Muscular Characteristics of Back Muscles at Different Pelvic Angle and Different Voluntary Contraction Strength

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**Purpose:** The purpose of this study was to analyze the effect of different pelvic alignment and voluntary contraction strength on electromyographic activity of the lumbar multifidus (LM) and erector spinae muscles (ES). In addition, we examined the activity of the LM in the absence of overactive ES.

**Methods:** Ten healthy men participated in this study. We studied the back muscles at 3 pelvic positions (moderate anterior tilt, neutral, and moderate posterior tilt) and 6 different voluntary contraction strengths (0%, 10%, 25%, 50%, 75%, and 100% maximum voluntary contraction: MVC). The participants performed a task that involved isometric contraction of the back muscles during pelvic anterior tilt in a prone position at the edge of the bed with the legs hanging. The main outcome measure was the normalized LM/ES ratio assessed by using surface electromyography for the right ES and right LM.

**Results:** The LM/ES ratio was more activated in the neutral position than in the moderate anterior and moderate posterior pelvic tilt position at 10% MVC. In neutral position, it was more activated at 10% MVC than 100% MVC.

**Conclusions:** The present findings suggest that the neutral pelvic positions with mild resistance facilitated lumbar multifidus activity in the absence of overactive ES.