

# Clinical Management of OA

Osteoarthritis Prevention and  
Management in Primary Care

**OA**

**OSTEOARTHRITIS**  
ACTION ALLIANCE  
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# Clinical Management of OA

Because there is neither a cure nor effective disease-modifying drug therapies for osteoarthritis (OA), management of symptoms (e.g. pain, tenderness and swelling) is essential for those patients who are living with the disease. A variety of OA evidence-based management guidelines have been developed by notable international organizations: Osteoarthritis Research Society International (OARSI), American College of Rheumatology (ACR), European League Against Rheumatology (EULAR), American Association of Orthopedic Surgeons (AAOS), just to name a few. The management recommendations presented in this module align with the most commonly prescribed practices across these expert bodies; where inconsistencies exist, ACR guidelines will be used as the exemplar model.

## Summary of Recommendations for Management of Osteoarthritis<sup>3</sup>

### CORE RECOMMENDATIONS

#### *always recommended*

- ✓ Self-management programs
- ✓ Education
- ✓ Individualized treatment plans
- ✓ Weight loss or maintenance
- ✓ Exercise (land or water-based)

### RECOMMENDED FOR MOST SITUATIONS

#### *if appropriate for clinical situation, comorbidities, etc.*

- ✓ Intra-articular corticosteroid injection
- ✓ Topical non-steroidal anti-inflammatory medications (NSAIDs)
- ✓ Acetaminophen
- ✓ Oral NSAIDs or COX-2 inhibitors
- ✓ Walking aids and assistive devices
- ✓ Thermal modalities
- ✓ Physical or Occupational therapy referral

### CONSIDER IN SOME SITUATIONS

#### *e.g. specific patient populations or presentations*

- ✓ Duloxetine
- ✓ Capsaicin
- ✓ Mind and body therapies (e.g. yoga, Tai Chi, acupuncture)
- ✓ Splinting and bracing
- ✓ Transcutaneous electrical nerve stimulation (TENS)
- ✓ Surgical intervention (specifically joint replacement)

### CONTROVERSIAL ACROSS GUIDELINES, INSUFFICIENT DATA, OR NOT ADDRESSED

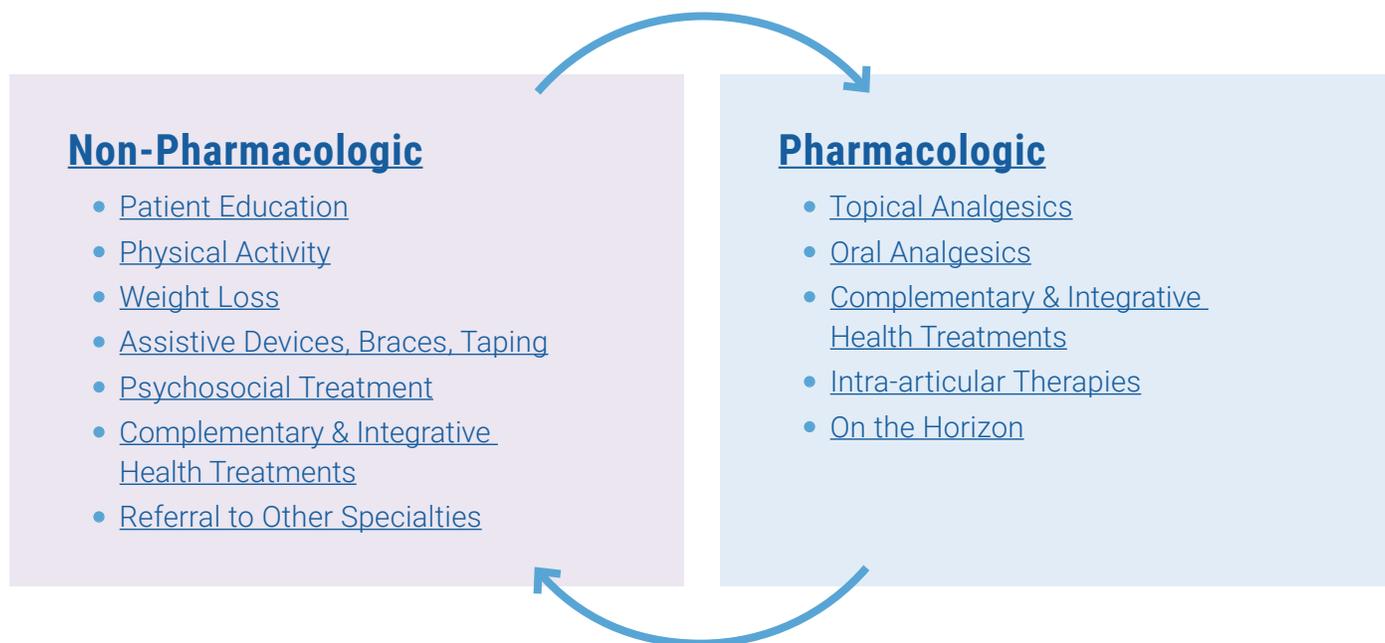
- Intra-articular hyaluronic acid injection
- Other IA treatments (e.g. platelet rich plasma, stem cells)
- Glucosamine/chondroitin
- Other surgical interventions (e.g. osteotomy, partial joint replacement, APM)
- Herbal or botanical treatments

### NOT RECOMMENDED

- Therapeutic ultrasound
- Needle lavage
- Arthroscopy with debridement

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The strategies for OA management fall into two broad categories, which are typically used concurrently: pharmacologic and non-pharmacologic. This module will provide a general overview of both categories.



# NONPHARMACOLOGIC MANAGEMENT

The most effective means for managing the symptoms and preventing or delaying the progression of OA is through the use of nonpharmacologic therapies.<sup>4,5</sup> All management guidelines strongly support the use of nonpharmacologic modalities as initial therapy, but also as concurrent management for OA throughout its progression.<sup>4,6-8</sup>

## Types of nonpharmacologic interventions include:

- Patient Education
- Physical Activity
- Weight Loss
- Assistive Devices, Braces, Taping
- Psychosocial Treatment
- Complementary & Integrative Health Treatments
- Referral to Other Specialties

## PATIENT EDUCATION

Optimal management of OA requires an investment in patient education as all of the initial treatment recommendations require patient commitment. Dispelling misconceptions, (e.g., “I’m just getting old,” “nothing helps,” “progression is inevitable,” “I’m wheelchair bound”), especially about disease progression, the use of narcotics and that exercise will make pain worse, are vital to the success of symptom management and improving the patient’s quality of life (QOL).

Patients should be empowered to manage the day-to-day impact the disease has on their lives. Research has shown that patients with arthritis are interested in learning about self-management strategies, particularly nonpharmacologic strategies for managing their condition.<sup>9</sup> By connecting patients to evidenced-based self-management education (SME) programs and services in the community, clinicians can help ensure that they will have the confidence to be an active participant in the management of their OA, helping to prevent short- and long-term health consequences, and achieve the best possible QOL.<sup>9</sup>

*A patient handout about OA, its symptoms, causal factors, and treatment options is available in this Toolkit.*

## CDC-RECOMMENDED SME PROGRAM

### Chronic Disease Self-Management (CDSMP):

CDSMP teaches useful tools to help manage symptoms related to many chronic conditions. This CDC-recommended program includes sessions on behavior change, goal setting, problem solving, and peer support. CDSMP has been proven to lead to significant improvements in: ability to do social and household activities, mental health, reduction in symptoms like pain and increased confidence in ability to manage chronic conditions. A Spanish version of the program, Tomando Control de su Salud (Spanish CDSMP), is available.<sup>2</sup>

Local offerings of CDSMP and Tomando Control de su Salud can be found through the Evidence-Based Leadership Council.<sup>70</sup>

## PHYSICAL ACTIVITY

Physical activity and weight management are essential therapies for the management of OA.<sup>4</sup> Physical activity improves pain, stiffness, and physical function in patients with OA.<sup>1</sup> In a meta-analysis by Wallis et al, patients with severe knee OA who were waiting for a joint arthroplasty had less pain after participating in pre-operative exercise.<sup>10</sup> National guidelines recommend 150 minutes per week of moderate intensity physical activity, plus 2 strength training sessions/week. Moderate intensity activity can be defined as intense enough that an individual can talk, but cannot “sing.” Examples include: brisk walking, slow biking, general gardening, and ballroom dancing.<sup>11</sup> These overall guidelines for physical activity among adults can serve as a basis for clinicians’ recommendations. However, Dunlop et al found that **as little as 45 minutes of moderate-to-vigorous activity per week can improve or maintain function in adults with lower extremity OA.**<sup>12</sup> Community-based and other physical activity programs can also provide more specific guidance and support regarding physical activity for patients with OA. Utilizing Physical Activity as a Vital Sign regularly can help providers assess if and how often a patient is active and engage with the patient around setting physical activity goals.

While physical activity is one of the best treatments for OA, it should be individualized. If someone hesitates at the notion of “exercise,” then a suggestion to “just move more” may seem more easily accomplished. The clinician should address patients’ fears that exercise or movement will further worsen pain or increase joint damage and emphasize that it can

## PHYSICAL ACTIVITY AS A VITAL SIGN

Assessing patients' current level of physical activity is vital when treating patients with OA, just as measuring blood pressure at each clinic visit is vital to the treatment of hypertension. There is not currently a universal approach to this idea of "Physical Activity as a Vital Sign," however, by using one of several Physical Activity as a Vital Sign measures, like the SNAP, PAVS, EVS, providers can quickly assess patients' current level of physical activity, and in some cases, even assess patients' readiness and motivation to become more physically active.<sup>1</sup> Read more in the Engaging Patients in OA Management Strategies module.

actually help reduce pain and protect the joint. In fact, limiting the amount of "inactivity" may also help with pain reduction.<sup>13</sup>

## Types of Exercise to Consider

See *Resources for People with Arthritis* handout to help your patients find community programs that offer these types of exercises.

### LOW-IMPACT LAND-BASED AEROBIC EXERCISE

Low-impact physical activity is sometimes referred to as "joint-friendly" physical activity because it minimizes the load and impact on weight-bearing joints, especially those that are commonly affected by OA, such as the knees, hips, and spine.<sup>5</sup> Walking and biking are some of the most common joint-friendly activities that also have the added benefits of contributing to cardiovascular health and improved emotional health.

### LOW-IMPACT AQUATIC AEROBIC EXERCISE

Water aerobics or pool therapy are examples of aquatic exercise, which can improve muscle strength while minimizing joint loading.<sup>14</sup> Both land-based and aquatic exercise programs have been shown to be equally effective in improving patients' arthritis symptoms and overall quality of life. However, in a meta-analysis, Dong, et al., found that participants in aquatic exercise programs had increased adherence rates and satisfaction levels compared to those in land-based programs.<sup>15</sup>

## STRENGTHENING EXERCISES

Strengthening exercises are recommended for patients with knee and hip OA.<sup>5</sup> Quadriceps weakness, in particular, can be a risk factor for knee OA.<sup>13,16</sup> Loss of leg strength has been connected to increased pain and disability in patients with knee

OA. Resistance exercises (i.e., those that use weights or other devices such as bands to provide resistance) can improve pain and function in patients with knee and hip OA.<sup>8,16</sup> To get the most benefit, it is recommended that patients participate in resistance exercises two days per week. In addition to leg strengthening, participating in whole body resistance exercises can improve self-efficacy, self-esteem and reduce anxiety and depression.<sup>16</sup>

## FLEXIBILITY AND RANGE OF MOTION EXERCISES

Flexibility and range of motion exercises contribute to cartilage health, protect joints, and improve comfort during routine daily activities. Patients should engage in low-impact, slow and controlled movements that do not result in increased pain.<sup>8</sup> Hand exercises, such as range of motion and stretching, may help improve hand pain related to OA.<sup>17</sup>

## TAI CHI & YOGA

See more about these practices in the *Complementary & Integrative Health* section below

Encouraging progress beyond these basic movements can be beneficial to the patient's success. In general, low-impact aerobic exercise is recommended.<sup>5</sup> Sharing the CDC's S.M.A.R.T. tips with patients can help them feel empowered to start moving no matter what their fitness level or comfort level.<sup>18</sup>

## LEARN HOW TO SAFELY EXERCISE<sup>18</sup>

Enjoy the benefits of increased physical activity with the S.M.A.R.T. tips below.

- **S**tart low, go slow.
- **M**odify activity when arthritis symptoms increase, try to stay active.
- **A**ctivities should be "joint friendly."
- **R**ecognize safe places and ways to be active.
- **T**alk to a health professional or certified exercise specialist.

### **SIMPLE SUGGESTIONS FOR INCREASING MOVEMENT DURING THE DAY**

- Walk around the house when talking on the phone
- March in place during commercials when watching television
- Choose a parking spot away from the storefront door
- Even yardwork and household chores count!

### **CDC-Recommended Physical Activity Programs**

*The Arthritis Program at the CDC recommends a number of evidence-based physical activity programs that teach participants to safely increase their physical activity as a way of managing arthritis or other chronic conditions through the integration of aerobic, strengthening, and flexibility exercises.<sup>19</sup>*

#### **ACTIVE LIVING EVERY DAY**

This is a classroom-based program for people who want to become and stay more physically active; participants meet for 1 hour a week for 12-20 weeks. Benefits of this program include: increased physical activity and aerobic fitness, decreased stiffness, and improved blood pressure, blood lipid levels, and body fat.<sup>20</sup>

#### **FIT AND STRONG!**

This group-based fitness program was created for sedentary older adults who are experiencing lower-extremity joint pain and stiffness but is appropriate for all. Classes are 90 minutes, 3 times a week for 8 weeks. One hour of the class is focused on exercise such as flexibility, strength training and aerobic walking. The remainder of the time is spent on health education for arthritis management. This program improves lower extremity stiffness, pain and strength, aerobic capacity and symptom management.<sup>21</sup>

#### **WALK WITH EASE (WWE)**

WWE is a 6-week program that offers practical advice on how to walk safely and comfortably, while also providing numerous strategies to help maintain their progress and overcome challenges. In both the instructor-led and self-directed version of WWE, participants are guided through a workbook that educates them on safe walking, exercise safety and symptom management.<sup>22</sup>

### **PATIENT RESOURCES**

Patients should be encouraged to investigate their insurance coverage of evidence-based programs and other physical activity programming through their physical therapy benefits and/or through added fitness benefits such as Silver Sneakers, an exercise program for adults 65 years and older that is covered by many insurance plans. Also, many local gyms or activity centers offer programs tailored for those with arthritis, including land-and water-based exercise activities. You or your patients can locate these programs in your community using the Arthritis Foundation Resource Finder or refer to the Resources for People with Arthritis handout for patients included in this Toolkit.

### **ENHANCE FITNESS**

This group-based, informal program was originally designed for older adults, but is open to adults of all fitness levels, is typically held at gyms or other fitness facilities, and can be joined at any time. Classes are usually held for 1 hour 3 times a week. Benefits include increased strength, improved flexibility and balance, increased activity levels, and improved mood.<sup>23</sup>

*See Engaging Patients in OA Management Strategies module for specific strategies and frameworks to discuss increasing physical activity levels with patients. Patient handouts about Prevention and Self-Management strategies and Resources for People with Arthritis, are also available in this Toolkit.*

## Summary of Physical Activity Recommendations for OA

### TYPES

- Low-impact aerobic, either land-based or aquatic
- Strengthening
- Flexibility/Range of Motion

### AMOUNT

- 150 minutes a week of moderate activity
- Even 45 minutes per week can improve or maintain function in adults with lower extremity OA.
- 2 days of strength training

### EXAMPLES OF LOW-IMPACT AEROBIC & STRENGTHENING ACTIVITIES

- Swimming
- Walking
- Tai chi
- Yoga
- Resistance exercise
- Bicycling

### EVIDENCE-BASED PROGRAMS

- Active Living Every Day
- Fit and Strong!
- Walk With Ease
- Enhance Fitness
- Tai chi for Arthritis

## WEIGHT LOSS

In the presence of excess weight, the biomechanical load on weight-bearing joints is significantly increased, disrupting joint integrity and increasing pain. A 10-pound weight loss in someone overweight can reduce the risk of knee OA by 50% and the amount of knee joint loading by 40 pounds.<sup>24,25</sup> In the IDEA trial (Intensive Diet and Exercise for Arthritis), participants with knee OA who were overweight and who achieved a modest weight loss (10% of body weight) through diet and exercise, achieved a 50% reduction in pain scores.<sup>26</sup> Weight loss counseling is a key component to successful weight loss in patients. The CDC reports that adults with arthritis who are overweight or obese and who receive provider counseling about weight loss are four times more likely to attempt to lose weight; yet, fewer than half of those adults are actually receiving such counseling.<sup>27</sup> Primary care providers can engage patients in weight loss counseling with successful strategies such as motivational interviewing to better advise and assist the patient, guiding the patient to programmatic resources, and educating patients that even small amounts of weight loss can significantly reduce joint load and pain and is also achievable.<sup>28</sup>

See *Engaging Patients in OA Management Strategies module for specific strategies and frameworks to discuss weight management with patients. A patient handout about Prevention and Self-Management strategies, including weight management is also available in this Toolkit.*

### PRACTICAL TIPS FOR MANAGING WEIGHT

- Practice mindful eating — think about the taste and feel of the food and how you are feeling while eating; avoid watching television or reading while eating so you can be aware of how your food tastes and your body feels
- Eat a healthy snack like a salad or piece of fruit before a meal (or party) to avoid overeating
- Pre-portion snacks rather than eating straight from the package
- When eating out, ask for a to-go container at the start of the meal and wrap up half the portion before eating
- Drink water instead of sugary beverages. Add fruit slices or drink sparkling water to make it more appealing
- Stay full longer by replacing high calorie foods with things that have higher water and fiber content like beans, whole grains, broths, fruits and vegetables
- Consult a dietician for more tips and counseling.

SOURCE: Centers for Disease Control and Prevention. Overweight & Obesity: Fact Sheets and Brochures. Available at [www.cdc.gov/obesity/resources/factsheets.html](http://www.cdc.gov/obesity/resources/factsheets.html).

## ASSISTIVE DEVICES & OTHER EXTERNAL TREATMENTS

In combination with the lifestyle factors mentioned above, assistive devices can provide another layer of non-pharmacologic treatment for patients, although guidelines recommending specific interventions are lacking.<sup>5</sup> Specialized shoe inserts, neoprene sleeve braces, and taping have all been shown to provide some relief of joint pain for older adults with OA.<sup>29</sup> In OA of the knee, the use of custom-made foot orthotics – in particular a lateral wedge orthotic – may help reduce the mechanical load placed on a joint, reducing pain.<sup>30</sup> Such interventions may be best guided through referral to an occupational or physical therapist specializing in their use.

### BRACES

In some instances, using a brace helps reduce pain for those with OA. For example, knee braces, which come in a variety of types and materials, can help take pressure off the part of the joint that is most affected by OA. Whether choosing a universal size brace or a custom-fit brace, the added stability of the device can provide a sense of confidence to the wearer, helping them feel less compromised and unsteady or like a joint might buckle under weight.<sup>31</sup> Getting input from a physical therapist is useful for selection and fitting of an appropriate brace.

### THERAPEUTIC TAPING

While therapeutic taping has shown promise in reducing pain among those with knee OA,<sup>32,33</sup> it should be introduced by a physical therapist trained in the practice, and patients should be educated about proper techniques and skin care.<sup>34</sup>

### THERMAL MODALITIES

The application of thermal modalities (e.g., ice or heat) to the affected joint(s) may also be employed. Although the effectiveness of this modality is not consistently demonstrated in clinical research, it has been shown to provide temporary relief in some patients, and is very safe.<sup>4,5</sup>

## PSYCHOSOCIAL INTERVENTIONS

As a chronic condition with no cure and significant symptomology, OA is a disease that can have a cumulative effect, both physically and emotionally. People with OA, compared to those without, are at greater risk for developing anxiety and depression<sup>35,36</sup> which can impact patients' participation in several types of activities: routine activities of daily living, life-giving activities like hobbies and spending meaningful time with family and friends, and self-management activities like exercise.<sup>35</sup> Pre-existing depression and anxiety, may also impact a patient's ability or desire to participate in self-management activities.<sup>36</sup> A multi-faceted and individualized treatment plan for OA is needed to address social support,

sleep, coping skills, and mental health.<sup>35</sup> Combined with pain control (e.g. medication, acupuncture, water therapy, etc.) many of the self-management programs mentioned earlier in this module – particularly CDSMP – expose patients to pain coping strategies, social support and self-care practices, which may also contribute to improved pain and physical function. A referral to mental health professional may be warranted in some cases.

## COMPLEMENTARY & INTEGRATIVE HEALTH TREATMENTS

More than 30% of American adults use treatments that are not typically considered mainstream. These may include natural products and mind and body practices, many of which were developed outside traditional Western practice.<sup>37</sup> Nonpharmacologic complementary and integrative health treatments for OA include mind and body practices such as acupuncture, deep breathing, yoga, tai chi, meditation, massage, and relaxation techniques among others. Some encouraging research has been published on acupuncture, tai chi and yoga; however, with little evidence base available, ACR has not endorsed any of these practices in their recommendations.

### ACUPUNCTURE

Acupuncture uses the insertion of slender metal needles into the skin at targeted points in the body which is thought to trigger the release of enkephalins, endorphins, and possibly cortisol which may be the mechanism by which some patients experience a reduction in OA pain. The effectiveness of acupuncture in clinical research is not consistently demonstrated, but it has provided pain relief to some patients.<sup>38</sup>

### TAI CHI

Tai chi is a form of exercise from China that utilizes slow movements to enhance muscle strength, improve flexibility and balance. In clinical trials, the benefits of tai chi in patients with OA are modest; however, some patients did report a reduction in pain and/or an improvement in function.<sup>39</sup> Tai chi has also been shown to reduce the risk for falls in older adults.<sup>40</sup> The Arthritis Foundation's Tai Chi Program has demonstrated improvements in pain, fatigue, stiffness, and helplessness that were sustained one-year following program participation.<sup>41</sup> Tai chi can be performed individually or in a group setting.

### YOGA

Yoga is a form of exercise that combines focused breathing and mindfulness with physical activity. For patients with arthritis, yoga can help patients increase their flexibility and strength<sup>42,43</sup> as well as develop breathing and relaxation techniques to help combat painful arthritic flare-ups.<sup>42</sup>

## REFERRAL TO OTHER SPECIALTIES

As with most chronic conditions, the management pathway for each patient will vary, but an interprofessional approach — where patients work closely with a team of health care providers (podiatry, PT/OT, orthopedics, sports medicine, mental health, rheumatology, dietician/nutritionist, naturopaths/integrative medicine) — is crucial for determining an actionable plan for ongoing disease management. Ascertaining information, such as the number and specific joint(s) involved, degree of functional discomfort and level of impairment, weight or body mass index (BMI), and overall health status, including other chronic conditions, will facilitate a patient-specific management plan and help determine which additional specialties might be beneficial. Common referrals are to Physical Therapy (PT), Occupational Therapy (OT), and Orthopedics, although many others play an important role in caring for patients with OA (see *table below*).

Referral to PT or OT should be considered when functional deficits are noted.<sup>3</sup> These disciplines can provide manual and/or exercise therapy to help improve activity, balance, and gait.

These specialists should also be consulted when employing the safe and effective use of an assistive walking device (e.g., cane, walker) or in selecting and fitting an appropriate brace. Older adults or those whose balance is compromised due to arthritis may benefit from community-based falls prevention programs to improve agility and strength as a means of reducing injury risk.<sup>44</sup>

For patients with more severe knee or hip OA, a referral to Orthopedics for consideration of surgery (e.g., joint replacement or arthroplasty) may be necessary when non-operative interventions have failed. However, up to 20% of patients who undergo total joint replacement surgery report significant long-term pain despite having surgery.<sup>45</sup> Patients identified at higher risk of lasting and diffuse pain despite having had surgery are those who have widespread pain, significant pain preoperatively, high body mass index, co-morbidities and depressive symptoms.<sup>46</sup>

The following table describes the unique attributes and contributions of the various specialties involved in the care of patients with OA. Many of these descriptions were provided by experts in the respective professions.

## Common Specialties Involved in the Care of Patients with OA

SPECIALTY	CONTRIBUTION TO OA PATIENT CARE
<b>Primary Care Provider (MD, NP, PA, etc.)</b>	<ul style="list-style-type: none"> <li>• Diagnoses OA and distinguishes from other causes of MSK pain</li> <li>• Initiates pain management strategies</li> <li>• Refers to other specialties as indicated</li> <li>• Management of OA within context of patient’s other comorbid conditions and medications</li> <li>• Supports and serves as accountability for patient as he/she engages in self-management strategies</li> </ul>
<b>Podiatrist</b>	<ul style="list-style-type: none"> <li>• Beneficial for patients with foot or toe OA</li> <li>• Can recommend or create special shoe inserts or recommend the right kind of footwear for patients with foot and/or knee OA<sup>47</sup></li> </ul>
<b>Physical Therapist</b>	<ul style="list-style-type: none"> <li>• Assists individuals to maintain and improve movement, activity and functioning and reduce pain, enabling optimal performance to enhance health, well-being, and quality of life</li> <li>• May include strength training, aerobic training, balance training, electrical stimulation, aquatic therapy, taping, orthotics, braces, advice on assistive/adaptive walking devices<sup>48,49</sup></li> <li>• Provides appropriate environmental (or home) adaptations or modifications to enhance independent function</li> </ul>

[continued]

## [continued] Common Specialties Involved in the Care of Patients with OA

SPECIALTY	CONTRIBUTION TO OA PATIENT CARE
<b>Occupational Therapist</b>	<ul style="list-style-type: none"><li>• Focuses on improving patient's occupational functioning and maintaining or regaining functional independence<sup>50</sup></li><li>• Assists with splinting, orthoses, assistive devices, walking aids<sup>49</sup></li><li>• Provides training on joint protection strategies and education/training on techniques and tools for managing everyday tasks like opening a jar and cooking (in the case of hand OA)<sup>50</sup></li></ul>
<b>Registered Dietitian Nutritionist</b>	<ul style="list-style-type: none"><li>• Provides counseling and advice on weight management and weight loss</li></ul>
<b>Mental Health Provider</b>	<ul style="list-style-type: none"><li>• Addresses social support, sleep, coping skills, depression, and anxiety as they relate to pain, functional limitations, and engaging in self-management strategies</li></ul>
<b>Athletic Trainer</b>	<ul style="list-style-type: none"><li>• Focuses on preventive care</li><li>• Implements and disseminates primary prevention strategies (e.g., injury prevention training programs)</li><li>• Focuses on reducing the risk of injury among athletes</li></ul>
<b>Certified Exercise Professional/Personal Trainer</b>	<ul style="list-style-type: none"><li>• Designs and implements supervised physical activity programs for individuals with OA</li><li>• Potential for long-term relationship and meaningful engagement over time</li></ul>
<b>Sports Medicine Physician</b>	<ul style="list-style-type: none"><li>• Works with athletes, sports teams, and individuals with an active lifestyle</li><li>• Focuses on non-operative treatments following sports injuries and advocate for injury prevention activities</li><li>• Can recommend exercise or strengthening program<sup>51</sup></li></ul>
<b>Rheumatologist</b>	<ul style="list-style-type: none"><li>• Diagnoses OA and can help differentiate between OA and other conditions like RA or other forms of arthritis</li><li>• Assists patients who have multi-joint OA or who have OA and other rheumatic conditions</li></ul>

[continued]

## [continued] Common Specialties Involved in the Care of Patients with OA

SPECIALTY	CONTRIBUTION TO OA PATIENT CARE
<b>Orthopedist</b>	<ul style="list-style-type: none"><li>• Works with patient to determine when surgery is necessary</li><li>• Performs joint replacement or other surgery</li></ul>
<b>Naturopath/Integrative Medicine</b>	<ul style="list-style-type: none"><li>• Assists patient in selecting appropriate complementary and naturopathic treatments for OA symptom management</li></ul>

## PHARMACOLOGIC AND INTRA-ARTICULAR INTERVENTIONS

The pharmacologic options for OA target the treatment of pain and other symptoms since no disease-modifying therapies have been developed to date. Simple over-the-counter (OTC) analgesics (e.g., acetaminophen, aspirin) as well as non-steroidal anti-inflammatory drugs (NSAIDs), and intra-articular injections are the mainstay of OA analgesia despite their modest efficacy. As research promotes the rise of evidence-based medicine and the re-evaluation of clinical treatment guidelines, it is important for all providers to remember that OA treatment should be individualized, and risks and benefits of therapeutic options carefully weighed.

See *Comorbidities and Co-Occurring Symptoms module* for a table outlining contraindications for common OA meds.

### TOPICAL ANALGESICS

Topical NSAIDs (e.g., diclofenac solution or 1% gel) are FDA-approved for the treatment of OA of the hand, hip, and knee. While they carry the same black box warning as the oral NSAIDs, given their minimal systemic absorption, they appear to be better tolerated in some patients (e.g., older adults and people with more comorbid conditions) and have fewer drug interactions. The ACR supports topical NSAID use in OA of the hand and knee, but not the hip (given likely minimal absorption at the deeper hip joint).<sup>4</sup> Some patients may need counseling on appropriate use of topical NSAIDs; a dosing card comes

inside the box with the tube and patients should be referred to these instructions.

Topical capsaicin has demonstrated efficacy for the treatment of OA-associated pain of the hand, hip, shoulder and knee, and appears to have a relatively benign side effect profile.<sup>52</sup> With regular, prolonged use (four times a day for 2–3 weeks), patients reported mild to moderate pain relief — especially of the hands and knee.<sup>53</sup> To help improve adherence, twice-daily application may be attempted while still achieving pain relief.<sup>54</sup> A burning sensation is the most common side effect and patients should be cautioned to avoid contact with open skin and mucous membranes.

Although likely safe, other over-the-counter agents, such as topical salicylates<sup>55</sup> and counterirritants (e.g., menthol) have not demonstrated benefits in studies to date.

### ORAL ANALGESICS

#### ACETAMINOPHEN

For many years, acetaminophen (APAP) was the drug of choice (over NSAIDs) for the initial management of mild OA pain. As an agent with no anti-inflammatory activity, APAP can provide adequate pain relief in some patients potentially fewer side effects compared with NSAIDs providing there is little to no inflammation present in the joint. The ACR 2012 conditionally recommended\* acetaminophen for both hip and knee OA based on clinical research.<sup>4</sup> Of note, the 2019 Osteoarthritis Research Society International (OARSI) guideline does not recommend use of APAP due to mounting evidence of minimal to no efficacy of this agent for OA pain and concerns for toxicity.<sup>56</sup> The biggest caution with the use of APAP is the risk of potential overdose and liver toxicity which can occur when consumers do not recognize the APAP content of many OTC and prescription-based products or simultaneously consume other potentially hepatotoxic substances (e.g., alcohol). It is recommended that patients receive counseling from providers

including physicians, physician assistants, nurse practitioners, and pharmacists to ensure safe doses and combinations of medication. Given the overall safety of APAP, doses of  $\leq 3$  grams per day can be considered for the initial trial of mild OA pain unless there is a contraindication (e.g., reported allergy, known liver disease).

See *Comorbidities and Co-Occurring Symptoms* module for a table outlining contraindications for common OA meds.

## ORAL NSAIDS

Oral NSAIDs are recommended for hand, knee, and hip OA especially in the presence of appreciable inflammation.<sup>4</sup> When taken only as needed, these drugs provide more analgesia than anti-inflammatory effects. Lower (OTC) doses of ibuprofen ( $\leq 1200$  mg/day) are usually not enough to provide good anti-inflammatory activity. There is no superiority data to recommend one NSAID over another and when one NSAID does not appear to work, consideration for the use of a different NSAID should be made when inflammation is noted.

NSAIDs pose a risk of gastrointestinal (GI) (e.g., ulceration and bleeding), renal (e.g., acute renal failure), and cardiovascular (e.g., hypertension, heart failure, stroke, myocardial infarction) side effects, and caution should be used when recommending and dispensing these agents to patients. The FDA has issued a black box warning on all NSAIDs regarding their potential cardiovascular side effects.<sup>57</sup> Senior patients are most vulnerable to the adverse effects of NSAIDs; furthermore, seniors may also experience sedation, confusion, and/or falls when taking NSAIDs. **NSAIDs should be used at the lowest effective dose for the shortest time possible in an effort to minimize these potentially serious side effects.**

The large multicenter PRECISION trial assessed over 24,000 patients with OA or rheumatoid arthritis taking celecoxib, naproxen, or ibuprofen over 2 years and found similar efficacy for all 3 NSAIDs. There was no significant difference among these 3 drugs for adverse cardiovascular events, although fewer gastrointestinal and renal events were seen in the celecoxib group.<sup>58</sup>

NSAIDs also pose the potential for drug interactions. NSAIDs should be avoided or used with extreme caution when used concomitantly with medications that increase the risk for bleeding (e.g., aspirin, warfarin, low-molecular weight heparin, anticoagulants, and glucocorticoids). Concurrent use of a diuretic, angiotensin converting enzyme (ACE)-inhibitor, angiotensin receptor blockers (ARB), or direct renin inhibitor (aliskiren) should also be carefully evaluated since concurrent use can significantly increase the risk of acute renal failure.

## DULOXETINE

Duloxetine is a relative newcomer to the OA treatment armamentarium and is FDA-approved for chronic

## CHECKLIST FOR RECOMMENDING ORAL NSAIDS FOR OA

- Non-pharmacologic therapies (e.g., weight loss, exercise, and education) have been implemented, but pain persists
- Consideration has been given to APAP
- Allergies have been reviewed and verified
- Patient has been assessed for their risk of GI, renal, CV and other side effects (as indicated)
- Potential drug interactions have been evaluated
- Patient has been counseled on proper NSAID use including dosing and interactions
- Gastrointestinal prophylaxis has been considered and implemented where indicated

musculoskeletal pain, among other indications. It is a potent inhibitor of serotonin and norepinephrine reuptake and a centrally-acting analgesic, and can interact with other similar medications, including tramadol (discussed below). It has demonstrated a greater reduction in pain when compared to placebo.<sup>59,60</sup> Although it is generally well-tolerated, frequently reported adverse effects include nausea, constipation, fatigue, diarrhea, and somnolence, potentially more severe in older individuals.<sup>61</sup> Research has indicated that it may take four weeks before any significant OA pain relief with duloxetine may be seen. The most recent published treatment guidelines from the ACR conditionally recommend\* duloxetine in OA of the knee in patients  $\geq 75$  years of age; otherwise, they provide no recommendations for its use.<sup>4</sup> Other centrally-acting agents (e.g., gabapentin, pregabalin) have not been adequately studied in OA but may prove to be useful.

## OPIOIDS

Opioid narcotics should be reserved for patients who continue to have symptoms or who are not candidates for previously mentioned therapies. When used, opioids are frequently “add-on” therapy to acetaminophen or NSAIDs. In the context of the ongoing opioid epidemic, the use of these medications for non-cancer pain has come under increasing scrutiny.<sup>62</sup>

Tramadol, a “weak” opioid, has been recommended for refractory OA by a number of professional societies. However, it is still an opioid, and therefore a controlled substance with many potential adverse events including dependence, respiratory depression and death, among others. Additionally, as a norepinephrine and serotonin reuptake inhibitor, it has the potential for drug interactions with other serotonergic medications (similar to the drug interactions with duloxetine). Opioids are frequently associated with nausea, vomiting,

constipation, sedation, and respiratory depression, which can be amplified in older adults or debilitated patients. When used in older patients, falls and altered mental status may also occur.

Despite frequent patient perception that opioids provide strong analgesia, many patients report only modest improvements in their pain and the effects are usually short-term resulting in the need for multiple daily dosing. A large network meta-analysis showed similar pain reduction for NSAIDs, weak, and potent opioids, with greater adverse events for the opioid medications.<sup>63</sup> **Therefore, more potent opioids (e.g., oxycodone) or long-acting opioids should generally be avoided if possible, given their poor benefit to risk ratio for chronic OA pain.**

## COMPLEMENTARY & INTEGRATIVE HEALTH TREATMENTS

More than 30% of American adults use treatments that are not typically considered mainstream. These may include natural products and mind and body practices, many of which were developed outside traditional Western practice.<sup>37</sup> Pharmacologic complementary and integrative health treatments for OA include natural products such as herbs, vitamins and minerals, probiotics, and cannabis derivatives.

In light of the paucity of effective treatments for the management of OA and the enormous direct-to-consumer advertising for “all natural” treatments reporting to be “safe and effective” in patients with OA, the use of complementary and alternative medicines is a billion-dollar industry. While most herbal supplements have few side effects in the majority of users, the science behind their claims is often unsubstantiated and the placebo effect cannot be discounted; these products are also unregulated and therefore may not contain the ingredients advertised or may have contaminants. Based on either inconsistent data or lack of scientific evidence, **neither ACR nor the AAOS recommends the use of herbal supplements (e.g., glucosamine, chondroitin, turmeric, ginger, copper, omega-3) for the treatment or prevention of OA.** Short trials may be attempted in specific patients, and those taking supplements with self-reported pain relief and no adverse effects are usually not encouraged to discontinue the product.<sup>64</sup>

Similarly, while cannabidiol (CBD) derivatives have demonstrated potential utility in animal models,<sup>65</sup> no studies have shown efficacy in humans, and the compounds available to consumers are unregulated and have unknown safety profiles, such that these should not be recommended for use in OA.

## INTRA-ARTICULAR THERAPIES

Intra-articular injections are used primarily as alternative therapies to acetaminophen and NSAIDs for OA and their efficacy has been associated with a placebo effect.<sup>66</sup> Intra-articular corticosteroids are backed by the most evidence and are conditionally recommended\* by the ACR for the initial treatment of hip and knee OA. However, due to their potential systemic and local adverse effects combined with their short duration of action (4–6 weeks) and lack of consistent efficacy, they are most often used as second line agents or when local inflammation within a particular joint is appreciated.<sup>67</sup>

Other intra-articular therapies are more controversial in the OA literature, with some disagreement among guidelines. In general, the evidence for intra-articular hyaluronic acid is mixed, and their use is not widely supported by guidelines, although they may be useful for selected patients. Similarly, the evidence base for intra-articular platelet-rich plasma or mesenchymal stem cells is still evolving, and until more robust efficacy, safety, and optimal dosing data are available, these treatments are not generally recommended.

## ON THE HORIZON

There are as yet no disease modifying drugs for osteoarthritis (DMOADs), although many clinical trials are ongoing. Agents in development include those targeted toward subchondral bone, cartilage damage, and synovial inflammation, among others.<sup>68</sup>

While it has proven challenging to affect structural progression in OA, novel symptomatic therapies have shown promise. In particular, humanized monoclonal antibodies against nerve growth factor (anti-NGF) therapies, have demonstrated efficacy in reducing OA pain in clinical trials.

NGF is a neurotrophin with increased expression in OA and other painful states which has nociceptive sensitizing effects; its blockade is therefore an interesting target for pain reduction.<sup>69</sup> Initially studied at high doses and often in combination with NSAIDs, there were signals for increased joint damage, leading to a hold on further studies. Since 2015, studies have resumed with risk mitigation strategies including lower doses, avoiding combination therapy with NSAIDs, and extensive radiographic screening and monitoring. Anti-NGF agents are likely to be available for clinical use in the near future but will require careful patient selection and vigilance for potential adverse events.

*\*In the ACR guidelines, “A conditional recommendation for using a modality was based on absence of high quality evidence and/or evidence of only a small gradient of difference between desirable and undesirable effects of the treatment.”<sup>4</sup>*



## Clinical Take-Home Points

- Physical activity and weight management are the most effective approaches to OA management.
- An interdisciplinary approach to OA care is essential and should be individually tailored to meet the patient's goals.
- Pharmacologic therapy should always be used in conjunction with non-pharmacologic approaches.
- Topical agents are often as effective as and generally safer than oral agents.
- Consideration of comorbidities and potential risks should be carefully weighed for each patient.
- Oral NSAIDs should be used at the lowest dose and for the shortest time possible.

## ADDITIONAL READING

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