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Muscle Vascularization in Young and Old Rats Following Repeated Bouts of Dynamometer Applied Stretch-Shortening Contractions: 1722: Board #159 June 2 2:00 PM - 3:30 PM

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Exposure to repetitive motion in the workplace results in injuries, and the prevalence of these injuries is greater in older workers. This greater susceptibility to injury may be due to a reduced ability of muscle to adapt to repeated exposures in older workers.

PURPOSE: To determine if age-related differences in muscle adaptation are associated with changes in tibialis anterior muscle (TA) vascularization following exposure to stretch-shortening contractions (SSCs).

METHODS: The left dorsiflexor muscles, which includes the TA, in young (n=6, 3 mos) and old (n=6, 30 mos) anesthetized male Fischer Brown Norway Hybrid rats, were exposed 3 times/week for 4.5 weeks to a protocol of 80 maximal SSCs per exposure **in vivo** while the right muscles were unexposed and used for control. Left dorsiflexor muscle contractile properties were characterized by isometric and dynamic performance before and after each exposure. Twenty-four hours after the last exposure, rats were euthanized, the dorsiflexor muscles were dissected and TA muscle wet mass taken, and the mid belly of the TA was frozen. Transverse sections from the mid belly portion of the TA muscle were collected and labeled with a-actin antibody to identify blood vessels. Ten images were captured from each section, the a-actin labeled area from each image was measured using densitometry, and the percent calculated. Data collected from each set of 10 images were averaged. Average values from left and right TA for young and old were compared statistically using a paired two samples for means t-Test.

RESULTS: Wet TA muscle mass increased in the young to a greater extent than in the old rats. At the end of the exposure, isometric force was increased in the young, but decreased in the old rats. Compared to the unexposed TA, a-actin labeling of vascular tissue in the exposed TA was increased in the young ($p = 0.03$) and unchanged in the old ($p = 0.97$).

CONCLUSIONS: Young rats responded to repeated bouts of SSCs by increasing muscle mass, isometric force, and vascularization. In old rats, training failed to elicit a change in vascularization and resulted in loss of force production.