Ankle Joint Laxity Correlates with Self-Reported Function in Persons with Chronic Ankle Instability

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ABSTRACT INTRODUCTION:
Disability related to chronic ankle instability (CAI) has contributions from both mechanical and functional impairments. Recent literature suggests the need for multi-factorial approaches to understanding this pathology, with emphasis to include measures of patient-reported disability. Mechanical impairments (MI) can be quantified through measures of ligamentous integrity and laxity. Clinical examination is useful, but mostly subjective. Arthrometer affords objective quantification of MI in the ankle and correlates well with radiography and clinical exam tests. Self-reported function can indicate the level of disability related to CAI. While many instruments have been used to quantify ankle disability, the Foot and Ankle Disability Index (FADI) and the FADISport scales have been shown to be reliable and appropriate for assessing functional disability in individuals with recurrent ankle instability. While both relate to CAI, it is still unknown to what extent MI and self-reported disability influence each other. Understanding this relationship may help to explain the contributions to and consequences of recurrent ankle pathology. Therefore, the purpose of this investigation was to determine if MI, represented with measures of ankle arthrometry, and self-reported disability, represented by the FADI and FADISport, were correlated in individuals with CAI.

METHODS:
Twenty participants with unilateral CAI (13F/7M, 20.85±1.50 years, 171.01 ±11.22 cm, 67.95±11.63 kg) volunteered for this study. All read and signed a university IRB approved consent form. Participants had a history of at least 1 significant lateral ankle sprain, and at least two episodes of the affected ankle giving way/feeling unstable in the previous 3 months. Additionally, they had to score less than 90% on the Foot and Ankle Disability Index (FADI) or less than 80% on the FADISport scale. The FADI consists of 26 questions pertaining to a variety of activities of daily living that ask the participant to rate their level of disability in performing these tasks. The FADISport includes 3 questions that ask the participant to rate their disability during performance of more demanding physical activities. The FADI and FADISport are reported as percentage scores, with less than 90% and less than 80% on the FADISport used to represent CAI. Participants reported to the research laboratory for a single session during which ankle joint laxity was assessed in anterior/posterior displacement (A/P) and inversion/eversion displacement (I/E) using an instrumented ankle arthrometer interfaced with a laptop using custom software. The participant was seated on a plinth with the knee and lower limb secured to the plinth. The arthrometer was secured to the foot, ankle and lower leg with the ankle positioned in sagittal plane and frontal plane neutral (Figure 1). Three trials of A/P (mm) and I/E (degrees) displacement were assessed on the injured limb of the CAI group. A/P laxity was measured with 125 N force, while I/E laxity assessment was conducted at 4 N-m. For both measurements, higher values indicate a greater amount of laxity in that direction of motion. The means from the trials of laxity assessments were used for statistical analysis. Additionally, the FADI and FADISport scores were used to represent disability. Non-parametric correlations (Spearman’s rank) were performed to examine the relationships between the A/P laxity, I/E laxity, FADI and FADISport scores. Statistical significance was set at P <.05.

RESULTS SECTION:
For the FADI scores, correlation coefficients were not statistically significant with A/P laxity (Spearman’s ρ = -0.243; P = 0.30) or I/E laxity (Spearman’s ρ = 0.080; P = 0.74). For the FADISport scores, correlation coefficients were statistically significant with A/P laxity (Spearman’s ρ = -0.532; P = 0.016), but not statistically significant with I/E laxity (Spearman’s ρ = -0.103; P = 0.67).

DISCUSSION:
Ankle laxity measures were correlated significantly with self-reported measures of physical activity; but were not correlated with self-reported measures of activities of daily living. The laxity measures were negatively correlated with the FADISport, indicating that when laxity scores increased, the FADISport scores decreased, and therefore the level of self-reported function decreased. Specifically, of the two measures, only A/P laxity was significantly correlated. The A/P laxity assessment with the arthrometer mimics an Anterior Drawer test, often performed in clinical examinations, which stresses the anterior talofibular ligament. It appears that laxity in this direction is correlated significantly with diminished self-reported function during physical activity. Laxity measures were not correlated with the assessment of self-reported function during activities of daily living. Perhaps more benign tasks do not create demand on the ankle joint such that CAI patients did not perceive a limitation on their function. In conclusion, if A/P laxity and self-reported function are significantly and negatively correlated, perhaps clinicians should focus efforts to correct deficits in ankle laxity in order to improve the self-reported function of their patients. Previous research has advocated for a multifactorial approach to understanding the complex etiology of ankle instability. Our data confirm that mechanical and self-reported assessments of ankle instability are related. Future studies should explore the most appropriate interventions to address laxity, as this may have an impact on improving patient outcomes and levels of function in this population.

SIGNIFICANCE:
The results of this study have significance on the field of orthopedic research and clinical practice in sports medicine. Ankle laxity measured in the A/P direction correlates significantly with self-reported function, verifying that addressing ankle laxity may be an important step in improving the level of function in patients with chronic ankle instability.

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REFERENCES: