

MAGNITUDES OF RECRUITMENT OF SPINAL STABILIZERS AND SHOULDER COMPLEX MUSCLES DURING AN INVERTED ROW USING A PORTABLE PULL-UP DEVICE AND BODY WEIGHT RESISTANCE

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Background and Purpose: Physical therapists prescribe exercise procedures to train back, trunk, vertebroscapular, posterior shoulder, and arm muscles. Our purpose was to record muscle recruitment/activation of these muscles during an inverted body weight row using a commercially available portable pull-up device.

Methods and Measures: Surface electromyographic (EMG) analysis was carried out on 13 male and 13 female subjects while performing 4 inverted row exercises: 1) forearms pronated both feet weight-bearing (WB); 2) forearms supinated both feet WB; 3) forearms pronated one leg WB; and 4) forearms supinated single leg WB. Nine muscles from the right side were analyzed: upper trapezius (UT), middle trapezius (MT), lower trapezius (LT), biceps brachii (BB), rectus abdominus (RA), longissimus thoracis (LTh), lumbar multifidus (LM), latissimus dorsi (LD), and posterior deltoid (PD).

Analysis: Data from each muscle were examined separately with a repeated measures analysis of variance (ANOVA) at $\alpha = .05$. Post hoc comparisons of the magnitudes of EMG recruitment across exercises for statistically significant ANOVAs were conducted with Bonferroni corrections for multiple comparisons.

Results: The LD showed greater activation during supinated double limb WB (94% MVIC) than pronated double limb WB (79% MVIC). The UT showed greater activation during pronated single leg WB (67% MVIC) than supinated single leg WB (56% MVIC). There were no statistically significant differences in muscle activation between single and double leg WB in all muscles analyzed.

Conclusion: Four muscles (BB, LD, LT, and PD) demonstrated very high (> 61% MVIC) EMG activation during all four exercise conditions. Three muscles (UT, MT, LM) demonstrated high (41% - 60% MVIC) recruitment, whereas two muscles (LTh and RA) demonstrated moderate (21- 40% MVIC) recruitment.

Implications: Four inverted row exercises activated the LD, UT, MT, LT, and BB at levels conducive to strengthening. The RA, LTh, LM and MT were activated at levels conducive to endurance training.