A specific exercise program for patients with subacromial impingement syndrome can improve function and reduce the need for surgery

Synopsis


**Question:** Does a specific exercise program improve shoulder function more than non-specific exercises in patients with subacromial impingement? **Design:** Randomised, controlled trial with concealed allocation and blinded outcome assessment. **Setting:** University hospital in Sweden. **Participants:** Patients aged 30 to 65 years with subacromial impingement syndrome of at least 6 months duration, and on the waiting list for surgery were included. Key exclusion criteria included previous shoulder fractures, and frozen shoulder. Randomisation of 102 participants allocated 52 to the intervention exercise group and 50 to a control exercise group. **Interventions:** Both groups received a subacromial corticosteroid injection at inclusion and commenced exercises 2 weeks later. Both groups visited a physiotherapist 7 times over 10 weeks and were prescribed home exercises for 12 weeks. The intervention exercise group were prescribed 6 exercises: 2 eccentric exercises for the rotator cuff, 3 concentric/ eccentric exercises for the scapula stabilisers, and a posterior shoulder stretch. Each strengthening exercise was repeated 15 times in 3 sets twice daily for 8 weeks and then once daily for 4 weeks. The stretch was completed for 30 to 60 seconds and repeated 3 times twice daily. Training load was progressed using weights or elasticised bands. The control group exercise program consisted of 6 non-specific movement exercises for the neck and shoulder (e.g. neck retraction, shoulder abduction). The control group exercises were not loaded or progressed and were completed 10 times 3 times daily. **Outcome measures:** The primary outcome was the Constant shoulder score at 3 months. The Constant score is scored from 0 to 100 with a higher score indicating better function. Secondary outcome measures included the disability of the arm, shoulder and hand questionnaire (DASH), a visual analogue score for pain, the EuroQol quality of life instrument, and whether the participant thought they still needed surgery. **Results:** 97 participants completed the study. At 3 months, the change in Constant score was significantly more in the specific exercise group than the control group by 15 (95% CI 8.5 to 20.6) points. The DASH improved significantly more in the intervention than the control group by 8 (95% CI 2.3 to 13.7) points. The intervention group also improved significantly more than the control group in ratings of night pain, and quality of life. A lower proportion of the specific exercise group subsequently chose surgery (20% v 63%, Number Needed to Treat 3, 95% CI 1.6 to 3.9). **Conclusion:** A specific, progressive exercise program focusing on training the rotator cuff and scapular stabilisers was effective in improving function, reducing pain and reducing the need of surgery for patients with chronic subacromial impingement syndrome.

[Numbers needed to treat and 95% CIs calculated by the CAP Editor.]

Commentary

Controversy persists regarding the pathoaeiology and even existence of subacromial impingement syndrome (Lewis 2011). Exercise has been shown to achieve comparable results to injection therapy and surgery in the treatment of shoulder pain syndrome, at substantially reduced economic burden when compared with the latter. Combined injection and exercise therapy has not been shown to achieve better results than exercise alone at 12 weeks (Crawshaw et al 2010); and injection therapy and exercise therapy achieved comparable results at 6 months (Hay et al 2003).

This study provides further evidence for the benefit of exercise, with a specific program conferring enhanced clinical benefit. The authors are to be commended for their insightful contribution to the body of knowledge required to treat shoulder pain effectively. However consideration needs to given to issues pertaining to the study design.

A numerical imbalance existed in the number of participants in the experimental and control groups with partial and full thickness tears, and this may have influenced the overall findings. There were more than double the number of partial thickness tears in the experimental group (n = 15) than in the control group (n = 6). Injection therapy was administered to everyone prior to rehabilitation. Algorithms for the treatment of rotator cuff tendinopathy have been proposed (Lewis 2010) and injection therapy may arguably be more beneficial in intact and partial thickness tears than full thickness tears. Full thickness tears may benefit from a different rehabilitation strategy (Ainsworth et al 2009). However, the relatively small number of participants with full thickness tears in the trial (experimental n = 3, control n = 6) means that this particular factor may have had little effect on the overall conclusions. Additionally, the authors did not detail if the injections were performed by the same person or under ultrasound guidance. One therapist provided all the treatment. While this arguably would improve consistency, bias, most notably in the form of enthusiasm (Suarez-Almazor et al 2010) may have profoundly confounded the findings.

The economic burden of arthroscopy is substantial, without any demonstrable enhanced clinical benefit (Lewis 2011). This study’s finding that injection and exercise reduces the need for surgery at 3 months is of considerable importance.

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References

Daily use of a cane for two months reduced pain and improved function in patients with knee osteoarthritis

Synopsis


**Question:** Does daily use of a cane for two months produce clinical benefits in patients with knee osteoarthritis (OA)? **Design:** A randomised, controlled trial where group allocation was carried out by computer-generated randomisation in a 1:1 ratio. **Setting:** An outpatient rheumatology clinic in Sao Paulo, Brazil. **Participants:** Men and women with the diagnosis of knee OA according to the American College of Rheumatology criteria, knee pain score between 3 and 7 (on a 0–10 Visual Analogue Scale), stable doses of non-steroidal anti-inflammatory drugs (NSAIDs), and no regular physical exercise or use of canes in the months prior to the study. **Interventions:** Each participant in the intervention group received an individually height adjusted wooden cane with a T-shaped handle and instruction in how to use it on the contralateral side at the start of the intervention and after one month. **Outcome measures:** The primary outcome was pain measured on a 0–10 Visual Analogue Scale at one and two months. Secondary outcomes were function measured with the Lequesne knee questionnaire and the Western Ontario and McMaster Universities (WOMAC) questionnaire, health related quality of life (SF-36), energy expenditure during a 6-minute walk test, and consumption of NSAIDs. **Results:** In total 64 patients were assigned to the intervention (n = 32) and control groups (n = 32), and 59 completed the two month follow-up. Mean differences in pain were 0.8 (95% CI 0.3 to 1.3) at one month follow up and 2.1 (95% CI 1.4 to 2.8) at two months, both in the favour of the intervention group. There were significant differences in favour of the intervention group in Lequesne knee questionnaire, SF-36 Bodily Pain and Role Physical scores, and consumption of NSAIDs. **Conclusion:** Use of a cane can diminish pain and improve physical functioning in patients with knee osteoarthritis.

[95% CIs calculated by the CAP Editors.]

Commentary

Treatment guidelines in osteoarthritis (OA) have for years recommended applying walking aids, based on expert opinion. Walking aids are simple to use, cheap, and easily accessible. This is the first randomised controlled trial published on the effect of cane use for persons with knee OA.

The primary outcome pain measured by visual analogue scale was reduced by 2.1 cm on a 0–10 scale in the experimental group compared to controls after 2 months. This is considered clinically significant (Tubach et al 2006) and beyond the minimum clinically important differences (Stauffer et al 2011). As the authors acknowledge, only 20% of enrolled patients fulfilled the inclusion criteria, thus weakening the representativeness of the study sample. The presence or paucity of adverse effects was not reported, and a rationale for recommending only outdoor use is lacking. The trial is well conducted, but included a short-term follow-up. More studies and longer follow-up are needed to enable generalisation of results to a larger population.

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References

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

Exercise training improves cardiovascular fitness in people receiving haemodialysis for chronic renal disease

Synopsis


Objective: To review the effects of exercise training on cardiovascular fitness, cardiac function, strength, quality of life and safety in people on regular haemodialysis for chronic renal disease. Data Sources: CENTRAL, Embase, Medline and CINAHL, searched up to December 2010. Reference lists of included studies were hand searched for further eligible trials. Study selection: Randomised controlled trials involving people with chronic renal disease on regular haemodialysis, in which exercise training was compared to no training or in which different exercise modalities were compared. Trials assessing peak oxygen consumption as a measure of cardiopulmonary fitness were included. Other outcome measures were cardiac function, strength, quality of life, and safety. Exercise adherence was also considered. Data extraction: Two reviewers determined the eligibility of studies. Methodological quality was assessed using the Jadad scale. Results: Of 69 studies initially identified by the searches, 15 studies involving a total of 565 participants were eligible and were included in the review. Study quality ranged from 1 to 3 out of 5 on the Jadad scale. Eight studies involving 365 participants compared cardiovascular fitness between training and control groups. The pooled result showed significantly greater peak oxygen consumption in the training group by 5 mL per kg per min (95% CI 4 to 7). Subgroup analyses indicated that this effect was greater among studies where the exercise training was of longer duration, was not performed during dialysis, and included strength training as opposed to aerobic training alone. The exercise group also had significantly lower heart rate variability (ie, heart rate SD reduced by 16, 95% CI 8 to 24) and tended to have greater left ventricular ejection fraction (by 5%, 95% CI 0 to 9). Two studies measured cross-sectional area of limb muscles. Both showed significantly greater improvement in the exercise group, but only one also showed significantly greater strength. The effect of exercise training on quality of life was not clear, however the exercise training appeared to be safe with no deaths reported during exercise training. Among those patients originally approached about participation, 25% were ineligible due to comorbidities and a further 28% refused to participate. Of those who commenced exercise, 15% withdrew, which was similar to the dropout rate in the control group. Conclusion: Exercise training is safe, substantially improves cardiovascular fitness and reduces cardiac variability. To maximise the effect on cardiovascular fitness, the training should be long-term, be performed outside of haemodialysis periods, and include strength as well as aerobic training.

Commentary

Recent systematic reviews in this area have included trials involving patients in various stages of renal disease (Segura-Orti 2010, Heiwe and Jacobson 2011). This review instead focuses exclusively on haemodialysis patients and considers outcome measures relevant to them. Cardiovascular fitness and heart rate variability are important because they are predictors of mortality in haemodialysis patients (Sietsema et al 2004, Hayano et al 1999). Left ventricular dysfunction occurs in some haemodialysis patients secondary to anaemia (Middleton et al 2001). The other outcomes are also appropriate, although it is disappointing that the review does not provide much outcome data from functional exercise tests. The assessment of adherence is welcome, given the difficulties of sustaining exercise in this population (Bennett et al 2010).

The review helpfully presents some data as a percentage of normative values. For example, haemodialysis patients have peak oxygen consumption that is about 70% of their healthy peers and exercise training improves this to 88% – a substantial restoration towards normal function. A limitation of the review is the analysis of the quality of the included studies. Two trials were categorised as blinded but the comparison of interest (exercise vs control) was not concealed from patients, which is part of the blinding criterion (Jadad et al 1996). When this is corrected, the Jadad scale does little to discriminate the quality of the included studies, with 13 of the 15 studies scoring 2 out of 5.

A sensitivity analysis conducted with a more discriminatory tool would indicate whether the estimate of the effect changes with study quality.

Physiotherapists should advise haemodialysis patients of the benefits of exercise training and prescribe an aerobic and strengthening training regimen tailored to each patient’s fitness, strength, and comorbidities. One issue we must consider carefully when prescribing the regimen is that exercise in non-dialysis periods may improve cardiovascular outcomes more, but exercise during dialysis is associated with greater adherence (Bennett et al 2010).

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References