

Exercise therapy in the management of hip and knee osteoarthritis (May 2018)

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Key Messages

- There is strong evidence suggesting that exercise in general can help patients manage the pain of hip and knee osteoarthritis (OA).
- The benefits of exercise on pain levels continue after the intervention period, with some patients reporting a reduction in pain for between 3 - 18 months after cessation.
- Appropriate exercise can be prescribed irrespective of age, pain level, co-morbidity and disability.
- Catering to the patient's specific needs and circumstances may improve adherence, which is important for improvements in outcomes.
- Exercises in group or individual settings are equally effective, so patient preference should drive this decision.
- There is no evidence to suggest that one type of exercise (aerobic, strength, or range of motion) is superior to another. Management plans often combine these approaches in an attempt to improve effectiveness.
- There is some evidence that specifically strengthening the muscles of the leg through resistance exercises will reduce pain in sufferers of knee OA.
- Effectiveness of specific exercises, dosage, frequencies and intensities are unclear due to a lack of both quality and quantity of data.

Context

This Snapshot Summary is intended to provide a brief overview of predominantly osteopathic and osteopathic-relevant research, with references provided for further reading. It is not intended to be an exhaustive account of the literature.

Osteopaths are regulated primary healthcare professionals who are consulted by patients with a wide range of issues, predominantly involving musculoskeletal pain and dysfunction. A range of manual techniques appropriate to the patient can be used as part of osteopathic management, and advice and education are included within this package of care.

Exercise therapy in the management of hip and knee osteoarthritis

Osteoarthritis is "a chronic arthropathy characterized by disruption and potential loss of joint cartilage along with other joint changes, including bone hypertrophy (osteophyte formation). Symptoms include gradually developing pain aggravated or triggered by activity, stiffness lasting < 30 min on awakening and after inactivity, and occasional joint swelling" [1]. The most common sites affected in the lower body are the knees and hips [1].

Osteoarthritis is a very common condition, and 8.75 million people over the age of 45 in the UK have sought treatment for it. Nearly three quarters of people with osteoarthritis report constant pain and nearly a third of sufferers reduce their work hours or give up work because of their condition [2]. Management of OA is divided into three areas: pharmacological; non-pharmacological; and surgical [3]. Appropriate exercise or physical activity is recommended in all patient groups, irrespective of demographics, severity of the condition, and pain levels experienced [3].

This snapshot aims to explore the current exercise recommendations to help osteopaths understand which types of exercise are most effective in helping patients manage their condition and which may be most suitable in a clinical appointment setting.

Results

Three systematic reviews and one clinical guideline were identified by searching the Cochrane Database and the National Institute of Clinical Excellence respectively. Citation review of these sources produced 1 more literature review. Previous Snapshot Summaries

were also reviewed regarding specific exercise interventions in people with hip osteoarthritis. Excluded were reviews that focused on exercises requiring specialist equipment not commonly available to the public or requiring ongoing supervision/instruction.

Fransen *et al.* (2014) sought to investigate the effect of therapeutic exercise on pain, improved physical function and disability, and quality of life in sufferers of symptomatic hip OA. They included 9 trials with a total of 549 participants that compared exercise (strength, range of motion and aerobic exercises, and Tai Chi) versus non-exercise groups. Seven of the included trials were assessed to have a low risk of bias. However, the authors note that blinding was not possible due to the nature of the interventions and self-reported results.

The results suggest that there is strong evidence that exercise reduces pain (difference of 8 points on a 0-100 scale) and improves physical function (difference of 7 points on a 0-100 scale) immediately after treatment and that these results are maintained for at least 3-6 months after the ceasing exercise. The authors assert their belief that further research is very unlikely to contradict these results. However, quality of life scores remained unchanged. Evidence was weaker here since only three studies measured this element, and further research is likely to alter this result.

Regnaud *et al.* (2015) investigated the effects of high intensity versus low intensity exercise programs in people with hip or knee OA. The activities included strength exercise repetitions, walking and cycling. The higher intensity intervention group was defined to be participants that exercised for a longer duration, a higher number of sessions, or an increased amount of load/effort required to perform an activity compared to the control group. Searches identified six trials with a total of 656 participants (70% female) that measured pain, function and quality of life, for safety purposes they also recorded adverse events and drop-out rates due to adverse events.

The results showed that participants who completed higher intensity programmes rated their pain 0.84 points lower (lower indicating less pain) on a points scale of 0-20, a 4% improvement over the lower intensity group. When measuring physical function, the scores were 2.65 points lower on a 0-68 scale (lower indicating better function) in the high intensity group, a 4% improvement. Quality of life measurements were also improved in the high intensity group, on a scale of 0-200mm (higher score indicating better quality of life) these participants had 4.3mm higher scores, a 2% improvement, than those in the low intensity group. The high intensity group also had a 2% higher incidence of adverse effects, although no serious adverse events were reported.

Regnaux *et al.* conclude that there is insufficient evidence to determine the effect of different types of intensity of exercise programs. This is due to 5 of the 6 studies in the review being judged to be high risk for performance, detection, and attrition biases. They also had concerns that the small amount of studies used large confidence intervals and there was no systematic method of recording withdrawals due to adverse events. Further research seems likely to alter these results.

The 2014 NICE guidelines for the care and management of osteoarthritis in adults [3] suggest that exercise is appropriate for all sufferers of osteoarthritis, irrespective of age, comorbidity, and pain levels. They also recommend a mix of aerobic and strength exercises, and that the patient be encouraged to carry out the exercise themselves. The healthcare professional should provide advice and encouragement in light of the individual's needs and the availability of local facilities. The evidence used to develop the guidelines reveals the following:

- When studying the effects of exercise versus non-exercise in terms of pain, disability, medication usage, and improved physical function in sufferers of knee OA, there were strong improvements in all measures up to 18 months. The exercises used in this large scale systematic review and one trial were a mix of aerobic, strength (quadriceps specifically), or a mix of both, conducted in both supervised and home setting.
- When assessing what type of setting may be the most beneficial they conclude that exercise in a class setting supplemented by home exercise may be superior to home exercise alone in measures of pain, reduced disability and increased walking speed, and that classes are superior to home exercise for up to 12 months (knee OA only)..
- Adherence is highlighted as being important to produce behaviour change so there is a focus on patient preference of setting when choosing exercise type and setting.

The European League Against Rheumatism (EULAR) produced an often-cited literature review, Fernandes *et al.* (2013), which was developed to produce management guidelines for the non-pharmacological management of hip and knee OA. In addition to the above-stated recommendations, they make the following observations:

- Improvements to quality of life are inconsistent.
- Mixed programmes of exercise are recommended since no one form of exercise appears better than any other.
- Integration into daily activity is important.

- Optimal 'dosage' of exercise is unclear, mainly due to lack of research in this area. However, they recommend 30 mins aerobic exercise progressing to 60 mins daily in the elderly and those with long-term OA, and progressive strength training at least 2 days per week at "moderate to vigorous" intensity (60%-80% one-repetition maximum for 8-12 repetitions)

Comparison to Previous Snapshot Summaries

When compared to a previous NCOR Snapshot Summary [7] looking at the effects of exercise on pain levels in people with OA from 2010, the following updates are noted:

- Trials still lack systematic reporting of adverse events although these are thought to be low in number.
- Previously a mix of aerobic and strength exercises were recommended. Range of motion exercises are now recommended in addition.
- There is more emphasis on adherence to the activity as opposed to the specificity of the activity since most interventions appear to be beneficial.

References

Arthritis Research UK (2018). State of Musculoskeletal Health 2018, [online] <https://www.arthritisresearchuk.org/arthritis-information/data-and-statistics/state-of-musculoskeletal-health.aspx>

Fawkes, C (2010). The use of exercise in the management of osteoarthritic pain – a brief summary of current evidence [online] <https://www.ncor.org.uk/wp-content/uploads/2012/10/The-use-of-exercise-and-its-effect-on-osteoarthritic-pain.pdf>

Fernandes L, Hagen B, Bjilmsa J, Andreasson O, Christensen P, Conaghan P, Doherty M, Geenen R, Hammond A, Kjekken I, Lohmander S, Lund H, Mallen C, Nava T, Oliver S, Pavelka K, Pitsillidou I, da Silva J, de la Torre J, Zanolli G, Vlieland T (2013). European League Against Rheumatism (EULAR) recommendations for the non-pharmacological core management of hip and knee osteoarthritis, [online] <http://ard.bmj.com/content/72/7/1125.short>

Fransen M, McConnell S, Hernandez-Molina G, Reichenbach S. (2014). Exercise for osteoarthritis of the hip. Cochrane Database of Systematic Reviews, Issue 4. Art. No.: CD007912. DOI:10.1002/14651858.CD007912.pub2.

Kontzias A, (2017). Osteoarthritis. MSD Manual, [online] <https://www.msdmanuals.com/en-gb/professional/musculoskeletal-and-connective-tissue-disorders/joint-disorders/osteoarthritis-oa>

National Institute for Clinical Excellence (2014). Osteoarthritis. Care and management in adults [online] <https://www.nice.org.uk/guidance/cg177/evidence/full-guideline-pdf-191761311>

Regnaux J, Lefevre-Colau M, Trinquart L, Nguyen C, Boutron I, Brosseau L, Ravaud P (2015). High-intensity versus low-intensity physical activity or exercise in people with hip or knee osteoarthritis. Cochrane Database of Systematic Reviews, Issue 10. Art. No.: CD010203. DOI: 10.1002/14651858.CD010203.pub2.