AN EXAMINATION OF MUSCLE ACTIVATION AND POWER CHARACTERISTICS WHILE PERFORMING THE DEADLIFT EXERCISE WITH STRAIGHT AND HEXAGONAL BARBELLS

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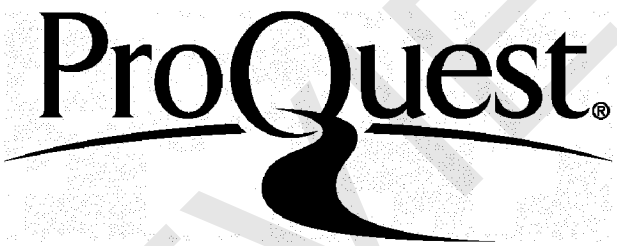

ABSTRACT

The deadlift exercise is commonly performed to develop strength and power, and to train the lower body and erector spinae muscle groups. However, little is known about the acute training effects of a hexagonal barbell vs. a sraight barbell when performing deadlifts. Therefore, the purpose of this study was to examine the hexagonal barbell in comparison to the straight barbell by analyzing electromyography (EMG) from the vastus lateralis, biceps femoris, and erector spinae, as well as peak force, peak power, and peak velocity using a force plate. Twenty men, with deadlifting experience volunteered to participate in the study. All participants completed a one-repetition maximum (1RM) test with each barbell on two separate occasions. Three repetitions at 65% and 85% 1RM were performed with each barbell on a third trial. The results revealed there was no significant difference for 1RM values between barbells. Significantly greater EMG values were found from the vastus lateralis for both the concentric and eccentric phases of the hexagonal vs. straight barbell deadlift, while the straight barbell deadlift led to significantly greater EMG values from the biceps femoris during the concentric phase and the erector spinae during the eccentric phase. In addition, the hexagonal barbell deadlift demonstrated significantly greater peak force, peak power, and peak velocity compared to the straight barbell deadlift. These results suggest that the barbells lead to different patterns of muscle activation, and that the hexagonal barbell maybe more effective at developing maximal force, power, and velocity.

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CHAPTER 1

INRODUCTION

The deadlift exercise is widely used by athletes of many sports, as well as recreational lifters, to enhance power and strength (20). The exercise is a multi-joint movement that activates several large muscle groups. Research has shown that, compared to other free weight exercises, the deadlift involves the lifting of heavier loads (1, 10). The ability to lift heavier loads elicits a larger stimulus to adapt making it ideal for enhancing muscular strength, which contributes to power (20). The movement requires grasping a barbell while in a squat position and then elevating the barbell by extending the hips, knees, and ankles. When the hips are fully extended the concentric portion of the movement has ended. The barbell traveling downward until it reaches the floor or starting position completes the eccentric portion of the deadlift. The movement begins with the barbell starting at the mid-leg level and should remain close to the leg, thighs, and hips as the barbell elevates (1). It is vital that the barbell remain close to the lower extremities throughout the lift in order to reduce the moment arm of the barbell at the individual joints, decreasing the resistance of the external load (7).

In comparison to other strength exercises, such as the bench press and squat, the deadlift has received comparatively little research interest (2, 4, 5, 9, 11, 13, 19). The majority of research examining strength and power exercises has examined the back squat. A common belief is the deadlift and back squat have similar movement patternsit