Rethink the effect of resistance training on six-minute walk distance?

The utilisation of resistance training in patients with chronic heart failure is an area of great interest and potential. In their recent systematic review, Hwang et al (2010) provide a clear argument supporting the hypothesis that resistance training could improve peripheral muscle strength and ultimately functional capacity in people with chronic heart failure. Their review reports the meta-analysis of randomised controlled trials; however, both the title and primary conclusion should be considered with caution.

The authors are to be commended on the presentation of their methodology and for rating the quality of included trials using the PEDro scale (Maher et al 2003). However, all systematic reviews are limited by the quality of the studies they include and this is particularly relevant here. It is well documented that poorly conducted randomised controlled trials may yield misleading results. Results suggest a clinically important and statistically significant 30–50% exaggeration of treatment efficacy when results of studies of low methodological quality are pooled (Moher et al 1999). While Hwang et al report the quality of included trials using PEDro scores, they appear not to have taken the next step and interpreted the meta-analysis in the context of these quality ratings. Although heterogeneity is mentioned, its consideration in having combined the studies should be detailed, as should the quality of the studies excluded from analysis. Thus, readers should be circumspect about their interpretation of results reported by Hwang et al.

Specifically, the title and conclusion of the paper selectively highlight one of multiple primary outcome measures, that being the only significant finding of the review. A more plausible conclusion would be that resistance training may improve six-minute walk distance and at best their findings are hypothesis-generating. In fact, the title of the paper is focussed on the meta-analysis of only two studies and one of these only scored 5 out of a possible 10 for quality, which raises some concern. These same two studies of six-minute walk distance after resistance training included a combined total of only 24 patients in their experimental groups. Neither study used concealed group allocation, nor were the respective control and experimental groups similar at baseline and the assessor measuring outcomes was not blinded to group allocation in one of the studies. However, Hwang et al state that therefore ‘some firm evidence’ exists for improvements in six-minute walk distance following resistance exercise training.

There is also a suggestion that participants included in the review were particularly sick patients with heart failure and yet they are able to perform resistance training at intensive levels. Further, this suggestion is clouded by the apparent discrepancies in how chronic heart failure was defined in both the manuscript and at least some of the studies (ie, < 40% or < 45%).

In summary, the findings reported by Hwang et al (2010) are of interest and are hypothesis-generating rather than confirmatory. Readers should be cautious not to over-interpret the title of the paper and the lead conclusion. As is the case with all systematic reviews, the findings are limited by the quality of the included trials. In this case, the included trials are not of particularly high quality or large size and hence the results should be considered within the context of the heterogeneity and quality of trials. We agree that further large-scale controlled trials with high quality designs are needed.

Julie Redfern  
The George Institute for International Health, and Faculty of Medicine, The University of Sydney

Tom Briffa  
University of Western Australia

References

We are pleased to respond to the letter written by Dr Redfern and Dr Briffa. First, we used the PEDro scale to rate the quality of included trials in our meta-analysis. The score of included trials in our systemic review was at least 4, half of them were 6 or 7, and the average was 5.8 (SD 1.2). The average PEDro score of trials of physiotherapy interventions published in the same years as the included trials (ie, 1997–2008) was 5.0 (SD 1.5) (scores downloaded from PEDro on 17/7/2010). Therefore we do not feel that the trials were of particularly low quality. We agree that readers should consider the quality of the included trials and we presented the scores in Table 2 for this purpose. We also agree that trial quality could have been higher and that there is definitely a need for high-quality large scale randomised trials focusing on the effect of resistance training in patients with chronic heart failure.

As stated in our Data Analysis, heterogeneity was examined first and the meta-analysis of each outcome was conducted with the appropriate model. We put the major significant finding in the title and conclusion but also pointed out the limitations. We agree with Dr Redfern and Dr Briffa that readers should be reminded that the benefit we found of resistance training on six-minute walk distance was based on the results of two studies (as we stated in the Discussion).

We thank Dr Redfern and Dr Briffa and agree that some studies could improve their study design by using concealed group allocation and by blinding investigators to group allocation while measuring outcomes. However, the comment on the diagnosis of chronic heart failure was somewhat misleading. As we know, heart failure is a clinical syndrome characterised by signs and symptoms of exertional dyspnoea due to structural and/or functional heart diseases with a range of left ventricular ejection fraction (LVEF) (Libby et al 2008). Some discrepancies in LVEF could be possible.

Chueh-Lung Hwang, Chen-Lin Chien and Ying-Tai Wu
National Taiwan University, Taipei, Taiwan

References