# Shearwave Elastography Of Equine Digital Flexor Tendons And Suspensory Ligament.

**Shearwave elastography of equine digital flexor tendons and suspensory ligament.**

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Shearwave elastography (SWE) detects pathologic changes in stiffness prior to B-mode alterations, offering potential for early injury detection and monitoring healing [(1,2)]. This study aimed to optimize SWE technique and document stiffness of the superficial digital flexor tendon (SDFT), deep digital flexor tendon (DDFT) and suspensory ligament (SL) in normal Thoroughbred horses.

B-mode and SWE assessments of the SDFT, DDFT and SL were performed in both metacarpal regions of eight normal Thoroughbred horses using a MylabX90Vet system. The first three horses were used for protocol optimization. SWE measurements were obtained in transverse (T) and longitudinal (L) planes under weightbearing (WB) and non-weightbearing (NWB) conditions. Data are reported as median [interquartile range] and were analysed using Kruskal-Wallis test with Dunn's multiple comparisons.

Initial optimization revealed that the L-WB technique produced lower stiffness values than L-NWB, T-WB and T-NWB (77 [26 - 116] vs 154 [129 - 168], 150 [132 - 171] and 153 [141 - 165] kPa respectively, $P < 0.05$). A standardized protocol was adopted for the subsequent five horses whose data are presented in Figure 1. SWE of the SL body was highly variable.

Conclusions: SWE is feasible using T-WB, L-NWB and T-NWB techniques, yielding similar values to human gastrocnemius tendons. Further work is needed to optimise SWE of the SL. This study demonstrates normal values in Thoroughbred horses, paving the way for future work in injury prediction, pathology evaluation and rehabilitation monitoring.

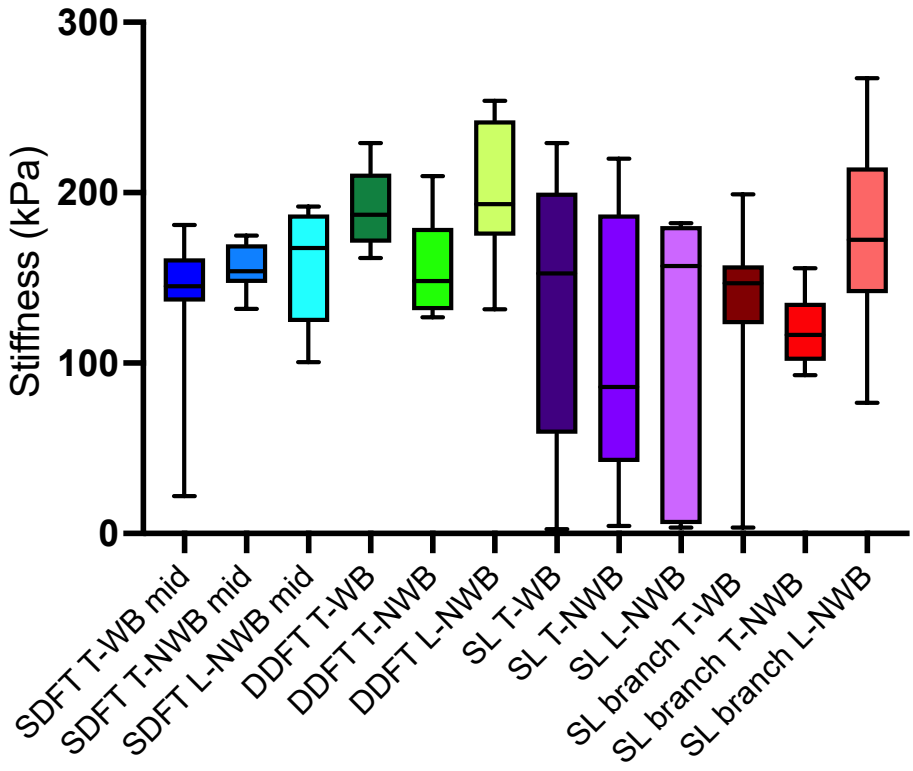


Figure 1: Stiffness of the SDFT, DDFT, SL, and SL branches measured by SWE in transverse (T) and longitudinal (L) orientation under WB and NWB conditions. Boxes represent median and IQR, whiskers demonstrate range.

All authors have adhered to the Principles of Veterinary Medical Ethics of the AVMA while conducting this study. The authors have no conflicts of interest to declare. Funding for this study was provided by the Raymond Firestone Trust, University of Pennsylvania School of Veterinary Medicine.

1.Taljanovic MS, Gimber LH, Becker GW et al. Shear-Wave Elastography: Basic Physics and Musculoskeletal Applications. *RadioGraphics* 2017;37:855-870.
2.Chen X-M, Cui L-G, He P et al. Shear Wave Elastographic Characterization of Normal and Torn Achilles Tendons. *Journal of Ultrasound in Medicine* 2013;32:449-455.