**Reliability of elastography measures of the Achilles tendon**

Background: Elastography provides a direct, real-time assessment of tissue elasticity and is valuable in tumour tissue differentiation, used for detection and diagnosis of many cancers and liver fibrosis. Its value in musculoskeletal imaging is less well defined. The purpose of this study was to determine the reproducibility and repeatability of two common types of elastography, compression (CE) and shear wave elastography (SWE), in depicting the mechanical properties of the *in vivo* Achilles tendon.

Methods: Data from CE and SWE were collected from 8 healthy participants at the relative tendon mid-point in two blocks including five consecutive measurements taken in a one hour period and one measure taken every day for a five day period.

Results: For CE, all Coefficient of Variation (CV) scores were above 53%, correlations indicated no correlation to weak correlations, and Intra-Class Correlation Coefficient (ICC) values were all in the poor category. For SWE, CV scores were 3.70% - 7.37%, correlations ranged from 0.15 - 0.85 and ICC ranged from 0.34 - 0.89. No significant differences were noted with respect to protocol or time, no significant differences were found in transverse data for foot position, but significant differences were shown between fixed and relaxed foot positions for longitudinal scanning (p=0.003). ICC between two separate operators was 0.70 for transverse and 0.80 for longitudinal scanning.

Conclusions: Given the wide variation in CE results, it was deemed to have a low level of reliability for depicting mechanical properties of the Achilles tendon and not applicable for this particular purpose. In comparison, SWE was shown to be reproducible and repeatable at depicting and quantitatively assessing the mechanical properties of the human Achilles tendon. There was no additional benefit to securing the foot during SWE examination and there is a high level of agreement between different operators.