

Rapid Communication

**Trunk muscle activation and cocontraction
while resisting applied moments in a twisted posture**

STEVEN A. LAVENDER, YANG-HWEI TSUANG,*
and GUNNAR B. J. ANDERSSON

Department of Orthopedic Surgery
Rush-Presbyterian-St Luke's Medical Center,
1653 West Congress Parkway, Chicago, IL 60612, USA

* Department of Orthopaedic Surgery,
National Taiwan University Hospital, Taipei, Taiwan

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Previous studies of twisting have revealed substantial cocontraction of agonist and antagonist muscles within the torso when torsional moments are generated. The objective of the current study was to quantify the activations and cocontraction of eight trunk muscles as subjects maintained an axially rotated trunk posture and resisted external applied bending moments. Ten subjects twisted their torsos 25° to the right (clockwise) and resisted 20 and 40 Nm bending moments from 12 directions. The moment directions were in a transverse plane and labelled clockwise as viewed from above, ranging from 0° (mid-sagittal, anterior) to 330°, in 30° increments. RMS EMG amplitude data were collected using surface electrodes and normalized to maximal voluntary contractions. Significant changes were observed in the muscle responses due to the interaction of the moment direction and moment magnitude for six of the eight muscles tested. Comparison of the present data with that collected previously in neutral postures indicated: (1) a large increase in the activation levels of the right erector spinae and the left external oblique muscles; and (2) a counter-clockwise shift in the moment direction at which the peak activation of these same muscles occurs. Analysis of the relative activation levels (RALs), constructed from the NEMG data to quantify the cocontraction, indicated that the changes in cocontraction were more robust in response to changes in the bending moment's direction as opposed to changes in bending moment's magnitude.