ABSTRACT

Background: Patients with non-specific low back pain (LBP) often present with a decrease in transversus abdominis (TrA) muscle activation and delayed onset of contraction with extremity movements, potentially contributing to recurrent LBP. Core stability is required for extremity movement and if the timing of when the TrA contracts is not corrected patients may continue to experience LBP.

Hypothesis/Purpose: The purpose of this study was to assess the effects of a four-week core stability rehabilitation program on TrA activation ratio and when the TrA initiates contraction during upper extremity movements in subjects with and without LBP. It was hypothesized that those with LBP would experience greater changes in TrA activation and onset of contraction by the TrA compared to the healthy group.

Study Design: Randomized Clinical Trial

Methods: Forty-two participants volunteered (21 healthy and 21 LBP). Ultrasound imaging measured the TrA activation ratio and time of initial contraction of the TrA during upper extremity movement into flexion. Half of the healthy and LBP participants were assigned to the exercise group. Participants reported twice a week to the athletic training facility to complete an exercise progression of three exercises. After four weeks, all participants returned to have TrA activation and timing measured again.

Results: Pertaining to demographics, there were no differences between the healthy and LBP participants. There was a group interaction for both TrA activation ratio (p = .049) and onset of initial contraction (p = .008). Those in the exercise group showed an increase in TrA activation ratio (1.85 ± 0.09) compared to the control group (1.79 ± 0.08), as well as an improvement in the onset of contraction (2.07 ± 0.08 seconds) compared to the control group (2.23 ± 0.09 seconds) after the four-week rehabilitation program. Strong effect sizes for TrA activation ratio (0.71 [0.06-1.35]) and initial onset of TrA contraction (-1.88 [-2.63 - -1.11]) were found indicating clinical differences related to the interventions.

Conclusion: TrA activation and timing were altered following a four-week core stability program in people with and without LBP. Clinicians should consider incorporating these exercises for improving the function of the TrA.

Level of Evidence: Therapy, level 2b

Key words: core stabilization exercises, low back pain, ultrasound imaging

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