

# Use of Multisite Quantitative Ultrasonography for Noninvasive Assessment of Bone in Horses

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**OBJECTIVE:** To evaluate the usefulness of multisite quantitative ultrasonography for noninvasive assessment of bone in horses.

**SAMPLE POPULATION:** 12 healthy horses and both forelimbs from 8 clinically normal horses.

**PROCEDURE:** For in vivo measurements, various regions of interest (ROI) were examined on the third metacarpal bone, radius, and tibia. Precision error for speed of sound (SOS) measurements was obtained by measuring each ROI of 4 horses 10 times with probe repositioning. Additionally, 3 operators measured each aspect of the third metacarpal bone of 6 horses 5 times each. For ex vivo measurements, third metacarpal bones were examined at 9 ROI, and SOS measurements were performed before and after soft tissue removal. One ROI of a single forelimb was subjected to 96 ex vivo measurements with 3 different contact media.

**RESULTS:** The lateral aspect of the third metacarpal bone had significantly higher SOS values than the dorsal and medial aspect of the third metacarpal bone. No difference was obtained between SOS values of the lateral and medial aspect of the radius. The tibia had significantly higher SOS values than the lateral aspect of the radius and the dorsal and medial aspect of the third metacarpal bone. Intraoperator coefficients of variation ranged from 0.62 to 3.15%, and interoperator coefficients of variation ranged from 0.78 to 2.70%. Values of SOS were highest when silicone oil was used as the contact medium.

**CONCLUSIONS AND CLINICAL RELEVANCE:** Speed of sound measurements obtained by quantitative ultrasonography in axial transmission mode can be used to precisely measure superficial cortical bone properties of third metacarpal bone, radius, and tibia in horses.

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