Impact of High and Low Velocity Muscle Contraction on Myosin Heavy Chain mRNA and Protein Expression in Conjunction with Muscle Performance in the Elderly

**Help in discovering what type of resistance training is best suited for older adults!**

Dr. Warren Franke and Davis Englund in the Department of Kinesiology are recruiting people who are at least 60 years of age to participate in a research study assessing whether resistance training (weight lifting) at faster movement speeds is more effective than resistance training at slower speeds. Weight lifting at slower speeds is more commonly done, but some research suggests that training at higher speeds may be more effective for older adults. The impacts of the varying movement speeds will be assessed through muscular strength and functional tests (as described below). The purpose of this study is to determine if movement speeds can affect adaptations within the trained muscle. Only the thigh muscles will be trained in this study.

Participants will benefit directly due to increased levels of physical activity and the potential to increase muscle strength and/or size. The benefits to society from attaining this information is it will help in developing exercise training programs which have an increased potential to slow or reverse some of the risks associated with aging (i.e., sarcopenia). If we can demonstrate that muscles respond more favorably to certain movement speeds, practitioners can prescribe more specific and effective training guidelines to older individuals.

We ask that you do not participate in this study if you have any preexisting conditions that could inhibit successful participation in the exercise program, such as cardiovascular disease, musculoskeletal disorders, neurological, or cognitive impairment. We also ask you do not participate if you have taken part in highly intense sport-oriented training within the past month, and that you do not partake in lower body resistance training for the duration of the study. You will be asked to maintain levels of prior physical activity for the duration of the study. If you miss 6 of the 24 training sessions, you will no longer be allowed to participate in the study.

If you agree to participate, you will be randomly assigned to either a high or low speed resistance training group. Resistance training, or “weight lifting”, is ordinarily the act of repeating movements against a weight greater than those normally encountered in activities of daily living. You will complete 8 weeks of resistance training which will target the thigh muscles. In this study, thigh muscles will be targeted though extending ones leg at the knee joint (or moving the lower leg away from the body) using high tech resistance training equipment. Resistance training of the thigh muscles will be performed at either a high or a low speed, depending on group assignment. This training will taking place 3 times a week, with each session lasting approximately 30 minutes. Strength and functional testing will take place on the first and last day of the 8 week protocol. Strength testing will determine the maximal strength of your thigh muscles, or how “strong” those muscles are. Functional testing will be used to determine your ability to carry out activities of daily living (e.g., how quickly you can walk 10 meters). Muscle
biopsies of the thigh will be performed both before and at the conclusion of the training protocol. You will also be encouraged to attend a familiarization session 3-7 days before the start of exercise in order to become comfortable with the training program and environment.

You will be assigned an identifier code to be used during all data collection. No references will be made to individuals in any presentations of publications resulting from this study.

Compensation for participating is valued at $190 (2 semesters of membership in The Exercise Clinic: $120, fitness assessment: $70). You will be given this upon completion of the study. If you do not complete the study, you will be awarded a pro-rated membership to the Exercise Clinic.

Your participation in this study is completely voluntary and you may withdraw from the study at any time without penalty by notifying the Principle Investigator or other key personnel listed below.

**Principle Investigator**
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If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office for Responsible Research, Iowa State University, Ames, Iowa, 50011