



## THE EFFECT OF PELVIC INCLINATION ON NEUROMUSCULAR ACTIVATION OF SELECTED TRUNK, HIP AND LOWER EXTREMITY MUSCLES

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### **ABSTRACT BODY:**

**Purpose/Hypothesis:** To determine if the sagittal plane angle of pelvic inclination (PI) affects the neuromuscular activation strategy of selected trunk and lower extremity muscles in asymptomatic females, during a squat maneuver.

**Number of Subjects:** Two groups (n=7) of physically active females (mean age = 23.08  $\pm$  3.65 yrs., mean ht. = 165.71  $\pm$  6.57 cm., mean wt. = 66.97  $\pm$  15.78 kg.) selected by sagittal view PI were evaluated. The neutral pelvic position group, PI from 0-5° (mean = 4.11  $\pm$  1.09°). The anterior inclination group, PI > 10° (mean = 18.37  $\pm$  2.29°).

**Materials/Methods:** Subjects from both groups performed three trials of a functional squat with foot placement identical to that of the PI measure, at a controlled cadence (one second into flexion and one second into extension), through a specific knee range of motion of 0-60° as monitored by an electrogoniometer with visual feedback for the subject using an oscilloscope. The EMG data were analyzed assessing muscle onset latency reported in milliseconds (ms) and EMG amplitude values reported as mean normalized root means square in percent (%) for each of the six muscles, rectus abdominis, external oblique, erector spinae, gluteus maximus, rectus femoris and biceps femoris. Selected muscle amplitude ratios were also evaluated, to explore functional relationships between anterior and posterior muscle groups. The EMG muscle onset latencies and amplitudes were analyzed using a two way (group by muscle) factorial design with repeated measures on the last factor (ANOVA). The selected muscle amplitude ratios were evaluated using Student's t-test.

**Results:** No statistically significant differences were found for any of the variables, muscle onset latency, muscle amplitude or the ratio data.

**Conclusions:** These findings suggest that the position of the pelvis did not play a significant mechanical role in the neuromuscular recruitment of the trunk and lower extremity muscles during a controlled squat maneuver. Burst duration data indicated that most muscles were active during the entire squat maneuver suggesting that the task selection promoted a co-contraction behavior rather than the expected distinguishable bursting characteristics of a more demanding task.

**Clinical Relevance:** At this time, clinicians should be cautious of discarding the importance of the neutral pelvic position. Future research should repeat this study using a more demanding task.

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