

## Exercise for Osteoarthritis of the Hip

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<LEAP> highlights the findings and application of Cochrane reviews and other evidence pertinent to the practice of physical therapy. The Cochrane Library is a respected source of reliable evidence related to health care. Cochrane systematic reviews explore the evidence for and against the effectiveness of appropriate interventions—medications, surgery, education, nutrition, exercise—and the evidence for and against the use of diagnostic tests for specific conditions. Cochrane reviews are designed to facilitate the decisions of clinicians, patients, and others in health care by providing a careful review and interpretation of research studies published in the scientific literature.<sup>1</sup> Each article in this PTJ series summarizes a Cochrane review or other scientific evidence on a single topic and presents clinical scenarios based on real patients or programs to illustrate how the results of the review can be used to directly inform clinical decisions. This article focuses on an adult patient with osteoarthritis of the hip. [Can exercise help this patient?](#)

Osteoarthritis (OA) is the most common form of arthritis and is characterized by a progressive degeneration of the joint, affecting most frequently the hands, knees, and hips. Radiographic signs of OA include joint space narrowing, subchondral bone sclerosis, and osteophyte formation. The loss of cartilage is often associated with synovium inflammation,<sup>2</sup> thickening of the capsule, and muscle weakness.<sup>3,4</sup> Osteoarthritis is a leading cause of disability, especially in the elderly population, with pain and functional limitation being the main associated symptoms.<sup>5</sup>

Management strategies for OA of the hip include a combination of nonpharmacological and pharmacological modalities. Education, exercise, and weight loss are considered as core treatments by international guidelines<sup>6-10</sup> and should be considered as the first management option, before medications. When medication is needed, the treatment starts with paracetamol or nonsteroidal anti-inflammatory drugs (NSAIDs), with opioids reserved for patients with refractory severe pain. Prescription of NSAIDs should always follow a close consideration of the patient's comorbidities and the related risk factors. Joint replacement surgery should be considered for patients with substantial pain or functional limitation despite optimal conservative care.

Land-based therapeutic exercises are used to relieve symptoms of hip OA, aiming to improve muscle strength, joint range of motion, physical function, and aerobic capacity. Fransen et al<sup>11</sup> conducted a Cochrane systematic review to assess the effectiveness of exercise on pain, physical function, and quality of life for adults with hip OA. The review included studies evaluating any type of land-based exercise programs, supervised or performed at home. The intervention had to be compared with any other active treatment (excluding another exercise program) or a placebo. Outcome data were extracted at the end of the treatment and at longer-term

follow-up. Treatment compliance and adverse events also were assessed. The search was up-to-date on February 2013.

### Take-Home Message

Ten randomized controlled trials (549 participants) were included in this Cochrane review,<sup>11</sup> half of these trials (419 participants) focusing on people with hip OA only<sup>12-16</sup> and the rest including a mixed population with knee and hip OA.<sup>17-21</sup> Seven of the 10 included studies were considered at low risk of bias based on methodological rating. High-quality evidence supported a significantly greater reduction in pain and physical function in the exercise group compared with the control group at the end of the treatment and at longer-term follow-up (3–6 months). Low-quality evidence showed no difference in terms of quality of life compared with the control group. There was large variability in exercise treatment dosage, from 6 to 36 sessions over 6 to 12 weeks, each session lasting 30 to 60 minutes. Treatment sessions were provided to groups of patients<sup>15,16,18-20</sup> or individually<sup>13,14,17,21</sup> and could be completed via a home exercise program.<sup>14,16</sup> One study specifically evaluated a tai chi program for arthritis<sup>19</sup>; the other studies included traditional exercise programs with muscle strengthening, functional training, and fitness training. Additional descriptions of the results are presented in Table 1.

### Case #29: Applying Evidence to a Patient With Osteoarthritis of the Hip

[Can exercise help this patient?](#)

Mrs J is a 71-year-old woman with 10 years' insidious onset of bilateral hip pain, right side worse than left side. Symptoms initially settled but have returned over the last 10 months and have progressively worsened. Previously very active, Mrs J retired as a nurse 2 years ago and has become more and more sedentary, increasing her weight by 5 kg (weight=65.8 kg, body mass index [BMI]=26.89 kg/m<sup>2</sup>). She lives at home alone and has some difficulty in

Find the <LEAP> case archive at <http://ptjournal.apta.org/collection/leap-linking-evidence-and-practice>.

<LEAP> Case #29 OA Hip Exercise

**Table 1.**

Key Results From the 2014 Cochrane Review by Fransen et al<sup>11,a</sup>

10 RCTs were included, with a total of 549 participants. Only 2 RCTs had more than 50 participants in each allocation group.	
The search was up-to-date on February 2013.	
7 of the 10 included trials were at low risk of bias according to the Cochrane risk of bias scale.	
Participants were adults with hip OA diagnosed using the American College of Rheumatology clinical and radiographic criteria or on the basis of chronic anterior joint pain without radiographic confirmation. They were recruited from the community, general practice, or specialist clinics.	
Intervention was any land-based therapeutic exercise program; one study included a specific tai chi program. Exercise dosage varied widely: - Frequency: 5 studies – 1 time/wk; 3 studies – 2 times/wk; 2 studies – 3 times/wk. With eventual additional booster sessions or daily home exercises. - Intensity: not specified in the majority of the studies. When provided, it was the number of repetitions, the level of effort, or a progression scale. - Duration of each session: from 30 min (3 studies) to 60 min (3 studies). - Duration of the program: half of the studies included a 12-wk program, and the other half included shorter programs of 6, 7, or 8 wk.	
Comparators included usual care, patient education, and wait-list controls.	
Exercise interventions showed significantly better outcomes compared with the control groups immediately after treatment, with small but clinically important effect on pain and physical function.	
➤ Pain	9 studies–549 participants
	Quality of the evidence: high (GRADE)
	SMD=–0.38; 95% CI=–0.55, –0.2 The effect size was considered small to moderate, favoring exercise over the control group to reduce pain, equivalent to a reduction of 8 points (95% CI=4, 11) on a 0 to 100 pain scale.
	Pain was measured using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain subscale (4 studies), the visual analog scale (VAS) (4 studies), or the numerical rating scale (NRS) (1 study).
➤ Physical function	9 studies–521 participants
	Quality of the evidence: high (GRADE)
	SMD=–0.33; 95% CI=–0.54, –0.05 The effect size was considered small to moderate, favoring exercise over the control group to improve physical function, equivalent to an improvement of 7 points (95% CI=1, 12) on a 0 to 100 physical function scale.
	Physical function was measured using the WOMAC physical function subscale (6 studies), the Influence of Rheumatic Disease on General Health and Lifestyle (IRGL) mobility subscale (2 studies), and the Groningen Activity Restriction Scale (GARS) (1 study).
➤ Quality of life	3 studies–183 participants
	Quality of the evidence: low (GRADE)
	SMD=0.07; 95% CI=–0.23, 0.36 No statistically significant difference was found between groups.
➤ Withdrawals	7 studies–715 participants
	Quality of the evidence: moderate (GRADE)
	Risk difference=0.01; 95% CI=–0.01, 0.04 There was no significantly increased risk of withdrawal in the exercise group compared with the control group.
Similar results were found at longer-term follow-up (3–6 mo), with sustained significant reduction of pain and improvement of physical function for the exercise group.	
➤ Pain	6 studies–391 participants
	Quality of the evidence: high (GRADE)
	SMD=–0.38; 95% CI=–0.58, –0.18
➤ Physical function	6 studies–365 participants
	Quality of the evidence: high (GRADE)
	SMD=–0.37; 95% CI=–0.57, –0.16

<sup>a</sup> RCTs=randomized controlled trials; OA=osteoarthritis; GRADE=Grading of Recommendations Assessment, Development and Evaluation; SMD=standardized mean difference; CI=confidence interval.

managing housework (vacuuming, changing bed linens, cleaning bathroom). She has to negotiate 30 steps with a rail to enter her unit and is no longer able to play lawn bowls, which she ceased 6 months previously due to pain. Mrs J reports right hip pain as being 40 on a 0 to 100 visual analog scale. The aggravating factors are going up and down stairs, below-knee activities such as squatting and kneeling (eg, cleaning the bathroom, reaching for items out of low cupboards), walking over 10 minutes, and prolonged standing (ie, over 10 minutes). Pain is eased by heat, rest, acetaminophen, and celecoxib. Mrs J did not report any falls or disturbed sleep. She was on medication for associated comorbidities: Avapro (irbesartan) (Sanofi US, Bridgewater, New Jersey) for hypertension, Lipitor (atorvastatin calcium) (Pfizer, New York, New York) for hypercholesterolemia, and Nexium (esomeprazole) (AstraZeneca, London, United Kingdom) for gastroesophageal reflux disease (GORD). She was prescribed radiographs that revealed moderate right hip OA with reduced superolateral joint space and acetabular osteophytes.

The physical therapist evaluation included objective measures of hip range of motion, muscle strength (knee extensor, hip flexor and extensor, hip abductor, hip external and internal rotator), walking and stair-climbing abilities, and related disability. There was no limitation of hip movements but a bilateral muscle weakness of the gluteal muscle leading to a moderate limp with a positive Trendelenburg sign. The Six-Minute Walk Test resulted in a distance of 428 m, and Mrs J performed the Timed “Up & Go” Test in 9.2 seconds. Her results fall into published norms of these 2 tests for community-living older people.<sup>22,23</sup> The Hip Disability and Osteoarthritis Outcome Score (HOOS)<sup>24</sup> was used to assess the disability associated with OA of the hip. The HOOS questionnaire is composed of 40 items divided into 5 subscales: Pain, Symptoms, Activity Limitations in Daily Living, Function in Sport and Recreation, and Hip-Related Quality of Life. Each item is scored using a 5-point Likert scale from 0 to 4 (none, mild, moderate, severe, and extreme). Each subscale gives a score from 0 to

**Table 2.**

American College of Rheumatology Criteria for the Diagnosis of Osteoarthritis of the Hip<sup>25,a</sup>

Clinical Criteria (Specificity: 86%; Sensitivity: 75%)		Clinical and Radiological Criteria (Specificity: 89%; Sensitivity: 91%)
Set A	Set B	<ul style="list-style-type: none"> <li>• Hip pain</li> </ul> And at least 2 of the following features: <ul style="list-style-type: none"> <li>• ESR &lt;20 mm/h</li> <li>• Radiographic femoral or acetabular osteophytes</li> <li>• Radiographic joint space narrowing (superior, axial, or medial)</li> </ul>
<ul style="list-style-type: none"> <li>• Hip pain</li> <li>• Hip internal rotation &lt;15°</li> <li>• ESR ≤45 mm/h (OR hip flexion ≤115°, if ESR not available)</li> </ul>	<ul style="list-style-type: none"> <li>• Hip pain</li> <li>• Hip internal rotation ≥15°</li> <li>• Hip internal rotation painful</li> <li>• Morning stiffness of the hip ≤60 min</li> <li>• Age &gt;50 y</li> </ul>	

<sup>a</sup> Clinical (2 sets possible) or clinical and radiological criteria can be used. ESR=erythrocyte sedimentation rate.

100, with 0 indicating the worst situation and 100 the best condition. For Mrs J, the HOOS revealed moderate outcomes for Pain (50), Symptoms (55), Activity Limitations in Daily Living (47), and Function in Sport and Recreation (55) but severe consequences on Hip-Related Quality of Life (25). The goals of Mrs J were to complete weekly lawn bowls with minimal pain, to return to a body weight of 60 kg, and to be able to walk for more than 30 minutes with minimal pain.

### How did the results of the Cochrane systematic review apply to Mrs J?

Using the PICO (Population, Intervention, Comparator, Outcome) format, Mrs J’s physical therapist asked the following question: Will land-based therapeutic exercise (compared with no exercise) be beneficial for a 71-year-old woman with OA of the hip to reduce joint pain and improve physical function and quality of life? The results of the Cochrane systematic review from Fransen et al<sup>11</sup> were used to support the intervention plan for Mrs J.

**Population.** The included population in the systematic review was adults with OA of the hip diagnosed using the American College of Rheumatology (ACR) clinical or radiographic criteria<sup>25</sup> (Tab. 2) or on the basis of chronic anterior joint pain. According to these criteria, Mrs J fits the target population of the review.

**Intervention.** The review focused on any type of home-based or supervised

land-based exercise aiming to ease hip symptoms. Mrs J was involved in a 9-month therapeutic program with 4 sessions: an initial session of 90 minutes and 60-minute follow-up sessions every 3 months. This time frame was chosen because recent OA trials focusing on reducing weight, improving function, and embedding self-management strategies have shown that programs exceeding 6 months promoted long-term behavior change.<sup>26,27</sup> She started with a strengthening program targeting hip muscles, especially gluteal muscles, including bridging exercise, side-lying hip abduction, sit-to-stand exercise with yellow Thera-Band (The Hygenic Corp, Akron, Ohio) above knees, and standing hip extension. Fifteen repetitions of each movement were performed twice and completed 3 times per week. In progression, subsequent sessions included single-leg bridge exercise, isometric hip abduction against a wall, standing resisted hip abduction and hip extension with yellow Thera-Band, and single-leg squat. In addition, Mrs J used an exercise bike to train from 5 minutes with minimal resistance to 20 minutes with interval training (30 seconds of resistance followed by 30 seconds of recovery), twice a week. Her walking program included a progression from 20 minutes of walking, split into four 5-minute intervals with 1 minute of rest 3 times per week, to 40 minutes of walking daily. In addition to land-based exercise, Mrs J benefited from hydrotherapy for strengthening and range-of-motion exercises twice per week for 6 weeks. Thereafter, she con-

**Table 3.**  
Summary of the Outcomes for Mrs J<sup>a</sup>

Outcome Measures	Value at:		Change in Value (MCID)
	Baseline	End of Treatment (9 mo)	
Visual analog scale (0–100)	40	10	30 (15)
Six-Minute Walk Test	428 m	485 m	57 m (50 m)
Timed “Up & Go” Test	9.2 s	5.9 s	3.3 s (3.1 s)
Hip Disability and Osteoarthritis Outcome Score (HOOS)	P: 50	P: 72	22 (10)
	S: 55	S: 65	10 (10)
	ADL: 47	ADL: 66	19 (10)
	SP: 55	SP: 67	12 (10)
	QoL: 25	QoL: 55	30 (10)

<sup>a</sup> MCID=minimal clinically important difference; subscales of the HOOS: P=Pain, S=Symptoms, ADL=Activity Limitations in Daily Living, SP=Function in Sport and Recreation, QoL=Hip-Related Quality of Life.

tinued her own water-based program twice per week. To facilitate adherence to the exercise program, an exercise diary was used. Mrs J was encouraged to fill it out and bring it in to her follow-up appointments. She also was encouraged to call the physical therapist if she had any questions pertaining to the exercise program. Furthermore, she was provided with education on the importance of low-impact exercise for the management of her OA, dispelling misconceptions that exercise would lead to further joint deterioration. Referral was made to a dietitian for weight loss management strategies.

**Comparator.** Studies included in the meta-analysis of the Cochrane review compared the exercise program with usual care or a wait-list control group. Mrs J had a sedentary lifestyle and was not previously engaged in a formalized exercise program. Taking these factors into consideration, decisions about the program proposed were made in conjunction with Mrs J according to her expectations, preferences, and specific condition.

**Outcome.** Outcome measures considered in the review were all patient-reported outcome measures, including hip pain, self-reported physical function, and quality of life. These measures were assessed at the end of the treatment (10 weeks on average) and at longer-term follow-up (16 weeks on average). These

3 outcome measures were of interest for the assessment of Mrs J’s response to the 9-month treatment period, in addition to other outcome measures such as her weight, qualitative gait analysis, and the Six-Minute Walk Test.

**How well do the outcomes of the intervention provided to the patient match those suggested by the systematic review?**

After 4 physical therapy sessions spaced over 9 months with a daily, multimodal home exercise program, Mrs J reached her goals. She had returned to playing lawn bowls once per week and experienced only mild discomfort toward the end of the game. She was able to walk 40 minutes on a flat surface with minimal pain, and stairs were managed with only minor discomfort. She had lost 7.9% of her body weight (5.2 kg), reaching a weight of 60.6 kg (BMI=25.22 kg/m<sup>2</sup>).

Mrs J’s outcomes were similar to those found in the Cochrane review and were clinically relevant according to the minimal clinically important difference (MCID) defined for each outcome measure (Tab. 3). The assumed MCID was 15 points on a 0 to 100 pain scale and 10 points on a 0 to 100 function scale.<sup>11</sup> Mrs J’s hip pain improved by 30 points. Physical function and quality of life also were significantly improved according to the HOOS score. Final scores of the 5 HOOS subscales were 72 for Pain (improvement of 22 points), 65 for Symptoms (improvement of 10 points), 66 for Activities of Daily Living (improvement of 19 points), 67 for Function in Sport and Recreation (improvement of 20 points), and 55 for Hip-Related Quality of Life (improvement of 30 points).

In addition, her gait pattern improved, resulting in a negative Trendelenburg sign and no limp. Mrs J improved her outcomes for the Six-Minute Walk Test with a distance of 485 m (improvement of 57 m), which represents a substantial meaningful change according to the published MCID for older adults.<sup>28</sup> She performed the Timed “Up & Go” Test in 5.9 seconds (improvement of 3.3 seconds), also showing a clinically significant change. Starting with a time of less than 10 seconds, an improvement of at least 3 seconds was expected to demonstrate a clinically important difference.<sup>29</sup> Mrs J also had hired a cleaner to assist with heavier activities of daily living around the house. For medication, she only used acetaminophen when necessary and did not require celecoxib any longer.

**Can you apply the results of this systematic review to your own patients?**

The findings of the Cochrane review can be applied to adults with symptomatic hip OA, like Mrs J. She had experienced a worsening of her symptoms over the last 10 months with significant effects on her physical function and activities of daily living and was willing to follow an exercise program to improve her health condition. Mrs J was motivated to successfully complete the 9-month exercise program and reached her goals. It is common for physical therapists to see patients with similar histories to that of Mrs J. Clinically significant improvements should be expected for most patients with OA of the hip following an exercise program. The review showed the benefits of exercise on pain and physical function at both short- and long-term follow-up. However, no significant change was found concerning patients’ quality of life. The studied population had a mean age of 66 years with an age range from the available data of 37 to 92 years, allowing the possibility of applying the conclusions to younger adults.



**What can be advised based on the results of this systematic review?**

People with hip OA can benefit from exercise to reduce pain and improve physical function. Osteoarthritis is a very common and disabling chronic condition, particularly affecting the elderly population. It is essential, therefore, to keep people active and involved in their daily activities over an extended period. Thus, patient adherence needs to be encouraged and reinforced in order to maintain long-term benefits. The Cochrane systematic review assessed any land-based therapeutic exercise program; most of the included programs contained muscle strengthening, functional training, and aerobic exercises. Frequency, intensity, duration, and delivery mode varied among studies. The range of exercise programs available allows physical therapists to adapt and choose the best exercise set for their patients according to their needs and preferences. It should be a shared decision between the patient and the clinician.

Although the Cochrane review did not show any difference in outcomes depending on the type of exercise included, which may be due to the small number of trials, it seems that the best exercise option should be to combine muscle strengthening with flexibility and aerobic exercises.<sup>30</sup> It has been shown elsewhere<sup>31</sup> that the benefits of exercise decline with time; thus, attention to adherence strategies is important. Clinicians should work with the patient to identify individual barriers to exercise and develop proactive approaches to facilitate successful outcomes.<sup>32</sup>

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