

# Trunk Position Influences Muscle Activity During Bulgarian

## Split Squat Exercise

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### INTRODUCTION

Knowing exercise variations that will ensure most effective activation of lumbo-pelvic-hip complex muscles is highly important in terms of achieving optimal performance and preventing injury.

The trunk position can lead to the emergence of different activation profiles for muscles by altering the load on the lumbo-pelvic-hip complex.

Thus, this study aims to explore whether trunk position affects muscle activation during Bulgarian split squat exercise.

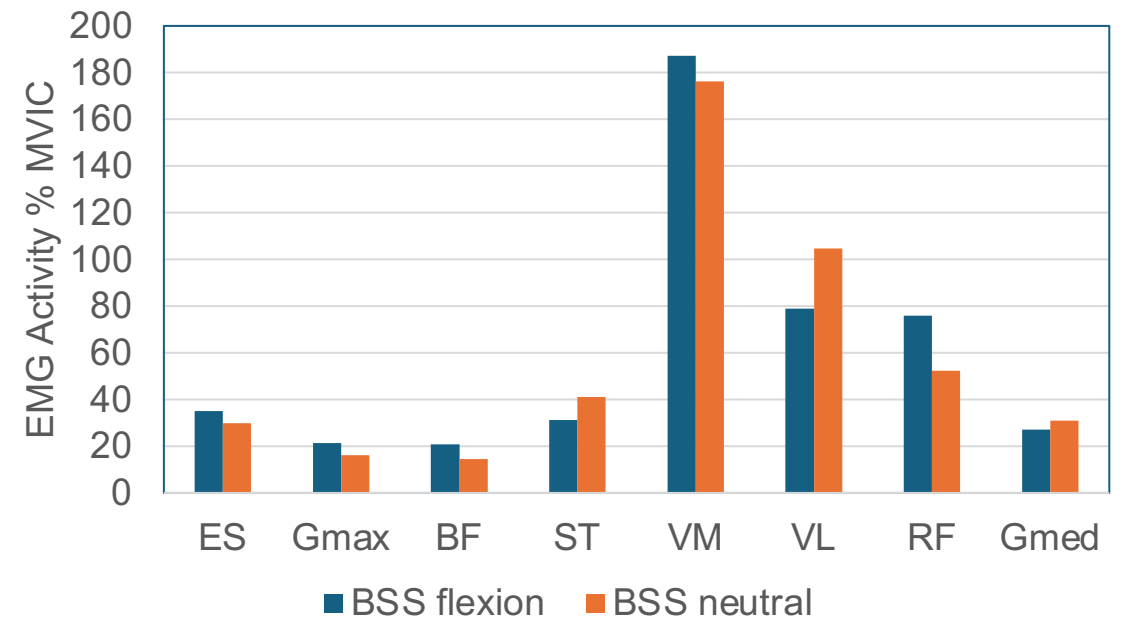
### METHODS



21 female athletes (mean  $\pm$  SD age,  $20.3 \pm 2.5$  years; mean mass,  $58.5.7 \pm 5.7$  kg; mean height,  $165.9 \pm 5.8$  cm) from different sports branches (badminton, boxing, flag football, football, kickbox, table tennis, and taekwondo) were included in the study.

The muscle activity of the gluteus medius (GMed), gluteus maximus (GMax), vastus lateralis (VL), rectus femoris (RF), vastus medialis (VM), semitendinosus (ST), biceps femoris (BF), and erector spina (ES) was measured by surface EMG.

### RESULTS



The study revealed that trunk position significantly influenced the activations of the GMax, BF, and RF muscles, with their activations increasing notably during trunk flexion ( $p < 0.05$ ). But the activations of GMed, VL, VM, ST, and ES were similar in both instances ( $p > 0.05$ ).

### DISCUSSION

In our study, GMax, BF and RF muscle activation were affected by trunk position, and activation was found to increase with trunk flexion.

In the literature, it has been stated that performing single-leg squat exercises with moderate trunk flexion ( $\sim 40^\circ$ ) can minimize loads on the knee joint. Therefore, training with trunk flexion during Bulgarian split squat exercises may be a more effective strategy in terms of muscle activation and knee loading. Especially if the target muscle groups are GMax, BF and RF muscles, trunk flexion may be added during exercises for strength and endurance development.

### KEY POINTS

- ✦ The progression in Bulgarian split squat variations can be achieved by trunk position based on individual requirements.
- ✦ If the target muscle groups are **GMax, BF and RF**, trunk flexion may be added during Bulgarian split squat exercises for progressive training.