Evaluation of Bone Marrow–Derived Mesenchymal Stem Cells as a Treatment for Collagenase-Induced Desmitis of the Proximal Suspensory Ligament in Horses

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Intralesional injection of autologous bone marrow–derived mesenchymal stem cells improves healing of the proximal suspensory ligament compared with rest alone. Ultrasound significantly underestimates severity of ligament damage, and MRI is recommended to determine an accurate estimate of damage to the proximal suspensory ligament in the rear limbs of horses. Author's addresses: Texas A&M University, Large Animal Clinical Sciences, College Station, TX 77845 (Marsh); McKinlay & Peters Equine Hospital, Newman Lake, WA 99025 (Schneider); Colorado State University, Orthopaedic Research Center, Fort Collins, CO 80523-1678 (Frisbie); Washington State University, Department of Veterinary Clinical Sciences, Pullman, WA 99164 (Roberts); VA-MD Regional College of Veterinary Medicine, Blacksburg, VA 24061 (Neelis); and Pacific Crest Equine, Exeter, CA 93221 (Sampson); e-mail: CMarsh@cvm.tamu.edu. *Corresponding and presenting author. © 2012 AAEP.

1. Introduction
The purpose of this study was to evaluate the use of bone marrow–derived mesenchymal stem cells (BMdMSCs) for the treatment of hind limb proximal suspensory ligament (PSL) desmitis and to determine if MRI can be used to correlate healing with histologic and biochemical findings.

2. Materials and Methods
Autologous BMdMSCs were cultured. Desmitis of the PSL was induced. One limb was treated with BMdMSCs, and the opposite limb was not treated. Horses were rested, and healing was evaluated by MRI and ultrasound examinations. Biochemical analysis and histologic evaluation of the suspensory ligaments were performed.

3. Results
Immunohistochemical and histologic evaluation revealed improvements in ligament healing in treated versus control ligaments. MRI and ultrasound revealed improvement in the quality of
repair in treated and control ligaments. Ultra-sonography underestimated ligament size and lesion size initially compared with MRI; however, at the conclusion of the study, ultrasonographic examinations significantly overestimated lesion size. Serial MRI examinations correlated with histologic healing at the conclusion of the study.

4. Discussion
Intralesional injection of BMdMSCs in PSL desmitis appears to improve healing of the ligament. The effect of BMdMSC injection was a significant improvement in structural and architectural organization of the PSL.
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