

Electromyographic Comparison Between the Rear-Foot-Elevated vs. B-Stance Unilateral Back Squat Techniques

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ABSTRACT

The Rear-Foot-Elevated back squat (RFE) and B-Stance (BS) are two unilateral back squat techniques with the latter commonly proposed as the more stable of the two. There is currently a lack of research comparing these two techniques with respect to neuromuscular demand and movement characteristics. **PURPOSE:** The purpose of this study was to examine the muscle activation differences via surface electromyography (EMG) between the RFE vs. BS unilateral back squat techniques with equated load. **METHODS:** Thirteen healthy college-aged, resistance-trained male (n=10) and female (n=3) subjects were recruited for this study. Subjects visited the laboratory on two occasions separated by 5-7 days. Visit 1 included descriptive measurements and one-repetition max (1RM) testing for the RFE back squat. For visit 2, subjects performed the RFE and BS unilateral squat techniques under a load of 85% of RFE 1RM. Electromyographic assessment of the external oblique (OBL), rectus femoris (RF), gluteus maximums (GM) and biceps femoris (BF) was administered during each technique and subsequently compared. **RESULTS:** A paired sample t-test was used to compare mean and peak normalized root mean square (RMS) EMG between the RFE and BS techniques. There was no significant difference in mean and peak eccentric, concentric, and total activation between the RFE vs. BS for the OBL and RF. For GM, mean and peak eccentric, concentric, and total activation was greater during the RFE vs. BS ($p < 0.05$). For BF, mean eccentric activation did not differ between the two exercises; however, mean concentric and total activation was greater in the RFE condition ($p < 0.002$). Also, peak eccentric, concentric, and total activation for BF was greater during the RFE vs. BS ($p < 0.001$). **CONCLUSION:** The RFE unilateral back squat technique elicited overall greater activation of the hip extensors, GM and BF vs. BS. Based on these findings, the two unilateral squat techniques are not interchangeable from a muscle activation perspective which should be considered when employing unilateral back squat variations in training or rehabilitation programs.