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Commentary

# Getting Off the Mat: Lumbar Stabilization Training in Standing Using Ultrasound Imaging

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## DESCRIPTION

The Abdominal Drawing-In Maneuver (ADIM) has been explained as the optimal method for activation of the transverses abdominus (TrA) muscle, whose importance in controlling motion (stabilizing) of the lumbar spine is well-known. The ADIM is boilerplate physiotherapy exercise in a traditional stabilization program for Low Back Pain (LBP) patients and is often one of the first exercises instructed to patients in a lumbar stabilization exercise program prior to exercise progression in non-weight bearing and then in weight bearing. Bio feedback has been recommended for low back pain patients with impaired activation of the TrA. Ultrasound Imaging (USI) visualizes the "corset-like action" or lateral sliding and thickening of the TrA muscle during activation of TrA. With USI utilization in physiotherapist practice, patients are able to see changes in their TrA cross-sectional area, and clinicians are able to assess the muscle recruitment pattern. The USI visualization is important for us, because in our experience many clients initially believe they are proficient with "core activation" until they are able visualize their incorrect muscle activation pattern. This training of the TrA has been shown to improve pain and function in patients with chronic LBP. The success of ADIM training programs in healthy adult populations during functional loaded tasks has developed since such exercising may also lead to injury prevention of LBP. Acquiring correct lumbar stabilization is typically verified by eliminating the visual USI feedback while doing the same exercise maneuvers to evaluate kill retention, or another task to assess skill transfer. Historically, supine hook lying postures and exercises were chosen for initial spinal position during ADIM training and skill acquisition. This was so as to enhance ease of performance and acquisition. However, both the TrA and the internal oblique muscles are noted to increase in thickness in response to the weight-bearing tasks over nonweight bearing tasks. Additionally, acceptable reliability has been shown for USI measurement of TrA muscle thickness, and thickness changes taken during loaded and functional activities. This is important as reliable USI measures of TrA muscle thickness changes meet the continuing necessity for clinician knowledge of correct and appropriately intense muscle activation in the clinical setting to assist progression of lumbar stabilization exercises. Considering that adults on a daily basis typically perform tasks such as an extended forward reach with a weighted object, which proves to be problematic to those with clinical lumbar instability, we included this task in our recent experimental protocol of ADIM acquisition in healthy subjects. Minimal time was required for the ADIM training, and the ADIM technique, taught in the supine position, translated into use of this technique during upright loaded functional tasks (e.g. lifting a weighted box, holding a weighted object with arms extended) for at least five months without any monitoring of compliance. Additionally, both goal setting and augmented feedback may be combined. Here for example, the client is provided with a goal to increase TrA contraction by a specific amount and estimates whether or not this goal was met following task performances. Based on our findings of upright training of ADIM in healthy subjects, we recommend moving beyond the traditional non-weight bearing initialization of stabilization exercises as soon as possible for the patient. The application of motor learning principles and use of retention and transfer of learning testing will be vital in design and analysis when creating injury prevention programs for healthy adults. Finally, we believe training programs that adhere to motor learning principles may help to alleviate compliance issues if enough task appropriate practice is incorporated in training and community programs. This will help to ensure clients reach the point where ADIM technique is incorporated automatically in their activities of daily living.

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