Equine skin characterization using shear wave elastography: a preliminary study

Cátia Braga[1], Gesiane Ribeiro[2,3], João Borges[2], Tomás Casqueiro[1], Lúcia Carvalho[2], José Prazeres[2]

1Faculty of Veterinary Medicine, Lusófona University, Lisbon University Centre, Lisbon, Portugal.
[2]I-MVET (Research in Veterinary Medicine) Faculty of Veterinary Medicine, Lusófona University, Lisbon University Centre, Lisbon, Portugal.
[3]CECAV – Animal and Veterinary Science Centre, Lusófona University, Lisbon University Centre, Lisbon, Portugal.

Objectives: The skin is the largest organ in the equine body and plays a crucial role in protection and homeostasis. Despite its importance and frequent involvement in various diseases, equine skin remains relatively understudied. Shear wave elastography (SWE) is a non-invasive imaging technique that allows for the quantitative assessment of tissue stiffness. The aim of this study was to characterize the elastic properties of equine skin and establish species-specific reference values in clinically healthy horses.

Materials and methods: Ten clinically healthy horses were included. Skin elasticity was measured using SWE at three anatomical sites: the neck, the withers, and the girth region just caudal to the elbow. For each region, three elasticity measurements (expressed in kilopascals, kPa) were obtained per horse. The mean of these three measurements was calculated to determine the final elasticity value for each region in each horse.

Results: Skin elasticity values exhibited considerable intra-regional variability, presenting high coefficients of variation across all anatomical regions. The withers showed the greatest range of values (46.5 to 215 kPa) and a substantial interquartile range (IQR = 44.4 kPa), indicating pronounced dispersion. Furthermore, the distribution of values in the withers region deviated from normality, supporting the presence of heterogeneous variability within this dataset.

Conclusions: While SWE holds potential as a non-invasive tool to evaluate the biomechanical properties of equine skin, the significant variability observed highlights key limitations. Factors such as probe pressure, tissue anisotropy, hydration status, and measurement depth may affect SWE outcomes. To enhance its reliability for applications in equine dermatology, further methodological refinement and standardized measurement protocols are essential.

Key words: elastography, equine dermatology, horse.