

Physical Fitness Training for Patients With Stroke : Updated Review
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Physical Fitness Training for Patients With Stroke

Updated Review

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Physical fitness is low after stroke and this may cause or exacerbate some common poststroke problems, including disability. It is not known whether improving physical fitness or participating in physical fitness training after stroke reduces death, disability, or dependency.

Objectives

The primary aim of the review was to determine whether physical fitness training (cardiorespiratory training and/or resistance training) after stroke reduces death, dependence, and disability at the end of intervention or at the end of follow-up. The secondary aim was to determine the effects of fitness training on physical fitness, mobility, physical function, health status and quality of life, mood, and the incidence of adverse events.

Methods

Search Strategy

We searched the Cochrane Stroke Group Trials Register (last searched April 2010), the Cochrane Central Register of Controlled Trials (CENTRAL; The Cochrane Library, July 2010), MEDLINE (1966 to March 2010), EMBASE (1980 to March 2010), CINAHL (1982 to March 2010), SPORTDiscus (1949 to March 2010), and 5 additional databases (March 2010). We also searched registers of ongoing trials, hand-searched relevant journals and conference proceedings, screened reference lists, and contacted experts in the field.

Selection Criteria

We selected randomized trials comparing cardiorespiratory training, resistance training, or a combination of both (mixed training) with no intervention, a nonexercise intervention, or usual care in stroke survivors.

Data Collection and Analysis

Two review authors independently selected trials, assessed quality, and extracted data. We analyzed data using random-effects meta-analyses using Cochrane Review manager software (RevMan Version 5).

Results

We included 32 trials, involving 1414 participants, which comprised cardiorespiratory (14 trials, n=651), resistance (7 trials, n=246), and mixed training interventions (11 trials, n=517). Five deaths were reported at the end of the intervention and 9 at the end of follow-up. No dependence data were reported. Diverse outcome measures limited the intended meta-analyses and most estimates of effect were not significant. However, a clear pattern of benefits emerged for walking outcomes (Table). Cardiorespiratory training improved cardiorespiratory fitness and when it also involved walking as a mode of exercise, it caused a significant increase in walking speed (maximum and preferred speeds) and tolerance (6-minute walking test) at the end of intervention. Some of these benefits persisted 3 months after the intervention had stopped. Mixed training showed weaker, heterogeneous effects on walking, which were confounded by lack of attention control. Resistance training improved muscle strength but showed no significant effects on walking. The variability in the quality of included trials hampered the reliability and generalizability of the observed results.

Reviewer Conclusions

The effects of physical fitness training on disability, death, and dependence are unclear. However, some of the evidence can be implemented because there is sufficient evidence to incorporate cardiorespiratory training, involving walking, within poststroke rehabilitation to improve the speed and tolerance of walking. The findings reinforce the importance of task-related training when functional benefits are sought. Current data include few strength training trials and lack nonexercise attention controls, long-term training, and follow-up. Further well-designed trials are needed to determine the optimal exercise prescription and assess long-term benefits.

Note: The full text of this review is available in the Cochrane Library (for subscribers <http://www.mrw.interscience.wiley.com/>)

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This article is based on a Cochrane Review published in The Cochrane Library 2011, Issue 11 (see www.thecochranelibrary.com for information). Cochrane Reviews are regularly updated as new evidence emerges and in response to feedback, and The Cochrane Library should be consulted for the most recent version of the review.

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Table. Meta-Analyses (Random-Effects Models) of Cardiorespiratory Training, Resistance Training, and Mixed Training Interventions on Walking Performance Outcomes at the End of Intervention and at the End of Follow-Up

Fitness Training Intervention	Walking Outcome	End of Intervention			End of Follow-Up		
		Trial No. (No. of Participants)	Mean Difference (95% CI)	Significance Level	Trial No. (No. of Participants)	Mean Difference (95% CI)	Significance Level
Cardiorespiratory training	MWS	7 (365)	8.66 m/min (2.98 to 14.3)	$P=0.003$	3 (186)	8.21 m/min (3.38 to 13.05)	$P=0.0009$
	PWS	4 (221)	4.68 m/min (1.40 to 7.96)	$P=0.005$	...	...	...
	6-MWT	4 (219)	47.1 m (19.4 to 74.9)	$P=0.0009$	2 (107)	69.3 m (33.4 to 105)	$P=0.0002$
Resistance training	MWS	4 (104)	1.92 m/min (−3.50 to 7.35)	NS	1 (24)	−19.8 m/min (−95.8 to 56.2)	NS
	PWS	3 (80)	2.34 m/min (−6.77 to 11.45)	NS	...	...	...
	6-MWT	2 (66)	3.78 m (−68.6 to 76.1)	NS	1 (24)	11.0 m (−106 to 128)	NS
Mixed training	MWS	...	...	...	...	...	...
	PWS	8 (397)	2.93 m/min (0.02 to 5.84)	$P=0.05$	3 (201)	−2.12 m/min (−4.85 to 0.62)	NS
	6-MWT	3 (168)	30.6 m (8.90 to 52.3)	$P=0.006$	...	...	...

MWS indicates maximum walking speed; PWS, preferred walking speed; 6-MWT, 6-minute walking test; NS, nonsignificant; ..., no trial data.

cochrane/clsystrev/articles/CD003316/frame.html). The full article should be cited as: Brazzelli M, Saunders DH, Greig CA, Mead GE. Physical fitness training for stroke patients. *Cochrane Database Syst Rev* 2011. Issue 11.

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Disclosures

Drs Saunders, Greig and Mead were coauthors of 1 included study (Mead, 2007). Dr Mead has received research funding for exercise after stroke. She has received honoraria from Later Life Training to develop an educational course of exercise after stroke for exercise professionals. She has also received honoraria and expenses to present work on exercise after stroke at conferences.

KEY WORDS: cardiorespiratory fitness ■ disability ■ exercise ■ muscle strength ■ physiotherapy ■ therapy