# AAOS Clinical Practice Guideline Summary

# American Academy of Orthopaedic Surgeons Clinical Practice Guideline Summary Management of Osteoarthritis of the Hip

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## ABSTRACT

The Management of Osteoarthritis (OA) of the Hip Evidence-Based Clinical Practice Guideline is based on a systematic review of published studies examining the treatment of OA of the hip in adults (aged 18 years and older). Based on the best current available evidence, this guideline contains eight recommendations and nine options to assist orthopaedic surgeons and all qualified physicians managing patients who have been diagnosed by a trained healthcare provider with OA of the hip and are currently undergoing treatment. It is also intended to serve as an information resource for professional healthcare practitioners and developers of practice guidelines and recommendations. In addition to providing pragmatic practice recommendations, this guideline also highlights gaps in the literature and informs areas for future research and quality measure development.

## **Overview and Rationale**

The American Academy of Orthopaedic Surgeons (AAOS) with input from representatives from The Hip Society, the American Physical Therapy Association, the American Association of Hip and Knee Surgeons, and the American College of Radiology recently published their clinical practice guideline (CPG), Management of Osteoarthritis (OA) of the Hip.<sup>1</sup> This CPG was approved by the AAOS Board of Directors in December 2023.

Hip OA is a globally prevalent condition, estimated to affect 7.2% of the population.<sup>2</sup> The incidence and prevalence of hip OA are expected to rise, driven by increases in life expectancy and obesity rates.<sup>3</sup> This rise in OA prevalence is making hip OA one of the leading causes of ambulatory care visits, with it being responsible for 23.7 million visits annually.<sup>4</sup> Moreover, hip OA constitutes 14% of all hospital discharges related to OA and accounts for 6% of all physician office visits for the condition.<sup>4</sup>

The effect of hip OA extends well beyond the joint itself, markedly impairing functional abilities and thus deteriorating the quality of life of affected

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This clinical practice guideline was approved by the American Academy of Orthopaedic Surgeons Board of Directors on December 1, 2023.

The complete document, *Management of Osteoarthritis of the Hip Evidence-Based Clinical Practice Guideline,* includes all tables, and figures, and is available at www.aaos.org/ oahcpg2.

J Am Acad Orthop Surg 2024;00:1-8

DOI: 10.5435/JAAOS-D-24-00420

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patients. It not only affects physical health but also has a notable influence on emotional wellbeing and mental health. A staggering 19% of patients diagnosed with OA are reported to suffer from anxiety and depression, highlighting the profound emotional toll of the disease.<sup>5</sup>

The repercussions of this condition are notably more severe for older adults, who, as a result of both physical and emotional effects of OA, seek medical care more frequently and endure greater functional limitations than their age-matched counterparts without OA. In addition, the mortality rates among patients with OA of the hip and knee are higher than among those in age-matched control subjects.<sup>6</sup>

As both life expectancy and obesity rates continue to climb, the emotional and physical effects of hip OA are projected to become even more widespread. This escalating trend underscores the urgency for enhanced public health interventions, targeted research, and more comprehensive care strategies to manage the growing burden of hip OA on patients and healthcare systems worldwide.

A variety of treatment options are available for OA of the hip, encompassing both nonsurgical and surgical approaches. Common nonsurgical treatments include over-the-counter medications such as acetaminophen or nonsteroidal anti-inflammatory drugs (NSAIDs), exercise, weight management, physical therapy, and intraarticular injections. Surgical intervention is considered for patients who have end-stage OA of the hip, notable pain, and dysfunction from the OA and for whom nonsurgical treatments are no longer effective. Total hip arthroplasty (THA) is the most prevalent surgical procedure performed for end-stage OA of the hip. Annually, approximately 500,000 THAs are performed in the United States, with projections indicating a growth of 71% to 635,000 by the year 2030.<sup>7</sup>

Both nonsurgical and surgical treatments for OA of the hip are associated with some risk. Nonsurgical treatment may lead to persistent pain and dysfunction and increase mortality. Surgical management has risks as well, including infection, dislocation, fracture, leg-length discrepancy, aseptic loosening, and neurovascular injury, along with more routine postoperative concerns such as venous thromboembolism or anesthesia complications. The choice of treatment for each patient depends on a variety of considerations, including surgical factors and patient-specific factors such as medical comorbidities, individual preferences, and desired activity level.

Therefore, the AAOS developed this CPG to aid practitioners in the management of patients diagnosed with OA of the hip.<sup>1</sup> Furthermore, the CPG represents a resource demonstrating areas that need additional investigation to provide improved evidence-based guidelines for the management of OA of the hip.

In summary, Management of OA of the Hip CPG involved reviewing 5,699 abstracts and 766 full-text articles to develop eight recommendations supported by 179 research articles meeting stringent inclusion criteria. Each recommendation is based on a systematic review of the research-related topic, which resulted in three recommendations classified as high and five recommendations classified as moderate for adult patients diagnosed with OA of the hip. The strength of recommendation also takes into account the quality, quantity, and trade-offs between benefits and harms of a treatment, magnitude of treatment effect, and whether there are data on critical outcomes. Strength of recommendation is assigned based on the quality of the supporting evidence. In addition, nine options were formulated. Options are formed when there is little or no evidence on a topic. This is defined as evidence from only one moderate-quality study (eg, limited strength option), evidence from only low-quality studies (eg, limited strength option), or when there is no evidence or conflicting evidence (eg, consensus option). This led to the creation of three consensus options regarding (1) the prescription of opioids as a conservative treatment, (2) the utilization of oral acetaminophen to improve pain and function, and (3) the increased risk of dislocation after THA for patients diagnosed with stiff spine syndrome. Limited strength options were formulated on the use of neuraxial anesthesia; the potential negative

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outcomes after THA due to social determinants of health (eg, education, income level, food deserts, and insurance type); the higher risk of adverse events after THA in patients with poorly controlled diabetes; and elevated body mass index (BMI) resulting in higher risk of adverse events and lower absolute patient-reported outcome scores, but similar degree of improvement after THA.

## **Guideline Summary**

The developed recommendations are meant to aid in the clinical decision-making process for the treatment of patients who have been diagnosed with OA of the hip. Use of this guideline helps treating physicians determine the appropriate intervention(s) that are likely to provide the greatest benefit.

This CPG was a notable update to the previously published 2017 CPG, which had 18 recommendations, four of which were strong recommendations supported by high-quality evidence. This updated 2023 CPG consisted of 17 recommendations, three of which were strong recommendations supported by high-quality evidence.

Oral NSAIDs, acetaminophen, and opioids are the most common oral treatments for OA of the hip. The use of NSAIDs was again supported by strong evidence to reduce postoperative pain and improve function. Limited data were available on the safety of NSAIDs or the efficacy differences between selective and nonselective cyclooxygenase-2 oral NSAIDs. Acetaminophen was a new therapy evaluated in the 2023 CPG because it is widely used for treatment of OA of the hip. Unfortunately, there was no evidence evaluating the use of acetaminophen for OA of the hip. As a result, a consensus recommendation was made recommending oral acetaminophen be considered to improve pain and function. Similarly, there was a lack of evidence on the use of prescription opioids for conservative treatment of OA of the hip. However, it is well established that opioids, including tramadol, are associated with notable adverse events and increased risk of complications after THA. Understanding these risks, the workgroup made a consensus option recommending against the use of opioids for conservative treatment.

Intra-articular injections, including with corticosteroids and hyaluronic acid, are widely used by patients for conservative management of hip OA. Consistent with the 2017 CPG, recent high-quality data from four studies demonstrate that corticosteroids may reduce pain and improve function in the short term. However, in contrast to the 2017 CPG, the strength of this recommendation was downgraded to moderate because of heterogeneity in study design, corticosteroid dosing, and reporting of adverse events. Recent data suggest that intra-articular corticosteroid injections may increase the risk of rapidly progressive OA of the hip.<sup>8</sup> The recommendation on the use of intra-articular hyaluronic acid injections did not change with the update. High-quality evidence from five studies all showed no improvement in pain or function with intra-articular hyaluronic acid compared with placebo. As a result, a strong recommendation was made against the use of hyaluronic acid.

Physical therapy is a commonly prescribed nonsurgical treatment to reduce pain and improve function in patients with OA of the hip. Fifteen articles (13 high quality) evaluated physical therapy as conservative treatment, and results were mixed. Eight studies found no difference while the remaining seven studies found improvement in certain parameters including pain, patient-reported outcome scores, and functional assessments. Thus, the recommendation was made that physical therapy could be considered for mild-tomoderate symptomatic OA of the hip. Despite the number of high-quality studies, the recommendation was downgraded to moderate strength because of heterogeneity in types of physical therapy modalities and interventions studied, as well as the duration, frequency, and intensity of treatments.

Several risk factors were evaluated for their association with adverse events and clinical outcomes after THA including BMI, diabetes, social determinants of health, and tobacco use. Obesity is commonly identified as a risk factor of adverse events after THA, and this was supported by the evidence. However, the quality of evidence was low, leading to a limited recommendation consistent with the 2017 guideline. In a change from the 2017 guideline, a limited recommendation was made in this guideline that patients with elevated BMI may achieve lower absolute patient-reported outcome scores, but similar degree of improvement, compared with patients with lower BMI. In 2017, a similar finding was reached but the recommendation was moderate strength. The evidence was rated in the updated guideline as low quality, which led to the downgrade in recommendation. Tobacco use is also frequently identified as a risk factor of adverse events after THA. In 2017, this was supported by a limited recommendation and confirmed again in the 2023 guideline. Eleven low-quality studies were reviewed and supported that tobacco use may increase the risk of adverse events. There is a lack of clarity, however,

regarding the different forms of tobacco use and any differential risk associated with them.

Diabetes and social determinants of health were two new topics evaluated in the 2023 CPG. Social determinants of health are an evolving field with several factors identified as influencing outcomes after surgery including, but not limited to, education, income level, food deserts, and insurance type. Twenty-one low-quality studies were evaluated and demonstrated that social determinants of health may negatively affect length of stay, total cost of care, and mortality after THA. Diabetes is a very common medical comorbidity in patients undergoing THA. While there are several studies evaluating the association of diabetes and adverse events after THA, there is a paucity of literature that directly compares outcomes or adverse events after THA between patients with and without diabetes. Thus, limited evidence supported that patients with poorly controlled diabetes may be at a higher risk of adverse events after THA. Poorly controlled diabetes remains loosely defined, and there is no consensus on a laboratory cutoff value at which the risks of surgery outweigh the benefits. As with all risk factors including BMI, diabetes, social determinants of health, and tobacco use, each of these should be considered in the context of the whole patient and strict cutoffs should be avoided. The decision to proceed with surgery should be made by each individual patient after an informed decision-making process with the surgeon, whereby risks and benefits of the procedure for that individual patient are discussed.

Tranexamic acid (TXA) is an extremely effective modality to limit blood loss and the need for allogeneic blood transfusions. The 2017 moderate recommendation supporting the use of TXA was updated to a strong recommendation in the 2023 CPG. High-quality evidence consistently demonstrates that the administration of TXA decreases intraoperative blood loss and the need for allogeneic blood transfusions. None of the studies evaluated demonstrated an increased risk of adverse events related to the perioperative use of TXA in THA. The optimal route of administration, including oral, topical, or intravenous, as well as number of doses, remains in question.

Neuraxial and general anesthesia was revisited for the 2023 CPG because it remains a debated topic in primary THA. One moderate-quality and four low-quality studies were evaluated. Consistent with the 2017 CPG, a limited recommendation was made in this 2023 CPG supporting neuraxial anesthesia because it may be associated with fewer adverse events.

Anterior and posterolateral approaches are most commonly used in primary THA. Several high-quality studies have been published comparing these approaches as well as many other approaches in THA. The data consistently demonstrate that there is not one approach that is better than the others. Each approach has its own unique risks and benefits that should be considered in the context of each patient. This recommendation was made in the 2017 CPG and again supported in the 2023 CPG. The CPG recommendation was downgraded to a moderate recommendation because of heterogeneity of the data and the lack of direct comparison between approaches.

A new topic in the 2023 CPG was cemented versus noncemented femoral fixation. Eleven low-quality studies were evaluated that compared cemented with noncemented femoral fixation. In older patients undergoing THA, cemented femoral stems were associated with a lower risk of periprosthetic fractures. This recommendation was upgraded from limited to moderate for several reasons including the risk of periprosthetic fracture, likelihood of broad acceptance because most of the stems implanted are noncemented, and the importance of educating surgeons on cement technique. While cemented femoral stems are associated with lower risk of periprosthetic fracture in older patients, there is a small risk of bone cement implantation syndrome. Similar to all recommendations in the guideline, the decision to use a cemented or noncemented femoral stem should be individualized to each patient because it may be influenced by individual patient factors including comorbidities, such as osteoporosis, and intraoperative bone quality assessment.

There has been notable recent interest in the hip-spine relationship and its influence on acetabular implant position as well as risk of dislocation. Five low-quality studies were evaluated, but these were limited by notable heterogeneity in the data. One study found increased risk of complications and revision surgery with stiff spine syndrome while the other four found no notable association with dislocation. As a result, a consensus recommendation was formulated suggesting that stiff spine syndrome may place patients at increased risk of dislocation after THA compared with patients without stiff spine syndrome.

Postoperative physical therapy may be prescribed after THA to enhance recovery and improve function. In 2017, a limited recommendation was made supporting the use of postoperative physical therapy. Since 2017, several high-quality studies have been published. Highquality evidence supports either formal physical therapy or an unsupervised home exercise program after THA to improve function after surgery. The recommendation was downgraded to moderate for several reasons including the heterogeneity in physical therapy modalities, treatments, duration, and frequency. In summary, this guideline summarizes the best recommendations for the treatment of OA of the hip based on available evidence. These are simply recommendations and should not be viewed as prescriptive for all patients. It is important that these recommendations are considered in the context of the individual patient including the patient's demographics, medical comorbidities, social situation, and preferences. Several recommendations were limited because of a lack of evidence highlighting the importance of future research in many of these areas.

### Recommendations

This Summary of Recommendations of the AAOS Management of Osteoarthritis of the Hip Evidence-Based Clinical Practice Guideline contains a list of evidencebased prognostic and treatment recommendations. Discussions of how each recommendation was developed and the complete evidence report are contained in the full guideline at www.aaos.org/oahcpg2. Readers are urged to consult the full guideline for the comprehensive evaluation of available scientific studies. The recommendations were established using methods of evidence-based medicine that rigorously control for bias, enhance transparency, and promote reproducibility. An exhaustive literature search was conducted, resulting initially in over 760 papers for full review. The papers were then graded for quality and aligned with the work group's patients, interventions, and outcomes of concern. For CPG PICO (ie, population, intervention, comparison, and outcome) questions that returned no evidence from the systematic literature review, the work group used the established AAOS CPG methodology to generate three companion consensus options: (1) physicians should not prescribe opioids as a conservative treatment for nonsurgical treatment of symptomatic OA of the hip; (2) with pharmacological management of OA of the hip, acetaminophen may be considered to improve pain and function; and (3) patients with hip and stiff spine syndrome may be at an increased risk of dislocation after THA.

The 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, values, preferences, and rights. A patientcentered discussion understanding an individual patient's values and preferences can inform appropriate decision making. Treatment decisions should be made after comprehensive individualized shared decisionmaking discussion between the patient and physician. 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 "Limited" option means that there is a lack of compelling evidence that has resulted in an unclear balance between benefits and potential harm. A "Consensus" option means that expert opinion supports the guideline recommendation although there is no available evidence that meets the inclusion criteria of the guideline's systematic review (Table 1).

### **Tranexamic Acid**

High-quality evidence supports that TXA should be considered for patients with symptomatic OA of the hip who are undergoing THA to reduce blood loss and the need for blood transfusions.

Strength of recommendation: Strong.

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

## Postoperative Physical Therapy

High-quality evidence supports either formal physical therapy or unsupervised home exercise after THA for symptomatic OA of the hip.

Strength of recommendation: Moderate.  $\bigstar$  (downgraded)

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

Physical Therapy as Conservative Treatment Physical therapy could be considered as a treatment for

patients with mild-to-moderate symptomatic OA of the hip to improve function and reduce pain.

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

### Intra-articular Corticosteroid Injection

Intra-articular corticosteroids could be considered to improve function and reduce pain in the short term for patients with symptomatic OA of the hip.

Strength of recommendation: Moderate.

Strength of Recommendation	Evidence of Quality	Statement Description	Strength Visual
Strong	High	Evidence from two or more "High" quality studies with consistent findings for recommending for or against the intervention. Or Rec is upgraded using the EtD framework.	
Moderate	Moderate	Evidence from two or more "Moderate" quality studies with consistent findings, or evidence from a single "High" quality study for recommending for or against the intervention. Or Rec is upgraded or downgraded from Limited or Strong using the EtD framework.	
Limited	Low	Evidence from two 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	Low	Evidence from one "Low" quality study, no supporting evidence, or Rec is downgraded using the EtD framework. In the absence of sufficient evidence, the guideline work group is making a statement based on their clinical opinion.	

Table	1.	Strength of Recommendation Descriptions
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Implication: Practitioners should generally follow a Moderate recommendation but remain alert to new information and be sensitive to patient preferences.

#### Intra-articular Hyaluronic Acid

Intra-articular hyaluronic acid should not be considered for treatment of symptomatic OA of the hip because it does not improve function or reduce pain better than placebo.

Strength of recommendation: Strong.

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

# Pharmacological Management: Nonsteroidal Anti-inflammatory Drugs

When not contraindicated, oral NSAIDs should be used to reduce pain and improve function in the treatment of symptomatic hip OA.

Strength of recommendation: Strong.

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

# Cemented Versus Noncemented Femoral Fixation

Low-quality evidence suggests that in older patients undergoing THA for symptomatic OA, cemented femoral stems could be considered because these are associated with a lower risk of periprosthetic fracture.

Strength of recommendation: Moderate.

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

### Exposure Approach

High-quality evidence supports that there are no specific risks and benefits to each surgical approach and that there is not a preferred surgical approach for patients with symptomatic OA of the hip undergoing THA.

Strength of recommendation: Moderate.

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

# **Options**

Low-quality evidence, no evidence, or conflicting support evidence has resulted in the following statements for patient interventions to be listed as options for the specified condition. Future research may eventually cause these statements to be upgraded to strong or moderate recommendations for treatment.

## Body Mass Index: Adverse Events

Limited evidence suggests that elevated BMI may increase the risk of adverse events in patients undergoing THA for symptomatic hip OA.

Strength of recommendation: Limited.  $\star \star \star$ 

Implication: Practitioners should feel little constraint in following a recommendation labeled as Limited, 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.

## Body Mass Index: Clinical Outcomes

Limited evidence supports that patients with elevated BMI and symptomatic OA of the hip may achieve lower absolute patient-reported outcome scores but similar degree of improvement in patient satisfaction, pain, function, and quality of life after THA.

Strength of recommendation: Limited.  $\star \star \star$ 

Implication: Practitioners should feel little constraint in following a recommendation labeled as Limited, 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.

# Prescription Opioid as Conservative Treatment

In the absence of sufficient evidence, it is the opinion of the workgroup that oral opioids not be used for nonsurgical treatment of symptomatic OA of the hip.

Strength of recommendation: Consensus

Implication: In the absence of reliable evidence, practitioners should remain alert to new information because emerging studies may change this recommendation. Practitioners should weigh this recommendation with their clinical expertise and be sensitive to patient preferences.

## Diabetes: Adverse Events

Limited evidence suggests that patients with symptomatic OA of the hip and poorly controlled diabetes may be at a higher risk of adverse events after THA.

Strength of recommendation: Limited.

Implication: Practitioners should feel little constraint in following a recommendation labeled as Limited, 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.

# Social Determinants of Health

Limited evidence suggests that social determinants of health (eg, education, income level, food desert, and insurance type) may negatively affect length of stay, total cost of care, and mortality after THA.

Strength of recommendation: Limited.  $\star \star \star$ 

Implication: Practitioners should feel little constraint in following a recommendation labeled as Limited, 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.

## Pharmacological Management: Acetaminophen

In the absence of sufficient evidence, it is the opinion of the workgroup that, when not contraindicated, oral acetaminophen may be considered to improve pain and function in the treatment of symptomatic OA of the hip.

Strength of recommendation: Consensus

Implication: In the absence of reliable evidence, practitioners should remain alert to new information because emerging studies may change this recommendation. Practitioners should weigh this recommendation with their clinical expertise and be sensitive to patient preferences.

## **Hip-Spine Relationship**

In the absence of sufficient evidence, it is the opinion of the workgroup that patients with OA of the hip and stiff spine syndrome may be at increased risk of dislocation after THA compared with patients without stiff spine syndrome.

Strength of recommendation: Consensus.

Implication: In the absence of reliable evidence, practitioners should remain alert to new information because emerging studies may change this recommendation. Practitioners should weigh this recommendation with their clinical expertise and be sensitive to patient preferences.

### Neuraxial Versus General Anesthesia

Limited evidence suggests that neuraxial anesthesia may be used to reduce adverse events in patients with symptomatic OA of the hip undergoing THA.

Strength of recommendation: Limited.  $\star \star \star$ 

Implication: Practitioners should feel little constraint in following a recommendation labeled as Limited, 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.

#### Tobacco Use

Limited evidence suggests that patients with symptomatic OA of the hip who use tobacco products may be at an increased risk of adverse events after THA.

Strength of recommendation: Limited.  $\star$ 

Implication: Practitioners should feel little constraint in following a recommendation labeled as Limited, 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.

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