

Expert Review

The Critical Role of Physical Activity and Weight Management in Knee and Hip Osteoarthritis: A Narrative Review

Katie F. Huffman¹, Kirsten R. Ambrose¹ , Amanda E. Nelson² , Kelli D. Allen³ ,
Yvonne M. Golightly⁴ , and Leigh F. Callahan⁵ 

ABSTRACT. Physical activity (PA) and weight management are critical components of an effective knee and hip osteoarthritis (OA) management plan, yet most people with OA remain insufficiently active and/or overweight. Clinicians and their care teams play an important role in educating patients with OA about PA and weight management, eliciting patient motivation to engage in these strategies, and referring patients to appropriate self-management interventions. The purpose of this review is to educate clinicians about the current public health and clinical OA guidelines for PA and weight management and highlight a variety of evidence-based self-management interventions available in community and clinical settings and online.

Key Indexing Terms: body weight, exercise, osteoarthritis

Osteoarthritis (OA), the most common form of arthritis, is a highly prevalent, disabling, and costly chronic disease. Most often occurring in the knees, hips, hands, feet, and spine, OA is a complex condition of the whole joint that can result in pain, stiffness, swelling, and impairments in both physical and mental health.¹ Globally, more than 302 million people have OA,¹ including 1 in 8 adults in Canada^{2,3} and 1 in 7 adults in the United States.² OA prevalence rates are rising, likely a result of increased population trends in aging, obesity, physical inactivity, and joint injury.³

OA has a considerable effect on individuals' quality of life (QOL): approximately 44% of US adults with arthritis, most of whom have OA, report limitations in their ability to perform usual activities because of arthritis symptoms.⁴ Underrepresented populations (eg, Black, Hispanic, and rural adult) are more negatively affected by arthritis, experiencing greater pain, limitations in daily activities, disability, functional limitations, work loss,

and reduced QOL.⁵⁻⁷ Further, patients with OA often experience comorbid conditions that significantly affect disease progression and treatment. One-third of adults with OA have 5 or more other chronic conditions, the most common of which are cardiovascular disease, diabetes, hypertension, and obesity.⁸ The presence of OA significantly limits optimal treatment of these other conditions, in no small part because OA-related pain and disability contribute to reduced physical activity (PA).⁴

A variety of evidence-based guidelines for the clinical management of OA have been developed by national and international organizations.⁹ Given that there is no cure for OA, these bodies promote the use of self-management and behavioral strategies (eg, PA, weight loss, and education) concurrent with clinical interventions (eg, topical and oral nonsteroidal antiinflammatory drugs [NSAIDs], intraarticular injections, walking aids) to help manage symptoms and improve QOL.⁹ Joint replacement surgery may be recommended when pain and

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¹K.F. Huffman, MA, K.R. Ambrose, MS, Osteoarthritis Action Alliance, Thurston Arthritis Research Center, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina; ²A.E. Nelson, MD, Osteoarthritis Action Alliance, Thurston Arthritis Research Center, and Division of Rheumatology, Allergy, and Immunology, Department of Medicine, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina; ³K.D. Allen, PhD, Osteoarthritis Action Alliance, Thurston Arthritis Research Center, and Division of Rheumatology, Allergy, and Immunology, Department of Medicine, University of North Carolina at Chapel Hill, Chapel Hill, and Center of Innovation to Accelerate Discovery and Practice Transformation, Durham VA Healthcare System, Durham, North Carolina; ⁴Y.M. Golightly, PhD, Osteoarthritis Action Alliance, Thurston Arthritis Research Center,

University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, and College of Allied Health Professions, University of Nebraska Medical Center, Omaha, Nebraska; ⁵L.F. Callahan, PhD, Osteoarthritis Action Alliance, Thurston Arthritis Research Center, and Division of Rheumatology, Allergy, and Immunology, Department of Medicine, Department of Orthopaedics, Department of Epidemiology, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA.

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Address correspondence to K.F. Huffman, Thurston Arthritis Research Center, University of North Carolina, 3300 Thurston Building, CB 7280, Chapel Hill, NC 27599-7280, USA. Email: katie_huffman@med.unc.edu.

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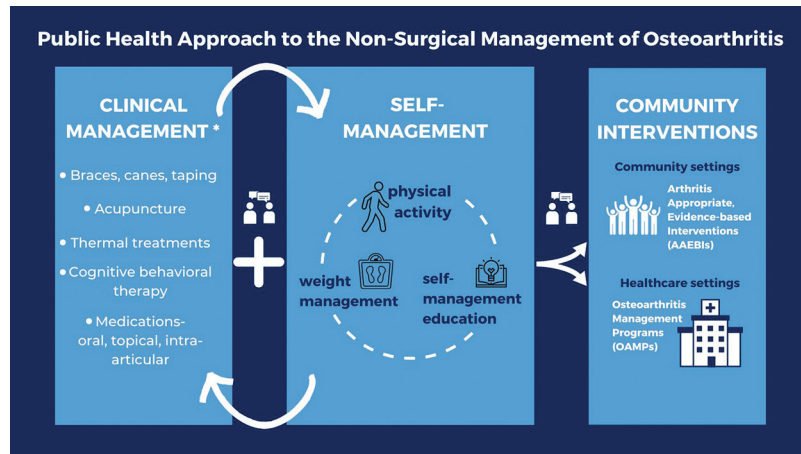


Figure 1. Public health approach to the nonsurgical management of osteoarthritis. *As recommended by the 2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee.¹

functional disability significantly impede QOL.¹⁰ The World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC), along with the National Public Health Agenda for OA,^{11,12} similarly promote PA and weight management among first-line interventions for preventing and managing OA.¹¹⁻¹³

When combined, PA and weight loss can help patients achieve meaningful improvements in pain, function, and QOL.¹⁴⁻¹⁶ Clinicians and their care teams play an important role in educating patients about PA and weight management and referring patients to interventions that support these behaviors. The purpose of this review is to inform clinicians about the current public health and clinical guidelines for OA self-management and the many evidence-based PA and weight management interventions available in community and clinical settings and online.

Physical activity

PA is a broad category of bodily movements that result in energy expenditure, whereas *exercise* is a type of PA intentionally initiated for a specific result (eg, enjoyment, weight loss, health benefits).^{17,18} Although exercise is an excellent way to achieve PA goals, the emphasis for adults with OA should be on overall PA; therefore, we will use this broader term going forward.

Benefits of PA. A substantial amount of research has evaluated the benefits of PA on OA outcomes, primarily focused on the knee, followed by the hip, with less research on other joints.¹⁹ Two notable reviews published recently describe the benefits of PA for knee and hip OA.^{17,18}

A systematic umbrella review conducted to advise the US Department of Health and Human Services' updated PA Guidelines for Americans in special populations²⁰ confirmed that among adults with knee and/or hip OA, PA reduces pain and improves physical function and QOL.¹⁸ Evidence suggests that improvements in pain from PA are comparable to the effects of analgesics^{18,21,22} (effect sizes 0.46 and 0.41, respectively).²² Additional benefits include reduced risk of falling and increased ability to live independently and participate in activities of daily

living.¹⁷ Contrary to common misconceptions, recreational running and walking are not associated with OA progression.^{17,18}

Not only is PA beneficial for OA symptoms, but it also aids in the management and prevention of the chronic conditions that commonly co-occur with OA.^{19,23-25} Other benefits of PA include improved performance of occupational and recreational activities, body weight management,²⁶ and sleep.¹⁷

Although these benefits have been validated in reputable trials and metaanalyses, there is current discourse about the true benefits of PA on OA outcomes arising from questions about the scientific design of the existing studies.²⁷⁻²⁹ For example, the benefits observed in PA interventions may be owing partly to the "attention" provided in a formal program or a regression to the mean effect rather than exclusively from the PA itself.²⁷ In addition, much remains to be learned about how PA improves OA outcomes, with possible mechanisms including psychological or social factors.²⁹ At present, PA continues to be recommended as a low-harm, beneficial first-line intervention for people with OA^{1,17,18,28,30} and is especially important for comanaging OA and comorbid conditions, as well as for overall health and wellness.

- **Types and dose of PA.** There is no concordance on the exact type, frequency, intensity, and duration of activity needed to yield the most benefit for patients with OA.^{1,26,30}
- **Type.** Improvements in pain, physical function, and QOL result from various forms of PA including aerobic and strengthening activities (both land- and aquatic-based), balance and flexibility exercises, and tai chi.¹⁸

Aerobic activity enhances cardiorespiratory fitness.²³ In OA, weightbearing aerobic activity provides the added benefit of mechanical stress, which helps build muscle and maintain cartilage.³⁰ Walking is the most common type of aerobic activity among adults¹⁷ and is the most researched form of exercise in OA.¹ Walking is a safe, effective, and low-impact option for adults with OA.²¹ Stationary or outdoor cycling and aquatic exercise (eg, swimming laps or water aerobics) are also beneficial low-impact forms of aerobic activity for OA.²¹ Aquatic exercise may be slightly less effective than land-based exercise in reducing

pain and functional impairments over the long term, but is an alternative when land-based weightbearing activities are not well-tolerated²³ or when patients prefer water exercise.

The benefits of strength training for adults with OA include reduced pain along with improved cartilage integrity, muscular shock absorption, mental health,³¹ physical function, self-efficacy,³² and joint stability.³³ Customized muscle strengthening programs can be designed by a physical therapist or exercise professional³³ and may include use of body weight, bands, free weights, or machines.³² Other types of PA that provide benefits for OA outcomes include yoga, tai chi, performance exercises, stretching and flexibility exercises, and daily activities (Box 1).

- **Dose.** Meeting the PA Guidelines for Americans recommendation of 150 minutes/week of moderate-intensity activity (ie, 3.0-5.9 metabolic equivalent of tasks [METs], or activities such as brisk walking, raking leaves)²⁰ and an additional 2 days per week of strengthening exercises²⁰ can result in significant benefits for adults with knee and hip OA.¹⁸ However, as little as 45 minutes per week of moderate-intensity activity can improve function for adults with knee or hip OA.³⁸

With the widespread availability of consumer-grade wearable monitors, including fitness trackers, step counting is another popular and relatively accurate way to measure PA, both among patients and researchers.¹⁷ Measuring steps allows for the inclusion of a wide range of daily activities (eg, chores, grocery shopping) and may motivate adults to reduce sedentary behaviors,^{39,40} which are associated with increased risk of cardiovascular disease and all-cause mortality.¹⁷ White et al found that 6000 steps per day was the threshold for determining whether patients with knee OA would or would not develop functional limitations.^{17,41}

PA recommendations. The major international guidelines for the clinical management of knee and hip OA all recommend PA and/or exercise—in a variety of forms—as the first-line intervention regardless of joint involvement or comorbidities, but the guidelines do not provide specific exercise recommendations.³⁰

In the US, public health leaders, clinicians, and researchers alike rely on the PA Guidelines for Americans, which include considerations for populations with specific chronic diseases.²⁰ These guidelines suggest that the evidence for therapeutic benefits of PA among individuals with OA is strong and that most people with OA can follow the recommendations for the general population. Specifically, for adults with OA, the guidelines advise 150 minutes per week of moderate-intensity activity and note that walking $\leq 10,000$ steps/day does not appear to cause OA progression; activities should be low-impact and not painful, and joint-friendly activities include swimming, walking, tai chi, and strengthening exercises. Activities should be customized by type and amount to individuals' abilities and pain levels.²⁰

The Canadian Society for Exercise Physiology's "Canadian 24-Hour Movement Guidelines for Adults" recommend 150 minutes/week of moderate-to-vigorous PA plus 2 days per week of strengthening exercises; for adults > 65 years, balance exercises are also recommended. Uniquely, these guidelines encourage a reduction in sedentary time, limiting sitting to a cumulative 8 hours per day and breaking up long periods of sitting.⁴²

Although these public health guidelines provide advice on type and dose of PA for adults with OA, they also emphasize the importance of "moving more,"²⁰ "reducing sedentary behavior,"⁴² and that "some PA is better than none."²⁴ Given that fewer than 10% of adults with knee OA meet the recommended 150 minutes of moderate-intensity PA per week,¹⁷ it is important for clinicians and patients to know that any increase in PA, even if below the guidelines, or reduction in overall sedentary time and even low-intensity activities (ie, < 3 METs, or activities such as light gardening or a slow-paced walk) can benefit people with OA.¹⁷

Patient barriers to and facilitators of PA. Barriers to PA among adults with OA vary and may include fear of further joint damage or injury; pain and functional impairment; lack of knowledge, motivation, or time; and difficulty accessing or paying for services, programs, or equipment.^{30,43} Generally, patients with OA are more likely to be physically active if it is recommended

Box 1. Types of physical activity beneficial for knee or hip OA.

Aerobic exercise: Low-impact activities such as walking, cycling, and swimming enhance cardiorespiratory fitness, build strength, and can improve OA pain, function, and quality of life.

Strengthening exercises: Strengthening exercises with body weight, elastic bands, or weights can reduce OA pain and improve physical and mental health.

Yoga: With its strengthening and stress-reduction characteristics, yoga may improve pain, stiffness, and function in adults with knee OA.^{1,34,35}

Tai chi: In chronic conditions, including OA, tai chi reduces pain and improves function, balance, flexibility, and aerobic capacity.²⁶ Tai chi also has beneficial effects on mood and self-efficacy.¹

Performance exercises: Performance exercises such as proprioceptive, sensorimotor, balance, and neuromuscular exercises can improve strength, function, balance, and body control.^{1,36}

Stretching and flexibility exercises: Stretching improves physical function, whereas flexibility exercises improve physical function, pain, range of motion, and stiffness.³³

Daily activities: In measures of energy expenditures, walking around the house or light household chores such as dusting or washing dishes qualify as light-intensity activity, and heavier chores like changing the bed or carrying groceries/laundry qualify as moderate-intensity activity.^{17,37} Even light-intensity activity can help prevent functional limitations in adults with OA.¹⁷

OA: osteoarthritis.

by a healthcare provider.⁴⁴ To help patients establish a safe and appropriate PA plan, clinicians should engage in shared decision making with patients, addressing any barriers and identifying patients' strengths and interests. Activity supervised by an exercise professional, whether in a group or individual setting, not only results in optimal functional and symptom improvements^{1,26} but also supports maintenance over the long term.²⁶ Other tools to support adherence to a PA plan include digital resources such as fitness trackers,⁴⁰ mobile applications, or online programs; family or peer support; goal setting; education; and community programming (Box 2).³⁰

Weight management

Adults with obesity are almost twice as likely to report having arthritis than adults who are underweight or at healthy weights (32% and 17.6%, respectively).⁴⁵ Obesity is one of the most significant and modifiable risk factors for the development and progression of OA,⁴⁶ owing to ensuing systemic inflammation and increased mechanical joint loading.^{47,48} Together, these inflammatory processes and altered joint mechanics degrade the structural integrity of the joint and contribute to increased pain and decreased function.⁴⁸ Adults with OA and obesity have more difficulty with daily activities such as walking and getting up from a seated position.⁴⁸ As BMI (calculated as weight in kilograms divided by height in meters squared) increases, there is a progressive decline in mobility and function.⁴⁸ Compared to adults with normal weight, adults with OA and obesity are less physically active¹⁷—likely a result of pain, functional limitations, and fear of movement⁴⁸—and are more likely to undergo total joint replacement.¹⁴

To address obesity globally, the WHO describes 3 primary strategies: weight loss, weight maintenance, and prevention of weight gain.⁴⁶ In the context of OA, the umbrella term “weight management” encompasses these same 3 strategies, as relevant for each patient's current weight status, with the goal of achieving and maintaining a healthy weight and avoiding weight gain.⁴⁶

Benefits of weight management. For patients with OA who have overweight or obesity, weight loss helps improve pain, stiffness, and function.⁴⁹ Messier and colleagues established that every 1 pound of weight lost results in a 4-lb (1.81-kg) reduction

in knee joint load.⁵⁰ Additionally, a 10% weight loss results in improved pain, function, and QOL while reducing joint loads and inflammation compared to no weight loss or < 10% loss.¹⁵ This 10% weight reduction is consistent with the general weight loss recommendation among obesity experts for improving health outcomes.⁵¹ Messier et al identified a dose-response in OA wherein the greater the weight loss, the larger the effect size for improvements in pain, function, and QOL.⁵² In addition to symptom relief, weight loss also contributes to reduced fear of movement and increased physical ability, independence, and participation in daily and social activities among adults with OA.⁴⁸ Similar to PA, weight loss can also improve comorbid conditions common in adults with OA.⁸

For adults with obesity, the risk of developing symptomatic knee OA is 60%.⁴⁹ Therefore, achieving and maintaining a healthy weight plays a role in primary prevention (intervening before OA occurs⁵³) and secondary prevention (intervening during early OA⁵³).⁴⁷ In the Framingham Study, a weight loss of 5.1 kg (11.2 lbs) reduced women's risk of developing knee OA by 50% over 10 years.⁵⁴ Further, prevention of weight gain is an effective approach to address joint pain, regardless of sex and BMI status, even when the patient is at a healthy weight.⁴⁶

Approaches to weight management. Weight management, like OA management in general, is not a one-size-fits-all approach. The severity of obesity and OA should factor into shared decision making between a clinician and a patient. Some available options for assisting patients with weight management include behavioral modifications, medications, and bariatric surgery.⁴⁸ Behavioral modifications such as diet and exercise, or combinations thereof, are effective and should be employed first alongside other medical interventions for weight and OA symptom management.^{15,49,55,56}

• *Diet.* The most common diet-related interventions in weight loss studies for patients with OA are energy-restricted diets, meal replacements, nutrition classes, and visits with a dietitian, or a combination thereof.^{49,57} In a randomized control trial by Bennell et al, a ketogenic low-calorie diet combined with a telehealth exercise program helped patients achieve a 10% weight loss over 12 months.⁵⁸ Additionally, evidence from a recent umbrella review suggests that the Mediterranean diet could be

Box 2. Summary of PA for knee or hip OA.

- The benefits of PA for people with knee or hip OA include reduced pain and stiffness, increased mobility and physical function, and improvements in mental health, quality of life, and comorbid conditions.
- A prescription for PA should be personalized to a patient's physical abilities, affected joint/s, pain, comorbidities, preferences and goals, and access to facilities, programs, and equipment.
- Proven recommendations for a PA prescription for OA include:
 - 150 minutes/week of moderate aerobic activity plus 2 days/week of strengthening exercises; however as little as 45 minutes/week may be beneficial.
 - 6000-10,000 steps/day.
- Types of PA that benefit people with OA include walking, cycling, water aerobics or swimming, strength training, stretching, tai chi, yoga, gardening, and household chores.
- Patients should be counseled to move more and reduce sedentary time.
- Supervised PA sessions, community-based PA programs, wearable activity monitors, goal setting, and peer support are techniques to increase adherence to and maintenance of a PA routine.

OA: osteoarthritis; PA: physical activity.

beneficial for patients with OA because of its antiinflammatory properties and positive weight loss results.⁵⁹

The Intensive Diet and Exercise for Arthritis (IDEA) trial was a seminal study investigating the roles and interplay of diet and exercise in managing weight and OA symptoms. In this study, there were 3 groups: an exercise-only intervention, a diet-only intervention, and a diet plus exercise intervention. The diet intervention consisted of calorie restriction (< 1100 kcal for women and < 1200 kcal for men with specific macronutrient calorie distribution) supported by meal replacements and both individual and group nutrition counseling. The diet-only group lost 9.5% of their body weight over 18 months.¹⁵ A precision medicine evaluation also found that the diet-only intervention was most beneficial for subsets of participants needing to reduce systemic inflammation and/or knee compressive force.⁶⁰

- *Exercise.* Exercise (ie, an intentional form of PA) can not only help relieve OA symptoms but can also contribute to weight reduction^{47,48} while preserving muscle mass.⁴⁹ The American College of Sports Medicine suggests that any increase in PA can result in weight loss in the general population. However, 150 to 250 minutes/week of moderate-intensity PA helps prevent weight gain but provides only modest weight loss; moderate-intensity PA in amounts 225 to 420 minutes/week can result in more significant weight loss.⁶¹

In the Arthritis, Diet and PA Promotion Trial (ADAPT), participants in an exercise-only group experienced a 3.7% weight loss after an 18-month exercise intervention, which included 60 minutes of combined aerobic exercise (50-75% of heart rate reserve) plus strength training 3 days per week.¹⁶ This intervention was similar to that in the IDEA trial, which resulted in a 2% weight loss for the exercise-only group.¹⁵ A systematic review of exercise interventions for people with obesity and musculoskeletal (MSK) pain recommended an exercise prescription of moderate-intensity (progressing to vigorous) exercise 30 to 60 minutes, 3 times per week, as an effective approach for managing weight and obesity-related MSK pain. They also suggested that although treadmill exercise resulted in the greatest body weight and fat reduction, other aerobic modalities, including weight-bearing and partial weightbearing (eg, stationary bike) exercise, can produce satisfactory weight and symptom management results.⁴⁷

- *Combination of diet and exercise.* The combined diet plus exercise group in the IDEA trial lost 11.4% of their body weight, more than either the diet or exercise groups alone.¹⁵ Using similar dietary and exercise interventions, the pragmatic Weight Loss and Exercise for Communities with Arthritis in North Carolina (WE-CAN) trial showed an 8% body weight reduction in the diet plus exercise group.⁵⁶ Bennell et al also saw a greater body weight reduction in their diet plus exercise group compared to diet alone.⁵⁸ The more substantial benefits for weight loss from the combination of diet and exercise in these clinical trials is corroborated in general obesity⁶² and nutrition research.^{63,64}

When combined, PA and weight loss are also more effective for improving OA outcomes than either intervention alone,^{15-17,60} resulting not only in greater weight loss but also in greater pain reduction, improvements in function, and reduction in joint loading and inflammatory markers.^{10,15}

Weight management recommendations. Weight management is a cornerstone in most of the major international guidelines for the clinical management of knee and hip OA,^{9,46} yet terminology and strength of the recommendations vary.⁴⁶ Most of the international OA management guidelines recommend a combined approach of diet and exercise for weight loss but stop short of describing a specific strategy or intervention.⁴⁶ None of the international guidelines mention weight loss medications, and only one suggests that bariatric surgery should be considered as a weight management option, specifically for people with BMI > 40.⁴⁶

The American College of Rheumatology (ACR) guidelines strongly recommend $\geq 5\%$ weight loss for adults who have overweight or obesity, also noting a dose-response relationship wherein “clinically important benefits continue to increase with weight loss of 5-10%, 10-20%, and > 20% of body weight.”⁷¹ The ACR guidelines also encourage weight loss be combined with PA for better outcomes.¹ The addition of PA to a weight loss regimen, either concurrently or subsequently, helps preserve or increase muscle mass and improve physical function.⁴⁹

The CDC guidance similarly advises that even a modest amount of weight loss (eg, 5% of body weight or 10-12 lbs/4.5-5.4 kg) can help improve arthritis outcomes,⁶⁵ achievable through healthy eating, PA, optimal sleep, and stress reduction.⁶⁶

Patient barriers to and facilitators of weight loss. Although weight loss is effective for improving OA outcomes, it is a difficult behavior change to initiate and maintain long term.¹⁰ Maintenance of weight loss is a known challenge for most people. One metaanalysis of 29 long-term weight loss studies showed that within 2 years, more than half the weight initially lost was regained, and within 5 years, more than 80% of weight lost was regained.⁶⁷ Adults with OA face unique challenges; for example, pain or obesity may affect their ability or desire to participate in PA for weight loss and other health benefits.⁵⁵ Behavior change techniques and education can help adults with OA engage in and sustain weight management activities (Box 3).⁵⁸ Examples of supports to encourage weight management include the following:

- *Provider counseling* is a key component of successful weight loss. According to the CDC, adults with arthritis and overweight or obesity who receive provider counseling about weight management are 4 times more likely to try to lose weight, yet fewer than half receive such counseling.⁶⁸
- *Self-management education* equips patients with skills such as goal setting, problem solving, disease education, self-efficacy, and pain coping strategies.⁵⁸
- *Pain management* such as topical or oral NSAIDs (if appropriate), thermal treatments, bracing, or taping¹ can reduce pain during and after PA.⁵⁸
- *Cognitive behavioral therapy* improves the success of weight loss and maintenance of weight loss.⁵⁸
- *Peer support* encompasses both practical and emotional types of assistance.⁵⁸
- *Registered dietitians* can recommend a safe and effective weight management plan that is unique to each patient's needs and health.

Box 3. Summary of weight management for knee or hip OA.

- Every 1 pound of weight lost equals a 4-lb (1.81-kg) reduction of pressure on the knee joints.
- For adults who have overweight or obesity, weight loss improves pain, physical function, mobility, quality of life, and other comorbid conditions.
- A prescription for weight management should be personalized to the severity of a patient's obesity and OA symptoms.
- Strategies for weight loss may be used concurrently and include medications, bariatric surgery, and behavioral modifications such as diet and exercise.
- Weight management guidelines for OA recommend:
 - Weight loss of $\geq 5\%$ body weight for adults with overweight or obesity.
 - A combination of diet and exercise for the greatest effect on weight loss and symptom management in adults with knee and hip OA.
- Even a small amount of weight loss can improve OA-related outcomes.

OA: osteoarthritis.

Community interventions to support PA and weight management

To support both clinicians and patients in their efforts to optimize OA outcomes through the self-management practices of PA and weight management, community and healthcare organizations offer evidence-based interventions specifically designed for patients with arthritis. These programs can improve pain, stiffness, function, mood, QOL, body weight, PA level, and self-efficacy^{69,70} and can positively affect other chronic conditions.⁴ Whether delivered in community-based or healthcare settings, or increasingly, online, these arthritis-appropriate, evidence-based interventions (AAEBIs) and osteoarthritis management programs (OAMPs) are beneficial throughout the OA care continuum and in concurrence with clinical care (Figure).

AAEBIs. AAEBIs are community-based programs that improve arthritis symptoms.⁴ AAEBIs may be available through senior centers, health departments, employers, faith organizations, or other local settings as well as through national organizations, and are delivered in a variety of formats including in-person, virtual, phone, self-directed or hybrid. To receive recognition as an AAEBI, programs are reviewed through a rigorous process overseen by the Osteoarthritis Action Alliance (OAAA) to ensure that they are supported scientifically, address OA-related symptoms, and can reasonably be carried out by a community organization. The current list of recognized AAEBIs includes PA programs, which are designed to help increase PA safely and comfortably, and self-management education programs, which teach adults how to cope with arthritis-related symptoms and how to adopt healthy behaviors to lead active and fulfilling lives (Box 4). Some of the programs^{76,85} address weight management specifically. Although AAEBIs generally remain underused,^{4,92,93} rates of participation in self-management classes among adults with arthritis rose from 11.4% in 2014 to 16.2% in 2019.⁹³

OAMPs. OAMPs are recognized internationally as models of care based in healthcare settings that provide coordinated, evidence-based, nonsurgical management of OA.^{69,94} The core

components of OAMPs include OA education, exercise, and/or weight loss but may also offer adjunctive treatments such as physical therapy and psychosocial support.⁶⁹ Examples of OAMPs include Better Living with OA⁹⁵ (digital version: Joint Academy⁹⁶) and the OA Chronic Care Program.⁹⁷ In addition to these highly researched programs, many health systems around the world have their own version of OAMPs or MSK care programs.^{69,94} OA Research Society International (OARSI) has done extensive work through their Joint Effort Initiative (<https://oarsi.org/discussion-group-joint-effort-initiative>) to establish standards for implementing and evaluating OAMPs.^{69,98,99}

Referrals to community interventions. Given the low rates of PA¹⁷ and participation in evidence-based programs among adults with arthritis,^{4,92,93} a disconnect exists between the guidelines and behaviors of both adults with OA and referring clinicians. Research shows that patients are more likely to engage in PA, weight management, or disease management education if a healthcare provider recommends these interventions.^{4,44} To improve adherence to the recommendations for PA and weight management among adults with OA, there is a need to increase provider referrals to and patient participation in community interventions such as AAEBIs and OAMPs. Shared decision making between providers and patients can help determine which programs are appropriate based on program availability, delivery format, cost, location, and patient preferences and abilities. The OAAA has developed several resources to support clinicians and patients in these conversations (Box 5).

Conclusion

PA and weight management are the most effective strategies for managing OA symptoms and related health outcomes. Although separately modestly effective, the combination of PA with weight loss yields the greatest improvements in OA symptoms, especially for adults with obesity. A variety of evidence-based interventions exist in community and clinical settings to support adults to be physically active and manage their weight, yet these programs are underused. Clinicians and their support staff can engage patients in OA self-management practices by educating about the benefits of these behaviors, addressing fear of movement and pain, explaining the PA and weight management recommendations, encouraging realistic self-management goals, and referring to community-based interventions. To address the public health burden of OA, it is critical to increase patient engagement with AAEBIs, OAMPs, and self-directed OA management programs and resources.

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The OAAA is a national public health coalition in the US committed to increasing awareness about OA, promoting evidence-based interventions for OA, and providing resources for public and professional education in support of OA prevention and management. More information and resources for clinicians and patients are available on the OAAA website (www.oaaaction.unc.edu).

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Physical Activity Programs	Self-Management Education Programs
AEA Arthritis Foundation Exercise Program ⁷¹	Better Choices, Better Health ⁸⁴
Active Living Everyday ⁷²	Chronic Disease Self-Management Program ⁸⁵
Arthritis Foundation Aquatic Program ⁷³	Chronic Pain Self-Management Program ⁸⁶
Camine Con Gusto ⁷⁴	EnhanceWellness ⁸⁷
Enhance Fitness ⁷⁵	Program to Encourage Active Rewarding Lives (PEARLS) ⁸⁸
Fit & Strong! ⁷⁶	Tomando Control de su Salud ⁸⁹
Fit & Strong! Plus ⁷⁶	Toolkit for Active Living with Chronic Pain ⁹⁰
Good Life with Arthritis in Denmark (GLA:D) ⁷⁷	Toolkit for Active Living with Chronic Conditions ⁹⁰
My Knee Exercise Program ⁷⁸	Workplace Chronic Disease Self-Management Program ⁹¹
Otago Exercise Program ⁷⁹	
Stay Active and Independent for Life ⁸⁰	
Tai Chi for Arthritis ⁸¹	
Tai Ji Quan: Moving for Better Balance ⁸²	
Walk With Ease- Self-Directed & Group ⁸³	

^a Current list following the 2023 program evaluation process; updated annually. More information is available at <https://oaaction.unc.edu/aaebi/>. AAEBI: arthritis-appropriate, evidence-based intervention; AEA: Aquatic Exercise Association.

Box 5. OAAA resources to support patient self-management.

<p>OACareTools (https://oaaction.unc.edu/oacaretools/): An online toolkit for clinicians and their patients containing videos, learning modules, and downloadable resources on topics related to OA diagnosis and treatment, functional assessments, physical activity counseling, and pain management.</p> <p>Living Better With Osteoarthritis (https://oaaction.unc.edu/individuals/): Patient education on general OA information and management, physical activity, weight management, and injury prevention.</p> <p>AAEBI Webpage (https://oaaction.unc.edu/aaebi/): Detailed information about AAEBIs, the AAEBI review process, and cross-sectional tables comparing the current list of recognized AAEBIs.</p> <p>Walk With Ease Portal (www.walkwitharthritis.org): An online platform that allows clinicians and organizations to offer self-directed Walk With Ease to their constituents, with robust data management/reporting and low administrative burden.</p>
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AAEBI: arthritis-appropriate, evidence-based intervention; OA: osteoarthritis; OAAA: Osteoarthritis Action Alliance.

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