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The effects of resistance exercise on cardiometabolic health and body composition in obese or overweight individuals undergoing dietary weight loss interventions: A systematic review and meta-analysis

A. Binmahfoz¹, A. Dighrir¹, C.M Gray² and S. Gray¹

¹School of Cardiovascular and Metabolic Health, College of Medical, Veterinary and Life Sciences, University of Glasgow

²School of Social and Political Sciences, College of Social Sciences, University of Glasgow

Obesity prevalence has tripled in over the past 35 years and has detrimental effects on physical and psychological health⁽¹⁾. Weight loss via dietary intervention is a mainstay for the treatment of obesity and reduces body fat⁽²⁾, but also results in loss of lean tissue⁽³⁾. A potential solution to mitigate the loss of lean tissue, and thus enhance the benefits of weight loss, is resistance exercise. The aim of the current systematic review was to examine the impact of resistance exercise on body weight/composition and markers of cardiometabolic health, as well as physical function, in people living with overweight or obesity undergoing dietary weight loss interventions.

A search was performed in PubMed, Embase, CINAHL, SCOPUS, Web of Science, and the Cochrane Central Register of Controlled Trials (CENTRAL) based on the set inclusion and exclusion criteria. Systematic searches yielded N=5147 studies of which n=27 were relevant for inclusion after screening for eligibility. We included randomised controlled clinical trials of adult participants (18-65 years of age) with body mass index (BMI) $\geq 25\text{kg/m}^2$ that compared dietary weight loss interventions including resistance exercise with 1) dietary weight loss interventions including other non-resistance exercise and/or 2) dietary weight loss interventions without any exercise. Resistance exercise was classed as any form of resistance or muscle strengthening exercise (e.g. gym or home-based, supervised or non-supervised, used equipment or body weight only). Key data were extracted, risk of bias was assessed using the Cochrane risk of bias tool, and the quality of evidence assessed using Grades of Recommendation, Assessment, Development and Evaluation (GRADE). Meta-analysis was performed including only studies that compared dietary weight loss plus resistance exercise interventions to diet-only (i.e. not including any other exercise) weight loss interventions to explore differences in body weight/composition and cardiometabolic health changes between diet plus resistance exercise and diet only interventions.

Overall, resistance exercise in addition to diet-induced weight loss had no effect on weight loss (mean difference between groups: -0.32kg, 95% confidence interval [CI] -1.00 to 0.35; $p=0.35$) but did preserve fat free mass (between-group standardised mean difference (SMD): 0.40, 95%, [CI] 0.18 to 0.61; $p=0.0003$) and increase loss of fat mass (SMD: -0.36, 95% [CI] -0.49 to -0.23; $p<0.00001$). Muscular strength was also improved (SMD: 2.36, 95% [CI] 1.38 to 3.34; $p=0.00001$) by the inclusion of resistance exercise. No effects of resistance exercise were seen in any of the other cardiometabolic markers studied, although data were limited.

In people who are obese or overweight, the addition of resistance exercise to dietary restriction may enhance its beneficial effects. Current evidence, therefore, supports the inclusion of resistance exercise during weight loss to attenuate the loss of lean mass, increase fat mass loss and improve muscle strength.

References

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