Multiple sclerosis and exercise in people with minimal gait impairment: a review
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CRD summary
This review assessed exercise interventions for people with mild to moderate multiple sclerosis and concluded that effectiveness remained unclear due to the poor quality of the included studies. The authors' conclusion reflected the poor-quality evidence reported, but should be treated with considerable caution as a substantial proportion of the evidence available was not considered in the review.

Authors' objectives
To describe the effect of exercise on body structure and function, activities and participation in people with multiple sclerosis with mild gait dysfunction.

Searching
MEDLINE, CINAHL, EMBASE, AMED and The Cochrane Library were searched for the period March 2004 to June 2008 for papers published in English. Search terms were reported. Reference lists of reviews and relevant papers were searched.

Study selection
Quantitative studies of exercise interventions for people with mild to moderate multiple sclerosis (defined as an Expanded Disability Status Scale (EDSS) score of ≤6) were eligible for inclusion.

The included studies evaluated aerobic exercise (four to 12 weeks duration), progressive resistance exercise (six to 10 weeks duration), a combination of aerobic and progressive resistance exercise (60 minutes to 29 weeks duration) and other forms of exercise. Participants were predominantly female and aged 25 to 65 years, where reported. Aerobic exercise interventions consisted of 30 to 60 minute sessions using cycle ergometry or treadmill training two to three times per week at 55% to 85% of heart rate maximum, where reported. Studies of progressive resistance exercise used conventional weight machines twice a week at 50% to 80% of maximum voluntary contraction or weight increase to 2% to 5% when 12 repetitions had been achieved. Combined programmes used aerobic exercise that ranged from 55% to 70% heart rate maximum combined with progressive resistance exercise at 50% to 70% one repetition maximum.

One reviewer selected studies for inclusion.

Assessment of study quality
Studies were assessed for concealment of allocation, blinding of assessors, similar treatment of groups apart from the intervention being evaluated and adequate reporting of attrition. Studies were classified as being at low risk of bias if all criteria were met, at moderate risk of bias if one or more of the criteria were met partly and at high risk of bias when one or more criteria were not met.

The authors did not state how validity assessment was performed.

Data extraction
It appeared that details of the intervention (frequency, intensity, type and time), outcome measures used and a narrative summary of the results were extracted.

The authors did not state how data were extracted for the review.

Methods of synthesis
A narrative synthesis was undertaken with studies grouped by type of intervention.

Results of the review
Nineteen studies were included. All were assessed as having a high risk of bias. In most studies follow-up was at end of intervention; one study had a three-month follow-up.
Aerobic exercise (four RCTs, two before and after studies and one experimental study design, n=113): Three studies reported statistically significant improvement in one or more measure of walking speed in the aerobic exercise group. The effect on fatigue varied between studies. Quality of life improved in three studies. There was improved fitness in all studies on a range of different measure.

Progressive resistance exercise (five before and after studies, n=59): The effect on activity level varied between studies; there was statistically significant improvement in some studies and not others following the intervention. Three studies that assessed fatigue reported statistically significant improvement and in all five studies at least one measure of strength significantly improved.

Combined exercise (four RCTs, n=301): One study that assessed balance reported no statistically significant improvement. None of the studies reported a statistically significant improvement in fitness. One study that assessed strength reported a significant improvement following the intervention.

Other interventions (two controlled studies and one case study, n=99): Fatigue significantly improved with participation in yoga. Breathing enhanced upper extremity exercises improved activity levels and pulmonary function. Aquatics exercise improved maximal oxygen consumption in two participants and improved fatigue in one person but not the other.

Authors' conclusions
The effectiveness of interventions for patients with different impairments remained unclear due to the levels of bias in studies that evaluated exercise in people with multiple sclerosis.

CRD commentary
There was a clearly stated review question. A number of relevant databases were searched for relevant studies. However, relevant studies may have been missed due to exclusion of unpublished work and studies published in languages other than English. In addition, studies published before 2004 that had been included in an earlier review were excluded, which precluded several potentially relevant high-quality RCTs from being considered in the synthesis. Study quality was assessed and considered in the synthesis, although it appeared that appropriate methods to reduce error and bias were not used in the review processes. A narrative synthesis seemed appropriate due to variability between studies; however, it was not always clear whether between-group differences or within-group differences were being described in the synthesis and tables. The authors' conclusion reflected the poor-quality evidence reported, but it should be treated with considerable caution as it appeared that a substantial proportion of the evidence available on exercise interventions for people with multiple sclerosis was not considered in the review.

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

Research: Good-quality RCTs were required of exercise interventions for people with mild to moderate multiple sclerosis. Studies needed to be of sufficient size to allow investigation of the effect of baseline activity levels on outcome and include long-term follow-up, longer measures of walking speed and evaluation of gait quality as outcomes. A RCT was required that compared a combined exercise programme, yoga and a control.

Funding
Irish Research Council for Science, Engineering and Technology.

Bibliographic details

DOI
10.1179/174328809X435295

Original Paper URL
http://www.ingentaconnect.com/content/maney.ptr/2009/00000014/00000003/art00003
Indexing Status
Subject indexing assigned by CRD

MeSH
Exercise Therapy; Gait Disorders, Neurologic; Humans; Multiple Sclerosis; Posture

AccessionNumber
12009110188

Date bibliographic record published
17/03/2010

Date abstract record published
04/08/2010

Record Status
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.