



Management of Distal Radius Fractures Evidence-Based Clinical Practice Guideline

Adopted by the American Academy of Orthopaedic Surgeons (AAOS) Board of Directors

December 5, 2020



**MANAGEMENT OF DISTAL RADIUS FRACTURES
EVIDENCE-BASED CLINICAL PRACTICE GUIDELINE**

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View background material via the DRF CPG [eAppendix 1](#)
View data summaries via the DRF CPG [eAppendix 2](#)

The American Academy of Orthopaedic Surgeons 2020 Management of Distal Radius Fractures Evidence-Based Clinical Practice Guideline

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WHAT IS A CLINICAL PRACTICE GUIDELINE?

Clinical Practice Guideline

A clinical practice guideline is a series of recommendations created to inform clinicians of best practices, based on best available evidence



GOALS AND RATIONALE OF A CLINICAL PRACTICE GUIDELINE



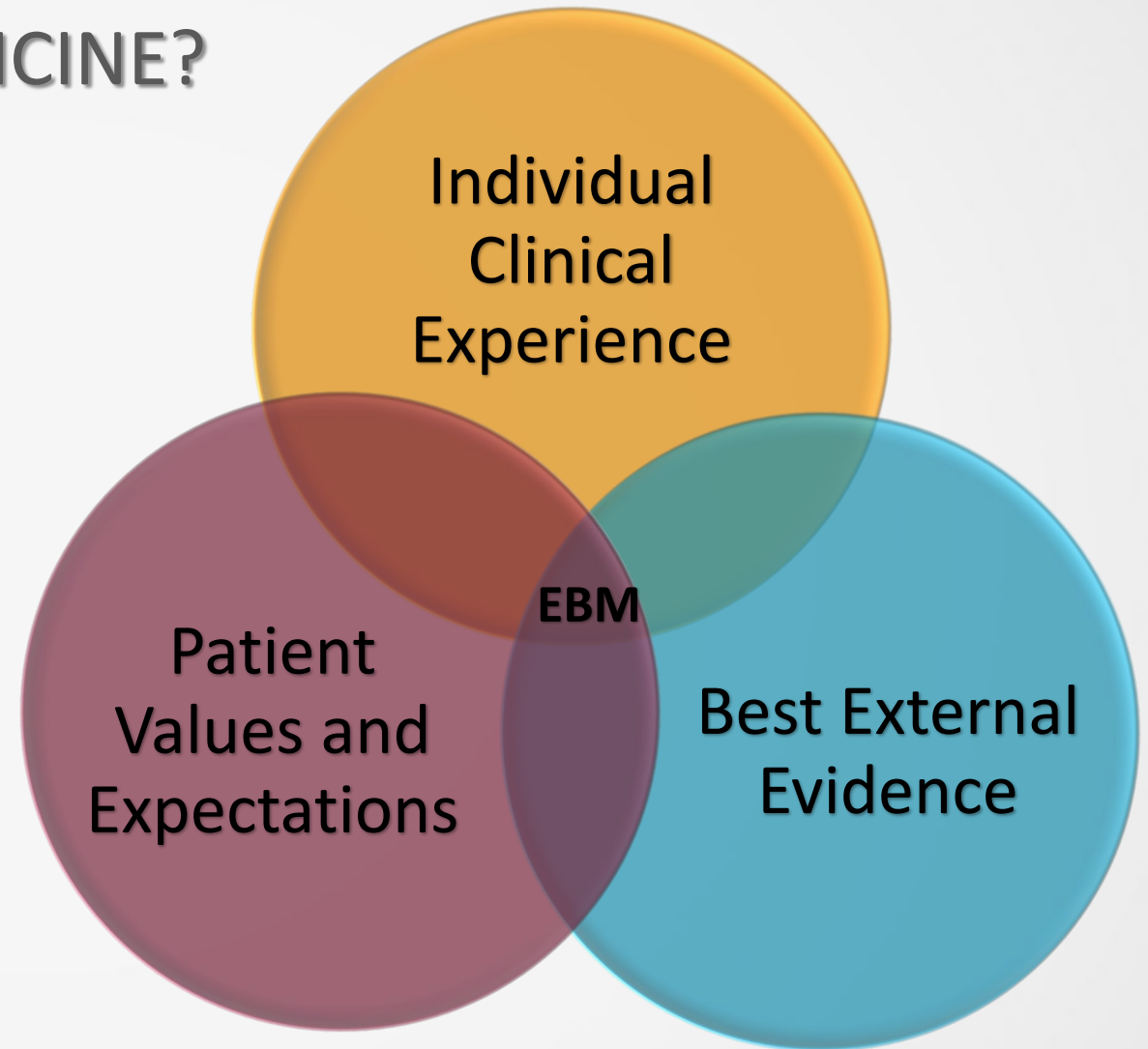
- Improve treatment based on current best evidence
- Guides qualified physicians through treatment decisions to improve quality and efficiency of care
- Identify areas for future research

CPG recommendations are not meant to be fixed protocols; patients' needs, local resources, and clinician independent medical judgement must be considered for any specific procedure or treatment

WHAT IS EVIDENCE-BASED MEDICINE?

Evidence-Based Medicine is a Combination of:

- *Individual Clinical Experience*
- *Best External Evidence*
- *Patient Values and Expectations*



WHAT IS EVIDENCE-BASED MEDICINE?

Evidence-Based Medicine

Evidence-based medicine is the conscientious, explicit, and judicious use of current best evidence from clinical care research in the management of individual patients



Haynes, Sackett et al, 1996

Transferring evidence from research into practice

Sackett et al, 1996, BMJ

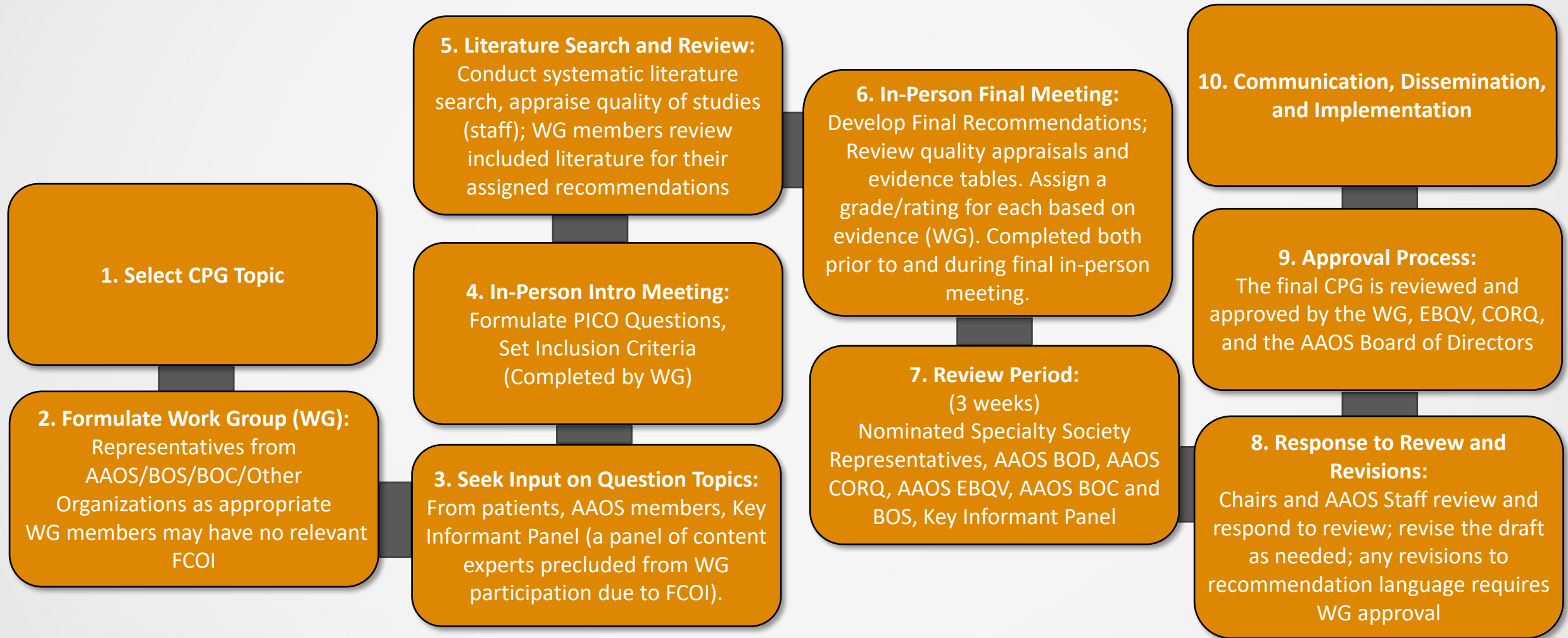
EBM: what it is and isn't

IOM STANDARDS FOR DEVELOPING TRUSTWORTHY GUIDELINE

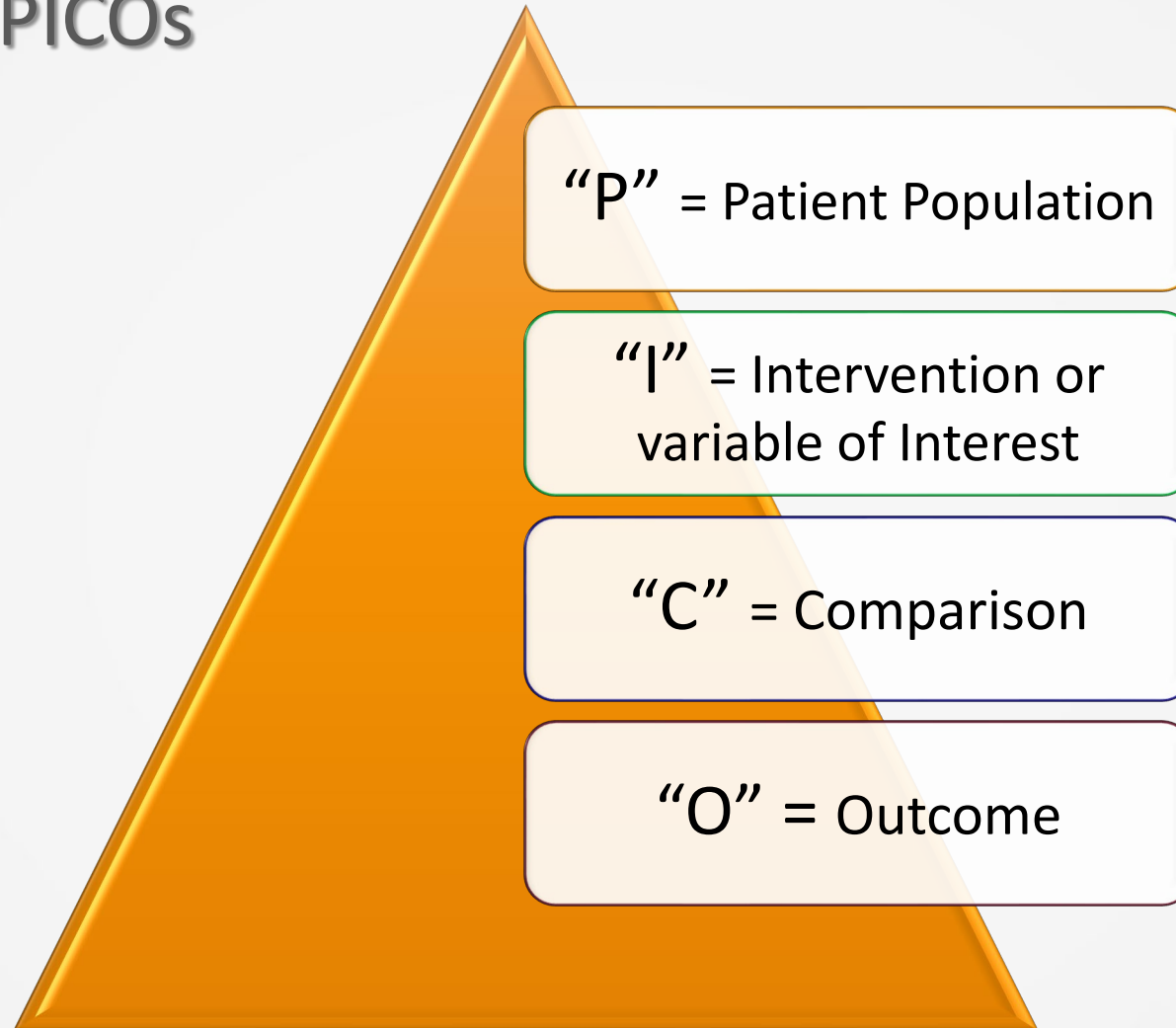


- Establish Transparency
- Management of Conflict of Interest
- Guideline Development Group Composition
- Clinical Practice Guideline-Systematic Review Intersection
- Establish Evidence of Foundations for and Rating Strength of Recommendations
- Articulation of Recommendations
- External Review
- Updating

CLINICAL PRACTICE GUIDELINE PROCESS FLOWCHART



FORMULATING PICO_s



INCLUSION/EXCLUSION CRITERIA

Standard inclusion criteria include:

- Must study humans
- Must be published in English
- Can not be performed on cadavers

Work group members define additional exclusion criteria based on PICO question

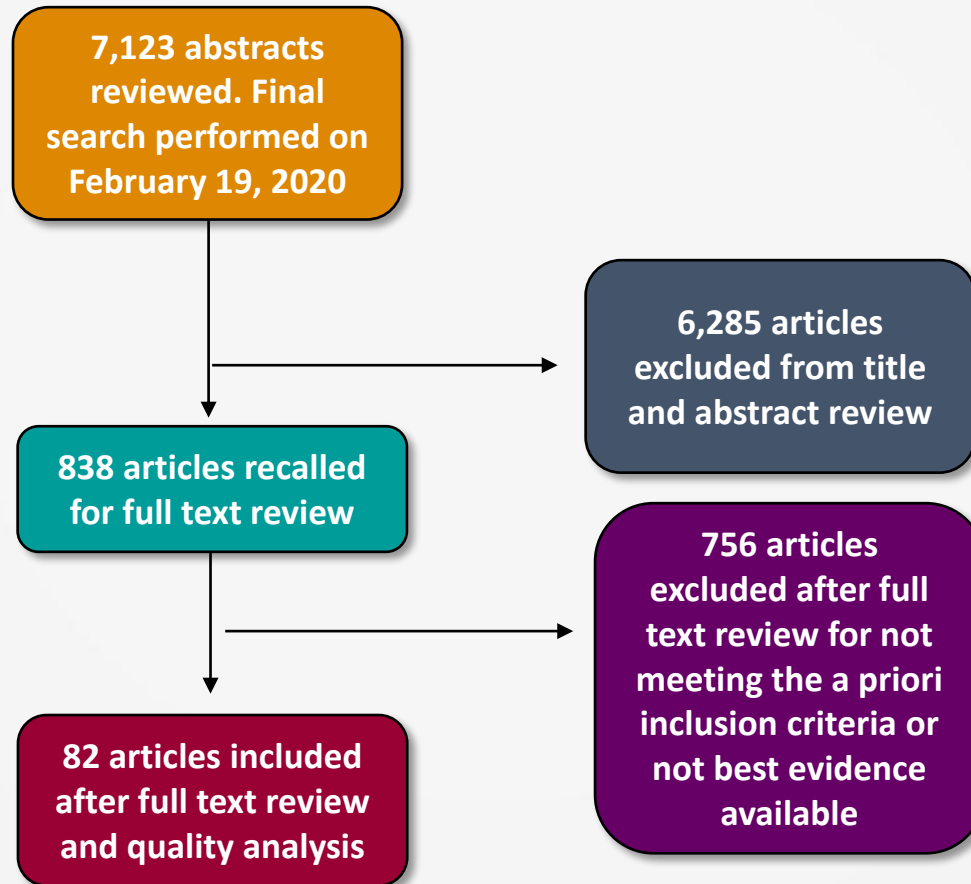


LITERATURE SEARCHES

- Databases used:
 - MEDLINE
 - EMBASE (Excerpta Medica dataBASE)
 - Cochrane Central Register of Controlled Trials
- Search using key terms from work group's PICO questions and inclusion criteria
- Secondary manual search of the bibliographies of all retrieved publications for relevant citations
- Recalled articles evaluated for inclusion based on the study selection criteria



RESULTS OF QUALITY ASSESSMENT: STUDY ATTRITION FLOWCHART



BEST EVIDENCE SYNTHESIS

Include only highest quality evidence for any given outcome if available

If there are fewer than two occurrences of an outcome of this quality, the next lowest quality is considered until at least two occurrences have been acquired.



ASSESSING QUALITY OF EVIDENCE



- All included studies undergo a quality assessment.
- Each study's design is evaluated for risk of bias and receives a final quality grade, depending on the number of study design flaws.
- Study quality tables are made available to the work group in the final data report and the final publication of the guideline

STRENGTH OF RECOMMENDATIONS

STRENGTH	OVERALL STRENGTH OF EVIDENCE	OVERALL STRENGTH OF EVIDENCE	STRENGTH VISUAL
STRONG	STRONG	Two or more HIGH Strength Studies with consistent findings for recommending for or against the intervention. Also requires no reasons to downgrade from the EtD framework	
MODERATE	MODERATE OR STRONG	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. Also requires no or minor concerns addressed in the EtD framework.	
LIMITED	LIMITED, MODERATE OR STRONG	Evidence from one or more "Low" quality studies with consistent findings or evidence from a single "Moderate" quality study recommending for or against the intervention. Also, higher strength evidence can be downgraded to limited due to major concerns addressed in the EtD framework.	
CONSENSUS	NO RELIABLE EVIDENCE	There is no supporting evidence, or higher quality evidence was downgraded due to major concerns addressed in the EtD framework. In the absence of reliable evidence, the guideline workgroup is making a recommendation based on their clinical opinion.	



Incorporating the GRADE Evidence to Decision Framework into Recommendation Strengths

- Benefits and Harms
- Certainty of Evidence
- Outcome Importance
- Cost Effectiveness
- Acceptability and Feasibility





WORDING THE FINAL RECOMMENDATIONS

GUIDELINE LANGUAGE	STRENGTH OF RECOMMENDATION
In patients with [condition], X is recommended for...	STRONG
In patients with [condition], X is suggested for...	MODERATE
In patients with [condition], X is an option for...	LIMITED
In the absence of reliable evidence, it is the <i>opinion</i> of this guideline work group that...	CONSENSUS

TRANSLATING RECOMMENDATIONS IN A CPG

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	More	Possible / Anticipates
Consensus	Most	Most Important	Impact unknown

FINAL MEETING

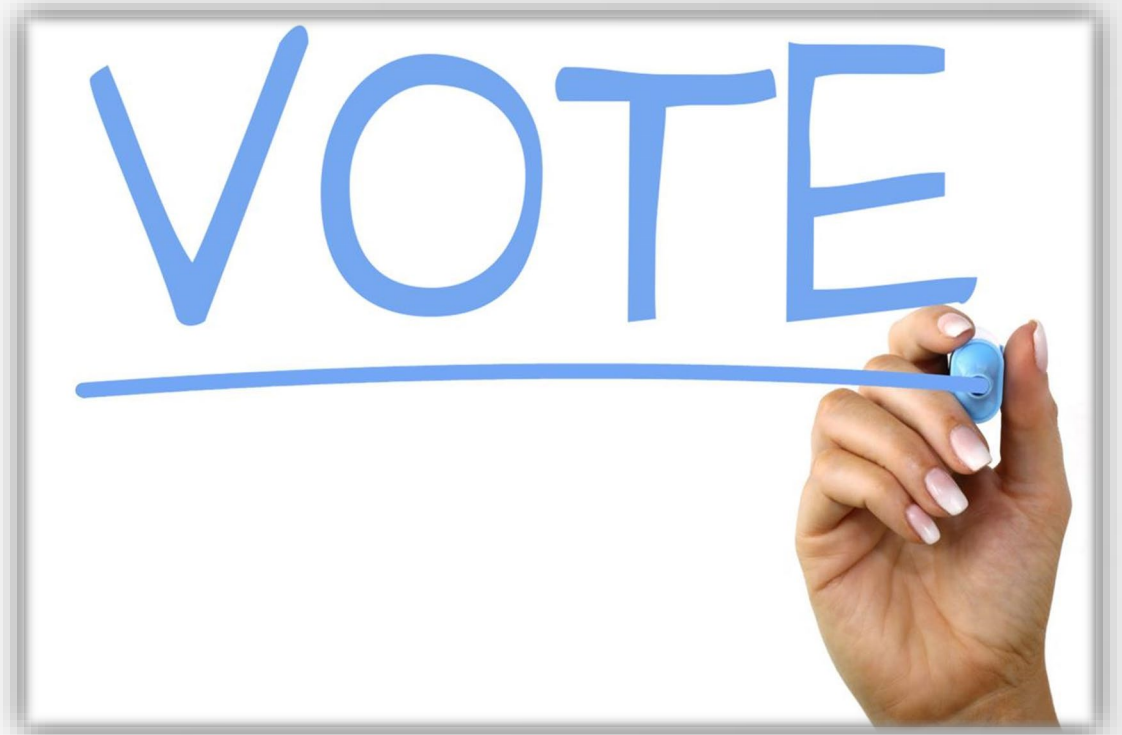
The work group is charged with:

- Review of data summaries
- Final recommendation language
- Rationale and risk/harm construction
- Future research



VOTING ON THE RECOMMENDATIONS

- Recommendations and recommendation strengths voted on by work group during final meeting
- Approved and adopted by simple majority (60%) when voting on every recommendation
- If disagreement, further discussion to whether the disagreement could be resolved



REVIEW PERIOD



- Specialty societies are solicited for nominations of reviewers approximately six weeks prior to final meeting
- CPG is also provided to:
 - AAOS Board of Directors
 - AAOS Council on Research and Quality
 - AAOS Committee on Evidence-Based Quality and Value
 - AAOS Board of Councilors
 - AAOS Board of Specialty Societies
 - 200 commentators have the opportunity to provide input into each CPG.
- Recommendation changes required a majority vote by work group
- A detailed report of all resulting revisions is published with the guideline document

CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF DISTAL RADIUS FRACTURES



MANAGEMENT OF DISTAL RADIUS FRACTURES EVIDENCE-BASED CLINICAL PRACTICE GUIDELINE

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Please cite this guideline as:

American Academy of Orthopaedic Surgeons. Management of Distal Radius Fractures Evidence-Based Clinical Practice Guideline. <https://www.aaos.org/dripgp> Published December 5, 2020

View background material via the DRF CPG sAppendix 1
View data summaries via the DRF CPG sAppendix 2

- Based on a systematic review of published studies
- Addresses the treatment of patients with acute distal radius fractures in patients 18 years of age and older
- This guideline does not address distal radius malunion
- Highlights limitations in literature and areas requiring future research
- This guideline is intended to be used by orthopaedic surgeons and all qualified physicians managing patients with distal radius fractures



ARTHROSCOPIC ASSISTANCE

- Inconsistent evidence suggests no difference in outcomes between use of arthroscopic assistance and no arthroscopic assistance when treating patients for distal radius fractures.

Strength of Recommendation: Moderate





HOME EXERCISE PROGRAM

- Inconsistent evidence suggests no difference in outcomes between a home exercise program and supervised therapy following treatment for distal radius fractures.

Strength of Recommendation: Limited





INDICATIONS FOR FIXATION (NON-GERIATRIC PATIENTS)

- Moderate evidence supports that for non-geriatric patients (most commonly defined in studies as under 65 years of age), operative treatment for fractures with post reduction radial shortening >3mm, dorsal tilt >10 degrees, or intraarticular displacement or step off >2 mm leads to improved radiographic and patient reported outcomes.

Strength of Recommendation: Moderate





INDICATIONS FOR FIXATION (GERIATRIC PATIENTS)

- Strong evidence suggests that operative treatment for geriatric patients (most commonly defined in studies as 65 years of age and older) does not lead to improved long-term patient reported outcomes compared to non-operative treatment.

Strength of Recommendation: Strong





SERIAL RADIOGRAPHY

- Limited evidence suggests no difference in outcomes based on frequency of radiographic evaluation for patients treated for distal radius fractures.

Strength of Recommendation: Limited





FIXATION TECHNIQUE

- Strong evidence suggests no significant difference in radiographic or patient reported outcomes between fixation techniques for complete articular or unstable distal radius fractures, although volar locking plates lead to earlier recovery of function in the short term (3 months).

Strength of Recommendation: Strong



OPIOID USE

- In the absence of sufficient evidence specific to distal radius fractures, it is the opinion of the workgroup that opioid sparing and multimodal pain management strategies should be considered for patients undergoing treatment for distal radius fractures.

Strength of Recommendation: Consensus





FUTURE RESEARCH

- The adoption of technology and novel treatments for distal radius fractures requires evidentiary support of efficacy and effectiveness while acknowledging cost and value. Likewise, current practice patterns, despite being practice norms, may not be supported as high-quality care, and should be evaluated by the same level of scrutiny. The systematic review for this guideline identified areas of care with conflicting evidence, and some areas of care where more focused clinical trials are needed. For example, our evaluation of the evidence for hand therapy after the treatment of distal radius fractures identified areas for potential future research, such as the benefit of supervised therapy for elderly patients with finger arthritis and preoperative stiffness.



FUTURE RESEARCH – ARTHROSCOPIC ASSISTANCE

- Continued high quality comparative studies that assess contemporary fracture care for specific fracture patterns and the adjunctive use of arthroscopy to improve fracture reduction, treatment of associated soft tissue injury, and implant position may further clarify the role (if any) of wrist arthroscopy in the treatment of specific patterns of distal radius fracture that requires operative treatment.



FUTURE RESEARCH – HOME EXERCISE PROGRAM

- More and better evidence is needed to determine when supervised hand therapy benefits people recovering from DRF. Most importantly, further research is needed to determine prognostic criteria that would allow for proper patient selection. Thus, research should be invested in establishing a classification system for DRF patients sub-categorization based on their rehabilitation needs, while considering all contextual factors that may limit their recovery potential.



FUTURE RESEARCH – INDICATIONS FOR FIXATION (NON-GERIATRIC PATIENTS)

- The effects of using more rigid radiographic criteria (e.g. any fracture displacement not just >2mm) as indications for surgical fixation, and their effect on patient outcomes have not been well studied. The durability of these treatment indications on patient outcomes in the longer term (e.g. 10-20 years) should also be studied.



FUTURE RESEARCH – INDICATIONS FOR FIXATION (GERIATRIC PATIENTS)

- Research using other tools that better describe a patient's functional demand instead of age are needed. These tools could better inform point of care decisions for the treatment of distal radius fractures in the elderly that avoid the aforementioned risks of treatment based on age alone. While the workgroup acknowledges that functional demand would be a better explanatory variable for understanding the benefits of operative treatment, this clinical practice guideline uses age greater than 65 as this is what is used in the literature.



FUTURE RESEARCH – SERIAL RADIOGRAPHY

- Longer term follow-up, (5 and 10 year) will be useful to determine if non-inferiority of the reduced radiograph group is maintained.



FUTURE RESEARCH – FIXATION TECHNIQUE

- The current literature suggests that function recovers earlier in patients treated with volar locked plating than with other methods, but outcomes equalize before a year from injury. Further randomized controlled trials should help address multiple questions including long term complication profiles (tendon ruptures, secondary surgery etc.) and the impact of the differences in cost between various treatment approaches. Further, studies that use fracture type (e.g. extraarticular, partial articular, etc.) to group patients may lead to more actionable results that can be applied to real life care.



FUTURE RESEARCH – OPIOID USE

- Continued comparative studies are needed to compare the effectiveness of opioid analgesics and non-opioid pharmacologic and nonpharmacologic alternatives to determine the need for opioids, the dose and duration of therapy, and effective alternatives for pain management following distal radius fractures.

ACKNOWLEDGEMENTS:

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PLEASE CITE CLINICAL PRACTICE GUIDELINE AS:

American Academy of Orthopaedic Surgeons Management of Distal Radius Fractures Evidence-Based Clinical Practice Guideline www.aaos.org/drfcpg, or <http://www.orthoguidelines.org/topic?id=1033>. Published December 5, 2020.



The American Academy of Orthopaedic Surgeons 2021 Appropriate Use Criteria for the Treatment of Distal Radius Fractures

Appropriate use criteria (AUC) provide treatment recommendations on a patient-specific level using evidence from AAOS clinical practice guidelines, along with clinician expertise and experience. A multidisciplinary clinician writing panel creates realistic patient profiles who may present with a particular orthopaedic disease in a clinical setting. A separate multidisciplinary clinician voting panel uses a modified Delphi method to rate the appropriateness of various procedures for those patient profiles.



The American Academy of Orthopaedic Surgeons 2021 Appropriate Use Criteria for the Treatment of Distal Radius Fractures

Assumptions:

1. Provisional treatment (e.g., provisional reduction and immobilization) may have been attempted as necessary. The AUC tool is intended to address definitive treatment.
2. It is assumed that the patient is appropriately risk stratified and otherwise optimized to undergo surgery.
3. An adequate physical exam of the patient has been conducted.
4. It assumed that adequate Radiographs have been obtained and examined by the clinician.
5. The patient history is available and has been reviewed by the clinician.



The American Academy of Orthopaedic Surgeons 2021 Appropriate Use Criteria for the Treatment of Distal Radius Fractures

Assumptions (continued):

6. Informed consent had been obtained from the patient or medical decision maker.
7. It is assumed that the surgeon is trained and capable of performing all operative techniques.
8. The fracture is not so complex, and/or the patient's comorbidities or social situation such a factor, as to represent an exception to these scenarios (e.g., C3.3 fracture that might be optimally treated with a distraction plate).
9. It is assumed that the surgery, when indicated, will be performed in a timely fashion to allow ideal treatment of the fracture.
10. It is assumed the surgeon will perform the surgery in the most appropriate location (i.e., ASC, outpatient, inpatient) based on the health of the patient and other injuries rather the nature of the fracture. Open fractures and associated injuries may dictate that surgery should be inpatient.
11. The facility has each type of implant/equipment available and capable support personnel.
12. Median Neuropathy will be addressed appropriately (i.e., carpal tunnel release as indicated)



The American Academy of Orthopaedic Surgeons 2021 Appropriate Use Criteria for the Treatment of Distal Radius Fractures

Indications

AO/OTA Fracture Type:

1. Type A AO/OTA Fracture
2. Type B AO/OTA Fracture
3. Type C AO/OTA Fracture

Mechanism of Injury:

1. High-energy Fracture
2. Low-energy Fracture



The American Academy of Orthopaedic Surgeons 2021 Appropriate Use Criteria for the Treatment of Distal Radius Fractures

Indications

Pre-Injury Activity Level of Patient:

1. High Functional Activity – Patients experiencing substantial stress/strain on their wrist on regular basis (e.g., high-level athletics, heavy labor jobs)
2. Normal Independent Activity – Completes activities of daily living without assistance.
3. Normal Dependent Activity – Completes activities of daily living with assistance (e.g., crutches/walker and assisted devices)
4. Low Functional Activity – Patients experiencing no stress/strain on their wrist on a regular basis (e.g., sedentary or assisted living)

Patient Health:

1. ASA 1-2
2. ASA 3-4



The American Academy of Orthopaedic Surgeons 2021 Appropriate Use Criteria for the Treatment of Distal Radius Fractures

Indications

Other Injuries (in addition to distal radius fracture):

1. Median Neuropathy
2. Gustilo Anderson Type I or II Open Fracture
3. Gustilo Anderson Type III Open Fracture
4. Other Multi-trauma Injury
5. No Associated Injuries



The American Academy of Orthopaedic Surgeons 2021 Appropriate Use Criteria for the Treatment of Distal Radius Fractures

Treatments:

1. Spanning External Fixation
2. Percutaneous Pinning
3. Dorsal Spanning Bridge/Wrist Plate
4. Volar Locking Plate
5. Dorsal Plate
6. Fragment Specific Fixation
7. Intramedullary Nail
8. Immobilization without reduction
9. Reduction and Immobilization



The American Academy of Orthopaedic Surgeons 2021 Appropriate Use Criteria for the Treatment of Distal Radius Fractures

Disclaimer:

Volunteer physicians from multiple specialties created and categorized these Appropriate Use Criteria. These Appropriate Use Criteria are not intended to be comprehensive or a fixed protocol, as some patients may require more or less treatment or different means of diagnosis. These Appropriate Use Criteria represent patients and situations that clinicians treating or diagnosing musculoskeletal conditions are most likely to encounter. The clinician's independent medical judgement, given the individual patient's clinical circumstances, should always determine patient care and treatment. Practitioners are advised to consider management options in the context of their own training and background and institutional capabilities when selecting recommended treatment options.



APPROPRIATE USE CRITERIA: DISTAL RADIUS FRACTURES: TREATMENT (2021)

INDICATION PROFILE

- ☐ Type A AO/OTA Fracture
- ☐ Type B AO/OTA Fracture
- ☐ Type C AO/OTA Fracture

- ☐ High-energy Fracture
- ☐ Low-energy Fracture

- ☐ High Functional Activity
- ☐ Normal Independent Activity
- ☐ Normal Dependent Activity
- ☐ Low Functional Activity

- ☐ ASA 1-2-3
- ☐ ASA 4

- ☐ Median Neuropathy
- ☐ Gustilo Anderson Type I or II Open Fracture
- ☐ Gustilo Anderson Type III Open Fracture
- ☐ Other Multi-trauma Injury
- ☐ No associated injuries

PROCEDURE RECOMMENDATIONS



The American Academy of Orthopaedic Surgeons 2021 Appropriate Use Criteria for the Treatment of Distal Radius Fractures

APPROPRIATE USE CRITERIA: DISTAL RADIUS FRACTURES: TREATMENT (2021)

INDICATION PROFILE

AO/OTA Fracture Type

Type A AO/OTA Fracture

Type B AO/OTA Fracture

Type C AO/OTA Fracture

Mechanism of Injury

High-energy Fracture

Low-energy Fracture

Pre-Injury Activity Level of Patient

High Functional Activity

Normal Independent Activity

Normal Dependent Activity

Low Functional Activity

Patient Health

ASA 1-2-3

ASA 4

Other Injuries (injury associated with the fracture)

Median Neuropathy

Gustilo Anderson Type I Open Fracture

Gustilo Anderson Type II Open Fracture

Other Multi-trauma Injury

No associated injuries

PROCEDURE RECOMMENDATIONS

Spanning External Fixation

7

Dorsal Spanning Bridge/Wrist Plate

7

Volar Locking Plate

7

Fragment Specific Fixation

7

Reduction and Immobilization

5

Percutaneous Pinning

6

Dorsal Plate

6

Intramedullary Nail

4

Immobilization without reduction

2

E-MAIL RESULTS

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Easier access to AAOS Guidelines:

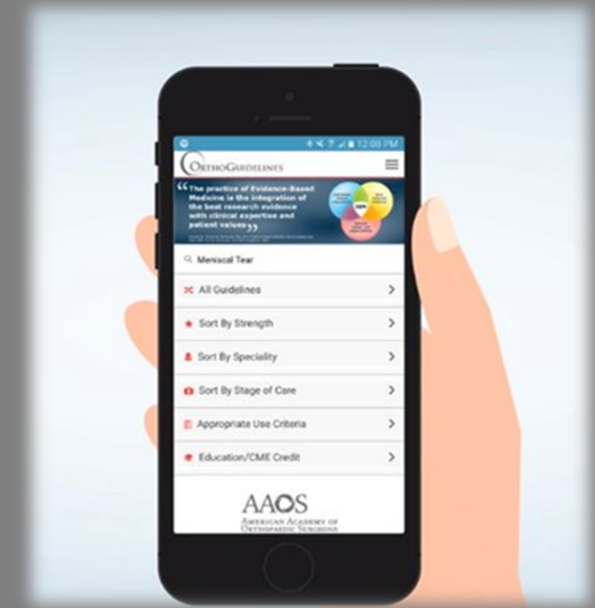
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- Sort Recommendations by Strength
 - (*Strong, Moderate, Limited, Consensus*)
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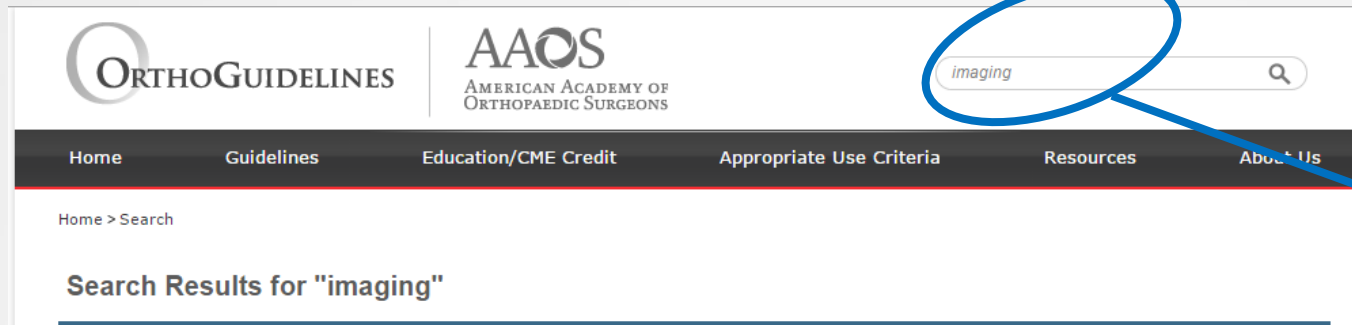
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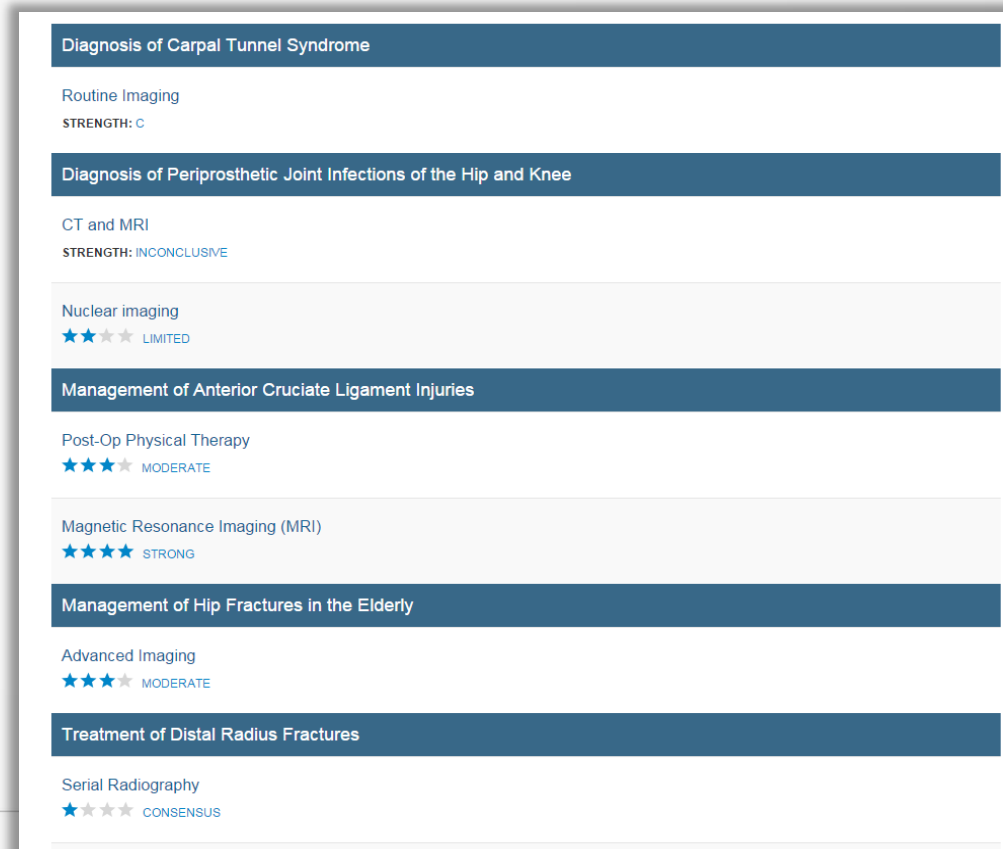
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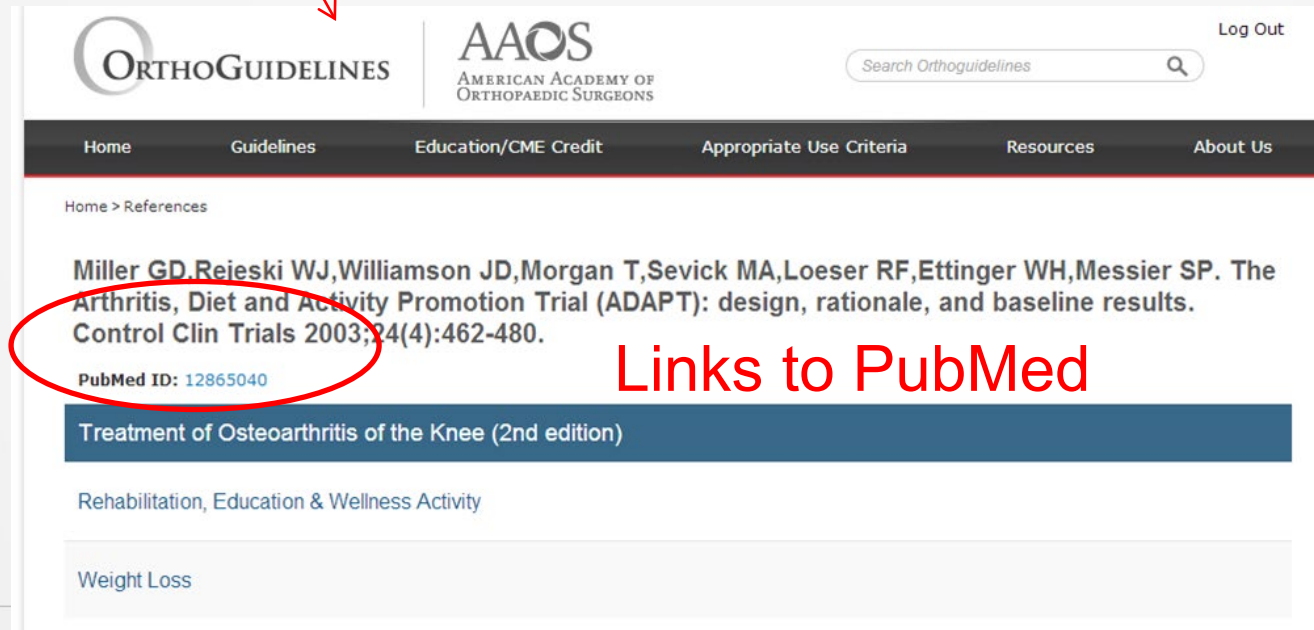
Search across all CPG and AUC
Via a Single Keyword Search



References provided for each recommendation

Miller GD,Rejeski WJ,Williamson JD,Morgan T,Sevick MA,Loeser RF,Ettinger WH,Messier SP. The Arthritis, Diet and Activity Promotion Trial (ADAPT): design, rationale, and baseline results. Control Clin Trials 2003;24(4):462-480.

(20) Lorig K, Lubeck D, Kraines PG, Seleznick M, Holan HR. Outcomes of self-help education for patients with arthritis. Arthritis Rheum 1985;28:680-685



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Miller GD,Rejeski WJ,Williamson JD,Morgan T,Sevick MA,Loeser RF,Ettinger WH,Messier SP. The Arthritis, Diet and Activity Promotion Trial (ADAPT): design, rationale, and baseline results. Control Clin Trials 2003;24(4):462-480.

PubMed ID: **12865040**

Treatment of Osteoarthritis of the Knee (2nd edition)

Rehabilitation, Education & Wellness Activity

Weight Loss

Links to PubMed

OrthoGUIDELINES

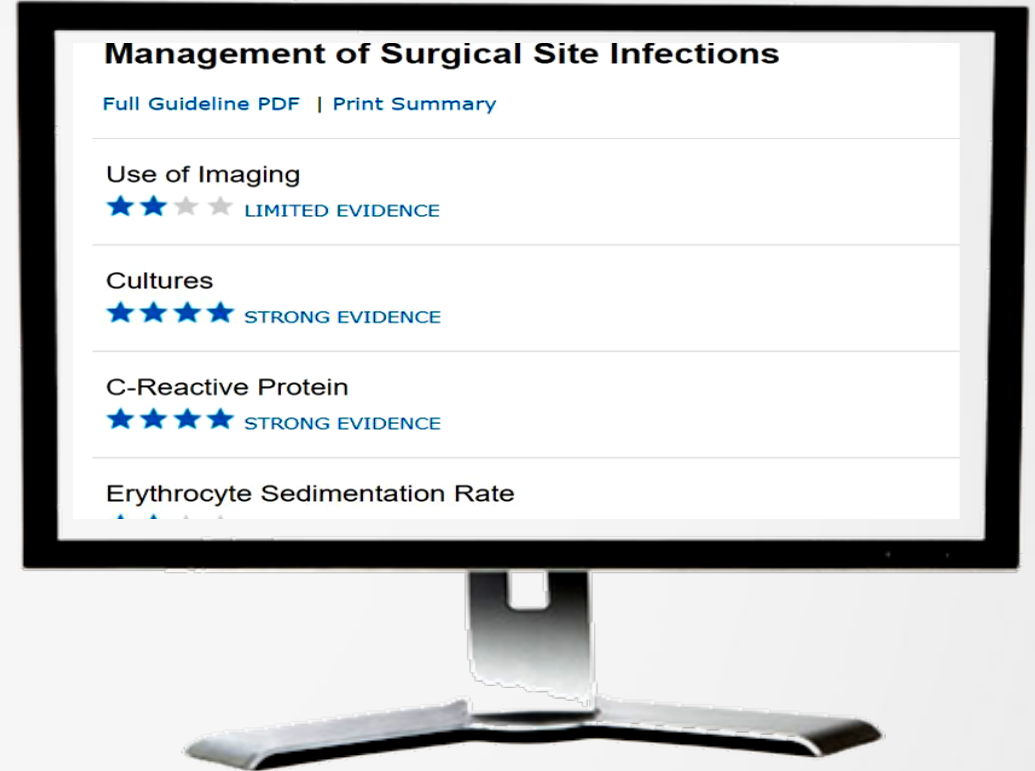
Anterior Cruciate Ligament Injuries: Treatment

Procedure Recommendations

Recommendation	Level of Evidence
✓ ACL Reconstruction ~Autograft	9
✓ ACL Reconstruction ~Allograft	8
✗ Self-directed exercise program without reconstruction	2
✗ Supervised Rehabilitation program without reconstruction	2
✗ Activity Modification without reconstruction	2

PUBLISHED CLINICAL PRACTICE GUIDELINES

- Acute Compartment Syndrome
- Anterior Cruciate Ligament Injuries
- Carpal Tunnel Syndrome
- Diagnosis and Prevention of Periprosthetic Joint Infections
- Distal Radius Fractures
- Glenohumeral Joint Osteoarthritis
- Hip Fractures in the Elderly
- Limb Salvage or Early Amputation
- Osteoarthritis of the Hip
- Osteoarthritis of the Knee (Arthroplasty)
- Osteoarthritis of the Knee (Non-Arthroplasty)
- Osteochondritis Dissecans
- Pediatric Developmental Dysplasia of the Hip in infants up to Six Months
- Pediatric Diaphyseal Femur Fractures
- Pediatric Supracondylar Humerus Fractures
- Psychosocial Factors Influencing Trauma Recovery
- Prevention of Orthopaedic Implant Infections in Patients Undergoing Dental Procedures
- Rotator Cuff Injuries
- Surgical Site Infections
- VTE Disease in Patients Undergoing Elective Hip & Knee Arthroplasty
- Tranexamic Acid in Total Joint Arthroplasty (Endorsement)
- Use of Imaging Prior to Referral to a Musculoskeletal Oncologist (Endorsement)
- Treatment of Metastatic Carcinoma and Myeloma of the Femur (Endorsement)
- Anesthesia and Analgesia in TJA (Endorsement)



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