Procedure Information:

Magnetic resonance imaging is a very exciting and clinically rewarding diagnostic aid used at Animal Imaging since 2004. MRI has been used medically for over 20 years and is now becoming available to veterinarians in select areas. The patient is placed in a strong magnetic field and the protons within the patient are excited using an externally applied radio-frequency pulse. Images are then created by analyzing the resulting signal when the protons return to their initial state following removal of the radio-frequency pulse. These radio-frequency pulses are transmitted and/or received by coils placed over the area of anatomy that we are interested in imaging. The science and technology behind the creation of images acquired by magnetic resonance imaging is fascinating, but beyond the scope of this discussion.

Animal Imaging is the only private practice in Texas with a Siemens Verio 3.0 Tesla MRI system. Magnets commonly used in human and veterinary medicine range from 0.2 - 3.0T strengths. The higher the tesla strength, the faster the scan can be performed. The image quality is also greatly increased with stronger tesla magnets. Given the sensitivity to motion and the length and time it takes to acquire the study, all MRI patients at Animal Imaging are anesthetized with Sevoflurane during the procedure.

Prior to the MRI study, it is important to ensure that the region of interest has been localized with regional anesthesia by the referring veterinarian or one of the veterinarians at Animal Imaging. Areas that can easily be imaged with the MRI include the hock, carpus, and distal limb as well as the head in most patients. However, due to the size of the bore of the magnet, there are some limitations as to what other areas of anatomy can be imaged. The stifle can sometimes be imaged in small equine patients. Please contact our office should you be interested in an equine stifle study and we can advise you regarding patient selection.

In the horse, a typical MRI study sequence for a given area of anatomy (i.e., the foot from the toe to mid-pastern) may take up to 30-35 minutes to acquire. Horses that have multiple sites of lameness can often have multiple sites imaged during one anesthetic session with the direction and close supervision of Animal Imaging doctors and staff; however, anesthesia time is limited to no more than 1 ½ hours in most cases. Animal Imaging’s doctors and staff utilize state-of-the-art monitoring equipment to ensure anesthetic safety for each and every patient.

The MR imaging sequences used at Animal Imaging all offer different insights into anatomy.
and pathology based on the physics of the sequence selected. Sequences typically performed on the equine include: proton density, T2, STIR (fat suppressed), T1 vibe, and SPACE. Gadolinium contrast is occasionally used for imaging equine brains and/or some soft tissue structures in the lower limb where contrast enhancement can be beneficial in the final diagnosis. In a typical bilateral foot study, up to several thousand images will be evaluated. Every effort is made to understand and rank the clinical significance of the imaging findings based on the history and clinical exam. Treatment is then typically directed back to the referring veterinarian. If requested by the referring veterinarian, various treatment options can also be performed at Animal Imaging.

**Indications for MRI:**

- **Definitive diagnosis of proximal suspensory disease in the forelimb or the hind-limb**
  - The amount of fat and/or muscle fibers within the origin of the suspensory can often hinder critical ultrasound evaluation of suspensory disease. MRI is very effective in reviewing bone and/or soft tissue pathology in the proximal suspensory region to assist veterinarians in determining the appropriate diagnosis and therapy.
- **Better understanding of pathology within the hoof capsule**
  - A multitude of soft tissue structures within the foot are often damaged, and can only be critically assessed with MRI. Examples include the distal portion of the deep digital flexor tendon, the impar ligament, P3, the collateral suspensory ligament of the navicular, the navicular bursa, the collateral ligaments of the distal interphalangeal joint, and cartilage within the proximal and distal interphalangeal joints. MRI can also help to diagnose the presence of adhesions, bone bruising, and penetrating lesions in the foot.
- **Evaluation of the foot to determine if the patient is a candidate for a neurectomy in the case of refractory lameness issues**
- **Imaging support for sepsis in a bursa, joint, or tendon sheath**
- **Critical evaluation of the bone and soft tissue supports of multiple joints such as the carpus, fetlock, hock, and stifle**
- **Critical evaluation of the head including the brain and sinuses**
  - Potential lesions diagnosed could include tumors, sinus cysts, sinusitis, infarcts, nerve sheath lesions, and dental abnormalities.
- **Evaluation of patients that have been refractory to treatment of lameness previously localized**
- **Evaluation of patients with a localized lameness but no significant findings with conventional imaging (ultrasound, radiographs)**
Scheduling an MRI Appointment:

To provide the best diagnosis possible, a completed MRI referral form is required from the referring veterinarian, including any pertinent history related to the exam. This form is available on our website at www.animalimaging.net. Equine MRI exams are scheduled Monday thru Friday. We ask that the patient be dropped off the night prior to the appointment or by 7:30am the morning of the appointment. In most cases, patients are ready to be discharged by 3:00pm the same day of the MRI exam. Clients are asked to call the office between 11:00am and 12:00pm the day of the MRI to check on the status of the patient and to set up a discharge time. If the return destination is over 4-5 hours away, we will keep the patient until the following day to ensure a safe trip home given the extended travel distance.

Because general anesthesia is used for the MRI, we ask that the horse not be fed after midnight the night before the appointment. There are no restrictions on medications and it is important that the horse have access to fresh water up until the MRI exam. A CBC and a limited chemistry panel are required to evaluate the health of the horse prior to anesthesia. Please consult with the referring veterinarian to perform the CBC and chemistry prior to the visit, or Animal Imaging can perform these blood tests upon arrival if so desired. At the time of discharge, Dr. Hersman and/or Dr. Sharp will be able to review preliminary results with the client and/or trainer. Our equine board-certified radiologists, Dr. Dana Neelis, DACVR and Dr. Beth Biscoe, DACVR, have extensive training in MRI evaluations and will rank multiple pathologies in the order of probable clinical significance. All reports, including Animal Imaging’s radiologists’ reports, will be sent to the client and the referring veterinarian within 24 - 48 hours of the procedure.