Equine Health Program

NC STATE UNIVERSITY COLLEGE OF VETERINARY MEDICINE

Various Imaging Available to Diagnose Equine Lameness

	Thermography	**(Digital) Radiography**	**Ultrasonography**	**Nuclear Scintigraphy ("Bone Scan")**	**Computed Tomography (CT)**	**Magnetic Resonance Imaging (MRI)**
Image mechanism	Detects heat emitted by body, if no blood supply may detect a "cold" area	Uses X-rays to penetrate body tissues and expose image on film – limitation on differences between soft tissues	Uses sound waves reflected back from different tissue densities to form image	Gamma camera detects radioactivity patterns emitted by horse following injection of radioactive material	Uses rotating X-ray to penetrate body tissues, generates multiple slice images – can detect more density differences than radiography.	Generates multi-planar slice images based on different magnetic properties of tissues. Produces high detail, high contrast anatomic images.
Image detection	Can help localize soft tissue inflammation (e.g. muscle tear) or area on body surface with poor blood supply	Detects bone changes when 30% difference from normal has occurred. Wider latitude than conventional radiography. Limited contrast as compared to CT & MRI	Very useful for looking at soft tissue injuries (tendons, ligaments, muscle) and bone/joint surfaces	Three phases allow assessment of blood supply, soft tissue injury and alterations in bone metabolism	Excellent imaging of bone: for fractures, joint surfaces, bone loss and deposition; head structures (e.g. teeth, sinuses), 2D or 3D reconstructions possible	State of the art imaging for bone and soft tissue; can see pathologic and physiologic changes; unparalleled contrast and definition of soft tissues; 2D &3D reconstructions
	Thermography	**(Digital) Radiography**	**Ultrasonography**	**Nuclear Scintigraphy**	**Computed Tomography**	**Magnetic Resonance**

				(“Bone Scan”)	**(CT)**	**Imaging (MRI)**
Image value	Good general screening tool during lameness evaluations or evaluation of back pain	Widely used for suspected major bony causes of lameness; pre-purchase exams screening for major boney problems of lower limbs	Routinely used during lameness evaluations once area is localized, and to monitor healing	Frequently used as a screening tool in multi-limb or otherwise complicated lameness’s to help determine source(s) of pain	Used frequently to evaluate head diseases, teeth problems and complicated fractures	Best imaging currently available for diagnosing “occult” lameness from knee and hock distally. Specified area has to be localized.
Image Penetration	Can image whole body	Can image most of body; general anesthesia is recommended for some sites e.g. pelvis	Can image most of body. There can be some depth limitations	Can image whole body	Can image head, and distal limbs up to and including carpus (knee) and tarsus (hock)	Can image head, and distal limbs up to and including carpus and tarsus
Availability	Not widely available; portable. Has external environmental concerns.	Widely available, portable	Widely available, portable	Available in some university and private hospitals. Not portable	Available in a few university and private hospitals. Not portable	Available in four university hospitals. Standing MRI more available. Not portable
Patient positioning	Standing patient	Standing, usually sedated patient	Standing, sedated patient	Standing, sedated patient	Requires general anesthesia	Requires general anesthesia (standing sedation for standing MRI)
Length of Study	10 minute study	30-90 minute study	10-60 minute study	Soft tissue phase 15 minutes, bone phase 1-2 hours	Up to 30 minute study	Up to 90 minute study
	Outpatient	Outpatient	Outpatient	2 nights hospitalization	1-2 nights hospitalization	1-2 nights hospitalization
Approximate Cost	$200	$70-125/region	$200/region	$600/region, $2000 whole body	$1200 including anesthesia	$3000 including anesthesia