TACSM Abstract

Exercise in Aging: Can Handgrip Training Improve Skeletal Muscle Oxidative Recovery Kinetics?

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ABSTRACT

Loss of skeletal muscle function is a key factor contributing to reduced mobility and quality of life in aging individuals. While the exact mechanism remains unclear, impaired skeletal muscle oxidative capacity has been shown to play a major role. Exercise training increases oxidative capacity early in life; however, the potential for exercise to improve oxidative capacity later in life remains equivocal. **PURPOSE**: To test the hypothesis that 4 weeks of exercise training can improve skeletal muscle oxidative capacity in elderly individuals beyond the 6th decade of life. **METHODS**: To-date, 4 community-dwelling seniors from the local Dallas-Fort Worth area (70 ± 8 yrs; m/f: 2/2; BMI: 23.8 ± 2.5 kg) underwent 4 weeks of handgrip training at 30% MVC (maximal voluntary contraction). Training was performed 5 days a week. Upon successful completion of each week of training, MVC was reassessed and the total number of contractions was gradually increased (30, 45, 60, and 75 grips 20x per day, respectively). Pre- and post-training assessments were performed using a well-established near-infrared spectroscopy (NIRS) protocol, evaluating post-exercise skeletal muscle oxidative recovery (time to recovery, or *tau,* in seconds). **RESULTS**: As expected, all four participants increased their MVC (pre-training MVC: 25.6 ± 18.8 kg; post-training MVC: 32.5 ± 14.6 kg, or 26.8% increase). In contrast to our hypothesis, however, exercise training did not improve skeletal muscle oxidative recovery (pre-training tau: 44.6 ± 16.2 s; post-training tau: 49.0 ± 10.1 s, or 10.1% increase). **CONCLUSION**: Four weeks of progressive exercise training does not improve skeletal muscle oxidative capacity in elderly individuals beyond the sixth decade of life. That we observed an improvement in grip strength suggests that the training stimulus was sufficient enough to produce a positive adaptation, but that the mechanisms controlling changes in strength and oxidative metabolism are either temporally disparate or otherwise distinct — at least in the elderly.