Long-term effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a systematic review


CRD summary
The authors concluded that positive post-treatment effects of exercise therapy in patients with osteoarthritis of the hip and/or knee are not sustained long term. However, post-treatment booster sessions positively influence the maintenance of beneficial effects in the long term. Based on the data presented these conclusions are likely to be reliable, although they should be interpreted with some degree of caution given the possibility of publication bias.

Authors' objectives
To determine the long-term effectiveness of exercise therapy for osteoarthritis of the hip and/or knee.

Searching
PubMed, CINAHL, EMBASE, SciSearch, the Cochrane CENTRAL Register, PEDro, and databases of the Dutch National Institute of Allied Health Professions and Netherlands Institute for Health Services Research were searched from inception to November 2005; the search terms were reported. The reference lists of relevant studies and review articles were screened for additional studies. Only full length articles published in Dutch, German or English were eligible.

Study selection
Randomised controlled trials (RCTs) or controlled clinical trials that assessed at least one type of exercise therapy in patients with osteoarthritis of the hip and/or knee, based on accepted American College of Rheumatology criteria or the Kellgren/Lawrence radiologic scale, and in which outcomes were assessed at least 6 months following the end of treatment, were eligible. Studies had to report at least one of the following outcomes: pain, self-reported physical function, observed physical function and patient global assessment of effectiveness. Studies in which additional booster sessions were administered during the post-treatment period were also eligible for inclusion if they consisted of either strategies that supported and/or stimulated long-term adherence to exercise, or advice about physical activities and/or integration of exercise into the patients' daily lives. Studies of peri-operative exercise therapy were excluded.

The included studies compared exercise therapy with usual care, patient education and subtherapeutic ultrasound therapy. A variety of different types of exercise therapy were evaluated and different measures were used to assess the outcomes. The duration of follow-up ranged from 6 to 15 months after the end of treatment.

Two reviewers independently assessed studies for inclusion. Any disagreements were resolved through discussion or by referral to a third reviewer, where necessary.

Assessment of study quality
Study quality was assessed on the basis of criteria recommended by the Cochrane Collaboration Back Review Group. All criteria were scored as yes, no or unclear. Studies were considered to be of sufficient quality if at least 6 of the 11 criteria were fulfilled.

Two reviewers independently assessed study quality. Any disagreements were resolved through discussion or by referral to a third reviewer, where necessary.

Data extraction
Data for continuous variables were extracted as standardised mean differences (SMDs) together with corresponding 95% confidence intervals. Where possible, data were extracted for comparisons between exercise therapy and a non-treated control group. An SMD between 0.2 and 0.4 was considered a small effect, 0.5 to 0.7 was considered a moderate effect, and 0.8 and over was considered a large effect. Where studies reported comparisons for more than two
exercise treatment groups, the effect estimates were calculated between the two groups with the largest contrast in treatment effects. Authors were contacted for additional information where necessary.

The authors did not state how many reviewers performed the data extraction.

**Methods of synthesis**
Study results were not pooled because of heterogeneity between the studies. A narrative synthesis was reported.

**Results of the review**
Eleven RCTs (n=1,521) were included. Eight studies (n=1,166) compared exercise therapy with control and 3 studies (n=355) compared exercise therapy plus additional booster sessions with control.

Five studies were considered to be of a high methodological quality, four of these evaluated exercise therapy without additional booster sessions. None of the included studies met criteria for blinding of care providers of patients, as this is not possible in studies of exercise therapy.

Pain.
Exercise therapy versus control (8 studies, 4 high quality): 3 high-quality studies and 2 low-quality studies reported small to moderate improvements in pain post-treatment, but these findings were no longer significant at long-term follow-up. One high-quality study and 2 low-quality studies found no significant beneficial effects either post-treatment or at long-term follow-up.

Exercise therapy plus booster sessions versus control (3 studies, 1 high quality): all studies reported significant treatment effects at long-term follow-up.

Self-reported physical functioning.
Exercise therapy versus control (8 studies, 4 high quality): 3 high-quality studies and 2 low-quality studies reported no significant effects either post-treatment or at long-term follow-up. One low-quality study reported no effect post-treatment but a small positive effect at long-term follow-up; another low-quality study reported beneficial effects post-treatment which were no longer significant at long-term follow-up. One high-quality study reported significant moderate beneficial effects both after treatment and at long-term follow-up.

Exercise therapy plus booster sessions versus control (2 low-quality studies): both studies reported a large post-treatment effect that increased at long-term follow-up.

Observed physical function (7 studies).
Exercise therapy versus control (4 studies, 3 high quality): 2 high-quality studies and 1 low-quality study reported significant post-treatment effects which remained in 2 studies but was no longer significant in one of the high-quality studies. The other high-quality study reported no significant treatment effects.

Exercise therapy plus booster sessions versus control (3 studies, 1 high quality): all studies reported small to large significant effects post-treatment and moderate to large effects at long-term follow-up.

Global assessment of effectiveness.
Exercise therapy versus control (1 high-quality study): the study reported a moderate significant post-treatment effect and a small significant treatment effect at long-term follow-up.

Sensitivity analysis based on using a threshold of at least 4 or at least 8 methodological criteria to define a high-quality study did not significantly alter the results.
Authors' conclusions
Positive post-treatment effects of exercise therapy in patients with osteoarthritis of the hip and/or knee are not sustained at long-term follow-up. Additional booster sessions following treatment have a positive effect on maintaining beneficial effects of treatment in the long-term.

CRD commentary
The review addressed a focused objective that was supported by clearly defined inclusion criteria. The literature search involved a range of databases but was restricted to published studies in certain languages, so there is a possibility of language and publication bias. Appropriate steps were taken to minimise bias and error in the study selection and quality assessment processes, but it is unclear whether such steps were also taken for the extraction of data. Study quality was assessed using appropriate criteria and considered in the synthesis of the results. The decision not to pool data appears appropriate given the heterogeneity between the studies. The authors' conclusions are supported by the data presented and are likely to be reliable, although should be interpreted with some degree of caution because of the possibility of publication bias.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated the need for further research on the influence of exercise adherence and strategies to improve exercise adherence post-treatment on the long-term effectiveness of exercise therapy. Future research should also investigate how long the beneficial effects of exercise therapy that includes booster sessions last for, and what is required to maintain the beneficial effects of exercise therapy in the long term.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.