

Exercise for the Treatment of Knee Osteoarthritis

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Clinical Inquiries provides answers to questions submitted by practicing family physicians to the Family Physicians Inquiries Network (FPIN). Members of the network select questions based on their relevance to family medicine. Answers are drawn from an approved set of evidence-based resources and undergo peer review. The strength of recommendations and the level of evidence for individual studies are rated using criteria developed by the Evidence-Based Medicine Working Group (<http://www.cebm.net/?o=1025>).

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Clinical Question

What role does exercise play in the treatment of knee osteoarthritis?

Evidence-Based Answer

Regular exercise reduces osteoarthritic knee pain and improves functioning. (Strength of Recommendation: A, based on systematic reviews.) Aerobic and strength-training exercises, including land- and water-based exercises, are effective for treating knee osteoarthritis. (Strength of Recommendation: A, based on a randomized controlled trial [RCT].)

Evidence Summary

A Cochrane review of 32 RCTs involving nearly 3,800 men and women found improvement in self-reported knee pain and function when patients participated in land-based exercises.¹ The RCTs involved a broad range of delivery methods, and varying intensity and duration of exercises. Participants had differing degrees of arthritis and pain severity. Pain and functioning were measured primarily with the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). The standardized mean difference for pain was 0.40 (95% confidence interval [CI], 0.30 to 0.50), and the standardized mean difference for physical functioning was 0.37 (95% CI, 0.25 to 0.49). These effects were comparable to those of nonsteroidal anti-inflammatory drug therapy alone and were directly related to the number of supervised exercise sessions.

A systematic review examined 18 studies of 2,832 total patients with knee osteoarthritis, all of whom were community-dwelling, middle-aged or older adults. The authors concluded that resistance training resulted

in statistically significant improvements in objective muscle strength (mean improvement = 17.4 percent) in 64 percent of the studies, patient-reported pain in 56 percent of the studies, and function in 79 percent of the studies.²

An RCT including 312 participants who were randomized to water-based therapy or usual care identified a 10 percent reduction in pain at one year for the water-based therapy group as measured by the WOMAC (mean group difference = 0.89; effect size = 0.25; 95% CI, 0.02 to 0.47). This reduction was not seen at 18 months; 213 participants provided follow-up assessment. Only 18 percent of persons in the treatment group were in compliance with the program at this time. The authors hypothesized that the low compliance rate was due to the intervention no longer being free of charge after the initial 12 months of the study.³

A four-group RCT of 132 patients ranging in age from 45 to 77 years examined the effects of isokinetic, isotonic, and isometric muscle-strengthening exercises on knee osteoarthritis. Each type of training resulted in improvements at one year after the initial intervention. There was a 45 percent improvement in pain, as measured by the visual analog scale; a 43 percent improvement in disability, as measured by the Lequesne index; and a 27 percent improvement in walking speed (164 ft [50 m] on a treadmill). These results were statistically significant ($P < .05$) compared with results from the control group.⁴

Aerobic conditioning is comparable with strength training for treating knee osteoarthritis. A systematic review of 13 RCTs investigated the effects of aerobic walking and quadriceps-strengthening exercises on

self-reported pain and disability. The average intervention length was eight weeks to two years. Pain was significantly reduced with aerobic activity in 449 participants (effect size = 0.52) and with home-based quadriceps strengthening in 2,004 participants (effect size = 0.39). Self-reported disability was significantly reduced with aerobic activity in 385 participants (effect size = 0.46) and with quadriceps strengthening in 2,004 participants (effect size = 0.32).⁵

Recommendations from Others

The Osteoarthritis Research Society International has published 23 guidelines (five of which are evidence-based) recommending a combination of pharmacologic and nonpharmacologic modalities for the management of hip and knee osteoarthritis. Recommended nonpharmacologic modalities include the following: education and self-management; regular telephone contact with the primary care physician; referral to a physical therapist; aerobic, muscle-strengthening, and water-based exercises; weight reduction; walking aids; knee braces; footwear and insoles; thermal modalities; transcutaneous electrical nerve stimulation; and acupuncture.⁶

The American College of Sports Medicine recommends physical activity as a therapeutic intervention in the treatment of osteoarthritis.⁷ The American Academy of Orthopaedic Surgeons recommends encouraging patients with symptomatic knee pain to participate in self-management educational programs to help modify exercise activity (e.g., walking versus running).⁸ It also recommends range-of-motion/flexibility exercises and quadriceps strengthening for these patients.⁸

A consensus group published the first recommendations to clearly differentiate knee and hip osteoarthritis treatment research evidence from expert opinion. Based on evidence from at least one RCT, the group reported that strengthening and aerobic exercise can reduce

pain and improve function and health status in patients with knee osteoarthritis.⁹

The opinions and assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the U.S. Air Force Medical Department or the U.S. Air Force at large.

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