Is dynamic exercise beneficial in patients with rheumatoid arthritis?
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CRD summary
This review concluded that dynamic exercise programmes for patients with rheumatoid arthritis showed improvements in aerobic capacity and muscle strength without increases in disease activity. Effects on functional and physical capacity were not clear. The conclusions reflected the limited evidence presented, but methodological and reporting weaknesses in the review made the reliability of the conclusions uncertain.

Authors' objectives
To assess the efficacy and safety of dynamic exercise therapy in patients with rheumatoid arthritis.

Searching
MEDLINE and The Cochrane Library were searched to locate relevant studies published between 1964 and 2005. Search terms were reported. It was not clear whether language restrictions were applied.

Study selection
Eligible studies were randomised controlled trials comparing a dynamic exercise programme to another programme involving non-dynamic exercise or no exercise. Criteria for the studies to be eligible were: adult participants (older than 18 years) who fulfilled standard criteria for rheumatoid arthritis; a dynamic exercise programme intervention that increased heart rate to at least 60 per cent of maximal heart rate during 20 minutes with at least two sessions a week for at least six weeks. Also, at least one of the following outcomes needed to be measured: VO\textsubscript{2} max, quadriceps strength, range of motion, time needed to walk 50 feet, function as assessed by validated questionnaires, pain score, erythrocyte sedimentation rate and swollen joint counts.

Most participants in the included studies were female (65 per cent to 100 per cent). Median age ranged from 45 to 56 years, although one group of patients was older (median age 67 years). Most participants had been on stable disease-modifying antirheumatic drug therapy for at least three months. Those with moderate to severe functional disability were excluded. Some participants were on glucocorticoid therapy. The dynamic exercise programme ranged from twice to four to five times per week. Session times ranged from 20 to 90 minutes. Duration varied from six weeks to years, although the majority of studies had programmes of three months or less. The exercise programme included home bicycles and exercises in water. Control groups received either no exercise or home exercises.

Two of the authors independently selected studies for inclusion, with disagreements resolved by informal consensus.

Assessment of study quality
Each study was graded according to whether a number of methodological criteria were present (graded 1) or absent (graded 0). The criteria included: rigorous randomisation procedure; absence of significant differences at baseline; description of patient inclusion criteria; description of the intervention and control programs; statistical evaluation of outcomes by blinded investigators; comparable measurement frequency in the two groups; information on the number of study withdrawals and reasons for withdrawal; information on compliance with the intervention; description of the primary and secondary evaluation criteria; and intention to treat analysis. Scores were summed to produce a final score.

The authors did not state how the validity assessment was performed.

Data extraction
The authors stated neither how data were extracted for the review nor how many reviewers performed the data extraction.

Methods of synthesis
Studies were combined in a narrative synthesis. Study differences were reported in text in terms of participants.
outcome measurements and methodology, but how these differences related to the interventions used or the length of follow up was not reported.

**Results of the review**

Nine studies (n=647) were included in the review. The median quality score was eight out of a maximum 10 points (range 5-10). The randomisation procedure was described in two of the nine studies. Five studies had blinded data analysts. Three studies used intention to treat analysis. Publication bias was not investigated.

Three of six studies that evaluated aerobic capacity showed statistically significant improvements with dynamic exercise therapy compared to the control group (figures not reported).

Three of five studies that evaluated quadriceps strength showed a statistically significant benefit with dynamic exercise therapy compared to the control group (figures not reported). Functional capacity was measured by a variety of different questionnaires in most studies. Functional capacity improved with dynamic exercise therapy, but in only two (in which capacity was measured by MACTAR and SF36) was the difference statistically significant. Seven studies measured disease activity and found no increases in these parameters. The review did not report on the effects of dynamic exercise on pain.

References to the included studies in several parts of the text did not correspond to the numbers of studies cited.

**Authors' conclusions**

There was intermediate level evidence that dynamic exercise was associated with improvements in aerobic capacity and muscle strength without increases in disease activity. It was not clear whether dynamic exercise influenced functional and physical capacity.

**CRD commentary**

The research question was clearly stated and inclusion criteria appropriate to the question were clearly defined with respect to design, participants, interventions and outcomes. Searching was restricted to only two databases and there was no indication whether language restrictions were applied or attempts were made to locate unpublished studies, so language bias cannot be ruled out and relevant studies may have been missed. Publication bias was not assessed.

Methods were used to minimise bias in the selection of studies, but no detail of the methods used for quality assessment and data extraction was supplied, so reviewer error and bias may have been introduced in the review process. Study validity was formally assessed and considered in the reporting of the results. The decision by the authors not to pool studies in a meta-analysis was appropriate given the variation in the interventions, follow up and tools used to measure some outcomes. The reporting of results from the included studies did not accurately correspond to the references cited in several parts of the text. The authors' conclusions reflected the limited evidence presented. Given the possibility that relevant studies may have been missed and reviewer error and bias may have been introduced into the review process, and that citation of references did not correspond with publications referred to or results reported in the text, the reliability of the conclusions was unclear.

**Implications of the review for practice and research**

**Practice:** the authors stated that dynamic exercise programs could be individually tailored and offered to patients with rheumatoid arthritis at different stages in the course of their disease.

**Research:** the authors stated that more randomised controlled trials were needed with stringent randomisation procedures, intention to treat analyses and blinded assessors. The RCTs should include only two groups: an intervention and a control group. Dynamic exercise programs should be developed and standardised by a panel of experts and evaluation criteria needed to be standardised.

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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.