

Interaction between age and fatigue on antagonist muscle coactivation during an acute post-fatigue recovery phase

ELIZABETH CAFFERTY¹, SARA A. HARPER^{1,2}, & BRENNAN J. THOMPSON^{1,2}

¹Department of Kinesiology and Health Science; Utah State University; Logan, UT

²Sorenson Legacy Foundation Center for Clinical Excellence; Dennis Dolny Movement Research Clinic; Utah State University; Logan, UT

Category: Masters

Advisor / Mentor: Thompson, Brennan J. (Brennan.thompson@usu.edu)

ABSTRACT

PURPOSE: This study investigated the age-related changes in antagonist muscle coactivation of the biceps femoris (BF) during an acute recovery period following a leg extensor fatiguing protocol. **METHODS:** Twenty-three young (mean±SD: age=25.1±3.0 years) and twenty-three old men (age=71.5±3.9 years) participated. Surface electromyography (sEMG) was recorded from the BF muscles for antagonist muscle coactivation. Testing involved participants performing leg extension isometric maximal voluntary contractions (MVCs) and isokinetic MVCs at 240°·s⁻¹ at baseline (Pre) and again after the fatigue protocol at 0 (Post0), 7 (Post7), 15 (Post15), and 30 (Post30) minutes post fatigue. Root mean square (RMS) values were computed from the BF sEMG and were calculated as the first 200ms from onset for the isometric (IsomCoact200ms) and dynamic isokinetic 240°·s⁻¹ (DynCoact200ms) MVCs, and for the final 10° of the leg extension (DynCoact10°) on the isokinetic 240°·s⁻¹ MVCs. Two-way ANOVAs (age group [young vs. old] × time [Pre vs. Post0 vs. Post7 vs. Post15 vs. Post30]) suggests that DynCoact200ms had an effect for time (p=0.018), with greater antagonist coactivation in Pre than Post0 (p=0.009) and recovering by Post7 (p=0.011) with no group differences. **RESULTS:** DynCoact10° exhibited a non-significant interaction (p=0.070), such that the young group exhibited an effect of time (p=0.017), with Post0 being lower than other time points but no effect for time for the old group (p=0.566). **CONCLUSION:** Following a fatiguing bout, DynCoact10° may be a more sensitive variable for capturing antagonist coactivation fatigue responses, and this finding may indicate older adults could have an impaired feedback mechanism in fatigue-induced dynamic movement tasks.