Effect of Mesenchymal Stem Cells on Healing of Core Lesions of Superficial Flexor Tendons

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Treatment of surgically induced core lesions in the superficial digital flexor tendon with bone marrow–derived mesenchymal stem cells does not result in repair tissue more similar to normal tendon than treatment with bone marrow supernatant alone. Authors’ addresses: Departement Hippique, National Veterinary School of Lyon, Marcy L’Etoile, France 69280 (Schramme); Department of Clinical Sciences, North Carolina State University, College of Veterinary Medicine, Raleigh, NC 27614 (Caniglia, Kerekes); Department of Pathobiology, College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, College Station, TX 77843-4467 (Pool); and Department of Veterinary Clinical Sciences, The Royal Veterinary College, North Mymms, Hertfordshire, AL9 7TA, UK (Smith); e-mail: michael.schramme@vetagro-sup.fr. *Corresponding and presenting author. © 2012 AAEP.

1. Introduction
The purpose of this study was to evaluate the effect of bone marrow–derived mesenchymal stem cells (BM-MSCs) on surgically created core lesions in the superficial digital flexor tendon (SDFT). We hypothesized that intralesional injection of BM-MSCs would result in repair more similar to normal tendon than BM supernatant alone.

2. Materials and Methods
Standardized core lesions were surgically created in the SDFT of both forelimbs of 6 horses. Ten × 10^6 autologous BM-MSCs suspended in BM supernatant were injected intralesionally 4 weeks after injury into randomly assigned treated limbs. Control tendons were injected with 2 mL BM supernatant. Lesions were serially evaluated ultrasonographically and with MRI and histology at 12 weeks after injection.

3. Results
No significant differences existed between treated and control limbs with respect to ultrasonographic lesion cross-sectional area (CSA), lesion volume, tendon volume, transverse echogenicity scores, and longitudinal fiber pattern scores; to histological scores for lesion size, fascicular organization, and maturity; and to lesion CSA, volume, or signal intensity on magnetic resonance imaging (MRI).

4. Discussion
This study did not support the hypothesized regenerative effect of BM-MSCs in 16-week-old lesions based on ultrasonographic, MRI, and histological evaluation. Possible explanations include insufficient follow-up time, insufficient survival or spread of BM-MSCs within the lesion, and absence of beneficial regenerative effects of BM-MSCs.