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This section features a recent systematic review which is indexed on PEDro, the Physiotherapy Evidence Database (http://www.pedro.org.au/). PEDro is a free, web-based database of evidence relevant to physiotherapy.

Aerobic exercise is beneficial for people with rheumatoid arthritis

► **Baillet A**, Zeboulon N, Gossec L, *et al. Arthritis Care Res* 2011;**62**:984–92.

BACKGROUND

It is estimated that at least 1.16% of women and 0.44% of men in the UK have rheumatoid arthritis.[1] It is a disabling condition that has been recognised as having cardiovascular systemic effects and secondary effects of immobilisation.[2] National Institute for Health and Clinical Excellence (NICE) guidelines for the management of rheumatoid arthritis mention specialist physiotherapy to enhance general fitness, joint flexibility and muscle strength in order to improve function.[3] But the NICE reference to 'general fitness' probably undervalues the importance of aerobic exercise in improving quality of life for people with rheumatoid arthritis.[4]

AIM

This systematic review was performed to determine the effects of aerobic exercise on pain, disease activity, functional ability and quality of life in people with rheumatoid arthritis. The review also examined possible adverse effects.

SEARCHES AND INCLUSION CRITERIA

PubMed, the Cochrane Central Register of Trials and EMBASE were searched with search terms related to rheumatoid arthritis, exercise therapy, activities of daily living and physical education and training. The ClinicalTrials.gov registry was searched for additional published and unpublished trials. Lists of abstracts from three rheumatology conferences and the reference lists of included articles were hand searched. A single reviewer applied the selection criteria and extracted the relevant data, including information about study quality using two quality assessment scales.[5,6] Studies were not excluded on the basis of their methodological quality, but only those published in English, French and German were included.

To be eligible for inclusion in the review, studies were required to have used a randomised design to examine the effect of aerobic exercise in adults who had rheumatoid arthritis as defined by recognised criteria.[7] Studies were excluded if the participants had had recent surgery.

INTERVENTIONS

The aerobic exercise was required to have been undertaken at 50–90% of the maximal heart rate. The control arm could include no-intervention comparators or non-aerobic rehabilitation therapies such as stretching and aquatic therapies. Because the control arm included some interventions that may have some benefit – such as relaxation[8] and Tai chi,[9] which have some effect on pain – the estimates of the effects of aerobic exercise may be slightly conservative.

MAIN OUTCOME MEASURES

The outcomes considered by the review were pain, indicators of disease activity, radiographic evaluation, quality of life, functional ability, exercise tolerance, participant withdrawals, steroid injections, cardiovascular events and joint and muscle soreness. The authors also use the term 'exercise tolerance' to describe outcomes that reflect whether the exercise exacerbated symptoms, such as programme completion, pain or need for injection.

STATISTICAL METHODS

Meta-analyses were reported as standardised mean differences (SMDs). Heterogeneity was assessed and the fixed-effect analysis was substituted with a random-effects model where I^2 values were 50% or more. Sensitivity analyses were conducted for patient factors (functional class, disease duration), exercise parameters (frequency, duration, intervention period, supervision) and trial design (publication date, quality score).

RESULTS

The search strategy identified 14 eligible studies involving 1040 participants. The pooled treatment and control groups were similar in age, disease duration, sex ratio, proportion of completers, proportion of patients with a positive rheumatoid factor test and use of pharmaceutical treatments.

At least half of the included trials scored below the midpoint on both quality scores. The mean age of participants in the included studies ranged from 44 to 68 years. The mean duration of disease ranged from 1 to 16 years. The duration of the aerobic exercise intervention ranged from 2 to 102 weeks. The control groups undertook range of motion exercises in three studies, non-aerobic exercises in one study, education programmes in two studies and usual care in eight studies.

Meta-analysis demonstrated that aerobic training produced a significant reduction in pain, with an SMD of 0.31 and a 95% CI of 0.06 to 0.55. There were no significant differences between the groups in painful or swollen joint counts or in the disease activity score (DAS28). Radiologically, however, a small joint sparing effect was observed: SMD 0.36 (95% CI 0.16 to 0.56). Overall, participants in the aerobic exercise group gave significantly better ratings than those in the control group for their quality of life (SMD 0.39, 95% CI 0.23 to 0.56), see figure 1, and disability (SMD 0.24, 95% CI 0.10 to 0.38).[10–14] Safety was measured by changes to the DAS28 score, radiological assessment and the ability to complete the programme. These findings were similar or slightly better in the aerobic exercise groups. Adverse events were not well reported.

LIMITATIONS/CONSIDERATIONS

Although only three electronic databases were searched, PubMed and the Cochrane Central Register of Trials have excellent coverage of randomised trials of physical therapies.[15] The eligibility criteria were rigorous, excluding several trials of aerobic exercise for rheumatoid arthritis. For example, the trial by Brodin and colleagues[16] used moderately intensive exercise but did not confirm that exercising heart rates were 50–90% of maximum. The rigorous criteria produced minimal clinical and methodological diversity among the included studies. This may have contributed to the low degree of heterogeneity observed in each of the meta-analyses, which, in turn, makes the use of fixed-effect analyses reasonable. Overall, the use of rigorous eligibility criteria appears to have been advantageous, especially since sufficient data could still be included to make estimates with narrow CIs.

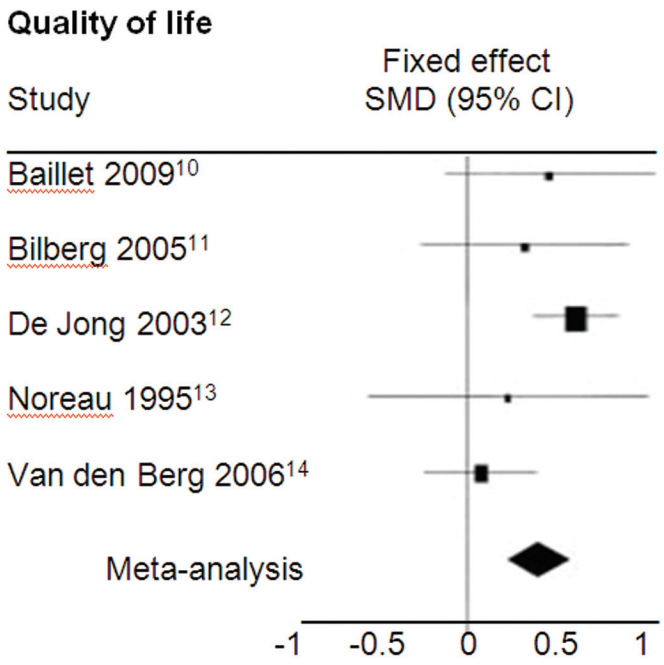

Figure 1 Effect of aerobic exercise on quality of life in people with rheumatoid arthritis. Reproduced from Baillet A *et al*.[18]

The authors use the term 'exercise tolerance' to describe outcomes that reflect whether the exercise exacerbated symptoms, such as programme completion, pain or need for injection. They were not able to report on exercise tolerance defined by fatigue. Compliance with scheduled exercise sessions may have been a more sensitive measure than programme completions, but unfortunately this was not reported in the trials.

If all the individual studies in a meta-analysis reported the outcome in the same units, the result of that meta-analysis can be presented in the original units, rather than as an SMD. This has the advantage of being more readily interpretable by clinicians. Therefore, it is unclear why the authors chose to report SMDs for outcomes such as disability, for which all the relevant studies used the Health Assessment Questionnaire. Conversely, quality of life was measured using a range of tools. The authors of this review appear to have converted each study's quality-of-life data to a percentage of the original tool's available range. Although the scores from one tool may correlate with the scores from another tool, the correlation may not be perfect or even linear.[17] Therefore, this approach may have influenced the result of this meta-analysis.

To explore heterogeneity, the reviewers conducted eight subgroup analyses on four outcomes. This large number of analyses increases the risk of finding a statistically significant result by chance. However, the overall conclusions of the review are not substantially influenced by the results of these analyses.

CLINICAL IMPLICATIONS

Even allowing for some error due to the limitations of the review, the average effect of aerobic exercise on quality of life appears to be quite substantial and very unlikely to be due to chance. Therefore, although the magnitude of the effect may be slightly uncertain, it is reasonable to accept the authors' conclusion that aerobic exercise improves the quality of life of people with rheumatoid arthritis.

Aerobic exercise did not exacerbate disability or radiological signs of disease. Therefore, overall, this systematic review supports a more frequent recommendation of exercise to people with rheumatoid arthritis. Aerobic exercise should be considered as a safe therapy, not exacerbating the condition, and with positive effects on quality of life, function and pain.

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Competing interests None.

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