

**Figure 1:** a) Superimposed on this pilot scan image of the equine first phalanx are the longitudinal axis of the bone and the coronal slice locations used for the analysis at 25% (dorsal), 50% (central) and 75% (palmar) of the distance from dorsal to palmar along the proximal articular surface of the first phalanx. b) A microcomputed tomography image through the entire central (50%) slice of P1 at 75 $\mu$ m isotropic voxel resolution. Only the proximal portion of this slice was used for analysis.

**Figure 2:** Three dimensional reconstruction of the proximal surface of the equine first phalanx illustrating the 15 sites at which the subchondral bone was analysed. First, the area was divided into dorsal (sites 1-5), central (sites 6-10) and palmar (sites 11-15) coronal planes, from dorsal to palmar. Then five experimental sites were designated from lateral to medial within these zones: lateral fovea (sites 1,6,11), lateral ridge of the sagittal groove (2,7,12), sagittal groove (3,8,13), medial ridge of the sagittal groove (4,9,14), medial fovea (5,10,15).

**Figure 3.** Box plots of subchondral bone density (mgHA/cm<sup>3</sup>) at the 15 sites in each cohort. Boxes represent the first and third quartiles separated by the median (horizontal line). Whiskers show the minimum and maximum values. Annotations above each box indicate significant differences of the coefficient of variations between two cohorts (Fligner-Killeen). Annotations below each box indicate significant differences of the medians between two cohorts (Mann-Whitney). Schematics show the positions of the sample sites on the P1 bone, oriented with medial to the right and lateral to the left (as in Figure 2). UC-unraced; CF-raced with contralateral fracture; RC-raced.

**Figure 4.** Box plots of subchondral bone thickness (mm) at the 15 sites in each cohort. Boxes represent the first and third quartiles separated by the median (horizontal line). Whiskers show the minimum and maximum values. Annotations above each box indicate significant differences of the coefficient of variations between two cohorts (Fligner-Killeen). Annotations below each box indicate significant differences of the medians between two cohorts (Mann-Whitney). Schematics show the positions of the sample sites on the P1 bone, oriented with medial to the right and lateral to the left (as in Figure 2). UC-unraced; CF-raced with contralateral fracture; RC-raced.

**Table 1:** Means, standard deviations (SD) and ranges for subchondral bone mineral densities (SCB vBMD, units of mgHA/cm<sup>3</sup>)

**Table 2.** Means, standard deviations (SD) and ranges for subchondral bone thickness (mm)