Combined resistance and aerobic training is more effective than aerobic training alone in people with coronary artery disease

Synopsis


**Objective**: To review the evidence as to whether combined aerobic and resistance training is as effective as aerobic training at improving body composition, fitness, strength and quality of life in people with coronary artery disease.

**Data sources**: Cochrane Controlled Trials Register, Embase, Medline, PreMedline, SportDiscus and CINAHL, searched up to October 2009. This search was supplemented by citation tracking. **Study selection**: Randomised controlled trials involving people with coronary artery disease (including people who had undergone coronary artery surgery or percutaneous intervention) in which aerobic training was compared to combined aerobic and resistance training. Outcome measures were measures of cardiovascular fitness, body composition measured by dual energy X-ray absorptiometry, muscular strength, health-related quality of life and self efficacy. Trials involving only patients with heart failure were excluded. **Data extraction**: Two reviewers determined eligibility and one reviewer extracted data. Methodological quality was assessed using the PEDro scale and the Jadad scale. **Data synthesis**: Of 271 studies initially identified by the search, 12 studies with a total of 504 patients met the selection criteria and were included in the review. Study quality ranged from 4 to 8 out of 10 on the PEDro scale, and 2 to 3 out of 5 on the Jadad scale. Based on the quantitative pooling of the available data from these trials, the combined training induced significantly greater improvements than aerobic training on most outcomes. Peak exercise capacity was better by a standardised mean difference of 0.88 (95% CI 0.45 to 1.31), fat free mass improved by 0.9 kg more (95% CI 0.4 to 1.4) and percent body fat improved by 2% more (95% CI 1 to 4). Trunk fat and upper and lower limb strength were also significantly better after combined training than after aerobic training. Data for quality of life and self efficacy could not be pooled quantitatively, but all the studies that measured these outcomes reported improvements either in both groups or in the combined training group only. The adverse events noted were typically mild cardiovascular changes or musculoskeletal pain. In subgroup analyses, the study duration and the intensity of the resistance were not associated with an altered treatment effect. **Conclusion**: Combined aerobic and resistance training is more effective than aerobic training in improving body composition, strength and cardiovascular fitness, probably improving quality of life and self efficacy as well.

Commentary

One of the many challenges in providing comprehensive and effective cardiac rehabilitation is to have the right combination of physical activities incorporated into the programs because many participants find undertaking resistance training problematic. Combined aerobic and resistance exercise is effective rehabilitation in other types of cardiac disease, such as heart failure (Hwang et al 2010, Savage et al 2011, Chien et al 2011) so the meta-analysis by Marzolini and colleagues is therefore timely in attempting to synthesise current evidence on the value of incorporating resistance training with the traditional supervised aerobic training routines that are part of about 80% of cardiac rehabilitation programs across Australia (Briffa et al 2010). The review shows that aerobic exercise and resistance training provides better outcomes than aerobic exercise alone. This would suggest that the ACSM guidelines (2009) should make a stronger recommendation than they do about resistance training for this population.

The search strategy was rigorous but the PEDro database was not searched, which may have meant that some studies went unidentified. For example the study by Moghadam and colleagues (2009) appears eligible. To attempt to balance training volume, some studies reduced the amount of aerobic training when resistance training was introduced although about half of the included studies added extra sessions of resistance training to the same aerobic training regimen used by the control group. In the latter trials, it is difficult to know whether the outcomes differed between groups because the resistance training was additional exercise.

The variation in the interventions in the included studies makes specific recommendations for exercise prescription difficult. The resistance training groups were prescribed 2 to 4 sets of 2 to 10 exercises at an intensity of 40–80% of one repetition maximum, 2 to 3 times per week. Nevertheless, armed with the conclusions of this study and the 2011 ACSM position stand on guidance for prescribing exercise, physiotherapists can bring more rigour and certainty to the incorporation of resistance training into cardiac rehabilitation for groups and individuals.

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References


