



Complete Summary

GUIDELINE TITLE

American Academy of Orthopaedic Surgeons treatment of osteoarthritis of the knee (non-arthroplasty).

BIBLIOGRAPHIC SOURCE(S)

American Academy of Orthopaedic Surgeons (AAOS). Treatment of osteoarthritis of the knee (non-arthroplasty). Rosemont (IL): American Academy of Orthopaedic Surgeons (AAOS); 2008 Dec 6. 263 p. [111 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: American Academy of Orthopaedic Surgeons. AAOS clinical practice guideline on osteoarthritis of the knee. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2003. 17 p. [114 references]

COMPLETE SUMMARY CONTENT

- SCOPE
- METHODOLOGY - including Rating Scheme and Cost Analysis
- RECOMMENDATIONS
- EVIDENCE SUPPORTING THE RECOMMENDATIONS
- BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS
- CONTRAINDICATIONS
- QUALIFYING STATEMENTS
- IMPLEMENTATION OF THE GUIDELINE
- INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES
- IDENTIFYING INFORMATION AND AVAILABILITY
- DISCLAIMER

SCOPE

DISEASE/CONDITION(S)

Osteoarthritis (OA) of the knee

Note: This guideline covers treatment of osteoarthritis (OA) of the knee in adults up to, but not including, knee replacement.

GUIDELINE CATEGORY

Management
Rehabilitation
Treatment

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Orthopedic Surgery
Physical Medicine and Rehabilitation
Rheumatology

INTENDED USERS

Allied Health Personnel
Health Care Providers
Health Plans
Hospitals
Managed Care Organizations
Occupational Therapists
Physical Therapists
Physician Assistants
Physicians
Public Health Departments

GUIDELINE OBJECTIVE(S)

- To help improve treatment of osteoarthritis (OA) of the knee based on the current best evidence
- To guide qualified physicians through a series of treatment decisions in an effort to improve the quality and efficiency of care for OA of the knee
- To serve as an information resource for decision makers and developers of practice guidelines and recommendations

TARGET POPULATION

Adults (19 years of age and older) diagnosed with osteoarthritis of the knee

Note: This guideline does not address patients diagnosed with rheumatoid arthritis or other inflammatory arthropathies.

INTERVENTIONS AND PRACTICES CONSIDERED

1. Patient education and lifestyle modification
 - Self-management educational programs
 - Activity modifications
 - Regular telephone contact
 - Weight loss/maintenance
2. Rehabilitation
 - Low-impact aerobics
 - Range of motion/flexibility exercises
 - Quadriceps strengthening

3. Mechanical interventions
 - Patellar taping
4. Pain relievers
 - Acetaminophen
 - Non-steroidal anti-inflammatory drugs (NSAIDs), including:
 - Topical NSAIDs
 - Nonselective oral NSAIDs plus gastro-protective agent
 - Cyclooxygenase-2 inhibitors
5. Intra-articular corticosteroid injections
6. Surgical intervention
 - Arthroscopic partial meniscectomy or loose body removal
 - Realignment osteotomy

Note: No recommendation for or against use could be made for the following interventions: use of a brace with a valgus directing force for patients with medial uni-compartmental OA of the knee; use of a brace with a varus directing force for patients with lateral uni-compartmental OA of the knee, acupuncture, intra-articular hyaluronic acid injections, osteotomy of the tibial tubercle for patients with isolated symptomatic patello-femoral OA.

Note: The following interventions were considered but not recommended: Lateral heel wedges for patients with symptomatic medial compartmental OA, glucosamine and/or chondroitin sulfate or hydrochloride, needle lavage, arthroscopy with debridement or lavage; use of free-floating interpositional device for symptomatic unicompartmental OA.

MAJOR OUTCOMES CONSIDERED

- Pain relief
- Functional status
- Range of motion

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
 Hand-searches of Published Literature (Secondary Sources)
 Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Simulated Recommendations

The workgroup began work on this guideline by constructing a set of simulated recommendations. These recommendations specify [what] should be done in [whom], [when], [where], and [how often or how long]. They function as questions for the systematic review, not as final recommendations or conclusions. Simulated recommendations are almost always modified on the basis of the results of the systematic review. These recommendations also form the guideline's scope and guide the searches for literature. These *a priori* simulated recommendations are inviolate in that, once specified, they cannot be modified, they must all be addressed by the systematic review, and the relevant review results must be presented in the final guideline. The *a priori* and inviolate nature of the simulated recommendations combats bias.

Study Selection Criteria

Types of Studies

The physician workgroup also decided to exclusively use an Agency for Healthcare Research and Quality (AHRQ) evidence report, "Treatment of Primary and Secondary Osteoarthritis of the Knee", to address certain recommendations and a previously published clinical practice guideline to address certain other questions. Accordingly, the workgroup unanimously agreed to refer to the AHRQ evidence report to address recommendations 12 and 16, and to refer to the Osteoarthritis Research Society International (OARSI) guidelines to address recommendations 1, 2, 3, 4, 11, 13, and 14. The workgroup addressed the remaining recommendations by conducting their own systematic reviews of the literature.

The workgroup developed *a priori* article selection criteria for their review. First, they searched for published systematic reviews that examined the clinical effectiveness of treatments for osteoarthritis (OA) of the knee, up to but not including knee replacement surgery. Except for one recommendation (recommendation 18), only these reviews were included when they were available. For recommendation 18, one of the two relevant systematic reviews did not compare the treatment of interest to placebo, but the original studies did. Therefore, these original studies were included in the analysis. As a result of the searches for published systematic reviews, they were used to address recommendations 6, 7, 8, 9, 15, and 18.

The remaining recommendations (recommendations 5, 10, 16, 18, 19, 20, 21, and 22) were addressed with the workgroup's own *de novo* systematic reviews of primary, published studies. When examining primary studies the best available evidence regardless of study design was analyzed. The randomized controlled trials (RCTs) identified by the search strategy were considered first. In the absence of two or more RCTs, the workgroup sequentially searched for prospective controlled trials, prospective comparative studies, retrospective comparative studies, and case-series studies.

Article Inclusion Criteria for De Novo Systematic Reviews

The workgroup developed *a priori* inclusion criteria that articles had to meet to be included in the *de novo* systematic reviews. Specifically, to be included in the systematic reviews an article had to be a report of a study that:

- Evaluated a treatment for OA of the knee
- Enrolled a patient population of at least 80% of patients with OA of the knee
- Reported quantified results
- Was a full article, not a meeting abstract
- Was published in the peer-reviewed literature
- Was not a cadaveric, animal or in vitro study
- Was not a letter, case report, historical article, editorial, or commentary
- Enrolled ≥ 10 patients in each of its study arms
- Enrolled a patient population of $\geq 80\%$ or more of patients 19 years of age or older
- Was an English language article

- Was published in or after 1980 (older studies may not reflect current medical practice in OA Knee or pharmacology)
- Was not a retrospective chart review
- Was prospective (for all recommendations except those pertaining to needle lavage, arthroscopy, osteotomy, and free-floating interpositional devices)

See the original guideline document for more discussion on the outcomes considered and the effects of treatments in terms of the minimal clinically important improvement (MCII).

Literature Searches

The workgroup searched for articles published up to February 22, 2008. Search strategies were reviewed by the workgroup prior to conducting the searches. All literature searches were supplemented with manual screening of bibliographies of all publications retrieved. A list of potentially relevant studies was also provided by the workgroup members. No such articles were included inasmuch as none met the inclusion criteria. The bibliographies of recent review articles were also searched for potentially relevant citations.

Search For Existing Systematic Reviews

The workgroup chose to use systematic reviews (rather than primary studies) to provide evidence and support when such reviews were available. The following databases were searched for these reviews:

- The Cochrane Database of Systematic Reviews (through February 22, 2008)
- PubMed (through February 22, 2008)

The study attrition diagram in Appendix III of the original guideline document provides details about the inclusion and exclusion of these reviews, the search strategies used are provided in Appendix IV of the original guideline document, and a list of included systematic reviews can be found in the evidence tables (see the "Availability of Companion" Documents" field). Seven systematic reviews that considered thirty-four unique RCTs were included. (See Evidence Tables 1-5 in the separate Evidence Table document that accompanies this guideline and evidence report [see the "Availability of Companion" Documents" field]).

Search For RCTs and Other Study Designs

To identify primary studies for this guideline, three electronic databases were searched: PubMed, EMBASE, and CINAHL. The study attrition diagram in Appendix III of the original guideline document provides details about the inclusion and exclusion of these studies, the search strategies used are provided in Appendix IV of the original guideline document, and a list of included studies can be found in the evidence tables.

A previously published search strategy was used to identify relevant RCTs. In the absence of relevant RCTs, the search strategy was modified to identify studies of other designs. Studies of other designs were sequentially searched according to

their level of evidence. If higher level evidence was available, lower level evidence was not searched for or included unless there was only one higher level study.

Five recommendation-specific searches were conducted for primary articles. These were searches for literature on acupuncture, needle lavage, arthroscopy, osteotomy, and free-floating interpositional devices. Thirty-seven studies were included and ninety-two studies were excluded.

NUMBER OF SOURCE DOCUMENTS

Literature Searches for Systematic Reviews

The initial search of PubMed and the Cochrane Database yielded 278 systematic reviews, of which 48 were retrieved and evaluated. Seven systematic reviews met all inclusion criteria.

Literature Searches For Primary Studies

1. *Acupuncture*: Literature search yielded **124** citations. 14 were included.
2. *Needle Lavage*: Literature search yielded **11** citations. 4 were included.
3. *Arthroscopic Lavage and/or Debridement*: Literature search yielded **22** citations. 3 were included.
4. *Realignment Osteotomy*: Literature search yielded **769** citations. 11 were included.
5. *Free-Floating Interpositional Device*: Literature search yielded **14** citations. 5 were included.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence for Primary Research Question¹

Types of Studies				
	Therapeutic Studies Investigating the results of treatment	Prognostic Studies Investigating the effects of a patient characteristic on the outcome of disease	Diagnostic Studies Investigating a diagnostic test	Economic and Decision Analysis Developing an economic or decision model
Level I	<ul style="list-style-type: none"> • High quality randomized trial (RCT) with statistically significant difference but 	<ul style="list-style-type: none"> • High quality prospective study⁴ (all patients were enrolled at the same point in 	<ul style="list-style-type: none"> • Testing of previously developed diagnostic criteria on consecutive 	<ul style="list-style-type: none"> • Sensible and alternative values obtained from many studies

Types of Studies				
	Therapeutic Studies Investigating the results of treatment	Prognostic Studies Investigating the effects of a patient characteristic on the outcome of disease	Diagnostic Studies Investigating a diagnostic test	Economic and Decision Analysis Developing an economic or decision model
	<ul style="list-style-type: none"> narrow confidence intervals • Systematic Review² of Level I RCTs (and study results were homogenous³) 	<ul style="list-style-type: none"> their disease with ≥80% follow-up of enrolled patients) • Systematic review² of Level I studies 	<ul style="list-style-type: none"> patients (with universally applied reference "gold" standard) • Systematic review² of Level I studies 	<ul style="list-style-type: none"> with multiple sensitivity analyses • Systematic review² of Level I studies
Level II	<ul style="list-style-type: none"> • Lesser quality RCT (e.g. <80% follow-up, no blinding, or improper randomization) • Prospective⁴ comparative study⁵ • Systematic review² of Level II studies or Level I studies with inconsistent results 	<ul style="list-style-type: none"> • Retrospective⁶ study • Untreated controls from an RCT • Lesser quality prospective study (e.g. patients enrolled at different points in their disease or <80% follow-up) • Systematic review² of Level II studies 	<ul style="list-style-type: none"> • Development of diagnostic criteria on consecutive patients (with universally applied reference "gold" standard) • Systematic review² of Level II studies 	<ul style="list-style-type: none"> • Sensible and alternative values obtained in limited studies; multiway sensitivity analyses • Systematic review² of Level II studies
Level III	<ul style="list-style-type: none"> • Case control study⁷ • Retrospective⁶ comparative study⁵ • Systematic review² of Level III studies 	<ul style="list-style-type: none"> • Case control study⁷ 	<ul style="list-style-type: none"> • Study of non-consecutive patients; without consistently applied reference "gold" standard • Systematic review² of Level III studies 	<ul style="list-style-type: none"> • Analysis based on limited alternative and cost and poor estimates • Systematic review² of Level III studies
Level IV	Case Series ⁸	Case Series	<ul style="list-style-type: none"> • Case-control study • Poor reference 	<ul style="list-style-type: none"> • Analysis with no sensitivity

Types of Studies				
	Therapeutic Studies Investigating the results of treatment	Prognostic Studies Investigating the effects of a patient characteristic on the outcome of disease	Diagnostic Studies Investigating a diagnostic test	Economic and Decision Analyses Developing an economic or decision model
			standard	analyse
Level V	Expert Opinion	Expert Opinion	Expert Opinion	Expert Opinion

1. A complete assessment of quality of individual studies requires critical appraisal of all aspects of the study design.
2. A combination of results from two or more prior studies.
3. Studies provided consistent results.
4. Study was started before the first patient enrolled.
5. Patients treated one way (e.g., cemented hip arthroplasty) compared with a group of patients treated in another way (e.g., uncemented hip arthroplasty) at the same institution.
6. The study was started after the first patient enrolled.
7. Patients identified for the study based on their outcome, called "cases" (e.g., failed total hip arthroplasty) are compared to those who did not have outcome, called "controls";(e.g., successful total hip arthroplasty).
8. Patients treated one way with no comparison group of patients treated in another way.

METHODS USED TO ANALYZE THE EVIDENCE

Meta-Analysis of Randomized Controlled Trials
 Review of Published Meta-Analyses
 Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Judging the Quality of Evidence

The quality of evidence was rated using an evidence hierarchy and an accompanying checklist for randomized controlled trials (RCTs). This evidence hierarchy is shown in Appendix V of the original guideline document (see the "Rating Scheme for the Strength of the Evidence" field, above).

Typically, RCTs were initially categorized as Level I studies, but the level of evidence was reduced by one level if there was a "No" or "Not Reported by Authors" to any of the following checklist items:

- Was randomization stochastic? (i.e. at the time of assignment to groups, did all patients have an equal probability of being assigned to any given group)
- Was there concealment of the allocation to groups?
- Were the patients, caregivers, or evaluators blinded?

Downgrading of Level I studies was not cumulative. If a study had more than one of the methodological flaws listed above, it would only decrease by a single level.

The downgrading of the formal level of evidence of a study indicates the discrepancy between claims of the study authors and the results of the critical appraisal process.

According to the American Academy of Orthopaedic Surgeons (AAOS) Levels of Evidence, non-randomized controlled trials and other prospective comparative studies were initially categorized as Level II studies. Retrospective comparative studies and case-control studies were initially categorized as Level III studies and case-series studies/reports were categorized as Level IV studies.

The AMSTAR tool with additional criteria (Appendix VI of the original guideline document) was used to rate the quality of systematic reviews.

Data Extraction

Data elements extracted from studies were defined in consultation with the physician workgroup. Six reviewers completed data extraction independently for all studies. Disagreements were resolved by consensus and by consulting the workgroup. Evidence tables were constructed to summarize the best evidence pertaining to each simulated recommendation. The elements extracted are shown in Appendix VII of the original guideline document.

Statistical Methods

When published studies only reported the median, range, and size of the trial, their means and variances were estimated according to a published method.

Meta-analyses were performed using the random effects method of DerSimonian and Laird. Heterogeneity was assessed with the I-squared statistic. All meta-analyses and effect size calculations were performed using STATA 10.0 (StataCorp LP, College Station, Texas) and the "metan" command.

Meta-regression was used in the analysis of studies concerning acupuncture. Regression analyses were performed using the permutation method of Higgins and Thompson with 10,000 iterations. STATA 10.0 (StataCorp LP, College Station, Texas) and the "metareg" command were used to perform these computations.

The program TechDig 2.0 (Ronald B. Jones, Mundelein, Illinois) was used to estimate means and variances from studies presenting data only in graphical form.

For one study concerning acupuncture, the standard deviation was imputed according to a published method. For two additional studies concerning acupuncture, the baseline standard deviations were used and estimated the means from the mean change from baseline scores.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Nominal Group Technique)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

To develop this guideline, the workgroup held multiple teleconferences and participated in a two-day recommendation meeting at which the final recommendations were written and voted on.

Grading the Recommendations

Following data extraction and analyses, each guideline recommendation was assigned a grade that was based on the total body of evidence available using the system described in the "Rating Scheme for the Strength of the Recommendations" field below.

Final grades were based upon preliminary grades assigned by American Academy of Orthopaedic Surgeons (AAOS) staff, who took into account only the quality of the available evidence. Workgroup members then modified the grade using the 'Form for Assigning Grade of Recommendation (Interventions)' shown in Appendix VIII of the original guideline document.

Consensus Development

The recommendations and their grades of recommendation were voted on using a structured voting technique known as the nominal group technique. Details of this technique are presented in Appendix IX of the original guideline document. Each recommendation was constructed using the following language which takes into account the final grade of recommendation:

Guideline Language	Grade of Recommendation	Level of Evidence
The authors <i>recommend</i>	A	Level I
The authors <i>suggest</i>	B	Level II or III
<i>Option</i>	C	Level IV or V
The authors are <i>unable to recommend for or against</i>	I	None or conflicting

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grading the Recommendations

A: Good evidence (Level I Studies with consistent finding) for or against recommending intervention.

B: Fair evidence (Level II or III Studies with consistent findings) for or against recommending intervention.

C: Poor quality evidence (Level IV or V) for or against recommending intervention.

I: There is insufficient or conflicting evidence not allowing a recommendation for or against intervention.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Peer Review

The draft of the guideline and evidence report were peer reviewed for content by an expert outside advisory panel that was nominated by the physician work group *a priori* to the development of the guideline. In addition, the physician members of the American Academy of Orthopaedic Surgeons (AAOS) Guidelines and Technology Oversight Committee and the Evidence Based Practice Committee also provided peer review of the draft document. Peer review was accomplished using a structured peer review form (Appendix X of the original guideline document). The draft guideline was sent to a total of 31 reviewers and 10 returned reviews. The disposition of all non-editorial peer review comments was documented and accompanied this guideline through the public commentary and the following approval process.

Public Commentary

After modifying the draft in response to peer review, the guideline was subjected to a twenty-one day period of "Public Commentary." Commentators consist of members of the AAOS Board of Directors (BOD), members of the Council on Research, Quality Assessment, and Technology (CORQAT), members of the Board of Councilors (BOC), and members of the Board of Specialty Societies (BOS). Based on these bodies, up to 187 commentators had the opportunity to provide input into this guideline development process. Of these, 33 requested to review the document and 4 returned public comments.

The AAOS Guideline Approval Process

Following peer review, the final guideline draft was approved by the AAOS Guidelines Oversight Committee, the AAOS Evidence Based Practice Committee, the AAOS Council on Research, Quality Assessment, and Technology (CORQAT), and the AAOS Board of Directors. Descriptions of these bodies and dates of approval are provided in Appendix II of the original guideline document.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions of the levels of evidence (I-V) and grades of recommendation (A-C, I) are provided at the end of the "Major Recommendations" field.

Note from the American Academy of Orthopaedic Surgeons (AAOS): This guideline was explicitly developed to include only treatments less invasive than knee replacement (arthroplasty). This summary does not contain rationales that explain how and why these recommendations were developed nor does it contain the evidence supporting these recommendations. All readers of this summary are strongly urged to consult the full guideline and evidence report for this information (see the "Guideline Availability" and "Availability of Companion Documents" fields). The authors are confident that those who read the full guideline and evidence report will also 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.

Patient Education and Lifestyle Modification

Recommendation 1

The authors suggest patients with symptomatic osteoarthritis (OA) of the knee be encouraged to participate in self-management educational programs such as those conducted by the Arthritis Foundation, and incorporate activity modifications (e.g., walking instead of running; alternative activities) into their lifestyle. **(Grade B, Level II)**

Recommendation 2

Regular contact to promote self-care is an option for patients with symptomatic OA of the knee. **(Grade C, Level IV)**

Recommendation 3

The authors recommend patients with symptomatic OA of the knee, who are overweight (as defined by a body mass index [BMI] > 25), should be encouraged to lose weight (a minimum of five percent [5%] of body weight) and maintain their weight at a lower level with an appropriate program of dietary modification and exercise. **(Grade A, Level I)**

Rehabilitation

Recommendation 4

The authors recommend patients with symptomatic OA of the knee be encouraged to participate in low-impact aerobic fitness exercises. **(Grade A, Level I)**

Recommendation 5

Range of motion/flexibility exercises are an option for patients with symptomatic OA of the knee. **(Grade C, Level V)**

Recommendation 6

The authors suggest quadriceps strengthening for patients with symptomatic OA of the knee. **(Grade B, Level II)**

Mechanical Interventions

Recommendation 7

The authors suggest patients with symptomatic OA of the knee use patellar taping for short term relief of pain and improvement in function. **(Grade B, Level II)**

Recommendation 8

The authors suggest lateral heel wedges not be prescribed for patients with symptomatic medial compartmental OA of the knee. **(Grade B, Level II)**

Recommendation 9

The authors are unable to recommend for or against the use of a brace with a valgus directing force for patients with medial uni-compartmental OA of the knee. **(Inconclusive, Level II)**

Recommendation 10

The authors are unable to recommend for or against the use of a brace with a varus directing force for patients with lateral uni-compartmental OA of the knee. **(Inconclusive, Level V)**

Complementary and Alternative Therapy

Recommendation 11

The authors are unable to recommend for or against the use of acupuncture as an adjunctive therapy for pain relief in patients with symptomatic OA of the knee. **(Inconclusive, Level I)**

Recommendation 12

The authors recommend glucosamine and/or chondroitin sulfate or hydrochloride not be prescribed for patients with symptomatic OA of the knee. **(Grade A, Level I)**

Pain Relievers

Recommendation 13

The authors suggest patients with symptomatic OA of the knee receive one of the following analgesics for pain unless there are contraindications to this treatment:

- Acetaminophen [not to exceed 4 grams per day]
- Non-steroidal anti inflammatory drugs (NSAIDs)

(Grade B, Level II)

Recommendation 14

The authors suggest patients with symptomatic OA of the knee and increased gastrointestinal (GI) risk (Age \geq 60 years, comorbid medical conditions, history of peptic ulcer disease, history of GI bleeding, concurrent corticosteroids, and/or concomitant use of anticoagulants) receive one of the following analgesics for pain:

- Acetaminophen [not to exceed 4 grams per day]
- Topical NSAIDs
- Nonselective oral NSAIDs plus gastro-protective agent
- Cyclooxygenase-2 inhibitors

(Grade B, Level II)

Intra-Articular Injections

Recommendation 15

The authors suggest intra-articular corticosteroids for short-term pain relief for patients with symptomatic OA of the knee. **(Grade B, Level II)**

Recommendation 16

The authors cannot recommend for or against the use of intra-articular hyaluronic acid for patients with mild to moderate symptomatic OA of the knee.

(Inconclusive, Level I and II)

Needle Lavage

Recommendation 17

The authors suggest that needle lavage not be used for patients with symptomatic OA of the knee. **(Grade B, Level I and II)**

Surgical Intervention

Recommendation 18

The authors recommend against performing arthroscopy with debridement or lavage in patients with a primary diagnosis of symptomatic OA of the knee. **(Grade A, Level I and II)**

Recommendation 19

Arthroscopic partial meniscectomy or loose body removal is an option in patients with symptomatic OA of the knee who also have primary signs and symptoms of a torn meniscus and/or a loose body. **(Grade C, Level V)**

Recommendation 20

The authors cannot recommend for or against an osteotomy of the tibial tubercle for patients with isolated symptomatic patello-femoral osteoarthritis. **(Inconclusive, Level V)**

Recommendation 21

Realignment osteotomy is an option in active patients with symptomatic unicompartmental OA of the knee with malalignment. **(Grade C, Level IV and V)**

Recommendation 22

The authors suggest against using a free-floating interpositional device for patients with symptomatic unicompartmental OA of the knee. **(Grade B, Level IV)**

Definitions:

Levels of Evidence for Primary Research Question¹

Types of Studies				
	Therapeutic Studies Investigating the results of treatment	Prognostic Studies Investigating the effects of a patient characteristic on the outcome of disease	Diagnostic Studies Investigating a diagnostic test	Economic and Decision Analysis Developing an economic or decision model
Level I	<ul style="list-style-type: none"> High quality randomized trial (RCT) with statistically significant difference but narrow confidence intervals Systematic Review² of Level I 	<ul style="list-style-type: none"> High quality prospective study⁴ (all patients were enrolled at the same point in their disease with ≥80% follow-up of enrolled patients) Systematic 	<ul style="list-style-type: none"> Testing of previously developed diagnostic criteria on consecutive patients (with universally applied reference "gold" standard) 	<ul style="list-style-type: none"> Sensible and alternative values obtained from many studies with multiple sensitivity analyses Systematic review²

Types of Studies				
	Therapeutic Studies Investigating the results of treatment	Prognostic Studies Investigating the effects of a patient characteristic on the outcome of disease	Diagnostic Studies Investigating a diagnostic test	Economic and Decision Analysis Developing an economic or decision model
	RCTs (and study results were homogenous ³)	review ² of Level I studies	<ul style="list-style-type: none"> Systematic review² of Level I studies 	Level I
Level II	<ul style="list-style-type: none"> Lesser quality RCT (e.g. <80% follow-up, no blinding, or improper randomization) Prospective⁴ comparative study⁵ Systematic review² of Level II studies or Level I studies with inconsistent results 	<ul style="list-style-type: none"> Retrospective⁶ study Untreated controls from an RCT Lesser quality prospective study (e.g. patients enrolled at different points in their disease or <80% follow-up) Systematic review² of Level II studies 	<ul style="list-style-type: none"> Development of diagnostic criteria on consecutive patients (with universally applied reference "gold" standard) Systematic review² of Level II studies 	<ul style="list-style-type: none"> Sensible and alternative values obtained from limited studies; multiway sensitivity analyses Systematic review² of Level II studies
Level III	<ul style="list-style-type: none"> Case control study⁷ Retrospective⁶ comparative study⁵ Systematic review² of Level III studies 	<ul style="list-style-type: none"> Case control study⁷ 	<ul style="list-style-type: none"> Study of non-consecutive patients; without consistently applied reference "gold" standard Systematic review² of Level III studies 	<ul style="list-style-type: none"> Analysis based on limited alternative and cost and poor estimates Systematic review² of Level III studies
Level IV	Case Series ⁸	Case Series	<ul style="list-style-type: none"> Case-control study Poor reference standard 	<ul style="list-style-type: none"> Analysis with no sensitivity analyses
Level V	Expert Opinion	Expert Opinion	Expert Opinion	Expert Opinion

1. A complete assessment of quality of individual studies requires critical appraisal of all aspects of the study design.
2. A combination of results from two or more prior studies.
3. Studies provided consistent results.
4. Study was started before the first patient enrolled.
5. Patients treated one way (e.g., cemented hip arthroplasty) compared with a group of patients treated in another way (e.g., uncemented hip arthroplasty) at the same institution.
6. The study was started after the first patient enrolled.
7. Patients identified for the study based on their outcome, called "cases" (e.g., failed total hip arthroplasty) are compared to those who did not have outcome, called "controls";(e.g., successful total hip arthroplasty).
8. Patients treated one way with no comparison group of patients treated in another way.

Grading the Recommendations

A: Good evidence (Level I Studies with consistent finding) for or against recommending intervention.

B: Fair evidence (Level II or III Studies with consistent findings) for or against recommending intervention.

C: Poor quality evidence (Level IV or V) for or against recommending intervention.

I: There is insufficient or conflicting evidence not allowing a recommendation for or against intervention.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is specifically stated for each recommendation (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Effective treatment of osteoarthritis (OA) of the knee in adults

POTENTIAL HARMS

Individuals with osteoarthritis (OA) of the knee often complain of joint pain, stiffness, and functional deficits. The aim of treatment is pain relief and improvement or maintenance of the patient's functional status. Long term results were often not available and adverse events varied by study (frequently they were not reported) in the literature available for this guideline. Most treatments are associated with some known risks, especially invasive and operative

treatments. Therefore, discussion of available treatments and procedures applicable to the individual patient rely on mutual communication between the patient and physician, weighing the potential risks and benefits for that patient.

CONTRAINDICATIONS

CONTRAINDICATIONS

Contraindications vary widely based on the treatment administered. Therefore, discussion of available treatments and procedures applicable to the individual patient rely on mutual communication between the patient and physician, weighing the potential risks and benefits for that patient.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- 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.
- This guideline is intended to be used by all appropriately trained surgeons and all qualified physicians considering treatment of osteoarthritis (OA) of the knee. 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.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Quick Reference Guides/Physician Guides

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

American Academy of Orthopaedic Surgeons (AAOS). Treatment of osteoarthritis of the knee (non-arthroplasty). Rosemont (IL): American Academy of Orthopaedic Surgeons (AAOS); 2008 Dec 6. 263 p. [111 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1996 (revised 2008)

GUIDELINE DEVELOPER(S)

American Academy of Orthopaedic Surgeons - Medical Specialty Society

SOURCE(S) OF FUNDING

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GUIDELINE COMMITTEE

American Academy of Orthopaedic Surgeons (AAOS) Treatment of Osteoarthritis of the Knee Guideline Workgroup

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

All members of the American Academy of Orthopaedic Surgeons (AAOS) workgroup disclosed any conflicts of interest prior to the development of the recommendations for this guideline. Conflicts of interest are disclosed in writing with the AAOS via a private on-line reporting database and also verbally at the recommendation approval meeting.

Refer to Appendix XI in the original guideline document for individual workgroup members' conflicts of interest.

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: American Academy of Orthopaedic Surgeons. AAOS clinical practice guideline on osteoarthritis of the knee. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2003. 17 p. [114 references]

GUIDELINE AVAILABILITY

Electronic copies: Available from [American Academy of Orthopaedic Surgeons Web site](#).

Print copies: Available from the American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018-4262. Telephone: (800) 626-6726 (800 346-AAOS); Fax: (847) 823-8125; Web site: www.aaos.org.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Treatment of osteoarthritis of the knee (non-arthroplasty). Summary of recommendations. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2008. 5 p. Electronic copies: Available in Portable Document Format (PDF) from the [American Academy of Orthopaedic Surgeons Web site](#).
- Treatment of osteoarthritis of the knee (non-arthroplasty). Evidence tables. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2008. 86 p. Electronic copies: Available in Portable Document Format (PDF) from the [American Academy of Orthopaedic Surgeons Web site](#).

Print copies: Available from the American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018-4262. Telephone: (800) 626-6726 (800 346-AAOS); Fax: (847) 823-8125; Web site: www.aaos.org.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on April 8, 2009. The information was verified by the guideline developer on May 4, 2009.

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