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Kettlebell Training Increases Muscle Mass and Improves Muscle Function in Older Adults

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The age-related loss of muscle mass can begin as early as 40 years of age, with muscle mass declining at a rate of roughly 1% annually. When the progressive loss of muscle mass is accompanied by decline in muscle function, it can ultimately lead to increased morbidity and mortality. Resistance training has been introduced as a method to increase muscle mass and improve muscle function in older adults, but only a limited number of research studies has evaluated whether training with kettlebells can induce positive changes in this population. **PURPOSE:** Determine whether kettlebell training (KT) increases fat free mass (FFM), muscle strength (grip strength and knee extension torque), and muscle function [short physical performance battery test (SPPB)] in older adults. **METHODS:** Individuals meeting the inclusion criteria (≥ 60 years old and body mass index $< 42 \text{ kg/m}^2$) were enrolled in the study and participated in KT (2x/week) consisting of deadlifts, shoulder press, bent over rows, squats, and swings (3-9 sets with 4-10 reps for each exercise at a rate of perceived exertion level 7/10). Baseline measurements were conducted prior to initiating the training program and were repeated after 2 and 4 months of training. Participants were evaluated in the following assessments: body composition (dual-energy X-ray absorptiometry), SPPB test (including balance tests, gait speed test, and repeated chair stand test), grip strength, and knee extension torque. A repeated measures one-way Analysis of Variance was used to determine statistical differences across time. **RESULTS:** Sixteen subjects (3 men/13 women) completed the training. KT increased FFM from baseline to 4 months of training (+2.55lbs, $p=0.001$) while not altering body weight or fat mass ($p>0.05$). Time to complete the 6-meter walk test and time to complete 5 repeated chair stands decreased from baseline to 4 months of training ($5.2 \pm 1.0 \text{ sec}$ vs. $4.2 \pm 0.5 \text{ sec}$, $p=0.001$; $10.3 \pm 2.9 \text{ sec}$ vs. $8.6 \pm 2.2 \text{ sec}$, $p=0.011$, respectively). Grip strength and knee extension torque increased from baseline to 4 months ($29.3 \pm 7.6 \text{ kg}$ vs. $32.3 \pm 6.9 \text{ kg}$, $p=0.0003$; $85.9 \pm 26.3 \text{ Nm}$ vs. $97.9 \pm 30.9 \text{ Nm}$, $p=0.039$, respectively). **CONCLUSION:** Our data shows that KT increases in FFM and improves muscle strength and muscle function in older adults. **SIGNIFICANCE/NOVELTY:** The age-related decline in muscle mass and strength leads to an inability to easily and safely complete activities of daily living. Therefore, strategies to maintain/improve muscle function and independence in older adults should receive increased attention. Here we show that long-term KT increases muscle mass and improves muscle function in older adults, thus suggesting that this type of training could be prescribed to counteract some of the age-related changes experienced in older adults.

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