

Gene Therapy Using Plasmid DNA Encoding Bone Morphogenetic Protein 2 and Vascular Endothelial Growth Factor 164 Genes for the Treatment of Equine Proximal Suspensory Desmitis: Case Reports

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Abstract

Injury to the proximal part of the equine suspensory ligament (SL), called proximal suspensory desmitis (PSD), commonly causes lameness in horses. PSD is extremely difficult to manage and treat, with present methods often unable to achieve full recovery, especially in chronic cases. The present study was the first to use gene therapy to restore moderate and severe injuries of the proximal suspensory ligament in horses. Plasmid DNA encoding species specific bone morphogenetic protein 2 (BMP2) and vascular endothelial growth factor (VEGF164) was injected into the site of proximal suspensory ligament injury, followed by box rest and a controlled exercise program. Clinical observations and ultrasound imaging was used to evaluate effectiveness over a period of 12 months. No negative side effects were observed. Clinical improvements were observed, especially in the forelimb affected horses, by day 30. In horses with chronic hindlimb PSD few clinical improvements were reported. Echogenicity and the fiber alignment scoring improved but no concomitant changes to cross section area, dorsopalmar thickness or lateromedial width of the proximal suspensory ligament were observed. The transfer of BMP2 and VEGF164 genes into the equine PSL exhibited beneficial effects in horses with acute or subacute forms of lesions, primarily in the forelimb.

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