The Influence of Lumbopelvic Function on Perceived Ankle Instability in Individuals with Chronic Ankle Instability

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Introduction

- Individuals with chronic ankle instability (CAI) display impairments via patient-reported outcomes (PROs).
- Often, CAI results in reduced self-reported function via the Foot and Ankle Ability Measure (FAAM), increased fear injury-related fear via the Tampa Scale of Kinesiophobia (TSK-11), and Fear-Avoidance Beliefs Questionnaire (FABQ), and reduced balance ability via the Self-Efficacy of Balance Scale (SEBS).
- However, the relationship between impaired PROs and clinician-oriented outcomes have yet to be explored in individuals with CAI.
- Hip and trunk neuromuscular impairments have been considered as critical factors that can cause decreased postural stability and malpositioning of the lower extremity in those with CAI.
- Identifying the relevance between reduced lumbopelvic function and impaired sensory-perceptual outcomes might direct clinicians to novel methods of improving perceived ankle function and reducing fear in patients with CAI.

Methods

- We recruited 33 individuals with CAI (F:18, M:15, ±3.4yrs, 169.8±8.4cm, 77.4±13.4kg)
- Participants completed the following PROs at the beginning of a single laboratory session:
  - Foot and Ankle Ability Measure - Activity of Daily Living (FAAM-ADL) & Sport (FAAM-S)
  - Tampa Scale of Kinesiophobia (TSK-11)
  - Fear-Avoidance Beliefs Questionnaire - Work (FABQ-W) & Physical Activity (FABQ-PA)
  - Self-Efficacy of Balance Scale (SEBS)
- We assessed transversus abdominis (TA, Figure 1) & lumbar multifidus (LM, Figure 2) contractility with a Sonosite M-MSK Portable Diagnostic Ultrasound unit and linear-array transducer (FUJIFILM Sonosite, Inc, Bothell, WA)
- Mean thickness was calculated for 3 trials at rest and 3 trials in a contracted condition
- A percent change in contraction thickness between rested and contracted conditions was computed: \( \frac{\text{mean}_{\text{contracted}} - \text{mean}_{\text{rested}}}{\text{mean}_{\text{rested}}} \times 100 \)
- Each participant completed a single trial of four lumbopelvic stability tests (Figures 3-6).
- Each participant completed 3 trials of 3 isometric hip strength tests (Figures 7-9). Hip extension, abduction, and external rotation were measured using a hand-held dynamometer.
- Statistical analysis:
  - Pearson product moment correlations were used to identify the relationship between lumbopelvic function and patient-reported outcome scores.
  - Separate backward linear regression analyses assessed the degree of each PRO score variance explained by the tests of lumbopelvic function.
  - Alpha was set a priori at P<0.05.

Results

- The side plank endurance test was moderately correlated with the FAAM-ADL. The linear regression model indicated that the side plank endurance test explained 20% of FAAM-ADL (r=.451, R²=0.20, P<0.01).
- The isometric hip abduction strength was moderately correlated with the SEBS. The linear regression model indicated that the isometric hip abduction strength explained 29% of SEBS (r=.540, R²=0.29, P<0.01).
- No other significant relationships between lumbopelvic function (trunk muscles contractility, lumbopelvic stability, and isometric hip strength) and ankle-specific PROs were identified.
- No other significant relationships between lumbopelvic function (trunk muscles contractility, lumbopelvic stability, and isometric hip strength) and PROs regarding fear of movement or re-injury were identified.

Conclusions

- Our data suggests that deficits in hip abductor function are related to low levels of perceived ankle function and balance self-efficacy in individuals with CAI.
- Hip strengthening exercises have previously resulted in improved isometric hip strength, balance performance, and self-reported function in individuals with CAI.
- Therefore, patients may benefit from rehabilitation that includes a concentration on lumbopelvic stability and strength of hip abdution, as it may help address reduced patient-reported function as well as perceived postural impairments in individuals with CAI.

Purpose

To examine the relationship between lumbopelvic function and PROs that assess self-reported function, balance self-efficacy, kinesiophobia, and fear avoidance beliefs in individuals with CAI.

References