Aerobic and resistance exercise improve walking speed and endurance in people with multiple sclerosis

Synopsis


Objective: To quantify the benefits of exercise for improving walking speed and endurance in adults with multiple sclerosis.

Data sources: PubMed, EMBASE, CINAHL, SPORTDiscus, and the Cochrane Central Register of Controlled Trials, searched up to March 31, 2014. This search was supplemented by searching reference lists of retrieved publications. Study selection: Randomised, controlled trials that compared exercise with no intervention or waitlist control in ambulatory adults with multiple sclerosis, with at least 10 subjects in the post-intervention analysis, and published in English. Exercise intervention was defined as aerobic and endurance training, resistance training, aquatics and yoga. Exercise involving treadmill, robot assistance, or other specialised techniques (eg, functional electrical stimulation) were excluded. Outcome measures for gait speed were the 10-m walk test, timed 25-foot walk test, and 500-m walk test; measures for endurance were the 2-minute and 6-minute walk tests. Functional mobility was assessed with the Timed Up and Go test. Data extraction: Study quality was assessed using a modified Physiotherapy Evidence Database score (maximum score of 8). Data synthesis: Of the 437 studies initially identified by the search, 13 studies with a total of 655 participants with multiple sclerosis (357 exercise, 298 controls) met selection criteria and were included in the review. Quality assessment scores ranged from 5 to 8. Meta-analysis demonstrated a statistically significant difference in gait speed in favour of exercise, based on the 10-m walk test (eight intervention groups, MD –1.76 seconds, 95% CI –2.47 to –1.06) and the 500-m walk test (one intervention group, MD –0.31 seconds, 95% CI –0.59 to –0.03), but not the timed 25-foot walk (five intervention groups, MD –0.59 seconds, 95% CI –2.55 to 1.36). There was also a statistically significant difference in walking endurance in favour of exercise for both the 6-minute walk test (four intervention groups, MD 36 m, 95% CI 15 to 58) and the 2-minute walk test (five intervention groups, MD 12 m, 95% CI 5 to 20). Differences in the Timed Up and Go test were not significant (five intervention groups, MD –1.05 seconds, 95% CI –2.19 to 0.09). The strongest effects of exercise on gait speed were found for interventions combining aerobic and resistance training, and for interventions > 12 weeks in duration. Conclusion: Exercise interventions improve walking speed (10-m walk test, 500-m walk test) and endurance (2-minute and 6-minute walk tests) in people with multiple sclerosis. Combination interventions may be optimal.


Prudence Plummer
Division of Physical Therapy, University of North Carolina at Chapel Hill, USA
http://dx.doi.org/10.1016/j.jphys.2015.12.006

Commentary

Walking dysfunction is a common, life-altering feature of multiple sclerosis. Accordingly, the improvement of walking function is a major focus of ongoing rehabilitation research. Physiological deconditioning (eg, aerobic capacity) is a primary determinant of walking dysfunction in multiple sclerosis, and exercise represents a behavioural approach for reversing deconditioning and thereby improving ambulation. The meta-analysis by Pearson and colleagues quantified the improvement in walking performance across randomised, controlled trials of exercise in multiple sclerosis. The meta-analysis included 13 trials and suggested that exercise can improve walking speed, walking endurance, and perhaps mobility (eg, Timed Up and Go test) in people with multiple sclerosis.

This meta-analysis did not consider disease status or fitness adaptations as effect moderators. This is important for understanding if exercise is effective across the disease spectrum, particularly considering that drugs are ineffective for slowing eventual progression of mobility disability in moderate and severe multiple sclerosis. The focus on fitness would provide information on changes in physiological functioning as possible mechanisms for walking improvements.

Overall, this meta-analysis provides estimates of exercise effects on walking outcomes in multiple sclerosis. The results can inform power analyses for future randomised, controlled trials and inform clinical practice recommendations. Clinically, exercise is a considerably less expensive option for managing walking outcomes in multiple sclerosis than pharmacotherapy and can be prescribed as part of ongoing, comprehensive multiple sclerosis care. There are many benefits of exercise in multiple sclerosis, and this meta-analysis further underscores its importance for comprehensively improving outcomes, including walking, in this neurological disease.


Robert Motl
Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, USA

References


http://dx.doi.org/10.1016/j.jphys.2015.12.005