Principal Investigator

Ankle assistance and resistance in older adults

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Statistical Analysis Plan

Functional outcomes of interest were (1) plantarflexor muscle strength, (2) habitual walking speed, (3) fastest walking speed, (4) six-minute walk test distance, and (5) the cost of transport (COT). For the six minute walk test, participants walked back-and-forth between the two cones spaced 15-meters apart while an investigator followed behind them with a distance measuring wheel (ML1212, Komelon, Waukesha, WI). Before beginning, the task was described to the participants, and they were told 'Let's see how far you can get in six minutes'. This test was performed one time to avoid participant fatigue, with the final distance, in meters, recorded as the outcome measure of interest.

To calculate the COT, we first calculated the metabolic power of the standing baseline and walking periods using Brockway's standard equation. Net metabolic power was then calculated by subtracting the standing baseline's metabolic power from the average metabolic power from the last two-minutes of treadmill walking and normalizing by participant body mass. Finally, cost of transport was determined by normalizing net metabolic power by the participant's treadmill walking speed.

Following the warm-up period, individuals performed maximum voluntary isometric contractions of the ankle plantarflexors while lying in a supine position by pressed their foot into a handheld dynamometer (microFET2, Hoggan Scientific, Salt Lake City, UT) that recorded the peak force, in newtons. While the individual was lying supine, a member of the research team held their knee to prevent flexion upon contraction of the plantarflexors. The test was performed once as a practice to familiarize the participant with the task and ensure no discomfort, followed by three bouts for each leg with adequate rest (determined by the user) between each bout. The average force across both legs was calculated and normalized by participant body mass.

Statistical Analyses

All statistical tests were performed in SPSS (IBM, Armonk, NY). Two-tailed paired t-tests with a fixed significance level of $\alpha = 0.05$ were used to compare strength, functional mobility, and energetic outcomes between the pre- and post-assessment visits. Prior to conducting the test, the assumptions of the test, namely normality and presence of outliers in the differences between assessments, were checked via Shapiro-Wilk tests and by plotting the data against a box plot with interquartile ranges. In instances where violations of the assumptions occurred, Wilcoxon signed-rank tests were utilized to assess the data.