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### Differences in Tibialis Anterior Mitochondrial Capacity in Recreationally Active Younger and Middle-aged Adults

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Mitochondrial capacity measures the efficiency of a muscle's ability to utilize oxygen, and this overall capacity is thought to decrease with age. Mitochondrial capacity deficits within a muscle in middle-age may indicate future risk of reduced physical function and poor quality of life (QOL). **PURPOSE:** To examine the differences in mitochondrial capacity of the tibialis anterior (TA) muscle and QOL in recreationally active younger and middle-aged individuals. **METHODS:** Apparently healthy participants (21-45 yrs; n=12) arrived for testing after refraining from physical activity, food, alcohol, and caffeine for 12 hrs. Participants consisted of younger (Y) (n=6) and middle-aged (MA) (n=6) recreationally active adults. Participants completed the SF-12 questionnaire to assess physical and mental QOL. A near infrared spectroscopy (NIRS) device was placed on the belly of the TA with electrodes placed proximally and distally to measure differences in oxygenated and deoxygenated hemoglobin (Hb diff). A cuff capable of rapid inflation was placed on the upper leg proximal to the tibiofemoral joint. Resting metabolism of the TA muscle was assessed as the downward slope in Hb diff during a 30s occlusion and the average of three trials was used. Mitochondrial capacity of the TA muscle of the dominant leg was assessed with NIRS using a 22-cuff recovery protocol following 30s of electrical stimulation. The protocol was repeated twice, and a physiological calibration was performed to correct for changes in blood volume. Recovery time constants (seconds) following stimulation were derived from analyses of Hb diff signals. **RESULTS:** Independent t-tests revealed no significant main effect of age on resting metabolism ( $p=0.155$ ). Mitochondrial capacity of the TA muscle was significantly greater in MA individuals compared with Y individuals ( $58.6 \pm 13.8$  s vs.  $39.1 \pm 7.1$  s vs.,  $p=0.012$ ). There were no age-related differences in physical ( $55.4 \pm 3.8$  vs.  $56.1 \pm 3.5$  AU in MA vs. Y, respectively) or mental ( $52.4 \pm 7.1$  vs.  $47.4 \pm 10.7$  AU, MA vs. Y, respectively) QOL scores. **CONCLUSION:** Preliminary results of this study demonstrated higher mitochondrial capacity in the TA of middle-aged compared with younger adults. These findings may suggest a shift in the TA to a more oxidative phenotype in middle-age in an effort to maintain QOL.

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