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[Intervention Review]

Progressive resistance strength training for improving physical function in older adults

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ABSTRACT

Background

Muscle weakness in old age is associated with physical function decline. Progressive resistance strength training (PRT) exercises are designed to increase strength.

Objectives

To assess the effects of PRT on older people and identify adverse events.

Search methods

We searched the Cochrane Bone, Joint and Muscle Trauma Group Specialized Register (to March 2007), the Cochrane Central Register of Controlled Trials (*The Cochrane Library* 2007, Issue 2), MEDLINE (1966 to May 01, 2008), EMBASE (1980 to February 06 2007), CINAHL (1982 to July 01 2007) and two other electronic databases. We also searched reference lists of articles, reviewed conference abstracts and contacted authors.

Selection criteria

Randomised controlled trials reporting physical outcomes of PRT for older people were included.

Data collection and analysis

Two review authors independently selected trials, assessed trial quality and extracted data. Data were pooled where appropriate.

Main results

One hundred and twenty one trials with 6700 participants were included. In most trials, PRT was performed two to three times per week and at a high intensity. PRT resulted in a small but significant improvement in physical ability (33 trials, 2172 participants; SMD 0.14, 95% CI 0.05 to 0.22). Functional limitation measures also showed improvements: e.g. there was a modest improvement in gait speed (24 trials, 1179 participants, MD 0.08 m/s, 95% CI 0.04 to 0.12); and a moderate to large effect for getting out of a chair (11 trials, 384 participants, SMD -0.94, 95% CI -1.49 to -0.38). PRT had a large positive effect on muscle strength (73 trials, 3059 participants, SMD 0.84, 95% CI 0.67 to 1.00). Participants with osteoarthritis reported a reduction in pain following PRT(6 trials, 503 participants, SMD -0.30, 95% CI -0.48 to -0.13). There was no evidence from 10 other trials (587 participants) that PRT had an effect on bodily pain. Adverse events were poorly recorded but adverse events related to musculoskeletal complaints, such as joint pain and muscle soreness, were reported in many of the studies that prospectively defined and monitored these events. Serious adverse events were rare, and no serious events were reported to be directly related to the exercise programme.

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Authors' conclusions

This review provides evidence that PRT is an effective intervention for improving physical functioning in older people, including improving strength and the performance of some simple and complex activities. However, some caution is needed with transferring these exercises for use with clinical populations because adverse events are not adequately reported.

PLAIN LANGUAGE SUMMARY

Progressive resistance strength training for improving physical function in older adults

Older people generally lose muscle strength as they age. This reduction in muscle strength and associated weakness means that older people are more likely to have problems carrying out their daily activities and to fall. Progressive resistance training (PRT) is a type of exercise where participants exercise their muscles against some type of resistance that is progressively increased as their strength improves. The exercise is usually conducted two to three times a week at moderate to high intensity by using exercise machines, free weights, or elastic bands. This review sets out to examine if PRT can help to improve physical function and muscle strength in older people.

Evidence from 121 randomised controlled trials (6,700 participants) shows that older people who exercise their muscles against a force or resistance become stronger. They also improve their performance of simple activities such as walking, climbing steps, or standing up from a chair more quickly. The improvement in activities such as getting out of a chair or stair climbing is generally greater than walking speed. Moreover, these strength training exercises also improved older people's physical abilities, including more complex daily activities such as bathing or preparing a meal. PRT also reduced pain in people with osteoarthritis. There was insufficient evidence to comment on the risks of PRT or long term effects.