Treatying Sarcopenia: Does Resistance Training Need to Include a Power Component?

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Introduction

Sarcopenia has been defined as age-related decline in skeletal muscle mass that contributes to disability, frailty, and falls. Fast-twitch muscle fibers are the primary fiber type affected by sarcopenia (Walston, 2012). Resistance training is a proven treatment for sarcopenia in humans. When designing a resistance training program to combat sarcopenia in the elderly, it may be necessary to include a power component to better target the fast-twitch muscle fibers. This study trained C57BL/6 mice with a powered running wheel and weight harness. This resistance training protocol was shown to mimic human voluntary weight training and is a valid tool for studying muscle adaptations to resistance training. The purpose of our study was to investigate the different adaptations of elderly and adult mice to a typical resistance training program. Our hypothesis was that both adult and elderly mice would respond favorably to the training program.

Resistance Training Protocol

Mice were divided into 4 groups: old exercise (n=7), old control (n=12), adult exercise (n=6), and adult control (n=14). Old and adult mice correspond to approximately an 80- and 40-year-old human respectively. The experimental groups underwent the resistance training protocol outlined in Figure 1. The powered running wheel and weight harness that were used are shown in Figures 2 and 3.

Whole Body Physiology

Results

Conclusion

Table 1: Effect sizes and significance tests. All exercise mice increased force production with training. Adult mice increased normalized power with training, old mice did not.

Mean power production throughout training was greater in adult mice

Exercise mice improved performance, control mice did worse

This resistance training protocol mimics human voluntary weight training and is most similar to walking luges. Both adult and elderly mice responded favorably to the protocol by increasing force and improving performance. However, adult mice increased power throughout study, but the old mice did not.

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This study, and others, suggests that decreased power output in the elderly may partly be explained by decreased velocity (Macaluso & De Vito, 2003).

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