

New High Field Magnet in Northern CA

Welcome to the first issue of *The Proton Press*, a Pioneer Equine publication that will focus on magnetic resonance imaging. A 1.0 Tesla (high field) magnet has been installed and operating at Pioneer's new location since spring, 2009. As we are excited to be learning about this new imaging modality, we would like to include our supporters in the process! *The Proton Press* will be a monthly internet publication, with each issue devoted to the discussion of a select MRI case, providing information on new advances in equine MRI and aiming to answer common questions about this modality. This inaugural issue highlights a case study. Subsequent issues will be modeled and expanded based on your feedback.



ONI 1.0 Tesla High Field MRI

Case Study 1

Signalment/History:

- 3 year QH stallion with acute left front lameness.
- No distal limb joint effusion or soft tissue swelling was detected. Response to hoof testers was negative. Left front lameness was graded at 2+/5 on hard ground circling to the left, and 2/5 circling to the right. Flexion of the distal limb was negative.
- A palmar digital nerve block improved the lameness by approximately 85%. Five days later, a left front coffin joint block improved the lameness by approximately 90%.
- No significant findings were observed on radiographs of the left front foot. The left front coffin joint was medicated with hyaluronic acid and triamcinolone.

MRI Case Study 1



Sagittal STIR image demonstrating increased signal intensity of dorsodistal P2.

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- With joint medication, approximately 90% lameness improvement was achieved for 3 to 4 weeks, under light work.
- One month after initial examination, the left front lameness was graded at 2+/5 on hard ground, remained negative to hoof testers and flexion, and improved approximately 90% to a PD nerve block (similar to initial lameness exam). MRI examination was recommended.

Summary of MRI Findings:

- The sagittal STIR image and transverse images (PD and STIR) show a change in signal intensity at the distolateral aspect of dorsal P2.
- The P2 lesion is identifiable as decreased signal intensity on proton density (PD) sequences. Decreased signal intensity in bone on a PD sequence may correlate with fluid, osteonecrosis, hemorrhage, or sclerosis.
- The corresponding increased signal intensity on the STIR sequence confirms a fluid basis of the lesion, which may be indicative of edema, contusion or osteonecrosis.
- The fluid within distal dorsal P2, is most consistent with bony contusion. On the STIR image, increased signal intensity is also present associated with the distal palmar surface of the navicular bone, consistent with edema or contusion.
- Additional findings on this study, included mild to moderate degenerative injury and scarring of the deep digital flexor tendon (DDFT), mild to moderate navicular bursitis and adhesion formation involving the navicular bursa, DDFT, impar ligament and navicular bone. Mild synovitis of the distal interphalangeal joint was also detected.



Transverse proton density (top) and STIR (bottom) images demonstrating distolateral P2 lesion (arrows).

What is a STIR image?

STIR stands for short tau inversion sequence. In these sequences, fat signal is suppressed and appears black, while fluid signal is white.