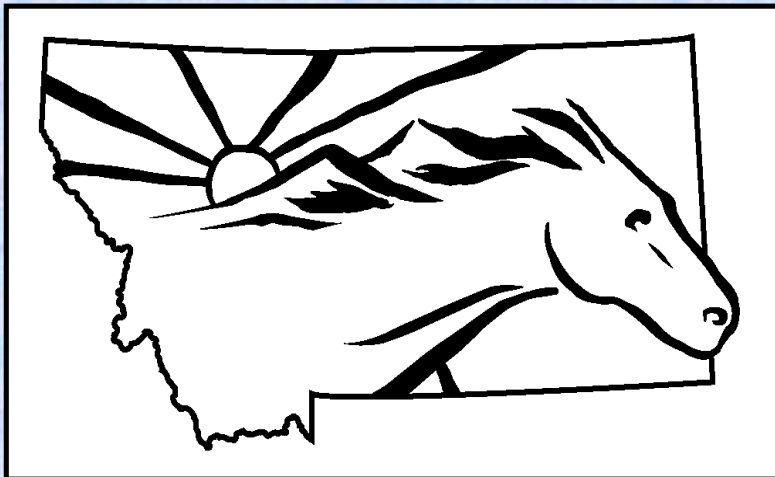


*Equine Lameness &
Imaging Techniques*



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Types of lameness

- **Skeletal Disease**

- Any type of joint inflammation
 - Hock, pastern, stifle, coffin joints
 - Most often cumulative stress
 - Wear and Tear
 - Following injury
 - Developmental Diseases
 - Usually worsens during flexion test
- Diagnosis: Radiographs, CT/MRI, Scintigraphy



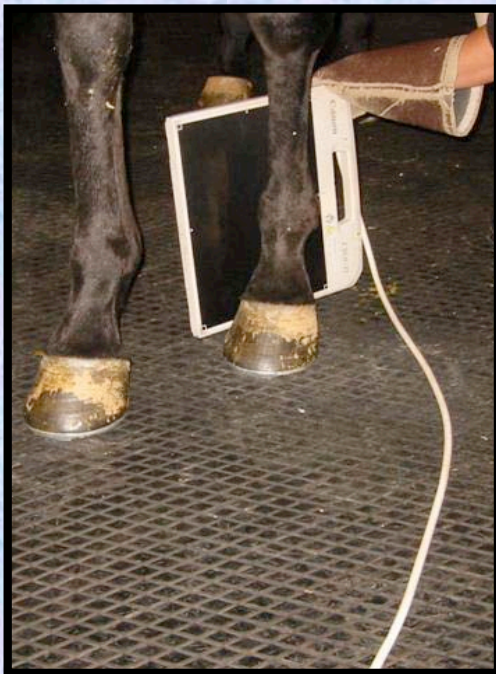
- **Soft Tissue**

- Tendons, Ligaments, Muscles, Bursa
- Usually improves with rest, worsens after work
- Diagnosis: Ultrasound, CT/MRI



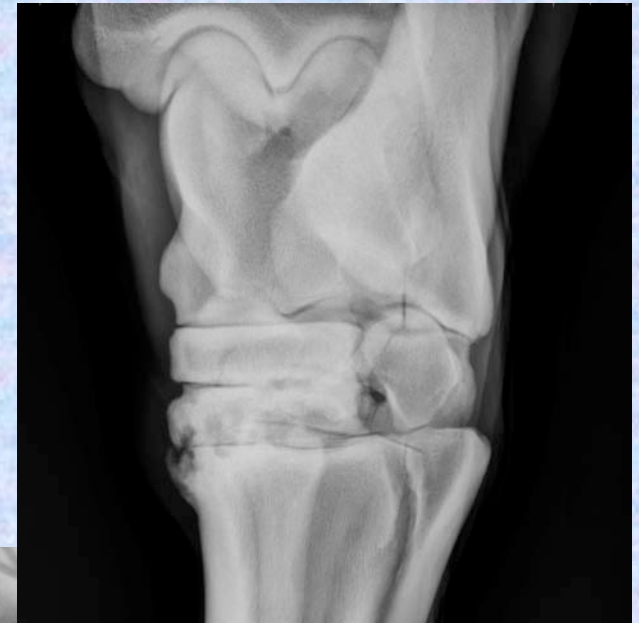
Orthopedic Abnormalities: Bone

- Routine Diagnostics:
 - Radiographs
 - Digital and Computed Radiology
 - +/-Fluoroscopy



Arthritis

- Hock Arthritis, Pastern Arthritis
 - “Ring-Bone”
 - Wear-and-Tear
 - Gradually increasing inflammation over months or years
 - Acute Trauma
 - Collateral Ligament Tears
 - Chip Fractures
- Diagnosis:
 - Where?
 - Nerve and/or Joint Blocks
 - What?
 - Radiographs



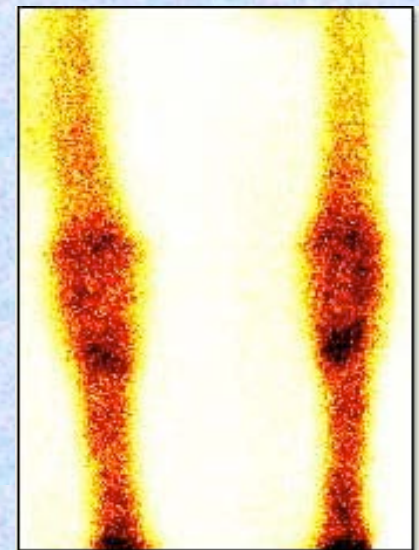
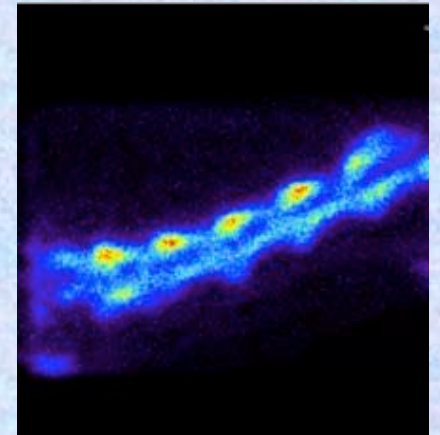
Radiographic Changes post Soft Tissue Injury

- Collateral: “CO”-lateral
 - Injury follows twisting and shearing trauma
 - Worst in deep footing
 - Provides stability to joints
 - Medial to Lateral Support
 - Wrapping can support collateral ligaments
- Response to Injury
 - Varying Degrees of Instability
 - Joint is unstable : new bone formation



Nuclear Scintigraphy

- Measures bone metabolism
 - Technesium isotope “bound” to phosphorus
 - Increased metabolism with inflammation
 - Gamma Camera measures density of isotope



Soft Tissue Injury

- Routine Diagnostics:
 - Ultrasound



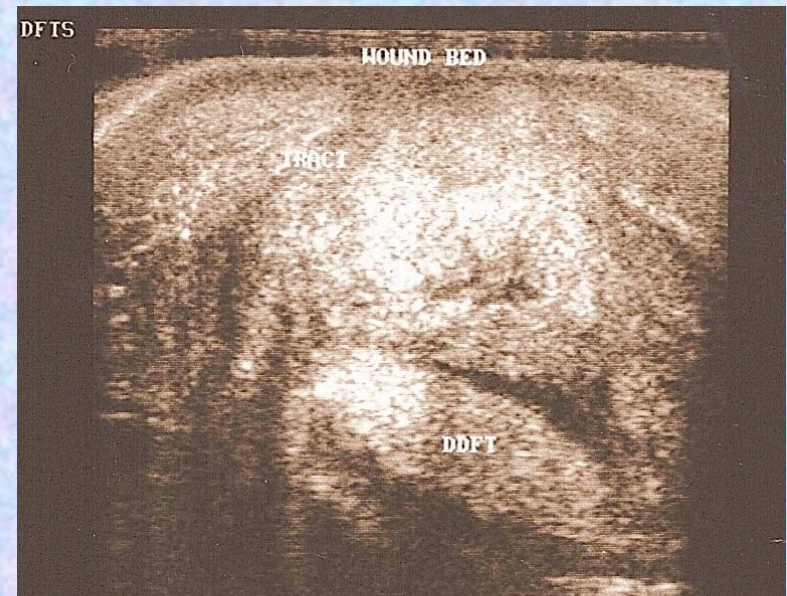
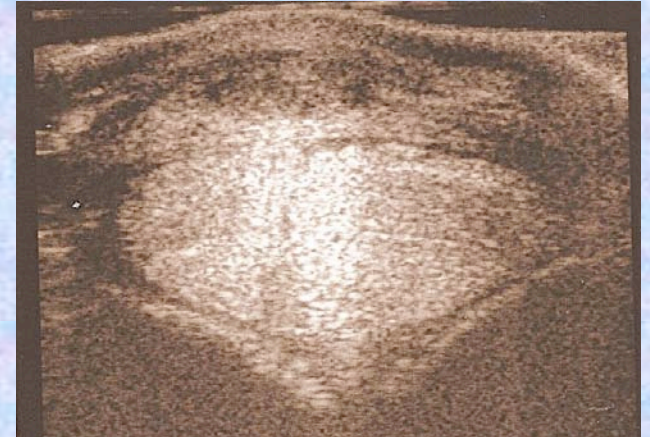
Soft Tissue Injury

- Tendons and Ligaments are fiber bundles
 - When fibers tear: Produces pain, weakens the entire unit
- Classically:
 - Occur with rapid change in direction
 - More Frequent with deep footing
 - Moderate Intermittent Lameness
 - Worse towards outside of circle
- Diagnosis:
 - Where? Nerve Blocks
 - What?
 - * Ultrasound *
 - MRI/CT Scan



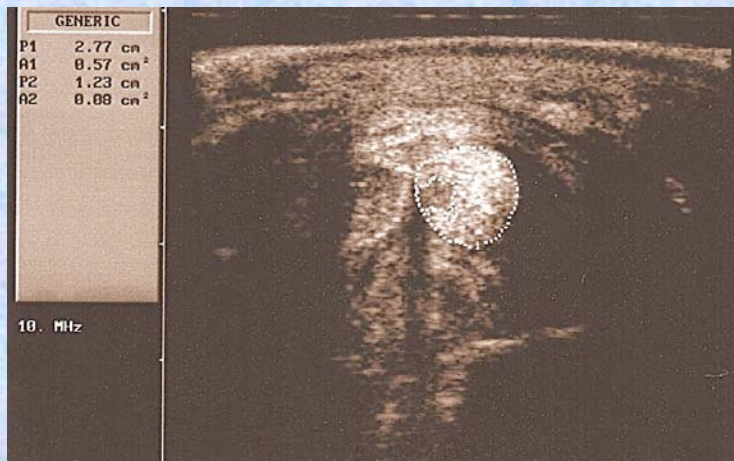
Flexor Tendon Injuries

- Mild “Bow”: Peritendinous Swelling
 - E.g. “Bandage Bow”
 - Short-Term Rest - Weeks
- Severe “Bow”:
 - Fiber Tearing
 - Long-term rest - Months
- The Classic Soft Tissue Injury
 - Early: Obvious to See and feel
 - Late: May palpates normal
 - May have minimal Lameness until extended work



Suspensory Ligament

- Occurs during sliding stops
- Suspensory Branches
 - Just above the fetlock joint
- Origin of the Suspensory
 - Just below the knee/hock





Computed Tomography



Magnetic Resonance Imaging

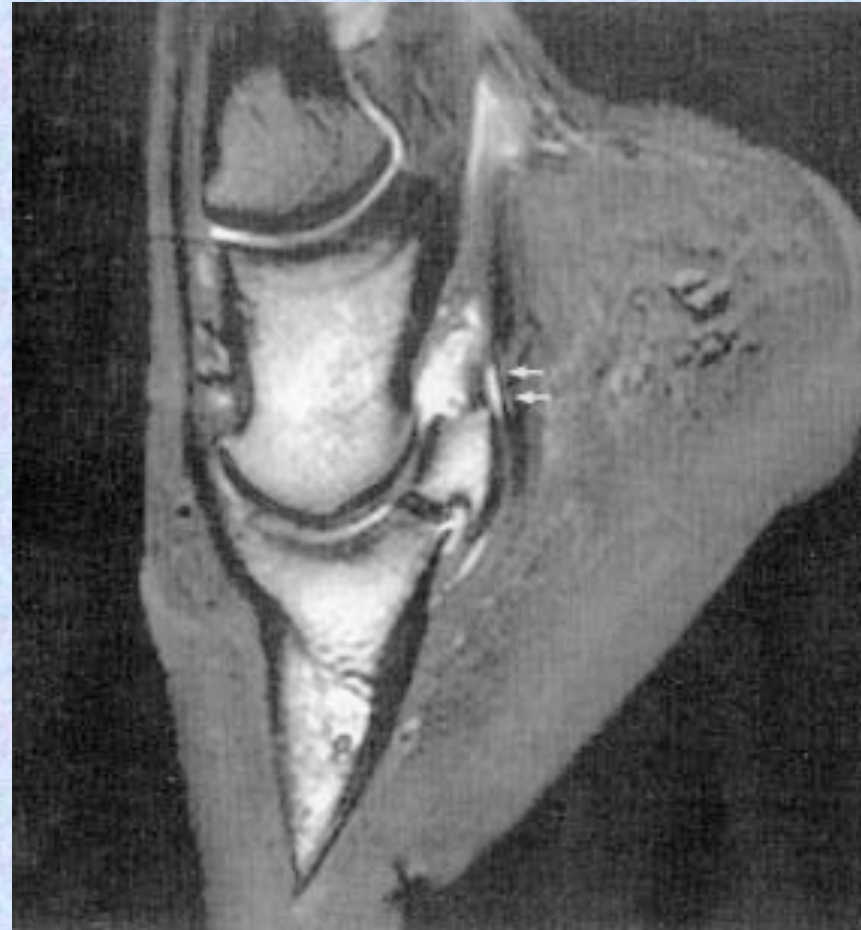


Arthroscopic Evaluation

- Synovial Structures
 - Joint, Tendon Sheath
- Offers direct visual evaluation of the area
- Areas inaccessible to U/S or MRI
 - E.g. Deep Flexor Tendon within Tendon Sheath
 - Cruciate Ligaments of Stifle

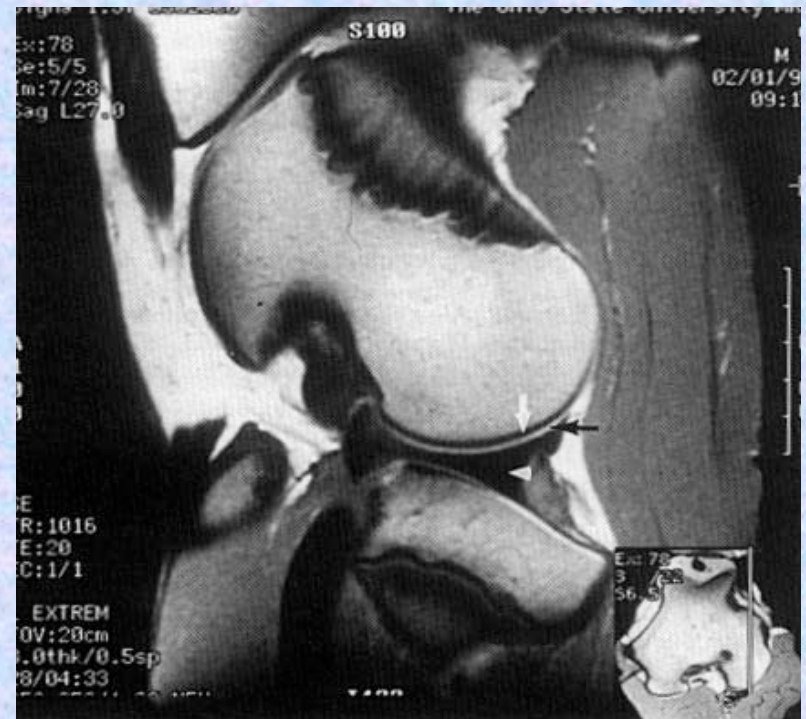
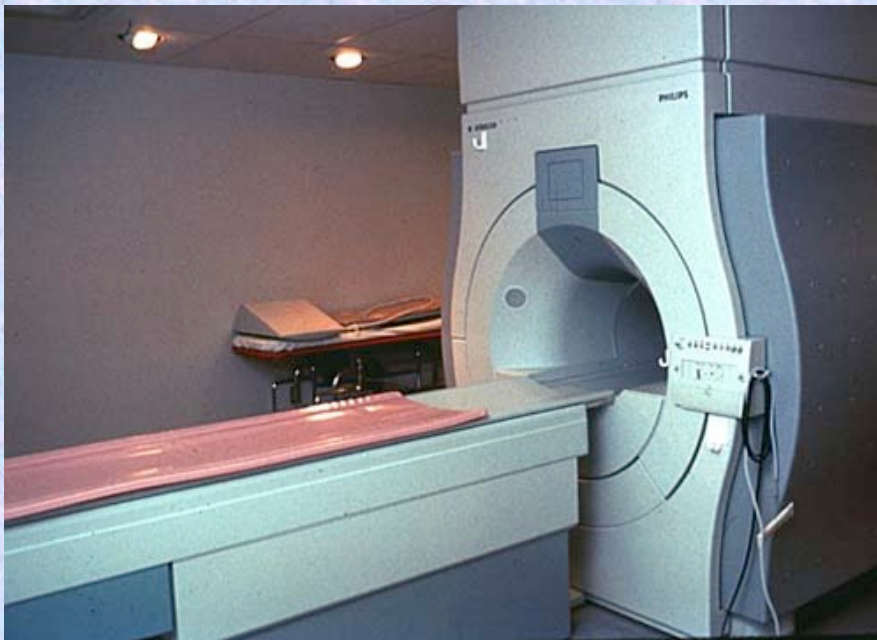


Digital Radiography vs MRI



MRI: Magnetic Resonance Imaging

- Powerful magnet induces flux “vibrations” in tissue
- Different tissues vibrate differently
 - Complex Algorithms Generate Images
- High Power (1 T) vs. Low Power (0.3 T)

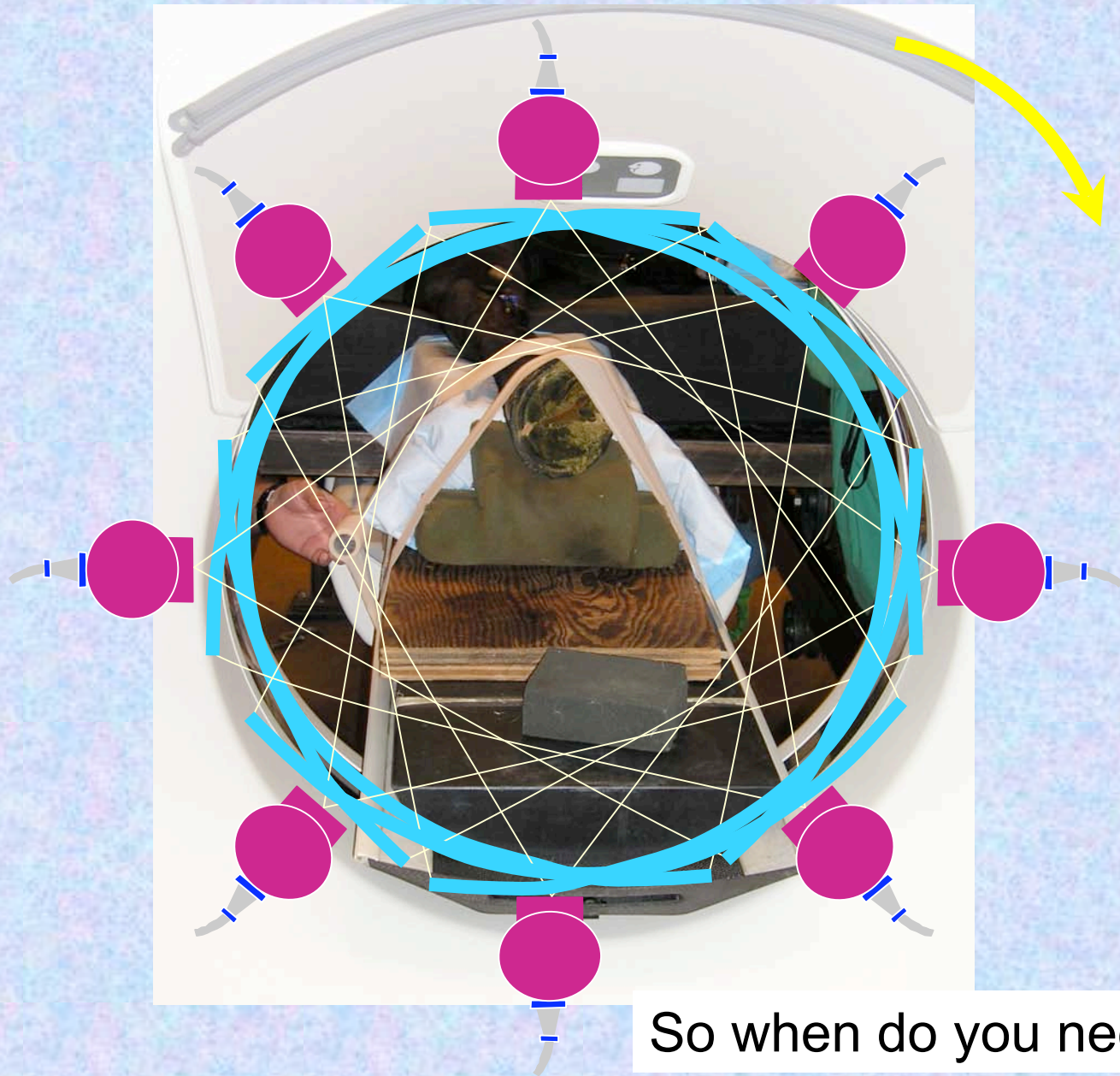


Computed Tomography: CT

Creates a series of circular Radiographs: “Slices”



Computer processes Images → Reassembles in ANY plane



So when do you need CT?

Heel Pain



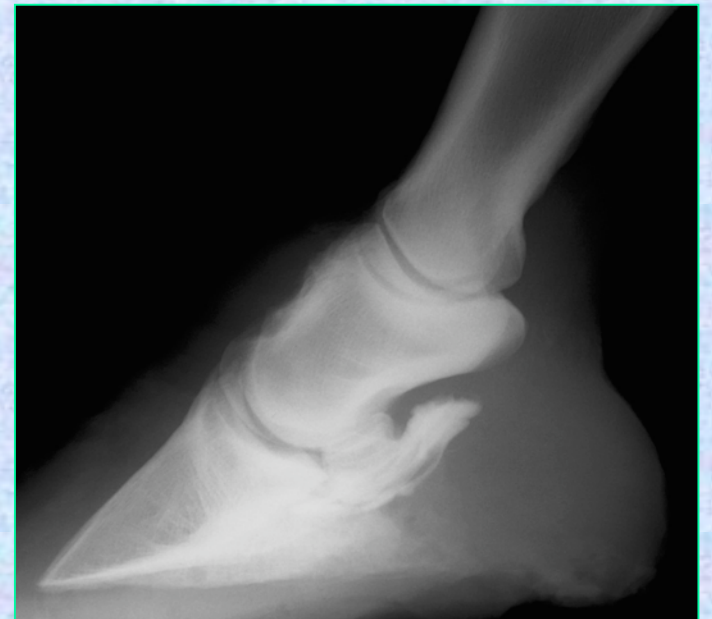
- Aka “Navicular Disease”
- Navicular Bone is rarely the problem



- Instead:
 - Solar/Pedal Pain
 - Deep Digital Flexor Tendon
 - Sesamoidean Ligaments
 - Collateral Ligaments (Pastern, Coffin Jts.)
 - Navicular Bursa, Impar Lig.
 - Suspensory Lig. of Navicular

Treatments

- *Trimming and shoeing:
 - Hoof-pastern Axis:
 - Maintaining strong, wide heels
 - Minimizing the toe to ease Break-Over
- “Bute” as needed
 - Side Effects
 - Does not treat the primary inflammation
- Shockwave
 - Minimize pain
 - Stimulate soft-tissue healing
- Navicular Bursa Injections
 - Symptomatic Therapy
- Coffin Joint Injections
 - Coffin Joint Pain may be a component
 - “Reservoir” for treating the entire region



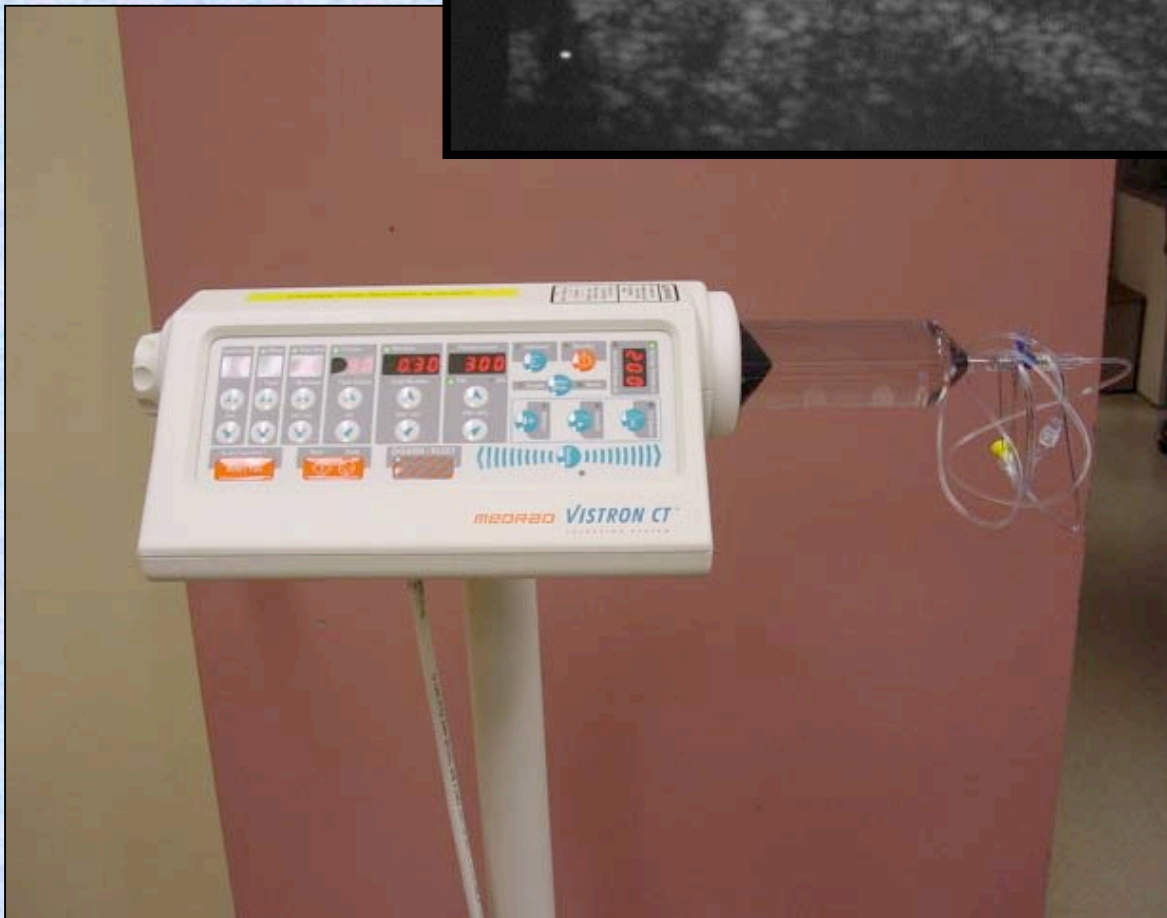
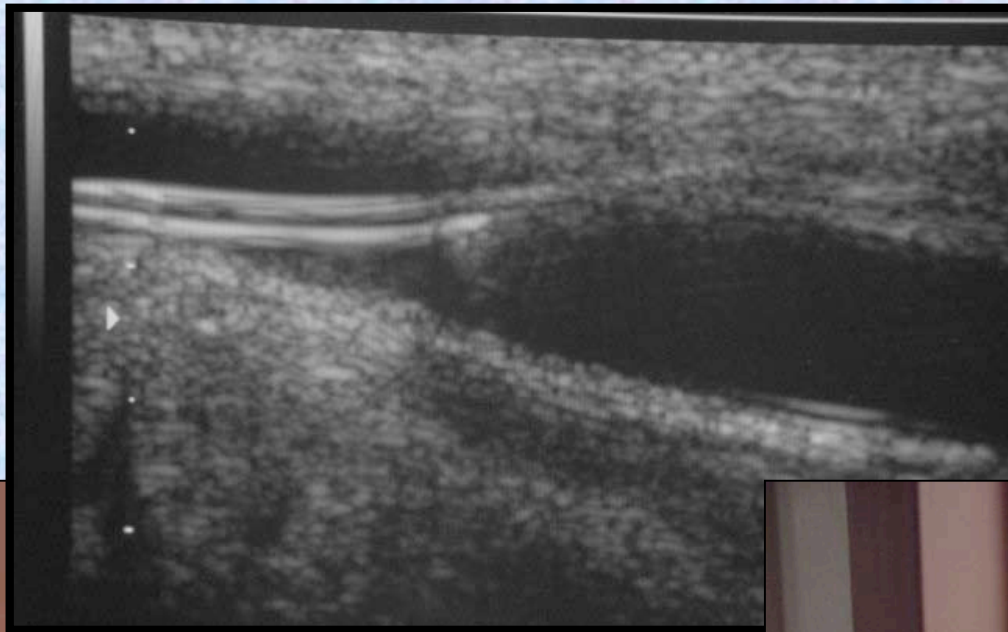
Contrast Enhanced CT

- Helical

- Rapid
 - 1 slice per second
 - 45 seconds per limb
- Thin slices
 - Min 1 mm

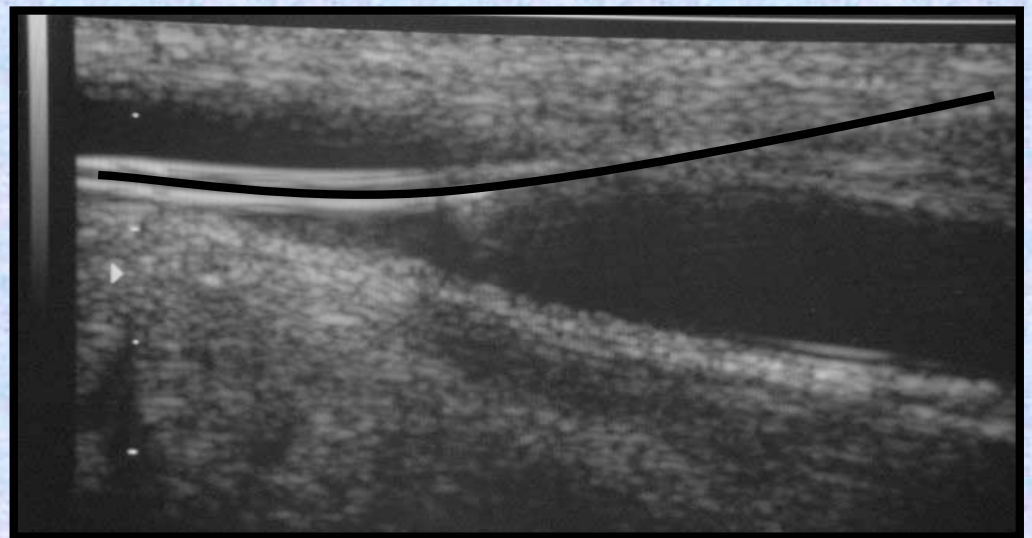
- Contrast





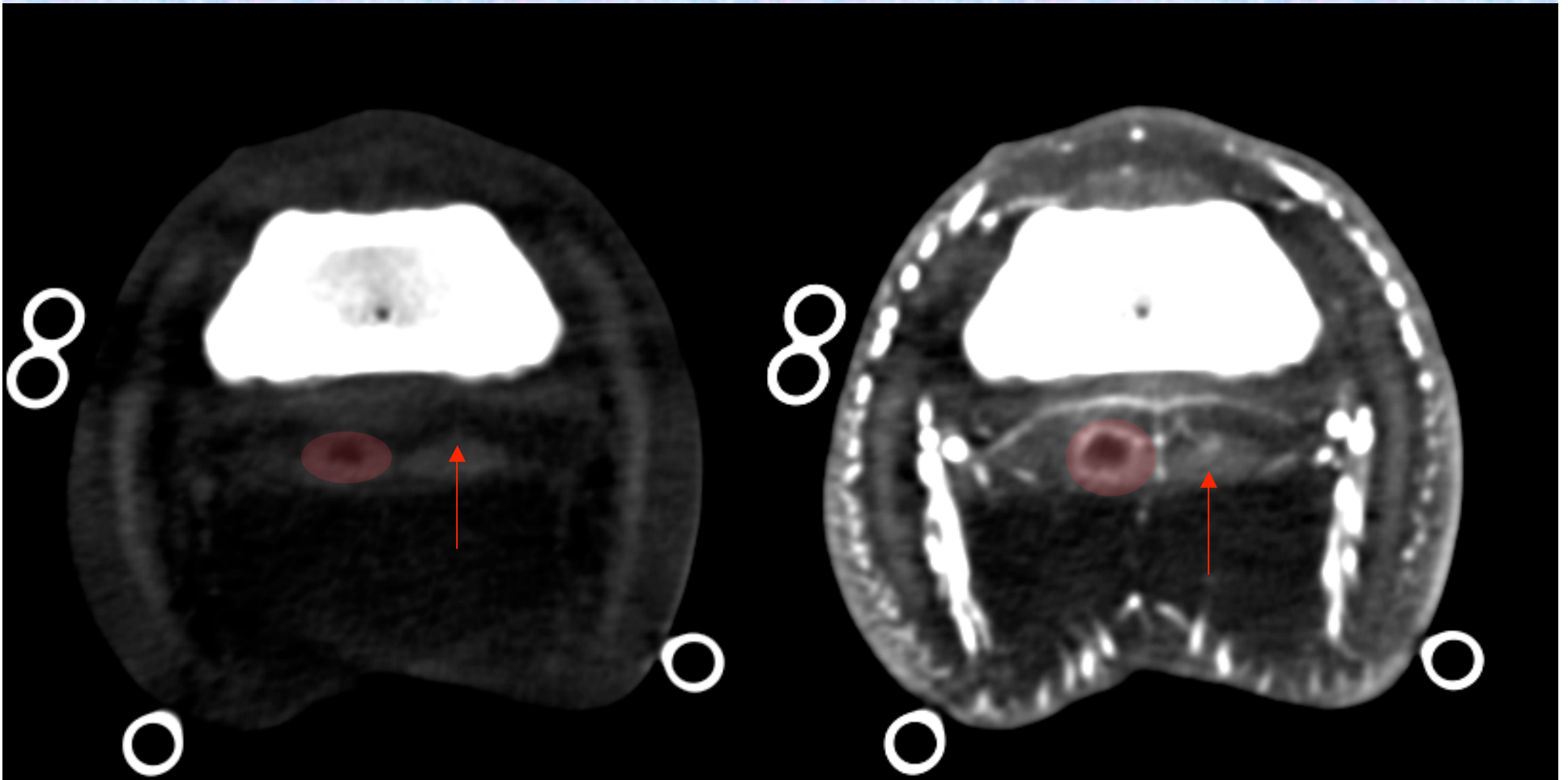
Contrast Enhanced CT

- **Equine use:**
- Intra-arterial
 - 100 – 150 mL
 - Concurrent scanning and administration
 - Blood vessel i.d.
 - Contrast extravasation



8 Year-old Warmblood Medial Lobe DDF Tear

Case I



Very Difficult to ID without Contrast



Case II : WB Jumper



- Blocked to Palmar Digital Nerve
- Blocked to DFTS

Radiographs were Normal...



Case II

8 year old Warmblood

TS and PD to block

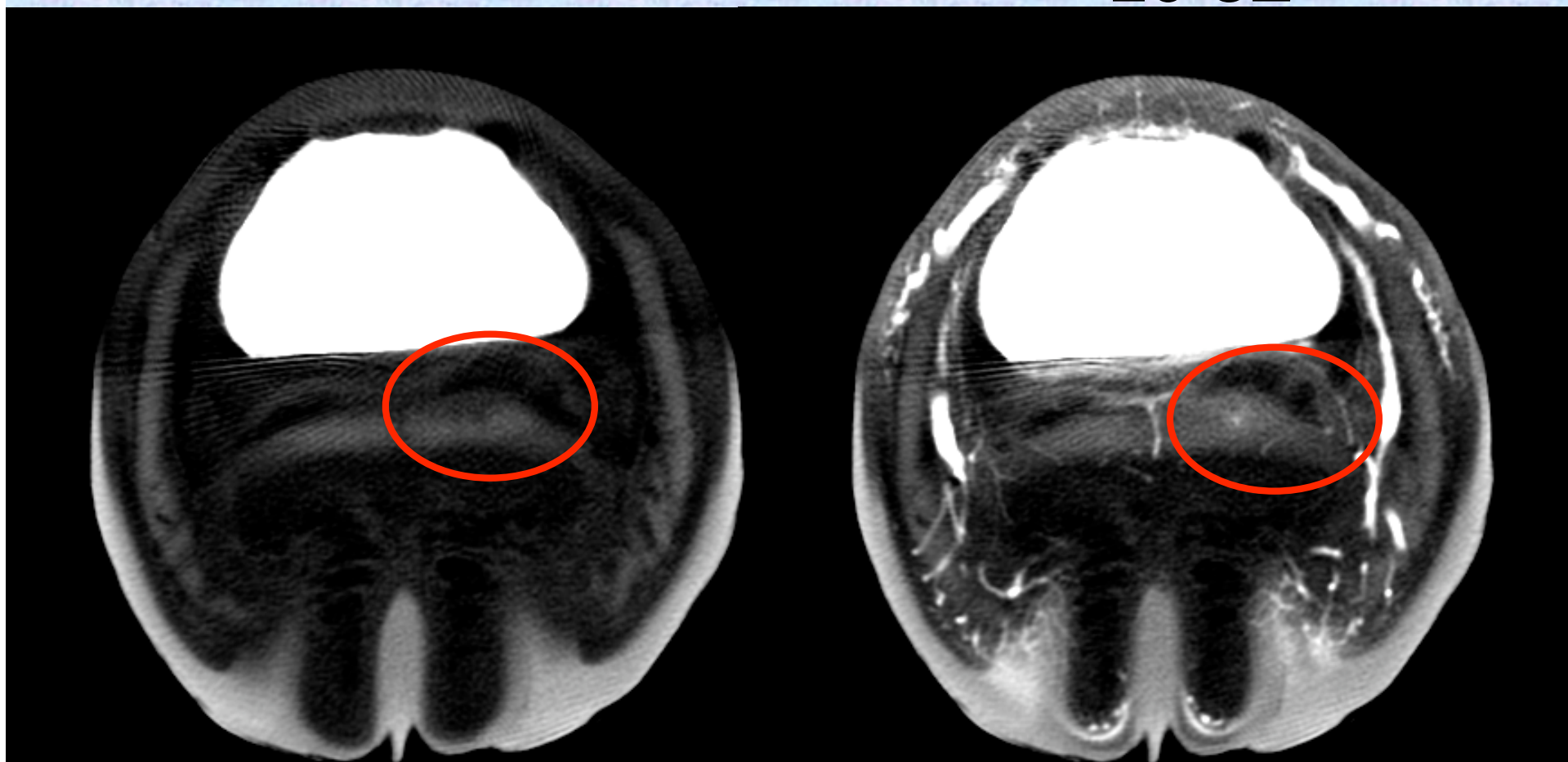


Case II

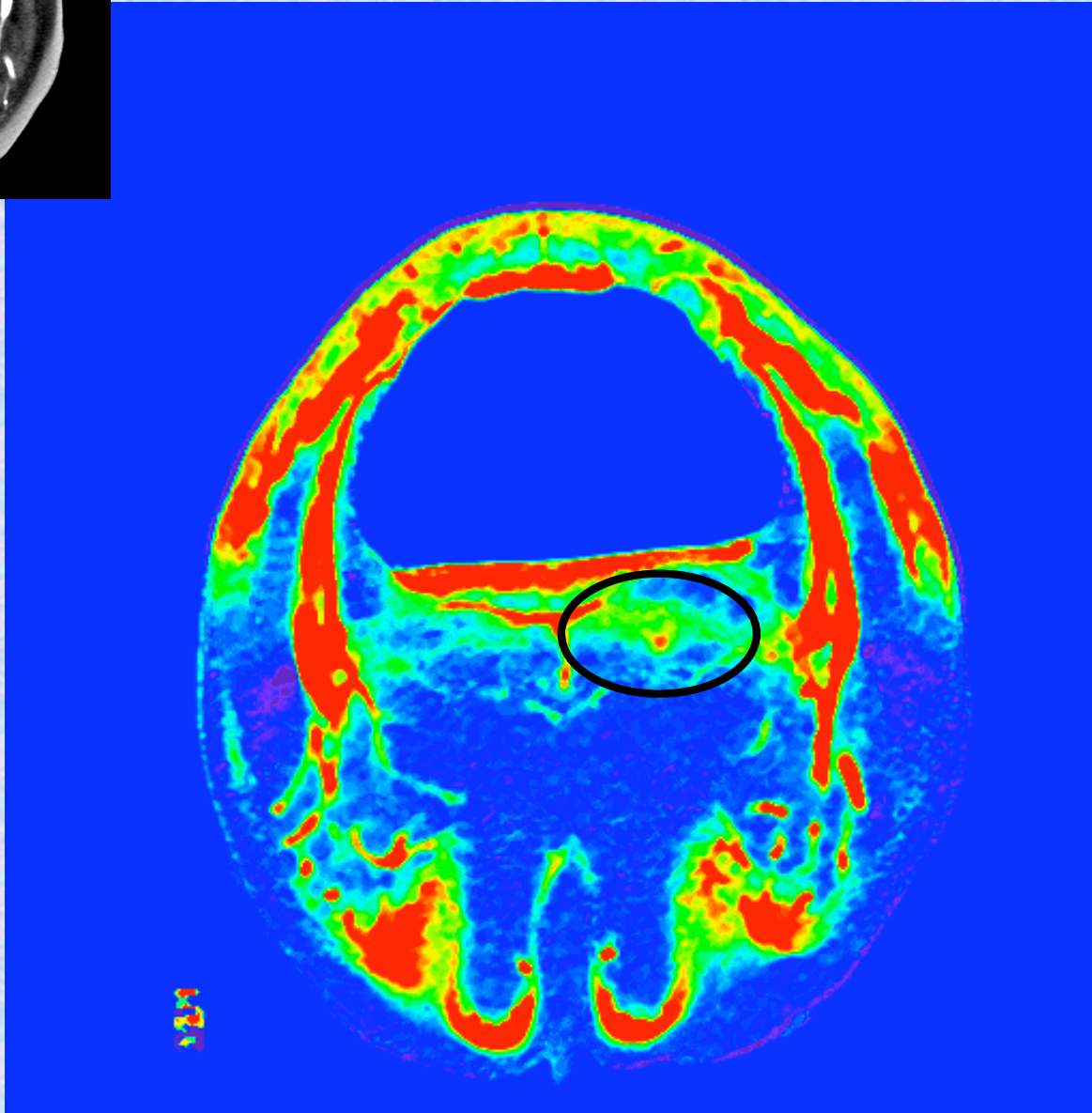
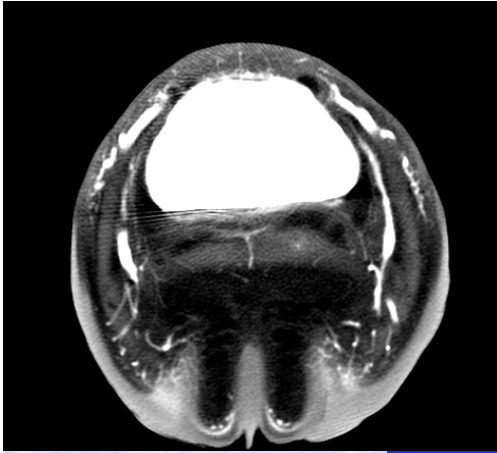
8 Year-old Warmblood Jumper
88 limbs

59 DDFT

26 CL



Case II



121

5 yo reining horse

Case III

PDNn – No Change

Abaxial Sesamoid - Resolved



Further Evaluation

Radiographic Evaluation

NSF

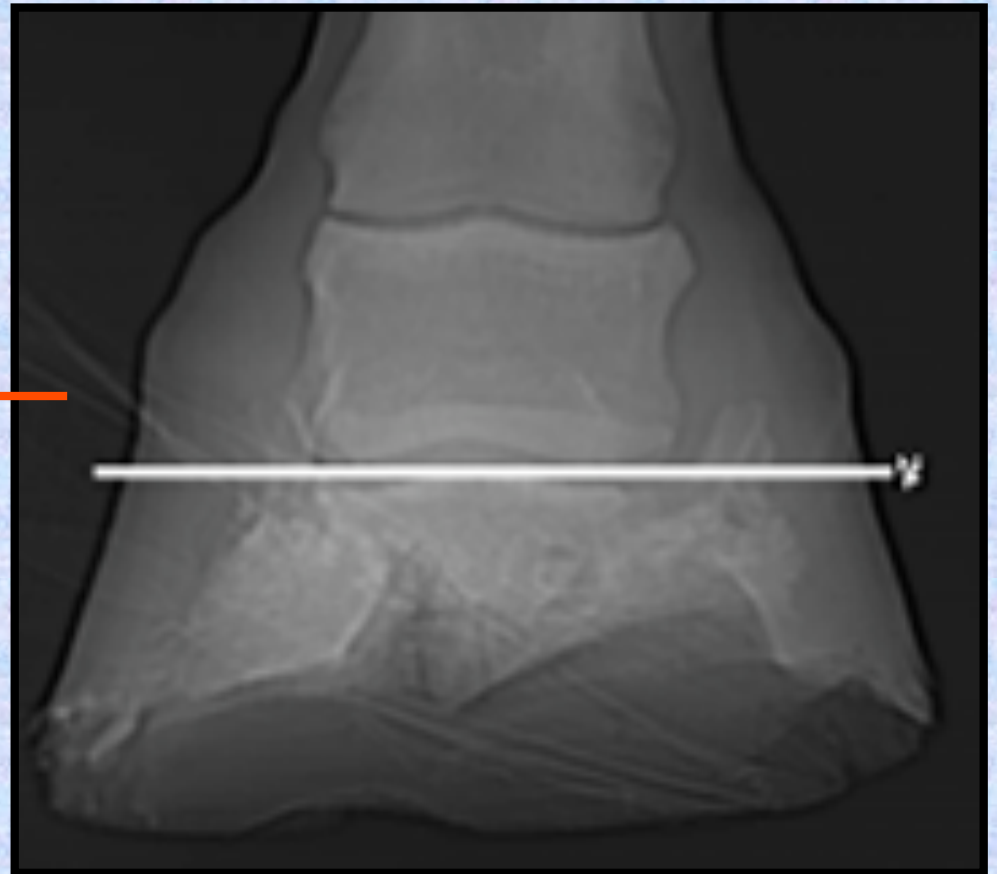
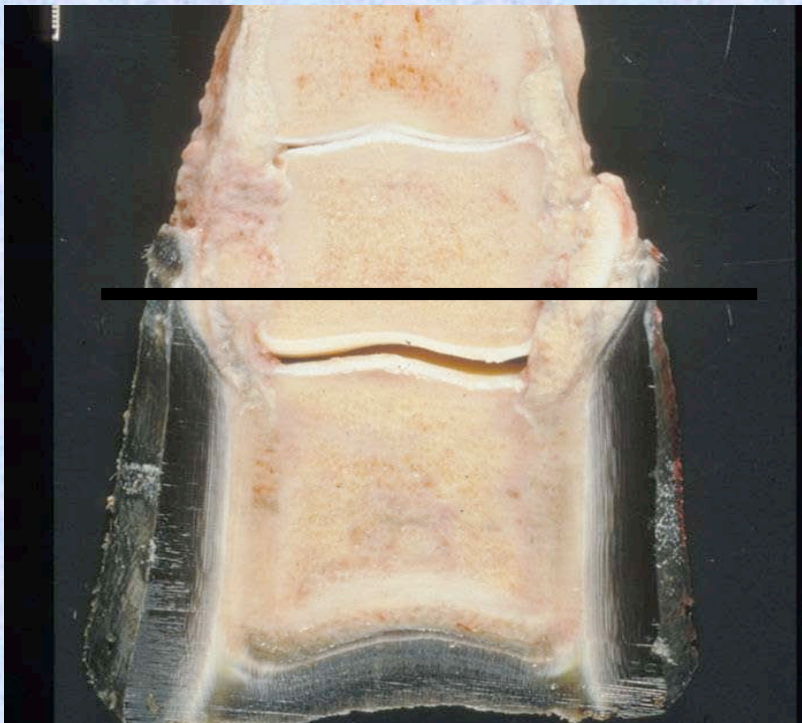
77 Horses

25% NSF



Case III

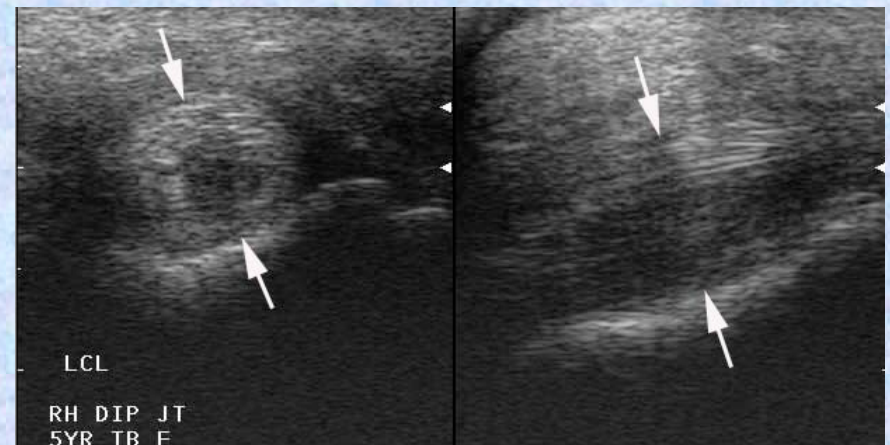
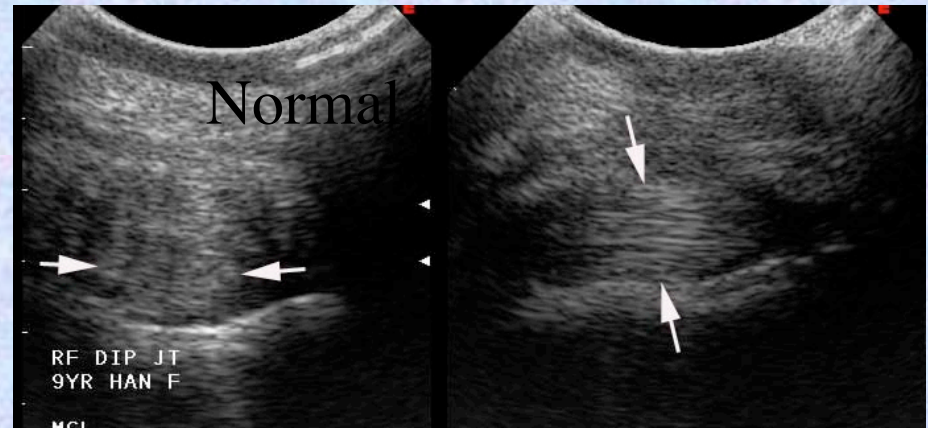
Areas of Interest



Collateral Ligament Injury Of The Coffin Joint

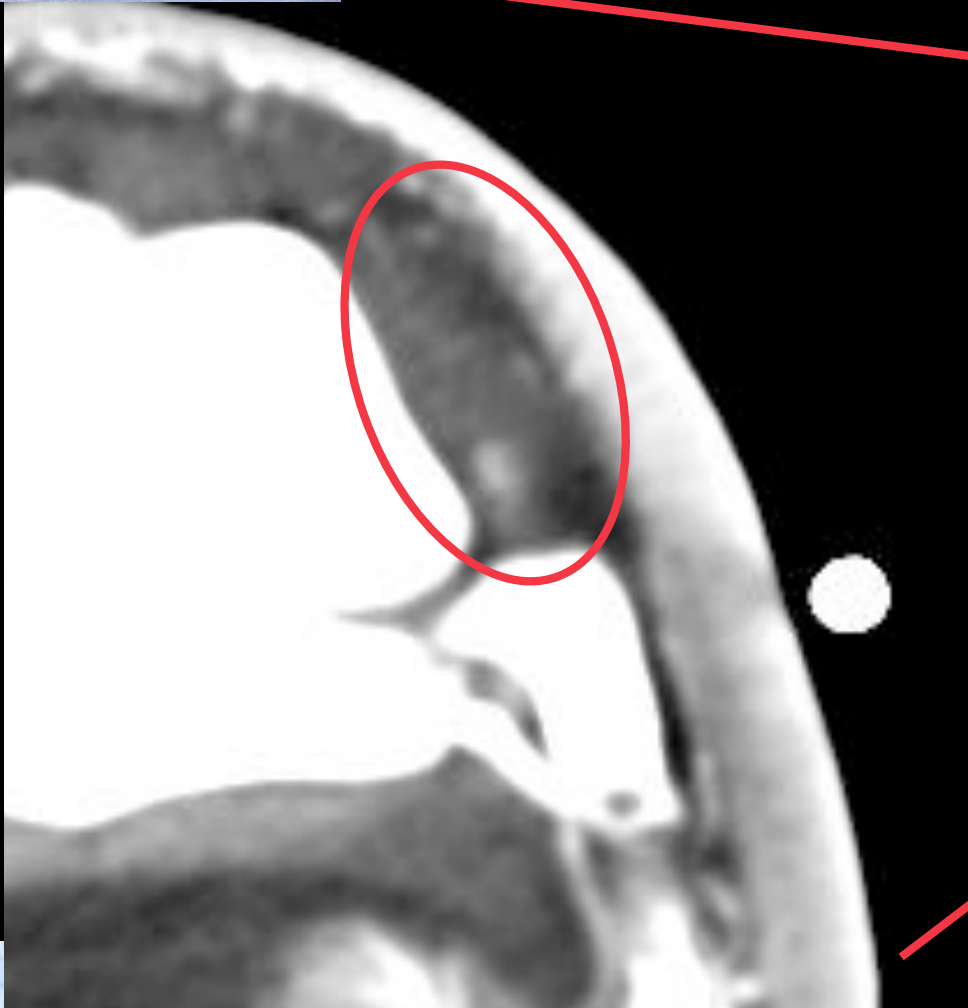
Often Will Not Improve With Coffin Joint Anesthesia
2nd most common soft tissue lesion in foot area

- **Collateral ligament injuries**

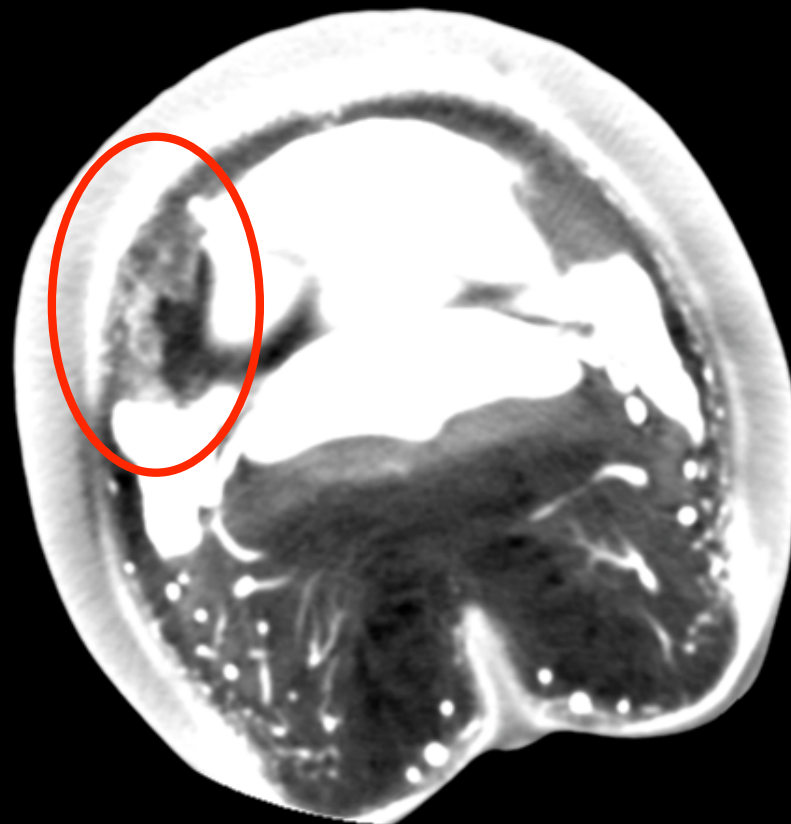
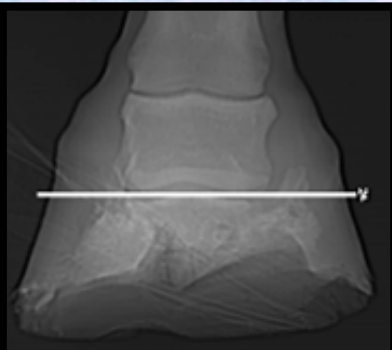




Case III



Collateral Ligament of the Coffin Joint

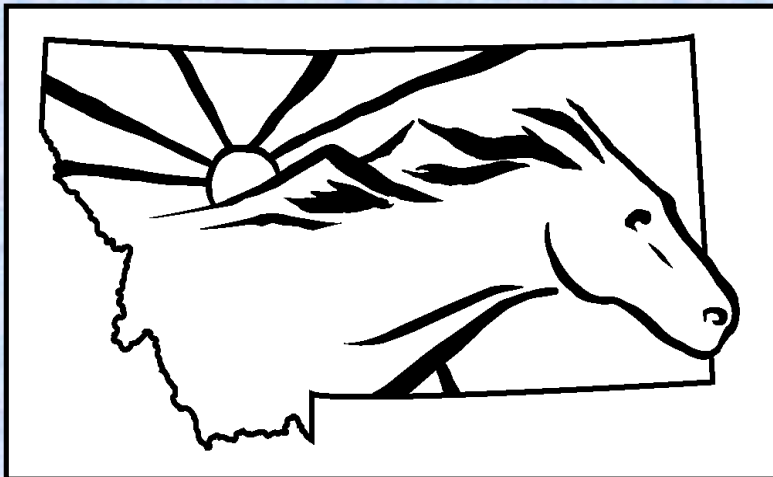


Thank You!!!

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