

Nonoperative Options for Management of Articular Cartilage Disease

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KEYWORDS

- Viscosupplementation • Cartilage • Osteoarthritis • Corticosteroid • Glucosamine • NSAIDs

KEY POINTS

- Low-impact exercise and weight loss are beneficial for osteoarthritis of weight-bearing joints.
- Judicious use of nonsteroidal anti-inflammatory drugs (NSAIDs) and acetaminophen can be appropriate for pain management.
- Topical NSAIDs may be a treatment option with fewer side effects than their oral counterpart.
- Viscosupplementation injections are useful for mild to moderate knee osteoarthritis.
- Corticosteroid injections are useful for short-term pain relief.

INTRODUCTION

Articular cartilage damage is a major cause of pain and functional disability which can occur as a result of injury, disease process such as osteoarthritis, or both. While surgical approaches may provide definitive treatment, they are not typically indicated for mild to moderate damage, may be contraindicated in patients with risk factor, and carry a risk of both operative and anesthetic complications. Nonoperative care may not be definitive in advanced cases, however it can provide definitive treatment in more mild to moderate disease. When excluding biologic options, nonoperative treatments do not reverse the disease process or damage, however there are a variety of options which have been shown to provide significant improvement in terms of pain and function, and many treatments delay and can potentially stall progression of articular cartilage damage. In this chapter, we provide an evidence based approach to the various nonoperative options for the treatment of articular cartilage disease, including

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exercise, weight loss, physical therapy, braces, oral medications, topical medications, supplements, corticosteroid injections, viscosupplementation, and prolotherapy.

Exercise

Among nonpharmacologic treatments of osteoarthritis (OA), exercise is one of the most consistently recommended modalities in national and international guidelines. Exercise has been shown to decrease symptoms of OA, improve joint function, and prevent disability.¹ Modalities that are recommended include both land-based and water-based training, as well as strength, flexibility, and endurance training. The Osteoarthritis Research Society International has made recommendations in favor of land-based exercise, water-based exercise, and strength training, all based on good-quality evidence taken from systematic reviews and meta-analyses of randomized controlled trials (RCTs).²

A 2015 systematic review of 54 RCTs assessed the immediate and short-term effects of exercise on knee OA.³ High-quality evidence demonstrated a mean 12-point reduction in pain on a 0 to 100 scale immediately following exercise. Additionally, exercise improved function by an equivalent of 10 points. Twelve studies included in the review analyzed the sustainability of treatment effect after cessation of formal treatment for both pain and physical function over a 2-month to 6-month period. An equivalent reduction of 6 points on the pain scale and improvement of 3 points on the function scale were noted.

A similar systematic review published in 2014 analyzed 10 RCTs pertaining to the treatment benefits of land-based exercise for hip OA.⁴ Although not as marked as the effect for knee OA, a significant improvement in both pain and physical function was noted. Pain was reduced by 8 points with exercise, and physical function was improved by 7 points. These improvements were both sustained for 3 to 6 months after the cessation of treatment in the 5 studies that followed patients for this duration.

Thirteen RCTs were included in the most recent systematic review assessing the benefits of aquatic based therapy for both knee and hip OA.⁵ Twelve of the studies showed a significant decrease in pain scores by a mean of 5 points and an improvement in disability by a mean of 5 points. Ten of the studies additionally found a mean 7-point higher score on quality of life compared with the control group.

Weight Loss

As a person's weight increases, there is an associated increase in joint pain symptoms and severity.⁶ In addition, there is an elevated risk of developing OA with weight gain, up to 36% for every 5 kg. Weight gain can also accelerate the progression of OA and lead to greater severity of disease. This has been demonstrated in cadaveric studies.

However, weight loss has been shown to decrease physical disability due to OA, and meta-analysis has shown that this effect can be predictably reproduced with only a 5% weight reduction over a 20-week period.⁷ In addition, pain has been demonstrated to be reduced with weight loss, although a dose-response relationship has not been established. When weight loss is maintained, the benefits of pain reduction continue to be significant, and this has been shown to be true when assessed over a year after initial weight reduction.⁸ The improvement in pain and function associated with weight loss may be partially due to a significant reduction in joint compressive forces and inflammatory cytokines.⁹ For example, every decrease in 1 kg of weight leads to a 2.2 kg decrease in peak knee load.¹⁰ Notably, this is independent of the effects of exercise, as weight loss due to diet has been shown to have a greater reduction in the aforementioned measures when compared with weight loss due to exercise.⁹ Interestingly, this decrease in joint loads and proinflammatory cytokines is seen with increased walking speed. Weight loss has also

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