Physical fitness is important for the performance of everyday activities. Although muscle strength and cardiorespiratory fitness are impaired in stroke patients, it is not known whether improving fitness by physical fitness training reduces disability after stroke.

Objectives
The objective of this study was to perform a systematic review to establish whether strength and/or cardiorespiratory fitness training reduces death, dependence, and disability after stroke. Secondary aims were to evaluate the effects of fitness training on physical fitness, mobility, physical function, health and quality of life, mood, and the incidence of adverse events.

Methods
Search Strategy
We searched the Cochrane Stroke Group Trials Register (last searched June 2003). In addition, the following electronic databases were searched: Cochrane Central Register of Controlled Trials (Cochrane Library, Issue 4, 2002), MEDLINE (1966 to December 2002), EMBASE (1980 to December 2002), CINAHL (1982 to December 2002), SPORTDiscus (1949 to December 2002), Web of Science Proceedings (1982 to December 2002), PEDro (December 2002), REHABDATA (1956 to December 2002), and Index to UK Theses (1970 to December 2002). We hand-searched relevant journals and conference proceedings and screened reference lists. To identify unpublished and ongoing trials, we searched trial directories and contacted experts in the field.

Selection Criteria
Randomized controlled trials were included when an intervention represented a clear attempt to improve muscle strength and/or cardiorespiratory fitness, and whose control groups comprised either usual care or a non-exercise intervention.

Data Collection and Analysis
Data from eligible studies were independently extracted by 2 reviewers. The primary outcome measures were death, disability, and dependence. Standardized mean differences (SMD) and weighted mean differences (WMD) of variables were calculated using fixed and random effects models, but lack of common outcome measures limited the analysis.

Results
Twelve trials comprising 289 participants met the inclusion criteria. Only 3 trials commenced soon (<1 month) after stroke, and only 2 examined the effect of strength training. No trials reported death and dependence data. Two small trials reporting disability showed no evidence of benefit (SMD, −0.06; 95% CI, −0.76 to 0.65). There were few secondary outcome measures common to the included trials. Significant improvements were observed only in Functional Ambulation Category scores (WMD, 0.60; 95% CI, 0.14 to 1.06) and maximal walking speed (SMD, 0.42 m/s; 95% CI, 0.04 to 0.79) after cardiorespiratory walking training. Like ambulation outcomes, the incidence of other physical benefits was associated with interventions using modes of physical activity closely related to the outcome task.

Reviewer Conclusions
There are inadequate data to either encourage or discourage physical fitness training after stroke. Beyond improvements in some measures of ambulation, little is known about the benefits of fitness training in stroke patients or the optimal regimen for improving fitness. Any training-induced functional benefits appear to be associated with specific or “task-related” training.

Fitness training after stroke is an under-researched area. Further trials are needed to determine the efficacy and feasibility of fitness training, particularly soon after stroke. The optimal training regimen for improving fitness remains unknown; therefore, smaller more specific studies are also required. These should explore the effect of “dose” and type of training, particularly strength training.

Physical Fitness Training for Stroke Patients
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