Effects of Third Metacarpal Geometry on the Incidence of Condylar Fractures in Thoroughbred Racehorses

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Horses with condylar fractures had significant differences in overall joint surface geometry compared with the opposite limbs and limbs of horses without fracture. Assessment of third metacarpal geometry may be helpful as a screening tool for identifying horses that might be predisposed to fractures. Authors’ addresses: Gail Holmes Equine Orthopaedic Research Center, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Fort Collins, Colorado 80523 (Kawcak, Zimmerman, Easton, McIlwraith); and Faculty of Veterinary Medicine, University of Glasgow, Glasgow G61 1QH, United Kingdom (Parkin); e-mail: ckawcak@colostate.edu. © 2009 AAEP.

1. Introduction
The objective of this study was to determine the influence of third metacarpal surface geometry on third metacarpal condylar fracture in Thoroughbred racehorses.

2. Materials and Methods
Computed tomographic scans of the limbs of horses with condylar fractures (FX; n = 51), the contralateral limbs of the same horses (NFX; n = 61), and the limbs of non-fractured horses (CTL; n = 80) were made. The images were rendered into a three-dimensional image of the condylar surface to characterize condylar width, condylar area, and curvature in the joints. A mixed model analysis of variance was used to compare data between the three different groups.

3. Results
Curvature varied significantly between the FX and CTL groups at five sites and in particular, was more strikingly different in the lateral condyle near the parasagittal groove. Additionally, the ratio of lateral to medial condylar width was significantly different between the FX and CTL groups at eight of nine sites and in the NFX and CTL groups, at two sites. In particular, the lateral condyle was relatively smaller compared with the medial condyle in FX groups.

4. Discussion
Compared with non-fractured horses, the lateral condyle in horses with condylar fracture appeared significantly smaller than the medial condyle. In addition, the curvature of the condyle was significantly different in fractured horses compared with non-fractured horses. These differences in geometrical properties may possibly be used for a screening tool in the future.