Cover Page for ClinicalTrials.gov

Official Title of the Study:

Sex-specific Adaptation to Different Resistance Exercise Programs in Older Adults

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Our goal is to assess the main effects of training (traditional low-velocity, high-load resistance training and high-velocity, low-load power training versus baseline) and sex and determine if training alters muscle function differently in men and women (training by sex interaction). Primary outcomes include: (1) whole muscle: peak isometric torque and isokinetic power; (2) cellular: single fiber specific force, velocity, power; (3) molecular: myofilament stiffness (A-elastic), myosin rate of force production, myosin attachment time (t_{on}). We will model the data from this project with linear mixed models. This class of models is appropriate since it models the intra-participant correlation that is anticipated to result from the repeated measurements on each person, both multiple fibers and training protocols. This model and associated testing procedures such as likelihood ratio tests and large sample confidence intervals for coefficient contrasts will allow us to assess the main effects (treatment effects and sex effects) and their interactions. It also can accommodate other covariates, such as muscle size, if necessary. The analyses will be done in R and will use the lme4 library for linear mixed models. Transformations to normality, adjustments for multiple testing, and assessments of the linear assumptions will be done as appropriate. Additionally, we will examine correlations among functional parameters at different anatomic levels to determine whether cellular and molecular phenotypes relate to whole muscle parameters.