

Comparison of Muscle Activation during an Overhead Press: Kettlebell v. Dumbbell

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Though little scientific evidence has been reported, kettlebells are often used to replace dumbbells during common resistance exercises. In reviewing the mechanics of the overhead press exercise, it was surmised that the kettlebell's center of gravity is located posterior to the glenohumeral (GH) joint. The location of this center of gravity may place additional external rotation torque on the GH joint as compared to a dumbbell.

PURPOSE: To examine if muscle activity is altered during the performance of an overhead press using a kettlebell vs. a dumbbell. **METHODS:** Surface electromyography (EMG) was conducted on 21 subjects (7 female, 14 male). The anterior deltoid (AD), a prime mover, and pectoralis major (PM), both superficial muscles that contribute to internal rotation of the shoulder, were chosen for examination. For consistency, the overhead press was standardized. Each subject performed a two second isometric hold followed by a two second concentric phase, two second eccentric phase, and one second isometric hold at the end. EMG data were normalized and an RMS value was calculated for use in the analysis. A repeated-measures ANOVA compared RMS values for the AD and PM across conditions (kettlebell press v. dumbbell press). **RESULTS:** A statistically significant increase in the RMS value (0.000388 ± 0.000185 v. 0.000423 ± 0.000187 ; $p=0.003$) was identified in the AD when performing the dumbbell press as compared to the kettlebell press. No significant difference (0.0000974 ± 0.000125 v. 0.0000756 ± 0.000033 ; $p=0.437$) was noted in the PM between conditions.

CONCLUSION: The results from this study support previous literature examining muscle activity using implements of varying stability. In this study, EMG activity was attenuated in the prime mover (AD) while using an implement that may require more stabilization, the kettlebell. This finding may be the result of a potential increase in recruitment of the muscles that stabilize the GH joint during overhead activity.