



Musculoskeletal Ultrasound

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Introduction

- Very popular and widely utilized in Europe and Australasia
- Few scattered centers of excellence in USA
- Early dominance of MRI
- Financial
- Attitudes
- Technological advances of US more recent

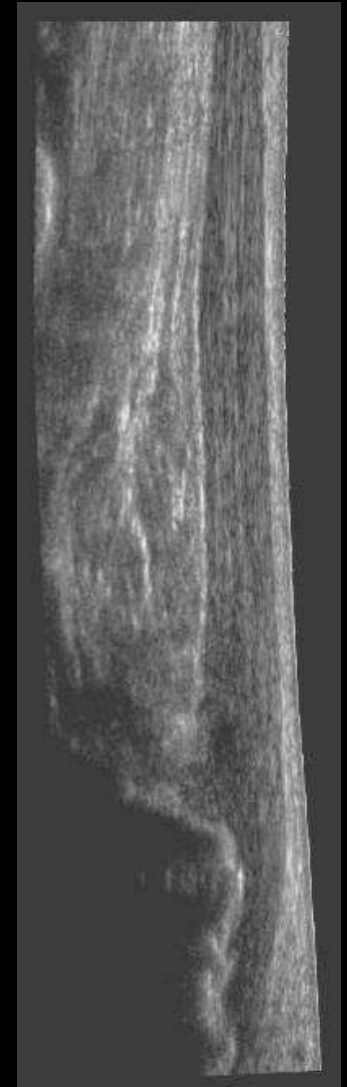
Equipment

- Frequency 5-17MHz
- Linear array
- Compound
- Extended field



Pros

- Higher spatial resolution in near field
- Dynamic - Move, Compress
- Scan both sides
- Interactive, targeted
- Cheap, Fast, Well tolerated, Safe
- Color and Spectral Doppler
- Guide injection



Achilles tendinosis

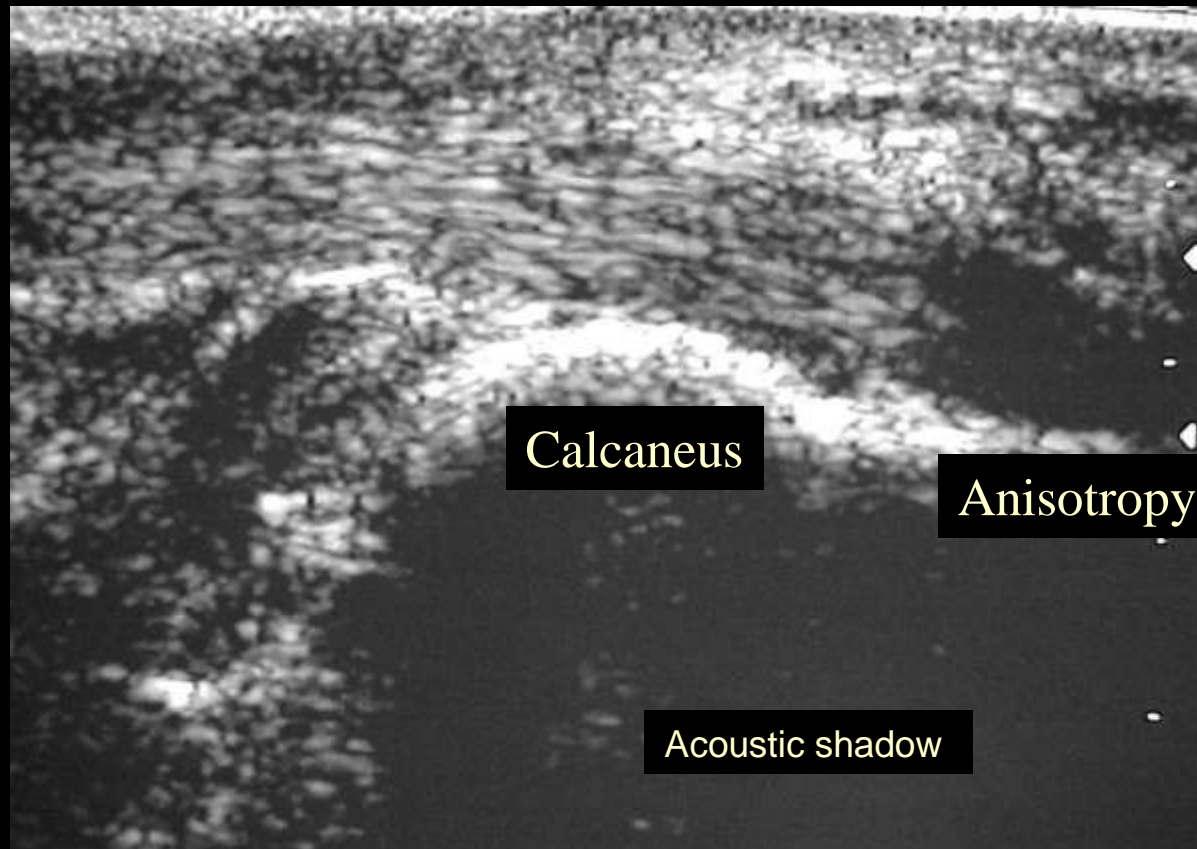
Cons

- Poor contrast resolution
- Can't see into bone, or beyond bone
- Limited resolution at greater depths
- Artifacts
- Operator dependant
- Patient body habitus
- Post op can be difficult

Artifacts

- Anisotropy
- Refraction
- Posterior shadowing
- Posterior enhancement
- Reverberation

Artifacts



Technique

- Scan in at least 2 planes
- Assess all 'abnormalities' (?artifact)
- Be dynamic
- Be interactive
- Use Doppler

Calf

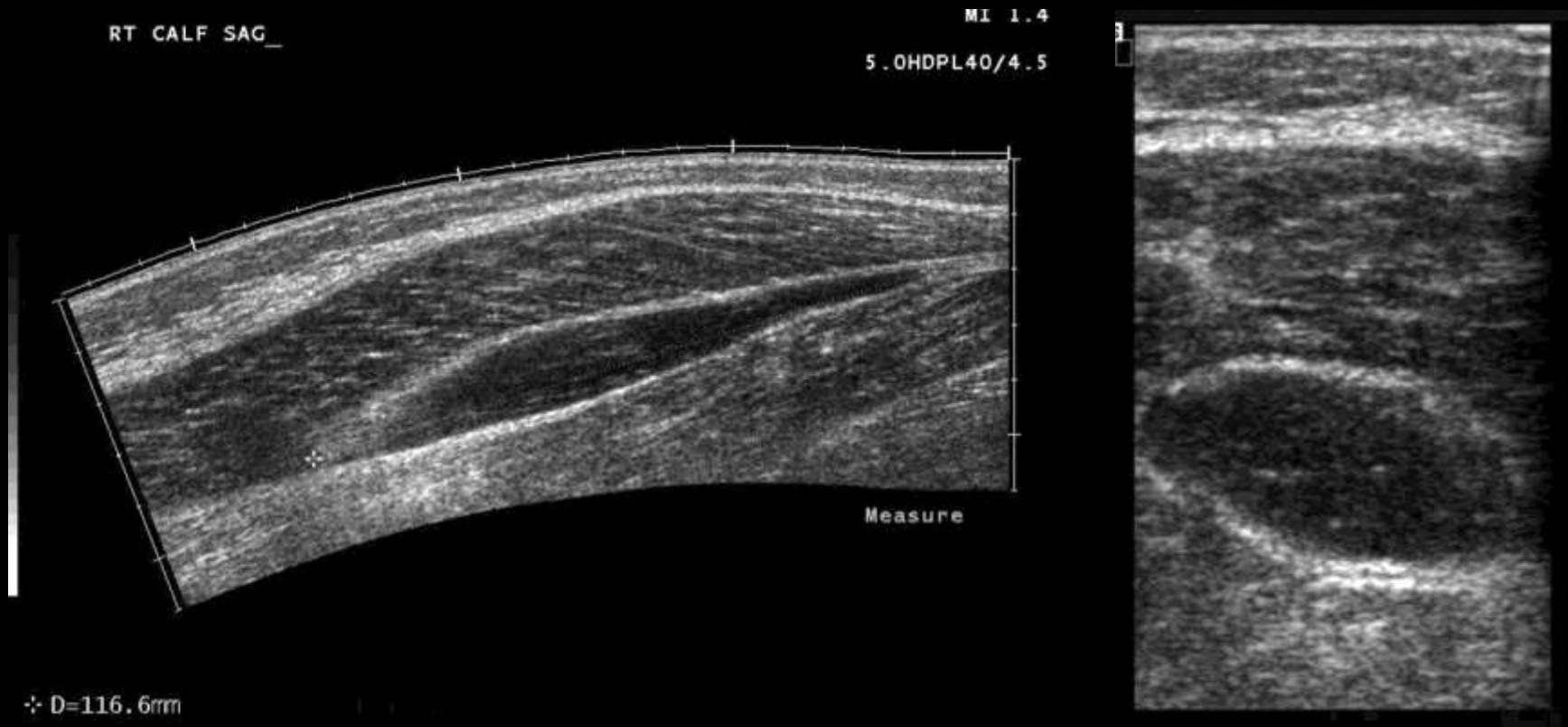
- DVT / Cellulitis
- Ruptured popliteal cyst
- Muscle strain
 - Tennis leg
- Muscle hernia
 - Standing



Calf



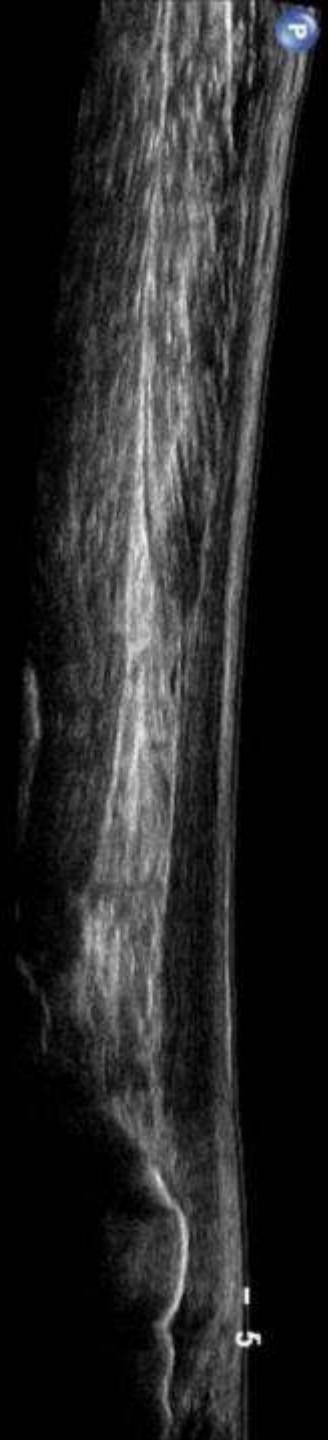
Calf



Ruptured plantaris tendon

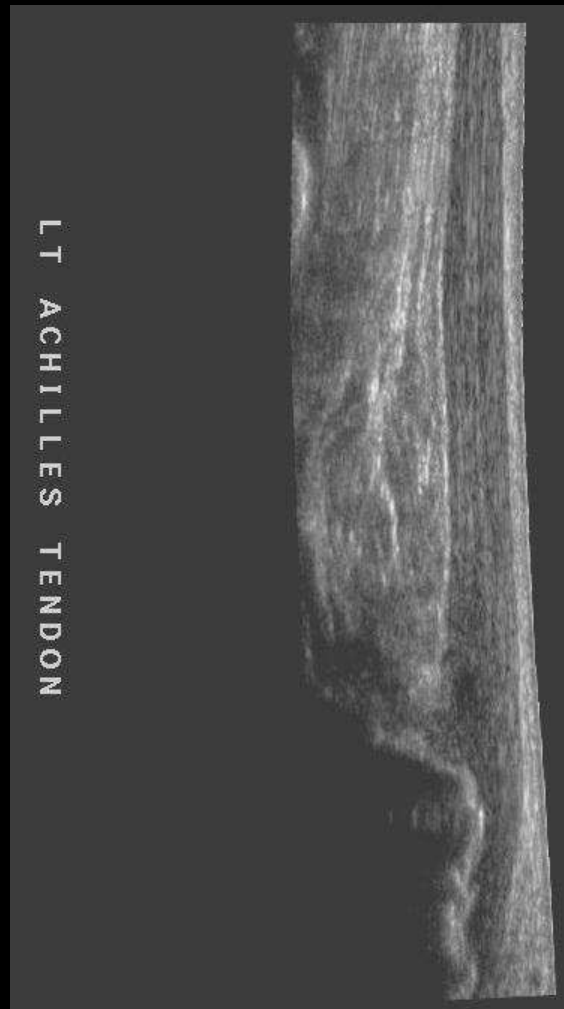
Ankle

- Tendons
 - Achilles
 - Medial
 - Lateral
- Ligaments are limited
- Tarsal tunnel syndrome



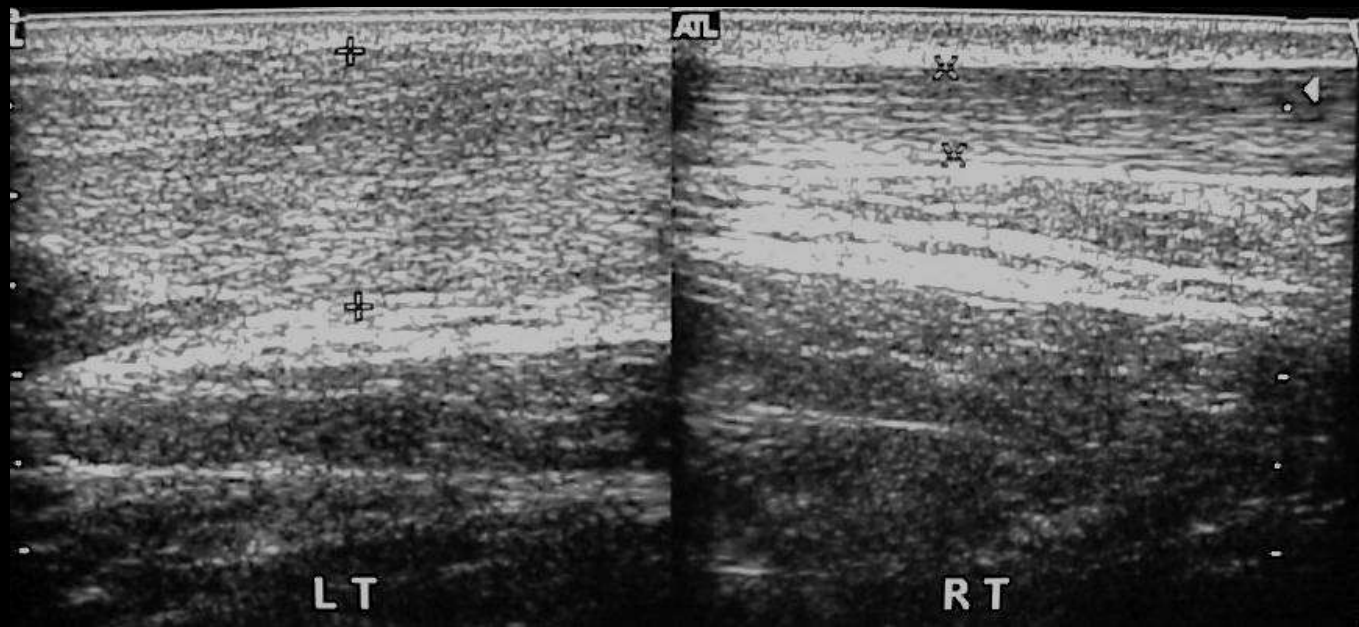
Musculoskeletal Ultrasound

Ankle - Posterior



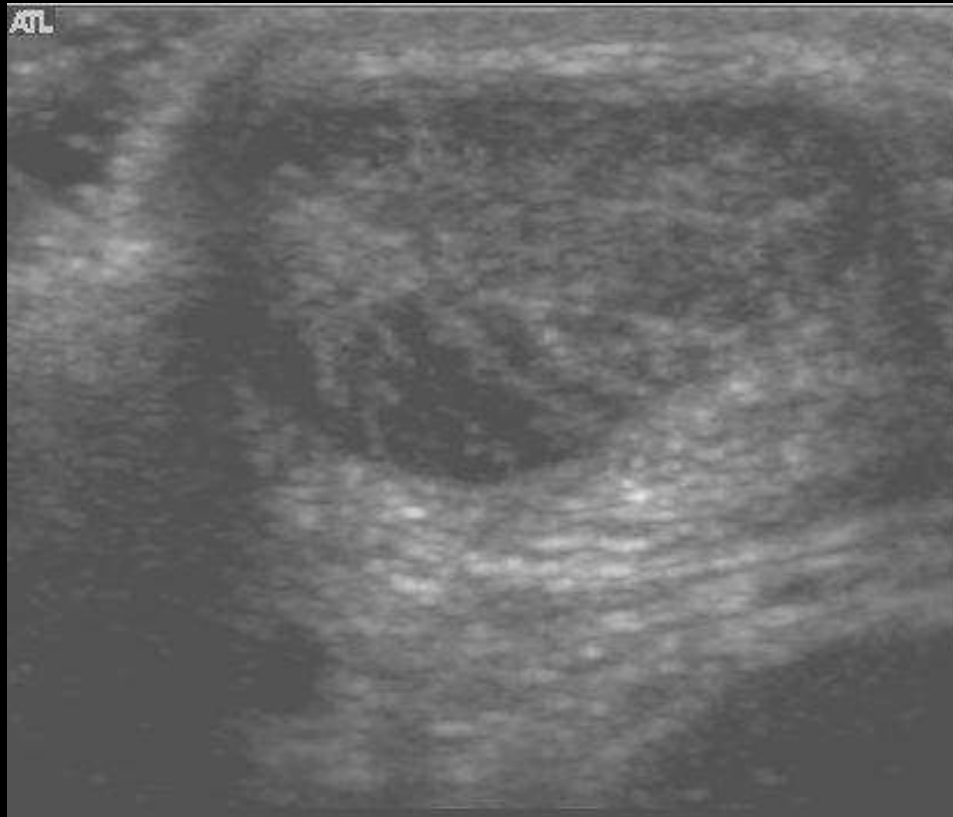
Musculoskeletal Ultrasound

Ankle - Posterior



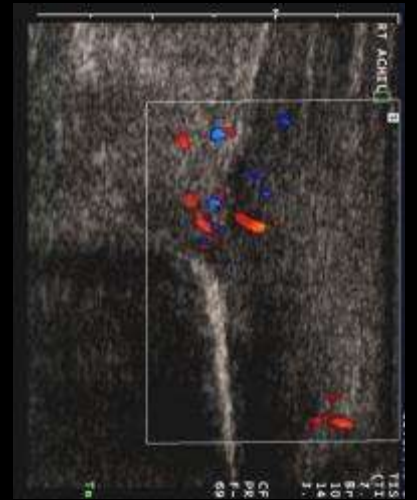
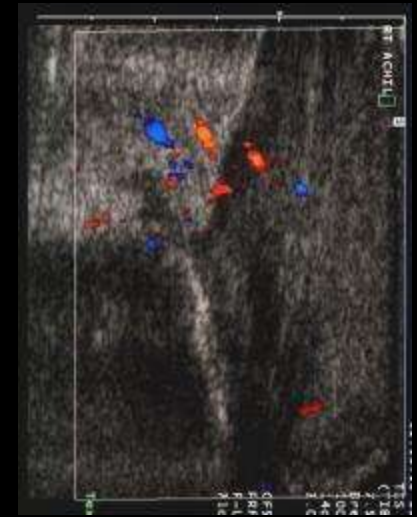
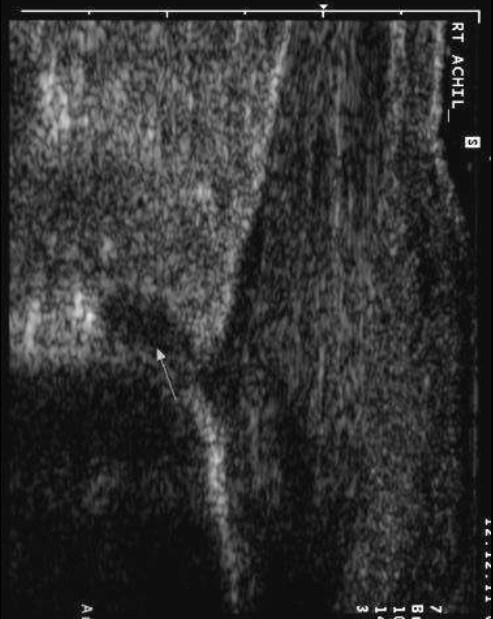
Musculoskeletal Ultrasound

Ankle - Posterior



Musculoskeletal Ultrasound

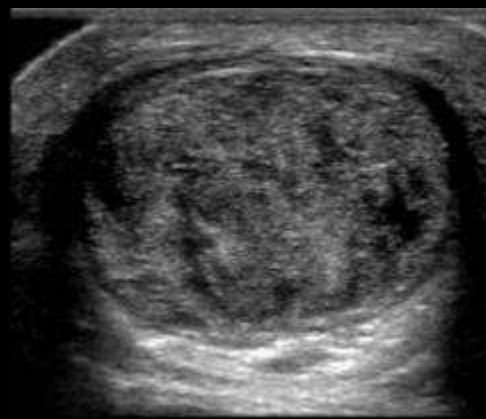
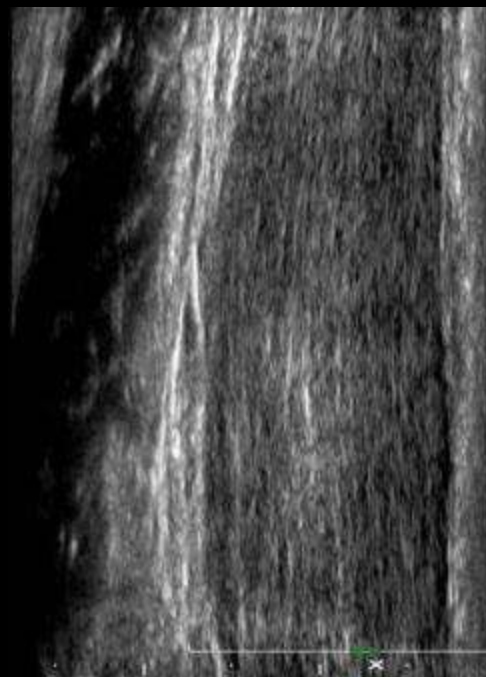
Ankle - Posterior



Achilles Tendon - Pump bump

Musculoskeletal Ultrasound

Ankle - Posterior

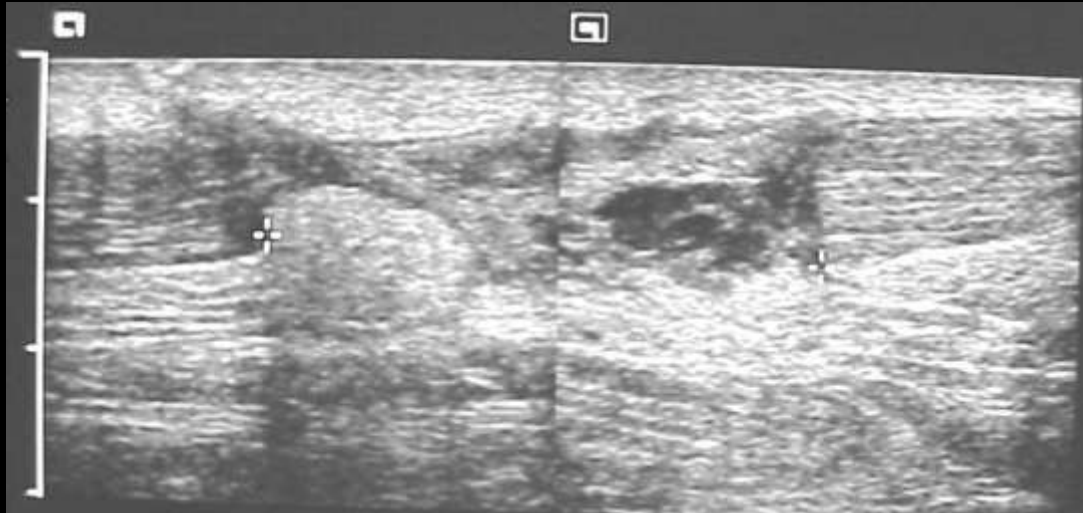


Panoramic imaging

Achilles tendon low grade partial tear

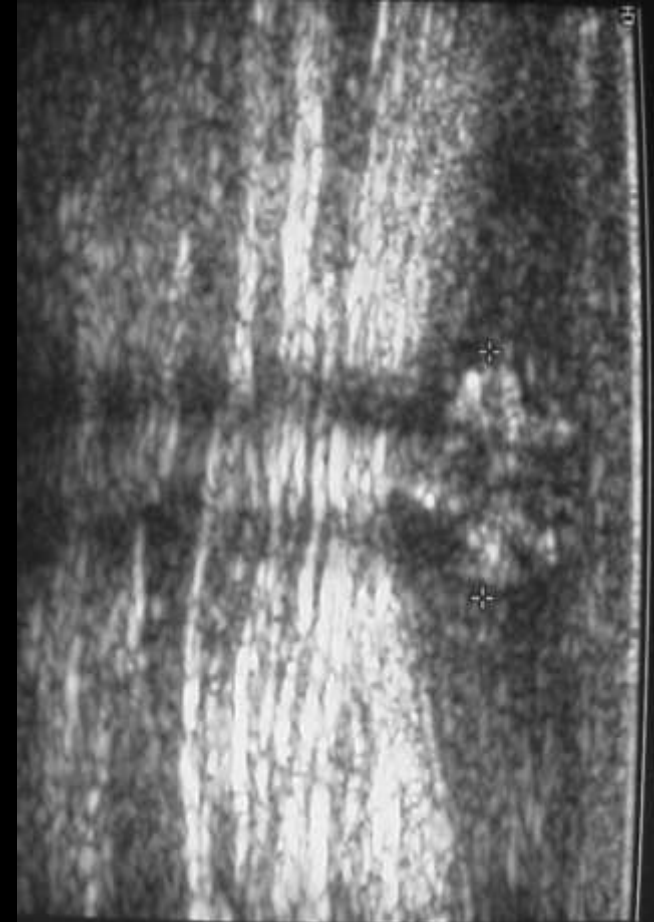
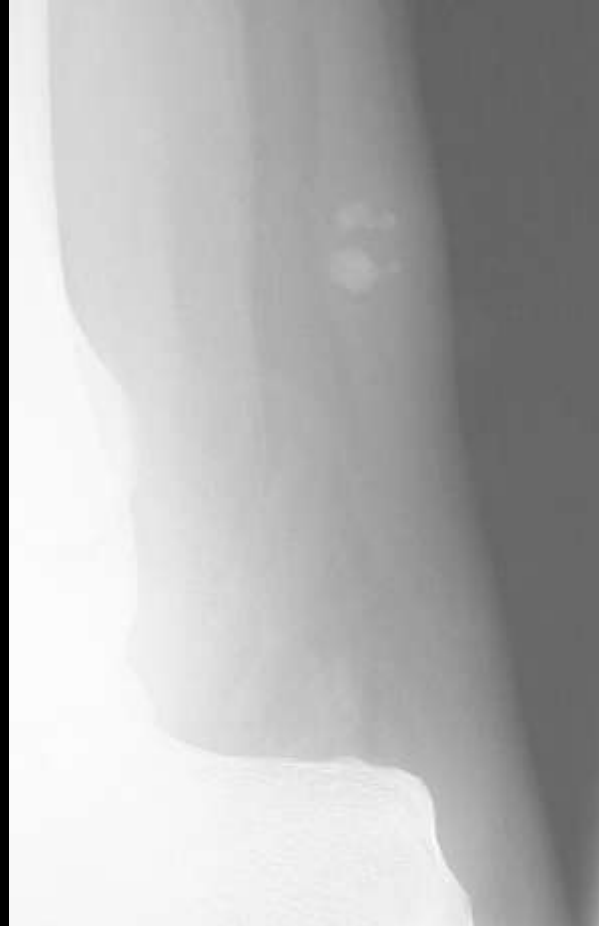
Musculoskeletal Ultrasound

Ankle - Posterior



Musculoskeletal Ultrasound

Ankle - Posterior



Dystrophic Calcification post injury

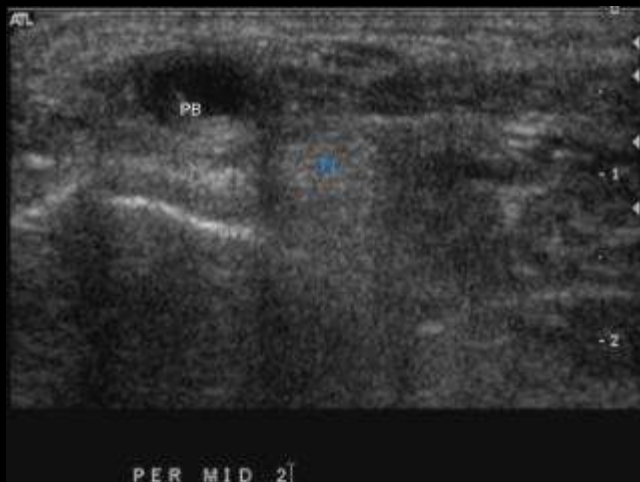
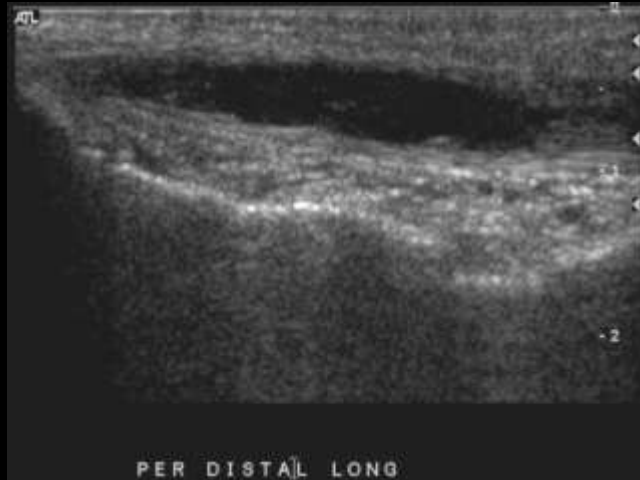
Musculoskeletal Ultrasound

Ankle - Lateral



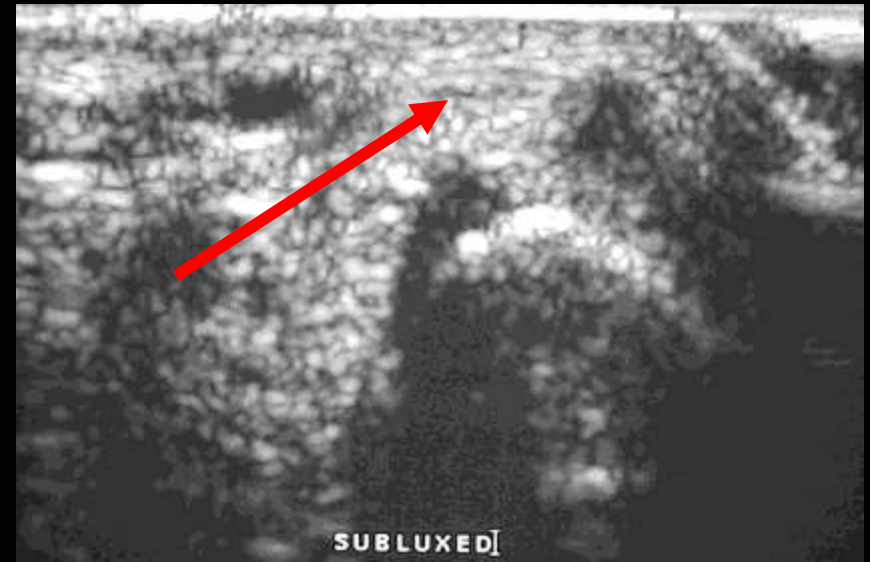
Musculoskeletal Ultrasound

Ankle - Lateral



Musculoskeletal Ultrasound

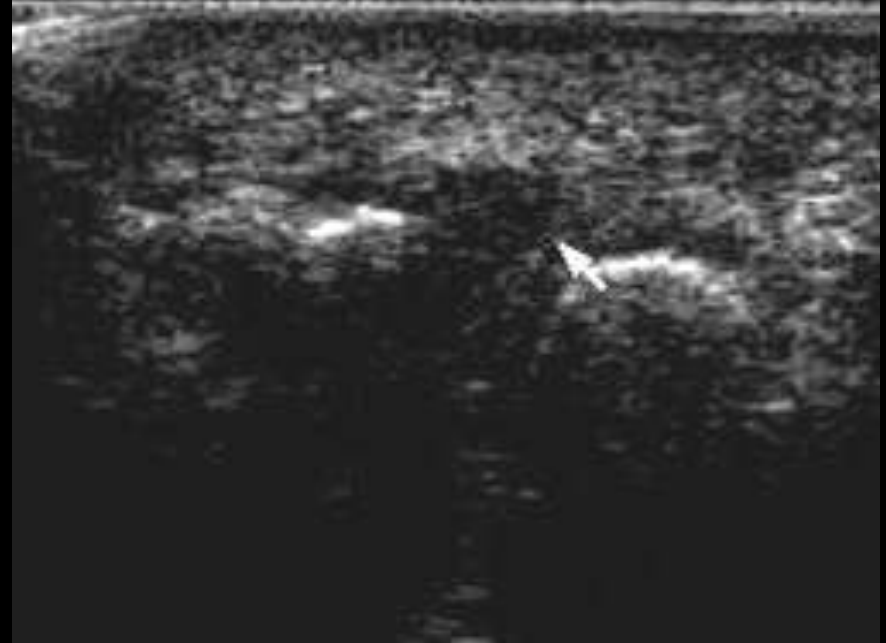
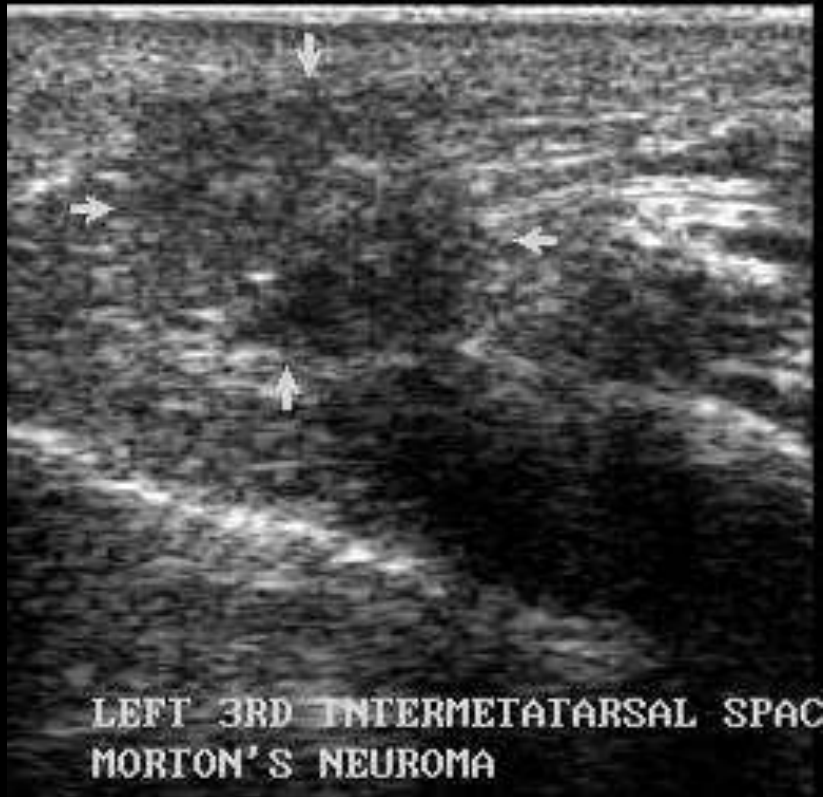
Ankle - Lateral



Foot

- Morton's neuroma
 - Steroid injection
- Ganglia
- Plantar fasciitis
- Plantar fibroma/fibromatosis
- Masses

Foot – Morton Neuroma

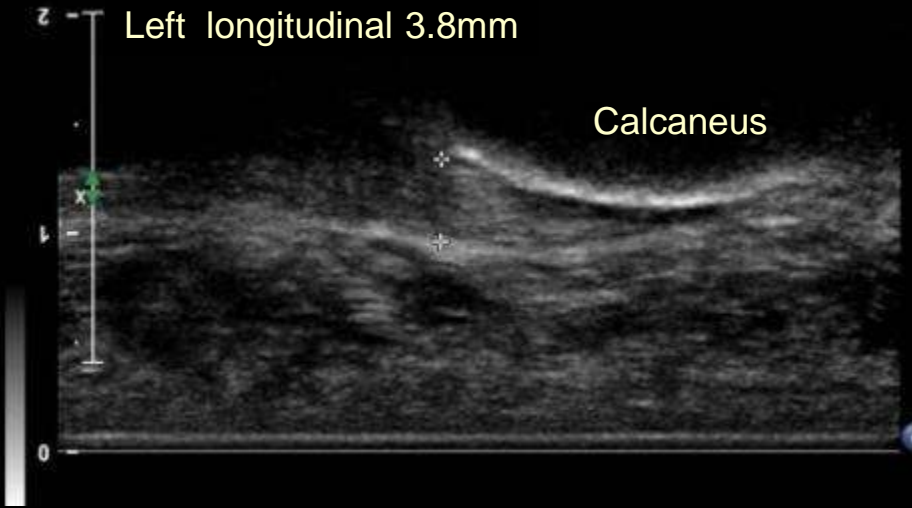


- Round or ovoid hypoechoic
- Power Doppler for bursitis

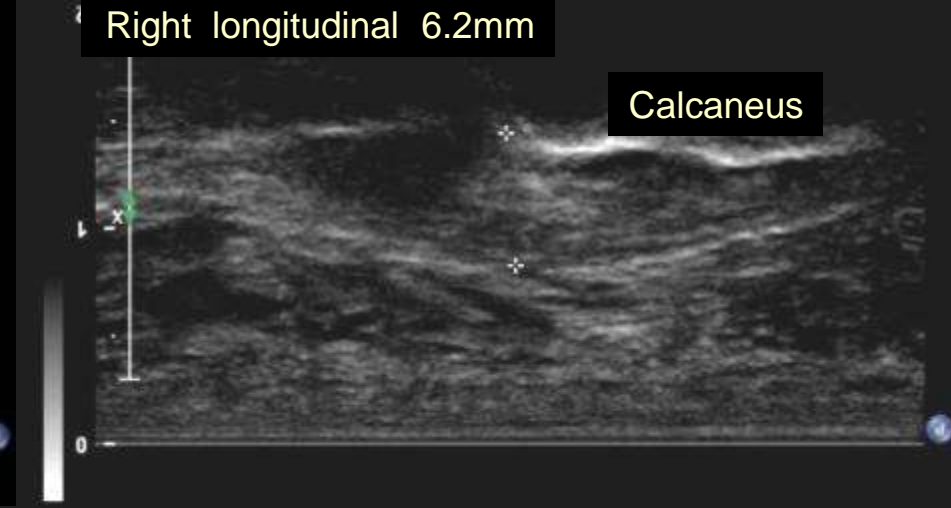
Musculoskeletal Ultrasound

Foot – Plantar fasciitis

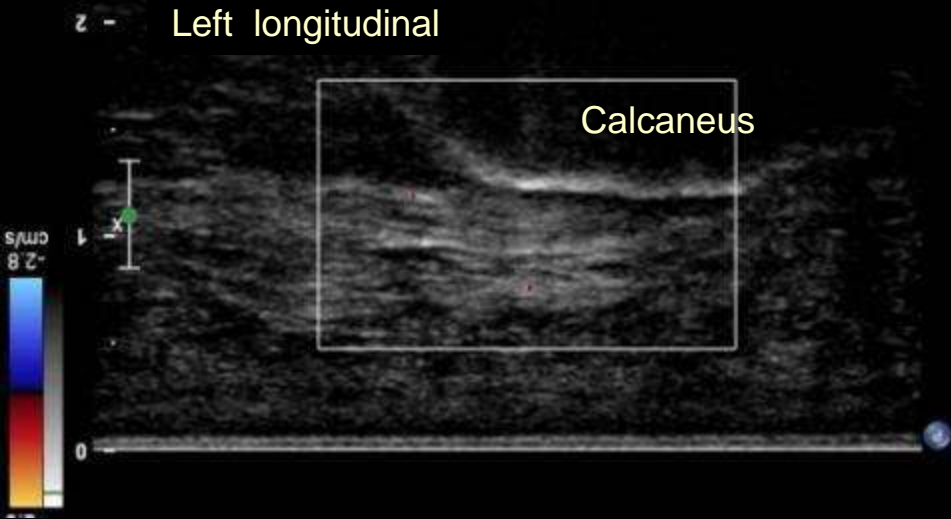
Left longitudinal 3.8mm



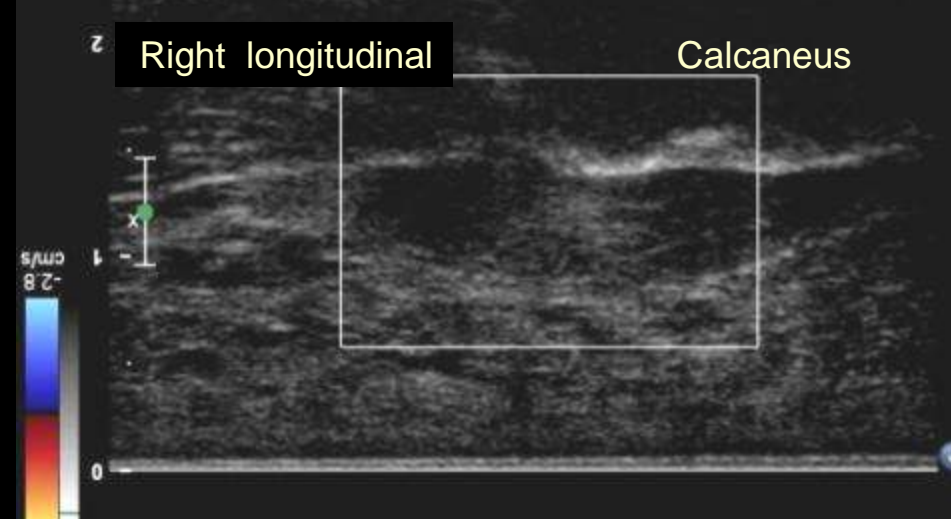
Right longitudinal 6.2mm



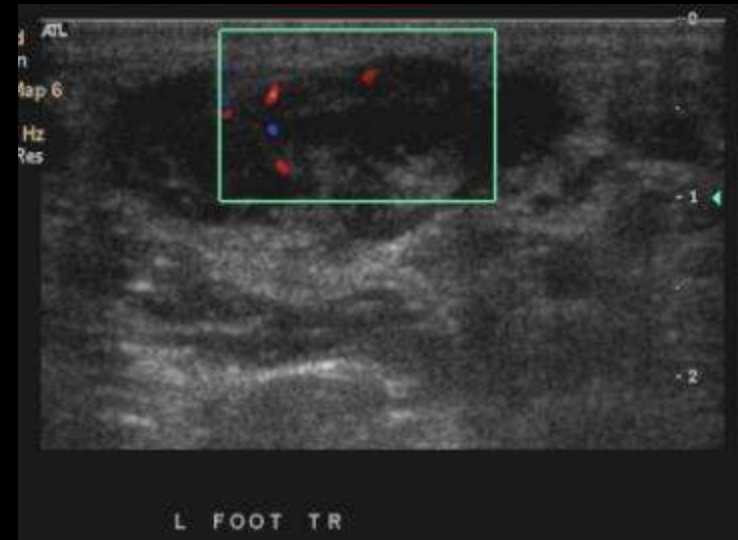
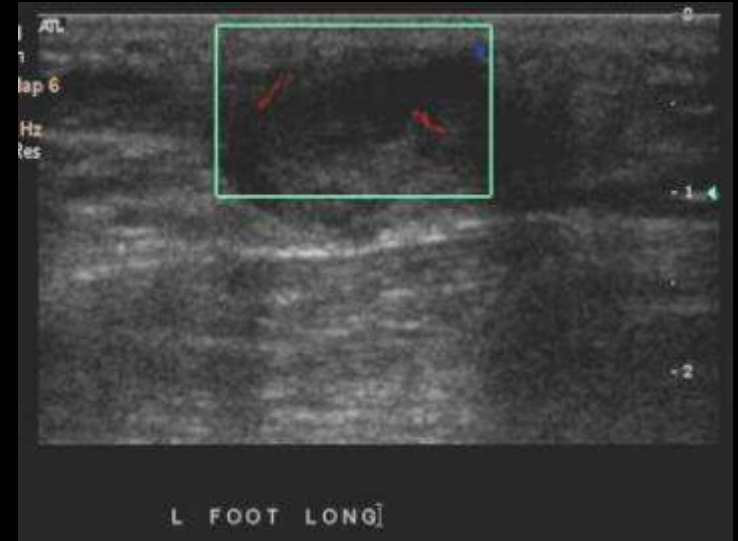
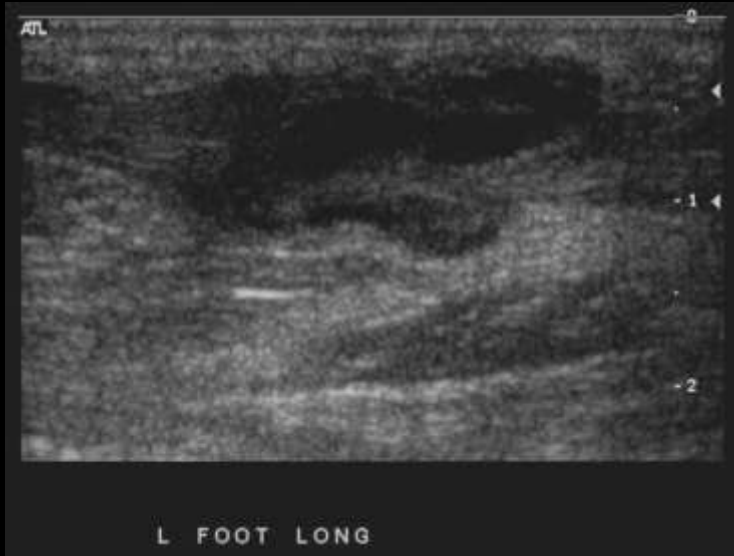
Left longitudinal



Right longitudinal



Foot

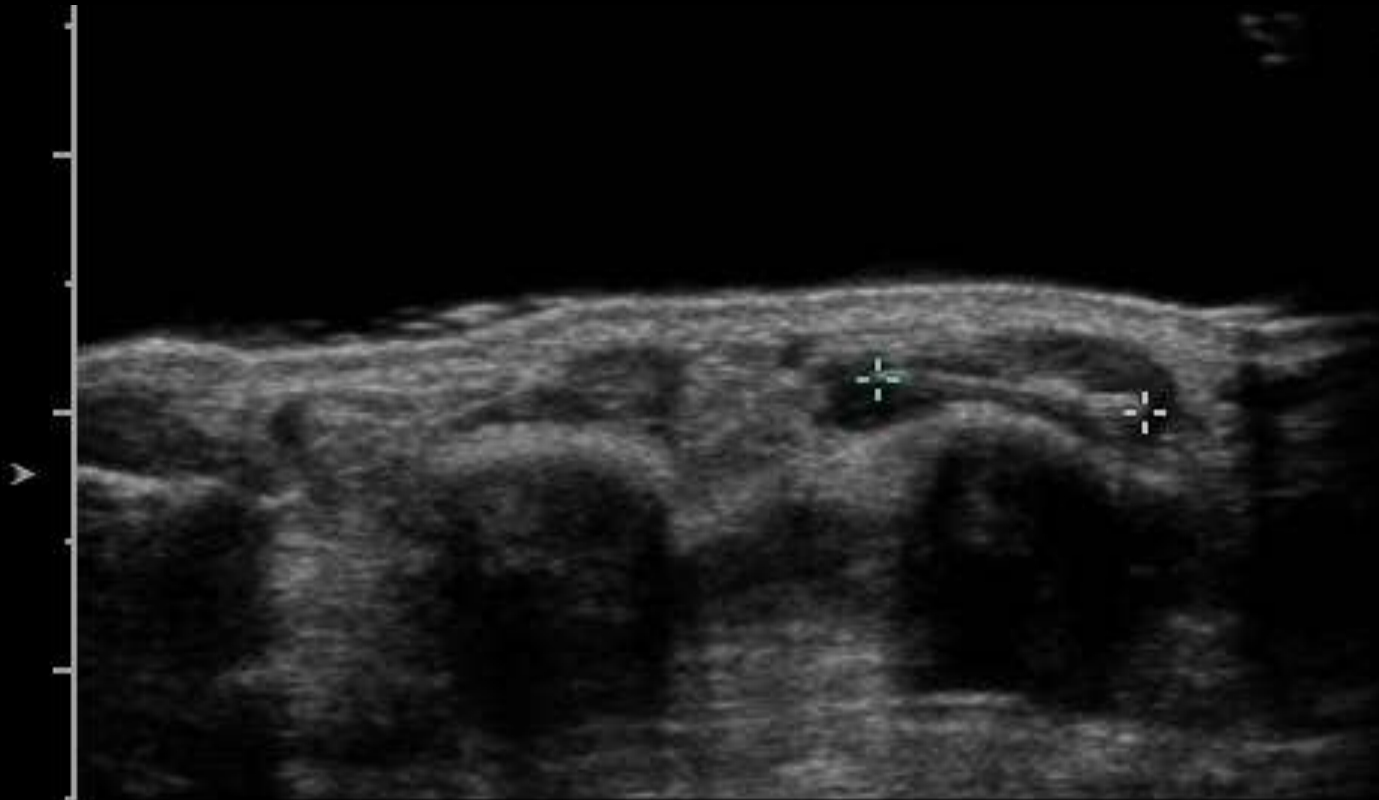


56M Tender mass in the arch of left foot for 6 months. Plantar fibroma

Foreign Body

- If body not seen on X-ray
- If body could be radiolucent
- Must scan in 3 planes

Wood Splinter



Breast
Compound /V
79dB SC1/+1/2/4
Gain= -2dB Δ=2

Store in progress

RT DORSAL HAND TRV

Dist = 1.04cm

Delete Set

Lock Set

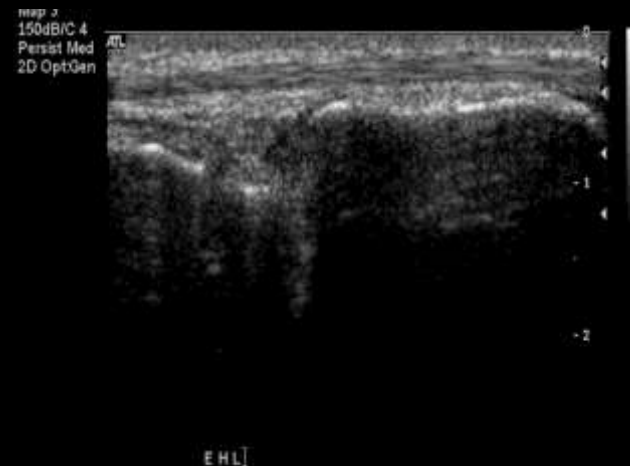
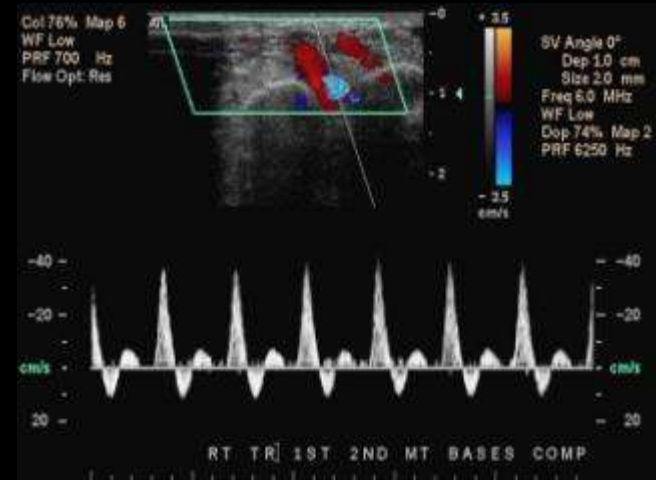
US FB 3rd MC 31F

Tumors

- Good visualization
- Vascular / Nerve relationships
- Must use Doppler
- Anatomy requires real time knowledge
- Limited characterization
- Biopsy

Investigating a mass

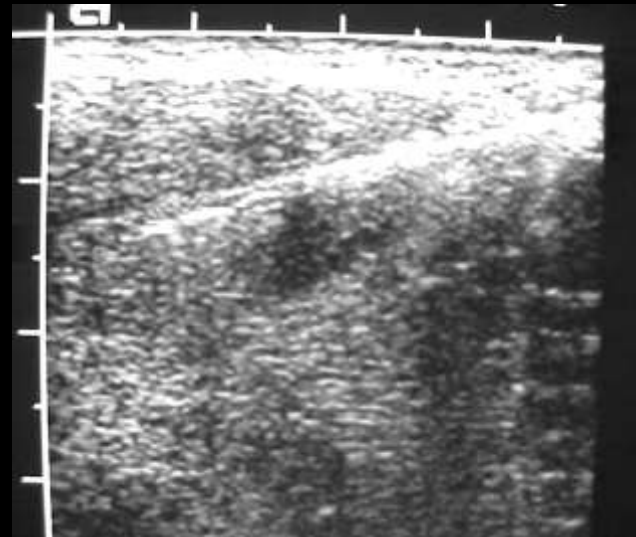
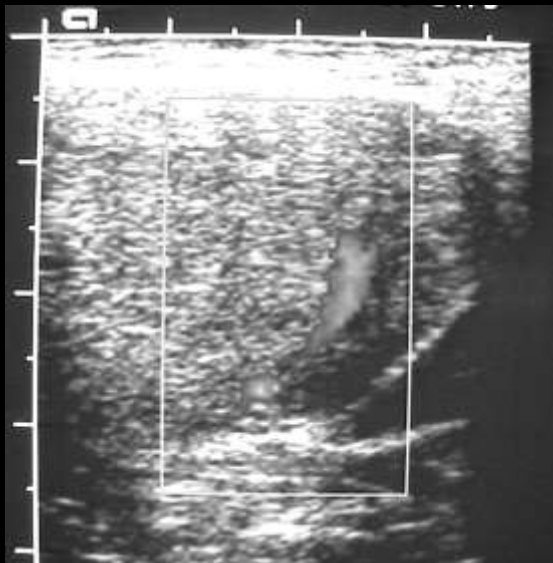
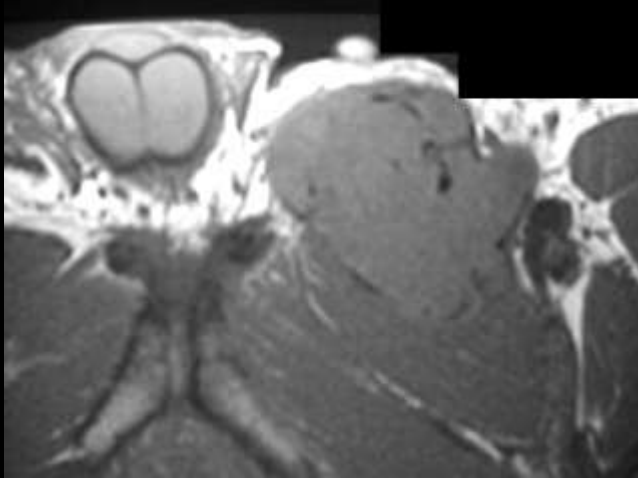
- Anatomic location
- Adjacent structures
- Internal echo matrix
- Compressibility
- Internal blood flow
- Correlate with pain



Biopsy

- Preferred method for most ST masses
- Real time
- See mass
- See needle
- See things to miss
- ? Sterility a problem

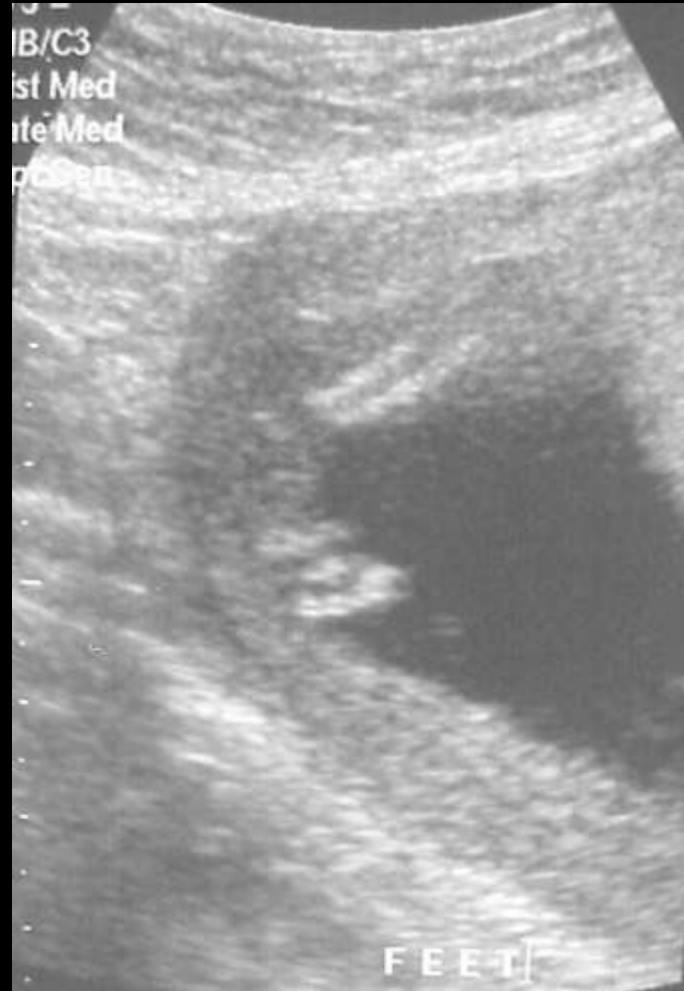
Solitary Fibrous Tumor of Soft Tissue Parts



Fetal US

- Club foot
- Open neural arch of spine
- Short stature

Club foot



Future

- Higher frequency
- Improved resolution at greater depth
- Tissue characterization
- Improved 3D
- Widespread acceptance
- Quality control

Future

- 3D
 - Reproduce any plane of the anatomy with precision
 - Accurate volume measurements