TACSM Abstract

A Comparison of Techniques for Decomposing Surface Electromyography Signals During High-Intensity Contractions a Preliminary Analysis

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ABSTRACT

Advancements in surface electromyography (sEMG) have led to discrepancies in identification of high-threshold motor units (MU) following signal decomposition **PURPOSE:** To examine the differences in MU firing behaviors recorded from two separate sEMG sensors following respective decomposition analysis. **METHODS:** Following 2 maximal voluntary contractions (MVC), ten (23 ± 3 yrs.; 178.64 ± 5.82 cm; 177.8 ± 17.37 kg) lower body resistance trained males performed a 10 sec submaximal (50%) isometric ramp contraction of the knee extension exercise. Signals were recorded from the vastus lateralis and separately decomposed into their constituent MU action potential trains, then further validated for subsequent analysis of firing behaviors. The slope and *y*-intercept were calculated between recruitment threshold versus mean firing rate (RT/MFR). Two separate paired samples *t* test were used to compare differences in regression coefficients for RT/MFR relationships between sensors, and differences in RTs of validated MUs during $50\%_{MVC}$. **RESULTS:** There were significant differences in RT/MFR coefficients between the two sensors ($p < 0.05$), as well as, respective RTs from the identified MUs ($p<0.05$) **CONCLUSION:** We are uncertain as to what led to the differences between the two sEMG systems (decomposition algorithms, validation techniques, application area, etc). It is feasible that the substantial difference in yield (i.e. number of validated MUs), possibly due to different validation criteria, affected the outcomes. Thus, further studies should examine the effects of manual editing validation process on the end results.