Palmar Lesions and Trabecular Bone Compaction Likely Precede Proximal Sesamoid Bone Mid-Body Fractures in Thoroughbred Racehorses

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Proximal sesamoid bones (PSBs) from horses with PSB fracture had focal evidence of remodeling that likely predisposed them to complete catastrophic fracture. Evidence of focal injury before complete fracture provides an opportunity for injury detection and prevention of catastrophic injury. Authors’ addresses: J.D. Wheat Veterinary Orthopedic Research Laboratory, School of Veterinary Medicine, University of California, at Davis, Davis, California 95616 (Anthenill, Garcia, Stover); Department of Medicine and Epidemiology, School of Veterinary Medicine, University of California, at Davis, Davis, California 95616 (Gardner); and Department of Veterinary Pathology, College of Veterinary Medicine and Biological Sciences, Texas A&M University, College Station, Texas 77843 (Pool); e-mail: lanthenill@cahfs.ucdavis.edu. © 2009 AAEP.

1. Introduction
Forelimb proximal sesamoid bone (PSB) fractures are the most common fatal injury in Thoroughbred racehorses; however, little is known about fracture pathogenesis. Our goal was to detect differences in macrostructural and microstructural features of PSBs from horses with and horses without PSB mid-body fracture.

2. Materials and Methods
Sagittal sections of fractured and contralateral intact PSBs without associated soft tissue from eight horses with a PSB mid-body fracture were assessed for visual, radiographic, microradiographic (microscopic evaluation), and histomorphometric (bone porosity and anisotropy) differences in bone porosity and pathologic lesions. These findings were compared with intact PSBs from eight age- and gender-matched control horses without PSB fracture.

3. Results
A focal linear defect was evident in the palmar spongiosa of 1 fractured and 2 contralateral medial PSBs. PSBs of horses with PSB fracture had significantly (p < 0.05) more compacted trabecular bone (92%) than PSBs from control horses (84%).

4. Discussion
Compaction of trabecular bone could be an adaptation to increased intensity or prolonged training. Palmar defects likely represent bone remodeling foci that predispose PSBs to complete fracture. Enhancements in diagnostic imaging should be directed to identify at-risk horses to allow for exercise modifications to reduce the incidence of PSB fracture.

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