

TENDINopathy Severity assessment–Achilles (TENDINS-A): evaluation of reliability and validity in accordance with COSMIN recommendations

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Abstract

Objective: To evaluate the construct validity (structural validity and hypothesis testing), reliability (test–retest reliability, measurement error and internal consistency) and minimal important change (MIC) of the 13-item TENDINopathy Severity assessment–Achilles (TENDINS-A).

Methods: Participants with Achilles pain completed an online survey including: demographics, TENDINS-A, Foot and Ankle Outcome Score (FAOS) and Victorian Institute of Sport Assessment–Achilles (VISA-A). Exploratory factor analysis (EFA) assessed dimensionality. Confirmatory factor analysis (CFA) assessed structural validity (root mean square error of approximation (RMSEA); Comparative Fit Index (CFI); Tucker-Lewis Index (TLI); standardised root measure square (SRMS)). Correlations between TENDINS-A and the FAOS or VISA-A assessed hypothesis testing. Intraclass correlation (ICC) assessed test–retest reliability. Cronbach’s alpha assessed internal consistency. SE of the measurement (SEM) assessed measurement error. A distribution-based approach assessed MIC.

Results: 79 participants (51% female) with a mean (SD) age=42.6 (13.0) years, height=175.0 (11.7) cm and body mass=82.0 (19.1) kg were included. EFA identified three meaningful factors, proposed as pain, symptoms and function. The best model identified using CFA for TENDINS-A had structural validity (RMSEA=0.101, CFI=0.959, TLI=0.947, SRMS=0.068), which included three factors (pain, symptoms and function), but excluded three items from the original TENDINS-A. TENDINS-A exhibited moderate positive correlation with FAOS ($r=0.598$, $p<0.001$) and a moderate negative correlation with VISA-A ($r=-0.639$, $p<0.001$). Reliability of the TENDINS-A was excellent (ICC=0.930; Cronbach’s $\alpha=0.808$; SEM=6.54 units), with an MIC of 12 units.

Conclusions: Our evaluation of the revised 10-item TENDINS-A determined it has construct validity and excellent reliability, compared with the VISA-A and FAOS which lack content

and construct validity. The TENDINS-A is recommended as the preferred patient-reported outcome measure to assess disability in people with Achilles tendinopathy.