

Reference: Wilhelm M, Learman K, Hooper T, James CR, Gilbert K, Brismée JM, Cook C, Sizer PS. The Effect of Low Back Pain History on Multifidus Co-contraction During Common Lumbosacral Voluntary Stabilizing Contractions

Context: Individuals who experience low back pain (LBP) are four times more likely to experience another episode within the next year. Low back pain has been shown to relate to multifidus (MF) changes, increasing the likelihood of pain reoccurrence. The abdominal drawing in maneuver (ADIM) and abdominal bracing maneuver (ABM) are two strategies used in hopes to prevent LBP reoccurrence.

Objective: To determine the effect of a LBP history (HxLBP) on deep (DMF) and superficial (SMF) MF co-contraction during ADIM, ABM and resting. Additionally, this study aimed to determine if DMF and SMF fibers demonstrate different co-contraction patterns during the ADIM and ABM.

Design: Quasi-experimental repeated-measures design (2017-2018) in a university laboratory.

Participants: A convenience sample of 30 HxLBP subjects and 30 age and sex-matched subjects without a recent history of LBP.

Interventions: Subjects completed three trials each of ADIM, ABM, and resting in standing and quadruped positions.

Main Outcome Measures: Root mean square EMG activity of the DMF and SMF.

Results: ANOVAs revealed no significant differences between HxLBP and healthy controls. Significant differences in co-contraction activity were observed when comparing DMF and SMF during standing ADIM ($p=0.04$), quadruped resting ($p<0.001$), and quadruped ADIM ($p=0.022$). These differences were not significant during standing resting ($p=0.339$), standing ABM ($p=0.079$), and quadruped ABM ($p=0.111$). Within both groups, the ADIM and ABM resulted in significantly greater MF activity than the resting condition in standing and quadruped positions ($p<0.001$). No differences in MF co-contraction were identified between the ADIM and ABM conditions in either position. In the HxLBP group, multifidus co-contraction was significantly greater in standing than quadruped during all three contraction conditions.

Conclusion: Subjects with a HxLBP can use both ADIM and ABM strategies to facilitate MF contraction similar to individuals without a recent history of LBP. During the ADIM and ABM, DMF and SMF co-contrast in subjects with and without a recent history of LBP. Neither contraction strategy facilitated greater MF co-contraction than the other. Abdominal contractions in standing resulted in greater MF co-contraction versus the same in a quadruped position.