

# Trunk Muscle Activation

## The Effects of Torso Flexion, Moment Direction, and Moment Magnitude

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**Objectives.** This study was performed to quantify the electromyographic trunk muscle activities in response to variations in moment magnitude and direction while in forward-flexed postures.

**Methods.** Recordings were made over eight trunk muscles in 19 subjects who maintained forward-flexed postures of 30° and 60°. In each of the two flexed postures, external moments of 20 Nm and 40 Nm were applied via a chest harness. The moment directions were varied in seven 30° increments to a subject's right side, such that the direction of the applied load ranged from the upper body's anterior midsagittal plane (0°) to the posterior midsagittal plane (180°).

**Results.** Statistical analyses yielded significant moment magnitude by moment-direction interaction effects for the EMG output from six of the eight muscles. Trunk flexion by moment-direction interactions were observed in the responses from three muscles.

**Conclusions.** In general, the primary muscle supporting the torso and the applied load was the contralateral (left) erector spinae. The level of electromyographic activity in the anterior muscles was quite low, even with the posterior moment directions. [Key words: coactivation, asymmetric loading, ergonomics, electromyography, trunk muscles, trunk flexion] *Spine* 1994;19:771-778