Review of the effects of resistance training in patients with chronic heart failure: potential effects upon the muscle hypothesis
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CRD summary
This review assessed the long-term effects of resistance training in chronic heart failure patients. The authors concluded that resistance training is likely to promote improvement in many clinical aspects of the condition. Given a number of methodological shortcomings and poor reporting, the reliability of this conclusion cannot be determined.

Authors' objectives
To assess the long-term effects of resistance training (RT) in patients with chronic heart failure (CHF).

Searching
MEDLINE was searched; the search terms were reported but the dates for the search were not. The references of published articles were also checked.

Study selection
Studies of RT alone or in conjunction with aerobic exercise (AE) in individuals with CHF were eligible for inclusion. The RT and AE programmes used in the included studies varied, and the duration of the interventions ranged from 8 weeks to 6 months. Most included studies evaluated RT combined with short or long bouts of AE. No inclusion criteria were reported for the study design or study outcomes. The included studies appear to have been randomised controlled trials (RCTs), non-randomised controlled studies and uncontrolled studies. A wide range of outcomes were reported.

The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
The studies were combined in a narrative, grouped by outcome. The effects of treatment mode, intensity and duration were also discussed.

Results of the review
Twenty-four studies (n=646) were included in the review: four appeared to be RCTs, fifteen were non-randomised controlled studies and five were uncontrolled studies.

Twenty-one studies reported improved skeletal muscle strength, while seven found improvements in skeletal muscle endurance. Four studies of RT plus short episodes of AE found improvements in peripheral blood flow, twenty-one found improvements in functional or exercise abilities, sixteen observed improved oxygen consumption, six found improvements in left ventricular function and seven found an improvement in quality of life.

Authors' conclusions
The provision of RT to individuals with CHF is likely to promote improvement in many of the clinical manifestations of CHF.

CRD commentary
The review question and inclusion criteria were specified only with respect to the intervention and participants. The authors searched only one database, which increases the possibility that some relevant studies were not included in the review. The authors did not report using methods designed to minimise bias and error in the selection of the studies for the review, or in the extraction of data. They also did not report assessing the validity of the included studies, which makes it difficult to determine the reliability of conclusions based upon the evidence of these studies. The decision to employ a narrative synthesis was probably appropriate given the clinical and methodological heterogeneity between the studies. The failure to report the statistical results of the included studies, or the statistical significance of those results, makes it impossible to assess the true effectiveness of the interventions. Given the limited search, the poor reporting of review methodology and the lack of a validity assessment, it is not possible to determine the reliability of the authors' conclusions.

**Implications of the review for practice and research**

Practice: The authors did not state any implications for practice.

Research: The authors stated the need for further research comparing RT alone and RT plus long and short bouts of AE.

**Funding**

Not stated.

**Bibliographic details**


**Indexing Status**

Subject indexing assigned by CRD

**MeSH**

Cardiac Output, Low /rehabilitation; Chronic Disease; Exercise; Heart Failure /rehabilitation; Treatment Outcome

**AccessionNumber**

12006005152

**Date bibliographic record published**

14/03/2008

**Date abstract record published**

30/09/2008

**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.