MAGNITUDES OF MUSCLE ACTIVATION OF SHOULDER COMPLEX AND SPINE STABILIZERS DURING ROWING EXERCISES USING A SUSPENSION STRAP TRAINING SYSTEM


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Background and Purpose: Suspension training systems may be effective when strengthening persons with scapular dyskinesis or subacromial impingement syndrome (SIS) using body weight resistance and unstable conditions. The purpose of this study was to quantify muscle recruitment with surface electrode electromyographic (EMG) analysis during three rowing conditions.

Methods and Measures: Surface EMG data were collected and analyzed for 14 male and 14 female participants during three rowing exercises: low row (LR); high row (HR); and horizontal abduction row (HAR). Thirteen right-sided muscles were analyzed at a sampling frequency of 1000 Hz. Maximal voluntary isometric contractions (MVIC) were established for normalization purposes. Subjects completed three repetitions per exercise in random order.

Analysis: Data were compared among the three exercise conditions using repeated measures ANOVA. Post hoc comparisons of EMG recruitment for statistically significant ANOVAs were conducted with Bonferroni corrections.

Results and Conclusion: For HR and HAR exercise conditions the upper, middle, and lower fibers of the trapezius and posterior deltoid demonstrated very high (>60% MVIC) muscle recruitment. Both HR and HAR exercise conditions demonstrated high (40%-60% MVIC) muscle activation in the upper erector spinae. In contrast, the LR exercise only demonstrated high EMG activation for the middle trapezius, latissimus dorsi, and posterior deltoid.

Implications: Our data suggest both HR and HAR exercise conditions using the TRX® suspension system promote muscle strengthening (>50% MVIC) in upper, middle, and lower fibers of trapezius, posterior deltoid, and upper erector spinae. These exercises may be indicated in patients with scapular dyskinesis and SIS.