GUIDELINE SYNTHESIS

Nonsurgical Management of Osteoarthritis of the Knee

Guidelines Being Compared:

1 American Academy of Orthopaedic Surgeons (AAOS)

American Academy of Orthopaedic Surgeons clinical practice guideline on the treatment of osteoarthritis of the knee, 2nd edition.

2013 May 18

View Summary >

2 Department of Veterans Affairs (VA)

VA/DoD clinical practice guideline for the non-surgical management of hip and knee osteoarthritis.

2014 Jan 01

View Summary >

Areas of Agreement and Difference

A direct comparison of recommendations presented in the above guidelines for nonsurgical management of osteoarthritis (OA) of the knee is provided. The AAOS guideline provides recommendations for surgical interventions that are less invasive than knee replacement, which are beyond the scope of this synthesis. The VA/DoD guideline addresses OA of the hip,

topics.

Areas of Agreement

General Recommendations

The groups agree that nonsurgical interventions should be attempted before considering surgery in patients with symptomatic OA of the knee, and that the decision to prescribe any intervention should take into consideration factors such as potential benefits and harms, pain severity, functional status, and patient preferences.

Weight Reduction

AAOS and VA/DoD agree that overweight or obese patients (defined by a BMI >25 kg/m^2 [VA/DoD] or ≥25 kg/m^2 [AAOS]) with symptomatic OA of the knee should attempt weight loss. Ideally, patients should lose a minimum of five percent body weight and maintain this new level of weight, specifies VA/DoD.

Complementary and Alternative Medicine

The developers recommend against the use of chondroitin sulfate and/or glucosamine to treat joint pain or improve function in patients with symptomatic OA of the knee. Acupuncture is also not recommended by the developers for this purpose. Due to insufficient evidence, AAOS and VA/DoD were unable to recommend for or against chiropractic therapy for relief of pain and improved function. VA/DoD was also unable to make a recommendation for the use of dietary supplements.

Intra-articular Injections (Corticosteroids and Hyaluronic Acid)

Neither developer recommends routine use of intra-articular corticosteroid or hyaluronic acid injection. With regard to corticosteroids, AAOS makes an "Inconclusive" recommendation, signifying a lack of compelling evidence resulting in an unclear balance of benefits and harms. VA/DoD makes a "C" recommendation for their use, meaning they can be selectively offered/provided based on clinical judgment and patient preferences.

considered for patients who have not responded adequately to nonpharmacologic measures and who have an inadequate response, intolerable adverse events, or contraindications to other pharmacologic therapies. AAOS takes a firmer position, making a "Strong" recommendation against the use of hyaluronic acid in patients with symptomatic OA of the knee.

Other Interventions

VA/DoD recommends that the prescription and training of ambulation or walking aids should be carried out by a physical therapist or the referring provider. AAOS was unable to recommend for or against the use of physical agents (including electrotherapeutic modalities) due to inconsistent findings, as well as the use of a valgus directing force brace (medial compartment unloader) for patients with symptomatic OA of the knee due to a lack of available evidence. AAOS also could not recommend the use of lateral wedge insoles for patients with symptomatic medial compartment OA of the knee due to a preponderance of potential harm over benefit.

Areas of Difference

Manual Therapy

According to VA/DoD, for patients with OA of the knee, the addition of manual physical therapy as an adjunct to traditional physical therapy and supervised exercise can improve pain, function, and walking distance. Although AAOS recommends participation in self-management programs, strengthening, low-impact aerobic exercises, and neuromuscular education, they were unable to recommend for or against manual therapy in patients with symptomatic OA of the knee due to a lack of evidence on the topic.

Pharmacologic Therapy

Recommendations for the use of pharmacologic therapies for pain relief in patients with symptomatic OA of the knee differ somewhat. VA/DoD makes recommendations according to severity of OA pain and recommends acetaminophen (no more than four grams daily from all sources) or oral NSAIDs as first-line treatment in patients with no contraindications to pharmacologic therapy. If oral NSAIDs are prescribed in patients at high risk for serious

line therapy or adjunctive therapy. For patients with **persistent moderate or moderately severe pain**, the developer cites duloxetine and tramadol as alternatives or adjuncts to oral NSAIDs. For patients with **persistent severe pain** who have contraindications, inadequate response, or intolerable adverse effects with non-opioid therapies and tramadol, clinicians may consider prescribing non-tramadol opioids.

In contrast, the only pharmacologic therapies recommended by AAOS for patients with symptomatic OA of the knee are NSAIDs (oral or topical) and tramadol. AAOS was unable to recommend for or against the use of acetaminophen, opioids, or pain patches.

Comparison of Recommendations

Nonsurgical Management of Osteoarthritis of the Knee

AAOS (2013)	**Note from the AAOS**: This synthesis of the AAOS clinical practice guideline "Treatment of Osteoarthritis of the Knee" contains a list of the evidence-based treatment recommendations and includes only less invasive alternatives to knee replacement. Discussion of how and why each recommendation was developed and the evidence report are contained in the full guideline from the AAOS Web site. Readers are urged to consult the full guideline for the comprehensive evaluation of the available scientific studies (see the "Availability of the Companion Documents" field in the NGC summary). The recommendations were established using methods of evidence-based medicine that rigorously control for bias, enhance transparency, and promote reproducibility. **Conservative Treatments** **Recommendation 1** The work group recommends that patients with symptomatic osteoarthritis 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.

The work group suggests weight loss for patients with symptomatic osteoarthritis of the knee and a body mass index (BMI) ≥25.

Strength of Recommendation: Moderate

Recommendation 3A

The work group cannot recommend using acupuncture in patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Strong

Recommendation 3B

The work group is unable to recommend for or against the use of physical agents (including electrotherapeutic modalities) in patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Inconclusive

Recommendation 3C

The work group is unable to recommend for or against manual therapy in patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Inconclusive

Recommendation 4

The work group is unable to recommend for or against the use of a valgus directing force brace (medial compartment unloader) for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Inconclusive

Recommendation 5

Strength of Recommendation: Moderate

Recommendation 6

The work group cannot recommend using glucosamine and chondroitin for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Strong

Pharmacologic Treatments

Recommendation 7A

The work group recommends NSAIDs (oral or topical) or Tramadol for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Strong

Recommendation 7B

The work group is unable to recommend for or against the use of acetaminophen, opioids, or pain patches for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Inconclusive

Procedural Treatments

Recommendation 8

The work group is unable to recommend for or against the use of intraarticular (IA) corticosteroids for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Inconclusive

Recommendation 9

	Strength of Recommendation: Strong **Recommendation 10** The work group is unable to recommend for or against growth factor injections and/or platelet rich plasma for patients with symptomatic osteoarthritis of the knee. **Strength of Recommendation: Inconclusive** **Recommendation 11** The work group cannot suggest that the practitioner use needle lavage for patients with symptomatic osteoarthritis of the knee. **Strength of Recommendation: Moderate**
VA/DoD (2014)	**Note from the Department of Veterans Affairs and the Department of Defense (VA/DoD) and the National Guideline Clearinghouse (NGC)**: The recommendations for the non-surgical management of hip and knee osteoarthritis (OA) are organized into 6 modules with 1 algorithm. The modules with accompanying recommendations are presented below. See the original guideline document for the algorithm and evidence tables associated with selected recommendations, including level and quality of evidence, strength of recommendation, and supporting evidence citations. Module A: Diagnosis and Evaluation **History and Physical Examination** *Recommendation* • Clinicians should conduct a history and physical examination for all patients, with an emphasis on the musculoskeletal examination. **[EO]** **Plain Radiography**

and knee OA. **[C]**

Magnetic Resonance Imaging (MRI)

Recommendation

- Clinicians should not use MRI as an evaluative tool to diagnose, confirm, or manage the treatment of OA. **[D]**

Routine Use of Laboratories and Synovial Fluid Analysis

Recommendation

- Clinicians should avoid routine use of laboratory examinations or synovial fluid analysis to diagnose OA of the hip and/or knee. **[EO]**

Module B: Core Non-surgical Treatment Principles

Patient Education

Recommendation

- The decision to prescribe any intervention should be based on consideration of assessment findings, risk vs. benefit analysis, pain severity, functional status, patient preference, and resource utilization. **[EO]**

Comprehensive Management Plan

Recommendations

- For patients with OA of the hip and/or knee, clinicians should attempt the core non-surgical therapies prior to referral for surgery. **[C]**
- For patients with OA of the hip and/or knee, clinicians should refer for physical therapist services early on, as part of a comprehensive management plan. **[B]**

Weight Reduction in Patients with Knee or Hip OA and Elevated BMI

Recommendation

minimum of five percent body weight and maintain this new level of weight. **[C]**

Module C: Physical Therapy Approaches

Manual Physical Therapy

Recommendation

- For patients with OA of the knee, the addition of manual physical therapy as an adjunct to traditional physical therapy and supervised exercise can improve pain, function, and walking distance. **[B]**

Aquatic Therapy

Recommendation

- For adults with OA of the knee who do not tolerate land-based therapeutic exercise, clinicians should consider adjunctive aquatic physical therapy. **[C]**

Walking Aids

Recommendation

- For patients with OA of the knee or hip, the prescription and training of ambulation or walking aids should be carried out by a physical therapist or the referring provider. **[EO]**

Module D: Pharmacologic Therapies

Acetaminophen and NSAIDs

Recommendations

- In patients with no contraindications to pharmacologic therapy, clinicians should consider acetaminophen or oral NSAIDs as first line treatment. **[B]**
- Clinicians should ensure that patients receive no more than four grams of acetaminophen daily from all sources of prescribed and non-prescribed medications. **[A]**

the addition of a proton-pump inhibitor (PPI) or misoprostol. **[A]**

- Clinicians should consider the balance of benefit and potential harm in prescribing oral NSAIDs in patients at risk for or with known cardiovascular disease or renal injury/disease. **[B]**

Topical Capsaicin

Recommendation

- In patients with mild to moderate pain associated with OA of the knee, topical capsaicin can be considered as first line therapy or adjunctive therapy. **[C]**

Other Pain Management Pharmacotherapies

Recommendations

- For patients with persistent moderate or moderately severe OA pain, clinicians may offer duloxetine or tramadol as an alternative or adjunct to oral NSAIDs. **[B]**
- For patients with persistent severe OA pain who have contraindications, inadequate response, or intolerable adverse effects with non-opioid therapies and tramadol, clinicians may consider prescribing non-tramadol opioids. **[C]**

Intra-articular Injections (Corticosteroids and Hyaluronic Acid)

Recommendations

- For patients with symptomatic OA of the knee, clinicians may consider intra-articular corticosteroid injection. **[C]**
- There is insufficient evidence to recommend for or against the use of intra-articular hyaluronate/hylan injection in patients with OA of the knee; however it may be considered for patients who have not responded adequately to nonpharmacologic measures and who have an inadequate response, intolerable adverse events, or contraindications to other pharmacologic therapies. **[I]**

<u>Module E: Complementary and Alternative Medicine</u>

Nutritional Supplements/Nutraceuticals/Dietary Supplements

recommend for or against the use of dietary supplements for relief of pain and improved function. **[I]**

- In patients with hip and/or knee OA, clinicians should not prescribe chondroitin sulfate, glucosamine, and/or any combination of the two, to treat joint pain or improve function. **[D]**

Acupuncture and Chiropractic Care

Recommendation

- In patients with hip and/or knee OA, there is insufficient evidence to recommend for or against referral for short term trial of needle acupuncture or chiropractic therapy for relief of pain and improved function. **[I]**

Module F. Referrals for Surgical Consultation

Recommendations

- For patients with OA of the hip and/or knee, who experience joint symptoms (such as pain, stiffness, and reduced function) with substantial impact on their quality of life (individualized based upon patient assessment), and who have not benefited from the core non-surgical therapies, clinicians may offer referral for joint replacement surgery. **[B]**
- In patients with OA of the hip and/or knee considered for surgical consultations, clinicians should obtain weight-bearing plain radiographs within 6 months prior to the referral to surgical consultation. **[B]**
- In candidates for joint replacement of the hip and/or knee, joint injections should not be given into the involved joint if surgery is anticipated within three months. **[EO]**

Strength of Evidence and Recommendation Grading Schemes

AAOS	**Recommendation Strengths, Descriptions, and Clinical Implications**

Strong	Evidence is based on two or more "High" strength studies with consistent findings in support of recommending for or against the intervention. A **Strong** (positive) recommendation means that the benefits of the recommended approach clearly exceed the potential harm, and/or that the strength of the supporting evidence is high. A **Strong** (negative) recommendation means that the quality of the supporting evidence is high. A harms analysis on this recommendation was not performed.	Practitioners should follow a **Strong** recommendation unless a clear and compelling rationale for an alternative approach is present.

Moderate	Evidence from two or more "Moderate" strength studies with consistent results, or evidence from a single "High" quality study recommending for or against the intervention. 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.	Practitioners should generally follow a **Moderate** recommendation but remain alert to new information and be sensitive to patient preferences.

Limited	Evidence from two or more "Low" strength studies with consistent results, or evidence from a single Moderate quality study recommending for or against the intervention or diagnostic. A **Limited** recommendation means the strength of the supporting evidence is unconvincing, or that well-conducted studies show little clear advantage to one approach versus another.	Practitioners should exercise clinical judgment when following a recommendation classified as **Limited**, and should be alert to emerging evidence that might negate the current findings. Patient preference should have a substantial influencing role.

Inconclusive	Evidence from a single low strength study or otherwise conflicting findings that do not allow a recommendation to be made for or against the intervention. An **Inconclusive** recommendation means that there is a lack of compelling evidence resulting in an unclear balance between benefits and potential harm.	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.

	Consensus	The supporting evidence is lacking and requires the work group to make a recommendation based on expert opinion by considering the known potential harm and benefits associated with the treatment. A **Consensus** recommendation means that expert opinion supports the guideline recommendation even though there is no available empirical evidence that meets the inclusion criteria in the systematic review.	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.

VA/DoD (2014)

The recommendations in this Clinical Practice guideline are rated according to the U.S. Preventive Services Task Force (USPSTF) rating scheme and are based on two main dimensions: 1) **net benefit** of an intervention and 2) **certainty** of evidence association with that net benefit.

USPSTF Recommendations

Grade	Grade Definitions	Suggestions for Practice

	recommends the service. There is high certainty that the net benefit is substantial.	service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.	Offer or provide this service.
C	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service for selected patients depending on individual circumstances.

	recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	this service.
I Statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be measured.	If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

Grade of **EO** was added for "Expert Opinion".

USPSTF Levels of Certainty Regarding Net Benefit

Definition: The USPSTF defines certainty as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.

	includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by factors such as: • The number, size, or quality of individual studies • Inconsistency of findings across individual studies • Limited generalizability of findings to routine primary care practice; and • Lack of coherence in the chain of evidence As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.

		to assess effects on health outcomes. Evidence is insufficient because of: • The limited number or size of studies • Important flaws in study design or methods • Inconsistency of findings across individual studies • Gaps in the chain of evidence • Findings not generalizable to routine primary care practice; and • A lack of information on important health outcomes More information may allow an estimation of effects on health outcomes.

Methodology

Click on the links below for details of guideline development methodology	
AAOS **(2013)**	**VA/DoD** **(2014)**
To collect the evidence, AAOS and VA/DoD performed searches of electronic databases. AAOS also performed hand-searches of published literature. Both guideline developers provide relevant details of the literature collection and selection process, including the databases searched, keywords used, and inclusion/exclusion criteria applied. Methods used to assess the quality and strength of the evidence were similar in so much as both groups weighted it according to a rating scheme and provide the scheme. VA/DoD also	

evidence tables. AAOS also performed a meta-analysis of randomized controlled trials. Both of the guideline developers employed expert consensus (AAOS specifies Nominal Group Technique) to formulate the recommendations, and describe the process. The groups rated the strength of the recommendations according to a scheme and provided the scheme. To validate the guidelines, the developers sought internal peer review. AAOS also sought external peer review. The groups described the validation process.

Benefits and Harms

Benefits

AAOS (2013)	Effective treatment of osteoarthritis of the knee in adults
VA/DoD (2014)	A comprehensive care program for patients with osteoarthritis (OA) may help them achieve maximum functionality and independence, as well as improve patient and family quality of life.

Harms

AAOS (2013)	Individuals with osteoarthritis of the knee often complain of joint pain, stiffness, and difficulty with purposeful movement. The aim of treatment is to provide pain relief and improve the patient's functioning. Most interventions are associated with some potential for adverse outcomes, especially if invasive or operative. Potential harms of treatment include adverse effects of medications and complications of surgical procedures.
VA/DoD (2014)	• Long-term use of oral NSAIDs is limited by adverse effects such as increased cardiovascular events, gastrointestinal (GI) perforation, ulceration, and bleeding, and renal impairment. The risks of these complications increase with age, drug-drug and drug-disease interactions, and probably duration of use. These risks are especially important concerning the typically older population

- All NSAIDs have the potential to increase the risk for cardiovascular (CV) events and therefore should be used at the lowest effective dose for the shortest possible duration. Naproxen has a neutral or lowest risk for adverse CV events. Use with caution or avoid use of NSAIDs in patients with renal impairment, history of gastrointestinal bleeding, uncontrolled hypertension, congestive heart failure, advanced liver diseases, known cardiovascular disease, patients receiving anticoagulants, etc.
- Adverse events associated with topical NSAIDs may be due to components of the formulation rather than the NSAID itself (e.g., unpleasant odor from the dimethyl sulfide metabolite of dimethylsulfoxide [DMSO] in diclofenac solution).
- Use of nonselective or cyclooxygenase (COX)-2 selective NSAIDs can result in renal papillary necrosis, acute tubular necrosis, renal insufficiency, fluid and electrolyte disturbances, acute renal failure or other renal-related injury in an estimated one to five percent of patients. All available agents approved for use in the U.S. include a warning for such events in their prescribing information. The risk for renal adverse events is increased in patients who are dependent upon a compensatory increase in the production of renal prostaglandins to maintain renal perfusion. Patients at higher risk for renal injury from NSAIDs or COX-2s include those with preexisting renal disease, volume depletion (e.g., diuretics and vomiting), congestive heart failure, liver dysfunction, cirrhosis with ascites, use of angiotensin converting enzyme inhibitors (ACEs) or angiotensin receptor blockers (ARBs) and older patients.
- Although acetaminophen is a relatively safe analgesic when taken in usual doses (up to a maximum of four grams daily), the risk for acute liver injury and liver failure is increased in patients taking doses greater than 4,000 mg daily.
- Duloxetine therapy can be limited by adverse gastrointestinal, central nervous system and other reactions. The most common adverse events in clinical trials were nausea, dry mouth, fatigue, somnolence and constipation. When duloxetine is added on to a NSAID, the incidence of adverse events (i.e.,

to those for NSAID therapy alone.

- Some patients may develop physical dependence with regular use and experience withdrawal symptoms typical of opioid withdrawal if tramadol therapy is stopped too quickly. Atypical withdrawal symptoms that may be related to the serotonin–norepinephrine reuptake inhibitor (SNRI) effects (e.g., hallucinations, paranoia, extreme anxiety, panic attacks, confusion and unusual sensory experiences such as numbness and tingling in the extremities) may also occur. If tramadol is discontinued, the dose should be slowly tapered off to avoid withdrawal symptoms. The main safety concern with tramadol is development of seizures. Tramadol should be avoided or used with caution in patients with a history or risk of seizures or those who are taking drugs that reduce the seizure threshold, such as antidepressants, anorectics, selective serotonin reuptake inhibitors (SSRIs), SNRIs, tricyclic antidepressants, tricyclic compounds (such as cyclobenzaprine, promethazine), other opioids, monoamine oxidase inhibitors (MAOIs), and neuroleptics. Careful attention should be given to recommended dosage adjustments and maximal dosage limits in at-risk populations (e.g., the elderly and patients with renal or hepatic impairment).
- Adverse events such as endocrine dysfunction and sleep-disordered breathing are associated with long-term opioid therapy in chronic pain.
- Results from two studies showed that oral diclofenac has a higher incidence of adverse GI symptoms, whereas topical diclofenac has a higher incidence of local application site reactions, commonly dry skin, rash, and pruritus.
- Adverse events associated with topical capsaicin are limited to temporary burning, stinging and pain at the site of application.
- Local adverse events are the most commonly reported adverse events from steroid injections. These include pain on injection, redness, post injection flare and skin discoloration. The rate of joint infection is considered to be very low when strict aseptic techniques are followed. Systemic effects include rapid suppression of serum cortisol, adrenocorticotropin hormone (ACTH) and

	diabetics, a transient, short-term increase in blood glucose levels has been reported. The evidence for an effect on blood pressure is mixed but facial flushing can occur.

Contraindications

AAOS (2013)	Contraindications vary widely by procedure. Reducing risks improves treatment efficacy and is accomplished through collaboration between patient and physician.
VA/DoD (2014)	No contraindications related to management of OA of the knee are provided.

Abbreviations

AAOS, American Academy of Orthopaedic Surgeons

BMI, body mass index

GI, gastrointestinal

MRI, magnetic resonance imaging

NSAID, nonsteroidal anti-inflammatory drug

OA, osteoarthritis

PPI, proton-pump inhibitor

VA/DoD, Department of Defense/Department of Veterans Affairs/Veterans Health Administration

Status

recommendations from AAOS and SMOH, and to add recommendations from AAOS and VA/DoD. The information was verified by AAOS on May 27, 2016.