

Effect of Volitional Preemptive Abdominal Contraction on Superficial Multifidus Response During Unipodal Lower Extremity Reach Task in Healthy Subjects. Drusch A, Garcia L, Kunkel B, Hooper T, Kublawi M, Brismee J, Yang H, Sizer P.

Context: Low back pain has a profound effect on daily activities of many Americans. To facilitate the rehabilitation process, improvements in muscle activation patterns during functional activities is warranted.

Objective: The determine the effect of volitional preemptive abdominal contraction (VPAC) on abdominal and superficial multifidus activation during a lower extremity (LE) unipodal functional task in healthy subjects. Subjects either used an abdominal bracing maneuver (ABM), abdominal drawing in maneuver (ADIM), or no VPAC while performing the Y-balance test (YBT).

Design: Within-subjects, repeated measure cohort design; 2015-2017.

Setting: Clinical laboratory setting. Subjects recruited from the local community.

Participants: Convenience sample of 30 healthy individuals, ranging 20-41 years ($x = 27.2$ yrs).

Intervention: Surface electromyography data was recorded on subjects' L5 superficial multifidus (Mf) and obliques while performing the YBT in the anterior (ANT), posteromedial (PM), and posterolateral (PL) directions, using either ABM, ADIM, or no-VPAC.

Results: One-way ANOVAs showed there was a significant main effect for VPAC strategy for both IO and EO activation in all YBT directions ($p < .05$). The 2(Mf side) x 3(VPAC) repeated measures ANOVAs found a significant interaction between Mf side and VPAC strategy in the PM ($p = .002$) and PL ($p = .003$) directions, favoring stance side Mf. Pearson r correlation analyses revealed no Mf activation and YBT reach distance relationship.

Conclusion: In addition to producing an abdominal co-activation, healthy subjects used VPAC to produce improved superficial Mf activation in the PM and PL YBT directions, most significant on the stance side. No relationship was found between trunk activation and YBT reach distances. These findings will help rehabilitation professionals understand the role abdominals and multifidi play during unipodal functional reaching activities.