorbidity resulted in an average 5.6 point reduction in VAS satisfaction level

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Rolfson, O., 2009	Moderate Quality	VAS pain (percent reduction)	1 Days	6158	total hip arthroplasty	Charnley category C versus lower	dimensions of EQ-5D pre-operatively, Charnley category, age, gender	ANCOVA adjusted percentage difference between groups(SE) (p value)s (SE) (p value)	8.2(SE 0.82) (p<.001)	higher comorbidity resulted in an average 5.6 point reduction in VAS Pain level
Schaller, G., 2015	Low Quality	overall complications	3 months	153	total hip arthroplasty	ASA continuous	none	spearman's rank correlation	not reported	NS
Schaller, G., 2015	Low Quality	overall complications (in-hospital complications)	Discharge	180	total hip arthroplasty	ASA continuous	none; variables excluded from model for univariate insignificance:age, gender, femoral component, acetabular component,femoral head component material	logistic regression odds ratio per 1 unit increase in ASA score	4.34	higher ASA score is associated with increase in odds of in-hospital complications

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Vogl, M., 2014	Low Quality	EQ-5d (change in VAS score)	1 Days	321	total hip arthroplasty	ASA 2 compared to 1	Variables in final model: pre-op WOMAC pain/function, pre-op EQ-5d anxiety/depression, pre-op EQ-5d overall, major hip distortion, other arthroplasty, discharged home vs inpatient rehabilitation, metabolic syndrome; variables excluded from final model: WOMAC stiffness, EQ-5d usual activity, diabetes, obesity, other functional implants, reflux, number of operations and procedures, living with family vs living alone, ASA 2 vs 1, Discharge home compared to inpatient rehabilitation	variable excluded from model after backward stepwise deletion	none reported	NS
Vogl, M., 2014	Low Quality	WOMAC (change from baseline)	1 Days	321	total hip arthroplasty	ASA 2 compared to 1	Variables in final model: pre-op WOMAC pain/function/stiffness, pre-op EQ-5d usual activity score, pre-op EQ-5d anxiety/depression, major hip distortion, diabetes, obesity, other functional implants, reflux, number of operations and procedures, living with family vs living alone, ASA 2 vs 1, metabolic syndrome; Variables not in final model: discharge home vs inpatient rehabilitation, pre-op EQ-5d overall	regression of change from baseline (SE)	-4.611(1.501)	those with ASA 2 scores improved less than those with ASA 1 scores

OBESITY (EARLY AND LATE SURGICAL OUTCOMES)

A) Moderate strength evidence supports that obese patients with symptomatic osteoarthritis of the hip, when compared to non-obese patients, may achieve lower absolute outcome scores but a similar level of patient satisfaction and relative improvement in pain and function after total hip arthroplasty.

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 strength evidence supports that obese patients with symptomatic osteoarthritis of the hip, when compared to non-obese patients, have increased incidence of postoperative dislocation, superficial wound infection, and blood loss after total hip arthroplasty.

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.*

RATIONALE

There are four moderate quality studies that support the existence of lower clinical scores in obese patients with mild variation in the cutoff points that define obesity (Yeung et al; BMI>30, Stevens et al; BMI>30, Davis et al; BMI >35, Judge et al; BMI >30). These results are supported by two low quality studies (McCalden et al; BMI>30, Jackson et al; BMI>30). Similar improvements in clinical scores between obese and non-obese patients are supported by one moderate quality study (Judge et al) and two low quality studies (Bennett et al; BMI>40, McCalden et al).

Similarities between obese and non-obese patient satisfaction with total hip replacement are supported by one moderate quality study (Yeung et al) and one low quality study (Villalobos et al; BMI>28).

One moderate quality study identifies a higher incidence of post-operative dislocation and superficial wound infection in obese patients (Davis et al; BMI>35). A low quality study reported a higher operative blood loss in obese patients (Bowditch et al; BMI>30).

Most of the included studies used a BMI level >30 to define obesity and for use as a comparison with lower ranges. This relatively low cutoff may mask some more dramatic differences in complications and outcomes at the higher levels, such as 40-50 and >50. In addition, BMI may not be a specific enough index to define the proportionality and distribution of adipose tissue at surgical sites.

POSSIBLE HARMS OF IMPLEMENTATION

None

FUTURE RESEARCH

Future research should examine the following:

1) BMI >30 incrementally upwards to detect risk stratification for adverse events and inferior outcomes.

2) Find new measurements to be used in conjunction with BMI that will refine the risk stratification for adverse events and poor outcomes. Perhaps direct measurements of local fat deposition (e.g. Depth of surgical wound) vs. BMI would be more helpful in stratifying the risk of wound problems such as dehiscence, hematoma, and infection.

3) Encourage longitudinal studies that evaluate the effects of weight loss in an individual and the outcomes of total hip replacement in patients who have lost significant weight pre-operatively.

RESULTS

QUALITY EVALUATION TABLE 1-OBESITY SHORT TERM

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Aranda,Villalobos P., 2013	◑	●	○	●	◑	◑	Include	Low Quality
Bennett,D., 2010	◑	◑	●	●	○	◑	Include	Low Quality
Bowditch,M.G., 1999	◑	●	●	○	○	●	Include	Low Quality
Ibrahim,T., 2005	◑	◑	◑	●	○	●	Include	Low Quality
Jackson,M.P., 2009	●	●	○	●	○	◑	Include	Low Quality
Jones,C.A., 2012	◑	◑	●	●	◑	○	Include	Low Quality
Judge,A., 2011	●	◑	●	●	◑	◑	Include	Moderate Quality
McCalden,R.W., 2011	●	◑	◑	●	○	◑	Include	Low Quality
Sadr,Azodi O., 2006	◑	●	◑	●	◑	○	Include	Low Quality
Yeung,E., 2011	◑	●	●	●	○	●	Include	Moderate Quality

QUALITY EVALUATION TABLE 2- OBESITY LONG TERM

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Aranda,Villalobos P., 2013	◑	●	○	●	◑	◑	Include	Low Quality
Bennett,D., 2010	◑	◑	●	●	○	◑	Include	Low Quality
Bowditch,M.G., 1999	◑	●	●	○	○	●	Include	Low Quality
Davis,A.M., 2011	◑	◑	●	●	●	○	Include	Moderate Quality
Gandhi,R., 2010	◑	◑	●	●	◑	◑	Include	Moderate Quality
Ibrahim,T., 2005	◑	◑	◑	●	○	●	Include	Low Quality
Jackson,M.P., 2009	●	●	○	●	○	◑	Include	Low Quality

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Jones,C.A., 2012	◑	◑	●	●	◑	○	Include	Low Quality
Judge,A., 2011	●	◑	●	●	◑	◑	Include	Moderate Quality
Judge,A., 2013	●	◑	●	●	◑	◑	Include	Moderate Quality
McCalden,R.W., 2011	●	◑	◑	●	○	◑	Include	Low Quality
Sadr,Azodi O., 2006	◑	●	◑	●	◑	○	Include	Low Quality
Stevens,M., 2012	◑	●	◑	●	○	●	Include	Moderate Quality
Yeung,E., 2011	◑	●	●	●	○	●	Include	Moderate Quality

SUMMARY OF FINDINGS TABLE 2: OBESITY SHORT TERM OUTCOMES (0 TO 90 57 *DAYS)*

	Low Quality			
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	Aranda,Villalobos P., 2013	Bennett,D., 2010	Bowditch,M.G., 1999	Sadr,Azodi O., 2006
Complications				
blood loss complications()			↓	
blood loss complications(transfusions)			●	
Oxford Hip Score(change)		●		
overall complications(systemic complications (excludes local wound and prosthesis problems))				↓
Composite				
Harris Hip Score(change from baseline)	●			
Oxford Hip Score(change from baseline)	●			
WOMAC(total change from baseline)	●			
Function				
SF-36(mental component change from baseline)	●			
SF-36(physical component score change from baseline)	↑			
WOMAC(function change from baseline)	↑			
Length Of Stay				
length of hospital stay()		●		↓
Other				
WOMAC(stiffness change from baseline)	●			

SUMMARY OF FINDINGS TABLE 3: OBESITY LONG TERM OUTCOMES (≥180 DAYS)

	Moderate Quality						Low Quality			
↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	Davis,A.M., 2011	Gandhi,R., 2010	Judge,A., 2011	Judge,A., 2013	Stevens,M., 2012	Yeung,E., 2011	Aranda,Villalobos P., 2013	Bennett,D., 2010	Jackson,M.P., 2009	McCalden,R.W., 2011
Complications										
dislocation()	↓									
Oxford Hip Score(change)								●		
infection(superficial)	↓									
Composite										
Harris Hip Score()	↓									
WOMAC()					↓					
WOMAC(OMERACT-OARSI responders)			●							
Oxford Hip Score()				↓						
SF-12(mental improvement)										●
Harris Hip Score(total)						↓				
Function										
SF-36(Energy/vitality)	↓									
SF-36(Mental health)	●									
SF-36(physical function)	↓	●								
SF-36(role emotional)	↓									
SF-36(Role Limitation: physical)	↓	●								
SF-36(social function)	↓									
WOMAC(improvement)										↑
Harris Hip Score(Activities)						↓				
Harris Hip Score(function)						↓				
Other										
other questionnaire(VAS patient satisfaction)						●				
Pain										
SF-36(Pain)	↓									
WOMAC(pain change from baseline)							●			
Harris Hip Score(pain)						●				
Quality Of Life										
SF-36(change in health)	●									
SF-36(General health perception)	↓									
SF-36(General Health)					↓					
Reoperation										
implant revision()	●									
implant revision(survival with revision for any reason as endpoint)									●	
Harris Hip Score(improvement)										↑
SF-12(physical improvement)										●
implant revision(cumulative survival rate)						●				
Mortality										
mortality()									●	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Aranda, Villalobos P., 2013	Low Quality	WOMAC (pain change from baseline)	3 years	63	total hip arthroplasty	BMI <28 vs 28 or above	unclear. they say the covariates listed in the methods section didn't change the results, but it is unclear if they presented the adjusted or bivariate data in the results section.	p value for improvement from baseline from repeated mesures anova	p=0.583	
Aranda, Villalobos P., 2013	Low Quality	WOMAC (function change from baseline)	3 months	63	total hip arthroplasty	BMI <28 vs 28 or above	unclear. they say the covariates listed in the methods section didn't change the results, but it is unclear if they presented the adjusted or bivariate data in the results section	p value for improvement from baseline from repeated mesures anova	p=0.041	WOMAC function improved more in patients with a BMI of 28 or above
Aranda, Villalobos P., 2013	Low Quality	SF-36 (mental component change from baseline)	3 months	63	total hip arthroplasty	BMI <28 vs 28 or above	unclear. they say the covariates listed in the methods section didn't change the results, but it is unclear if they presented the adjusted or bivariate data in the results section.	p value for improvement from baseline from repeated mesures anova	p=0.878	
Aranda, Villalobos P., 2013	Low Quality	SF-36 (physical component score change from baseline)	3 months	63	total hip arthroplasty	BMI <28 vs 28 or above	final variables included in stepwise model: BMI, baseline WOMAC score; variables excluded due to non-significance:age, gender, physical activity, educational level, and marital status	bootstrap regression coefficient (bootstrap-bias corrected CI)	.774 (.226-1.652)	patients with BMI of 28 or above had better physical component improvements

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Aranda, Villalobos P., 2013	Low Quality	Oxford Hip Score (change from baseline)	3 months	63	total hip arthroplasty	BMI <28 vs 28 or above	unclear. they say the covariates listed in the methods section didn't change the results, but it is unclear if they presented the adjusted or bivariate data in the results section.	p value for improvement from baseline from repeated mesures anova	p=0.428	
Aranda, Villalobos P., 2013	Low Quality	WOMAC (stiffness change from baseline)	3 months	63	total hip arthroplasty	BMI <28 vs 28 or above	unclear. they say the covariates listed in the methods section didn't change the results, but it is unclear if they presented the adjusted or bivariate data in the results section.	p value for improvement from baseline from repeated mesures anova	p=0.879	
Aranda, Villalobos P., 2013	Low Quality	WOMAC (total change from baseline)	3 months	63	total hip arthroplasty	BMI <28 vs 28 or above	unclear. they say the covariates listed in the methods section didn't change the results, but it is unclear if they presented the adjusted or bivariate data in the results section.	p value for improvement from baseline from repeated mesures anova	p=0.152	
Aranda, Villalobos P., 2013	Low Quality	Harris Hip Score (change from baseline)	3 months	63	total hip arthroplasty	BMI <28 vs 28 or above	unclear. they say the covariates listed in the methods section didn't change the results, but it is unclear if they presented the adjusted or bivariate data in the results section.	p value for improvement from baseline from repeated mesures anova	p=0.793	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Bennett, D., 2010	Low Quality	Oxford Hip Score (change)	1 years	59	total hip arthroplasty	BMI 40 or above vs. 20 to 25	matched for age, gender and pre-operative diagnosis	mean obese/mean not obese (paired t-test p value)	26.2/22.3 (p=.06)	
Bennett, D., 2010	Low Quality	Oxford Hip Score (change)	6 weeks	58	total hip arthroplasty	BMI 40 or above vs. 20 to 25	matched for age, gender and pre-operative diagnosis	mean difference with paired t-test	26.6/26.6	
Bennett, D., 2010	Low Quality	length of hospital stay	Discharge	58	total hip arthroplasty	BMI 40 or above vs. 20 to 25	matched for age, gender and pre-operative diagnosis	mean obese/mean not obese (paired t-test p value)	5.5/3.7 (p=.17)	
Bowditch, M.G., 1999	Low Quality	blood loss complications	Post-Op	80	total hip arthroplasty	BMI over 30 vs BMI under 30	none	mean difference (CI)	380 ml (95% CI, 200-560 ml)	blood loss was greater in the obese group
Bowditch, M.G., 1999	Low Quality	blood loss complications	Intra-Op	80	total hip arthroplasty	BMI over 30 vs BMI under 30	none	mean difference (CI)	213 (76 to 350	blood loss was greater in the obese group
Bowditch, M.G., 1999	Low Quality	blood loss complications	Peri-Op	46	total hip arthroplasty	BMI 26 to 30 vs BMI under 30	none	mean difference (CI)	243 (42 to 444)	blood loss was greater in the obese group
Bowditch, M.G., 1999	Low Quality	blood loss complications	Post-Op	80	total hip arthroplasty	BMI over 30 vs BMI under 30	none	mean difference (CI)	136 (55 to 217)	blood loss was greater in the obese group
Bowditch, M.G., 1999	Low Quality	blood loss complications (transfusions)	Post-Op	80	total hip arthroplasty	BMI <26 vs BMI 26 to 30 vs BMI 30 to 40 vs BMI over 40	none	chi squared p value	p=.805	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Davis, A.M., 2011	Moderate Quality	Harris Hip Score	5 years	1163	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	% worsening of score per 10 unit increase in BMI (CI)	3.02 (1.63 to 4.40)	HHS score gets 3.02% worse for every 10 unit increase in BMI
Davis, A.M., 2011	Moderate Quality	SF-36 (physical function)	5 years	1095	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	% worsening of score per 10 unit increase in BMI (CI)	8.19 (4.74 to 11.63)	physical function score gets 8.19% worse for every 10 unit increase in BMI
Davis, A.M., 2011	Moderate Quality	SF-36 (General health perception)	5 years	1095	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	% worsening of score per 10 unit increase in BMI (p value)	3.44 (0.65 to 6.23)	pain score gets 3.44% worse for every 10 unit increase in BMI
Davis, A.M., 2011	Moderate Quality	SF-36 (social function)	5 years	1095	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	% worsening of score per 10 unit increase in BMI (CI)	6.08 (2.19 to 9.97)	social function score gets 6.08% worse for every 10 unit increase in BMI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Davis, A.M., 2011	Moderate Quality	dislocation	5 years	1609	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	%increase in odds per 10 point increase in BMI (CI)	113.9 (11.5 to 308.1)	odds of dislocation increase by 113.9% for each 10 unit increase in BMI
Davis, A.M., 2011	Moderate Quality	SF-36 (Mental health)	5 years	1095	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	% worsening of score per 10 unit increase in BMI (p value)	0.13 (p=.913)	
Davis, A.M., 2011	Moderate Quality	implant revision	5 years	1609	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	%increase in odds per 10 point increase in BMI (CI)	52.4 (-27.0 to 219.0)	
Davis, A.M., 2011	Moderate Quality	SF-36 (Pain)	5 years	1095	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	% worsening of score per 10 unit increase in BMI(p value)	3.98 (0.29 to 7.66)	pain score gets 3.98% worse for every 10 unit increase in BMI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Davis, A.M., 2011	Moderate Quality	Infection (superficial)	5 years	1609	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	%increase in odds per 10 point increase in BMI (CI)	89.5 (18.4 to 205.1)	a 10 point increase in BMI increases odds of complications by 89.5%
Davis, A.M., 2011	Moderate Quality	SF-36 (Role Limitation: physical)	5 years	1095	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	% worsening of score per 10 unit increase in BMI (CI)	10.41 (4.64 to 16.18)	physical role limitation score gets 10.41% worse for every 10 unit increase in BMI
Davis, A.M., 2011	Moderate Quality	SF-36 (change in health)	5 years	1095	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	p value from regression	p=.201	
Davis, A.M., 2011	Moderate Quality	SF-36 (role emotional)	5 years	1095	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	% worsening of score per 10 unit increase in BMI(CI)	8.38 (2.03 to 14.73)	Role limitation score gets 8.38% worse for every 10 unit increase in BMI

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Davis, A.M., 2011	Moderate Quality	SF-36 (Energy/ vitality)	5 years	1095	total hip arthroplasty	continuous	age, gender, operating consultant preoperative HHS, preoperative SF-36 scores, cancer, atherosclerotic disease, cardiac disease, diabetes mellitus, osteoporosis, phlebitis	% worsening of score per 10 unit increase in BMI(p value)	4.31 (1.32 to 6.94)	Energy/Vitality score gets 4.31% worse for every 10 unit increase in BMI
Gandhi, R., 2010	Moderate Quality	WOMAC	6 years	636	total hip arthroplasty	continuous	age, gender, year of follow up, BMI, Comorbidity(CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	–0.28 (–0.57, 0.01)	
Gandhi, R., 2010	Moderate Quality	SF-36 (Physical Function)	6 years	636	total hip arthroplasty	continuous	age, gender, year of follow up, BMI, Comorbidity(CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	–0.01 (–0.42, 0.39)	
Gandhi, R., 2010	Moderate Quality	SF-36 (Role Limitation: physical)	6 years	636	total hip arthroplasty	continuous	age, gender, year of follow up, BMI, Comorbidity(CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	0.26 (–0.42, 0.95)	
Jackson, M.P., 2009	Low Quality	mortality	NR	2026	total hip arthroplasty	BMI <30 vs. 30 or above	matched by age to within one year, side of surgery, pre-operative diagnosis, operating surgeon, acetabular component, bearing configuration and the time to latest follow-up (within one year)	chi squared p value	0.231	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Jackson, M.P., 2009	Low Quality	implant revision (survival with revision for any reason as endpoint)	12 years	2026	total hip arthroplasty	BMI <30 vs. 30 or above	matched by age to within one year, side of surgery, pre-operative diagnosis, operating surgeon, acetabular component, bearing configuration and the time to latest follow-up (within one year)	log rank p value from kaplan meier analysis	p=.552	
Judge, A., 2011	Moderate Quality	WOMAC (OMERACT-OARSI responders)	1 years	908	total hip arthroplasty	per 1 unit increase in BMI	prior expectations, age, sex, education, ASA status, kellgreen lawrence grade, bmi, number of medications, preop WOMAC score, preop eq-5d	odds ratio (95% CI)	0.97 (0.82, 1.13)	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Judge, A., 2013	Moderate Quality	Oxford Hip Score	5 years	1281	total hip arthroplasty	BMI continuous	year, age, BMI, number of coexisting diseases, baseline sf-36,surgeon grade(consultant;registrar; senior), surgical approach, use of lavage for acetabular component, whether there was cement pressurisation for both the femoral and acetabular components, the type of cement used in both the socket (none, simplex, cmw1, palacos r and other) and the femur (simplex, cmw1, cmw3, palacos r and palacos lv), the type of polyethylene used (uhmwpe and crosslinked), whether the femoral head was made of stainless steel or ceramic, femoral head size (22, 26 or 28 mm) and the femoral component offset size (35, 37.5, 44, 50 mm offset)	regression coefficient for a 10 unit increase in BMI (CI)	-1.54 (-2.45 to -0.64)	Oxford Hip Scores decrease 1.54 points per 10 unit increase in BMI.
McCalden, R.W., 2011	Low Quality	WOMAC (improvement)	2 years	3290	total hip arthroplasty	BMI 40 or above vs. 30 to 40 vs 25 to 29 vs less than 25	none	Tamhanes post hoc anova test	p=.002	improvement was significantly greater in morbidly obese patients than in other bmi groups

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
McCalden, R.W., 2011	Low Quality	SF-12 (mental improvement)	2 years	3290	total hip arthroplasty	BMI 40 or above vs. 30 to 40 vs 25 to 29 vs less than 25	none	Tamhanes post hoc anova test	morbid obese to normal p = 0.23 , to overweight P = 0.425, to obese p = 0.077	
McCalden, R.W., 2011	Low Quality	Harris Hip Score (improvement)	2 years	3290	total hip arthroplasty	BMI 40 or above vs. 30 to 40 vs 25 to 29 vs less than 25	none	BMI 40/30-40/25-29/<25. overall test with ANOVA. post hoc test for group differences with least squares difference	p<.001	improvement was significantly greater in morbidly obese patients than in other bmi groups
McCalden, R.W., 2011	Low Quality	SF-12 (physical improvement)	2 years	3290	total hip arthroplasty	BMI 40 or above vs. 30 to 40 vs 25 to 29 vs less than 25	none	Tamhanes post hoc anova test	morbid obese to normal p = 0.957, to overweight p = 0.639, to obese P = 0.796,	
Sadr, Azodi O., 2006	Low Quality	length of hospital stay	NA	3309	total hip arthroplasty	BMI over 25 to 29.9 vs BMI 18.5 to 24.9	age, calendar period, BMI, medical region, diabetes, congestive heart failure, chronic obstructive lung disease, history of previous cerebrovascular or acute myocardial events	percentage increase in length of stay over reference group (CI)	4.7% (95% CI 2.0 to 7.5)	length of stay longer in overweight patients

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Sadr, Azodi O., 2006	Low Quality	length of hospital stay	NA	3309	total hip arthroplasty	BMI over 30 or over vs BMI 18.5 to 24.9	age, calendar period, BMI, medical region, diabetes, congestive heart failure, chronic obstructive lung disease, history of previous cerebrovascular or acute myocardial events	percentage increase in length of stay over reference group (CI)	7.0% (95% CI 2.9 to 11.1)	length of stay longer in obese patients
Sadr, Azodi O., 2006	Low Quality	overall complications (systemic complications (excludes local wound and prosthesis problems))	60 days	3309	total hip arthroplasty	BMI over 30 or over vs BMI 18.5 to 24.9	age, calendar period, BMI, medical region, diabetes, congestive heart failure, chronic obstructive lung disease, history of previous cerebrovascular or acute myocardial events	logistic regression odds ratio (CI)	1.58 (1.06 to 2.35)	odds of systemic complications 58% greater in obese than normal weight patients
Stevens, M., 2012	Moderate Quality	WOMAC	1 years	653	total hip arthroplasty	continuous	age, gender, bmi, complications, number of comorbidities	regression coefficient (standard error) (pvalue)	-0.63 (SE 0.18) (<0.001)	every increase in 1 kg/m2 BMI leads to a reduction of 0.63 points on the WOMAC score
Stevens, M., 2012	Moderate Quality	SF-36 (general health)	1 years	653	total hip arthroplasty	continuous	age, gender, bmi, complications, number of comorbidities	regression coefficient (standard error) (pvalue)	-0.40 (SE 0.18) (p=0.03)	every increase in 1 kg/m2 BMI leads to a reduction of 0.40 points on the general health score
Yeung, E., 2011	Moderate Quality	Harris Hip Score (total)	NA	268	total hip arthroplasty	BMI <30 vs BMI 30 or above	matched by: duration of follow up, age, surgeon, acetabular component, bearing configuration	paired t test	93.2/89.9	harris hip scores were better in non-obese patients

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Yeung, E., 2011	Moderate Quality	Harris Hip Score (function)	NA	268	total hip arthroplasty	BMI <30 vs BMI 30 or above	matched by: duration of follow up, age, surgeon, acetabular component, bearing configuration	paired t test	31/29.6	scores better in non-obese group
Yeung, E., 2011	Moderate Quality	other questionnaire (VAS patient satisfaction)	NA	268	total hip arthroplasty	BMI <30 vs BMI 30 or above	matched by: duration of follow up, age, surgeon, acetabular component, bearing configuration	paired t test	9.3/9	
Yeung, E., 2011	Moderate Quality	Harris Hip Score (pain)	NA	268	total hip arthroplasty	BMI <30 vs BMI 30 or above	matched by: duration of follow up, age, surgeon, acetabular component, bearing configuration	paired t test	42.3/41.8	
Yeung, E., 2011	Moderate Quality	Harris Hip Score (Activities)	NA	268	total hip arthroplasty	BMI <30 vs BMI 30 or above	matched by: duration of follow up, age, surgeon, acetabular component, bearing configuration	paired t test	11.7/10.6	non-obese had better scores
Yeung, E., 2011	Moderate Quality	implant revision (cumulative survival rate)	11 years	268	total hip arthroplasty	BMI <30 vs BMI 30 or above	matched by: duration of follow up, age, surgeon, acetabular component, bearing configuration	cumulative percent survival tested with log rank test	95.2/96.7	

AGE-ADVERSE EVENTS IN THA PATIENTS

A) Moderate strength evidence supports that increased age is associated with lower functional and quality of life outcomes in patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty.

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 strength evidence supports that increased age may be associated with a higher risk of mortality in patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty.

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.*

C) Limited strength evidence supports that younger age may be associated with a higher risk of revision in patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty.

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.*

RATIONALE

There are four moderate and two low quality articles that support increased age is associated with lower functional and quality of life outcomes in patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty. Specifically, older age is associated with lower mental and physical component SF-36, EQ-5D, and WOMAC scores (Badure-Brzoza 2008, Fujita 2016 & Stevens 2012). Older age is also associated with less sustained improvement in SF-36 and WOMAC scores (Gandhi 2010). There is a non-linear association of age and EQ-5D scores with peak of improvement at age 65 then steeply declining around age 70 (Gordon 2014). Additionally, there is worsening of Oxford hip scores in patients older than 70 (Judge 2013), and patients older than 80 had an average Oxford hip score 3.81 points lower than patients in the 60-70 years cohort. Nonetheless, the change in functional status between younger and older patients was similar (Judge et al 2011; Aranda,Villalobos; Jones et al 2012; McHugh 2013; Quintana et al 2009).

In regard to mortality, there was one moderate and one low quality article demonstrating increased mortality with increasing age in patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty. Whittle 1993 showed a proportional increase of a hazard ratio of 2.4 per 10 year increase in age, which corresponds to a 3.75% 90 day mortality among patients 85 years of age or older. McMinn 2012 demonstrated a similar trend of increasing

Four low quality studies showed an increased risk of revision surgeries in younger patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty. For selected studies, age under 65 was associated with increased risk of revision for aseptic loosening with uncemented prostheses with hazard ratios of 3.21 (Corten 2011) and 2.29 (Visuri 2002). Conversely, Katz 2012 reported a 2% risk of revision in the first 18 months followed by 1% for every year thereafter. Similarly, McMinn 2012 showed that revision risk decreases with increasing age.

POSSIBLE HARMS OF IMPLEMENTATION

It is possible that elderly patients will be denied access to the benefits of THA due to concerns regarding increased risk.

FUTURE RESEARCH

Continued long term studies following younger (age < 50) and older (age > 80) patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty using contemporary techniques.

QUALITY EVALUATION TABLE: AGE-ADVERSE EVENTS IN THA PATIENTS

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION TABLE 3-AGE

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Aranda,Villalobos P., 2013	◑	●	○	●	◑	◑	Include	Low Quality
Badura-Brzoza,K., 2008	◑	◑	◑	●	◑	○	Include	Low Quality
Conroy,J.L., 2008	●	◑	◑	●	○	◑	Include	Low Quality
Corten,K., 2011	◑	●	◑	●	○	◑	Include	Low Quality
Davis,A.M., 2006	◑	●	●	●	◑	◑	Include	Moderate Quality
Fujita,K., 2016	◑	◑	●	●	◑	◑	Include	Low Quality
Gandhi,R., 2010	◑	◑	●	●	◑	◑	Include	Moderate Quality
Gillam,M.H., 2010	◑	●	◑	●	○	◑	Include	Low Quality
Gordon, M., 2013	●	◑	◑	●	◑	◑	Include	Low Quality
Gordon, M., 2014	●	◑	◑	●	◑	●	Include	Moderate Quality
Havelin,L.I., 1995	◑	●	◑	●	○	◑	Include	Low Quality
Huddleston,J.I., 2012	●	●	◑	○	◑	◑	Include	Low Quality
Jameson,S.S., 2013	◑	●	◑	●	○	○	Include	Low Quality
Jones,C.A., 2001	◑	●	●	●	◑	◑	Include	Moderate

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
								Quality
Judge,A., 2011	●	◑	●	●	◑	◑	Include	Moderate Quality
Judge,A., 2013	●	◑	●	●	◑	◑	Include	Moderate Quality
Katz,J.N., 2012	●	◑	◑	●	◑	○	Include	Low uality
Kennedy,J.W., 2013	●	◑	●	●	○	◑	Include	Low Quality
Mancuso,C.A., 2003	◑	◑	◑	●	◑	○	Include	Low Quality
Martinez-Huedo,M.A., 2013	●	●	◑	●	◑	◑	Include	Moderate Quality
McHugh,G.A., 2013	◑	◑	◑	●	◑	◑	Include	Low Quality
McMinn, D.J., 2012	◑	◑	●	●	◑	○	Include	Low Quality
Pedersen,A.B., 2011	●	●	○	●	○	◑	Include	Low Quality
Quintana, J.M., 2009	◑	◑	●	●	◑	○	Include	Low Quality
Rissanen,P., 1996	◑	◑	●	●	◑	●	Include	Moderate Quality
Stevens,M., 2012	◑	●	◑	●	○	●	Include	Moderate Quality
Visuri,T., 2002	●	◑	◑	●	○	◑	Include	Low Quality

SUMMARY OF FINDINGS TABLE 4: AGE

↑ Better Outcomes ↓ Worse Outcomes ● Not Significant	Moderate Quality								Low Quality														
	Gandhi,R., 2010	Gordon,M., 2014	Jones,C.A., 2001	Judge,A., 2011	Judge,A., 2013	Rissanen,P., 1996	Stevens,M., 2012	Whittle,J., 1993	Aranda,Villalobos P., 2013	Badura-Brzoza,K., 2008	Conroy,J.L., 2008	Corten,K., 2011	Fujita,K., 2016	Gillam,M.H., 2010	Gordon,M., 2013	Huddleston,J.I., 2012	Jameson,S.S., 2013	Jones,C.A., 2012	Katz,J.N., 2012	McHugh,G.A., 2013	McMinn,D.J., 2012	Quintana,J.M., 2009	Visuri,T., 2002
Complications																							
overall complications(in hosptial)																↓							
Composite																							
Harris Hip Score(change from baseline)									●														
WOMAC()	↓						↓																
WOMAC(total change from baseline)									●														
WOMAC(OMERACT-OARSI responders)				●																			
Oxford Hip Score()					↑																		
Function																							
other questionnaire(number of hours of physical activity per week)									●														
SF-36(mental component change from baseline)									●														
SF-36(mental component scores)										↓													
SF-36(physical component change from baseline)									●														
SF-36(physical component score)										↓													
SF-36(physical function)	↓																					●	
SF-36(Role Limitation: physical)	↓																						
WOMAC(function change from baseline)									●														
WOMAC(function)			●																				
WOMAC(function change over time)																		●					
SF-36(physical score)																				●			
SF-36(role physical)																						●	
SF-36(mental component score)																						●	
other questionnaire(ADS-items score)						●																	
other questionnaire(Nottingham Health Profile Mobility)						●																	
Other																							
WOMAC(stiffness change from baseline)									●														
Pain																							
WOMAC(pain change from baseline)									●														
WOMAC(pain)			●																				
WOMAC(pain change over time)																		●					
SF-36(bodily pain)																						●	
other questionnaire(Nottingham Health Profile Pain)						●																	
Quality Of Life																							
EQ-5d()													↓										
EQ-5d(index score)		↓													↓								
EQ-5d(VAS score)		↓													↓								
SF-36(General Health)							↓															●	
other questionnaire(15d improvement)						↓																	
Reoperation																							
implant revision()														●			●		↑		↑		↑
implant revision(aseptic revision)												↑											
implant revision(for dislocation)											●												
Mortality																							
mortality()								↓													↓		

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Aranda, Villalobos P., 2013	Low Quality	Harris Hip Score (change from baseline)	3 months	63	total hip arthroplasty	continuous	none	correlation coefficient	0.145	
Aranda, Villalobos P., 2013	Low Quality	WOMAC (pain change from baseline)	3 years	63	total hip arthroplasty	continuous	none	correlation coefficient	-.080	
Aranda, Villalobos P., 2013	Low Quality	WOMAC (function change from baseline)	3 months	63	total hip arthroplasty	continuous	none	correlation coefficient	-.213	
Aranda, Villalobos P., 2013	Low Quality	other questionnaire (number of hours of physical activity per week)	3 months	63	total hip arthroplasty	continuous	none	correlation coefficient	0.065	
Aranda, Villalobos P., 2013	Low Quality	WOMAC (stiffness change from baseline)	3 months	63	total hip arthroplasty	continuous	none	correlation coefficient	-.024	
Aranda, Villalobos P., 2013	Low Quality	WOMAC (total change from baseline)	3 months	63	total hip arthroplasty	continuous	none	correlation coefficient	-.201	
Aranda, Villalobos P., 2013	Low Quality	SF-36 (mental component change from baseline)	3 months	63	total hip arthroplasty	continuous	none	correlation coefficient	0.104	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Aranda, Villalobos P., 2013	Low Quality	SF-36 (physical component change from baseline)	3 months	63	total hip arthroplasty	continuous	none	correlation coefficient	0.107	
Badura-Brzoza, K., 2008	Low Quality	SF-36 (mental component scores)	6 months	184	total hip arthroplasty - Only Hip OA	continuous	age, gender, merital status, education, working, comorbidities, bmi, anxiety (post-op), depression (post op), satisfaction	p value from logistic regression	p<0.011	older age associated with worse mental component scores
Badura-Brzoza, K., 2008	Low Quality	SF-36 (physical component score)	6 months	184	total hip arthroplasty - Only Hip OA	continuous	age, gender, merital status, education, working, comorbidities, bmi, anxiety (post-op), depression (post op), satisfaction	p value from logistic regression	p=.012	older age associated with worse physical component scores
Conroy, J.L., 2008	Low Quality	implant revision (for dislocation)	Post-Op	58190	total hip arthroplasty	age 80-89 vs less than 50	gender, head size, age, cemented vs cementless acetabular components	relative risk from log binomial model (CI)	1.49 (0.87-2.56)	
Conroy, J.L., 2008	Low Quality	implant revision (for dislocation)	Post-Op	58190	total hip arthroplasty	age 70-79 vs less than 50	gender, head size, age, cemented vs cementless acetabular components	relative risk from log binomial model (CI)	1.23 (0.73-2.05)	
Conroy, J.L., 2008	Low Quality	implant revision (for dislocation)	Post-Op	58190	total hip arthroplasty	age 90+ vs less than 50	gender, head size, age, cemented vs cementless acetabular components	relative risk from log binomial model (CI)	2.41 (0.95-6.14)	
Conroy, J.L., 2008	Low Quality	implant revision (for dislocation)	Post-Op	58190	total hip arthroplasty	age 50 to 59 vs less than 50	gender, head size, age, cemented vs cementless acetabular components	relative risk from log binomial model (CI)	1.00 (0.57-1.75)	
Conroy, J.L., 2008	Low Quality	implant revision (for dislocation)	Post-Op	58190	total hip arthroplasty	age 60-69 vs less than 50	gender, head size, age, cemented vs cementless acetabular components	relative risk from log binomial model (CI)	0.96 (0.57-1.62)	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Corten, K., 2011	Low Quality	implant revision (aseptic revision)	17 years	250	total hip arthroplasty	age under 65 vs 65+	THA fixation group, age, gender	cox proportional hazard ratio with death as a competing risk (p value)	3.21 (p<0.001)	younger age increases the risk of aseptic revision.
Fujita, K., 2016	Low Quality	EQ-5d	3 years	576	total hip arthroplasty - Only Hip OA	continuous	3 year post-op womac function score, 3 year post-op womac pain score, age, use of japanese seiza eating position at 3 years, comorbidity	only p value was extracted. coding of age was not specified, so regression coefficient not extracted	0.001	age was negatively associated with quality of life.
Gandhi, R., 2010	Moderate Quality	WOMAC	6 years	636	total hip arthroplasty	continuous	age, gender, year of follow up, BMI, Comorbidity (CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	0.25 (0.14, 0.36)	older age associated with less sustained improvement
Gandhi, R., 2010	Moderate Quality	SF-36 (Physical Function)	6 years	636	total hip arthroplasty	continuous	age, gender, year of follow up, BMI, Comorbidity (CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	–0.29 (–0.44, –0.14)	older age associated with less sustained improvement
Gandhi, R., 2010	Moderate Quality	SF-36 (Role Limitation: physical)	6 years	636	total hip arthroplasty	continuous	age, gender, year of follow up, BMI, Comorbidity (CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	–0.54 (–0.77, –0.31)	older age associated with less sustained improvement
Gillam, M.H., 2010	Low Quality	implant revision	6 years	73424	total hip arthroplasty	age over 70 vs under 70	none	p value for grays test of survival analysis with death as a competing risk	p=.2	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Gordon, M., 2013	Low Quality	EQ-5d (VAS score)	1 years	15192	total hip arthroplasty (from Swedish Hip Arthroplasty Register and Danish Hip Arthroplasty Register)	continuous	age, sex, Charlson's index, country (Sweeden or Denmark)	used cubic splines for age in a regression model	not reported	Age had a non-linear association, peaking at age 65 and then steeply declining around age 70
Gordon, M., 2013	Low Quality	EQ-5d (index score)	1 years	15192	total hip arthroplasty (from Swedish Hip Arthroplasty Register and Danish Hip Arthroplasty Register)	continuous	age, sex, Charlson's index, country (Sweeden or Denmark)	used cubic splines for age in a regression model	not reported	Age had a non-linear association, peaking at age 65 and then steeply declining around age 70
Gordon, M., 2014	Moderate Quality	EQ-5d (Index score)	1 years	34519	total hip arthroplasty	continuous	age, sex, preoperative VAS pain, previous contralateral surgery, Charnley class	used cubic splines for age in a regression model	statistic not reported	Age had a significant non-linear association with quality of life.the decline starts in the late 60s
Gordon, M., 2014	Moderate Quality	EQ-5d (VAS score)	1 years	34519	total hip arthroplasty	continuous	age, sex, preoperative VAS pain, previous contralateral surgery, Charnley class	used cubic splines for age in a regression model	statistic not reported	Age had a significant non-linear association with quality of life.the decline starts in the late 60s

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Huddleston, J.I., 2012	Low Quality	overall complications (in hosptial)	Post-Op	1809	total hip arthroplasty	age 75-84 vs 85 and over	unclear	p value from hierarchical generalized linear modeling	p=.027	in hostpital complications lower in younger group
Huddleston, J.I., 2012	Low Quality	overall complications (in hosptial)	Post-Op	1809	total hip arthroplasty	age 65 or less vs 85 and over	unclear	p value from hierarchical generalized linear modeling	0.008	in hostpital complications lower in younger group
Huddleston, J.I., 2012	Low Quality	overall complications (in hosptial)	Post-Op	1809	total hip arthroplasty	age 65-74 vs 85 and over	unclear	p value from hierarchical generalized linear modeling	p=.003	in hostpital complications lower in younger group
Jameson, S.S., 2013	Low Quality	implant revision	5 years	35386	total hip arthroplasty	age over 85 vs age 65 to 74 vs age <65; in subgroup of cementless THAs	varabiable not included in multivariate model due to univariate insignificance	univariate proportional hazards with pairwise over strata p value for difference betweeen age groups	P=.796	
Jones, C.A., 2001	Moderate Quality	WOMAC (pain)	6 months	194	total hip arthroplasty	continuous	Variables included in forward stepwise model: Age, sex, wait list time, length of stay, pre op SF-36 pain, number of comorbidities, use of cement; variables excluded from stepwise model: bmi, contralateral joint involvement, lives alone	unstandardized regression coefficient of change score (CI)	-.02 (-.41, .37)	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Jones, C.A., 2001	Moderate Quality	WOMAC (function)	6 months	193	total hip arthroplasty	continuous	Age, sex, wait list time, length of stay, pre op SF-36 pain, pre op WOMAC pain, number of comorbidities, lives alone, bmi, contralateral joint involvement, lives alone; variables excluded from stepwise model: use of cement	unstandardized regression coefficient of change score (CI)	.28 (-.07,.63)	
Jones, C.A., 2012	Low Quality	WOMAC (pain change over time)	3 years	231	total hip arthroplasty	continuous	bmi, age, diabetes, cardiac disease, gender, gender x time interaction, diabetes x time interaction	fixed effects regression coefficient	-0.06 (-0.21, 0.10)	
Jones, C.A., 2012	Low Quality	WOMAC (function change over time)	3 years	231	total hip arthroplasty	continuous	bmi, age, diabetes, cardiac disease, gender, gender x time interaction, diabetes x time interaction	fixed effects regression coefficient	0.13 (-0.3, 0.28)	
Judge, A., 2011	Moderate Quality	WOMAC (OMERACT-OARSI responders)	1 years	908	total hip arthroplasty	odds ratio per 10 unit increase	prior expectations, age, sex, education, ASA status, kellgreen lawrence grade, bmi, number of medications, preop WOMAC score, preop eq-5d	odds ratio (95% CI)	1 (.77, 1.33)	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Judge, A., 2013	Moderate Quality	Oxford Hip Score	5 years	1281	total hip arthroplasty	age 70-80 vs age 60 to 70	year, age, BMI, number of coexisting diseases, baseline sf-36,surgeon grade (consultant;registrar;senior), surgical approach, use of lavage for acetabular component, whether there was cement pressurisation for both the femoral and acetabular components, the type of cement used in both the socket (none, simplex, cmw1, palacos r and other) and the femur (simplex, cmw1, cmw3, palacos r and palacos lv), the type of polyethylene used (uhmwpe and crosslinked), whether the femoral head was made of stainless steel or ceramic, femoral head size (22, 26 or 28 mm) and the femoral component offset size (35, 37.5, 44, 50 mm offset)	regression coefficient (CI)	-1.49 (-2.37 to -0.61)	70-80 year olds had an average oxford hip score 1.49 points worse than patients 60-70

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Judge, A., 2013	Moderate Quality	Oxford Hip Score	5 years	1281	total hip arthroplasty	age 80+ vs age 60 to 70	year, age, BMI, number of coexisting diseases, baseline sf-36,surgeon grade (consultant;registrar;senior), surgical approach, use of lavage for acetabular component, whether there was cement pressurisation for both the femoral and acetabular components, the type of cement used in both the socket (none, simplex, cmw1, palacos r and other) and the femur (simplex, cmw1, cmw3, palacos r and palacos lv), the type of polyethylene used (uhmwpe and crosslinked), whether the femoral head was made of stainless steel or ceramic, femoral head size (22, 26 or 28 mm) and the femoral component offset size (35, 37.5, 44, 50 mm offset)	regression coefficient (CI)	-3.81 (-5.29 to -2.33)	80+ year olds had an average oxford hip score 3.81 points worse than patients 60-70

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Judge, A., 2013	Moderate Quality	Oxford Hip Score	5 years	1281	total hip arthroplasty	age less than 50-60 vs age 60 to 70	year, age, BMI, number of coexisting diseases, baseline sf-36,surgeon grade(consultant;registrar;senior), surgical approach, use of lavage for acetabular component, whether there was cement pressurisation for both the femoral and acetabular components, the type of cement used in both the socket (none, simplex, cmw1, palacos r and other) and the femur (simplex, cmw1, cmw3, palacos r and palacos lv), the type of polyethylene used (uhmwpe and crosslinked), whether the femoral head was made of stainless steel or ceramic, femoral head size (22, 26 or 28 mm) and the femoral component offset size (35, 37.5, 44, 50 mm offset)	regression coefficient (CI)	-1.87 (-3.22 to -0.53)	50-60 year olds had an average oxford hip score 1.87 points worse than patients 60-70
Katz, J.N., 2012	Low Quality	implant revision	12 years	51347	total hip arthroplasty	age 65 to 75 vs older than 75	sex, age, race, medicaid eligibility,charlson score greater than 1 vs lower, hospital volume	Hazard ratio accounting for competing risk of death, fracture, myocardial infarction and stroke	1.75 (1.63, 1.88)	younger at higher risk for revision

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
McHugh, G.A., 2013	Low Quality	SF-36 (physical score)	6 months	188	total hip arthroplasty	continuous	age,gender,bmi,ENRICHD Social Support score at baseline,Previous joint surgery, involvement in decision to undergo THR,comorbidity, Any comorbidies,any complicatoins, taking opioids, taking nsaids, hospital anxiety and depression(HADS)/anxiety subscore at baseline, HADS depression subscore at baseline, baseline WOMAC pain, baseline SF-36 physical score at baseline	linear mixed regression model coeficient (CI)	-0.01 (-0.10 to 0.09)	
McHugh, G.A., 2013	Low Quality	SF-36 (physical score)	1 years	188	total hip arthroplasty	continuous	age,gender,bmi,ENRICHD Social Support score at baseline,Previous joint surgery, involvement in decision to undergo THR,comorbidity, Any comorbidies,any complicatoins, taking opioids, taking nsaids, hospital anxiety and depression (HADS)/anxiety subscore at baseline, HADS depression subscore at baseline, baseline WOMAC pain, baseline SF-36 physical score at baseline	linear mixed regression model coeficient (CI)	-0.01 (-0.10 to 0.09)	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
McMinn, D.J., 2012	Low Quality	mortality	8 years	103938	total hip arthroplasty	age continuous, but unclear if hazard ratio reported is per 1 or 10 year increase. not reported here	use of cement, age, ASA score, gender, surgical complexity	HR not repored here because of unclear variable coding in article	not reported	age increases risk of mortality
McMinn, D.J., 2012	Low Quality	implant revision	6 years	103938	hip resurfacing	age continuous, but unclear if hazard ratio reported is per 1 or 10 year increase. not reported here	variables in final model: use of cement, age, ASA score; variable excluded from final model:gender,surgical complexity	HR not repored here because of unclear variable coding in article	not reported	
McMinn, D.J., 2012	Low Quality	implant revision	8 years	103938	total hip arthroplasty	age continuous, but unclear if hazard ratio reported is per 1 or 10 year increase. not reported here	variables in final model: use of cement, age, ASA score, gender; variable excluded from final model:surgical complexity	HR not repored here because of unclear variable coding in article	not reported	revision risk decreases with increasing age

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
McMinn, D.J., 2012	Low Quality	mortality	6 years	103938	hip resurfacing	age continuous, but unclear if hazard ratio reported is per 1 or 10 year increase. not reported here	use of cement, age, ASA score, gender, surgical complexity	HR not repored here because of unclear variable coding in article	not reported	age increases risk of mortality
Pedersen, A.B., 2011	Low Quality	mortality	90 days	178232	total hip arthroplasty	age 10 to 59 compared to age matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	2.1 (1.1 to 3.7)	hip THA patients aged 10 to 59 had higher mortality rates than age and sex matched healthy controls
Pedersen, A.B., 2011	Low Quality	mortality	12 years	178232	total hip arthroplasty	age 10 to 59 compared to age matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.9 (0.8 to 1.1)	
Pedersen, A.B., 2011	Low Quality	mortality	90 days	178232	total hip arthroplasty	age 60 to 69 compared to age matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.6 (0.4 to 0.9)	hip THA patients aged 60 to 69 had lower mortality rates than age and sex matched healthy controls

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Pedersen, A.B., 2011	Low Quality	mortality	12 years	178232	total hip arthroplasty	age 70 to 79 compared to age matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.7 (0.7 to 0.8)	hip THA patients aged 70 to 79 had lower mortality rates than age and sex matched healthy controls
Pedersen, A.B., 2011	Low Quality	mortality	90 days	178232	total hip arthroplasty	age 70 to 79 compared to age matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.8 (0.6 to 0.9)	hip THA patients aged 70 to 79 had lower mortality rates than age and sex matched healthy controls
Pedersen, A.B., 2011	Low Quality	mortality	12 years	178232	total hip arthroplasty	age 60 to 69 compared to age matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.7 (0.7 to 0.8)	hip THA patients aged 60 to 69 had lower mortality rates than age and sex matched healthy controls
Pedersen, A.B., 2011	Low Quality	mortality	12 years	178232	total hip arthroplasty	age 80+ compared to age matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.6 (0.6 to 0.7)	hip THA patients aged 80+ had lower mortality rates than age and sex matched healthy controls

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Pedersen, A.B., 2011	Low Quality	mortality	90 days	178232	total hip arthroplasty	age 80+ compared to age matched healthy population without hip replacement	age, gender, charlson comorbidity index	mortality rate ratio	0.8 (0.7 to 1.0)	hip THA patients aged 80+ had lower mortality rates than age and sex matched healthy controls
Quintana, J.M., 2009	Low Quality	SF-36 (physical function)	6 months	590	total hip arthroplasty	age over 70 vs under 70	preintervention score, pre intervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	-2.91 (p=.15)	
Quintana, J.M., 2009	Low Quality	SF-36 (bodily pain)	6 months	590	total hip arthroplasty	age over 70 vs under 70	preintervention score, pre intervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	1.92 (p=0.42)	
Quintana, J.M., 2009	Low Quality	SF-36 (role physical)	6 months	590	total hip arthroplasty	age over 70 vs under 70	preintervention score, pre intervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	3.98 (p=0.33)	
Quintana, J.M., 2009	Low Quality	SF-36 (General Health)	6 months	590	total hip arthroplasty	age over 70 vs under 70	preintervention score, preintervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	1.28 (p=0.39)	
Quintana, J.M., 2009	Low Quality	SF-36 (mental component score)	6 months	590	total hip arthroplasty	age over 70 vs under 70	preintervention score, preintervention SF-36 mental health, age, gender, contralateral hip oa, charlson comorbidity score, back pain	regression coefficient of change (p value)	0.82 (p=0.41)	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Rissanen, P., 1996	Moderate Quality	other questionnaire (ADS-items score)	24 months	276	total hip arthroplasty	continuous	age, gender, education, baseline score	quadratic term in regression model. decrease in functional change per 1000 unit increase in age-squared.	-0.034	
Rissanen, P., 1996	Moderate Quality	other questionnaire (15d improvement)	24 months	276	total hip arthroplasty	continuous	age, gender, education, baseline score	quadratic term in regression model. decrease in functional improvement per 1000 unit increase in age-squared.	-0.0079	improvement in 15d score has a negative curvilinear relationship with age
Rissanen, P., 1996	Moderate Quality	other questionnaire (Nottingham Health Profile Pain)	24 months	276	total hip arthroplasty	continuous, transformed to age-squared	age, gender, education, baseline score	quadratic term in regression model. decrease in functional change per 1000 unit increase in age-squared.	-1.401	
Rissanen, P., 1996	Moderate Quality	other questionnaire (Nottingham Health Profile Mobility)	24 months	276	total hip arthroplasty	continuous, transformed to age-squared	age, gender, education, baseline score	quadratic term in regression model. decrease in functional change per 1000 unit increase in age-squared.	0.9289	
Stevens, M., 2012	Moderate Quality	WOMAC	1 years	653	total hip arthroplasty	continuous, but units are unclear	age, gender, bmi, complications, number of comorbidities	regression coefficient (standard error) (pvalue)	-0.18 (SE 0.09) (p=0.04)	higher age results in worse post op WOMAC score

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Stevens, M., 2012	Moderate Quality	SF-36 (general health)	1 years	653	total hip arthroplasty	continuous, but units are unclear	age, gender, bmi, complications, number of comorbidities	regression coefficient(standard error) (pvalue)	-0.24 (SE 0.09) (p=0.01)	higher age results in worse post op general health score
Visuri, T., 2002	Low Quality	implant revision	Post-Op	38010	total hip arthroplasty	age over 75 vs age under 55	age, gender, ten year time period of surgery, use of cement	cox proportional hazard ratio	2.95 (2.58–3.39)	risk of revision is higher in patients younger than 55
Visuri, T., 2002	Low Quality	implant revision	Post-Op	38010	total hip arthroplasty	age over 75 vs age 65-75	age, gender, ten year time period of surgery, use of cement	cox proportional hazard ratio	1.50 (1.34–1.67)	risk of revision is higher in patients age 65-75
Visuri, T., 2002	Low Quality	implant revision	Post-Op	38010	total hip arthroplasty	age over 75 vs age 55 to 65	age, gender, ten year time period of surgery, use of cement	cox proportional hazard ratio	2.29 (2.04–2.57)	risk of revision is higher in patients age 55-65
Whittle, J., 1993	Moderate Quality	mortality	3 years	3442	total hip arthroplasty (Osteoarthritis patients only)	continuous	age, race, gender	cox proportional hazard ratio per 10 year increase in age (CI)	2.40 (1.80 3.21)	older patients are at increased risk of mortality

MENTAL HEALTH DISORDER

Moderate strength evidence supports that mental health disorders, such as depression, anxiety, and psychosis, are associated with decreased function, pain relief, and quality of life outcomes in patients with symptomatic osteoarthritis of the hip who undergo total hip arthroplasty (THA).

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.

RATIONALE

Six moderate quality studies (Davis, 2006; Duivenvoorden, 2013; Gandhi, 2010; Jamsen, 2013; Judge, 2013; Rolfson, 2009) support this recommendation. Mental health disorders were assessed using a variety of validated tools including the SF36 Mental Component Score (Judge, 2013; Gandhi, 2010), the depression/anxiety question on the EQ-5D (Rolfson, 2009) and the HADS (Duivenvoorden, 2013). Functional outcomes were assessed utilizing the Oxford Hip Score, WOMAC or HOOS.The presence of depression preoperatively predicted a lower functional outcome and/or less improvement between pre-operative and post-operative function. In one long-term study (Jamsen, 2013), patients with depression were found to exceed 10% revision rate at ten years; pre-operative psychosis increased the risk of implant failure with Kaplan Meier Survivorship analysis by 40%.

POSSIBLE HARMS OF IMPLEMENTATION

It is possible that patients with mental health disorders will be denied access to the potential benefits of THA due to concerns regarding increased risk.

FUTURE RESEARCH

Addressing mental health disorders as modifiable risk factors should be considered as an important focus of research. Research questions might include the treatment of depression prior to surgery and managing anxiety through the episode of care and the impact on outcomes and patient satisfaction.

QUALITY EVALUATION TABLE: MENTAL HEALTH DISORDERS

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION TABLE 4-MENTAL HEALTH DISORDERS

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Davis,A.M., 2006	◑	●	●	●	◑	◑	Include	Moderate Quality
Duivenvoorden,T., 2013	◑	◑	◑	●	●	●	Include	Moderate Quality
Gandhi,R., 2010	◑	◑	●	●	◑	◑	Include	Moderate Quality
Jamsen,E., 2013	●	●	○	●	●	●	Include	Moderate Quality
Judge,A., 2013	●	◑	●	●	◑	◑	Include	Moderate Quality
Rolfson,O., 2009	●	◑	◑	●	◑	◑	Include	Moderate Quality

	Moderate Quality				
↑ **Better Outcomes** ↓ **Worse Outcomes** ● **Not Significant**	Duivenvoorden,T., 2013	Gandhi,R., 2010	Jamsen,E., 2013	Judge,A., 2013	Rolfson,O., 2009
Composite					
WOMAC()		●			
Oxford Hip Score()				↓	
Function					
HOOS(ADL)	↓				
HOOS(sport)	↓				
SF-36(physical function)		●			
SF-36(Role Limitation: physical)		●			
Pain					
HOOS(pain change)	↓				
VAS pain(percent reduction)					↓
Quality Of Life					
HOOS(quality of life)	↓				
Reoperation					
implant revision()			↓		
Symptoms					
HOOS(symptoms)	↓				
patient satisfaction(satisfaction reduction in VAS units)					↓

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Duivenvoorden, T., 2013	Moderate Quality	HOOS (ADL)	1 years	153	total hip arthroplasty	HADS depression score over 8 (depressed) versus HADS depression score under 8 (not depressed)	age, gender, preoperative score of the HOOS subscale,waiting time, HOOS symptoms score, familial depression	adjusted change from baseline (CI)	-10.2 (-15.3; -5.1)	depression predicted less improvement
Duivenvoorden, T., 2013	Moderate Quality	HOOS (sport)	1 years	153	total hip arthroplasty	HADS depression score over 8 (depressed) versus HADS depression score under 8 (not depressed)	age, gender, preoperative score of the HOOS subscale,waiting time, HOOS symptoms score, familial depression	adjusted change from baseline (CI)	-4.7 (-12.5; 3.2)	
Duivenvoorden, T., 2013	Moderate Quality	HOOS (quality of life)	1 years	153	total hip arthroplasty	HADS depression score over 8 (depressed) versus HADS depression score under 8 (not depressed)	age, gender, preoperative score of the HOOS subscale,waiting time, HOOS symptoms score, familial depression	adjusted change from baseline (CI)	-9.0 (-15.4; -2.6)	depression predicted less improvement

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Duivenvoorden, T., 2013	Moderate Quality	HOOS (ADL)	1 years	153	total hip arthroplasty	HADS Anxiety score over 8 (anxious) versus HADS anxiety score under 8 (not anxious)	age, gender, preoperative score of the HOOS subscale,waiting time, HOOS symptoms score, familial depression	adjusted change from baseline (CI)	9.5 (-15.1; -4.0)	anxiety predicted less improvement
Duivenvoorden, T., 2013	Moderate Quality	HOOS (sport)	1 years	153	total hip arthroplasty	HADS Anxiety score over 8 (anxious) versus HADS anxiety score under 8 (not anxious)	age, gender, preoperative score of the HOOS subscale,waiting time, HOOS symptoms score, familial depression	adjusted change from baseline (CI)	-9.1 (-17.7; -0.4)	anxiety predicted less improvement
Duivenvoorden, T., 2013	Moderate Quality	HOOS (quality of life)	1 years	153	total hip arthroplasty	HADS Anxiety score over 8 (anxious) versus HADS anxiety score under 8 (not anxious)	age, gender, preoperative score of the HOOS subscale,waiting time, HOOS symptoms score, familial depression	adjusted change from baseline (CI)	11.2 (-18.1; -4.3)	anxiety predicted less improvement

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Duivenvoorden, T., 2013	Moderate Quality	HOOS (pain change)	1 years	153	total hip arthroplasty	HADS Anxiety score over 8 (anxious) versus HADS anxiety score under 8 (not anxious)	age, gender, preoperative score of the HOOS subscale,waiting time, HOOS symptoms score, familial depression	adjusted change from baseline (CI)	-7.6 (-13.1; -2.1)	anxiety predicted less improvement
Duivenvoorden, T., 2013	Moderate Quality	HOOS (symptoms)	1 years	153	total hip arthroplasty	HADS Anxiety score over 8 (anxious) versus HADS anxiety score under 8 (not anxious)	age, gender, preoperative score of the HOOS subscale,waiting time, HOOS symptoms score, familial depression	adjusted change from baseline (CI)	-4.5 (-9.8; 0.7)	
Duivenvoorden, T., 2013	Moderate Quality	HOOS (pain change)	1 years	153	total hip arthroplasty	HADS depression score over 8 (depressed) versus HADS depression score under 8 (not depressed)	age, gender, preoperative score of the HOOS subscale,waiting time, HOOS symptoms score, familial depression	adjusted change from baseline (CI)	-9.1 (-14.1; 4.0)	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Duivenvoorden, T., 2013	Moderate Quality	HOOS (symptoms)	1 years	153	total hip arthroplasty	HADS depression score over 8 (depressed) versus HADS depression score under 8 (not depressed)	age, gender, preoperative score of the HOOS subscale,waiting time, HOOS symptoms score, familial depression	adjusted change from baseline (CI)	-6.2 (-10.9; -1.4)	depression predicted less improvement
Gandhi, R., 2010	Moderate Quality	WOMAC	6 years	636	total hip arthroplasty	baseline SF-36 Mental Health score (continuous)	age, gender, year of follow up, BMI, Comorbidity (CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	0.04 (–0.02, 0.11)	
Gandhi, R., 2010	Moderate Quality	SF-36 (Physical Function)	6 years	636	total hip arthroplasty	baseline SF-36 Mental Health score (continuous)	age, gender, year of follow up, BMI, Comorbidity (CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	0.005 (–0.09, 0.10)	
Gandhi, R., 2010	Moderate Quality	SF-36 (Role Limitation: physical)	6 years	636	total hip arthroplasty	baseline SF-36 Mental Health score (continuous)	age, gender, year of follow up, BMI, Comorbidity (CIRS), SF-36 baseline mental scores, fixation method	change from baseline in longitudinal regression model	0.10 (–0.05, 0.25)	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Jamsen, E., 2013	Moderate Quality	implant revision	10 years	43747	total hip arthroplasty	psychotic disorders versus none	cardiovascular diseases, coronary heart disease, atrial fibrillation, heart failure, hypertension w/o cardiovascular disease, diabetes, cancer, pulmonary disease, depression, psychotic disorders, neurodegenerative diseases, age, sex, operation year, laterality, fixation method, hospital type	cox proportional hazard ratio	1.41 (1.04 to 1.91)	psychotic disorders increase the risk of revision
Jamsen, E., 2013	Moderate Quality	implant revision	10 years	43747	total hip arthroplasty	depression vs no depression	cardiovascular diseases, coronary heart disease, atrial fibrillation, heart failure, hypertension w/o cardiovascular disease, diabetes, cancer, pulmonary disease, depression, psychotic disorders, neurodegenerative diseases, age, sex, operation year, laterality, fixation method, hospital type	cox proportional hazard ratio	0.60 (0.22 to 1.63)	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Judge, A., 2013	Moderate Quality	Oxford Hip Score	5 years	1281	total hip arthroplasty	SF-36 mental health (continuous)	year, age, BMI, number of coexisting diseases, baseline sf-36	regression coefficient for a 10 unit increase in mental health score (CI)	0.76 (0.46 to 1.07)	worse pre-op mental health score was related to worse post op oxford hip score
Rolfson, O., 2009	Moderate Quality	VAS pain (percent reduction)	1 years	6158	total hip arthroplasty	preoperative anxiety and depression in the 5th dimension of the EQ-5D vs no depression and anxiety	dimensions of EQ-5D pre-operatively, Charnley category, age, gender	ANCOVA adjusted percentage difference between groups (SE) (p value)s (SE) (p value)	4.4 (SE 0.84) (p<.001)	Patients with any pre-operative anxiety/depression reported 4.4% less pain reduction than patients
Rolfson, O., 2009	Moderate Quality	patient satisfaction (satisfaction reduction in VAS units)	1 years	6158	total hip arthroplasty	preoperative anxiety and depression in the 5th dimension of the EQ-5D vs no depression and anxiety	dimensions of EQ-5D pre-operatively, Charnley category, age, gender	ANCOVA adjusted difference between groups (SE) (p value)	4 (SE 0.55) (p<.001)	anxiety/depression resulted in an average 4 point reduction in VAS satisfaction level

TOBACCO USE

Limited strength evidence supports that patients who use tobacco products are at an increased risk for complications after total hip arthroplasty.

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*

RATIONALE

Two low-quality studies (Sadr et al and Huddleston et al) examined the complication rates of THA patients who smoked tobacco compared with those who did not. One of the studies (Sadr) found a significant increase in perioperative complications in heavy tobacco users, and a 43% increase in complications in those who previously used tobacco, which rose to 56% for current tobacco users. However, Huddleston et al showed no increase in complications among THA patients who smoked tobacco when compared with those who did not.

The detrimental effects of smoking on wound healing, pulmonary function, and the immune system are well accepted. While the evidence to require patients to cease smoking prior to THA consisted of low-quality studies, educating and engaging patients in the health benefits of smoking cessation remains a priority.

POSSIBLE HARMS OF IMPLEMENTATION

It is possible that patients who use tobacco products will be denied access to the potential benefits of THA based on limited available evidence.

FUTURE RESEARCH

A randomized controlled trial of patients who use tobacco and are undergoing total hip arthroplasty is warranted, comparing patients who cease or decrease tobacco use, to those who continue smoking during the perioperative period. Consideration should also be given to evaluation of the efficacy of nicotine replacement therapy and/or counseling on smoking behavior.

QUALITY EVALUATION TABLE: TOBACCO USE

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION -TOBACCO USE

Study	Representative Population	Reason for Follow Up Loss	Prognostic Factor Measured	Outcome Measurement	Confounders	Appropriate Statistical Analysis	Inclusion	Strength
Huddleston,J.I., 2012	●	●	◑	○	◑	◑	Include	Low Quality
Sadr,Azodi O., 2006	◑	●	◑	●	◑	○	Include	Low Quality

↑ Better Outcomes ↓ Worse Outcomes ● Not Significant		Low Quality	
Outcome Type	**Outcome**	Huddleston2012	Sadr2006
Complications	overall complications(in-hospital complications)	●	
	overall complications(local wound and prosthesis problems)		●
	overall complications(systemic complications (excludes local wound and prosthesis problems))		↓
Length Of Stay	length of hospital stay()		●

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Huddleston, J.I., 2012	Low Quality	overall complications (in hosptial)	Post-Op	1809	total hip arthroplasty	current smoker or previous smoker vs non-smokers	unclear	p value from hierarchical generalized linear modeling	p=.83	
Sadr, Azodi O., 2006	Low Quality	length of hospital stay	NA	3309	total hip arthroplasty	previous smoker or current smoker versus never smoked	age, calendar period, BMI, medical region, diabetes, congestive heart failure, chronic obstructive lung disease, history of previous cerebrovascular or acute myocardial events	regression analysis used	coefficients not reported	
Sadr, Azodi O., 2006	Low Quality	overall complications (systemic complications (excludes local wound and prosthesis problems))	60 days	3309	total hip arthroplasty	current smokers versus never smokers	age, calendar period, BMI, medical region, diabetes, congestive heart failure, chronic obstructive lung disease, history of previous cerebrovascular or acute myocardial events	logistic regression odds ratio (CI)	1.56 (1.14 to 2.14)	odds of systemic complications were 56% greater in current smokers than in those who never smoked
Sadr, Azodi O., 2006	Low Quality	length of hospital stay	NA	3309	total hip arthroplasty	type of tobacco (none vs cigarette, pipe/cigar, snuff, mixed)	age, calendar period, BMI, medical region, diabetes, congestive heart failure, chronic obstructive lung disease, history of previous cerebrovascular or acute myocardial events	regression analysis used	coefficient not reported	

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Sadr, Azodi O., 2006	Low Quality	overall complications (local wound and prosthesis problems)	60 days	3309	total hip arthroplasty	previous smoker or current smoker versus never smoked	age, calendar period, BMI, medical region, diabetes, congestive heart failure, chronic obstructive lung disease, history of previous cerebrovascular or acute myocardial events	none reported	none reported	
Sadr, Azodi O., 2006	Low Quality	overall complications (systemic complications (excludes local wound and prosthesis problems))	60 days	3309	total hip arthroplasty	previous smokers versus never smokers	age, calendar period, BMI, medical region, diabetes, congestive heart failure, chronic obstructive lung disease, history of previous cerebrovascular or acute myocardial events	logistic regression odds ratio (CI)	1.32 (1.04 to 1.97)	odds of systemic complications were 32% greater in former smokers than in those who never smoked

Strong evidence supports that NSAIDs improve short-term pain, function, or both in patients with symptomatic osteoarthritis of the hip.

Strength of Recommendation: Strong Evidence ★★★★

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

RATIONALE

All efficacy studies included are high quality placebo controlled trials (Schnitzer, et.al., Baerwald, et.al. , Svensson, et.al., Klein, et.al., Macarowski, et.al. , Kivitz et.al). Some studies also included comparisons to unavailable, experimental and nutriceutical agents (insert references); these agents were not considered for this review.
All studies reported clinical improvements employing standard clinical measuring instruments, including Womac, SF-36, VAS, OARSI and Lequensne scoring; at least two were used in each study. Study duration never exceeded 13 weeks and was the maximum duration considered when "short-term" was referenced in the work group recommendation. The clinically relevant drugs reviewed included Naproxen, Celecoxib, and Diclofenac. No recommendation can thus be made regarding the use of other agents possibly studied prior to the cutoff date of the systematic literature review inclusion criteria (1990). The "percent responders" ranged widely in studies that made specific note. Likely the values of 67%(Schnitzer), 50% Baerwald, 50% Klein, and 30% Kivitz, can be considered prognostic.

POSSIBLE HARMS OF IMPLEMENTATION

No extreme adverse events were reported; gastrointestinal side effects predominated. Given the short term duration of use in these studies, no comment can be made for longer duration therapeutic safety.

FUTURE RESEARCH

Future studies performed assessing the efficacy and potential complications of long-term use of NSAIDs for the treatment of symptomatic hip osteoarthritis may be of benefit.

QUALITY EVALUATION TABLE: NON-NARCOTIC MANAGEMENT

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION -NON-NARCOTIC MANAGEMENT RANDOMIZED

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
Baerwald,C., 2010	●	●	●	●	●	●	●	●	●	Include	High Quality
Kivitz,A.J., 2001	●	●	●	●	●	○	●	●	●	Include	High Quality
Klein,G., 2006	◑	◑	◑	●	●	○	●	●	●	Include	Moderate Quality
Makarowski,W., 2002	●	●	●	●	●	●	●	●	●	Include	High Quality
Schnitzer,T.J., 2011	●	●	●	●	●	●	●	●	●	Include	High Quality
Svensson,O., 2006	●	●	●	●	●	●	●	●	●	Include	High Quality

SUMMARY OF FINDINGS TABLE 6: PART 1-NSAIDS COMPARED TO NO TREATMENT

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**					**Moderate Quality**
	Baerwald2010	**Kivitz2001**	**Makarowski2002**	**Schnitzer2011**	**Svensson2006**	**Klein2006**
Complications						
other adverse event(any adverse events)	[•][•]					
other adverse event(all adverse events)		[+][•][•][•]				
overall complications(Adverse events with incidence ?5% in any treatment group Total)			[•][•][•]			
overall complications(GI-related adverse events causing withdrawal Total GI tract disorders)			[-][•][•]			
Composite						
WOMAC(composite score)		[+|+][+|+][+|+][+|+]				
WOMAC(Composite Index)			[+|+|+][+|+|+][+|+|+]			
other questionnaire(Patient's Global Assessment of Arthritis)			[+|+|+][+|+|+][+|+|+]			
other questionnaire(Physician's Global Assessment of Arthritis)			[+|+|+][+|+|+][+|+|+]			
Function						
WOMAC(WOMAC Function)				[+|+|+][+|+|+]		
WOMAC(Physical function)						•
WOMAC(Joint stiffness)						•
WOMAC(function subscale)	[+][+]					
other questionnaire(Lequesne's index)						•
WOMAC(Physical Function Index)			[+|+|+][+|+|+][+|+|+]			
WOMAC(Stiffness Index)			[+|+|+][+|+|+][+|+|+]			
WOMAC(function VAS)					•	
WOMAC(stiffness, VAS)					•	
Other						
WOMAC(stiffness subscale)	[•][•]					
other adverse event(Investigators overall rating of response to therapy)	•					
other questionnaire(Investigators overall rating of disease status)	•					
other questionnaire(Investigators overall rating of response to therapy)	•					
other questionnaire(Investigators overall rating of treatment)	•|•|•|•					
other questionnaire(Patient's overall rating of disease status)	[+][+]					
other questionnaire(patient's global assessment of pain)		[+|+|+][+|+|+][+|+|+][+|+|+]				
other questionnaire(Obrien global sum)						•
other questionnaire(patient's global assessment of disease activity)				+|+|+		
Pain						
WOMAC(Pain)						•
WOMAC(WOMAC Pain)				[+|+][+|+]		
VAS pain(at rest)	[•][•]					
VAS pain(while walking)	[•][•]					
WOMAC(pain subscale)	[+][+]					
VAS pain(arthritis)		[+|+|+][+|+|+][+|+|+][+|+|+]				
WOMAC(Pain Index)			[+|+|+][+|+|+][+|+|+]			
other questionnaire(Patient's Assessment of Arthritis Pain)			[+|+|•][+|+|+][+|+|•]			
WOMAC(Pain, VAS)					+	

SUMMARY OF FINDINGS TABLE 7: PART 2-NSAIDS COMPARED TO OTHER NSAIDS

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**			
	Baerwald2010	**Kivitz2001**	**Makarowski2002**	**Schnitzer2011**
Complications				
other adverse event(any adverse events)	•			
other adverse event(all adverse events)		[-][-][•][-][•][•]		
overall complications(Adverse events with incidence ?5% in any treatment group Total)			[•][•][•]	
overall complications(GI-related adverse events causing withdrawal Total GI tract disorders)			[•][•][•]	
Composite				
WOMAC(composite score)		[•|•][•|•][•|•][•|+][•|•][•|•]		
WOMAC(Composite Index)			[•|•|•][•|•|•][•|•|•]	
other questionnaire(Patient's Global Assessment of Arthritis)			[•|•|•][•|•|•][•|•|•]	
other questionnaire(Physician's Global Assessment of Arthritis)			[•|•|•][•|•|•][•|•|•]	
Function				
WOMAC(WOMAC Function)				•|•|•
WOMAC(function subscale)	•			
WOMAC(Physical Function Index)			[•|•|•][•|•|•][•|•|•]	
WOMAC(Stiffness Index)			[•|•|•][+|•|•][•|•|•]	
Other				
WOMAC(stiffness subscale)	•			
other questionnaire(Patient's overall rating of disease status)	•			
other questionnaire(patient's global assessment of pain)		[+|•|•][+|•|•][•|•|•][+|•|+][•|•|•][•|•|+]		
Pain				
WOMAC(WOMAC Pain)				•|•|•|•|•|•
VAS pain(at rest)	•			
VAS pain(while walking)	•			
WOMAC(pain subscale)	•			
VAS pain(arthritis)		[+|•|+][+|•|•][•|•|•][+|•|•][•|•|•][•|•|•]		
WOMAC(Pain Index)			[•|•|•][•|•|•][•|•|•]	
other questionnaire(Patient's Assessment of Arthritis Pain)			[•|•|•][•|•|•][•|•|•]	

TABLE 4: PART 1- NSAIDS COMPARED TO NO TREATMENT: COMPLICATIONS

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
Kivitz, A.J., 2001	High Quality	other adverse event (all adverse events)	2.8 months	Celecoxib (Celecoxib 100mg daily)	216	0.1667	Placebo (Placebo)	217	0.5714	RR	0.29 (0.21, 0.40)	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other adverse event (all adverse events)	2.8 months	Celecoxib (Celecoxib 200 mg daily)	207	0.657	Placebo (Placebo)	217	0.5714	RR	1.15 (0.99, 1.34)	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other adverse event (all adverse events)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	0.615	Placebo (Placebo)	217	0.5714	RR	1.08 (0.92, 1.26)	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	other adverse event (any adverse events)	2.6 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	322	43.17%	Placebo	330	0.3818	RR	1.13 (0.94, 1.36)	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	other adverse event (any adverse events)	3 months	Naproxen (500 mg)	156	46.79%	Placebo	330	0.3818	RR	1.23 (0.99, 1.52)	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other adverse event (all adverse events)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	0.6329	Placebo (Placebo)	217	0.5714	RR	1.11 (0.95, 1.29)	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
Makarowski, W., 2002	High Quality	overall complications (Adverse events with incidence 5% in any treatment group Total)	Post-Op	Naproxen (Naproxen)	120	59.17%	Placebo (Placebo)	120	0.5	RR	1.18 (0.94, 1.49)	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	overall complications (GI-related adverse events causing withdrawal Total GI tract disorders)	Post-Op	Naproxen (Naproxen)	120	10.83%	Placebo (Placebo)	120	0.0167	RR	6.50 (1.50, 28.19)	**Treatment 2 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	overall complications (Adverse events with incidence 5% in any treatment group Total)	Post-Op	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	111	51.35%	Placebo (Placebo)	120	0.5	RR	1.03 (0.80, 1.32)	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
Makarowski, W., 2002	High Quality	overall complications (GI-related adverse events causing withdrawal Total GI tract disorders)	Post-Op	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	120	4.17%	Placebo (Placebo)	120	0.0167	RR	2.50 (0.49, 12.64)	Not Significant (P-value>.05)
Makarowski,W., 2002	High Quality	overall complications (Adverse events with incidence 5% in any treatment group Total)	Post-Op	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	120	56.67%	Placebo (Placebo)	120	0.5	RR	1.13 (0.89, 1.44)	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	overall complications (GI-related adverse events causing withdrawal Total GI tract disorders)	Post-Op	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	120	4.17%	Placebo (Placebo)	120	0.0167	RR	2.50 (0.49, 12.64)	Not Significant (P-value>.05)

TABLE 5: PART 1- NSAIDS COMPARED TO NO TREATMENT: COMPOSITE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2 weeks	Celecoxib (Celecoxib 100mg daily)	216	-8	Placebo (Placebo)	216	-3.4	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2.8 months	Celecoxib (Celecoxib 100mg daily)	216	-8	Placebo (Placebo)	217	-4.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2 weeks	Celecoxib (Celecoxib 200 mg daily)	207	-11.7	Placebo (Placebo)	216	-3.4	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2.8 months	Celecoxib (Celecoxib 200 mg daily)	207	-10.3	Placebo (Placebo)	217	-4.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2 weeks	Celecoxib (Celecoxib 400 mg daily)	213	-11.7	Placebo (Placebo)	216	-3.4	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	-11	Placebo (Placebo)	217	-4.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-12.7	Placebo (Placebo)	216	-3.4	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-12.4	Placebo (Placebo)	217	-4.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2 weeks	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2 weeks	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC(Composite Index)	2 weeks	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	1.4 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	1.4 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC(Composite Index)	1.4 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2.8 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2.8 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	2.8 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2 weeks	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2 weeks	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	2 weeks	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	1.4 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	1.4 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	1.4 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2.8 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2.8 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	2.8 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

TABLE 6: PART 1- NSAIDS COMPARED TO NO TREATMENT: 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
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Function)	4 weeks	Celecoxib (Celecoxib 200 mg)	327	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Function)	1.8 months	Celecoxib (Celecoxib 200 mg)	327	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Function)	3 months	Celecoxib (Celecoxib 200 mg)	327	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Klein, G., 2006	Moderate Quality	other questionnaire (Lequesne's index)	1.4 months	Diclofenac (Diclofenac)	.	. %	Phlogenzym (Diclofenac)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Klein, G., 2006	Moderate Quality	WOMAC (Joint stiffness)	1.4 months	Diclofenac (Diclofenac)	.	. %	Phlogenzym (Diclofenac)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Klein, G., 2006	Moderate Quality	WOMAC (Physical function)	1.4 months	Diclofenac (Diclofenac)	.	. %	Phlogenzym (Diclofenac)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Function)	4 weeks	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Function)	1.8 months	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Schnitzer,T.J., 2011	High Quality	WOMAC (WOMAC Function)	3 months	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 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
Baerwald, C., 2010	High Quality	WOMAC (function subscale)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	322	-22.24 (29.94)	Placebo	331	-13.45 (29.89)	MeanDif	-8.79 (-13.38, -4.20)	**Treatment 1 Significant (P-value<.05)**
Svensson, O., 2006	High Quality	WOMAC (function VAS)	1.4 months	Naproxen (500 mg)	123	-11.66 (16.78)	Placebo	33	-4.95 (117.67)	MeanDif	-6.71 (-46.97, 33.55)	Not Significant (P-value>.05)
Svensson, O., 2006	High Quality	WOMAC (stiffness, VAS)	1.4 months	Naproxen (500 mg)	123	-12.97 (21.52)	Placebo	33	-8.15 (20.88)	MeanDif	-4.82 (-12.90, 3.26)	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	WOMAC (function subscale)	3 months	Naproxen (500 mg)	155	-21.67 (23.50)	Placebo	331	-13.45 (29.89)	MeanDif	-8.22 (-13.12, -3.32)	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	2 weeks	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC(Stiffness Index)	2 weeks	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC(Physical Function Index)	1.4 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC(Stiffness Index)	1.4 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC(Physical Function Index)	2.8 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 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
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	2.8 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	2 weeks	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 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
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	2 weeks	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	1.4 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	1.4 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	2.8 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	2.8 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2 weeks	Celecoxib (Celecoxib 100mg daily)	216	-0.9	Placebo (Placebo)	217	-0.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	1.4 months	Celecoxib (Celecoxib 100mg daily)	216	-1	Placebo (Placebo)	217	-0.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2.8 months	Celecoxib (Celecoxib 100mg daily)	216	-0.9	Placebo (Placebo)	217	-0.5	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2 weeks	Celecoxib (Celecoxib 200 mg daily)	207	-1.2	Placebo (Placebo)	217	-0.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	1.4 months	Celecoxib (Celecoxib 200 mg daily)	207	-1.1	Placebo (Placebo)	217	-0.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2.8 months	Celecoxib (Celecoxib 200 mg daily)	207	-1.1	Placebo (Placebo)	217	-0.5	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Schnitzer, T.J., 2011	High Quality	other questionnaire (patient's global assessment of disease activity)	4 weeks	Celecoxib (Celecoxib 200 mg)	327	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Schnitzer, T.J., 2011	High Quality	other questionnaire (patient's global assessment of disease activity)	1.8 months	Celecoxib (Celecoxib 200 mg)	327	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Schnitzer, T.J., 2011	High Quality	other questionnaire (patient's global assessment of disease activity)	3 months	Celecoxib (Celecoxib 200 mg)	327	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2 weeks	Celecoxib (Celecoxib 400 mg daily)	213	-1.1	Placebo (Placebo)	217	-0.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	1.4 months	Celecoxib (Celecoxib 400 mg daily)	213	-1.1	Placebo (Placebo)	217	-0.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	-0.9	Placebo (Placebo)	217	-0.5	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Klein, G., 2006	Moderate Quality	other questionnaire (Obrien global sum)	1.4 months	Diclofenac (Diclofenac)	.	. %	Phlogenzym (Diclofenac)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	other questionnaire (Patient's overall rating of disease status)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	320	0.86 (1.19)	Placebo	328	0.51 (1.20)	MeanDif	0.35 (0.17,0.53)	**Treatment 1 Significant (P-value<.05)**
Baerwald, C., 2010	High Quality	WOMAC (stiffness subscale)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	263	-26.69 (.)	Placebo	256	-18.36 (.)	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)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Baerwald, C., 2010	High Quality	other adverse event (Investigators overall rating of response to therapy)	3 months	Naproxen (500 mg)	127	3.54 (0.11)	Placebo	256	3.11 (.)	Author Reported	0.43 (.,.)	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	other questionnaire (Investigators overall rating of disease status)	3 months	Naproxen (500 mg)	126	0.98 (.)	Placebo	255	0.59 (.)	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	other questionnaire (Investigators overall rating of response to therapy)	3 months	Naproxen (500 mg)	128	3.62 (.)	Placebo	256	3.17 (.)	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	other questionnaire (Investigators overall rating of treatment)	3 months	Naproxen (500 mg)	127	3.54 (0.10)	Placebo	255	3.21 (.)	Author Reported	0.33 (.,.)	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	other questionnaire (Investigators overall rating of treatment)	3 months	Naproxen (500 mg)	127	3.54 (0.10)	Placebo	256	3.24 (.)	Author Reported	0.3 (.,.)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Baerwald, C., 2010	High Quality	other questionnaire (Investigators overall rating of treatment)	3 months	Naproxen (500 mg)	128	3.67 (.)	Placebo	256	3.24 (.)	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	other questionnaire (Investigators overall rating of treatment)	3 months	Naproxen (500 mg)	128	3.67 (.)	Placebo	255	3.21 (.)	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	other questionnaire (Patient's overall rating of disease status)	3 months	Naproxen (500 mg)	153	0.82 (1.14)	Placebo	328	0.51 (1.20)	MeanDif	0.31 (0.09, 0.53)	**Treatment 1 Significant (P-value<.05)**
Baerwald, C., 2010	High Quality	WOMAC (stiffness subscale)	3 months	Naproxen (500 mg)	128	-25.56 (.)	Placebo	256	-18.36 (.)	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-1.2	Placebo (Placebo)	217	-0.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	1.4 months	Naproxen (Naproxen 1000 mg day)	207	-1.1	Placebo (Placebo)	217	-0.6	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-1.1	Placebo (Placebo)	217	-0.5	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

TABLE 8: PART 1- NSAIDS COMPARED TO NO TREATMENT: PAIN

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2 weeks	Celecoxib (Celecoxib 100mg daily)	216	-19.7	Placebo (Placebo)	217	-11.8	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	1.4 months	Celecoxib (Celecoxib 100mg daily)	216	-21.5	Placebo (Placebo)	217	-13.2	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2.8 months	Celecoxib (Celecoxib 100mg daily)	216	-19	Placebo (Placebo)	217	-11.1	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2 weeks	Celecoxib (Celecoxib 200 mg daily)	207	-24.4	Placebo (Placebo)	217	-11.8	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	1.4 months	Celecoxib (Celecoxib 200 mg daily)	207	-25.1	Placebo (Placebo)	217	-13.2	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2.8 months	Celecoxib (Celecoxib 200 mg daily)	207	-23.3	Placebo (Placebo)	217	-11.1	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Pain)	1.8 months	Celecoxib (Celecoxib 200 mg)	327	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Pain)	3 months	Celecoxib (Celecoxib 200 mg)	327	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2 weeks	Celecoxib (Celecoxib 400 mg daily)	213	-24.4	Placebo (Placebo)	217	-11.8	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	1.4 months	Celecoxib (Celecoxib 400 mg daily)	213	-23.9	Placebo (Placebo)	217	-13.2	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	-19.3	Placebo (Placebo)	217	-11.1	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Klein, G., 2006	Moderate Quality	WOMAC (Pain)	1.4 months	Diclofenac (Diclofenac)	.	. %	Phlogenzym (Diclofenac)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Pain)	1.8 months	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Pain)	3 months	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Placebo (Placebo pill)	287	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Baerwald, C., 2010	High Quality	VAS pain (at rest)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	254	-25.33 (.)	Placebo	253	-18.11 (.)	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	VAS pain (while walking)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	254	-30.56 (.)	Placebo	253	-21.92 (.)	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)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Baerwald, C., 2010	High Quality	WOMAC (pain subscale)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	323	-25.81 (30.81)	Placebo	331	-17.97 (30.63)	MeanDif	-7.84 (-12.55, -3.13)	**Treatment 1 Significant (P-value<.05)**
Svensson, O., 2006	High Quality	WOMAC (Pain, VAS)	1.4 months	Naproxen (500 mg)	123	-12.33 (19.78)	Placebo	33	-3.24 (22.27)	MeanDif	-9.09 (-17.45, -0.73)	**Treatment 1 Significant (P-value<.05)**
Baerwald, C., 2010	High Quality	VAS pain (at rest)	3 months	Naproxen (500 mg)	124	-23.72 (.)	Placebo	253	-18.11 (.)	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	VAS pain (while walking)	3 months	Naproxen (500 mg)	124	-21.92 (.)	Placebo	253	-21.92 (.)	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	WOMAC (pain subscale)	3 months	Naproxen (500 mg)	156	-24.31 (27.91)	Placebo	331	-17.97 (30.63)	MeanDif	-6.34 (-11.82, -0.86)	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-26.5	Placebo (Placebo)	217	-11.8	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	1.4 months	Naproxen (Naproxen 1000 mg day)	207	-24.8	Placebo (Placebo)	217	-13.2	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-22.3	Placebo (Placebo)	217	-11.1	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2 weeks	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2 weeks	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	1.4 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	1.4 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2.8 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2.8 months	Naproxen (Naproxen)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2 weeks	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2 weeks	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	1.4 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	1.4 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2.8 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2.8 months	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Placebo (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**

TABLE 9: PART 2- NSAIDS COMPARED TO NSAIDS: COMPLICATIONS

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kivitz, A.J., 2001	High Quality	other adverse event (all adverse events)	2.8 months	Celecoxib (Celecoxib 200 mg daily)	207	0.657	Celecoxib (Celecoxib 100mg daily)	216	0.1667	RR	3.94 (2.88, 5.40)	**Treatment 2 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other adverse event (all adverse events)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	0.615	Celecoxib (Celecoxib 100mg daily)	216	0.1667	RR	3.69 (2.69, 5.06)	**Treatment 2 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other adverse event (all adverse events)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	0.615	Celecoxib (Celecoxib 200 mg daily)	207	0.657	RR	0.94 (0.81, 1.08)	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	other adverse event (any adverse events)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	322	43.17%	Naproxen (500 mg)	156	0.4679	RR	0.92 (0.75, 1.14)	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other adverse event (all adverse events)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	0.6329	Celecoxib (Celecoxib 100mg daily)	216	0.1667	RR	3.80 (2.77, 5.21)	**Treatment 2 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other adverse event (all adverse events)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	0.6329	Celecoxib (Celecoxib 200 mg daily)	207	0.657	RR	0.96 (0.83, 1.11)	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other adverse event (all adverse events)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	0.6329	Celecoxib (Celecoxib 400 mg daily)	213	0.615	RR	1.03 (0.89, 1.19)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	overall complications (Adverse events with incidence ?5% in any treatment group Total)	Post-Op	Naproxen 500 mg (Naproxen 500 mg)	120	59.17%	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	111	0.5135	RR	1.15 (0.91, 1.46)	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	overall complications (GI-related adverse events causing withdrawal Total GI tract disorders)	Post-Op	Naproxen 500 mg (Naproxen 500 mg)	120	10.83%	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	120	0.0417	RR	2.60 (0.96, 7.07)	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	overall complications (Adverse events with incidence ?5% in any treatment group Total)	Post-Op	Naproxen 500 mg (Naproxen 500 mg)	120	59.17%	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	120	0.5667	RR	1.04 (0.84, 1.30)	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	overall complications (GI-related adverse events causing withdrawal Total GI tract disorders)	Post-Op	Naproxen 500 mg (Naproxen 500 mg)	120	10.83%	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	120	0.0417	RR	2.60 (0.96, 7.07)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	overall complications (Adverse events with incidence ?5% in any treatment group Total)	Post-Op	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	111	51.35%	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	120	0.5667	RR	0.91 (0.71, 1.15)	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	overall complications (GI-related adverse events causing withdrawal Total GI tract disorders)	Post-Op	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	120	4.17%	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	120	0.0417	RR	1.00 (0.30, 3.37)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2 weeks	Celecoxib (Celecoxib 200 mg daily)	207	-11.7	Celecoxib (Celecoxib 100mg daily)	216	-8	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2.8 months	Celecoxib (Celecoxib 200 mg daily)	207	-10.3	Celecoxib (Celecoxib 100mg daily)	216	-8	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2 weeks	Celecoxib (Celecoxib 400 mg daily)	213	-11.7	Celecoxib (Celecoxib 100mg daily)	216	-8	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	-11	Celecoxib (Celecoxib 100mg daily)	216	-8	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2 weeks	Celecoxib (Celecoxib 400 mg daily)	213	-11.7	Celecoxib (Celecoxib 200 mg daily)	207	-11.7	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	-11	Celecoxib (Celecoxib 200 mg daily)	207	-10.3	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-12.7	Celecoxib (Celecoxib 100 mg daily)	216	-8	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-12.4	Celecoxib (Celecoxib 100 mg daily)	216	-8	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-12.7	Celecoxib (Celecoxib 200 mg daily)	207	-11.7	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-12.4	Celecoxib (Celecoxib 200 mg daily)	207	-10.3	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-12.7	Celecoxib (Celecoxib 400 mg daily)	213	-11.7	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	WOMAC (composite score)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-12.4	Celecoxib (Celecoxib 400 mg daily)	213	-11	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Global Assessment of Arthritis)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Physician's Global Assessment of Arthritis)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Composite Index)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 11: PART 2- NSAIDS COMPARED TO NSAIDS: 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
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Function)	4 weeks	Celecoxib (Celecoxib 200 mg)	327	. %	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Author Reported	NA	Not Significant (P-value>.05)
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Function)	1.8 months	Celecoxib (Celecoxib 200 mg)	327	. %	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Author Reported	NA	Not Significant (P-value>.05)
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Function)	3 months	Celecoxib (Celecoxib 200 mg)	327	. %	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	WOMAC (function subscale)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	322	-22.24 (29.94)	Naproxen (500 mg)	155	-21.67 (23.50)	MeanDif	-0.57 (-5.51,4.37)	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	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
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	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
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Physical Function Index)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	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
Makarowski, W., 2002	High Quality	WOMAC (Stiffness Index)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	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
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2 weeks	Celecoxib (Celecoxib 200 mg daily)	207	-1.2	Celecoxib (Celecoxib 100mg daily)	216	-0.9	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	1.4 months	Celecoxib (Celecoxib 200 mg daily)	207	-1.1	Celecoxib (Celecoxib 100mg daily)	216	-1	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2.8 months	Celecoxib (Celecoxib 200 mg daily)	207	-1.1	Celecoxib (Celecoxib 100mg daily)	216	-0.9	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2 weeks	Celecoxib (Celecoxib 400 mg daily)	213	-1.1	Celecoxib (Celecoxib 100mg daily)	216	-0.9	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	1.4 months	Celecoxib (Celecoxib 400 mg daily)	213	-1.1	Celecoxib (Celecoxib 100mg daily)	216	-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
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	-0.9	Celecoxib (Celecoxib 100mg daily)	216	-0.9	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2 weeks	Celecoxib (Celecoxib 400 mg daily)	213	-1.1	Celecoxib (Celecoxib 200 mg daily)	207	-1.2	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	1.4 months	Celecoxib (Celecoxib 400 mg daily)	213	-1.1	Celecoxib (Celecoxib 200 mg daily)	207	-1.1	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	-0.9	Celecoxib (Celecoxib 200 mg daily)	207	-1.1	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	other questionnaire (Patient's overall rating of disease status)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	320	0.86 (1.19)	Naproxen (500 mg)	153	0.82 (1.14)	MeanDif	0.04 (-0.18, 0.26)	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
Baerwald, C., 2010	High Quality	WOMAC (stiffness subscale)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	263	-26.69 (.)	Naproxen (500 mg)	128	-25.56 (.)	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-1.2	Celecoxib (Celecoxib 100mg daily)	216	-0.9	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	1.4 months	Naproxen (Naproxen 1000 mg day)	207	-1.1	Celecoxib (Celecoxib 100mg daily)	216	-1	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-1.1	Celecoxib (Celecoxib 100mg daily)	216	-0.9	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-1.2	Celecoxib (Celecoxib 200 mg daily)	207	-1.2	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
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	1.4 months	Naproxen (Naproxen 1000 mg day)	207	-1.1	Celecoxib (Celecoxib 200 mg daily)	207	-1.1	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-1.1	Celecoxib (Celecoxib 200 mg daily)	207	-1.1	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-1.2	Celecoxib (Celecoxib 400 mg daily)	213	-1.1	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	1.4 months	Naproxen (Naproxen 1000 mg day)	207	-1.1	Celecoxib (Celecoxib 400 mg daily)	213	-1.1	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	other questionnaire (patient's global assessment of pain)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-1.1	Celecoxib (Celecoxib 400 mg daily)	213	-0.9	Author Reported	NA	**Treatment 1 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
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2 weeks	Celecoxib (Celecoxib 200 mg daily)	207	-24.4	Celecoxib (Celecoxib 100mg daily)	216	-19.7	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	1.4 months	Celecoxib (Celecoxib 200 mg daily)	207	-25.1	Celecoxib (Celecoxib 100mg daily)	216	-21.5	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2.8 months	Celecoxib (Celecoxib 200 mg daily)	207	-23.3	Celecoxib (Celecoxib 100mg daily)	216	-19	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Pain)	4 weeks	Celecoxib (Celecoxib 200 mg)	327	. %	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Author Reported	NA	Not Significant (P-value>.05)
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Pain)	4 weeks	Celecoxib (Celecoxib 200 mg)	327	. %	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Author Reported	NA	Not Significant (P-value>.05)
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Pain)	1.8 months	Celecoxib (Celecoxib 200 mg)	327	. %	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Author Reported	NA	Not Significant (P-value>.05)
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Pain)	1.8 months	Celecoxib (Celecoxib 200 mg)	327	. %	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Author Reported	NA	Not Significant (P-value>.05)
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Pain)	3 months	Celecoxib (Celecoxib 200 mg)	327	. %	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	Author Reported	NA	Not Significant (P-value>.05)
Schnitzer, T.J., 2011	High Quality	WOMAC (WOMAC Pain)	3 months	Celecoxib (Celecoxib 200 mg)	327	. %	Lumiracoxib (Lumiracoxib 100 mg)	337	. %	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
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2 weeks	Celecoxib (Celecoxib 400 mg daily)	213	-24.4	Celecoxib (Celecoxib 100mg daily)	216	-19.7	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	1.4 months	Celecoxib (Celecoxib 400 mg daily)	213	-23.9	Celecoxib (Celecoxib 100mg daily)	216	-21.5	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	-19.3	Celecoxib (Celecoxib 100mg daily)	216	-19	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2 weeks	Celecoxib (Celecoxib 400 mg daily)	213	-24.4	Celecoxib (Celecoxib 200 mg daily)	207	-24.4	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	1.4 months	Celecoxib (Celecoxib 400 mg daily)	213	-23.9	Celecoxib (Celecoxib 200 mg daily)	207	-25.1	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2.8 months	Celecoxib (Celecoxib 400 mg daily)	213	-19.3	Celecoxib (Celecoxib 200 mg daily)	207	-23.3	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	VAS pain (at rest)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	254	-25.33 (.)	Naproxen (500 mg)	124	-23.72 (.)	Author Reported	NA	Not Significant (P-value>.05)
Baerwald, C., 2010	High Quality	VAS pain (while walking)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	254	-30.56 (.)	Naproxen (500 mg)	124	-21.92 (.)	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
Baerwald, C., 2010	High Quality	WOMAC (pain subscale)	3 months	Naproxcinod (750 mg, Cyclooxygenase-inhibiting nitric oxide donator)	323	-25.81 (30.81)	Naproxen (500 mg)	156	-24.31 (27.91)	MeanDif	-1.5 (-7.02,4.02)	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-26.5	Celecoxib (Celecoxib 100mg daily)	216	-19.7	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	1.4 months	Naproxen (Naproxen 1000 mg day)	207	-24.8	Celecoxib (Celecoxib 100mg daily)	216	-21.5	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-22.3	Celecoxib (Celecoxib 100mg daily)	216	-19	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-26.5	Celecoxib (Celecoxib 200 mg daily)	207	-24.4	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	1.4 months	Naproxen (Naproxen 1000 mg day)	207	-24.8	Celecoxib (Celecoxib 200 mg daily)	207	-25.1	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-22.3	Celecoxib (Celecoxib 200 mg daily)	207	-23.3	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2 weeks	Naproxen (Naproxen 1000 mg day)	207	-26.5	Celecoxib (Celecoxib 400 mg daily)	213	-24.4	Author Reported	NA	Not Significant (P-value>.05)
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	1.4 months	Naproxen (Naproxen 1000 mg day)	207	-24.8	Celecoxib (Celecoxib 400 mg daily)	213	-23.9	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
Kivitz, A.J., 2001	High Quality	VAS pain (arthritis)	2.8 months	Naproxen (Naproxen 1000 mg day)	207	-22.3	Celecoxib (Celecoxib 400 mg daily)	213	-19.3	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	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
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2 weeks	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	1.4 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2.8 months	Naproxen 500 mg (Naproxen 500 mg)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	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
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2 weeks	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	1.4 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	other questionnaire (Patient's Assessment of Arthritis Pain)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Makarowski, W., 2002	High Quality	WOMAC (Pain Index)	2.8 months	Valdecoxib 10 mg QD (Valdecoxib 10 mg QD)	.	. %	Valdecoxib 5 mg QD (Valdecoxib 5 mg QD)	.	. %	Author Reported	NA	Not Significant (P-value>.05)

GLUCOSAMINE SULFATE

Moderate strength evidence does not support the use of glucosamine sulfate because it did not perform better than placebo for improving function, reducing stiffness and decreasing pain for patients with symptomatic osteoarthritis of the hip.

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.

RATIONALE

A literature search for studies investigating the treatment of symptomatic hip OA with glucosamine, chondroitin, and other nutraceuticals yielded 85 studies. Only one high quality study met our inclusion criteria (Rozendaal et al). In this placebo randomized control trial study, 222 patients were given oral glucosamine or placebo and evaluated for 2 years. Glucosamine sulfate did not perform better than placebo for improving function, or reducing stiffness and pain.

POSSIBLE HARMS OF IMPLEMENTATION

None

FUTURE RESEARCH

As only one high quality study was discovered for this inquiry, additional high-powered placebo randomized controlled trials could further clarify this recommendation.

.

RESULTS

QUALITY EVALUATION TABLE: NEUTRACEUTICALS

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION -NEUTRACEUTICALS RANDOMIZED

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
Maheu,E., 1998	●	●	●	●	●	●	●	●	●	Include	High Quality
Maheu,E., 2014	●	○	●	●	●	○	●	●	●	Include	Moderate Quality
Rozendaal,R.M., 2008	●	●	●	●	●	●	●	●	●	Include	High Quality

+ Favors Treatment 1
- Favors Treatment 2
• Not Significant
| Separate Follow-ups
[ ] Separate Treatment Comparisons

	High Quality
	Rozendaal2008
Complications	
other adverse event(Abdominal pain, stomach, intestinal, increased blood pressure, fatigue, headach, vertigo, cardiac pr)	•
Function	
WOMAC(Function)	•|•|•
WOMAC(Stiffness)	•|•|•
WOMAC(Womac Function overall)	-
Pain	
WOMAC(Pain)	•|•|•
WOMAC(Overall)	-

TABLE 14: PART 1- GLUCOSAMINE COMPARED TO NO TREATMENT: COMPLICATIONS

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
Rozendaal, R.M., 2008	High Quality	other adverse event (Abdominal pain, stomach, intestinal, increased blood pressure, fatigue, headach, vertigo, cardiac pr)	Post-Op	Glucosamine sulfate	111	51.35%	Placebo	111	53.15%	RR	0.97 (0.75, 1.24)	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
Rozendaal, R.M., 2008	High Quality	WOMAC (Womac Function overall)	Post-Op	Glucosamine sulfate	111	-1.69 (1.30)	Placebo	111	0.38 (1.30)	MeanDif	-2.07 (-2.41, -1.73)	**Treatment 2 Significant (P-value<.05)**
Rozendaal, R.M., 2008	High Quality	WOMAC (Function)	3 months	Glucosamine sulfate	111	-3.29 (14.90)	Placebo	111	-1.08 (12.70)	MeanDif	-2.21 (-5.85, 1.43)	Not Significant (P-value>.05)
Rozendaal, R.M., 2008	High Quality	WOMAC (Stiffness)	3 months	Glucosamine sulfate	111	-4.59 (22.60)	Placebo	111	-3.39 (17.70)	MeanDif	-1.2 (-6.54, 4.14)	Not Significant (P-value>.05)
Rozendaal, R.M., 2008	High Quality	WOMAC (Function)	11.8 months	Glucosamine sulfate	111	-0.98 (14.90)	Placebo	111	-0.88 (17.60)	MeanDif	-0.1 (-4.39, 4.19)	Not Significant (P-value>.05)
Rozendaal, R.M., 2008	High Quality	WOMAC (Stiffness)	11.8 months	Glucosamine sulfate	111	-1.38 (22.10)	Placebo	111	-3.43 (21.60)	MeanDif	2.05 (-3.70, 7.80)	Not Significant (P-value>.05)
Rozendaal, R.M., 2008	High Quality	WOMAC (Function)	2 years	Glucosamine sulfate	111	-0.84 (19.10)	Placebo	111	1.92 (19.70)	MeanDif	-2.76 (-7.86, 2.34)	Not Significant (P-value>.05)
Rozendaal, R.M., 2008	High Quality	WOMAC (Stiffness)	2 years	Glucosamine sulfate	111	-3.43 (26.20)	Placebo	111	-2.19 (24.10)	MeanDif	-1.24 (-7.86, 5.38)	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
Rozendaal, R.M., 2008	High Quality	WOMAC (Overall)	Post-Op	Glucosamine sulfate	111	-1.9 (1.60)	Placebo	111	-0.3 (1.60)	MeanDif	-1.6 (-2.02, -1.18)	**Treatment 2 Significant (P-value<.05)**
Rozendaal, R.M., 2008	High Quality	WOMAC (Pain)	3 months	Glucosamine sulfate	111	-2.5 (19.20)	Placebo	111	-1.79 (16.20)	MeanDif	-0.71 (-5.38,3.96)	Not Significant (P-value>.05)
Rozendaal, R.M., 2008	High Quality	WOMAC (Pain)	11.8 months	Glucosamine sulfate	111	-0.54 (19.90)	Placebo	111	-0.89 (23.30)	MeanDif	0.35 (-5.35,6.05)	Not Significant (P-value>.05)
Rozendaal, R.M., 2008	High Quality	WOMAC (Pain)	2 years	Glucosamine sulfate	111	-1.47 (20.70)	Placebo	111	0.88 (26.40)	MeanDif	-2.35 (-8.59,3.89)	Not Significant (P-value>.05)

INTRA-ARTICULAR INJECTABLES

A) Strong evidence supports the use of intraarticular corticosteroids to improve function and reduce pain in the short-term for patients with symptomatic osteoarthritis of the hip.

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) Strong evidence does not support the use of intraarticular hyaluronic acid because it does not perform better than placebo for function, stiffness, and pain in patients with symptomatic osteoarthritis of the hip.

Strength of Recommendation: Strong Evidence ★★★★

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

RATIONALE

Three high quality studies (Lambert et al, Atchia et al , Qvistgaard et al) compared IA injection of corticosteroids with placebo and showed statistically significant improvement in pain and function scores. Significant benefits from IA corticosteroid injection were present 3 months (Lambert et al) and 8 weeks (Atchia et al) after treatment compared to placebo.

Atchia et al and Qvistgaard et al also compared IA injection of hyaluronic acid (HA) to corticosteroid and placebo in the same aforementioned studies. While these studies demonstrated improved pain and function with IA corticosteroid, they both failed to show significant difference between the performance of HA and placebo. In addition, single IA injection of HA for the treatment of symptomatic (VAS pain score >40mm) moderate hip OA (Kellgren Lawrence grades 2 and 3) failed to demonstrate significant improvement compared to placebo in another high quality study (Richette et al for function, stiffness and pain at 3 months. Other high quality studies investigating HA for the treatment of symptomatic hip OA discovered in this search compared the performance of IA injections of different formulations of HA (Bekerom 2008, Tikiz et al , IA injection of corticosteroids (Spitzer et al), and IA injection of anesthetic (Migliore et al), but did not test against a placebo.

No high quality randomized controlled trials were available comparing the performance of IA injection of stem cells or prolotherapy to placebo. Three studies (Battaglia et al , Dallari et al) compared IA injections of platelet-rich plasma (PRP) versus HA or a combination of PRP and HA. However, no high quality studies comparing PRP with placebo were available for inclusion in our analysis.

POSSIBLE HARMS OF IMPLEMENTATION

Risks of corticosteroid IA injection include bleeding, potential injury to adjacent structures, transient pain, allergic reaction, infection before and after total hip arthroplasty, post-injection pain flare and hyperglycemia.

FUTURE RESEARCH

Further randomized control studies to better elucidate the effect of repeat IA injections of corticosteroids on the cartilage may be warranted. Similarly, randomized placebo control trials may be warranted to establish if PRP, stem cells and prolotherapy are efficacious.

QUALITY EVALUATION TABLE: INTRAARTICULAR INJECTIONS

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION -IA INJECTABLES RANDOMIZED

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
Atchia,I., 2011	●	◑	◑	●	●	●	●	●	●	Include	High Quality
Battaglia,M., 2013	●	●	●	●	●	○	●	●	●	Include	High Quality
Bekerom,M.P.J., 2008	●	◑	●	●	●	○	●	●	●	Include	High Quality
Dallari,D., 2016	●	●	○	●	●	●	●	●	●	Include	High Quality
Lambert,R.G., 2007	●	●	●	●	●	●	●	●	●	Include	High Quality
Migliore,A., 2009	●	◑	●	●	●	●	●	●	●	Include	High Quality
Qvistgaard,E., 2006	●	●	●	●	●	○	●	●	●	Include	High Quality
Richette,P., 2009	●	●	●	●	●	●	●	●	●	Include	High Quality
Spitzer,A.I., 2010	●	●	●	○	●	○	●	●	●	Include	Moderate Quality
Tikiz,C., 2005	◑	◑	●	●	●	●	●	●	●	Include	High Quality

SUMMARY OF FINDINGS TABLE 9 IA CORTICOSTEROIDS COMPARED TO NO TREATMENT

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**		
	Atchia2011	**Lambert2007**	**Qvistgaard2006**
Composite			
SF-36(Physical component)		•|-	
WOMAC(Patient's global assessment of health)		+|+	
WOMAC(Womac OA index)			•
other questionnaire(Patient's golbal assessment)			•
Function			
WOMAC(Stiffness)		+|+	
WOMAC(Physical function)		+|+	
SF-36(Physical functioning)		•|•	
range of motion(Hip external rotation)		•|•	
range of motion(Hip internal rotation)		•|-	
other questionnaire(Lequesne index)			•
Other			
SF-36(Social functioning)		•|•	
reduction/elimination of narcotic use(Anagesic pill count)		•|•	
Pain			
SF-36(Bodily pain)		+|•	
WOMAC(Pain)		+|+	
VAS pain(Pain on walking)			+|+|•
VAS pain(Vas pain at rest)			•
OMERACT-OARSI responder()	+|+|-		

SUMMARY OF FINDINGS TABLE 10 IA HYALURONIC ACID COMPARED TO NO TREATMENT

+ Favors Treatment 1 - Favors Treatment 2 • Not Significant | Separate Follow-ups [ ] Separate Treatment Comparisons	High Quality		
	Atchia2011	Qvistgaard2006	Richette2009
Composite			
WOMAC(Womac OA index)		•	
other questionnaire(Patient's golbal assessment)		•	
WOMAC(WOMAC global score)			•
Function			
other questionnaire(Lequesne index)		•	
WOMAC(WOMAC functional score)			•
WOMAC(WOMAC stiffness score)			•
OMERACT-OARSI responder()	•|•|•		
Other			
other questionnaire(OARSI responders at 3 months, % of patients)			•
other questionnaire(Patient global assessment of severity of hip OA)			•
Pain			
VAS pain(Pain on walking)		•	
VAS pain(Vas pain at rest)		•	
VAS pain(Pain score)			•
WOMAC(WOMAC pain score)			•

SUMMARY OF FINDINGS TABLE 11 IA CORTICOSTEROIDS COMPARED TO IA HYALURONIC ACID

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**		**Moderate Quality**
	Atchia2011	**Qvistgaard2006**	**Spitzer2010**
Complications			
other adverse event(Total adverse event)			•
Composite			
WOMAC(Womac OA index)		•|•|•	
other questionnaire(Patient's golbal assessment)		•|•|•	
WOMAC(Womac total)			•|•
Function			
other questionnaire(Lequesne index)		•|•|•	
Other			
other questionnaire(Patient global assessment of severity of hip OA)			•|•
other questionnaire(Clinician observer global assessment)			•|•
Pain			
VAS pain(Pain on walking)		•|•|•	
VAS pain(Vas pain at rest)		•|•|•	
OMERACT-OARSI responder()	+|+|-		

SUMMARY OF FINDINGS TABLE 12 IA HYALURONIC ACID COMPARED TO OTHER IA HYALURONIC ACID

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**	
	Bekerom2008	**Tikiz2005**
Composite		
Harris Hip Score(HHS post op)	•	
other questionnaire(Lequesne index)		•|•|•
WOMAC(WOMAC overall)		•|•|•
Function		
functional task(Time to sit on and stand up from a chair)		•|•|•
functional task(Walking time for 30 m)		•|•|•
Pain		
VAS pain(VAS pain score)		•|•|•
VAS pain(VAS pain during walking)	[•][•][•]	

SUMMARY OF FINDINGS TABLE 13 IA HYALURONIC ACID COMPARED TO IA PLATELET RICH PLASMA

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**	
	Battaglia2013	**Dallari2016**
Composite		
Harris Hip Score( )	•|•|•|•	[•|•|•][•|•|•]
WOMAC( )		[•|•|•][•|•|•]
Other		
reduction/elimination of narcotic use(NSAID consumption)	•	
Pain		
VAS pain(VAS pain score)	•|•|•|•	
VAS pain( )		[•|•|•][•|•|•]

SUMMARY OF FINDINGS TABLE 14 IA HYALURONIC ACID COMPARED TO PROLOTHERAPY

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**
	Migliore2009
Composite	
other questionnaire(Global physician assessment)	•|•
Function	
other questionnaire(Lesquesne index)	•|•
Other	
reduction/elimination of narcotic use(NSAID consumption)	+|+
other questionnaire(Global patient assessment)	•|•
Pain	
VAS pain(Pain VAS scale)	•|•

SUMMARY OF FINDINGS TABLE 15 IA PLATELET RICH PLASMA COMPARED TO OTHER IA PLATELET RICH PLASMA

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**
	Dallari2016
Composite	
Harris Hip Score( )	•|•|•
WOMAC( )	•|•|•
Pain	
VAS pain( )	•|•|•

TABLE 17: PART 1- IA CORTICOSTEROIDS COMPARED TO NO TREATMENT: COMPOSITE

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
Lambert, R.G., 2007	High Quality	SF-36 (Physical component)	1 months	IA steroid injection	31	32.17 (9.90)	Placebo	21	26.88 (9.62)	MeanDif	5.29 (-0.10, 10.68)	Not Significant (P-value>.05)
Lambert, R.G., 2007	High Quality	WOMAC (Patient's global assessment of health)	1 months	IA steroid injection	31	40.7 (24.20)	Placebo	21	59.7 (23.50)	MeanDif	-19 (-32.18, -5.82)	**Treatment 1 Significant (P-value<.05)**
Lambert, R.G., 2007	High Quality	SF-36 (Physical component)	2 months	IA steroid injection	31	31.01 (8.59)	Placebo	21	26.58 (6.78)	MeanDif	4.43 (0.24, 8.62)	**Treatment 2 Significant (P-value<.05)**
Lambert, R.G., 2007	High Quality	WOMAC (Patient's global assessment of health)	2 months	IA steroid injection	31	44.5 (25.90)	Placebo	21	60.2 (20.20)	MeanDif	-15.7 (-28.26, -3.14)	**Treatment 1 Significant (P-value<.05)**
Qvistgaard, E., 2006	High Quality	WOMAC Total	3 months	Steroid (Steroid)	.	. %	No Treatment (Placebo)	.	. %	Standardized Mean Difference	-.5 (-0.00, 1)	Not Significant (P-value>.05)
Atchia, I., 2011	High Quality	OMERACT-OARSI responder	1 weeks	Steroid (methylprednisolone acetate)	19	73.68%	Placebo (Saline)	19	21.05%	RR	3.5 (1.41, 8.71)	**Treatment 1 Significant (P-value<.05)**
Atchia, I., 2011	High Quality	OMERACT-OARSI responder	4 weeks	Steroid (methylprednisolone acetate)	19	57.89%	Placebo (Saline)	19	15.79%	RR	3.67 (1.21, 11.09)	**Treatment 1 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
Atchia, I., 2011	High Quality	OMERACT-OARSI responder	12 weeks	Steroid (methylprednisolone acetate)	19	36.84%	Placebo (Saline)	19	10.53%	RR	3.5 (0.83,14.73)	Not Significant (P-value>.05)

Table 18: Part 1- IA corticosteroids Compared to no treatment: 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
Lambert, R.G., 2007	High Quality	SF-36 (Physical functioning)	1 months	IA steroid injection	31	36.17 (21.84)	Placebo	21	26.43 (22.70)	MeanDif	9.74 (-2.64,22.12)	Not Significant (P-value>.05)
Lambert, R.G., 2007	High Quality	WOMAC (Physical function)	1 months	IA steroid injection	31	516 (388.10)	Placebo	21	897.4 (369.30)	MeanDif	-381.4 (-590.24, -172.56)	**Treatment 1 Significant (P-value<.05)**
Lambert, R.G., 2007	High Quality	WOMAC (Stiffness)	1 months	IA steroid injection	31	79.6 (57.30)	Placebo	21	119.8 (43.80)	MeanDif	-40.2 (-67.73, -12.67)	**Treatment 1 Significant (P-value<.05)**
Lambert, R.G., 2007	High Quality	range of motion (Hip external rotation)	1 months	IA steroid injection	31	23 (6.90)	Placebo	21	21.2 (4.20)	MeanDif	1.8 (-1.22, 4.82)	Not Significant (P-value>.05)
Lambert, R.G., 2007	High Quality	range of motion (Hip internal rotation)	1 months	IA steroid injection	31	20.4 (9.00)	Placebo	21	16.8 (7.40)	MeanDif	3.6 (-0.88, 8.08)	Not Significant (P-value>.05)
Lambert, R.G., 2007	High Quality	SF-36 (Physical functioning)	2 months	IA steroid injection	31	32.62 (19.33)	Placebo	21	22.62 (19.34)	MeanDif	10 (-0.71, 20.71)	Not Significant (P-value>.05)
Lambert, R.G., 2007	High Quality	WOMAC (Physical function)	2 months	IA steroid injection	31	538.5 (402.00)	Placebo	21	949.1 (350.40)	MeanDif	-410.6 (-616.72, -204.48)	**Treatment 1 Significant (P-value<.05)**
Lambert, R.G., 2007	High Quality	WOMAC (Stiffness)	2 months	IA steroid injection	31	75.6 (58.10)	Placebo	21	126.8 (48.40)	MeanDif	-51.2 (-80.30, -22.10)	**Treatment 1 Significant (P-value<.05)**
Lambert, R.G., 2007	High Quality	range of motion (Hip external rotation)	2 months	IA steroid injection	31	23.9 (7.10)	Placebo	21	20.3 (8.20)	MeanDif	3.6 (-0.71, 7.91)	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
Lambert, R.G., 2007	High Quality	range of motion (Hip internal rotation)	2 months	IA steroid injection	31	20.2 (9.60)	Placebo	21	15.4 (7.90)	MeanDif	4.8 (0.02, 9.58)	**Treatment 2 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
Lambert, R.G., 2007	High Quality	SF-36 (Social functioning)	1 months	IA steroid injection	31	72.5 (24.65)	Placebo	21	60.12 (29.12)	MeanDif	12.38 (-2.80, 27.56)	Not Significant (P-value>.05)
Lambert, R.G., 2007	High Quality	reduction/ elimination of narcotic use (Anagesic pill count)	1 months	IA steroid injection	31	31.7 (49.70)	Placebo	21	47.5 (78.20)	MeanDif	-15.8 (-53.55, 21.95)	Not Significant (P-value>.05)
Lambert, R.G., 2007	High Quality	SF-36 (Social functioning)	2 months	IA steroid injection	31	66.94 (27.87)	Placebo	21	53.57 (24.73)	MeanDif	13.37 (-1.06, 27.80)	Not Significant (P-value>.05)
Lambert, R.G., 2007	High Quality	reduction/ elimination of narcotic use (Anagesic pill count)	2 months	IA steroid injection	31	35.5 (58.90)	Placebo	21	60.3 (96.50)	MeanDif	-24.8 (-70.99, 21.39)	Not Significant (P-value>.05)

TABLE 20: PART 1- IA CORTICOSTEROIDS COMPARED TO NO TREATMENT: 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
Lambert, R.G., 2007	High Quality	SF-36 (Bodily pain)	1 months	IA steroid injection	31	46.37 (19.30)	Placebo	21	33.95 (19.48)	MeanDif	12.42 (1.67, 23.17)	**Treatment 1 Significant (P-value<.05)**
Lambert, R.G., 2007	High Quality	WOMAC (Pain)	1 months	IA steroid injection	31	149.6 (113.00)	Placebo	19	276.4 (129.00)	MeanDif	-126.8 (-197.13, -56.47)	**Treatment 1 Significant (P-value<.05)**
Lambert, R.G., 2007	High Quality	SF-36 (Bodily pain)	2 months	IA steroid injection	31	43.77 (21.40)	Placebo	32.29	14.79 (.)	Author Reported	28.98 (.,.)	Not Significant (P-value>.05)
Lambert, R.G., 2007	High Quality	WOMAC (Pain)	2 months	IA steroid injection	31	157.4 (127.20)	Placebo	21	306.5 (121.20)	MeanDif	-149.1 (-217.60, -80.60)	**Treatment 1 Significant (P-value<.05)**
Qvistgaard, E., 2006	High Quality	VAS pain (Pain on walking)	2 weeks	Steroid (Steroid)	.	. %	No Treatment (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Qvistgaard, E., 2006	High Quality	VAS pain (Pain on walking)	4 weeks	Steroid (Steroid)	.	. %	No Treatment (Placebo)	.	. %	Author Reported	NA	**Treatment 1 Significant (P-value<.05)**
Qvistgaard, E., 2006	High Quality	VAS pain (Pain at rest improvement)	3 months	Steroid (Steroid)	.	. %	No Treatment (Placebo)	.	. %	Standardized Mean Difference	-.4 (-0.1, .9)	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	Lequesne Index	3 months	Steroid (Steroid)	.	. %	No Treatment (Placebo)	.	. %	Standardized Mean Difference	.4 (-0.2, .8)	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	VAS pain(Pain on walking)	3 months	Steroid (Steroid)	.	. %	No Treatment (Placebo)	.	. %	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
Atchia, I., 2011	High Quality	OMERACT-OARSI responder	1 weeks	Hyaluronic Acid (Durolane)	19	10.53%	Placebo (Saline)	19	21.05%	RR	0.5 (0.1, 2.41)	Not Significant (P-value>.05)
Atchia, I., 2011	High Quality	OMERACT-OARSI responder	4 weeks	Hyaluronic Acid (Durolane)	19	10.53%	Placebo (Saline)	19	15.79%	RR	0.67 (0.13, 3.55)	Not Significant (P-value>.05)
Atchia, I., 2011	High Quality	OMERACT-OARSI responder	12 weeks	Hyaluronic Acid (Durolane)	19	21.05%	Placebo (Saline)	19	10.53%	RR	2 (0.41, 9.65)	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	Lequesne Index	3 months	Hyaluronic acid (HA)	.	. %	No Treatment (Placebo)	.		Standardized Mean Difference	.2 (-.3, .7)	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	WOMAC Total	3 months	Hyaluronic acid (HA)	.	. %	No Treatment (Placebo)	.		Standardized Mean Difference	.3 (-.2, .7)	Not Significant (P-value>.05)
Richette, P., 2009	High Quality	WOMAC (WOMAC global score)	3 months	Hyaluronic acid (HA)	42	-6.2 (21.30)	Placebo (Placebo)	43	-6.5 (20.20)	MeanDif	0.3 (-8.53, 9.13)	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
Richette, P., 2009	High Quality	WOMAC (WOMAC functional score)	3 months	Hyaluronic acid (HA)	42	-6.7 (22.70)	Placebo (Placebo)	43	-5.7 (19.90)	MeanDif	-1 (-10.08, 8.08)	Not Significant (P-value>.05)
Richette, P., 2009	High Quality	WOMAC (WOMAC stiffness score)	3 months	Hyaluronic acid (HA)	42	-2.8 (25.20)	Placebo (Placebo)	43	-11.1 (26.00)	MeanDif	8.3 (-2.58, 19.18)	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
Richette, P., 2009	High Quality	other questionnaire (OARSI responders at 3 months, % of patients)	3 months	Hyaluronic acid (HA)	42	33.33%	Placebo (Placebo)	43	32.56%	RR	1.02 (0.56, 1.88)	Not Significant (P-value>.05)
Richette, P., 2009	High Quality	other questionnaire (Patient global assessment of severity of hip OA)	3 months	Hyaluronic acid (HA)	42	-7 (24.90)	Placebo (Placebo)	43	-5.4 (27.20)	MeanDif	-1.6 (-12.68, 9.48)	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
Qvistgaard, E., 2006	High Quality	VAS pain (Pain on walking)	2 weeks	Hyaluronic acid (HA)	.	. %	No Treatment (Placebo)	.		Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	VAS pain (Pain on walking)	4 weeks	Hyaluronic acid (HA)	.	. %	No Treatment (Placebo)	.		Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	VAS pain (Pain on walking)	3 months	Hyaluronic acid (HA)	.	. %	No Treatment (Placebo)	.		Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	VAS pain (Pain at rest improvement)	3 months	Hyaluronic acid (HA)	.	. %	No Treatment (Placebo)	.		Standardized Mean Difference	.1 (-.3,.6)	Not Significant (P-value>.05)
Richette, P., 2009	High Quality	VAS pain (Pain score)	3 months	Hyaluronic acid (HA)	42	-7.8 (24.90)	Placebo (Placebo)	43	-9.1 (27.40)	MeanDif	1.3 (-9.83, 12.43)	Not Significant (P-value>.05)
Richette, P., 2009	High Quality	WOMAC (WOMAC pain score)	3 months	Hyaluronic acid (HA)	42	-8.6 (22.30)	Placebo (Placebo)	43	-7.5 (24.60)	MeanDif	-1.1 (-11.08, 8.88)	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
Spitzer, A.I., 2010	Moderate Quality	other adverse event (Total adverse event)	Post-Op	Methylprednisolone acetate (Methylprednisolone acetate)	156	14.10%	Hylan G-F 20 (Hylan G-F 20)	156	10.90%	RR	0.77 (0.43, 1.40)	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
Spitzer, A.I., 2010	Moderate Quality	WOMAC (Womac total)	4 weeks	Methylprednisolone acetate (Methylprednisolone acetate)	94	-26.98 (.)	Hylan G-F 20 (Hylan G-F 20)	102	-18.18 (.)	Author Reported	NA	Not Significant (P-value>.05)
Spitzer, A.I., 2010	Moderate Quality	WOMAC (Womac total)	6 months	Methylprednisolone acetate (Methylprednisolone acetate)	94	-12 (.)	Hylan G-F 20 (Hylan G-F 20)	102	-14.7 (.)	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	WOMAC (Womac OA index)	2 weeks	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	other questionnaire (Patient's golbal assessment)	2 weeks	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	WOMAC (Womac OA index)	4 weeks	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	other questionnaire (Patient's global assessment)	4 weeks	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	WOMAC (Womac OA index)	3 months	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	other questionnaire (Patient's golbal assessment)	3 months	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	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
Atchia, I., 2011	High Quality	OMERACT-OARSI responder	1 weeks	Steroid (methylprednisolone acetate)	19	73.68%	Hyaluronic Acid (Durolane)	19	10.53%	RR	7 (1.84, 26.68)	**Treatment 1 Significant (P-value<.05)**
Atchia, I., 2011	High Quality	OMERACT-OARSI responder	4 weeks	Steroid (methylprednisolone acetate)	19	57.89%	Hyaluronic Acid (Durolane)	19	10.53%	RR	5.5 (1.4, 21.56)	**Treatment 1 Significant (P-value<.05)**
Atchia, I., 2011	High Quality	OMERACT-OARSI responder	12 weeks	Steroid (methylprednisolone acetate)	19	36.84%	Hyaluronic Acid (Durolane)	19	21.05%	RR	1.75 (0.61, 5.01)	Not Significant (P-value>.05)

TABLE 27: PART 4- IA CORTICOSTEROIDS COMPARED TO IA HYALURONIC ACID: 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
Qvistgaard, E., 2006	High Quality	other questionnaire (Lequesne index)	2 weeks	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	other questionnaire (Lequesne index)	4 weeks	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	other questionnaire (Lequesne index)	3 months	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	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
Spitzer, A.I., 2010	Moderate Quality	other questionnaire (Clinician observer global assessment)	4 weeks	Methylprednisolone acetate (Methylprednisolone acetate)	94	-27.5 (.)	Hylan G-F 20 (Hylan G-F 20)	102	-20.53 (.)	Author Reported	NA	Not Significant (P-value>.05)
Spitzer, A.I., 2010	Moderate Quality	other questionnaire (Patient global assessment of severity of hip OA)	4 weeks	Methylprednisolone acetate (Methylprednisolone acetate)	94	-26.1 (.)	Hylan G-F 20 (Hylan G-F 20)	102	-17.11 (.)	Author Reported	NA	Not Significant (P-value>.05)
Spitzer, A.I., 2010	Moderate Quality	other questionnaire (Clinician observer global assessment)	6 months	Methylprednisolone acetate (Methylprednisolone acetate)	94	-14.71 (.)	Hylan G-F 20 (Hylan G-F 20)	102	-18.51 (.)	Author Reported	NA	Not Significant (P-value>.05)
Spitzer, A.I., 2010	Moderate Quality	other questionnaire (Patient global assessment of severity of hip OA)	6 months	Methylprednisolone acetate (Methylprednisolone acetate)	94	-14.71 (.)	Hylan G-F 20 (Hylan G-F 20)	102	-16.67 (.)	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
Qvistgaard, E., 2006	High Quality	VAS pain (Pain on walking)	2 weeks	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	VAS pain (Vas pain at rest)	2 weeks	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	VAS pain (Pain on walking)	4 weeks	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	VAS pain (Vas pain at rest)	4 weeks	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	VAS pain (Pain on walking)	3 months	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Qvistgaard, E., 2006	High Quality	VAS pain (Vas pain at rest)	3 months	Steroid (Steroid)	.	. %	Hyaluronic acid (HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Atchia, I., 2011	High Quality	WOMAC (Pain)	1 weeks	Steroid (methylprednisolone acetate)	19	. %	Hyaluronic Acid (Durolane)	18	. %	Author Reported	NA	Not Significant (P-value>.05)
Atchia, I., 2011	High Quality	WOMAC (Pain)	4 weeks	Steroid (methylprednisolone acetate)	19	. %	Hyaluronic Acid (Durolane)	18	. %	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
Tikiz, C., 2005	High Quality	WOMAC (WOMAC overall)	1 months	Hylan G-F 20 (Hylan G-F 20)	18	35.6 (19.50)	Na-Hyaluronan (Na-hyaluronan)	25	37.1 (28.40)	MeanDif	-1.5 (-15.82, 12.82)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	other questionnaire (Lequesne index)	1 months	Hylan G-F 20 (Hylan G-F 20)	18	7.1 (4.50)	Na-Hyaluronan (Na-hyaluronan)	25	5.9 (4.80)	MeanDif	1.2 (-1.60, 4.00)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	WOMAC (WOMAC overall)	3 months	Hylan G-F 20 (Hylan G-F 20)	18	39.4 (27.90)	Na-Hyaluronan (Na-hyaluronan)	25	43.6 (31.40)	MeanDif	-4.2 (-22.02, 13.62)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	other questionnaire (Lequesne index)	3 months	Hylan G-F 20 (Hylan G-F 20)	18	6.3 (4.30)	Na-Hyaluronan (Na-hyaluronan)	25	6.2 (4.80)	MeanDif	0.1 (-2.64, 2.84)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	WOMAC (WOMAC overall)	5.9 months	Hylan G-F 20 (Hylan G-F 20)	18	32.5 (23.00)	Na-Hyaluronan (Na-hyaluronan)	25	38.7 (30.30)	MeanDif	-6.2 (-22.14, 9.74)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	other questionnaire (Lequesne index)	5.9 months	Hylan G-F 20 (Hylan G-F 20)	18	5.9 (5.40)	Na-Hyaluronan (Na-hyaluronan)	25	6.2 (5.80)	MeanDif	-0.3 (-3.68, 3.08)	Not Significant (P-value>.05)
Bekerom, M.P.J., 2008	High Quality	Harris Hip Score (HHS post op)	Post-Op	IA injectibles (Adant)	91	71.1 (15.70)	IA injectibles (Synocorm)	20	77.4 (14.70)	MeanDif	-6.3 (-13.51, 0.91)	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
Tikiz, C., 2005	High Quality	functional task (Time to sit on and stand up from a chair)	1 months	Hylan G-F 20 (Hylan G-F 20)	18	32.6 (6.80)	Na-Hyaluronan (Na-hyaluronan)	25	29.9 (7.20)	MeanDif	2.7 (-1.52, 6.92)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	functional task (Walking time for 30 m)	1 months	Hylan G-F 20 (Hylan G-F 20)	18	29.1 (6.70)	Na-Hyaluronan (Na-hyaluronan)	25	30.3 (7.10)	MeanDif	-1.2 (-5.36, 2.96)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	functional task (Time to sit on and stand up from a chair)	3 months	Hylan G-F 20 (Hylan G-F 20)	18	30.5 (7.60)	Na-Hyaluronan (Na-hyaluronan)	25	30.6 (8.00)	MeanDif	-0.1 (-4.81, 4.61)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	functional task (Walking time for 30 m)	3 months	Hylan G-F 20 (Hylan G-F 20)	18	28.4 (6.40)	Na-Hyaluronan (Na-hyaluronan)	25	29.6 (7.90)	MeanDif	-1.2 (-5.48, 3.08)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	functional task (Time to sit on and stand up from a chair)	5.9 months	Hylan G-F 20 (Hylan G-F 20)	18	30.4 (7.90)	Na-Hyaluronan (Na-hyaluronan)	25	30 (6.20)	MeanDif	0.4 (-3.98, 4.78)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	functional task (Walking time for 30 m)	5.9 months	Hylan G-F 20 (Hylan G-F 20)	18	27.8 (7.30)	Na-Hyaluronan (Na-hyaluronan)	25	28 (8.20)	MeanDif	-0.2 (-4.86, 4.46)	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
Tikiz, C., 2005	High Quality	VAS pain (Vas pain score)	1 months	Hylan G-F 20 (Hylan G-F 20)	18	4.4 (2.30)	Na-Hyaluronan (Na-hyaluronan)	25	4.1 (2.60)	MeanDif	0.3 (-1.17, 1.77)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	VAS pain (Vas pain score)	3 months	Hylan G-F 20 (Hylan G-F 20)	18	4.7 (2.70)	Na-Hyaluronan (Na-hyaluronan)	25	4.6 (2.50)	MeanDif	0.1 (-1.49, 1.69)	Not Significant (P-value>.05)
Tikiz, C., 2005	High Quality	VAS pain (Vas pain score)	5.9 months	Hylan G-F 20 (Hylan G-F 20)	18	3.4 (3.00)	Na-Hyaluronan (Na-hyaluronan)	25	4.6 (2.50)	MeanDif	-1.2 (-2.90, 0.50)	Not Significant (P-value>.05)
Bekerom, M.P.J., 2008	High Quality	VAS pain (VAS pain during walking)	Post-Op	IA injectibles (Adant)	91	39 (27.00)	IA injectibles (Synocorm)	20	29 (23.00)	MeanDif	10 (-1.51, 21.51)	Not Significant (P-value>.05)
Bekerom, M.P.J., 2008	High Quality	VAS pain (VAS pain during walking)	Post-Op	IA injectibles (Adant)	91	39 (27.00)	IA injectibles (Synvisc)	15	30 (29.00)	MeanDif	9 (-6.69, 24.69)	Not Significant (P-value>.05)
Bekerom, M.P.J., 2008	High Quality	VAS pain (VAS pain during walking)	Post-Op	IA injectibles (Synocorm)	20	29 (23.00)	IA injectibles (Synvisc)	15	30 (29.00)	MeanDif	-1 (-18.80, 16.80)	Not Significant (P-value>.05)

TABLE 33: PART 6- IA HYALURONIC ACID COMPARED TO IA PLATELET RICH PLASMA: COMPOSITE

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Dallari, D., 2016	High Quality	Harris Hip Score	2 months	Hyaluronic acid (HA)	.	. %	Platelet-rich plasma (Platelet-rich plasma)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	WOMAC	2 months	HA (HA)	.	. %	Platelet-rich plasma (Platelet-rich plasma)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	Harris Hip Score	5.9 months	HA (HA)	.	. %	Platelet-rich plasma (Platelet-rich plasma)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	WOMAC	5.9 months	HA (HA)	.	. %	Platelet-rich plasma (Platelet-rich plasma)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	Harris Hip Score	11.8 months	HA (HA)	.	. %	Platelet-rich plasma (Platelet-rich plasma)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	WOMAC	11.8 months	HA (HA)	.	. %	Platelet-rich plasma (Platelet-rich plasma)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	Harris Hip Score	2 months	HA (HA)	.	. %	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	WOMAC	2 months	HA (HA)	.	. %	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	Harris Hip Score	5.9 months	HA (HA)	.	. %	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	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)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Dallari, D., 2016	High Quality	WOMAC	5.9 months	HA (HA)	.	. %	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	Harris Hip Score	11.8 months	HA (HA)	.	. %	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	WOMAC	11.8 months	HA (HA)	.	. %	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Battaglia, M., 2013	High Quality	Harris Hip Score	1 months	Hyaluronic acid (HA)	.	78.02 (.)	Platelet-ricch plasma (150 mL of venous blood was taken from each patient and collected in a bag containing 21 mL of sodium citrate, and 2 centrifugations were performed (the first cycle was run at 1800 rpm for 15 minutes to separate erythrocytes, and the second cycle was run at 3500 rpm for 10 minutes to concentrate platelets) to obtain 4 units of 5 mL each of PRP.21-23)	.	73.72 (.)	Author Reported	NA	Not Significant (P-value>.05)
Battaglia, M., 2013	High Quality	Harris Hip Score	3 months	Hyaluronic acid (HA)	.	77.23 (.)	Platelet-ricch plasma (150 mL of venous blood was taken from each patient and collected in a bag containing 21 mL of sodium citrate, and 2 centrifugations were performed (the first cycle was run at 1800 rpm for 15 minutes to separate erythrocytes, and the second cycle was run at 3500 rpm for 10 minutes to concentrate platelets) to obtain 4 units of 5 mL each of PRP.21-23)	.	72.9 (.)	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)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Battaglia, M., 2013	High Quality	Harris Hip Score	5.9 months	Hyaluronic acid (HA)	.	75.26 (.)	Platelet-ricch plasma (150 mL of venous blood was taken from each patient and collected in a bag containing 21 mL of sodium citrate, and 2 centrifugations were performed (the first cycle was run at 1800 rpm for 15 minutes to separate erythrocytes, and the second cycle was run at 3500 rpm for 10 minutes to concentrate platelets) to obtain 4 units of 5 mL each of PRP.21-23)	.	70.23 (.)	Author Reported	NA	Not Significant (P-value>.05)
Battaglia, M., 2013	High Quality	Harris Hip Score	11.8 months	Hyaluronic acid (HA)	.	72.55 (.)	Platelet-ricch plasma (150 mL of venous blood was taken from each patient and collected in a bag containing 21 mL of sodium citrate, and 2 centrifugations were performed (the first cycle was run at 1800 rpm for 15 minutes to separate erythrocytes, and the second cycle was run at 3500 rpm for 10 minutes to concentrate platelets) to obtain 4 units of 5 mL each of PRP.21-23)	.	65.73 (.)	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
Battaglia, M., 2013	High Quality	reduction/ elimination of narcotic use (NSAID consumption)	11.8 months	Hyaluronic acid (HA)	.	. %	Platelet-ricch plasma (150 mL of venous blood was taken from each patient and collected in a bag containing 21 mL of sodium citrate, and 2 centrifugations were performed (the first cycle was run at 1800 rpm for 15 minutes to separate erythrocytes, and the second cycle was run at 3500 rpm for 10 minutes to concentrate platelets) to obtain 4 units of 5 mL each of PRP.21-23)	.	. %	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
Dallari, D., 2016	High Quality	VAS pain	2 months	HA (HA)	.	. %	Platelet-rich plasma (Platelet-rich plasma)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	VAS pain	5.9 months	HA (HA)	.	. %	Platelet-rich plasma (Platelet-rich plasma)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	VAS pain	11.8 months	HA (HA)	.	. %	Platelet-rich plasma (Platelet-rich plasma)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	VAS pain	2 months	HA (HA)	.	. %	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	VAS pain	5.9 months	HA (HA)	.	. %	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	VAS pain	11.8 months	HA (HA)	.	. %	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	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
Battaglia, M., 2013	High Quality	VAS pain(VAS pain score)	1 months	Hyaluronic acid (HA)	.	3.58 (.)	Platelet-ricch plasma (150 mL of venous blood was taken from each patient and collected in a bag containing 21 mL of sodium citrate, and 2 centrifugations were performed (the first cycle was run at 1800 rpm for 15 minutes to separate erythrocytes, and the second cycle was run at 3500 rpm for 10 minutes to concentrate platelets) to obtain 4 units of 5 mL each of PRP.21-23)	.	3.72 (.)	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
Battaglia, M., 2013	High Quality	VAS pain (VAS pain score)	3 months	Hyaluronic acid (HA)	.	3.8 (.)	Platelet-ricch plasma (150 mL of venous blood was taken from each patient and collected in a bag containing 21 mL of sodium citrate, and 2 centrifugations were performed (the first cycle was run at 1800 rpm for 15 minutes to separate erythrocytes, and the second cycle was run at 3500 rpm for 10 minutes to concentrate platelets) to obtain 4 units of 5 mL each of PRP.21-23)	.	3.8 (.)	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
Battaglia, M., 2013	High Quality	VAS pain (VAS pain score)	5.9 months	Hyaluronic acid (HA)	.	4.04 (.)	Platelet-ricch plasma (150 mL of venous blood was taken from each patient and collected in a bag containing 21 mL of sodium citrate, and 2 centrifugations were performed (the first cycle was run at 1800 rpm for 15 minutes to separate erythrocytes, and the second cycle was run at 3500 rpm for 10 minutes to concentrate platelets) to obtain 4 units of 5 mL each of PRP.21-23)	.	4.04 (.)	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
Battaglia, M., 2013	High Quality	VAS pain (VAS pain score)	11.8 months	Hyaluronic acid (HA)	.	4.59 (.)	Platelet-ricch plasma (150 mL of venous blood was taken from each patient and collected in a bag containing 21 mL of sodium citrate, and 2 centrifugations were performed (the first cycle was run at 1800 rpm for 15 minutes to separate erythrocytes, and the second cycle was run at 3500 rpm for 10 minutes to concentrate platelets) to obtain 4 units of 5 mL each of PRP.21-23)	.	4.75 (.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 36: PART 7- IA HYALURONIC ACID COMPARED TO IA PROLOTHERAPY: COMPOSITE

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
Migliore, A., 2009	High Quality	other questionnaire (Global physician assessment)	3 months	Hyalubrix (Hyalubrix)	17	4.4 (1.49)	Mepivacine (Mepivacine)	17	4.5 (1.61)	MeanDif	-0.1 (-1.14, 0.94)	Not Significant (P-value>.05)
Migliore, A., 2009	High Quality	other questionnaire (Global physician assessment)	5.9 months	Hyalubrix (Hyalubrix)	17	4 (1.51)	Mepivacine (Mepivacine)	17	4.3 (1.61)	MeanDif	-0.3 (-1.35, 0.75)	Not Significant (P-value>.05)

TABLE 37: PART 7- IA HYALURONIC ACID COMPARED TO IA PROLOTHERAPY: 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
Migliore, A., 2009	High Quality	other questionnaire (Lesquesne index)	3 months	Hyalubrix (Hyalubrix)	17	5.15 (5.15)	Mepivacine (Mepivacine)	17	6.53 (4.33)	MeanDif	-1.38 (-4.58, 1.82)	Not Significant (P-value>.05)
Migliore, A., 2009	High Quality	other questionnaire (Lesquesne index)	5.9 months	Hyalubrix (Hyalubrix)	17	6.53 (3.94)	Mepivacine (Mepivacine)	17	6.41 (4.14)	MeanDif	0.12 (-2.60, 2.84)	Not Significant (P-value>.05)

TABLE 38: PART 7- IA HYALURONIC ACID COMPARED TO IA PROLOTHERAPY: 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
Migliore, A., 2009	High Quality	other questionnaire (Global patient assessment)	3 months	Hyalubrix (Hyalubrix)	17	4.5 (2.31)	Mepivacine (Mepivacine)	17	4.7 (2.33)	MeanDif	-0.2 (-1.76, 1.36)	Not Significant (P-value>.05)
Migliore, A., 2009	High Quality	reduction/elimination of narcotic use (NSAID consumption)	3 months	Hyalubrix (Hyalubrix)	17	2.1 (0.40)	Mepivacine (Mepivacine)	17	5.5 (3.00)	MeanDif	-3.4 (-4.84, -1.96)	**Treatment 1 Significant (P-value<.05)**
Migliore, A., 2009	High Quality	other questionnaire (Global patient assessment)	5.9 months	Hyalubrix (Hyalubrix)	17	4 (2.06)	Mepivacine (Mepivacine)	17	4.9 (2.01)	MeanDif	-0.9 (-2.27, 0.47)	Not Significant (P-value>.05)
Migliore, A., 2009	High Quality	reduction/elimination of narcotic use (NSAID consumption)	5.9 months	Hyalubrix (Hyalubrix)	17	1.5 (0.50)	Mepivacine (Mepivacine)	17	2.3 (1.00)	MeanDif	-0.8 (-1.33, -0.27)	**Treatment 1 Significant (P-value<.05)**

TABLE 39: PART 7- IA HYALURONIC ACID COMPARED TO IA PROLOTHERAPY: 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
Migliore, A., 2009	High Quality	VAS pain (Pain VAS scale)	3 months	Hyalubrix (Hyalubrix)	17	4.3 (2.58)	Mepivacine (Mepivacine)	17	4.5 (2.63)	MeanDif	-0.2 (-1.95, 1.55)	Not Significant (P-value>.05)
Migliore, A., 2009	High Quality	VAS pain (Pain VAS scale)	5.9 months	Hyalubrix (Hyalubrix)	17	4.5 (1.96)	Mepivacine (Mepivacine)	17	5 (2.41)	MeanDif	-0.5 (-1.98, 0.98)	Not Significant (P-value>.05)

TABLE 40: PART 8- IA PLATELET RICH PLASMA COMPARED TO IA PLATELET RICH PLASMA: COMPOSITE

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
Dallari, D., 2016	High Quality	Harris Hip Score	2 months	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Platelet-rich plasma (PRP)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	WOMAC	2 months	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Platelet-rich plasma (PRP)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	WOMAC	2 months	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Platelet-rich plasma (PRP)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	WOMAC	2 months	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Platelet-rich plasma (PRP)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	Harris Hip Score	5.9 months	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Platelet-rich plasma (PRP)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	Harris Hip Score	11.8 months	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Platelet-rich plasma (PRP)	.	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 41: PART 8- IA PLATELET RICH PLASMA COMPARED TO IA PLATELET RICH PLASMA: 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
Dallari, D., 2016	High Quality	VAS pain	2 months	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Platelet-rich plasma (PRP)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	VAS pain	5.9 months	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Platelet-rich plasma (PRP)	.	. %	Author Reported	NA	Not Significant (P-value>.05)
Dallari, D., 2016	High Quality	VAS pain	11.8 months	Platelet-rich plasma+HA (Platelet-rich plasma+HA)	.	. %	Platelet-rich plasma (PRP)	.	. %	Author Reported	NA	Not Significant (P-value>.05)

PHYSICAL THERAPY-CONSERVATIVE

Strong evidence supports the use of physical therapy as a treatment to improve function and reduce pain for patients with osteoarthritis of the hip and mild to moderate symptoms.

Strength of Recommendation: Strong Evidence ★★★★

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

RATIONALE

There were 9 high quality studies (Bennell et al, Beselga et al, Fernandes et al, French et al, Hoesksma et al, Koybasi et al, Pister et al, Poulsen et al, Svege, et al) and 3 moderate quality studies (Nguyen et al, Svege et al, Tak et al) that were initially identified as evaluating the effect of physical therapy for individuals with hip osteoarthritis. One of the moderate quality studies (Nguyen et al) was excluded from this recommendation because it did not include interventions that are typical of physical therapy.

Patients included in the majority of these studies had mild or moderate symptoms, although this was defined differently between studies. Mild to moderate OA was qualified as being hip pain of at least 40 out of 100, but not being scheduled for hip surgery (Bennell et al), having a Harris Hip Score between 60 and 95 (Fernandes et al), not requiring a walking aid during ambulation (Beselga et al), or other similar criteria.

There was conflicting evidence pertaining to the effectiveness of physical therapy on pain and function in individuals with symptomatic hip osteoarthritis. In a high quality sham-controlled study, Beselga et al. found an immediate effect of joint mobilization on patient symptoms. In two other high quality studies, patients had greater improvements in pain with physical therapy compared to either a control group (Poulson et al) or a group that did not receive joint mobilization in addition to exercise (French et al). In one moderate quality study, physical therapy reduced pain and improved function compared to a non-active control group. In another moderate quality study an exercise intervention improved pain and function to a greater extent than a control group, sham ultrasound group, and active ultrasound group. Despite evidence to support physical therapy, two high quality studies found no benefit of physical therapy compared to a placebo group (Bennell et al) or a group that received only patient education (Fernandes et al).

To address this conflicting evidence, we performed a meta-analysis to determine the potential effect of physical therapy on pain and function at different follow-up periods. This analysis revealed that there was a net positive benefit of physical therapy on functional outcomes at 6 to 12 month follow-up. The analysis also revealed a positive effect of physical therapy on reducing pain at up to a 9-month follow-up. Given the cumulative positive effect of physical therapy on functional and pain, there is strong evidence to support physical therapy on improving outcomes at up to 9 months after treatment.

POSSIBLE HARMS OF IMPLEMENTATION

As noted in one high quality study (Bennell et al), it is possible that individuals who participate in a physical therapy program may experience mild and transient adverse events, including pain or stiffness in the hip, back or other body regions.

There were relatively few placebo controlled clinical trials for this patient population. Of the existing studies, both the duration and type of intervention was heterogeneous. Future research should focus on identifying the optimal dose and types of physical therapy interventions and modalities that may prove most useful to reduce long term pain and dysfunction.

QUALITY EVALUATION TABLE: PHYSICAL THERAPY AS CONSERVATIVE TREATMENT

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION -PHYSICAL THERAPY-CONSERVATIVE RANDOMIZED

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
Bennell,K.L., 2014	●	●	○	●	●	●	●	●	●	Include	High Quality
Beselga,C., 2016	●	◑	●	●	●	●	●	●	●	Include	High Quality
Fernandes,L., 2010	●	●	○	◑	●	●	●	●	●	Include	High Quality
French,H.P., 2013	●	●	◑	●	◑	●	●	●	●	Include	High Quality
Hoeksma,H.L., 2005	●	●	●	●	●	●	●	●	●	Include	High Quality
Koybasi,M., 2010	◑	●	◑	●	◑	●	●	●	●	Include	High Quality
Nguyen,M., 1997	●	○	○	●	●	○	●	●	●	Include	Moderate Quality
Pisters,M.F., 2010	●	●	◑	◑	●	●	●	●	●	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
Poulsen,E., 2013	●	●	◑	◑	●	●	●	●	●	Include	High Quality
Svege,I., 2015	●	●	○	◑	●	●	●	●	●	Include	High Quality
Svege,I., 2015	●	●	○	○	●	●	●	●	●	Include	Moderate Quality
Tak,E., 2005	●	◑	◑	○	●	●	●	●	●	Include	Moderate Quality

SUMMARY OF FINDINGS TABLE 16 SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO NO TREATMENT

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**				**Moderate Quality**
	Bennell2014	**Fernandes2010**	**French2013**	**Poulsen2013**	**Nguyen1997**
Composite					
other questionnaire(PASE)	•|•				
Function					
SF-36(Physical function)		•|•|•			
SF-36(Role physical)		•|•|•			
HOOS(Function sport & recreation)	•|•				
WOMAC(Physical function)	•|•	•|+|+			
functional task(30 s sit - stand)	•				
functional task(4 square step test)	•				
functional task(Daily step count)	•|•				
functional task(Step test)	•				
functional task(Timed stair climb)	•				
other questionnaire(PASE)		•|•|•			
other questionnaire(Self efficacy - function)	-|•				
SF-36(SF-36 physical summary score)			•		
WOMAC(WOMAC PF)			+		
functional task(50 foot walk test)			•		
functional task(Sit-to-stand)			•		
other questionnaire(Functional impairment- Lequesne hip index)					•
HOOS(Function in daily living)				[+|•][+|•]	
HOOS(sports & recreation)				[+|•][+|•]	
Other					
SF-36(Role emotional)		•|•|•			
SF-36(Social function)		•|•|•			
SF-36(Vitality)		•|•|•			
WOMAC(Stiffness)		•|•|+			
other questionnaire(Pain catastrophizing scale)	•|•				
SF-36(SF-36 mental summary score)			•		
other questionnaire(Hospital Anxiety and Depression Scale - anxiety)			•		
other questionnaire(Hospital Anxiety and Depression Scale - depression)			•		
reduction/elimination of narcotic use(Analgesic total consumption)					•
reduction/elimination of narcotic use(NSAID total consumption)					+
Pain					
SF-36(Bodily pain)		+|•|•			
WOMAC(Pain)		•|•|•			
other questionnaire(NRS pain)				[+|•][+|•]	
HOOS(Pain)	•|•			[+|•][+|•]	
VAS pain(Overall pain)	•|•				
VAS pain(Walking pain)	•|•				
other questionnaire(Self efficacy - pain)	•|•				
VAS pain(Pain)					•
other questionnaire(MQS- pain medication usage)			•		
other questionnaire(NRS- night pain severity)			+		
other questionnaire(NRS- pain severity with activity)			+		
Quality Of Life					
HOOS(Quality of life)	•|•				
SF-36(General health)		•|•|•			
SF-36(Mental health)		•|•|•			
other questionnaire(Assessment of quality of life)	•|•				
other questionnaire(Quality of life- AIMS2)					•
HOOS(hip-related QoL)				[+|•][+|•]	
Symptoms					
HOOS(Symptoms)				[+|•][+|•]	
HOOS(Other symptoms)	•|•				

SUMMARY OF FINDINGS TABLE 17 SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO SUPERVISED AND STRUCTURED PHYSICAL THERAPY 213

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**		
	French2013	**Hoeksma2005**	**Pisters2010**
Function			
SF-36(Physical function)		•|•|•	
Harris Hip Score( )		+|+|+	
WOMAC(Physical function)			•|+|•|•
SF-36(SF-36 physical summary score)	•		
WOMAC(WOMAC PF)	•		
functional task(50 foot walk test)	•		
functional task(Sit-to-stand)	•		
SF-36(Role physical function)		•|•|•	
functional task(Walking speed)		•|+|+	
functional task(5 m walking in s)			+|•|•
other questionnaire(Patient-oriented physical function, MACTAR)			•|-|•|•
Other			
SF-36(SF-36 mental summary score)	•		
other questionnaire(Hospital Anxiety and Depression Scale - anxiety)	•		
other questionnaire(Hospital Anxiety and Depression Scale - depression)	•		
patient satisfaction(Worse)		•	
need for THA(joint replacement surgery)			+
other questionnaire(PGA patient global assessment)			•|+|•|•
Pain			
SF-36(Bodily pain)		•|•|•	
WOMAC(Pain)			+|+|•|•
other questionnaire(MQS- pain medication usage)	•		
other questionnaire(NRS- night pain severity)	•		
other questionnaire(NRS- pain severity with activity)	•		
VAS pain(Pain at rest)		+|•|•	
VAS pain(Main complaint)		+|+|+	
VAS pain(Pain walking)		•|•|•	
VAS pain(starting stiffness)		•|•|•	

TABLE 42: PART 1- SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO NO TREATMENT: COMPOSITE

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
Bennell, K.L., 2014	High Quality	other questionnaire (PASE)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	145 (74.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	150 (77.00)	MeanDif	-5 (-35.21, 25.21)	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
Bennell, K.L., 2014	High Quality	other questionnaire (PASE)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	150 (73.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	163 (98.00)	MeanDif	-13 (-49.92, 23.92)	Not Significant (P-value>.05)

TABLE 43: PART 1- SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO NO TREATMENT: 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
Nguyen, M., 1997	Moderate Quality	other questionnaire (Functional impairment-Lequesne hip index)	5.5 months	(21 day period including journey, rest, balneotherapy, spring water and medical attention in the spa resort of Vichy)	13	-1 (2.00)	(21 day period during which patients maintained their routine life and out-patient care, including physical therapies if considered necessary by the physician)	16	0 (3.00)	MeanDif	-1 (-2.83, 0.83)	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
Bennell, K.L., 2014	High Quality	HOOS (Function sport & recreation)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	41 (24.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	41 (20.00)	MeanDif	0 (-8.88, 8.88)	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
Bennell, K.L., 2014	High Quality	WOMAC (Physical function)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	28 (13.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	26 (11.00)	MeanDif	2 (-2.84, 6.84)	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
Bennell, K.L., 2014	High Quality	functional task (30 s sit - stand)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	45	11 (4.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	46	11 (3.00)	MeanDif	0 (-1.46, 1.46)	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
Bennell, K.L., 2014	High Quality	functional task (4 square step test)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	45	9 (3.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	46	9 (2.00)	MeanDif	0 (-1.05, 1.05)	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
Bennell, K.L., 2014	High Quality	functional task (Daily step count)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	49	6818 (4178.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	7547 (3421.00)	MeanDif	-729 (-2234.89, 776.89)	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
Bennell, K.L., 2014	High Quality	functional task (Step test)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	45	14 (4.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	46	13 (4.00)	MeanDif	1 (-0.64, 2.64)	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
Bennell, K.L., 2014	High Quality	functional task (Timed stair climb)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	45	8 (4.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	46	7 (2.00)	MeanDif	1 (-0.30, 2.30)	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
Bennell, K.L., 2014	High Quality	other questionnaire (Self efficacy - function)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	8 (1.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	9 (1.00)	MeanDif	-1 (-1.40, -0.60)	**Treatment 2 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
Bennell, K.L., 2014	High Quality	HOOS (Function sport & recreation)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	43 (23.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	41 (22.00)	MeanDif	2 (-7.71, 11.71)	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
Bennell, K.L., 2014	High Quality	WOMAC (Physical function)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	28 (13.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	27 (13.00)	MeanDif	1 (-4.60, 6.60)	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
Bennell, K.L., 2014	High Quality	functional task (Daily step count)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	7623 (5029.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	6732 (4428.00)	MeanDif	891 (-1159.15, 2941.15)	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
Bennell, K.L., 2014	High Quality	other questionnaire (Self efficacy - function)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	8 (2.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	8 (2.00)	MeanDif	0 (-0.86, 0.86)	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
French, H.P., 2013	High Quality	SF-36 (SF-36 physical summary score)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	36 (11.00)	(Participants in the control group remained on the physiotherapy waitlist and completed a follow-up assessment with the blinded outcome assessor at 9 weeks, after which they were rerandomized into either the ET or ETþMT group. Received written information on hip OA)	43	34 (10.00)	MeanDif	2 (-2.44, 6.44)	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
French, H.P., 2013	High Quality	WOMAC (WOMAC PF)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	29 (17.00)	(Participants in the control group remained on the physiotherapy waitlist and completed a follow-up assessment with the blinded outcome assessor at 9 weeks, after which they were rerandomized into either the ET or ETþMT group. Received written information on hip OA)	43	36 (16.00)	MeanDif	-7 (-13.98, -0.02)	**Treatment 1 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
French, H.P., 2013	High Quality	functional task (50 foot walk test)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	15 (8.00)	(Participants in the control group remained on the physiotherapy waitlist and completed a follow-up assessment with the blinded outcome assessor at 9 weeks, after which they were rerandomized into either the ET or ETþMT group. Received written information on hip OA)	43	14 (8.00)	MeanDif	1 (-2.38, 4.38)	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
French, H.P., 2013	High Quality	functional task (Sit-to-stand)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	15 (9.00)	(Participants in the control group remained on the physiotherapy waitlist and completed a follow-up assessment with the blinded outcome assessor at 9 weeks, after which they were rerandomized into either the ET or ETþMT group. Received written information on hip OA)	43	13 (7.00)	MeanDif	2 (-1.41, 5.41)	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
Poulsen, E., 2013	High Quality	HOOS (Function in daily living)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	15 (16.00)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	5 (13.00)	MeanDif	10 (2.98, 17.02)	**Treatment 1 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
Poulsen, E., 2013	High Quality	HOOS (sports & recreation)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	21 (18.00)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	11 (18.00)	MeanDif	10 (1.31, 18.69)	**Treatment 1 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
Poulsen, E., 2013	High Quality	HOOS (Function in daily living)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	13 (20.00)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	10 (18.00)	MeanDif	3 (-6.17, 12.17)	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
Poulsen, E., 2013	High Quality	HOOS (sports & recreation)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	13 (22.00)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	11 (22.00)	MeanDif	2 (-8.62, 12.62)	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
Poulsen, E., 2013	High Quality	HOOS (Function in daily living)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	15 (16.00)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	1 (10.00)	MeanDif	14 (7.71, 20.29)	**Treatment 1 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
Poulsen, E., 2013	High Quality	HOOS (sports & recreation)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	21 (18.00)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	2 (14.00)	MeanDif	19 (11.42, 26.58)	**Treatment 1 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
Poulsen, E., 2013	High Quality	HOOS (Function in daily living)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	13 (20.00)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	9 (21.00)	MeanDif	4 (-5.60, 13.60)	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
Poulsen, E., 2013	High Quality	HOOS (sports & recreation)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	13 (22.00)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	10 (21.00)	MeanDif	3 (-7.09, 13.09)	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
Fernandes, L., 2010	High Quality	SF-36 (Physical function)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	55	76.1 (18.40)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	52	69.8 (20.10)	MeanDif	6.3 (-1.01, 13.61)	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
Fernandes, L., 2010	High Quality	SF-36 (Role physical)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	55	81.5 (24.40)	(E given was in the form of a previously described "Hip School" developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	53	74.9 (24.80)	MeanDif	6.6 (-2.68, 15.88)	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
Fernandes, L., 2010	High Quality	WOMAC (Physical function)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	55	17.9 (14.30)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	54	22.5 (17.00)	MeanDif	-4.6 (-10.50, 1.30)	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
Fernandes, L., 2010	High Quality	other questionnaire (PASE)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	53	114.9 (52.90)	(E given was in the form of a previously described "Hip School" developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	54	121.3 (45.40)	MeanDif	-6.4 (-25.09, 12.29)	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
Fernandes, L., 2010	High Quality	SF-36 (Physical function)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	49	77.2 (19.00)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	43	72.9 (22.30)	MeanDif	4.3 (-4.23, 12.83)	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
Fernandes, L., 2010	High Quality	SF-36 (Role physical)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	48	83.2 (20.00)	(E given was in the form of a previously described "Hip School" developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	44	74.7 (26.20)	MeanDif	8.5 (-1.09, 18.09)	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
Fernandes, L., 2010	High Quality	WOMAC (Physical function)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	47	15.8 (15.90)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	42	24.2 (18.40)	MeanDif	-8.4 (-15.59, -1.21)	**Treatment 1 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
Fernandes, L., 2010	High Quality	other questionnaire (PASE)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	47	118.2 (48.60)	(Given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	45	125.6 (48.30)	MeanDif	-7.4 (-27.20, 12.40)	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
Fernandes, L., 2010	High Quality	SF-36 (Physical function)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	40	75.5 (20.50)	(E given was in the form of a previously described "Hip School" developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	35	71.3 (20.80)	MeanDif	4.2 (-5.17, 13.57)	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
Fernandes, L., 2010	High Quality	SF-36 (Role physical)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	41	82.3 (25.50)	(E given was in the form of a previously described "Hip School" developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	37	75.7 (29.00)	MeanDif	6.6 (-5.58, 18.78)	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
Fernandes, L., 2010	High Quality	WOMAC (Physical function)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	41	15.1 (13.70)	(E given was in the form of a previously described "Hip School" developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	36	22.8 (18.60)	MeanDif	-7.7 (-15.08, -0.32)	**Treatment 1 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
Fernandes, L., 2010	High Quality	other questionnaire (PASE)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	41	123.1 (50.70)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	36	133.3 (57.30)	MeanDif	-10.2 (-34.51, 14.11)	Not Significant (P-value>.05)

TABLE 44: PART 1- SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO NO TREATMENT: 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
Nguyen, M., 1997	Moderate Quality	reduction/elimination of narcotic use (Analgesic total consumption)	5.5 months	(21 day period including journey, rest, balneotherapy, spring water and medical attention in the spa resort of Vichy)	13	144 (168.00)	(21 day period during which patients maintained their routine life and out-patient care, including physical therapies if considered necessary by the physician)	16	288 (336.00)	MeanDif	-144 (-332.27, 44.27)	Not Significant (P-value>.05)
Nguyen, M., 1997	Moderate Quality	reduction/elimination of narcotic use (NSAID total consumption)	5.5 months	(21 day period including journey, rest, balneotherapy, spring water and medical attention in the spa resort of Vichy)	13	288 (360.00)	(21 day period during which patients maintained their routine life and out-patient care, including physical therapies if considered necessary by the physician)	16	672 (672.00)	MeanDif	-384 (-767.04, -0.96)	**Treatment 1 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
Bennell, K.L., 2014	High Quality	other questionnaire (Pain catastrophizing scale)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	14 (10.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	13 (9.00)	MeanDif	1 (-2.82, 4.82)	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
Bennell, K.L., 2014	High Quality	other questionnaire (Pain catastrophizing scale)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	13 (9.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	10 (8.00)	MeanDif	3 (-0.68, 6.68)	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
French, H.P., 2013	High Quality	SF-36 (SF-36 mental summary score)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	50 (15.00)	(Participants in the control group remained on the physiotherapy waitlist and completed a follow-up assessment with the blinded outcome assessor at 9 weeks, after which they were rerandomized into either the ET or ETþMT group. Received written information on hip OA)	43	49 (14.00)	MeanDif	1 (-5.13, 7.13)	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
French, H.P., 2013	High Quality	other questionnaire (Hospital Anxiety and Depression Scale - anxiety)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	6 (6.00)	(Participants in the control group remained on the physiotherapy waitlist and completed a follow-up assessment with the blinded outcome assessor at 9 weeks, after which they were rerandomized into either the ET or ETþMT group. Received written information on hip OA)	43	6 (4.00)	MeanDif	0 (-2.16, 2.16)	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
French, H.P., 2013	High Quality	other questionnaire (Hospital Anxiety and Depression Scale - depression)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	5 (5.00)	(Participants in the control group remained on the physiotherapy waitlist and completed a follow-up assessment with the blinded outcome assessor at 9 weeks, after which they were rerandomized into either the ET or ETþMT group. Received written information on hip OA)	43	6 (3.00)	MeanDif	-1 (-2.74, 0.74)	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
Fernandes, L., 2010	High Quality	SF-36 (Role emotional)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	55	89.1 (21.30)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	53	91.5 (17.00)	MeanDif	-2.4 (-9.66, 4.86)	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
Fernandes, L., 2010	High Quality	SF-36 (Social function)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	53	90.3 (17.30)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	48	88.8 (19.00)	MeanDif	1.5 (-5.61, 8.61)	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
Fernandes, L., 2010	High Quality	SF-36 (Vitality)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	53	57.3 (20.30)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	52	59.6 (22.30)	MeanDif	-2.3 (-10.46, 5.86)	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
Fernandes, L., 2010	High Quality	WOMAC (Stiffness)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	55	28.9 (22.40)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	54	32.4 (22.50)	MeanDif	-3.5 (-11.93, 4.93)	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
Fernandes, L., 2010	High Quality	SF-36 (Role emotional)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	49	92.7 (13.10)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	43	93.6 (12.30)	MeanDif	-0.9 (-6.09, 4.29)	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
Fernandes, L., 2010	High Quality	SF-36 (Social function)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	49	92.7 (12.50)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	44	85.2 (23.40)	MeanDif	7.5 (-0.25, 15.25)	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
Fernandes, L., 2010	High Quality	SF-36 (Vitality)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	48	63.4 (17.40)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	44	60.5 (20.90)	MeanDif	2.9 (-5.00, 10.80)	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
Fernandes, L., 2010	High Quality	WOMAC (Stiffness)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	46	25.7 (20.90)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	42	32 (22.20)	MeanDif	-6.3 (-15.33, 2.73)	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
Fernandes, L., 2010	High Quality	SF-36 (Role emotional)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	41	90.7 (15.50)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	37	90.5 (21.70)	MeanDif	0.2 (-8.25, 8.65)	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
Fernandes, L., 2010	High Quality	SF-36 (Social function)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	41	91.2 (15.90)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	37	84.1 (26.90)	MeanDif	7.1 (-2.84, 17.04)	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
Fernandes, L., 2010	High Quality	SF-36 (Vitality)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	41	59 (21.00)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	37	61.7 (20.60)	MeanDif	-2.7 (-11.94, 6.54)	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
Fernandes, L., 2010	High Quality	WOMAC (Stiffness)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	42	24.4 (21.40)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	36	35.5 (26.90)	MeanDif	-11.1 (-22.01, -0.19)	**Treatment 1 Significant (P-value<.05)**

TABLE 45: PART 1- SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO NO TREATMENT: PAIN

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
Nguyen, M., 1997	Moderate Quality	VAS pain (Pain)	5.5 months	(21 day period including journey, rest, balneotherapy, spring water and medical attention in the spa resort of Vichy)	13	-4 (30.00)	(21 day period during which patients maintained their routine life and out-patient care, including physical therapies if considered necessary by the physician)	16	0 (27.00)	MeanDif	-4 (-25.00, 17.00)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bennell, K.L., 2014	High Quality	HOOS (Pain)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	59 (17.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	59 (15.00)	MeanDif	0 (-6.44, 6.44)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bennell, K.L., 2014	High Quality	VAS pain (Overall pain)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	40 (25.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	35 (21.00)	MeanDif	5 (-4.28, 14.28)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bennell, K.L., 2014	High Quality	VAS pain (Walking pain)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	45 (26.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	43 (25.00)	MeanDif	2 (-8.22, 12.22)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bennell, K.L., 2014	High Quality	other questionnaire (Self efficacy - pain)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	6 (2.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	6 (2.00)	MeanDif	0 (-0.80, 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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bennell, K.L., 2014	High Quality	HOOS (Pain)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	58 (18.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	57 (19.00)	MeanDif	1 (-6.96, 8.96)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bennell, K.L., 2014	High Quality	VAS pain (Overall pain)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	44 (25.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	39 (25.00)	MeanDif	5 (-5.78, 15.78)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bennell, K.L., 2014	High Quality	VAS pain (Walking pain)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	47 (27.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	43 (27.00)	MeanDif	4 (-7.64, 15.64)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Bennell, K.L., 2014	High Quality	other questionnaire (Self efficacy - pain)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	6 (2.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	6 (2.00)	MeanDif	0 (-0.86, 0.86)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
French, H.P., 2013	High Quality	other questionnaire (MQS- pain medication usage)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	5 (5.00)	(Participants in the control group remained on the physiotherapy waitlist and completed a follow-up assessment with the blinded outcome assessor at 9 weeks, after which they were rerandomized into either the ET or ETþMT group. Received written information on hip OA)	43	6 (6.00)	MeanDif	-1 (-3.33, 1.33)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
French, H.P., 2013	High Quality	other questionnaire (NRS- night pain severity)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	3 (4.00)	(Participants in the control group remained on the physiotherapy waitlist and completed a follow-up assessment with the blinded outcome assessor at 9 weeks, after which they were rerandomized into either the ET or ETþMT group. Received written information on hip OA)	43	5 (4.00)	MeanDif	-2 (-3.69, -0.31)	**Treatment 1 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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
French, H.P., 2013	High Quality	other questionnaire (NRS- pain severity with activity)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	4 (3.00)	(Participants in the control group remained on the physiotherapy waitlist and completed a follow-up assessment with the blinded outcome assessor at 9 weeks, after which they were rerandomized into either the ET or ETþMT group. Received written information on hip OA)	43	6 (3.00)	MeanDif	-2 (-3.27, -0.73)	**Treatment 1 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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Poulsen, E., 2013	High Quality	HOOS (Pain)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	18 (13.00)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	3 (13.00)	MeanDif	15 (8.72, 21.28)	**Treatment 1 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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Poulsen, E., 2013	High Quality	other questionnaire (NRS pain)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	-1.9 (2.30)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	-0.3 (1.50)	MeanDif	-1.6 (-2.53, -0.67)	**Treatment 1 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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Poulsen, E., 2013	High Quality	HOOS (Pain)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	16 (20.00)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	13 (18.00)	MeanDif	3 (-6.17, 12.17)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Poulsen, E., 2013	High Quality	other questionnaire (NRS pain)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	-1.8 (3.10)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	-1.5 (2.60)	MeanDif	-0.3 (-1.68, 1.08)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Poulsen, E., 2013	High Quality	HOOS (Pain)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	18 (13.00)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	-1 (11.00)	MeanDif	19 (13.34, 24.66)	**Treatment 1 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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Poulsen, E., 2013	High Quality	other questionnaire (NRS pain)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	-1.9 (2.30)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	0.3 (1.90)	MeanDif	-2.2 (-3.19, -1.21)	**Treatment 1 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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Poulsen, E., 2013	High Quality	HOOS (Pain)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	16 (20.00)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	11 (23.00)	MeanDif	5 (-5.08, 15.08)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Poulsen, E., 2013	High Quality	other questionnaire (NRS pain)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	-1.8 (3.10)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	-1.5 (3.60)	MeanDif	-0.3 (-1.87, 1.27)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fernandes , L., 2010	High Quality	SF-36 (Bodily pain)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	53	68.6 (19.30)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	48	59.3 (20.30)	MeanDif	9.3 (1.56, 17.04)	**Treatment 1 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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fernandes , L., 2010	High Quality	WOMAC (Pain)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	55	20.6 (17.20)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	54	25.3 (18.50)	MeanDif	-4.7 (-11.41, 2.01)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fernandes , L., 2010	High Quality	SF-36 (Bodily pain)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	49	68.9 (18.20)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	44	60.8 (21.50)	MeanDif	8.1 (-0.04, 16.24)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fernandes , L., 2010	High Quality	WOMAC (Pain)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	47	16.8 (17.70)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	42	23.4 (19.60)	MeanDif	-6.6 (-14.39, 1.19)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fernandes , L., 2010	High Quality	SF-36 (Bodily pain)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	41	70.5 (18.60)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	37	61.4 (24.30)	MeanDif	9.1 (-0.58, 18.78)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Fernandes , L., 2010	High Quality	WOMAC (Pain)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	42	17.3 (14.50)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	36	22.3 (18.40)	MeanDif	-5 (-12.44, 2.44)	Not Significant (P-value>.05)

TABLE 46: PART 1- SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO NO TREATMENT: QUALITY OF LIFE

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
Nguyen, M., 1997	Moderate Quality	other questionnaire (Quality of life- AIMS2)	5.5 months	(21 day period including journey, rest, balneotherapy, spring water and medical attention in the spa resort of Vichy)	13	-0.8 (1.00)	(21 day period during which patients maintained their routine life and out-patient care, including physical therapies if considered necessary by the physician)	16	-0.2 (0.70)	MeanDif	-0.6 (-1.24, 0.04)	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
Bennell, K.L., 2014	High Quality	HOOS (Quality of life)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	44 (21.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	46 (20.00)	MeanDif	-2 (-10.22, 6.22)	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
Bennell, K.L., 2014	High Quality	other questionnaire (Assessment of quality of life)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	1 (0.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	1 (0.00)	MeanDif	0 (0.00, 0.00)	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
Bennell, K.L., 2014	High Quality	HOOS (Quality of life)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	42 (23.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	44 (23.00)	MeanDif	-2 (-11.91, 7.91)	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
Bennell, K.L., 2014	High Quality	other questionnaire (Assessment of quality of life)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	1 (0.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	1 (0.00)	MeanDif	0 (0.00, 0.00)	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
Poulsen, E., 2013	High Quality	HOOS (hip-related QoL)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	12 (18.00)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	4 (10.00)	MeanDif	8 (1.03, 14.97)	**Treatment 1 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
Poulsen, E., 2013	High Quality	HOOS (hip-related QoL)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	10 (20.00)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	12 (21.00)	MeanDif	-2 (-11.91, 7.91)	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
Poulsen, E., 2013	High Quality	HOOS (hip-related QoL)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	12 (18.00)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	-2 (11.00)	MeanDif	14 (6.96, 21.04)	**Treatment 1 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
Poulsen, E., 2013	High Quality	HOOS (hip-related QoL)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	10 (20.00)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	10 (27.00)	MeanDif	0 (-11.09, 11.09)	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
Fernandes, L., 2010	High Quality	SF-36 (General health)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	54	68.1 (18.20)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	53	69.4 (17.40)	MeanDif	-1.3 (-8.05, 5.45)	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
Fernandes, L., 2010	High Quality	SF-36 (Mental health)	3.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	55	82.3 (15.20)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	53	82.7 (13.50)	MeanDif	-0.4 (-5.82, 5.02)	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
Fernandes, L., 2010	High Quality	SF-36 (General health)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	47	69.6 (19.10)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	44	70 (19.20)	MeanDif	-0.4 (-8.27, 7.47)	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
Fernandes, L., 2010	High Quality	SF-36 (Mental health)	9.9 months	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	49	84.8 (13.50)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	44	81.9 (16.70)	MeanDif	2.9 (-3.32, 9.12)	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
Fernandes, L., 2010	High Quality	SF-36 (General health)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	38	71.3 (20.70)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	36	67.6 (22.10)	MeanDif	3.7 (-6.07, 13.47)	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
Fernandes, L., 2010	High Quality	SF-36 (Mental health)	1.3 years	(exercising within a week after completing the PE group sessions. The exercise program consisted of 26 different exercises, including warm-up, strengthening exercises, functional exercises and flexibility exercises11. The patients in the PE þ SE group were offered individual supervision of the exercise program twice a week and had access to the gym any other weekday for a period of 12 weeks. They were instructed to perform the exercise program two to three times a week and were supervised during)	40	81.8 (14.90)	(E given was in the form of a previously described “Hip School” developed for patients with hip OA10. This comprised three group-based sessions and one individual physical therapy visit, 2 months after completing the group sessions)	37	82.8 (15.40)	MeanDif	-1 (-7.78, 5.78)	Not Significant (P-value>.05)

TABLE 47: PART 1- SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO NO TREATMENT: 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
Bennell, K.L., 2014	High Quality	HOOS (Other symptoms)	1.1 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	46	59 (19.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	50	59 (18.00)	MeanDif	0 (-7.42, 7.42)	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
Bennell, K.L., 2014	High Quality	HOOS (Other symptoms)	3 years	(All participants received manual therapy techniques (hip thrust manipulation, hiplumbar spine mobilization, deep tissue massage, and muscle stretches), 4 to 6 home exercises (performed 4 times/wk and including strengthening of the hip abductors and quadriceps, stretching and range ofmotion, and functional balance and gait drills), education and advice, and provision of a walking stick if appropriate (eTable 1 in the Supplement). During the 6-month follow-up, participants were instructed to perfo)	39	58 (20.00)	(inactive ultrasound and inert gel lightly applied to the anterior and posterior hip region)	44	59 (18.00)	MeanDif	-1 (-9.23, 7.23)	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
Poulsen, E., 2013	High Quality	HOOS (Symptoms)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	15 (15.00)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	4 (11.00)	MeanDif	11 (4.68, 17.32)	**Treatment 1 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
Poulsen, E., 2013	High Quality	HOOS (Symptoms)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	12 (19.00)	(Patients receive a pamphlet advising them not to initiate or alter their use of pain medication, nonsteroidal anti-inflammatory drugs or glucosamine products during the intervention period and instructing them not to initiate other treatment for their hip in the same period. The pamphlet includes the sheet with the stretching program from the PE group and patients receive 5e10 min of instruction on the program.)	32	10 (18.00)	MeanDif	2 (-6.93, 10.93)	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
Poulsen, E., 2013	High Quality	HOOS (Symptoms)	1.4 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	15 (15.00)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	-1 (15.00)	MeanDif	16 (8.97, 23.03)	**Treatment 1 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
Poulsen, E., 2013	High Quality	HOOS (Symptoms)	11.8 months	(The protocol is developed by the principal investigator (EP). It includes three different manual therapies: trigger point release therapy (TPPR), muscular stretching by muscle energy technique (MET) and joint manipulation.)	34	12 (19.00)	(The program includes a total of five sessions: one initial personal interview, three group sessions and one follow-up interview. Power point presentations and anatomic models are used as teaching aids. Each patient receives a sheet of paper with recommendations for activities of daily living (ADL) and home stretching exercises related to balance and hip mobility)	36	10 (23.00)	MeanDif	2 (-7.86, 11.86)	Not Significant (P-value>.05)

TABLE 48: PART 2- SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO SUPERVISED AND STRUCTURED PHYSICAL 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
French, H.P., 2013	High Quality	SF-36 (SF-36 physical summary score)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	36 (11.00)	(Participants attended 6 to 8 individual 30-minute physiotherapy sessions over 8 weeks, which included flexibility and strengthening exercises delivered using a semi-structured protocol)	45	37 (11.00)	MeanDif	-1 (-5.60, 3.60)	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
French, H.P., 2013	High Quality	WOMAC(WOMAC PF)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	29 (17.00)	(Participants attended 6 to 8 individual 30-minute physiotherapy sessions over 8 weeks, which included flexibility and strengthening exercises delivered using a semi-structured protocol)	45	28 (15.00)	MeanDif	1 (-5.71, 7.71)	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
French, H.P., 2013	High Quality	functional task(50 foot walk test)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	15 (8.00)	(Participants attended 6 to 8 individual 30-minute physiotherapy sessions over 8 weeks, which included flexibility and strengthening exercises delivered using a semi-structured protocol)	45	14 (8.00)	MeanDif	1 (-2.34, 4.34)	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
French, H.P., 2013	High Quality	functional task(Sit-to-stand)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	15 (9.00)	(Participants attended 6 to 8 individual 30-minute physiotherapy sessions over 8 weeks, which included flexibility and strengthening exercises delivered using a semi-structured protocol)	45	13 (6.00)	MeanDif	2 (-1.21, 5.21)	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
Pisters,M.F., 2010	High Quality	WOMAC (Physical function)	3 months	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	25	-4.55 (8.80)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	40	-3.28 (10.29)	MeanDif	-1.27 (-5.97, 3.43)	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
Pisters, M.F., 2010	High Quality	functional task (5 m walking in s)	3 months	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	25	-0.56 (1.17)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	39	0.11 (0.92)	MeanDif	-0.67 (-1.21, -0.13)	**Treatment 1 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
Pisters, M.F., 2010	High Quality	other questionnaire (Patient-oriented physical function, MACTAR)	3 months	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	26	6.62 (5.67)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	40	4.55 (7.26)	MeanDif	2.07 (-1.06, 5.20)	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
Pisters, M.F., 2010	High Quality	WOMAC (Physical function)	8.9 months	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	24	-6.81 (10.52)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	34	-1.64 (8.45)	MeanDif	-5.17 (-10.25, -0.09)	**Treatment 1 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
Pisters, M.F., 2010	High Quality	other questionnaire (Patient-oriented physical function, MACTAR)	8.9 months	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	28	6.69 (9.21)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	38	-0.97 (8.40)	MeanDif	7.66 (3.33, 11.99)	**Treatment 2 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
Pisters, M.F., 2010	High Quality	WOMAC (Physical function)	1.2 years	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	24	-6.99 (13.72)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	35	-5.23 (10.65)	MeanDif	-1.76 (-8.29, 4.77)	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
Pisters, M.F., 2010	High Quality	functional task (5 m walking in s)	1.2 years	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	20	-0.71 (1.39)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	32	-0.04 (0.98)	MeanDif	-0.67 (-1.37, 0.03)	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
Pisters, M.F., 2010	High Quality	other questionnaire (Patient-oriented physical function, MACTAR)	1.2 years	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	25	5.6 (8.42)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	35	1.54 (8.93)	MeanDif	4.06 (-0.37, 8.49)	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
Pisters, M.F., 2010	High Quality	WOMAC (Physical function)	4.9 years	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	21	-13.34 (13.65)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	31	-10.06 (14.66)	MeanDif	-3.28 (-11.07, 4.51)	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
Pisters, M.F., 2010	High Quality	functional task (5 m walking in s)	4.9 years	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	19	-0.42 (1.38)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	28	0.2 (1.35)	MeanDif	-0.62 (-1.42, 0.18)	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
Pisters, M.F., 2010	High Quality	other questionnaire (Patient-oriented physical function, MACTAR)	4.9 years	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	20	5.5 (9.58)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	31	5.32 (9.89)	MeanDif	0.18 (-5.27, 5.63)	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
Hoeksma, H.L., 2005	High Quality	Harris Hip Score	1.2 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	53	69.3 (15.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	50	57.2 (11.00)	MeanDif	12.1 (7.04, 17.16)	**Treatment 1 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
Hoeksma, H.L., 2005	High Quality	SF-36 (Physical function)	1.2 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	53	43.6 (18.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	50	41.5 (22.00)	MeanDif	2.1 (-5.69, 9.89)	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
Hoeksma, H.L., 2005	High Quality	SF-36 (Role physical function)	1.2 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	53	23.2 (30.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	50	32.2 (24.00)	MeanDif	-9 (-19.46, 1.46)	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
Hoeksma, H.L., 2005	High Quality	functional task (Walking speed)	1.2 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	53	88.3 (23.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	50	96.5 (27.00)	MeanDif	-8.2 (-17.91, 1.51)	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
Hoeksma, H.L., 2005	High Quality	Harris Hip Score	3.9 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	49	68.4 (17.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	45	56 (15.00)	MeanDif	12.4 (5.93, 18.87)	**Treatment 1 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
Hoeksma, H.L., 2005	High Quality	SF-36 (Physical function)	3.9 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	49	45.3 (23.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	45	46.6 (21.00)	MeanDif	-1.3 (-10.20, 7.60)	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
Hoeksma, H.L., 2005	High Quality	SF-36 (Role physical function)	3.9 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	49	25.4 (43.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	45	29.8 (33.00)	MeanDif	-4.4 (-19.82, 11.02)	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
Hoeksma, H.L., 2005	High Quality	functional task (Walking speed)	3.9 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	49	86.8 (27.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	45	99.4 (21.00)	MeanDif	-12.6 (-22.34, -2.86)	**Treatment 1 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
Hoeksma, H.L., 2005	High Quality	Harris Hip Score	6.7 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	44	70.2 (20.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	44	59.7 (18.00)	MeanDif	10.5 (2.55, 18.45)	**Treatment 1 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
Hoeksma, H.L., 2005	High Quality	SF-36 (Physical function)	6.7 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	44	50.4 (22.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	44	45.3 (18.00)	MeanDif	5.1 (-3.30, 13.50)	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
Hoeksma, H.L., 2005	High Quality	SF-36 (Role physical function)	6.7 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	44	36.7 (44.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	44	32.4 (35.00)	MeanDif	4.3 (-12.31, 20.91)	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
Hoeksma, H.L., 2005	High Quality	functional task (Walking speed)	6.7 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	44	90.5 (26.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	44	102.8 (18.00)	MeanDif	-12.3 (-21.64, -2.96)	**Treatment 1 Significant (P-value<.05)**

TABLE 49: PART 2- SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO SUPERVISED AND STRUCTURED PHYSICAL THERAPY: 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
French, H.P., 2013	High Quality	SF-36 (SF-36 mental summary score)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	50 (15.00)	(Participants attended 6 to 8 individual 30-minute physiotherapy sessions over 8 weeks, which included flexibility and strengthening exercises delivered using a semi-structured protocol)	45	49 (13.00)	MeanDif	1 (-4.88, 6.88)	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
French, H.P., 2013	High Quality	other questionnaire (Hospital Anxiety and Depression Scale - anxiety)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	6 (6.00)	(Participants attended 6 to 8 individual 30-minute physiotherapy sessions over 8 weeks, which included flexibility and strengthening exercises delivered using a semi-structured protocol)	45	7 (4.00)	MeanDif	-1 (-3.14, 1.14)	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
French, H.P., 2013	High Quality	other questionnaire (Hospital Anxiety and Depression Scale - depression)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	5 (5.00)	(Participants attended 6 to 8 individual 30-minute physiotherapy sessions over 8 weeks, which included flexibility and strengthening exercises delivered using a semi-structured protocol)	45	5 (3.00)	MeanDif	0 (-1.73, 1.73)	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
Pisters, M.F., 2010	High Quality	other questionnaire (PGA patient global assessment)	3 months	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	26	34.62%	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	40	22.50%	RR	1.54 (0.70, 3.36)	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
Pisters, M.F., 2010	High Quality	other questionnaire (PGA patient global assessment)	8.9 months	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	25	52.00%	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	36	13.89%	RR	3.74 (1.53, 9.18)	**Treatment 1 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
Pisters, M.F., 2010	High Quality	other questionnaire (PGA patient global assessment)	1.2 years	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	24	58.33%	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	32	37.50%	RR	1.56 (0.89, 2.73)	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
Pisters, M.F., 2010	High Quality	need for THA (joint replacement surgery)	4.9 years	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	30	20.00%	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	40	45.00%	RR	0.44 (0.20, 0.98)	**Treatment 1 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
Pisters, M.F., 2010	High Quality	other questionnaire (PGA patient global assessment)	4.9 years	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	21	57.14%	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	28	50.00%	RR	1.14 (0.68, 1.93)	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
Hoeksma, H.L., 2005	High Quality	patient satisfaction(Worse)	1.2 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	81	3.70%	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	50	12.00%	RR	0.31 (0.08, 1.18)	Not Significant (P-value>.05)

TABLE 50: PART 2- SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO SUPERVISED AND STRUCTURED PHYSICAL THERAPY: 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
French, H.P., 2013	High Quality	other questionnaire (MQS- pain medication usage)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	5 (5.00)	(Participants attended 6 to 8 individual 30-minute physiotherapy sessions over 8 weeks, which included flexibility and strengthening exercises delivered using a semi-structured protocol)	45	5 (5.00)	MeanDif	0 (-2.09, 2.09)	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
French, H.P., 2013	High Quality	other questionnaire (NRS- night pain severity)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	3 (4.00)	(Participants attended 6 to 8 individual 30-minute physiotherapy sessions over 8 weeks, which included flexibility and strengthening exercises delivered using a semi-structured protocol)	45	3 (3.00)	MeanDif	0 (-1.48, 1.48)	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
French, H.P., 2013	High Quality	other questionnaire (NRS- pain severity with activity)	2.1 months	(Participants attended 6 to 8 individual 45-minute physiotherapy sessions over an 8-week period, which included 30 minutes of ET, as previously described, and up to 15 minutes of MT in line with current clinical practice at participating sites. A choice of nonmanipulative MT techniques based on pain/stiffness relations)	43	4 (3.00)	(Participants attended 6 to 8 individual 30-minute physiotherapy sessions over 8 weeks, which included flexibility and strengthening exercises delivered using a semi-structured protocol)	45	4 (3.00)	MeanDif	0 (-1.25, 1.25)	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
Pisters, M.F., 2010	High Quality	WOMAC (Pain)	3 months	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	26	-2.57 (2.52)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	40	-1.1 (2.90)	MeanDif	-1.47 (-2.79, -0.15)	**Treatment 1 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
Pisters, M.F., 2010	High Quality	WOMAC (Pain)	8.9 months	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	26	-3.12 (4.47)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	36	-0.06 (3.55)	MeanDif	-3.06 (-5.13, -0.99)	**Treatment 1 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
Pisters, M.F., 2010	High Quality	WOMAC (Pain)	1.2 years	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	25	-3.88 (4.03)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	35	-2.54 (3.14)	MeanDif	-1.34 (-3.23, 0.55)	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
Pisters, M.F., 2010	High Quality	WOMAC (Pain)	4.9 years	(The treatment consisted of a 12-week period with a maximum of 18 sessions, followed by five pre-set booster moments with a maximum of seven sessions (respectively in week 18, 25, 34, 42, and 55). After the 12-week treatment period physiotherapists advised patients to maintain exercising and performing the activities at home. The additional booster sessions consisted of evaluating, motivating (stimulating exercise adherence) and repeating the main treatment message)	20	-4.7 (4.34)	(information and advice, exercise therapy, and encouragement of a positive coping with the complaints. Furthermore, it is recommended to advise patients to maintain exercising at home after discharge. The treatment consisted of a maximum of 18 sessions within a period of 12 weeks)	31	-3.59 (4.80)	MeanDif	-1.11 (-3.65, 1.43)	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
Hoeksma, H.L., 2005	High Quality	SF-36 (Bodily pain)	1.2 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	53	44 (17.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	50	42.4 (17.00)	MeanDif	1.6 (-4.97, 8.17)	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
Hoeksma, H.L., 2005	High Quality	VAS pain(Main complaint)	1.2 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	53	37.7 (22.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	50	50.2 (22.00)	MeanDif	-12.5 (-21.00, -4.00)	**Treatment 1 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
Hoeksma, H.L., 2005	High Quality	VAS pain (Pain at rest)	1.2 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	53	17.1 (22.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	50	26.7 (18.00)	MeanDif	-9.6 (-17.34, -1.86)	**Treatment 1 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
Hoeksma, H.L., 2005	High Quality	VAS pain (Pain walking)	1.2 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	53	22.8 (21.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	50	27.1 (21.00)	MeanDif	-4.3 (-12.41, 3.81)	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
Hoeksma, H.L., 2005	High Quality	VAS pain (starting stiffness)	1.2 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	53	33.3 (25.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	50	41.3 (29.00)	MeanDif	-8 (-18.48, 2.48)	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
Hoeksma, H.L., 2005	High Quality	SF-36 (Bodily pain)	3.9 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	49	47.4 (25.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	45	46.1 (20.00)	MeanDif	1.3 (-7.82, 10.42)	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
Hoeksma, H.L., 2005	High Quality	VAS pain(Main complaint)	3.9 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	49	38.5 (22.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	45	53 (24.00)	MeanDif	-14.5 (-23.83, -5.17)	**Treatment 1 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
Hoeksma, H.L., 2005	High Quality	VAS pain (Pain at rest)	3.9 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	49	19.1 (29.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	45	26.9 (28.00)	MeanDif	-7.8 (-19.33, 3.73)	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
Hoeksma, H.L., 2005	High Quality	VAS pain (Pain walking)	3.9 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	49	16.4 (26.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	45	23.7 (21.00)	MeanDif	-7.3 (-16.82, 2.22)	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
Hoeksma, H.L., 2005	High Quality	VAS pain(starting stiffness)	3.9 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	49	32.9 (33.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	45	43 (32.00)	MeanDif	-10.1 (-23.25, 3.05)	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
Hoeksma, H.L., 2005	High Quality	SF-36 (Bodily pain)	6.7 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	44	51.4 (22.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	44	49.9 (24.00)	MeanDif	1.5 (-8.12, 11.12)	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
Hoeksma, H.L., 2005	High Quality	VAS pain (Main complaint)	6.7 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	44	35.6 (22.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	44	49.1 (30.00)	MeanDif	-13.5 (-24.49, -2.51)	**Treatment 1 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
Hoeksma, H.L., 2005	High Quality	VAS pain (Pain at rest)	6.7 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	45	14 (27.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	44	21.6 (30.00)	MeanDif	-7.6 (-19.47, 4.27)	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
Hoeksma, H.L., 2005	High Quality	VAS pain (Pain walking)	6.7 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	44	17 (22.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	44	24.3 (28.00)	MeanDif	-7.3 (-17.82, 3.22)	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
Hoeksma, H.L., 2005	High Quality	VAS pain (starting stiffness)	6.7 months	(session started with stretching techniques of identified shortened muscles surrounding the hip joint (Appendix A). Second, traction of the hip joint was performed, followed by traction manipulation in each limited position (a high velocity thrust technique) (14). All manipulations were repeated during each session until the manual therapist concluded optimal results of the session.)	44	44.3 (26.00)	(These training sessions were repeated every 3 months. All patients were treated twice weekly for a period of 5 weeks with a total of 9 treatments.an exercise therapy program was planned by the physical therapist and adjusted to individual symptoms (Appendix B). Exercise therapy included exercises for muscle functions, muscle length, joint mobility, pain relief, and walking ability. Finally, instructions for home exercises were given.)	44	44.8 (30.00)	MeanDif	-0.5 (-12.23, 11.23)	Not Significant (P-value>.05)

PREOPERATIVE/POSTOPERATIVE PHYSICAL THERAPY

Limited evidence supports the use of pre-operative physical therapy to improve early function in patients with symptomatic osteoarthritis of the hip following total hip arthroplasty.

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*

Moderate evidence supports the use of post-operative physical therapy because it could improve early function to a greater extent than no physical therapy management for patients with symptomatic osteoarthritis of the hip who have undergone total hip arthroplasty.

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.

RATIONALE

There were 2 high quality and 2 moderate quality studies that evaluated the effect of pre-operative physical therapy on post-operative outcomes with conflicting results causing this recommendation to be of limited strength (Villadsen et al, Rooks et al, Ferrara et al, Vukomanovik et al). There was a trend that pre-operative physical therapy improved short term post-operative outcomes. One moderate study demonstrated a reduced risk of needing inpatient rehabilitation after THA (Rooks et al) and another high quality study found improved early recovery (less than 3 months) after THA in the group that received pre-operative physical therapy (Villadsen et al). One high quality study found no benefit of pre-operative physical therapy on most post-operative outcomes with the exception of range of motion and pain at 3 months (Ferrara), while another high quality study found no functional benefit of pre-operative rehabilitation on outcomes 3 months after THA (Vukomanovik et al).

Five studies evaluated the effect of post-operative physical therapy on outcomes. Three of the high quality studies revealed a benefit of post-operative physical therapy (Mikkelson et al, Heiberg et al, Umpierres et al), although one of these studies only found a significant benefit for secondary outcomes of walking speed and stair performance, while the primary outcome of leg strength was not different between groups. One of these studies demonstrated only a short term benefit at 15 days after THA (Umpierres et al), while another found a persistent benefit at one year for one of the functional measures (Heiberg et al). Two studies showed no benefit to post-operative physical therapy (Galea et al, Heiberg et al), although one of these studies was a 5-year follow-up of the original clinical trial (Heiberg et al).

While there were 13 high quality studies and 4 moderate quality studies that were initially identified in the search, several were excluded. Studies were excluded because they were feasibility studies (Hoogenboom et al, Jepson et al), did not include a passive or unsupervised control group to which physical therapy was compared (Hesse et al, Husby et al, Husby et al,

Liebs et al, Giaquinto et al, Monticone et al) or did not include a post-operative assessment (Villadsen et al).

POSSIBLE HARMS OF IMPLEMENTATION

It is possible that individuals who participate in a physical therapy program may experience mild and transient adverse events, including pain or stiffness in the hip, back or other body regions.

FUTURE RESEARCH

Future work should identify the individuals who are most likely to receive benefit from pre- or post-operative physical therapy interventions.

QUALITY EVALUATION TABLE: PREOPERATIVE/POSTOPERATIVE PHYSICAL THERAPY

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION -PREOPERATIVE/POSTOPERATIVE PHYSICAL THERAPY RANDOMIZED

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
Ferrara,P.E., 2008	●	●	◑	●	●	●	●	●	●	Include	High Quality
Galea,M.P., 2008	◑	◑	●	●	●	●	●	●	●	Include	High Quality
Heiberg,K.E., 2012	●	●	○	●	●	●	●	●	●	Include	High Quality
Heiberg,K.E., 2015	●	●	○	●	●	●	●	●	●	Include	High Quality
Mikkelsen,L.R., 2014	●	●	◑	○	●	●	●	●	●	Include	High Quality
Rooks,D.S., 2006	○	◑	○	○	●	●	●	●	●	Include	Moderate Quality
Umpierres,C.S., 2014	◑	◑	●	●	●	●	●	●	●	Include	High Quality
Villadsen,A., 2014	●	●	◑	●	●	●	●	●	●	Include	High Quality
Vukomanovic,A., 2008	◑	◑	◑	●	◑	●	●	●	●	Include	Moderate Quality
Suetta,C., 2004	●	◑	●	●	●	●	●	●	●	Not best available evidence	High Quality

SUMMARY OF FINDINGS TABLE 18 PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO HOME BASED PHYSICAL THERAPY &/OR EDUCATION

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**						**Moderate Quality**
	Galea2008	**Heiberg2012**	**Heiberg2015**	**Mikkelsen2014**	**Umpierres2014**	**Villadsen2014b**	**Rooks2006**
Complications							
overall complications( )							+
other adverse event(Falls)		•					
Composite							
Harris Hip Score( )		•|+					
other questionnaire(Global clinical evaluation)					•		
other questionnaire(Merle d'Aubigne and Postel score - Mobility chlinical)					+		
other questionnaire(Merle d'Aubigne and Postel score - Pain clinical)					+		
other questionnaire(Merle d'Aubigne and Postel score - motor performance)					•		
Function							
HOOS(Sport)		•|•					
SF-36(Physical function)							•|•|•
SF-36(Role emotional)					•		
SF-36(Role physical)					•		
WOMAC(Function)	•						+|•|•
functional task(6 minute walking test)	•						
functional task(Stair power (Nm/s))	•						
functional task(Stair time (s))	•						
functional task(Timed up and go test)	-						
functional task(Walking speed (cm/s))	•						
other questionnaire(Exercise frequency (days))	•						
HOOS(Activities of daily living)		•|•		•|•|•|•|•|•			
functional task(6 minute walk test)		+|+	•				
functional task(Figure of eight test, steps)		-|•					
functional task(Stair climbing test (s))		+|+	•				
other questionnaire(Self effincacy)		+|•					
SF-36(Physical functioning)					•		
HOOS(Sports and recreation)				•|•|•|•		•|•	
functional task(Sit to stand test (reps))				•|•			
functional task(Stair climb test (s))				•|•			
functional task(Walking speed (s))				•|•|•			
SF-36(Role limitation physical)							•|•|•
functional task(Functional reach)							•|•|•
functional task(Timed up and go (s))							•|•|•
functional task(Walk <50 ft)							•
functional task(Walk >50 ft)							•
Length Of Stay							
length of hospital stay( )					•		
Other							
HOOS(Sport)			•				
SF-36(Vitality)					•		
WOMAC(Stiffness)	•						
HOOS(Activities of daily living)			•				
other questionnaire(Self-efficacy)			•				
SF-36(Social functioning)					•		
discharge location(Discharged at home)							•
discharge location(Discharged to rehabilitation)							•
Pain							
SF-36(Bodily pain)					+		
SF-36(Pain)							+|•|•
WOMAC(Pain)	•						+|•|•
HOOS(Pain)		•|•	•	•|•|•|•|•|•		•|•	
Quality Of Life							
EQ-5d(VAS)						•|•	
HOOS(Quality of life)		•|•	•	•|•|•|•|•|•		•|•	
SF-36(General health)					•		
SF-36(Mental health)					•		
WOMAC(Quality of life)	•						
HOOS(Activities of daily living)						•|•	
EQ-5d(index)						+|•	
Symptoms							
HOOS(Symptoms)		•|•	•			•|•	
Harris Hip Score(Symptoms)				•|•|•|•|•|•			

SUMMARY OF FINDINGS TABLE 19 PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**	**Moderate Quality**
	Ferrara2008	**Vukomanovic2008**
Composite		
Harris Hip Score( )	•|•	•|•
Function		
WOMAC(Function)	+|+	
SF-36(Physical)	+|•	
Oxford Hip Score( )		+|•
other questionnaire(Japanese Orthopedic Association hip score)		•|•
Other		
WOMAC(Stiffness)	•|•	
other questionnaire(Barthel Index- disability)	•|+	
Pain		
WOMAC(Pain)	•|•	
VAS pain(Pain)	+|+	
VAS pain(Pain in rest (mm))		•|•
VAS pain(Pain while moving (mm))		•|•
Quality Of Life		
SF-36(Mental)	+|•	

DETAILED DATA TABLES

TABLE 51: PART 1- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO HOME BASED PHYSICAL THERAPY &/OR EDUCATION: COMPLICATIONS

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
Heiberg, K.E., 2012	High Quality	other adverse event (Falls)	1 years	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	25.71%	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	45.45%	RR	0.57 (0.29, 1.11)	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
Rooks, D.S., 2006	Moderate Quality	overall complications	Post-Op	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	0.00%	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	16.67%	RD	-0.17 (-0.32, -0.02)	**Treatment 1 Significant (P-value<.05)**

Table 52: Part 1- Preoperative/postoperative supervised and structured physical therapy Compared to home based physical therapy **383** &/or Education: Composite

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
Heiberg, K.E., 2012	High Quality	Harris Hip Score	4.9 months	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	93 (9.06)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	90 (5.86)	MeanDif	3 (-0.61, 6.61)	Not Significant (P-value>.05)
Heiberg, K.E., 2012	High Quality	Harris Hip Score	1 years	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	96 (6.04)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	92 (8.79)	MeanDif	4 (0.39, 7.61)	**Treatment 1 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
Umpierres, C.S., 2014	High Quality	other questionnaire (Global clinical evaluation)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	10.4 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	8.6 (.)	Author Reported	NA	Not Significant (P-value>.05)
Umpierres, C.S., 2014	High Quality	other questionnaire (Merle d'Aubigne and Postel score - Mobility chlinical)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	4.1 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	3.5 (.)	Author Reported	NA	Better outcome 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
Umpierres, C.S., 2014	High Quality	other questionnaire (Merle d'Aubigne and Postel score - Pain clinical)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	4.1 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	3.4 (.)	Author Reported	NA	Better outcome Significant (P-value<.05)
Umpierres, C.S., 2014	High Quality	other questionnaire (Merle d'Aubigne and Postel score - motor performance)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	8.6 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	8.3 (.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 53: PART 1- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO HOME BASED PHYSICAL THERAPY &/OR EDUCATION: 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
Galea, M.P., 2008	High Quality	WOMAC (Function)	1.8 months	(7 exercises that focused on functional tasks, daily living tasks, balance, strength, and endurance. Both groups performed the same exercises. However, participants in the center-based group were provided with advice about how to progress the exercises, whereas those in the home-based group were not given any further instruction on progressing or modifying the exercises. The maximum time period for each exercise was 5 minutes, which included a rest period if required)	11	168.2 (147.40)	(home-based group received an illustrated guide of the same prescribed exercises that included basic instructions for the exercise with illustrations. Participants in the home-based group were not given any further instruction regarding performance of the exercises at home or any advice on progressing or modifying the exercises. Participants in both groups were given a diary and instructed to keep a daily record of the exercises they performed including the time or number of sets and repetitions)	12	222.6 (129.10)	MeanDif	-54.4 (-168.08, 59.28)	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
Galea, M.P., 2008	High Quality	functional task (6 minute walking test)	1.8 months	(7 exercises that focused on functional tasks, daily living tasks, balance, strength, and endurance. Both groups performed the same exercises. However, participants in the center-based group were provided with advice about how to progress the exercises, whereas those in the home-based group were not given any further instruction on progressing or modifying the exercises. The maximum time period for each exercise was 5 minutes, which included a rest period if required)	11	427.3 (78.20)	(home-based group received an illustrated guide of the same prescribed exercises that included basic instructions for the exercise with illustrations. Participants in the home-based group were not given any further instruction regarding performance of the exercises at home or any advice on progressing or modifying the exercises. Participants in both groups were given a diary and instructed to keep a daily record of the exercises they performed including the time or number of sets and repetitions)	12	457.8 (112.20)	MeanDif	-30.5 (-109.02, 48.02)	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
Galea, M.P., 2008	High Quality	functional task (Stair power (Nm/s))	1.8 months	(7 exercises that focused on functional tasks, daily living tasks, balance, strength, and endurance. Both groups performed the same exercises. However, participants in the center-based group were provided with advice about how to progress the exercises, whereas those in the home-based group were not given any further instruction on progressing or modifying the exercises. The maximum time period for each exercise was 5 minutes, which included a rest period if required)	11	173.9 (53.10)	(home-based group received an illustrated guide of the same prescribed exercises that included basic instructions for the exercise with illustrations. Participants in the home-based group were not given any further instruction regarding performance of the exercises at home or any advice on progressing or modifying the exercises. Participants in both groups were given a diary and instructed to keep a daily record of the exercises they performed including the time or number of sets and repetitions)	12	200 (65.40)	MeanDif	-26.1 (-74.62, 22.42)	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
Galea, M.P., 2008	High Quality	functional task (Stair time (s))	1.8 months	(7 exercises that focused on functional tasks, daily living tasks, balance, strength, and endurance. Both groups performed the same exercises. However, participants in the center-based group were provided with advice about how to progress the exercises, whereas those in the home-based group were not given any further instruction on progressing or modifying the exercises. The maximum time period for each exercise was 5 minutes, which included a rest period if required)	11	3.1 (0.40)	(home-based group received an illustrated guide of the same prescribed exercises that included basic instructions for the exercise with illustrations. Participants in the home-based group were not given any further instruction regarding performance of the exercises at home or any advice on progressing or modifying the exercises. Participants in both groups were given a diary and instructed to keep a daily record of the exercises they performed including the time or number of sets and repetitions)	12	2.9 (0.50)	MeanDif	0.2 (-0.17, 0.57)	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
Galea, M.P., 2008	High Quality	functional task(Timed up and go test)	1.8 months	(7 exercises that focused on functional tasks, daily living tasks, balance, strength, and endurance. Both groups performed the same exercises. However, participants in the center-based group were provided with advice about how to progress the exercises, whereas those in the home-based group were not given any further instruction on progressing or modifying the exercises. The maximum time period for each exercise was 5 minutes, which included a rest period if required)	11	11.1 (2.50)	(home-based group received an illustrated guide of the same prescribed exercises that included basic instructions for the exercise with illustrations. Participants in the home-based group were not given any further instruction regarding performance of the exercises at home or any advice on progressing or modifying the exercises. Participants in both groups were given a diary and instructed to keep a daily record of the exercises they performed including the time or number of sets and repetitions)	12	9.3 (1.30)	MeanDif	1.8 (0.15, 3.45)	**Treatment 2 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
Galea, M.P., 2008	High Quality	functional task (Walking speed (cm/s))	1.8 months	(7 exercises that focused on functional tasks, daily living tasks, balance, strength, and endurance. Both groups performed the same exercises. However, participants in the center-based group were provided with advice about how to progress the exercises, whereas those in the home-based group were not given any further instruction on progressing or modifying the exercises. The maximum time period for each exercise was 5 minutes, which included a rest period if required)	11	116.7 (18.10)	(home-based group received an illustrated guide of the same prescribed exercises that included basic instructions for the exercise with illustrations. Participants in the home-based group were not given any further instruction regarding performance of the exercises at home or any advice on progressing or modifying the exercises. Participants in both groups were given a diary and instructed to keep a daily record of the exercises they performed including the time or number of sets and repetitions)	12	117.4 (16.70)	MeanDif	-0.7 (-14.97, 13.57)	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
Galea, M.P., 2008	High Quality	other questionnaire (Exercise frequency (days))	1.8 months	(7 exercises that focused on functional tasks, daily living tasks, balance, strength, and endurance. Both groups performed the same exercises. However, participants in the center-based group were provided with advice about how to progress the exercises, whereas those in the home-based group were not given any further instruction on progressing or modifying the exercises. The maximum time period for each exercise was 5 minutes, which included a rest period if required)	11	4.7 (5.30)	(home-based group received an illustrated guide of the same prescribed exercises that included basic instructions for the exercise with illustrations. Participants in the home-based group were not given any further instruction regarding performance of the exercises at home or any advice on progressing or modifying the exercises. Participants in both groups were given a diary and instructed to keep a daily record of the exercises they performed including the time or number of sets and repetitions)	12	5.8 (4.30)	MeanDif	-1.1 (-5.07, 2.87)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Activities of daily living)	2 weeks	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	63.8 (11.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	65.8 (16.00)	MeanDif	-2 (-8.88, 4.88)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Activities of daily living)	4 weeks	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	74.9 (11.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/ extension.)	30	76.5 (14.00)	MeanDif	-1.6 (-7.89, 4.69)	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
Mikkelsen, L.R., 2014	High Quality	functional task (Walking speed (s))	4 weeks	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	13.85 (3.70)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/ extension.)	30	13.72 (3.00)	MeanDif	0.13 (-1.54, 1.80)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Activities of daily living)	1.4 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	81.1 (13.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/ extension.)	30	82 (14.00)	MeanDif	-0.9 (-7.64, 5.84)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Sports and recreation)	1.4 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	62.6 (25.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/ extension.)	30	69.5 (24.00)	MeanDif	-6.9 (-19.10, 5.30)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Activities of daily living)	2.3 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	89.1 (10.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	86.5 (13.00)	MeanDif	2.6 (-3.20, 8.40)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Sports and recreation)	2.3 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	77 (18.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	74.4 (21.00)	MeanDif	2.6 (-7.17, 12.37)	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
Mikkelsen, L.R., 2014	High Quality	functional task (Sit to stand test (reps))	2.3 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	14.41 (3.90)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	13.13 (4.30)	MeanDif	1.28 (-0.77, 3.33)	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
Mikkelsen, L.R., 2014	High Quality	functional task(Stair climb test (s))	2.3 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	9.49 (3.20)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	10.54 (4.00)	MeanDif	-1.05 (-2.86, 0.76)	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
Mikkelsen, L.R., 2014	High Quality	functional task (Walking speed (s))	2.3 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	11.08 (2.40)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	11.99 (2.60)	MeanDif	-0.91 (-2.16, 0.34)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Activities of daily living)	5.9 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	90.4 (11.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	91.7 (10.00)	MeanDif	-1.3 (-6.53, 3.93)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Sports and recreation)	5.9 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	80.1 (17.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/ extension.)	30	83.7 (17.00)	MeanDif	-3.6 (-12.07, 4.87)	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
Mikkelsen, L.R., 2014	High Quality	functional task (Sit to stand test (reps))	5.9 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	15.47 (4.50)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	15.07 (5.10)	MeanDif	0.4 (-2.00, 2.80)	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
Mikkelsen, L.R., 2014	High Quality	functional task (Stair climb test (s))	5.9 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	9.07 (3.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	9.03 (2.80)	MeanDif	0.04 (-1.40, 1.48)	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
Mikkelsen, L.R., 2014	High Quality	functional task(Walking speed (s))	5.9 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	10.81 (2.80)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/ extension.)	30	11.02 (2.60)	MeanDif	-0.21 (-1.55, 1.13)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Activities of daily living)	11.8 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	93.4 (8.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/ extension.)	30	92.1 (12.00)	MeanDif	1.3 (-3.81, 6.41)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Sports and recreation)	11.8 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	81.9 (20.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	82.8 (19.00)	MeanDif	-0.9 (-10.61, 8.81)	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
Heiberg, K.E., 2015	High Quality	functional task (6 minute walk test)	5 years	(The participants exercised for 12 supervised sessions, 70 minutes per session, twice a week. There were 2–8 participants in the group, depending on the number allocated at the relevant time. The walking skill training program consisted of ambulatory activities like sit-to-stand, stair climbing, walking in different ways, obstacle course, lunges, squats, balance exercises, step up/step down, and throwing a ball while moving around)	30	524 (111.78)	(not allowed to attend supervised physiotherapy during the same period between 3 and 5 months after THA, but they were encouraged to continue training on their own and to keep generally active.)	30	530 (120.16)	MeanDif	-6 (-64.73, 52.73)	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
Heiberg, K.E., 2015	High Quality	functional task (Stair climbing test (s))	5 years	(The participants exercised for 12 supervised sessions, 70 minutes per session, twice a week. There were 2–8 participants in the group, depending on the number allocated at the relevant time. The walking skill training program consisted of ambulatory activities like sit-to-stand, stair climbing, walking in different ways, obstacle course, lunges, squats, balance exercises, step up/step down, and throwing a ball while moving around)	30	13 (5.59)	(not allowed to attend supervised physiotherapy during the same period between 3 and 5 months after THA, but they were encouraged to continue training on their own and to keep generally active.)	30	13 (5.59)	MeanDif	0 (-2.83, 2.83)	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
Heiberg, K.E., 2012	High Quality	HOOS (Activities of daily living)	4.9 months	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	90 (6.04)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	89 (5.86)	MeanDif	1 (-1.83, 3.83)	Not Significant (P-value>.05)
Heiberg, K.E., 2012	High Quality	HOOS (Sport)	4.9 months	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	78 (15.09)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	74 (14.65)	MeanDif	4 (-3.07, 11.07)	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
Heiberg, K.E., 2012	High Quality	functional task(6 minute walk test)	4.9 months	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	513 (48.29)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	462 (46.89)	MeanDif	51 (28.37, 73.63)	**Treatment 1 Significant (P-value<.05)**
Heiberg, K.E., 2012	High Quality	functional task (Figure of eight test, steps)	4.9 months	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	7 (6.04)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	10 (5.86)	MeanDif	-3 (-5.83, -0.17)	**Treatment 2 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
Heiberg, K.E., 2012	High Quality	functional task (Stair climbing test (s))	4.9 months	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	11 (0.00)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	12 (2.93)	MeanDif	-1 (-2.00, -0.00)	**Treatment 1 Significant (P-value<.05)**
Heiberg, K.E., 2012	High Quality	other questionnaire (Self effincacy)	4.9 months	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	86 (12.07)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	81 (8.79)	MeanDif	5 (0.00,10.00)	**Treatment 1 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
Heiberg, K.E., 2012	High Quality	HOOS (Activities of daily living)	1 years	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	92 (9.06)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	91 (8.79)	MeanDif	1 (-3.24, 5.24)	Not Significant (P-value>.05)
Heiberg, K.E., 2012	High Quality	HOOS (Sport)	1 years	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	79 (21.13)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	78 (17.59)	MeanDif	1 (-8.22, 10.22)	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
Heiberg, K.E., 2012	High Quality	functional task(6 minute walk test)	1 years	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	535 (60.37)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	483 (58.62)	MeanDif	52 (23.71, 80.29)	**Treatment 1 Significant (P-value<.05)**
Heiberg, K.E., 2012	High Quality	functional task(Figure of eight test, steps)	1 years	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	7 (3.02)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	8 (5.86)	MeanDif	-1 (-3.24, 1.24)	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
Heiberg, K.E., 2012	High Quality	functional task (Stair climbing test (s))	1 years	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	10 (3.02)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	12 (2.93)	MeanDif	-2 (-3.41, -0.59)	**Treatment 1 Significant (P-value<.05)**
Heiberg, K.E., 2012	High Quality	other questionnaire (Self effincacy)	1 years	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	88 (12.07)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	84 (11.72)	MeanDif	4 (-1.66, 9.66)	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
Rooks, D.S., 2006	Moderate Quality	SF-36 (Physical function)	Peri-Op	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	40.4 (23.40)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	30.3 (17.10)	MeanDif	10.1 (-1.34, 21.54)	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
Rooks, D.S., 2006	Moderate Quality	SF-36 (Role limitation physical)	Peri-Op	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	44.6 (37.50)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	32.1 (39.00)	MeanDif	12.5 (-8.94, 33.94)	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
Rooks, D.S., 2006	Moderate Quality	WOMAC (Function)	Peri-Op	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	26.9 (11.90)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	33.7 (10.90)	MeanDif	-6.8 (-13.19, -0.41)	**Treatment 1 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
Rooks, D.S., 2006	Moderate Quality	functional task (Functional reach)	Peri-Op	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	30.6 (6.60)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	31.5 (7.10)	MeanDif	-0.9 (-4.74, 2.94)	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
Rooks, D.S., 2006	Moderate Quality	functional task (Timed up and go (s))	Peri-Op	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	11.35 (2.35)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	11.3 (2.25)	MeanDif	0.05 (-1.24, 1.34)	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
Rooks, D.S., 2006	Moderate Quality	functional task (Walk <50 ft)	Discharge	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	16.00%	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	41.67%	RR	0.38 (0.14, 1.06)	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
Rooks, D.S., 2006	Moderate Quality	functional task (Walk >50 ft)	Discharge	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	64.00%	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	66.67%	RR	0.96 (0.64, 1.44)	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
Rooks, D.S., 2006	Moderate Quality	SF-36 (Physical function)	1.8 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	57.6 (22.00)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	55.1 (22.40)	MeanDif	2.5 (-9.94, 14.94)	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
Rooks, D.S., 2006	Moderate Quality	SF-36 (Role limitation physical)	1.8 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	48.2 (41.90)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	47.2 (42.40)	MeanDif	1 (-22.61, 24.61)	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
Rooks, D.S., 2006	Moderate Quality	WOMAC (Function)	1.8 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	12.8 (9.00)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	12.9 (8.00)	MeanDif	-0.1 (-4.86, 4.66)	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
Rooks, D.S., 2006	Moderate Quality	functional task (Functional reach)	1.8 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	30.7 (6.90)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	32.8 (6.10)	MeanDif	-2.1 (-5.74, 1.54)	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
Rooks, D.S., 2006	Moderate Quality	functional task (Timed up and go (s))	1.8 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	11.53 (2.42)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	10.9 (2.83)	MeanDif	0.63 (-0.85, 2.11)	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
Rooks, D.S., 2006	Moderate Quality	SF-36 (Physical function)	6 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	81.7 (18.10)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	76.6 (18.60)	MeanDif	5.1 (-5.18, 15.38)	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
Rooks, D.S., 2006	Moderate Quality	SF-36 (Role limitation physical)	6 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	83 (35.20)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	86.5 (24.40)	MeanDif	-3.5 (-20.40, 13.40)	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
Rooks, D.S., 2006	Moderate Quality	WOMAC(Function)	6 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	5.4 (5.80)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	5.3 (5.40)	MeanDif	0.1 (-3.04, 3.24)	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
Rooks, D.S., 2006	Moderate Quality	functional task (Functional reach)	6 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	33.5 (5.20)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	31.4 (7.10)	MeanDif	2.1 (-1.40, 5.60)	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
Rooks, D.S., 2006	Moderate Quality	functional task (Timed up and go (s))	6 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	9.76 (1.29)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	9.41 (1.46)	MeanDif	0.35 (-0.42, 1.12)	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
Umpierres, C.S., 2014	High Quality	SF-36 (Physical functioning)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	13.5 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	12.7 (.)	Author Reported	NA	Not Significant (P-value>.05)
Umpierres, C.S., 2014	High Quality	SF-36 (Role emotional)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	40.1 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	28.8 (.)	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
Umpierres, C.S., 2014	High Quality	SF-36 (Role physical)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	11.1 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	9.6 (.)	Author Reported	NA	Not Significant (P-value>.05)
Villadsen, A., 2014b	High Quality	HOOS (Sports and recreation)	1.4 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	19.9 (23.08)	(The control group received only the standard preoperative educational package (TJA))	41	20.6 (23.19)	MeanDif	-0.7 (-10.60, 9.20)	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
Villadsen, A., 2014b	High Quality	HOOS (Sports and recreation)	3 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	30.7 (23.08)	(The control group received only the standard preoperative educational package (TJA))	41	25.6 (23.19)	MeanDif	5.1 (-4.80, 15.00)	Not Significant (P-value>.05)

TABLE 54: PART 1- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO HOME BASED PHYSICAL THERAPY &/OR EDUCATION: LENGTH OF STAY

Reference Title	Quality	Outcome Details	Duration	Treatment 1 (Details)	Group 1 N	Mean1/P1 (SD1)	Treatment 2 (Details)	Group2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Umpierres, C.S., 2014	High Quality	length of hospital stay	Post-Op	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	. %	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 55: PART 1- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO HOME BASED PHYSICAL THERAPY &/OR EDUCATION: 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
Galea, M.P., 2008	High Quality	WOMAC (Stiffness)	1.8 months	(7 exercises that focused on functional tasks, daily living tasks, balance, strength, and endurance. Both groups performed the same exercises. However, participants in the center-based group were provided with advice about how to progress the exercises, whereas those in the home-based group were not given any further instruction on progressing or modifying the exercises. The maximum time period for each exercise was 5 minutes, which included a rest period if required)	11	33.2 (30.40)	(home-based group received an illustrated guide of the same prescribed exercises that included basic instructions for the exercise with illustrations. Participants in the home-based group were not given any further instruction regarding performance of the exercises at home or any advice on progressing or modifying the exercises. Participants in both groups were given a diary and instructed to keep a daily record of the exercises they performed including the time or number of sets and repetitions)	12	47.8 (26.30)	MeanDif	-14.6 (-37.93, 8.73)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Heiberg, K.E., 2015	High Quality	HOOS (Activities of daily living)	5 years	(The participants exercised for 12 supervised sessions, 70 minutes per session, twice a week. There were 2–8 participants in the group, depending on the number allocated at the relevant time. The walking skill training program consisted of ambulatory activities like sit-to-stand, stair climbing, walking in different ways, obstacle course, lunges, squats, balance exercises, step up/step down, and throwing a ball while moving around)	30	90 (11.18)	(not allowed to attend supervised physiotherapy during the same period between 3 and 5 months after THA, but they were encouraged to continue training on their own and to keep generally active.)	30	93 (11.18)	MeanDif	-3 (-8.66, 2.66)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Heiberg, K.E., 2015	High Quality	HOOS (Sport)	5 years	(The participants exercised for 12 supervised sessions, 70 minutes per session, twice a week. There were 2–8 participants in the group, depending on the number allocated at the relevant time. The walking skill training program consisted of ambulatory activities like sit-to-stand, stair climbing, walking in different ways, obstacle course, lunges, squats, balance exercises, step up/step down, and throwing a ball while moving around)	30	75 (19.56)	(not allowed to attend supervised physiotherapy during the same period between 3 and 5 months after THA, but they were encouraged to continue training on their own and to keep generally active.)	30	82 (22.36)	MeanDif	-7 (-17.63, 3.63)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Heiberg, K.E., 2015	High Quality	other questionnaire (Self-efficacy)	5 years	(The participants exercised for 12 supervised sessions, 70 minutes per session, twice a week. There were 2–8 participants in the group, depending on the number allocated at the relevant time. The walking skill training program consisted of ambulatory activities like sit-to-stand, stair climbing, walking in different ways, obstacle course, lunges, squats, balance exercises, step up/step down, and throwing a ball while moving around)	30	87 (13.97)	(not allowed to attend supervised physiotherapy during the same period between 3 and 5 months after THA, but they were encouraged to continue training on their own and to keep generally active.)	30	87 (25.15)	MeanDif	0 (-10.30, 10.30)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Rooks, D.S., 2006	Moderate Quality	discharge location (Discharged at home)	Discharge	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	56.00%	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	58.33%	RR	0.96 (0.59, 1.56)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Rooks, D.S., 2006	Moderate Quality	discharge location (Discharged to rehabilitation)	Discharge	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	24.00%	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	50.00%	RR	0.48 (0.21, 1.07)	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/P 2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Umpierres, C.S., 2014	High Quality	SF-36 (Social functioning)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	62.2 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	52.8 (.)	Author Reported	NA	Not Significant (P-value>.05)
Umpierres, C.S., 2014	High Quality	SF-36 (Vitality)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	74.1 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	66.5 (.)	Author Reported	NA	Not Significant (P-value>.05)

TABLE 56: PART 1- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO HOME BASED PHYSICAL THERAPY &/OR EDUCATION: 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
Galea, M.P., 2008	High Quality	WOMAC (Pain)	1.8 months	(7 exercises that focused on functional tasks, daily living tasks, balance, strength, and endurance. Both groups performed the same exercises. However, participants in the center-based group were provided with advice about how to progress the exercises, whereas those in the home-based group were not given any further instruction on progressing or modifying the exercises. The maximum time period for each exercise was 5 minutes, which included a rest period if required)	11	39.54 (31.30)	(home-based group received an illustrated guide of the same prescribed exercises that included basic instructions for the exercise with illustrations. Participants in the home-based group were not given any further instruction regarding performance of the exercises at home or any advice on progressing or modifying the exercises. Participants in both groups were given a diary and instructed to keep a daily record of the exercises they performed including the time or number of sets and repetitions)	12	56.3 (38.10)	MeanDif	-16.76 (-45.17, 11.65)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Pain)	2 weeks	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	68.2 (15.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, -extension, -abduction and knee flexion/extension.)	30	67.7 (15.00)	Author Reported	-52.7 (.,.)	Not Significant (P-value>.05)
Mikkelsen, L.R., 2014	High Quality	HOOS (Pain)	4 weeks	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	74.9 (13.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, -extension, -abduction and knee flexion/extension.)	30	78.8 (15.00)	MeanDif	-3.9 (-10.91, 3.11)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Pain)	1.4 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	82.5 (15.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, -extension, -abduction and knee flexion/extension.)	30	81.9 (15.00)	MeanDif	0.6 (-6.87, 8.07)	Not Significant (P-value>.05)
Mikkelsen, L.R., 2014	High Quality	HOOS (Pain)	2.3 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	88.7 (12.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, -extension, -abduction and knee flexion/extension.)	30	86.3 (16.00)	MeanDif	2.4 (-4.68, 9.48)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Pain)	5.9 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	91.7 (10.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, -extension, -abduction and knee flexion/extension.)	30	91.4 (13.00)	MeanDif	0.3 (-5.50, 6.10)	Not Significant (P-value>.05)
Mikkelsen, L.R., 2014	High Quality	HOOS (Pain)	11.8 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	94 (8.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, -extension, -abduction and knee flexion/extension.)	30	92.2 (14.00)	MeanDif	1.8 (-3.93, 7.53)	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
Heiberg, K.E., 2015	High Quality	HOOS (Pain)	5 years	(The participants exercised for 12 supervised sessions, 70 minutes per session, twice a week. There were 2–8 participants in the group, depending on the number allocated at the relevant time. The walking skill training program consisted of ambulatory activities like sit-to-stand, stair climbing, walking in different ways, obstacle course, lunges, squats, balance exercises, step up/step down, and throwing a ball while moving around)	30	92 (11.18)	(not allowed to attend supervised physiotherapy during the same period between 3 and 5 months after THA, but they were encouraged to continue training on their own and to keep generally active.)	30	95 (8.38)	MeanDif	-3 (-8.00, 2.00)	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
Heiberg, K.E., 2012	High Quality	HOOS (Pain)	4.9 months	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	92 (9.06)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	90 (8.79)	MeanDif	2 (-2.24, 6.24)	Not Significant (P-value>.05)
Heiberg, K.E., 2012	High Quality	HOOS (Pain)	1 years	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	94 (6.04)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	94 (8.79)	MeanDif	0 (-3.61, 3.61)	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
Rooks, D.S., 2006	Moderate Quality	SF-36 (Pain)	Peri-Op	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	49.5 (19.40)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	37.7 (17.90)	MeanDif	11.8 (1.35, 22.25)	**Treatment 1 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
Rooks, D.S., 2006	Moderate Quality	WOMAC (Pain)	Peri-Op	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	7.8 (4.10)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	9.9 (2.90)	MeanDif	-2.1 (-4.08, -0.12)	**Treatment 1 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
Rooks, D.S., 2006	Moderate Quality	SF-36 (Pain)	1.8 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	71.4 (20.10)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	70.8 (21.20)	MeanDif	0.6 (-10.98, 12.18)	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
Rooks, D.S., 2006	Moderate Quality	WOMAC (Pain)	1.8 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	2.6 (2.60)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	2.7 (2.00)	MeanDif	-0.1 (-1.40, 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
Rooks, D.S., 2006	Moderate Quality	SF-36 (Pain)	6 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	79.6 (21.20)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	77.4 (16.30)	MeanDif	2.2 (-8.36, 12.76)	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
Rooks, D.S., 2006	Moderate Quality	WOMAC (Pain)	6 months	(performed water and land-based exercise 3 times weekly over a 6-week period immediately prior to surgery. During the first 3 weeks, participants performed 1–2 sets of 8 –12 repetitions of single-joint movements while standing in chest-deep, 93°F water.)	25	1.1 (1.70)	(received the first handout via mail during week 1 of the 6-week intervention and a followup telephone call during week 2. During week 3, participants received the second handout, and during week 4 they received a telephone call to answer any questions and schedule the postintervention testing appointment. A final telephone call during week 6 confirmed the postintervention testing date and time. The 2 mailings and 3 telephone calls were designed to provide some degree of attention control)	24	1 (1.20)	MeanDif	0.1 (-0.72, 0.92)	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
Umpierres, C.S., 2014	High Quality	SF-36 (Bodily pain)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	53.8 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	43.9 (.)	Author Reported	NA	Better outcome Significant (P-value<.05)
Villadsen, A., 2014b	High Quality	HOOS (Pain)	1.4 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	36.4 (17.06)	(The control group received only the standard preoperative educational package (TJA))	41	33.5 (17.31)	MeanDif	2.9 (-4.45, 10.25)	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
Villadsen, A., 2014b	High Quality	HOOS (Pain)	3 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	37.2 (17.06)	(The control group received only the standard preoperative educational package (TJA))	41	33.6 (16.66)	MeanDif	3.6 (-3.61, 10.81)	Not Significant (P-value>.05)

TABLE 57: PART 1- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO HOME BASED PHYSICAL THERAPY &/OR EDUCATION: QUALITY OF LIFE

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
Galea, M.P., 2008	High Quality	WOMAC (Quality of life)	1.8 months	(7 exercises that focused on functional tasks, daily living tasks, balance, strength, and endurance. Both groups performed the same exercises. However, participants in the center-based group were provided with advice about how to progress the exercises, whereas those in the home-based group were not given any further instruction on progressing or modifying the exercises. The maximum time period for each exercise was 5 minutes, which included a rest period if required)	11	0.6 (0.10)	(home-based group received an illustrated guide of the same prescribed exercises that included basic instructions for the exercise with illustrations. Participants in the home-based group were not given any further instruction regarding performance of the exercises at home or any advice on progressing or modifying the exercises. Participants in both groups were given a diary and instructed to keep a daily record of the exercises they performed including the time or number of sets and repetitions)	12	0.55 (0.30)	MeanDif	0.05 (-0.13, 0.23)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Quality of life)	2 weeks	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	51.8 (16.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	55.1 (16.00)	MeanDif	-3.3 (-11.27, 4.67)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Quality of life)	4 weeks	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	61.9 (16.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	62.3 (18.00)	MeanDif	-0.4 (-8.90, 8.10)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Quality of life)	1.4 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	67.6 (21.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	69.5 (21.00)	MeanDif	-1.9 (-12.36, 8.56)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Quality of life)	2.3 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	79 (16.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	75.6 (20.00)	MeanDif	3.4 (-5.65, 12.45)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Quality of life)	5.9 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	83.8 (18.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	86.7 (17.00)	MeanDif	-2.9 (-11.61, 5.81)	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
Mikkelsen, L.R., 2014	High Quality	HOOS (Quality of life)	11.8 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	86.7 (16.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension.)	30	86 (20.00)	MeanDif	0.7 (-8.35, 9.75)	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
Heiberg, K.E., 2015	High Quality	HOOS (Quality of life)	5 years	(The participants exercised for 12 supervised sessions, 70 minutes per session, twice a week. There were 2–8 participants in the group, depending on the number allocated at the relevant time. The walking skill training program consisted of ambulatory activities like sit-to-stand, stair climbing, walking in different ways, obstacle course, lunges, squats, balance exercises, step up/step down, and throwing a ball while moving around)	30	85 (13.97)	(not allowed to attend supervised physiotherapy during the same period between 3 and 5 months after THA, but they were encouraged to continue training on their own and to keep generally active.)	30	84 (16.77)	MeanDif	1 (-6.81, 8.81)	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
Heiberg, K.E., 2012	High Quality	HOOS (Quality of life)	4.9 months	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	77 (15.09)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	76 (11.72)	MeanDif	1 (-5.40, 7.40)	Not Significant (P-value>.05)
Heiberg, K.E., 2012	High Quality	HOOS (Quality of life)	1 years	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	81 (15.09)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	83 (14.65)	MeanDif	-2 (-9.07, 5.07)	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
Umpierres, C.S., 2014	High Quality	SF-36 (General health)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	83.5 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	79.02 (.)	Author Reported	NA	Not Significant (P-value>.05)
Umpierres, C.S., 2014	High Quality	SF-36 (Mental health)	2.1 weeks	(received the same assistance by the multidisciplinary hip group with the additional presence of a physiotherapy professional. All physiotherapy exercises and gait training were performed with the physiotherapy professional)	54	76.9 (.)	(received introduction and orientation about the rehabilitation protocol without the presence of a physiotherapeutic professional. This assistance was performed once a day for 60 min)	52	67.7 (.)	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
Villadsen, A., 2014b	High Quality	EQ-5d (VAS)	1.4 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	20.3 (17.73)	(The control group received only the standard preoperative educational package (TJA))	41	14.4 (17.64)	MeanDif	5.9 (-1.67, 13.47)	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
Villadsen, A., 2014b	High Quality	EQ-5d (index)	1.4 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	0.2 (0.13)	(The control group received only the standard preoperative educational package (TJA))	41	0.13 (0.13)	MeanDif	0.07 (0.01, 0.13)	**Treatment 1 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
Villadsen, A., 2014b	High Quality	HOOS (Activities of daily living)	1.4 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	29.7 (16.73)	(The control group received only the standard preoperative educational package (TJA))	41	26.7 (16.66)	MeanDif	3 (-4.14, 10.14)	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
Villadsen, A., 2014b	High Quality	HOOS (Quality of life)	1.4 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	28.7 (19.07)	(The control group received only the standard preoperative educational package (TJA))	41	23.6 (18.62)	MeanDif	5.1 (-2.96, 13.16)	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
Villadsen, A., 2014b	High Quality	EQ-5d (VAS)	3 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	21.2 (17.73)	(The control group received only the standard preoperative educational package (TJA))	41	19.3 (18.62)	MeanDif	1.9 (-5.88, 9.68)	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
Villadsen, A., 2014b	High Quality	HOOS (Activities of daily living)	3 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	31.7 (16.73)	(The control group received only the standard preoperative educational package (TJA))	41	28.5 (16.66)	MeanDif	3.2 (-3.94, 10.34)	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
Villadsen, A., 2014b	High Quality	HOOS (Quality of life)	3 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	31.8 (19.07)	(The control group received only the standard preoperative educational package (TJA))	41	29.2 (18.62)	MeanDif	2.6 (-5.46, 10.66)	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
Villadsen, A., 2014b	High Quality	EQ-5d (index)	5.9 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	0.21 (0.13)	(The control group received only the standard preoperative educational package (TJA))	41	0.18 (0.13)	MeanDif	0.03 (-0.03, 0.09)	Not Significant (P-value>.05)

TABLE 58: PART 1- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO HOME BASED PHYSICAL THERAPY &/OR EDUCATION: 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
Mikkelsen, L.R., 2014	High Quality	Harris Hip Score (Symptoms)	2 weeks	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	62.9 (16.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension .)	30	64.6 (16.00)	MeanDif	-1.7 (-9.67, 6.27)	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
Mikkelsen, L.R., 2014	High Quality	Harris Hip Score (Symptoms)	4 weeks	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	72.8 (12.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension .)	30	73.3 (16.00)	MeanDif	-0.5 (-7.58, 6.58)	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
Mikkelsen, L.R., 2014	High Quality	Harris Hip Score (Symptoms)	1.4 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	76.2 (14.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension .)	30	80.3 (17.00)	Author Reported	59.2 (.,.)	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
Mikkelsen, L.R., 2014	High Quality	Harris Hip Score (Symptoms)	2.3 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	82.9 (12.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension .)	30	80.3 (17.00)	MeanDif	2.6 (-4.77, 9.97)	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
Mikkelsen, L.R., 2014	High Quality	Harris Hip Score (Symptoms)	5.9 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	85 (15.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension .)	30	86.2 (13.00)	MeanDif	-1.2 (-8.18, 5.78)	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
Mikkelsen, L.R., 2014	High Quality	Harris Hip Score (Symptoms)	11.8 months	(PRT was initiated within the first week after surgery and performed twice a week for 10 weeks. Home based exercised in the IG was recommended to perform the same exercises 5 days a week and omit these exercises on the days with PRT)	32	90.7 (11.00)	(The rehabilitation in the CG reflected standard care at the hospital. Home based exercise was recommended to perform the exercises 7 days a week. consisted of unloaded exercises in the movement directions: hip flexion, - extension, - abduction and knee flexion/extension .)	30	90 (14.00)	MeanDif	0.7 (-5.59, 6.99)	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
Heiberg, K.E., 2015	High Quality	HOOS (Symptoms)	5 years	(The participants exercised for 12 supervised sessions, 70 minutes per session, twice a week. There were 2–8 participants in the group, depending on the number allocated at the relevant time. The walking skill training program consisted of ambulatory activities like sit-to-stand, stair climbing, walking in different ways, obstacle course, lunges, squats, balance exercises, step up/step down, and throwing a ball while moving around)	30	84 (13.97)	(not allowed to attend supervised physiotherapy during the same period between 3 and 5 months after THA, but they were encouraged to continue training on their own and to keep generally active.)	30	88 (11.18)	MeanDif	-4 (-10.40, 2.40)	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
Heiberg, K.E., 2012	High Quality	HOOS (Symptoms)	4.9 months	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	81 (9.06)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	81 (8.79)	MeanDif	0 (-4.24, 4.24)	Not Significant (P-value>.05)
Heiberg, K.E., 2012	High Quality	HOOS (Symptoms)	1 years	(patients exercised under supervision of a physiotherapist, mainly comprising flexibility and strengthening exercises on a bench or in an apparatus. 12 sessions, which were held twice a week.)	35	86 (9.06)	(did not attend any supervised physiotherapy programs during the same time period, but were encouraged to continue with the exercise they had learned in the hospital or during their rehab stay)	33	87 (11.72)	MeanDif	-1 (-6.00, 4.00)	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
Villadsen, A., 2014b	High Quality	HOOS (Symptoms)	1.4 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	31 (19.74)	(The control group received only the standard preoperative educational package (TJA))	41	31.4 (17.31)	MeanDif	-0.4 (-8.33, 7.53)	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
Villadsen, A., 2014b	High Quality	HOOS (Symptoms)	3 months	(standard preoperative educational package in addition to attending a NEMEX programme for 8 weeks prior to surgery (EX+TJA). 1 h twice a week. It consisted of a 10-minute aerobic warm-up on a stationary exercise bike followed by a circuit programme with four main focus)	43	33.6 (17.06)	(The control group received only the standard preoperative educational package (TJA))	41	30.5 (17.31)	MeanDif	3.1 (-4.25, 10.45)	Not Significant (P-value>.05)

TABLE 59: PART 2- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY: COMPOSITE

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
Ferrara, P.E., 2008	High Quality	Harris Hip Score	Peri-Op	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	43.6 (15.70)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	34.9 (15.50)	MeanDif	8.7 (-4.07, 21.47)	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
Ferrara, P.E., 2008	High Quality	Harris Hip Score	3 months	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	69.47 (7.49)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	65.2 (15.40)	MeanDif	4.27 (-5.50, 14.04)	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
Vukomanovic, A., 2008	Moderate Quality	Harris Hip Score	Peri-Op	(consisted of education and elements of physical therapy. The patients from the study group were informed about the operation, caution measures and rehabilitation after the arthroplasty through conversation with the physiatrist and a brochure. They were instructed by a physiotherapist to perform exercises and basic activities of postoperative rehabilitation program, such as bed mobility, getting out and in bed, standing and walking with crutches, use of toilet, sitting on chair, walking up and do)	23	44 (7.25)	(one appointment with the physiatrist and two practical classes with a physiotherapist. Control group did not receive preoperative education and physical therapy, but both groups had the same program of rehabilitation after the arthroplasty. The program of rehabilitation for patients of both groups started on the first day after the operation)	22	45.75 (11.82)	MeanDif	-1.75 (-7.51, 4.01)	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
Vukomanovic, A., 2008	Moderate Quality	Harris Hip Score	Discharge	(consisted of education and elements of physical therapy. The patients from the study group were informed about the operation, caution measures and rehabilitation after the arthroplasty through conversation with the physiatrist and a brochure. They were instructed by a physiotherapist to perform exercises and basic activities of postoperative rehabilitation program, such as bed mobility, getting out and in bed, standing and walking with crutches, use of toilet, sitting on chair, walking up and do)	23	51.25 (8.17)	(one appointment with the physiatrist and two practical classes with a physiotherapist. Control group did not receive preoperative education and physical therapy, but both groups had the same program of rehabilitation after the arthroplasty. The program of rehabilitation for patients of both groups started on the first day after the operation)	22	50.1 (6.17)	MeanDif	1.15 (-3.07, 5.37)	Not Significant (P-value>.05)

TABLE 60: PART 2- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL 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
Ferrara, P.E., 2008	High Quality	SF-36 (Physical)	Peri-Op	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	34.4 (4.05)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	27.3 (10.30)	MeanDif	7.1 (0.80, 13.40)	**Treatment 1 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
Ferrara, P.E., 2008	High Quality	WOMAC (Function)	Peri-Op	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	33.7 (13.80)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	43.5 (9.50)	MeanDif	-9.8 (-19.57, -0.03)	**Treatment 1 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
Ferrara, P.E., 2008	High Quality	SF-36 (Physical)	3 months	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	46.6 (8.95)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	52.09 (8.11)	MeanDif	-5.49 (-12.49, 1.51)	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
Ferrara, P.E., 2008	High Quality	WOMAC (Function)	3 months	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	18.3 (12.36)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatent.)	12	28.5 (10.01)	MeanDif	-10.2 (-19.44, -0.96)	**Treatment 1 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
Vukomanovic, A., 2008	Moderate Quality	Oxford Hip Score	Peri-Op	(consisted of education and elements of physical therapy. The patients from the study group were informed about the operation, caution measures and rehabilitation after the arthroplasty through conversation with the physiatrist and a brochure. They were instructed by a physiotherapist to perform exercises and basic activities of postoperative rehabilitation program, such as bed mobility, getting out and in bed, standing and walking with crutches, use of toilet, sitting on chair, walking up and do)	23	44.75 (5.76)	(one appointment with the physiatrist and two practical classes with a physiotherapist. Control group did not receive preoperative education and physical therapy, but both groups had the same program of rehabilitation after the arthroplasty. The program of rehabilitation for patients of both groups started on the first day after the operation)	22	38.85 (8.01)	MeanDif	5.9 (1.81, 9.99)	**Treatment 1 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
Vukomanovic,A., 2008	Moderate Quality	other questionnaire (Japanese Orthopedic Association hip score)	Peri-Op	(consisted of education and elements of physical therapy. The patients from the study group were informed about the operation, caution measures and rehabilitation after the arthroplasty through conversation with the physiatrist and a brochure. They were instructed by a physiotherapist to perform exercises and basic activities of postoperative rehabilitation program, such as bed mobility, getting out and in bed, standing and walking with crutches, use of toilet, sitting on chair, walking up and do)	23	50 (8.66)	(one appointment with the physiatrist and two practical classes with a physiotherapist. Control group did not receive preoperative education and physical therapy, but both groups had the same program of rehabilitation after the arthroplasty. The program of rehabilitation for patients of both groups started on the first day after the operation)	22	54.75 (10.32)	MeanDif	-4.75 (-10.33, 0.83)	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
Vukomanovic,A., 2008	Moderate Quality	other questionnaire (Japanese Orthopedic Association hip score)	Discharge	(consisted of education and elements of physical therapy. The patients from the study group were informed about the operation, caution measures and rehabilitation after the arthroplasty through conversation with the physiatrist and a brochure. They were instructed by a physiotherapist to perform exercises and basic activities of postoperative rehabilitation program, such as bed mobility, getting out and in bed, standing and walking with crutches, use of toilet, sitting on chair, walking up and do)	23	64 (6.78)	(one appointment with the physiatrist and two practical classes with a physiotherapist. Control group did not receive preoperative education and physical therapy, but both groups had the same program of rehabilitation after the arthroplasty. The program of rehabilitation for patients of both groups started on the first day after the operation)	22	62.6 (6.21)	MeanDif	1.4 (-2.40, 5.20)	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
Vukomanovic,A., 2008	Moderate Quality	Oxford Hip Score	1.2 years	(consisted of education and elements of physical therapy. The patients from the study group were informed about the operation, caution measures and rehabilitation after the arthroplasty through conversation with the physiatrist and a brochure. They were instructed by a physiotherapist to perform exercises and basic activities of postoperative rehabilitation program, such as bed mobility, getting out and in bed, standing and walking with crutches, use of toilet, sitting on chair, walking up and do)	23	17.06 (6.10)	(one appointment with the physiatrist and two practical classes with a physiotherapist. Control group did not receive preoperative education and physical therapy, but both groups had the same program of rehabilitation after the arthroplasty. The program of rehabilitation for patients of both groups started on the first day after the operation)	22	17.59 (7.84)	MeanDif	-0.53 (-4.65, 3.59)	Not Significant (P-value>.05)

TABLE 61: PART 2- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY: 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
Ferrara, P.E., 2008	High Quality	WOMAC (Stiffness)	Peri-Op	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	4.82 (1.88)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	4.58 (1.62)	MeanDif	0.24 (-1.20, 1.68)	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
Ferrara, P.E., 2008	High Quality	other questionnaire (Barthel Index-disability)	Peri-Op	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	84.5 (6.70)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	75 (16.20)	MeanDif	9.5 (-0.48, 19.48)	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
Ferrara, P.E., 2008	High Quality	WOMAC (Stiffness)	3 months	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	1 (1.33)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	1.3 (1.56)	MeanDif	-0.3 (-1.48, 0.88)	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
Ferrara, P.E., 2008	High Quality	other questionnaire (Barthel Index-disability)	3 months	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	95 (4.08)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	91.82 (2.52)	MeanDif	3.18 (0.38, 5.98)	**Treatment 1 Significant (P-value<.05)**

TABLE 62: PART 2- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY: 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
Ferrara, P.E., 2008	High Quality	VAS pain (Pain)	Peri-Op	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	5.5 (2.20)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	7.3 (2.00)	MeanDif	-1.8 (-3.52, -0.08)	**Treatment 1 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
Ferrara, P.E., 2008	High Quality	WOMAC (Pain)	Peri-Op	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	8 (3.80)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	11 (3.60)	MeanDif	-3 (-6.03, 0.03)	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
Ferrara, P.E., 2008	High Quality	VAS pain (Pain)	3 months	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	0.3 (0.48)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	1.27 (1.00)	MeanDif	-0.97 (-1.60, -0.34)	**Treatment 1 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
Ferrara, P.E., 2008	High Quality	WOMAC (Pain)	3 months	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	1.7 (2.35)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	2.2 (1.75)	MeanDif	-0.5 (-2.21, 1.21)	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
Vukomanovic, A., 2008	Moderate Quality	VAS pain (Pain in rest (mm))	Discharge	(consisted of education and elements of physical therapy. The patients from the study group were informed about the operation, caution measures and rehabilitation after the arthroplasty through conversation with the physiatrist and a brochure. They were instructed by a physiotherapist to perform exercises and basic activities of postoperative rehabilitation program, such as bed mobility, getting out and in bed, standing and walking with crutches, use of toilet, sitting on chair, walking up and do)	23	3.95 (13.08)	(one appointment with the physiatrist and two practical classes with a physiotherapist. Control group did not receive preoperative education and physical therapy, but both groups had the same program of rehabilitation after the arthroplasty. The program of rehabilitation for patients of both groups started on the first day after the operation)	22	6.2 (14.95)	MeanDif	-2.25 (-10.47, 5.97)	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
Vukomanovic, A., 2008	Moderate Quality	VAS pain (Pain in rest (mm))	Peri-Op	(consisted of education and elements of physical therapy. The patients from the study group were informed about the operation, caution measures and rehabilitation after the arthroplasty through conversation with the physiatrist and a brochure. They were instructed by a physiotherapist to perform exercises and basic activities of postoperative rehabilitation program, such as bed mobility, getting out and in bed, standing and walking with crutches, use of toilet, sitting on chair, walking up and do)	23	37.45 (25.34)	(one appointment with the physiatrist and two practical classes with a physiotherapist. Control group did not receive preoperative education and physical therapy, but both groups had the same program of rehabilitation after the arthroplasty. The program of rehabilitation for patients of both groups started on the first day after the operation)	22	33.5 (29.09)	MeanDif	3.95 (-12.02, 19.92)	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
Vukomanovic, A., 2008	Moderate Quality	VAS pain (Pain while moving (mm))	Peri-Op	(consisted of education and elements of physical therapy. The patients from the study group were informed about the operation, caution measures and rehabilitation after the arthroplasty through conversation with the physiatrist and a brochure. They were instructed by a physiotherapist to perform exercises and basic activities of postoperative rehabilitation program, such as bed mobility, getting out and in bed, standing and walking with crutches, use of toilet, sitting on chair, walking up and do)	23	69.9 (19.11)	(one appointment with the physiatrist and two practical classes with a physiotherapist. Control group did not receive preoperative education and physical therapy, but both groups had the same program of rehabilitation after the arthroplasty. The program of rehabilitation for patients of both groups started on the first day after the operation)	22	71.95 (15.31)	MeanDif	-2.05 (-12.15, 8.05)	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
Vukomanovic, A., 2008	Moderate Quality	VAS pain (Pain while moving (mm))	Discharge	(consisted of education and elements of physical therapy. The patients from the study group were informed about the operation, caution measures and rehabilitation after the arthroplasty through conversation with the physiatrist and a brochure. They were instructed by a physiotherapist to perform exercises and basic activities of postoperative rehabilitation program, such as bed mobility, getting out and in bed, standing and walking with crutches, use of toilet, sitting on chair, walking up and do)	23	10.25 (17.33)	(one appointment with the physiatrist and two practical classes with a physiotherapist. Control group did not receive preoperative education and physical therapy, but both groups had the same program of rehabilitation after the arthroplasty. The program of rehabilitation for patients of both groups started on the first day after the operation)	22	11.5 (17.33)	MeanDif	-1.25 (-11.38, 8.88)	Not Significant (P-value>.05)

TABLE 63: PART 2- PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY COMPARED TO PREOPERATIVE/POSTOPERATIVE SUPERVISED AND STRUCTURED PHYSICAL THERAPY: QUALITY OF LIFE

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
Ferrara, P.E., 2008	High Quality	SF-36 (Mental)	Peri-Op	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	51.1 (11.20)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	40.9 (11.60)	MeanDif	10.2 (0.88, 19.52)	**Treatment 1 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
Ferrara, P.E., 2008	High Quality	SF-36 (Mental)	3 months	(One month prior to surgery did individual exercises for 5 days/week 60 min/day. Received strength and flexibility training and postural realignment.)	11	53.1 (6.65)	(The control group performed exercise only after surgery. The post-surgery inpatient rehabilitation programme in both study and control group patients was performed in our department for four weeks, with a standard protocol of: strengthening progressive exercises of hip muscles, postural and educational nursing, progressive stretching of the hamstrings, hip adductor muscles, walking in progressive weight with crutches and educational programmes as in pre-operative treatment.)	12	51.36 (9.03)	MeanDif	1.74 (-4.71, 8.19)	Not Significant (P-value>.05)

Limited evidence supports the use of neuraxial anesthesia compared to general anesthesia to reduce complications in patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty

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*

RATIONALE

Two studies (Hunt et al and Basques et al) examined the use of spinal compared with general anesthesia in total hip arthroplasty and met the criteria for the guideline. Both were retrospective analyses of large cohort databases, and both noted fewer adverse events when spinal anesthesia was used when compared with general anesthesia. Hunt et al examined outcomes of 409,096 total hip arthroplasties recorded in the National Joint Registry for England and Wales, and reported a 0.85 hazard ratio of death within 90 days when spinal anesthesia was used instead of general. Basques et al examined 20,936 total hip arthroplasty patients in the National Surgical Quality Improvement Program (NSQIP) database, of which 12,752 had general and 8184 had spinal anesthesia. General anesthesia was associated with a 1.31 odds ratio of having any adverse event, 5.81 odds ratio of prolonged ventilator use, 2.17 odds ratio of unplanned intubation, 2.51 odds ratio of stroke, 5.04 odds ratio of cardiac arrest, 1.34 odds ratio of blood transfusion, and 1.35 odds ratio of a minor adverse event after surgery.

POSSIBLE HARMS OF IMPLEMENTATION

None known

FUTURE RESEARCH

A randomized controlled trial of spinal vs general endotracheal anesthesia in total hip arthroplasty patients should be conducted to evaluate this question further.

QUALITY EVALUATION TABLE: ANESTHESIA

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION -ANESTHESIA OBSERVATIONAL

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
Basques,B.A., 2015	○	●	●	●	●	○	●	●	●	Include	Low Quality
Hunt, L.P., 2013	○	●	●	●	●	○	●	●	●	Include	Low Quality

SUMMARY OF FINDINGS TABLE 20 GENERAL ANESTHESIA COMPARED TO NEURAXIAL ANESTHESIA

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**Low Quality**	
	Basques2015	**Hunt2013**
Complications		
other adverse event(Acute renal failure)	•	
other adverse event(Any adverse event)	-	
other adverse event(Any minor adverse event)	-	
other adverse event(Any severe adverse event)	•	
other adverse event(Cardiac arrest)	-	
other adverse event(Death)	•	
other adverse event(Graft, prosthesis or flap failure)	-	
other adverse event(Myocardinal infection)	-	
other adverse event(Peripheral nerve injury)	-	
other adverse event(Pneumonia)	•	
other adverse event(Progressive renal insufficiency)	•	
other adverse event(Return to the operating room)	•	
other adverse event(Sepsis or septic shock)	•	
other adverse event(Stroke or cerebrovascular accident)	•	
other adverse event(Surgical site infection)	•	
other adverse event(Thromboembolic event (deep vein thrombosis or pulmonary embolisim)	•	
other adverse event(Unplanned intubation)	-	
other adverse event(Urinary tract infection)	•	
other adverse event(Ventilator use for more than forty-eight hours)	-	
other adverse event(Wound dehiscence)	•	
other questionnaire(Readmission)	•	
Length Of Stay		
length of hospital stay(Length of hospital stay)	•	
Mortality		
Mortality	•	[•][•][-][•][•][-][-][-]
Other		
other adverse event(Blood transfusion)	-	

TABLE 64: PROGNOSTIC STUDY- GENERAL ANESTHESIA COMPARED TO NEURAXIAL ANESTHESIA FOR MORTALITY RISK

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hunt, L.P., 2013	Low Quality	mortality	3 months	14723	total hip arthroplasty	epidural anesthesia compared to general anesthesia	Year of operation, ASA score, surgical approach (posterior vs other), mechanical prophylaxis, chemical prophylaxis, anesthetic type, hip replacement type/cementing, myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease or rheumatic disease, peptic ulcer disease, liver disease, diabetes without vs with vs no diabetes, Paraplegia or hemiplegia, renal disease, cancer	hazard ratio(CI)	0.97 (0.74–1.26)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hunt, L.P., 2013	Low Quality	mortality	3 months	16563	total hip arthroplasty	general and epidural compared to general anesthsia only	Year of operation, ASA score, surgical approach (posterior vs other), mechanical prophylaxis, chemical prophylaxis, anesthetic type, hip replacement type/cementing, myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease or rheumatic disease, peptic ulcer disease, liver disease, diabetes without vs with vs no diabetes, Paraplegia or hemiplegia, renal disease, cancer	hazard ratio (CI)	0.93 (0.71–1.22)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hunt, L.P., 2013	Low Quality	mortality	3 months	29707	total hip arthroplasty	General and nerve block compared to general anesthesia only	Year of operation, ASA score, surgical approach (posterior vs other), mechanical prophylaxis, chemical prophylaxis, anesthetic type, hip replacement type/cementing, myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease or rheumatic disease, peptic ulcer disease, liver disease, diabetes without vs with vs no diabetes, Paraplegia or hemiplegia, renal disease, cancer	hazard ratio (CI)	0.78 (0.62–0.98)	**patients with general and nerve block anesthesia had lower mortality risk.**

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hunt, L.P., 2013	Low Quality	mortality	3 months	3032	total hip arthroplasty	nerve block compared to general anesthesia	Year of operation, ASA score, surgical approach (posterior vs other), mechanical prophylaxis, chemical prophylaxis, anesthetic type, hip replacement type/cementing, myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease or rheumatic disease, peptic ulcer disease, liver disease, diabetes without vs with vs no diabetes, Paraplegia or hemiplegia, renal disease, cancer	hazard ratio (CI)	1.56 (0.99–2.45)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hunt, L.P., 2013	Low Quality	mortality	3 months	6509	total hip arthroplasty	spinal and epidural compared to general anesthesia	Year of operation, ASA score, surgical approach (posterior vs other), mechanical prophylaxis, chemical prophylaxis, anesthetic type, hip replacement type/cementing, myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease or rheumatic disease, peptic ulcer disease, liver disease, diabetes without vs with vs no diabetes, Paraplegia or hemiplegia, renal disease, cancer	hazard ratio (CI)	0.84 (0.59–1.19)	Not Significant (P-value>.05)

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hunt, L.P., 2013	Low Quality	mortality	3 months	49989	total hip arthroplasty	spinal and general anesthesia compared to general only	Year of operation, ASA score, surgical approach (posterior vs other), mechanical prophylaxis, chemical prophylaxis, anesthetic type, hip replacement type/cementing, myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease or rheumatic disease, peptic ulcer disease, liver disease, diabetes without vs with vs no diabetes, Paraplegia or hemiplegia, renal disease, cancer	hazard ratio (CI)	0.74 (0.60–0.91)	**patients with general and spinal anesthesia had lower mortality risk than patient with only general**

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hunt, L.P., 2013	Low Quality	mortality	3 months	10424	total hip arthroplasty	spinal and nerve block compared to general anesthsia	Year of operation, ASA score, surgical approach (posterior vs other), mechanical prophylaxis, chemical prophylaxis, anesthetic type, hip replacement type/cementing, myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease or rheumatic disease, peptic ulcer disease, liver disease, diabetes without vs with vs no diabetes, Paraplegia or hemiplegia, renal disease, cancer	hazard ratio (CI)	0.65 (0.44–0.96)	**patients who had spinal and nerve block anesthesia had lower mortality risk than general anesthesia.**

Reference Title	Quality	Outcome Details	Duration	N	Treatment (Details)	Comparison	Confounding Adjustment	Statistic	Result	Significance
Hunt, L.P., 2013	Low Quality	mortality	3 months	165807	total hip arthroplasty	spinal anesthesia compared to general anesthesia	Year of operation, ASA score, surgical approach (posterior vs other), mechanical prophylaxis, chemical prophylaxis, anesthetic type, hip replacement type/cementing, myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease or rheumatic disease, peptic ulcer disease, liver disease, diabetes without vs with vs no diabetes, Paraplegia or hemiplegia, renal disease, cancer	hazard ratio (CI)	0.85 (0.74–0.97)	**risk lower with spinal anesthesia**

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
Basques, B.A., 2015	Low Quality	other adverse event (Acute renal failure)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.08%	Spinal anesthesia (Spinal anaesthesia)	8184	0.06%	RR	1.28 (0.44, 3.75)	Not Significant (P-value>.05)
Basques, B.A., 2015	Low Quality	other adverse event (Any adverse event)	Post-Op	General anaesthesia (General anaesthesia)	12752	23.51%	Spinal anesthesia (Spinal anaesthesia)	8184	19.65%	RR	1.20 (1.13, 1.26)	**Treatment 2 Significant (P-value<.05)**
Basques, B.A., 2015	Low Quality	other adverse event (Any minor adverse event)	Post-Op	General anaesthesia (General anaesthesia)	12752	20.95%	Spinal anesthesia (Spinal anaesthesia)	8184	17.14%	RR	1.22 (1.15, 1.30)	**Treatment 2 Significant (P-value<.05)**
Basques, B.A., 2015	Low Quality	other adverse event (Any severe adverse event)	Post-Op	General anaesthesia (General anaesthesia)	12752	3.81%	Spinal anesthesia (Spinal anaesthesia)	8184	3.69%	RR	1.03 (0.90, 1.19)	Not Significant (P-value>.05)
Basques, B.A., 2015	Low Quality	other adverse event (Cardiac arrest)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.12%	Spinal anesthesia (Spinal anaesthesia)	8184	0.02%	RR	4.81 (1.10, 21.04)	**Treatment 2 Significant (P-value<.05)**
Basques, B.A., 2015	Low Quality	other adverse event (Death)	Post-Op	General anaesthesia (General anaesthesia)	12572	0.15%	Spinal anesthesia (Spinal anaesthesia)	8184	0.13%	RR	1.12 (0.54, 2.36)	Not Significant (P-value>.05)
Basques, B.A., 2015	Low Quality	other adverse event (Graft, prosthesis or flap failure)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.30%	Spinal anesthesia (Spinal anaesthesia)	8184	0.01%	RR	24.39 (3.35, 177.60)	**Treatment 2 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
Basques, B.A., 2015	Low Quality	other adverse event (Myocardinal infection)	Post-Op	General anaesthesia (General anaesthesia)	12752	2.60%	Spinal anesthesia (Spinal anaesthesia)	8184	0.24%	RR	10.65 (6.79, 16.72)	**Treatment 2 Significant (P-value<.05)**
Basques, B.A., 2015	Low Quality	other adverse event (Peripheral nerve injury)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.70%	Spinal anesthesia (Spinal anaesthesia)	8184	0.06%	RR	11.42 (4.64, 28.11)	**Treatment 2 Significant (P-value<.05)**
Basques, B.A., 2015	Low Quality	other adverse event (Pneumonia)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.31%	Spinal anesthesia (Spinal anaesthesia)	8184	0.22%	RR	1.43 (0.82, 2.49)	Not Significant (P-value>.05)
Basques,B. A., 2015	Low Quality	other adverse event (Progressive renal insufficiency)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.11%	Spinal anesthesia (Spinal anaesthesia)	8184	0.04%	RR	2.99 (0.86, 10.42)	Not Significant (P-value>.05)
Basques,B. A., 2015	Low Quality	other adverse event (Return to the operating room)	Post-Op	General anaesthesia (General anaesthesia)	12752	1.76%	Spinal anesthesia (Spinal anaesthesia)	8184	1.88%	RR	0.93 (0.76, 1.14)	Not Significant (P-value>.05)
Basques,B. A., 2015	Low Quality	other adverse event (Sepsis or septic shock)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.38%	Spinal anesthesia (Spinal anaesthesia)	8184	0.34%	RR	1.10 (0.69, 1.75)	Not Significant (P-value>.05)
Basques,B. A., 2015	Low Quality	other adverse event (Stroke or cerebrovascular accident)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.17%	Spinal anesthesia (Spinal anaesthesia)	8184	0.07%	RR	2.35 (0.95, 5.80)	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
Basques,B. A., 2015	Low Quality	other adverse event (Surgical site infection)	Post-Op	General anaesthesia (General anaesthesia)	12752	1.25%	Spinal anesthesia (Spinal anaesthesia)	8184	1.30%	RR	0.96 (0.75, 1.23)	Not Significant (P-value>.05)
Basques,B. A., 2015	Low Quality	other adverse event (Thromboembolic event (deep vein thrombosis or pulmonary embolisim)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.64%	Spinal anesthesia (Spinal anaesthesia)	8184	0.59%	RR	1.10 (0.77, 1.56)	Not Significant (P-value>.05)
Basques,B. A., 2015	Low Quality	other adverse event (Unplanned intubation)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.28%	Spinal anesthesia (Spinal anaesthesia)	8184	0.13%	RR	2.10 (1.07, 4.12)	**Treatment 2 Significant (P-value<.05)**
Basques,B. A., 2015	Low Quality	other adverse event (Urinary tract infection)	Post-Op	General anaesthesia (General anaesthesia)	12752	1.29%	Spinal anesthesia (Spinal anaesthesia)	8184	1.04%	RR	1.25 (0.96, 1.62)	Not Significant (P-value>.05)
Basques,B. A., 2015	Low Quality	other adverse event (Ventilator use for more than forty-eight hours)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.14%	Spinal anesthesia (Spinal anaesthesia)	8184	0.02%	RR	5.78 (1.34, 24.89)	**Treatment 2 Significant (P-value<.05)**
Basques,B. A., 2015	Low Quality	other adverse event (Wound dehiscence)	Post-Op	General anaesthesia (General anaesthesia)	12752	0.13%	Spinal anesthesia (Spinal anaesthesia)	8184	0.09%	RR	1.56 (0.65, 3.76)	Not Significant (P-value>.05)
Basques,B. A., 2015	Low Quality	other questionnaire (Readmission)	Post-Op	General anaesthesia (General anaesthesia)	12752	3.60%	Spinal anesthesia (Spinal anaesthesia)	8184	3.38%	RR	1.06 (0.92, 1.23)	Not Significant (P-value>.05)

TABLE 66: PART 1- GENERAL ANESTHESIA COMPARED TO NEURAXIAL ANESTHESIA: LENGTH OF STAY

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
Basques, B.A., 2015	Low Quality	length of hospital stay (Length of hospital stay)	Post-Op	General anaesthesia (General anaesthesia)	12572	3.1 (2.30)	Spinal anesthesia (Spinal anaesthesia)	8184	3.1 (3.20)	MeanDif	0 (-0.08, 0.08)	Not Significant (P-value>.05)

TABLE 67: PART 1- GENERAL ANESTHESIA COMPARED TO NEURAXIAL ANESTHESIA: 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
Basques, B.A., 2015	Low Quality	other adverse event (Blood transfusion)	Post-Op	General anaesthesia (General anaesthesia)	12752	19.79%	Spinal anesthesia (Spinal anaesthesia)	8184	16.24%	RR	1.22 (1.15, 1.29)	**Treatment 2 Significant (P-value<.05)**

TRANEXAMIC ACID

Moderate strength evidence supports that the practitioner could use intravenous or topical tranexamic acid for patients with symptomatic osteoarthritis of the hip who are undergoing total hip arthroplasty (THA) as a part of the effort to reduce blood loss.

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.

RATIONALE

Two high quality (Martin et al, Niskanen et al) and two moderate strength (Imai et al, Benoni et al) studies evaluated the perioperative use of tranexamic acid (TXA) for total hip arthroplasty (THA). Martin, et al conducted a prospective, stratified, randomized, double-blind, placebo-controlled trial that demonstrated that the use of topical TXA in THA resulted in a smaller reduction in postoperative hemoglobin. There was a trend toward lower transfusion rates that was not statistically significant. Niskanen at el and Korkala et al conducted a randomized, double-blind study of 39 THA patients that demonstrated smaller total blood loss in cemented THA for patients who received perioperative intravenous TXA. Imai, et al evaluated 107 THA patients who were randomly divided into 1 control group and 4 treatment groups based on the timing of TXA administration. All groups who received TXA, irrespective of the dose timing, experienced lower intraoperative and perioperative total blood loss. Benoni et al, performed a prospective, randomized, double-blind study on the effect of intravenous TXA at the beginning of THA which also demonstrated significantly lower postoperative blood loss compared to placebo. Since indications for allogenic blood transfusions differed among studies, there was no consistent evidence that TXA reduced perioperative transfusion rates.

POSSIBLE HARMS OF IMPLEMENTATION

While there is concern that there may be contraindications to the use of TXA, none of the papers cited above demonstrated an increased risk of adverse events related to the perioperative use of TXA for THA.

FUTURE RESEARCH

Randomized, prospective trials comparing IV TXA, topical TXA, and oral TXA are warranted to specifically assess dosing, technique and timing of administration, uniform measures of perioperative blood loss, cost, including impact on blood transfusion, and contraindications.

RESULTS

QUALITY EVALUATION TABLE: TRANEXAMIC ACID RANDOMIZED

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION -TRANEXAMIC ACID RANDOMIZED

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
Benoni, G., 2001	◑	◑	●	●	●	○	●	●	●	Include	Moderate Quality
Imai, N., 2012	◑	◑	◑	●	◑	●	●	●	●	Include	Moderate Quality
Martin,J.G., 2014	●	◑	●	●	●	●	●	●	●	Include	High Quality
Niskanen,R.O., 2005	◑	●	●	●	●	○	●	●	●	Include	High Quality

SUMMARY OF FINDINGS TABLE 21 IV TRANEXAMIC ACID COMPARED TO NO TREATMENT

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**	**Moderate Quality**	
	Niskanen2005	**Benoni2001**	**Imai2012**
Complications			
blood loss complications(Blood loss during operation and into drains)		•	
blood loss complications(Blood loss during operation)		•	
blood loss complications(Blood transfusions)		+	
blood loss complications(Hematoma)		•	
blood loss complications(Postoperative blood loss- drain removal)		+	
blood loss complications(Sum of operative blood loss + drain loss + hematoma volumes)		+	
blood loss complications(Total blood loss (peroperative + drains))		-	
nausea( )		•	
other adverse event(Chest pain)		•	
other adverse event(Hematoma)		•	
other adverse event(Pulmonary embolism)		•	
other adverse event(Secretion from drainsite)		•	
other adverse event(Secretion from wound)		•	
other adverse event(Staphylococcus epidermidis)		•	
blood loss complications(Hb reduction on day 1 (g/dl))			[+][+][+]
blood loss complications(Intraoperative blood loss (ml))			[-][-][+][+]
blood loss complications(Postoperative blood loss (ml) collected by suction drainage)			[+][+][+][+]
blood loss complications(Postoperative blood loss (ml))			[+][+][+][+]
deep vein thrombosis (DVT)( )			[•][•][•][•]
pulmonary embolism (PE)( )			[•][•][•][•]
Other			
blood loss complications(Bleeding time (min))			[•][•][•][•]
blood loss complications(Bleeding + drainage)	+		
blood loss complications(Peroperative bleeding)	•|+|•|•		
blood loss complications(Total drainage)	+		

SUMMARY OF FINDINGS TABLE 22 TOPICAL TRANEXAMIC ACID COMPARED TO NO TREATMENT

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**
	Martin2014
Other	
blood loss complications(Change in hemoglobin)	+

SUMMARY OF FINDINGS TABLE 23 IV TRANEXAMIC ACID COMPARED TO OTHER TRANEXAMIC ACID

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**Moderate Quality**	**Meta-Analysis**
	Imai2012	
Complications		
blood loss complications(Hb reduction on day 1 (g/dl))	[+][+][+]	
blood loss complications(Intraoperative blood loss (ml))	[-][-][-][-][-][+]	
blood loss complications(Postoperative blood loss (ml) collected by suction drainage)	[+][+][+][+][+][+]	
blood loss complications(Postoperative blood loss (ml))	[+][+][+][+][+][+]	
deep vein thrombosis (DVT)( )	[•][•][•][•][•][•]	
pulmonary embolism (PE)( )	[•][•][•][•][•][•]	
blood loss complications(Actual blood loss (ml))	[+][+][+][+][+][+]	
Other		
blood loss complications(Bleeding time (min))	[•][•][•][•][•][•]	

TABLE 68: PART 1- INTRAVENOUS TRANEXAMIC ACID COMPARED TO NO TRANEXAMIC ACID: COMPLICATIONS

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
Imai, N., 2012	Moderate Quality	blood loss complications (Hb reduction on day 1 (g/dl))	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Intraoperative blood loss (ml))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Worse outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml) collected by suction drainage)	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome 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
Imai, N., 2012	Moderate Quality	deep vein thrombosis (DVT)	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	10.00%	(untreated control group (no drug was administered))	22	13.64%	RR	0.73 (0.14, 3.95)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	pulmonary embolism (PE)	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	0.00%	(untreated control group (no drug was administered))	22	0.00%	RD	0.00 (0.00, 0.00)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Hb reduction on day 1 (g/dl))	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome 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
Imai, N., 2012	Moderate Quality	blood loss complications (Intraoperative blood loss (ml))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Worse outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml) collected by suction drainage)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome 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
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcomes Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	deep vein thrombosis (DVT)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	12.50%	(untreated control group (no drug was administered))	22	13.64%	RR	0.92 (0.21, 4.08)	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
Imai, N., 2012	Moderate Quality	pulmonary embolism (PE)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	0.00%	(untreated control group (no drug was administered))	22	0.00%	RD	0.00 (0.00, 0.00)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Intraoperative blood loss (ml))	Intra-Op	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml) collected by suction drainage)	Post-Op	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome 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
Imai, N., 2012	Moderate Quality	deep vein thrombosis (DVT)	Post-Op	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	11.54%	(untreated control group (no drug was administered))	22	13.64%	RR	0.85 (0.19, 3.78)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	pulmonary embolism (PE)	Post-Op	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	3.85%	(untreated control group (no drug was administered))	22	0.00%	RD	0.04 (-0.04, 0.11)	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
Benoni, G., 2001	Moderate Quality	blood loss complications (Blood loss during operation and into drains)	Intra-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	809 (339.84)	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	959 (394.73)	MeanDif	-150 (-383.62, 83.62)	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
Benoni, G., 2001	Moderate Quality	blood loss complications (Blood loss during operation)	Intra-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	561 (287.89)	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	608 (287.49)	MeanDif	-47 (-230.21, 136.21)	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
Benoni, G., 2001	Moderate Quality	blood loss complications (Blood transfusions)	Post-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	27.78%	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	65.00%	RR	0.43 (0.19, 0.96)	**Treatment 1 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
Benoni, G., 2001	Moderate Quality	blood loss complications (Postoperative blood loss-drain removal)	Post-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	199 (123.38)	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	388 (244.14)	MeanDif	-189 (-310.23, -67.77)	**Treatment 1 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
Benoni, G., 2001	Moderate Quality	blood loss complications (Sum of operative blood loss + drain loss + hematoma volumes)	Post-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	1028 (355.00)	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	1382 (486.00)	MeanDif	-354 (-622.82, -85.18)	**Treatment 1 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
Benoni, G., 2001	Moderate Quality	blood loss complications (Total blood loss (peroperative + drains))	Post-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	759 (281.40)	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	996 (406.14)	MeanDif	-237 (-457.42, -16.58)	**Treatment 2 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
Benoni, G., 2001	Moderate Quality	nausea	Post-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	0.00%	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	5.00%	RD	-0.05 (-0.15, 0.05)	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
Benoni, G., 2001	Moderate Quality	other adverse event (Chest pain)	Post-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	5.56%	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	0.00%	RD	0.06 (-0.05, 0.16)	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
Benoni, G., 2001	Moderate Quality	other adverse event (Hematoma)	Post-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	33.33%	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	35.00%	RR	0.95 (0.39, 2.31)	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
Benoni, G., 2001	Moderate Quality	other adverse event (Pulmonary embolism)	Post-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	5.56%	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	5.00%	RR	1.11 (0.07, 16.50)	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
Benoni, G., 2001	Moderate Quality	other adverse event (Secretion from drainsite)	Post-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	16.67%	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	25.00%	RR	0.67 (0.19, 2.40)	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
Benoni, G., 2001	Moderate Quality	other adverse event (Secretion from wound)	Post-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	11.11%	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	30.00%	RR	0.37 (0.09, 1.61)	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
Benoni, G., 2001	Moderate Quality	other adverse event (Staphylococcus epidermidis)	Post-Op	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	5.56%	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	0.00%	RD	0.06 (-0.05, 0.16)	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
Benoni, G., 2001	Moderate Quality	blood loss complications (Hematoma)	1 weeks	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	18	270 (132.04)	(The patients received tranexamic acid 100 mg/mL (Cyklokapron, Pharmacia & Upjohn, Sweden), 10 mg/kg body weight (maximum 1 g), in a slow (5–10 minutes) intravenous injection or a similar volume of placebo (saline) immediately before the operation started, contained in specially-prepared ampoules with 10 mL of the substance, identi?fed by their numbers only.)	20	376 (269.24)	MeanDif	-106 (-238.83, 26.83)	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
Imai, N., 2012	Moderate Quality	blood loss complications (Hb reduction on day 1 (g/dl))	Post-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Intraoperative blood loss (ml))	Intra-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml) collected by suction drainage)	Post-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml))	Post-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	(untreated control group (no drug was administered))	22	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	deep vein thrombosis (DVT)	Post-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	8.00%	(untreated control group (no drug was administered))	22	13.64%	RR	0.59 (0.11, 3.20)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	pulmonary embolism (PE)	Post-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	0.00%	(untreated control group (no drug was administered))	22	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/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Imai, N., 2012	Moderate Quality	blood loss complications (Bleeding time (min))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	1.43 (0.65)	(untreated control group (no drug was administered))	22	1.39 (0.59)	MeanDif	0.04 (-0.34, 0.42)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Bleeding time (min))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	1.42 (0.64)	(untreated control group (no drug was administered))	22	1.39 (0.59)	MeanDif	0.03 (-0.33, 0.39)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Bleeding time (min))	Intra-Op	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	1.47 (0.63)	(untreated control group (no drug was administered))	22	1.39 (0.59)	MeanDif	0.08 (-0.27, 0.43)	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
Niskanen,R. O., 2005	High Quality	blood loss complications (Bleeding + drainage)	Post-Op	(3 doses of tranexamic acid (100 mg/mL, Cyklokapron, Pharmacia, later Pfizer) 10 mg/kg of body weight mixed in 100 mL saline.)	19	. %	(received a corresponding dose of saline.The first injection was given intravenously over 5–10 min, immediately before the operation. The next two doses of tranexamic acid or placebo were given 8 h and 16 h after the first injection.)	20	. %	Author Reported	NA	Better outcome 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
Niskanen,R. O., 2005	High Quality	blood loss complications (Peroperative bleeding)	Peri-Op	(3 doses of tranexamic acid (100 mg/mL, Cyklokapron, Pharmacia, later Pfizer) 10 mg/kg of body weight mixed in 100 mL saline.)	19	. %	(received a corresponding dose of saline.The first injection was given intravenously over 5–10 min, immediately before the operation. The next two doses of tranexamic acid or placebo were given 8 h and 16 h after the first injection.)	20	. %	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
Niskanen, R.O., 2005	High Quality	blood loss complications (Total drainage)	Post-Op	(3 doses of tranexamic acid (100 mg/mL, Cyklokapron, Pharmacia, later Pfizer) 10 mg/kg of body weight mixed in 100 mL saline.)	19	. %	(received a corresponding dose of saline.The first injection was given intravenously over 5–10 min, immediately before the operation. The next two doses of tranexamic acid or placebo were given 8 h and 16 h after the first injection.)	20	. %	Author Reported	NA	Better outcome 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
Niskanen, R.O., 2005	High Quality	blood loss complications (Peroperative bleeding)	8 hours	(3 doses of tranexamic acid (100 mg/mL, Cyklokapron, Pharmacia, later Pfizer) 10 mg/kg of body weight mixed in 100 mL saline.)	19	. %	(received a corresponding dose of saline.The first injection was given intravenously over 5–10 min, immediately before the operation. The next two doses of tranexamic acid or placebo were given 8 h and 16 h after the first injection.)	20	. %	Author Reported	NA	Better outcome 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
Niskanen, R.O., 2005	High Quality	blood loss complications (Peroperative bleeding)	16 hours	(3 doses of tranexamic acid (100 mg/mL, Cyklokapron, Pharmacia, later Pfizer) 10 mg/kg of body weight mixed in 100 mL saline.)	19	. %	(received a corresponding dose of saline.The first injection was given intravenously over 5–10 min, immediately before the operation. The next two doses of tranexamic acid or placebo were given 8 h and 16 h after the first injection.)	20	. %	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
Niskanen, R.O., 2005	High Quality	blood loss complications (Peroperative bleeding)	1 Days	(3 doses of tranexamic acid (100 mg/mL, Cyklokapron, Pharmacia, later Pfizer) 10 mg/kg of body weight mixed in 100 mL saline.)	19	. %	(received a corresponding dose of saline.The first injection was given intravenously over 5–10 min, immediately before the operation. The next two doses of tranexamic acid or placebo were given 8 h and 16 h after the first injection.)	20	. %	Author Reported	NA	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Bleeding time (min))	Intra-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	1.45 (0.62)	(untreated control group (no drug was administered))	22	1.39 (0.59)	MeanDif	0.06 (-0.29, 0.41)	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
Martin, J.G., 2014	High Quality	blood loss complications (Change in hemoglobin)	Post-Op	(s. The treatment arm was prepared by removing 20 ml of NS from a 100 ml NS IV piggyback and adding 2 g/20 ml TXA to the NS piggyback to provide a total volume of 100 ml.)	25	. %	(The placebo arm was prepared by removing 20 ml of NS from a 100 ml NS IV piggyback and adding 20 ml NS back into the NS piggyback to provide a total volume of 100 ml.)	25	. %	Author Reported	NA	Better outcome Significant (P-value<.05)

TABLE 71: PART 3- INTRAVENOUS TRANEXAMIC ACID COMPARED TO INTRAVENOUS TRANEXAMIC ACID: COMPLICATIONS

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
Imai, N., 2012	Moderate Quality	blood loss complications (Actual blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Intraoperative blood loss (ml))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Worse outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml) collected by suction drainage)	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Better outcome 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
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	deep vein thrombosis (DVT)	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	10.00%	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	11.54%	RR	0.87 (0.16, 4.70)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	pulmonary embolism (PE)	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	0.00%	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	3.85%	RD	-0.04 (-0.11, 0.04)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Actual blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	Author Reported	NA	Better outcome 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
Imai, N., 2012	Moderate Quality	blood loss complications (Hb reduction on day 1 (g/dl))	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Intraoperative blood loss (ml))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	Author Reported	NA	Worse outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml) collected by suction drainage)	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	Author Reported	NA	Better outcome 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
Imai, N., 2012	Moderate Quality	deep vein thrombosis (DVT)	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	10.00%	1 g of TNA administered 10 minutes before surgery (T3 group))	25	8.00%	RR	1.25 (0.19, 8.11)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	pulmonary embolism (PE)	Post-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	0.00%	1 g of TNA administered 10 minutes before surgery (T3 group))	25	0.00%	RD	0.00 (0.00, 0.00)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Actual blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	Author Reported	NA	Better outcome 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
Imai, N., 2012	Moderate Quality	blood loss complications (Hb reduction on day 1 (g/dl))	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Intraoperative blood loss (ml))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	Author Reported	NA	Worse outcome 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
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml) collected by suction drainage)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	. %	Author Reported	NA	Better outcomes 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
Imai, N., 2012	Moderate Quality	deep vein thrombosis (DVT)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	12.50%	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	10.00%	RR	1.25 (0.23, 6.76)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	pulmonary embolism (PE)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	0.00%	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	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/P1 (SD1)	Treatment 2 (Details)	Group 2 N	Mean2/P2 (SD2)	Effect Measure	Result (95% CI)	Favored Treatment
Imai, N., 2012	Moderate Quality	blood loss complications (Actual blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Intraoperative blood loss (ml))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Worse outcome 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
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml) collected by suction drainage)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Better outcomes 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
Imai, N., 2012	Moderate Quality	deep vein thrombosis (DVT)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	12.50%	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	11.54%	RR	1.08 (0.24, 4.86)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	pulmonary embolism (PE)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	0.00%	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	3.85%	RD	-0.04 (-0.11, 0.04)	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
Imai, N., 2012	Moderate Quality	blood loss complications (Actual blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Hb reduction on day 1 (g/dl))	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	Author Reported	NA	Better outcome 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
Imai, N., 2012	Moderate Quality	blood loss complications (Intraoperative blood loss (ml))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	Author Reported	NA	Worse outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml) collected by suction drainage)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	Author Reported	NA	Better outcome 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
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml))	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	. %	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	Author Reported	NA	Better outcomes Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	deep vein thrombosis (DVT)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	12.50%	1 g of TNA administered 10 minutes before surgery (T3 group))	25	8.00%	RR	1.56 (0.29, 8.55)	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
Imai, N., 2012	Moderate Quality	pulmonary embolism (PE)	Post-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	0.00%	1 g of TNA administered 10 minutes before surgery (T3 group))	25	0.00%	RD	0.00 (0.00, 0.00)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Actual blood loss (ml))	Post-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Intraoperative blood loss (ml))	Intra-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Better outcome 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
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml) collected by suction drainage)	Post-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Postoperative blood loss (ml))	Post-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	. %	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	. %	Author Reported	NA	Better outcome Significant (P-value<.05)
Imai, N., 2012	Moderate Quality	deep vein thrombosis (DVT)	Post-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	8.00%	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	11.54%	RR	0.69 (0.13, 3.81)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	pulmonary embolism (PE)	Post-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	0.00%	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	3.85%	RD	-0.04 (-0.11, 0.04)	Not Significant (P-value>.05)

TABLE 72: PART 3- INTRAVENOUS TRANEXAMIC ACID COMPARED TO INTRAVENOUS TRANEXAMIC ACID: 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
Imai, N., 2012	Moderate Quality	blood loss complications (Bleeding time (min))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	1.43 (0.65)	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	1.47 (0.63)	MeanDif	-0.04 (-0.41, 0.33)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Bleeding time (min))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	1.43 (0.65)	1 g of TNA administered 10 minutes before surgery (T3 group))	25	1.45 (0.62)	MeanDif	-0.02 (-0.39, 0.35)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Bleeding time (min))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	1.42 (0.64)	(1 g of TNA administered 10 minutes before skin closure and again at 6 hours after the first administration (T2 group))	20	1.43 (0.65)	MeanDif	-0.01 (-0.39, 0.37)	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
Imai, N., 2012	Moderate Quality	blood loss complications (Bleeding time (min))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	1.42 (0.64)	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	1.47 (0.63)	MeanDif	-0.05 (-0.40, 0.30)	Not Significant (P-value>.05)
Imai, N., 2012	Moderate Quality	blood loss complications (Bleeding time (min))	Intra-Op	(1 g of TNA administered 10 minutes before skin closure to avoid fibrinolytic inhibition during the phase of operation and to exploit the effect of TNA maximally in the postoperative phase (T1 group))	24	1.42 (0.64)	1 g of TNA administered 10 minutes before surgery (T3 group))	25	1.45 (0.62)	MeanDif	-0.03 (-0.38, 0.32)	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
Imai, N., 2012	Moderate Quality	blood loss complications (Bleeding time (min))	Intra-Op	1 g of TNA administered 10 minutes before surgery (T3 group))	25	1.45 (0.62)	(1 g of TNA administered 10 minutes before surgery and again at 6 hours after the first administration (T4 group))	26	1.47 (0.63)	MeanDif	-0.02 (-0.36, 0.32)	Not Significant (P-value>.05)

APPROACH EXPOSURE

Moderate strength evidence supports that there were no clinically significant differences in patient oriented outcomes related to the surgical approach for patients with symptomatic osteoarthritis of the hip undergoing total hip arthroplasty.

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.

RATIONALE

Three high quality studies (Goosen et al 2011, Repantis et al 2015, and Taunton et al 2014) examined the three most common total hip approaches. Though well designed individually, they did not compare all of the common approaches in each paper. Therefore, the strength of the recommendation was downgraded to moderate.

POSSIBLE HARMS OF IMPLEMENTATION

None

FUTURE RESEARCH

Randomized controlled trial comparing common and emerging techniques on approaches to THA.

QUALITY EVALUATION TABLE: APPROACH EXPOSURE

Quality Chart Key

● =No Flaw in Domain of Interest

○ =Flaw in Domain of Interest

◑ = Half flaw in domain of interest

QUALITY EVALUATION -APPROACH EXPOSURE RANDOMIZED

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
Goosen,J.H., 2011	●	●	●	●	◑	●	●	●	●	Include	High Quality
Repantis,T., 2015	●	◑	◑	●	◑	●	●	●	●	Include	High Quality
Taunton,M.J., 2014	●	◑	●	●	●	○	●	●	●	Include	High Quality

SUMMARY OF FINDINGS TABLE 24: APPROACH EXPOSURE PART 1- ANTERIOR SURGICAL APPROACH COMPARED TO POSTERIOR SURGICAL APPROACH

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**
	Taunton2014
Composite	
Harris Hip Score(Total)	•|•|•
WOMAC(Total)	-|•|•
Function	
Harris Hip Score(Function)	•|•|•
WOMAC(Function)	•|•|•
SF-12(Physical score)	•|•|•
early ambulation(Discontinued all walking aids)	+
early ambulation(Discontinued walker/crutches)	•
early ambulation(Walk .5 miles)	•
return to ADL(Perform ADLs independently)	•
Other	
SF-12(Mental score)	-|•|•
WOMAC(Joint stiffness)	•|•|•
Pain	
Harris Hip Score(Pain)	•|•|•
WOMAC(Pain)	•|•|•
Quality Of Life	
functional task(Climb stairs)	•

SUMMARY OF FINDINGS TABLE 25 PART 2: MINIMALLY INVASIVE ANTEROLATERAL SURGICAL APPROACH COMPARED TO ANTEROLATERAL SURGICAL APPROACH

+ Favors Treatment 1 **- Favors Treatment 2** **• Not Significant** **| Separate Follow-ups** **[ ] Separate Treatment Comparisons**	**High Quality**	
	Goosen2011	**Repantis2015**
Complications		
infection(Postoperative)	•	
blood loss complications(Hematocrit (%PCV))		•
other adverse event(Heterotopic ossification)		•
Composite		
Harris Hip Score( )	-|•	
WOMAC( )	•|•	
Oxford Hip Score( )	•|•	
SF-36( )	•|•	
Function		
SF-36(Physical function)		•
functional task(Walking endurance)		•
Pain		
VAS pain(10 days post op)		+
VAS pain(4 years post op)		•
Quality Of Life		
SF-36(Mental health)		•
Reoperation		
implant revision(Cup revision)	•	
implant revision(Stem revision)	•	

TABLE 73: PART 1- ANTERIOR SURGICAL APPROACH COMPARED TO POSTERIOR SURGICAL APPROACH: COMPOSITE

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
Taunton, M.J., 2014	High Quality	Harris Hip Score (Total)	3 weeks	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	WOMAC (Total)	3 weeks	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	Author Reported	NA	worse outcomes 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
Taunton, M.J., 2014	High Quality	Harris Hip Score (Total)	1.4 months	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	WOMAC (Total)	1.4 months	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	Harris Hip Score (Total)	1 years	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	WOMAC (Total)	1 years	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 74: PART 1- ANTERIOR SURGICAL APPROACH COMPARED TO POSTERIOR SURGICAL APPROACH: 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
Taunton, M.J., 2014	High Quality	early ambulation (Discontinued all walking aids)	Post-Op	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	Author Reported	NA	better outcomes 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
Taunton, M.J., 2014	High Quality	early ambulation (Discontinued walker/crutches)	Post-Op	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	early ambulation (Walk .5 miles)	Post-Op	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	return to ADL (Perform ADLs independently)	Post-Op	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	Harris Hip Score (Function)	3 weeks	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	SF-12 (Physical score)	3 weeks	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	WOMAC (Function)	3 weeks	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	Harris Hip Score (Function)	1.4 months	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	SF-12 (Physical score)	1.4 months	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	WOMAC (Function)	1.4 months	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	Harris Hip Score (Function)	1 years	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	SF-12 (Physical score)	1 years	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	WOMAC (Function)	1 years	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 75: PART 1- ANTERIOR SURGICAL APPROACH COMPARED TO POSTERIOR SURGICAL APPROACH: 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
Taunton, M.J., 2014	High Quality	SF-12 (Mental score)	3 weeks	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	Author Reported	NA	worse outcomes 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
Taunton, M.J., 2014	High Quality	WOMAC (Joint stiffness)	3 weeks	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	SF-12 (Mental score)	1.4 months	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	WOMAC (Joint stiffness)	1.4 months	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	SF-12 (Mental score)	1 years	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	WOMAC (Joint stiffness)	1 years	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 76: PART 1- ANTERIOR SURGICAL APPROACH COMPARED TO POSTERIOR SURGICAL APPROACH: PAIN 611

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
Taunton, M.J., 2014	High Quality	Harris Hip Score (Pain)	3 weeks	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	WOMAC (Pain)	3 weeks	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	Harris Hip Score (Pain)	1.4 months	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	WOMAC (Pain)	1.4 months	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	Harris Hip Score (Pain)	1 years	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	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
Taunton, M.J., 2014	High Quality	WOMAC (Pain)	1 years	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 77: PART 1- ANTERIOR SURGICAL APPROACH COMPARED TO POSTERIOR SURGICAL APPROACH: QUALITY OF LIFE

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
Taunton, M.J., 2014	High Quality	functional task (Climb stairs)	Post-Op	(An oblique incision is made over the anterior margin of the tensor muscle at a point approximately 2 cm lateral from the anterior superior iliac spine and extending 10 cm.)	27	. %	(A 10 cm incision is placed over the greater trochanter, slightly curved posteriorly. An incision is placed just superior to the piriformis tendon through the hip capsule. The hip capsule is retracted posteriorly and is detached with the short external rotators from the posterior aspect of the greater trochanter extending down to and often including the quadratus muscle)	27	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 78: PART 2- ANTEROLATERAL SURGICAL APPROACH COMPARED TO ANTEROLATERAL SURGICAL APPROACH: COMPLICATIONS

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
Repantis, T., 2015	High Quality	blood loss complications (Hematocrit (%PCV))	Discharge	(MIS anterolateral, short incision, muscle-sparing approach)	43	. %	(Watson-Jones anterolateral approach)	37	. %	Author Reported	NA	Not Significant (P-value>.05)
Repantis, T., 2015	High Quality	other adverse event (Heterotopic ossification)	Post-Op	(MIS anterolateral, short incision, muscle-sparing approach)	43	. %	(Watson-Jones anterolateral approach)	37	. %	Author Reported	NA	Not Significant (P-value>.05)
Goosen, J.H., 2011	High Quality	infection(Post operative)	Post-Op	(The MIS procedures are described as a small-incision technique in which the quantitative skin and muscle dissection of the gluteus muscles has been reduced with respect to the classic approach)	30	0.00%	(standard anterolateral surgical approach)	30	3.33%	RD	-0.03 (-0.10, 0.03)	Not Significant (P-value>.05)

TABLE 79: PART 2- ANTEROLATERAL SURGICAL APPROACH COMPARED TO ANTEROLATERAL SURGICAL APPROACH: COMPOSITE

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
Goosen, J.H., 2011	High Quality	Harris Hip Score	1.4 months	(The MIS procedures are described as a small-incision technique in which the quantitative skin and muscle dissection of the gluteus muscles has been reduced with respect to the classic approach)	28	-73 (14.00)	(standard anterolateral surgical approach)	29	75 (15.00)	MeanDif	-148 (-155.53, -140.47)	**Treatment 2 Significant (P-value<.05)**
Goosen, J.H., 2011	High Quality	Oxford Hip Score	1.4 months	(The MIS procedures are described as a small-incision technique in which the quantitative skin and muscle dissection of the gluteus muscles has been reduced with respect to the classic approach)	28	37 (9.00)	(standard anterolateral surgical approach)	29	37 (13.00)	MeanDif	0 (-5.79, 5.79)	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
Goosen, J.H., 2011	High Quality	SF-36	1.4 months	(The MIS procedures are described as a small-incision technique in which the quantitative skin and muscle dissection of the gluteus muscles has been reduced with respect to the classic approach)	28	63 (15.00)	(standard anterolateral surgical approach)	29	62 (17.00)	MeanDif	1 (-7.32, 9.32)	Not Significant (P-value>.05)
Goosen, J.H., 2011	High Quality	WOMAC	1.4 months	(The MIS procedures are described as a small-incision technique in which the quantitative skin and muscle dissection of the gluteus muscles has been reduced with respect to the classic approach)	28	69 (12.00)	(standard anterolateral surgical approach)	29	73 (14.00)	MeanDif	-4 (-10.76, 2.76)	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
Goosen, J.H., 2011	High Quality	Harris Hip Score	1 years	(The MIS procedures are described as a small-incision technique in which the quantitative skin and muscle dissection of the gluteus muscles has been reduced with respect to the classic approach)	24	91 (10.00)	(standard anterolateral surgical approach)	27	90 (10.00)	MeanDif	1 (-4.50, 6.50)	Not Significant (P-value>.05)
Goosen, J.H., 2011	High Quality	Oxford Hip Score	1 years	(The MIS procedures are described as a small-incision technique in which the quantitative skin and muscle dissection of the gluteus muscles has been reduced with respect to the classic approach)	24	21 (8.00)	(standard anterolateral surgical approach)	27	23 (7.00)	MeanDif	-2 (-6.15, 2.15)	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
Goosen, J.H., 2011	High Quality	SF-36	1 years	(The MIS procedures are described as a small-incision technique in which the quantitative skin and muscle dissection of the gluteus muscles has been reduced with respect to the classic approach)	24	79 (23.00)	(standard anterolateral surgical approach)	27	86 (7.00)	MeanDif	-7 (-16.57, 2.57)	Not Significant (P-value>.05)
Goosen, J.H., 2011	High Quality	WOMAC	1 years	(The MIS procedures are described as a small-incision technique in which the quantitative skin and muscle dissection of the gluteus muscles has been reduced with respect to the classic approach)	24	84 (13.00)	(standard anterolateral surgical approach)	27	82 (12.00)	MeanDif	2 (-4.89, 8.89)	Not Significant (P-value>.05)

TABLE 80: PART 2- ANTEROLATERAL SURGICAL APPROACH COMPARED TO ANTEROLATERAL SURGICAL APPROACH: 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
Repantis, T., 2015	High Quality	SF-36 (Physical function)	4 years	(MIS anterolateral, short incision, muscle-sparing approach)	60	. %	(Watson-Jones anterolateral approach)	37	. %	Author Reported	NA	Not Significant (P-value>.05)
Repantis, T., 2015	High Quality	functional task (Walking endurance)	4 years	(MIS anterolateral, short incision, muscle-sparing approach)	43	. %	(Watson-Jones anterolateral approach)	37	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 81: PART 2- ANTEROLATERAL SURGICAL APPROACH COMPARED TO ANTEROLATERAL SURGICAL APPROACH: 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
Repantis, T., 2015	High Quality	VAS pain (10 days post op)	1.4 weeks	(MIS anterolateral, short incision, muscle-sparing approach)	43	1 (1.00)	(Watson-Jones anterolateral approach)	37	2 (2.00)	MeanDif	-1 (-1.71, -0.29)	**Treatment 1 Significant (P-value<.05)**
Repantis, T., 2015	High Quality	VAS pain (4 years post op)	4 years	(MIS anterolateral, short incision, muscle-sparing approach)	43	0 (.)	(Watson-Jones anterolateral approach)	37	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 82: PART 2- ANTEROLATERAL SURGICAL APPROACH COMPARED TO ANTEROLATERAL SURGICAL APPROACH: QUALITY OF LIFE

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
Repantis, T., 2015	High Quality	SF-36 (Mental health)	4 years	(MIS anterolateral, short incision, muscle-sparing approach)	43	. %	(Watson-Jones anterolateral approach)	37	. %	Author Reported	NA	Not Significant (P-value>.05)

TABLE 83: PART 2- ANTEROLATERAL SURGICAL APPROACH COMPARED TO ANTEROLATERAL SURGICAL APPROACH: REOPERATION

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
Goosen, J.H., 2011	High Quality	implant revision (Cup revision)	Post-Op	(The MIS procedures are described as a small-incision technique in which the quantitative skin and muscle dissection of the gluteus muscles has been reduced with respect to the classic approach)	30	0.00%	(standard anterolateral surgical approach)	30	0.00%	RD	0.00 (0.00, 0.00)	Not Significant (P-value>.05)
Goosen, J.H., 2011	High Quality	implant revision (Stem revision)	Post-Op	(The MIS procedures are described as a small-incision technique in which the quantitative skin and muscle dissection of the gluteus muscles has been reduced with respect to the classic approach)	30	13.33%	(standard anterolateral surgical approach)	30	3.33%	RR	4.00 (0.47, 33.73)	Not Significant (P-value>.05)

I. APPENDIXES

APPENDIX I. GUIDELINE DEVELOPMENT GROUP ROSTER

Greg Polkowski, MD, Co-Chair
American Association of Hip and Knee Surgeons

Norman Johanson, MD, Co-Chair
The Hip Society

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Albert Song, MD
American College of Radiology

Joseph A. Zeni, PT, PhD
American Physical Therapy Association

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ADDITIONAL CONTRIBUTING MEMBERS

The following participants contributed to the development of the preliminary recommendations during the introductory meeting, but did not participate in the final meeting where the evidence was reviewed and the final recommendations were developed:

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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

PICO QUESTIONS USED TO DEFINE LITERATURE SEARCH

PICO #	Short Title	Full Question
1	Weight Loss – Conservative Tx	In overweight patients with symptomatic OA of the hip, does weight loss and/or weight loss with combined modality decrease pain, improve function, or improve quality of life?
2	Obesity - Early Surgical Outcomes	In overweight patients with symptomatic OA of the Hip undergoing hip surgery, is there a difference in short term adverse events and functional recovery compared to non-overweight patients?
3	Obesity – Long Term	In overweight patients with symptomatic OA of the Hip undergoing hip surgery, is there a difference in functional outcomes and/or secondary surgery after 6 months compared to non-overweight patients?
4	Diabetes – Adverse Events	In patients with poorly controlled diabetes and symptomatic OA of the Hip undergoing hip surgery, is there a difference in short term adverse events and functional recovery compared to patients with well controlled diabetes or no diabetes?
5	Tobacco Use	In patients who use tobacco and/or nicotine and have symptomatic OA of the Hip undergoing THA, is there a difference in short and long term adverse events and functional recovery compared to patients who do not use tobacco and/or nicotine?
6	Non-Narcotic Management	In patients with symptomatic Hip OA, does non-narcotic pharmacologic management improve pain, stiffness, quality of life, and/or function?
7	Nutraceuticals	In patients with symptomatic Hip OA, does nutraceutical management improve pain, stiffness, quality of life, and/or function?
8	IA Injectables	In patients with symptomatic Hip OA, does use of IA injectables (to be stratified later) improve pain, stiffness, quality of life, and/or function?
9	Prescription Opioids	In patients with symptomatic Hip OA who are being conservatively treated, does use of long-term prescription opioids improve pain, stiffness, quality of life, and/or function or lead to adverse events?
10	Chronic Prescription Opioids or Cannabis	In patients who use chronic prescription opioids or cannabis and have symptomatic OA of the Hip undergoing hip surgery, is there a difference in short and long term adverse events, including continuation of use of the opioids or cannabis, and functional recovery compared to patients who do not use these substances?
11	Dysplasia	In patients with symptomatic acetabular dysplasia, does PAO, femoral osteotomy, hip

PICO #	Short Title	Full Question
		osteotomy, or arthroscopy lead to better patient reported outcomes compared with patients who do not undergo surgery?
12	Symptomatic FAI*	In patients with symptomatic FAI, does PAO, femoral osteotomy, hip osteotomy, or arthroscopy lead to better patient reported outcomes compared with patients who do not undergo surgery?
13	Physical Therapy - Conservation	In patients with symptomatic hip OA, not scheduled for total hip replacement, does physical therapy lead to better outcomes compared with patients without treatment?
14	Physical Therapy - Peri/Post-Op	In patients with symptomatic hip OA, scheduled for or have undergone total hip replacement, does perioperative/postoperative physical therapy lead to better outcomes compared with patients who do not undergo PT or undergo comparison PTs?
15	Physical Therapy - Self-Management	Among patients with symptomatic hip OA who participate in a self-management program, do their outcomes improve as compared to patients with no treatment or usual care?
16	MRSA/MSSA - Screening/Treatment	In adult patients with osteoarthritis scheduled for THA, does pre-operative screening and treatment for MRSA and MSSA improve outcomes and / or decrease complications compared to not screening and treating for MRSA and MSSA?
17	Tranexamic Acid	In adult patients with osteoarthritis undergoing THA and with no known contraindications to the use of tranexamic acid, does the use of topical or intravenous tranexamic acid reduce complications and / or improve outcomes compared to not using tranexamic acid?
18	Age - Adverse Events	In patients undergoing THA, does age adversely affect functional outcomes and/or secondary surgery?
19	Mental Health Disorder	In patients with symptomatic OA of the Hip undergoing hip surgery and documented mental health disorders, is there a difference in short term adverse events and functional recovery compared to patients without documented mental health disorders?
20	Social Comorbidities	In patients with symptomatic OA of the Hip undergoing THA, does socioeconomic status, social comorbidities, and/or lack of social support affect outcomes?
21	Risk Assessment Tools	In patients with symptomatic hip OA undergoing THA, are preoperative risk assessment tools effectively predictive of adverse events or increased surgical risks?
22	Hip Precautions	In patients with symptomatic Hip OA who have undergone hip arthroplasty, do post-op hip dislocation precautions decrease dislocation rates?
23	Approach Exposure	In patients with symptomatic hip OA undergoing THA, does the surgical approach affect patient oriented outcomes?

PICO #	Short Title	Full Question
24	Anesthetic Types	Do different anesthesia types affect outcomes of patients with symptomatic hip OA undergoing THA?
25	IA Imaging	Patients with history and physical exam consistent with IA hip pathology with normal x-rays, does advanced imaging and/or diagnostic IA injection improve confirmation of clinical diagnosis or affect surgical decision?

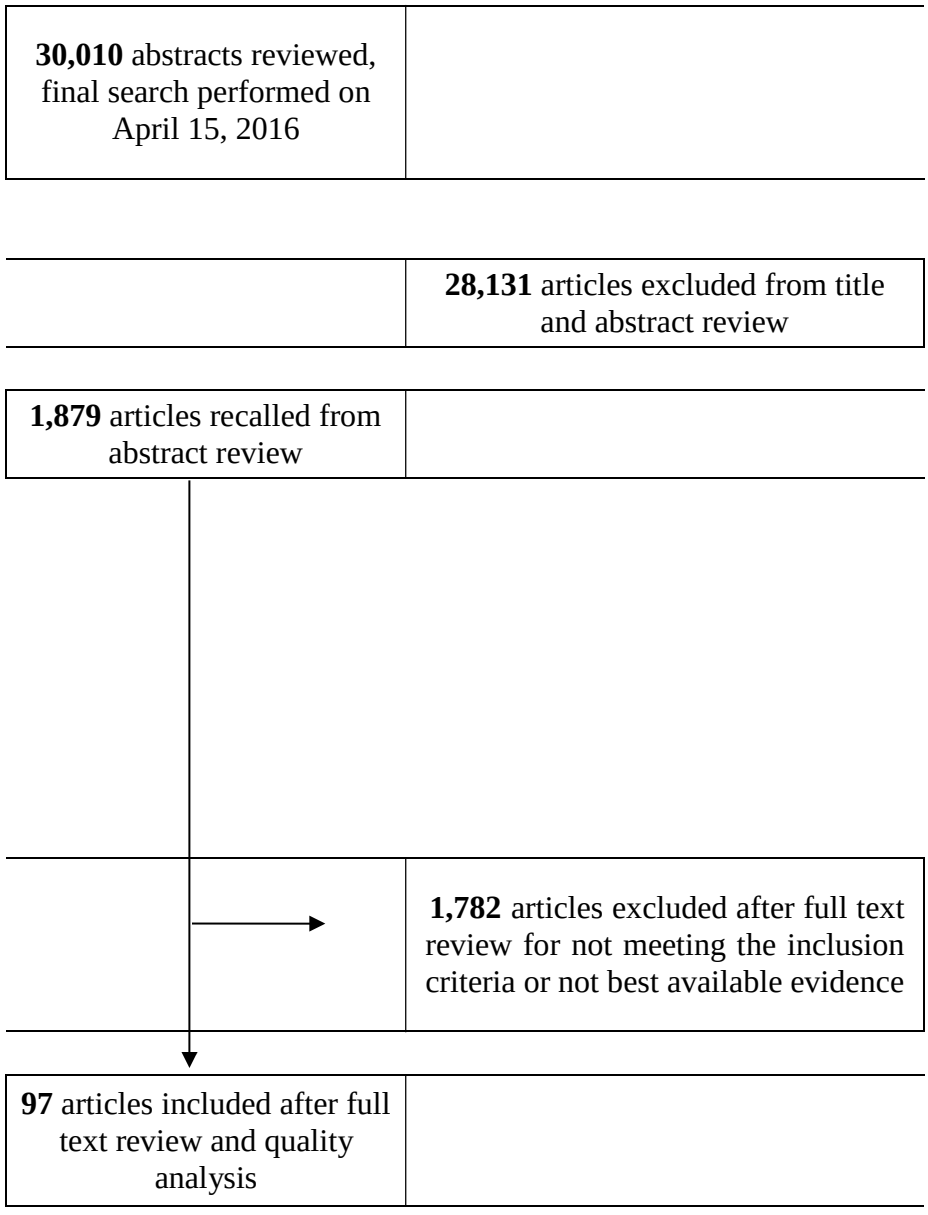
*The question on Femoacetabular Impingement Syndrome (FAI) did return three low quality studies, upon which a "Limited" recommendation was constructed at the final meeting. However, during peer review, concerns were brought to light regarding the inclusion of FAI in the absence of other secondary causes of hip osteoarthritis. These concerns led the work group, along with members of the AAOS Committee on Evidence-Based Quality and Value (EBQV) , to make the difficult decision to remove the recommendation from this guideline with the understanding that a future hip preservation guideline is a better avenue for addressing this topic. The three studies, and details about their findings, are listed below for the sake of transparency.

FAI literature which met the inclusion criteria for this guideline:
Four studies, 3 low quality (Domb et al; Nepple et al; Zingg et al) and 1 high quality (Krych et al), met the strict criteria for inclusion in the analysis of whether patients with symptomatic FAI reported better outcomes with open or arthroscopic hip surgery. Due to the heterogeneous study cohorts, varying study questions, differing procedures performed, and short-term follow up, a strong, generalizable statement regarding patient outcomes could not made.

Nepple et al. evaluated patients (average age > 33 years) with symptomatic FAI using 2 different surgical procedures. One cohort of patients (n=23) underwent HA with labral debridement, while a second cohort (n=25) underwent HA, labral debridement and a limited open osteochondroplasty. Both cohorts demonstrated statistically significant improvements in the modified Harris hip score (mHHS), with more patients in the limited open osteochondroplasty cohort demonstrating 10 point improvements. Krych et al., the only high quality study, randomized 36 women (18 to 59 years old) undergoing HA to one of two cohorts, labral debridement or labral repair. the hip outcome scores (HOSs) for activity of daily living (ADL) and sports improved significantly from pre- to post-operatively. The post-operative HOS ADL and sports was significantly higher in the repair cohort than in the debridement cohort.

Domb et al. and Zingg et al. compared HA to surgical hip dislocation (SHD) for the treatment of symptomatic FAI. Domb et al. matched 10 patients under 30 years old who underwent SHD to 20 patients who underwent HA. All patients had a Tönnis grade ≤ 1. There was a statistically significant improvement in the HOS sports specific subscale and the non-arthritic hip score for all patients. Zingg et al. compared 23 patients undergoing HA to 15 patients undergoing SHD. All patients were < 46 years old and all patients had a Tönnis grade ≤ 1. One year post-operatively, patients undergoing HA had significantly higher HHS compared to those undergoing SHD, but there was no difference in WOMAC scores. In both studies, there was great variability in the pathoanatomy found at time of surgery and the procedures performed during HA or SHD.

APPENDIX IV
STUDY ATTRITION FLOWCHART



APPENDIX V
LITERATURE SEARCH STRATEGIES

PICO 1
PubMed
Date: May 21, 2015
Results: 39
Ref IDs 1-39

#1Osteoarthritis, Hip[mh] OR ((Hip[mh] OR Hip Joint[mh]) AND Osteoarthritis[mh]) OR ((hip[tiab] OR hips[tiab]) AND (osteoarthr*[tiab] OR arthrosis[tiab] OR arthroses[tiab])) OR ((hip[ot] OR hips[ot]) AND (osteoarthr*[ot] OR arthrosis[ot] OR arthroses[ot])) OR coxarthros*[tiab] OR coxarthros*[ot] OR malum coxae senilis[tiab]
#2obesity[mh] OR overweight[mh] OR overweight[tiab] OR obese[tiab] OR obesity[tiab] OR adipos*[tiab]
#3Weight Loss[mh] OR Weight Reduction Programs[mh] OR bariatrics[mh] OR weight loss[tiab] OR weight reduc*[tiab]
#4(animal[mh] NOT human[mh]) OR cadaver[mh] OR cadaver*[ti] OR comment[pt] OR editorial[pt] OR letter[pt] OR "historical article"[pt] OR addresses[pt] OR news[pt] OR "newspaper article"[pt] OR "in vitro"[pt] OR "case report"[ti]
#5((#1 AND #2 AND #3) NOT #4) AND English[la]
Embase
Date: May 21, 2015
Results: 99 (70 de-duplicated)
Ref IDs 40-137

#1 ‘Hip osteoarthritis’/exp OR (hip/exp AND osteoarthritis/exp) OR ((Hip:ab,ti OR hips:ab,ti) AND (osteoarthr*:ab,ti OR arthrosis:ab,ti OR arthroses:ab,ti)) OR coxarthros*:ab,ti OR ‘malum coxae senilis’:ab,ti OR ((Hip:ab,ti OR hips:ab,ti) AND (degenerative NEAR/3 (‘joint disease’ OR arthritis)):ab,ti)
#2‘obesity’/exp OR obese:ab,ti OR obesity:ab,ti OR overweight:ab,ti OR adipos*:ab,ti
#3‘bariatric surgery’/exp OR bariatric*:ab,ti OR ‘weight reduction’/exp OR (weight NEAR/3 (loss OR reduc*)):ab,ti OR ‘weight loss program’/exp
#4cadaver/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
#5((#1 AND #2 AND #3) NOT #4) AND [English]/lim
Cochrane Library
Date: May 21, 2015
CDSR Results: 1 (0 de-duplicated)
CENTRAL Results: 8 (1 de-duplicated)
Ref IDs 139

#1[mh "osteoarthritis, hip"] or (([mh hip] or [mh "hip joint"]) and [mh osteoarthritis]) or (hip:ti,ab,kw or hips:ti,ab,kw) and (osteoarthr*:ti,ab,kw or arthrosis:ti,ab,kw or arthroses:ti,ab,kw) or coxarthros*:ti,ab,kw or coxarthros*:ti,ab,kw or "malum coxae

senilis":ti,ab,kw or ((hip:ti,ab,kw or hips:ti,ab,kw) and (degenerative near/3 ("joint disease" or arthritis)):ti,ab,kw)
#2[mh obesity] or [mh overweight] or overweight:ti,ab,kw or obese:ti,ab,kw or obesity:ti,ab,kw or adipos*:ti,ab,kw
#3[mh "weight loss"] or [mh "weight reduction program"] or [mh bariatrics] or "weight loss":ti,ab,kw or weight next reduc*:ti,ab,kw
#4#1 and #2 and #3
PICOs 2-3
PubMed
Date: May 22, 2015
Results: 114 (103 de-duplicated)
Ref IDs 140-253

#1Osteoarthritis, Hip[mh] OR ((Hip[mh] OR Hip Joint[mh]) AND Osteoarthritis[mh]) OR ((hip[tiab] OR hips[tiab]) AND (osteoarthr*[tiab] OR arthrosis[tiab] OR arthroses[tiab]) OR ((hip[ot] OR hips[ot]) AND (osteoarthr*[ot] OR arthrosis[ot] OR arthroses[ot])) OR coxarthros*[tiab] OR coxarthros*[ot] OR malum coxae senilis[tiab]
#2obesity[mh] OR overweight[mh] OR overweight[tiab] OR obese[tiab] OR obesity[tiab] OR adipos*[tiab]
#3hip/surgery[mh] OR hip joint/surgery[mh] OR osteotomy[mh:noexp] OR arthroscopy[mh] OR Arthroplasty, Replacement, Hip[mh] OR hip prosthesis[mh] OR arthroplast*[tiab] OR replacement*[tiab] OR resurfac*[tiab] OR arthroscop*[tiab] OR osteotom*[tiab] OR reconstructi*[tiab]
#4(animal[mh] NOT human[mh]) OR cadaver[mh] OR cadaver*[ti] OR comment[pt] OR editorial[pt] OR letter[pt] OR "historical article"[pt] OR addresses[pt] OR news[pt] OR "newspaper article"[pt] OR "in vitro"[pt] OR "case report"[ti]
#5((#1 AND #2 AND #3) NOT #4) AND English[la]
Embase
Date: May 22, 2015
Results: 235 (106 de-duplicated)
Ref IDs: 257-488

#1 ‘Hip osteoarthritis’/exp OR (hip/exp AND osteoarthritis/exp) OR ((Hip:ab,ti OR hips:ab,ti) AND (osteoarthr*:ab,ti OR arthrosis:ab,ti OR arthroses:ab,ti)) OR coxarthros*:ab,ti OR ‘malum coxae senilis’:ab,ti OR ((Hip:ab,ti OR hips:ab,ti) AND (degenerative NEAR/3 (‘joint disease’ OR arthritis)):ab,ti)
#2‘obesity’/exp OR obese:ab,ti OR obesity:ab,ti OR overweight:ab,ti OR adipos*:ab,ti
#3‘hip surgery’/exp OR ‘hip prosthesis’/exp OR ‘hip arthroscopy’/exp OR arthroplast*:ti,ab OR replacement*:ti,ab OR resurfac*:ti,ab OR arthroscop*:ti,ab OR osteotom*:ti,ab OR reconstructi*:ti,ab
#4cadaver/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
#5((#1 AND #2 AND #3) NOT #4) AND [English]/lim
Cochrane Library
Date: May 22, 2015
CDSR Results: 0

CENTRAL Results: 9 (4 de-duplicated)
Ref IDs: 489-496

#1[mh "osteoarthritis, hip"] or (([mh hip] or [mh "hip joint"]) and [mh osteoarthritis]) or (hip:ti,ab,kw or hips:ti,ab,kw) and (osteoarthr*:ti,ab,kw or arthrosis:ti,ab,kw or arthroses:ti,ab,kw) or coxarthros*:ti,ab,kw or coxarthros*:ti,ab,kw or "malum coxae senilis":ti,ab,kw or ((hip:ti,ab,kw or hips:ti,ab,kw) and (degenerative near/3 ("joint disease" or arthritis)):ti,ab,kw)
#2[mh obesity] or [mh overweight] or overweight:ti,ab,kw or obese:ti,ab,kw or obesity:ti,ab,kw or adipos*:ti,ab,kw
#3[mh "hip"/SU] OR [mh "hip joint"/SU] OR [mh ^osteotomy] OR[mh arthroscopy] OR [mh "Arthroplasty, Replacement, Hip"] OR [mh "hip prosthesis"] OR arthroplast*:ti,ab,kw OR replacement*:ti,ab,kw OR resurfac*ti,ab,kw OR arthroscop*ti,ab,kw OR osteotom*:ti,ab,kw OR reconstructi*ti,ab,kw
#4#1 AND #2 AND #3
PICO 4
PubMed
Date: May 22, 2015
Results: 31 (22 de-duplicated)
Ref IDs: 498-527

#1Osteoarthritis, Hip[mh] OR ((Hip[mh] OR Hip Joint[mh]) AND Osteoarthritis[mh]) OR ((hip[tiab] OR hips[tiab]) AND (osteoarthr*[tiab] OR arthrosis[tiab] OR arthroses[tiab]) OR ((hip[ot] OR hips[ot]) AND (osteoarthr*[ot] OR arthrosis[ot] OR arthroses[ot])) OR coxarthros*[tiab] OR coxarthros*[ot] OR malum coxae senilis[tiab]
#2hip/surgery[mh] OR hip joint/surgery[mh] OR osteotomy[mh:noexp] OR arthroscopy[mh] OR Arthroplasty, Replacement, Hip[mh] OR hip prosthesis[mh] OR arthroplast*[tiab] OR replacement*[tiab] OR resurfac*[tiab] OR arthroscop*[tiab] OR osteotom*[tiab] OR reconstructi*[tiab]
#3Diabetes Mellitus[mh] OR diabet*[tiab]
#4(animal[mh] NOT human[mh]) OR cadaver[mh] OR cadaver*[ti] OR comment[pt] OR editorial[pt] OR letter[pt] OR "historical article"[pt] OR addresses[pt] OR news[pt] OR "newspaper article"[pt] OR "in vitro"[pt] OR "case report"[ti]
#5((#1 AND #2 AND #3) NOT #4) AND English[la]
Embase
Date: May 22, 2015
Results: 93 (46 de-duplicated)
Ref IDs: 528-615

#1‘Hip osteoarthritis’/exp OR (hip/exp AND osteoarthritis/exp) OR ((Hip:ab,ti OR hips:ab,ti) AND (osteoarthr*:ab,ti OR arthrosis:ab,ti OR arthroses:ab,ti)) OR coxarthros*:ab,ti OR ‘malum coxae senilis’:ab,ti OR ((Hip:ab,ti OR hips:ab,ti) AND (degenerative NEAR/3 (‘joint disease’ OR arthritis)):ab,ti)
#2‘hip surgery’/exp OR ‘hip prosthesis’/exp OR ‘hip arthroscopy’/exp OR arthroplast*:ti,ab OR replacement*:ti,ab OR resurfac*:ti,ab OR arthroscop*:ti,ab OR osteotom*:ti,ab OR reconstructi*:ti,ab

#3'diabetes mellitus'/exp OR diabet*:ti,ab
#4cadaver/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
#5((#1 AND #2 AND #3) NOT #4) AND [English]/lim
Cochrane Library
Date: May 22, 2015
CDSR Results: 0
CENTRAL Results: 1 (0 de-duplicated)
Ref IDs: --

#1[mh "osteoarthritis, hip"] or (([mh hip] or [mh "hip joint"]) and [mh osteoarthritis]) or (hip:ti,ab,kw or hips:ti,ab,kw) and (osteoarthr*:ti,ab,kw or arthrosis:ti,ab,kw or arthroses:ti,ab,kw) or coxarthros*:ti,ab,kw or coxarthros*:ti,ab,kw or "malum coxae senilis":ti,ab,kw or ((hip:ti,ab,kw or hips:ti,ab,kw) and (degenerative near/3 ("joint disease" or arthritis)):ti,ab,kw)
#2[mh obesity] or [mh overweight] or overweight:ti,ab,kw or obese:ti,ab,kw or obesity:ti,ab,kw or adipos*:ti,ab,kw
#3[mh "diabetes mellitus"] or diabet*:ti,ab,kw
#4#1 and #2 and #3
General OA Hip Search
PubMed
Date: June 2, 2015
Results: 9,673 (8,018 de-duplicated)
Ref IDs: 616-8833

#1Osteoarthritis, Hip[mh] OR ((Hip[mh] OR Hip Joint[mh]) AND Osteoarthritis[mh]) OR ((hip[tiab] OR hips[tiab]) AND (osteoarthr*[tiab] OR arthrosis[tiab] OR arthroses[tiab])) OR ((hip[ot] OR hips[ot]) AND (osteoarthr*[ot] OR arthrosis[ot] OR arthroses[ot])) OR coxarthros*[tiab] OR coxarthros*[ot] OR malum coxae senilis[tiab]
#2(animals[mh] NOT humans[mh]) OR cadaver[mh] OR cadaver*[ti] OR comment[pt] OR editorial[pt] OR letter[pt] OR "historical article"[pt] OR addresses[pt] OR news[pt] OR "newspaper article"[pt] OR "case report"[ti]
#3(#1 NOT #2) AND English[la] AND 1990:2015[dp]
Embase
Date: June 3, 2015
Results: 11,279 (5,100 de-duplicated)
Ref IDs: 8834-20112

#1‘Hip osteoarthritis’/exp OR (hip/exp AND osteoarthritis/exp) OR ((Hip:ab,ti OR hips:ab,ti) AND (osteoarthr*:ab,ti OR arthrosis:ab,ti OR arthroses:ab,ti)) OR coxarthros*:ab,ti OR ‘malum coxae senilis’:ab,ti OR ((Hip:ab,ti OR hips:ab,ti) AND (degenerative NEAR/3 (‘joint disease’ OR arthritis)):ab,ti)
#2cadaver/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
#3(#1 NOT #2) AND [English]/lim AND [1990-2015]/py
Cochrane Library

Date: June 5, 2015
CDSR Results: 42 (26 de-duplicated)
CENTRAL Results: 1,460 (252 de-duplicated)
REF IDs: 20113-21614

#1[mh "osteoarthritis, hip"] or (([mh hip] or [mh "hip joint"]) and [mh osteoarthritis]) or (hip:ti,ab,kw or hips:ti,ab,kw) and (osteoarthr*:ti,ab,kw or arthrosis:ti,ab,kw or arthroses:ti,ab,kw) or coxarthros*:ti,ab,kw or coxarthros*:ti,ab,kw or "malum coxae senilis":ti,ab,kw or ((hip:ti,ab,kw or hips:ti,ab,kw) and (degenerative near/3 ("joint disease" or arthritis)):ti,ab,kw)
Limits: 1990-present
PICOs 11-12
PubMed
Date: June 9, 2015
Results: 3,725 (3,537 de-duplicated)
Ref IDs: 21615-25339

#1Osteoarthritis, Hip[mh] OR ((Hip[mh] OR Hip Joint[mh]) AND Osteoarthritis[mh]) OR ((hip[tiab] OR hips[tiab]) AND (osteoarthr*[tiab] OR arthrosis[tiab] OR arthroses[tiab])) OR ((hip[ot] OR hips[ot]) AND (osteoarthr*[ot] OR arthrosis[ot] OR arthroses[ot])) OR coxarthros*[tiab] OR coxarthros*[ot] OR malum coxae senilis[tiab]
#2(animals[mh] NOT humans[mh]) OR cadaver[mh] OR cadaver*[ti] OR comment[pt] OR editorial[pt] OR letter[pt] OR "historical article"[pt] OR addresses[pt] OR news[pt] OR "newspaper article"[pt] OR "case report"[ti]
#3Acetabulum[mh] OR ((acetabul*[tiab] OR cotyloid[tiab]) AND (dysplasia[tiab] OR dysplastic[tiab] OR dislocat*[tiab] OR luxation[tiab] OR subluxat*[tiab] OR instability[tiab] OR unstable[tiab] OR stability[tiab] OR abnormal*[tiab]))
#4Femoracetabular Impingement[mh] OR ((femoracetabular [tiab] OR femoroacetabular[tiab] OR femoro-acetabular[tiab] OR “femoral acetabular”[tiab]) AND impingement[tiab]) OR pincer impingement[tiab] OR cam impingement[tiab]
#5surgery[sh] OR osteotomy[mh:noexp] OR arthroscopy[mh] OR arthroscop*[tiab] OR osteotom*[tiab] OR surgical dislocation[tiab]
#6((#3 OR #4) AND #5) NOT (#1 OR #2))
#7#6 AND English[la] AND 1990:2015[dp]
Embase
Date: June 9, 2015
Results: 737 (281 de-duplicated)
Ref IDs: 25341-26074

#1‘Hip osteoarthritis’/exp OR (hip/exp AND osteoarthritis/exp) OR ((Hip:ab,ti OR hips:ab,ti) AND (osteoarthr*:ab,ti OR arthrosis:ab,ti OR arthroses:ab,ti)) OR coxarthros*:ab,ti OR ‘malum coxae senilis’:ab,ti OR ((Hip:ab,ti OR hips:ab,ti) AND (degenerative NEAR/3 (‘joint disease’ OR arthritis)):ab,ti)
#2cadaver/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
#3acetabulum/de OR ((acetabul*:ab,ti OR cotyloid:ab,ti) AND (dysplasia:ab,ti OR

dysplastic:ab,ti OR dislocat*:ab,ti OR luxation:ab,ti OR subluxat*:ab,ti OR instability:ab,ti OR unstable:ab,ti OR stability:ab,ti OR abnormal*:ab,ti))
#4femoroacetabular impingement:de OR ((femoracetabular :ab,ti OR femoroacetabular:ab,ti OR femoro-acetabular:ab,ti OR femoral acetabular:ab,ti) AND impingement:ab,ti) OR pincer impingement:ab,ti OR cam impingement:ab,ti
#5osteotomy/exp OR arthroscopy/exp OR osteotom*:ab,ti OR arthroscop*:ab,ti OR surgical dislocation:ab,ti
#6((#3 OR #4) AND #5) NOT (#1 OR #2))
#7#6 AND [English]/lim AND [1990-2015]/py
Cochrane Library
Date: June 9, 2015
CDSR Results: 2 (2 de-duplicated)
CENTRAL Results: 37 (10 de-duplicated)
REF IDs: 26075-26112

#1[mh "osteoarthritis, hip"] or (([mh hip] or [mh "hip joint"]) and [mh osteoarthritis]) or (hip:ti,ab,kw or hips:ti,ab,kw) and (osteoarthr*:ti,ab,kw or arthrosis:ti,ab,kw or arthroses:ti,ab,kw) or coxarthros*:ti,ab,kw or coxarthros*:ti,ab,kw or "malum coxae senilis":ti,ab,kw or ((hip:ti,ab,kw or hips:ti,ab,kw) and (degenerative near/3 ("joint disease" or arthritis)):ti,ab,kw)
#2[mh acetabulum] or ((acetabul*:ti,ab,kw or cotyloid:ti,ab,kw) and (dysplasia:ti,ab,kw or dysplastic:ti,ab,kw or dislocat*:ti,ab,kw or luxation:ti,ab,kw or subluxat*:ti,ab,kw or instability:ti,ab,kw or unstable:ti,ab,kw or stability:ti,ab,kw or abnormal*:ti,ab,kw))
#3[mh "Femoracetabular Impingement"] or ((femoracetabular:ti,ab,kw or femoroacetabular:ti,ab,kw or femoro-acetabular:ti,ab,kw or "femoral acetabular":ti,ab,kw) and impingement:ti,ab,kw) or pincer impingement:ti,ab,kw or cam impingement:ti,ab,kw
#4[mh osteotomy] or [mh arthroscopy] or arthroscop*:ti,ab,kw or osteotom*:ti,ab,kw or surgical dislocation:ti,ab,kw
#5((#2 or #3) and #4) not #1
Limits: 1990-present
PICO 18
PubMed
Date: June 16, 2015
Results: 1,643 (1,404 de-duplicated)
Ref IDs: 26113-27755

#1Osteoarthritis, Hip[mh] OR ((Hip[mh] OR Hip Joint[mh]) AND Osteoarthritis[mh]) OR ((hip[tiab] OR hips[tiab]) AND (osteoarthr*[tiab] OR arthrosis[tiab] OR arthroses[tiab])) OR ((hip[ot] OR hips[ot]) AND (osteoarthr*[ot] OR arthrosis[ot] OR arthroses[ot])) OR coxarthros*[tiab] OR coxarthros*[ot] OR malum coxae senilis[tiab]
#2(animals[mh] NOT humans[mh]) OR cadaver[mh] OR cadaver*[ti] OR comment[pt] OR editorial[pt] OR letter[pt] OR "historical article"[pt] OR addresses[pt] OR news[pt] OR "newspaper article"[pt] OR "case report"[ti]
#3Arthroplasty, Replacement, Hip[mh] OR hip prosthesis[mh] OR ((hip[tiab] OR hips[tiab]) AND (arthroplast*[tiab] OR replacement*[tiab]))
#4Age Factors[mh] OR ((age[tiab OR ages[tiab]) AND (Regression Analysis[mh] OR Treatment

Outcome[mh] OR Postoperative Complications[mh] OR "propensity score"[tiab] OR covariance[tiab] OR prognostic[tiab] OR "hazard ratio"[tiab] OR covariate[tiab] OR regression*[tiab] OR multivaria*[tiab] OR "survival analysis"[tiab] OR Mantel-Haenszel[tiab]))
#5((#3 AND #4) NOT (#1 OR #2)) AND English[la] AND 1990:2015[dp]
Embase
Date: June 16, 2015
Results: 3,223 (1,719 de-duplicated)
Ref IDs: 27756-30978

#1'Hip osteoarthritis'/exp OR (hip/exp AND osteoarthritis/exp) OR ((Hip:ab,ti OR hips:ab,ti) AND (osteoarthr*:ab,ti OR arthrosis:ab,ti OR arthroses:ab,ti)) OR coxarthros*:ab,ti OR 'malum coxae senilis':ab,ti OR ((Hip:ab,ti OR hips:ab,ti) AND (degenerative NEAR/3 ('joint disease' OR arthritis)):ab,ti)
#2cadaver/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 OR 'conference abstract'/it
#3'total hip prosthesis'/exp OR 'hip arthroplasty'/exp OR ((hip:ab,ti OR hips:ab,ti) AND (arthroplast*:ab,ti OR replacement*:ab,ti))
#4'age'/exp OR ((age:ab,ti OR ages:ab,ti) AND ('regression analysis'/exp OR regression:ab,ti OR regressions:ab,ti OR 'treatment outcome'/exp OR 'postoperative complication'/exp OR 'propensity score':ab,ti OR covariance:ab,ti OR prognostic:ab,ti OR 'hazard ratio':ab,ti OR covariate:ab,ti OR multivaria*:ab,ti OR 'survival analysis':ab,ti OR Mantel-Haenszel:ab,ti))
#5((#3 AND #4) NOT (#1 OR #2)) AND [English]/lim AND [1990-2015]/py

Cochrane Library
Date: June 18, 2015
CDSR Results: 1 (1 de-duplicated)
CENTRAL Results: 185 (58 de-duplicated, foreign language removed)
REF IDs: 30979-31164

#1[mh "osteoarthritis, hip"] or (([mh hip] or [mh "hip joint"]) and [mh osteoarthritis]) or (hip:ti,ab,kw or hips:ti,ab,kw) and (osteoarthr*:ti,ab,kw or arthrosis:ti,ab,kw or arthroses:ti,ab,kw) or coxarthros*:ti,ab,kw or coxarthros*:ti,ab,kw or "malum coxae senilis":ti,ab,kw or ((hip:ti,ab,kw or hips:ti,ab,kw) and (degenerative near/3 ("joint disease" or arthritis)):ti,ab,kw)
#2[mh "arthroplasty, replacement, hip"] or [mh "hip prosthesis"] or ((hip:ti,ab,kw or hips:ti,ab,kw) and (arthroplast*:ti,ab,kw or replacement*:ti,ab,kw))
#3[mh "age factors"] or ((age:ab,ti,kw or ages:ti,ab,kw) and ([mh "regression analysis"] or [mh "treatment outcome"] or [mh "Postoperative complications"] or "propensity score":ti,ab or covariance:ab,ti or prognostic:ti,ab or "hazard ratio":ab,ti or covariate:ti,ab or regression*:ti,ab or multivaria*:ti,ab or "survival analysis":ti,ab or Mantel-Haenszel:ti,ab))
#4(#3 and #2) not #1
Publication Year from 1990-2015
PICO 25
PubMed
Date: June 18, 2015
Results: 4,173 (3,649 de-duplicated)

Ref IDs: 31165-35337

#1Osteoarthritis, Hip[mh] OR ((Hip[mh] OR Hip Joint[mh]) AND Osteoarthritis[mh]) OR ((hip[tiab] OR hips[tiab]) AND (osteoarthr*[tiab] OR arthrosis[tiab] OR arthroses[tiab])) OR ((hip[ot] OR hips[ot]) AND (osteoarthr*[ot] OR arthrosis[ot] OR arthroses[ot])) OR coxarthros*[tiab] OR coxarthros*[ot] OR malum coxae senilis[tiab]
#2(animals[mh] NOT humans[mh]) OR cadaver[mh] OR cadaver*[ti] OR comment[pt] OR editorial[pt] OR letter[pt] OR "historical article"[pt] OR addresses[pt] OR news[pt] OR "newspaper article"[pt] OR "case report"[ti]
#3("Hip/pathology"[Mesh] OR "Hip Joint/pathology"[Mesh] OR "hip"[tiab] OR "hips"[tiab] OR labral[tiab] OR labrum[tiab] OR chondral[tiab]) AND (patholog*[tiab] OR damage[tiab] OR tear[tiab] OR pathology[subheading]) AND ("Diagnostic Imaging"[Mesh] OR radiography[subheading] OR x-ray*[tiab] OR xray*[tiab])
#4(#3 NOT (#1 OR #2)) AND English[la] AND 1990:2015[dp]
Embase
Date: June 18, 2015
Results: 4394 (2,958 de-duplicated)
Ref IDs: 35339-39731

#1‘Hip osteoarthritis’/exp OR (hip/exp AND osteoarthritis/exp) OR ((Hip:ab,ti OR hips:ab,ti) AND (osteoarthr*:ab,ti OR arthrosis:ab,ti OR arthroses:ab,ti)) OR coxarthros*:ab,ti OR ‘malum coxae senilis’:ab,ti OR ((Hip:ab,ti OR hips:ab,ti) AND (degenerative NEAR/3 (‘joint disease’ OR arthritis)):ab,ti)
#2cadaver/de OR 'in vitro study'/exp OR 'abstract report'/de OR book/de OR editorial/de OR note/de OR letter/de OR 'case study'/de OR 'case report'/de OR 'conference abstract'/it
#3'hip disease'/exp NOT 'hip injury'/exp OR ('hip'/exp AND ('arthropathy'/exp OR 'pathology'/exp OR patholog*:ab,ti OR damage:ab,ti OR tear:ab,ti)) AND ('radiodiagnosis'/exp OR 'x ray':ab,ti OR 'x rays':ab,ti OR xray*:ab,ti)
#4(#3 NOT (#1 OR #2)) AND [English]/lim AND [1990-2015]/py
Cochrane Library
Date: June 23, 2015
CDSR Results: 2 (2 de-duplicated)
CENTRAL Results: 24 (4 de-duplicated)
REF IDs: 39732-39733, 39741-39755

#1[mh "osteoarthritis, hip"] or (([mh hip] or [mh "hip joint"]) and [mh osteoarthritis]) or (hip:ti,ab,kw or hips:ti,ab,kw) and (osteoarthr*:ti,ab,kw or arthrosis:ti,ab,kw or arthroses:ti,ab,kw) or coxarthros*:ti,ab,kw or coxarthros*:ti,ab,kw or "malum coxae senilis":ti,ab,kw or ((hip:ti,ab,kw or hips:ti,ab,kw) and (degenerative near/3 ("joint disease" or arthritis)):ti,ab,kw)
#2([mh hip/PA] or [mh "hip joint"/PA] or (("hip":ti,ab or "hips":ti,ab) and (patholog*:ti,ab or damage:ti,ab or tear:ti,ab))) and ([mh "diagnostic imaging"] or x-ray*:ti,ab or xray*:ti,ab)
#3#2 not #1
Publication Year from 1990-2015
Updated Searches
Date: March 10, 2016

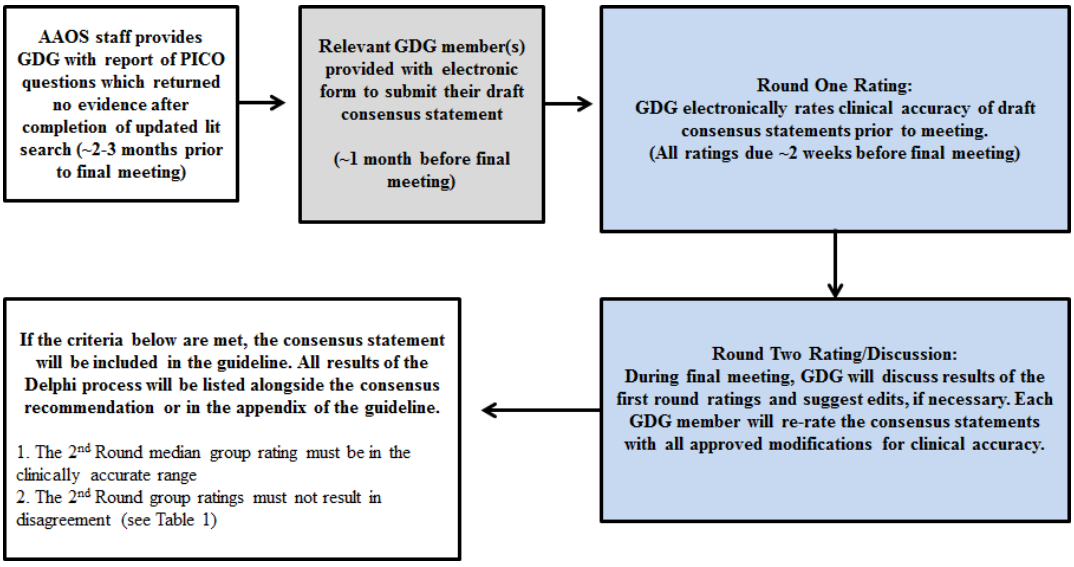
Bib search results
15 new references; Ref IDs 39756-39770
Date: March 23, 2016
PubMed
855 results (814 de-duplicated); Ref IDs 39771-40625
Embase
2,390 results (1,565 de-duplicated); Ref IDs 40627-43015
Date: April 15, 2016
PubMed
80 results (33 de-duplicated); Ref IDs 43016-43095
Embase
168 results (92 de-duplicated); Ref IDs 43096-43263
Cochrane Library
158 (39 de-duplicated); Ref IDs 43264-43420

APPENDXV
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



APPENDXVI
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, 21 organizations were invited to review the full guideline. Six societies participated in the review of the guideline on management of osteoarthritis of the ip and have given consent to be listed below:

American College of Radiology
Pediatric Orthopaedic Society of North America
American Society of Anesthesiologists
American Academy of Physical Medicine and Rehabilitation
American Physical Therapy Association
Hip Society
American Orthopaedic Society for Sports Medicine

Peer review comments will be available on www.aaos.org.

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.	○	○	○	○	○
2. The health question(s) covered by the guideline is (are) specifically described.	○	○	○	○	○
3. The guideline's target audience is clearly described.	○	○	○	○	○
4. The guideline development group includes individuals from all the relevant professional groups.	○	○	○	○	○
5. There is an explicit link between the recommendations and the supporting evidence.	○	○	○	○	○
6. Given the nature of the topic and the data, all clinically important outcomes are considered.	○	○	○	○	○
7. The patients to whom this guideline is meant to apply are specifically described.	○	○	○	○	○
8. The criteria used to select articles for inclusion are appropriate.	○	○	○	○	○
9. The reasons why some studies were excluded are clearly described.	○	○	○	○	○
10. All important studies that met the article inclusion criteria are included.	○	○	○	○	○
11. The validity of the studies is appropriately appraised.	○	○	○	○	○
12. The methods are described in such a way as to be reproducible.	○	○	○	○	○
13. The statistical methods are appropriate to the material and the objectives of this guideline.	○	○	○	○	○
14. Important parameters (e.g., setting, study population, study design) that could affect study results are systematically addressed.	○	○	○	○	○
15. Health benefits, side effects, and risks are adequately addressed.	○	○	○	○	○
16. The writing style is appropriate for health care professionals.	○	○	○	○	○
17. The grades assigned to each recommendation are appropriate.	○	○	○	○	○

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 exampleof 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.

Disclosure Items: (n) = Respondent answered 'No' to all items indicating no conflicts. 1 = Royalties from a company or supplier; 2 = Speakers bureau/paid presentations for a company or supplier; 3A = Paid employee for a company or supplier; 3B = Paid consultant for a company or supplier; 3C = Unpaid consultant for a company or supplier; 4 = Stock or stock options in a company or supplier; 5 = Research support from a company or supplier as a PI; 6 = Other financial or material support from a company or supplier; 7 = Royalties, financial or material support from publishers; 8 = Medical/Orthopaedic publications editorial/governing board; 9 = Board member/committee appointments for a society.

Robert H Quinn, MD, Oversight Chair: AAOS: Board or committee member; American Orthopaedic Association: Board or committee member; Journal of Wilderness & Environmental Medicine: Editorial or governing board; Musculoskeletal Transplant Foundation: Research support; Musculoskeletal Tumor Society: Board or committee member; Wilderness Medical Society: Board or committee member (Submitted on: 05/24/2016)

Norman A Johanson, MD, Co-Chair: (This individual reported nothing to disclose); Submitted on: 06/01/2016

Gregory G Polkowski, II MD, Co-Chair: American Association of Hip and Knee Surgeons: Board or committee member (Submitted on: 06/27/2016)

Mark Lucian Barba, MD: (This individual reported nothing to disclose); Submitted on: 05/16/2016

John Grady-Benson, MD: AAOS: Board or committee member (Submitted on: 04/09/2016)

James Andrew Browne, MD: American Journal of Orthopedics: Editorial or governing board; DJ Orthopaedics: IP royalties; Paid consultant; Journal of Arthroplasty: Editorial or governing board; Radlink: Stock or stock Options; Radlink/DePuy: Paid consultant; Saunders/Mosby-Elsevier: Publishing royalties, financial or material support; Southern Orthopaedic Association: Board or committee member (Submitted on: 04/19/2016)

Theodore Toan Le, MD: (This individual reported nothing to disclose); Submitted on: 06/07/2016

Courtland G Lewis, MD: Biomet: Research support (Submitted on: 05/30/2016)

David A Podeszwa, MD: AAOS: Board or committee member; Pediatric Orthopaedic Society of North America: Board or committee member (Submitted on: 06/01/2016)

Harold Wharton Rees, MD: AAOS: Board or committee member; Journal of Arthroplasty: Editorial or governing board
Orthopedics: Editorial or governing board (Submitted on: 04/04/2016)

Ralph T Salvagno, MD: Journal of Arthroplasty: Editorial or governing board (Submitted on: 10/01/2014)

Richard B Schultz, MD: (This individual reported nothing to disclose); Submitted on: 10/05/2014

Albert Song, MD: (This individual reported nothing to disclose); Submitted on: 08/07/2014

Ira Zaltz, MD: DePuy, A Johnson & Johnson Company: Research support; Orthopaediatrics: Paid consultant (Submitted on: 05/01/2016)

Joseph Adam Zeni, PT: Ongoing Care Solutions: Research support (Submitted on: 05/25/2016)

APPENDIX X
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INTRODUCTION AND METHODS

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LOWER QUALITY STUDIES THAT MET THE INCLUSION CRITERIA BUT WERE EXCLUDED FOR NOT BEST AVAILABLE EVIDENCE

Authors	Year	Article Title
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Aderinto,J.; Brenkel,I.J.; Chan,P.	2005	Weight change following total hip replacement: A comparison of obese and non-obese patients
Gandhi,R.; Razak,F.; Davey,J.R.; Mahomed,N.N.	2010	Metabolic syndrome and the functional outcomes of hip and knee arthroplasty
Hingsammer,A.M.; Kalish,L.A.; Stelzeneder,D.; Bixby,S.; Mamisch,T.C.; Connell,P.; Millis,M.B.; Kim,Y.J.	2015	Does periacetabular osteotomy for hip dysplasia modulate cartilage biochemistry?
Mechlenburg,I.; Nyengaard,J.R.; Gelineck,J.; Soballe,K.	2015	Cartilage Thickness and Cyst Volume Are Unchanged 10 Years After Periacetabular Osteotomy in Patients Without Hip Symptoms
Czyzewska,A.; Glinkowski,W.M.; Walesiak,K.; Krawczak,K.; Cabaj,D.; Gorecki,A.	2014	Effects of preoperative physiotherapy in hip osteoarthritis patients awaiting total hip replacement
Amlie,E.; Havelin,L.I.; Furnes,O.; Baste,V.; Nordsletten,L.; Hovik,O.; Dimmen,S.	2014	Worse patient-reported outcome after lateral approach than after anterior and posterolateral approach in primary hip arthroplasty. A cross-sectional questionnaire study of 1,476 patients 1-3 years after surgery
Dienstknecht,T.; Luring,C.; Tingart,M.; Grifka,J.; Sendtner,E.	2014	Total hip arthroplasty through the mini-incision (Micro-hip) approach versus the standard transgluteal (Bauer) approach: a prospective, randomised study
Lindgren,J.V.; Wretenberg,P.; Karrholm,J.; Garellick,G.; Rolfson,O.	2014	Patient-reported outcome is influenced by surgical approach in total hip replacement: a study of the Swedish Hip Arthroplasty Register including 42,233 patients
Migliore,A.; Massafra,U.; Bizzi,E.; Tormenta,S.; Cassol,M.; Granata,M.	2014	Duration of symptom relief after intra-articular injection of hyaluronic acid combined with sorbitol (anti-ox-vs) in symptomatic hip osteoarthritis
Kamimura,A.; Sakakima,H.; Tsutsumi,F.; Sunahara,N.	2014	Preoperative predictors of ambulation ability at different time points after total hip arthroplasty in patients with osteoarthritis
Landgraeber,S.; Quitmann,H.; Guth,S.; Haversath,M.; Kowalczyk,W.; Kecskemethy,A.; Heep,H.; Jager,M.	2013	A prospective randomized peri- and post-operative comparison of the minimally invasive anterolateral approach versus the lateral approach
Klop,C.; de,Vries F.; Lalmohamed,A.; Mastbergen,S.C.; Leufkens,H.G.; Noort-van der Laan WH; Bijlsma,J.W.; Welsing,P.M.	2012	COX-2-selective NSAIDs and risk of hip or knee replacements: a population-based case-control study
Jigami,H.; Sato,D.; Tsubaki,A.; Tokunaga,Y.; Ishikawa,T.; Dohmae,Y.; Iga,T.; Minato,I.; Yamamoto,N.; Endo,N.	2012	Effects of weekly and fortnightly therapeutic exercise on physical function and health-related quality of life in individuals with hip osteoarthritis

Authors	Year	Article Title
Migliore,A.; Bella,A.; Bisignani,M.; Calderaro,M.; De,Amicis D.; Logroscino,G.; Mariottini,F.; Moreschini,O.; Massafra,U.; Bizzi,E.; Lagana,B.; Piscitelli,P.; Tormenta,S.	2012	Total hip replacement rate in a cohort of patients affected by symptomatic hip osteoarthritis following intra-articular sodium hyaluronate (MW 1,500-2,000 kDa) ORTOBRIX study
Cohen,S.B.; Huang,R.; Ciccotti,M.G.; Dodson,C.C.; Parvizi,J.	2012	Treatment of femoroacetabular impingement in athletes using a mini-direct anterior approach
Bond,M.; Davis,A.; Lohmander,S.; Hawker,G.	2012	Responsiveness of the OARSI-OMERACT osteoarthritis pain and function measures
Muller,M.; Schwachmeyer,V.; Tohtz,S.; Taylor,W.R.; Duda,G.N.; Perka,C.; Heller,M.O.	2012	The direct lateral approach: impact on gait patterns, foot progression angle and pain in comparison with a minimally invasive anterolateral approach
Chiron,P.; Espie,A.; Reina,N.; Cavaignac,E.; Molinier,F.; Laffosse,J.M.	2012	Surgery for femoroacetabular impingement using a minimally invasive anterolateral approach: analysis of 118 cases at 2.2-year follow-up
Tsukagoshi,R.; Tateuchi,H.; Fukumoto,Y.; Okumura,H.; Ichihashi,N.	2012	Stepping exercises improve muscle strength in the early postoperative phase after total hip arthroplasty: a retrospective study
Sanchez,M.; Guadilla,J.; Fiz,N.; Andia,I.	2012	Ultrasound-guided platelet-rich plasma injections for the treatment of osteoarthritis of the hip
Schleicher,I.; Haas,H.; Adams,T.S.; Szalay,G.; Klein,H.; Kordelle,J.	2011	Minimal-invasive posterior approach for total hip arthroplasty versus standard lateral approach
Rylander,J.H.; Shu,B.; Andriacchi,T.P.; Safran,M.R.	2011	Preoperative and postoperative sagittal plane hip kinematics in patients with femoroacetabular impingement during level walking
Kempthorne,J.T.; Armour,P.C.; Rietveld,J.A.; Hooper,G.J.	2011	Surgical dislocation of the hip and the management of femoroacetabular impingement: results of the Christchurch experience
Kim,K.I.; Cho,Y.J.; Ramteke,A.A.; Yoo,M.C.	2011	Peri-acetabular rotational osteotomy with concomitant hip arthroscopy for treatment of hip dysplasia
Edmunds,C.T.; Boscainos,P.J.	2011	Effect of surgical approach for total hip replacement on hip function using Harris Hip scores and Trendelenburg's test. A retrospective analysis
Karashima,H.; Naito,M.; Shiramizu,K.; Kiyama,T.; Maeyama,A.	2011	A periacetabular osteotomy for the treatment of severe dysplastic hips
Holstege,M.S.; Lindeboom,R.; Lucas,C.	2011	Preoperative quadriceps strength as a predictor for short-term functional outcome after total hip replacement
Restrepo,C.; Parvizi,J.; Pour,A.E.; Hozack,W.J.	2010	Prospective randomized study of two surgical approaches for total hip arthroplasty
Muller,M.; Tohtz,S.; Winkler,T.; Dewey,M.; Springer,I.; Perka,C.	2010	MRI findings of gluteus minimus muscle damage in primary total hip arthroplasty and the influence on clinical outcome
Mechlenburg,I.; Nyengaard,J.R.; Gelineck,J.; Soballe,K.; Troelsen,A.	2010	Cartilage thickness in the hip measured by MRI and stereology before and after periacetabular osteotomy
Brantingham,J.W.; Globe,G.A.; Cassa,T.K.; Globe,D.; de,Luca K.; Pollard,H.; Lee,F.; Bates,C.; Jensen,M.; Mayer,S.; Korporaal,C.	2010	A single-group pretest posttest design using full kinetic chain manipulative therapy with rehabilitation in the treatment of 18 patients with hip osteoarthritis

Authors	Year	Article Title
Horisberger,M.; Brunner,A.; Herzog,R.F.	2010	Arthroscopic treatment of femoroacetabular impingement of the hip: a new technique to access the joint
Maeyama,A.; Naito,M.; Moriyama,S.; Yoshimura,I.	2009	Periacetabular osteotomy reduces the dynamic instability of dysplastic hips
Larson,C.M.; Giveans,M.R.	2009	Arthroscopic debridement versus refixation of the acetabular labrum associated with femoroacetabular impingement
Byrd,J.W.; Jones,K.S.	2009	Arthroscopic femoroplasty in the management of cam-type femoroacetabular impingement
Bardakos,N.V.; Vasconcelos,J.C.; Villar,R.N.	2008	Early outcome of hip arthroscopy for femoroacetabular impingement: the role of femoral osteoplasty in symptomatic improvement
Beer,A.M.; Wegener,T.	2008	Willow bark extract (Salicis cortex) for gonarthrosis and coxarthrosis--results of a cohort study with a control group
Larson,C.M.; Giveans,M.R.	2008	Arthroscopic management of femoroacetabular impingement: early outcomes measures
Migliore,A.; Tormenta,S.; Massafra,U.; Bizzi,E.; Iannessi,F.; Alimonti,A.; Granata,M.	2008	Intra-articular administration of hylan G-F 20 in patients with symptomatic hip osteoarthritis: tolerability and effectiveness in a large cohort study in clinical practice
Petersen,M.K.; Andersen,N.T.; Soballe,K.	2008	Self-reported functional outcome after primary total hip replacement treated with two different periopera-tive regimes: a follow-up study involving 61 patients
van den Bekerom,M.P.; Rys,B.; Mulier,M.	2008	Viscosupplementation in the hip: evaluation of hyaluronic acid formulations
Stahelin,L.; Stahelin,T.; Jolles,B.M.; Herzog,R.F.	2008	Arthroscopic offset restoration in femoroacetabular cam impingement: accuracy and early clinical outcome
Beaule,P.E.; Le Duff,M.J.; Zaragoza,E.	2007	Quality of life following femoral head-neck osteochondroplasty for femoroacetabular impingement
Duwelius,P.J.; Burkhart,R.L.; Hayhurst,J.O.; Moller,H.; Butler,J.B.	2007	Comparison of the 2-incision and mini-incision posterior total hip arthroplasty technique: a retrospective match-pair controlled study
Conrozier,T.; Bertin,P.; Bailleul,F.; Mathieu,P.; Charlot,J.; Vignon,E.; Treves,R.; Chevalier,X.	2006	Clinical response to intra-articular injections of hylan G-F 20 in symptomatic hip osteoarthritis: the OMERACT-OARSI criteria applied to the results of a pilot study
Peck,C.N.; Foster,A.; McLauchlan,G.J.	2006	Reducing incision length or intensifying rehabilitation: what makes the difference to length of stay in total hip replacement in a UK setting?
Peters,C.L.; Erickson,J.A.; Hines,J.L.	2006	Early results of the Bernese periacetabular osteotomy: the learning curve at an academic medical center
Peters,C.L.; Erickson,J.A.	2006	Treatment of femoro-acetabular impingement with surgical dislocation and debridement in young adults
Espinosa,N.; Rothenfluh,D.A.; Beck,M.; Ganz,R.; Leunig,M.	2006	Treatment of femoro-acetabular impingement: preliminary results of labral refixation
Iorio,R.; Healy,W.L.; Warren,P.D.; Appleby,D.	2006	Lateral trochanteric pain following primary total hip arthroplasty

Authors	Year	Article Title
Tribe,K.L.; Lapsley,H.M.; Cross,M.J.; Courtenay,B.G.; Brooks,P.M.; March,L.M.	2005	Selection of patients for inpatient rehabilitation or direct home discharge following total joint replacement surgery: a comparison of health status and out-of-pocket expenditure of patients undergoing hip and knee arthroplasty for osteoarthritis
Dohnke,B.; Knauper,B.; Muller-Fahrnow,W.	2005	Perceived self-efficacy gained from, and health effects of, a rehabilitation program after hip joint replacement
Caglar-Yagci,H.; Unsal,S.; Yagci,I.; Dulgeroglu,D.; Ozel,S.	2005	Safety and efficacy of ultrasound-guided intra-articular hylan G-F 20 injection in osteoarthritis of the hip: a pilot study
Yamasaki,S.; Masuhara,K.; Fuji,T.	2005	Tranexamic acid reduces postoperative blood loss in cementless total hip arthroplasty
Suetta,C.; Magnusson,S.P.; Rosted,A.; Aagaard,P.; Jakobsen,A.K.; Larsen,L.H.; Duus,B.; Kjaer,M.	2004	Resistance training in the early postoperative phase reduces hospitalization and leads to muscle hypertrophy in elderly hip surgery patients--a controlled, randomized study
Chung,W.K.; Liu,D.; Foo,L.S.	2004	Mini-incision total hip replacement--surgical technique and early results
Tindall,E.A.; Sharp,J.T.; Burr,A.; Katz,T.K.; Wallemark,C.B.; Verburg,K.; Lefkowith,J.B.	2002	A 12-month, multicenter, prospective, open-label trial of radiographic analysis of disease progression in osteoarthritis of the knee or hip in patients receiving celecoxib
Nilsdotter,A.K.; Lohmander,L.S.	2002	Age and waiting time as predictors of outcome after total hip replacement for osteoarthritis
Brocq,O.; Tran,G.; Breuil,V.; Grisot,C.; Flory,P.; Euller-Ziegler,L.	2002	Hip osteoarthritis: short-term efficacy and safety of viscosupplementation by hylan G-F 20. An open-label study in 22 patients
Singer,F.; Mayrhofer,F.; Klein,G.; Hawel,R.; Kollenz,C.J.	2000	Evaluation of the efficacy and dose-response relationship of dexibuprofen (S(+)-ibuprofen) in patients with osteoarthritis of the hip and comparison with racemic ibuprofen using the WOMAC osteoarthritis index
Huang,S.C.; Hwang,Y.F.; Liu,H.C.; Chen,P.Q.; Liu,T.K.	1997	Triple innominate osteotomy and rotational acetabular osteotomy in the treatment of congenital hip dysplasia
Barber,T.C.; Roger,D.J.; Goodman,S.B.; Schurman,D.J.	1996	Early outcome of total hip arthroplasty using the direct lateral vs the posterior surgical approach
Barbato,M.; D'Angelo,E.; Di,Loreto G.; Menna,A.; Di,Francesco A.; Salini,V.; Zoppi,U.; Cavasinni,L.; La,Floresta P.; Romano,C.L.	2012	Adherence to routine use of pharmacological prophylaxis of heterotopic ossification after total hip arthroplasty: Results from an Italian multicenter, prospective, observational survey
Khan,R.J.K.; Fick,D.; Khoo,P.; Yao,F.; Nivbrant,B.; Wood,D.	2006	Less Invasive Total Hip Arthroplasty. Description of a New Technique
Cauwenberge,H.; Ruhwiedel,M.; Albert,A.; Franchimont,P.	1992	Comparative study of tilidine-naloxone and pentazocine in knee and hip osteoarthritis
MÃ¼ller,M.; Tohtz,S.; Dewey,M.; Springer,I.; Perka,C.	2010	Evidence of reduced muscle trauma through a minimally invasive anterolateral approach by means of MRI
Redmond,J.M.; El Bitar,Y.F.; Gupta,A.; Stake,C.E.; Vemula,S.P.; Domb,B.G.	2015	Arthroscopic acetabuloplasty and labral refixation without labral detachment

Authors	Year	Article Title
Frank,R.M.; Lee,S.; Bush-Joseph,C.A.; Kelly,B.T.; Salata,M.J.; Nho,S.J.	2014	Improved outcomes after hip arthroscopic surgery in patients undergoing T-capsulotomy with complete repair versus partial repair for femoroacetabular impingement: a comparative matched-pair analysis
Classen,T.; Korsmeier,K.; Kamminga,M.; Beck,S.; Rekowski,J.; Jager,M.; Landgraeber,S.	2014	Is early treatment of cam-type femoroacetabular impingement the key to avoiding associated full thickness isolated chondral defects?
Greidanus,N.V.; Chihab,S.; Garbuz,D.S.; Masri,B.A.; Tanzer,M.; Gross,A.E.; Duncan,C.P.	2013	Outcomes of minimally invasive anterolateral THA are not superior to those of minimally invasive direct lateral and posterolateral THA
Larson,C.M.; Giveans,M.R.; Stone,R.M.	2012	Arthroscopic debridement versus refixation of the acetabular labrum associated with femoroacetabular impingement: mean 3.5-year follow-up
Schilders,E.; Dimitrakopoulou,A.; Bismil,Q.; Marchant,P.; Cooke,C.	2011	Arthroscopic treatment of labral tears in femoroacetabular impingement: a comparative study of refixation and resection with a minimum two-year follow-up
Flecher,X.; Dumas,J.; Argenson,J.N.	2011	Is a hip distractor useful in the arthroscopic treatment of femoroacetabular impingement?
Scardino,M.; Grappiolo,G.; Gurgone,A.; Mazziotta,G.; Astore,F.; Ferrari,M.	2015	Single-shot epidural-spinal anesthesia followed by oral oxycodone/naloxone and ketoprofen combination in patients undergoing total hip replacement: Analgesic efficacy and tolerability
Ueno,M.; Sonohata,M.; Fukumori,N.; Kawano,S.; Kitajima,M.; Mawatari,M.	2016	Comparison between topical and intravenous administration of tranexamic acid in primary total hip arthroplasty
Chang,C.F.; Lin,K.C.; Chen,W.M.; Jane,S.W.; Yeh,S.H.; Wang,T.J.	2015	Effects of a Home-Based Resistance Training Program on Recovery From Total Hip Replacement Surgery: Feasibility and Pilot Testing
Subedi,N.; Chew,N.S.; Chandramohan,M.; Scally,A.J.; Groves,C.	2015	Effectiveness of fluoroscopy-guided intra-articular steroid injection for hip osteoarthritis
Rivera,F.	2015	Single intra-articular injection of high molecular weight hyaluronic acid for hip osteoarthritis
Zhen,Y.; Yin,C.; Tan,S.; Yuan,Q.; Zhu,L.; Wang,X.	2016	Retrospective analysis of the radiographic indicators for peri-acetabular osteotomy of developmental dysplasia in children
Sansone,M.; Ahlden,M.; Jonasson,P.; Thomee,C.; Sward,L.; Ohlin,A.; Baranto,A.; Karlsson,J.; Thomee,R.	2016	Outcome after hip arthroscopy for femoroacetabular impingement in 289 patients with minimum 2-year follow-up
Bozic,K.J.; Ong,K.; Kurtz,S.; Lau,E.; Vail,T.P.; Rubash,H.; Berry,D.	2016	Short-term Risk of Revision THA in the Medicare Population Has Not Improved With Time
Dietrich,M.; Zingg,P.O.; Egbring,M.; Kamath,A.F.; Dora,C.	2015	Pre-hospital medications in total hip arthroplasty: Risk factors for poor outcomes
Vlatis,G.; Georgiades,G.; Magnissalis,E.A.; Hartofilakidis,G.	2005	Mid-term behaviour of cemented titanium stems: A seven to eleven year clinical radiographic and retrieval study

EXCLUDED STUDIES

Authors	Year	Article Title	Periodical	Reason for Exclusion
	2014	Obesity Management Interventions Delivered in Primary Care for Patients with Osteoarthritis: A Review of the Clinical Effectiveness [Internet]	Canadian Agency for Drugs and Technologies in Health	Systematic Review
	2010	Glucosamine sulphate more effective than paracetamol to treat osteoarthritis	The Australian Journal of Pharmacy	Abstract
Abate,M.; Pulcini,D.; Di,Iorio A.; Schiavone,C.	2010	Viscosupplementation with intra-articular hyaluronic acid for treatment of osteoarthritis in the elderly	Curr Pharm.Des	Review
Abate,M.; Schiavone,C.; Di,Gregorio P.; Pantalone,A.; Scuccimarra,T.; Vanni,D.; Andreoli,E.; Salini,V.	2013	Comparison between hyaluronic acid and platelet rich plasma in the treatment of hip and knee osteoarthritis: Preliminary results	Journal of Orthopaedics and Traumatology	
Abbott,J.H.; Robertson,M.C.; Chapple,C.; Pinto,D.; Wright,A.A.; Leon,de la Barra; Baxter,G.D.; Theis,J.C.; Campbell,A.J.	2013	Manual therapy, exercise therapy, or both, in addition to usual care, for osteoarthritis of the hip or knee: a randomized controlled trial. 1: clinical effectiveness	Osteoarthritis Cartilage	90% of pop isn't Hip OA
Abbott,J.H.; Robertson,M.C.; McKenzie,J.E.; Baxter,G.D.; Theis,J.C.; Campbell,A.J.	2009	Exercise therapy, manual therapy, or both, for osteoarthritis of the hip or knee: a factorial randomised controlled trial protocol	Trials	Method section/not completed study
Ackerman,I.N.; Buchbinder,R.; Osborne,R.H.	2012	Challenges in evaluating an Arthritis Self-Management Program for people with hip and knee osteoarthritis in real-world clinical settings	J Rheumatol.	90% of pop isn't Hip OA
Ackerman,I.N.; Dieppe,P.A.; March,L.M.; Roos,E.M.; Nilsdotter,A.K.; Brown,G.C.; Sloan,K.E.; Osborne,R.H.	2009	Variation in age and physical status prior to total knee and hip replacement surgery: a comparison of centers in Australia and Europe	Arthritis Rheum.	outcomes measured preoperatively, but not post-operatively
Adatia,A.; Rainsford,K.D.; Kean,W.F.	2012	Osteoarthritis of the knee and hip. Part II: therapy with ibuprofen and a review of clinical trials	J Pharm.Pharmacol	
Adatia,A.; Rainsford,K.D.; Kean,W.F.	2012	Osteoarthritis of the knee and hip. Part I: aetiology and pathogenesis as a basis for pharmacotherapy	J Pharm.Pharmacol	Hip and Knee combined

Authors	Year	Article Title	Periodical	Reason for Exclusion
Adelowo,O.O.; Chukwuani,C.M.; Grange,J.J.; Ojeasebhulo,E.E.; Onabowale,B.O.	1998	Comparative double blind study of the efficacy and safety of tenoxicam vs. piroxicam in osteoarthritis of knee and hip joints	West Afr.J Med	Unclear if 90% of pop is Hip OA
Ageberg,E.; Nilsdotter,A.; Kosek,E.; Roos,E.M.	2013	Effects of neuromuscular training (NEMEX-TJR) on patient-reported outcomes and physical function in severe primary hip or knee osteoarthritis: a controlled before-and-after study	BMC Musculoskelet.Disord.	healthy control
Agrawal,N.M.; Caldwell,J.; Kivitz,A.J.; Weaver,A.L.; Bocanegra,T.S.; Ball,J.; Dhadda,S.; Hurley,S.; Hancock,L.	1999	Comparison of the upper gastrointestinal safety of Arthrotec 75 and nabumetone in osteoarthritis patients at high risk for developing nonsteroidal anti-inflammatory drug-induced gastrointestinal ulcers	Clin Ther	Hip and Knee combined
Agus,H.; Bozoglan,M.; Kalenderer,O.; Kazimoglu,C.; Onvural,B.; Akan,I.	2014	How are outcomes affected by performing a one-stage combined procedure simultaneously in bilateral developmental hip dysplasia?	Int Orthop	Not relevant, does not answer pico question
Ahmed,S.; Anuntiyo,J.; Malemud,C.J.; Haqqi,T.M.	2005	Biological basis for the use of botanicals in osteoarthritis and rheumatoid arthritis: a review	Evid Based Complement Alternat.Med	Systematic Review
Ahnfelt,L.; Herberts,P.; Malchau,H.; Andersson,G.B.J.	1990	Prognosis of total hip replacement. A Swedisch multicenter study of 4,664 revisions	Acta Orthopaedica Scandinavica, Supplement	inadequate presentation of age data. unclear if statistical significance acheved for most subgroups
Ahrengart,L.; Lindgren,U.	1993	Heterotopic bone after hip arthroplasty	Clin.Orthop.	very low quality
Akhtar,N.; Haqqi,T.M.	2012	Current nutraceuticals in the management of osteoarthritis: A review	Therapeutic Advances in Musculoskeletal Disease	Narrative review
Akiyama,M.; Nakashima,Y.; Oishi,M.; Sato,T.; Hirata,M.; Hara,D.; Iwamoto,Y.	2014	Risk factors for acetabular retroversion in developmental dysplasia of the hip: does the Pemberton osteotomy contribute?	J Orthop Sci	Retrospective case series
Akman,B.; Ozkan,K.; Cift,H.; Akan,K.; Eceviz,E.; Eren,A.	2009	Treatment of Tonnis type II hip dysplasia with or without open reduction in children older than 18 months: a preliminary report	J Child Orthop	Patient population, tonnis 2

Authors	Year	Article Title	Periodical	Reason for Exclusion
Aksoy,M.; Dostbil,A.; Ince,I.; Ahiskalioglu,A.; Alici,H.A.; Aydin,A.; Kilinc,O.O.	2014	Continuous spinal anaesthesia versus ultrasound-guided combined psoas compartment-sciatic nerve block for hip replacement surgery in elderly high-risk patients: A prospective randomised study	BMC Anesthesiology	Not relevant, outcome
Alaseem,A.M.; Madiraju,P.; Aldebeyan,S.A.; Noorwali,H.; Antoniou,J.; Mwale,F.	2015	Naproxen induces type X collagen expression in human bone-marrow-derived mesenchymal stem cells through the upregulation of 5-lipoxygenase	Tissue Eng Part A	Cadaver study
Albers,C.E.; Steppacher,S.D.; Ganz,R.; Tannast,M.; Siebenrock,K.A.	2013	Impingement adversely affects 10-year survivorship after periacetabular osteotomy for DDH	Clin Orthop Relat Res	Patient population, Tonnis 2 and 3 used
Alberto,M.; Umberto,M.; Emanuele,B.; Bruno,L.; Valentina,G.; Prisco,P.; Mauro,G.; Sandro,T.	2011	Intra-articular injection of hyaluronic acid (MW 1,500-2,000 kDa; HyalOne(registered trademark)) in symptomatic osteoarthritis of the hip: A prospective cohort study	Arch.Orthop.Trauma Surg.	
Albinana,J.; Dolan,L.A.; Spratt,K.F.; Morcuende,J.; Meyer,M.D.; Weinstein,S.L.	2004	Acetabular dysplasia after treatment for developmental dysplasia of the hip. Implications for secondary procedures	Journal of Bone and Joint Surgery - Series B	Not relevant, does not answer pico question
Al-Ghadir,M.; Masquijo,J.J.; Guerra,L.A.; Willis,B.	2009	Combined femoral and pelvic osteotomies versus femoral osteotomy alone in the treatment of hip dysplasia in children with cerebral palsy	J Pediatr Orthop	Not relevant, does not answer pico question
Allen,Butler R.; Rosenzweig,S.; Myers,L.; Barrack,R.L.	2011	The Frank Stinchfield Award: the impact of socioeconomic factors on outcome after THA: a prospective, randomized study	Clin Orthop Relat Res	less than 90% OA hip
Allen,K.D.; Oddone,E.Z.; Coffman,C.J.; Datta,S.K.; Juntilla,K.A.; Lindquist,J.H.; Walker,T.A.; Weinberger,M.; Bosworth,H.B.	2010	Telephone-based self-management of osteoarthritis: A randomized trial	Ann Intern.Med	90% of pop isn't Hip OA
Allen,K.D.; Oddone,E.Z.; Stock,J.L.; Coffman,C.J.; Lindquist,J.H.; Juntilla,K.A.; Lemmerman,D.S.; Datta,S.K.; Harrelson,M.L.; Weinberger,M.; Bosworth,H.B.	2008	The Self-Management of OsteoArthritis in Veterans (SeMOA) Study: design and methodology	Contemp Clin Trials	Patient population

Authors	Year	Article Title	Periodical	Reason for Exclusion
Almeida,F.; Pino,L.; Silvestre,A.; Gomar,F.	2010	Mid- to long-term outcome of cementless total hip arthroplasty in younger patients	J Orthop Surg (Hong Kong)	less than 90% OA hip
Altman,R.D.; Strand,V.; Hochberg,M.C.; Gibofsky,A.; Markenson,J.A.; Hopkins,W.E.; Cryer,B.; Kivitz,A.; Nezzer,J.; Imasogie,O.; Young,C.L.	2015	Low-dose SoluMatrix diclofenac in the treatment of osteoarthritis: A 1-year, open-label, Phase III safety study	Postgrad.Med	No comparison group
Altman,R.D.; Zinsenheim,J.R.; Temple,A.R.; Schweinle,J.E.	2007	Three-month efficacy and safety of acetaminophen extended-release for osteoarthritis pain of the hip or knee: a randomized, double-blind, placebo-controlled study	Osteoarthritis Cartilage	Hip and Knee combined
Alvarez,C.; Chicheportiche,V.; Lequesne,M.; Vicaut,E.; Laredo,J.D.	2005	Contribution of helical computed tomography to the evaluation of early hip osteoarthritis: a study in 18 patients	Joint Bone Spine	Retrospective case series
Amstutz,H.C.; Ball,S.T.; Le Duff,M.J.; Dorey,F.J.	2007	Resurfacing THA for patients younger than 50 year: results of 2- to 9-year followup	Clin Orthop Relat Res	patient did not get THA
Amstutz,H.C.; Le Duff,M.J.	2010	Hip resurfacing results for osteonecrosis are as good as for other etiologies at 2 to 12 years	Clin Orthop Relat Res	patient population not relevant to risk assessment or bmi questions. not relevant to age because paitent did not have THA
Amstutz,H.C.; Le Duff,M.J.	2015	Aseptic loosening of cobalt chromium monoblock sockets after hip resurfacing	HIP International	less than 90% OA hip
Anderson,E.S.; Hodell,E.; Mantuani,D.; Fahimi,J.; Pampalone,I.; Nagdev,A.	2014	Pilot study of ultrasound-guided corticosteroid hip injections by emergency physicians	West J Emerg.Med	
Andrawis,J.; Akhavan,S.; Chan,V.; Lehil,M.; Pong,D.; Bozic,K.J.	2015	Higher Preoperative Patient Activation Associated With Better Patient-reported Outcomes After Total Joint Arthroplasty	Clin Orthop Relat Res	90% of pop isn't Hip OA
Andrew,J.G.; Palan,J.; Kurup,H.V.; Gibson,P.; Murray,D.W.; Beard,D.J.	2008	Obesity in total hip replacement	J Bone Joint Surg Br	less than 90% OA hip
Ansari,A.; Jones,S.; Hashemi-Nejad,A.; Catterall,A.	2008	Varus proximal femoral osteotomy for hip dysplasia in adults	Hip Int	Retrospective case series

Authors	Year	Article Title	Periodical	Reason for Exclusion
Aprato,A.; Masse,A.; Faletti,C.; Valente,A.; Atzori,F.; Stratta,M.; Jayasekera,N.	2013	Magnetic resonance arthrography for femoroacetabular impingement surgery: is it reliable?	J Orthop Traumatol.	Not relevant, does not answer pico question
Archibeck,M.J.; Berger,R.A.; Jacobs,J.J.; Quigley,L.R.; Gitelis,S.; Rosenberg,A.G.; Galante,J.O.	2001	Second-generation cementless total hip arthroplasty. Eight to eleven-year results	J Bone Joint Surg Am	the data for age as a risk factor not adequately presented to answer this pico question
Archibeck,M.J.; Surdam,J.W.; Schultz,Jr; Junick,D.W.; White,R.E.	2006	Cementless Total Hip Arthroplasty in Patients 50 Years or Younger	J.Arthroplasty	does not evaluate age as a risk factor
Armiger,R.S.; Armand,M.; Tallroth,K.; Lepisto,J.; Mears,S.C.	2009	Three-dimensional mechanical evaluation of joint contact pressure in 12 periacetabular osteotomy patients with 10-year follow-up	Acta Orthop	retrospective case series
Arnold,C.M.; Faulkner,R.A.; Gyurcsik,N.C.	2011	The Relationship between Falls Efficacy and Improvement in Fall Risk Factors Following an Exercise Plus Educational Intervention for Older Adults with Hip Osteoarthritis	Physiother.Can	outcome measure
Aro,H.T.; Alm,J.J.; Moritz,N.; Makinen,T.J.; Lankinen,P.	2012	Low BMD affects initial stability and delays stem osseointegration in cementless total hip arthroplasty in women: a 2-year RSA study of 39 patients	Acta Orthop	no patient oriented outcomes
Arsoy,D.; Woodcock,J.A.; Lewallen,D.G.; Trousdale,R.T.	2014	Outcomes and Complications Following Total Hip Arthroplasty in the Super-Obese Patient, BMI > 50	J.Arthroplasty	less than 90% OA hip
Arthroplasty Society, Canadian	2013	The Canadian Arthroplasty Society's experience with hip resurfacing arthroplasty. An analysis of 2773 hips	Bone Joint J	model results are inadequately reported. unable to tell if results in table V are from a multivariate model.
Asayama,I.; Kinsey,T.L.; Mahoney,O.M.	2006	Two-Year Experience Using a Limited-Incision Direct Lateral Approach in Total Hip Arthroplasty	J.Arthroplasty	90% of pop isn't Hip OA
Ashok,N.; Sivan,M.; Tafazal,S.; Sell,P.	2009	The diagnostic value of anaesthetic hip injection in differentiating between hip and spinal pain	European Journal of Orthopaedic Surgery and Traumatology	Not relevant, does not answer pico question

Authors	Year	Article Title	Periodical	Reason for Exclusion
Ashton,L.A.; Bruce,W.; Goldberg,J.; Walsh,W.	2000	Prevention of heterotopic bone formation in high risk patients post-total hip arthroplasty	J Orthop Surg (Hong Kong)	less than 10 patients in groups
Ast,M.P.; Abdel,M.P.; Lee,Y.Y.; Lyman,S.; Ruel,A.V.; Westrich,G.H.	2015	Weight changes after total hip or knee arthroplasty: prevalence, predictors, and effects on outcomes	J Bone Joint Surg Am	retrospective case series
Averbuch,M.; Katzper,M.	2004	Assessment of visual analog versus categorical scale for measurement of osteoarthritis pain	J Clin Pharmacol	Not relevent, outcome study
Ayeni,O.; Foote,C.J.; Debiparshad,K.; Crouch,S.; Maizlin,Z.; Farrokhyar,F.; Bhandari,M.	2013	Response from intra-articular hip injection to predict outcome after arthroscopic management for FAI	Arthroscopy - Journal of Arthroscopic and Related Surgery	Abstract
Ayeni,O.R.; Adamich,J.; Farrokhyar,F.; Simunovic,N.; Crouch,S.; Philippon,M.J.; Bhandari,M.	2014	Surgical management of labral tears during femoroacetabular impingement surgery: a systematic review	Knee Surg Sports Traumatol.Arthrosc.	Systematic Review
Ayeni,O.R.; Alradwan,H.; de,Sa D.; Philippon,M.J.	2014	The hip labrum reconstruction: indications and outcomes--a systematic review	Knee Surg Sports Traumatol.Arthrosc.	Systematic Review
Ayeni,O.R.; Naudie,D.; Crouch,S.; Adili,A.; Pindiprolu,B.; Chien,T.; Beaule,P.E.; Bhandari,M.	2013	Surgical indications for treatment for femoroacetabular impingement with surgical hip dislocation	Knee Surg Sports Traumatol.Arthrosc.	Systematic Review
Ayeni,O.R.; Simunovic,N.; Crouch,S.; Grassby,MH S.; Hoyeck,P.; Islam,Z.; Wood,G.; JOrgensen,U.; Seppanen,M.; Junnila,M.; Virolainen,P.; Routapohja,M.; Sihvonen,R.; Raivio,M.; Toivonen,P.; Joukainen,A.; Kaariainen,T.; Jalava,E.; Jarvinen,T.	2015	A multi-centre randomized controlled trial comparing arthroscopic osteochondroplasty and lavage with arthroscopic lavage alone on patient important outcomes and quality of life in the treatment of young adult (18-50) Femoroacetabular impingement	BMC Musculoskeletal Disorders	Methodology
Ayeni,O.R.; Wong,I.; Chien,T.; Musahl,V.; Kelly,B.T.; Bhandari,M.	2012	Surgical indications for arthroscopic management of femoroacetabular impingement		Systematic Review
Baar,M.E.; Dekker,J.; Oostendorp,R.A.; Bijl,D.; Voorn,T.B.; Bijlsma,J.W.	2001	Effectiveness of exercise in patients with osteoarthritis of hip or knee: nine months' follow up	Ann.Rheum.Dis.	90% of pop isn't Hip OA
Baar,M.E.; Dekker,J.; Oostendorp,R.A.; Bijl,D.; Voorn,T.B.; Lemmens,J.A.; Bijlsma,J.W.	1998	The effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a randomized clinical trial	J.Rheumatol.	90% of pop isn't Hip OA

Authors	Year	Article Title	Periodical	Reason for Exclusion
Baber,Y.F.; Robinson,A.H.; Villar,R.N.	1999	Is diagnostic arthroscopy of the hip worthwhile? A prospective review of 328 adults investigated for hip pain	J Bone Joint Surg Br	diagnostic study of arthroscopy
Backer,M.W.; Lee,K.S.; Blankenbaker,D.G.; Kijowski,R.; Keene,J.S.	2014	Correlation of ultrasound-guided corticosteroid injection of the Quadratus Femoris with MRI findings of ischiofemoral impingement	Am.J.Roentgenol.	Not relevant, does not answer pico question
Bacon,P.	1993	Worldwide experience with etodolac (Lodine(registered trademark)) 300 mg b.i.d. in the treatment of osteoarthritis	Rheumatol.Int.	Systematic Review
Bacon,P.; Luqmani,R.A.; Bossingham,D.H.; Daymond,T.J.; Grahame,R.; West,J.; Hazleman,B.L.; Adebajo,A.O.; Hughes,G.R.; Abdullah,M.; .	1990	A comparison of two formulations of indomethacin ('Flexin Continus' tablets and 'Indocid' capsules) in the treatment of osteoarthritis	Curr Med Res Opin	Hip and Knee combined
Badura-Brzoza,K.; Zajac,P.; Brzoza,Z.; Kasperska-Zajac,A.; Matysiakiewicz,J.; Piegza,M.; Hese,R.T.; Rogala,B.; Semenowicz,J.; Koczy,B.	2009	Psychological and psychiatric factors related to health-related quality of life after total hip replacement - preliminary report	Eur Psychiatry	insufficient data. the direction of the effect for physical and mental component score conflicts with what is said in the text regarding state anxiety. also, what is reported as r squareds in the table are reported as p values in the text.
Baker,J.F.; Mulhall,K.J.	2010	Femoro-acetabular impingement and hip pain with conventionally normal x-rays	Ir.Med J	Review
Bakshi,R.	1996	Comparative efficacy and tolerability of two diclofenac formulations in the treatment of painful osteoarthritis	Br J Clin Pract	Unclear if 90% of pop is Hip OA
Bakshi,R.; Ezzet,N.; Frey,L.; Lasry,D.; Salliere,D.	1993	Efficacy and tolerability of diclofenac dispersible in painful osteoarthrosis	Clin Rheumatol.	90% of pop isn't Hip OA

Authors	Year	Article Title	Periodical	Reason for Exclusion
Balanescu,A.R.; Feist,E.; Wolfram,G.; Davignon,I.; Smith,M.D.; Brown,M.T.; West,C.R.	2014	Efficacy and safety of tanezumab added on to diclofenac sustained release in patients with knee or hip osteoarthritis: a double-blind, placebo-controlled, parallel-group, multicentre phase III randomised clinical trial	Ann Rheum.Dis	Hip and Knee combined
Baldwin,K.D.; Harrison,R.A.; Namdari,S.; Nelson,C.L.; Hosalkar,H.S.	2009	Outcomes of hip arthroscopy for treatment of femoroacetabular impingement: A systematic review	Current Orthopaedic Practice	Systematic Review
Bali,K.; Railton,P.; Kiefer,G.N.; Powell,J.N.	2014	Subcapital osteotomy of the femoral neck for patients with healed slipped capital femoral epiphysis	Bone Joint J	<10 patient per group
Baltzer,A.W.; Ostapczuk,M.S.; Stosch,D.; Seidel,F.; Granrath,M.	2013	A new treatment for hip osteoarthritis: clinical evidence for the efficacy of autologous conditioned serum	Orthop Rev (Pavia)	
Bannwarth,B.; Treves,R.; Euller-Ziegler,L.; Rolland,D.; Ravaud,P.; Dougados,M.	2003	Adverse events associated with rofecoxib therapy: results of a large study in community-derived osteoarthritic patients	Drug Saf	Unclear if 90% of pop is Hip OA
Barnes,J.R.; Thomas,S.R.; Wedge,J.	2011	Acetabular coverage after innominate osteotomy	J Pediatr Orthop	Not relevant, does not answer pico question
Bartels,E.M.; Folmer,V.N.; Bliddal,H.; Altman,R.D.; Juhl,C.; Tarp,S.; Zhang,W.; Christensen,R.	2015	Efficacy and safety of ginger in osteoarthritis patients: a meta-analysis of randomized placebo-controlled trials	Osteoarthritis Cartilage	
Bartels,E.M.; Lund,H.; Hagen,K.B.; Dagfinrud,H.; Christensen,R.; Danneskiold-Samsoe,B.	2007	Aquatic exercise for the treatment of knee and hip osteoarthritis	Cochrane Database Syst Rev	Systematic Review
Bartels,Else Marie; Juhl,Carsten B.; Christensen,Robin; Hagen,KÃ¥re Birger; Danneskiold,SamsÃ¸e Bente; Dagfinrud,Hanne; Lund,Hans	2016	Aquatic exercise for the treatment of knee and hip osteoarthritis	Cochrane Database of Systematic Reviews	Systematic Review
Bartlett,C.; Doyal,L.; Ebrahim,S.; Davey,P.; Bachmann,M.; Egger,M.; Dieppe,P.	2005	The causes and effects of socio-demographic exclusions from clinical trials	Health Technol Assess	Systematic Review
Barton,C.; Banga,K.; Beaule,P.E.	2009	Anterior Hueter approach in the treatment of femoro-acetabular impingement: rationale and	Orthop Clin North Am	Case report

Authors	Year	Article Title	Periodical	Reason for Exclusion
		technique		
Barton,C.; Salineros,M.J.; Rakhra,K.S.; Beaule,P.E.	2011	Validity of the alpha angle measurement on plain radiographs in the evaluation of cam-type femoroacetabular impingement	Clin Orthop Relat Res	Not relevant, does not answer pico question
Bastian,J.D.; Tannast,M.; Siebenrock,K.A.; Keel,M.J.B.	2013	Mid-term results in relation to age and analysis of predictive factors after fixation of acetabular fractures using the modified Stoppa approach		Patient population not OA
Battaglia,M.; Vannini,F.; Guaraldi,F.; Rossi,G.; Biondi,F.; Sudanese,A.	2011	Validity of preoperative ultrasound-guided aspiration in the revision of hip prosthesis	Ultrasound Med.Biol.	Not relevant, does not answer pico question
Batterham,S.I.; Heywood,S.; Keating,J.L.	2011	Systematic review and meta-analysis comparing land and aquatic exercise for people with hip or knee arthritis on function, mobility and other health outcomes	BMC Musculoskelet.Disord.	Systematic Review
Bauer,H.W.; Klasser,M.; von Hanstein,K.L.; Rolinger,H.; Schladitz,G.; Henke,H.D.; Gimbel,W.; Steinbach,K.	1999	Oxaceprol is as effective as diclofenac in the therapy of osteoarthritis of the knee and hip	Clin Rheumatol.	90% of pop isn't Hip OA
Baumann,C.; Rat,A.C.; Osnowycz,G.; Mainard,D.; Cuny,C.; Guillemin,F.	2009	Satisfaction with care after total hip or knee replacement predicts self-perceived health status after surgery	BMC Musculoskelet.Disord.	hip and knee results combined
Baumann,C.; Rat,A.C.; Osnowycz,G.; Mainard,D.; Delagoutte,J.P.; Cuny,C.; Guillemin,F.	2006	Do clinical presentation and pre-operative quality of life predict satisfaction with care after total hip or knee replacement?	J Bone Joint Surg Br	hip and knee results combined
Baumgartner,H.; Schwarz,H.A.; Blum,W.; Bruhin,A.; Gallachi,G.; Goldinger,G.; Saxer,M.; Trost,H.	1996	Ibuprofen and diclofenac sodium in the treatment of osteoarthritis: a comparative trial of two once-daily sustained-release NSAID formulations	Curr Med Res Opin	Hip and Knee combined
Beaule,P.E.; Campbell,P.; Shim,P.	2007	Femoral head blood flow during hip resurfacing	Clin Orthop Relat Res	Not relevant to recommendation
Beaule,P.E.; Dowding,C.; Parker,G.; Ryu,J.J.	2015	What factors predict improvements in outcomes scores and reoperations after the Bernese periacetabular osteotomy?	Clin Orthop Relat Res	retrospective case series

Authors	Year	Article Title	Periodical	Reason for Exclusion
Beaulieu,A.D.; Peloso,P.M.; Haraoui,B.; Bensen,W.; Thomson,G.; Wade,J.; Quigley,P.; Eisenhoffer,J.; Harsanyi,Z.; Darke,A.C.	2008	Once-daily, controlled-release tramadol and sustained-release diclofenac relieve chronic pain due to osteoarthritis: a randomized controlled trial	Pain Res Manag	Hip and Knee combined
Beaupre,L.A.; Masson,E.C.; Luckhurst,B.J.; Arafah,O.; O'Connor,G.J.	2014	A randomized pilot study of a comprehensive postoperative exercise program compared with usual care following primary total hip arthroplasty in subjects less than 65 years of age: feasibility, selection of outcome measures and timing of assessment	BMC Musculoskelet.Disord.	Unclear of population
Beckmann,N.A.; Weiss,S.; Klotz,M.C.; Gondan,M.; Jaeger,S.; Bitsch,R.G.	2014	Loosening after acetabular revision: comparison of trabecular metal and reinforcement rings. A systematic review	J Arthroplasty	Systematic Review
Becvar,R.; Urbanova,Z.; Vlasakova,V.; Vitova,J.; Rybar,I.; Maldyk,H.; Filipowicz-Sosnowska,A.; Bernacka,K.; Mackiewicz,S.; Gomor,B.; Rojkovich,B.; Siro,B.; Bereczki,J.; Toth,K.; Sukenik,S.; Green,L.; Ehrenfeld,M.; Pavelka,K.	1999	Nabumetone induces less gastrointestinal mucosal changes than diclofenac retard	Clin Rheumatol.	Hip and Knee combined
Bedi,A.; Zaltz,I.; De La Torre,K.; Kelly,B.T.	2011	Radiographic comparison of surgical hip dislocation and hip arthroscopy for treatment of cam deformity in femoroacetabular impingement	Am J Sports Med	Not relevant, outcome
Bedi,A.; Zbeda,R.M.; Bueno,V.F.; Downie,B.; Dolan,M.; Kelly,B.T.	2012	The incidence of heterotopic ossification after hip arthroscopy	Am J Sports Med	Retrospective case series
Behery,O.A.; Foucher,K.C.	2013	Age, gender, and body mass index do not explain individual variability in clinical and gait recovery after total hip arthroplasty	Osteoarthritis Cartilage	abstract only
Bellamy,N.; Bensen,W.G.; Ford,P.M.; Huang,S.H.; Lang,J.Y.	1992	Double-blind randomized controlled trial of flurbiprofen-SR (ANSAID-SR) and diclofenac sodium-SR (Voltaren-SR) in the treatment of osteoarthritis	Clin Invest Med	Hip and Knee combined

Authors	Year	Article Title	Periodical	Reason for Exclusion
Bellamy,N.; Bensen,W.G.; Ford,P.M.; Huang,S.H.; Lang,J.-Y.	1992	Double-blind randomized controlled trial of Flurbiprofen-SR (ANSAID-SR(registered trademark)) and Diclofenac Sodium-SR (Voltaren-SR) in the treatment of osteoarthritis	Clinical and Investigative Medicine	90% of pop isn't Hip OA
Belmont,P.J.; Goodman,G.P.; Hamilton,W.; aterman,B.R.; Bader,J.O.; Schoenfeld,A.J.	2014	Morbidity and mortality in the thirty-day period following total hip arthroplasty: Risk factors and incidence	J.Arthroplasty	not best available evidence. unclear specification of which variables were included in the final model, along with inadequate reporting of statistically insignificant results caused quality to be downgraded.
Bennell,K.L.; Buchbinder,R.; Hinman,R.S.	2015	Physical therapies in the management of osteoarthritis: current state of the evidence	Curr Opin Rheumatol.	review
Bennell,K.L.; Egerton,T.; Pua,Y.H.; Abbott,J.H.; Sims,K.; Metcalf,B.; McManus,F.; Wrigley,T.V.; Forbes,A.; Harris,A.; Buchbinder,R.	2010	Efficacy of a multimodal physiotherapy treatment program for hip osteoarthritis: a randomised placebo-controlled trial protocol	BMC Musculoskelet.Disord.	Results section/not completed study
Bennell,K.L.; Hall,M.; Hinman,R.S.	2016	Osteoarthritis year in review 2015: rehabilitation and outcomes	Osteoarthritis Cartilage	Systematic Review
Bennell,K.L.; O'Donnell,J.M.; Takla,A.; Spiers,L.N.; Hunter,D.J.; Staples,M.; Hinman,R.S.	2014	Efficacy of a physiotherapy rehabilitation program for individuals undergoing arthroscopic management of femoroacetabular impingement - the FAIR trial: a randomised controlled trial protocol	BMC Musculoskelet.Disord.	Methodology
Bennell,K.L.; Rini,C.; Keefe,F.; French,S.; Nelligan,R.; Kasza,J.; Forbes,A.; Dobson,F.; Abbott,J.H.; Dalwood,A.; Vicenzino,B.; Harris,A.; Hinman,R.S.	2015	Effects of Adding an Internet-Based Pain Coping Skills Training Protocol to a Standardized Education and Exercise Program for People With Persistent Hip Pain (HOPE Trial): Randomized Controlled Trial Protocol	Phys Ther	Unclear of population
Bennett,D.; Humphreys,L.; O'Brien,S.; Kelly,C.; Orr,J.F.; Beverland,D.E.	2008	Gait kinematics of age-stratified hip replacement patients-A large scale, long-term	Gait Posture	no patient oriented outcomes

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		follow-up study		
Benz,T.; Angst,F.; Oesch,P.; Hilfiker,R.; Lehmann,S.; Mueller,Mebes C.; Kramer,E.; Verra,M.L.	2015	Comparison of patients in three different rehabilitation settings after knee or hip arthroplasty: a natural observational, prospective study	BMC Musculoskelet.Disord.	90% of pop isn't Hip OA
Berenbaum,F.; Grifka,J.; Brown,J.P.; Zacher,J.; Moore,A.; Krammer,G.; Dutta,D.; Sloan,V.S.	2005	Efficacy of lumiracoxib in osteoarthritis: a review of nine studies	J Int Med Res	Systematic Review
Berend,K.R.; Lombardi,A.V.; Mallory,T.H.; Dodds,K.L.; Adams,J.B.	2004	Cementless double-tapered total hip arthroplasty in patients 75 years of age and older	J Arthroplasty	no comparison to younger patients
Berg,P.; Olsson,U.	2004	Intra-articular injection of non-animal stabilised hyaluronic acid (NASHA) for osteoarthritis of the hip: a pilot study	Clin Exp.Rheumatol.	
Berge,D.J.; Dolin,S.J.; Williams,A.C.; Harman,R.	2004	Pre-operative and post-operative effect of a pain management programme prior to total hip replacement: a randomized controlled trial		Work group does not consider study treatments to fit the definition of self management programs they used when the wrote the pico question
Berger,R.A.; Sanders,S.A.; Thill,E.S.; Sporer,S.M.; Della,Valle C.	2009	Newer anesthesia and rehabilitation protocols enable outpatient hip replacement in selected patients	Clin.Orthop.	Review
Bernasek,T.L.; Lee,W.S.; Lee,H.J.; Lee,J.S.; Kim,K.H.; Yang,J.J.	2010	Minimally invasive primary THA: anterolateral intermuscular approach versus lateral transmuscular approach	Arch Orthop Trauma Surg	retrospective case series

Authors	Year	Article Title	Periodical	Reason for Exclusion
Berry,D.J.; von,Knoch M.; Schleck,C.D.; Harmsen,W.S.	2004	The cumulative long-term risk of dislocation after primary Charnley total hip arthroplasty	J Bone Joint Surg Am	not best available evidence. quality was downgraded because univariate statistical methods specified in the methods section don't match the multivariate methods that were mentioned in the results section. also, the setting of outcome measurement was not the same for all patients, and the proportional hazards assumption was likely not met due to the unparrallel lines in figure 3
Berry,D.J.; von,Knoch M.; Schleck,C.D.; Harmsen,W.S.	2005	Effect of femoral head diameter and operative approach on risk of dislocation after primary total hip arthroplasty	Journal of Bone and Joint Surgery - Series A	Unclear of population
Berry,H.; Bird,H.A.; Black,C.; Blake,D.R.; Freeman,A.M.; Golding,D.N.; Hamilton,E.B.; Jayson,M.I.; Kidd,B.; Kohn,H.; .	1992	A double blind, multicentre, placebo controlled trial of lornoxicam in patients with osteoarthritis of the hip and knee	Ann Rheum.Dis	Hip and Knee combined
Berstock,J.R.; Blom,A.W.; Beswick,A.D.	2014	A systematic review and meta-analysis of the standard versus mini-incision posterior approach to total hip arthroplasty	J.Arthroplasty	Systematic Review
Best,J.T.	2005	Revision total hip and total knee arthroplasty	Orthopaedic nursing / National Association of Orthopaedic Nurses	narrative review

Authors	Year	Article Title	Periodical	Reason for Exclusion
Beumer,L.; Wong,J.; Warden,S.J.; Kemp,J.L.; Foster,P.; Crossley,K.M.	2015	Effects of exercise and manual therapy on pain associated with hip osteoarthritis: a systematic review and meta-analysis	Br J Sports Med	Systematic Review
Biber,R.; Brem,M.; Singler,K.; Moellers,M.; Sieber,C.; Bail,H.J.	2012	Dorsal versus transgluteal approach for hip hemiarthroplasty: an analysis of early complications in seven hundred and four consecutive cases	Int Orthop	Patient population not OA
Bicimoglu,A.; Agus,H.; Omeroglu,H.; Tumer,Y.	2003	Six years of experience with a new surgical algorithm in developmental dysplasia of the hip in children under 18 months of age	J Pediatr Orthop	Not relevant, does not answer pico question
Bidar,R.; Kouyoumdjian,P.; Munini,E.; Asencio,G.	2009	Long-term results of the ABG-1 hydroxyapatite coated total hip arthroplasty: Analysis of 111 cases with a minimum follow-up of 10 years	Orthopaedics and Traumatology	inadequate data for osteolysis outcome. in exact p values reported, and the chosen significance threshold was .01
Biegert,C.; Wagner,I.; Ludtke,R.; Kotter,I.; Lohmuller,C.; Gunaydin,I.; Taxis,K.; Heide,L.	2004	Efficacy and safety of willow bark extract in the treatment of osteoarthritis and rheumatoid arthritis: results of 2 randomized double-blind controlled trials	J Rheumatol.	Hip and Knee combined
Bigsby,E.; Whitehouse,M.R.; Bannister,G.C.; Blom,A.W.	2012	The medium term outcome of the Omnifit constrained acetabular cup	Hip Int	does not consider age as a risk factor
Bingham III,C.O.; Bird,S.R.; Smugar,S.S.; Xu,X.; Tershakovec,A.M.	2008	Responder analysis and correlation of outcome measures: pooled results from two identical studies comparing etoricoxib, celecoxib, and placebo in osteoarthritis	Osteoarthritis Cartilage	Hip and Knee combined
Bingham III,C.O.; Sebba,A.I.; Rubin,B.R.; Ruoff,G.E.; Kremer,J.; Bird,S.; Smugar,S.S.; Fitzgerald,B.J.; O'Brien,K.; Tershakovec,A.M.	2007	Efficacy and safety of etoricoxib 30 mg and celecoxib 200 mg in the treatment of osteoarthritis in two identically designed, randomized, placebo-controlled, non-inferiority studies	Rheumatology (Oxford).	Hip and Knee combined
Bingham III,C.O.; Smugar,S.S.; Wang,H.; Peloso,P.M.; Gammaitoni,A.	2011	Predictors of Response to Cyclo-Oxygenase-2 Inhibitors in Osteoarthritis: Pooled Results from Two Identical Trials Comparing Etoricoxib, Celecoxib, and Placebo	Pain Medicine	90% of pop isn't Hip OA

Authors	Year	Article Title	Periodical	Reason for Exclusion
Bingham III,C.O.; Smugar,S.S.; Wang,H.; Tershakovec,A.M.	2009	Early response to COX-2 inhibitors as a predictor of overall response in osteoarthritis: Pooled results from two identical trials comparing etoricoxib, celecoxib and placebo	Rheumatology (Oxford).	Hip and Knee combined
Bingham,C.O.,III; Bird,S.R.; Smugar,S.S.; Xu,X.; Tershakovec,A.M.	2008	Responder analysis and correlation of outcome measures: pooled results from two identical studies comparing etoricoxib, celecoxib, and placebo in osteoarthritis	Osteoarthritis Cartilage	Hip and Knee combined
Bingham,C.O.,III; Sebba,A.I.; Rubin,B.R.; Ruoff,G.E.; Kremer,J.; Bird,S.; Smugar,S.S.; Fitzgerald,B.J.; O'Brien,K.; Tershakovec,A.M.	2007	Efficacy and safety of etoricoxib 30 mg and celecoxib 200 mg in the treatment of osteoarthritis in two identically designed, randomized, placebo-controlled, non-inferiority studies	Rheumatology (Oxford)	Hip and Knee combined
Bingham,C.O.,III; Smugar,S.S.; Wang,H.; Peloso,P.M.; Gammaitoni,A.	2011	Predictors of response to cyclo-oxygenase-2 inhibitors in osteoarthritis: pooled results from two identical trials comparing etoricoxib, celecoxib, and placebo	Pain Med	Hip and Knee combined
Birch,S.; Liljensoe,A.; Hartig-Andreasen,C.; Soballe,K.; Mechlenburg,I.	2015	No correlations between radiological angles and self-assessed quality of life in patients with hip dysplasia at 2-13 years of follow-up after periacetabular osteotomy	Acta Radiol	Patient population - all patient who had PAO
Bird,H.A.; Hill,J.; Stratford,M.E.; Fenn,G.C.; Wright,V.	1995	A double-blind cross-over study comparing the analgesic efficacy of tramadol with pentazocine in patients with osteoarthritis	Journal of Drug Development and Clinical Practice	90% of pop isn't Hip OA
Biring,G.S.; Masri,B.A.; Greidanus,N.V.; Duncan,C.P.; Garbuz,D.S.	2007	Predictors of quality of life outcomes after revision total hip replacement	J Bone Joint Surg Br	unclear coding of age independent variable
Bischoff,H.A.; Roos,E.M.	2003	Effectiveness and safety of strengthening, aerobic, and coordination exercises for patients with osteoarthritis	Curr.Opin.Rheumatol.	review
Bischoff-Ferrari,H.A.; Lingard,E.A.; Losina,E.; Baron,J.A.; Roos,E.M.; Phillips,C.B.; Mahomed,N.N.; Barrett,J.; Katz,J.N.	2004	Psychosocial and geriatric correlates of functional status after total hip replacement	Arthritis Rheum.	not best available evidence due to cross sectional design and greater than 50% non response rate. cross sectional design

Authors	Year	Article Title	Periodical	Reason for Exclusion
				does not establish temporal sequence for bmi and mental health.
Bissacotti,J.F.; Cates,H.E.; Keating,E.M.; Faris,P.M.; Ritter,M.A.	1995	Survivorship analysis of acetabular revision in medial, lateral, and global primary osteoarthritis		retrospective case series
Bistolfi,A.; Crova,M.; Rosso,F.; Titolo,P.; Ventura,S.; Massazza,G.	2011	Dislocation rate after hip arthroplasty within the first postoperative year: 36mm versus 28mm femoral heads	HIP International	Not relevant, does not answer pico question
Biz,C.; Frizziero,A.; Baban,A.; Masiero,S.; Pavan,D.; Iacobellis,C.	2014	Heterotopic ossification following hip arthroplasty: A comparative study about its development with the use of three different kinds of implants	Journal of Orthopaedics and Traumatology	abstract only
Bjorgul,K.; Novicoff,W.N.; Andersen,S.T.; Ahlund,O.R.; Bunes,A.; Wiig,M.; Brevig,K.	2013	High rate of revision and a high incidence of radiolucent lines around Metasul metal-on-metal total hip replacements: results from a randomised controlled trial of three bearings after seven years	Bone Joint J	Unclear of population
Blackham,J.; Garry,J.P.; Cummings,D.M.; Russell,R.G.; Dealleaume,L.	2008	Does regular exercise reduce the pain and stiffness of osteoarthritis?	J Fam Pract	Commentary
Blandino,D.	2001	Are NSAIDs more effective than acetaminophen in patients with osteoarthritis?	J Fam Pract	Abstract
Bliddal,H.; Rosetzsky,A.; Schlichting,P.; Weidner,M.S.; Andersen,L.A.; Ibfelt,H.H.; Christensen,K.; Jensen,O.N.; Barslev,J.	2000	A randomized, placebo-controlled, cross-over study of ginger extracts and ibuprofen in osteoarthritis	Osteoarthritis Cartilage	Hip and Knee combined
Blomfeldt,R.; Tornkvist,H.; Ponzer,S.; Soderqvist,A.; Tidermark,J.	2005	Comparison of internal fixation with total hip replacement for displaced femoral neck fractures: Randomized, controlled trial performed at four years	Journal of Bone and Joint Surgery - Series A	Patient population not OA

Authors	Year	Article Title	Periodical	Reason for Exclusion
Blotman,F.; Maheu,E.; Wulwik,A.; Caspard,H.; Lopez,A.	1997	Efficacy and safety of avocado/soybean unsaponifiables in the treatment of symptomatic osteoarthritis of the knee and hip. A prospective, multicenter, three-month, randomized, double-blind, placebo-controlled trial	Rev Rhum.Engl.Ed	Hip and Knee combined
Bocanegra,T.S.; Weaver,A.L.; Tindall,E.A.; Sikes,D.H.; Ball,J.A.; Wallemark,C.B.; Geis,G.S.; Fort,J.G.	1998	Diclofenac/misoprostol compared with diclofenac in the treatment of osteoarthritis of the knee or hip: a randomized, placebo controlled trial. Arthrotec Osteoarthritis Study Group	J Rheumatol.	Hip and Knee combined
Boeer,J.; Mueller,O.; Krauss,I.; Haupt,G.; Axmann,D.; Horstmann,T.	2010	Effects of a sensory-motor exercise program for older adults with osteoarthritis or prosthesis of the hip using measurements made by the Posturomed oscillatory platform	J Geriatr.Phys Ther	Unclear if 90% of pop is Hip OA
Bohm,P.; Klinger,H.M.; Kusswetter,W.	1999	The Salter innominate osteotomy for the treatment of developmental dysplasia of the hip in young adults	Arch Orthop Trauma Surg	retrospective case series
Boissier,C.; Perpoint,B.; Laporte-Simitsidis,S.; Mismetti,P.; Hocquart,J.; Gayet,J.L.; Rambaud,C.; Queneau,P.; Decousus,H.	1992	Acceptability and efficacy of two associations of paracetamol with a central analgesic (dextropropoxyphene or codeine): comparison in osteoarthritis	J Clin Pharmacol	90% of pop isn't Hip OA
Bolland,B.J.; Wahed,A.; Al-Hallao,S.; Culliford,D.J.; Clarke,N.M.	2010	Late reduction in congenital dislocation of the hip and the need for secondary surgery: radiologic predictors and confounding variables	J Pediatr Orthop	Not relevant to recommendation
Bolland,B.J.; Whitehouse,S.L.; Timperley,A.J.	2012	Indications for early hip revision surgery in the UK--a re-analysis of NJR data	Hip Int	analysis included resurfacing arthroplasties
Bolnot,Delmas D.; Buch,J.P.; Zeidler,H.; Dougados,M.	1996	Ro 15-8081 in osteoarthritis of hip and knee: a double-blind placebo-controlled multicentre dose-ranging study on analgesia		Hip and Knee combined
Bonnevialle,P.; Saragaglia,D.; Ehlinger,M.; Tonetti,J.; Maisse,N.; Adam,P.; Le,Gall C.	2011	Trochanteric locking nail versus arthroplasty in unstable intertrochanteric fracture in patients aged over 75 years	Orthop Traumatol.Surg Res	not all patients had THA

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Bono,J.V.; Sanford,L.; Toussaint,J.T.	1994	Severe polyethylene wear in total hip arthroplasty. Observations from retrieved AML PLUS hip implants with an ACS polyethylene liner	J Arthroplasty	inadequate presentation of data for age. statistical significance not reported
Borges,J.L.; Kumar,S.J.; Guille,J.T.	1995	Congenital dislocation of the hip in boys	J Bone Joint Surg Am	Not relevant, does not answer pico question
Borrelli,J.,Jr.; Peelle,M.; McFarland,E.; Evanoff,B.; Ricci,W.M.	2008	Computer-reconstructed radiographs are as good as plain radiographs for assessment of acetabular fractures	Am J Orthop (Belle Mead NJ)	Not relevant, does not answer pico question
Bossen,D.; Veenhof,C.; Van Beek,K.E.; Spreeuwenberg,P.M.; Dekker,J.; de Bakker,D.H.	2013	Effectiveness of a web-based physical activity intervention in patients with knee and/or hip osteoarthritis: randomized controlled trial	J Med Internet Res	90% of pop isn't Hip OA
Botser,I.B.; Jackson,T.J.; Smith,T.W.; Leonard,J.P.; Stake,C.E.; Domb,B.G.	2014	Open surgical dislocation versus arthroscopic treatment of femoroacetabular impingement	Am J Orthop (Belle Mead NJ)	<10 patient per group
Botser,I.B.; Ozoude,G.C.; Martin,D.E.; Siddiqi,A.J.; Kuppuswami,S.; Domb,B.G.	2012	Femoral anteversion in the hip: comparison of measurement by computed tomography, magnetic resonance imaging, and physical examination		Not relevant, does not answer pico question
Botser,I.B.; Smith,T.W.,Jr.; Nasser,R.; Domb,B.G.	2011	Open surgical dislocation versus arthroscopy for femoroacetabular impingement: a comparison of clinical outcomes		Systematic Review
Boureau,F.; Schneid,H.; Zeghari,N.; Wall,R.; Bourgeois,P.	2004	The IPSO study: ibuprofen, paracetamol study in osteoarthritis. A randomised comparative clinical study comparing the efficacy and safety of ibuprofen and paracetamol analgesic treatment of osteoarthritis of the knee or hip	Ann Rheum.Dis	Hip and Knee combined
Boutron,I.; Tubach,F.; Giraudeau,B.; Ravaud,P.	2003	Methodological differences in clinical trials evaluating nonpharmacological and pharmacological treatments of hip and knee osteoarthritis		Hip and Knee combined
Bozic,K.J.; Chiu,V.W.; Slover,J.D.; Immerman,I.; Kahn,J.G.	2011	Health state utility in patients with osteoarthritis of the hip and total hip arthroplasty	J Arthroplasty	does not answer pico question

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Bozic,K.J.; Lau,E.; Ong,K.; Chan,V.; Kurtz,S.; Vail,T.P.; Rubash,H.E.; Berry,D.J.	2014	Risk factors for early revision after primary total hip arthroplasty in Medicare patients	Clin Orthop Relat Res	adjust for confounder age but doesn't present results for variable
Bragantini,A.; Molinaroli,F.	1994	A pilot clinical evaluation of the treatment of hip osteoarthritis with hyaluronic acid	Current Therapeutic Research - Clinical and Experimental	
Brander,V.A.; Malhotra,S.; Jet,J.; Heinemann,A.W.; Stulberg,S.D.	1997	Outcome of hip and knee arthroplasty in persons aged 80 years and older	Clin Orthop Relat Res	very low quality
Brantingham,J.W.; Parkin-Smith,G.; Cassa,T.K.; Globe,G.A.; Globe,D.; Pollard,H.; deLuca,K.; Jensen,M.; Mayer,S.; Korporaal,C.	2012	Full kinetic chain manual and manipulative therapy plus exercise compared with targeted manual and manipulative therapy plus exercise for symptomatic osteoarthritis of the hip: a randomized controlled trial	Arch Phys Med Rehabil	manipulation of multiple joints
Brauner,T.; Wearing,S.; Ramisch,E.; Zillober,M.; Horstmann,T.	2014	Can measures of limb loading and dynamic stability during the squat maneuver provide an index of early functional recovery after unilateral total hip arthroplasty?	Arch Phys Med Rehabil	Unclear of population
Breivik,H.; Ljosaa,T.M.; Stengaard-Pedersen,K.; Persson,J.; Aro,H.; Villumsen,J.; Tvinnemose,D.	2010	A 6-months, randomised, placebo-controlled evaluation of efficacy and tolerability of a low-dose 7-day buprenorphine transdermal patch in osteoarthritis patients naive to potent opioids	Scandinavian Journal of Pain	
Brien,S.; Lewith,G.T.; McGregor,G.	2006	Devil's Claw (Harpagophytum procumbens) as a treatment for osteoarthritis: A review of efficacy and safety	J.Altern.Complement.Med.	Systematic Review
Broden,C.; Mukka,S.; Muren,O.; Eisler,T.; Boden,H.; Stark,A.; Skoldenberg,O.	2015	High risk of early periprosthetic fractures after primary hip arthroplasty in elderly patients using a cemented, tapered, polished stem	Acta Orthop	not all patients had THA
Broden,C.; Mukka,S.; Muren,O.; Eisler,T.; Boden,H.; Stark,A.; Skoldenberg,O.	2015	High risk of early periprosthetic fractures after primary hip arthroplasty in elderly patients using a cemented, tapered, polished stem: An observational, prospective cohort study on 1,403 hips with 47 fractures after mean follow-up time of 4 years	Acta orthopaedica	not all patients had tha

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Broderick,J.E.; Keefe,F.J.; Bruckenthal,P.; Junghaenel,D.U.; Schneider,S.; Schwartz,J.E.; Kaell,A.T.; Caldwell,D.S.; McKee,D.; Reed,S.; Gould,E.	2014	Nurse practitioners can effectively deliver pain coping skills training to osteoarthritis patients with chronic pain: A randomized, controlled trial		Hip and Knee combined
Brosseau,Lucie; MacLeay,L.; Welch,Vivian; Tugwell,Peter; Wells,George A.	2013	Intensity of exercise for the treatment of osteoarthritis	Cochrane Database of Systematic Reviews	The review was flawed and withdrew
Brown,G.A.; Firoozbakhsh,K.; Gehlert,R.J.	2001	Three-dimensional CT modeling versus traditional radiology techniques in treatment of acetabular fractures	Iowa Orthop J	Not relevant, does not answer pico question
Brown,N.M.; Foran,J.R.; Della Valle,C.J.	2013	Hip resurfacing and conventional THA: comparison of acetabular bone stock removal, leg length, and offset		Not relevant to recommendation
Bruce,W.; van der Wall,H.; STOREY,G.; Loneragan,R.; Pitsis,G.; Kannangara,S.	2004	Bone scintigraphy in acetabular labral tears	Clin Nucl.Med	Retrospective case series
Brunner,A.; Horisberger,M.; Herzog,R.F.	2009	Sports and recreation activity of patients with femoroacetabular impingement before and after arthroscopic osteoplasty	Am J Sports Med	Not relevent, patient population of osteoarthritis
Bruyere,O.; Reginster,J.Y.	2007	Glucosamine and chondroitin sulfate as therapeutic agents for knee and hip osteoarthritis	Drugs Aging	Narrative review
Buchler,L.; Beck,M.	2014	Periacetabular osteotomy: a review of swiss experience	Curr Rev Musculoskelet.Med	review
Buchler,L.; Neumann,M.; Schwab,J.M.; Iselin,L.; Tannast,M.; Beck,M.	2013	Arthroscopic versus open cam resection in the treatment of femoroacetabular impingement		NOt relevent, outcome
Bulbul,M.; Ayanoglu,S.; Beytemur,O.; Gurkan,V.; Esenyel,C.Z.; Gurbuz,H.	2010	The relationship between morphometric parameters and Trendelenburg sign following the Hardinge incision	Acta Orthop Traumatol.Turc.	no patient oriented outcomes
Bulthuis,Y.; Mohammad,S.; Braakman-Jansen,L.M.; Drossaers-Bakker,K.W.; van de Laar,M.A.	2008	Cost-effectiveness of intensive exercise therapy directly following hospital discharge in patients with arthritis: results of a randomized controlled clinical trial	Arthritis Rheum.	90% of pop isn't Hip OA

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Bulut,M.; Gurger,M.; Belhan,O.; Batur,O.C.; Celik,S.; Karakurt,L.	2013	Management of developmental dysplasia of the hip in less than 24 months old children	Indian J Orthop	Not relevant to recommendation
Bulut,M.; Karakurt,L.; Azboy,I.; Demirtas,A.; Ersoz,G.; Belhan,O.	2013	Comparison of soft-tissue and bone surgeries in the treatment of developmental dysplasia of the hip in 18-24-month-old patients	J Pediatr Orthop B	Patient population, includes tonnis 2, 3 and 4
Burge,A.J.; Gold,S.L.; Lurie,B.; Nawabi,D.H.; Fields,K.G.; Koff,M.F.; Westrich,G.; Potter,H.G.	2015	MR Imaging of Adverse Local Tissue Reactions around Rejuvenate Modular Dual-Taper Stems		Retrospective case series
Burnett,R.S.; Della Rocca,G.J.; Prather,H.; Curry,M.; Maloney,W.J.; Clohisy,J.C.	2006	Clinical presentation of patients with tears of the acetabular labrum	J Bone Joint Surg Am	Not relevant, does not answer pico question
Busato,A.; Roder,C.; Herren,S.; Eggli,S.	2008	Influence of high BMI on functional outcome after total hip arthroplasty	Obes.Surg	less than 90% OA hip
Busch,C.A.; Whitehouse,M.R.; Shore,B.J.; MacDonald,S.J.; McCalden,R.W.; Bourne,R.B.	2010	The efficacy of periarticular multimodal drug infiltration in total hip arthroplasty	Clin Orthop Relat Res	
Buszewicz,M.; Rait,G.; Griffin,M.; Nazareth,I.; Patel,A.; Atkinson,A.; Barlow,J.; Haines,A.	2006	Self management of arthritis in primary care: randomised controlled trial		Unclear if 90% of pop is Hip OA
Butler,M.; Forte,M.L.; Joglekar,S.B.; Swiontkowski,M.F.; Kane,R.L.	2011	Evidence summary: Systematic review of surgical treatments for geriatric hip fractures	Journal of Bone and Joint Surgery - Series A	Patient population not OA
Buvanendran,A.; Kroin,J.S.; Berger,R.A.; Hallab,N.J.; Saha,C.; Negrescu,C.; Moric,M.; Caicedo,M.S.; Tuman,K.J.	2006	Upregulation of prostaglandin E2 and interleukins in the central nervous system and peripheral tissue during and after surgery in humans		Hip and Knee combined
Byrd,J.W.; Jones,K.S.	2014	Primary repair of the acetabular labrum: outcomes with 2 years' follow-up		Retrospective case series
Cabilan,C.J.; Hines,S.; Munday,J.	2015	The effectiveness of prehabilitation or preoperative exercise for surgical patients: A systematic review	JBI Database of Systematic Reviews and Implementation Reports	Systematic Review
Calabro,J.J.; Andelman,S.V.; Caldwell,J.R.; Gerber,R.C.; Hamaty,D.; Kaplan,H.; Maltz,B.A.; Parsons,J.L.; Saville,P.; Tretbar,H.C.;	1977	A multicenter trial of sulindac in osteoarthritis of the hip	Clin.Pharmacol.Ther.	

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Ward,J.R.				
Callaghan,J.J.; Heithoff,B.E.; Goetz,D.D.; Sullivan,P.M.; Pedersen,D.R.; Johnston,R.C.	2001	Prevention of dislocation after hip arthroplasty: lessons from long-term followup	Clin Orthop Relat Res	Not relevant, does not answer pico question
Cameron,M.; Gagnier,J.J.; Little,C.V.; Parsons,T.J.; Blumle,A.; Chrubasik,S.	2009	Evidence of effectiveness of herbal medicinal products in the treatment of arthritis. Part I: Osteoarthritis	Phytother.Res	Systematic Review
Cameron,Melainie; Chrubasik,Sigrun	2014	Oral herbal therapies for treating osteoarthritis	Cochrane Database of Systematic Reviews	Systematic Review
Cannon,G.W.; Caldwell,J.R.; Holt,P.; McLean,B.; Seidenberg,B.; Bolognese,J.; Ehrich,E.; Mukhopadhyay,S.; Daniels,B.	2000	Rofecoxib, a specific inhibitor of cyclooxygenase 2, with clinical efficacy comparable with that of diclofenac sodium: results of a one-year, randomized, clinical trial in patients with osteoarthritis of the knee and hip. Rofecoxib Phase III Protocol 035 Study Group	Arthritis Rheum.	Hip and Knee combined
Cannon,G.W.; Caldwell,J.R.; Holt,P.; McLean,B.; Seidenberg,B.; Bolognese,J.; Ehrich,E.; Mukhopadhyay,S.; Daniels,B.	2000	Rofecoxib, a specific inhibitor of cyclooxygenase 2, with clinical efficacy comparable with that of diclofenac sodium: Results of a one-year, randomized, clinical trial in patients with osteoarthritis of the knee and hip	Arthritis Rheum.	Hip and Knee combined
Cao,L.; Wang,B.; Li,M.; Song,S.; Weng,W.; Li,H.; Su,J.	2014	Closed reduction and internal fixation versus total hip arthroplasty for displaced femoral neck fracture	Chin J Traumatol.	not relevant. compares internal fixation to tha
Cao,Y.; Winzenberg,T.; Nguo,K.; Lin,J.; Jones,G.; Ding,C.	2013	Association between serum levels of 25-hydroxyvitamin D and osteoarthritis: a systematic review	Rheumatology (Oxford)	Systematic Review
Capello,W.N.; D'Antonio,J.A.; Feinberg,J.R.; Manley,M.T.	2002	Hydroxyapatite coated stems in younger and older patients with hip arthritis	Clin Orthop Relat Res	very low quality
Capuano,N.; Del,Buono A.; Maffulli,N.	2015	Tissue preserving total hip arthroplasty using superior capsulotomy	Oper.Orthop Traumatol.	Review was outcome paper

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Caracciolo,B.; Giaquinto,S.	2005	Self-perceived distress and self-perceived functional recovery after recent total hip and knee arthroplasty	Arch Gerontol.Geriatr.	unclear if 90% of the patient population had oa hip
Carroll,K.L.; Schiffern,A.N.; Murray,K.A.; Stevenson,D.A.; Viskochil,D.H.; Toydemir,R.; MacWilliams,B.A.; Roach,J.W.	2016	The occurrence of occult acetabular dysplasia in relatives of individuals with developmental dysplasia of the hip	Journal of Pediatric Orthopaedics	Not relevant, does not answer pico question
Carsi,M.B.; Clarke,N.M.	2015	Acetabuloplasties at Open Reduction Prevent Acetabular Dysplasia in Intentionally Delayed Developmental Dysplasia of the Hip: A Case-control Study	Clin Orthop Relat Res	Retrospective case series
Casale,R.; Damiani,C.; Rosati,V.; Atzeni,F.; Sarzi-Puttini,P.; Nica,A.S.	2012	Efficacy of a comprehensive rehabilitation programme combined with pharmacological treatment in reducing pain in a group of OA patients on a waiting list for total joint replacement	Clin.Exp.Rheumatol.	90% of pop isn't Hip OA
Casartelli,N.C.; Leunig,M.; Maffiuletti,N.A.; Bizzini,M.	2015	Return to sport after hip surgery for femoroacetabular impingement: a systematic review	Br J Sports Med	Systematic Review
Case,R.D.; Gargan,M.F.; Grier,D.; Portinaro,N.M.A.	2000	Confirmation of the reduction and containment of the femoral head with CT or MRI scans in DDH: The need for repeated scans	HIP International	Not relevant, does not answer pico question
Cashman,J.P.; Round,J.; Taylor,G.; Clarke,N.M.	2002	The natural history of developmental dysplasia of the hip after early supervised treatment in the Pavlik harness. A prospective, longitudinal follow-up	J Bone Joint Surg Br	Not symptomatic hip OA pop
Castaneda,P.; Vidal-Ruiz,C.; Mendez,A.; Salazar,D.P.; Torres,A.	2016	How Often Does Femoroacetabular Impingement Occur After an Innominate Osteotomy for Acetabular Dysplasia?	Clin Orthop Relat Res	Retrospective case series
Castelein,R.M.	1997	Ultrasonography in developmental dysplasia of the hip	Current Orthopaedics	Narrative review
Cebatorius,A.; Robertsson,O.; Stucinskas,J.; Smailys,A.; Leonas,L.; Tarasevicius,S.	2015	Choice of approach, but not femoral head size, affects revision rate due to dislocations in THA after femoral neck fracture: results from the Lithuanian Arthroplasty Register	Int Orthop	Patient population not OA

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Cepeda,M.S.; Camargo,F.; Zea,C.; Valencia,L.	2007	Tramadol for osteoarthritis: A systematic review and metaanalysis	J.Rheumatol.	Systematic Review
Cepeda,M.Soledad; Camargo,Francisco; Zea,Carlota; Valencia,Lina	2006	Tramadol for osteoarthritis	Cochrane Database of Systematic Reviews	Systematic Review
Chahal,J.; Van Thiel,G.S.; Mather,R.C.,III; Lee,S.; Song,S.H.; Davis,A.M.; Salata,M.; Nho,S.J.	2015	The Patient Acceptable Symptomatic State for the Modified Harris Hip Score and Hip Outcome Score Among Patients Undergoing Surgical Treatment for Femoroacetabular Impingement	Am J Sports Med	Not relevant, does not answer pico question
Chammai,Y.; Brax,M.	2015	Medium-term comparison of results in obese patients and non-obese hip prostheses with Metha(R) short stem	Eur J Orthop Surg Traumatol.	<90% OA
Chammout,G.K.; Mukka,S.S.; Carlsson,T.; Neander,G.F.; Stark,A.W.; Skoldenberg,O.G.	2012	Total hip replacement versus open reduction and internal fixation of displaced femoral neck fractures: a randomized long-term follow-up study	J Bone Joint Surg Am	Patient population not OA
Chan,Y.S.; Lien,L.C.; Hsu,H.L.; Wan,Y.L.; Lee,M.S.; Hsu,K.Y.; Shih,C.H.	2005	Evaluating hip labral tears using magnetic resonance arthrography: a prospective study comparing hip arthroscopy and magnetic resonance arthrography diagnosis		Not relevant, does not answer pico question
Chandrasekaran,S.; Gui,C.; Darwish,N.; Lodhia,P.; Suarez-Ahedo,C.; Domb,B.G.	2016	Outcomes of Hip Arthroscopic Surgery in Patients With Tonnis Grade 1 Osteoarthritis With a Minimum 2-Year Follow-up: Evaluation Using a Matched-Pair Analysis With a Control Group With Tonnis Grade 0	Am J Sports Med	Not relevant, does not answer pico question
Chang,C.F.; Wang,T.M.; Wang,J.H.; Huang,S.C.; Lu,T.W.	2011	Adolescents after Pemberton's osteotomy for developmental dysplasia of the hip displayed greater joint loading than healthy controls in affected and unaffected limbs during gait	J Orthop Res	Not relevant, does not answer pico question
Chang,C.H.; Chang,Y.; Chen,D.W.; Ueng,S.W.; Lee,M.S.	2014	Topical tranexamic acid reduces blood loss and transfusion rates associated with primary total hip arthroplasty	Clin Orthop Relat Res	less than 90% OA hip
Chantre,P.; Cappelaere,A.; Leblan,D.; Guedon,D.; Vandermander,J.; Fournie,B.	2000	Efficacy and tolerance of Harpagophytum procumbens versus diacerhein in treatment of osteoarthritis		Hip and Knee combined

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Chawda,M.; Hucker,P.; Whitehouse,S.L.; Crawford,R.W.; English,H.; Donnelly,W.J.	2009	Comparison of cemented vs uncemented acetabular component positioning using an imageless navigation system	J Arthroplasty	Not relevant to recommendation
Chee,Y.H.; Teoh,K.H.; Sabnis,B.M.; Ballantyne,J.A.; Brenkel,I.J.	2010	Total hip replacement in morbidly obese patients with osteoarthritis: Results of a prospectively matched study	Journal of Bone and Joint Surgery - Series B	very low quality because they use diffferent inclusion criteria for the non-obese patients (non-obese had no comorbidiies
Chen,D.W.; Hsieh,P.H.; Huang,K.C.; Hu,C.C.; Chang,Y.H.; Lee,M.S.	2010	Continuous intra-articular infusion of bupivacaine for post-operative pain relief after total hip arthroplasty: a randomized, placebo-controlled, double-blind study	Eur J Pain	
Chen,D.W.; Hu,C.C.; Chang,Y.H.; Yang,W.E.; Lee,M.S.	2009	Comparison of clinical outcome in primary total hip arthroplasty by conventional anterolateral transgluteal or 2-incision approach	J Arthroplasty	90% of pop isn't Hip OA
Chen,Y.-F.; Jobanputra,P.; Barton,P.; Bryan,S.; Fry-Smith,A.; Harris,G.; Taylor,R.S.	2008	Cyclooxygenase-2 selective non-steroidal anti-inflammatory drugs (etodolac, meloxicam, celecoxib, rofecoxib, etoricoxib, valdecoxib and lumiracoxib) for osteoarthritis and rheumatoid arthritis: A systematic review and economic evaluation	Health Technol.Assess.	Systematic Review
Cheras,P.A.; Myers,S.P.; Paul-Brent,P.A.; Outerbridge,K.H.; Nielsen,G.V.	2010	Randomized double-blind placebo-controlled trial on the potential modes of action of SheaFlex70 in osteoarthritis	Phytother.Res	hip and knee results combined
Chikanza,I.C.; Clarke,B.; Hopkins,R.; MacFarlane,D.G.; Bird,H.; Grahame,R.	1994	A comparative study of the efficacy and toxicity of etodolac and naproxen in the treatment of osteoarthritis	Br J Clin Pract	Hip and Knee combined
Chimento,G.F.; Pavone,V.; Sharrock,N.; Kahn,B.; Cahill,J.; Sculco,T.P.	2005	Minimally invasive total hip arthroplasty: a prospective randomized study	J Arthroplasty	not relevant comparison. both groups get posterolateral surgery, with the only difference being incision

Authors	Year	Article Title	Periodical	Reason for Exclusion
				length
Chiron,P.; Murgier,J.; Reina,N.	2014	Reduced blood loss with ligation of medial circumflex pedicle during total hip arthroplasty with minimally invasive posterior approach	Orthopaedics and Traumatology	Results section/not completed study
Chiu,F.-Y.; Lin,Y.-P.; Hung,S.-H.; Su,Y.-P.; Liu,C.-L.	2015	Cementless acetabular reconstruction for arthropathy in old acetabular fractures		the sample size was too small for multivariate analysis, and the event rate was less than 10, which could lead to unstable estimates. the quality was therefore downgraded to very low.
Cho,S.H.; Jung,Y.B.; Seong,S.C.; Park,H.B.; Byun,K.Y.; Lee,D.C.; Song,E.K.; Son,J.H.	2003	Clinical efficacy and safety of Lyprinol, a patented extract from New Zealand green-lipped mussel (Perna Canaliculus) in patients with osteoarthritis of the hip and knee: a multicenter 2-month clinical trial	Eur Ann Allergy Clin Immunol.	90% of pop isn't Hip OA
Choi,J.-A.; Sung,H.K.; Hong,S.-H.; Yong,H.K.; Choi,J.-Y.; Kang,H.S.	2009	Rheumatoid arthritis and tuberculous arthritis: Differentiating MRI features	Am.J.Roentgenol.	Not relevant, does not answer pico question
Choong,P.F.M.; Dowsey,M.M.; Carr,D.; Daffy,J.; Stanley,P.	2007	Risk factors associated with acute hip prosthetic joint infections and outcome of treatment with a rifampinbased regimen	Acta orthopaedica	less than 90% OA hip
Choquette,D.; McCarthy,T.G.; Rodrigues,J.F.; Kelly,A.J.; Camacho,F.; Horbay,G.L.; Husein-Bhabha,F.A.	2008	Transdermal fentanyl improves pain control and functionality in patients with osteoarthritis: an open-label Canadian trial	Clin Rheumatol.	90% of pop isn't Hip OA
Choubey,J.; Patel,A.; Verma,M.K.	2013	Phytotherapy in the treatment of arthritis: A review	International Journal of Pharmaceutical Sciences and Research	Systematic Review

Authors	Year	Article Title	Periodical	Reason for Exclusion
Christensen,R.; Bartels,E.M.; Altman,R.D.; Astrup,A.; Bliddal,H.	2008	Does the hip powder of Rosa canina (rosehip) reduce pain in osteoarthritis patients?--a meta-analysis of randomized controlled trials	Osteoarthritis Cartilage	Review
Christensen,R.; Bartels,E.M.; Astrup,A.; Bliddal,H.	2008	Symptomatic efficacy of avocado-soybean unsaponifiables (ASU) in osteoarthritis (OA) patients: a meta-analysis of randomized controlled trials	Osteoarthritis Cartilage	Systematic Review
Chrubasik,C.; Duke,R.K.; Chrubasik,S.	2006	The evidence for clinical efficacy of rose hip and seed: a systematic review	Phytother.Res	Systematic Review
Chrubasik,C.; Roufogalis,B.D.; Muller-Ladner,U.; Chrubasik,S.	2008	A systematic review on the Rosa canina effect and efficacy profiles	Phytother.Res	Systematic Review
Chrubasik,J.E.; Roufogalis,B.D.; Chrubasik,S.	2007	Evidence of effectiveness of herbal antiinflammatory drugs in the treatment of painful osteoarthritis and chronic low back pain	Phytother.Res	Systematic Review
Chrubasik,S.	2013	Questionable efficacy of avocado soybean unsaponifiables	Focus on Alternative and Complementary Therapies	Abstract
Chrubasik,S.; Chrubasik,C.; Kunzel,O.; Black,A.	2007	Patient-perceived benefit during one year of treatment with Doloteffin((registered trademark))		Hip and Knee combined
Chrubasik,S.; Thanner,J.; Kunzel,O.; Conradt,C.; Black,A.; Pollak,S.	2002	Comparison of outcome measures during treatment with the proprietary Harpagophytum extract doloteffin in patients with pain in the lower back, knee or hip		retrospective case series
Chu,Y.M.; Zhou,Y.X.; Han,N.; Yang,D.J.	2016	Two Different Total Hip Arthroplasties for Hartofilakidis Type C1 Developmental Dysplasia of Hip in Adults	Chin Med J (Engl.)	not joint preserving surgery. patients had osteotomy with THA
Cimbiz,A.; Bayazit,V.; Hallaceli,H.; Cavlak,U.	2005	Effect of combined spa and physical therapy on pain in various chronic diseases	Neurosciences (Riyadh)	90% of pop isn't Hip OA
Civinini,R.; Nistri,L.; Martini,C.; Redl,B.; Ristori,G.; Innocenti,M.	2013	Growth factors in the treatment of early osteoarthritis	Clin Cases Miner.Bone Metab	systematic review
Claeys,M.A.; Vermeersch,N.; Haentjens,P.	2007	Reduction of blood loss with tranexamic acid in primary total hip replacement surgery	Acta Chir Belg.	Unclear if 90% of pop is OA
Clement,N.D.; MacDonald,D.; Gaston,P.	2014	Hip arthroscopy for femoroacetabular impingement: a health economic analysis	Hip Int	Not relevant, does not answer pico

Authors	Year	Article Title	Periodical	Reason for Exclusion
				question
Clement,N.D.; MacDonald,D.; Howie,C.R.; Biant,L.C.	2011	The outcome of primary total hip and knee arthroplasty in patients aged 80 years or more	J Bone Joint Surg Br	very low quality due to using bivariate analysis
Clement,N.D.; Muzammil,A.; MacDonald,D.; Howie,C.R.; Biant,L.C.	2011	Socioeconomic status affects the early outcome of total hip replacement	J Bone Joint Surg Br	very low quality due to potential for aggregation bias. SES is measured using deprivation index according to geographic location, instead being measured at the individual level
Clohisy,J.C.; Barrett,S.E.; Gordon,J.E.; Delgado,E.D.; Schoenecker,P.L.	2006	Periacetabular osteotomy in the treatment of severe acetabular dysplasia. Surgical technique	J Bone Joint Surg Am	Narrative review
Clohisy,J.C.; Barrett,S.E.; Gordon,J.E.; Delgado,E.D.; Schoenecker,P.L.	2005	Periacetabular osteotomy for the treatment of severe acetabular dysplasia	J Bone Joint Surg Am	retrospective case series
Clohisy,J.C.; Nepple,J.J.; Ross,J.R.; Pashos,G.; Schoenecker,P.L.	2015	Does surgical hip dislocation and periacetabular osteotomy improve pain in patients with Perthes-like deformities and acetabular dysplasia?	Clin Orthop Relat Res	Retrospective case series
Clohisy,J.C.; Oryhon,J.M.; Seyler,T.M.; Wells,C.W.; Liu,S.S.; Callaghan,J.J.; Mont,M.A.	2010	Function and fixation of total hip arthroplasty in patients 25 years of age or younger	Clin Orthop Relat Res	very low quality
Clohisy,J.C.; St John,L.C.; Nunley,R.M.; Schutz,A.L.; Schoenecker,P.L.	2009	Combined periacetabular and femoral osteotomies for severe hip deformities	Clin.Orthop.	Retrospective case series
Clohisy,J.C.; St John,L.C.; Schutz,A.L.	2010	Surgical treatment of femoroacetabular impingement: a systematic review of the literature	Clin Orthop Relat Res	Systematic Review

Authors	Year	Article Title	Periodical	Reason for Exclusion
Clohisy,J.C.; Zebala,L.P.; Nepple,J.J.; Pashos,G.	2010	Combined hip arthroscopy and limited open osteochondroplasty for anterior femoroacetabular impingement	J Bone Joint Surg Am	Not relevant, does not answer pico question
Cochrane,T.; Davey,R.C.; Matthes Edwards,S.M.	2005	Randomised controlled trial of the cost-effectiveness of water-based therapy for lower limb osteoarthritis	Health Technol Assess	90% of pop isn't Hip OA
Colen,S.; Haverkamp,D.; Mulier,M.; van den Bekerom,M.P.	2012	Hyaluronic acid for the treatment of osteoarthritis in all joints except the knee: what is the current evidence?	BioDrugs	
Colen,S.; van den Bekerom,M.P.; Bellemans,J.; Mulier,M.	2010	Comparison of intra-articular injections of hyaluronic acid and corticosteroid in the treatment of osteoarthritis of the hip in comparison with intra-articular injections of bupivacaine. Design of a prospective, randomized, controlled study with blinding of the patients and outcome assessors	BMC Musculoskelet.Disord.	
Collins,J.A.; Ward,J.P.; Youm,T.	2014	Is prophylactic surgery for femoroacetabular impingement indicated? A systematic review	Am J Sports Med	Systematic Review
Combes,A.; Migaud,H.; Girard,J.; Duhamel,A.; Fessy,M.H.	2013	Low rate of dislocation of dual-mobility cups in primary total hip arthroplasty	Clin.Orthop.	Not relevant, does not answer pico question
Conaghan,P.G.; O'Brien,C.M.; Wilson,M.; Schofield,J.P.	2011	Transdermal buprenorphine plus oral paracetamol vs an oral codeine-paracetamol combination for osteoarthritis of hip and/or knee: a randomised trial	Osteoarthritis Cartilage	Unclear if 90% of pop is Hip OA
Conrozier,T.; Bertin,P.; Mathieu,P.; Charlot,J.; Bailleul,F.; Treves,R.; Vignon,E.; Chevalier,X.	2003	Intra-articular injections of hylan G-F 20 in patients with symptomatic hip osteoarthritis: an open-label, multicentre, pilot study	Clin Exp.Rheumatol.	
Conrozier,T.; Couris,C.M.; Mathieu,P.; Merle-Vincent,F.; Piperno,M.; Coury,F.; Belin,V.; Tebib,J.; Vignon,E.	2009	Safety, efficacy and predictive factors of efficacy of a single intra-articular injection of non-animal-stabilized-hyaluronic-acid in the hip joint: results of a standardized follow-up of patients treated for hip osteoarthritis in daily practice	Arch Orthop Trauma Surg	

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Conrozier,T.; Vignon,E.	2005	Is there evidence to support the inclusion of viscosupplementation in the treatment paradigm for patients with hip osteoarthritis?	Clin Exp.Rheumatol.	
Corts Giner,J.R.; Garcia Borras,J.J.	1991	Double-blind, randomized and parallel comparison between droxicam and diclofenac sodium in patients with coxarthrosis and gonarthrosis	Eur J Rheumatol.Inflamm.	Hip and Knee combined
Corts,Giner,Jr.; GarcÃa-BorrÃ¡s,J.J.	1991	Double-blind, randomized and parallel comparison between droxicam and diclofenac sodium in patients with coxarthrosis and gonarthrosis	Eur.J.Rheumatol.Inflamm.	Systematic Review
Costa,C.R.; Johnson,A.J.; Mont,M.A.	2012	Use of cementless, tapered femoral stems in patients who have a mean age of 20 years	J Arthroplasty	descriptive study that does not evaluate age as a prognostic factor
Costi,K.; Howie,D.W.; Campbell,D.G.; McGee,M.A.; Cornish,B.L.	2010	Long-term survival and reason for revision of wagner resurfacing hip arthroplasty	J.Arthroplasty	not relevant. patients got resurfacing arthroplasty
Coudeyre,E.; Eschalier,B.; Descamps,S.; Claeys,A.; Boisgard,S.; Noirfalize,C.; Gerbaud,L.	2014	Transcultural validation of the Risk Assessment and Predictor Tool (RAPT) to predict discharge outcomes after total hip replacement	Ann Phys Rehabil Med	less than 90% OA hip patients
Coudeyre,E.; Jardin,C.; Givron,P.; Ribinik,P.; Revel,M.; Rannou,F.	2007	Could preoperative rehabilitation modify postoperative outcomes after total hip and knee arthroplasty? Elaboration of French clinical practice guidelines	Annales de Readaptation et de Medecine Physique	Systematic Review
Coudeyre,E.; Sanchez,K.; Rannou,F.; Poiraudeau,S.; Lefevre-Colau,M.M.	2010	Impact of self-care programs for lower limb osteoarthritis and influence of patients' beliefs	Ann Phys Rehabil Med	Systematic Review
Coulter,C.L.; Weber,J.M.; Scarvell,J.M.	2009	Group physiotherapy provides similar outcomes for participants after joint replacement surgery as 1-to-1 physiotherapy: a sequential cohort study	Arch Phys Med Rehabil	90% of pop isn't Hip OA
Coupe,V.M.; Veenhof,C.; van Tulder,M.W.; Dekker,J.; Bijlsma,J.W.; van den Ende,C.H.	2007	The cost effectiveness of behavioural graded activity in patients with osteoarthritis of hip and/or knee	Ann Rheum.Dis	Not relevant to recommendation

Authors	Year	Article Title	Periodical	Reason for Exclusion
Crawford,R.W.; Gie,G.A.; Ling,R.S.; Murray,D.W.	1998	Diagnostic value of intra-articular anaesthetic in primary osteoarthritis of the hip	J Bone Joint Surg Br	Not relevant, does not answer pico question
Crespo Rodriguez,A.M.; de Lucas Villarrubia,J.C.; Pastrana Ledesma,M.A.; Millan,Santos,I; Padron,M.	2015	Diagnosis of lesions of the acetabular labrum, of the labral-chondral transition zone, and of the cartilage in femoroacetabular impingement: Correlation between direct magnetic resonance arthrography and hip arthroscopy	Radiologia	Not relevant, does not answer pico question
Croft,P.; Cooper,C.; Wickham,C.; Coggon,D.	1991	Osteoarthritis of the hip and acetabular dysplasia	Ann Rheum.Dis	Not relevant to recommendation
Cronin,M.D.; Gofton,W.; Erwin,L.; Fitch,D.A.; Chow,J.	2015	Early surgical and functional outcomes comparison of the supercapsular percutaneously-assisted total hip and traditional posterior surgical techniques for total hip arthroplasty: protocol for a randomized, controlled study	Ann Transl.Med	Is not completed no results
Crotty,M.; Prendergast,J.; Battersby,M.W.; Rowett,D.; Graves,S.E.; Leach,G.; Giles,L.C.	2009	Self-management and peer support among people with arthritis on a hospital joint replacement waiting list: a randomised controlled trial	Osteoarthritis Cartilage	90% of pop isn't Hip OA
Crowe,J.; Henderson,J.	2003	Pre-arthroplasty rehabilitation is effective in reducing hospital stay	Canadian journal of occupational therapy.Revue canadienne d'ergothÃ©rapie.	90% of pop isn't Hip OA
Cunic,D.; Lacombe,S.; Mohajer,K.; Grant,H.; Wood,G.	2014	Can the Blaylock Risk Assessment Screening Score (BRASS) predict length of hospital stay and need for comprehensive discharge planning for patients following hip and knee replacement surgery? Predicting arthroplasty planning and stay using the BRASS	Can J Surg	hip and knee results combined
Cushnaghan,J.; Coggon,D.; Reading,I.; Croft,P.; Byng,P.; Cox,K.; Dieppe,P.; Cooper,C.	2007	Long-term outcome following total hip arthroplasty: a controlled longitudinal study	Arthritis Rheum.	less than 50% follow up
da Costa,B.R.; Nuesch,E.; Kasteler,R.; Husni,E.; Welch,V.; Rutjes,A.W.; Juni,P.	2014	Oral or transdermal opioids for osteoarthritis of the knee or hip	Cochrane Database Syst Rev	Systematic Review

Authors	Year	Article Title	Periodical	Reason for Exclusion
da Costa,B.R.; Reichenbach,S.; Keller,N.; Nartey,L.; Wandel,S.; Juni,P.; Trelle,S.	2016	Effectiveness of non-steroidal anti-inflammatory drugs for the treatment of pain in knee and hip osteoarthritis: a network meta-analysis		
Dagenais,S.	2007	Intra-articular hyaluronic acid (viscosupplementation) for hip osteoarthritis	Issues Emerg.Health Technol	Review
Dagfinrud,H.; Moe,R.H.; Osteras,N.	2014	Multimodal physiotherapy may be no better than sham treatment for people with hip osteoarthritis	Journal of physiotherapy	Commentary
Dahl,L.B.; Dengso,K.; Bang-Christiansen,K.; Petersen,M.M.; Sturup,J.	2014	Clinical and radiological outcome after periacetabular osteotomy: a cross-sectional study of 127 hips operated on from 1999-2008	Hip Int	Not relevant to recommendation
Dahlberg,L.E.; Holme,I.; Hoye,K.; Ringertz,B.	2009	A randomized, multicentre, double-blind, parallel-group study to assess the adverse event-related discontinuation rate with celecoxib and diclofenac in elderly patients with osteoarthritis	Scand.J Rheumatol.	Hip and Knee combined
Dale,H.; Skramm,I.; Lower,H.L.; Eriksen,H.M.; Espehaug,B.; Furnes,O.; Skjeldestad,F.E.; Havelin,L.I.; Engesaeter,L.B.	2011	Infection after primary hip arthroplasty: a comparison of 3 Norwegian health registers	Acta Orthop	less than 90% OA hip patients
Dall,G.F.; Ohly,N.E.; Ballantyne,J.A.; Brenkel,I.J.	2009	The influence of pre-operative factors on the length of in-patient stay following primary total hip replacement for osteoarthritis: A multivariate analysis of 2302 patients	Journal of Bone and Joint Surgery - Series B	no relevant outcomes to age pico question
Darge,K.; Papadopoulou,F.; Ntoulia,A.; Bulas,D.I.; Coley,B.D.; Fordham,L.A.; Paltiel,H.J.; McCarville,B.; Volberg,F.M.; Cosgrove,D.O.; Goldberg,B.B.; Wilson,S.R.; Feinstein,S.B.	2013	Safety of contrast-enhanced ultrasound in children for non-cardiac applications: A review by the Society for Pediatric Radiology (SPR) and the International Contrast Ultrasound Society (ICUS)	Pediatr.Radiol.	Narrative review
D'Arrigo,C.; Alberti,F.; Speranza,A.; Alonzo,R.; De,Sanctis S.; Maestri,B.; Ferretti,A.	2013	Natural course of early radiological signs of femoroacetabular impingement in an asymptomatic population	Journal of Orthopaedics and Traumatology	Abstract

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Datir,A.; Xing,M.; Kang,J.; Harkey,P.; Kakarala,A.; Carpenter,W.A.; Terk,M.R.	2014	Diagnostic utility of MRI and MR arthrography for detection of ligamentum teres tears: a retrospective analysis of 187 patients with hip pain	AJR Am J Roentgenol.	Not relevant, does not answer pico question
Davies,G.M.; Watson,D.J.; Bellamy,N.	1999	Comparison of the responsiveness and relative effect size of the western Ontario and McMaster Universities Osteoarthritis Index and the short-form Medical Outcomes Study Survey in a randomized, clinical trial of osteoarthritis patients	Arthritis Care Res	Hip and Knee combined
Davis,A.M.	2012	Osteoarthritis year in review: rehabilitation and outcomes	Osteoarthritis Cartilage	Knee OA outcomes
Davis,A.M.; Perruccio,A.V.; Ibrahim,S.; Hogg-Johnson,S.; Wong,R.; Streiner,D.L.; Beaton,D.E.; Cote,P.; Gignac,M.A.; Flannery,J.; Schemitsch,E.; Mahomed,N.N.; Badley,E.M.	2011	The trajectory of recovery and the inter-relationships of symptoms, activity and participation in the first year following total hip and knee replacement	Osteoarthritis Cartilage	combined hip and knee data for risk factor analysis
Davlin,L.B.; Amstutz,H.C.; Tooke,S.M.; Dorey,F.J.; Nasser,S.	1990	Treatment of osteoarthrosis secondary to congenital dislocation of the hip. Primary cemented surface replacement compared with conventional total hip replacement	J Bone Joint Surg Am	inadequate data for age risk factor
Day,R.; Morrison,B.; Luza,A.; Castaneda,O.; Strusberg,A.; Nahir,M.; Helgetveit,K.B.; Kress,B.; Daniels,B.; Bolognese,J.; Krupa,D.; Seidenberg,B.; Ehrich,E.	2000	A randomized trial of the efficacy and tolerability of the COX-2 inhibitor rofecoxib vs ibuprofen in patients with osteoarthritis. Rofecoxib/Ibuprofen Comparator Study Group	Arch Intern.Med	Hip and Knee combined
Day,R.; Morrison,B.; Luza,A.; Castaneda,O.; Strusberg,A.; Nahir,M.; Helgetveit,K.B.; Kress,B.; Daniels,B.; Bolognese,J.; Krupa,D.; Seidenberg,B.; Ehrich,E.	2000	A randomized trial of the efficacy and tolerability of the COX-2 inhibitor rofecoxib vs ibuprofen in patients with osteoarthritis	Arch.Intern.Med.	Hip and Knee combined
de Jong,O.R.; Hopman-Rock,M.; Tak,E.C.; Klazinga,N.S.	2004	An implementation study of two evidence-based exercise and health education programmes for older adults with osteoarthritis	Health Educ Res	90% of pop isn't Hip OA

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		of the knee and hip		
De La Rocha,A.; Sucato,D.J.; Tulchin,K.; Podeszwa,D.A.	2012	Treatment of adolescents with a periacetabular osteotomy after previous pelvic surgery	Clin Orthop Relat Res	Not relevant to recommendation
de Luis,D.A.; Izaola,O.; Garcia,Alonso M.; Aller,R.; Cabezas,G.; de la Fuente,B.	2012	Effect of a commercial hypocaloric diet in weight loss and post surgical morbidities in obese patients with chronic arthropathy, a randomized clinical trial	Eur Rev Med Pharmacol Sci	Analysis includes OA knee
de Witte,P.B.; Brand,R.; Vermeer,H.G.; van der Heide,H.J.; Barnaart,A.F.	2011	Mid-term results of total hip arthroplasty with the CementLess Spotorno (CLS) system	J Bone Joint Surg Am	inadequate reporting of statistical methods and age results in the article. they note that age was excluded from models becuase of nonsignificance, but it is unclear if non-significance for age was determined in a univariate or multivariate analysis.
de,Luca K.; Pollard,H.; Brantingham,J.; Globe,G.; Cassa,T.	2011	A randomized controlled trial of chiropractic management of the lower limb kinetic chain for the treatment of hip osteoarthritis: a study protocol	J Chiropr.Med	Trial is ongoing/results are not completed
De,Roeck N.; Hashemi-Nejad,A.	2003	The modified Tonnis triple pelvic osteotomy in the young adult - Early results	HIP International	retrospective case series
de,Rooij M.; van der Leeden,M.; Heymans,M.W.; Holla,J.F.; Hakkinen,A.; Lems,W.F.; Roorda,L.D.; Veenhof,C.; Sanchez-Ramirez,D.C.; de Vet,H.C.; Dekker,J.	2016	Course and predictors of pain and physical functioning in patients with hip osteoarthritis: Systematic review and meta-analysis	J Rehabil Med	Systematic Review

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de,Sa D.; Cargnelli,S.; Catapano,M.; Bedi,A.; Simunovic,N.; Burrow,S.; Ayeni,O.R.	2015	Femoroacetabular impingement in skeletally immature patients: a systematic review examining indications, outcomes, and complications of open and arthroscopic treatment		Systematic Review
de,Sa D.; Horner,N.S.; MacDonald,A.; Simunovic,N.; Slobogean,G.; Philippon,M.J.; Belzile,E.L.; Karlsson,J.; Ayeni,O.R.	2015	Evaluating healthcare resource utilization and outcomes for surgical hip dislocation and hip arthroscopy for femoroacetabular impingement	Knee Surg Sports Traumatol.Arthrosc.	
de,Sa D.; Urquhart,N.; Philippon,M.; Ye,J.E.; Simunovic,N.; Ayeni,O.R.	2014	Alpha angle correction in femoroacetabular impingement	Knee Surg Sports Traumatol.Arthrosc.	Systematic Review
De,Silva,V; El-Metwally,A.; Ernst,E.; Lewith,G.; Macfarlane,G.J.	2011	Evidence for the efficacy of complementary and alternative medicines in the management of osteoarthritis: a systematic review	Rheumatology (Oxford)	Systematic Review
de,Thomasson E.; Caux,I.; Guingand,O.; Terracher,R.; Mazel,C.	2009	Total hip arthroplasty for osteoarthritis in patients aged 80 years or older: influence of co-morbidities on final outcome	Orthop Traumatol.Surg Res	very low quality due to using bivariate analysis
Deal,C.L.; Moskowitz,R.W.	1999	Nutraceuticals as therapeutic agents in osteoarthritis. The role of glucosamine, chondroitin sulfate, and collagen hydrolysate	Rheum.Dis Clin North Am	Narrative review
Delarue,Y.; de Branch; Anract,P.; Revel,M.; Rannou,F.	2007	Supervised or unsupervised exercise for the treatment of hip and knee osteoarthritis. Clinical practice recommendations	Ann Readapt.Med Phys	Systematic Review
Delaunay,C.; Cazeau,C.; Kapandji,A.I.	1998	Cementless primary total hip replacement. Four to eight year results with the Zweymuller-Alloclassic prosthesis	Int Orthop	dos not look at age as a risk factor
DeLemos,B.P.; Xiang,J.; Benson,C.; Gana,T.J.; Pascual,M.L.; Rosanna,R.; Fleming,B.	2011	Tramadol hydrochloride extended-release once-daily in the treatment of osteoarthritis of the knee and/or hip: a double-blind, randomized, dose-ranging trial	Am J Ther	Hip and Knee combined
Deleuran,T.; Vilstrup,H.; Overgaard,S.; Jepsen,P.	2015	Cirrhosis patients have increased risk of complications after hip or knee arthroplasty: A Danish population-based cohort study	Acta orthopaedica	hip and knee results combined

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den Hartog,Y.M.; Mathijssen,N.M.; Hannink,G.; Vehmeijer,S.B.	2015	Which patient characteristics influence length of hospital stay after primary total hip arthroplasty in a 'fast-track' setting?	Bone Joint J	less than 90% OA hip patients
den Hartog,Y.M.; Mathijssen,N.M.C.; Vehmeijer,S.B.W.; Van Dasselaar,N.T.; Langendijk,P.N.J.	2015	No effect of the infiltration of local anaesthetic for total hip arthroplasty using an anterior approach: A randomised placebo controlled trial	Bone and Joint Journal	
Deshmukh,A.J.; Panagopoulos,G.; Alizadeh,A.; Rodriguez,J.A.; Klein,D.A.	2011	Intra-articular hip injection: does pain relief correlate with radiographic severity of osteoarthritis?	Skeletal Radiol	retrospective case series. the multivariate prediction model is not relevant to age because no surgery was given
Deshmukh,A.J.; Thakur,R.R.; Goyal,A.; Klein,D.A.; Ranawat,A.S.; Rodriguez,J.A.	2010	Accuracy of diagnostic injection in differentiating source of atypical hip pain	J Arthroplasty	
Desmeules,F.; Hall,J.; Woodhouse,L.J.	2013	Prehabilitation improves physical function of individuals with severe disability from hip or knee osteoarthritis	Physiother.Can	90% of pop isn't Hip OA
Devitt,A.; O'Sullivan,T.; Quinlan,W.	1997	16- to 25-year follow-up study of cemented arthroplasty of the hip in patients aged 50 years or younger	J Arthroplasty	does not compare young versus older patients
Devitt,B.M.; Philippon,M.J.; Goljan,P.; Peixoto,L.P.; Briggs,K.K.; Ho,C.P.	2014	Preoperative diagnosis of pathologic conditions of the ligamentum teres: is MRI a valuable imaging modality?		Abnormal radiograph not defined
Di,Monaco M.; Castiglioni,C.	2013	Which type of exercise therapy is effective after hip arthroplasty? A systematic review of randomized controlled trials	Eur J Phys Rehabil Med	Systematic Review
Di,Monaco M.; Vallero,F.; Tappero,R.; Cavanna,A.	2009	Rehabilitation after total hip arthroplasty: a systematic review of controlled trials on physical exercise programs	Eur J Phys Rehabil Med	Systematic Review
Di,Nicola,V; Di,Nicola R.	2012	Self-repair in degenerative joint disease	Curr Aging Sci	Hip and Knee combined
Diaz-Heredia,J.; Loza,E.; Cebreiro,I.; Ruiz Iban,M.A.	2015	Preventive analgesia in hip or knee arthroplasty: a systematic review	Rev Esp.Cir.Ortop.Traumatol.	Systematic Review

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Dietrich,T.J.; Suter,A.; Pfirrmann,C.W.; Dora,C.; Fucentese,S.F.; Zanetti,M.	2012	Supraacetabular fossa (pseudodefect of acetabular cartilage): frequency at MR arthrography and comparison of findings at MR arthrography and arthroscopy		Not relevant, does not answer pico question
Digas,G.	2005	New polymer materials in total hip arthroplasty. Evaluation with radiostereometry, bone densitometry, radiography and clinical parameters	Acta Orthop Suppl	review. one paper within review looked at age, but did not use a patient oriented outcome
Dijkmans,B.A.C.; De Sonnaville,P.B.J.; Schardijn,G.H.C.; Hazes,J.M.W.	1990	Pirprofen versus naproxen in osteoarthritis of hip and knee: a multicentre randomised double-blind cross-over trial	Journal of Orthopaedic Rheumatology	Hip and Knee combined
Dinauer,P.A.; Murphy,K.P.; Carroll,J.F.	2004	Sublabral sulcus at the posteroinferior acetabulum: a potential pitfall in MR arthrography diagnosis of acetabular labral tears	AJR Am J Roentgenol.	Not relevant, does not answer pico question
Dinubile,N.A.	2010	A potential role for avocado- and soybean-based nutritional supplements in the management of osteoarthritis: a review	Phys Sportsmed.	Systematic Review
Diracoglu,D.; Alptekin,K.; Teksoz,B.; Yagci,I.; Ozcakar,L.; Aksoy,C.	2009	Knee vs hip single-joint intra-articular hyaluronic acid injection in patients with both hip and knee osteoarthritis: a pilot study	Clin Rheumatol.	Hip and Knee combined
Dixon,M.C.; Scott,R.D.; Schai,P.A.; Stamos,V.	2004	A simple capsulorrhaphy in a posterior approach for total hip arthroplasty	J Arthroplasty	90% of pop isn't Hip OA
Doherty,M.	1992	The efficacy of Arthrotec in the treatment of osteoarthritis	Scand.J Rheumatol.Suppl	Hip and Knee combined
Doherty,M.	1992	The efficacy of Arthrotec(registered trademark) in the treatment of osteoarthritis	Scandinavian Journal of Rheumatology, Supplement	Hip and Knee combined
Dold,A.P.; Zywiel,M.G.; Taylor,D.W.; Dwyer,T.; Theodoropoulos,J.	2014	Platelet-rich plasma in the management of articular cartilage pathology: a systematic review	Clin J Sport Med	
Domayer,S.E.; Ziebarth,K.; Chan,J.; Bixby,S.; Mamisch,T.C.; Kim,Y.J.	2011	Femoroacetabular cam-type impingement: Diagnostic sensitivity and specificity of radiographic views compared to radial MRI	Eur.J.Radiol.	Not relevant, does not answer pico question
Domb,B.G.; El Bitar,Y.F.; Sadik,A.Y.; Stake,C.E.; Botser,I.B.	2014	Comparison of robotic-assisted and conventional acetabular cup placement in THA:	Clin Orthop Relat Res	Unclear of population

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		a matched-pair controlled study		
Domb,B.G.; Gui,C.; Lodhia,P.	2015	How much arthritis is too much for hip arthroscopy: a systematic review		Systematic Review
Donovan,J.; Dingwall,I.; McChesney,S.	2006	Weight change 1 year following total knee or hip arthroplasty	ANZ Journal of Surgery	combines hip and knee patients
Dorleijn,D.M.; Luijsterburg,P.A.; Bierma-Zeinstra,S.M.; Bos,P.K.	2014	Is anesthetic hip joint injection useful in diagnosing hip osteoarthritis? A meta-analysis of case series	J Arthroplasty	Systematic Review
Dorr,L.D.; Kane,T.J.,III; Conaty,J.P.	1994	Long-term results of cemented total hip arthroplasty in patients 45 years old or younger. A 16-year follow-up study	J Arthroplasty	<50% follow up
Dorr,L.D.; Luckett,M.; Conaty,J.P.	1990	Total hip arthroplasties in patients younger than 45 years. A nine- to ten-year follow-up study	Clin Orthop Relat Res	does not evaluate age as a risk factor
Dorr,L.D.; Wan,Z.; Gruen,T.	1997	Functional results in total hip replacement in patients 65 years and older	Clin Orthop Relat Res	no patient outcomes statisitically examined in relation to risk factors relevant to picoquestion
Dougados,M.; Gueguen,A.; Nguyen,M.; Berdah,L.; Lequesne,M.; Mazieres,B.; Vignon,E.	1999	Requirement for total hip arthroplasty: an outcome measure of hip osteoarthritis?	J Rheumatol.	THA is outcome
Douira-Khomsi,W.; Smida,M.; Louati,H.; Hassine,L.B.; Bouchoucha,S.; Saied,W.; Ladeb,M.F.; Ghachem,M.B.; Bellagha,I.	2010	Magnetic resonance evaluation of acetabular residual dysplasia in developmental dysplasia of the hip: a preliminary study of 27 patients	J Pediatr Orthop	Not relevant, does not answer pico question
Dowsey,M.M.; Castle,D.J.; Knowles,S.R.; Monshat,K.; Salzberg,M.R.; Choong,P.F.	2014	The effect of mindfulness training prior to total joint arthroplasty on post-operative pain and physical function: study protocol for a randomised controlled trial	Trials	Unclear if 90% of pop is Hip OA
Dowsey,M.M.; Liew,D.; Stoney,J.D.; Choong,P.F.	2010	The impact of obesity on weight change and outcomes at 12 months in patients undergoing total hip arthroplasty	Med J Aust.	less than 90% OA hip

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Dreiser,R.L.; Riebenfeld,D.	1993	Nimesulide in the treatment of osteoarthritis. Double-blind studies in comparison with piroxicam, ketoprofen and placebo		Hip and Knee combined
Drozdov,V.N.; Kim,V.A.; Tkachenko,E.V.; Varvanina,G.G.	2012	Influence of a specific ginger combination on gastropathy conditions in patients with osteoarthritis of the knee or hip	J Altern.Complement Med	Hip and Knee combined
Ducou Le,Pointe H.; Haddad,S.; Silberman,B.; Filipe,G.; Monroc,M.; Montagne,J.-P.	1994	Legg-Perthes-Calve disease: Staging by MRI using gadolinium	Pediatr.Radiol.	Not relevant, does not answer pico question
Dudda,M.; Gueleryuez,A.; Gautier,E.; Busato,A.; Roeder,C.	2010	Risk factors for early dislocation after total hip arthroplasty: a matched case-control study	J Orthop Surg (Hong Kong)	Not relevant, does not answer pico question
Dudkiewicz,I.; Salai,M.; Chechik,A.; Ganel,A.	2000	Total hip arthroplasty after childhood septic hip in patients younger than 25 years of age	J Pediatr Orthop	does not evaluate age as a risk factor
Dudkiewicz,I.; Salai,M.; Israeli,A.; Amit,Y.; Chechick,A.	2003	Total hip arthroplasty in patients younger than 30 years of age	Israel Medical Association Journal	less than 90% OA hip patients
Duggan,S.T.; Scott,L.J.	2010	Morphine/naltrexone	CNS Drugs	review
Duijsens,A.W.; Keizer,S.; Vliet-Vlieland,T.; Nelissen,R.G.	2005	Resurfacing hip prostheses revisited: failure analysis during a 16-year follow-up	Int Orthop	less than 90% OA hip. for age, patients did not get THA
Dutka,J.; Dutka,L.; Janiszewski,M.; Hajduk,G.	2008	Cost analysis and sociomedical aspects of the conservative and surgical treatment of hip osteoarthritis	Ortop.Traumatol.Rehabil	Not relevant to recommendation
Dutka,J.; Sosin,P.; Libura,M.; Skowronek,P.	2007	Total hip arthroplasty through a minimally invasive lateral approach--our experience and early results	Ortop.Traumatol.Rehabil	90% of pop isn't Hip OA
Dworkin,R.H.; Peirce-Sandner,S.; Turk,D.C.; McDermott,M.P.; Gibofsky,A.; Simon,L.S.; Farrar,J.T.; Katz,N.P.	2011	Outcome measures in placebo-controlled trials of osteoarthritis: Responsiveness to treatment effects in the REPORT database	Osteoarthritis Cartilage	Systematic Review
Dworkin,R.H.; Turk,D.C.; Peirce-Sandner,S.; He,H.; McDermott,M.P.; Hochberg,M.C.; Jordan,J.M.; Katz,N.P.; Lin,A.H.; Neogi,T.; Rappaport,B.A.; Simon,L.S.; Strand,V.	2014	Meta-analysis of assay sensitivity and study features in clinical trials of pharmacologic treatments for osteoarthritis pain	Arthritis Rheumatol.	review

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Dy,C.J.; Bozic,K.J.; Pan,T.J.; Wright,T.M.; Padgett,D.E.; Lyman,S.	2014	Risk factors for early revision after total hip arthroplasty	Arthritis Care Res (Hoboken)	less than 90% OA hip patients
Earl,R.T.; Jenkins,R.; Munro,A.J.	1996	A double-masked comparison of the efficacy of once-daily sustained-release ibuprofen and once-daily piroxicam for 24-hour control of arthralgia due to osteoarthritis in the elderly	Current Therapeutic Research - Clinical and Experimental	Hip and Knee combined
Edwards,D.S.; Barbur,S.A.R.; Bull,A.M.J.; Stranks,G.J.	2015	Posterior mini-incision total hip arthroplasty controls the extent of post-operative formation of heterotopic ossification	European Journal of Orthopaedic Surgery and Traumatology	inadequate quality due to loss to follow up and the use of bivariate statistical methods.
Edworthy,S.M.; Devins,G.M.	1999	Improving medication adherence through patient education distinguishing between appropriate and inappropriate utilization	J.Rheumatol.	Unclear if 90% of pop is Hip OA
Ehrich,E.W.; Bolognese,J.A.; Watson,D.J.; Kong,S.X.	2001	Effect of rofecoxib therapy on measures of health-related quality of life in patients with osteoarthritis	Am J Manag Care	Hip and Knee combined
Eitzen,I.; Fernandes,L.; Nordsletten,L.; Risberg,M.A.	2015	No effects of a 12-week supervised exercise therapy program on gait in patients with mild to moderate osteoarthritis: a secondary analysis of a randomized trial	J Negat.Results Biomed	outcome is gait only
Ekelund,A.; Rydell,N.; Nilsson,O.S.	1992	Total hip arthroplasty in patients 80 years of age and older	Clin.Orthop.	does not consider age as a risk factor
Ekman,E.F.; Gimbel,J.S.; Bello,A.E.; Smith,M.D.; Keller,D.S.; Annis,K.M.; Brown,M.T.; West,C.R.; Verburg,K.M.	2014	Efficacy and safety of intravenous tanezumab for the symptomatic treatment of osteoarthritis: 2 randomized controlled trials versus naproxen	J Rheumatol.	Hip and Knee combined
El Bitar,Y.F.; Stake,C.E.; Dunne,K.F.; Botser,I.B.; Domb,B.G.	2014	Arthroscopic Iliopsoas Fractional Lengthening for Internal Snapping of the Hip: Clinical Outcomes With a Minimum 2-Year Follow-up	Am J Sports Med	Not relevent, patient population
Elbourne,D.; Dezateux,C.; Arthur,R.; Clarke,N.M.; Gray,A.; King,A.; Quinn,A.; Gardner,F.; Russell,G.	2002	Ultrasonography in the diagnosis and management of developmental hip dysplasia (UK Hip Trial): clinical and economic results of a multicentre randomised controlled trial		Not relevant, does not answer pico question

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Elings,J.; van der Sluis,G.; Goldbohm,R.A.; Galindo,Garre F.; de,Gast A.; Hoogeboom,T.; van Meeteren,N.L.	2016	Development of a Risk Stratification Model for Delayed Inpatient Recovery of Physical Activities in Patients Undergoing Total Hip Replacement	J Orthop Sports Phys Ther	less than 90% OA hip patients
Ellermann,J.; Ziegler,C.; Nissi,M.J.; Goebel,R.; Hughes,J.; Benson,M.; Holmberg,P.; Morgan,P.	2014	Acetabular cartilage assessment in patients with femoroacetabular impingement by using T2* mapping with arthroscopic verification		Not relevant, does not answer pico question
Emery,D.F.; Clarke,H.J.; Grover,M.L.	1997	Stanmore total hip replacement in younger patients: review of a group of patients under 50 years of age at operation	J Bone Joint Surg Br	retrospective case series
Emery,P.; Koncz,T.; Pan,S.; Lowry,S.	2008	Analgesic effectiveness of celecoxib and diclofenac in patients with osteoarthritis of the hip requiring joint replacement surgery: a 12-week, multicenter, randomized, double-blind, parallel-group, double-dummy, noninferiority study	Clin Ther	not relevant comparison
Emery,P.; Kong,S.X.; Ehrich,E.W.; Watson,D.J.; Towheed,T.E.	2002	Dose-effect relationships of nonsteroidal anti-inflammatory drugs: a literature review	Clin Ther	Systematic Review
Endo,H.; Mitani,S.; Senda,M.; Kawai,A.; McCown,C.; Umeda,M.; Miyakawa,T.; Inoue,H.	2003	Three-dimensional gait analysis of adults with hip dysplasia after rotational acetabular osteotomy	J Orthop Sci	Not relevant to recommendation
Engesaeter,I.O.; Lehmann,T.; Laborie,L.B.; Lie,S.A.; Rosendahl,K.; Engesaeter,L.B.	2011	Total hip replacement in young adults with hip dysplasia: age at diagnosis, previous treatment, quality of life, and validation of diagnoses reported to the Norwegian Arthroplasty Register between 1987 and 2007	Acta Orthop	does not answer pico question
Engesaeter,L.B.; Engesaeter,I.O.; Fenstad,A.M.; Havelin,L.I.; Karrholm,J.; Garellick,G.; Pedersen,A.B.; Overgaard,S.	2012	Low revision rate after total hip arthroplasty in patients with pediatric hip diseases	Acta Orthop	they adjusted there primary analysis for age, but did not report age results
Engesaeter,L.B.; Lie,S.A.; Espehaug,B.; Furnes,O.; Vollset,S.E.; Havelin,L.I.	2003	Antibiotic prophylaxis in total hip arthroplasty: effects of antibiotic prophylaxis systemically and in bone cement on the revision rate of 22,170 primary hip replacements followed 0-14 years in the Norwegian Arthroplasty Register	Acta Orthop Scand.	controls for age, but doesn't present results

Authors	Year	Article Title	Periodical	Reason for Exclusion
Engstrom,G.; Gerhardsson,de,V; Rollof,J.; Nilsson,P.M.; Lohmander,L.S.	2009	C-reactive protein, metabolic syndrome and incidence of severe hip and knee osteoarthritis. A population-based cohort study	Osteoarthritis Cartilage	incidence of hip OA is the outcome, not relevant
Ennis,Z.N.; Dideriksen,D.; Vaegter,H.B.; Handberg,G.; Pottegard,A.	2016	Acetaminophen for Chronic Pain: A Systematic Review on Efficacy	Basic Clin Pharmacol Toxicol.	Systematic Review
Enocson,A.; Lapidus,G.; Tornkvist,H.; Tidermark,J.; Lapidus,L.J.	2010	Direction of hip arthroplasty dislocation in patients with femoral neck fractures	Int Orthop	Patient population not OA
Ernst,E.	2003	Avocado-soybean unsaponifiables (ASU) for osteoarthritis - a systematic review	Clin Rheumatol.	Systematic Review
Ersmark,H.; Tjornstrand,B.; Gudmundsson,G.; Duppe,H.; Fagerlund,M.; Jacobsson,B.; Ordeberg,G.; Wallinder,L.	1992	Piroxicam and indomethacin suppositories for painful coxarthrosis	Clin Rheumatol.	Review
Erturk,C.; Altay,M.A.; Isikan,U.E.	2013	A radiological comparison of Salter and Pemberton osteotomies to improve acetabular deformations in developmental dysplasia of the hip	J Pediatr Orthop B	Not relevent, outcome
Es,P.P.; Luijsterburg,P.A.; Dekker,J.; Koopmanschap,M.A.; Bohnen,A.M.; Verhaar,J.A.; Koes,B.W.; Bierma-Zeinstra,S.M.	2011	Cost-effectiveness of exercise therapy versus general practitioner care for osteoarthritis of the hip: design of a randomised clinical trial	BMC Musculoskeletal Disorders	Results section/not completed study
Eskelinen,A.; Paavolainen,P.; Helenius,I.; Pulkkinen,P.; Remes,V.	2006	Total hip arthroplasty for rheumatoid arthritis in younger patients: 2,557 replacements in the Finnish Arthroplasty Register followed for 0-24 years	Acta Orthop	less than 90% OA hip patients
Eskelinen,A.; Remes,V.; Helenius,I.; Pulkkinen,P.; Nevalainen,J.; Paavolainen,P.	2006	Uncemented total hip arthroplasty for primary osteoarthritis in young patients: a mid-to long-term follow-up study from the Finnish Arthroplasty Register	Acta Orthop	does not evaluate age as a risk factor

Authors	Year	Article Title	Periodical	Reason for Exclusion
Espehaug,B.; Havelin,L.I.; Engesaeter,L.B.; Langeland,N.; Vollset,S.E.	1998	Patient satisfaction and function after primary and revision total hip replacement	Clin.Orthop.	not all revised hips had whole implant replaced, which makes that group not relevant to the pico question. could use results of subgroup of unrevised hips as a seperate cohort study, but this would be very low quality because only unrevised patients would be included, which would directly influence patient satisfaction outcome.
Essex,M.N.; Brown,P.B.; Sands,G.H.	2014	The efficacy of continuous versus intermittent celecoxib treatment in osteoarthritis patients aged <60 and (greater-than or equal to)60 years	International Journal of Clinical Rheumatology	Hip and Knee combined
Essex,M.N.; Zhang,R.Y.; Berger,M.F.; Upadhyay,S.; Park,P.W.	2013	Safety of celecoxib compared with placebo and non-selective NSAIDs: Cumulative meta-analysis of 89 randomized controlled trials	Expert Opinion on Drug Safety	Review
Ethgen,O.; Vanparijs,P.; Delhalle,S.; Rosant,S.; Bruyere,O.; Reginster,J.Y.	2004	Social support and health-related quality of life in hip and knee osteoarthritis	Qual Life Res	hip and knee results combined
Etropolski,M.; Kuperwasser,B.; Flugel,M.; Haufel,T.; Lange,B.; Rauschkolb,C.; Laschewski,F.	2014	Safety and tolerability of tapentadol extended release in moderate to severe chronic osteoarthritis or low back pain management: pooled analysis of randomized controlled trials	Adv Ther	Unclear if 90% of pop is Hip OA
Ettinger,M.; Berger,S.; Floerkemeier,T.; Windhagen,H.; Ezechieli,M.	2015	Sports activity after treatment of residual hip dysplasia with triple pelvic osteotomy using the Tonnis and Kalchschmidt technique	Am J Sports Med	Retrospective case series

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Eyigor,C.; Pirim,A.; Eyigor,S.; Uyar,M.	2010	Efficacy of intraarticular hyaluronic acid injection through a lateral approach under fluoroscopic control for advanced hip osteoarthritis	Agri	
Ezirmik,N.; Yildiz,K.	2012	Advantages of single-stage surgical treatment with salter innominate osteotomy and Pemberton pericapsular osteotomy for developmental dysplasia of both hips	J Int Med Res	Not relevant to recommendation
Ezquerra-Herrando,L.; Seral-Garcia,B.; Quilez,M.P.; Perez,M.A.; Albareda-Albareda,J.	2015	Instability of total hip replacement: A clinical study and determination of its risk factors	Rev Esp.Cir.Ortop.Traumatol.	very low quality
Faraj,A.A.; Kumaraguru,P.; Kosygan,K.	2003	Intra-articular bupivacaine hip injection in differentiation of coxarthrosis from referred thigh pain: a 10 year study	Acta Orthop Belg.	
Fawzy,E.; Mandellos,G.; de,Steiger R.; McLardy-Smith,P.; Benson,M.K.; Murray,D.	2005	Is there a place for shelf acetabuloplasty in the management of adult acetabular dysplasia? A survivorship study	J Bone Joint Surg Br	Not relevant to recommendation
Fedder,M.; Stroehmann,I.	1990	Efficacy and safety of nabumetone in 5,421 patients with osteoarthritis of the hip and/or knee joints. A subgroup evaluation of an outpatient study involving 18,047 patients		Hip and Knee combined
Felson,D.T.	1996	Weight and osteoarthritis	Am J Clin Nutr.	Narrative review
Felson,D.T.; Chaisson,C.E.	1997	Understanding the relationship between body weight and osteoarthritis	Baillieres Clin Rheumatol.	review
Fernandes,L.; Hagen,K.B.; Bijlsma,J.W.; Andreassen,O.; Christensen,P.; Conaghan,P.G.; Doherty,M.; Geenen,R.; Hammond,A.; Kjeken,I.; Lohmander,L.S.; Lund,H.; Mallen,C.D.; Nava,T.; Oliver,S.; Pavelka,K.; Pitsillidou,I.; da Silva,J.A.; de la Torre,J.; Zanoli,G.; Vliet Vlieland,T.P.	2013	EULAR recommendations for the non-pharmacological core management of hip and knee osteoarthritis	Ann Rheum.Dis	Systematic Review
Fernandes,L.; Storheim,K.; Nordsletten,L.; Risberg,M.	2009	Effect of patient education and supervised exercise in patients with hip osteoarthritis. A	Osteoarthritis Cartilage	Abstract only

Authors	Year	Article Title	Periodical	Reason for Exclusion
		randomized clinical trial		
Fernandez Lopez,J.C.; Ruano-Ravina,A.	2006	Efficacy and safety of intraarticular hyaluronic acid in the treatment of hip osteoarthritis: a systematic review	Osteoarthritis Cartilage	
Ferro,F.P.; Ho,C.P.; Briggs,K.K.; Philippon,M.J.	2015	Patient-centered outcomes after hip arthroscopy for femoroacetabular impingement and labral tears are not different in patients with normal, high, or low femoral version		Retrospective case series
Fidelix,T.S.; Macedo,C.R.; Maxwell,L.J.; Fernandes,Moca Trevisani,V	2014	Diacerein for osteoarthritis	Cochrane Database Syst Rev	
Field,R.E.; Singh,P.J.; Latif,A.M.; Cronin,M.D.; Matthews,D.J.	2006	Five-year prospective clinical and radiological results of a new cannulated cemented polished Tri-Taper femoral stem	J Bone Joint Surg Br	Not relevant to recommendation
Finkbone,P.R.; Severson,E.P.; Cabanela,M.E.; Trousdale,R.T.	2012	Ceramic-on-ceramic total hip arthroplasty in patients younger than 20 years	J Arthroplasty	doesn't compare young versus older patients
Fioravanti,A.; Storri,L.; Di,Martino S.; Bisogno,S.; Oldani,V.; Scotti,A.; Marcolongo,R.	2002	A randomized, double-blind, multicenter trial of nimesulide-beta-cyclodextrin versus naproxen in patients with osteoarthritis	Clin Ther	90% of pop isn't Hip OA
Fiorentino,G.; Fontanarosa,A.; Cepparulo,R.; Guardoli,A.; Berni,L.; Coviello,G.; Guardoli,A.	2015	Treatment of cam-type femoroacetabular impingement	Joints.	Retrospective case series
FIRST Investigators	2015	A multi-centre randomized controlled trial comparing arthroscopic osteochondroplasty and lavage with arthroscopic lavage alone on patient important outcomes and quality of life in the treatment of young adult (18-50) Femoroacetabular impingement	BMC Musculoskelet.Disord.	Methodology
Fitzgerald,G.K.; Hinman,R.S.; Zeni,J.,Jr.; Risberg,M.A.; Snyder-Mackler,L.; Bennell,K.L.	2015	OARSI Clinical Trials Recommendations: Design and conduct of clinical trials of rehabilitation interventions for osteoarthritis	Osteoarthritis Cartilage	Systematic Review

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Fleischmann,R.; Tannenbaum,H.; Patel,N.P.; Notter,M.; Sallstig,P.; Reginster,J.Y.	2008	Long-term retention on treatment with lumiracoxib 100 mg once or twice daily compared with celecoxib 200 mg once daily: a randomised controlled trial in patients with osteoarthritis	BMC Musculoskelet.Disord.	Hip and Knee combined
Florete,O.G.; Xiang,J.; Vorsanger,G.J.	2008	Effects of extended-release tramadol on pain-related sleep parameters in patients with osteoarthritis	Expert Opin Pharmacother.	Dosage
Flugsrud,G.B.; Nordsletten,L.; Espehaug,B.; Havelin,L.I.; Meyer,H.E.	2003	Weight change and the risk of total hip replacement		Screening test/ no comparisons
Flugsrud,G.B.; Nordsletten,L.; Espehaug,B.; Havelin,L.I.; Meyer,H.E.	2007	The effect of middle-age body weight and physical activity on the risk of early revision hip arthroplasty: a cohort study of 1,535 individuals	Acta Orthop	less than 90% OA hip
Fong,H.C.; Lu,W.; Li,Y.H.; Leong,J.C.	2000	Chiari osteotomy and shelf augmentation in the treatment of hip dysplasia	J Pediatr Orthop	Retrospective case series
Foucher,K.C.; Wimmer,M.A.; Moisio,K.C.; Hildebrand,M.; Berli,M.C.; Walker,M.R.; Berger,R.A.; Galante,J.O.	2011	Time course and extent of functional recovery during the first postoperative year after minimally invasive total hip arthroplasty with two different surgical approaches--a randomized controlled trial	J Biomech.	not patient reported outcome
Fransen,M.; McConnell,S.; Bell,M.	2002	Therapeutic exercise for people with osteoarthritis of the hip or knee. A systematic review	J Rheumatol.	Systematic Review
Fransen,M.; McConnell,S.; Hernandez-Molina,G.; Reichenbach,S.	2014	Exercise for osteoarthritis of the hip	Cochrane Database Syst Rev	Systematic Review
Fransen,M.; McConnell,S.; Hernandez-Molina,G.; Reichenbach,S.	2010	Does land-based exercise reduce pain and disability associated with hip osteoarthritis? A meta-analysis of randomized controlled trials	Osteoarthritis Cartilage	Systematic Review
Fransen,M.; McConnell,S.; Hernandez-Molina,G.; Reichenbach,S.	2009	Exercise for osteoarthritis of the hip	Cochrane Database Syst Rev	Systematic Review
Franzen,H.; Nilsson,L.T.; Stromqvist,B.; Johnsson,R.; Herrlin,K.	1990	Secondary total hip replacement after fractures of the femoral neck	J Bone Joint Surg Br	not relevant. compares OA to hip fracture patients stratified by age

Authors	Year	Article Title	Periodical	Reason for Exclusion
				group, without presenting the effect of age.
French,H.P.; Brennan,A.; White,B.; Cusack,T.	2011	Manual therapy for osteoarthritis of the hip or knee - a systematic review	Man.Ther	Systematic Review
French,H.P.; Cusack,T.; Brennan,A.; White,B.; Gilsenan,C.; Fitzpatrick,M.; O'Connell,P.; Kane,D.; Fitzgerald,O.; McCarthy,G.M.	2009	Exercise and manual physiotherapy arthritis research trial (EMPART): a multicentre randomised controlled trial	BMC Musculoskelet.Disord.	Results section/not completed study
French,H.P.; Galvin,R.; Cusack,T.; McCarthy,G.M.	2014	Predictors of short-term outcome to exercise and manual therapy for people with hip osteoarthritis	Phys Ther	intervention if PT, not THA
Friedmann,N.; Klutzaritz,V.; Webster,L.	2011	Efficacy and safety of an extended-release oxycodone (Remoxy) formulation in patients with moderate to severe osteoarthritic pain	J Opioid Manag	90% of pop isn't Hip OA
Friedmann,N.; Klutzaritz,V.; Webster,L.	2011	Long-term safety of Remoxy(R) (extended-release oxycodone) in patients with moderate to severe chronic osteoarthritis or low back pain	Pain Med	90% of pop isn't Hip OA
Friedmann,N.; Klutzaritz,V.; Webster,L.	2011	Efficacy and safety of an extended-release oxycodone (Remoxy(registered trademark)) formulation in patients with moderate to severe osteoarthritic pain	Journal of Opioid Management	90% of pop isn't Hip OA
Frost,K.L.; Bertocci,G.E.; Wassinger,C.A.; Munin,M.C.; Burdett,R.G.; Fitzgerald,S.G.	2006	Isometric performance following total hip arthroplasty and rehabilitation	J.Rehabil.Res.Dev.	Not relevant to recommendation
Fuchtmeier,B.; Galler,M.; Muller,F.	2015	Mid-term results of 121 periprosthetic femoral fractures: Increased failure and mortality within but not after one postoperative year	J.Arthroplasty	not all patients had THA. some had internal fixation
Fujii,M.; Nakashima,Y.; Sato,T.; Akiyama,M.; Iwamoto,Y.	2012	Acetabular tilt correlates with acetabular version and coverage in hip dysplasia	Clin Orthop Relat Res	would be very low quality diagnostic study for using healthy controls

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Fujii,T.; Takana,K.; Orita,S.; Inoue,G.; Ochiai,N.; Kuniyoshi,K.; Aoki,Y.; Ishikawa,T.; Miyagi,M.; Kamoda,H.; Suzuki,M.; Sakuma,Y.; Kubota,G.; Oikawa,Y.; Inage,K.; Sainoh,T.; Sato,J.; Yamauchi,K.; Toyone,T.; Nakamura,J.; Kishida,S.; Takahashi,K.; Ohtori,S.	2014	Progressive change in joint degeneration in patients with knee or hip osteoarthritis treated with fentanyl in a randomized trial	Yonsei Med J	90% of pop isn't Hip OA
Fujita,K.; Kabata,T.; Maeda,T.; Kajino,Y.; Iwai,S.; Kuroda,K.; Hasegawa,K.; Tsuchiya,H.	2014	The use of the transverse acetabular ligament in total hip replacement: An analysis of the orientation of the trial acetabular component using a navigation system	Bone Joint J	no patient oriented outcomes
Fukumoto,Y.; Tateuchi,H.; Ikezoe,T.; Tsukagoshi,R.; Akiyama,H.; So,K.; Kuroda,Y.; Ichihashi,N.	2014	Effects of high-velocity resistance training on muscle function, muscle properties, and physical performance in individuals with hip osteoarthritis: a randomized controlled trial	Clin Rehabil	Work group does not consider study treatments to fit the definition of self management programs they used when the wrote the pico question
Fukushima,K.; Uchiyama,K.; Takahira,N.; Moriya,M.; Yamamoto,T.; Itoman,M.; Takaso,M.	2014	Prevalence of radiographic findings of femoroacetabular impingement in the Japanese population	J Orthop Surg Res	Retrospective case series
Furnes,O.; Lie,S.A.; Espehaug,B.; Vollset,S.E.; Engesaeter,L.B.; Havelin,L.I.	2001	Hip disease and the prognosis of total hip replacements. A review of 53,698 primary total hip replacements reported to the Norwegian Arthroplasty Register 1987-99	J Bone Joint Surg Br	insufficient data for the pico question
Furnes,O.; Lie,S.A.; Espehaug,B.; Vollset,S.E.; Engesaeter,L.B.; Havelin,L.I.	2001	Hip disease and the prognosis of total hip replacements	Journal of Bone and Joint Surgery - Series B	not relevant. the purpose of the article is to determine how results vary by diagnosis, stratified by age. however, the data is not presented in a manner that allows evaluation of

Authors	Year	Article Title	Periodical	Reason for Exclusion
				age as a risk factor, which is needed to answer the pico question
Gabriel,R.A.; Kaye,A.D.; Jones,M.R.; Dutton,R.P.; Urman,R.D.	2016	Practice Variations in Anesthetic Care and Its Effect on Clinical Outcomes for Primary Total Hip Arthroplasties	J.Arthroplasty	Not relevant, does not answer pico question
Gajria,K.; Kosinski,M.; Schein,J.; Kavanagh,S.; Dubois,D.	2008	Health-Related Quality-of-Life Outcomes in Patients Treated with Push-Pull OROS Hydromorphone versus Extended-Release Oxycodone for Chronic Hip or Knee Osteoarthritis Pain: A Randomized, Open-Label, Parallel-Group, Multicenter Study	Patient	90% of pop isn't Hip OA
Gana,T.J.; Pascual,M.L.; Fleming,R.R.; Schein,J.R.; Janagap,C.C.; Xiang,J.; Vorsanger,G.J.	2006	Extended-release tramadol in the treatment of osteoarthritis: a multicenter, randomized, double-blind, placebo-controlled clinical trial	Curr Med Res Opin	Hip and Knee combined
Gandhi,R.; Davey,J.R.; Mahomed,N.N.	2008	Predicting patient dissatisfaction following joint replacement surgery	J Rheumatol.	hip and knee results combined
Gandhi,R.; Razak,F.; Davey,J.R.; Mahomed,N.N.	2008	Ethnicity and patient's perception of risk in joint replacement surgery	J Rheumatol.	combines hip and knee results
Gandhi,R.; Razak,F.; Davey,J.R.; Rampersaud,Y.R.; Mahomed,N.N.	2010	Effect of sex and living arrangement on the timing and outcome of joint replacement surgery	Can J Surg	hip and knee results combined
Gandhi,R.; Razak,F.; Mahomed,N.N.	2008	Ethnic differences in the relationship between obesity and joint pain and function in a joint arthroplasty population	J Rheumatol.	hip and knee results combined
Gandhi,R.; Razak,F.; Tso,P.; Davey,J.R.; Mahomed,N.N.	2009	Greater perceived helplessness in osteoarthritis predicts outcome of joint replacement surgery	J Rheumatol.	hip and knee results combined
Gandhi,R.; Tsvetkov,D.; Dhottar,H.; Davey,J.R.; Mahomed,N.N.	2010	Quantifying the pain experience in hip and knee osteoarthritis	Pain Res Manag	hip and knee results combined. also outcomes measured before surgery

Authors	Year	Article Title	Periodical	Reason for Exclusion
Gandhi,R.; Zywiel,M.G.; Mahomed,N.N.; Perruccio,A.V.	2015	Depression and the Overall Burden of Painful Joints: An Examination among Individuals Undergoing Hip and Knee Replacement for Osteoarthritis	Arthritis	combines Hip and Knee patients, and it is unclear if 90% of the patient population had THA verus TKA
Ganz,R.; Horowitz,K.; Leunig,M.	2010	Algorithm for femoral and periacetabular osteotomies in complex hip deformities	Clin Orthop Relat Res	Retrospective case series
Garbuz,D.S.; Awwad,M.A.; Duncan,C.P.	2008	Periacetabular osteotomy and total hip arthroplasty in patients older than 40 years	J Arthroplasty	Not relevant, does not answer pico question
GarcÃ?Âa-Rey,E.; GarcÃ?Âa-Cimbrelo,E.	2016	Abductor Biomechanics Clinically Impact the Total Hip Arthroplasty Dislocation Rate. A Prospective Long-Term Study	J.Arthroplasty	less than 90% OA hip patients
Garcia-Rey,E.; Cruz-Pardos,A.; Madero,R.	2014	Clinical outcome following conversion of Girdlestone's resection arthroplasty to total hip replacement: a retrospective matched case-control study	Bone Joint J	very low quality for the data that is relevant to the pico question
Garland,A.; Rolfson,O.; Garellick,G.; Karrholm,J.; Hailer,N.P.	2015	Early postoperative mortality after simultaneous or staged bilateral primary total hip arthroplasty: an observational register study from the swedish Hip arthroplasty register	BMC Musculoskelet.Disord.	not best available evidence due potential for immortal time bias, and missing predictor data.
Garneti,N.; Field,J.	2004	Bone bleeding during total hip arthroplasty after administration of tranexamic acid	J Arthroplasty	not patient reported outcome
Garnett,G.M.; Kimball,S.; Kon,K.; Woo,R.K.	2013	Pulmonary artery pseudoaneurysm after MRSA septicemia in a pediatric patient	J.Pediatr.Surg.	case report
Gaston,M.S.; Tiemessen,C.H.; Philips,J.E.	2007	Intra-articular hip viscosupplementation with synthetic hyaluronic acid for osteoarthritis: efficacy, safety and relation to pre-injection radiographs	Arch Orthop Trauma Surg	
Gaught,A.M.H.; Carneiro,K.A.	2013	Evidence for determining the exercise prescription in patients with osteoarthritis	Physician and Sportsmedicine	Method section/not completed study

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Gay,C.; Chabaud,A.; Guilley,E.; Coudeyre,E.	2016	Educating patients about the benefits of physical activity and exercise for their hip and knee osteoarthritis. Systematic literature review	Ann Phys Rehabil Med	Systematic Review
Gedouin,J.E.; May,O.; Bonin,N.; Nogier,A.; Boyer,T.; Sadri,H.; Villar,R.N.; Laude,F.	2010	Assessment of arthroscopic management of femoroacetabular impingement. A prospective multicenter study	Orthop Traumatol.Surg Res	Not relevant, does not answer pico question
Geesink,R.G.; Hoefnagels,N.H.	1995	Six-year results of hydroxyapatite-coated total hip replacement	J Bone Joint Surg Br	does not look at age as a risk factor
Gerdesmeyer,L.; Gollwitzer,H.; Diehl,P.; Buttgereit,B.; Rudert,M.	2009	The minimally invasive anterolateral approach combined with hip onlay resurfacing	Oper.Orthop Traumatol.	review
Geusens,P.	2009	Naproxcinod, a new cyclooxygenase-inhibiting nitric oxide donator (CINOD)	Expert Opinion on Biological Therapy	Abstract
Giaquinto,S.; Ciotola,E.; Dall'armi,V.; Margutti,F.	2010	Hydrotherapy after total hip arthroplasty: a follow-up study	Arch Gerontol.Geriatr.	no passive control
Giaquinto,S.; Ciotola,E.; Margutti,F.; Valentini,F.	2007	Gait during hydrokinesitherapy following total hip arthroplasty	Disabil.Rehabil.	Unclear if 90% of pop is Hip OA
Gibofsky,A.; Altman,R.; Daniels,S.; Imasogie,O.; Young,C.	2015	Low-dose SoluMatrix diclofenac : a review of safety across two Phase III studies in patients with acute and osteoarthritis pain	Expert Opin Drug Saf	
Gibofsky,A.; Hochberg,M.C.; Jaros,M.J.; Young,C.L.	2014	Efficacy and safety of low-dose submicron diclofenac for the treatment of osteoarthritis pain: a 12 week, phase 3 study	Curr Med Res Opin	Hip and Knee combined
Gicquel,T.; Gedouin,J.E.; Krantz,N.; May,O.; Gicquel,P.; Bonin,N.	2014	Function and osteoarthritis progression after arthroscopic treatment of femoro-acetabular impingement: a prospective study after a mean follow-up of 4.6 (4.2-5.5) years	Orthop Traumatol.Surg Res	Not relevant, does not answer pico question
Gignac,M.A.; Backman,C.L.; Davis,A.M.; Lacaille,D.; Mattison,C.A.; Montie,P.; Badley,E.M.	2008	Understanding social role participation: what matters to people with arthritis?	J Rheumatol.	combines hip and knee results
Gilbey,H.J.; Ackland,T.R.; Wang,A.W.; Morton,A.R.; Trouchet,T.; Tapper,J.	2003	Exercise improves early functional recovery after total hip arthroplasty	Clin Orthop Relat Res	90% of pop isn't Hip OA

Authors	Year	Article Title	Periodical	Reason for Exclusion
Gililland,J.M.; Anderson,L.A.; Erickson,J.; Pelt,C.E.; Peters,C.L.	2013	Mean 5-year clinical and radiographic outcomes of cementless total hip arthroplasty in patients under the age of 30	BioMed Research International	descriptive study that does not evaluate age as a prognostic factor
Gill,R.S.; Al-Adra,D.P.; Shi,X.; Sharma,A.M.; Birch,D.W.; Karmali,S.	2011	The benefits of bariatric surgery in obese patients with hip and knee osteoarthritis: a systematic review	Obes.Rev	Systematic Review
Gill,S.D.; McBurney,H.; Schulz,D.L.	2009	Land-based versus pool-based exercise for people awaiting joint replacement surgery of the hip or knee: results of a randomized controlled trial	Arch Phys Med Rehabil	90% of pop isn't Hip OA
Gillam,M.H.; Ryan,P.; Salter,A.; Graves,S.E.	2012	Multi-state models and arthroplasty histories after unilateral total hip arthroplasties: introducing the Summary Notation for Arthroplasty Histories	Acta Orthop	most results are for gender stratified by age, without evaluating differences in results between age groups. The only outcome in which age is considered as a risk factor is need for contralateral hip replacement, which is not a relevant outcome
Gillam,M.H.; Ryan,P.; Salter,A.; Graves,S.E.	2012	Multi-state models and arthroplasty histories after unilateral total hip arthroplasties	Acta orthopaedica	most results are for gender stratified by age, without evaluating differences in results between age groups. The only outcome in which age is considered as a risk factor is need for contralateral hip replacement, which

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				is not a relevant outcome
Gillespie,J.A.; Patil,S.R.; Meek,R.D.	2015	Clinical outcome scores for arthroscopic femoral osteochondroplasty in femoroacetabular impingement: a quantitative systematic review	Scott.Med J	Systematic Review
Gillingham,S.J.; Alvi,F.; Lovell,M.E.	2010	The effect of increasing age on nocturnal joint pain in patients about to undergo hip or knee joint arthroplasty	Arch Gerontol.Geriatr.	outcomes measured before THA
Giraudet-Le,Quintrec J.-S.; Coste,J.; Vastel,L.; Pacault,V.; Jeanne,L.; Lamas,J.-P.; Kerboull,L.; Fougeray,M.; Conseiller,C.; Kahan,A.; Courpied,J.-P.	2003	Positive effect of patient education for hip surgery: A randomized trial	Clin.Orthop.	Work group does not consider study treatments to fit the definition of self management programs they used when the wrote the pico question
Gjertsen,J.E.; Lie,S.A.; Fevang,J.M.; Havelin,L.I.; Engesaeter,L.B.; Vinje,T.; Furnes,O.	2007	Total hip replacement after femoral neck fractures in elderly patients : results of 8,577 fractures reported to the Norwegian Arthroplasty Register	Acta Orthop	analysis adjusts for age, but doesn't report results
Glyn-Jones,S.; Alfaro-Adrian,J.; Murray,D.W.; Gill,H.S.	2006	The influence of surgical approach on cemented stem stability: an RSA study	Clin Orthop Relat Res	Not relevant to recommendation
Gocen,Z.; Sen,A.; Unver,B.; Karatosun,V.; Gunal,I.	2004	The effect of preoperative physiotherapy and education on the outcome of total hip replacement: a prospective randomized controlled trial	Clin Rehabil	90% of pop isn't Hip OA
Goebel,S.; Steinert,A.F.; Schillinger,J.; Eulert,J.; Broscheit,J.; Rudert,M.; Noth,U.	2012	Reduced postoperative pain in total hip arthroplasty after minimal-invasive anterior approach	Int Orthop	retrospective case series

Authors	Year	Article Title	Periodical	Reason for Exclusion
Goetz,D.D.; Smith,E.J.; Harris,W.H.	1994	The prevalence of femoral osteolysis associated with components inserted with or without cement in total hip replacements. A retrospective matched- pair series	Journal of Bone and Joint Surgery - Series A	Not relevant to recommendation
Goker,B.; Doughan,A.M.; Schnitzer,T.J.; Block,J.A.	2000	Quantification of progressive joint space narrowing in osteoarthritis of the hip: longitudinal analysis of the contralateral hip after total hip arthroplasty	Arthritis Rheum.	uses surrogate outcomes, which are measured on the contralateral hip
Gokhale,S.; Soliman,A.; Dantas,J.P.; Richardson,J.B.; Cook,F.; Kuiper,J.H.; Jones,P.	2005	Variables affecting initial stability of impaction grafting for hip revision	Clin Orthop Relat Res	article was about revision patients, some patients did not have all components replaced.
Golightly,Y.M.; Allen,K.D.; Caine,D.J.	2012	A comprehensive review of the effectiveness of different exercise programs for patients with osteoarthritis	Phys Sportsmed.	Narrative review
Golightly,Y.M.; Allen,K.D.; Caine,D.J.	2013	A comprehensive review of the effectiveness of different exercise programs for patients with osteoarthritis	Physician and Sportsmedicine	Systematic Review
Goncnullalves,M.J.; Sepriano,A.; Rodrigues,A.; Lopes,A.; Caetano-Lopes,J.; Fonseca,J.E.; Canhao,H.	2014	Procollagen type 1 amino-terminal propeptide is negatively associated with bone stiffness in subpopulations of patients submitted to hip replacement surgery	Annals of the Rheumatic Disease	age not considered as a risk factor
Gonzalez Gil,A.B.; Llombart,Blanco R.; Diaz de,Rada P.	2015	Validity of magnetic resonance arthrography as a diagnostic tool in femoroacetabular impingement syndrome	Rev Esp.Cir.Ortop.Traumatol.	Retrospective case series
Gonzalez Saenz de,Tejada M.; Escobar,A.; Bilbao,A.; Herrera-Espineira,C.; Garcia-Perez,L.; Aizpuru,F.; Sarasqueta,C.	2014	A prospective study of the association of patient expectations with changes in health-related quality of life outcomes, following total joint replacement	BMC Musculoskelet.Disord.	combines hip and knee patients. less than 90% OA hip
Gonzalez Saenz de,Tejada M.; Escobar,A.; Herrera,C.; Garcia,L.; Aizpuru,F.; Sarasqueta,C.	2010	Patient expectations and health-related quality of life outcomes following total joint replacement	Value Health	combines hip and knee patients
Gordon,M.; Greene,M.; Frumento,P.; Rolfson,O.; Garellick,G.; Stark,A.	2014	Age- and health-related quality of life after total hip replacement	Acta orthopaedica	repeat

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Goregaonkar,A.; Mathiazhagan,K.J.; Shah,R.R.; Kapoor,P.S.; Taneja,P.; Sharma,A.; Bolmall,C.; Baliga,V.P.	2009	Comparative assessment of the effectiveness and tolerability of lornoxicam 8 mg BID and diclofenac 50 mg TID in adult indian patients with osteoarthritis of the hip or knee: A 4-week, double-blind, randomized, comparative, multicenter study	Curr Ther Res Clin Exp.	Hip and Knee combined
Gotze,C.; Tschugunow,A.; Gotze,H.G.; Bottner,F.; Potzl,W.; Gosheger,G.	2006	Long-term results of the metal-cancellous cementless Lubeck total hip arthroplasty: a critical review at 12.8 years	Arch Orthop Trauma Surg	very low quality
Graf,R.; Azizbaig-Mohajer,M.	2006	Minimally invasive total hip replacement with the patient in the supine position and the contralateral leg elevated	Oper.Orthop Traumatol.	Narrative review
Grammatico-Guillon,L.; Baron,S.; Rosset,P.; Gaborit,C.; Bernard,L.; Rusch,E.; Astagneau,P.	2015	Surgical site infection after primary hip and knee arthroplasty: A cohort study using a hospital database	Infect.Control Hosp.Epidemiol.	combines hip and knee patients
Grange,C.C.; Maire,J.; Groslambert,A.; Tordi,N.; Dugue,B.; Pernin,J.N.; Rouillon,J.D.	2004	Perceived exertion and rehabilitation with arm crank in elderly patients after total hip arthroplasty: a preliminary study	J Rehabil Res Dev	less than 10 patients in groups
Graves,M.L.; Mast,J.W.	2009	Femoroacetabular impingement: do outcomes reliably improve with surgical dislocations?	Clin Orthop Relat Res	Not relevant, does not answer pico question
Graves,S.C.; Dropkin,B.M.; Keeney,B.J.; Lurie,J.D.; Tomek,I.M.	2016	Does Surgical Approach Affect Patient-reported Function After Primary THA?	Clin Orthop Relat Res	Unclear of population
Green,J.; McKenna,F.; Redfern,E.J.; Chamberlain,M.A.	1993	Home exercises are as effective as outpatient hydrotherapy for osteoarthritis of the hip	Br J Rheumatol.	not patient reported outcome
Greene,M.E.; Rolfson,O.; Nemes,S.; Gordon,M.; Malchau,H.; Garellick,G.	2014	Education attainment is associated with patient-reported outcomes: findings from the Swedish Hip Arthroplasty Register	Clin Orthop Relat Res	less than 50% follow up
Gregory,R.J.H.; Gibson,M.J.; Moran,C.G.	1991	Dislocation after primary arthroplasty for subcapital fracture of the hip. Wide range of movement is a risk factor	Journal of Bone and Joint Surgery - Series B	Not relevant, does not answer pico question
Gremeaux,V.; Renault,J.; Pardon,L.; Deley,G.; Lepers,R.; Casillas,J.M.	2008	Low-frequency electric muscle stimulation combined with physical therapy after total hip arthroplasty for hip osteoarthritis in elderly patients: a randomized controlled trial	Arch Phys Med Rehabil	Not relevant to recommendation

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Groeneveld,P.W.; Kwoh,C.K.; Mor,M.K.; Appelt,C.J.; Geng,M.; Gutierrez,J.C.; Wessel,D.S.; Ibrahim,S.A.	2008	Racial differences in expectations of joint replacement surgery outcomes	Arthritis Rheum.	not relevant. outcome is patient expectation of joint replacement results, which is measured before surgery
Grotle,M.; Garratt,A.M.; Klokkerud,M.; Lochting,I.; Uhlig,T.; Hagen,K.B.	2010	What's in team rehabilitation care after arthroplasty for osteoarthritis? Results from a multicenter, longitudinal study assessing structure, process, and outcome	Phys Ther	knee and hip combined
Grudziak,J.S.; Ward,W.T.	2001	Dega osteotomy for the treatment of congenital dysplasia of the hip	J Bone Joint Surg Am	Not relevant to recommendation
Gruenwald,J.; Petzold,E.; Busch,R.; Petzold,H.P.; Graubaum,H.J.	2009	Effect of glucosamine sulfate with or without omega-3 fatty acids in patients with osteoarthritis	Adv Ther	Hip and Knee combined
Grzybowski,J.S.; Malloy,P.; Stegemann,C.; Bush-Joseph,C.; Harris,J.D.; Nho,S.J.	2015	Rehabilitation Following Hip Arthroscopy - A Systematic Review	Front Surg	Systematic Review
Guanche,C.A.; Bare,A.A.	2006	Arthroscopic treatment of femoroacetabular impingement	Arthroscopy - Journal of Arthroscopic and Related Surgery	Not relevent, patient population of osteoarthritis
Guenther,D.; Schmidl,S.; Klatte,T.O.; Widhalm,H.K.; Omar,M.; Krettek,C.; Gehrke,T.; Kendoff,D.; Haasper,C.	2015	Overweight and obesity in hip and knee arthroplasty: Evaluation of 6078 cases	World J Orthop	the regression models are on preoperative outcomes. only the perioperative complications data is relevant to the pico question, and the quality is very low for this data because it is bivariate, and because of sparsity of events.

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Guille,J.T.; Forlin,E.; Kumar,S.J.; MacEwen,G.D.	1992	Triple osteotomy of the innominate bone in treatment of developmental dysplasia of the hip	J Pediatr Orthop	retrospective case series
Gulati,V.; Eseonu,K.; Sayani,J.; Ismail,N.; Uzoigwe,C.; Choudhury,M.Z.; Gulati,P.; Aqil,A.; Tibrewal,S.	2013	Developmental dysplasia of the hip in the newborn: A systematic review	World J Orthop	Systematic Review
Gulman,B.; Tuncay,I.C.; Dabak,N.; Karaismailoglu,N.	1994	Salter's innominate osteotomy in the treatment of congenital hip dislocation: a long-term review	J Pediatr Orthop	Not relevant to recommendation
Gunel,U.; Daglar,B.; Tasbas,B.A.; Delialioglu,O.; Bayrakci,K.	2012	Results of Tonnis-type acetabuloplasty in patients with developmental hip dysplasia	J Orthop Sci	Not relevant, does not answer pico question
Gupta,A.; Redmond,J.M.; Hammarstedt,J.E.; Lindner,D.; Stake,C.E.; Domb,B.G.	2015	Does obesity affect outcomes after hip arthroscopy? A cohort analysis	J Bone Joint Surg Am	Not relevant, does not answer pico question
Gupta,A.; Redmond,J.M.; Hammarstedt,J.E.; Schwindel,L.; Domb,B.G.	2014	Safety measures in hip arthroscopy and their efficacy in minimizing complications: a systematic review of the evidence		Systematic Review
Gupta,A.; Redmond,J.M.; Stake,C.E.; Dunne,K.F.; Hammarstedt,J.E.; Domb,B.G.	2016	Outcomes of Revision Hip Arthroscopy: 2-Year Clinical Follow-up		Retrospective case series
Gupta,A.; Redmond,J.M.; Stake,C.E.; Finch,N.A.; Dunne,K.F.; Domb,B.G.	2014	Does the femoral cam lesion regrow after osteoplasty for femoroacetabular impingement? Two-year follow-up	Am J Sports Med	Not relevant, does not answer pico question
Gupta,A.K.; Abrams,G.D.; Nho,S.J.	2014	What's New in Femoroacetabular Impingement Surgery: Will We Be Better in 2023?	Sports Health	Systematic Review
Ha,Y.C.; Choi,J.A.; Lee,Y.K.; Kim,J.Y.; Koo,K.H.; Lee,G.Y.; Kang,H.S.	2013	The diagnostic value of direct CT arthrography using MDCT in the evaluation of acetabular labral tear: with arthroscopic correlation	Skeletal Radiol	Not relevant, does not answer pico question
HÃ?Â¶lmich,P.; Thorborg,K.; Nyvold,P.; Klit,J.; Nielsen,M.B.; Troelsen,A.	2014	Does bony hip morphology affect the outcome of treatment for patients with adductor-related groin pain? Outcome 10 years after baseline assessment	Br.J.Sports Med.	Not relevant, does not answer pico question
Habermann,B.; Eberhardt,C.; Kurth,A.A.	2008	Total joint replacement in HIV positive patients	J.Infect.	<90% OA

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Habib,G.S.; Saliba,W.; Nashashibi,M.	2010	Local effects of intra-articular corticosteroids	Clin.Rheumatol.	Systematic Review
Haddad,B.; Konan,S.; Haddad,F.S.	2014	Debridement versus re-attachment of acetabular labral tears: A review of the literature and quantitative analysis	Bone Joint J	Literature review
Hagen,K.B.; Dagfinrud,H.; Moe,R.H.; Osteras,N.; Kjeken,I.; Grotle,M.; Smedslund,G.	2012	Exercise therapy for bone and muscle health: an overview of systematic reviews	BMC Med	Systematic Review
Hailer,N.P.; Lazarinis,S.; Makela,K.T.; Eskelinen,A.; Fenstad,A.M.; Hallan,G.; Havelin,L.; Overgaard,S.; Pedersen,A.B.; Mehnert,F.; Karrholm,J.	2015	Hydroxyapatite coating does not improve uncemented stem survival after total hip arthroplasty!: An analysis of 116,069 THAs in the Nordic Arthroplasty Register Association (NARA) database	Acta orthopaedica	analysis controlls for age to compare implant types, but does not evaluate the effect of age on post-op outcomes
Hailer,N.P.; Soykaner,L.; Ackermann,H.; Rittmeister,M.	2005	Triple osteotomy of the pelvis for acetabular dysplasia: age at operation and the incidence of nonunions and other complications influence outcome	J Bone Joint Surg Br	Retrospective case series
Hailer,N.P.; Weiss,R.J.; Stark,A.; Karrholm,J.	2012	The risk of revision due to dislocation after total hip arthroplasty depends on surgical approach, femoral head size, sex, and primary diagnosis	Acta orthopaedica	less than 90% OA hip patients
Hair,P.I.; Curran,M.P.; Keam,S.J.	2006	Tramadol extended-release tablets		Narrative review
Hale,L.A.; Waters,D.; Herbison,P.	2012	A randomized controlled trial to investigate the effects of water-based exercise to improve falls risk and physical function in older adults with lower-extremity osteoarthritis	Arch Phys Med Rehabil	Unclear if 90% of pop is Hip OA
Hale,M.; Tudor,I.C.; Khanna,S.; Thipphawong,J.	2007	Efficacy and tolerability of once-daily OROS hydromorphone and twice-daily extended-release oxycodone in patients with chronic, moderate to severe osteoarthritis pain: results of a 6-week, randomized, open-label, noninferiority analysis	Clin Ther	90% of pop isn't Hip OA
Hale,M.; Upmalis,D.; Okamoto,A.; Lange,C.; Rauschkolb,C.	2009	Tolerability of tapentadol immediate release in patients with lower back pain or osteoarthritis of the hip or knee over 90 days: a randomized, double-blind study	Curr Med Res Opin	Patient population
Hameed,F.; Ihm,J.	2012	Injectable Medications for Osteoarthritis	PM and R	Narrative review

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Hamilton,W.G.; Parks,N.L.; Huynh,C.	2015	Comparison of Cup Alignment, Jump Distance, and Complications in Consecutive Series of Anterior Approach and Posterior Approach Total Hip Arthroplasty	J.Arthroplasty	retrospective case series
Hananouchi,T.; Yasui,Y.; Yamamoto,K.; Toritsuka,Y.; Ohzono,K.	2012	Anterior impingement test for labral lesions has high positive predictive value	Clin Orthop Relat Res	Not relevant, does not answer pico question
Harris,A.H.; Bowe,T.R.; Gupta,S.; Ellerbe,L.S.; Giori,N.J.	2013	Hemoglobin A1C as a marker for surgical risk in diabetic patients undergoing total joint arthroplasty	J Arthroplasty	combines Hip and Knee patients, and it is unclear if 90% of the patient population had THA verus TKA
Harris,J.D.; Erickson,B.J.; Bush-Joseph,C.A.; Nho,S.J.	2013	Treatment of femoroacetabular impingement: a systematic review	Curr Rev Musculoskelet.Med	Systematic Review
Harris,J.D.; McCormick,F.M.; Abrams,G.D.; Gupta,A.K.; Ellis,T.J.; Bach,B.R.,Jr.; Bush-Joseph,C.A.; Nho,S.J.	2013	Complications and reoperations during and after hip arthroscopy: a systematic review of 92 studies and more than 6,000 patients		Systematic Review
Harsten,A.; Kehlet,H.; Ljung,P.; Toksvig,Larsen S.	2015	Total intravenous general anaesthesia vs. spinal anaesthesia for total hip arthroplasty: A randomised, controlled trial	Acta Anaesthesiol.Scand.	considered by work group to be not relevant method of anesthesia for pico question
Hart,A.J.; Skinner,J.A.; Winship,P.; Faria,N.; Kulinskaya,E.; Webster,D.; Muirhead-Allwood,S.; Aldam,C.H.; Anwar,H.; Powell,J.J.	2009	Circulating levels of cobalt and chromium from metal-on-metal hip replacement are associated with CD8+ T-cell lymphopenia	J Bone Joint Surg Br	no patient oriented outcomes
Hart,R.; Stipcak,V.; Janecek,M.; Visna,P.	2005	Component position following total hip arthroplasty through a miniinvasive posterolateral approach	Acta Orthop Belg.	Not relevant to recommendation
Hartig-Andreasen,C.; Troelsen,A.; Thillemann,T.M.; Soballe,K.	2012	What factors predict failure 4 to 12 years after periacetabular osteotomy?	Clin Orthop Relat Res	Retrospective case series
Hartofilakidis,G.	1997	Survival of the Charnley low-friction arthroplasty. A 12-24-year follow-up of 276 cases	Acta Orthop Scand.Suppl	inadequate data to answer pico question

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Hartofilakidis,G.; Bardakos,N.V.; Babis,G.C.; Georgiades,G.	2011	An examination of the association between different morphotypes of femoroacetabular impingement in asymptomatic subjects and the development of osteoarthritis of the hip	J Bone Joint Surg Br	Retrospective case series
Hartofilakidis,G.; Georgiades,G.; Babis,G.C.; Yiannakopoulos,C.K.	2008	Evaluation of two surgical techniques for acetabular reconstruction in total hip replacement for congenital hip disease: results after a minimum ten-year follow-up	J Bone Joint Surg Br	Patient population not OA
Hartofilakidis,G.; Karachalios,T.; Zacharakis,N.	1997	Charnley low friction arthroplasty in young patients with osteoarthritis. A 12- to 24-year clinical and radiographic followup study of 84 cases	Clin Orthop Relat Res	does not evaluate age as a risk factor
Hartrick,C.; Van,Hove,I; Stegmann,J.U.; Oh,C.; Upmalis,D.	2009	Efficacy and tolerability of tapentadol immediate release and oxycodone HCl immediate release in patients awaiting primary joint replacement surgery for end-stage joint disease: a 10-day, phase III, randomized, double-blind, active- and placebo-controlled study	Clin Ther	Unclear if 90% of pop is Hip OA
Harwin,S.F.	2005	Trochanteric heterotopic ossification after total hip arthroplasty performed using a direct lateral approach	J.Arthroplasty	90% of pop isn't Hip OA
Hasegawa,Y.; Fukatsu,H.; Matsuda,T.; Iwase,T.; Iwata,H.	1996	Magnetic resonance imaging in osteoarthrosis of the dysplastic hip	Arch Orthop Trauma Surg	17 abnormal x-ray
Hasegawa,Y.; Iwase,T.; Kitamura,S.; Kawasaki,M.; Yamaguchi,J.	2014	Eccentric rotational acetabular osteotomy for acetabular dysplasia and osteoarthritis: follow-up at a mean duration of twenty years	J Bone Joint Surg Am	Not relevent, patient population of osteoarthritis
Hasegawa,Y.; Iwase,T.; Kitamura,S.; Yamauchi,Ki K.; Sakano,S.; Iwata,H.	2002	Eccentric rotational acetabular osteotomy for acetabular dysplasia: follow-up of one hundred and thirty-two hips for five to ten years	J Bone Joint Surg Am	Osteoarthritis already present
Hasegawa,Y.; Iwata,H.; Mizuno,M.; Genda,E.; Sato,S.; Miura,T.	1992	The natural course of osteoarthritis of the hip due to subluxation or acetabular dysplasia	Arch Orthop Trauma Surg	Not relevant to recommendation
Hasegawa,Y.; Sakano,S.; Kawabe,K.	2004	Ectopic bone formation around the poly-L-lactide screw head in rotational acetabular osteotomy for hip dysplasia	J Orthop Sci	Not relevant, does not answer pico question

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Hashimoto,S.; Fujishiro,T.; Hayashi,S.; Kanzaki,N.; Nishiyama,T.; Kurosaka,M.	2014	Clinical importance of impingement deformities for hip osteoarthritis progression in a Japanese population	Int Orthop	Not relevant to recommendation
Hattori,T.; Ono,Y.; Kitakoji,T.; Takashi,S.; Iwata,H.	1999	Soft-tissue interposition after closed reduction in developmental dysplasia of the hip. The long-term effect on acetabular development and avascular necrosis	J Bone Joint Surg Br	Not relevant, tonnis grade not mentioned
Haughom,B.D.; Schairer,W.W.; Hellman,M.D.; Yi,P.H.; Levine,B.R.	2014	Resident involvement does not influence complication after total hip arthroplasty: an analysis of 13,109 cases	J Arthroplasty	less than 90% OA hip patients
Hauselmann,H.J.	2001	Nutripharmaceuticals for osteoarthritis	Best Pract Res Clin Rheumatol.	Systematic Review
Havelin,L.I.; Espehaug,B.; Vollset,S.E.; Engesaeter,L.B.	1994	Early failures among 14,009 cemented and 1,326 uncemented prostheses for primary coxarthrosis. The Norwegian Arthroplasty Register, 1987-1992	Acta Orthop Scand.	not relevant. the article presents the interaction effect of age on the difference in outcomes between cemented and uncemented implants.
Havelin,L.I.; Fenstad,A.M.; Salomonsson,R.; Mehnert,F.; Furnes,O.; Overgaard,S.; Pedersen,A.B.; Herberts,P.; Karrholm,J.; Garellick,G.	2009	The Nordic Arthroplasty Register Association: a unique collaboration between 3 national hip arthroplasty registries with 280,201 THRs	Acta Orthop	not relevant. intent is to compare revision rates in 3 countries
Haverkamp,D.; de Man,F.H.; de Jong,P.T.; van Stralen,R.A.; Marti,R.K.	2008	Is the long-term outcome of cemented THA jeopardized by patients being overweight?	Clin Orthop Relat Res	less than 90% OA hip
Haverkamp,D.; Marti,R.K.	2007	Bilateral varus osteotomies in hip deformities: are early interventions superior? A long-term follow-up	Int Orthop	Retrospective case series
Hawel,R.; Klein,G.; Singer,F.; Mayrhofer,F.; Kahler,S.T.	2003	Comparison of the efficacy and tolerability of dexibuprofen and celecoxib in the treatment of osteoarthritis of the hip	Int J Clin Pharmacol Ther	not relevant comparison
Hayakawa,K.; Minoda,Y.; Aihara,M.; Sakawa,A.; Ohzono,K.; Tada,K.	2009	Acetabular component orientation in intra- and postoperative positions in total hip arthroplasty	Arch Orthop Trauma Surg	Not relevant to recommendation

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Hayashi,S.; Nishiyama,T.; Fujishiro,T.; Hashimoto,S.; Kanzaki,N.; Nishida,K.; Kurosaka,M.	2012	Obese patients may have more soft tissue impingement following primary total hip arthroplasty	Int.Orthop.	less than 90% OA hip
Heath Quality Ontario	2005	Physiotherapy rehabilitation after total knee or hip replacement: an evidence-based analysis	Ont.Health Technol Assess Ser	Systematic Review
Hedlundh,U.; Hybbinette,C.H.; Fredin,H.	1995	Influence of surgical approach on dislocations after Charnley hip arthroplasty	J Arthroplasty	90% of pop isn't Hip OA
Heesch,K.C.; Ng,N.; Brown,W.	2011	Factors associated with physical activity in Australians with hip or knee osteoarthritis	J Phys Act Health	Unclear if 90% of pop is Hip OA
Heiberg,K.E.; Ekeland,A.; Bruun-Olsen,V.; Mengshoel,A.M.	2013	Recovery and prediction of physical functioning outcomes during the first year after total hip arthroplasty	Arch Phys Med Rehabil	no relvant outcomes to age pico question
Heintzbergen,S.; Kulin,N.A.; Ijzerman,M.J.; Steuten,L.M.; Werle,J.; Khong,H.; Marshall,D.A.	2013	Cost-utility of metal-on-metal hip resurfacing compared to conventional total hip replacement in young active patients with osteoarthritis	Value Health	cost analysis
Heinzl,S.	2014	Hip osteoarthritis: Pain relief and functional improvement through physical therapy?	Med.Monatsschr.Pharm.	not in English
Heisel,J.; Kipshoven,C.	2013	Safety and efficacy findings from a non-interventional study of a new hyaluronic acid/sorbitol formulation (GO-ON((registered trademark)) matrix) for intra-articular injection to relieve pain and disability in osteoarthritis patients	Drug Research	Hip and Knee combined
Hellman,M.D.; Mascarenhas,R.; Gupta,A.; Fillingham,Y.; Haughom,B.D.; Salata,M.J.; Nho,S.J.	2015	The False-Profile View May Be Used to Identify Cam Morphology		Not relevant, does not answer pico question
Henrotin,Y.; Mobasheri,A.; Marty,M.	2012	Is there any scientific evidence for the use of glucosamine in the management of human osteoarthritis?	Arthritis Res Ther	Review
Hernandez,Molina G.; Reichenbach,S.; Bin,Z.; Lavalley,M.; Felson,D.T.	2008	Effect of therapeutic exercise for hip osteoarthritis pain: Results of a meta-analysis	Arthritis Care Res.	Systematic Review
Hernandez-Molina,G.; Reichenbach,S.; Zhang,B.; Lavalley,M.; Felson,D.T.	2008	Effect of therapeutic exercise for hip osteoarthritis pain: results of a meta-analysis	Arthritis Rheum.	Systematic Review
Hernigou,P.; Homma,Y.; Pidet,O.; Guissou,I.; Hernigou,J.	2013	Ceramic-on-ceramic bearing decreases the cumulative long-term risk of dislocation	Clin Orthop Relat Res	does not evaluate age as a risk factor

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Hernigou,P.; Ratte,L.; Roubineau,F.; Pariat,J.; Mirouse,G.; Guissou,I.; Allain,J.; Lachaniette,C.H.	2013	The risk of dislocation after total hip arthroplasty for fractures is decreased with retentive cups	Int Orthop	Patient population not OA
Herrmann,G.; Steeger,D.; Klasser,M.; Wirbitzky,J.; Furst,M.; Venbrocks,R.; Rohde,H.; Jungmichel,D.; Hildebrandt,H.D.; Parnham,M.J.; Gimbel,W.; Dirschedl,H.	2000	Oxaceprol is a well-tolerated therapy for osteoarthritis with efficacy equivalent to diclofenac	Clin Rheumatol.	Hip and Knee combined
Hesse,S.; Werner,C.; Seibel,H.; von,Frankenberg S.; Kappel,E.M.; Kirker,S.; Kading,M.	2003	Treadmill training with partial body-weight support after total hip arthroplasty: a randomized controlled trial	Arch Phys Med Rehabil	no passive control
Hetaimish,B.M.; Khan,M.; Crouch,S.; Simunovic,N.; Bedi,A.; Mohtadi,N.; Bhandari,M.; Ayeni,O.R.	2013	Consistency of reported outcomes after arthroscopic management of femoroacetabular impingement		Systematic Review
Heuts,P.H.; de,Bie R.; Drietelaar,M.; Aretz,K.; Hopman-Rock,M.; Bastiaenen,C.H.; Metsemakers,J.F.; van,Weel C.; van,Schayck O.	2005	Self-management in osteoarthritis of hip or knee: a randomized clinical trial in a primary healthcare setting	J Rheumatol.	Work group does not consider study treatments to fit the definition of self management programs they used when the wrote the pico question
Heyworth,B.E.; Dolan,M.M.; Nguyen,J.T.; Chen,N.C.; Kelly,B.T.	2012	Preoperative three-dimensional CT predicts intraoperative findings in hip arthroscopy	Clin Orthop Relat Res	Not relevant, does not answer pico question
Higuchi,F.; Inoue,A.; Semlitsch,M.	1997	Metal-on-metal CoCrMo McKee-Farrar total hip arthroplasty: characteristics from a long-term follow-up study	Arch Orthop Trauma Surg	less than 90% OA hip patients
Hingsammer,A.M.; Lee,C.B.; LaReau,J.; Kalish,L.A.; Kim,Y.J.	2015	Is acetabular osteoplasty always required in mixed impingement?	Eur J Orthop Surg Traumatol.	Not relevant, does not answer pico question
Hingsammer,A.M.; Lee,C.B.; LaReau,J.; Kalish,L.A.; Kim,Y.-J.	2014	Is acetabular osteoplasty always required in mixed impingement?	European Journal of Orthopaedic Surgery & Traumatology	Retrospective case series

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Hinman,R.	2014	Manual physiotherapy or exercise leads to sustained reductions in pain and physical disability in people with hip and knee osteoarthritis	Journal of physiotherapy	Commentary
Hinman,R.S.; Heywood,S.E.; Day,A.R.	2007	Aquatic physical therapy for hip and knee osteoarthritis: results of a single-blind randomized controlled trial	Phys Ther	90% of pop isn't Hip OA
Hinrichs,T.; Bucker,B.; Wilm,S.; Klaassen-Mielke,R.; Brach,M.; Platen,P.; Moschny,A.	2015	Adverse events in mobility-limited and chronically ill elderly adults participating in an exercise intervention study supported by general practitioner practices	J.Am.Geriatr.Soc.	90% of pop isn't Hip OA
Hintermann,B.; Morscher,E.W.	1995	Total hip replacement with solid autologous femoral head graft for hip dysplasia	Arch Orthop Trauma Surg	retrospective case series
Hirose,S.; Otsuka,H.; Morishima,T.; Sato,K.	2011	Long-term outcomes of shelf acetabuloplasty for developmental dysplasia of the hip in adults: a minimum 20-year follow-up study	J Orthop Sci	retrospective case series
Hirsch,G.; Kitas,G.; Klocke,R.	2013	Intra-articular corticosteroid injection in osteoarthritis of the knee and hip: factors predicting pain relief--a systematic review	Semin Arthritis Rheum.	
Hirvensalo,E.; Lindahl,J.; Kiljunen,V.	2007	Modified and new approaches for pelvic and acetabular surgery		Patient population not OA
Hisatome,T.; Yasunaga,Y.; Tanaka,R.; Yamasaki,T.; Ishida,O.; Ochi,M.	2005	Natural course of the minimally symptomatic nonoperated hip in patients with bilateral hip dysplasia treated with contralateral rotational acetabular osteotomy	J Orthop Sci	Not relevant, does not answer pico question
Ho,K.W.K.; Whitwell,G.S.; Young,S.K.	2012	Reducing the rate of early primary hip dislocation by combining a change in surgical technique and an increase in femoral head diameter to 36 mm	Arch.Orthop.Trauma Surg.	Unclear if 90% of pop is Hip OA
Hochberg,M.; Chevalier,X.; Henrotin,Y.; Hunter,D.J.; Uebelhart,D.	2013	Symptom and structure modification in osteoarthritis with pharmaceutical-grade chondroitin sulfate: what's the evidence?	Curr Med Res Opin	Systematic Review
Hochberg,M.C.; Dougados,M.	2001	Pharmacological therapy of osteoarthritis	Best Pract Res Clin Rheumatol.	Review

Authors	Year	Article Title	Periodical	Reason for Exclusion
Hoeksma,H.L.; Dekker,J.; Ronday,H.K.; Heering,A.; van der Lubbe,N.; Vel,C.; Breedveld,F.C.; van den Ende,C.H.	2004	Comparison of manual therapy and exercise therapy in osteoarthritis of the hip: a randomized clinical trial	Arthritis Rheum.	Repeat article
Holloway,I.; Walter,W.L.; Zicat,B.; Walter,W.K.	2009	Osteolysis with a cementless second generation metal-on-metal cup in total hip replacement	Int.Orthop.	does not address age as a risk factor
Holnapy,G.; Illyes,A.; Kiss,R.M.	2013	Impact of the method of exposure in total hip arthroplasty on the variability of gait in the first 6months of the postoperative period	J.Electromyogr.Kinesiol.	outcome measure
Holnapy,G.; Kiss,R.M.	2013	Impact of the method of exposure in total hip arthroplasty on balancing ability in response to sudden unidirectional perturbation in the first six months of the postoperative period	J Electromyogr.Kinesiol.	outcome measure
Hoogeboom,T.J.; den Broeder,A.A.; Swierstra,B.A.; de Bie,R.A.; van den Ende,C.H.	2012	Joint-pain comorbidity, health status, and medication use in hip and knee osteoarthritis: a cross-sectional study	Arthritis Care Res (Hoboken)	not relevant. patients did not have surgery
Hoogeboom,T.J.; Dronkers,J.J.; van den Ende,C.H.; Oosting,E.; van Meeteren,N.L.	2010	Preoperative therapeutic exercise in frail elderly scheduled for total hip replacement: a randomized pilot trial	Clin Rehabil	feasability study
Hook,S.; Moulder,E.; Yates,P.J.; Burston,B.J.; Whitley,E.; Bannister,G.C.	2006	The exeter universal stem	Journal of Bone and Joint Surgery - Series B	does not evaluate age effect on patient oriented outcomes.
Hooper,G.J.; Rothwell,A.G.; Stringer,M.; Frampton,C.	2009	Revision following cemented and uncemented primary total hip replacement: a seven-year analysis from the New Zealand Joint Registry	J Bone Joint Surg Br	inadequate data to answer pico question
Hopman,Rock M.; Westhoff,M.H.	2000	The effects of a health educational and exercise program for older adults with osteoarthritis for the hip or knee	The Journal of rheumatology	Unclear if 90% of pop is Hip OA
Hopman-Rock,M.; Westhoff,M.H.	2000	The effects of a health educational and exercise program for older adults with osteoarthritis for the hip or knee	J Rheumatol.	Unclear if 90% of pop is Hip OA
Hosalkar,H.S.; Pandya,N.K.; Bomar,J.D.; Wenger,D.R.	2012	Hip impingement in slipped capital femoral epiphysis: a changing perspective	J Child Orthop	Systematic Review

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Hossain,M.; Parfitt,D.J.; Beard,D.J.; Darrah,C.; Nolan,J.; Murray,D.W.; Andrew,J.G.	2011	Pre-operative psychological distress does not adversely affect functional or mental health gain after primary total hip arthroplasty	Hip Int	less than 90% OA hip
Howard,K.J.; Ellis,H.B.; Khaleel,M.A.; Gatchel,R.J.; Bucholz,R.	2011	Psychosocial profiles of indigent patients with severe osteoarthritis requiring arthroplasty	J Arthroplasty	outcomes measured before arthroplasty. not relevant to pico question
Howes,F.; Buchbinder,R.; Winzenberg,T.	2011	Opioids for osteoarthritis? Weighing benefits and risks: A Cochrane Musculoskeletal Group review	J.Fam.Pract.	Systematic Review
Howie,D.W.; Holubowycz,O.T.; Middleton,R.	2012	Large femoral heads decrease the incidence of dislocation after total hip arthroplasty: a randomized controlled trial	J Bone Joint Surg Am	Not relevant, does not answer pico question
Hoyeraal,H.M.; Fagertun,H.; Ingemann-Hansen,T.; Ersmark,H.; Ronn,O.	1993	Characterization of responders and nonresponders to tiaprofenic acid and naproxen in the treatment of patients with osteoarthritis	J Rheumatol.	Hip and Knee combined
Hsieh,P.H.; Huang,K.C.; Lee,P.C.; Chang,Y.H.	2009	Comparison of periacetabular osteotomy and total hip replacement in the same patient: a two- to ten-year follow-up study	J Bone Joint Surg Br	Retrospective case series
Hsu,J.R.; Stinner,D.J.; Rosenzweig,S.D.; Salinas,J.; Dickson,K.F.	2010	Is there a benefit to drains with a Kocher-Langenbeck approach? A prospective randomized pilot study	J Trauma	Not relevant to recommendation
Huang,C.S.; Cheu,Y.D.; Ying,J.; Wei,M.H.	2011	Association between provider volume and comorbidity on hospital utilization and outcomes of total hip arthroplasty among National Health Insurance enrollees	J Formos.Med Assoc	less than 90% OA hip patients
Huang,D.-C.; Tatman,P.; Mehle,S.; Gioe,T.J.	2013	Cumulative revision rate is higher in metal-on-metal THA than metal-on-polyethylene THA: Analysis of survival in a community registry	Clin.Orthop.	age not evaluated as a risk factor
Huber,H.; Dora,C.; Ramseier,L.E.; Buck,F.; Dierauer,S.	2011	Adolescent slipped capital femoral epiphysis treated by a modified Dunn osteotomy with surgical hip dislocation	J Bone Joint Surg Br	
Hughes,P.M.; Gafoor,A.	2002	MR imaging of hip and groin pain	CME Journal Radiology	Narrative review

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Hulleberg,G.; Aamodt,A.; Espehaug,B.; Benum,P.	2008	A clinical and radiographic 13-year follow-up study of 138 Charnley hip arthroplasties in patients 50-70 years old: comparison of university hospital data and registry data	Acta Orthop	age was measured cross-sectionally after surgery. not best available evidence
Hunt,D.; Prather,H.; Harris,Hayes M.; Clohisy,J.C.	2012	Clinical outcomes analysis of conservative and surgical treatment of patients with clinical indications of prearthritic, intra-articular hip disorders	PM R	less than 10 patients in groups
Hurkmans,H.L.; Bussmann,J.B.; Selles,R.W.; Benda,E.; Stam,H.J.; Verhaar,J.A.	2007	The Difference Between Actual and Prescribed Weight Bearing of Total Hip Patients With a Trochanteric Osteotomy: Long-Term Vertical Force Measurements Inside and Outside the Hospital	Arch.Phys.Med.Rehabil.	Unclear of population
Husby,V.S.; Helgerud,J.; Bjorgen,S.; Husby,O.S.; Benum,P.; Hoff,J.	2010	Early postoperative maximal strength training improves work efficiency 6-12 months after osteoarthritis-induced total hip arthroplasty in patients younger than 60 years	Am J Phys Med Rehabil	no passive control
Husby,V.S.; Helgerud,J.; Bjorgen,S.; Husby,O.S.; Benum,P.; Hoff,J.	2009	Early maximal strength training is an efficient treatment for patients operated with total hip arthroplasty	Arch Phys Med Rehabil	no passive control
Huskisson,E.C.; Macciocchi,A.; Rahlfs,V.W.; Bernstein,R.M.; Bremner,A.D.; Doyle,D.V.; Molloy,M.G.; Burton,A.E.	1999	Nimesulide versus diclofenac in the treatment of osteoarthritis of the hip or knee: An active controlled equivalence study	Current Therapeutic Research - Clinical and Experimental	Hip and Knee combined
Husted,H.; Blond,L.; Sonne-Holm,S.; Holm,G.; Jacobsen,T.W.; Gebuhr,P.	2003	Tranexamic acid reduces blood loss and blood transfusions in primary total hip arthroplasty: a prospective randomized double-blind study in 40 patients	Acta Orthop Scand.	90% of pop isn't Hip OA
Husted,H.; Holm,G.; Jacobsen,S.	2008	Predictors of length of stay and patient satisfaction after hip and knee replacement surgery: fast-track experience in 712 patients	Acta Orthop	combines hip and knee results
Hynes,M.C.; Calder,P.; Rosenfeld,P.; Scott,G.	2005	The use of tranexamic acid to reduce blood loss during total hip arthroplasty: an observational study	Ann R Coll Surg Engl.	90% of pop isn't Hip OA

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Iamthanaporn,K.; Chareancholvanich,K.; Pornrattanamaneewong,C.	2015	Revision primary total hip replacement: Causes and risk factors	J.Med.Assoc.Thai.	less than 90% OA hip patients
Ieiri,A.; Tushima,E.; Ishida,K.; Abe,S.; Inoue,M.; Masuda,T.	2013	What predicts 36-item health survey version 2 after total hip arthroplasty	Arch Phys Med Rehabil	less than 50% follow up. only 138 of 659 patients included.
Ilizaliturri,V.M.,Jr.; Nossa-Barrera,J.M.; Acosta-Rodriguez,E.; Camacho-Galindo,J.	2007	Arthroscopic treatment of femoroacetabular impingement secondary to paediatric hip disorders	J Bone Joint Surg Br	Abstract
Illgen II,R.L.; Honkamp,N.J.; Weisman,M.H.; Hagenauer,M.E.; Heiner,J.P.; Anderson,P.A.	2006	The Diagnostic and Predictive Value of Hip Anesthetic Arthrograms in Selected Patients Before Total Hip Arthroplasty	J.Arthroplasty	Not relevant, does not answer pico question
Imai,H.; Kamada,T.; Takeba,J.; Shiraishi,Y.; Mashima,N.; Miura,H.	2014	Anterior coverage after eccentric rotational acetabular osteotomy for the treatment of developmental dysplasia of the hip	J Orthop Sci	Unclear of population-Tonnis Grade not mention
Imai, N.; Ito,T.; Suda,K.; Miyasaka,D.; Endo,N.	2013	Pelvic flexion measurement from lateral projection radiographs is clinically reliable	Clin Orthop Relat Res	Not relevant, does not answer pico question
Impellizzeri,F.M.; Mannion,A.F.; Naal,F.D.; Hersche,O.; Leunig,M.	2012	The early outcome of surgical treatment for femoroacetabular impingement: success depends on how you measure it	Osteoarthritis Cartilage	Outcome study
Impellizzeri,F.M.; Mannion,A.F.; Naal,F.D.; Leunig,M.	2015	Validity, reproducibility, and responsiveness of the oxford hip score in patients undergoing surgery for femoroacetabular impingement		Not relevant, does not answer pico question
Inaba,Y.; Kobayashi,N.; Yukizawa,Y.; Ishida,T.; Iwamoto,N.; Saito,T.	2011	Little clinical advantage of modified Watson-Jones approach over modified mini-incision direct lateral approach in primary total hip arthroplasty	J Arthroplasty	90% of pop isn't Hip OA
Inao,S.; Gotoh,E.; Ando,M.	1994	Total hip replacement using femoral neck bone to graft the dysplastic acetabulum. Follow-up study of 18 patients with old congenital dislocation of the hip	J Bone Joint Surg Br	Not relevant to recommendation
Inoue,K.; Ushiyama,T.; Tani,Y.; Hukuda,S.	1999	Sociodemographic factors and failure of hip arthroplasty	Int Orthop	less than 90% OA hip. age results not reported

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Insull,P.J.; Cobbett,H.; Frampton,C.M.; Munro,J.T.	2014	The use of a lipped acetabular liner decreases the rate of revision for instability after total hip replacement: A study using data from the New Zealand Joint Registry	Bone and Joint Journal	does not evaluate age as a risk factor
Iorio,R.; Eftekhar,N.S.; Kobayashi,S.; Grelsamer,R.P.	1995	Cemented revision of failed total hip arthroplasty. Survivorship analysis	Clin Orthop Relat Res	was a study of revision patients, but some patients only had certain components replaced instead of the whole implant.
Irisson,E.; Hemon,Y.; Pauly,V.; Parratte,S.; Argenson,J.N.; Kerbaul,F.	2012	Tranexamic acid reduces blood loss and financial cost in primary total hip and knee replacement surgery	Orthop Traumatol.Surg Res	90% of pop isn't Hip OA
Issa,K.; Wohl,H.; Naziri,Q.; McDermott,J.D.; Cherian,J.J.; Mont,M.A.	2013	Early results of total hip arthroplasty in the super-obese patients	J.Long.Term Eff.Med.Implants	<90% OA
Ito,H.; Matsuno,T.; Minami,A.	2005	Intertrochanteric varus osteotomy for osteoarthritis in patients with hip dysplasia: 6 to 28 years followup	Clin Orthop Relat Res	Retrospective case series
Ito,H.; Matsuno,T.; Minami,A.	2003	Comparison of the surgical approaches for a Chiari pelvic osteotomy	J Bone Joint Surg Br	Not relevant to recommendation
Ito,H.; Tanino,H.; Yamanaka,Y.; Nakamura,T.; Minami,A.; Matsuno,T.	2011	The Chiari pelvic osteotomy for patients with dysplastic hips and poor joint congruency: long-term follow-up	J Bone Joint Surg Br	retrospective comparative
Iversen,M.D.	2010	Managing Hip and Knee Osteoarthritis with Exercise: What is the Best Prescription?	Ther Adv Musculoskelet.Dis	Systematic Review
Jacobs,C.A.; Christensen,C.P.	2009	Progressive subsidence of a tapered, proximally coated femoral stem in total hip arthroplasty	Int.Orthop.	no patient oriented outcomes
Jacobsen,S.; Sonne-Holm,S.; Soballe,K.; Gebuhr,P.; Lund,B.	2005	Joint space width in dysplasia of the hip	Journal of Bone and Joint Surgery - Series B	Not relevant to recommendation
Jacquet,A.; Girodet,P.; Pariente,A.; Forest,K.; Mallet,L.; Moore,N.	2009	Phytalgic((registered trademark)), a food supplement, vs placebo in patients with osteoarthritis of the knee or hip: A randomised double-blind placebo-controlled clinical trial	Arthritis Research and Therapy	Hip and Knee combined

Authors	Year	Article Title	Periodical	Reason for Exclusion
Jacquet,A.; Girodet,P.O.; Pariente,A.; Forest,K.; Mallet,L.; Moore,N.	2009	Phytalgic, a food supplement, vs placebo in patients with osteoarthritis of the knee or hip: a randomised double-blind placebo-controlled clinical trial	Arthritis Res Ther	Hip and Knee combined
Jagtap,S.A.; Lahoti,S.; Anwaruddin,K.; Ram,S.; Ballary,C.; Desai,A.	2002	Evaluation of efficacy, safety and tolerability of valdecoxib in osteo-arthritis patients--an Indian study	J Indian Med Assoc	Unclear if 90% of pop is Hip OA
Jain,S.; Grogan,R.J.; Giannoudis,P.V.	2014	Options for managing severe acetabular bone loss in revision hip arthroplasty. A systematic review	Hip Int	
Jamali,A.A.; Fritz,A.T.; Reddy,D.; Meehan,J.P.	2010	Minimally invasive bone grafting of cysts of the femoral head and acetabulum in femoroacetabular impingement: arthroscopic technique and case presentation		Case report
James,I.G.; O'Brien,C.M.; McDonald,C.J.	2010	A randomized, double-blind, double-dummy comparison of the efficacy and tolerability of low-dose transdermal buprenorphine (BuTrans seven-day patches) with buprenorphine sublingual tablets (Temgesic) in patients with osteoarthritis pain	J Pain Symptom Manage.	Unclear if 90% of pop is Hip OA
James,I.G.V.; O'Brien,C.M.; McDonald,C.J.	2010	A randomized, double-blind, double-dummy comparison of the efficacy and tolerability of low-dose transdermal buprenorphine (BuTrans(registered trademark) seven-day patches) with buprenorphine sublingual tablets (Temgesic(registered trademark)) in patients with osteoarthritis pain	J.Pain Symptom Manage.	Unclear if 90% of pop is Hip OA
James,S.; Miocevic,M.; Malara,F.; Pike,J.; Young,D.; Connell,D.	2006	MR imaging findings of acetabular dysplasia in adults	Skeletal Radiol	Not relevant, does not answer pico question
James,S.L.; Ali,K.; Malara,F.; Young,D.; O'Donnell,J.; Connell,D.A.	2006	MRI findings of femoroacetabular impingement	AJR Am J Roentgenol.	Not relevant, does not answer pico question

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Jameson,S.S.; Baker,P.N.; Mason,J.; Gregg,P.J.; Brewster,N.; Deehan,D.J.; Reed,M.R.	2012	The design of the acetabular component and size of the femoral head influence the risk of revision following 34 721 single-brand cemented hip replacements: a retrospective cohort study of medium-term data from a National Joint Registry	J Bone Joint Surg Br	results not adequately reported for age
Jameson,S.S.; Khan,S.K.; Baker,P.; James,P.; Gray,A.; Reed,M.R.; Deehan,D.J.	2012	A national analysis of complications following hemiarthroplasty for hip fracture in older patients		study of Hemiarthroplasty
Jameson,S.S.; Mason,J.; Baker,P.; Gregg,P.J.; McMurtry,I.A.; Deehan,D.J.; Reed,M.R.	2014	A comparison of surgical approaches for primary hip arthroplasty: a cohort study of patient reported outcome measures (PROMs) and early revision using linked national databases	J Arthroplasty	Not relevant to recommendation
Jameson,S.S.; Mason,J.; Baker,P.; Gregg,P.J.; Porter,M.; Deehan,D.J.; Reed,M.R.	2015	Have cementless and resurfacing components improved the medium-term results of hip replacement for patients under 60 years of age? Patient-reported outcome measures, implant survival, and costs in 24,709 patients	Acta orthopaedica	results for age not presented in article
Jameson,S.S.; Mason,J.M.; Baker,P.N.; Elson,D.W.; Deehan,D.J.; Reed,M.R.	2014	The impact of body mass index on patient reported outcome measures (PROMs) and complications following primary hip arthroplasty	J Arthroplasty	very low strength of evidence due to large amounts of missing data
Jameson,S.S.; Mason,J.M.; Baker,P.N.; Jettoo,P.; Deehan,D.J.; Reed,M.R.	2013	Factors influencing revision risk following 15 740 single-brand hybrid hip arthroplasties: a cohort study from a National Joint Registry	J Arthroplasty	very low quality due to imcomplete data on important covariates in the data base.
Jamsen,E.; Nevalainen,P.; Eskelinen,A.; Huotari,K.; Kalliovalkama,J.; Moilanen,T.	2012	Obesity, diabetes, and preoperative hyperglycemia as predictors of periprosthetic joint infection: a single-center analysis of 7181 primary hip and knee replacements for osteoarthritis	J Bone Joint Surg Am	very low quality
Jamsen,E.; Nevalainen,P.I.; Eskelinen,A.; Kalliovalkama,J.; Moilanen,T.	2015	Risk factors for perioperative hyperglycemia in primary hip and knee replacements	Acta Orthop	hip and knee oa results combined, and less than 90% were hip oa

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Jamsen,E.; Nevalainen,P.I.; Eskelinen,A.; Kalliovalkama,J.; Moilanen,T.	2015	Risk factors for perioperative hyperglycemia in primary hip and knee replacements: A prospective observational study of 191 patients with osteoarthritis	Acta orthopaedica	seperated hip and knee data not shown
Jamsen,E.; Peltola,M.; Puolakka,T.; Eskelinen,A.; Lehto,M.U.	2015	Surgical outcomes of hip and knee arthroplasties for primary osteoarthritis in patients with Alzheimer's disease: a nationwide registry-based case-controlled study	Bone Joint J	Not relevant, does not answer pico question
Jamsen,E.; Puolakka,T.; Eskelinen,A.; Jantti,P.; Kalliovalkama,J.; Nieminen,J.; Valvanne,J.	2013	Predictors of mortality following primary hip and knee replacement in the aged. A single-center analysis of 1,998 primary hip and knee replacements for primary osteoarthritis	Acta Orthop	hip and knee results combined
Jamsen,E.; Puolakka,T.; Eskelinen,A.; Jantti,P.; Kalliovalkama,J.; Nieminen,J.; Valvanne,J.	2013	Predictors of mortality following primary hip and knee replacement in the aged	Acta orthopaedica	hip and knee results combined
Jan,M.H.; Hung,J.Y.; Lin,J.C.; Wang,S.F.; Liu,T.K.; Tang,P.F.	2004	Effects of a home program on strength, walking speed, and function after total hip replacement	Arch Phys Med Rehabil	unclear if 90% of the patient population had oa hip
Janssen,D.; Kalchschmidt,K.; Katthagen,B.D.	2009	Triple pelvic osteotomy as treatment for osteoarthritis secondary to developmental dysplasia of the hip	Int Orthop	results inadquately reported.
Jayakar,R.; Merz,A.; Plotkin,B.; Wang,D.; Seeger,L.; Hame,S.	2015	Magnetic resonance arthrography and the prevalence of acetabular labral tears in patients 50 years of age and older: Is it really indicated?	J.Investig.Med.	Abstract
Jeffcoat,D.M.; Carroll,E.A.; Huber,F.G.; Goldman,A.T.; Miller,A.N.; Lorich,D.G.; Helfet,D.L.	2012	Operative treatment of acetabular fractures in an older population through a limited ilioinguinal approach	J Orthop Trauma	Not symptomatic hip OA pop
Jenkins,P.J.; Clement,N.D.; Hamilton,D.F.; Gaston,P.; Patton,J.T.; Howie,C.R.	2013	Predicting the cost-effectiveness of total hip and knee replacement: a health economic analysis	Bone Joint J	not relevant comares tka to tha results
Jenkins,P.J.; Perry,P.R.; Yew,Ng C.; Ballantyne,J.A.	2009	Deprivation influences the functional outcome from total hip arthroplasty	Surgeon	very low quality due to use of aggregate data to measure individual SES.

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Jensen,C.; Roos,E.M.; Kjaersgaard-Andersen,P.; Overgaard,S.	2013	The effect of education and supervised exercise vs. education alone on the time to total hip replacement in patients with severe hip osteoarthritis. A randomized clinical trial protocol	BMC Musculoskelet.Disord.	Results section/not completed study
Jensen,E.M.; Ginsberg,F.	1994	Tramadol versus dextropropoxyphene in the treatment of osteoarthritis: A short term double-blind study	Drug Investigation	Hip and Knee combined
Jensen,M.P.; Wang,W.; Potts,S.L.; Gould,E.M.	2013	The meaning of global outcome measures in pain clinical trials: More than just change in pain intensity	Clin.J.Pain	Hip and Knee combined
Jeong,J.Y.; Kim,Y.-M.; Kang,S.Y.; Koo,K.-H.; Won,S.S.; Hee,J.K.	2005	Alumina-on-alumina total hip arthroplasty: A five-year minimum follow-up study	Journal of Bone and Joint Surgery - Series A	does not evaluate age as a risk factor
Jepson,P.; Sands,G.; Beswick,A.D.; Davis,E.T.; Blom,A.W.; Sackley,C.M.	2015	A feasibility randomised controlled trial of pre-operative occupational therapy to optimise recovery for patients undergoing primary total hip replacement for osteoarthritis (PROOF-THR)	Clin Rehabil	feasability study
Jessel,R.H.; Zilkens,C.; Tiderius,C.; Dudda,M.; Mamisch,T.C.; Kim,Y.J.	2009	Assessment of osteoarthritis in hips with femoroacetabular impingement using delayed gadolinium enhanced MRI of cartilage	J Magn Reson.Imaging	Medical records review
Jesudason,C.; Stiller,K.	2002	Are bed exercises necessary following hip arthroplasty?	Aust.J Physiother.	unclear if 90% of the patient population had oa hip
Jiang,Y.; Zhang,K.; Die,J.; Shi,Z.; Zhao,H.; Wang,K.	2011	A systematic review of modern metal-on-metal total hip resurfacing vs standard total hip arthroplasty in active young patients	J Arthroplasty	Systematic Review
Jibodh,S.R.; Gurkan,I.; Wenz,Sr; Henze,E.P.	2004	In-hospital outcome and resource use in hip arthroplasty: Influence of body mass		<90% OA
Jin,J.; Wang,G.; Gong,M.; Zhang,H.; Liu,J.	2015	Retrospective comparison of the effects of epidural anesthesia versus peripheral nerve block on postoperative outcomes in elderly chinese patients with femoral neck fractures	Clinical Interventions in Aging	Not relevant, osteoarthritis

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Jin,W.; Kim,K.I.; Rhyu,K.H.; Park,S.Y.; Kim,H.C.; Yang,D.M.; Park,J.S.; Park,S.J.; Ryu,K.N.	2012	Sonographic evaluation of anterosuperior hip labral tears with magnetic resonance arthrographic and surgical correlation	J Ultrasound Med	Not relevant, does not answer pico question
Jogi,P.; Overend,T.J.; Spaulding,S.J.; Zecevic,A.; Kramer,J.F.	2015	Effectiveness of balance exercises in the acute post-operative phase following total hip and knee arthroplasty: A randomized clinical trial	SAGE Open Medicine	Unclear if 90% of pop is Hip OA
Johanson,M.A.; Cohen,B.A.; Snyder,K.H.; McKinley,A.J.; Scott,M.L.	2009	Outcomes for aging adults following total hip arthroplasty in an acute rehabilitation facility versus a subacute rehabilitation facility: a pilot study	J Geriatr.Phys Ther	less than 10 patients in groups
Johansson,T.	2014	Internal fixation compared with total hip replacement for displaced femoral neck fractures: A minimum fifteen-year follow-up study of a previously reported randomized trial	Journal of Bone and Joint Surgery - Series A	Unclear of population
Johnsen,K.; Goll,R.; Reikeras,O.	2009	Acetabular dysplasia as an aetiological factor in development of hip osteoarthritis	Int Orthop	retrospective case series
Johnsen,S.P.; Sorensen,H.T.; Pedersen,A.B.; Lucht,U.; Soballe,K.; Overgaard,S.	2006	Patient-related predictors of implant failure after primary total hip replacement in the initial, short- and long-term: A nationwide Danish folow-up study including 36 984 patients	Journal of Bone and Joint Surgery - Series B	less than 90% OA hip patients
Johnsson,R.; Franzen,H.; Nilsson,L.T.	1994	Combined survivorship and multivariate analyses of revisions in 799 hip prostheses. A 10- to 20-year review of mechanical loosening	J Bone Joint Surg Br	
Jolles,B.M.; Bogoch,E.R.	2006	Posterior versus lateral surgical approach for total hip arthroplasty in adults with osteoarthritis	Cochrane Database Syst Rev	Systematic Review
Jolles,B.M.; Bogoch,E.R.	2004	Surgical approach for total hip arthroplasty: direct lateral or posterior?	J Rheumatol.	Systematic Review
Jolles,B.M.; Bogoch,E.R.	2004	Posterior versus lateral surgical approach for total hip arthroplasty in adults with osteoarthritis	Cochrane Database Syst Rev	Systematic Review
Jolles,Brigitte M.; Michel,Jacky; Burnand,Bernard; Leyvraz,Pierre FranÃ§ois	2006	Surgical treatment for advanced stage of avascular necrosis of the femoral head in adults	Cochrane Database of Systematic Reviews	systematic review

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Jones,C.A.; Voaklander,D.C.; Johnston,D.W.; Suarez-Almazor,M.E.	2000	Health related quality of life outcomes after total hip and knee arthroplasties in a community based population	J Rheumatol.	does not evaluate age as a risk factor
Jones,M.D.; Parry,M.C.; Whitehouse,M.R.; Blom,A.W.	2014	Early death following primary total hip arthroplasty	J Arthroplasty	very low quality due to low event rate relative to number of variables in the model.
Jong,O.R.; Hopman,Rock M.; Tak,E.C.; Klazinga,N.S.	2004	An implementation study of two evidence-based exercise and health education programmes for older adults with osteoarthritis of the knee and hip	Health Educ.Res.	Repeat article
Jorge,R.T.; Souza,M.C.; Chiari,A.; Jones,A.; Fernandes,Ada R.; Lombardi,Junior,I; Natour,J.	2015	Progressive resistance exercise in women with osteoarthritis of the knee: a randomized controlled trial	Clin Rehabil	Patient population
Joshi,A.B.; Porter,M.L.; Trail,I.A.; Hunt,L.P.; Murphy,J.C.; Hardinge,K.	1993	Long-term results of Charnley low-friction arthroplasty in young patients	J Bone Joint Surg Br	unclear coding of age variable in statistical analysis. cant tell if it is continuous, or if each age category is compared to a reference group.
Judet,H.	2007	Five years of experience in hip navigation using a mini-invasive anterior approach		Unclear if 90% of pop is Hip OA
Judge,A.; Batra,R.N.; Thomas,G.E.; Beard,D.; Javaid,M.K.; Murray,D.W.; Dieppe,P.A.; Dreinhoefer,K.E.; Peter-Guenther,K.; Field,R.; Cooper,C.; Arden,N.K.	2014	Body mass index is not a clinically meaningful predictor of patient reported outcomes of primary hip replacement surgery: prospective cohort study	Osteoarthritis Cartilage	meta analysis
Judge,A.; Javaid,M.K.; Arden,N.K.; Cushnaghan,J.; Reading,I.; Croft,P.; Dieppe,P.A.; Cooper,C.	2012	Clinical tool to identify patients who are most likely to achieve long-term improvement in physical function after total hip arthroplasty	Arthritis Care Res.	less than 50% follow up. 643 at baseline, but only 249 in final analysis
Judge,A.; Kendal,A.; Prieto-Alhambra,D.; Arden,N.K.; Carr,A.	2013	Mortality following elective total hip replacement and hip resurfacing	Osteoarthritis Cartilage	abstract only

Authors	Year	Article Title	Periodical	Reason for Exclusion
Juhakoski,R.; Malmivaara,A.; Lakka,T.A.; Tenhonen,S.; Hannila,M.L.; Arokoski,J.P.	2013	Determinants of pain and functioning in hip osteoarthritis - a two-year prospective study	Clin Rehabil	
Juhakoski,R.; Tenhonen,S.; Malmivaara,A.; Kiviniemi,V.; Anttonen,T.; Arokoski,J.P.	2011	A pragmatic randomized controlled study of the effectiveness and cost consequences of exercise therapy in hip osteoarthritis	Clin Rehabil	knee and hip combined
Jung,J.Y.; Kim,G.U.; Lee,H.J.; Jang,E.C.; Song,I.S.; Ha,Y.C.	2013	Diagnostic value of ultrasound and computed tomographic arthrography in diagnosing anterosuperior acetabular labral tears		Not relevant, does not answer pico question
Justo,D.; Vislapu,N.; Shvedov,V.; Fickte,M.; Danylesko,A.; Kimelman,P.; Merdler,C.; Lerman,Y.	2011	Admission Norton scale scores (ANSS) correlate with rehabilitation outcome and length in elderly patients following hip arthroplasty	Arch.Gerontol.Geriatr.	patient population not all osteoarthritis. for age, it is unclear if all patients got total hip arthroplasty.
Kadry,B.; Press,C.D.; Alosh,H.; Opper,I.M.; Orsini,J.; Popov,I.A.; Brodsky,J.B.; Macario,A.	2014	Obesity increases operating room times in patients undergoing primary hip arthroplasty: a retrospective cohort analysis	PeerJ.	less than 90% OA hip patients
Kaik,B.; Bauer,K.; Broll,H.	1991	Double-blind randomized clinical trial on imidazole salicylate vs ibuprofen in osteoarthritis	Int J Clin Pharmacol Ther Toxicol.	
Kain,M.S.; Novais,E.N.; Vallim,C.; Millis,M.B.; Kim,Y.J.	2011	Periacetabular osteotomy after failed hip arthroscopy for labral tears in patients with acetabular dysplasia	J Bone Joint Surg Am	Not relevant to recommendation
Kalteis,T.; Sendtner,E.; Beverland,D.; Archbold,P.A.; Hube,R.; Schuster,T.; Renkawitz,T.; Grifka,J.	2011	The role of the transverse acetabular ligament for acetabular component orientation in total hip replacement: an analysis of acetabular component position and range of movement using navigation software	J Bone Joint Surg Br	Not relevant to recommendation
Kamioka,H.; Tsutani,K.; Mutoh,Y.; Okuizum,H.; Ohta,M.; Handa,S.; Okada,S.; Kitayuguchi,J.; Kamada,M.; Shiozawa,N.; Park,S.J.; Honda,T.; Moriyama,S.	2011	A systematic review of nonrandomized controlled trials on the curative effects of aquatic exercise	Int J Gen.Med	Systematic Review

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Kaneuji,A.; Sugimori,T.; Ichiseki,T.; Fukui,K.; Takahashi,E.; Matsumoto,T.	2015	Rotational Acetabular Osteotomy for Osteoarthritis with Acetabular Dysplasia: Conversion Rate to Total Hip Arthroplasty within Twenty Years and Osteoarthritis Progression After a Minimum of Twenty Years	J Bone Joint Surg Am	Not relevant to recommendation
Kang,A.C.; Gooding,A.J.; Coates,M.H.; Goh,T.D.; Armour,P.; Rietveld,J.	2010	Computed tomography assessment of hip joints in asymptomatic individuals in relation to femoroacetabular impingement	Am J Sports Med	Not relevant, does not answer pico question
Kang,B.J.; Lee,Y.K.; Kim,H.J.; Ha,Y.C.; Koo,K.H.	2011	Deep venous thrombosis and pulmonary embolism are uncommon in East Asian patients after total hip arthroplasty	Clin Orthop Relat Res	90% of pop isn't Hip OA
Kang,K.; Shin,J.S.; Lee,J.; Lee,Y.J.; Kim,M.R.; Park,K.B.; Ha,I.H.	2016	Association between direct and indirect smoking and osteoarthritis prevalence in Koreans: a cross-sectional study	BMJ Open	not relevant. risk of OA was the outcome
Karlsson,J.; Pivodic,A.; Aguirre,D.; Schnitzer,T.J.	2009	Efficacy, safety, and tolerability of the cyclooxygenase-inhibiting nitric oxide donator naproxcinod in treating osteoarthritis of the hip or knee	J Rheumatol.	Hip and Knee combined
Karlsson,J.; Soderstrom,A.; Augustini,B.G.; Berggren,A.C.	2014	Is buprenorphine transdermal patch equally safe and effective in younger and elderly patients with osteoarthritis-related pain? Results of an age-group controlled study	Curr Med Res Opin	90% of pop isn't Hip OA
Karlsson,M.; Berggren,A.C.	2009	Efficacy and safety of low-dose transdermal buprenorphine patches (5, 10, and 20 microg/h) versus prolonged-release tramadol tablets (75, 100, 150, and 200 mg) in patients with chronic osteoarthritis pain: a 12-week, randomized, open-label, controlled, parallel-group noninferiority study	Clin Ther	Hip and Knee combined
Katz,J.N.; Wright,E.A.; Harris,M.B.; Losina,E.	2012	Incidence, risk factors and consequences of periprosthetic and femoral fracture among those who survived total hip replacement for more than a decade	Osteoarthritis Cartilage	abstract only
Katz,N.; Hale,M.; Morris,D.; Stauffer,J.	2010	Morphine sulfate and naltrexone hydrochloride extended release capsules in patients with chronic osteoarthritis pain	Postgrad.Med	90% of pop isn't Hip OA

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Katz,N.; Sun,S.; Johnson,F.; Stauffer,J.	2010	ALO-01 (morphine sulfate and naltrexone hydrochloride) extended-release capsules in the treatment of chronic pain of osteoarthritis of the hip or knee: pharmacokinetics, efficacy, and safety	J Pain	90% of pop isn't Hip OA
Kawasaki,M.; Hasegawa,Y.; Sakano,S.; Torii,Y.; Warashina,H.	2003	Quality of life after several treatments for osteoarthritis of the hip	J Orthop Sci	does not evaluate age as a risk factor
Kearns,S.R.; Jamal,B.; Rorabeck,C.H.; Bourne,R.B.	2006	Factors affecting survival of uncemented total hip arthroplasty in patients 50 years or younger	Clin.Orthop.	age not considered as a risk factor for worse outcomes compared to older patients
Keeney,J.A.; Nunley,R.M.; Baca,G.R.; Clohisy,J.C.	2015	Are younger patients undergoing THA appropriately characterized as active?	Clin Orthop Relat Res	less than 90% OA hip patients
Keeney,J.A.; Peelle,M.W.; Jackson,J.; Rubin,D.; Maloney,W.J.; Clohisy,J.C.	2004	Magnetic resonance arthrography versus arthroscopy in the evaluation of articular hip pathology	Clin Orthop Relat Res	Not relevant, does not answer pico question
Keerthi,N.; Chimutengwende-Gordon,M.; Sanghani,A.; Khan,W.	2013	The potential of stem cell therapy for osteoarthritis and rheumatoid arthritis	Current Stem Cell Research and Therapy	literature review; background
Keisu,K.S.; Orozco,F.; McCallum III,J.D.; Bissett,G.; Hozack,W.J.; Sharkey,P.F.; Rothman,R.H.	2001	Cementless femoral fixation in the rheumatoid patient undergoing total hip arthroplasty: Minimum 5-year results	J.Arthroplasty	less than 10 per group for t-test. they did a t test of age in 6 people with failures compared to patients without failures
Kemp,J.L.; Collins,N.J.; Makdissi,M.; Schache,A.G.; Machotka,Z.; Crossley,K.	2012	Hip arthroscopy for intra-articular pathology: a systematic review of outcomes with and without femoral osteoplasty	Br J Sports Med	Systematic Review
Kemp,J.L.; MacDonald,D.; Collins,N.J.; Hatton,A.L.; Crossley,K.M.	2015	Hip arthroscopy in the setting of hip osteoarthritis: systematic review of outcomes and progression to hip arthroplasty	Clin Orthop Relat Res	systematic review
Kemp,J.L.; MacDonald,D.; Collins,N.J.; Hatton,A.L.; Crossley,K.M.	2014	Hip Arthroscopy in the Setting of Hip Osteoarthritis: Systematic Review of Outcomes and Progression to Hip Arthroplasty	Clin.Orthop.	Systematic Review

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Kemp,J.L.; Makdissi,M.; Schache,A.G.; Pritchard,M.G.; Pollard,T.C.; Crossley,K.M.	2014	Hip chondropathy at arthroscopy: prevalence and relationship to labral pathology, femoroacetabular impingement and patient-reported outcomes	Br J Sports Med	not relevant because patients had arthroscopy and not THA
Kemp,J.L.; Moore,K.; Fransen,M.; Russell,T.G.; Crossley,K.M.	2015	A phase II trial for the efficacy of physiotherapy intervention for early-onset hip osteoarthritis: study protocol for a randomised controlled trial	Trials	Trial is ongoing
Kendal,A.R.; Prieto-Alhambra,D.; Arden,N.K.; Carr,A.; Judge,A.	1927	Mortality rates at 10 years after metal-on-metal hip resurfacing compared with total hip replacement in England: Retrospective cohort analysis of hospital episode statistics		does not evaluate age as a risk factor
Kennedy,A.C.; Mullen,B.J.; Roth,S.H.; Germain,B.F.; Bonebrake,R.A.; Wei,N.; Willkens,R.F.; Lawson,J.G.; Appelrouth,D.J.; White,R.E.	1994	A double-blind comparison of the efficacy and safety of ketoprofen extended-release (200 mg once daily) and diclofenac (75 mg twice daily) for treatment of osteoarthritis	Current Therapeutic Research - Clinical and Experimental	Hip and Knee combined
Kennedy,D.M.; Stratford,P.W.; Robarts,S.; Gollish,J.D.	2011	Using outcome measure results to facilitate clinical decisions the first year after total hip arthroplasty	J Orthop Sports Phys Ther	the model includes age, but only presents the overall fit of the model, without reporting the results for the indepdent effects of age
Kessler,S.; Kafer,W.	2007	Overweight and obesity: two predictors for worse early outcome in total hip replacement?	Obesity (Silver.Spring)	unclear if 90% of the patient population had oa hip
Keurentjes,J.C.	2015	CORR InsightsÃ?Â: Standard Comorbidity Measures Do Not Predict Patient-reported Outcomes 1 Year After Total Hip Arthroplasty	Clin.Orthop.	narrative review
Khan,W.; Khan,M.; Alradwan,H.; Williams,R.; Simunovic,N.; Ayeni,O.R.	2015	Utility of Intra-articular Hip Injections for Femoroacetabular Impingement: A Systematic Review	Orthopaedic Journal of Sports Medicine	Systematic Review

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Khanna,V.; Harris,A.; Farrokhyar,F.; Choudur,H.N.; Wong,I.H.	2014	Hip arthroscopy: prevalence of intra-articular pathologic findings after traumatic injury of the hip		Not relevant, does not answer pico question
Khatod,M.; Inacio,M.C.; Dell,R.M.; Bini,S.A.; Paxton,E.W.; Namba,R.S.	2015	Association of Bisphosphonate Use and Risk of Revision After THA: Outcomes From a US Total Joint Replacement Registry	Clin Orthop Relat Res	Not relevant, does not answer pico question
Kidd,B.; Frenzel,W.	1996	A multicenter, randomized, double blind study comparing lornoxicam with diclofenac in osteoarthritis	J Rheumatol.	<10 patient per group
Kim,D.M.; Brecher,M.E.; Estes,T.J.; Morrey,B.F.	1993	Relationship of hemoglobin level and duration of hospitalization after total hip arthroplasty: Implications for the transfusion target	Mayo Clin.Proc.	no relevant outcomes to age pico question
Kim,H.T.; Kim,I.B.; Lee,J.S.	2011	MR-based parameters as a supplement to radiographs in managing developmental hip dysplasia	Clin Orthop Surg	Not relevant, does not answer pico question
Kim,H.T.; Oh,M.H.; Lee,J.S.	2011	MR imaging as a supplement to traditional decision-making in the treatment of LCP disease	J Pediatr Orthop	Not relevant, does not answer pico question
Kim,J.W.; Oh,C.W.; Oh,J.K.; Baek,S.G.; Lee,B.J.; Hong,H.P.; Min,W.K.	2014	The incidence and the risk factors of venous thromboembolism in Korean patients with pelvic or acetabular fractures	J Orthop Sci	unclear if all patients had THA
Kim,Y.-H.	2006	Comparison of Primary Total Hip Arthroplasties Performed with a Minimally Invasive Technique or a Standard Technique. A Prospective and Randomized Study	J.Arthroplasty	90% of pop isn't Hip OA
Kim,Y.-H.	2002	Cementless total hip arthroplasty with a close proximal fit and short tapered distal stem (third-generation) prosthesis	J.Arthroplasty	regression analysis done on outcome that isn't patient oriented. for the ANOVA comparison among age subgroups, there is less than 10 patients per group

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Kim,Y.H.; Kim,J.S.; Park,J.W.; Joo,J.H.	2011	Comparison of total hip replacement with and without cement in patients younger than 50 years of age: the results at 18 years	J Bone Joint Surg Br	does not look at age as a risk factor
Kim,Y.H.; Kim,V.E.	1993	Uncemented porous-coated anatomic total hip replacement. Results at six years in a consecutive series	J Bone Joint Surg Br	no patient oriented outcomes reported for age
Kim,Y.-H.; Kim,V.E.M.	1993	Uncemented porous-coated anatomic total hip replacement	Journal of Bone and Joint Surgery - Series B	effect of age not examined for patient oriented outcomes
Kim,Y.H.; Park,J.W.; Kim,J.S.	2015	Outcome of an ultrashort metaphyseal-fitting anatomic cementless stem in highly active obese and non-obese patients	Int Orthop	90% of pop isn't Hip OA- not relevant to PICO
Kim,Y.-H.; Park,J.-W.; Park,J.-S.	2014	The 27 to 29-year outcomes of the PCA total hip arthroplasty in patients younger than 50 years old	J.Arthroplasty	not best available evidence due to loss to follow up and low number of events relative to number of variables in the multivariate model
Kindsfater,K.A.; Politi,J.R.; Dennis,D.A.; Sychterz Terefenko,C.J.	2011	The incidence of femoral component version change in primary THA using the S-ROM femoral component		quality downgraded to very low because the event rate was too low for multivariate analysis.
Kirkness,C.S.; McAdam-Marx,C.; Unni,S.; Young,J.; Ye,X.; Chandran,A.; Peters,C.L.; Asche,C.V.	2013	Characterization of patients undergoing total hip arthroplasty in a real-world setting and pain-related medication prescriptions for management of postoperative pain	J Pain Palliat.Care Pharmacother.	90% of pop isn't Hip OA
Kirschenbaum,I.H.; Vernace,J.V.; Booth,R.E.,Jr.; Balderston,R.A.; Rothman,R.H.	1991	Total hip arthroplasty for osteonecrosis	Semin Arthroplasty	less than 90% OA hip patients
Kiss,R.M.; Illyes,A.	2012	Comparison of gait parameters in patients following total hip arthroplasty with a direct-lateral or antero-lateral surgical approach	Hum Mov Sci	retrospective case series

Authors	Year	Article Title	Periodical	Reason for Exclusion
Kita,T.; Maki,N.; Song,Y.S.; Arai,F.; Nakai,T.	2007	Caudal epidural anesthesia administered intraoperatively provides for effective postoperative analgesia after total hip arthroplasty	J Clin Anesth.	<10 patient per group
Kitsoulis,P.B.; Stafilas,K.S.; Siamopoulou,A.; Soucacos,P.N.; Xenakis,T.A.	2006	Total hip arthroplasty in children with juvenile chronic arthritis: long-term results	J Pediatr Orthop	does not evaluate age as a risk factor
Kivitz,A.; Ma,C.; Ahdieh,H.; Galer,B.S.	2006	A 2-week, multicenter, randomized, double-blind, placebo-controlled, dose-ranging, phase III trial comparing the efficacy of oxymorphone extended release and placebo in adults with pain associated with osteoarthritis of the hip or knee	Clin Ther	90% of pop isn't Hip OA
Kivlan,B.R.; Martin,R.L.; Sekiya,J.K.	2011	Response to diagnostic injection in patients with femoroacetabular impingement, labral tears, chondral lesions, and extra-articular pathology		Retrospective case series
Kjaersgaard,Andersen P.	1991	Evaluating codeine plus paracetamol for pain	Nurs.Times	Narrative review
Kjaersgaard,Andersen P.; Nafei,A.; Skov,O.; Madsen,F.; Andersen,H.M.; KrÃ¸ner,K.; Hvass,I.; GjÃ¸derum,O.; Pedersen,L.; Branebjerg,P.E.	1990	Codeine plus paracetamol versus paracetamol in longer-term treatment of chronic pain due to osteoarthritis of the hip. A randomised, double-blind, multi-centre study		Repeat article
Kjaersgaard-Andersen,P.; Hougaard,K.; Linde,F.; Christiansen,S.E.; Jensen,J.	1990	Heterotopic bone formation after total hip arthroplasty in patients with primary or secondary coxarthrosis		not best available evidence
Kjaersgaard-Andersen,P.; Nafei,A.; Skov,O.; Madsen,F.; Andersen,H.M.; Kroner,K.; Hvass,I.; Gjoderum,O.; Pedersen,L.; Branebjerg,P.E.	1990	Codeine plus paracetamol versus paracetamol in longer-term treatment of chronic pain due to osteoarthritis of the hip. A randomised, double-blind, multi-centre study		Consenses
Klasen,J.; Haas,M.; Graf,S.; Harbach,H.; Quinzio,L.; Jurgensen,I.; Hempelmann,G.	2005	Impact on postoperative pain of long-lasting pre-emptive epidural analgesia before total hip replacement: A prospective, randomised, double-blind study		Epidural analgesia
Klassbo,M.; Larsson,G.; Harms-Ringdahl,K.	2003	Promising outcome of a hip school for patients with hip dysfunction	Arthritis Rheum.	90% of pop isn't Hip OA

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Klausmeier,V.; Lugade,V.; Jewett,B.A.; Collis,D.K.; Chou,L.S.	2010	Is there faster recovery with an anterior or anterolateral THA? A pilot study	Clin Orthop Relat Res	outcome measure
Kleiner,J.B.; Thorne,R.P.; Curd,J.G.	1991	The value of bupivicaine hip injection in the differentiation of coxarthrosis from lower extremity neuropathy	J Rheumatol.	Not relevant, does not answer pico question
Klingenstein,G.G.; Zbeda,R.M.; Bedi,A.; Magennis,E.; Kelly,B.T.	2013	Prevalence and preoperative demographic and radiographic predictors of bilateral femoroacetabular impingement	Am J Sports Med	patients got arthroscopy, not THA
Klit,J.	2014	Results of total joint arthroplasty and joint preserving surgery in younger patients evaluated by alternative outcome measures	Dan.Med J	relevance to pico questions unclear. the arthroplasty study included resurfacing patients, so it is not relevant to the THA for any diagnosis pico question. it was unclear if the patient population had OA for other risk factors besides age
Kloek,C.J.; Bossen,D.; Veenhof,C.; van Dongen,J.M.; Dekker,J.; de Bakker,D.H.	2014	Effectiveness and cost-effectiveness of a blended exercise intervention for patients with hip and/or knee osteoarthritis: study protocol of a randomized controlled trial	BMC Musculoskelet.Disord.	analysis is not finished
Kobayashi,D.; Satsuma,S.; Kinugasa,M.; Kuroda,R.; Kurosaka,M.	2015	Does Salter innominate osteotomy predispose the patient to acetabular retroversion in adulthood?	Clin Orthop Relat Res	Not relevant, does not answer pico question
Kobayashi,D.; Satsuma,S.; Kinugasa,M.; Kuroda,R.; Kurosaka,M.	2014	Does Salter Innominate Osteotomy Predispose the Patient to Acetabular Retroversion in Adulthood?	Clin.Orthop.	retrospective case series
Kobayashi,S.; Eftekhar,N.S.; Terayama,K.; Iorio,R.	1994	Risk factors affecting radiological failure of the socket in primary Charnley low friction arthroplasty. A 10- to 20-year followup study	Clin Orthop Relat Res	no patient oriented outcomes

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Kobayashi,S.; Eftekhar,N.S.; Terayama,K.; Joshi,R.P.	1997	Comparative study of total hip arthroplasty between younger and older patients	Clin Orthop Relat Res	very low quality. no adjustment for baseline differences in diagnosis. Also, the survival analysis was not prespecified in the methods section, increasing the risk for selective reporting.
Kodali,P.; Islam,A.; Andrish,J.	2011	Anterior knee pain in the young athlete: Diagnosis and treatment	Sports Medicine and Arthroscopy Review	Not relevant to recommendation
Konan,S.; Rayan,F.; Haddad,F.S.	2010	Is the frog lateral plain radiograph a reliable predictor of the alpha angle in femoroacetabular impingement?	J Bone Joint Surg Br	Not relevant, does not answer pico question
Korsmeier,K.; Classen,T.; Kamminga,M.; Rekowski,J.; Jager,M.; Landgraeber,S.	2014	Arthroscopic three-dimensional autologous chondrocyte transplantation using spheroids for the treatment of full-thickness cartilage defects of the hip joint	Knee Surg Sports Traumatol.Arthrosc.	Not relevant, does not answer pico question
Kosek,E.; Roos,E.M.; Ageberg,E.; Nilsdotter,A.	2013	Increased pain sensitivity but normal function of exercise induced analgesia in hip and knee osteoarthritis--treatment effects of neuromuscular exercise and total joint replacement	Osteoarthritis Cartilage	control group unclear if hip or knee
Kostensalo,I.; Junnila,M.; Virolainen,P.; Remes,V.; Matilainen,M.; Vahlberg,T.; Pulkkinen,P.; Eskelinen,A.; Makela,K.T.	2013	Effect of femoral head size on risk of revision for dislocation after total hip arthroplasty: a population-based analysis of 42,379 primary procedures from the Finnish Arthroplasty Register	Acta Orthop	age risk factor results not presented
Koulouvaris,P.; Stafylas,K.; Aznaoutoglou,C.; Zacharis,K.; Xenakis,T.	2007	Isolated varus intertrochanteric osteotomy for hip dysplasia in 52 patients: long-term results	Int Orthop	Not relevent, outcome
Kowalczuk,M.; Yeung,M.; Simunovic,N.; Ayeni,O.R.	2015	Does Femoroacetabular Impingement Contribute to the Development of Hip Osteoarthritis? A Systematic Review	Sports Med Arthrosc.	
Kralj,M.; Mavcic,B.; Antolic,V.; Iglic,A.; Kralj-Iglic,V.	2005	The Bernese periacetabular osteotomy: clinical, radiographic and mechanical 7-15-year follow-	Acta Orthop	Not relevant, tonnis grade, less then 10

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		up of 26 hips		patients per group
Krauss,I.	2014	Sham treatment shows similar effects on pain and function compared to a multimodal physiotherapeutic intervention programme in patients with painful hip osteoarthritis	Evidence-Based Medicine	Abstract only
Krauss,I.	2015	Can exercise ease the burden of hip osteoarthritis?	International Journal of Clinical Rheumatology	Narrative review
Krauss,I.; Steinhilber,B.; Haupt,G.; Miller,R.; Grau,S.; Janssen,P.	2011	Efficacy of conservative treatment regimes for hip osteoarthritis--evaluation of the therapeutic exercise regime "Hip School": a protocol for a randomised, controlled trial	BMC Musculoskelet.Disord.	Results section/not completed study
Krauss,I.; Steinhilber,B.; Haupt,G.; Miller,R.; Martus,P.; Janssen,P.	2014	Exercise therapy in hip osteoarthritis--a randomized controlled trial	Dtsch.Arztebl.Int	Some patients had some type of surgery
Krenzel,B.A.; Berend,M.E.; Malinzak,R.A.; Faris,P.M.; Keating,E.M.; Meding,J.B.; Ritter,M.A.	2010	High preoperative range of motion is a significant risk factor for dislocation in primary total hip arthroplasty	J Arthroplasty	Not relevant, does not answer pico question
Kreuzer,S.; Leffers,K.	2011	Direct anterior approach to total hip arthroplasty using computer navigation	Bulletin of the NYU Hospital for Joint Diseases	90% of pop isn't Hip OA
Kriegel,W.; Korff,K.J.; Ehrlich,J.C.; Lehnhardt,K.; Macciocchi,A.; Moresino,C.; Pawlowski,C.	2001	Double-blind study comparing the long-term efficacy of the COX-2 inhibitor nimesulide and naproxen in patients with osteoarthritis	Int J Clin Pract	90% of pop isn't Hip OA
Krishnan,E.; Fries,J.F.; Kwoh,C.K.	2007	Primary knee and hip arthroplasty among nonagenarians and centenarians in the United States	Arthritis Rheum.	less than 90% OA hip patients
Kroon-FÃ©line,P.B.; -van-der-Burg-Lennart-RA; Buchbinder,Rachelle; Osborne,Richard H.; Johnston,Renea,V; Pitt,Veronica	2014	Self-management education programmes for osteoarthritis	Cochrane Database of Systematic Reviews	Systematic Review
Kruczynski,J.	1996	Avascular necrosis of the proximal femur in developmental dislocation of the hip. Incidence, risk factors, sequelae and MR imaging for diagnosis and prognosis	Acta Orthop Scand.Suppl	Abstract

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Kruger,K.; Klasser,M.; Mossinger,J.; Becker,U.	2007	Oxaceprol--a randomised, placebo-controlled clinical study in osteoarthritis with a non-conventional non-steroidal anti-inflammatory drug	Clin Exp.Rheumatol.	Hip and Knee combined
Krupic,F.; Eisler,T.; Garellick,G.; Karrholm,J.	2013	Influence of ethnicity and socioeconomic factors on outcome after total hip replacement	Scand.J Caring Sci	not relevant. only variable analyzed was swedish immigration status
Krupic,F.; Garellick,G.; Gordon,M.; Karrholm,J.	2014	Different patient-reported outcomes in immigrants and patients born in Sweden	Acta orthopaedica	not relevant. only risk factor studied was nationality
Kruse,D.W.	2008	Intraarticular cortisone injection for osteoarthritis of the hip. Is it effective? Is it safe?	Curr Rev Musculoskelet.Med	
Krych,A.J.; Pagnano,M.W.; Wood,K.C.; Meneghini,R.M.; Kaufmann,K.	2010	No benefit of the two-incision THA over mini-posterior THA: a pilot study of strength and gait	Clin Orthop Relat Res	not patient reported outcome
Kubo,M.; Ando,K.; Mimura,T.; Matsusue,Y.; Mori,K.	2009	Chondroitin sulfate for the treatment of hip and knee osteoarthritis: current status and future trends	Life Sci	Narrative review
Kullenberg,B.; Runesson,R.; Tuvhag,R.; Olsson,C.; Resch,S.	2004	Intraarticular corticosteroid injection: pain relief in osteoarthritis of the hip?	J Rheumatol.	Retrospective case series
Kuo,F.C.; Liu,H.C.; Chen,W.S.; Wang,J.W.	2012	Ceramic-on-ceramic total hip arthroplasty: incidence and risk factors of bearing surface-related noises in 125 patients		no patient oriented outcomes
Kurtais,Y.; Oztuna,D.; Kucukdeveci,A.A.; Kutlay,S.; Hafiz,M.; Tennant,A.	2011	Reliability, construct validity and measurement potential of the ICF comprehensive core set for osteoarthritis	BMC Musculoskelet.Disord.	validation of an outcome measure, and not a risk assessment tool
Kurtinaitis,J.; Porvaneckas,N.; Kvederas,G.; Butenas,T.; Uvarovas,V.	2013	Revision rates after surgical treatment for femoral neck fractures: results of 2-year follow-up	Medicina (Kaunas)	quality is very low , mostly due to low number of events and low statistical power
Kurup,H.; Ward,P.	2010	Do we need radiological guidance for hip joint injections?	Acta Orthop Belg.	

Authors	Year	Article Title	Periodical	Reason for Exclusion
Kutty,S.; Schneider,P.; Faris,P.; Kiefer,G.; Frizzell,B.; Park,R.; Powell,J.N.	2012	Reliability and predictability of the centre-edge angle in the assessment of pincer femoroacetabular impingement	Int Orthop	Not relevant, does not answer pico question
Kuwajima,S.S.; Crawford,A.H.; Ishida,A.; Roy,D.R.; Filho,J.L.; Milani,C.	2002	Comparison between Salter's innominate osteotomy and augmented acetabuloplasty in the treatment of patients with severe Legg-Calve-Perthes disease. Analysis of 90 hips with special reference to roentgenographic sphericity and coverage of the femoral head	J Pediatr Orthop B	Not relevant to recommendation
Kvien,T.K.; Brors,O.; Staff,P.H.; Rognstad,S.; Nordby,J.	1991	Improved cost-effectiveness ratio with a patient self-adjusted naproxen dosing regimen in osteoarthritis treatment	Scand.J Rheumatol.	Hip and Knee combined
Lachiewicz,P.F.; Soileau,E.S.	2002	Stability of total hip arthroplasty in patients 75 years or older	Clin Orthop Relat Res	does not evaluate age as a risk factor
Lack,W.; Windhager,R.; Kutschera,H.P.; Engel,A.	1991	Chiari pelvic osteotomy for osteoarthritis secondary to hip dysplasia. Indications and long-term results	J Bone Joint Surg Br	retrospective case series
Laine,L.; White,W.B.; Rostom,A.; Hochberg,M.	2008	COX-2 Selective Inhibitors in the Treatment of Osteoarthritis	Semin.Arthritis Rheum.	Systematic Review
Lampropoulou-Adamidou,K.; Macheras,G.A.; Hartofilakidis,G.	2015	Bilateral character of total hip replacement does not change the overall survival	Hip Int	less than 90% OA hip patients
Lane,N.E.; Lin,P.; Christiansen,L.; Gore,L.R.; Williams,E.N.; Hochberg,M.C.; Nevitt,M.C.	2000	Association of mild acetabular dysplasia with an increased risk of incident hip osteoarthritis in elderly white women: the study of osteoporotic fractures	Arthritis Rheum.	Not relevant, does not answer pico question
Langford,R.; McKenna,F.; Ratcliffe,S.; Vojtassak,J.; Richarz,U.	2006	Transdermal fentanyl for improvement of pain and functioning in osteoarthritis: a randomized, placebo-controlled trial	Arthritis Rheum.	90% of pop isn't Hip OA
Large,K.E.; Page,C.J.; Brock,K.; Dowsey,M.M.; Choong,P.F.	2014	Physiotherapy-led arthroplasty review clinic: a preliminary outcomes analysis	Aust.Health Rev	retrospective case
Larsen,K.; Sorensen,O.G.; Hansen,T.B.; Thomsen,P.B.; Soballe,K.	2008	Accelerated perioperative care and rehabilitation intervention for hip and knee replacement is effective: a randomized clinical trial involving 87 patients with 3 months of follow-up	Acta Orthop	Unclear of population

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Larson,A.N.; Rabenhorst,B.; De La Rocha,A.; Sucato,D.J.	2012	Limited intraobserver and interobserver reliability for the common measures of hip joint congruency used in dysplasia	Clin Orthop Relat Res	Not relevant, does not answer pico question
Larson,A.N.; Sucato,D.J.; Herring,J.A.; Adolfsen,S.E.; Kelly,D.M.; Martus,J.E.; Lovejoy,J.F.; Browne,R.; Delarocha,A.	2012	A prospective multicenter study of Legg-Calve-Perthes disease: functional and radiographic outcomes of nonoperative treatment at a mean follow-up of twenty years	J Bone Joint Surg Am	Not relevant, does not answer pico question
Larson,C.M.; Giveans,M.R.; Samuelson,K.M.; Stone,R.M.; Bedi,A.	2014	Arthroscopic Hip Revision Surgery for Residual Femoroacetabular Impingement (FAI): Surgical Outcomes Compared With a Matched Cohort After Primary Arthroscopic FAI Correction	Am J Sports Med	Retrospective case series
Lattanzi,R.; Petchprapa,C.; Ascani,D.; Babb,J.S.; Chu,D.; Davidovitch,R.I.; Youm,T.; Meislin,R.J.; Recht,M.P.	2014	Detection of cartilage damage in femoroacetabular impingement with standardized dGEMRIC at 3T	Osteoarthritis Cartilage	Not relevant, does not answer pico question
Lattanzi,R.; Petchprapa,C.; Glaser,C.; Dunham,K.; Mikheev,A.V.; Krigel,A.; Mamisch,T.C.; Kim,Y.-J.; Rusinek,H.; Recht,M.	2012	A new method to analyze dGEMRIC measurements in femoroacetabular impingement: Preliminary validation against arthroscopic findings	Osteoarthritis Cartilage	Not relevant, does not answer pico question
Lavernia,C.J.; Alcerro,J.C.; Brooks,L.G.; Rossi,M.D.	2012	Mental health and outcomes in primary total joint arthroplasty	J Arthroplasty	unclear if 90% of the patient population had oa hip
Lavernia,C.J.; Alcerro,J.C.; Rossi,M.D.	2010	Fear in arthroplasty surgery: the role of race	Clin Orthop Relat Res	hip and knee data combined for the analysis of preop anxiety and post op outcomes.
Lavernia,C.J.; Laoruengthana,A.; Contreras,J.S.; Rossi,M.D.	2009	All-Patient Refined Diagnosis-Related Groups in Primary Arthroplasty	J.Arthroplasty	combines hip and knee results
Lavernia,C.J.; Sierra,R.J.; Gomez-Marin,O.	1999	Smoking and joint replacement: resource consumption and short-term outcome	Clin Orthop Relat Res	combines Hip and Knee patients, and it is unclear if 90% of the patient population had THA verus TKA

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Lavernia,C.J.; Villa,J.M.; Contreras,J.S.	2013	Alcohol use in elective total hip arthroplasty: risk or benefit?	Clin Orthop Relat Res	unclear if 90% of the patient population had oa hip
Lawless,B.M.; Greene,M.; Slover,J.; Kwon,Y.M.; Malchau,H.	2012	Does age or bilateral disease influence the value of hip arthroplasty?	Clin Orthop Relat Res	less than 90% OA hip patients
Lazarinis,S.; Krarholm,J.; Hailer,N.P.	2010	Increased risk of revision of acetabular cups coated with hydroxyapatite: A Swedish Hip Arthroplasty Register study involving 8,043 total hip replacements	Acta orthopaedica	less than 90% OA hip patients
Lazennec,J.Y.; Rousseau,M.A.; Rangel,A.; Gorin,M.; Belicourt,C.; Brusson,A.; Catonne,Y.	2011	Pelvis and total hip arthroplasty acetabular component orientations in sitting and standing positions: measurements reproductibility with EOS imaging system versus conventional radiographies	Orthop Traumatol.Surg Res	Not relevant, does not answer pico question
Le Duff,M.J.; Amstutz,H.C.; Dorey,F.J.	2007	Metal-on-metal hip resurfacing for obese patients	J Bone Joint Surg Am	less than 90% OA hip
Le Duff,M.J.; Johnson,A.J.; Wassef,A.J.; Amstutz,H.C.	2014	Does femoral neck to cup impingement affect metal ion levels in hip resurfacing?	Clin Orthop Relat Res	Not relevant, does not answer pico question
Le Duff,M.J.; Wisk,L.E.; Amstutz,H.C.	2009	Range of motion after stemmed total hip arthroplasty and hip resurfacing: A clinical study	Bulletin of the NYU Hospital for Joint Diseases	not relevant. compares hip resurfacing to THA
Le Mar,K.J.; Whitehead,D.	2014	Preoperative indicators of length of stay following total hip replacement: a New Zealand-based retrospective, observational study	J Clin Nurs	less than 90% OA hip patients
Le,Liu J.; Wang,X.L.; Gong,M.W.; Mai,H.X.; Pei,S.J.; Yuan,W.X.; Zhang,H.	2014	Comparative outcomes of peripheral nerve blocks versus general anesthesia for hip fractures in geriatric Chinese patients	Patient Preference and Adherence	hip fracture patients
Le,Loet,X; Dreiser,R.L.; Le,Gros,V; Febvre,N.	1997	Therapeutic equivalence of diclofenac sustained-released 75 mg tablets and diclofenac enteric-coated 50 mg tablets in the treatment of painful osteoarthritis	Int J Clin Pract	Unclear if 90% of pop is Hip OA
Le,Loet,X; Pavelka,K.; Richarz,U.	2005	Transdermal fentanyl for the treatment of pain caused by osteoarthritis of the knee or hip: an open, multicentre study	BMC Musculoskelet.Disord.	90% of pop isn't Hip OA

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Le,Quintrec J.-L.; Verlhac,B.; Cadet,C.; Breville,P.; Vetel,J.M.; Gauvain,J.B.; Jeandel,C.; Maheu,E.	2014	Physical exercise and weight loss for hip and knee osteoarthritis in very old patients: A systematic review of the literature	Open Rheumatology Journal	Repeat article
Leach,M.J.; Kumar,S.	2008	The clinical effectiveness of Ginger (Zingiber officinale) in adults with osteoarthritis	Int J Evid Based Healthc	Systematic Review
Leblan,D.; Chantre,P.; Fournie,B.	2000	Harpagophytum procumbens in the treatment of knee and hip osteoarthritis. Four-month results of a prospective, multicenter, double-blind trial versus diacerhein	Joint Bone Spine	90% of pop isn't Hip OA
Lee,C.; Hunsche,E.; Balshaw,R.; Kong,S.X.; Schnitzer,T.J.	2005	Need for common internal controls when assessing the relative efficacy of pharmacologic agents using a meta-analytic approach: case study of cyclooxygenase 2-selective inhibitors for the treatment of osteoarthritis	Arthritis Rheum.	Review
Lee,C.; Straus,W.L.; Balshaw,R.; Barlas,S.; Vogel,S.; Schnitzer,T.J.	2004	A comparison of the efficacy and safety of nonsteroidal antiinflammatory agents versus acetaminophen in the treatment of osteoarthritis: a meta-analysis	Arthritis Rheum.	Systematic Review
Lee,S.; Frank,R.M.; Harris,J.; Song,S.H.; Bush-Joseph,C.A.; Salata,M.J.; Nho,S.J.	2015	Evaluation of Sexual Function Before and After Hip Arthroscopic Surgery for Symptomatic Femoroacetabular Impingement	Am J Sports Med	Retrospective case series
Legre-Boyer,V.	2015	Viscosupplementation: techniques, indications, results	Orthop Traumatol.Surg Res	Review
Lehtimaki,M.Y.; Kautiainen,H.; Lehto,U.K.; Hamalainen,M.M.	1999	Charnley low-friction arthroplasty in rheumatoid patients: a survival study up to 20 years	J Arthroplasty	does not evaluate age as a risk factor
Lehtimaki,M.Y.; Lehto,M.U.K.; Kautiainen,H.; Lehtinen,K.; Hamalainen,M.M.J.	2001	Charnley total hip arthroplasty in ankylosing spondylitis: Survivorship analysis of 76 patients followed for 8-28 years	Acta Orthop.Scand.	very low quality due to inconsistent outcome measurment
Leonardsson,O.; Karrholm,J.; Akesson,K.; Garellick,G.; Rogmark,C.	2012	Higher risk of reoperation for bipolar and uncemented hemiarthroplasty	Acta Orthop	not relevant. patients recieved hemiarthroplasty
Lequesne,M.; Maheu,E.; Cadet,C.; Dreiser,R.L.	2002	Structural effect of avocado/soybean unsaponifiables on joint space loss in osteoarthritis of the hip	Arthritis Rheum.	Confound treatment

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Lerch,S.; Kasperczyk,A.; Berndt,T.; Ruhmann,O.	2015	Ultrasonography can quantify the extent of osteochondroplasty after treatment of Cam-type femoroacetabular impingement	Int Orthop	Not relevant, does not answer pico question
Leung,A.T.; Malmstrom,K.; Gallacher,A.E.; Sarembock,B.; Poor,G.; Beaulieu,A.; Castro,R.; Sanchez,M.; Detora,L.M.; Ng,J.	2002	Efficacy and tolerability profile of etoricoxib in patients with osteoarthritis: A randomized, double-blind, placebo and active-comparator controlled 12-week efficacy trial	Curr Med Res Opin	Hip and Knee combined
Leunig,M.; Werlen,S.; Ungersbock,A.; Ito,K.; Ganz,R.	1997	Evaluation of the acetabular labrum by MR arthrography	J Bone Joint Surg Br	15 abnormal x-ray
Levine,M.E.; Nace,J.; Kapadia,B.H.; Issa,K.; Banerjee,S.; Cherian,J.J.; Mont,M.A.	2013	Treatment of primary hip osteoarthritis for the primary care physician and the indications for total hip arthroplasty	J Long Term Eff.Med Implants	Narrative review
Levy,B.A.; Berry,D.J.; Pagnano,M.W.	2000	Long-term survivorship of cemented all-polyethylene acetabular components in patients > 75 years of age	J Arthroplasty	does not evaluate age as a risk factor
Levy,B.A.; Griffith,T.; Krych,A.; Hudgens,J.; Sierra,R.	2013	Intra-articular cortisone injection has limited clinical benefit for non-operative treatment of femoral acetabular impingement with labral pathology	Arthroscopy - Journal of Arthroscopic and Related Surgery	Abstract
Levy,R.N.; Levy,C.M.; Snyder,J.; Digiovanni,J.	1995	Outcome and long-term results following total hip replacement in elderly patients	Clin Orthop Relat Res	does not evaluate age as a risk factor
Li,L.C.; Sayre,E.C.; Kopec,J.A.; Esdaile,J.M.; Bar,S.; Cibere,J.	2011	Quality of nonpharmacological care in the community for people with knee and hip osteoarthritis	J Rheumatol.	90% of pop isn't Hip OA
Li,N.; Deng,Y.; Chen,L.	2012	Comparison of complications in single-incision minimally invasive THA and conventional THA		Systematic Review
Liang,T.J.; You,M.Z.; Xing,P.F.; Bin,S.; Ke,Z.Z.; Jing,Y.	2010	Uncemented total hip arthroplasty in patients younger than 50 years: A 6- to 10-year follow-up study		does not evaluate age as a risk factor
Lie,S.A.; Engesaeter,L.B.; Havelin,L.I.; Furnes,O.; Vollset,S.E.	2002	Early postoperative mortality after 67,548 total hip replacements: causes of death and thromboprophylaxis in 68 hospitals in Norway from 1987 to 1999	Acta Orthop Scand.	less than 90% OA hip patients

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Lie,S.A.; Engesaeter,L.B.; Havelin,L.I.; Gjessing,H.K.; Vollset,S.E.	2004	Dependency issues in survival analyses of 55,782 primary hip replacements from 47,355 patients	Stat.Med	does not evaluate age as a risk factor.
Lie,S.A.; Engesaeter,L.B.; Havelin,L.I.; Gjessing,H.K.; Vollset,S.E.	2000	Mortality after total hip replacement: 0-10-year follow-up of 39,543 patients in the Norwegian Arthroplasty Register	Acta Orthop Scand.	less than 90% OA hip patients
Lie,S.A.; Pratt,N.; Ryan,P.; Engesaeter,L.B.; Havelin,L.I.; Furnes,O.; Graves,S.	2010	Duration of the increase in early postoperative mortality after elective hip and knee replacement	J Bone Joint Surg Am	combines hip and knee results
Lieberman,J.R.; Dorey,F.; Shekelle,P.; Schumacher,L.; Kilgus,D.J.; Thomas,B.J.; Finerman,G.A.	1997	Outcome after total hip arthroplasty. Comparison of a traditional disease-specific and a quality-of-life measurement of outcome	J Arthroplasty	insufficient data to answer pico questions
Lieberman,J.R.; Engstrom,S.M.; Solovyova,O.; Au,C.; Grady,J.J.	2015	Is intra-articular hyaluronic acid effective in treating osteoarthritis of the hip joint?	J Arthroplasty	
Liebs,T.R.; Herzberg,W.; Ruther,W.; Haasters,J.; Russlies,M.; Hassenpflug,J.	2012	Multicenter randomized controlled trial comparing early versus late aquatic therapy after total hip or knee arthroplasty	Arch Phys Med Rehabil	comparison not relevant to recommendation
Liebs,T.R.; Herzberg,W.; Ruther,W.; Haasters,J.; Russlies,M.; Hassenpflug,J.	2010	Ergometer cycling after hip or knee replacement surgery: a randomized controlled trial	J Bone Joint Surg Am	no passive control
Liebs,T.R.; Nasser,L.; Herzberg,W.; Ruther,W.; Hassenpflug,J.	2014	The influence of femoral offset on health-related quality of life after total hip replacement	Bone Joint J	adjust for confounder age but doesn't present results for variable
Lilikakis,A.K.; Gillespie,B.; Villar,R.N.	2008	The benefit of modified rehabilitation and minimally invasive techniques in total hip replacement	Ann R Coll Surg Engl.	outcome measure not relevant
Lilikakis,A.K.; Villar,R.N.	2005	The influence of incision length on immediate postoperative rehabilitation after total hip replacement	HIP International	unvalidated patient reported instrument used.
Lincoln,M.; Johnston,K.; Muldoon,M.; Santore,R.	2009	Combined arthroscopic and modified open approach for cam femoroacetabular impingement: a preliminary experience		Retrospective case series
Lindahl,H.; Oden,A.; Garellick,G.; Malchau,H.	2007	The excess mortality due to periprosthetic femur fracture. A study from the Swedish national hip arthroplasty register		inadequate data presentation for age pico question

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Liodakis,E.; Bergeron,S.G.; Zukor,D.J.; Huk,O.L.; Epure,L.M.; Antoniou,J.	2015	Perioperative Complications and Length of Stay After Revision Total Hip and Knee Arthroplasties: An Analysis of the NSQIP Database	J.Arthroplasty	was a study of revision of THA, but some patients only had one component of implant revised.
Lisowska,B.; Maldyk,P.; Kontny,E.; Michalak,C.; Jung,L.; Cwiek,R.	2006	Postoperative evaluation of plasma interleukin-6 concentration in patients after total hip arthroplasty	Ortop.Traumatol.Rehabil	Not in English
Lisse,J.; Espinoza,L.; Zhao,S.Z.; Dedhiya,S.D.; Osterhaus,J.T.	2001	Functional status and health-related quality of life of elderly osteoarthritic patients treated with celecoxib	J Gerontol.A Biol Sci Med Sci	Hip and Knee combined
Lisse,J.R.; Perlman,M.; Johansson,G.; Shoemaker,J.R.; Schechtman,J.; Skalky,C.S.; Dixon,M.E.; Polis,A.B.; Mollen,A.J.; Geba,G.P.	2003	Gastrointestinal tolerability and effectiveness of rofecoxib versus naproxen in the treatment of osteoarthritis: a randomized, controlled trial	Ann Intern.Med	Hip and Knee combined
Liu,S.H.; Henry,M.H.; Nuccion,S.; Shapiro,M.S.; Dorey,F.	1996	Diagnosis of glenoid labral tears. A comparison between magnetic resonance imaging and clinical examinations	Am J Sports Med	Not relevent, patient population
Lloyd,R.S.; Costello,F.; Eves,M.J.; James,I.G.; Miller,A.J.	1992	The efficacy and tolerability of controlled-release dihydrocodeine tablets and combination dextropropoxyphene/paracetamol tablets in patients with severe osteoarthritis of the hips	Curr Med Res Opin	Consenses
Loiba,V.; Stucinskas,J.; Robertsson,O.; Wingstrand,H.; Tarasevicius,S.	2015	The analysis of posterior soft tissue repair durability after total hip arthroplasty in primary osteoarthritis patients	Hip Int	retrospective case series
Lombardi,A.V.,Jr.; Berend,K.R.; Morris,M.J.; Adams,J.B.; Sneller,M.A.	2015	Large-diameter metal-on-metal total hip arthroplasty: dislocation infrequent but survivorship poor	Clin Orthop Relat Res	very low quality due to inconsistent outcome measurement method.
Lombardi,A.V.,Jr.; Mallory,T.H.; Eberle,R.W.; Mitchell,M.B.; Lefkowitz,M.S.; Williams,J.R.	1995	Failure of intraoperatively customized non-porous femoral components inserted without cement in total hip arthroplasty	J Bone Joint Surg Am	less than 90% OA hip patients
Lombardi,A.V.,Jr.; Mallory,T.H.; Kraus,T.J.; Vaughn,B.K.	1991	Preliminary report on the S-ROM constraining acetabular insert: a retrospective clinical		Not relevant, does not answer pico

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		experience		question
Lombardi,A.V.; Berend,K.R.; Morris,M.J.; Adams,J.B.; Sneller,M.A.	2014	Large-diameter Metal-on-metal Total Hip Arthroplasty: Dislocation Infrequent but Survivorship Poor	Clin.Orthop.	repeat
Long,L.; Soeken,K.; Ernst,E.	2001	Herbal medicines for the treatment of osteoarthritis: a systematic review	Rheumatology (Oxford)	Systematic Review
Longo,U.G.; Franceschetti,E.; Maffulli,N.; Denaro,V.	2010	Hip arthroscopy: state of the art	Br Med Bull	Systematic Review
Lopez,H.L.	2012	Nutritional Interventions to Prevent and Treat Osteoarthritis. Part II: Focus on Micronutrients and Supportive Nutraceuticals	PM and R	Narrative review
Lopez-Carreno,E.; Carillo,H.; Gutierrez,M.	2008	Dega versus Salter osteotomy for the treatment of developmental dysplasia of the hip	J Pediatr Orthop B	Not relevant to recommendation
Lostak,J.; Gallo,J.; Mlcuchova,D.	2013	Multivariate analysis of blood loss during primary total hip or knee arthroplasty	Acta Chir.Orthop.Traumatol.Cech.	Not in English
Lovecchio,F.; Beal,M.; Kwasny,M.; Manning,D.	2014	Do Patients With Insulin-dependent and Noninsulin-dependent Diabetes Have Different Risks for Complications After Arthroplasty?	Clin.Orthop.	measurements of A1C were unavailable in the database, so they were unable to measure level of diabetic control
Lu,M.; Zhou,Y.X.; Du,H.; Zhang,J.; Liu,J.	2013	Reliability and validity of measuring acetabular component orientation by plain anteroposterior radiographs	Clin Orthop Relat Res	Not relevant, does not answer pico question
Lu,M.L.; Chou,S.W.; Yang,W.E.; Senan,V.; Hsieh,P.H.; Shih,H.N.; Lee,M.S.	2007	Hospital course and early clinical outcomes of two-incision total hip arthroplasty	Chang Gung Med J	90% of pop isn't Hip OA
Lubbeke,A.; Duc,S.; Garavaglia,G.; Finckh,A.; Hoffmeyer,P.	2009	BMI and severity of clinical and radiographic signs of hip osteoarthritis	Obesity (Silver.Spring)	not relevant. outcomes were assessed before surgery
Lubbeke,A.; Katz,J.N.; Perneger,T.V.; Hoffmeyer,P.	2007	Primary and revision hip arthroplasty: 5-year outcomes and influence of age and comorbidity	J Rheumatol.	very low quality due to using bivariate

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				analysis
Lubbeke,A.; Stern,R.; Garavaglia,G.; Zurcher,L.; Hoffmeyer,P.	2007	Differences in outcomes of obese women and men undergoing primary total hip arthroplasty	Arthritis Rheum.	very low quality due to selective analysis reporting and inconsistent method of measuring outcome
Lubovsky,O.; Liebergall,M.; Mattan,Y.; Weil,Y.; Mosheiff,R.	2005	Early diagnosis of occult hip fractures MRI versus CT scan		Not relevent, fracture study
Lui,M.; Jones,C.A.; Westby,M.D.	2015	Effect of non-surgical, non-pharmacological weight loss interventions in patients who are obese prior to hip and knee arthroplasty surgery: a rapid review	Syst Rev	Systematic Review
Luis,D.A.; Izaola,O.; GarcÃa,Alonso M.; Aller,R.; Cabezas,G.; Fuente,B.	2012	Effect of a commercial hypocaloric diet in weight loss and post surgical morbidities in obese patients with chronic arthropathy, a randomized clinical trial	Eur.Rev.Med.Pharmacol.Sci.	90% of pop isn't Hip OA
Luong,M.-L.; Cleveland,R.J.; Nyrop,K.A.; Callahan,L.F.	2012	Social determinants and osteoarthritis outcomes	Aging Health	
Luyten,F.P.; Geusens,P.; Malaise,M.; De,Clerck L.; Westhovens,R.; Raeman,F.; Vander,Mijnsbrugge D.; Mathy,L.; Hauzeur,J.P.; De,Keyser F.; Van den Bosch,F.	2007	A prospective randomised multicentre study comparing continuous and intermittent treatment with celecoxib in patients with osteoarthritis of the knee or hip	Ann Rheum.Dis	Hip and Knee combined
Lyman,S.; Lee,Y.Y.; Franklin,P.D.; Li,W.; Mayman,D.J.; Padgett,D.E.	2016	Validation of the HOOS, JR: A Short-form Hip Replacement Survey	Clin Orthop Relat Res	Not relevant to recommendation
Ma,K.; Luan,F.; Wang,X.; Ao,Y.; Liang,Y.; Fang,Y.; Tu,C.; Yang,T.; Min,J.	2013	Randomized, controlled trial of the modified stoppa versus the ilioinguinal approach for acetabular fractures		Patient population not OA
MacDonald,J.; Barrow,S.; Carty,H.M.; Taylor,J.F.	1995	Imaging strategies in the first 12 months after reduction of developmental dislocation of the hip	Journal of pediatric orthopaedics.Part B / European Paediatric Orthopaedic Society, Pediatric Orthopaedic Society of North America	Not relevant, does not answer pico question

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Macfarlane,G.J.; Paudyal,P.; Doherty,M.; Ernst,E.; Lewith,G.; MacPherson,H.; Sim,J.; Jones,G.T.	2012	A systematic review of evidence for the effectiveness of practitioner-based complementary and alternative therapies in the management of rheumatic diseases: Osteoarthritis	Rheumatology (Oxford).	Systematic Review
MacFarlane,R.J.; Haddad,F.S.	2010	The diagnosis and management of femoro-acetabular impingement	Ann R Coll Surg Engl.	Systematic Review
MacFarlane,R.J.; Konan,S.; El-Huseinny,M.; Haddad,F.S.	2014	A review of outcomes of the surgical management of femoroacetabular impingement	Ann R Coll Surg Engl.	Systematic Review
Machado,G.C.; Maher,C.G.; Ferreira,P.H.; Pinheiro,M.B.; Lin,C.W.; Day,R.O.; McLachlan,A.J.; Ferreira,M.L.	2015	Efficacy and safety of paracetamol for spinal pain and osteoarthritis: systematic review and meta-analysis of randomised placebo controlled trials		
Machado,G.C.; Maher,C.G.; Ferreira,P.H.; Pinheiro,M.B.; Lin,C.-W.; Day,R.O.; McLachlan,A.J.; Ferreira,M.L.	1931	Efficacy and safety of paracetamol for spinal pain and osteoarthritis: Systematic review and meta-analysis of randomised placebo controlled trials		Systematic Review
Macheras,G.; Kateros,K.; Kostakos,A.; Koutsostathis,S.; Danomaras,D.; Papagelopoulos,P.J.	2009	Eight- to Ten-Year Clinical and Radiographic Outcome of a Porous Tantalum Monoblock Acetabular Component	J.Arthroplasty	doesn't evaluate age as a risk factor
MacKenzie,J.R.; Kelley,S.S.; Johnston,R.C.	1996	Total hip replacement for coxarthrosis secondary to congenital dysplasia and dislocation of the hip. Long-term results	J Bone Joint Surg Am	does not evaluate age as a risk factor
Macnicol,M.F.; Bertol,P.	2005	The Salter innominate osteotomy: should it be combined with concurrent open reduction?	J Pediatr Orthop B	Retrospective case series
Magee,T.	2015	Comparison of 3.0-T MR vs 3.0-T MR arthrography of the hip for detection of acetabular labral tears and chondral defects in the same patient population	Br J Radiol	
Magerkurth,O.; Jacobson,J.A.; Jax,F.; Morag,Y.; Fessell,D.; Lee,S.J.; Bedi,A.; Sekiya,J.K.	2013	Femoroacetabular cam-type impingement: global assessment of the femoral head-neck junction on a single reformatted MR image		Not relevant, does not answer pico question
Magklara,E.; Burton,C.R.; Morrison,V.	2014	Does self-efficacy influence recovery and well-being in osteoarthritis patients undergoing joint replacement? A systematic review	Clin Rehabil	Systematic Review

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Maheu,E.; Ayral,X.; Dougados,M.	2002	A hyaluronan preparation (500-730 KDA) in the treatment of osteoarthritis: A review of clinical trials with Hyalgan(registered trademark)	Int.J.Clin.Pract.	Systematic Review
Mahmood,A.; Zafar,M.S.; Majid,I.; Maffulli,N.; Thompson,J.	2007	Minimally invasive hip arthroplasty: A quantitative review of the literature	Br.Med.Bull.	Systematic Review
Mahomed,N.N.; Davis,A.M.; Hawker,G.; Badley,E.; Davey,J.R.; Syed,K.A.; Coyte,P.C.; Gandhi,R.; Wright,J.G.	2008	Inpatient compared with home-based rehabilitation following primary unilateral total hip or knee replacement: a randomized controlled trial	J Bone Joint Surg Am	Unclear if 90% of pop is Hip OA
Mahomed,N.N.; Liang,M.H.; Cook,E.F.; Daltroy,L.H.; Fortin,P.R.; Fossel,A.H.; Katz,J.N.	2002	The importance of patient expectations in predicting functional outcomes after total joint arthroplasty	J Rheumatol.	post operative hip and knee results combined
Maire,J.; Dugue,B.; Faillenet-Maire,A.F.; Smolander,J.; Tordi,N.; Parratte,B.; Grange,C.; Rouillon,J.D.	2006	Influence of a 6-week arm exercise program on walking ability and health status after hip arthroplasty: a 1-year follow-up pilot study	J Rehabil Res Dev	less than 10 patients in groups
Maisongrosse,P.; Lepage,B.; Cavaignac,E.; Pailhe,R.; Reina,N.; Chiron,P.; Laffosse,J.-M.	2014	Obesity is no longer a risk factor for dislocation after total hip arthroplasty with a double-mobility cup	Int.Orthop.	<90% OA
Mak,J.C.; Fransen,M.; Jennings,M.; March,L.; Mittal,R.; Harris,I.A.	2014	Evidence-based review for patients undergoing elective hip and knee replacement	ANZ J Surg	Systematic Review
Makela,K.; Eskelinen,A.; Pulkkinen,P.; Paavolainen,P.; Remes,V.	2008	Cemented total hip replacement for primary osteoarthritis in patients aged 55 years or older: results of the 12 most common cemented implants followed for 25 years in the Finnish Arthroplasty Register	J Bone Joint Surg Br	results stratified by age, but doesn't evaluate age as a risk factor
Makela,K.T.; Eskelinen,A.; Paavolainen,P.; Pulkkinen,P.; Remes,V.	2010	Cementless total hip arthroplasty for primary osteoarthritis in patients aged 55 years and older	Acta Orthop	does not evaluate age as a risk factor
Makela,K.T.; Eskelinen,A.; Paavolainen,P.; Pulkkinen,P.; Remes,V.	2010	Cementless total hip arthroplasty for primary osteoarthritis in patients aged 55 years and older: Results of the 8 most common cementless designs compared to cemented reference implants in the Finnish Arthroplasty Register	Acta orthopaedica	does not evaluate age as a risk factor

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Makela,K.T.; Eskelinen,A.; Pulkkinen,P.; Paavolainen,P.; Remes,V.	2011	Results of 3,668 primary total hip replacements for primary osteoarthritis in patients under the age of 55 years	Acta Orthop	descriptive study that does not evaluate age as a prognostic factor
Makela,K.T.; Eskelinen,A.; Pulkkinen,P.; Paavolainen,P.; Remes,V.	2008	Total hip arthroplasty for primary osteoarthritis in patients fifty-five years of age or older. An analysis of the Finnish arthroplasty registry	J Bone Joint Surg Am	the comparison was different implant types, stratified by age, but the effect of age on post op outcomes not evaluated
Makela,K.T.; Eskelinen,A.; Pulkkinen,P.; Paavolainen,P.; Remes,V.	2011	Results of 3,668 primary total hip replacements for primary osteoarthritis in patients under the age of 55 years: A follow-up of a previous report from the Finnish Arthroplasty Register	Acta orthopaedica	does not evaluate age as a risk factor
Makela,K.T.; Eskelinen,A.; Pulkkinen,P.; Virolainen,P.; Paavolainen,P.; Remes,V.	2011	Cemented versus cementless total hip replacements in patients fifty-five years of age or older with rheumatoid arthritis	J Bone Joint Surg Am	Patient population not OA
Makela,K.T.; Matilainen,M.; Pulkkinen,P.; Fenstad,A.M.; Havelin,L.; Engesaeter,L.; Furnes,O.; Pedersen,A.B.; Overgaard,S.; Karrholm,J.; Malchau,H.; Garellick,G.; Ranstam,J.; Eskelinen,A.	2014	Failure rate of cemented and uncemented total hip replacements: register study of combined Nordic database of four nations		article compares cemented and uncemented implants stratified by age, but does not evaluate age as a risk factor
Makela,K.T.; Matilainen,M.; Pulkkinen,P.; Fenstad,A.M.; Havelin,L.; Engesaeter,L.; Furnes,O.; Pedersen,A.B.; Overgaard,S.; Karrholm,J.; Malchau,H.; Garellick,G.; Ranstam,J.; Eskelinen,A.	2013	Failure rate of cemented and uncemented total hip replacements: Register study of combined Nordic database of four nations		article compares cemented and uncemented implants stratified by age, but does not evaluate age as a risk factor
Malchau,H.; Wang,Y.X.; Karrholm,J.; Herberts,P.	1997	Scandinavian multicenter porous coated anatomic total hip arthroplasty study. Clinical and radiographic results with 7- to 10-year follow-up evaluation	J Arthroplasty	very low quality

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Malfair,D.	2008	Therapeutic and Diagnostic Joint Injections	Radiol.Clin.North Am.	Review
Malizos,K.N.; Bargiotas,K.; Papatheodorou,L.; Hantes,M.; Karachalios,T.	2008	Survivorship of monoblock trabecular metal cups in primary THA : midterm results	Clin Orthop Relat Res	age results not reported
Malonne,H.; Coffiner,M.; Fontaine,D.; Sonet,B.; Sereno,A.; Peretz,A.; Vanderbist,F.	2005	Long-term tolerability of tramadol LP, a new once-daily formulation, in patients with osteoarthritis or low back pain	J Clin Pharm.Ther	90% of pop isn't Hip OA
Malonne,H.; Coffiner,M.; Sonet,B.; Sereno,A.; Vanderbist,F.	2004	Efficacy and tolerability of sustained-release tramadol in the treatment of symptomatic osteoarthritis of the hip or knee: a multicenter, randomized, double-blind, placebo-controlled study	Clin Ther	Hip and Knee combined
Malviya,A.; Dandachli,W.; Beech,Z.; Bankes,M.J.; Witt,J.D.	2015	The incidence of stress fracture following peri-acetabular osteotomy: an under-reported complication	Bone Joint J	Not relevant, does not answer pico question
Malviya,A.; Walker,L.C.; Avery,P.; Osborne,S.; Weir,D.J.; Foster,H.E.; Deehan,D.J.	2011	The long-term outcome of hip replacement in adults with juvenile idiopathic arthritis: the influence of steroids and methotrexate	J Bone Joint Surg Br	Not relevant, does not answer pico question
Maly,M.R.; Robbins,S.M.	2014	Osteoarthritis year in review 2014: rehabilitation and outcomes	Osteoarthritis Cartilage	Systematic Review
Mamisch,T.C.; Zilkens,C.; Siebenrock,K.A.; Bittersohl,B.; Kim,Y.J.; Werlen,S.	2009	Hip MRI and its implications for surgery in osteoarthritis patients	Rheum.Dis Clin North Am	Review
Mancini,D.; Fontana,A.	2014	Five-year results of arthroscopic techniques for the treatment of acetabular chondral lesions in femoroacetabular impingement	Int Orthop	Retrospective case series
Mancuso,C.A.; Graziano,S.; Briskie,L.M.; Peterson,M.G.E.; Pellicci,P.M.; Salvati,E.A.; Sculco,T.P.	2008	Randomized trials to modify patients' preoperative expectations of hip and knee arthroplasties	Clin.Orthop.	Not relevant to recommendation
Mannion,A.F.; Impellizzeri,F.M.; Naal,F.D.; Leunig,M.	2013	Fulfilment of patient-rated expectations predicts the outcome of surgery for femoroacetabular impingement	Osteoarthritis Cartilage	Not relevent, outcome

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March,L.M.; Cross,M.J.; Lapsley,H.; Brnabic,A.J.; Tribe,K.L.; Bachmeier,C.J.; Courtenay,B.G.; Brooks,P.M.	1999	Outcomes after hip or knee replacement surgery for osteoarthritis. A prospective cohort study comparing patients' quality of life before and after surgery with age-related population norms	Med J Aust.	doesn't answer pico question. although the effects differnt implants are stratified by age, the effect of age on outcomes is not considered
Marcolongo,R.; Canesi,B.; Ferri,S.; Oriente,P.; Perpignano,G.; Serni,U.; Tirri,G.; Trotta,F.; Dal,Pra A.; Lucchini,M.	1997	Efficacy and tolerability of ketoprofen 200 mg controlled-release cps vs indomethacin 50 mg cps in patients with symptomatic hip osteoarthritis. A multicentre study	Minerva Med	not relevant comparison
Marcum,Z.A.; Perera,S.; Donohue,J.M.; Boudreau,R.M.; Newman,A.B.; Ruby,C.M.; Studenski,S.A.; Kwoh,C.K.; Simonsick,E.M.; Bauer,D.C.; Satterfield,S.; Hanlon,J.T.	2011	Analgesic use for knee and hip osteoarthritis in community-dwelling elders	Pain Med	90% of pop isn't Hip OA
Marks,R.	2009	Body mass characteristics of hip osteoarthritis patients experiencing aseptic loosening, periprosthetic fractures, dislocation, and infections after total hip replacement	Clinicoecon.Outcomes Res	patients presenting at hospital for primary hip replacement were compared to those presenting for complications after hip replacement. the control group is not adequate to answer the pico question
Marks,R.	2009	Comorbid depression and anxiety impact hip osteoarthritis disability	Disabil.Health J	very low quality for using different inclusion criteria for the non psychologically distressed cohort, which would lead to selection bias

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Marks,R.; Allegrante,J.P.	2002	Comorbid disease profiles of adults with end-stage hip osteoarthritis	Med Sci Monit.	adjust for confounder age but doesn't present results for variable
Marshall,D.A.; Pykerman,K.; Werle,J.; Lorenzetti,D.; Wasylak,T.; Noseworthy,T.; Dick,D.A.; O'Connor,G.; Sundaram,A.; Heintzbergen,S.; Frank,C.	2014	Hip resurfacing versus total hip arthroplasty: a systematic review comparing standardized outcomes	Clin Orthop Relat Res	Not relevant, does not answer pico question
Marshall,D.A.; Strauss,M.E.; Pericak,D.; Buitendyk,M.; Codding,C.; Torrance,G.W.	2006	Economic evaluation of controlled-release oxycodone vs oxycodone-acetaminophen for osteoarthritis pain of the hip or knee	Am J Manag Care	Unclear if 90% of pop is Hip OA
Martin,R.; Clayson,P.E.; Troussel,S.; Fraser,B.P.; Docquier,P.L.	2011	Anterolateral minimally invasive total hip arthroplasty: a prospective randomized controlled study with a follow-up of 1 year	J Arthroplasty	90% of pop isn't Hip OA
Martinelli,N.; Longo,U.G.; Marinozzi,A.; Franceschetti,E.; Costa,V.; Denaro,V.	2011	Cross-cultural adaptation and validation with reliability, validity, and responsiveness of the Italian version of the Oxford Hip Score in patients with hip osteoarthritis	Qual Life Res	Not relevent, outcome study
Martinez,D.; Gomez-Hoyos,J.; Marquez,W.; Gallo,J.	2015	Factors associated with the failure of arthroscopic surgery treatment in patients with femoroacetabular impingement: A cohort study	Rev Esp.Cir.Ortop.Traumatol.	very low quality
Martini,C.; Nistri,L.; Redl,B.; Turelli,L.; Civinini,R.; Innocenti,M.	2013	The treatment of early hip osteoarthritis with intraarticular ultrasound-guided injections of platelet rich plasma. A perspective study with short-term follow-up	Journal of Orthopaedics and Traumatology	
Martire,L.M.; Schulz,R.; Keefe,F.J.; Rudy,T.E.; Starz,T.W.	2007	Couple-oriented education and support intervention: Effects on individuals with osteoarthritis and their spouses	Rehabilitation Psychology	Unclear if 90% of pop is Hip OA
Matheney,T.; Kim,Y.J.; Zurakowski,D.; Matero,C.; Millis,M.	2010	Intermediate to long-term results following the bernese periacetabular osteotomy and predictors of clinical outcome: surgical technique	J Bone Joint Surg Am	Method section/not completed study
Matheney,T.; Kim,Y.J.; Zurakowski,D.; Matero,C.; Millis,M.	2009	Intermediate to long-term results following the Bernese periacetabular osteotomy and predictors of clinical outcome	J Bone Joint Surg Am	Consenses

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Matsuda,D.K.; Carlisle,J.C.; Arthurs,S.C.; Wierks,C.H.; Philippon,M.J.	2011	Comparative systematic review of the open dislocation, mini-open, and arthroscopic surgeries for femoroacetabular impingement		Systematic Review
Matsuno,T.; Ichioka,Y.; Kaneda,K.	1992	Modified Chiari pelvic osteotomy: a long-term follow-up study	J Bone Joint Surg Am	Case report
Matta,J.M.; Stover,M.D.; Siebenrock,K.	1999	Periacetabular osteotomy through the Smith-Petersen approach	Clin Orthop Relat Res	Narrative review
Matthews,P.C.; Dean,B.J.; Medagoda,K.; Gundle,R.; Atkins,B.L.; Berendt,A.R.; Byren,I.	2008	Native hip joint septic arthritis in 20 adults: delayed presentation beyond three weeks predicts need for excision arthroplasty	J Infect.	Not relevant to recommendation
Mattia,C.; Coluzzi,F.; Sarzi,Puttini P.; Vigano,R.	2008	Paracetamol/Tramadol association: The easy solution for mild-moderate pain	Minerva Med.	Systematic Review
Mauker,K.; Bonvini,J.M.; Ekatodramis,G.; Serena,S.; Borgeat,A.	2003	Continuous spinal anesthesia/analgesia vs. single-shot spinal anesthesia with patient-controlled analgesia for elective hip arthroplasty	Acta Anaesthesiol.Scand.	not relevant. Compares types of neuraxial anesthesia to each other
Mayer,S.W.; Stewart,J.R.; Fadell,M.F.; Kestel,L.; Novais,E.N.	2015	MRI as a reliable and accurate method for assessment of posterior hip dislocation in children and adolescents without the risk of radiation exposure	Pediatr.Radiol.	Not relevant, does not answer pico question
Mazieres,B.; Thevenon,A.; Coudeyre,E.; Chevalier,X.; Revel,M.; Rannou,F.	2008	Adherence to, and results of, physical therapy programs in patients with hip or knee osteoarthritis. Development of French clinical practice guidelines	Joint Bone Spine	Systematic Review
Mazloumi,M.; Omidi-Kashani,F.; Ebrahimzadeh,M.H.; Makhmalbaf,H.; Hoseinayee,M.M.	2015	Combined Femoral and Acetabular Osteotomy in Children of Walking Age for Treatment of DDH; A Five Years Follow-Up Report	Iran J Med Sci	less than 10 patients in groups
Mazoochian,F.; Weber,P.; Schramm,S.; Utzschneider,S.; Fottner,A.; Jansson,V.	2009	Minimally invasive total hip arthroplasty: a randomized controlled prospective trial	Arch Orthop Trauma Surg	90% of pop isn't Hip OA
McAlindon,T.E.; LaValley,M.P.; Gulin,J.P.; Felson,D.T.	2000	Glucosamine and chondroitin for treatment of osteoarthritis: a systematic quality assessment and meta-analysis		Systematic Review

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McAuley,J.P.; Szuszczewicz,E.S.; Young,A.; Engh,C.A.,Sr.	2004	Total hip arthroplasty in patients 50 years and younger	Clin Orthop Relat Res	no paitent oriented outcomes compared between younger and older groups.
McCarthy,J.C.; Busconi,B.	1995	The role of hip arthroscopy in the diagnosis and treatment of hip disease	Canadian journal of surgery.Journal canadien de chirurgie	Abstract
McCarthy,J.J.; Fox,J.S.; Gurd,A.R.	1996	Innominate osteotomy in adolescents and adults who have acetabular dysplasia	J Bone Joint Surg Am	Not relevant, does not answer pico question
McGrath,M.S.; Desser,D.R.; Ulrich,S.D.; Seyler,T.M.; Marker,D.R.; Mont,M.A.	2008	Total hip resurfacing in patients who are sixty years of age or older	J Bone Joint Surg Am	not relevent as patients got hip resurfacing instead of THA
McGregor,A.H.; Rylands,H.; Owen,A.; Dore,C.J.; Hughes,S.P.	2004	Does preoperative hip rehabilitation advice improve recovery and patient satisfaction?	J Arthroplasty	Unclear if 90% of pop is Hip OA
McGrory,B.J.; Estok,D.M.; Harris,W.H.	1998	Follow-up of intertrochanteric osteotomy of the hip during a 25-year period		Not relevant, does not answer pico question
McIndoe,A.K.; Young,K.; Bone,M.E.	1995	A comparison of acupuncture with intra-articular steroid injection as analgesia for osteoarthritis of the hip	Acupuncture in medicine	
McIntosh,A.L.; Hanssen,A.D.; Wenger,D.E.; Osmon,D.R.	2006	Recent intraarticular steroid injection may increase infection rates in primary THA	Clin Orthop Relat Res	
McMahon,S.E.; LeRoux,J.A.; Smith,T.O.; Hing,C.B.	2013	Total joint arthroplasty following intra-articular steroid injection: a literature review	Acta Orthop Belg.	
McMinn,D.J.W.; Snell,K.I.E.; Daniel,J.; Treacy,R.B.C.; Pynsent,P.B.; Riley,R.D.	1929	Mortality and implant revision rates of hip arthroplasty in patients with osteoarthritis: Registry based cohort study		repeat article.
McNair,P.J.; Simmonds,M.A.; Boocock,M.G.; Larmer,P.J.	2009	Exercise therapy for the management of osteoarthritis of the hip joint: a systematic review	Arthritis Res Ther	Systematic Review
Mears,D.C.; Mears,S.C.; Chelly,J.E.; Dai,F.; Vulakovich,K.L.	2009	THA with a minimally invasive technique, multi-modal anesthesia, and home rehabilitation: factors associated with early discharge?	Clin Orthop Relat Res	less than 90% OA hip patients

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Medina-Porqueres,I.; Alvarez-Juarez,P.	2015	The Efficacy of Platelet-Rich Plasma Injection in the Management of Hip Osteoarthritis: A Systematic Review Protocol	Musculoskeletal Care	Systematic Review
Meena,U.K.; Tripathy,S.K.; Sen,R.K.; Aggarwal,S.; Behera,P.	2013	Predictors of postoperative outcome for acetabular fractures	Orthop Traumatol.Surg Res	intervention was internal fixation, not THA
Meermans,G.; Corten,K.; Simon,J.P.	2012	Is the infection rate in primary THA increased after steroid injection?	Clin Orthop Relat Res	less than 90% OA hip
Meftah,M.; John,M.; Lendhey,M.; Khaimov,A.; Ranawat,A.S.; Ranawat,C.S.	2013	Safety and efficacy of non-cemented femoral fixation in patients 75 years of age and older	J Arthroplasty	does not examine age as a risk factor
Mei,Dan O.; McConkey,M.O.; Knudsen,J.S.; Brick,M.J.	2014	Bilateral hip arthroscopy under the same anesthetic for patients with symptomatic bilateral femoroacetabular impingement: 1-year outcomes	Arthroscopy Journal of Arthroscopic and Related Surgery	Not relevant, does not answer pico question
Mei-Dan,O.; McConkey,M.O.; Knudsen,J.S.; Brick,M.J.	2014	Bilateral hip arthroscopy under the same anesthetic for patients with symptomatic bilateral femoroacetabular impingement: 1-year outcomes		Not relevant, does not answer pico question
Mejjad,O.; Favre,S.; Dujardin,F.; Thomine,J.; Le,Loet,X; Weber,J.	2000	Efficacy of etodolac on gait in hip osteoarthritis as assessed by Bessou's locometer: a randomized, crossover, double-blind study versus placebo. Groupe de Recherche sur le Handicap de L'appareil Locomoteur	Osteoarthritis Cartilage	Hip and Knee combined
Mejjad,O.; Favre,S.; Dujardin,F.; Thomine,J.-M.; Le,Loet,X; Weber,J.	2000	Efficacy of etodolac on gait in hip osteoarthritis as assessed by Bessou's locometer: A randomized, crossover, double-blind study versus placebo	Osteoarthritis Cartilage	Gait study
Melloh,M.; Eggli,S.; Busato,A.; Roder,C.	2011	Predictors of early stem loosening after total hip arthroplasty: a case-control study	J Orthop Surg (Hong Kong)	90% of pop isn't Hip OA
Melo Gomes,J.A.; Roth,S.H.; Zeeh,J.; Bruyn,G.A.; Woods,E.M.; Geis,G.S.	1993	Double-blind comparison of efficacy and gastroduodenal safety of diclofenac/misoprostol, piroxicam, and naproxen in the treatment of osteoarthritis	Ann Rheum.Dis	Hip and Knee combined

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Memtsoudis,S.G.; Ma,Y.; Gonzalez,Della,V; Besculides,M.C.; Gaber,L.K.; Koulouvaris,P.; Liu,S.S.	2010	Demographics, outcomes, and risk factors for adverse events associated with primary and revision total hip arthroplasties in the United States	Am J Orthop (Belle Mead NJ)	less than 90% OA hip patients
Merle,C.; Sommer,J.; Streit,M.R.; Waldstein,W.; Bruckner,T.; Parsch,D.; Aldinger,P.R.; Gotterbarm,T.	2012	Influence of surgical approach on postoperative femoral bone remodelling after cementless total hip arthroplasty	HIP International	retrospective case series
Mesko,J.W.; Goodman,F.G.; Stanescu,S.	1994	Total articular replacement arthroplasty. A three- to ten-year case-controlled study	Clin Orthop Relat Res	patients did not get THA
Mibielli,M.A.; Diamante,B.; Cohen,J.C.; Nunes,C.P.; De Oliveira,P.C.; De Oliveira,J.M.; Geller,M.	2007	Safety and efficacy of a B-vitamin combination in the treatment of osteoarthritis-related pain	Rev.Bras.Med.	90% of pop isn't Hip OA
Michalek,J.; Kristkova,Z.; Skopalik,J.; Dudasova,Z.; Darinskas,A.; Moster,R.	2013	Stem cell therapy of osteoarthritis using stromal vascular fraction cells	Cytotherapy	Abstract
Michaud,K.; Fehringer,E.; Garvin,K.; O'Dell,J.R.; Mikuls,T.R.	2011	Rheumatoid arthritis patients are not at increased risk for 30-day cardiovascular events or infections following total joint arthoplasty	Arthritis Rheum.	hip and knee results combined
Michaud,K.; Fehringer,E.V.; Garvin,K.; O'Dell,J.R.; Mikuls,T.R.	2013	Rheumatoid arthritis patients are not at increased risk for 30-day cardiovascular events, infections, or mortality after total joint arthroplasty	Arthritis Res Ther	hip and knee results combined
Micu,M.C.; Bogdan,G.D.; Fodor,D.	2010	Steroid injection for hip osteoarthritis: efficacy under ultrasound guidance	Rheumatology (Oxford)	
Migliore,A.; Bizzi,E.; Massafra,U.; Bella,A.; Piscitelli,P.; Lagana,B.; Tormenta,S.	2012	The impact of treatment with hylan G-F 20 on progression to total hip arthroplasty in patients with symptomatic hip OA: a retrospective study	Curr Med Res Opin	
Migliore,A.; Bizzi,E.; Massafra,U.; Vacca,F.; Alimonti,A.; Iannessi,F.; Tormenta,S.	2009	Viscosupplementation: a suitable option for hip osteoarthritis in young adults	Eur Rev Med Pharmacol Sci	
Migliore,A.; Giovannangeli,F.; Granata,M.; Lagana,B.	2010	Hylan g-f 20: review of its safety and efficacy in the management of joint pain in osteoarthritis	Clin Med Insights Arthritis Musculoskelet.Disord.	

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Migliore,A.; Granata,M.	2008	Intra-articular use of hyaluronic acid in the treatment of osteoarthritis	Clin Interv Aging	
Migliore,A.; Granata,M.; Tormenta,S.; Lagana,B.; Piscitelli,P.; Bizzi,E.; Massafra,U.; Alimonti,A.; Maggi,C.; De,Chiara R.; Iannessi,F.; Sanfilippo,A.; Sotera,R.; Scapato,P.; Carducci,S.; Persod,P.; Denaro,S.; Camminiti,M.; Pagano,M.G.; Bagnato,G.; Iolascon,G.	2011	Hip viscosupplementation under ultra-sound guidance riduces NSAID consumption in symptomatic hip osteoarthritis patients in a long follow-up. Data from Italian registry	Eur Rev Med Pharmacol Sci	Not relevant, does not answer pico question
Migliore,A.; Lagana,B.; Granata,M.; Massafra,U.; Germano,V.; Tormenta,S.; Bizzi,E.; Piscitelli,P.	2012	Erratum: Intra-articular injection of hyaluronic acid (MW 1,500-2,000 kDa; HyalOne(registered trademark)) in symptomatic osteoarthritis of the hip: A prospective cohort study (Archives of Orthopaedic and Trauma Surgery (2011) 131 (1677-1685))	Arch.Orthop.Trauma Surg.	Abstract
Migliore,A.; Martin,L.S.; Alimonti,A.; Valente,C.; Tormenta,S.	2003	Efficacy and safety of viscosupplementation by ultrasound-guided intra-articular injection in osteoarthritis of the hip	Osteoarthritis Cartilage	
Migliore,A.; Massafra,U.; Bizzi,E.; Giovannangeli,F.; Tormenta,S.	2012	Intraarticular ultrasound-guided injection of sinovial(registered trademark) forte 1.6% in patients affected by symptomatic hip osteoarthritis: Effectiveness and safety in a large cohort of patients	European Journal of Inflammation	Retrospective case series
Migliore,A.; Massafra,U.; Bizzi,E.; Lagana,B.; Germano,V.; Piscitelli,P.; Granata,M.; Tormenta,S.	2011	Intra-articular injection of hyaluronic acid (MW 1,500-2,000 kDa; HyalOne) in symptomatic osteoarthritis of the hip: a prospective cohort study	Arch Orthop Trauma Surg	
Migliore,A.; Massafra,U.; Bizzi,E.; Vacca,F.; Martin-Martin,L.S.; Granata,M.; Tormenta,S.; Lagana,B.	2011	Efficacy and safety profile of intra-articular administration of Jointex(registered trademark) in patients suffering from symptomatic hip osteoarthritis: An open, prospective study with a 12-month follow-up	European Journal of Inflammation	Hip and Knee combined
Migliore,A.; Massafra,U.; Bizzi,E.; Vacca,F.; Martin-Martin,S.; Granata,M.; Alimonti,A.; Tormenta,S.	2009	Comparative, double-blind, controlled study of intra-articular hyaluronic acid (Hyalubrix((registered trademark))) injections	Arthritis Research and Therapy	Duplicate

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		versus local anesthetic in osteoarthritis of the hip		
Migliore,A.; Tormenta,S.; Lagana,B.; Piscitelli,P.; Granata,M.; Bizzi,E.; Massafra,U.; Giovannangeli,F.; Maggi,C.; De,Chiara R.; Iannessi,F.; Sanfilippo,A.; Camminiti,M.; Pagano,M.G.; Bagnato,G.; Iolascon,G.	2013	Safety of intra-articular hip injection of hyaluronic acid products by ultrasound guidance: an open study from ANTIAGE register	Eur Rev Med Pharmacol Sci	
Migliore,A.; Tormenta,S.; Martin Martin,L.S.; Iannessi,F.; Massafra,U.; Carloni,E.; Monno,D.; Alimonti,A.; Granata,M.	2006	The symptomatic effects of intra-articular administration of hylan G-F 20 on osteoarthritis of the hip: clinical data of 6 months follow-up	Clin Rheumatol.	
Migliore,A.; Tormenta,S.; Martin,L.S.; Valente,C.; Massafra,U.; Granata,M.; Alimonti,A.	2005	Open pilot study of ultrasound-guided intra-articular injection of hylan G-F 20 (Synvisc) in the treatment of symptomatic hip osteoarthritis	Clin Rheumatol.	
Mikkelsen,L.R.; Mikkelsen,S.S.; Christensen,F.B.	2012	Early, intensified home-based exercise after total hip replacement--a pilot study	Physiother.Res Int	not a conservative treatment
Milligan,D.J.; O'Brien,S.; Bennett,D.; Hill,J.C.; Beverland,D.E.	2013	The effects of age and gender on the diameter of the femoral canal in patients who undergo total hip replacement	Bone Joint J	no patient oriented outcomes
Minns Lowe,C.J.; Barker,K.L.; Dewey,M.E.; Sackley,C.M.	2009	Effectiveness of physiotherapy exercise following hip arthroplasty for osteoarthritis: a systematic review of clinical trials	BMC Musculoskelet.Disord.	Systematic Review
Minns Lowe,C.J.; Davies,L.; Sackley,C.M.; Barker,K.L.	2015	Effectiveness of land-based physiotherapy exercise following hospital discharge following hip arthroplasty for osteoarthritis: an updated systematic review		Systematic Review
Mintz,D.N.; Hooper,T.; Connell,D.; Buly,R.; Padgett,D.E.; Potter,H.G.	2005	Magnetic resonance imaging of the hip: detection of labral and chondral abnormalities using noncontrast imaging		Not relevant, does not answer pico question
Miozzari,H.H.; Celia,M.; Clark,J.M.; Werlen,S.; Naal,F.D.; Notzli,H.P.	2015	No regeneration of the human acetabular labrum after excision to bone	Clin Orthop Relat Res	Retrospective case series

Authors	Year	Article Title	Periodical	Reason for Exclusion
Mirza,A.J.; Lombardi,A.V.,Jr.; Morris,M.J.; Berend,K.R.	2014	A mini-anterior approach to the hip for total joint replacement: optimising results: improving hip joint replacement outcomes	Bone Joint J	Unclear of population
Mitsionis,G.I.; Lykissas,M.G.; Motsis,E.; Mitsiou,D.; Gkiatas,I.; Xenakis,T.A.; Beris,A.E.	2012	Surgical management of posterior hip dislocations associated with posterior wall acetabular fracture: a study with a minimum follow-up of 15 years	J Orthop Trauma	Not relevant, does not answer pico question
Miyamoto,T.; Tomita,M.; Koseki,H.; Hozumi,A.; Goto,H.; Shindo,H.; Osaki,M.	2014	Morphology of the femoral neck in Japanese persons: Analysis using CT data	Acta Med.Nagasaki.	Not relevant, does not answer pico question
Mladenovic,D.; Andjelkovic,Z.; Vukasinovic,Z.; Mitkovic,M.; Milenkovic,S.; Micic,I.; Mladenovic,M.	2014	Early clinical results of surgical treatment of patients with femoroacetabular impingement	Srp.Arh Celok.Lek	Abstract
Mnatzaganian,G.; Ryan,P.; Reid,C.M.; Davidson,D.C.; Hiller,J.E.	2013	Smoking and primary total hip or knee replacement due to osteoarthritis in 54,288 elderly men and women	BMC Musculoskelet.Disord.	not relevant. looks at smoking as as a risk factor for needing total join arthroplasty
Moe,R.H.; Dagfinrud,H.	2014	A neuromuscular exercise program prior to hip or knee arthroplasty does not improve recovery of function three months after surgery	Journal of physiotherapy	Commentary
Moe,R.H.; Haavardsholm,E.A.; Christie,A.; Jamtvedt,G.; Dahm,K.T.; Hagen,K.B.	2007	Effectiveness of nonpharmacological and nonsurgical interventions for hip osteoarthritis: an umbrella review of high-quality systematic reviews	Phys Ther	Systematic Review
Moe,R.H.; Uhlig,T.; Kjeken,I.; Hagen,K.B.; Kvien,T.K.; Grotle,M.	2010	Multidisciplinary and multifaceted outpatient management of patients with osteoarthritis: protocol for a randomised, controlled trial	BMC Musculoskelet.Disord.	Has not been published yet/no results
Mofidi,A.; Shields,J.S.; Stubbs,A.J.	2011	Central acetabular osteophyte (saber tooth sign), one of the earliest signs of osteoarthritis of the hip joint	European Journal of Orthopaedic Surgery and Traumatology	Case report
Monaghan,B.; Grant,T.; Hing,W.; Cusack,T.	2012	Functional exercise after total hip replacement (FEATHER): a randomised control trial	BMC Musculoskelet.Disord.	Results section/not completed study

Authors	Year	Article Title	Periodical	Reason for Exclusion
Monticone,M.; Ambrosini,E.; Rocca,B.; Lorenzon,C.; Ferrante,S.; Zatti,G.	2014	Task-oriented exercises and early full weight-bearing contribute to improving disability after total hip replacement: a randomized controlled trial	Clin Rehabil	no passive control
Moor,M.; Jolie,P.; Schreurs,F.	1990	Double blind comparison of tenoxicam diclofenac Na and placebo in patients suffering from coxarthrosis and /or gonarthrosis	Clin.Exp.Rheumatol.	abstract only
Moore,R.A.; Derry,S.; McQuay,H.J.; Moore,M.	2009	Single dose oral aceclofenac for postoperative pain in adults	Cochrane Database of Systematic Reviews	Systematic Review
Moore,R.A.; Gammaitoni,A.; Mehta,A.; Wang,H.; Peloso,P.	2009	Longitudinal numbers-needed-to-treat (NNT) analyses of analgesic treatments to achieve varying treatment response levels and stability over time: A pooled analysis of 7 randomized controlled trials from the etoricoxib osteoarthritis development program	J.Rheumatol.	Hip and Knee combined
Morbi,A.H.M.; Carsi,B.; Gorianinov,V.; Clarke,N.M.P.	2015	Adverse outcomes in infantile bilateral developmental dysplasia of the hip	Journal of Pediatric Orthopaedics	Retrospective case series
Morgan,G.J.,Jr.; Kaine,J.; DeLapp,R.; Palmer,R.	2001	Treatment of elderly patients with nabumetone or diclofenac: gastrointestinal safety profile	J Clin Gastroenterol.	Hip and Knee combined
Morgan,Jr; Kaine,J.; DeLapp,R.; Palmer,R.	2001	Treatment of elderly patients with nabumetone or diclofenac: Gastrointestinal safety profile	J.Clin.Gastroenterol.	Hip and Knee combined
Morin,C.; Rabay,G.; Morel,G.	1998	Retrospective review at skeletal maturity of the factors affecting the efficacy of Salter's innominate osteotomy in congenital dislocated, subluxed, and dysplastic hips	J Pediatr Orthop	retrospective case series
Morrey,B.F.	1997	Difficult complications after hip joint replacement. Dislocation	Clin Orthop Relat Res	Not relevant, does not answer pico question
Morshed,S.; Bozic,K.J.; Ries,M.D.; Malchau,H.; Colford,J.M.,Jr.	2007	Comparison of cemented and uncemented fixation in total hip replacement: a meta-analysis	Acta Orthop	meta-analysis
Moskowitz,R.W.; Sunshine,A.; Brugger,A.; Lefkowith,J.B.; Zhao,W.W.; Geis,G.S.	2003	American pain society pain questionnaire and other pain measures in the assessment of osteoarthritis pain: a pooled analysis of three celecoxib pivotal studies	Am J Ther	Hip and Knee combined

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Mulliken,B.D.; Rorabeck,C.H.; Bourne,R.B.; Nayak,N.	1998	A modified direct lateral approach in total hip arthroplasty: a comprehensive review	J Arthroplasty	90% of pop isn't Hip OA
Mulvaney,S.W.	2009	A review of viscosupplementation for osteoarthritis of the hip and a description of an ultrasound-guided hip injection technique	Curr Sports Med Rep	Review
Muncholm,Thillemann T.	2009	Use of medications and risk of revision after primary total hip arthroplasty	Acta orthopaedica	controls for age, but does not present results for age as a risk factor
Munera,C.; Drehobl,M.; Sessler,N.E.; Landau,C.	2010	A randomized, placebo-controlled, double-blinded, parallel-group, 5-week study of buprenorphine transdermal system in adults with osteoarthritis	J Opioid Manag	90% of pop isn't Hip OA
Munger,P.; Roder,C.; Ackermann-Liebrich,U.; Busato,A.	2006	Patient-related risk factors leading to aseptic stem loosening in total hip arthroplasty: a case-control study of 5,035 patients	Acta Orthop	less than 90% OA hip patients
Murphy,S.; Deshmukh,R.	2002	Periacetabular osteotomy: preoperative radiographic predictors of outcome	Clin Orthop Relat Res	Not relevant, does not answer pico question
Murphy,S.; Tannast,M.; Kim,Y.J.; Buly,R.; Millis,M.B.	2004	Debridement of the adult hip for femoroacetabular impingement: indications and preliminary clinical results	Clin Orthop Relat Res	Retrospective case series
Murphy,S.B.; Ganz,R.; Muller,M.E.	1995	The prognosis in untreated dysplasia of the hip. A study of radiographic factors that predict the outcome	J Bone Joint Surg Am	Not relevant to recommendation
Murphy,S.L.; Lyden,A.K.; Smith,D.M.; Dong,Q.; Koliba,J.F.	2010	Effects of a tailored activity pacing intervention on pain and fatigue for adults with osteoarthritis	Am J Occup Ther	Narrative review
Murphy,S.L.; Strasburg,D.M.; Lyden,A.K.; Smith,D.M.; Koliba,J.F.; Dadabhoy,D.P.; Wallis,S.M.	2008	Effects of activity strategy training on pain and physical activity in older adults with knee or hip osteoarthritis: a pilot study	Arthritis Rheum.	90% of pop isn't Hip OA
Murphy,T.P.; Byrne,D.P.; Curtin,P.; Baker,J.F.; Mulhall,K.J.	2012	Can a periarticular levobupivacaine injection reduce postoperative opiate consumption during primary hip arthroplasty?	Clin.Orthop.	Not relevant to recommendation

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Musetti,A.; Pagliari,M.; Del,Sordo S.; Dematte,E.	2013	The articular reconstruction in complex acetabulum fractures: Functional and clinical results in our personal experience	Journal of Orthopaedics and Traumatology	not relevant. patients did not get THA
Musil,D.; Stehlik,J.	2013	Minimally invasive anterolateral surgical approach for total hip arthroplasty: Seven-year results	Acta Chir.Orthop.Traumatol.Cech.	not in English
Myers,T.G.; Mihalko,W.M.; Brown,T.E.; Saleh,K.J.; Cui,Q.	2010	Outcomes of total hip arthroplasty for osteonecrosis of the hip: Systematic review and meta-analysis	Current Orthopaedic Practice	Systematic Review
Myllykangas,LuosujÃ¤rvi R.; Lu,H.S.; Chen,S.L.; Choon,D.; Amante,C.; Chow,C.T.; Pasero,G.; Genti,G.; Sarembock,B.; Zerbini,C.A.; Vrijens,F.; Moan,A.; Rodgers,D.B.; Tora,L.; Laurenzi,M.	2002	Comparison of low-dose rofecoxib versus 1000 mg naproxen in patients with osteoarthritis. Results of two randomized treatment trials of six weeks duration	Scand.J.Rheumatol.	Hip and Knee combined
Myllykangas-Luosujarvi,R.; Lu,H.S.; Chen,S.L.; Choon,D.; Amante,C.; Chow,C.T.; Pasero,G.; Genti,G.; Sarembock,B.; Zerbini,C.A.; Vrijens,F.; Moan,A.; Rodgers,D.B.; De,Tora L.; Laurenzi,M.	2002	Comparison of low-dose rofecoxib versus 1000 mg naproxen in patients with osteoarthritis. Results of two randomized treatment trials of six weeks duration	Scand.J Rheumatol.	Hip and Knee combined
Naal,F.D.; Impellizzeri,F.M.; Miozzari,H.H.; Mannion,A.F.; Leunig,M.	2011	The German Hip Outcome Score: validation in patients undergoing surgical treatment for femoroacetabular impingement		Not relevent, outcome study
Naal,F.D.; Impellizzeri,F.M.; von Eisenhart-Rothe,R.; Mannion,A.F.; Leunig,M.	2012	Reproducibility, validity, and responsiveness of the hip outcome score in patients with end-stage hip osteoarthritis	Arthritis Care Res (Hoboken)	measures the validity and reliablity of a hip outcome measure, and not a risk assessment tool
Nagase,Y.; Yasunaga,H.; Horiguchi,H.; Hashimoto,H.; Shoda,N.; Kadono,Y.; Matsuda,S.; Nakamura,K.; Tanaka,S.	2011	Risk factors for pulmonary embolism and the effects of fondaparinux after total hip and knee arthroplasty: a retrospective observational study with use of a national database in Japan	J Bone Joint Surg Am	analysis combines hip and knee patients

Authors	Year	Article Title	Periodical	Reason for Exclusion
Nakai,T.; Temporin,K.; Murao,R.; Kakiuchi,M.	2005	Intraosseous pressure correlates with postoperative blood loss following cementless total hip arthroplasty	Journal of Orthopaedics and Traumatology	very low quality due to bivariate analysis and the fact that blood loss could not be precisely measured
Nakamura,N.; Sugano,N.; Masuhara,K.; Ohzono,K.; Takaoka,K.	1996	Bone scintigraphy as an indicator for dome osteotomy of the pelvis: comparison between scintigraphy, radiography and outcome in 57 hips	Acta Orthop Scand.	Not relevant, does not answer pico question
Nakamura,S.; Matsuda,K.; Arai,N.; Kobayashi,M.; Wakimoto,N.; Matsushita,T.	2006	Method to reduce variations of inclination angle of the acetabular component during mini-incision hip arthroplasty	J Orthop Sci	Unclear of population
Nakamura,S.; Matsuda,K.; Arai,N.; Wakimoto,N.; Matsushita,T.	2004	Mini-incision posterior approach for total hip arthroplasty	Int.Orthop.	90% of pop isn't Hip OA
Nakamura,S.; Ninomiya,S.; Morimoto,S.; Moro,T.; Takatori,Y.	2001	Combined intertrochanteric valgus and rotational acetabular osteotomy	Clin Orthop Relat Res	less than 10 patients in groups
Nakano,S.; Nishisyo,T.; Hamada,D.; Kosaka,H.; Yukata,K.; Oba,K.; Kawasaki,Y.; Miyoshi,H.; Egawa,H.; Kinoshita,I.; Yasui,N.	2008	Treatment of dysplastic osteoarthritis with labral tear by Chiari pelvic osteotomy: outcomes after more than 10 years follow-up	Arch Orthop Trauma Surg	Not relevant to recommendation
Nakata,K.; Nishikawa,M.; Yamamoto,K.; Hirota,S.; Yoshikawa,H.	2009	A Clinical Comparative Study of the Direct Anterior With Mini-Posterior Approach. Two Consecutive Series	J.Arthroplasty	90% of pop isn't Hip OA
Nam,D.; Sculco,P.K.; Su,E.P.; Alexiades,M.M.; Figgie,M.P.; Mayman,D.J.	2013	Acetabular component positioning in primary THA via an anterior, posterolateral, or posterolateral-navigated surgical technique		retrospective case series
Nankaku,M.; Akiyama,H.; Kakinoki,R.; Nishikawa,T.; Tanaka,Y.; Matsuda,S.	2014	Factors associated with ambulatory status 6 months after total hip arthroplasty		no relevant outcomes to age pico question
Nankaku,M.; Tsuboyama,T.; Akiyama,H.; Kakinoki,R.; Fujita,Y.; Nishimura,J.; Yoshioka,Y.; Kawai,H.; Matsuda,S.	2013	Preoperative prediction of ambulatory status at 6 months after total hip arthroplasty	Phys Ther	outcomes not relevant to age pico question

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Naresh,K.; Nayak,K.; Mulliken,B.; Rorabeck,C.H.; Bourne,R.B.; Woolfrey,M.R.	1997	Prevalence of heterotopic ossification in cemented versus noncemented total hip joint replacement in patients with osteoarthrosis: A randomized clinical trial	Can.J.Surg.	does not evaluate age as a risk factor
Nash,M.S.; Tehranzadeh,J.; Green,B.A.; Rountree,M.T.; Shea,J.D.	1994	Magnetic resonance imaging of osteonecrosis and osteoarthrosis in exercising quadriplegics and paraplegics	Am J Phys Med Rehabil	Not relevant, does not answer pico question
Nashed,R.S.; Becker,D.A.; Gustilo,R.B.	1995	Are cementless acetabular components the cause of excess wear and osteolysis in total hip arthroplasty?	Clin Orthop Relat Res	less than 90% OA hip patients
Nassif,N.A.; Schoenecker,P.L.; Thorsness,R.; Clohisy,J.C.	2012	Periacetabular osteotomy and combined femoral head-neck junction osteochondroplasty: a minimum two-year follow-up cohort study	J Bone Joint Surg Am	Not relevant, does not answer pico question
Naudie,D.D.; Somerville,L.; Korczak,A.; Yuan,X.; McCalden,R.W.; Holdsworth,D.; Bourne,R.B.	2013	A randomized trial comparing acetabular component fixation of two porous ingrowth surfaces using RSA	J Arthroplasty	Not relevant to recommendation
Nawabi,D.H.; Nam,D.; Park,C.; Ranawat,A.S.	2013	Hip arthroscopy: the use of computer assistance	HSS J	Not relevant, does not answer pico question
Naylor,J.M.; Hayen,A.; Davidson,E.; Hackett,D.; Harris,I.A.; Kamalasena,G.; Mittal,R.	2014	Minimal detectable change for mobility and patient-reported tools in people with osteoarthritis awaiting arthroplasty	BMC Musculoskelet.Disord.	not relevant
Nelson,A.E.; Allen,K.D.; Golightly,Y.M.; Goode,A.P.; Jordan,J.M.	2014	A systematic review of recommendations and guidelines for the management of osteoarthritis: The chronic osteoarthritis management initiative of the U.S. bone and joint initiative	Semin Arthritis Rheum.	Systematic Review
Nepple,J.J.; Larson,C.M.; Smith,M.V.; Kim,Y.J.; Zaltz,I.; Sierra,R.J.; Clohisy,J.C.	2012	The reliability of arthroscopic classification of acetabular rim labrochondral disease	Am J Sports Med	Not relevant, does not answer pico question
Nepple,J.J.; Martel,J.M.; Kim,Y.-J.; Zaltz,I.; Clohisy,J.C.	2012	Do plain radiographs correlate with CT for imaging of cam-type femoroacetabular impingement?	Clin.Orthop.	Not relevant, does not answer pico question
Nepple,J.J.; Thomason,K.M.; An,T.W.; Harris-Hayes,M.;	2015	What is the utility of biomarkers for assessing the pathophysiology of hip osteoarthritis? A	Clin Orthop Relat Res	Systematic Review

Authors	Year	Article Title	Periodical	Reason for Exclusion
Clohisy,J.C.		systematic review		
Nercessian,O.A.; Joshi,R.P.; Martin,G.; Su,B.W.; Eftekhar,N.S.	2003	Influence of demographic and technical variables on the incidence of osteolysis in charnley primary low-friction hip arthroplasty	J.Arthroplasty	less than 90% OA hip patients
Neuerburg,C.; Impellizzeri,F.; Goldhahn,J.; Frey,P.; Naal,F.D.; von,Knoch M.; Leunig,M.; von,Knoch F.	2012	Survivorship of second-generation metal-on-metal primary total hip replacement	Arch Orthop Trauma Surg	less than 90% OA hip
Neumann,L.; Freund,K.G.; Sorensen,K.H.	1996	Total hip arthroplasty with the Charnley prosthesis in patients fifty-five years old and less. Fifteen to twenty-one-year results	J Bone Joint Surg Am	less than 90% OA hip patients
Newington,D.P.; Bannister,G.C.; Fordyce,M.	1990	Primary total hip replacement in patients over 80 years of age	J Bone Joint Surg Br	does not evaluate age as a risk factor
Ng,C.Y.; Ballantyne,J.A.; Brenkel,I.J.	2007	Quality of life and functional outcome after primary total hip replacement: A five-year follow-up	Journal of Bone and Joint Surgery - Series B	did not study the effect of age and mental health on post op outcomes
Ng,K.C.G.; Lamontagne,M.; Labrosse,M.R.; BeaulÃ?Â©,P.E.	2016	Hip joint stresses due to cam-type femoroacetabular impingement: A systematic review of finite element simulations	PLoS One	Systematic Review
Ng,N.T.; Heesch,K.C.; Brown,W.J.	2010	Efficacy of a progressive walking program and glucosamine sulphate supplementation on osteoarthritic symptoms of the hip and knee: a feasibility trial	Arthritis Res Ther	Unclear if 90% of pop is Hip OA
Ng,V.Y.; Arora,N.; Best,T.M.; Pan,X.; Ellis,T.J.	2010	Efficacy of surgery for femoroacetabular impingement: a systematic review	Am J Sports Med	Systematic Review
Nguyen,M.; Dougados,M.; Berdah,L.; Amor,B.	1994	Diacerhein in the treatment of osteoarthritis of the hip	Arthritis Rheum.	not relevant comparison
Nho,J.H.; Lee,Y.K.; Kim,H.J.; Ha,Y.C.; Suh,Y.S.; Koo,K.H.	2012	Reliability and validity of measuring version of the acetabular component	J Bone Joint Surg Br	Not relevant, does not answer pico question
Ni,G.X.; Lu,W.W.; Chiu,K.Y.; Fong,D.Y.	0	Cemented or uncemented femoral component in primary total hip replacement? A review from a clinical and radiological perspective	Journal of orthopaedic surgery	Review

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Ni,S.H.; Guo,L.; Jiang,T.L.; Zhao,J.; Zhao,Y.G.	2014	Press-fit cementless acetabular fixation with and without screws	Int Orthop	meta-analysis
Niccoli,L.; Bellino,S.; Cantini,F.	2002	Renal tolerability of three commonly employed non-steroidal anti-inflammatory drugs in elderly patients with osteoarthritis	Clin Exp.Rheumatol.	Hip and Knee combined
Nielen,J.T.; de,Vries F.; Dagnelie,P.C.; van den Bemt,B.J.; Emans,P.J.; Lalmohamed,A.; De,Boer A.; Boonen,A.	2016	Use of thiazolidinediones and the risk of elective hip or knee replacement: a population based case-control study	Br J Clin Pharmacol	not relevant. outcome is needing THA
Nielsen,T.G.; Miller,L.L.; Lund,B.; Christiansen,S.E.; Lind,M.	2014	Outcome of arthroscopic treatment for symptomatic femoroacetabular impingement	BMC Musculoskelet.Disord.	Not relevent, outcome
Nikolajsen,L.; Brandsborg,B.; Lucht,U.; Jensen,T.S.; Kehlet,H.	2006	Chronic pain following total hip arthroplasty: a nationwide questionnaire study	Acta Anaesthesiol.Scand.	bmi measured after surgery, which is not relevant to the PICO question
Nilsdotter,A.K.; Petersson,I.F.; Roos,E.M.; Lohmander,L.S.	2003	Predictors of patient relevant outcome after total hip replacement for osteoarthritis: a prospective study	Ann Rheum.Dis	very low quality
Nishii,T.; Nakanishi,K.; Sugano,N.; Masuhara,K.; Ohzono,K.; Ochi,T.	1998	Articular cartilage evaluation in osteoarthritis of the hip with MR imaging under continuous leg traction	Magn Reson.Imaging	Not relevant, does not answer pico question
Nishii,T.; Tamura,S.; Shiomi,T.; Yoshikawa,H.; Sugano,N.	2013	Alendronate treatment for hip osteoarthritis: prospective randomized 2-year trial	Clin Rheumatol.	Not relevant, does not answer pico question
Nishii,T.; Tanaka,H.; Nakanishi,K.; Sugano,N.; Miki,H.; Yoshikawa,H.	2005	Fat-suppressed 3D spoiled gradient-echo MRI and MDCT arthrography of articular cartilage in patients with hip dysplasia	AJR Am J Roentgenol.	Not relevant, does not answer pico question
Nishii,T.; Tanaka,H.; Sugano,N.; Miki,H.; Takao,M.; Yoshikawa,H.	2007	Disorders of acetabular labrum and articular cartilage in hip dysplasia: evaluation using isotropic high-resolutional CT arthrography with sequential radial reformation	Osteoarthritis Cartilage	Not relevant, does not answer pico question
Nishiyama,T.; Saegusa,Y.; Fujishiro,T.; Hayashi,S.; Kanzaki,N.; Hashimoto,S.; Kurosaka,M.	2012	Long-term results of intertrochanteric varus osteotomy for the dysplastic hip	Hip Int	retrospective case series

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Novais,E.N.; Heyworth,B.E.; Stamoulis,C.; Sullivan,K.; Millis,M.B.; Kim,Y.J.	2014	Open surgical treatment of femoroacetabular impingement in adolescent athletes: preliminary report on improvement of physical activity level	J Pediatr Orthop	Retrospective case series
Novais,E.N.; Potter,G.D.; Clohisy,J.C.; Millis,M.B.; Kim,Y.J.; Trousdale,R.T.; Carry,P.M.; Sierra,R.J.	2015	Obesity is a major risk factor for the development of complications after peri-acetabular osteotomy	Bone Joint J	pateient population did not have osteoarthritis
Novais,E.N.; Potter,G.D.; Sierra,R.J.; Kim,Y.J.; Clohisy,J.C.; Schoenecker,P.L.; Trousdale,R.T.; Carry,P.M.; Millis,M.B.	2014	Surgical Treatment of Adolescent Acetabular Dysplasia With a Periacetabular Osteotomy: Does Obesity Increase the Risk of Complications?	J Pediatr Orthop	Not relevant, does not answer pico question
Nozawa,M.; Enomoto,F.; Shitoto,K.; Matsuda,K.; Maezawa,K.; Kurosawa,H.	2005	Rotational acetabular osteotomy for osteonecrosis with collapse of the femoral head in young patients	J Bone Joint Surg Am	Retrospective case series
Nozawa,M.; Kurosawa,H.; Shitoto,K.; Kajihara,H.; Hirose,T.; Matsuda,K.	1997	Radiographic study of osteoarthritis of the hip joints treated conservatively for more than ten years	Journal of orthopaedic surgery	Not relevant, does not answer pico question
Nozawa,M.; Shitoto,K.; Matsuda,K.; Maezawa,K.; Kurosawa,H.	2002	Rotational acetabular osteotomy for acetabulr dysplasia	Journal of Bone and Joint Surgery - Series B	Not relevant, does not answer pico question
Nuesch,E.; Dieppe,P.; Reichenbach,S.; Williams,S.; Iff,S.; Juni,P.	2011	All cause and disease specific mortality in patients with knee or hip osteoarthritis: population based cohort study		patient population did not have knee surgery
Nuesch,E.; Rutjes,A.W.; Husni,E.; Welch,V.; Juni,P.	2009	Oral or transdermal opioids for osteoarthritis of the knee or hip	Cochrane Database Syst Rev	Systematic Review
Nuesch,E.; Rutjes,A.W.S.; Husni,E.; Welch,V.; Juni,P.	2008	Oral or transdermal opioids for osteoarthritis of the knee or hip	Cochrane Database of Systematic Reviews	Systematic Review
Nunley,R.M.; Keeney,J.A.; Zhu,J.; Clohisy,J.C.; Barrack,R.L.	2011	The reliability and variation of acetabular component anteversion measurements from cross-table lateral radiographs	J Arthroplasty	Not relevant, does not answer pico question
Oberg,U.; Oberg,T.	1996	Worse functional status among old people when admitted for arthroplasty--an evaluation with a new assessment system	Scand.J Caring Sci	outcomes appear to have been measured before surgery

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Ochi,M.; Sumen,Y.; Kanda,T.; Ikuta,Y.; Itoh,K.	1994	The diagnostic value and limitation of magnetic resonance imaging on chondral lesions in the knee joint		Not relevent, patient population
Oh,C.W.; Joo,S.Y.; Kumar,S.J.; MacEwen,G.D.	2009	A radiological classification of lateral growth arrest of the proximal femoral physis after treatment for developmental dysplasia of the hip	J Pediatr Orthop	Not relevant, does not answer pico question
Oinuma,K.; Eingartner,C.; Saito,Y.; Shiratsuchi,H.	2007	Total hip arthroplasty by a minimally invasive, direct anterior approach	Oper.Orthop Traumatol.	Review
Okano,K.; Enomoto,H.; Osaki,M.; Shindo,H.	2008	Rotational acetabular osteotomy with excision of the capital drop for advanced osteoarthritis secondary to developmental dysplasia of the hip	Arch Orthop Trauma Surg	
Okanoue,Y.; Kawakami,T.; Izumi,M.; Aso,K.; Sugimura,N.; Ikeuchi,M.	2015	Less invasive modified Spitzy shelf procedure for patients with dysplasia of the hip	Eur J Orthop Surg Traumatol.	Not relevant, does not answer pico question
Okoro,T.; Morrison,V.; Maddison,P.; Lemmey,A.B.; Andrew,J.G.	2013	An assessment of the impact of behavioural cognitions on function in patients partaking in a trial of early home-based progressive resistance training after total hip replacement surgery	Disabil.Rehabil	not relevant. article is a study of outcomes after post-op rehabilitation programs
Oksuzyan,A.; Jeune,B.; Juel,K.; Vaupel,J.W.; Christensen,K.	2013	Changes in hospitalisation and surgical procedures among the oldest-old: a follow-up study of the entire Danish 1895 and 1905 cohorts from ages 85 to 99 years	Age Ageing	surgeries not limited to THA
Older,J.	2002	Charnley low-friction arthroplasty: a worldwide retrospective review at 15 to 20 years	J Arthroplasty	very low quality
O'leary,J.A.; Berend,K.; Vail,T.P.	2001	The relationship between diagnosis and outcome in arthroscopy of the hip		Review
Oliveria,S.A.; Felson,D.T.; Klein,R.A.; Reed,J.I.; Walker,A.M.	1996	Estrogen replacement therapy and the development of osteoarthritis		Hip and Knee combined
Ollivier,M.; Frey,S.; Parratte,S.; Flecher,X.; Argenson,J.N.	2014	Pre-operative function, motivation and duration of symptoms predict sporting participation after total hip replacement	Bone Joint J	90% of pop isn't Hip OA

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Olney,B.; Latz,K.; Asher,M.	1998	Treatment of hip dysplasia in older children with a combined one-stage procedure	Clin Orthop Relat Res	Retrospective case series
Omololu,B.; Alonge,T.O.; Ogunlade,S.O.; Aduroja,O.O.	2005	Double blind clinical trial comparing the safety and efficacy of nimesulide (100mg) and diclofenac in osteoarthrosis of the hip and knee joints	West Afr.J Med	
Onsten,I.; Bengner,U.; Besjakov,J.	1993	Socket migration after Charnley arthroplasty in rheumatoid arthritis and osteoarthritis. A roentgen stereophotogrammetric study	J Bone Joint Surg Br	no patient oriented outcomes
Orbell,S.; Espley,A.; Johnston,M.; Rowley,D.	1998	Health benefits of joint replacement surgery for patients with osteoarthritis: prospective evaluation using independent assessments in Scotland	J Epidemiol.Community Health	hip and knee results combined
Orbell,S.; Johnston,M.; Rowley,D.; Espley,A.; Davey,P.	1998	Cognitive representations of illness and functional and affective adjustment following surgery for osteoarthritis	Soc Sci Med	combines hip and knee results
Oreffo,R.O.; Bennett,A.; Carr,A.J.; Triffitt,J.T.	1998	Patients with primary osteoarthritis show no change with ageing in the number of osteogenic precursors	Scand.J Rheumatol.	no patient oriented outcomes
Oremus,K.; Sostaric,S.; Trkulja,V.; Haspl,M.	2014	Influence of tranexamic acid on postoperative autologous blood retransfusion in primary total hip and knee arthroplasty: A randomized controlled trial	Transfusion (Paris).	90% of pop isn't Hip OA
Ornetti,P.; Parratte,S.; Gossec,L.; Tavernier,C.; Argenson,J.N.; Roos,E.M.; Guillemin,F.; Maillefert,J.F.	2010	Cross-cultural adaptation and validation of the French version of the Hip disability and Osteoarthritis Outcome Score (HOOS) in hip osteoarthritis patients	Osteoarthritis Cartilage	
Ortiguera,C.J.; Pulliam,I.T.; Cabanela,M.E.	1999	Total hip arthroplasty for osteonecrosis: matched-pair analysis of 188 hips with long-term follow-up	J Arthroplasty	no patient oriented outcomes
Osborne,R.H.; Buchbinder,R.; Ackerman,I.N.	2006	Can a disease-specific education program augment self-management skills and improve Health-Related Quality of Life in people with hip or knee osteoarthritis?	BMC Musculoskelet.Disord.	Method section/not completed study

Authors	Year	Article Title	Periodical	Reason for Exclusion
Oteo-Alvaro,A.; Marin,M.T.; Ruiz-Iban,M.A.; Armada,B.; Rejas,J.	2012	Treatment satisfaction after switching to another therapy in Spanish orthopaedic clinic outpatients with knee or hip osteoarthritis previously refractory to paracetamol	Clin Drug Investig.	Hip and Knee combined
O'toole,G.C.; Abuzukuk,T.; Murray,P.	2002	Elective total hip arthroplasty in patients aged 85 years and older	Ir.Med.J.	study quality downgraded to very low because outcome measurment was not consistent for all patients
Ottawa (ON): Canadian Agency for Drugs and Technologies in Health	2014	Obesity Management Interventions Delivered in Primary Care for Patients with Osteoarthritis: A Review of the Clinical Effectiveness [Internet].		Narrative review
Ottink,K.; Barnaart,L.; Westerbeek,R.; Kampen,K.V.; Bulstra,S.; Jonbergen,H.P.	2015	Survival, clinical and radiological outcome of the Zweymuller SL/Bicon-Plus total hip arthroplasty: a 15-year follow-up study	Hip Int	does not evaluate age as a risk factor
Overgaard,S.; Knudsen,H.M.; Hansen,L.N.; Mossing,N.	1992	Hip arthroplasty in Jutland, Denmark. Age and sex-specific incidences of primary operations	Acta Orthop Scand.	not relevant. outcome is need for THA
PÃ?Â©tursson,P.; Edmunds,K.J.; GÃ?Âslason,M.K.; MagnÃ?Âºsson,B.; MagnÃ?ÂºsdÃ?Â³ttir,G.; HalldÃ?Â³rsson,G.; JÃ?Â³nsson,H.; Gargiulo,P.	2015	Bone mineral density and fracture risk assessment to optimize prosthesis selection in total hip replacement	Computational and Mathematical Methods in Medicine	no patient oriented outcomes
Paans,N.; Stevens,M.; Wagenmakers,R.; van,Beveren J.; van der Meer,K.; Bulstra,S.K.; van,den Akker-Scheek,I	2012	Changes in body weight after total hip arthroplasty: short-term and long-term effects	Phys Ther	no relvant outcomes. the outcome is change in BMI, which is more of a surrogate measure of improved function.
Paans,N.; van,den Akker-Scheek,I; Dilling,R.G.; Bos,M.; van der Meer,K.; Bulstra,S.K.; Stevens,M.	2013	Effect of exercise and weight loss in people who have hip osteoarthritis and are overweight or obese: a prospective cohort study	Phys Ther	Repeat article

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Pace,T.B.	1994	Total hip arthroplasty. Are early dislocations related to the surgical approach?	Journal of Orthopaedic Techniques	90% of pop isn't Hip OA
Pagnano,M.W.; Leone,J.; Lewallen,D.G.; Hanssen,A.D.	2005	Two-incision THA had modest outcomes and some substantial complications	Clin.Orthop.	retrospective case series
Pagnano,M.W.; McLamb,L.A.; Trousdale,R.T.	2003	Primary and revision total hip arthroplasty for patients 90 years of age and older	Mayo Clin Proc	does not evaluate age as a risk factor
Pai,V.S.	1996	Significance of the Trendelenburg test in total hip arthroplasty. Influence of lateral approaches	J Arthroplasty	does not answer recommendation
Pai,V.S.	1994	Heterotopic ossification in total hip arthroplasty. The influence of the approach	J Arthroplasty	does not answer recommendation
Pajarinen,J.; Hirvensalo,E.	2003	Two-incision technique for rotational acetabular osteotomy: good outcome in 35 hips	Acta Orthop Scand.	Not relevant to recommendation
Palan,J.; Beard,D.J.; Murray,D.W.; Andrew,J.G.; Nolan,J.	2009	Which approach for total hip arthroplasty: anterolateral or posterior?	Clin Orthop Relat Res	90% of pop isn't Hip OA
Palazzo,C.; Jourdan,C.; Descamps,S.; Nizard,R.; Hamadouche,M.; Anract,P.; Boisgard,S.; Galvin,M.; Ravaud,P.; Poiraudeau,S.	2014	Determinants of satisfaction 1 year after total hip arthroplasty: the role of expectations fulfilment	BMC Musculoskelet.Disord.	less than 90% OA hip patients
Palmer,A.J.; Ayyar-Gupta,V.; Dutton,S.J.; Rombach,I.; Cooper,C.D.; Pollard,T.C.; Hollinghurst,D.; Taylor,A.; Barker,K.L.; McNally,E.G.; Beard,D.J.; Andrade,A.J.; Carr,A.J.; Glyn-Jones,S.	2014	Protocol for the Femoroacetabular Impingement Trial (FAIT): a multi-centre randomised controlled trial comparing surgical and non-surgical management of femoroacetabular impingement	Bone Joint Res	Methodology
Palmer,R.H.; DeLapp,R.	2000	Gastrointestinal toxicity in elderly osteoarthritis patients treated with	Inflammopharmacology	Hip and Knee combined
Paoloni,M.; Di,Sante L.; Dimaggio,M.; Bernetti,A.; Mangone,M.; Di,Renzo S.; Santilli,V.	2012	Kinematic and kinetic modifications in walking pattern of hip osteoarthritis patients induced by intra-articular injections of hyaluronic acid	Clin Biomech.(Bristol, Avon)	
Papalia,R.; Del,Buono A.; Franceschi,F.; Marinozzi,A.; Maffulli,N.; Denaro,V.	2012	Femoroacetabular impingement syndrome management: arthroscopy or open surgery?	Int Orthop	Systematic Review

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Park,S.Y.; Park,J.S.; Jin,W.; Rhyu,K.H.; Ryu,K.N.	2013	Diagnosis of acetabular labral tears: comparison of three-dimensional intermediate-weighted fast spin-echo MR arthrography with two-dimensional MR arthrography at 3.0 T	Acta Radiol	Not relevant, does not answer pico question
Park,Y.S.; Moon,Y.W.; Lim,B.H.; Shon,M.S.; Lim,S.J.	2011	A comparative study of the posterolateral and anterolateral approaches for isolated acetabular revision	Arch Orthop Trauma Surg	90% of pop isn't Hip OA
Parodi,D.; Valderrama,J.; Tobar,C.; Besomi,J.; Lopez,J.; Lara,J.; Ilic,J.P.	2014	Effect of warmed irrigation solution on core body temperature during hip arthroscopy for femoroacetabular impingement		Not relevant, does not answer pico question
Partio,E.; von,Bonsdorff H.; Wirta,J.; Avikainen,V.	1994	Survival of the Lubinus hip prosthesis. An eight- to 12-year follow-up evaluation of 444 cases	Clin Orthop Relat Res	very low quality
Parvizi,J.; Holiday,A.D.; Ereth,M.H.; Lewallen,D.G.	1999	Sudden death during primary hip arthroplasty	Clin.Orthop.	does not evaluate age as a risk factor
Parvizi,J.; Pour,A.E.; Keshavarzi,N.R.; D'Apuzzo,M.; Sharkey,P.F.; Hozack,W.J.	2007	Revision total hip arthroplasty in octogenarians. A case-control study	J Bone Joint Surg Am	very low strength of eidence
Parvizi,J.; Rasouli,M.R.; Jaberi,M.; Chevrollier,G.; Vizzi,S.; Sharkey,P.F.; Hozack,W.J.	2013	Does the surgical approach in one stage bilateral total hip arthroplasty affect blood loss?	Int Orthop	Unclear of population
Pateder,D.B.; Hungerford,M.W.	2007	Use of fluoroscopically guided intra-articular hip injection in differentiating the pain source in concomitant hip and lumbar spine arthritis	Am J Orthop (Belle Mead NJ)	
Patel,A.D.; Albrizio,M.	2007	Relationship of body mass index to early complications in hip replacement surgery : study performed at Hinchingbrooke Hospital, Orthopaedic Directorate, Huntingdon, Cambridgeshire	Int Orthop	less than 90% OA hip patients
Patel,J.; Lee,J.H.; Li,Z.; Soohoo,N.F.; Bozic,K.; Huddleston,J.I.	2015	Predictors of Low Patient-Reported Outcomes Response Rates in the California Joint Replacement Registry	J.Arthroplasty	combines hip and knee results

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Paterson,G.; Toupin-April,K.; Ueffing,E.; Hochberg,M.; Altman,R.; Benkhalti,M.; McGowan,J.; Welch,V.; Towheed,T.; Wells,G.; Tugwell,P.	2014	Source and quality of the evidence used in the development of the 2012 American college of rheumatology (ACR) knee and hip osteoarthritis clinical practice guidelines	J.Rheumatol.	Abstract
Patterson,A.J.; Murphy,N.M.; Nugent,A.M.; Finlay,O.E.; Nicholls,D.P.; Boreham,C.A.; Steele,I.; Henderson,S.A.; Beringer,T.R.	1995	The effect of minimal exercise on fitness in elderly women after hip surgery	Ulster Med J	Not relevant to recommendation
Paunescu,F.; Didilescu,A.; Antonescu,D.M.	2014	Does physiotherapy contribute to the improvement of functional results and of quality of life after primary total hip arthroplasty?	Maedica.(Buchar.)	Unclear of population
Pavlou,G.; Salhab,M.; Murugesan,L.; Jallad,S.; Petsatodis,G.; West,R.; Tsiridis,E.	2012	Risk factors for heterotopic ossification in primary total hip arthroplasty	Hip Int	retrospective case series
Paxton,E.W.; Inacio,M.; Slipchenko,T.; Fithian,D.C.	2008	The kaiser permanente national total joint replacement registry	Perm.J	
Pearce,F.; Hui,M.; Ding,C.; Doherty,M.; Zhang,W.	2013	Does smoking reduce the progression of osteoarthritis? Meta-analysis of observational studies	Arthritis Care Res (Hoboken)	
Pedersen,A.B.; Sorensen,H.T.; Mehnert,F.; Overgaard,S.; Johnsen,S.P.	2010	Risk factors for venous thromboembolism in patients undergoing total hip replacement and receiving routine thromboprophylaxis	J Bone Joint Surg Am	not best available evidence. quality was downgraded due to the fact that the registry did not capture patients treated in emergency departments, and only would capture those admitted to hospital. high potential for differential misclassification for

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				vte risk, especially if older patients are more likely to be admitted to hospital as a precaution.
Pedersen,D.R.; Callaghan,J.J.; Johnston,T.L.; Fetzer,G.B.; Johnston,R.C.	2001	Comparison of femoral head penetration rates between cementless acetabular components with 22-mm and 28-mm heads	J Arthroplasty	Not relevant to recommendation
Peloso,P.M.; Bellamy,N.; Bensen,W.; Thomson,G.T.; Harsanyi,Z.; Babul,N.; Darke,A.C.	2000	Double blind randomized placebo control trial of controlled release codeine in the treatment of osteoarthritis of the hip or knee	J Rheumatol.	90% of pop isn't Hip OA
Percope de Andrade,M.A.; Campos,T.V.; Abreu-E-Silva GM	2015	Supplementary methods in the nonsurgical treatment of osteoarthritis		Systematic Review
Periasamy,K.; Watson,W.S.; Mohammed,A.; Murray,H.; Walker,B.; Patil,S.; Meek,R.M.	2011	A randomised study of peri-prosthetic bone density after cemented versus trabecular fixation of a polyethylene acetabular component	J Bone Joint Surg Br	Not relevant to recommendation
Perpignano,G.; Bogliolo,A.; Puccetti,L.	1994	Double-blind comparison of the efficacy and safety of etodolac SR 600 mg u.i.d. and of tenoxicam 20 mg u.i.d. in elderly patients with osteoarthritis of the hip and of the knee	Int J Clin Pharmacol Res	Hip and Knee combined
Perpoint,B.; Mismetti,P.; Simitsidis,S.; Hocquart,J.; Rambaud,C.; Buchmuller,A.; Queneau,P.; Decousus,H.	1994	Dosing time optimizes sustained-release ketoprofen treatment of osteoarthritis	Chronobiol.Int	90% of pop isn't Hip OA
Perruccio,A.V.; Davis,A.M.; Hogg-Johnson,S.; Badley,E.M.	2011	Importance of self-rated health and mental well-being in predicting health outcomes following total joint replacement surgery for osteoarthritis	Arthritis Care Res (Hoboken)	hip and knee results combined

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Petchprapa,C.N.; Rybak,L.D.; Dunham,K.S.; Lattanzi,R.; Recht,M.P.	2015	Labral and cartilage abnormalities in young patients with hip pain: accuracy of 3-Tesla indirect MR arthrography	Skeletal Radiol	Abnormal x-ray included
Petchprapa,C.N.; Rybak,L.D.; Dunham,K.S.; Lattanzi,R.; Recht,M.P.	2014	Labral and cartilage abnormalities in young patients with hip pain: accuracy of 3-Tesla indirect MR arthrography	Skeletal Radiol.	Not relevant, does not answer pico question
Peter,W.F.; Jansen,M.J.; Hurkmans,E.J.; Bloo,H.; Dekker,J.; Dilling,R.G.; Hilberdink,W.; Kersten-Smit,C.; de,Rooij M.; Veenhof,C.; Vermeulen,H.M.; de Vos,R.J.; Schoones,J.W.; Vliet Vlieland,T.P.	2011	Physiotherapy in hip and knee osteoarthritis: development of a practice guideline concerning initial assessment, treatment and evaluation	Acta Reumatol.Port.	Systematic Review
Peterson,C.; Hodler,J.	2010	Evidence-based radiology (part 2): Is there sufficient research to support the use of therapeutic injections into the peripheral joints?	Skeletal Radiol	Review
Petrovic,N.M.; Milovanovic,D.R.; Ignjatovic,Ristic D.; Riznic,N.; Ristic,B.; Stepanovic,Z.	2014	Factors associated with severe postoperative pain in patients with total hip arthroplasty	Acta Orthopaedica et Traumatologica Turcica	unclear if patients had hip OA
Pettine,K.A.; Aamlid,B.C.; Cabanela,M.E.	1991	Elective total hip arthroplasty in patients older than 80 years of age	Clin.Orthop.	very low quality
Pincus,T.; Koch,G.; Lei,H.; Mangal,B.; Sokka,T.; Moskowitz,R.; Wolfe,F.; Gibofsky,A.; Simon,L.; Zlotnick,S.; Fort,J.G.	2004	Patient Preference for Placebo, Acetaminophen (paracetamol) or Celecoxib Efficacy Studies (PACES): two randomised, double blind, placebo controlled, crossover clinical trials in patients with knee or hip osteoarthritis	Ann Rheum.Dis	Hip and Knee combined
Pincus,T.; Wang,X.; Chung,C.; Sokka,T.; Koch,G.G.	2005	Patient preference in a crossover clinical trial of patients with osteoarthritis of the knee or hip: face validity of self-report questionnaire ratings	J Rheumatol.	Outcome study
Pinto,D.; Robertson,M.C.; Hansen,P.; Abbott,J.H.	2012	Cost-effectiveness of nonpharmacologic, nonsurgical interventions for hip and/or knee osteoarthritis: systematic review	Value Health	Systematic Review
Pinto,D.; Robertson,M.C.; Hansen,P.; Abbott,J.H.	2011	Economic evaluation within a factorial-design randomised controlled trial of exercise, manual therapy, or both interventions for osteoarthritis of the hip or knee: study protocol	BMJ Open	Not relevant to recommendation

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Pinto,P.R.; McIntyre,T.; Ferrero,R.; Almeida,A.; Araujo-Soares,V.	2013	Predictors of acute postsurgical pain and anxiety following primary total hip and knee arthroplasty	J Pain	hip and knee results combined
Pinto,P.R.; McIntyre,T.; Ferrero,R.; Almeida,A.; Araujo-Soares,V.	2013	Risk factors for moderate and severe persistent pain in patients undergoing total knee and hip arthroplasty: a prospective predictive study	PLoS One	hip and knee results combined
Piontek,T.; Szulc,A.; Glowacki,M.; Strzyzewski,W.	2006	Distant outcomes of the Chiari osteotomy 30 years follow up evaluation	Ortop.Traumatol.Rehabil	not in English
Piscitelli,P.; Iolascon,G.; Di,Tanna G.; Bizzi,E.; Chitano,G.; Argentiero,A.; Neglia,C.; Giolli,L.; Distante,A.; Gimigliano,R.; Brandi,M.L.; Migliore,A.	2012	Socioeconomic burden of total joint arthroplasty for symptomatic hip and knee osteoarthritis in the Italian population: a 5-year analysis based on hospitalization records	Arthritis Care Res (Hoboken)	socioeconomic status not evaluated as a risk factor for poor postoperative outcomes
Pisters,M.F.; Veenhof,C.; de Bakker,D.H.; Schellevis,F.G.; Dekker,J.	2010	Behavioural graded activity results in better exercise adherence and more physical activity than usual care in people with osteoarthritis: a cluster-randomised trial	J Physiother.	90% of pop isn't Hip OA
Pisters,M.F.; Veenhof,C.; Schellevis,F.G.; Twisk,J.W.; Dekker,J.; de Bakker,D.H.	2010	Exercise adherence improving long-term patient outcome in patients with osteoarthritis of the hip and/or knee	Arthritis Care Res (Hoboken)	90% of pop isn't Hip OA
Pisters,M.F.; Veenhof,C.; van Meeteren,N.L.; Ostelo,R.W.; de Bakker,D.H.; Schellevis,F.G.; Dekker,J.	2007	Long-term effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a systematic review	Arthritis Rheum.	Systematic Review
Pitto,R.P.; Garland,M.; Sedel,L.	2015	Are Ceramic-on-ceramic Bearings in Total Hip Arthroplasty Associated With Reduced Revision Risk for Late Dislocation?	Clin Orthop Relat Res	90% of pop isn't Hip OA
Pitto,R.P.; Klaue,K.; Ganz,R.; Ceppatelli,S.	1995	Acetabular rim pathology secondary to congenital hip dysplasia in the adult. A radiographic study	Chir Organi Mov	Not relevant to recommendation
Piuzzi,N.S.; Slullitel,P.A.; Bertona,A.; Onativia,I.J.; Albergo,I.; Zanotti,G.; Buttaro,M.A.; Piccaluga,F.; Comba,F.M.	2016	Hip arthroscopy in osteoarthritis: a systematic review of the literature	Hip Int	
Pivec,R.; Issa,K.; Naziri,Q.; Kapadia,B.H.; Bonutti,P.M.;	2014	Opioid use prior to total hip arthroplasty leads to worse clinical outcomes	Int Orthop	Unclear if 90% of pop is Hip OA

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Mont,M.A.				
Plant,M.J.; Borg,A.A.; Dziedzic,K.; Saklatvala,J.; Dawes,P.T.	1997	Radiographic patterns and response to corticosteroid hip injection	Ann Rheum.Dis	
Plosker,G.L.	2011	Buprenorphine 5, 10 and 20 mug/h transdermal patch: a review of its use in the management of chronic non-malignant pain		review
Poehling-Monaghan,K.L.; Kamath,A.F.; Taunton,M.J.; Pagnano,M.W.	2014	Direct Anterior versus Miniposterior THA With the Same Advanced Perioperative Protocols: Surprising Early Clinical Results	Clin.Orthop.	Unclear of population
Poggie,R.A.; Turgeon,T.R.; Coutts,R.D.	2007	Failure analysis of a ceramic bearing acetabular component	Journal of Bone and Joint Surgery - Series A	less than 90% OA hip patients
Pogliacomi,F.; De,Filippo M.; Paraskevopoulos,A.; Alesci,M.; Marenghi,P.; Ceccarelli,F.	2012	Mini-incision direct lateral approach versus anterior mini-invasive approach in total hip replacement: results 1 year after surgery	Acta Biomed	retrospective case series
Pogliacomi,F.; Paraskevopoulos,A.; Costantino,C.; Marenghi,P.; Ceccarelli,F.	2012	Influence of surgical experience in the learning curve of a new approach in hip replacement: anterior mini-invasive vs. standard lateral	Hip Int	retrospective case series
Pogliacomi,F.; Stark,A.; Wallensten,R.	2005	Periacetabular osteotomy. Good pain relief in symptomatic hip dysplasia, 32 patients followed for 4 years	Acta Orthop	retrospective case series
Pogliacomi,F.; Stark,A.; Wallensten,R.	2005	Periacetabular osteotomy	Acta orthopaedica	Not relevant, does not answer pico question
Poignard,A.; Bouhou,M.; Pidet,O.; Flouzat-Lachaniette,C.H.; Hernigou,P.	2011	High dislocation cumulative risk in THA versus hemiarthroplasty for fractures	Clin Orthop Relat Res	Patient population not OA
Pola,E.; Papaleo,P.; Santoliquido,A.; Gasparini,G.; Aulisa,L.; De,Santis E.	2004	Clinical factors associated with an increased risk of perioperative blood transfusion in nonanemic patients undergoing total hip arthroplasty	J Bone Joint Surg Am	very low quality
Polesello,G.C.; Lima,F.R.; Guimaraes,R.P.; Ricioli,W.; Queiroz,M.C.	2014	Arthroscopic treatment of femoroacetabular impingement: minimum five-year follow-up	Hip Int	Retrospective case series

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Polkowski,G.G.; Novais,E.N.; Kim,Y.J.; Millis,M.B.; Schoenecker,P.L.; Clohisy,J.C.	2012	Does previous reconstructive surgery influence functional improvement and deformity correction after periacetabular osteotomy?	Clin Orthop Relat Res	retrospective case series
Pollard,T.C.B.; Baker,R.P.; Eastaugh-Waring,S.J.; Bannister,G.C.	2006	Treatment of the young active patient with osteoarthritis of the hip	Journal of Bone and Joint Surgery - Series B	less than 90% OA hip for obesity rec. the results do not answer if age was associated with worse outcomes
Popa,A.S.; Rabinstein,A.A.; Huddleston,P.M.; Larson,D.R.; Gullerud,R.E.; Huddleston,J.M.	2009	Predictors of ischemic stroke after hip operation: a population-based study	J Hosp Med	not all patients had THA
Pope,J.E.; McCrea,K.; Stevens,A.; Ouimet,J.M.	2008	The relationship between NSAID use and osteoarthritis (OA) severity in patients with hip and knee OA: results of a case control study of NSAID use comparing those requiring hip and knee replacements to those in whom surgery was not recommended	Med Sci Monit.	Hip and Knee combined
Porter,S.E.; Russell,G.V.; Dews,R.C.; Qin,Z.; Woodall,J.,Jr.; Graves,M.L.	2008	Complications of acetabular fracture surgery in morbidly obese patients	J Orthop Trauma	only fracture patients included.
Pospischill,M.; Kranzl,A.; Attwenger,B.; Knahr,K.	2010	Minimally invasive compared with traditional transgluteal approach for total hip arthroplasty: a comparative gait analysis	J Bone Joint Surg Am	outcome measure
Posta,A.G.,Jr.; Allen,A.A.; Nercessian,O.A.	1997	Neurologic injury in the upper extremity after total hip arthroplasty	Clin Orthop Relat Res	age results as a risk factor are not presented
Poulsen,E.; Christensen,H.W.; Roos,E.M.; Vach,W.; Overgaard,S.; Hartvigsen,J.	2011	Non-surgical treatment of hip osteoarthritis. Hip school, with or without the addition of manual therapy, in comparison to a minimal control intervention: protocol for a three-armed randomized clinical trial	BMC Musculoskelet.Disord.	Results section/not completed study
Poultsides,L.A.; Ghomrawi,H.M.; Lyman,S.; Aharonoff,G.B.; Mancuso,C.A.; Sculco,T.P.	2012	Change in preoperative expectations in patients undergoing staged bilateral primary total knee or total hip arthroplasty	J Arthroplasty	not relevant outcome, patient expectation score between second surgery. also, less

Authors	Year	Article Title	Periodical	Reason for Exclusion
				than 90% oa hip
Pourbagher,M.A.; Ozalay,M.; Pourbagher,A.	2005	Accuracy and outcome of sonographically guided intra-articular sodium hyaluronate injections in patients with osteoarthritis of the hip	J Ultrasound Med	
Powers,C.C.; Ho,H.; Beykirch,S.E.; Huynh,C.; Hopper,R.H.,Jr.; Engh,C.A.,Jr.; Engh,C.A.	2010	A comparison of a second- and a third-generation modular cup design: is new improved?	J Arthroplasty	90% of pop isn't Hip OA
Pozzi,G.; Stradiotti,P.; Parra,C.G.; Zagra,L.; Sironi,S.; Zerbi,A.	2009	Femoro-acetabular impingement: can indirect MR arthrography be considered a valid method to detect endoarticular damage? A preliminary study	Hip Int	Not relevant, does not answer pico question
Prieto-Alhambra,D.; Kassim,Javaid M.; Judge,A.; Murray,D.; Carr,A.; Cooper,C.; Arden,N.K.	2014	Association between bisphosphonate use and implant survival after primary total arthroplasty of the knee or hip: Population based retrospective cohort study		adjust for confounder age but doesn't present results for variable
Prior,M.J.; Harrison,D.D.; Frustaci,M.E.	2014	A randomized, double-blind, placebo-controlled 12 week trial of acetaminophen extended release for the treatment of signs and symptoms of osteoarthritis	Curr Med Res Opin	Hip and Knee combined
Pritchard,J.M.; Papaioannou,A.; Tomowich,C.; Giangregorio,L.M.; Atkinson,S.A.; Beattie,K.A.; Adachi,J.D.; DeBeer,J.; Winemaker,M.; Avram,V.; Schwarcz,H.P.	2013	Bone mineralization is elevated and less heterogeneous in adults with type 2 diabetes and osteoarthritis compared to controls with osteoarthritis alone		no patient oriented outcomes
Prokopetz,J.J.; Losina,E.; Bliss,R.L.; Wright,J.; Baron,J.A.; Katz,J.N.	2012	Risk factors for revision of primary total hip arthroplasty: a systematic review	BMC Musculoskelet.Disord.	systematic review
Prosser,G.H.; Yates,P.J.; Wood,D.J.; Graves,S.E.; de Steiger,R.N.; Miller,L.N.	2010	Outcome of primary resurfacing hip replacement: evaluation of risk factors for early revision	Acta Orthop	article not about hip resurfacing.
Prosser,G.H.; Yates,P.J.; Wood,D.J.; Graves,S.E.; de Steiger,R.N.; Miller,L.N.	2010	Outcome of primary resurfacing hip replacement: Evaluation of risk factors for early revision: 12,093 replacements from the	Acta orthopaedica	risk factors were for patients who recieved hip

Authors	Year	Article Title	Periodical	Reason for Exclusion
		Australian Joint Registry		resurfacing, not THA
Prouse,P.J.; Bevis,P.J.; Bluhmki,E.; Distel,M.	1996	Evaluation of the safety, tolerability, and efficacy of meloxicam tablets in patients with osteoarthritis	Clin Ther	90% of pop isn't Hip OA
Pruszczynski,B.; Sibinski,M.; Synder,M.	2011	Outcomes of hip arthroplasty in patients younger than 28 years old	Ortop.Traumatol.Rehabil	does not evaluate age as a risk factor
Puopolo,A.; Boice,J.A.; Fidelholtz,J.L.; Littlejohn,T.W.; Miranda,P.; Berrocal,A.; Ko,A.; Cichanowitz,N.; Reicin,A.S.	2007	A randomized placebo-controlled trial comparing the efficacy of etoricoxib 30 mg and ibuprofen 2400 mg for the treatment of patients with osteoarthritis	Osteoarthritis Cartilage	Hip and Knee combined
Qu,Y.; Jiang,T.; Zhao,H.; Gao,Y.; Zheng,C.; Xu,J.	2014	Mid-term results of metal-on-metal hip resurfacing for treatment of osteoarthritis secondary to developmental dysplasia of the hip: a minimum of 8-years of follow-up	Med Sci Monit.	Patient population
Quattrini,A.; Paladin,S.	1995	A double-blind study comparing nimesulide with naproxen in the treatment of osteoarthritis of the hip	Clinical Drug Investigation	not relevant comparison
Queen,R.M.; Butler,R.J.; Watters,T.S.; Kelley,S.S.; Attarian,D.E.; Bolognesi,M.P.	2011	The effect of total hip arthroplasty surgical approach on postoperative gait mechanics	J Arthroplasty	less than 10 patients in groups
Queiros,M.V.	1990	Piroxicam and oxaprozin: A crossover comparison in the management of osteoarthritis	Current Therapeutic Research - Clinical and Experimental	Hip and Knee combined
Quiding,H.; Grimstad,J.; Rusten,K.; Stubhaug,A.; Bremnes,J.; Breivik,H.	1992	Ibuprofen plus codeine, ibuprofen, and placebo in a single- and multidose cross-over comparison for coxarthrosis pain		Hip and Knee combined
Quintrec,J.L.; Verlhac,B.; Cadet,C.; Breville,P.; Vetel,J.M.; Gauvain,J.B.; Jeandel,C.; Maheu,E.	2014	Physical exercise and weight loss for hip and knee osteoarthritis in very old patients: a systematic review of the literature	Open Rheumatol.J	Systematic Review
Rahman,L.; Muirhead-Allwood,S.K.; Alkinj,M.	2010	What is the midterm survivorship and function after hip resurfacing?	Clin.Orthop.	inadequate quality due to inconsistent outcome collection methods and use of bivariate analysis.

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Rahman,L.A.; Adie,S.; Naylor,J.M.; Mittal,R.; So,S.; Harris,I.A.	2013	A systematic review of the diagnostic performance of orthopedic physical examination tests of the hip	BMC Musculoskelet.Disord.	Systematic Review
Rahmann,A.E.; Brauer,S.G.; Nitz,J.C.	2009	A specific inpatient aquatic physiotherapy program improves strength after total hip or knee replacement surgery: a randomized controlled trial	Arch Phys Med Rehabil	Unclear if 90% of pop is Hip OA
Rahme,E.; Dasgupta,K.; Burman,M.; Yin,H.; Bernatsky,S.; Berry,G.; Nedjar,H.; Kahn,S.R.	2008	Postdischarge thromboprophylaxis and mortality risk after hip-or knee-replacement surgery		hip and knee results combined
Rajamaki,T.J.; Jamsen,E.; Puolakka,P.A.; Nevalainen,P.I.; Moilanen,T.	2015	Diabetes is associated with persistent pain after hip and knee replacement	Acta Orthop	very low quality because the hip oa subgroup was the only population relevent to the pico question, and the subgroup was too small to perform any adjustment for confounding.
Rajgopal,R.; Martin,R.; Howard,J.L.; Somerville,L.; MacDonald,S.J.; Bourne,R.	2013	Outcomes and complications of total hip replacement in super-obese patients	Bone Joint J	less than 90% hip OA
Ramaesh,R.; Jenkins,P.; Lane,J.V.; Knight,S.; MacDonald,D.; Howie,C.	2014	Personality, function and satisfaction in patients undergoing total hip or knee replacement	J Orthop Sci	insufficent data. the text references table 3 for hip data, table 2 is labled as the hip data. unclear which data is hip data.
Ramani,N.; Patil,M.S.; Mahna,M.	2014	Outcome of surgical management of developmental dysplasia of hip in children between 18 and 24 months	Indian J Orthop	less than 10 patients in groups
Rampazo-Lacativa,M.K.; D'Elboux,M.J.	2015	Effect of cycle ergometer and conventional exercises on rehabilitation of older patients with total hip arthroplasty: study protocol for randomized controlled trial	Trials	Results section/not completed study

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Rao,R.R.; Sharkey,P.F.; Hozack,W.J.; Eng,K.; Rothman,R.H.	1998	Immediate weightbearing after uncemented total hip arthroplasty	Clin Orthop Relat Res	Not relevant to recommendation
Raphael,I.J.; Parmar,M.; Mehrganpour,N.; Sharkey,P.F.; Parvizi,J.	2013	Obesity and operative time in primary total joint arthroplasty	J Knee Surg	unclear if 90% of the patient population had oa hip
Rat,A.C.; Guillemin,F.; Osnowycz,G.; Delagoutte,J.P.; Cuny,C.; Mainard,D.; Baumann,C.	2010	Total hip or knee replacement for osteoarthritis: mid- and long-term quality of life	Arthritis Care Res (Hoboken)	combines hip and knee results
Rathod,P.A.; Orishimo,K.F.; Kremenic,I.J.; Deshmukh,A.J.; Rodriguez,J.A.	2014	Similar improvement in gait parameters following direct anterior & posterior approach total hip arthroplasty	J Arthroplasty	less than 10 patients in groups
Ravaud,P.; Giraudeau,B.; Logeart,I.; Larguier,J.S.; Rolland,D.; Treves,R.; Euller-Ziegler,L.; Bannwarth,B.; Dougados,M.	2004	Management of osteoarthritis (OA) with an unsupervised home based exercise programme and/or patient administered assessment tools. A cluster randomised controlled trial with a 2x2 factorial design	Ann Rheum.Dis	90% of pop isn't Hip OA
Ravi,B.; Croxford,R.; Hawker,G.A.	2013	Low surgeon volume is associated with increased complications following total hip arthroplasty, after accounting for experience	Osteoarthritis Cartilage	abstract only
Ravi,B.; Croxford,R.; Hollands,S.; Hawker,G.A.	2013	Comparison of complication rates following total hip arthroplasty in individuals with ra versus oa	Osteoarthritis Cartilage	abstract only
Ravi,B.; Croxford,R.; Hollands,S.; Paterson,J.M.; Bogoch,E.; Kreder,H.; Hawker,G.A.	2014	Increased risk of complications following total joint arthroplasty in patients with rheumatoid arthritis	Arthritis Rheumatol.	less than 90% OA hip patients
Ravi,B.; Escott,B.G.; Wasserstein,D.; Croxford,R.; Hollands,S.; Paterson,J.M.; Kreder,H.J.; Hawker,G.A.	2015	Intraarticular hip injection and early revision surgery following total hip arthroplasty: a retrospective cohort study	Arthritis Rheumatol.	
Rebello,G.; Zilkens,C.; Dudda,M.; Matheney,T.; Kim,Y.J.	2009	Triple pelvic osteotomy in complex hip dysplasia seen in neuromuscular and teratologic conditions	J Pediatr Orthop	Not relevant to recommendation

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Reginster,J.Y.; Malmstrom,K.; Mehta,A.; Bergman,G.; Ko,A.T.; Curtis,S.P.; Reicin,A.S.	2007	Evaluation of the efficacy and safety of etoricoxib compared with naproxen in two, 138-week randomised studies of patients with osteoarthritis	Ann Rheum.Dis	Hip and Knee combined
Regnaux,Jean Philippe; Lefevre-Colau,Marie Martine; Trinquart,Ludovic; Nguyen,Christelle; Boutron,Isabelle; Brosseau,Lucie; Ravaud,Philippe	2015	High-intensity versus low-intensity physical activity or exercise in people with hip or knee osteoarthritis	Cochrane Database of Systematic Reviews	Systematic Review
Reichenbach,S.; Sterchi,R.; Scherer,M.; Trelle,S.; Burgi,E.; Burgi,U.; Dieppe,P.A.; Juni,P.	2007	Meta-analysis: chondroitin for osteoarthritis of the knee or hip	Ann Intern.Med	Systematic Review
Reid,M.C.	2013	Viscosupplementation for osteoarthritis: a primer for primary care physicians	Adv Ther	
Reikeras,O.; Gunderson,R.B.	2006	Long-term results of HA coated threaded versus HA coated hemispheric press fit cups: 287 hips followed for 11 to 16 years	Arch Orthop Trauma Surg	very low quality. inadequate control for confounding possible selective analysis reporting. the results reports odds ratios even though they say they used cox proportional hazards models in the methods section
Rejholec,M.; el-Sisi,H.	2001	Conservative treatment of developmental dysplasia of the hip in Kuwait	Sb Lek	Not relevant to recommendation
Rejholec,M.; Stryhal,F.	1991	Behavior of the proximal femur during the treatment of congenital dysplasia of the hip: a clinical long-term study	J Pediatr Orthop	Not relevant, does not answer pico question
Remadevi,R.; Szallisi,A.	2008	Adlea (ALGRX-4975), an injectable capsaicin (TRPV1 receptor agonist) formulation for longlasting pain relief	IDrugs	Review

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Rennesson-Rey,B.; Rat,A.C.; Chary-Valckenaere,I.; Bettembourg-Brault,I.; Juge,N.; Dintinger,H.; Pourel,J.; Loeuille,D.	2008	Does joint effusion influence the clinical response to a single Hylan GF-20 injection for hip osteoarthritis?	Joint Bone Spine	
Repantis,T.; Bouras,T.; Korovessis,P.	2014	Comparison of minimally invasive approach versus conventional anterolateral approach for total hip arthroplasty: a randomized controlled trial	European Journal of Orthopaedic Surgery and Traumatology	Repeat article
Restrepo,C.; Mortazavi,S.M.J.; Brothers,J.; Parvizi,J.; Rothman,R.H.	2011	Hip dislocation: Are hip precautions necessary in anterior approaches?	Clin.Orthop.	Not relevant, does not answer pico question
Reurink,G.; Jansen,S.P.; Bisselink,J.M.; Vincken,P.W.; Weir,A.; Moen,M.H.	2012	Reliability and validity of diagnosing acetabular labral lesions with magnetic resonance arthrography	J Bone Joint Surg Am	Not relevant, does not answer pico question
Riddle,D.L.; Singh,J.A.; Harmsen,W.S.; Schleck,C.D.; Lewallen,D.G.	2013	Clinically important body weight gain following total hip arthroplasty: A cohort study with 5-year follow-up	Osteoarthritis Cartilage	unclear if 90% of the patient population had oa hip
Riediger,W.; Doering,S.; Krismer,M.	2010	Depression and somatisation influence the outcome of total hip replacement	Int Orthop	unclear if 90% of the patient population had oa hip
Rini,C.; Porter,L.S.; Somers,T.J.; McKee,D.C.; DeVellis,R.F.; Smith,M.; Winkel,G.; Ahern,D.K.; Goldman,R.; Stiller,J.L.; Mariani,C.; Patterson,C.; Jordan,J.M.; Caldwell,D.S.; Keefe,F.J.	2015	Automated Internet-based pain coping skills training to manage osteoarthritis pain: a randomized controlled trial		90% of pop isn't Hip OA
Rissanen,P.; Aro,S.; Paavolainen,P.	1996	Hospital- and patient-related characteristics determining length of hospital stay for hip and knee replacements	Int J Technol Assess Health Care	statistical signficance is not adequately reported for age PICO question
Ritter,M.A.; Albohm,M.J.; Keating,E.M.; Faris,P.M.; Meding,J.B.	1995	Comparative outcomes of total joint arthroplasty	J Arthroplasty	does not answer pico question. doesn't assess the affect of pre-op

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				mental illness on post-op outcomes
Robbins,C.E.; Bono,J.V.; Ward,D.M.; Barry,M.T.; Doren,J.; McNinch,A.	2010	Effect of preoperative exercise on postoperative mobility in obese total joint replacement patients		less than 10 patients per group
Robbins,C.E.; Casey,D.; Bono,J.V.; Murphy,S.B.; Talmo,C.T.; Ward,D.M.	2014	A multidisciplinary total hip arthroplasty protocol with accelerated postoperative rehabilitation: does the patient benefit?	Am J Orthop (Belle Mead NJ)	retrospective case series
Robertson,D.D.; Sutherland,C.J.; Chan,B.W.; Hodge,J.C.; Scott,W.W.; Fishman,E.K.	1995	Depiction of pelvic fractures using 3D volumetric holography: comparison of plain X-ray and CT	J Comput Assist Tomogr.	Not relevant, does not answer pico question
Robertson,W.J.; Kadrmas,W.R.; Kelly,B.T.	2007	Arthroscopic management of labral tears in the hip: a systematic review of the literature	Clin Orthop Relat Res	Systematic Review
Robinson,M.; Bornstein,L.; Mennear,B.; Bostrom,M.; Nestor,B.; Padgett,D.; Westrich,G.	2012	Effect of restoration of combined offset on stability of large head THA	Hip Int	90% of pop isn't Hip OA
Robinson,P.; Keenan,A.M.; Conaghan,P.G.	2007	Clinical effectiveness and dose response of image-guided intra-articular corticosteroid injection for hip osteoarthritis	Rheumatology (Oxford)	
Roddy,E.; Zhang,W.; Doherty,M.; Arden,N.K.; Barlow,J.; Birrell,F.; Carr,A.; Chakravarty,K.; Dickson,J.; Hay,E.; Hosie,G.; Hurley,M.; Jordan,K.M.; McCarthy,C.; McMurdo,M.; Mockett,S.; O'Reilly,S.; Peat,G.; Pendleton,A.; Richards,S.	2005	Evidence-based recommendations for the role of exercise in the management of osteoarthritis of the hip or knee--the MOVE consensus	Rheumatology (Oxford)	Systematic Review
Roder,C.; Bach,B.; Berry,D.J.; Eggli,S.; Langenhahn,R.; Busato,A.	2010	Obesity, age, sex, diagnosis, and fixation mode differently affect early cup failure in total hip arthroplasty: a matched case-control study of 4420 patients	J Bone Joint Surg Am	less than 90% OA hip patients
Roder,C.; Eggli,S.; Munger,P.; Melloh,M.; Busato,A.	2008	Patient characteristics differently affect early cup and stem loosening in THA: a case-control study on 7,535 patients	Int Orthop	less than 90% OA hip

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Rodrigues,A.M.; Caetano-Lopes,J.; Vale,A.C.; Aleixo,I.; Pena,A.S.; Faustino,A.; Sepriano,A.; Polido-Pereira,J.; Vieira-Sousa,E.; Lucas,R.; Romeu,J.C.; Monteiro,J.; Vaz,M.F.; Fonseca,J.E.; Canhao,H.	2012	Smoking is a predictor of worse trabecular mechanical performance in hip fragility fracture patients	J Bone Miner.Metab	no patient oriented outcomes
Rogind,H.; Bliddal,H.; Klokker,D.; Jensen,F.	1997	: a prospective, randomised, double-blind, controlled multicentre study	Clin Drug Investig.	90% of pop isn't Hip OA
Rogind,H.; Bliddal,H.; Klokker,D.; Jensen,F.	1997	Comparison of etodolac and piroxicam in patients with osteoarthritis of the hip or knee: A prospective, randomised, double-blind, controlled multicentre study	Clinical Drug Investigation	90% of pop isn't Hip OA
Rogmark,C.; Johnell,O.	2006	Primary arthroplasty is better than internal fixation of displaced femoral neck fractures: A meta-analysis of 14 randomized studies with 2,289 patients	Acta orthopaedica	Systematic Review
Rolfson,O.; Karrholm,J.; Dahlberg,L.E.; Garellick,G.	2011	Patient-reported outcomes in the Swedish Hip Arthroplasty Register: results of a nationwide prospective observational study	J Bone Joint Surg Br	data from multivariate model insufficiently presented
Rolfson,O.; Salomonsson,R.; Dahlberg,L.E.; Garellick,G.	2011	Internet-based follow-up questionnaire for measuring patient-reported outcome after total hip replacement surgery-reliability and response rate	Value in Health	not relevant
Romagnoli,S.; Zacchetti,S.; Perazzo,P.; Verde,F.; Banfi,G.; Vigano,M.	2013	Simultaneous bilateral total hip arthroplasties do not lead to higher complication or allogeneic transfusion rates compared to unilateral procedures	Int.Orthop.	Unclear of population
Romeo,A.; Parazza,S.; Boschi,M.; Nava,T.; Vanti,C.	2013	Manual therapy and therapeutic exercise in the treatment of osteoarthritis of the hip: a systematic review		Systematic Review
Rommens,P.M.; Ingelfinger,P.; Nowak,T.E.; Kuhn,S.; Hessmann,M.H.	2011	Traumatic damage to the cartilage influences outcome of anatomically reduced acetabular fractures: a medium-term retrospective analysis		Not symptomatic hip OA pop

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Rong,Z.; Xu,Z.; Sun,Y.; Yao,Y.; Song,K.; Chen,D.; Shi,D.; Dai,J.; Zheng,M.; Jiang,Q.	2015	Deep venous thrombosis in the nonoperated leg after primary major lower extremity arthroplasty: A retrospective study based on diagnosis using venography	Blood Coagul.Fibrinolysis	less than 90% OA hip patients
Roos,E.M.; Juhl,C.B.	2012	Osteoarthritis 2012 year in review: rehabilitation and outcomes	Osteoarthritis Cartilage	Review was outcome paper
Roposch,A.; Ridout,D.; Protopapa,E.; Nicolaou,N.; Gelfer,Y.	2013	Osteonecrosis complicating developmental dysplasia of the hip compromises subsequent acetabular remodeling	Clin Orthop Relat Res	Not relevant to recommendation
Rosenlund,S.; Broeng,L.; Jensen,C.; Holsgaard-Larsen,A.; Overgaard,S.	2014	The effect of posterior and lateral approach on patient-reported outcome measures and physical function in patients with osteoarthritis, undergoing total hip replacement: a randomised controlled trial protocol	BMC Musculoskelet.Disord.	Results section/not completed study
Ross,J.R.; Schoenecker,P.L.; Clohisy,J.C.	2013	Surgical dislocation of the hip: evolving indications	HSS J	Systematic Review
Roth,A.; Venbrocks,R.A.	2007	Total hip replacement through a minimally invasive, anterolateral approach with the patient supine	Oper.Orthop Traumatol.	Narrative review
Roudesli,M.; Steenstrup,B.; Beaufils,J.; Debeaumont,D.; Duparc,F.	2013	Evaluation of a protocol of ambulatory physiotherapy for hip osteoarthritis and femoro-acetabular impingement in sportsmen	Journal de Traumatologie du Sport	Not in English
Rozendaal,R.M.; Koes,B.W.; Weinans,H.; Uitterlinden,E.J.; van Osch,G.J.; Ginai,A.Z.; Verhaar,J.A.; Bierma-Zeinstra,S.M.	2005	The effect of glucosamine sulphate on osteoarthritis: design of a long-term randomised clinical trial [ISRCTN54513166]	BMC Musculoskelet.Disord.	Hip and Knee combined
Rozendaal,R.M.; Uitterlinden,E.J.; van Osch,G.J.; Garling,E.H.; Willemsen,S.P.; Ginai,A.Z.; Verhaar,J.A.; Weinans,H.; Koes,B.W.; Bierma-Zeinstra,S.M.	2009	Effect of glucosamine sulphate on joint space narrowing, pain and function in patients with hip osteoarthritis; subgroup analyses of a randomized controlled trial	Osteoarthritis Cartilage	Subgroup analysis of RCT
Rozkydal,Z.; Kovanda,M.	2003	Chiari pelvic osteotomy in the management of developmental hip dysplasia: a long term follow-up	Bratisl Lek Listy	Retrospective case series

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Rubak,T.S.; Svendsen,S.W.; Soballe,K.; Frost,P.	2013	Risk and rate advancement periods of total hip replacement due to primary osteoarthritis in relation to cumulative physical workload	Scand.J Work Environ Health	not relevant. outcome is need for THA
Ruiz Iban,M.A.; Macule,F.; Torner,P.; Gil,Garay E.; Oteo-Alvaro,A.; Lopez Millan,J.M.; Diaz,Heredia J.; Loza,E.	2015	SECOT-GEDOS consensus on pre-surgical pain management in knee and hip arthrosis	Rev Esp.Cir.Ortop.Traumatol.	Systematic Review
Rundshagen,I.; Standl,T.; Kochs,E.; Muller,M.; Esch,J.S.A.	1997	Continuous spinal analgesia: Comparison between patient-controlled and bolus administration of plain bupivacaine for postoperative pain relief	Reg.Anesth.	Not relevant, does not answer pico question
Rupp,R.; Duggan,B.	2012	Peripheral versus central compartment starting point in hip arthroscopy for femoroacetabular impingement		Not relevan, comparison
Russo,M.W.; Macdonell,J.R.; Paulus,M.C.; Keller,J.M.; Zawadsky,M.W.	2015	Increased Complications in Obese Patients Undergoing Direct Anterior Total Hip Arthroplasty	J Arthroplasty	Unclear if 90% of patients hat hip OA
Rutjes,A.W.; Nuesch,E.; Reichenbach,S.; Juni,P.	2009	S-Adenosylmethionine for osteoarthritis of the knee or hip	Cochrane Database Syst Rev	Systematic Review
Rutjes,A.W.S.; Nuesch,E.; Reichenbach,S.; Juni,P.	2008	S-Adenosylmethionine for osteoarthritis of the knee or hip	Cochrane Database of Systematic Reviews	Systematic Review
Saadat,E.; Martin,S.D.; Thornhill,T.S.; Brownlee,S.A.; Losina,E.; Katz,J.N.	2013	Factors Associated With the Failure of Surgical Treatment for Femoroacetabular Impingement: Review of the Literature	Am J Sports Med	Systematic Review
Saag,K.; van der Heijde,D.; Fisher,C.; Samara,A.; DeTora,L.; Bolognese,J.; Sperling,R.; Daniels,B.	2000	Rofecoxib, a new cyclooxygenase 2 inhibitor, shows sustained efficacy, comparable with other nonsteroidal anti-inflammatory drugs: a 6-week and a 1-year trial in patients with osteoarthritis. Osteoarthritis Studies Group	Arch Fam Med	Hip and Knee combined
Saag,K.; van der Heijde,D.; Fisher,C.; Samara,A.; DeTora,L.; Bolognese,J.; Sperling,R.; Daniels,B.	2000	Rofecoxib, a new cyclooxygenase 2 inhibitor, shows sustained efficacy, comparable with other nonsteroidal anti-inflammatory drugs: A 6-week and a 1-year trial in patients with osteoarthritis	Arch.Fam.Med.	Hip and Knee combined

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Saddik,D.; Tran,P.; Troupis,J.; Tirman,P.; O'Donnell,J.; Howells,R.; Farish,S.; Tartaglia,C.	2012	Are extra-labral MR findings useful in the diagnosis of a labral tear?	J Med Imaging Radiat.Oncol.	Not relevant, does not answer pico question
Sadiq,S.; Hucker,J.; McCarthy,I.D.; Hughes,S.P.F.	2001	Five to seven years survival analysis of a modular titanium alloy stem primary total hip replacement	HIP International	very low quality
Sakellariou,V.I.; Christodoulou,M.; Sasalos,G.; Babis,G.C.	2014	Reconstruction of the Acetabulum in Developmental Dysplasia of the Hip in total hip replacement	Arch Bone Jt.Surg	review
Salaffi,F.; Carotti,M.; Stancati,A.; Grassi,W.	2005	Health-related quality of life in older adults with symptomatic hip and knee osteoarthritis: a comparison with matched healthy controls	Aging Clin Exp.Res	unclear if patients had hip surgery
Saleh,J.M.; O'Sullivan,M.E.; O'Brien,T.M.	1995	Pelvic remodeling after Salter osteotomy	J Pediatr Orthop	Not relevant to recommendation
Salemyr,M.; Muren,O.; Ahl,T.; Boden,H.; Chammout,G.; Stark,A.; Skoldenberg,O.	2015	Vitamin-E diffused highly cross-linked polyethylene liner compared to standard liners in total hip arthroplasty. A randomized, controlled trial	Int Orthop	Not relevant, does not answer pico question
Sampalis,J.S.; Brownell,L.A.	2012	A randomized, double blind, placebo and active comparator controlled pilot study of UP446, a novel dual pathway inhibitor anti-inflammatory agent of botanical origin	Nutr.J	
Sampath,K.K.; Mani,R.; Miyamori,T.; Tumilty,S.	2015	The effects of manual therapy or exercise therapy or both in people with hip osteoarthritis: A systematic review and meta-analysis	Clin Rehabil	
Sampson,E.L.; Raven,P.R.; Ndhlovu,P.N.; Vallance,A.; Garlick,N.; Watts,J.; Blanchard,M.R.; Bruce,A.; Blizard,R.; Ritchie,C.W.	2007	A randomized, double-blind, placebo-controlled trial of donepezil hydrochloride (Aricept) for reducing the incidence of postoperative delirium after elective total hip replacement	Int J Geriatr.Psychiatry	Not relevant, does not answer pico question
Sampson,J.D.; Safran,M.R.	2015	Biomechanical Implications of Corrective Surgery for FAI: An Evidence-based Review	Sports Med Arthrosc.	
Sands,G.H.; Brown,P.B.; Essex,M.N.	2013	The Efficacy of Continuous Versus Intermittent Celecoxib Treatment in Osteoarthritis Patients with Body Mass Index >/=30 and <30 kg/m(2.)	Open Rheumatol.J	Hip and Knee combined

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Sands,G.H.; Brown,P.B.; Essex,M.N.	2013	The efficacy of continuous versus intermittent celecoxib treatment in osteoarthritis patients with body mass index (greater-than or equal to)30 and <30 kg/m(2)	Open Rheumatology Journal	Hip and Knee combined
Sankar,W.N.; Spiegel,D.A.; Gregg,J.R.; Sennett,B.J.	2006	Long-term follow-up after one-stage reconstruction of dislocated hips in patients with cerebral palsy	Journal of Pediatric Orthopaedics	retrospective case series
Sanmartin,C.; McGrail,K.; Dunbar,M.; Bohm,E.	2010	Using population data to measure outcomes of care: the case of hip and knee replacements	Health Rep	hip and knee oa results combined, and less than 90% were hip oa
Sansone,M.; Ahlden,M.; Jonasson,P.; Thomee,C.; Sward,L.; Collin,D.; Baranto,A.; Karlsson,J.; Thomee,R.	2016	Outcome of hip arthroscopy in patients with mild to moderate osteoarthritis-A prospective study	J Hip Preserv.Surg	Retrospective case series
Santa,Mina D.; Clarke,H.; Ritvo,P.; Leung,Y.W.; Matthew,A.G.; Katz,J.; Trachtenberg,J.; Alibhai,S.M.H.	2014	Effect of total-body prehabilitation on postoperative outcomes: A systematic review and meta-analysis		Systematic Review
Santaguida,P.L.; Hawker,G.A.; Hudak,P.L.; Glazier,R.; Mahomed,N.N.; Kreder,H.J.; Coyte,P.C.; Wright,J.G.	2008	Patient characteristics affecting the prognosis of total hip and knee joint arthroplasty: a systematic review	Can J Surg	systematic review
Santori,N.; Villar,R.N.	1999	Arthroscopic findings in the initial stages of hip osteoarthritis		Retrospective case series
Saragaglia,D.; Belvisi,B.; Rubens-Duval,B.; Pailhe,R.; Rouchy,R.C.; Mader,R.	2015	Clinical and radiological outcomes with the Durom(trademark) acetabular cup for large-diameter total hip arthroplasty: 177implants after a mean of 80months	Orthopaedics and Traumatology	90% of pop isn't Hip OA
Sarkar,M.R.; Billharz,E.; Wachter,N.; Kinzl,L.; Bischoff,M.	2001	Long-term outcome of secondary joint replacement after acetabular fracture	European Journal of Trauma	in adequate presentation of data for effect of age on clinical outcome. statisticla significance not presented

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Sarmiento,A.; Ebramzadeh,E.; Gogan,W.J.; McKellop,H.A.	1990	Total hip arthroplasty with cement. A long-term radiographic analysis in patients who are older than fifty and younger than fifty years	J Bone Joint Surg Am	very low quality due to use of bivariate analyses, inadequate reporting of the patient orient revision outcome, and exclusion of infected patients, which could limit generalizablity.
Sasaki,K.; Senda,M.; Ishikura,T.; Ota,H.; Mori,T.; Tsukiyama,H.; Hamada,M.; Shiota,N.	2005	The relationship between ambulation ability before surgery and the D-dimer value after total hip arthroplasty: the evaluation of ambulation ability by the timed "Up & Go" test	Acta Med Okayama	very low quality. the main outcome was a surrogate and not adjustment for confounding. also and the timed functional test showed a curvilinear relationship that was modeled with a simple linear regression.
Sasaki,K.; Senda,M.; Nishida,K.; Ota,H.	2010	Preoperative time required for the timed "up and go" test in women with hip osteoarthritis could predict a deep venous thrombosis complication after total hip arthroplasty	Acta Med Okayama	results for relevant variables not presented
Sashika,H.; Matsuba,Y.; Watanabe,Y.	1996	Home program of physical therapy: effect on disabilities of patients with total hip arthroplasty	Arch Phys Med Rehabil	less than 10 patients in groups
Savilahti,S.; Myllyneva,I.; Pajamaki,K.J.; Lindholm,T.S.	1997	Survival of Lubinus straight (IP) and curved (SP) total hip prostheses in 543 patients after 4-13 years	Arch Orthop Trauma Surg	less than 90% OA hip patients

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Sayeed,S.A.; Trousdale,R.T.; Barnes,S.A.; Kaufman,K.R.; Pagnano,M.W.	2009	Joint arthroplasty within 10 years after primary charnley total hip arthroplasty	Am J Orthop (Belle Mead NJ)	inadequate presentation of data presentation. stratified survival curves presented, but no reporting of statistical signficance of difference between age groups
Scarpellini,M.; Lurati,A.; Vignati,G.; Marrazza,M.G.; Telese,F.; Re,K.; Bellistri,A.	2008	Biomarkers, type II collagen, glucosamine and chondroitin sulfate in osteoarthritis follow-up: the "Magenta osteoarthritis study"	J Orthop Traumatol.	Hip and Knee combined
Scaturro,D.; Sanfilippo,A.; D'arienzo,A.; D'Arienzo,M.; Letizia,Mauro G.	2012	The effectiveness of eco-guided infiltrations with high molecular weight associated with administration of oral chondroprotective supplements in osteoarthritis of the hip	Journal of Orthopaedics and Traumatology	
Schafer,T.; Krummenauer,F.; Mettelsiefen,J.; Kirschner,S.; Gunther,K.P.	2010	Social, educational, and occupational predictors of total hip replacement outcome	Osteoarthritis Cartilage	unclear if 90% of the patient population had oa hip
Schairer,W.W.; Sing,D.C.; Vail,T.P.; Bozic,K.J.	2014	Causes and frequency of unplanned hospital readmission after total hip arthroplasty	Clin Orthop Relat Res	Not relevant, does not answer pico question
Schauss,A.G.; Stenehjem,J.; Park,J.; Endres,J.R.; Clewell,A.	2012	Effect of the novel low molecular weight hydrolyzed chicken sternal cartilage extract, BioCell Collagen, on improving osteoarthritis-related symptoms: a randomized, double-blind, placebo-controlled trial	J Agric.Food Chem	Hip and Knee combined
Scheerlinck,T.; Duquet,W.; Casteleyn,P.-P.	2004	Socioeconomic aspects of total hip arthroplasty: A one-year survey in a Belgian university hospital	Acta Orthop.Belg.	less than 90% OA hip patients
Schein,J.R.; Kosinski,M.R.; Janagap-Benson,C.; Gajria,K.; Lin,P.; Freedman,J.D.	2008	Functionality and health-status benefits associated with reduction of osteoarthritis pain	Curr Med Res Opin	Hip and Knee combined

Authors	Year	Article Title	Periodical	Reason for Exclusion
Schencking,M.; Otto,A.; Deutsch,T.; Sandholzer,H.	2009	A comparison of Kneipp hydrotherapy with conventional physiotherapy in the treatment of osteoarthritis of the hip or knee: protocol of a prospective randomised controlled clinical trial	BMC Musculoskelet.Disord.	Unclear if 90% of pop is Hip OA
Schencking,M.; Wilm,S.; Redaelli,M.	2013	A comparison of Kneipp hydrotherapy with conventional physiotherapy in the treatment of osteoarthritis: a pilot trial	J Integr Med	under 10 hip OA participants
Schepens,S.L.; Braun,M.E.; Murphy,S.L.	2012	Effect of tailored activity pacing on self-perceived joint stiffness in adults with knee or hip osteoarthritis	Am J Occup Ther	Narrative review
Scher,M.A.; Jakim,I.	1991	Combined intertrochanteric and Chiari pelvic osteotomies for hip dysplasia	J Bone Joint Surg Br	Not relevant, does not answer pico question
Schmid,M.R.; Notzli,H.P.; Zanetti,M.; Wyss,T.F.; Hodler,J.	2003	Cartilage lesions in the hip: diagnostic effectiveness of MR arthrography		Not relevant, does not answer pico question
Schneider,K.; Audige,L.; Kuehnel,S.P.; Helmy,N.	2012	The direct anterior approach in hemiarthroplasty for displaced femoral neck fractures	Int Orthop	Patient population not OA
Schnitzer,T.J.; Beier,J.; Geusens,P.; Hasler,P.; Patel,S.K.; Senftleber,I.; Gitton,X.; Moore,A.; Sloan,V.S.; Poor,G.	2004	Efficacy and safety of four doses of lumiracoxib versus diclofenac in patients with knee or hip primary osteoarthritis: a phase II, four-week, multicenter, randomized, double-blind, placebo-controlled trial	Arthritis Rheum.	Hip and Knee combined
Schnitzer,T.J.; Ekman,E.F.; Spierings,E.L.; Greenberg,H.S.; Smith,M.D.; Brown,M.T.; West,C.R.; Verburg,K.M.	2015	Efficacy and safety of tanezumab monotherapy or combined with non-steroidal anti-inflammatory drugs in the treatment of knee or hip osteoarthritis pain	Ann Rheum.Dis	Review
Schnitzer,T.J.; Ekman,E.F.; Spierings,E.L.H.; Greenberg,H.S.; Smith,M.D.; Brown,M.T.; West,C.R.; Verburg,K.M.	2014	Efficacy and safety of tanezumab monotherapy or combined with non-steroidal anti-inflammatory drugs in the treatment of knee or hip osteoarthritis pain	Ann.Rheum.Dis.	Hip and Knee combined
Schnitzer,T.J.; Fricke,Jr; Gitton,X.; Jayawardene,S.; Sloan,V.S.	2005	Lumiracoxib in the treatment of osteoarthritis, rheumatoid arthritis and acute postoperative dental pain: Results of three dose-response studies	Curr.Med.Res.Opin.	Hip and Knee combined

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Schrama,J.C.; Espehaug,B.; Hallan,G.; Engesaeter,L.B.; Furnes,O.; Havelin,L.I.; Fevang,B.T.	2010	Risk of revision for infection in primary total hip and knee arthroplasty in patients with rheumatoid arthritis compared with osteoarthritis: a prospective, population-based study on 108,786 hip and knee joint arthroplasties from the Norwegian Arthroplasty Register	Arthritis Care Res (Hoboken)	article adjusted for age, but did not report results for it
Schrama,J.C.; Lutro,O.; Langvatn,H.; Hallan,G.; Espehaug,B.; Sjursen,H.; Engesaeter,L.B.; Fevang,B.T.	2012	Bacterial findings in infected hip joint replacements in patients with rheumatoid arthritis and osteoarthritis: a study of 318 revisions for infection reported to the norwegian arthroplasty register	ISRN Orthop	Not relevant to recommendation
Schramm,M.; Hohmann,D.; Radespiel-Troger,M.; Pitto,R.P.	2003	Treatment of the dysplastic acetabulum with Wagner spherical osteotomy. A study of patients followed for a minimum of twenty years	J Bone Joint Surg Am	Retrospective case series
Schramm,M.; Hohmann,D.; Radespiel-Troger,M.; Pitto,R.P.	2004	The Wagner Spherical Osteotomy of the Acetabulum	Journal of Bone and Joint Surgery - Series A	Narrative review
Schramm,M.; Pitto,R.P.; Bar,K.; Meyer,M.; Rohm,E.; Hohmann,D.	1999	Prophylaxis of secondary osteoarthrosis with spherical osteotomy in residual acetabular dysplasia. Analysis of predictive factors of success	Arch Orthop Trauma Surg	Not relevant, does not answer pico question
Schreurs,B.W.; Busch,V.J.J.F.; Welten,M.L.; Verdonschot,N.; Slooff,T.J.J.H.; Gardeniers,J.W.M.	2004	Acetabular reconstruction with impaction bone-grafting and a cemented cup in patients younger than fifty years old	Journal of Bone and Joint Surgery - Series A	does not evaluate age as a risk factor
Schwarzkopf,R.; Katz,G.; Walsh,M.; Lafferty,P.M.; Slover,J.D.	2011	Medical clearance risk rating as a predictor of perioperative complications after total hip arthroplasty	J Arthroplasty	design and patient population not adequate to answer pico question, since only those with perioperative complications were included
Schweppe,M.L.; Seyler,T.M.; Plate,J.F.; Swenson,R.D.; Lang,J.E.	2013	Does surgical approach in total hip arthroplasty affect rehabilitation, discharge disposition, and readmission rate?	Surgical technology international	90% of pop isn't Hip OA
Scott,D.	2006	Osteoarthritis of the hip	BMJ Clin Evid	Systematic Review

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Scott,D.L.; Palmer,R.H.	2000	Safety and efficacy of nabumetone in osteoarthritis: emphasis on gastrointestinal safety	Aliment.Pharmacol Ther	Hip and Knee combined
Sebecic,B.; Staresinic,M.; Culjak,V.; Japjec,M.	2012	Minimally invasive hip arthroplasty: advantages and disadvantages	Med Glas.(Zenica.)	retrospective case series
Sedel,L.; Kerboull,L.; Christel,P.; Meunier,A.; Witvoet,J.	1990	Alumina-on-alumina hip replacement. Results and survivorship in young patients	J Bone Joint Surg Br	composite outcome, that combines radiographic and clinical outcomes
Seed,S.M.; Dunican,K.C.; Lynch,A.M.	2009	Osteoarthritis: A review of treatment options		Narrative review
Seideman,P.; Samuelson,P.; Neander,G.	1993	Naproxen and paracetamol compared with naproxen only in coxarthrosis. Increased effect of the combination in 18 patients	Acta Orthop Scand.	Hip and Knee combined
Semanik,P.A.; Chang,R.W.; Dunlop,D.D.	2012	Aerobic activity in prevention and symptom control of osteoarthritis	PM R	Narrative review
Sen,C.; Asik,M.; Tozun,I.R.; Sener,N.; Cinar,M.	2003	Kotz and Ganz osteotomies in the treatment of adult acetabular dysplasia	Int Orthop	Not relevant to recommendation
Sen,C.; Sener,N.; Tozun,I.R.; Boynuk,B.	2003	Polygonal triple (Kotz) osteotomy in the treatment of acetabular dysplasia: 17 patients (19 hips) with 4-9 years of follow-up	Acta Orthop Scand.	Retrospective case series
Seral,F.; Villar,J.M.; Esteller,A.; Vivar,F.G.; Abad,I.; Martinez,Grande M.; Jorda,E.; Espinar,E.	1992	Five-year follow-up evaluation of the noncemented press-fit titanium hip-joint endoprosthesis	Clin Orthop Relat Res	age results inadequately presented
Seror,R.; Tubach,F.; Baron,G.; Falissard,B.; Logeart,I.; Dougados,M.; Ravaud,P.	2008	Individualising the Western Ontario and McMaster Universities osteoarthritis index (WOMAC) function subscale: incorporating patient priorities for improvement to measure functional impairment in hip or knee osteoarthritis	Ann Rheum.Dis	Hip and Knee combined
Sexton,S.A.; Walter,W.L.; Jackson,M.P.; de,Steiger R.; Stanford,T.	2009	Ceramic-on-ceramic bearing surface and risk of revision due to dislocation after primary total hip replacement	J Bone Joint Surg Br	results stratified by age, but age not evaluated independently as as risk factor

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Shah,N.N.; Edge,A.J.; Clark,D.W.	2009	Hydroxyapatite-ceramic-coated femoral components in young patients followed-up for 16 to 19 years: An update of a previous report	Journal of Bone and Joint Surgery - Series B	does not evaluate age as a risk factor
Shan,L.; Shan,B.; Graham,D.; Saxena,A.	2014	Total hip replacement: a systematic review and meta-analysis on mid-term quality of life	Osteoarthritis Cartilage	
Shao,Y.; Zhang,C.; Charron,K.D.; MacDonald,S.J.; McCalden,R.W.; Bourne,R.B.	2013	The fate of the remaining knee(s) or hip(s) in osteoarthritic patients undergoing a primary TKA or THA	J Arthroplasty	outcome is need for contralateral hip arthroplasty, which is not a relevant outcome to determine efficacy of the primary hip replacement
Shaw,J.A.; Bruno,A.; Paul,E.M.	1992	The influence of age, sex, and initial fit on bony ingrowth stabilization with the AML femoral component in primary THA		less than 90% OA hip patients
Shetty,V.D.; Vowler,S.L.; Villar,R.N.	2007	Factors influencing length of stay after primary total hip replacement: The role of anaesthesia and the anaesthetist	HIP International	Not relevant, does not answer pico question
Shih,T.T.; Su,C.T.; Chiu,L.C.; Erickson,F.; Hang,Y.S.; Huang,K.M.	1993	Evaluation of hip disorders by radiography, radionuclide scanning and magnetic resonance imaging	J Formos.Med Assoc	Not relevant, does not answer pico question
Shindo,H.; Igarashi,H.; Taneda,H.; Azuma,H.	1996	Rotational acetabular osteotomy for severe dysplasia of the hip with a false acetabulum	J Bone Joint Surg Br	Not relevant, does not answer pico question
Shrier,I.; Zukor,D.; Boivin,J.-F.; Collet,J.-P.; Tanzer,M.; Feldman,D.; Naimi,A.; Rossignol,M.; Prince,F.	2008	The feasibility of a randomized trial using a progressive exercise program in patients with severe hip osteoarthritis	Journal of Musculoskeletal Pain	less than 10 patients in groups
Siavashi,B.; Mohseni,N.; Zehtab,M.J.; Ramim,T.	2014	Clinical outcomes of total hip arthroplasty in patients with ankylosed hip	Arch Bone Jt.Surg	Patient population not OA
Sibinski,M.; Synder,M.	2004	The value of selected factors in predicting hip joint development after overhead traction for developmental dyplasia	Ortop.Traumatol.Rehabil	not in English

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Siebenrock,K.A.; Kienle,K.-P.; Steppacher,S.D.; Tannast,M.; Mamisch,T.C.; von,Rechenberg B.	2014	Biochemical MRI Predicts Hip Osteoarthritis in an Experimental Ovine Femoroacetabular Impingement Model	Clin.Orthop.	Sheep study
Siebenrock,K.A.; Schoeniger,R.; Ganz,R.	2003	Anterior femoro-acetabular impingement due to acetabular retroversion. Treatment with periacetabular osteotomy	J Bone Joint Surg Am	Retrospective case series
Signorello,L.B.; Ye,W.; Fryzek,J.P.; Lipworth,L.; Fraumeni,Jr; Blot,W.J.; McLaughlin,J.K.; Nyren,O.	2001	Nationwide study of cancer risk among hip replacement patients in Sweden	J.Natl.Cancer Inst.	Not relevant to recommendation
Siguier,T.; Siguier,M.; Brumpt,B.	2004	Mini-incision anterior approach does not increase dislocation rate: a study of 1037 total hip replacements	Clin Orthop Relat Res	retrospective case series
Silber,J.H.; Rosenbaum,P.R.; Kelz,R.R.; Reinke,C.E.; Neuman,M.D.; Ross,R.N.; Even-Shoshan,O.; David,G.; Saynisch,P.A.; Kyle,F.A.; Bratzler,D.W.; Fleisher,L.A.	2012	Medical and financial risks associated with surgery in the elderly obese	Ann Surg	unclear if 90% of the patient population had oa hip
Silbert,B.; Evered,L.; Scott,D.A.; McMahon,S.; Choong,P.; Ames,D.; Maruff,P.; Jamrozik,K.	2015	Preexisting Cognitive Impairment Is Associated with Postoperative Cognitive Dysfunction after Hip Joint Replacement Surgery		for age: it was unclear if the analysis of the age variable included only OA patients who got THA; for mental health: it was unclear if the multivariate regression included the non-THA controls so we couldn't use it. there was a univariate analysis that was clearly only THA patients, but the lack of control for confounding in this

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				analysis would make the study very low quality
Simon,J.-P.; Maes,M.; Robbens,E.; Bellemans,J.	2010	Total hip arthroplasty in inflammatory arthritis in patients under 35 years. A 7 to 19 year follow-up	HIP International	does not evaluate age as a risk factor
Simonian,P.T.; Routt,M.L.,Jr.; Harrington,R.M.; Tencer,A.F.	1995	The acetabular T-type fracture. A biomechanical evaluation of internal fixation	Clin Orthop Relat Res	use of cadavers
Singh,J.; Ballal,M.S.; Mitchell,P.; Denn,P.G.	2010	Effects of tranexamic acid on blood loss during total hip arthroplasty	J Orthop Surg (Hong Kong)	not patient reported outcome
Singh,J.A.; Kundukulam,J.; Riddle,D.L.; Strand,V.; Tugwell,P.	2011	Early postoperative mortality following joint arthroplasty: a systematic review	J Rheumatol.	systematic review
Singh,J.A.; Kwoh,C.K.; Boudreau,R.M.; Lee,G.C.; Ibrahim,S.A.	2011	Hospital volume and surgical outcomes after elective hip/knee arthroplasty: a risk-adjusted analysis of a large regional database	Arthritis Rheum.	age results not presented
Singh,J.A.; Lewallen,D.	2009	Age, gender, obesity, and depression are associated with patient-related pain and function outcome after revision total hip arthroplasty	Clin Rheumatol.	less than 90% OA hip patients
Singh,J.A.; Lewallen,D.G.	2010	Predictors of activity limitation and dependence on walking aids after primary total hip arthroplasty	J Am Geriatr.Soc	less than 90% OA hip patients
Singh,J.A.; Noorbaloochi,S.; MacDonald,R.; Maxwell,L.J.	2015	Chondroitin for osteoarthritis	Cochrane Database Syst Rev	Systematic Review
Singh,J.A.; Schleck,C.; Harmsen,W.S.; Jacob,A.K.; Warner,D.O.; Lewallen,D.G.	2015	Current tobacco use is associated with higher rates of implant revision and deep infection after total hip or knee arthroplasty: A	BMC Medicine	hip and knee results combined

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		prospective cohort study		
Singh,J.A.; Schleck,C.; Harmsen,W.S.; Lewallen,D.G.	2016	Validation of the Mayo Hip Score: Construct validity, reliability and responsiveness to change Orthopedics and biomechanics	BMC Musculoskeletal Disorders	unclear if the age variable represents age at arthroplasty or age at outcome measurement after arthroplasty. since the intent was to measure the validity of the mayo hip score, the variable was likely age at follow up, which wouldn't be relevant to the pico question.
Skeie,S.; Lende,S.; Sjoberg,E.J.; Vollset,S.E.	1991	Survival of the Charnley hip in coxarthrosis. A 10-15-year follow-up of 629 cases	Acta Orthop Scand.	very low quality
Skendzel,J.G.; Philippon,M.J.; Briggs,K.K.; Goljan,P.	2014	The effect of joint space on midterm outcomes after arthroscopic hip surgery for femoroacetabular impingement	Am J Sports Med	Not relevent, outcome
Skou,S.T.; Simonsen,M.E.; Odgaard,A.; Roos,E.M.	2014	Predictors of long-term effect from education and exercise in patients with knee and hip pain	Dan.Med J	90% of pop isn't Hip OA
Slawson,D.	2014	Physical therapy no better than sham therapy for hip osteoarthritis	Am Fam Physician	Abstract only
Smelter,E.; Hochberg,M.C.	2013	New treatments for osteoarthritis	Curr.Opin.Rheumatol.	Review
Smith,A.J.; Dieppe,P.; Porter,M.; Blom,A.W.	2012	Risk of cancer in first seven years after metal-on-metal hip replacement compared with other bearings and general population: linkage study between the National Joint Registry of England and Wales and hospital episode statistics		Not relevant to recommendation
Smith,A.J.; Dieppe,P.; Vernon,K.; Porter,M.; Blom,A.W.	2012	Failure rates of stemmed metal-on-metal hip replacements: analysis of data from the National Joint Registry of England and Wales		results for age not adequately presented to answer pico question

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Smith,A.J.; Wylde,V.; Berstock,J.R.; Maclean,A.D.; Blom,A.W.	2012	Surgical approach and patient-reported outcomes after total hip replacement	Hip Int	Patient population
Smith,T.O.; Hilton,G.; Toms,A.P.; Donell,S.T.; Hing,C.B.	2011	The diagnostic accuracy of acetabular labral tears using magnetic resonance imaging and magnetic resonance arthrography: a meta-analysis	Eur Radiol	Systematic Review
Smith,T.O.; Penny,F.; Fleetcroft,R.	2016	Smoking and alcohol behaviours in people following hip and knee arthroplasty: Data from the Osteoarthritis Initiative	Orthop Traumatol.Surg Res	not relevant. looks at change in smoking and drinking behavior pre and post arthroplasty, instead of evaluating them as risk factors for poor outcomes
Smugar,S.S.; Schnitzer,T.J.; Weaver,A.L.; Rubin,B.R.; Polis,A.B.; Tershakovec,A.M.	2006	Rofecoxib 12.5 mg, rofecoxib 25 mg, and celecoxib 200 mg in the treatment of symptomatic osteoarthritis: results of two similarly designed studies	Curr Med Res Opin	Hip and Knee combined
Snijders,G.F.; den Broeder,A.A.; van Riel,P.L.; Straten,V.H.; de Man,F.H.; van den Hoogen,F.H.; van den Ende,C.H.	2011	Evidence-based tailored conservative treatment of knee and hip osteoarthritis: between knowing and doing	Scand.J Rheumatol.	90% of pop isn't Hip OA
So,K.; Goto,K.; Kuroda,Y.; Matsuda,S.	2015	Minimum 10-Year Wear Analysis of Highly Cross-Linked Polyethylene in Cementless Total Hip Arthroplasty	J.Arthroplasty	no patient oriented outcomes
Soderman,P.; Malchau,H.; Herberts,P.	2001	Outcome of total hip replacement: a comparison of different measurement methods	Clin Orthop Relat Res	tests the validity of outcome measures, not preopoerative risk assessment tools
Spaans,A.J.; van den Hout,J.A.; Bolder,S.B.	2012	High complication rate in the early experience of minimally invasive total hip arthroplasty by the direct anterior approach	Acta Orthop	retrospective case series

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Spence,G.; Hocking,R.; Wedge,J.H.; Roposch,A.	2009	Effect of innominate and femoral varus derotation osteotomy on acetabular development in developmental dysplasia of the hip	J Bone Joint Surg Am	outcome measure
Spencer,S.; Millis,M.B.; Kim,Y.J.	2006	Early results of treatment of hip impingement syndrome in slipped capital femoral epiphysis and pistol grip deformity of the femoral head-neck junction using the surgical dislocation technique	J Pediatr Orthop	<10 patient per group
Spencer-Gardner,L.S.; Camp,C.L.; Martin,J.R.; Sierra,R.J.; Trousdale,R.T.; Krych,A.J.	2016	Does Prior Surgery for Femoroacetabular Impingement Compromise Hip Arthroplasty Outcomes?	J.Arthroplasty	Retrospective case series
Speranza,A.; Iorio,R.; Ferretti,M.; D'Arrigo,C.; Ferretti,A.	2007	A lateral minimal-incision technique in total hip replacement: a prospective, randomizes, controlled trial	Hip Int	Not relevant to recommendation
Sperber,N.R.; Bosworth,H.B.; Coffman,C.J.; Lindquist,J.H.; Oddone,E.Z.; Weinberger,M.; Allen,K.D.	2013	Differences in osteoarthritis self-management support intervention outcomes according to race and health literacy	Health Educ Res	Unclear if 90% of pop is Hip OA
Spierings,E.L.; Fidelholtz,J.; Wolfram,G.; Smith,M.D.; Brown,M.T.; West,C.R.	2013	A phase III placebo- and oxycodone-controlled study of tanezumab in adults with osteoarthritis pain of the hip or knee		90% of pop isn't Hip OA
Spierings,E.L.H.; Fidelholtz,J.; Wolfram,G.; Smith,M.D.; Brown,M.T.; West,C.R.	2013	Efficacy and safety of tanezumab versus placebo and oxycodone in adults with hip or knee osteoarthritis pain (NCT00985621)	Reg.Anesth.Pain Med.	conference abstract
Splavski,B.; Lovric,I.; Muzevic,D.; Arnautovic,K.; Splavski,B.	2012	The relevance of surgery in the acetabular injury management outcome	Med Arch	Patient population not OA
Sporer,S.M.; Callaghan,J.J.; Olejniczak,J.P.; Goetz,D.D.; Johnston,R.C.	1998	Hybrid total hip arthroplasty in patients under the age of fifty: A five- to ten-year follow-up	J.Arthroplasty	very low quality due to using bivariate analysis, and unclear testing of statistical assumptoins
Springer,B.D.; Connelly,S.E.; Odum,S.M.; Fehring,T.K.; Griffin,W.L.; Mason,J.B.;	2009	Cementless Femoral Components in Young Patients. Review and Meta-Analysis of Total Hip Arthroplasty and Hip Resurfacing	J.Arthroplasty	meta analysis

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Masonis,J.L.				
Spruit,M.; Van Goethem,C.J.; Kooijman,M.A.; Pavlov,P.W.	1997	Diagnostic infiltration of the hip joint with bupivacain in adult acetabular dysplasia	Acta Orthop Belg.	Not relevant, does not answer pico question
Staheli,L.T.; Chew,D.E.	1992	Slotted acetabular augmentation in childhood and adolescence	J Pediatr Orthop	Not relevant to recommendation
Stambough,J.B.; Clohisy,J.C.; Baca,G.R.; Zaltz,I.; Trousdale,R.; Millis,M.; Sucato,D.; Kim,Y.J.; Sink,E.; Schoenecker,P.L.; Sierra,R.; Podeszwa,D.; Beaule,P.	2015	Does previous pelvic osteotomy compromise the results of periacetabular osteotomy surgery?	Clin Orthop Relat Res	Not relevant, does not answer pico question
Stark,A.; Wallensten,R.	2003	Periacetabular osteotomy using the ilioinguinal incision for treatment of hip dysplasia	Operative Orthopadie und Traumatologie	Narrative review
Stea,S.; Comfort,T.; Sedrakyan,A.; Havelin,L.; Marinelli,M.; Barber,T.; Paxton,E.; Banerjee,S.; Isaacs,A.J.; Graves,S.	2014	Multinational comprehensive evaluation of the fixation method used in hip replacement: interaction with age in context	J Bone Joint Surg Am	analysis stratified by age group, but independent effect of age not evaluated
Stebbings,S.; Beattie,E.; McNamara,D.; Hunt,S.	2015	A pilot randomized, placebo-controlled clinical trial to investigate the efficacy and safety of an extract of Artemisia annua administered over 12 weeks, for managing pain, stiffness, and functional limitation associated with osteoarthritis of the hip and knee	Clin Rheumatol.	Hip and Knee combined
Steinhilber,B.; Haupt,G.; Miller,R.; Boeer,J.; Grau,S.; Janssen,P.; Krauss,I.	2012	Feasibility and efficacy of an 8-week progressive home-based strengthening exercise program in patients with osteoarthritis of the hip and/or total hip joint replacement: a preliminary trial	Clin Rheumatol.	90% of pop isn't Hip OA
Stener-Victorin,E.; Kruse-Smidje,C.; Jung,K.	2004	Comparison between electro-acupuncture and hydrotherapy, both in combination with patient education and patient education alone, on the symptomatic treatment of osteoarthritis of the hip	Clin J Pain	Groups lower than 10 people, insufficient data

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Stengaard-Pedersen,K.; Ekesbo,R.; Karvonen,A.L.; Lyster,M.	2004	Celecoxib 200 mg q.d. is efficacious in the management of osteoarthritis of the knee or hip regardless of the time of dosing	Rheumatology (Oxford)	Hip and Knee combined
Steppacher,S.D.; Anwander,H.; Zurmuhle,C.A.; Tannast,M.; Siebenrock,K.A.	2015	Eighty percent of patients with surgical hip dislocation for femoroacetabular impingement have a good clinical result without osteoarthritis progression at 10 years	Clin Orthop Relat Res	for fai-retrospective case series in non-consecutive patients. for obesity-patients did not have OA
Steppacher,S.D.; Anwander,H.; Zurmuhle,C.A.; Tannast,M.; Siebenrock,K.A.	2014	Eighty Percent of Patients With Surgical Hip Dislocation for Femoroacetabular Impingement Have a Good Clinical Result Without Osteoarthritis Progression at 10 Years	Clin.Orthop.	Retrospective case series
Steppacher,S.D.; Huemmer,C.; Schwab,J.M.; Tannast,M.; Siebenrock,K.A.	2014	Surgical hip dislocation for treatment of femoroacetabular impingement: factors predicting 5-year survivorship	Clin Orthop Relat Res	Retrospective case series
Steppacher,S.D.; Tannast,M.; Ganz,R.; Siebenrock,K.A.	2008	Mean 20-year followup of Bernese periacetabular osteotomy	Clin Orthop Relat Res	Retrospective case series
Stevens,M.S.; Legay,D.A.; Glazebrook,M.A.; Amirault,D.	2010	The evidence for hip arthroscopy: grading the current indications		Systematic Review
Stickles,B.; Phillips,L.; Brox,W.T.; Owens,B.; Lanzer,W.L.	2001	Defining the relationship between obesity and total joint arthroplasty	Obes.Res	>50% loss to follow up
Stockli,C.; Theiler,R.; Sidelnikov,E.; Balsiger,M.; Ferrari,S.M.; Buchzig,B.; Uehlinger,K.; Riniker,C.; Bischoff-Ferrari,H.A.	2014	Validity of a simple Internet-based outcome-prediction tool in patients with total hip replacement: a pilot study	J Telemed.Telecare	not a risk assssment tool, but rather a validation study of an instrument made up of selected womac questions deemed most predictive of post op function.

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Stoffelen,D.; Urlus,M.; Molenaers,G.; Fabry,G.	1995	Ultrasound, radiographs, and clinical symptoms in developmental dislocation of the hip: a study of 170 patients	Journal of pediatric orthopaedics.Part B / European Paediatric Orthopaedic Society, Pediatric Orthopaedic Society of North America	Not relevant to recommendation
Stoicanescu,D.; Cevei,M.	2013	Evolution of pain after complex medical rehabilitation in hiposteoarthritis	Osteoporos.Int.	Abstract only
Stoller,D.W.; Genant,H.K.	1990	Magnetic resonance imaging of the knee and hip	Arthritis Rheum.	Review
Stringa,G.; Pitto,R.P.; Di Muria,G.V.; Marcucci,M.	1995	Total hip replacement with bone grafting using the removed femoral head in severe acetabular dysplasia	Int Orthop	Not relevant to recommendation
Strom,H.; Huss,K.; Larsson,S.	2006	Unrestricted weight bearing and intensive physiotherapy after uncemented total hip arthroplasty	Scandinavian journal of surgery	Not relevant to recommendation
Strzyzewski,W.; Pietrzak,K.; Ruszkowski,K.; Glowacki,M.	2008	Short-term results of total hip replacement in patients under thirty years of age	Ortopedia Traumatologia Rehabilitacja	does not evaluate age as a risk factor
Stubbs,B.; Hurley,M.; Smith,T.	2015	What are the factors that influence physical activity participation in adults with knee and hip osteoarthritis? A systematic review of physical activity correlates	Clin Rehabil	Systematic Review
Suda,A.J.; Knahr,K.	2009	Early results with the cementless Variall(trademark) hip system	Expert Review of Medical Devices	less than 90% OA hip patients
Suetta,C.; Aagaard,P.; Rosted,A.; Jakobsen,A.K.; Duus,B.; Kjaer,M.; Magnusson,S.P.	2004	Training-induced changes in muscle CSA, muscle strength, EMG, and rate of force development in elderly subjects after long-term unilateral disuse	J Appl Physiol (1985)	Not relevant to recommendation
Suetta,C.; Andersen,J.L.; Dalgas,U.; Berget,J.; Koskinen,S.; Aagaard,P.; Magnusson,S.P.; Kjaer,M.	2008	Resistance training induces qualitative changes in muscle morphology, muscle architecture, and muscle function in elderly postoperative patients	J Appl Physiol (1985)	less than 10 patients in groups
Sutherland,D.H.; Moore,M.	1991	Clinical and radiographic outcome of patients treated with double innominate osteotomy for congenital hip dysplasia	J Pediatr Orthop	Retrospective case series

Authors	Year	Article Title	Periodical	Reason for Exclusion
Sutter,R.; Zubler,V.; Hoffmann,A.; Mamisch-Saupe,N.; Dora,C.; Kalberer,F.; Zanetti,M.; Hodler,J.; Pfirrmann,C.W.	2014	Hip MRI: how useful is intraarticular contrast material for evaluating surgically proven lesions of the labrum and articular cartilage?	AJR Am J Roentgenol.	Not relevant, does not answer pico question
Svege,I.; Nordsletten,L.; Fernandes,L.; Risberg,M.A.	2013	Exercise therapy may postpone total hip replacement surgery in patients with hip osteoarthritis: A long-term follow-up of a randomised trial	Ann.Rheum.Dis.	Repeat article
Swanson,K.C.; Valle,A.G.; Salvati,E.A.; Sculco,T.P.; Bottner,F.	2006	Perioperative morbidity after single-stage bilateral total hip arthroplasty: a matched control study	Clin Orthop Relat Res	incomplete description of statistical methodology, and inconsistent measurement of outcomes is all patients resulted in quality being downgraded to very low
Swarup,I.; Christoph,E.; Mandl,L.A.; Goodman,S.M.; Figgie,M.P.	2014	Implant survival and patient-reported outcomes after total hip arthroplasty in young patients with JIA	Arthritis and Rheumatology	repeat
Swarup,I.; Lee,Y.Y.; Christoph,E.I.; Mandl,L.A.; Goodman,S.M.; Figgie,M.P.	2015	Implant survival and patient-reported outcomes after total hip arthroplasty in young patients with juvenile idiopathic arthritis	J Arthroplasty	Age was controlled for in the multivariate analysis, but multivariate results were not reported because the effect of age was not the primary objective of the study. Would need to take univariate data in table 2 of study. This would be very low quality because

Authors	Year	Article Title	Periodical	Reason for Exclusion
				there is no control for confounding
Sylvester,K.L.	1990	Investigation of the effect of hydrotherapy in the treatment of osteoarthritic hips	Clin.Rehabil.	less than 10 patients in groups
Symeonides,P.; Petsatodes,G.; Pournaras,J.; Kapetanos,G.; Christodoulou,A.; Papadopoulos,P.	1997	Replacement of deficient acetabulum using Burch-Schneider cages. 22 patients followed for 2-10 years	Acta Orthop Scand.Suppl	Not relevant, does not answer pico question
Synder,M.; Forlin,E.; Xin,S.; Bowen,J.R.	1992	Results of the Kalamchi modification of salter osteotomy in the treatment of developmental dysplasia of the hip	J Pediatr Orthop	Not relevant to recommendation
Szepesi,K.; Rigo,J.; Biro,B.; Fazekas,K.; Poti,L.	1996	Pemberton's pericapsular osteotomy for the treatment of acetabular dysplasia	J Pediatr Orthop B	Not relevant, does not answer pico question
Tai,S.M.	2014	The effect of obesity on the clinical, functional and radiological outcome of cementless total hip replacement: a case-matched study with a minimum 10-year follow-up	The Journal of arthroplasty	unclear if 90% of the patient population had oa hip
Takakuwa,M.; Matsuno,T.; Gotoh,E.; Ando,M.; Funakoshi,M.	2004	Long-term results of triple osteotomy of the pelvis	Journal of Orthopaedics and Traumatology	Retrospective case series
Takatori,Y.; Ninomiya,S.; Nakamura,S.; Morimoto,S.; Sasaki,T.	1996	Long-term follow-up results of rotational acetabular osteotomy in painful dysplastic hips: efficacy in delaying the onset of osteoarthritis	Am J Orthop (Belle Mead NJ)	Not relevant, does not answer pico question
Takenaga,R.K.; Callaghan,J.J.; Bedard,N.A.; Liu,S.S.; Klaassen,A.L.; Pedersen,D.R.	2012	Cementless total hip arthroplasty in patients fifty years of age or younger: a minimum ten-year follow-up	J Bone Joint Surg Am	does not consider age as a risk factor
Tallroth,K.; Lepisto,J.	2006	Computed tomography measurement of acetabular dimensions: normal values for correction of dysplasia	Acta Orthop	Not relevant, does not answer pico question

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Tanaka,S.; Matsumoto,S.; Fujii,K.; Tamari,K.; Mitani,S.; Tsubahara,A.	2015	Factors related to low back pain in patients with hip osteoarthritis	J Back Musculoskelet.Rehabil	unclear if patients had hip surgery
Tang,P.; Hu,F.; Shen,J.; Zhang,L.; Zhang,L.	2012	Proximal femoral nail antirotation versus hemiarthroplasty: a study for the treatment of intertrochanteric fractures		Patient population not OA
Tarasevicius,S.; Cebatorius,A.; Valaviciene,R.; Stucinskas,J.; Leonas,L.; Robertsson,O.	2014	First outcome results after total knee and hip replacement from the Lithuanian arthroplasty register	Medicina (Kaunas)	90% of pop isn't Hip OA
Tarassoli,P.; Gargan,M.F.; Atherton,W.G.; Thomas,S.R.	2014	The medial approach for the treatment of children with developmental dysplasia of the hip	Bone Joint J	Not relevant to recommendation
Tay Swee,Cheng R.; Klainin-Yobas,P.; Hegney,D.; Mackey,S.	2015	Factors relating to perioperative experience of older persons undergoing joint replacement surgery: an integrative literature review	Disabil.Rehabil	Systematic Review
Taylor,Jr; Raffa,R.B.; Pergolizzi,Jr	2012	Controlled release formulation of oxycodone in patients with moderate to severe chronic osteoarthritis: A critical review of the literature	Journal of Pain Research	Literature review
Taylor,S.D.; Everett,S.V.; Taylor,T.N.; Watson,D.J.; Taylor-Stokes,G.	2013	A measure of treatment response: Patient and physician satisfaction with traditional NSAIDs for osteoarthritis control	Open Access Rheumatology	Hip and Knee combined
Taylor,W.R.; Szwedowski,T.D.; Heller,M.O.; Perka,C.; Matziolis,G.; Muller,M.; Janshen,L.; Duda,G.N.	2012	The difference between stretching and splitting muscle trauma during THA seems not to play a dominant role in influencing periprosthetic BMD changes	Clin Biomech.(Bristol, Avon)	no patient oriented outcomes
Tebe-Cordomi,C.; Prieto-Alhambra,D.; Serra-Sutton,V.; Martinez,O.; Garcia-Altes,A.; Espallargues,M.; Palliso,F.	2012	Implant survival after a total hip or knee replacement in Catalonia up to five years of follow-up: A populationbased register (RACat)	Osteoarthritis Cartilage	abstract only
Teirlinck,C.H.; Luijsterburg,P.A.; Dekker,J.; Bohnen,A.M.; Verhaar,J.A.; Koopmanschap,M.A.; van Es,P.P.; Koes,B.W.; Bierma-Zeinstra,S.M.	2016	Effectiveness of exercise therapy added to general practitioner care in patients with hip osteoarthritis: a pragmatic randomized controlled trial	Osteoarthritis Cartilage	90% of pop isn't Hip OA
Teixeira,F.; Porto,A.; Moura,J.	1993	Efficacy of a single daily dose of a nonsteroidal anti-inflammatory drug with an intermediate plasma half-live: A double-blind, comparative trial of acemetacin and piroxicam	Current Therapeutic Research - Clinical and Experimental	Hip and Knee combined

Authors	Year	Article Title	Periodical	Reason for Exclusion
Temple,A.R.; Benson,G.D.; Zinsenheim,J.R.; Schweinle,J.E.	2006	Multicenter, randomized, double-blind, active-controlled, parallel-group trial of the long-term (6-12 months) safety of acetaminophen in adult patients with osteoarthritis	Clin Ther	Hip and Knee combined
Teratani,T.; Naito,M.; Kiyama,T.; Maeyama,A.	2011	Periacetabular osteotomy in patients fifty years of age or older: surgical technique	J Bone Joint Surg Am	Method section/not completed study
Teratani,T.; Naito,M.; Shiramizu,K.	2010	Intraoperative muscle damage in total hip arthroplasty	J Arthroplasty	Not relevant to recommendation
Terjesen,T.; Horn,J.; Gunderson,R.B.	2014	Fifty-year follow-up of late-detected hip dislocation: clinical and radiographic outcomes for seventy-one patients treated with traction to obtain gradual closed reduction	J Bone Joint Surg Am	not relevant. patient population treated without surgery initially.
Testoni,M.; Baruffaldi,F.; Mattioli,P.; Sudanese,A.; Terzi,S.; Barbanti-Brodano,G.; Toni,A.	2000	Evaluation of radiolucency condition in total hip arthroplasty: a statistical comparison of the diagnostic capability of digitised image vs. conventional X-ray film	Eur Radiol	Not relevant, does not answer pico question
Theiler,R.; Bischoff-Ferrari,H.A.; Good,M.; Bellamy,N.	2004	Responsiveness of the electronic touch screen WOMAC 3.1 OA Index in a short term clinical trial with rofecoxib	Osteoarthritis Cartilage	Hip and Knee combined
Thien,T.M.; Chatziagorou,G.; Garellick,G.; Furnes,O.; Havelin,L.I.; Makela,K.; Overgaard,S.; Pedersen,A.; Eskelinen,A.; Pulkkinen,P.; Karrholm,J.	2014	Periprosthetic femoral fracture within two years after total hip replacement: analysis of 437,629 operations in the nordic arthroplasty register association database	J Bone Joint Surg Am	less than 90% OA hip patients
Thien,T.M.; Karrholm,J.	2010	Design-related risk factors for revision of primary cemented stems	Acta Orthop	does not evaluate age as a risk factor
Thien,T.M.; Karrholm,J.	2010	Design-related risk factors for revision of primary cemented stems: Analysis of 3 common stems in the Swedish Hip Arthroplasty Register	Acta orthopaedica	does not evaluate age as a risk factor
Thillemann,T.M.; Pedersen,A.B.; Mehnert,F.; Johnsen,S.P.; Soballe,K.	2010	Postoperative use of bisphosphonates and risk of revision after primary total hip arthroplasty: a nationwide population-based study		analysis adjust for age, but does not consider age as a risk factor

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Thomas,G.E.; Palmer,A.J.; Batra,R.N.; Kiran,A.; Hart,D.; Spector,T.; Javaid,M.K.; Judge,A.; Murray,D.W.; Carr,A.J.; Arden,N.K.; Glyn-Jones,S.	2014	Subclinical deformities of the hip are significant predictors of radiographic osteoarthritis and joint replacement in women. A 20 year longitudinal cohort study	Osteoarthritis Cartilage	need for tha is the outcome.
Thomas,S.R.; Wedge,J.H.; Salter,R.B.	2007	Outcome at forty-five years after open reduction and innominate osteotomy for late-presenting developmental dislocation of the hip	J Bone Joint Surg Am	incorrect patient populatin for obesity question. retrospective case series for dysplasia recommendation
Thorne,C.; Beaulieu,A.D.; Callaghan,D.J.; O'Mahony,W.F.; Bartlett,J.M.; Knight,R.; Kraag,G.R.; Akhras,R.; Piraino,P.S.; Eisenhoffer,J.; Harsanyi,Z.; Darke,A.C.	2008	A randomized, double-blind, crossover comparison of the efficacy and safety of oral controlled-release tramadol and placebo in patients with painful osteoarthritis	Pain Research and Management	Hip and Knee combined
Thornley,P.; Evaniew,N.; Riediger,M.; Winemaker,M.; Bhandari,M.; Ghert,M.	2015	Postoperative antibiotic prophylaxis in total hip and knee arthroplasty: a systematic review and meta-analysis of randomized controlled trials	CMAJ Open	Systematic Review
Thornqvist,C.; Gislason,G.H.; Kober,L.; Jensen,P.F.; Torp-Pedersen,C.; Andersson,C.	2014	Body mass index and risk of perioperative cardiovascular adverse events and mortality in 34,744 Danish patients undergoing hip or knee replacement	Acta Orthop	less than 90% OA hip population
Thyssen,J.P.; Jakobsen,S.S.; Engkilde,K.; Johansen,J.D.; Soballe,K.; Menne,T.	2009	The association between metal allergy, total hip arthroplasty, and revision	Acta orthopaedica	does not evaluate age as a risk factor
Tian,C.Y.; Wang,J.Q.; Zheng,Z.Z.; Ren,A.H.	2014	3.0 T conventional hip MR and hip MR arthrography for the acetabular labral tears confirmed by arthroscopy	Eur J Radiol	Hip and Knee combined
Tiberi,J.V.,III; Hansen,V.; El-Abbadi,N.; Bedair,H.	2014	Increased complication rates after hip and knee arthroplasty in patients with cirrhosis of the liver	Clin Orthop Relat Res	hip and knee results combined
Tiberi,J.V.; Pulos,N.; Kertzner,M.; Schmalzried,T.P.	2012	A more reliable method to assess acetabular component position	Clin Orthop Relat Res	Not relevant, does not answer pico question

Authors	Year	Article Title	Periodical	Reason for Exclusion
Tibor,L.M.; Leunig,M.	2012	Labral Resection or Preservation During FAI Treatment? A Systematic Review	HSS J	Systematic Review
Tietze,D.C.; Geissler,K.; Borchers,J.	2014	The effects of platelet-rich plasma in the treatment of large-joint osteoarthritis: a systematic review	Phys Sportsmed.	
Tiffreau,V.; Mulleman,D.; Coudeyre,E.; Lefevre-Colau,M.M.; Revel,M.; Rannou,F.	2007	The value of individual or collective group exercise programs for knee or hip osteoarthritis. Clinical practice recommendations	Ann Readapt.Med Phys	90% of pop isn't Hip OA
Tiffreau,V.; Mulleman,D.; Coudeyre,E.; Lefevre-Colau,M.M.; Revel,M.; Rannou,F.	2007	The value of individual or collective group exercise programs for knee or hip osteoarthritis. Elaboration of French clinical practice guidelines	Annales de Readaptation et de Medecine Physique	Systematic Review
Toossi,N.; Adeli,B.; Timperley,A.J.; Haddad,F.S.; Maltenfort,M.; Parvizi,J.	2013	Acetabular components in total hip arthroplasty: is there evidence that cementless fixation is better?	J Bone Joint Surg Am	meta-analysis
Toupin-April,K.; Hochberg,M.; Tugwell,P.; Altman,R.; Benkhalti,M.; Guyatt,G.; Maxwell,L.; McGowan,J.; Rader,T.; Tanjong-Ghogomu,E.; Ueffing,E.; Welch,V.; Wells,G.; Paterson,G.	2010	Development of the 2009 revised ACR recommendations for the management of osteoarthritis	J.Rheumatol.	Abstract
Towheed,T.; Shea,B.; Wells,G.; Hochberg,M.	2000	Analgesia and non-aspirin, non-steroidal anti-inflammatory drugs for osteoarthritis of the hip	Cochrane Database Syst Rev	Systematic Review
Towheed,T.E.; Hochberg,M.C.	1997	A systematic review of randomized controlled trials of pharmacological therapy in osteoarthritis of the hip	J Rheumatol.	Systematic Review
Towheed,T.E.; Hochberg,M.C.; Shea,B.J.; Wells,G.	2006	WITHDRAWN: Analgesia and non-aspirin, non-steroidal anti-inflammatory drugs for osteoarthritis of the hip	Cochrane Database Syst Rev	Review
Towheed,T.E.; Judd,M.J.; Hochberg,M.C.; Wells,G.	2003	Acetaminophen for osteoarthritis	Cochrane Database Syst Rev	Systematic Review
Towheed,T.E.; Maxwell,L.; Judd,M.G.; Catton,M.; Hochberg,M.C.; Wells,G.	2006	Acetaminophen for osteoarthritis	Cochrane Database Syst Rev	

Authors	Year	Article Title	Periodical	Reason for Exclusion
Towheed,Tanveer; Hochberg,Marc C.; Shea,Beverley; Wells,George A.	2006	Analgesia and non-aspirin, non-steroidal anti-inflammatory drugs for osteoarthritis of the hip	Cochrane Database of Systematic Reviews	Systematic Review
Towheed,Tanveer; Maxwell,Lara; Anastassiades,Tassos P.; Shea,Beverley; Houpt,J.B.; Welch,Vivian; Hochberg,Marc C.; Wells,George A.	2005	Glucosamine therapy for treating osteoarthritis	Cochrane Database of Systematic Reviews	Systematic Review
Treble,N.J.; Jensen,F.O.; Bankier,A.; Rogers,J.G.; Cole,W.G.	1990	Development of the hip in multiple epiphyseal dysplasia. Natural history and susceptibility to premature osteoarthritis	J Bone Joint Surg Br	Not relevant to recommendation
Trijau,S.; Avouac,J.; Escalas,C.; Gossec,L.; Dougados,M.	2010	Influence of flare design on symptomatic efficacy of non-steroidal anti-inflammatory drugs in osteoarthritis: a meta-analysis of randomized placebo-controlled trials	Osteoarthritis Cartilage	
Troelsen,A.	2009	Surgical advances in periacetabular osteotomy for treatment of hip dysplasia in adults	Acta Orthop Suppl	Systematic Review
Troelsen,A.; Malchau,E.; Sillesen,N.; Malchau,H.	2013	A review of current fixation use and registry outcomes in total hip arthroplasty: the uncemented paradox	Clin Orthop Relat Res	article compares cemented and uncemented implants stratified by age, but does not evaluate age as a risk factor
Troelsen,A.; Mechlenburg,I.; Gelineck,J.; Bolvig,L.; Jacobsen,S.; Soballe,K.	2009	What is the role of clinical tests and ultrasound in acetabular labral tear diagnostics?	Acta Orthop	
Trompeter,A.; Colegate-Stone,T.; Khakha,R.; Hull,J.	2013	Hip arthroscopy for femoroacetabular impingement: results of 118 consecutive cases in a district general hospital	Hip Int	Retrospective case series
Trousdale,R.T.; Ekkernkamp,A.; Ganz,R.; Wallrichs,S.L.	1995	Periacetabular and intertrochanteric osteotomy for the treatment of osteoarthrosis in dysplastic hips	J Bone Joint Surg Am	Not relevant, does not answer pico question
Trudelle-Jackson,E.; Smith,S.S.	2004	Effects of a late-phase exercise program after total hip arthroplasty: a randomized controlled trial	Arch Phys Med Rehabil	less than 90% OA hip

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Tsuboi,M.; Hasegawa,Y.; Fujita,K.; Kawabe,K.	2011	Pubic/ischial stress fractures after eccentric rotational acetabular osteotomy	J Orthop Sci	for displasia and fai, preoperative diagnosis unclear. inclusion criteria adequately described, to determine if article meets inclusion criteria
Tubach,F.; Ravaud,P.; Baron,G.; Falissard,B.; Logeart,I.; Bellamy,N.; Bombardier,C.; Felson,D.; Hochberg,M.; van der Heijde,D.; Dougados,M.	2005	Evaluation of clinically relevant changes in patient reported outcomes in knee and hip osteoarthritis: the minimal clinically important improvement	Ann Rheum.Dis	not relevant
Tuominen,U.; Blom,M.; Hirvonen,J.; Seitsalo,S.; Lehto,M.; Paavolainen,P.; Hietanieni,K.; Rissanen,P.; Sintonen,H.	2007	The effect of co-morbidities on health-related quality of life in patients placed on the waiting list for total joint replacement	Health and Quality of Life Outcomes	hip and knee results combined.
Turmezei,T.D.; Fotiadou,A.; Lomas,D.J.; Hopper,M.A.; Poole,K.E.	2014	A new CT grading system for hip osteoarthritis	Osteoarthritis Cartilage	Not relevant, does not answer pico question
Unlu,E.; Eksioglu,E.; Aydog,E.; Aydoo,S.T.; Atay,G.	2007	The effect of exercise on hip muscle strength, gait speed and cadence in patients with total hip arthroplasty: A randomized controlled study	Clin.Rehabil.	less than 10 patients in groups
Unnanuntana,A.; Mait,J.E.; Shaffer,A.D.; Lane,J.M.; Mancuso,C.A.	2012	Performance-based tests and self-reported questionnaires provide distinct information for the preoperative evaluation of total hip arthroplasty patients	J Arthroplasty	90% of pop isn't Hip OA
Uthman,O.A.; van der Windt,D.A.; Jordan,J.L.; Dziedzic,K.S.; Healey,E.L.; Peat,G.M.; Foster,N.E.	2013	Exercise for lower limb osteoarthritis: systematic review incorporating trial sequential analysis and network meta-analysis		Systematic Review
Uthman,O.A.; van der Windt,D.A.; Jordan,J.L.; Dziedzic,K.S.; Healey,E.L.; Peat,G.M.; Foster,N.E.	2012	Exercise for lower limb osteoarthritis: Systematic review incorporating trial sequential analysis and network meta-analysis		Systematic Review
Vaarbakken,K.; Ljunggren,A.E.	2007	Superior effect of forceful compared with standard traction mobilizations in hip	Adv Physiother.	Not symptomatic hip OA pop

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		disability?		
Vad,V.B.; Sakalkale,D.; Sculco,T.P.; Wickiewicz,T.L.	2003	Role of hylan G-F 20 in treatment of osteoarthritis of the hip joint	Arch Phys Med Rehabil	
Vaht,M.; Birkenfeldt,R.; Ubner,M.	2008	An evaluation of the effect of differing lengths of spa therapy upon patients with osteoarthritis (OA)	Complement Ther Clin Pract	90% of pop is Hip OA
Vail,T.P.; Mina,C.A.; Yergler,J.D.; Pietrobon,R.	2006	Metal-on-metal hip resurfacing compares favorably with THA at 2 years followup	Clin.Orthop.	adjust for confounder age but doesn't present results for variable
Valancius,K.; Soballe,K.; Nielsen,P.T.; Laursen,M.B.	2013	No superior performance of hydroxyapatite-coated acetabular cups over porous-coated cups	Acta Orthop	Not relevant, does not answer pico question
van Baar,M.E.; Assendelft,W.J.; Dekker,J.; Oostendorp,R.A.; Bijlsma,J.W.	1999	Effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a systematic review of randomized clinical trials	Arthritis Rheum.	Systematic Review
van Baar,M.E.; Dekker,J.; Oostendorp,R.A.; Bijl,D.; Voorn,T.B.; Bijlsma,J.W.	2001	Effectiveness of exercise in patients with osteoarthritis of hip or knee: nine months' follow up	Ann Rheum.Dis	90% of pop isn't Hip OA
van Baar,M.E.; Dekker,J.; Oostendorp,R.A.; Bijl,D.; Voorn,T.B.; Lemmens,J.A.; Bijlsma,J.W.	1998	The effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a randomized clinical trial	J Rheumatol.	90% of pop isn't Hip OA
van den Bekerom,M.P.; Hilverdink,E.F.; Sierevelt,I.N.; Reuling,E.M.; Schnater,J.M.; Bonke,H.; Goslings,J.C.; van Dijk,C.N.; Raaymakers,E.L.	2010	A comparison of hemiarthroplasty with total hip replacement for displaced intracapsular fracture of the femoral neck: a randomised controlled multicentre trial in patients aged 70 years and over	J Bone Joint Surg Br	does not look at age as a risk factor
van den Bekerom,M.P.; Lamme,B.; Sermon,A.; Mulier,M.	2008	What is the evidence for viscosupplementation in the treatment of patients with hip osteoarthritis? Systematic review of the literature	Arch Orthop Trauma Surg	
van den Bekerom,M.P.; Mylle,G.; Rys,B.; Mulier,M.	2006	Viscosupplementation in symptomatic severe hip osteoarthritis: a review of the literature and report on 60 patients	Acta Orthop Belg.	

Authors	Year	Article Title	Periodical	Reason for Exclusion
van der Grinten,M.; Reijman,M.; van Biezen,F.C.; Verhaar,J.A.	2011	Trochanteric osteotomy versus posterolateral approach: function the first year post surgery. A pilot study	BMC Musculoskelet.Disord.	Patient population - receiving THA
van der Veen,H.C.; van Jonbergen,H.P.; Poolman,R.W.; Bulstra,S.K.; van Raay,J.J.	2013	Is there evidence for accelerated polyethylene wear in uncemented compared to cemented acetabular components? A systematic review of the literature	Int Orthop	Systematic Review
van Dijk,G.M.; Dekker,J.; Veenhof,C.; van den Ende,C.H.	2006	Course of functional status and pain in osteoarthritis of the hip or knee: a systematic review of the literature	Arthritis Rheum.	Systematic Review
van Dijk,G.M.; Veenhof,C.; Lankhorst,G.J.; van den Ende,C.H.; Dekker,J.	2011	Vitality and the course of limitations in activities in osteoarthritis of the hip or knee	BMC Musculoskelet.Disord.	patients were recruited from a rehab center, but not all of them had surgery
van Es,P.P.; Luijsterburg,P.A.; Dekker,J.; Koopmanschap,M.A.; Bohnen,A.M.; Verhaar,J.A.; Koes,B.W.; Bierma-Zeinstra,S.M.	2011	Cost-effectiveness of exercise therapy versus general practitioner care for osteoarthritis of the hip: design of a randomised clinical trial	BMC Musculoskelet.Disord.	Repeat article
van Raay,J.J.; Willems,W.J.; Rozing,P.M.	1993	The uncemented Gerard bipolar double-cup arthroplasty of the hip. A five- to 11-year follow-up study	Clin Orthop Relat Res	not relevant because patients recieved resurfacing arthroplasty instead of THA
van Stralen,G.M.J.; Struben,P.J.; van Loon,C.J.M.	2003	The incidence of dislocation after primary total hip arthroplasty using posterior approach with posterior soft-tissue repair	Arch.Orthop.Trauma Surg.	90% of pop isn't Hip OA
van Stralen,R.A.; van Hellemondt,G.G.; Ramrattan,N.N.; de,Visser E.; de,Kleuver M.	2013	Can a triple pelvic osteotomy for adult symptomatic hip dysplasia provide relief of symptoms for 25 years?	Clin Orthop Relat Res	retrospective case series
Van Vijven,J.P.; Luijsterburg,P.A.; Verhagen,A.P.; van Osch,G.J.; Kloppenburg,M.; Bierma-Zeinstra,S.M.	2012	Symptomatic and chondroprotective treatment with collagen derivatives in osteoarthritis: a systematic review	Osteoarthritis Cartilage	
Van,Cauwenberge H.; Ruhwiedel,M.; Albert,A.; Franchimont,P.	1992	Comparative study of tilidine-naloxone and pentazocine in knee and hip osteoarthritis	Int J Clin Pharmacol Res	Consenses

Authors	Year	Article Title	Periodical	Reason for Exclusion
Van,Der,V; Pijls,B.G.; Nieuwenhuijse,M.J.; Jasper,J.; Fiocco,M.; Plevier,J.W.M.; Middeldorp,S.; Valstar,E.R.; Nelissen,R.G.H.H.	2015	Early subsidence of shape-closed hip arthroplasty stems is associated with late revision	Acta orthopaedica	systematic review
van,Middelkoop M.; Arden,N.K.; Atchia,I.; Birrell,F.; Chao,J.; Rezende,M.U.; Lambert,R.G.; Ravaud,P.; Bijlsma,J.W.; Doherty,M.; Dziedzic,K.S.; Lohmander,L.S.; McAlindon,T.E.; Zhang,W.; Bierma-Zeinstra,S.M.	2016	The OA Trial Bank: meta-analysis of individual patient data from knee and hip osteoarthritis trials show that patients with severe pain exhibit greater benefit from intra-articular glucocorticoids	Osteoarthritis Cartilage	Systematic Review
van,Middelkoop M.; Dziedzic,K.S.; Doherty,M.; Zhang,W.; Bijlsma,J.W.; McAlindon,T.E.; Lohmander,S.L.; Bierma-Zeinstra,S.M.	2013	Individual patient data meta-analysis of trials investigating the effectiveness of intra-articular glucocorticoid injections in patients with knee or hip osteoarthritis: an OA Trial Bank protocol for a systematic review	Syst Rev	
Varela-Egocheaga,J.R.; Suarez-Suarez,M.A.; Fernandez-Villan,M.; Gonzalez-Sastre,V.; Varela-Gomez,J.R.; Murcia-Mazon,A.	2013	Minimally invasive hip surgery: The approach did not make the difference	European Journal of Orthopaedic Surgery and Traumatology	Not relevant to recommendation
Varese,C.; Palazzini,A.	1997	Open study of a diclofenac sodium prolonged-release in patients suffering from coxarthrosis	Eur Rev Med Pharmacol Sci	
Varin,D.; Lamontagne,M.; Beaule,P.E.	2013	Does the anterior approach for THA provide closer-to-normal lower-limb motion?	J Arthroplasty	retrospective case series
Vase,L.; Vollert,J.; Finnerup,N.B.; Miao,X.; Atkinson,G.; Marshall,S.; Nemeth,R.; Lange,B.; Liss,C.; Price,D.D.; Maier,C.; Jensen,T.S.; Segerdahl,M.	2015	Predictors of the placebo analgesia response in randomized controlled trials of chronic pain: A meta-analysis of the individual data from nine industrially sponsored trials		meta-analysis
Vasileiadis,G.I.; Sakellariou,V.I.; Kelekis,A.; Galanos,A.; Soucacos,P.N.; Papagelopoulos,P.J.; Babis,G.C.	2010	Prevention of heterotopic ossification in cases of hypertrophic osteoarthritis submitted to total hip arthroplasty. Etidronate or Indomethacin?	J Musculoskelet.Neuronal Interact.	Not relevant, does not answer pico question

Authors	Year	Article Title	Periodical	Reason for Exclusion
Vedantam,R.; Capelli,A.M.; Schoenecker,P.L.	1998	Pemberton osteotomy for the treatment of developmental dysplasia of the hip in older children	J Pediatr Orthop	Retrospective case series
Veenhof,C.; Dekker,J.; Bijlsma,J.W.; van den Ende,C.H.	2005	Influence of various recruitment strategies on the study population and outcome of a randomized controlled trial involving patients with osteoarthritis of the hip or knee	Arthritis Rheum.	90% of pop isn't Hip OA
Veenhof,C.; Koke,A.J.; Dekker,J.; Oostendorp,R.A.; Bijlsma,J.W.; van Tulder,M.W.; van den Ende,C.H.	2006	Effectiveness of behavioral graded activity in patients with osteoarthritis of the hip and/or knee: A randomized clinical trial	Arthritis Rheum.	90% of pop isn't Hip OA
Verkleij,S.P.; Luijsterburg,P.A.; Bohnen,A.M.; Koes,B.W.; Bierma-Zeinstra,S.M.	2011	NSAIDs vs acetaminophen in knee and hip osteoarthritis: a systematic review regarding heterogeneity influencing the outcomes	Osteoarthritis Cartilage	
Vicente,J.R.; Croci,A.T.; Camargo,O.P.	2008	Blood loss in the minimally invasive posterior approach to total hip arthroplasty: a comparative study	Clinics (Sao Paulo)	90% of pop isn't Hip OA
Viens,N.A.; Hug,K.T.; Marchant,M.H.; Cook,C.; Vail,T.P.; Bolognesi,M.P.	2012	Role of diabetes type in perioperative outcomes after hip and knee arthroplasty in the United States	Journal of surgical orthopaedic advances	hip and knee results combined and unclear if diabetes was poorly controlled
Villadsen,A.	2016	Neuromuscular exercise prior to joint arthroplasty in patients with osteoarthritis of the hip or knee	Dan.Med J	90% of pop isn't Hip OA
Villadsen,A.; Overgaard,S.; Holsgaard-Larsen,A.; Christensen,R.; Roos,E.M.	2014	Immediate efficacy of neuromuscular exercise in patients with severe osteoarthritis of the hip or knee: a secondary analysis from a randomized controlled trial	J Rheumatol.	outcomes assessed pre operatively
Villanueva-Martnez,M.; Hernandez-Barrera,V.; Chana-Rodriguez,F.; Rojo-Manaute,J.; Ros-Luna,A.; San Roman,Montero J.; Gil-de-Miguel,A.; Jimenez-Garcia,R.	2012	Trends in incidence and outcomes of revision total hip arthroplasty in Spain: A population based study	BMC Musculoskeletal Disorders	less than 90% OA hip patients
Villatte,G.; Engels,E.; Erivan,R.; Mulliez,A.; Caumon,N.; Boisgard,S.; Descamps,S.	2016	Effect of local anaesthetic wound infiltration on acute pain and bleeding after primary total hip arthroplasty: the EDIPO randomised controlled	Int Orthop	not relevant. patients hat tha, so not a conservative

Authors	Year	Article Title	Periodical	Reason for Exclusion
		study		treatment
Vincent,H.K.; Alfano,A.P.; Lee,L.; Vincent,K.R.	2006	Sex and age effects on outcomes of total hip arthroplasty after inpatient rehabilitation	Arch Phys Med Rehabil	less than 90% OA hip patients
Vincent,H.K.; DeJong,G.; Mascarenas,D.; Vincent,K.R.	2009	The effect of body mass index and hip abductor brace use on inpatient rehabilitation outcomes after total hip arthroplasty	Am J Phys Med Rehabil	unclear if 90% of the patient population had oa hip
Vinje,O.; Fagertun,H.E.; Laerum,E.; Lund,H.; Larsen,S.	1993	Ketoprofen controlled release (CR) in the treatment of osteoarthrosis; a double blind, randomized multicentre study of single morning versus evening dose	Scand.J.Prim.Health Care	Hip and Knee combined
Vissers,M.M.; Bussmann,J.B.; Verhaar,J.A.N.; Busschbach,J.J.V.; Bierma-Zeinstra,S.M.A.; Reijman,M.	2012	Psychological factors affecting the outcome of total hip and knee arthroplasty: A systematic review	Semin.Arthritis Rheum.	systematic review
Visuri,T.; Pulkkinen,P.; Turula,K.B.; Paavolainen,P.; Koskenvuo,M.	1994	Life expectancy after hip arthroplasty. Case-control study of 1018 cases of primary arthrosis	Acta Orthop Scand.	control group did not get THA
Vlad,S.C.; LaValley,M.P.; McAlindon,T.E.; Felson,D.T.	2007	Glucosamine for pain in osteoarthritis: why do trial results differ?	Arthritis Rheum.	Systematic Review
Vojtassak,J.; Vojtassak,J.; Jacobs,A.; Rynn,L.; Waechter,S.; Richarz,U.	2011	A Phase IIIb, Multicentre, Randomised, Parallel-Group, Placebo-Controlled, Double-Blind Study to Investigate the Efficacy and Safety of OROS Hydromorphone in Subjects with Moderate-to-Severe Chronic Pain Induced by Osteoarthritis of the Hip or the Knee	Pain Res Treat.	90% of pop isn't Hip OA
Vorsanger,G.; Xiang,J.; Jordan,D.; Farrell,J.	2007	Post hoc analysis of a randomized, double-blind, placebo-controlled efficacy and tolerability study of tramadol extended release for the treatment of osteoarthritis pain in geriatric patients	Clin Ther	90% of pop isn't Hip OA
Vukasinovic,Z.; Spasovski,D.; Slavkovic,N.; Bascarevic,Z.; Zivkovic,Z.; Starcevic,B.	2011	Chiari pelvic osteotomy in the treatment of adolescent hip disorders: possibilities, limitations and complications	Int Orthop	Patient population dysplasia and avascular necrosis

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Vukasinovic,Z.; Spasovski,D.; Zivkovic,Z.; Slavkovic,N.; Cerovic,S.	2009	Triple pelvic osteotomy in the treatment of hip dysplasia	Srp.Arh Celok.Lek	Not relevant, does not answer pico question
-Vukomanovi?-A; -Popovi?-Z; -Durovi?-A; -Krsti?-L	2008	The effects of short-term preoperative physical therapy and education on early functional recovery of patients younger than 70 undergoing total hip arthroplasty	Vojnosanitetski pregled.Military medical and pharmaceutical review	Unclear if 90% of pop is Hip OA
WÃ³jcik,B.; ski,M.; bala,E.; Drelich,M.	2012	A comparison of effectiveness of fascial relaxation and classic model of patients rehabilitation after hip joint endoprosthetics	Ortopedia, traumatologia, rehabilitacja	Charts are not in English
Wade,W.E.; Spruill,W.J.	2009	Tapentadol hydrochloride: a centrally acting oral analgesic	Clin Ther	Systematic Review
Wagenitz,A.; Mueller,E.A.; Frentzel,A.; Cambon,N.	2007	Comparative efficacy and tolerability of two sustained-release formulations of diclofenac: results of a double-blind, randomised study in patients with osteoarthritis and a reappraisal of diclofenac's use in this patient population	Curr Med Res Opin	Hip and Knee combined
Wagenmakers,R.; Stevens,M.; Zijlstra,W.; Jacobs,M.L.; van,den Akker-Scheek,I; Groothoff,J.W.; Bulstra,S.K.	2008	Habitual physical activity behavior of patients after primary total hip arthroplasty	Phys Ther	not best available evidence. Crosssectional study. age was not measured at arthroplasty, but at follow up.
Wakabayashi,K.; Wada,I.; Horiuchi,O.; Mizutani,J.; Tsuchiya,D.; Otsuka,T.	2011	MRI findings in residual hip dysplasia	J Pediatr Orthop	Not relevant, does not answer pico question
Wall,P.D.; Brown,J.S.; Parsons,N.; Buchbinder,R.; Costa,M.L.; Griffin,D.	2014	Surgery for treating hip impingement (femoroacetabular impingement)	Cochrane Database Syst Rev	
Wallace,G.; Judge,A.; Prieto-Alhambra,D.; de,Vries F.; Arden,N.K.; Cooper,C.	2014	The effect of body mass index on the risk of post-operative complications during the 6 months following total hip replacement ortotal knee replacement surgery	Osteoarthritis Cartilage	unclear if 90% of the patient population had oa hip
Waller,B.; Ogonowska-Slodownik,A.; Vitor,M.; Lambeck,J.; Daly,D.; Kujala,U.M.; Heinonen,A.	2014	Effect of therapeutic aquatic exercise on symptoms and function associated with lower limb osteoarthritis: systematic review with meta-analysis	Phys Ther	Systematic Review

Authors	Year	Article Title	Periodical	Reason for Exclusion
Wallis,J.A.; Taylor,N.F.	2011	Pre-operative interventions (non-surgical and non-pharmacological) for patients with hip or knee osteoarthritis awaiting joint replacement surgery--a systematic review and meta-analysis	Osteoarthritis Cartilage	Systematic Review
Wallis,J.A.; Webster,K.E.; Levinger,P.; Fong,C.; Taylor,N.F.	2014	A pre-operative group rehabilitation programme provided limited benefit for people with severe hip and knee osteoarthritis	Disabil.Rehabil	90% of pop isn't Hip OA
Wallner,O.; Stark,A.; Muren,O.; Eisler,T.; Skoldenberg,O.	2014	Unstable hip arthroplasties. A prospective cohort study on seventy dislocating hips followed up for four years	Int Orthop	Not relevant, does not answer pico question
Wall-Peter,D.H.; Brown,Jamie S.; Parsons,Nick; Buchbinder,Rachelle; Costa,Matthew L.; Griffin,Damian	2014	Surgery for treating hip impingement (femoroacetabular impingement)	Cochrane Database of Systematic Reviews	Systematic Review
Wandel,S.; Juni,P.; Tendal,B.; Nuesch,E.; Villiger,P.M.; Welton,N.J.; Reichenbach,S.; Trelle,S.	2010	Effects of glucosamine, chondroitin, or placebo in patients with osteoarthritis of hip or knee: network meta-analysis		Systematic Review
Wang,A.W.; Gilbey,H.J.; Ackland,T.R.	2002	Perioperative exercise programs improve early return of ambulatory function after total hip arthroplasty: a randomized, controlled trial	Am J Phys Med Rehabil	90% of pop isn't Hip OA
Wang,C.; Xu,G.-J.; Han,Z.; Ma,J.-X.; Ma,X.-L.; Jiang,X.; Wang,Y.	2015	Topical application of tranexamic acid in primary total hip arthroplasty: A systemic review and meta-analysis	International Journal of Surgery	Systematic Review
Wang,C.W.; Wu,K.W.; Wang,T.M.; Huang,S.C.; Kuo,K.N.	2014	Comparison of acetabular anterior coverage after Salter osteotomy and Pemberton acetabuloplasty: a long-term followup	Clin Orthop Relat Res	Not relevant to recommendation
Wang,J.L.; Gadinsky,N.E.; Yeager,A.M.; Lyman,S.L.; Westrich,G.H.	2013	The increased utilization of operating room time in patients with increased BMI during primary total hip arthroplasty	J Arthroplasty	Unclear if 90% of patients hat hip OA
Wang,L.; Lee,M.; Zhang,Z.; Moodie,J.; Cheng,D.; Martin,J.	2016	Does preoperative rehabilitation for patients planning to undergo joint replacement surgery improve outcomes? A systematic review and meta-analysis of randomised controlled trials	BMJ Open	Systematic Review
Wang,Q.; Wang,T.T.; Qi,X.F.; Yao,M.; Cui,X.J.; Wang,Y.J.; Liang,Q.Q.	2015	Manual Therapy for Hip Osteoarthritis: A Systematic Review and Meta-analysis	Pain Physician	Systematic Review

Authors	Year	Article Title	Periodical	Reason for Exclusion
Wang,T.M.; Wu,K.W.; Shih,S.F.; Huang,S.C.; Kuo,K.N.	2013	Outcomes of open reduction for developmental dysplasia of the hip: does bilateral dysplasia have a poorer outcome?	J Bone Joint Surg Am	Not relevant, does not answer pico question
Wang,W.; Morrison,T.A.; Geller,J.A.; Yoon,R.S.; Macaulay,W.	2010	Predicting short-term outcome of primary total hip arthroplasty:a prospective multivariate regression analysis of 12 independent factors	J Arthroplasty	less than 90% OA hip patients
Wang,W.G.; Yue,D.B.; Zhang,N.F.; Hong,W.; Li,Z.R.	2011	Clinical diagnosis and arthroscopic treatment of acetabular labral tears	Orthop Surg	Not relevant, does not answer pico question
Ward,A.; Bozkaya,D.; Fleischmann,J.; Dubois,D.; Sabatowski,R.; Caro,J.J.	2007	Modeling the economic and health consequences of managing chronic osteoarthritis pain with opioids in Germany: Comparison of extended-release oxycodone and OROS hydromorphone	Curr.Med.Res.Opin.	90% of pop isn't Hip OA
Warholm,O.; Skaar,S.; Hedman,E.; Molmen,H.M.; Eik,L.	2003	The Effects of a Standardized Herbal Remedy Made from a Subtype of Rosa canina in Patients with Osteoarthritis: A Double-Blind, Randomized, Placebo-Controlled Clinical Trial	Curr Ther Res Clin Exp.	Hip and Knee combined
Warne,R.W.	1990	Acceptability and efficacy of anti-arthritic drugs in old age	Australian journal on ageing	Hip and Knee combined
Warnock,M.; McBean,D.; Suter,A.; Tan,J.; Whittaker,P.	2007	Effectiveness and safety of Devil's Claw tablets in patients with general rheumatic disorders	Phytother.Res	Patient population not OA hip
Weber,M.; Berry,D.J.; Harmsen,W.S.	1998	Total hip arthroplasty after operative treatment of an acetabular fracture	J Bone Joint Surg Am	less than 90% OA hip patients
Weber,M.; Ganz,R.	2002	The Bernese periacetabular osteotomy	Orthopedics and Traumatology	Narrative review
Wechter,J.; Comfort,T.K.; Tatman,P.; Mehle,S.; Gioe,T.J.	2013	Improved survival of uncemented versus cemented femoral stems in patients aged < 70 years in a community total joint registry	Clin Orthop Relat Res	article compares cemented and uncemented implants stratified by age, but does not evaluate age as a risk factor
Wegener,T.; Lupke,N.P.	2003	Treatment of patients with arthrosis of hip or knee with an aqueous extract of devil's claw (Harpagophytum procumbens DC.)	Phytother.Res	90% of pop isn't Hip OA

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Wegman,A.; van der Windt,D.; van,Tulder M.; Felson,D.	2004	Review: Non-steroidal anti-inflammatory drugs are slightly better than paracetamol for reducing pain in osteoarthritis	Evidence-Based Medicine	Hip and Knee combined
Wegman,A.; van der Windt,D.; van,Tulder M.; Stalman,W.; de,Vries T.	2004	Nonsteroidal antiinflammatory drugs or acetaminophen for osteoarthritis of the hip or knee? A systematic review of evidence and guidelines	J Rheumatol.	
Wei,W.; Wei,B.	2014	Comparison of topical and intravenous tranexamic acid on blood loss and transfusion rates in total hip arthroplasty	J Arthroplasty	unclear if 90% of the patient population had oa hip
Weigl,M.; Angst,F.; Stucki,G.; Lehmann,S.; Aeschlimann,A.	2004	Inpatient rehabilitation for hip or knee osteoarthritis: 2 year follow up study	Ann Rheum.Dis	90% of pop isn't Hip OA
Weiner,D.K.; Fang,M.; Gentili,A.; Kochersberger,G.; Marcum,Z.A.; Rossi,M.I.; Semla,T.P.; Shega,J.	2015	Deconstructing chronic low back pain in the older adult-step by step evidence and expert-based recommendations for evaluation and treatment: part I: hip osteoarthritis	Pain Med	Systematic Review
Weiss,R.J.; Hailer,N.P.; Stark,A.; Karrholm,J.	2012	Survival of uncemented acetabular monoblock cups: evaluation of 210 hips in the Swedish Hip Arthroplasty Register	Acta Orthop	effect of age was not reported
Weiss,R.J.; Stark,A.; Karrholm,J.	2011	A modular cementless stem vs. cemented long-stem prostheses in revision surgery of the hip: a population-based study from the Swedish Hip Arthroplasty Register	Acta Orthop	less than 90% OA hip patients
Wells,V.; Hearn,T.; Heard,A.; Lange,K.; Rankin,W.; Graves,S.	2006	Incidence and outcomes of knee and hip joint replacement in veterans and civilians	ANZ J Surg	not relevant. although the interaction of age and veteren status was studied, results are not presented for age in a manner that would allow it to answer this pico question
Wells,V.M.; Hearn,T.C.; McCaul,K.A.; Anderton,S.M.; Wigg,A.E.; Graves,S.E.	2002	Changing incidence of primary total hip arthroplasty and total knee arthroplasty for primary osteoarthritis	J Arthroplasty	THA incidence is the outcome

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Welton,K.L.; Gagnier,J.J.; Urquhart,A.G.	2016	Proportion of Obese Patients Presenting to Orthopedic Total Joint Arthroplasty Clinics		hip and knee results combined
Wenger,D.; Siversson,C.; Dahlberg,L.E.; Tiderius,C.J.	2016	Residual hip dysplasia at 1 year after treatment for neonatal hip instability is not related to degenerative joint disease in young adulthood: a 21-year follow-up study including dGEMRIC	Osteoarthritis Cartilage	Not relevant, does not answer pico question
Westby,M.D.; Carr,S.; Kennedy,D.; Brander,V.; Bell,M.; Doyle-Waters,M.M.; Backman,C.	2009	Post-acute physiotherapy for primary total hip arthroplasty: A cochrane systematic review	Arthritis Rheum.	Systematic Review
Wetterholm,M.; Turkiewicz,A.; Stigmar,K.; Hubertsson,J.; Englund,M.	2016	The rate of joint replacement in osteoarthritis depends on the patient's socioeconomic status	Acta Orthop	not relevant. joint replacement was the outcome.
Wetzels,R.; van,Weel C.; Grol,R.; Wensing,M.	2008	Family practice nurses supporting self-management in older patients with mild osteoarthritis: a randomized trial	BMC Fam Pract	90% of pop isn't Hip OA
White,W.B.; Schnitzer,T.J.; Bakris,G.L.; Frayssinet,H.; Duquesroix,B.; Weber,M.	2011	Effects of naproxcinod on blood pressure in patients with osteoarthritis	Am J Cardiol.	Hip and Knee combined
Whitehouse,S.L.; Bolland,B.J.; Howell,J.R.; Crawford,R.W.; Timperley,A.J.	2014	Mortality following hip arthroplasty--inappropriate use of National Joint Registry (NJR) data	J Arthroplasty	less than 90% oak for risk assessment tools. not all patients had THA for age pico question (some had hip resurfacing arthroplasty)
Whittle,J.; Steinberg,E.P.; Anderson,G.F.; Herbert,R.; Hochberg,M.C.	1993	Mortality after elective total hip arthroplasty in elderly Americans. Age, gender, and indication for surgery predict survival	Clin Orthop Relat Res	less than 90% OA hip patients
Widman,J.; Isacson,J.	2001	Lateral position reduces blood loss in hip replacement surgery: a prospective randomized study of 74 patients	Int Orthop	Not relevant, does not answer pico question
Wiesenhutter,C.W.; Boice,J.A.; Ko,A.; Sheldon,E.A.; Murphy,F.T.; Wittmer,B.A.; Aversano,M.L.; Reicin,A.S.	2005	Evaluation of the comparative efficacy of etoricoxib and ibuprofen for treatment of patients with osteoarthritis: A randomized, double-blind, placebo-controlled trial	Mayo Clin Proc	Hip and Knee combined

Authors	Year	Article Title	Periodical	Reason for Exclusion
Wieser,K.; Zingg,P.O.; Betz,M.; Neubauer,G.; Dora,C.	2012	Total hip replacement in patients with history of illicit injecting drug use	Arch Orthop Trauma Surg	retrospective comparative
Williams,N.H.; Amoakwa,E.; Belcher,J.; Edwards,R.T.; Hassani,H.; Hendry,M.; Burton,K.; Lewis,R.; Hood,K.; Jones,J.; Bennett,P.; Linck,P.; Neal,R.D.; Wilkinson,C.	2011	Activity Increase Despite Arthritis (AIDA): phase II randomised controlled trial of an active management booklet for hip and knee osteoarthritis in primary care	Br J Gen.Pract	Unclear if 90% of pop is Hip OA
Williams,N.H.; Amoakwa,E.; Burton,K.; Hendry,M.; Lewis,R.; Jones,J.; Bennett,P.; Neal,R.D.; Andrew,G.; Wilkinson,C.	2010	The Hip and Knee Book: developing an active management booklet for hip and knee osteoarthritis	Br J Gen.Pract	Systematic Review
Williamson,W.; Kluzek,S.; Roberts,N.; Richards,J.; Arden,N.; Leeson,P.; Newton,J.; Foster,C.	2015	Behavioural physical activity interventions in participants with lower-limb osteoarthritis: a systematic review with meta-analysis	BMJ Open	Systematic Review
Winther,K.; Apel,K.; Thamsborg,G.	2005	A powder made from seeds and shells of a rose-hip subspecies (Rosa canina) reduces symptoms of knee and hip osteoarthritis: a randomized, double-blind, placebo-controlled clinical trial	Scand.J Rheumatol.	Hip and Knee combined
Witzleb,W.C.; Stephan,L.; Krummenauer,F.; Neuke,A.; Gunther,K.P.	2009	Short-term outcome after posterior versus lateral surgical approach for total hip arthroplasty - A randomized clinical trial	Eur J Med Res	90% of pop isn't Hip OA
Wojcik,B.; Jablonski,M.; Gebala,E.; Drelich,M.	2012	A comparison of effectiveness of fascial relaxation and classic model of patients rehabilitation after hip joint endoprosthetics	Ortopedia, traumatologia, rehabilitacja	Unclear if 90% of pop is Hip OA
Woo,J.; Lau,E.; Lee,P.; Kwok,T.; Lau,W.C.; Chan,C.; Chiu,P.; Li,E.; Sham,A.; Lam,D.	2004	Impact of osteoarthritis on quality of life in a Hong Kong Chinese population	J Rheumatol.	not all patients had hip replacement.
Wood,G.C.; McLauchlan,G.J.	2006	Outcome assessment in the elderly after total hip arthroplasty	J Arthroplasty	insufficient data for the age pico question
Woolson,S.T.; Pouliot,M.A.; Huddleston,J.I.	2009	Primary Total Hip Arthroplasty Using an Anterior Approach and a Fracture Table. Short-term Results From a Community Hospital	J.Arthroplasty	90% of pop isn't Hip OA

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Woon,R.P.; Johnson,A.J.; Amstutz,H.C.	2013	The results of metal-on-metal hip resurfacing in patients under 30 years of age	J Arthroplasty	not relevant because patients got hip resurfacing instead of THA
Wright,A.A.; Abbott,J.H.; Baxter,D.; Cook,C.	2010	The ability of a sustained within-session finding of pain reduction during traction to dictate improved outcomes from a manual therapy approach on patients with osteoarthritis of the hip	J Man.Manip.Ther	Direction of affect not specified
Wright,A.A.; Cook,C.E.; Baxter,G.D.; Dockerty,J.D.; Abbott,J.H.	2011	A comparison of 3 methodological approaches to defining major clinically important improvement of 4 performance measures in patients with hip osteoarthritis	J Orthop Sports Phys Ther	outcome study
Wright,A.A.; Cook,C.E.; Flynn,T.W.; Baxter,G.D.; Abbott,J.H.	2011	Predictors of response to physical therapy intervention in patients with primary hip osteoarthritis	Phys Ther	patients did not have surgical intervention
Wright,E.A.; Katz,J.N.; Baron,J.A.; Wright,R.J.; Malchau,H.; Mahomed,N.; Prokopetz,J.J.; Losina,E.	2012	Risk factors for revision of primary total hip replacement: results from a national case-control study	Arthritis Care Res (Hoboken)	not best available evidence
Wroblewski,B.M.; Siney,P.D.; Fleming,P.A.	2002	Charnley low-frictional torque arthroplasty in patients under the age of 51 years	Journal of Bone and Joint Surgery - Series B	does not evaluate age as a risk factor
Wu,D.; Huang,Y.; Gu,Y.; Fan,W.	2013	Efficacies of different preparations of glucosamine for the treatment of osteoarthritis: a meta-analysis of randomised, double-blind, placebo-controlled trials	Int J Clin Pract	Systematic Review
Wu,K.W.; Wang,T.M.; Huang,S.C.; Kuo,K.N.; Chen,C.W.	2010	Analysis of osteonecrosis following Pemberton acetabuloplasty in developmental dysplasia of the hip: long-term results	J Bone Joint Surg Am	retrospective case series
Wurtz,L.D.; Feinberg,J.R.; Capello,W.N.; Meldrum,R.; Kay,P.J.	2003	Elective primary total hip arthroplasty in octogenarians	J Gerontol.A Biol Sci Med Sci	retrospective case series
Wylde,V.; Gooberman-Hill,R.; Horwood,J.; Beswick,A.; Noble,S.; Brookes,S.; Smith,A.J.; Pyke,M.; Dieppe,P.; Blom,A.W.	2011	The effect of local anaesthetic wound infiltration on chronic pain after lower limb joint replacement: a protocol for a double-blind randomised controlled trial	BMC Musculoskelet.Disord.	Hip and Knee combined

Authors	Year	Article Title	Periodical	Reason for Exclusion
Wylde,V.; Hewlett,S.; Learmonth,I.D.; Dieppe,P.	2011	Persistent pain after joint replacement: prevalence, sensory qualities, and postoperative determinants		not best available evidence. Crosssectional study
Wylde,V.; Lenguerrand,E.; Gooberman-Hill,R.; Beswick,A.D.; Marques,E.; Noble,S.; Horwood,J.; Pyke,M.; Dieppe,P.; Blom,A.W.	2015	Effect of local anaesthetic infiltration on chronic postsurgical pain after total hip and knee replacement: the APEX randomised controlled trials		Not relevant, does not answer pico question
Xu,L.; Hayashi,D.; Guermazi,A.; Hunter,D.J.; Li,L.; Winterstein,A.; Bohndorf,K.; Roemer,F.W.	2013	The diagnostic performance of radiography for detection of osteoarthritis-associated features compared with MRI in hip joints with chronic pain	Skeletal Radiol	Not relevant, does not answer pico question
Xu,R.J.; Li,W.C.; Ma,C.X.	2010	Slotted acetabular augmentation with concurrent open reduction for developmental dysplasia of the hip in older children	J Pediatr Orthop	Not relevant, does not answer pico question
Yamaguchi,J.; Hasegawa,Y.; Kanoh,T.; Seki,T.; Kawabe,K.	2009	Similar survival of eccentric rotational acetabular osteotomy in patients younger and older than 50 years	Clin Orthop Relat Res	retrospective case series
Yamamoto,K.; Imakiire,A.; Shishido,T.; Masaoka,T.; Koizumi,R.; Ito,K.; Sano,K.	2003	Cementless total hip arthroplasty using porous-coated Biomet acetabular cups (Hexloc and Ringloc types)	J Orthop Sci	no patient oriented outcomes evaluated for age
Yamamoto,Y.; Tonotsuka,H.; Ueda,T.; Hamada,Y.	2007	Usefulness of radial contrast-enhanced computed tomography for the diagnosis of acetabular labrum injury		Not relevant, does not answer pico question
Yan,D.; Song,Y.; Pei,F.	2015	Minimally invasive direct anterior approach for total hip arthroplasty in the management of femoral neck fractures in older patients	Current Orthopaedic Practice	Patient population not OA
Yanagimoto,S.; Hotta,H.; Izumida,R.; Sakamaki,T.	2005	Long-term results of Chiari pelvic osteotomy in patients with developmental dysplasia of the hip: indications for Chiari pelvic osteotomy according to disease stage and femoral head shape	J Orthop Sci	Not relevant to recommendation
Yang,C.; Zhu,Q.; Han,Y.; Zhu,J.; Wang,H.; Cong,R.; Zhang,D.	2010	Minimally-invasive total hip arthroplasty will improve early postoperative outcomes: a prospective, randomized, controlled trial	Ir.J Med Sci	90% of pop isn't Hip OA
Yang,W.E.; Shih,C.H.	1998	Porous coated anatomic total hip arthroplasty: 5- to 10-year follow up	Changgeng Yi Xue Za Zhi	age not evaluated for patient oriented

Authors	Year	Article Title	Periodical	Reason for Exclusion
				outcomes
Yang,Y.; Zhao,X.; Dong,T.; Yang,Z.; Zhang,Q.; Zhang,Y.	2016	Risk factors for postoperative delirium following hip fracture repair in elderly patients: a systematic review and meta-analysis	Aging Clinical and Experimental Research	systematic review
Yano,H.; Sano,S.; Nagata,Y.; Tabuchi,K.; Okinaga,S.; Seki,H.; Suyama,T.	1990	Modified rotational acetabular osteotomy (RAO) for advanced osteoarthritis of the hip joint in the middle-aged person. First report	Arch Orthop Trauma Surg	Not relevant, does not answer pico question
Yasunaga,H.; Tsuchiya,K.; Matsuyama,Y.; Ohe,K.	2009	High-volume surgeons in regard to reductions in operating time, blood loss, and postoperative complications for total hip arthroplasty	J Orthop Sci	very low quality
Yasunaga,Y.; Hisatome,T.; Tanaka,R.; Yamasaki,T.; Ochi,M.	2005	Curved varus femoral osteotomy for minimal dysplastic hip in patients older than 45 years of age: comparison with rotational acetabular osteotomy	J Orthop Sci	Not relevant to recommendation
Yasunaga,Y.; Ikuta,Y.; Shigenobu,T.; Nakamura,S.; Yamamoto,S.; Nakashiro,J.	2001	Rotational acetabular osteotomy for hip dysplasia: spontaneous medial enlargement of the acetabulum	Acta Orthop Scand.	retrospective case series
Yasunaga,Y.; Ochi,M.; Shimogaki,K.; Yamamoto,S.; Iwamori,H.	2004	Rotational acetabular osteotomy for hip dysplasia: 61 hips followed for 8-15 years	Acta Orthop Scand.	retrospective case series
Yasunaga,Y.; Takahashi,K.; Ochi,M.; Ikuta,Y.; Hisatome,T.; Nakashiro,J.; Yamamoto,S.	2003	Rotational acetabular osteotomy in patients forty-six years of age or older: comparison with younger patients	J Bone Joint Surg Am	Not relevant, does not answer pico question
Yeung,M.; Khan,M.; Schreiber,V.M.; Adamich,J.; Letkemann,S.; Simunovic,N.; Bhandari,M.; Musahl,V.; Philippon,M.J.; Safran,M.R.; Ayeni,O.R.	2014	Global discrepancies in the diagnosis, surgical management, and investigation of femoroacetabular impingement		Systematic Review
Yocum,D.; Fleischmann,R.; Dalgin,P.; Caldwell,J.; Hall,D.; Roszko,P.	2000	Safety and efficacy of meloxicam in the treatment of osteoarthritis: A 12-week, double-blind, multiple-dose, placebo-controlled trial	Arch.Intern.Med.	Hip and Knee combined
Yokochi,M.; Watanabe,T.; Ida,K.; Yoshida,K.; Sato,Y.	2012	Effects of physical exercise prescribed by a medical support team on elderly lower extremity osteoarthritis combined with metabolic syndrome and/or type 2 diabetes	Geriatr.Gerontol.Int	Unclear of population

Authors	Year	Article Title	Periodical	Reason for Exclusion
Yonclas,P.P.; Nadler,R.R.; Moran,M.E.; Kepler,K.L.; Napolitano,E.	2006	Orthotics and assistive devices in the treatment of upper and lower limb osteoarthritis: An update	Am.J.Phys.Med.Rehabil.	Review
Yoon,T.R.; Park,K.S.; Song,E.K.; Seon,J.K.; Seo,H.Y.	2009	New two-incision minimally invasive total hip arthroplasty: comparison with the one-incision method	J Orthop Sci	90% of pop isn't Hip OA
Youm,J.; Chan,V.; Belkora,J.; Bozic,K.J.	2015	Impact of socioeconomic factors on informed decision making and treatment choice in patients with hip and knee OA	J Arthroplasty	outcome is decision to have surgery. not relevant to pico question
Young,R.; Harding,J.; Kingsly,A.; Bradley,M.	2012	Therapeutic hip injections: is the injection volume important?	Clin Radiol	
Yu,R.; Hofstaetter,J.G.; Sullivan,T.; Costi,K.; Howie,D.W.; Solomon,L.B.	2013	Validity and reliability of the Paprosky acetabular defect classification	Clin Orthop Relat Res	Not relevant, does not answer pico question
Yu,X.W.; Ai,Z.S.; Gao,Y.S.; Zhang,C.Q.	2013	Blood loss closely correlates with body mass index in total hip arthroplasty performed through direct lateral approach	Saudi Med J	90% of pop isn't Hip OA
Yue,C.; Kang,P.; Yang,P.; Xie,J.; Pei,F.	2014	Topical application of tranexamic acid in primary total hip arthroplasty: A randomized double-blind controlled trial	J.Arthroplasty	90% of pop isn't Hip OA
Zacharias,A.; Green,R.A.; Semciw,A.I.; Kingsley,M.I.; Pizzari,T.	2014	Efficacy of rehabilitation programs for improving muscle strength in people with hip or knee osteoarthritis: a systematic review with meta-analysis	Osteoarthritis Cartilage	Systematic Review
Zacher,J.; Feldman,D.; Gerli,R.; Scott,D.; Hou,S.M.; Uebelhart,D.; Rodger,I.W.; Ozturk,Z.E.	2003	A comparison of the therapeutic efficacy and tolerability of etoricoxib and diclofenac in patients with osteoarthritis	Curr Med Res Opin	Hip and Knee combined
Zadeh,H.G.; Catterall,A.; Hashemi-Nejad,A.; Perry,R.E.	2000	Test of stability as an aid to decide the need for osteotomy in association with open reduction in developmental dysplasia of the hip	J Bone Joint Surg Br	Retrospective case series
Zaragoza,E.; Lattanzio,P.J.; Beaule,P.E.	2009	Magnetic resonance imaging with gadolinium arthrography to assess acetabular cartilage delamination	Hip Int	Not relevant, does not answer pico question
Zaragoza,E.J.; Beaule,P.E.	2004	Imaging of the painful non-arthritic hip: A practical approach to surgical relevancy	Operative Techniques in Orthopaedics	Retrospective case series

Authors	Year	Article Title	Periodical	Reason for Exclusion
Zawadzki,M.; Janosch,C.; Szechinski,J.	2013	Perna canaliculus lipid complex PCSO-524 (trademark) demonstrated pain relief for osteoarthritis patients benchmarked against fish oil, a randomized trial, without placebo control	Marine Drugs	Hip and Knee combined
Zeng,C.; Wei,J.; Li,H.; Yang,T.; Gao,S.G.; Li,Y.S.; Xiong,Y.L.; Xiao,W.F.; Luo,W.; Yang,T.B.; Lei,G.H.	2015	Comparison between 200 mg QD and 100 mg BID oral celecoxib in the treatment of knee or hip osteoarthritis	Sci Rep	
Zeng,R.; Lin,J.; Wu,S.; Chen,L.; Chen,S.; Gao,H.; Zheng,Y.; Ma,H.	2015	A randomized controlled trial: preoperative home-based combined Tai Chi and Strength Training (TCST) to improve balance and aerobic capacity in patients with total hip arthroplasty (THA)	Arch Gerontol.Geriatr.	Unclear of population
Zhang,W.; Jones,A.; Doherty,M.	2004	Does paracetamol (acetaminophen) reduce the pain of osteoarthritis? A meta-analysis of randomised controlled trials	Ann Rheum.Dis	Systematic Review
Zhang,W.; Moskowitz,R.W.; Nuki,G.; Abramson,S.; Altman,R.D.; Arden,N.; Bierma-Zeinstra,S.; Brandt,K.D.; Croft,P.; Doherty,M.; Dougados,M.; Hochberg,M.; Hunter,D.J.; Kwoh,K.; Lohmander,L.S.; Tugwell,P.	2008	OARSI recommendations for the management of hip and knee osteoarthritis, Part II: OARSI evidence-based, expert consensus guidelines	Osteoarthritis Cartilage	OARSI guideline
Zhang,W.; Moskowitz,R.W.; Nuki,G.; Abramson,S.; Altman,R.D.; Arden,N.; Bierma-Zeinstra,S.; Brandt,K.D.; Croft,P.; Doherty,M.; Dougados,M.; Hochberg,M.; Hunter,D.J.; Kwoh,K.; Lohmander,L.S.; Tugwell,P.	2007	OARSI recommendations for the management of hip and knee osteoarthritis, part I: critical appraisal of existing treatment guidelines and systematic review of current research evidence	Osteoarthritis Cartilage	Systematic Review
Zhang,X.; Xu,W.; Li,J.; Fang,Z.; Chen,K.	2010	Large-diameter metal-on-metal cementless total hip arthroplasty in the elderly		Retrospective case series
Zhang,Y.; Yang,T.-T.; Zhou,Y.; Ma,B.-A.	2006	Comparison of postoperative curative effect and the possible survival rate of prosthesis following cemented and cementless total hip replacement	Chinese Journal of Clinical Rehabilitation	does not answer recommendation

Authors	Year	Article Title	Periodical	Reason for Exclusion
Zhang,Z.J.; Zhao,X.Y.; Kang,Y.; Zhang,Z.Q.; Yang,Z.B.; He,A.S.; Fu,M.; Sheng,P.Y.; Liao,W.M.	2012	The influence of body mass index on life quality and clinical improvement after total hip arthroplasty	J Orthop Sci	less than 90% OA hip
Zhao,X.; Yan,Y.B.; Cao,P.C.; Ma,Y.S.; Wu,Z.X.; Zhang,Y.; Zang,Y.; Jie,Q.; Lei,W.	2014	Surgical results of developmental dysplasia of the hip in older children based on using three-dimensional computed tomography	J Surg Res	Not relevant to recommendation
Zheng,P.; Tang,K.; Lee,R.; Ji,C.; Lin,G.; Pan,X.; Zhang,Z.; Lou,Y.	2011	Surgical treatment of developmental dysplasia of the hip presenting in children above 10 years	J Orthop Sci	Not relevant to recommendation
Zheng,Y.; Kostenbader,K.; Barrett,T.; Hisaw,E.; Giuliani,M.J.; Chen,Y.; Young,J.L.	2015	Tolerability of Biphasic-Release Hydrocodone Bitartrate/Acetaminophen Tablets (MNK-155): A Phase III, Multicenter, Open-Label Study in Patients With Osteoarthritis or Chronic Low Back Pain	Clin Ther	Hip and Knee combined
Zhu,Y.; Chen,W.; Sun,T.; Zhang,X.; Liu,S.; Zhang,Y.	2014	Risk factors for the periprosthetic fracture after total hip arthroplasty: a systematic review and meta-analysis	Scand.J Surg	meta analysis
Zhu,Y.; Zhang,F.; Chen,W.; Zhang,Q.; Liu,S.; Zhang,Y.	2015	Incidence and risk factors for heterotopic ossification after total hip arthroplasty: a meta-analysis	Arch Orthop Trauma Surg	meta-analysis
Zhuo,H.; Wang,X.; Liu,X.; Song,G.Y.; Li,Y.; Feng,H.	2015	Quantitative evaluation of residual bony impingement lesions after arthroscopic treatment for isolated pincer-type femoroacetabular impingement using three-dimensional CT	Arch Orthop Trauma Surg	<10 patient per group
Zimmerma,S.; Hawkes,W.G.; Hudson,J.I.; Magaziner,J.; Hebel,J.R.; Towheed,T.; Gardner,J.; Provenzano,G.; Kenzora,J.E.	2002	Outcomes of surgical management of total HIP replacement in patients aged 65 years and older: cemented versus cementless femoral components and lateral or anterolateral versus posterior anatomical approach	J Orthop Res	retrospective case series
Zimmerman,S.; Hawkes,W.G.; Hudson,J.I.; Magaziner,J.; Richard,Hebel J.; Towheed,T.; Gardner,J.; Provenzano,G.; Kenzora,J.E.	2002	Outcomes of surgical management of total HIP replacement in patients aged 65 years and older: Cemented versus cementless femoral components and lateral or anterolateral versus posterior anatomical approach	J.Orthop.Res.	descriptive study that does not evaluate age as a prognostic factor

Authors	Year	Article Title	Periodical	Reason for Exclusion
Zwartele,R.E.; Brand,R.; Doets,H.C.	2004	Increased risk of dislocation after primary total hip arthroplasty in inflammatory arthritis: a prospective observational study of 410 hips	Acta Orthop Scand.	Not relevant, does not answer pico question

APPENDIX XI

OVERVIEW OF COST LITERATURE REVIEW PROCESS

In December of 2015 the AAOS Board of Directors approved the integration of a systematic cost literature review into the appendices of a clinical practice guideline (CPG). To prevent bias when creating a CPG recommendation, the guideline work group is blinded to the cost literature review findings until after the final recommendations are constructed; it is important that the CPG is based on a systematic review of the comparative effectiveness research for each PICO question, rather than the cost savings of one procedure over another. All findings related to the cost literature review are presented in the appendices of each CPG, to help ensure that the recommendations and their supporting rationales are kept separate from the findings of the cost literature review. Additionally, cost statements will only be made if evidence regarding an item addressed in the CPG is available; if no cost literature is available, a statement will not be made.

COST LITERATURE QUALITY TABLE

Cost Study Quality Visuals Key

	No Flaw in Domain	Half Flaw in Domain (unclear)	Full Flaw in Domain
Quality Visual	●	◑	○

Quality Evaluation Table for Included Studies

(see Cost Literature Methodogy for more Details)

Study	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Clement,N.D., 2014	●	○	●	○	●	●	●	●	●	●	●	●	●	○	●	●	●	○	●	●
Lawless,B.M., 2012	●	●	●	○	●	●	○	○	●	●	●	●	●	○	○	○	●	○	○	●
Sharifi,E., 2008	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	○	●	●
Shearer,D.W., 2012	●	●	●	●	○	○	●	●	●	●	●	●	●	●	●	●	●	○	●	●
Tan,S.S., 2016	●	○	●	●	●	●	○	○	○	●	●	●	●	●	○	○	●	○	●	●

COST LITERATURE REVIEW FINDINGS

AGE AS A RISK FACTOR COST LITERATURE FINDINGS

1) Patients with both unilateral and bilateral disease in both age groups had improved EQ5D scores after total hip arthroplasty, and the average change in scores was 0.27. There was no difference in the change in utility scores when patients older than 65 years of age were compared with patients younger than 65 years or when patients with unilateral disease were compared with those with bilateral disease. The average cost per quality-adjusted life-year (QALY) gained was $9773/QALY. CONCLUSIONS: Our data suggest the value of total hip arthroplasty compares favorably with other medical and surgical interventions for other patient groups. No adjustments for patient age or disease status of the contralateral limb are necessary when reporting the value of total hip arthroplasty.

Lawless,B.M., Greene,M., Slover,J., Kwon,Y.M., Malchau,H. Does age or bilateral disease influence the value of hip arthroplasty?. Clin Orthop Relat Res 2012/4; 4: 1073-1078

Disclaimer: To prevent bias when creating a CPG recommendation, the guideline work group is blinded to the cost literature review findings until after the final recommendations are constructed; it is important that the CPG is based on a systematic review of the comparative effectiveness research for each PICO question, rather than the cost savings of one procedure over another. All findings related to the cost literature review are presented in the appendices of each CPG to help ensure that the recommendations and their supporting rationales are kept separate from the findings of the cost literature review. Additionally, cost statements will only be made if evidence regarding an item addressed in the CPG is available; if no cost literature is available, a statement will not be made.

PHYSICAL THERAPY AS A CONSERVATIVE TREATMENT COST LITERATURE FINDINGS

1) A total of 203 patients were included. The annual direct medical costs per patient were significantly lower for the intervention group (euro 1233) compared to the control group (euro 1331). The average annual societal costs per patient were lower in the intervention group (euro 2634 vs euro 3241). Productivity costs were higher than direct medical costs. There was a very small adjusted difference in QoL of 0.006 in favour of the control group (95% CI: -0.04 to +0.02).

Tan,S.S., Teirlinck,C.H., Dekker,J., Goossens,L.M., Bohnen,A.M., Verhaar,J.A., van Es,P.P., Koes,B.W., Bierma-Zeinstra,S.M., Luijsterburg,P.A., Koopmanschap,M.A. Cost-utility of exercise therapy in patients with hip osteoarthritis in primary care. Osteoarthritis Cartilage 2016/4; 4: 581-588

Disclaimer: To prevent bias when creating a CPG recommendation, the guideline work group is blinded to the cost literature review findings until after the final recommendations are constructed; it is important that the CPG is based on a systematic review of the comparative effectiveness research for each PICO question, rather than the cost savings of one procedure over another. All findings related to the cost literature review are presented in the appendices of each CPG to help ensure that the recommendations and their supporting rationales are kept separate from the findings of the cost literature review. Additionally, cost statements will only be made if evidence regarding an item addressed in the CPG is available; if no cost literature is available, a statement will not be made.

COST STUDY LITERATURE SEARCH REPORT

Total References in Database: 1,246

PUBMED

Date: July 7, 2016
Results: 724 (723 de-duplicated)
Ref IDs: 1-724

#1 Osteoarthritis, Hip[mh] OR ((Hip[mh] OR Hip Joint[mh]) AND Osteoarthritis[mh]) OR ((hip[tiab] OR hips[tiab]) AND (osteoarthr*[tiab] OR arthrosis[tiab] OR arthroses[tiab])) OR ((hip[ot] OR hips[ot]) AND (osteoarthr*[ot] OR arthrosis[ot] OR arthroses[ot])) OR coxarthros*[tiab] OR coxarthros*[ot] OR malum coxae senilis[tiab]

#2 (animals[mh] NOT humans[mh]) OR cadaver[mh] OR cadaver*[ti] OR comment[pt] OR editorial[pt] OR letter[pt] OR "historical article"[pt] OR addresses[pt] OR news[pt] OR "newspaper article"[pt] OR "case report"[ti]

#3 Acetabulum[mh] OR ((acetabul*[tiab] OR cotyloid[tiab]) AND (dysplasia[tiab] OR dysplastic[tiab] OR dislocat*[tiab] OR luxation[tiab] OR subluxat*[tiab] OR instability[tiab] OR unstable[tiab] OR stability[tiab] OR abnormal*[tiab]))

#4 Femoracetabular Impingement[mh] OR ((femoracetabular [tiab] OR femoroacetabular[tiab] OR femoro-acetabular[tiab] OR “femoral acetabular”[tiab]) AND impingement[tiab]) OR pincer impingement[tiab] OR cam impingement[tiab]

#5 surgery[sh] OR osteotomy[mh:noexp] OR arthroscopy[mh] OR arthroscop*[tiab] OR osteotom*[tiab] OR surgical dislocation[tiab]

#6 Arthroplasty, Replacement, Hip[mh] OR hip prosthesis[mh] OR ((hip[tiab] OR hips[tiab]) AND (arthroplast*[tiab] OR replacement*[tiab]))

#7 Age Factors[mh] OR ((age[tiab OR ages[tiab]) AND (Regression Analysis[mh] OR Treatment Outcome[mh] OR Postoperative Complications[mh] OR "propensity score"[tiab] OR covariance[tiab] OR prognostic[tiab] OR "hazard ratio"[tiab] OR covariate[tiab] OR regression*[tiab] OR multivaria*[tiab] OR "survival analysis"[tiab] OR Mantel-Haenszel[tiab]))

#8 ("Hip/pathology"[Mesh] OR "Hip Joint/pathology"[Mesh] OR "hip"[tiab] OR "hips"[tiab] OR labral[tiab] OR labrum[tiab] OR chondral[tiab]) AND (patholog*[tiab] OR damage[tiab] OR tear[tiab] OR pathology[subheading]) AND ("Diagnostic Imaging"[Mesh] OR radiography[subheading] OR x-ray*[tiab] OR xray*[tiab])

#9 #1 OR ((#3 OR #4) AND #5) OR (#6 AND #7) OR #8

#10 (#9 NOT #2) AND English[la] AND 1990:2016[dp]

#11 “economics”[sh] OR economics[mh:noexp] OR economics, hospital[mh] OR economics, medical[mh] OR economics, nursing[mh] OR economics, pharmaceutical[mh] OR fees and charges[mh] OR costs and cost analysis[mh] OR health care costs[mh] OR economic*[tiab] OR expenditure*[tiab] OR costs[tiab] OR (cost[tiab] AND (effective*[tiab] OR utility[tiab] OR analys*[tiab] OR benefit[tiab]))

#12 #10 AND #11

EMBASE

Date: July 7, 2016
Results: 802 (438 de-duplicated)

Ref IDs: 725-1526

#26#24 NOT #25

#25[medline]/lim NOT [embase]/lim

#24#23 AND [1990-2016]/py

#23#21 AND #22

#22 'health economics'/exp OR economic*:ab,ti OR expenditure*:ab,ti OR costs:ab,ti OR (cost:ab,ti AND (effective*:ab,ti OR utility:ab,ti OR analys*:ab,ti OR benefit:ab,ti))

#21#20 AND [english]/lim

#20#5 OR #7 OR #9 OR #10 OR #14 OR #17 OR #19

#19#18 NOT (#1 OR #4)

#18 'hip disease'/exp NOT 'hip injury'/exp OR ('hip'/exp AND ('arthropathy'/exp OR 'pathology'/exp OR patholog*:ab,ti OR damage:ab,ti OR tear:ab,ti)) AND ('radiodiagnosis'/exp OR 'x ray':ab,ti OR 'x rays':ab,ti OR xray*:ab,ti)

#17#15 AND #16 NOT (#1 OR #4)

#16 'age'/exp OR (age:ab,ti OR ages:ab,ti AND ('regression analysis'/exp OR regression:ab,ti OR regressions:ab,ti OR 'treatment outcome'/exp OR 'postoperative complication'/exp OR 'propensity score':ab,ti OR covariance:ab,ti OR prognostic:ab,ti OR 'hazard ratio':ab,ti OR covariate:ab,ti OR multivaria*:ab,ti OR 'survival analysis':ab,ti OR 'mantel haenszel':ab,ti))

#15 'total hip prosthesis'/exp OR 'hip arthroplasty'/exp OR (hip:ab,ti OR hips:ab,ti AND (arthroplast*:ab,ti OR replacement*:ab,ti))

#14#11 OR #12 AND #13 NOT (#1 OR #4)

#13 'osteotomy'/exp OR 'arthroscopy'/exp OR osteotom*:ab,ti OR arthroscop*:ab,ti OR surgical AND dislocation:ab,ti

#12 femoroacetabular AND impingement:de OR (femoracetabular:ab,ti OR femoroacetabular:ab,ti OR 'femoro acetabular':ab,ti OR femoral AND acetabular:ab,ti AND impingement:ab,ti) OR pincer AND impingement:ab,ti OR cam AND impingement:ab,ti

#11 'acetabulum'/de OR (acetabul*:ab,ti OR cotyloid:ab,ti AND (dysplasia:ab,ti OR dysplastic:ab,ti OR dislocat*:ab,ti OR luxation:ab,ti OR subluxat*:ab,ti OR instability:ab,ti OR unstable:ab,ti OR stability:ab,ti OR abnormal*:ab,ti))

#10#1 NOT #4

#9#1 AND #6 AND #8 NOT #4

#8'diabetes mellitus'/exp OR diabet*:ab,ti

#7#1 AND #2 AND #6 NOT #4

#6 'hip surgery'/exp OR 'hip prosthesis'/exp OR 'hip arthroscopy'/exp OR arthroplast*:ab,ti OR replacement*:ab,ti OR resurfac*:ab,ti OR arthroscop*:ab,ti OR osteotom*:ab,ti OR reconstructi*:ab,ti

#5 #1 AND #2 AND #3 NOT #4

#4 '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 OR 'conference abstract'/it

#3 'bariatric surgery'/exp OR bariatric*:ab,ti OR 'weight reduction'/exp OR (weight NEAR/3 (loss OR reduc*)):ab,ti OR 'weight loss program'/exp

#2 'obesity'/exp OR obese:ab,ti OR obesity:ab,ti OR overweight:ab,ti OR adipos*:ab,ti

#1 'hip osteoarthritis'/exp OR ('hip'/exp AND 'osteoarthritis'/exp) OR (hip:ab,ti OR hips:ab,ti AND (osteoarthr*:ab,ti OR arthrosis:ab,ti OR arthroses:ab,ti)) OR coxarthros*:ab,ti OR 'malum coxae senilis':ab,ti OR (hip:ab,ti OR hips:ab,ti AND (degenerative NEAR/3 ('joint disease' OR arthritis)):ab,ti)

Search filter reference
McKinlay RJ, Wilczynski NL, Haynes RB, and the Hedges Team. Optimal search strategies for detecting cost and economic studies in EMBASE. BMC Health Serv Res. 2006 Jun 6;67.

THE COCHRANE LIBRARY (CDSR, CENTRAL, NHSEED)

Date: July 7, 2016
Results: 37 CDSR, 102 CENTRAL, 37 NHSEED (85 de-duplicated)
Ref IDs: 1527-1702

#1 [mh "osteoarthritis, hip"] or (([mh hip] or [mh "hip joint"]) and [mh osteoarthritis]) or (hip:ti,ab,kw or hips:ti,ab,kw) and (osteoarthr*:ti,ab,kw or arthrosis:ti,ab,kw or arthroses:ti,ab,kw) or coxarthros*:ti,ab,kw or coxarthros*:ti,ab,kw or "malum coxae senilis":ti,ab,kw or ((hip:ti,ab,kw or hips:ti,ab,kw) and (degenerative near/3 ("joint disease" or arthritis)):ti,ab,kw)

#2 [mh "osteoarthritis, hip"] or (([mh hip] or [mh "hip joint"]) and [mh osteoarthritis]) or (hip:ti,ab,kw or hips:ti,ab,kw) and (osteoarthr*:ti,ab,kw or arthrosis:ti,ab,kw or arthroses:ti,ab,kw) or coxarthros*:ti,ab,kw or coxarthros*:ti,ab,kw or "malum coxae senilis":ti,ab,kw or ((hip:ti,ab,kw or hips:ti,ab,kw) and (degenerative near/3 ("joint disease" or arthritis)):ti,ab,kw)

#3 [mh acetabulum] or ((acetabul*:ti,ab,kw or cotyloid:ti,ab,kw) and (dysplasia:ti,ab,kw or dysplastic:ti,ab,kw or dislocat*:ti,ab,kw or luxation:ti,ab,kw or subluxat*:ti,ab,kw or instability:ti,ab,kw or unstable:ti,ab,kw or stability:ti,ab,kw or abnormal*:ti,ab,kw))

#4 [mh "Femoracetabular Impingement"] or ((femoracetabular:ti,ab,kw or femoroacetabular:ti,ab,kw or femoro-acetabular:ti,ab,kw or "femoral acetabular":ti,ab,kw) and impingement:ti,ab,kw) or pincer impingement:ti,ab,kw or cam impingement:ti,ab,kw

#5 [mh osteotomy] or [mh arthroscopy] or arthroscop*:ti,ab,kw or osteotom*:ti,ab,kw or surgical

dislocation:ti,ab,kw

#6 ((#3 or #4) and #5) not #2

#7 [mh "osteoarthritis, hip"] or (([mh hip] or [mh "hip joint"]) and [mh osteoarthritis]) or (hip:ti,ab,kw or hips:ti,ab,kw) and (osteoarthr*:ti,ab,kw or arthrosis:ti,ab,kw or arthroses:ti,ab,kw) or coxarthros*:ti,ab,kw or coxarthros*:ti,ab,kw or "malum coxae senilis":ti,ab,kw or ((hip:ti,ab,kw or hips:ti,ab,kw) and (degenerative near/3 ("joint disease" or arthritis)):ti,ab,kw)

#8 [mh "arthroplasty, replacement, hip"] or [mh "hip prosthesis"] or ((hip:ti,ab,kw or hips:ti,ab,kw) and (arthroplast*:ti,ab,kw or replacement*:ti,ab,kw))

#9 [mh "age factors"] or ((age:ab,ti,kw or ages:ti,ab,kw) and ([mh "regression analysis"] or [mh "treatment outcome"] or [mh "Postoperative complications"] or "propensity score":ti,ab or covariance:ab,ti or prognostic:ti,ab or "hazard ratio":ab,ti or covariate:ti,ab or regression*:ti,ab or multivaria*:ti,ab or "survival analysis":ti,ab or Mantel-Haenszel:ti,ab))

#10 (#9 and #8) not #7

#11 ([mh hip/PA] or [mh "hip joint"/PA] or (("hip":ti,ab or "hips":ti,ab or "labral":ti,ab or "labrum":ti,ab or chondral:ti,ab) and (patholog*:ti,ab or damage:ti,ab or tear:ti,ab))) and ([mh "diagnostic imaging"] or x-ray*:ti,ab or xray*:ti,ab)

#12 [mh "osteoarthritis, hip"] or (([mh hip] or [mh "hip joint"]) and [mh osteoarthritis]) or (hip:ti,ab,kw or hips:ti,ab,kw) and (osteoarthr*:ti,ab,kw or arthrosis:ti,ab,kw or arthroses:ti,ab,kw) or coxarthros*:ti,ab,kw or coxarthros*:ti,ab,kw or "malum coxae senilis":ti,ab,kw or ((hip:ti,ab,kw or hips:ti,ab,kw) and (degenerative near/3 ("joint disease" or arthritis)):ti,ab,kw)

#13 #11 not #12

#14 #1 or #6 or #10 or #13

#15 [mh /EC] or [mh ^economics] or [mh "economics, hospital"] or [mh "economics, medical"] or [mh "economics, nursing"] or [mh "economics, pharmaceutical"] or [mh "fees and charges"] or [mh "costs and cost analysis"] or [mh "health care costs"] or economic*:ti,ab or expenditure*ti,ab or costs:ti,ab or (cost near/3 (effective* or utility or analys* or benefit)):ti,ab,kw

#16#14 AND #15

APPENDIX XII
LETTERS OF ENDORSEMENT FROM EXTERNAL ORGANIZATIONS

POSNA
PEDIATRIC ORTHOPAEDIC SOCIETY OF NORTH AMERICA

January 13, 2017

Gregory Brown, MD, PhD,
AAOS Clinical Practice Guidelines Section Leader of the
Committee on Evidence-Based Quality and Value

Dear Dr. Brown,

The Pediatric Orthopaedic Society of North America (POSNA) agrees to endorse the AAOS Clinical Practice Guideline on the Management of Osteoarthritis of the Hip. 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,

James McCarthy, MD, MHCM
President

9400 West Higgins Road, Suite 500
Rosemont, IL 60018-4976
(847) 698-1692 posna@aaos.org posna.org orthokids.org

1111 North Fairfax Street
Alexandria, VA 22314-1488
703 684 2782
703 684 7343 fax
www.apta.org

February 28, 2017

Gregory Brown, MD, PhD
AAOS Clinical Practice Guidelines Section Leader of the Committee on Evidence-Based Quality and Value
9400 West Higgins Road
Rosemont, Illinois 6018

Dear Gregory Brown, MD, PhD,

The American Physical Therapy Association has followed our process for endorsing the AAOS Clinical Practice Guideline on the Management of Osteoarthritis of the Hip. We are pleased to endorse this guideline and give 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.

If you need assistance with our endorsement, please contact Matt Elrod at mattelrod@apta.org

Sincerely,

Sharon L. Dunn PT, PhD
President

PAR: me

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QUALITY IS UR IMAGE

acr.org

William T. Thorwarth Jr., MD, FACR
Chii?f Executivi? O fficer

Phone: 703-648-8901
fax: 703-648-3997
Em ail: wthorworth@ocr.org

March 9, 2017

Gregory Brown MD, PhD
Clinical Practice Guidelines Section Leader
Committee on Evidence-Based Quality and Value
American Academy of Orthopaedic Surgeons
9400 West Higgins Road
Rosemont Illinois 60018

Dear Dr. Brown,

I am pleased to info1m you that the Executive Committee of the American College of Radiology (ACR) Board of Chancellors has voted to endorse the AAOS Clinical Practice Guideline on the Management of Osteoarthritis of the Hip.

This endorsement implies pennission for tbe .AAOS to officially list our organization as an endorser of this guideline and reprint our logo in the introductory section of the guideline document.

Thank you again for seeking our endorsement.

Sincerely ,

Q.d&..- /

William T. Thonv ai1h, Jr. MD, FACR

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American Society of Anesthesiologists®

1061 American Lane ▪ Schaumburg, IL 60173-4973 ▪ (847) 825-5586 ▪ asahq.org

October 26, 2017

Gregory Brown, M.D., Ph.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, IL 60018

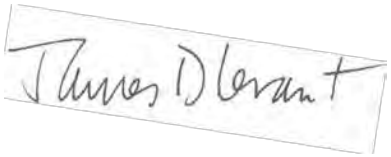
Dear Dr. Brown,

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 Osteoarthritis of the Hip. I am pleased to share that ASA's leadership approved endorsement of the Clinical Practice Guideline on the Management of Osteoarthritis of the Hip.

The following parties reviewed the document: Committee on Geriatric Anesthesia, Committee on Standards and Practice Parameters, Section on Subspecialties chair, Vice president for Scientific Affairs, Board Review Committee on Scientific Affairs chair, Administrative Council and Board of Directors.

ASA 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,



James D. Grant, M.D., M.B.A., FASA
President
American Society of Anesthesiologists