

# Treatment of Osteoarthritis of the Knee: Evidence-Based Guideline, 2nd Edition

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## Abstract

*Treatment of Osteoarthritis of the Knee: Evidence-Based Guideline, 2nd Edition*, is based on a systematic review of the current scientific and clinical research. This guideline contains 15 recommendations, replaces the 2008 AAOS clinical practice guideline, and was reevaluated earlier than the 5-year recommendation of the National Guideline Clearinghouse because of methodologic concerns regarding the evidence used in the first guideline. The current guideline does not support the use of viscosupplementation for the treatment of osteoarthritis of the knee. In addition, the work group highlighted the need for better research in the treatment of knee osteoarthritis.

## Overview and Rationale

The American Academy of Orthopaedic Surgeons (AAOS), with input from representatives from the American College of Rheumatology, the American Academy of Family Physicians, and the American Physical Therapy Association, recently published their clinical practice guideline (CPG), *Treatment of Osteoarthritis of the Knee: Evidence-Based Guideline, 2nd Edition*.<sup>1</sup> This guideline contains 15 recommendations, replaces the 2008 AAOS CPG, and was reevaluated earlier than the 5-year recommendation of the National Guideline Clearinghouse<sup>2</sup> because of methodologic concerns regarding the evidence used in the first CPG.

Specifically, the previous AAOS guideline included evidence analysis from three sources: the Agency for Healthcare Research and Quality evidence report, “Treatment of Primary and Secondary Osteoarthritis of the

Knee;”<sup>3</sup> Osteoarthritis Research Society International guidelines;<sup>4</sup> and the Cochrane Database of Systematic Reviews.<sup>5</sup> As was noted by several AAOS members and industry representatives, the original guideline differed from the AAOS standard of performing an independent analysis of the available evidence. The AAOS no longer relies on previous systematic reviews in its evidence analysis because of the significant variability in the included studies, additional potential for bias, and variable clinical applicability of those reviews. These facts were highlighted in meta-analyses in joint arthroplasty by Sharma et al.<sup>6</sup> The AAOS Board of Directors authorized the accelerated update based on these concerns.

The current work group used the 2008 guideline for its simulated recommendations to guide the MeSH (medical subject headings) terms used for the literature review. The work group made significant changes in the search inclusion criteria, requiring all studies to have a sample size of at least 30 par-

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This clinical practice guideline was approved by the American Academy of Orthopaedic Surgeons on May 18, 2013.

The complete evidence-based guideline, *Treatment of Osteoarthritis of the Knee: Evidence-Based Guideline, 2nd Edition*, includes all tables, figures, and appendices, and is available at <http://www.aaos.org/guidelines>.

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ticipants. This was done to limit the “small study” effect of lower-powered clinical trials. It also helped to mitigate against publication bias in the evidence review. Additionally, a follow-up period of at least 4 weeks was required. Thus, studies showing potential efficacy at 2 weeks status post-intervention were not included in the update.

More than 10,000 separate pieces of literature were reviewed during the evidence analysis phase. The AAOS uses a “best-evidence synthesis” form of evidence analysis, meaning that, although all studies that meet the inclusion criteria are examined, only the highest levels of available evidence are used in the meta-analysis and network meta-analysis.

When completed, the second edition of the osteoarthritis (OA) of the knee CPG was subjected to the most extensive peer review yet for an AAOS CPG. Sixteen peer reviewers, representing multiple specialty societies, submitted formal peer reviews. Each reviewer meticulously dissected the final recommendations of the document, and important changes were made to the final document based on the work group’s consideration of the well-informed and insightful comments from the peer reviewers. Reviewers correctly noted that the recommendations did not include “harm/risk” analysis but rather only evidence of the presence or absence of effect. The original recommendations “recommended against” several of the treatments, which could have been interpreted as implying “harm” or “risk.” The work group agreed and changed the language of four recommendations to “we cannot recommend” (Recom-

mendations 3A, 6, 9, and 12) and two recommendations to “we cannot suggest” (Recommendations 5 and 11), which implies evidence only of a lack of efficacy.<sup>1</sup>

The 2013 OA of the knee CPG contains one significant recommendation change from the 2008 CPG. The current CPG could not support the use of viscosupplementation for the treatment of OA of the knee. This Strong recommendation (Recommendation 9) differs from the Inconclusive recommendation in the previous guideline, which was largely the motivating factor for the expedited update of the CPG. The recommendation in the second edition reads, “We cannot recommend using hyaluronic acid (HA) for patients with symptomatic osteoarthritis of the knee.”<sup>1</sup> The work group understands the potential impact that this recommendation could have on clinical practice. The evidence did not support the efficacy of viscosupplementation. Although statistically significant outcomes were seen in studies using higher molecular weight HA preparations, these were not clinically significant, based on a lack of minimum clinically important improvement (MCII). Of note, 14 high and moderate research-quality articles were analyzed using this metric in determining clinically significant differences. The AAOS believes that MCII is the best way to measure such differences.<sup>7</sup> Overall, the literature on viscosupplementation has a significant degree of publication bias, as highlighted by other systematic reviews,<sup>3,5,8,9</sup> and the analysis indicates that studies with results that did not support the use of viscosup-

plementation were less likely to be published than were studies with positive results.

Current published studies, despite a clear publication bias toward positive results, do not show a clinically effective response for HA injections based on MCII. Some peer reviewers were critical of this finding, especially in light of the important clinical practice implications. Many highlighted prior systematic reviews supported the use of HA.<sup>3,5</sup> We reviewed these published systematic reviews and found that they suffer several faults. Most of them do not address the issues of publication bias, between-study heterogeneity, and clinical significance in determining final recommendations. Additionally, several reviewers noted inherent faults in using the MCII to determine clinical significance. The AAOS CPG process has used MCII to elucidate clinical significance since the inception of the guidelines; it represents the best validated measure of MCII when trying to determine whether a treatment truly has efficacy rather than providing just slight improvements that register as statistically significant.<sup>7,10-13</sup>

Two other effect-size tools, the patient acceptable symptomatic state, which is an absolute score beyond which patients are satisfied, and the Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials score, which denotes a specific percentage of patients who are satisfied, both have methodologic limitations that make them less appropriate for the AAOS CPG analysis process. Additional high methodologic-quality studies on the effects of high molecular

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weight preparations on OA of the knee with subgroup analysis are awaited.

Other recommendations changed based on the strength of their supporting evidence only. Some reviewers expressed concern over changing the intra-articular corticosteroid injection recommendation to a lower grade. The evidence supported this change, and the use of intra-articular corticosteroid injections does remain supported in clinical practice. The recommendation regarding arthroscopic meniscectomy increased in strength from a Consensus to an Inconclusive recommendation, which is now supported by evidence and is no longer based solely on expert opinion. The current Inconclusive recommendation does help the AAOS support the use of this procedure in our patients with OA of the knee.

The second edition of the OA of the knee CPG addresses concerns raised regarding methodologic flaws associated with the evidence base of the first edition. The AAOS CPG process benefitted from the extensive involvement of the peer reviewers and specialty societies and will continue to do so. The process improves with the thoughtful criticism of our guidelines and the evidence synthesis process. This CPG, as with all AAOS CPGs, is not intended as a tool for coverage determinations. The AAOS also remains committed to ensuring that the guidelines are interpreted and used properly and will advocate vigorously on behalf of patients and members.

Although a CPG delineates whether a procedure, intervention, or diagnostic test “works,” the AAOS also will follow this CPG with an Appropriate Use Criteria (AUC). The AUC further defines “in which patients” and “when” an intervention, procedure, or diagnostic test is appropriate. Work on the accompanying AUC for this CPG is currently

underway and should further define clinical scenarios for patients with OA of the knee.

The work group highlighted the need for better research in the management of knee OA, in addition to improved methodologies that differentiate responders from nonresponders. Evidence, whether strong or inconclusive, is never sufficient to make important clinical decisions. “Individual values and preferences must balance this evidence to achieve optimal shared decision-making and highlight that the practice of evidence-based medicine is not a “one size fits all” approach.<sup>14</sup> It is again important to note that evidence-based practice incorporates three components: scientific evidence, the clinician’s experience, and the patient’s values. No single component of patient care can stand alone.

## Recommendations

This Summary of Recommendations of the AAOS *Treatment of Osteoarthritis of the Knee: Evidence-Based Guideline, 2nd Edition*, contains a list of the evidence-based treatment recommendations and includes only less invasive alternatives to knee replacement. Discussion of how each recommendation was developed and the complete evidence report are contained in the full guideline at [www.aaos.org/guidelines](http://www.aaos.org/guidelines). Readers are urged to consult the full guideline for the comprehensive evaluation of the available scientific studies. The recommendations were established using methods of evidence-based medicine that rigorously control for bias, enhance transparency, and promote reproducibility.

This Summary of Recommendations is not intended to stand alone. Medical care should be based on evidence, a physician’s expert judgment, and the patient’s circumstances, val-

ues, preferences, and rights. For treatment procedures to provide benefit, mutual collaboration with shared decision-making between patient and physician/allied healthcare provider is essential.

A Strong recommendation means that the quality of the supporting evidence is high. A Moderate recommendation means that the benefits exceed the potential harm (or that the potential harm clearly exceeds the benefits in the case of a negative recommendation), but the quality/applicability of the supporting evidence is not as strong. A Consensus recommendation means that expert opinion supports the guideline recommendation even though there is no available empirical evidence that meets the inclusion criteria of the guideline’s systematic review. An Inconclusive recommendation means that there is a lack of compelling evidence that has resulted in an unclear balance between benefits and potential harm.

### Recommendation 1

We recommend that patients with symptomatic OA of the knee participate in self-management programs, strengthening, low-impact aerobic exercises, and neuromuscular education and engage in physical activity consistent with national guidelines.

**Strength of recommendation:** Strong.

**Implication:** Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.

### Recommendation 2

We suggest weight loss for patients with symptomatic OA of the knee and a body mass index  $\geq 25$ .

**Strength of recommendation:** Moderate.

**Implication:** Practitioners should

generally follow a Moderate recommendation but remain alert to new information and be sensitive to patient preferences.

### **Recommendation 3a**

We cannot recommend using acupuncture in patients with symptomatic OA of the knee.

Strength of recommendation: Strong. A harms analysis on this recommendation was not performed.

Implication: Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.

### **Recommendation 3b**

We are unable to recommend for or against the use of physical agents (including electrotherapeutic modalities) in patients with symptomatic OA of the knee.

Strength of recommendation: Inconclusive.

Implication: Practitioners should feel little constraint in following a recommendation labeled as Inconclusive, exercise clinical judgment, and be alert for emerging evidence that clarifies or helps to determine the balance between benefits and potential harm. Patient preference should have a substantial influencing role.

### **Recommendation 3c**

We are unable to recommend for or against manual therapy in patients with symptomatic OA of the knee.

Strength of recommendation: Inconclusive.

Implication: Practitioners should feel little constraint in following a recommendation labeled as Inconclusive, exercise clinical judgment, and be alert for emerging evidence that clarifies or helps to determine the balance between benefits and potential harm. Patient preference should have a substantial influencing role.

### **Recommendation 4**

We are unable to recommend for or against the use of a valgus-directing force brace (medial compartment unloader) for patients with symptomatic OA of the knee.

Strength of recommendation: Inconclusive.

Implication: Practitioners should feel little constraint in following a recommendation labeled as Inconclusive, exercise clinical judgment, and be alert for emerging evidence that clarifies or helps to determine the balance between benefits and potential harm. Patient preference should have a substantial influencing role.

### **Recommendation 5**

We cannot suggest that lateral wedge insoles be used for patients with symptomatic medial compartment OA of the knee.

Strength of recommendation: Moderate.

Implication: Practitioners should generally follow a Moderate recommendation but remain alert to new information and be sensitive to patient preferences.

### **Recommendation 6**

We cannot recommend using glucosamine and chondroitin for patients with symptomatic OA of the knee.

Strength of recommendation: Strong. A harms analysis on this recommendation was not performed.

Implication: Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.

### **Recommendation 7a**

We recommend nonsteroidal anti-inflammatory drugs (oral or topical) or tramadol for patients with symptomatic OA of the knee.

Strength of recommendation: Strong.

Implication: Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.

### **Recommendation 7b**

We are unable to recommend for or against the use of acetaminophen, opioids, or pain patches for patients with symptomatic OA of the knee.

Strength of recommendation: Inconclusive.

Implication: Practitioners should feel little constraint in following a recommendation labeled as Inconclusive, exercise clinical judgment, and be alert for emerging evidence that clarifies or helps to determine the balance between benefits and potential harm. Patient preference should have a substantial influencing role.

### **Recommendation 8**

We are unable to recommend for or against the use of intra-articular corticosteroids for patients with symptomatic OA of the knee.

Strength of recommendation: Inconclusive.

Implication: Practitioners should feel little constraint in following a recommendation labeled as Inconclusive, exercise clinical judgment, and be alert for emerging evidence that clarifies or helps to determine the balance between benefits and potential harm. Patient preference should have a substantial influencing role.

### **Recommendation 9**

We cannot recommend using HA for patients with symptomatic OA of the knee.

Strength of recommendation: Strong. A harms analysis on this recommendation was not performed.

**Implication:** Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.

### Recommendation 10

We are unable to recommend for or against growth factor injections and/or platelet rich plasma for patients with symptomatic OA of the knee.

**Strength of recommendation:** Inconclusive.

**Implication:** Practitioners should feel little constraint in following a recommendation labeled as Inconclusive, exercise clinical judgment, and be alert for emerging evidence that clarifies or helps to determine the balance between benefits and potential harm. Patient preference should have a substantial influencing role.

### Recommendation 11

We cannot suggest that the practitioner use needle lavage for patients with symptomatic OA of the knee.

**Strength of recommendation:** Moderate.

**Implication:** Practitioners should generally follow a Moderate recommendation but remain alert to new information and be sensitive to patient preferences.

### Recommendation 12

We cannot recommend performing arthroscopy with lavage and/or débridement in patients with a primary diagnosis of symptomatic OA of the knee.

**Strength of recommendation:** Strong. A harms analysis on this recommendation was not performed.

**Implication:** Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.

### Recommendation 13

We are unable to recommend for or against arthroscopic partial meniscectomy in patients with OA of the knee with a torn meniscus.

**Strength of recommendation:** Inconclusive.

**Implication:** Practitioners should feel little constraint in following a recommendation labeled as Inconclusive, exercise clinical judgment, and be alert for emerging evidence that clarifies or helps to determine the balance between benefits and potential harm. Patient preference should have a substantial influencing role.

### Recommendation 14

The practitioner might perform a valgus-producing proximal tibial osteotomy in patients with symptomatic medial compartment OA of the knee.

**Strength of Recommendation:** Limited.

**Implication:** Practitioners should exercise clinical judgment when following a recommendation classified as Limited, and should be alert to emerging evidence that might counter the current findings. Patient preference should have a substantial influencing role.

### Recommendation 15

In the absence of reliable evidence, it is the opinion of the work group not to use the free-floating (unfixed) interpositional device in patients with symptomatic medial compartment OA of the knee.

**Strength of Recommendation:** Consensus.

**Implication:** Practitioners should be flexible in deciding whether to follow a recommendation classified as Consensus, although they may give it preference over alternatives. Patient preference should have a substantial influencing role.

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