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Clinical Practice Guideline for the Management of Anterior Cruciate Ligament Injuries

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

August 22, 2022

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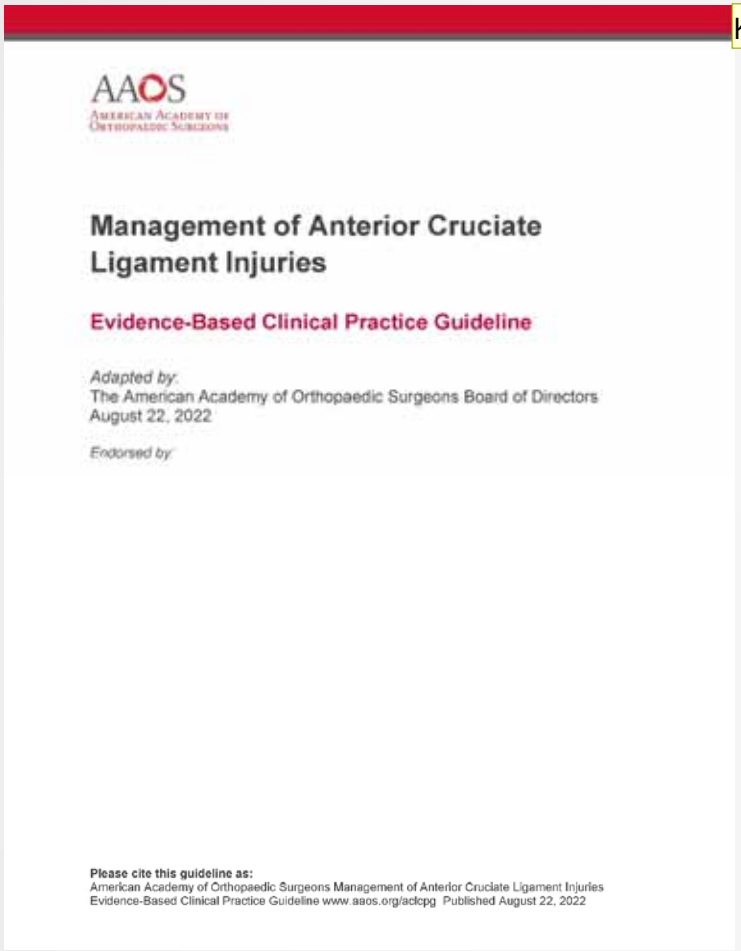

The American Academy of Orthopaedic Surgeons 2022 Clinical Practice Guideline for the Anterior Cruciate Ligament Injuries

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KB0 Update cover

Krause, Barbara, 2022-07-08T16:55:04.990

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

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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

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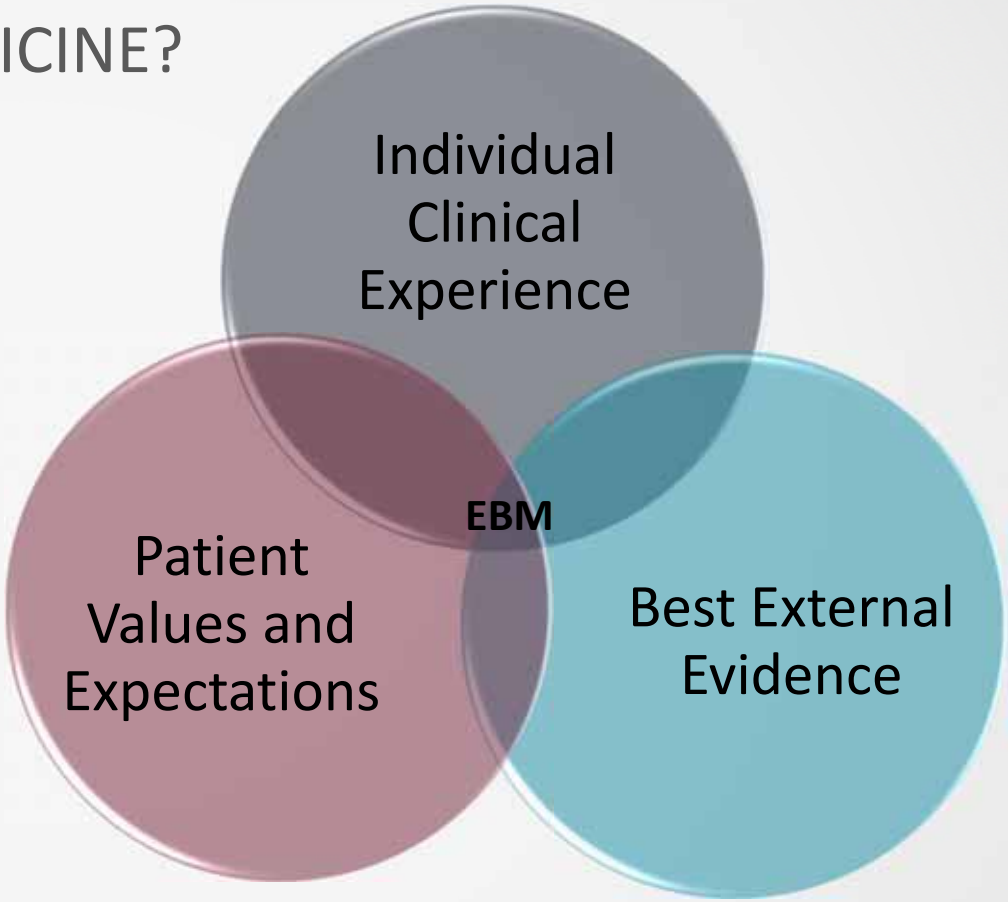
WHAT IS EVIDENCE-BASED MEDICINE?

Evidence-Based Medicine is a Combination of:

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



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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 Sacket et al, 1996, BMJEBM: what it is and isn't

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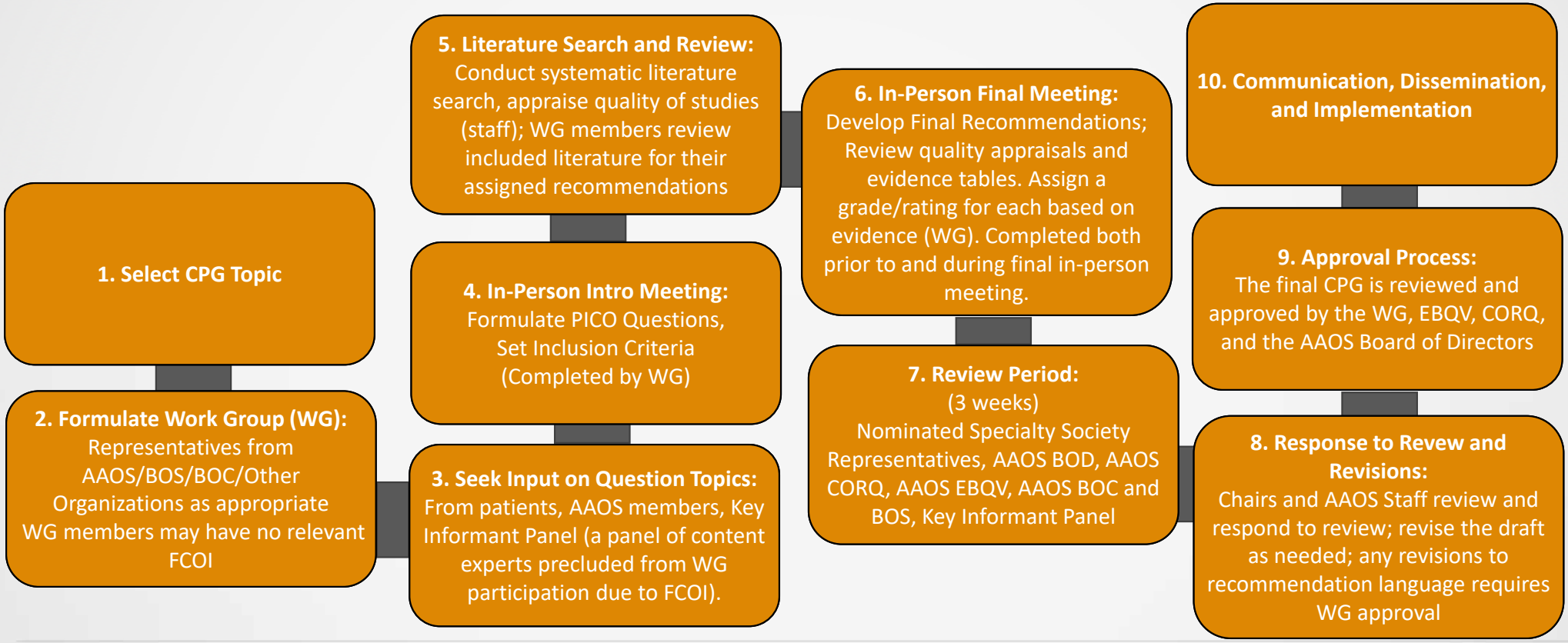
IOM STANDARDS FOR DEVELOPING TRUSTWORTHY GUIDELINE

- 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



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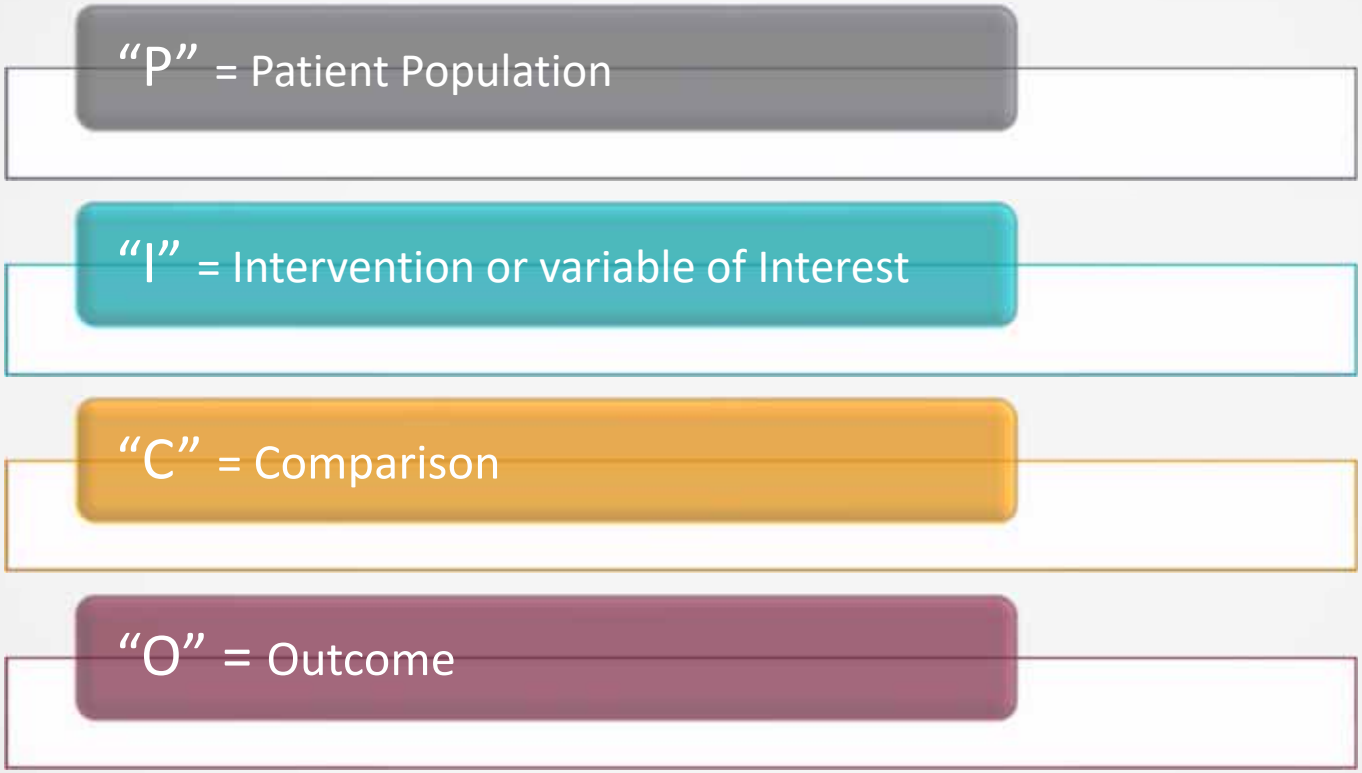
FORMULATING PICOs



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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

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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

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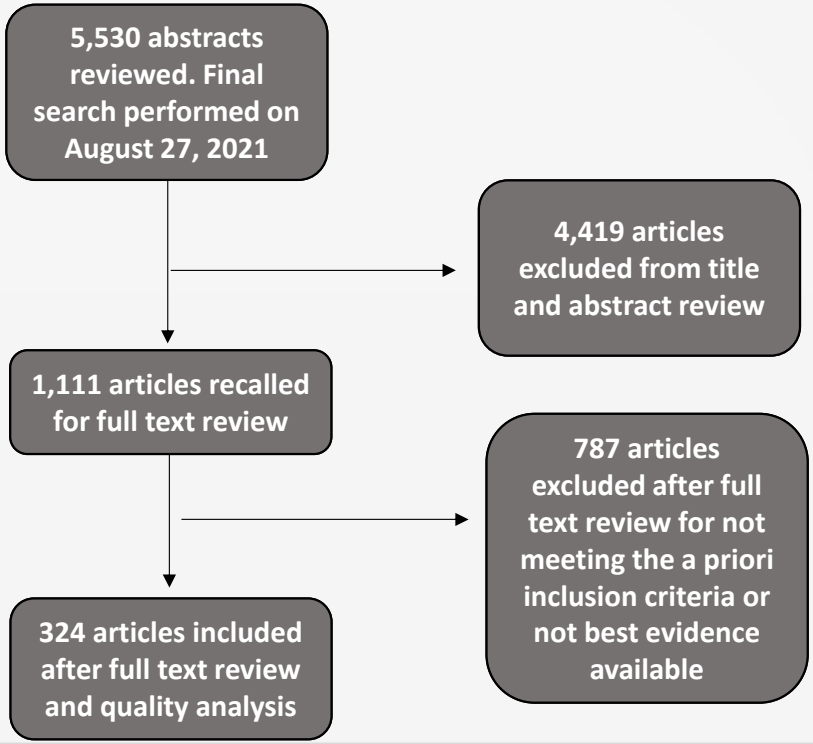
RESULTS OF QUALITY ASSESSMENT: STUDY ATTRITION FLOWCHART



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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.

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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 OR MODERATE	Evidence from two or more “High” quality studies with consistent findings for recommending for or against the intervention. Or Rec is upgrade from Moderate using the EtD framework.	
MODERATE	STRONG, MODERATE, OR LIMITED	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. Or Rec is upgraded or downgraded from Limited or Strong using the EtD framework.	
LIMITED	STRONG, MODERATE, OR LIMITED	Evidence from one or more “Low” quality studies with consistent findings or evidence from a single “Moderate” quality study recommending for or against the intervention. Or Rec is downgraded from Strong or Moderate using 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 work group is making a recommendation based on their clinical opinion.	

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Incorporating the GRADE Evidence to Decision Framework into Recommendation Strengths

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

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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	Change Possible / Anticipated
Consensus	Most	Most Important	Impact unknown

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FINAL MEETING

The work group is charged with:

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

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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

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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

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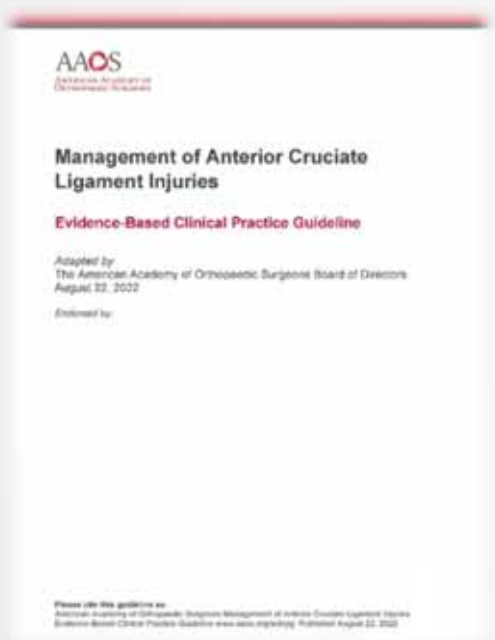
Clinical Practice Guideline for the Management of Anterior Cruciate Ligament Injuries



- Based on a systematic review of published studies
- Evaluates the treatment of anterior cruciate ligament injuries (ACL) in skeletally mature and immature patients
- Highlights gaps in the literature and areas that require future research
- This guideline is intended to orthopaedic surgeons and physicians managing patients with ACL injuries

Slide 21

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HISTORY AND PHYSICAL

- A relevant history should be obtained, and a focused musculoskeletal exam of the lower extremities should be performed when assessing for an ACL injury.

Strength of Recommendation: Strong 

SURGICAL TIMING

- When surgical treatment is indicated for an acute isolated ACL tear, early reconstruction is preferred because the risk of additional cartilage and meniscal injury starts to increase within 3 months.

Strength of Recommendation: Strong 

SINGLE OR DOUBLE BUNDLE ACL RECONSTRUCTION

- In patients undergoing intraarticular ACL reconstruction single or double bundle techniques can be considered because measured outcomes are similar.

Strength of Recommendation: Strong 

AUTOGRAFT VS. ALLOGRAFT

- When performing an ACL reconstruction, surgeons should consider autograft over allograft to improve patient outcomes and decrease ACL graft failure rate, particularly in young and/or active patients.

Strength of Recommendation: Strong 

AUTOGRAFT SOURCE

- When performing an ACL reconstruction with autograft for skeletally mature patients, surgeons may favor BTB to reduce the risk of graft failure or infection , hamstring to reduce the risk of anterior or kneeling pain.

Strength of Recommendation: Moderate  downgraded

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ACL TRAINING PROGRAMS

- Training programs designed to prevent injury can be used to reduce the risk of primary ACL injuries in athletes participating in high-risk sports.

Strength of Recommendation: Moderate 

ANTEROLTERAL LIGAMENT / LATERAL EXTRAARTICULAR TENODESIS

- ALL reconstruction / LET could be considered when performing hamstring autograph reconstruction in select patients to reduce graft failure and improve short-term function, although long-term outcomes are yet unclear.

Strength of Recommendation: Moderate  downgraded

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REPAIR VS. RECONSTRUCTION

- ACL tears indicated for surgery should be treated with ACL reconstruction rather than repair because of the lower risk of revision surgery.

Strength of Recommendation: Strong 

ASPIRATION OF THE KNEE

- In the absence of reliable evidence, it is the opinion of the workgroup that physicians may consider aspirating painful, tense effusions after knee injury.

Strength of Recommendation: Consensus 

ACL SURGICAL RECONSTRUCTION

- ACL reconstruction can be considered in order to lower the risk of future meniscus pathology or procedures, particularly in younger and/or more active patients. ACL reconstruction may be considered to improve long term pain and function.

Strength of Recommendation: Limited 

MENISCAL REPAIR

- In patients with ACL tear and meniscal tear, meniscal preservation should be considered to optimize joint health and function.

Strength of Recommendation: Limited 

COMBINED ACL / MCL TEAR

- In patients with combined ACL and MCL tears, non-operative treatment of the MCL injury results in good patient outcomes, although operative treatment of the MCL may be considered I select cases.

Strength of Recommendation: Limited  downgraded

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PROPHYLACTIC KNEE BRACING

- Prophylactic bracing is not a preferred option to prevent ACL injury.

Strength of Recommendation: Limited 

RETURN TO SPORT

- Functional evaluation, such as the hop test, may be considered as one factor to determine return to sport after ACL reconstruction.

Strength of Recommendation: Limited 

RETURN TO ACTIVITY FUNCTIONAL BRACING

- Functional knee braces are not recommended for routine use in patients who have received isolated primary ACL reconstruction, as they confer no clinical benefit.

Strength of Recommendation: Limited 

FUTURE RESEARCH – HISTORY AND PHYSICAL

- Future research could help confirm the most useful history and physical exam findings for the diagnosis of ACL injury and concomitant pathology.

FUTURE RESEARCH – SURGICAL TIMING

- Prospective studies controlling for confounders to continue to define the ideal time for surgical intervention after an ACL injury would be valuable. Studies to assess the cost effectiveness of early versus late ACL reconstruction would also be informative.

FUTURE RESEARCH – SINGLE OR DOUBLE BUNDLE ACL RECONSTRUCTION

- While no differences have been noted at 10-year follow up, future research is indicated to determine any differences between single and double bundle ACL reconstructions in the rate of degenerative changes at long-term (> 20 year) follow up.

FUTURE RESEARCH – AUTOGRAFT VS. ALLOGRAFT

- Future research should evaluate the long-term consequences of differing graft options, as well as relative cost effectiveness.

FUTURE RESEARCH – AUTOGRAFT SOURCE

- Future research should evaluate the long-term consequences of differing graft options, as well as relative cost effectiveness. Quad tendon autograft deserves further study as an emerging option for ACL reconstruction.

FUTURE RESEARCH – ACL TRAINING

- Future research should examine ways to optimize exercise programs by decreasing their length/complexity while maximizing injury prevention benefits, elucidate the optimal timing/duration of program and the length of prevention effect, and assess the cost effectiveness of these programs. Additionally, recognizing that ACL injury risk increases dramatically from 11-17 years of age in both sexes and coincides with the increasing risk in females over males and additional research understanding the increased risk in pediatric patients, timing of this risk and subsequent intervention for prevention strategies.

FUTURE RESEARCH – ANTEROLATERAL LIGAMENT / LATERAL EXTRAARTICULAR TENODESIS

- Future research should focus on medium and long-term outcomes after ALL reconstruction or LET (including graft failure, osteoarthritis, and patient reported outcomes). Furthermore, the impact of ALL or LET with patellar tendon or quadriceps tendon grafts should be investigated, as the majority of current data pertains to hamstring ACL reconstruction. Additional research can also investigate the impact of these procedures on adolescents, especially females, who are at highest risk of graft failure.

FUTURE RESEARCH – REPAIR VS. RECONSTRUCTION

- Future research should focus on lowering the rate of revision surgery for ACL repair. This may include innovations in patient selection based on tear location, biologic intervention and/or surgical technique.

FUTURE RESEARCH – ASPIRATION OF THE KNEE

- Prospective, randomized trials will be needed to determine the effect of aspiration of the hematoma following acute ACL tear in reducing pain and/or improving clinical outcome.

FUTURE RESEARCH – ACL SURGICAL RECONSTRUCTION

- Future research should strive for higher methodological quality. Additionally, stratified analyses (along the lines of age, activity level, patient goals, etc.) will help determine specifically which patients benefit from ACL reconstruction versus non-operative treatment.

FUTURE RESEARCH – MENISCAL REPAIR

- Long term studies that focus on meniscus repair and the rates of osteoarthritis progression are required in order to determine the value of this procedure.

FUTURE RESEARCH – COMBINED ACL / MCL TEAR

- Prospective studies to determine which MCL tears need to be repaired/reconstructed while controlling for confounders such as severity and location of MCL injury.

FUTURE RESEARCH – PROPHYLACTIC KNEE BRACING

- Future research could explore subgroups where bracing may show more significant effects.

FUTURE RESEARCH – RETURN TO SPORT

- Future research should strive for higher study quality and focus on the impact of various criteria (time from surgery, functional testing, strength testing, psychological readiness, etc.) on safe return to activity after ACL reconstruction in order to establish better evidence-based guidelines.

FUTURE RESEARCH – RETURN TO ACTIVITY FUNCTIONAL BRACING

- While there is no evidence to date of clinical benefit from brace use for return to activity following isolated ACL reconstruction, the variance in bracing protocols and relatively small size of the study cohorts suggests more research is warranted. Opportunities for further study include analysis of newer custom designed braces, the impact of graft choice on bracing efficacy, outcomes of long-term bracing after return to sport, and the potential role of bracing in subgroups such as high-risk young athletes as well as following treatment of combined injuries such as multi-ligament reconstructions or ACL reconstruction and meniscal repair.

ACKNOWLEDGEMENTS:

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PLEASE CITE CLINICAL PRACTICE GUIDELINE AS:

American Academy of Orthopaedic Surgeons Clinical Practice Guideline for the Management Anterior Cruciate Ligament Injuries www.aaos.org/aclcpg, or https://www.orthoguidelines.org/topic?id=1042&tab=all_guidelines. Published August 22, 2022.

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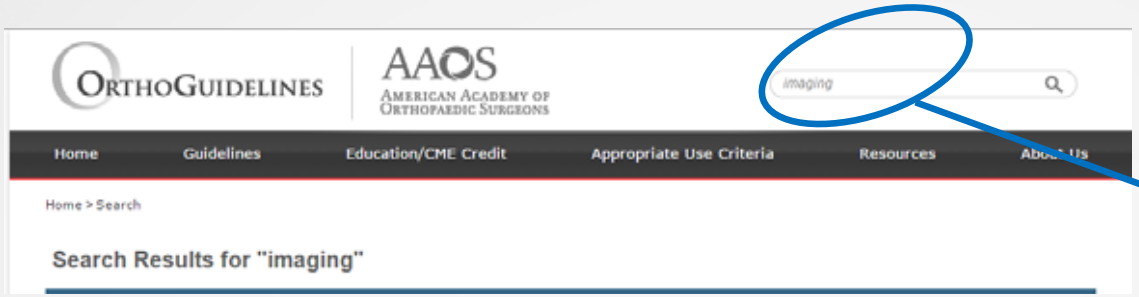
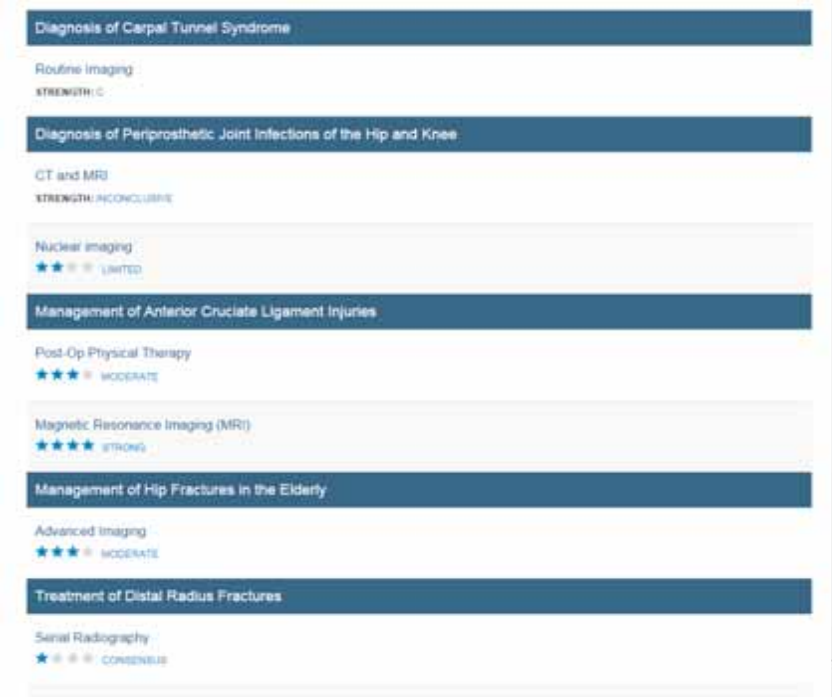


Imaging

Search across <u>all</u> CPG and AUC
Via a Single Keyword Search



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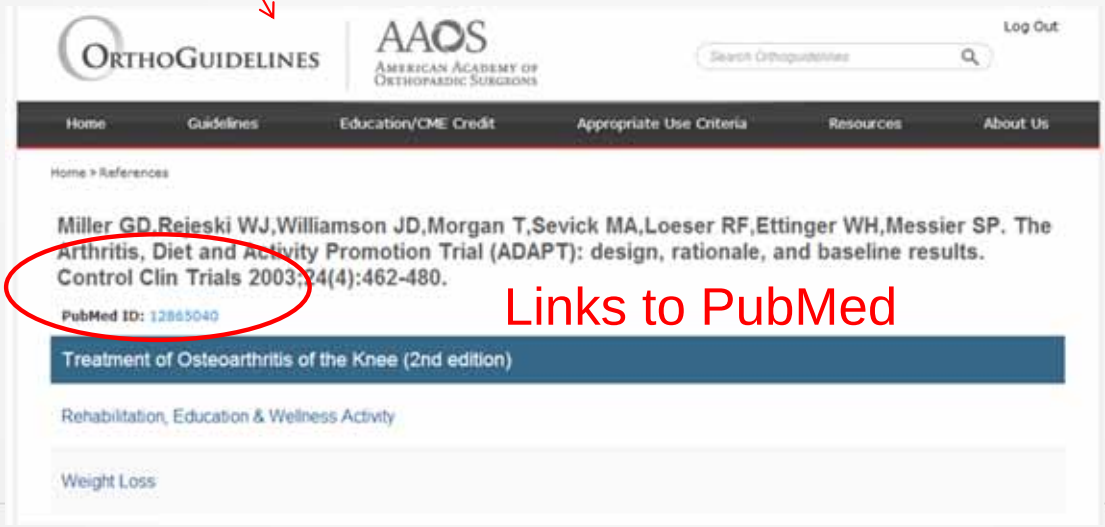
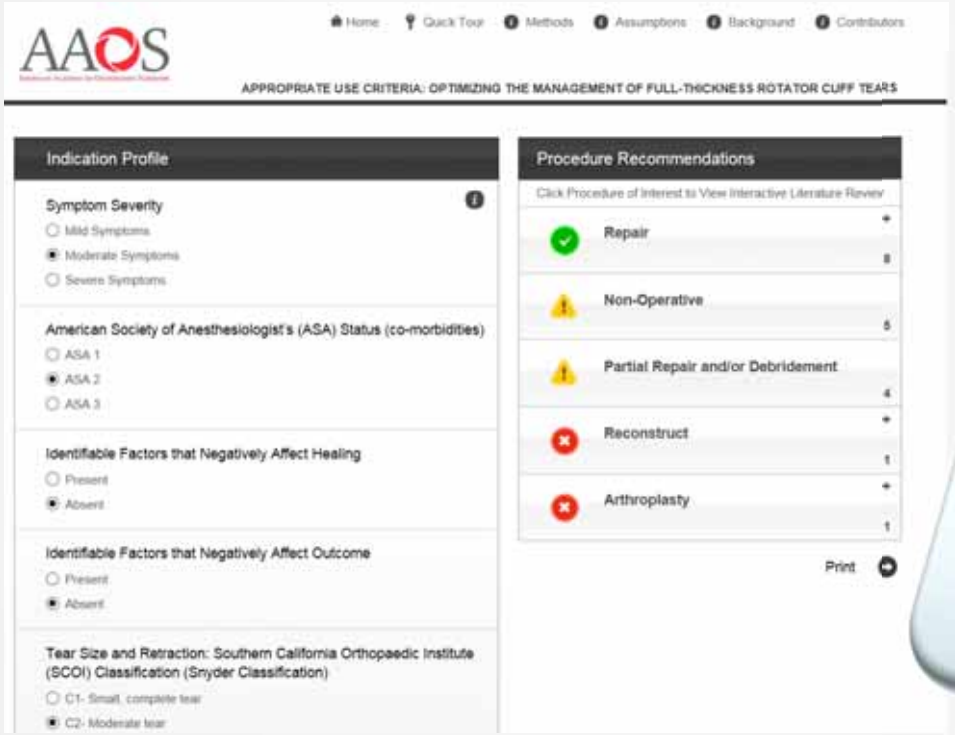
References provided for each recommendation

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 RG, Seleznick M, Holan HR. Outcomes of self-help education for patients with arthritis. Arthritis Rheum 1985;28:680-685



Appropriate Use Criteria Tool



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 Older Adults
- 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
- Pharmacologic, Physical, and Cognitive Pain Alleviation for Musculoskeletal Extremity/Pelvis Surgery
- Psychosocial Factors Influencing Trauma Recovery
- Prevention of Orthopaedic Implant Infections in Patients Undergoing Dental Procedures
- Prevention of Surgical Site Infections After Major Extremity Trauma
- 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)

For additional information, please visit
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