

Multi Site Quantitative Ultrasound Measurement In Horses: Preliminary Results For Metacarpal Bone Assessment

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Dorsal Metacarpal disease occurs most often in 2-year-old horses during their first year of training on the dorsomedial aspect of the third metacarpus (McIII) and incomplete or complete cortical stress fracture of this bone are usually seen in the second year of training on the dorsolateral cortex. In trained horses it is considered that speed of sound (SOS) reflects differences in McIII intra-cortical porosity. In this study we investigated the methodology and usefulness for multiple site SOS measurements of McIII, using the Omnisense quantitative ultrasound device (Sunlight Ltd., Israel). Ten Thoroughbred horses (8 stallions, 2 females) aged 2-10 years were evaluated for SOS values at three different cortical sites (lateral, dorsal and medial). Seven horses were measured bilaterally. For acoustic coupling, 1000 centistokes silicon oil was applied on the measured sites without prior shaving. The probe was placed midway between the apex of the sesamoid bone and the proximal extremity of McIV. Five SOS measurements were taken by three different operators at all three sites. The intra-operator coefficient of variation (CV) ranges from 0.25 to 2.08%, the lowest CV being obtained at the lateral site and the highest CV at the medial site. The average SOS measurements (mean±std) obtained on the lateral site were 4196±104 m/s, compared to the medial (4016±118 m/s) and dorsal site (3648±214 m/s). The prominent feature observed was the low SOS value measured at the dorsal site relative to the lateral and medial sites, the lateral site having a higher or equal value as compared to the medial position. This type of axial asymmetry is also found in long bones of humans, the nature of which is yet unexplained. We conclude that SOS measurement at the McIII of horses with a multi site ultrasound device appears to be a precise and reproducible technique in horses. The lowest CV on the lateral aspect of McIII compared to the highest CV on the medial side can be explained, in horses, by a difference in accessibility.

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