ELECTROMYOGRAPHIC ANALYSIS OF THE CONVENTIONAL STYLE DEADLIFT MUSCLE ACTIVATION COMPARED TO FOCUSED MUSCLE ACTIVATION

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Background and Purpose: The deadlift exercise has been used in the rehabilitative process and athletic arena to improve muscle strength and stability. The deadlift is considered a multijoint exercise whereas the biceps curl is considered a single joint exercise. Both exercises have their place in the rehabilitative process and in the functional improvement of individuals in sport-specific activities. Further study of these exercises will allow clinicians to maximize the rehabilitative process when strengthening is required and also provide athletes with information to select the most effective exercise for their sport. Investigators have recommended muscle activation levels greater than 50-60% maximum voluntary isometric contraction (MVIC) promote muscle strength gains.

Methods and Measures: Surface electromyographic (EMG) analysis was carried out on twelve muscle groups on 12 healthy subjects while performing five exercises: (1) conventional deadlift, (2) biceps curl, (3) pull-up, (4) shoulder shrug and (5) abdominal crunch.

Analysis: Muscles were examined independently with the Friedman ANOVA by ranks test ($\alpha = .05$). When the Friedman test was significant Wilcoxon signed ranks tests were used to examine pairwise comparisons of the magnitude of EMG (% MVIC) recruitment during the deadlift exercise and the focused muscle exercises with Bonferroni corrections for multiple comparisons.

Results: In the deadlift exercise, the mean 50% MVIC was exceeded in 7 of 12 muscles. In the pull-up exercise, latissimus dorsi ($p<.05$) biceps brachii ($p<.05$), and rectus abdominus ($p<.05$) exceeded deadlift activation. In the abdominal crunch, rectus abdominus ($p<.01$) exceeded deadlift activation. In the shoulder shrug, upper trapezius ($p<.01$) exceeded deadlift activation. In the biceps curl, biceps brachii ($p<.01$) exceeded deadlift activation.

Conclusions: The deadlift simultaneously recruits multiple muscle groups at a level conducive to strengthening. However, when compared to the deadlift, focused muscle activation may be superior for activating isolated muscle groups.

Implications: Clinicians can maximize efficient strength training by prescribing the deadlift in healthy individuals.