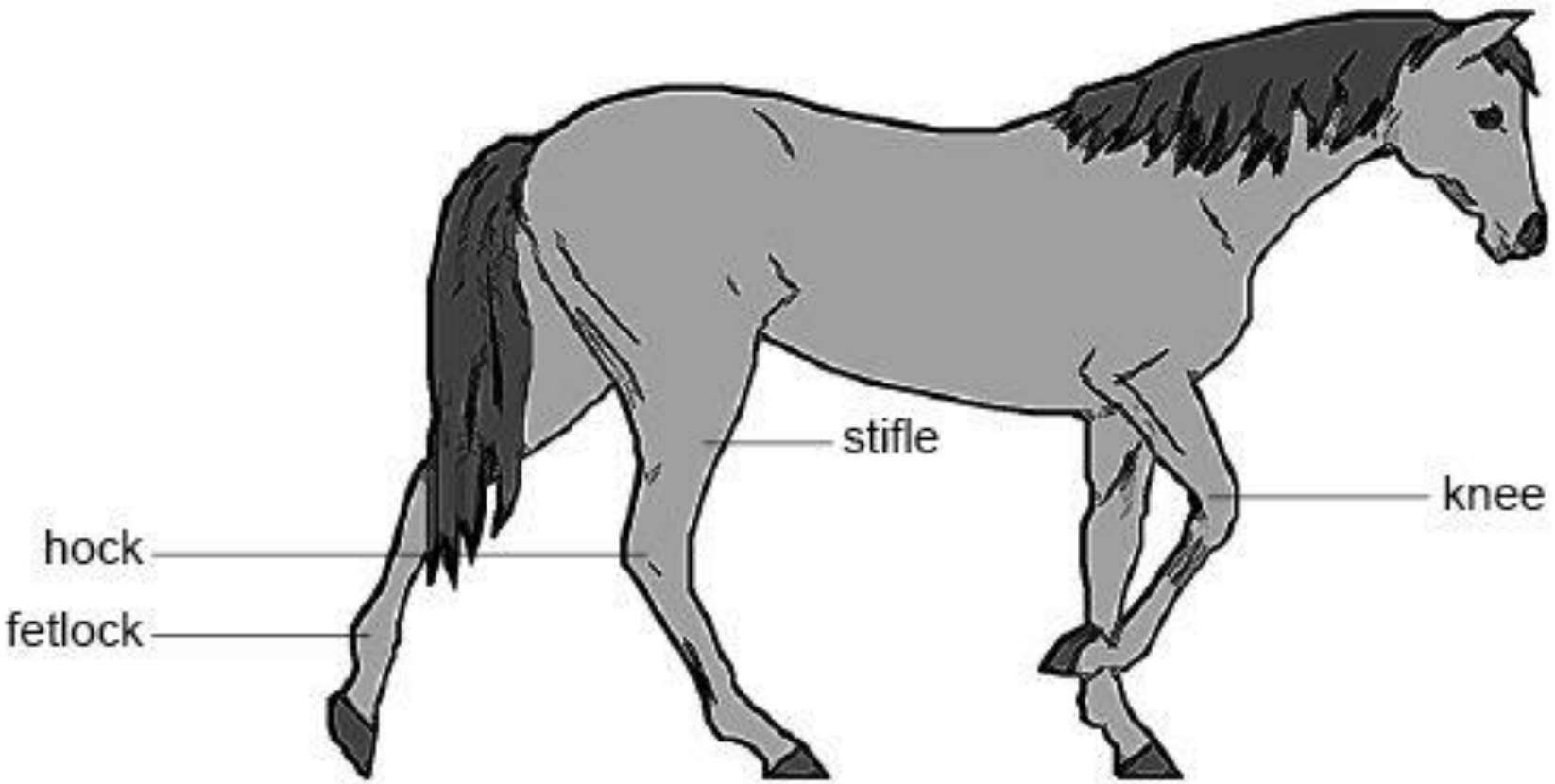
LAMENESS

Lameness:

Is defined as an alteration in the animal's normal stance and/or mode of progression caused by pain or neural or mechanical dysfunction.

Lameness in the horse can range from an obvious non-weight-bearing gait to more subtle signs of discomfort that may only be displayed as poor performance. The goals of a lameness examination are to identify the affected leg and the exact part of it that is causing the lameness


stifle
knee
hock
fetlock

Top Five Causes Of Lameness

- Foot abscess
- Navicular syndrome
- Heel pain
- Degenerative joint disease
- Tendon and ligament injury

Foot abscess

The one of the most widespread causes of foot pain are subsolar abscesses, localized infections just beneath the sole of the hoof . As an abscess develops, it exerts pressure on the sensitive structures of the foot. Because the hard hoof wall does not expand, this pressure can become extremely painful. Horses with abscesses may show varying signs of lameness, but it is often an acute onset of a significant degree of pain, sometimes as severe as Grade 5 lameness (see "Lameness Scale”). These horses may have heat in the foot and an increased digital pulse felt at the fetlock or pastern.

Navicular syndrome

Navicular syndrome is a term used to describe the heel pain and pathology of navicular disease. Affected horses often have an abnormal hoof-pastern angle. While many other injuries affect only one leg, navicular horses tend to be lame in both front limbs. When walking and trotting, they will land toe first. This may temporarily relieve the pain as the horse moves, but it actually increases the strain on the navicular bone and can worsen the disease. During a lameness exam, the gait abnormality will worsen when the horse is trotted in a circle and will dramatically improve after the heel and sole are numbed using a palmar digital nerve block. Horses with a history of heavy work from an early age are at risk of developing navicular syndrome. In addition, breeds such as Quarter Horses, Thoroughbreds are often affected.

Heel pain

Heel pain is a component of navicular syndrome, it is very important to point out that there are a multitude of other structures in the hoof that can cause heel pain, such as the suspensory ligament of the navicular bone, the impar ligament that connects the navicular bone to the back of the coffin bone, and other collateral ligaments. Radiographs don't always solve the riddle, as they do not give information about these soft tissue structures. In recent years, magnetic resonance imaging (MRI) has become the gold standard for diagnosing lameness of the equine foot. MRIs provide information about both the soft tissue and bone structures in great detail, and many horses who would have been classified as having navicular syndrome are found to have other problems within the foot.

Degenerative joint disease

Degenerative joint disease (DJD) is a common occurrence in older, and sometimes not so old, equine athletes. The body is designed to maintain the cartilage in the joints, repairing damage after normal wear and tear. In athletic horses, however, excessive wear can overwhelm the repair process. The signs of degenerative joint disease include lameness, which can range from mild to severe; heat and swelling around a joint; and sometimes a reduced range of motion of the joint. These signs can progress slowly or show up acutely once your horse's pain threshold has been exceeded.

Tendon and ligament injury

Tendon and ligament are the most prominent and often prone to injury. Injuries to these structures can occur acutely or be a result of chronic strain. Signs of tendon or ligament damage include lameness, heat, pain on palpation, or swelling across the back of the limb where these structures lie. Diagnosis of these injuries involves the previously described techniques to localize the problem. The best way to evaluate the tendons and ligaments of the lower leg is through ultrasonography, which displays the intricate linear fiber pattern of the tendons and ligaments to show disruption or swelling in the structures.

DIAGNOSIS OF LAMENESS

Diagnostic methods:

1- Clinical examination :-

- **At rest**
- **At exercise**
- **Manipulative tests**

At rest

The horse should be visually inspected, ideally standing square on a level surface, from both sides, front and behind for overall conformation, signs of asymmetry of the muscles and bones, swelling, sites of trauma, foot conformation, and stance

At exercise

Lameness is generally assessed from in front (for forelimbs) and behind (for hind limbs) at the walk and trot, in-hand, and in a straight line on a level, hard, even surface.

Manipulative tests

Once the lame limb and degree of lameness have been ascertained, identification of the site(s) of the lameness is carried out. Manipulative tests aim to exacerbate temporarily the degree of lameness

2- Diagnostic Analgesia:

- Perineural Nerve Blocks
- Local Infiltration
- Intrasynovial Joint/Sheath/Bursa Blocks

Regional And Intraarticular Analgesia

Diagnostic Analgesic Technique

3- Radiography
4- Ultrasonography
5- Nuclear imaging
6- Thermography
7- Magnetic resonance imaging (MRI)
8- Computed tomography (CT Scan)

Radiography:

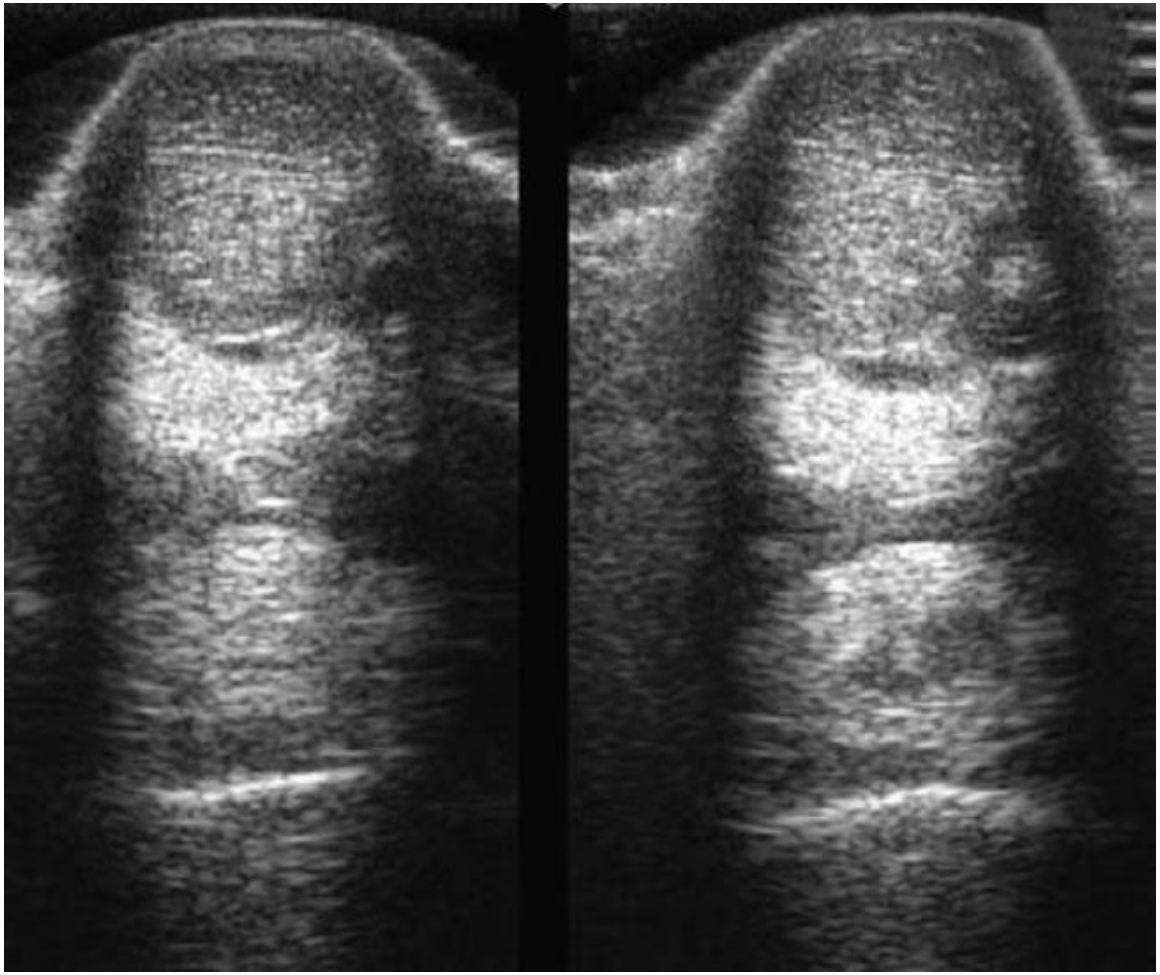
Radiography is the most common diagnostic imaging modality used for the musculoskeletal system. Images are produced by X-rays that are attenuated by the different tissues in the region of interest onto film inside a lightproof cassette lined with a special screen that intensifies the image. The film is then processed to give the final black and white radiographic image for interpretation

Digital Radiograph Of A Lateromedial Projection Of A Tarsus Showing Osteochondral Fragmentation Of The Distal Intermediate Ridge Of The Tibia In A Young Horse

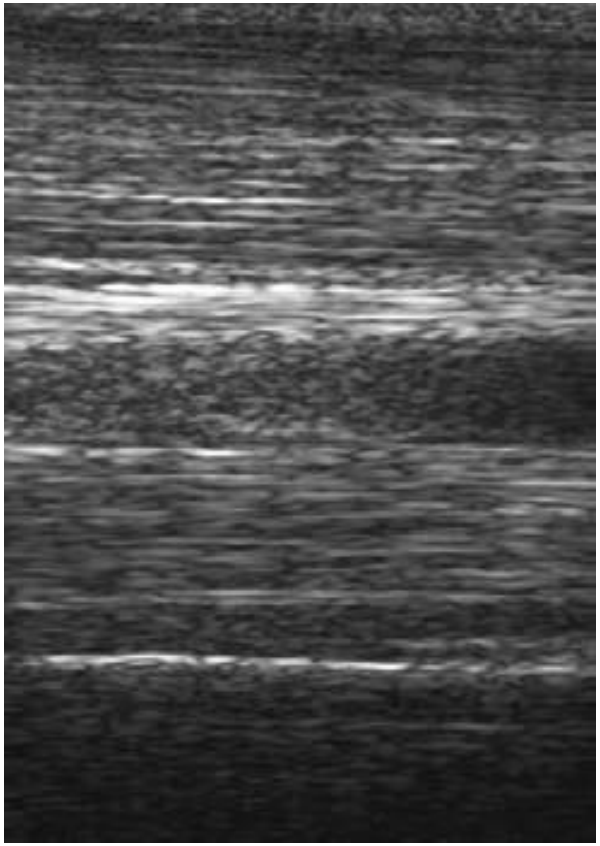
Standard Radiograph Of A Dorsolateral/Plantaro medial Oblique Projection Of A Tarsus Illustrating Degenerative Joint Disease Of The Small Tarsal Joints (‘Bone Spavin’)

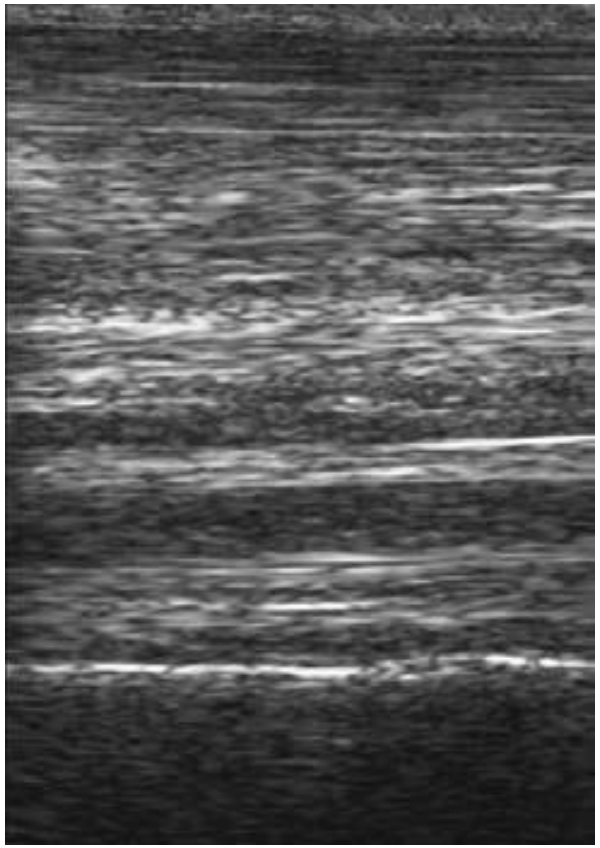
Ultrasonography

Ultrasonography relies on the emission of high-frequency sound waves by electrically stimulated piezoelectric crystals in a transducer that are transmitted through the region of interest via a probe. The sound waves are attenuated by the different tissues and reflected back to the transducer as echoes. The reflected waves return to the probe and are electronically passed on to a computer that formulates a visual image of the tissues.



Transverse Ultrasonogram Of The Upper Palmar Metacarpus Of A Racehorse With Acute-onset Lameness And Soft Tissue Swelling Of The Area



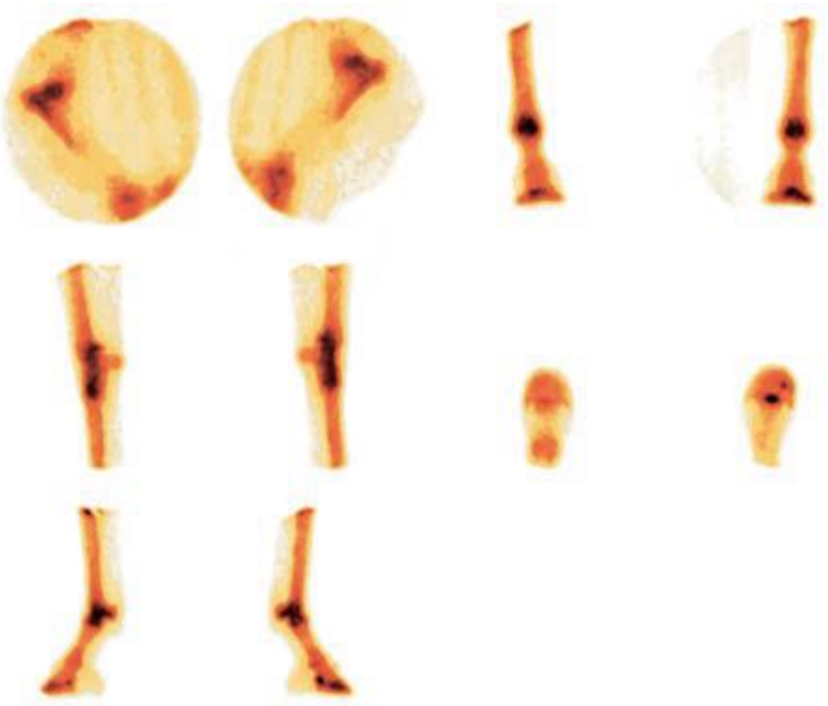


Sagittal Longitudinal Ultrasonogram Of The Case Demonstrating The Lesion In The Right Limb And Confirming The Length Of Ligament That Is Injured

Nuclear imaging

Nuclear imaging (gamma scintigraphy or 'bone scanning') involves the intravenous injection of a radioactive substance (e.g. Technetium) that is then distributed throughout the horse. A gamma camera is then placed alongside the horse and the energy emitted from radioactive decay of the substance is recorded, processed by a computer, and an image pattern produced for interpretation

Bone scintigraphy being carried out on the distal hind limb of a horse using a gamma camera



Scan Of The Forelimb Of A Horse With Pathology Involving The Right Navicular Bone

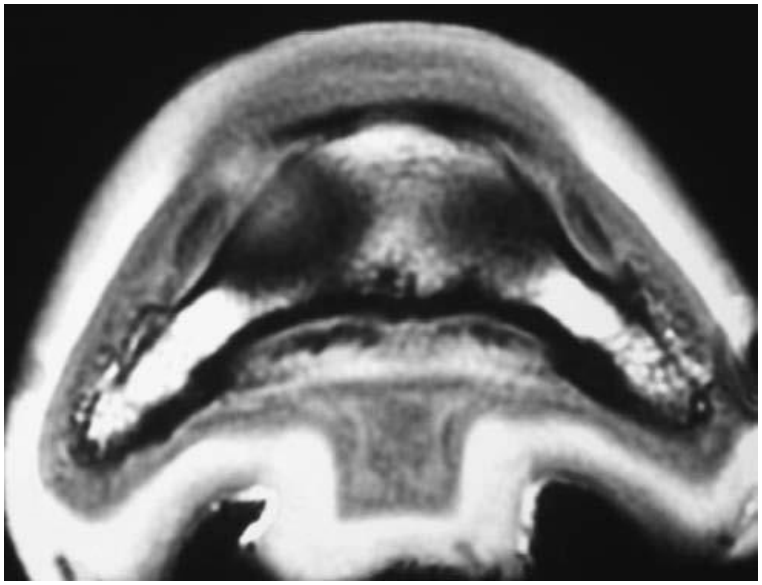
Thermography

The surface temperature of an object can be measured and illustrated by the use of a thermographic camera, and it is used by some clinicians in the early diagnosis of certain types of lameness. It is noninvasive and can detect superficial inflammation, although there is very little serious scientific evidence confirming its efficacy. The circulatory pattern and blood flow in an area dictate the thermal pattern seen, and this forms the basis for thermographic interpretation.

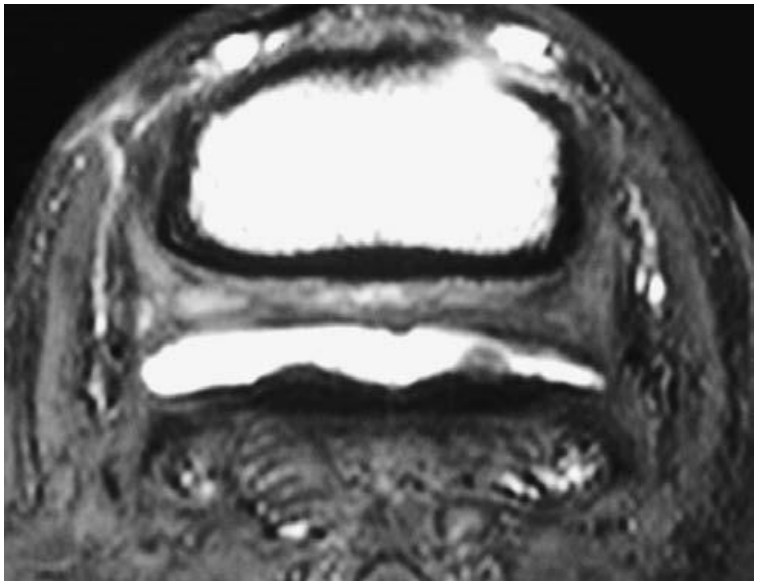
Magnetic resonance imaging

MRI scans are produced by a complex process involving exciting hydrogen nuclei in the horse at specific resonance radio frequencies within a static magnetic field, and detecting the energy released. Water and fat contain the most hydrogen nuclei and the MRI signal created is built up from these. 2-D ‘slices’ or 3-D images can be achieved depending on the machine and computer software used. High-signal areas are depicted as white and low-signal areas are black

Standing MRI being carried out on the distal right forelimb of a horse



MRI scan of the foot in a Transverse plane demonstrating An injury of the collateral Ligament of the distal interphalangeal Joint (left side Of scan).



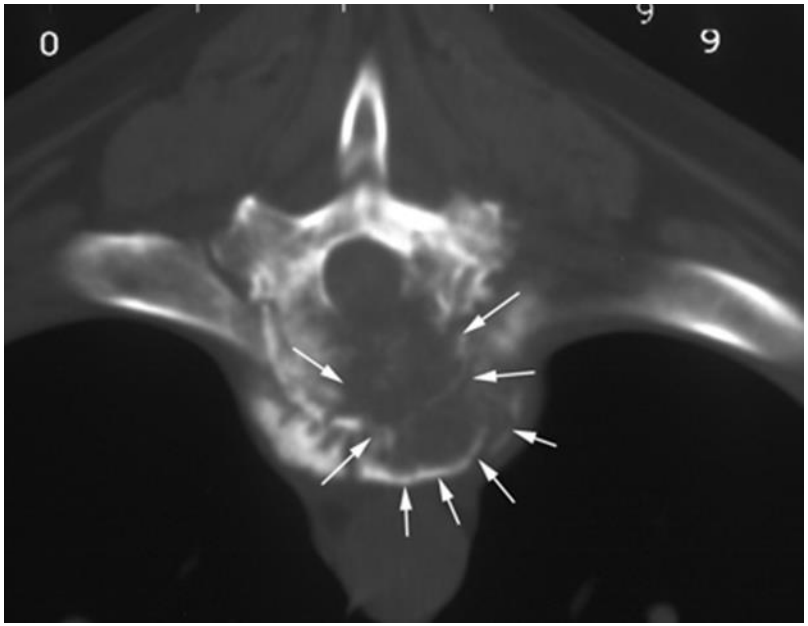
MRI scan in a transverse plane showing a lesion in the deep digital flexor tendon (right side of scan).

Computed tomography

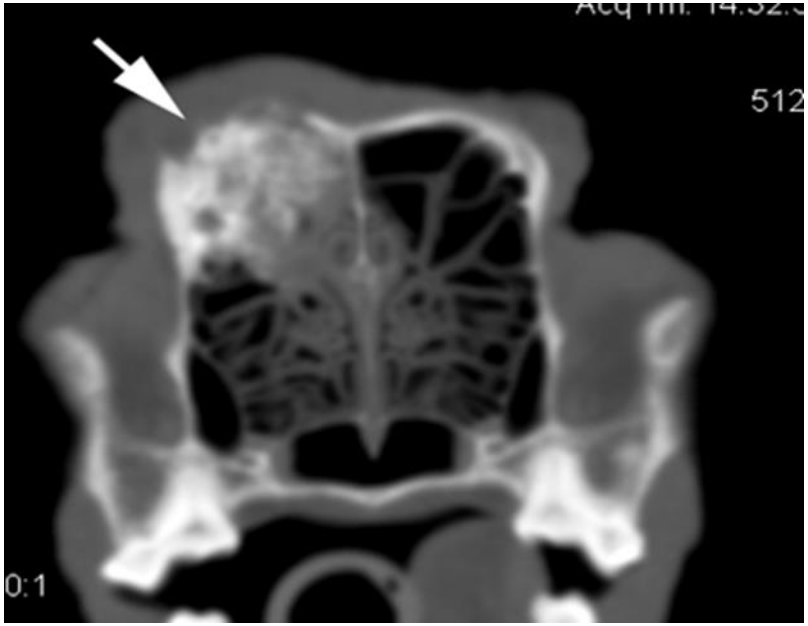
CT scanning involves the use of advanced X-ray technology, radiation detectors, and a computer system and operating console. CT images are composed of numeric pixels (Hounsfield Units), which represent 2-D or 3-D representations (depending on the software) of tissue volume. The pixels range from –1,000 for air to +1,000 for bone, therefore a large gray scale of gradient is available for depiction of tissues within the region of interest. Cross-sectional images are obtained as required

CT has special advantages over other imaging techniques because it clearly shows the exact shape and location of tissues in any cross section of the body. It is useful in diagnosing lesions in the brain, sinuses, and the oral cavity. These images greatly improve our ability to accurately diagnose fractures, tumors, cysts, and dental abnormalities within the skull. Visualization of brain tumors can be further enhanced with the use of intravenous contrast agents.

CT is also used to examine legs and the cervical spine (neck). The use of CT is limited solely by the size of the patient - only those parts of the body that fit through the gantry can be imaged.



This is a transverse CT image of the T13 vertebral body from a dog with back pain and pelvic limb weakness. Note the loss of detail and mineral opacity within the vertebral body on the right of the CT (white arrows). These findings are suggestive of tumor, which was confirmed on biopsy.



This transverse CT image of the head comes from a dog with a skull mass located over the frontal bone. A white arrow points to a proliferative, erosive bone lesion confirmed by surgical biopsy as an MLO (multi-lobular osteochondroma)

Equine CT scanner can peek inside standing, conscious horses