Study Title: Fatigability of Lower Limb Muscle in Older Adults: Protective Effects of Strength Training Exercise in Old Men and Women

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Experimental Protocol

To compare the effects of blood flow restriction (BFR) training and repetition-matched free-flow (FF) training on neuromuscular and cardiovascular function in older adults, we used a within-subject, unilateral design. One leg of each participant completed the BFR protocol, while the contralateral leg completed the FF protocol. This design reduced the confounding effects of the substantial interindividual variability in responses to resistance exercise training among older adults, although it precluded assessment of potential training-induced crossover effects between limbs. Protocol assignment was counterbalanced according to baseline maximal voluntary isometric contraction (MVC) to minimize the influence of initial strength differences between legs. Participants completed 8 weeks of training, with three sessions per week. During each session, the BFR leg performed two sets of 15 knee-extension repetitions followed by a third set to volitional failure. The FF leg performed the same number of repetitions as the BFR leg. To allow participants to become accustomed to the training stimulus, the first two sessions consisted of only two sets of 15 repetitions. Neuromuscular and cardiovascular outcomes were assessed before training and approximately 1 week after the final training session. Outcomes included knee-extensor muscle size, strength, power, and fatigability and vascular function at rest and during exercise.

Statistical Analysis

A two-way repeated-measures analysis of variance (ANOVA) was used to examine the effects of training protocol (within-subject factor: BFR vs. FF), time (within-subject factor: pre- vs. post-training), and their interaction. To determine whether these effects differed by sex, a three-way mixed ANOVA was performed, with sex as a

between-subject factor (men vs. women) and protocol and time as within-subject factors. Significant time × protocol and sex × time × protocol interactions were examined using Bonferroni-adjusted pairwise comparisons. ANOVA effect sizes are reported as partial eta squared (η_p^2).