Procedure Information:

Since 2004, nuclear medicine has been an important diagnostic tool used at Animal Imaging in the diagnosis of lameness in the horse. The basic principal of nuclear scintigraphy is the detection of gamma rays emitted from the decay of a radionuclide injected intravenously into the patient with a gamma camera. The radionuclide, or radioisotope, is a radioactive component attached to a carrier pharmaceutical, together termed a radiopharmaceutical. The radionuclide used at Animal Imaging is technetium [Tc-99M]. Technetium has a six-hour half-life to facilitate early decay of radioactivity. Methylene diphosphonate, also known as MDP, is the most commonly used attached pharmaceutical in the equine. MDP is localized in bone based on the osteoblastic activity or remodeling in bone and therefore is an excellent, extremely sensitive, physiologic marker of bone disease.

Bone that is stressed or remodeling due to an injury that affects the metabolism of bone will absorb a disproportion amount of the radiopharmaceutical. This will then appear as an area of increased radiopharmaceutical uptake, or a “hot spot”, on the gamma camera. Although the spatial resolution is poor compared to MRI or CT, the sensitivity is remarkable. Any area of uptake represents a physiologic change in bone that may need further evaluation.

Prior to injection of MDP, the horse is often exercised to increase blood flow to effectively distribute the drug throughout the body. The patient is then injected with a dose of 160 mCi to 200 mCi of technetium/MDP intravenously through an indwelling catheter. The dose is very safe. Occasionally, a pool phase, or vascular phase may be obtained of a specific area of interest which reflects the amount of blood flow to the target area. Pool phase images are obtained immediately following injection. Pool phase image acquisition is compromised after 10 minutes post-injection, which limits the number of images that can be obtained in a pool phase exam. Approximately 3 hours post injection, bone phase images are acquired.

At Animal Imaging, we can scan the front half, back half, entire horse, or a specific region of interest. A region of interest study can be effectively utilized on horses in which pathology has been localized to a given region, or to further define expected pathology. Region of interest exams include the acquisition of less than 10 images.

An extremely important aspect of scintigraphy is the post-evaluation lameness exam. The multiple areas of increased radiopharmaceutical uptake are evaluated clinically to determine their individual importance to the overall presentation. These results are communicated to the referring veterinarian and a diagnostic and/or treatment plan is then developed.
Equine Nuclear Bone Scan

Indications for nuclear medicine in the horse include the following:

- Poor performance, or an ill-defined cause of lameness
- Suspected cervical, thoracolumbar and/or pelvic region pain
- An intermittent and/or subtle lameness that cannot be reliably reproduced to perform effective local anesthesia
- Lameness in multiple limbs
- The inability to perform local anesthesia due to the fractious nature of the horse
- An obvious lameness that cannot be localized to a specific region
- Collaboration of an equivocal radiographic abnormality to help determine its clinical significance
- An acute lameness with a clinical suspicion of a fracture or stress related bone injury that cannot be identified radiographically
- Monitoring convalescence of previously diagnosed bone injury
- An athletic horse with a history of lameness at high speed or during work, which is not evident in hand

Scheduling an appointment:

To provide the best diagnosis possible, a completed Nuclear Medicine 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](http://www.animalimaging.net). Bone scans are performed on Mondays, Tuesdays and Wednesdays of each week. We ask that the patient be dropped off the night prior to the appointment or by 7:30 am the morning of the appointment. A calibrated dose of MDP is ordered the day before the exam specifically for the patient scheduled to be imaged. If the appointment needs to be canceled for any reason, please notify our staff the day prior to the study, or the unused dose will be billed to the client. Animal Imaging is required to maintain the patient overnight due to the residual radioactivity until the horse is at a safe radiation level to be discharged.

Reports will be generated by Dr. Sharp and/or Dr. Hersman and our equine radiologists within 24 - 48 hours of the study. Our board-certified radiologists, Dr. Dana Neelis, DACVR and Dr. Beth Biscoe, DACVR, have extensive training in this diagnostic modality.