

The effects of resistance training on inflammatory markers, strength, physical function and balance in older men and women

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We aimed to determine the effects of resistance exercise on the strength, physical function and inflammatory markers of healthy, untrained, older adults. Participants, 16 women (68 ± 3 years, BMI 28.6 ± 6 kg/m²) and 18 men (74 ± 5 years, BMI 26.9 ± 3.2 kg/m²), engaged in a progressive resistance training program three times per week for 12wk. 1RM leg press and extension strength as well as the short physical performance battery (SPPB) were assessed before and after training as markers of physical function. All SPPB balance measurements were taken on a force plate. Serum interleukin-6 (IL-6) and tumor necrosis factor- α (TNF- α) concentrations were measured pre and post training as markers of systemic inflammation. Strength increased from 59.4 ± 18.6 to 71.2 ± 18.7 kg ($P=0.000$) and 21.4 ± 9.7 to 29.3 ± 17.8 kg ($P=0.01$) for leg press and extension respectively. Repeated chair stand time decreased from 9.6 ± 2.2 to 8.6 ± 1.9 seconds ($P=0.003$). There were significant improvements in SPPB balance tasks assessed on the force plate: mean displacement of the centre of pressure in semi-tandem stance ($p=0.031$), trace length in side-by-side stance ($P=0.026$), trace length in semi-tandem stance ($P=0.004$), C90 area in semi-tandem stance ($P=0.041$), mean anterior-posterior displacement in semi-tandem stance ($P=0.009$), and velocity in semi-tandem stance ($p=0.003$). There was no change in SPPB summary ordinal score, however, 29 or 34 subjects achieved the maximal score before training. There were no significant changes in the resting concentrations of IL-6 ($P=0.67$) or TNF- α ($P=0.08$) from pre and post training. In conclusion, 12 wk of progressive resistance training led to balance improvements in older adults who were already high functioning based on their SBBP score. Thrice weekly resistance training for 12 wk was of not of sufficient volume or duration to improve markers of systemic inflammation.