

The Effects of Twelve Weeks of Combined Resistance and Aerobic Training on Arm Lean Mass in Post-Menopausal, Obese Women

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ABSTRACT

Sarcopenia, a loss in muscle mass as a result of aging, is an independent risk factor for disability and is significantly associated with self-reported physical disability in both men and women. Strength training reverses the loss of, or maintains muscle mass in individuals as they age. **PURPOSE:** To examine the potential change in lean muscle mass of the arms in response to a 12-week combination strength and aerobic exercise training intervention in post-menopausal (55-75 years), obese women. **METHODS:** Forty-one women were randomly assigned to either an exercise (EX, n=22) or education (ED, n=19) group. For twelve weeks (12 WT), the EX group participated in resistance and aerobic training three days per week. Participants performed 2 sets of the following 8 resistance exercises at 8-12 RM: "lat" pulldown, chest press, seated row, leg press, leg extension, leg curl, hip adduction, and hip abduction. The first set consisted of 8 repetitions, while the second set was to failure. The participants then walked on a treadmill at 75 - 85% heart rate reserve for 30 min. The ED group participated in education sessions twice per week and were restricted from exercise. Lean muscle mass of the arms was measured before (BT) and after (AT) 12 WT via dual-energy X-ray absorptiometry (DEXA). Strength was measured using eight repetition maximum (8RM) on chest press BT and AT. VO₂max was estimated using a treadmill exercise bout where participants exercised to 85% of their heart rate reserve (BT & AT). **RESULTS:** There was a group x training interaction for left arm lean mass (EX BT: 2.24 ± 0.086, EX AT: 2.38 ± 0.092; ED BT: 2.11 ± 0.092, ED AT: 2.12 ± 0.100 kg, p=0.018) and total arm lean mass (EX BT: 4.54 ± 0.164, EX AT: 4.76 ± 0.177; ED BT: 4.379 ± 0.177, ED AT: 4.30 ± 0.191 kg, p=0.048). We observed a group x training interaction for VO₂ max (EX BT: 21.1 ± 0.82, EX AT: 23.8 ± 0.80; ED BT: 19.9 ± 0.88, ED AT: 20.1 ± 0.86 ml•kg⁻¹•min⁻¹ p=0.006) and chest press 8RM (EX BT: 28.1 ± 1.16, EX AT: 38.9 ± 1.53; ED BT: 25.10 ± 1.4, ED AT: 23.9 ± 0.1.9 kg, p<0.001). There was a main effect of training (p=0.015) where mean right arm lean mass increased (BT: 2.23 ± 0.063, AT=2.30 ± 0.067 Kg) in response to 12 WT. **CONCLUSION:** An increase in lean mass of the arms, strength, and aerobic fitness can be associated with a decrease in disability. The results of this study provide further evidence that strength training can be used as an intervention to combat age related sarcopenia. Furthermore, the training intervention utilized in this study can serve a population who does not normally meet the physical activity guidelines outlined by the American College of Sports Medicine in order to increase arm lean mass, VO₂ max, and strength.