



COMMON ANKLE PATHOLOGY

Dr Quentin Reeves FRANZCR
Musculoskeletal Radiologist

Introduction

- Ankle and foot pathology challenging
- Complex anatomy
- Acute/Chronic presentation
- Knowledge of patterns of disease
- High quality imaging
- Weight bearing xrays
- Clinician interest

Radiology

- Good clinical information
- Radiologist/Technologist expertise
- Xray
- Ultrasound
- CT
- MRI
- Scintigraphy
- Intervention

When to Image

- Failure of conservative treatment
- Most injuries heal without pain or disability
- Unable to weightbear
- Chronic instability
- Chronic pain/impingemen

Ultrasound

- Alternative to MRI especially tendons
- Best when symptoms localised/specific clinical question
- Dynamic
- Side to side comparison
- Injections/Aspiration

Routine Ankle Views

- Weight bearing where possible
- AP
- Lateral
- Mortise

- Additional Views
 - Oblique tarsal
 - Anterior process of calcaneus
 - 5th metatarsal base

Additional AnkleViews

- Impingement
- Oblique Tarsal
- Harris Beath
- Weightbearing
- Lazy Lateral
- StressViews
- Proximal fibula view

R



Normal
Lateral
Ankle

AP and Mortise



Normal Foot



Normal Lateral Foot



Lazy Lateral



Plain Film Approach

- Soft tissue swelling/effusion
 - Effusion >13mm -82% pos pred value for #
 - Generalized ankle swelling without effusion is a red flag- distal tib fib syndesmosis injury
 - Vascular calcification < 50 yrs may indicate diabetes
 - Foreign bodies/Calcification

Plain Film Approach

- Bones and Joints
 - Hind foot: cavus/planus
 - Commonly missed fractures
 - Talar dome /tibial plafond
 - Anterior process calcaneus
 - Lateral tubercle talus posterior process
 - Lateral process of talus
 - Base of fifth metatarsal

Common Conditions

- Fractures
 - Occult
 - Stress
 - Osteochondral
- Coalitions
- Tendon
- Mass lesions
- Arthritis

Normal Variants

- Os Peroneum
- Os Supranaviculare
- Accessory Navicular
- Os Trigonum

Os Peroneum



Os trigonum



Accessory Navicular



Ankle and Subtalar Joint Pain

- Osteochondral lesions /OA
- Ligaments
- Tendons
- Impingement
- Tendons
- Developmental
- Sinus Tarsi

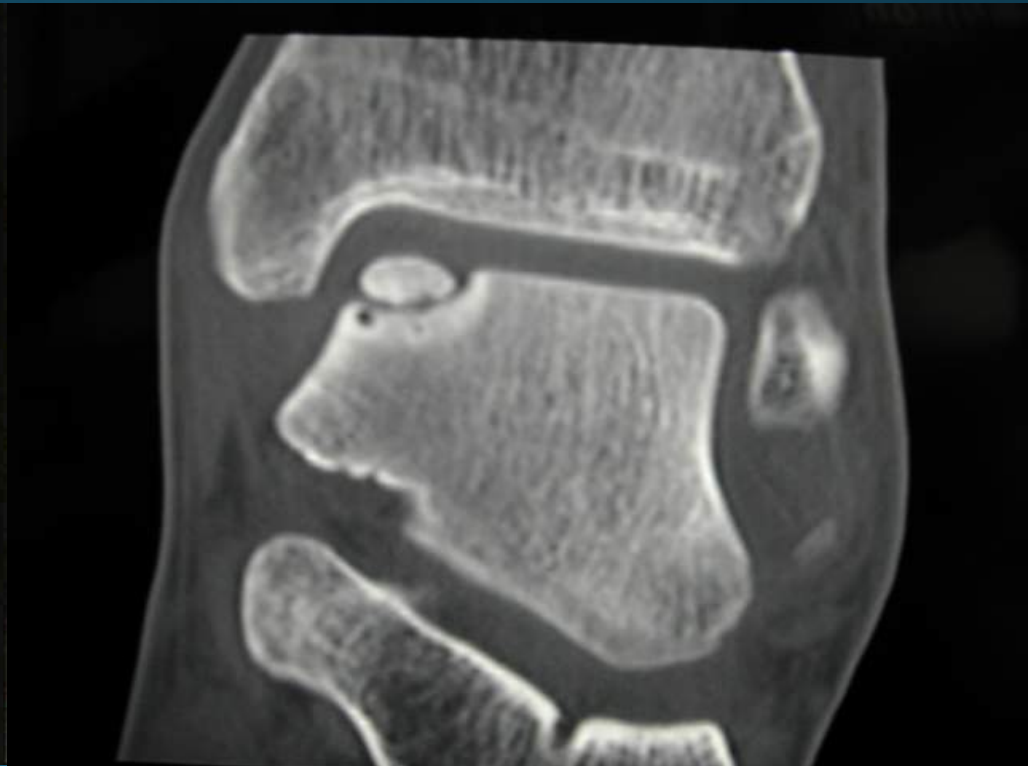
OCD Talus

- Typically involve posteromedial or anterolateral talar dome
- Equivalent tibial lesion
- Trauma/repeated microtrauma accepted etiology
- Lateral lesions-Inversion/dorsiflexion/internal rotation most common
- Medial lesions-Inversion/plantar flexion/external rotation
- X rays may be normal
- MRI –must accurately size lesion

Ankle: OCD Talar Dome



OCD Talus



OCD Talus



OCD Lesion Talar Dome



Osteochondral Fracture



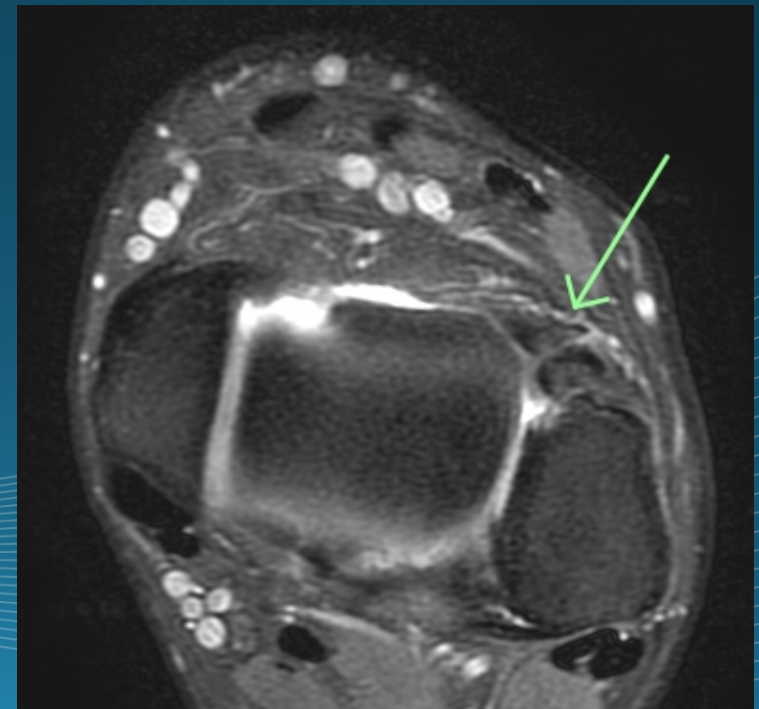
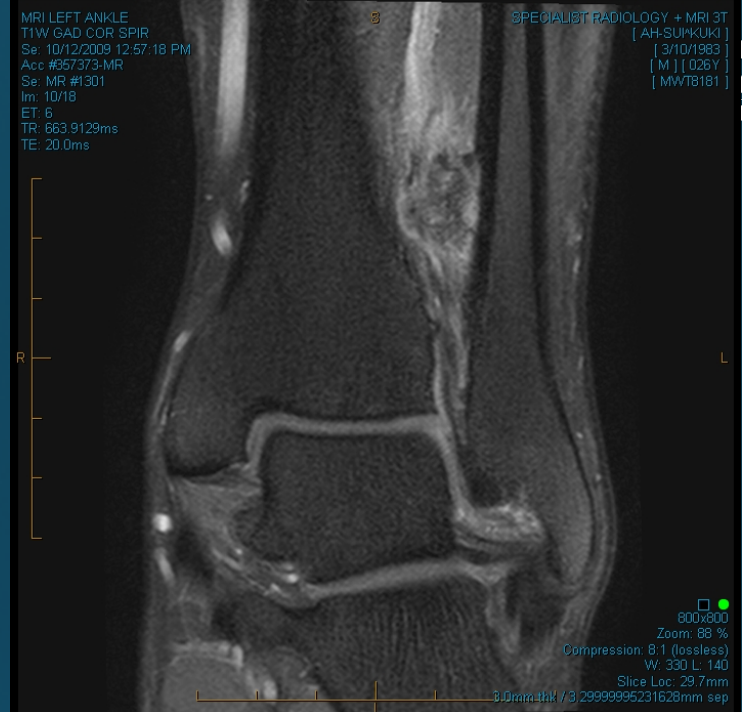
Syndesmosis Injuries

- External rotation of dorsiflexed foot
- Often subtle
- Rapid onset OA if undiagnosed
- Plain x rays diagnose only 64%
- Not all injuries unstable
- Unstable injuries not always visible on unstressed views

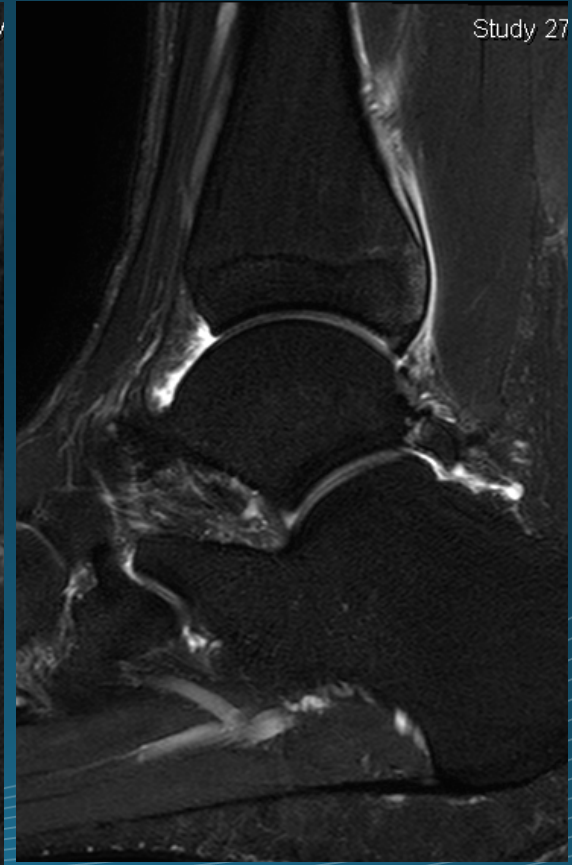
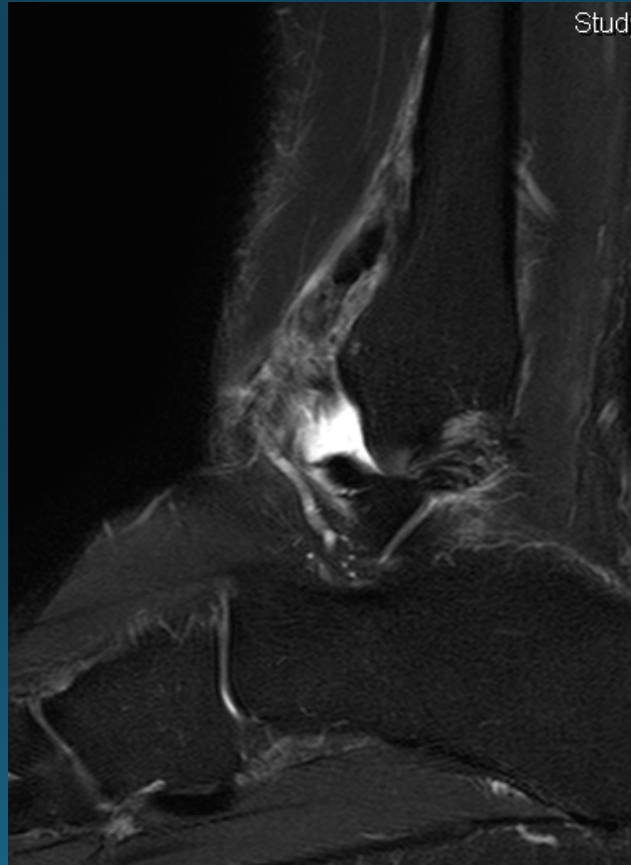
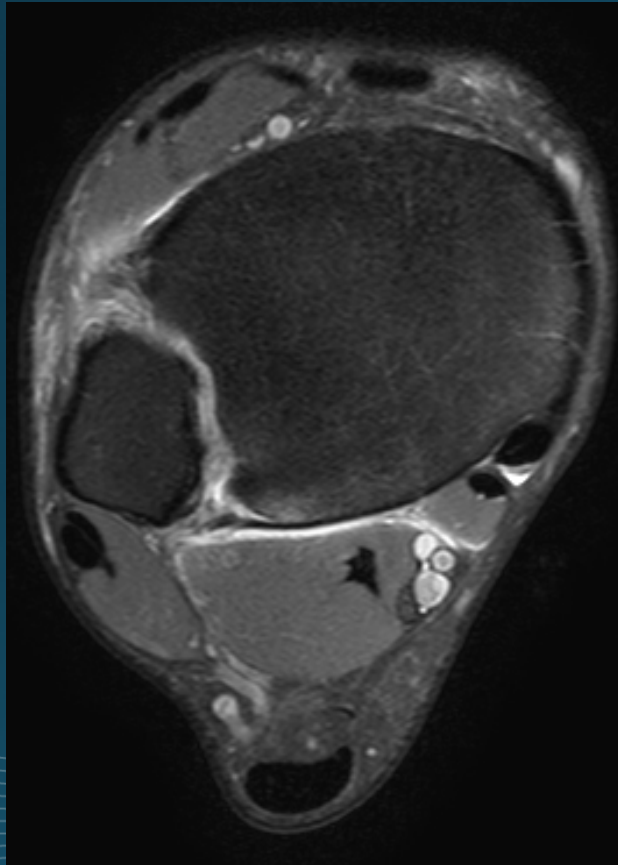
Syndesmotic Injuries

- Medial joint space varies with rotation
- Most reliable sign is widening of syndesmosis $> 5.5\text{mm}$
- From medial border of fibula to base of notch
- Does not significantly vary with rotation

High Ankle Sprain



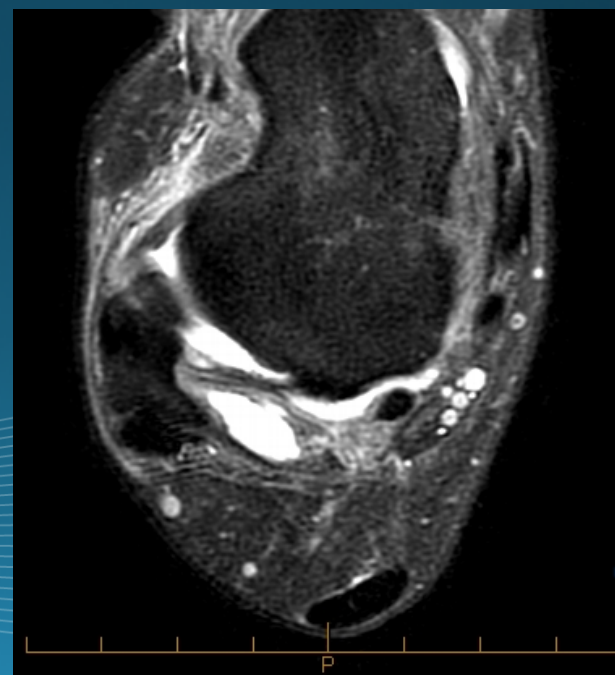
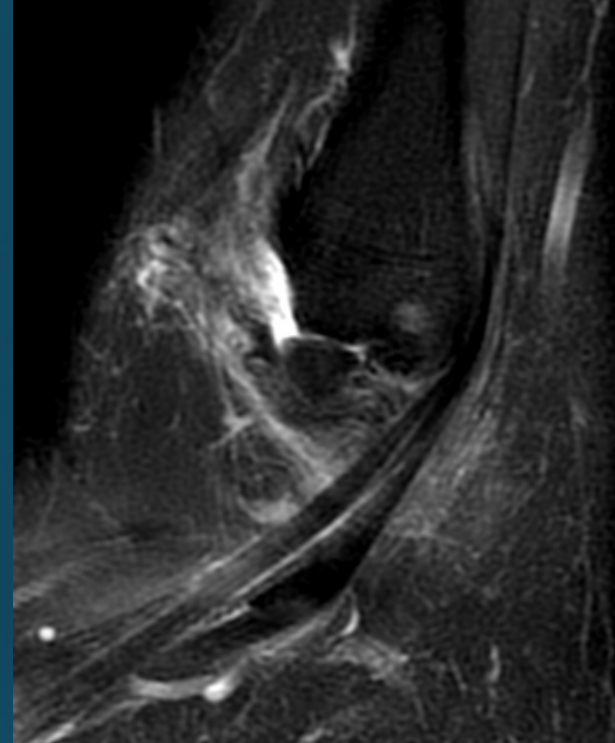
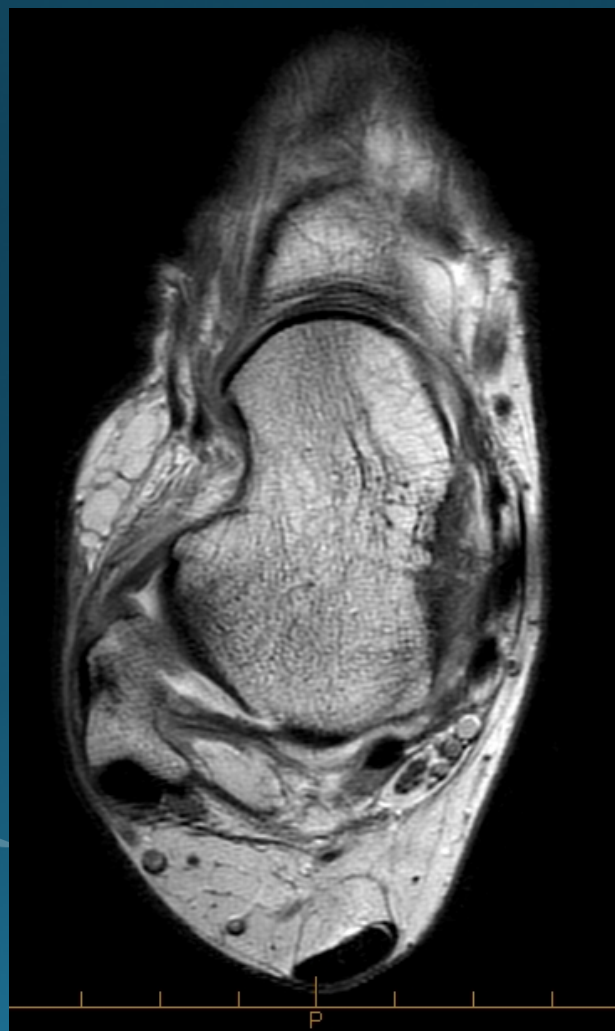
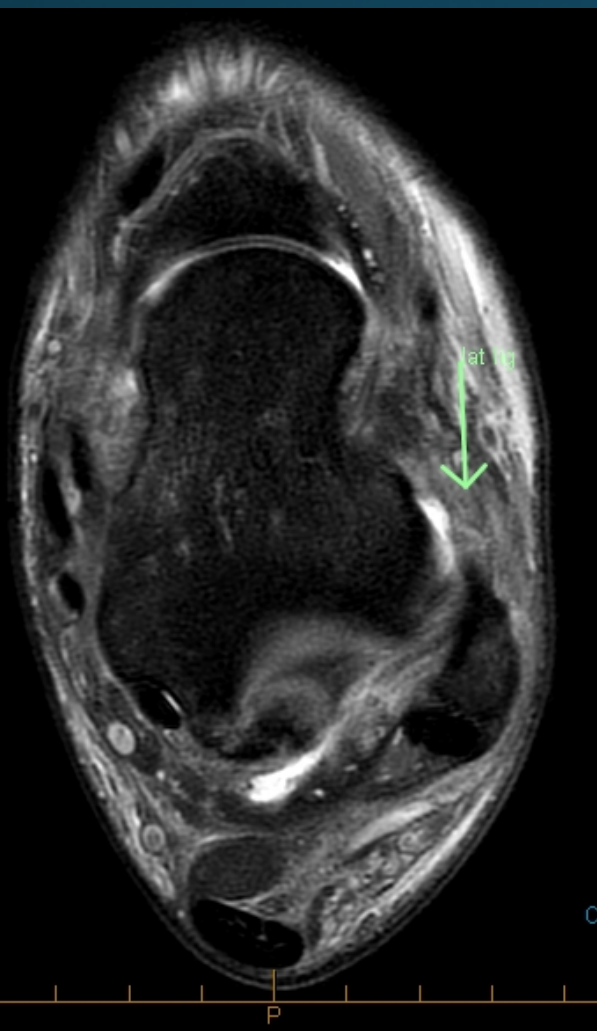
Syndesmotic Injury



Lateral Ligament Tear



Lateral Ligament Tear



Lateral Process of the Talus

- External rotation/axial force
- Seen on lateral/mortise views
- May remain occult
- CT/MRI

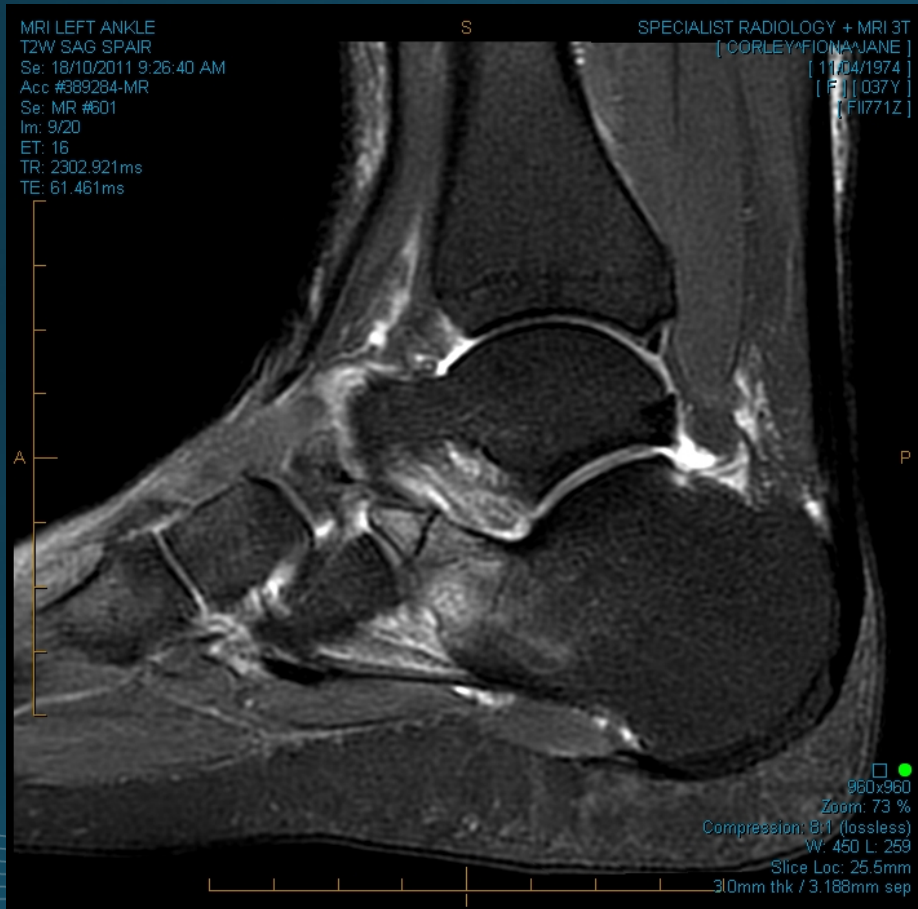
Lateral Process of Talus



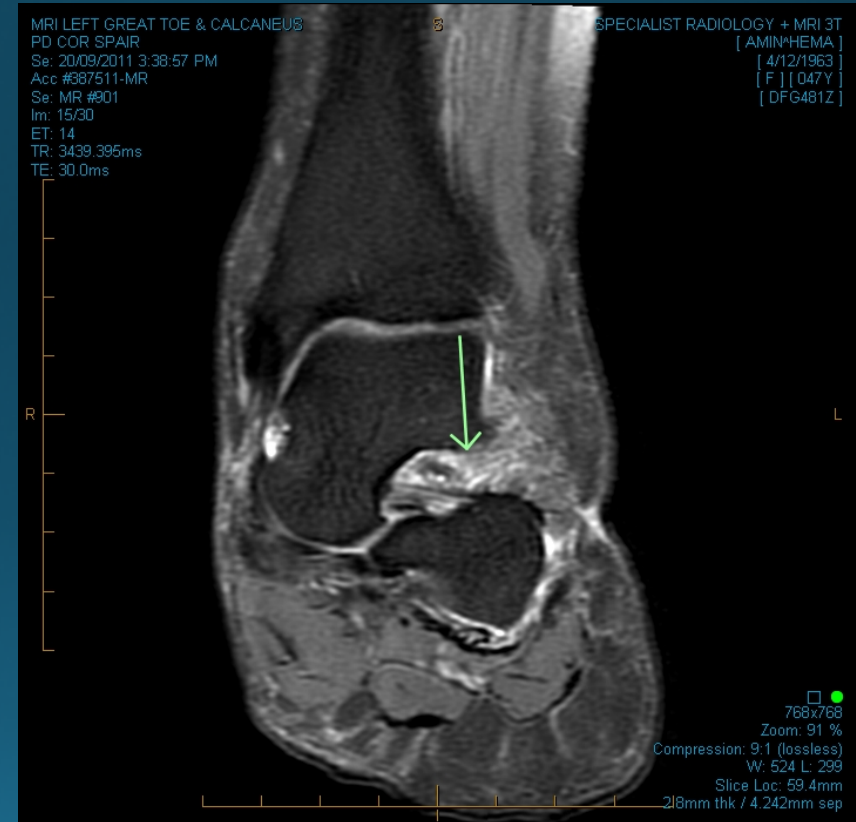
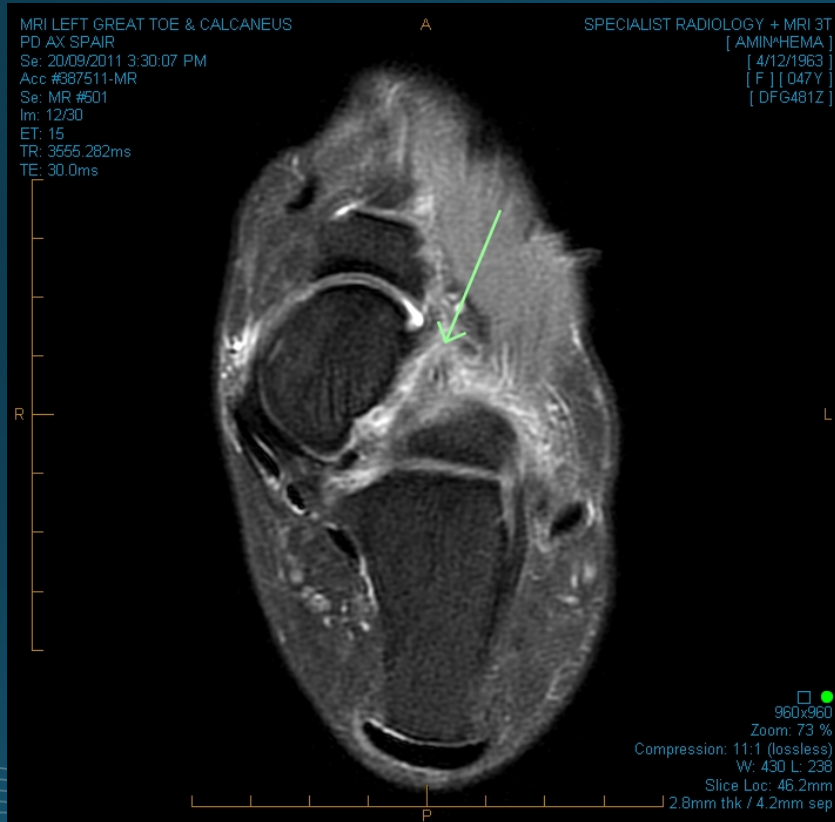
Anterior Process Fracture



Anterior Process Fracture



Sinus Tarsi Inflammation



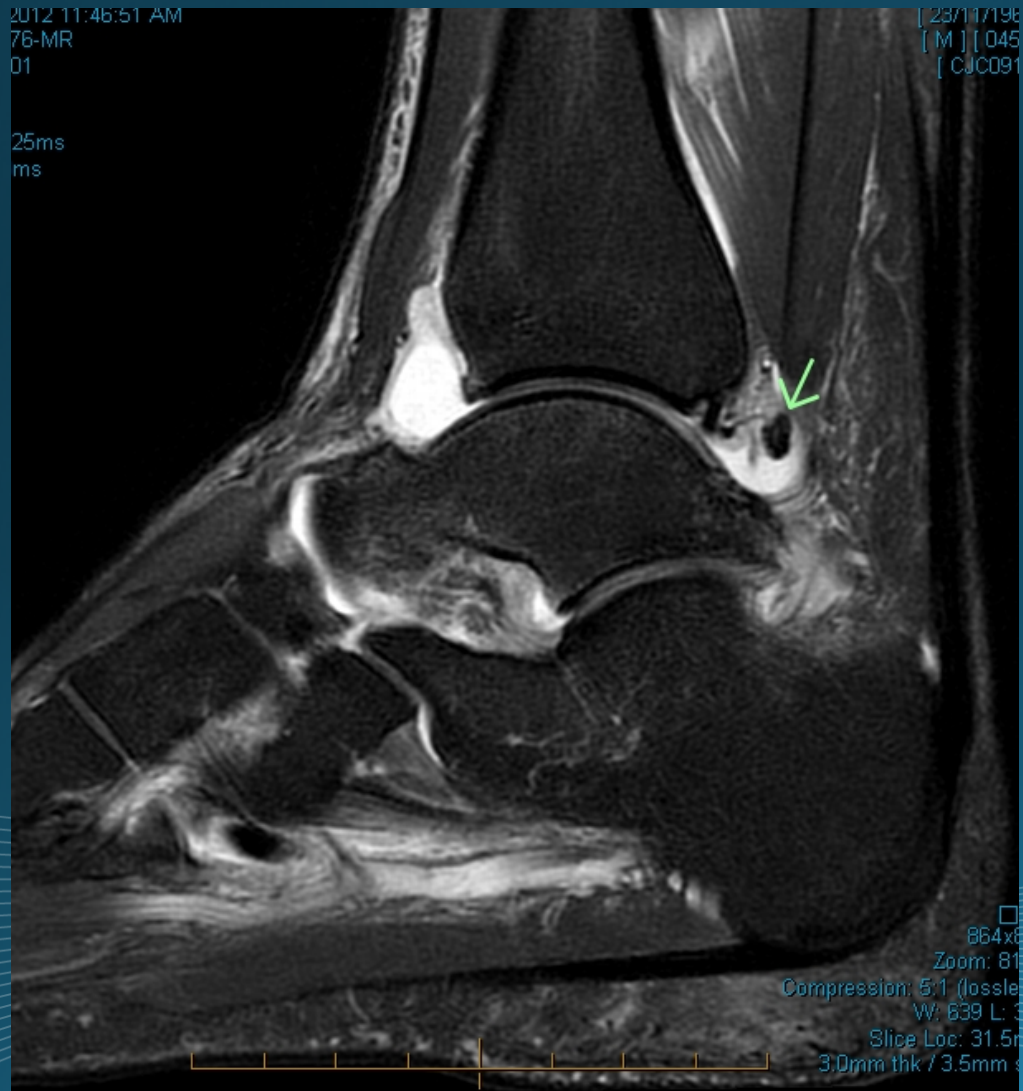
Deltoid Ligament Avulsion / Tear



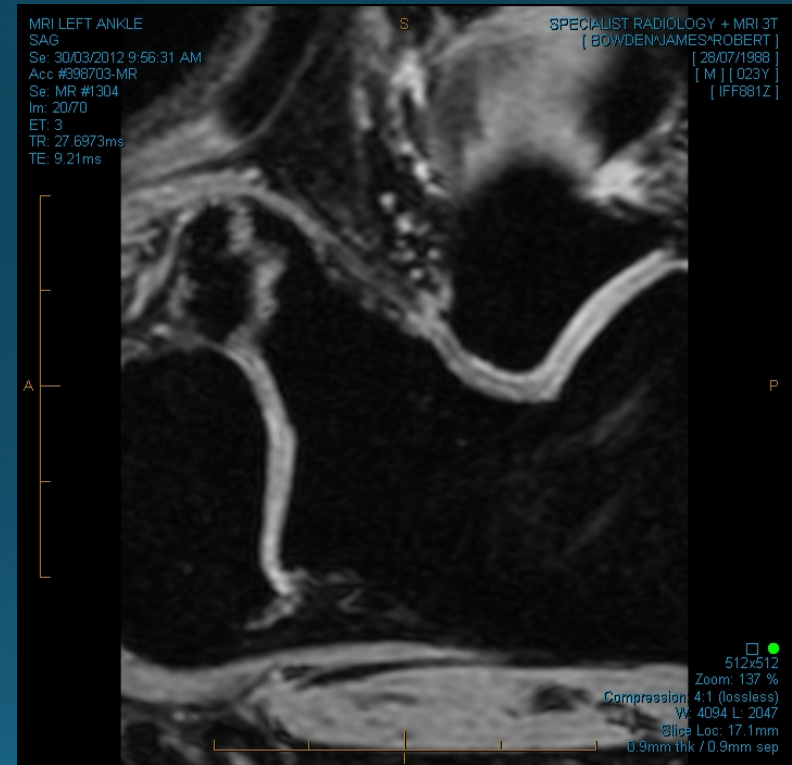
Deltoid Ligament Tear



Post traumatic Synovitis



Coalition

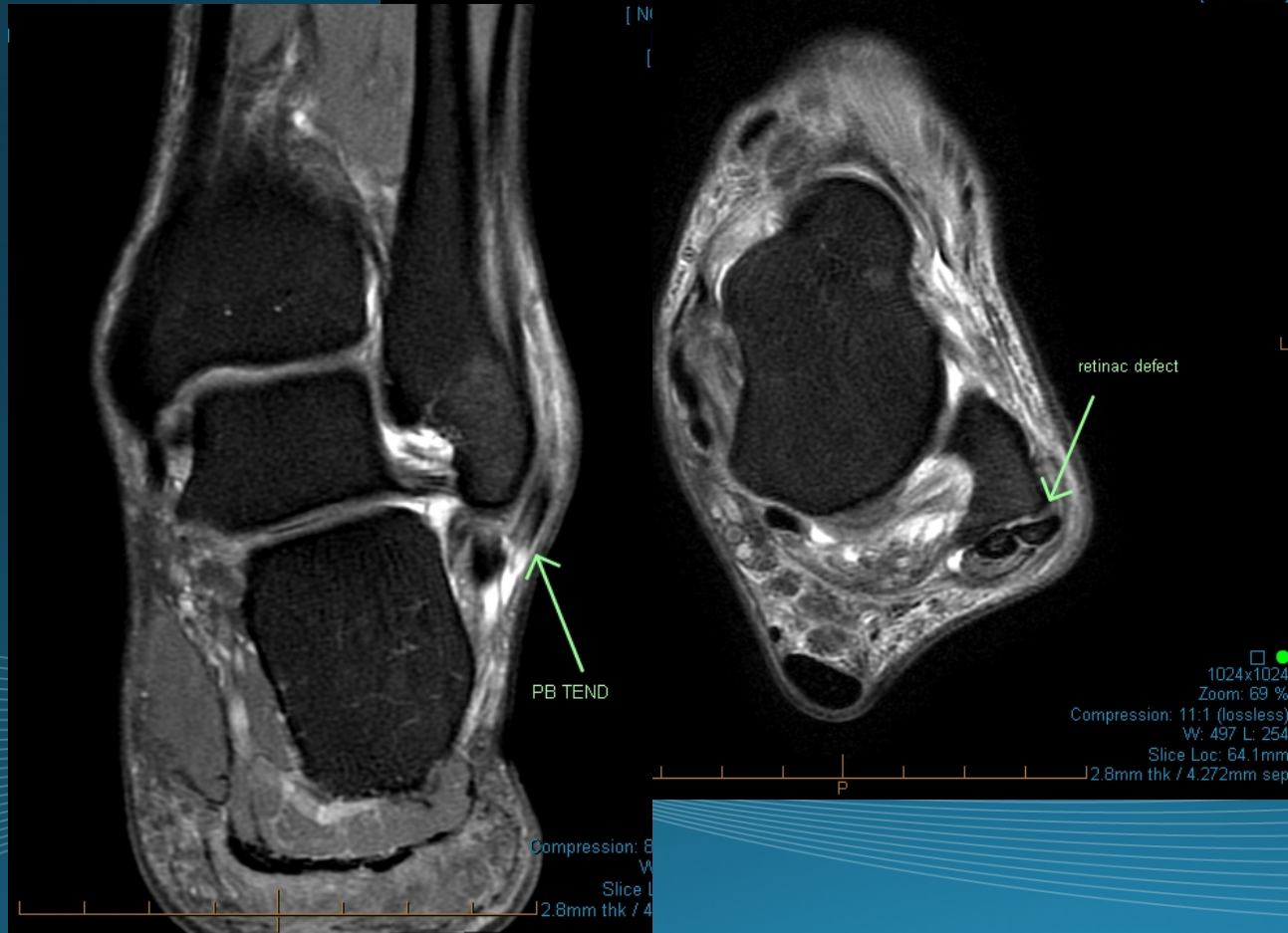


Peroneal Tendon Subluxation

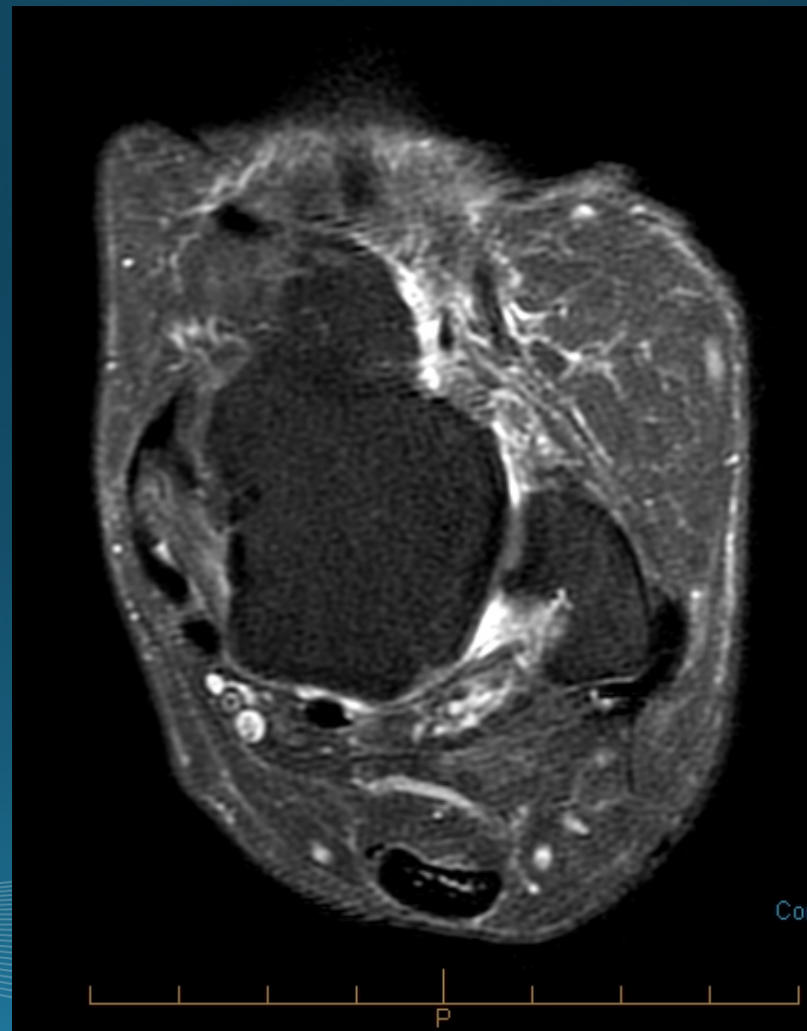
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PD AX SPAIR
Se: 3/07/2012 9:48:39 AM
Acc: #404273-MR
Se: MR #601



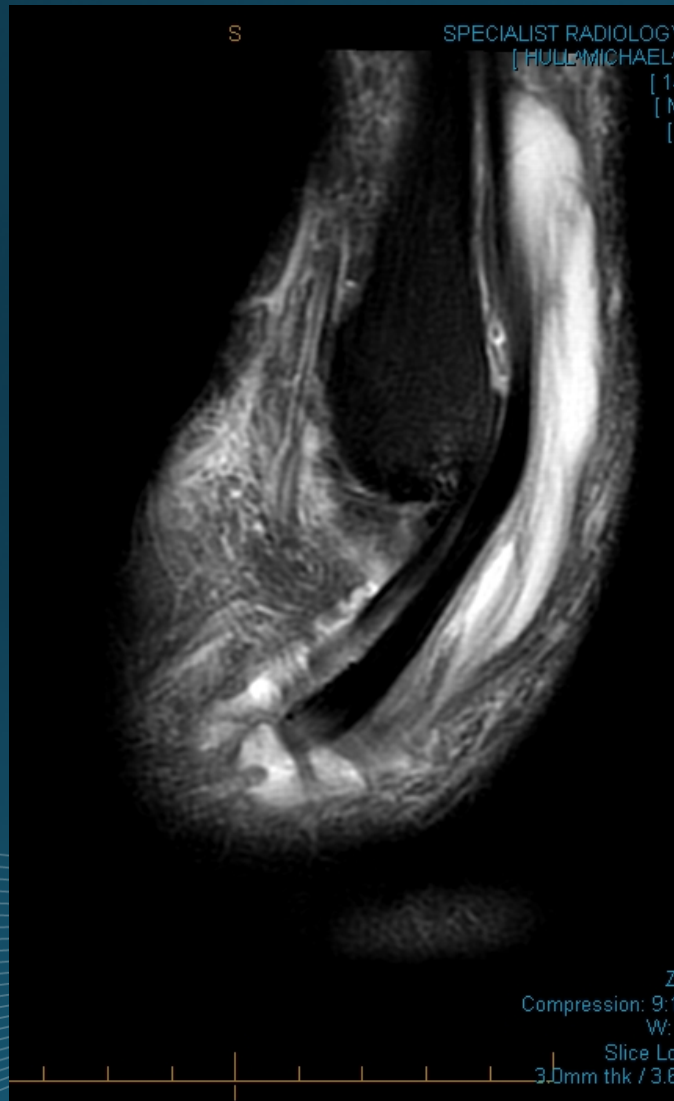
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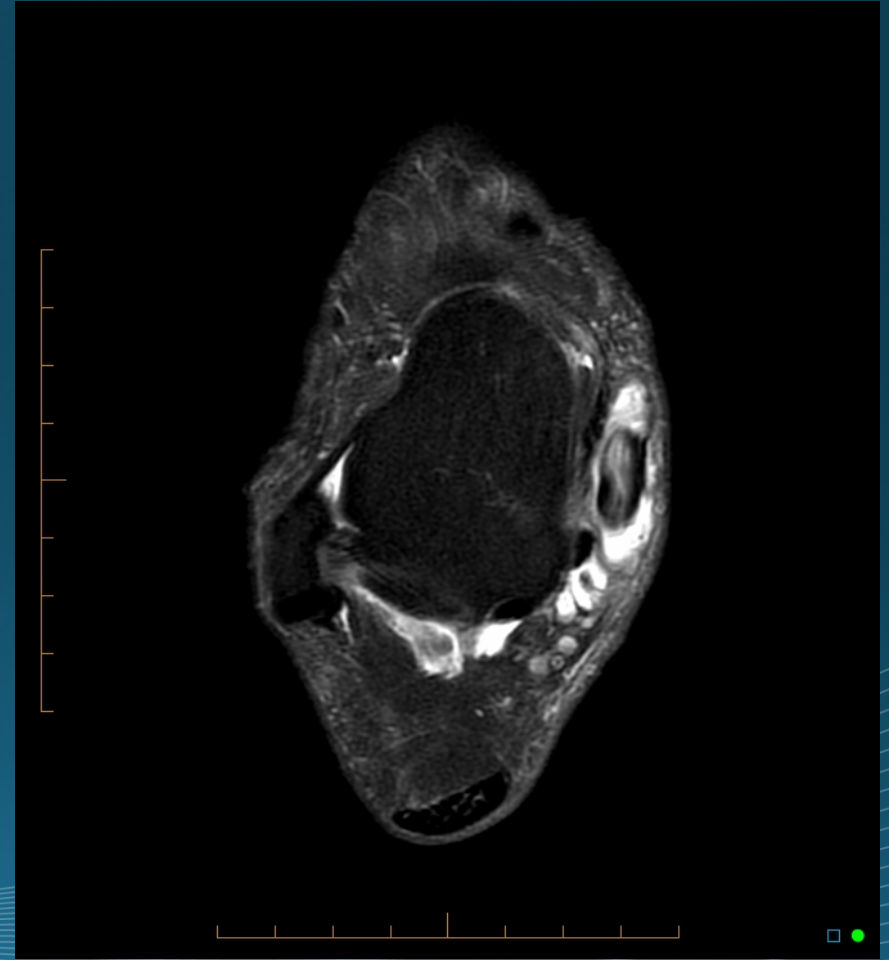
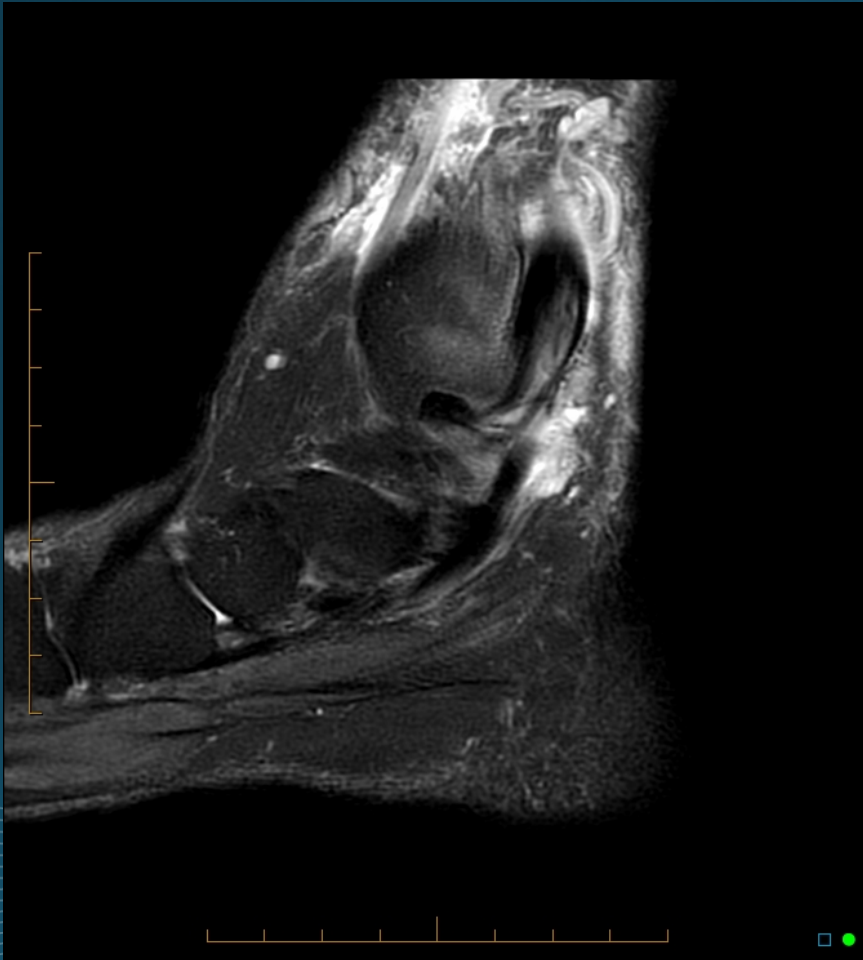
Peroneal Tendon Dislocation



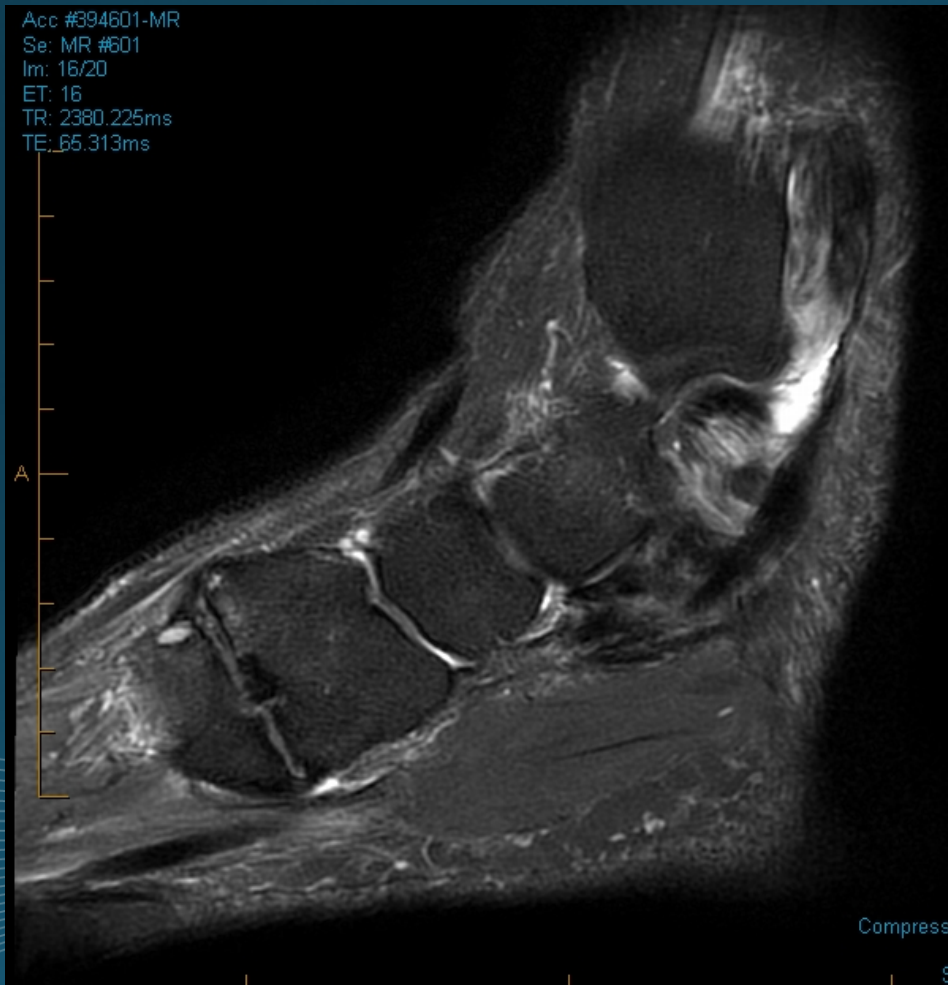
Peroneal Synovitis



Post Tib Partial Tear



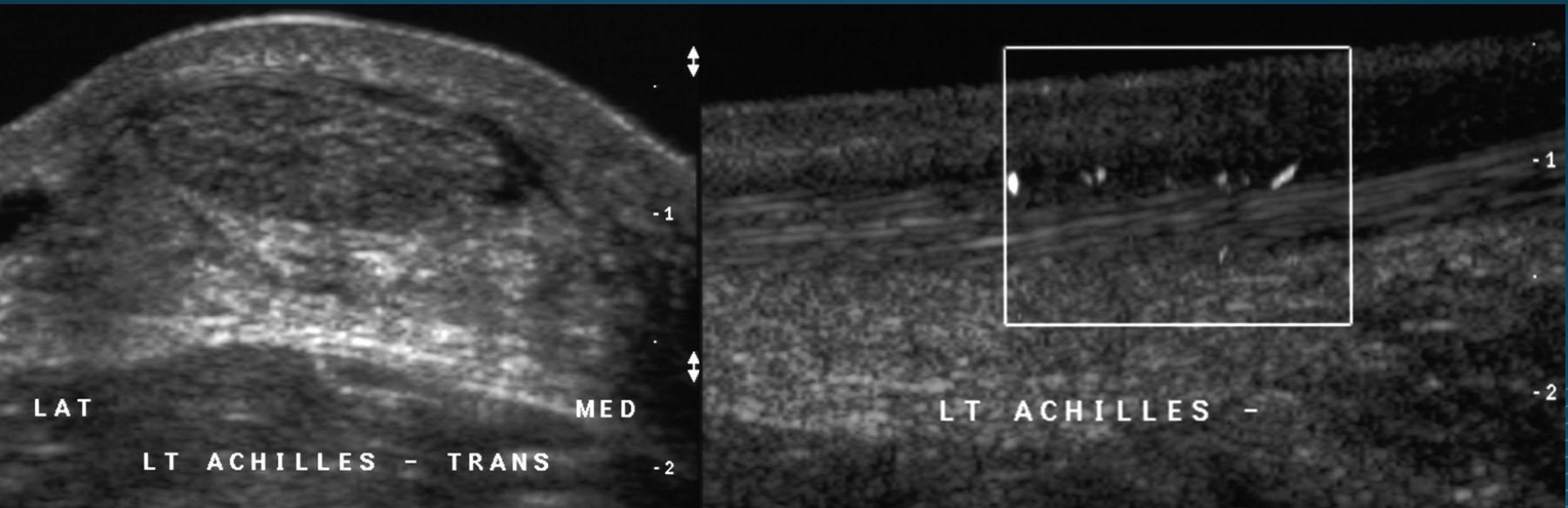
Posterior Tibial Tendon Rupture



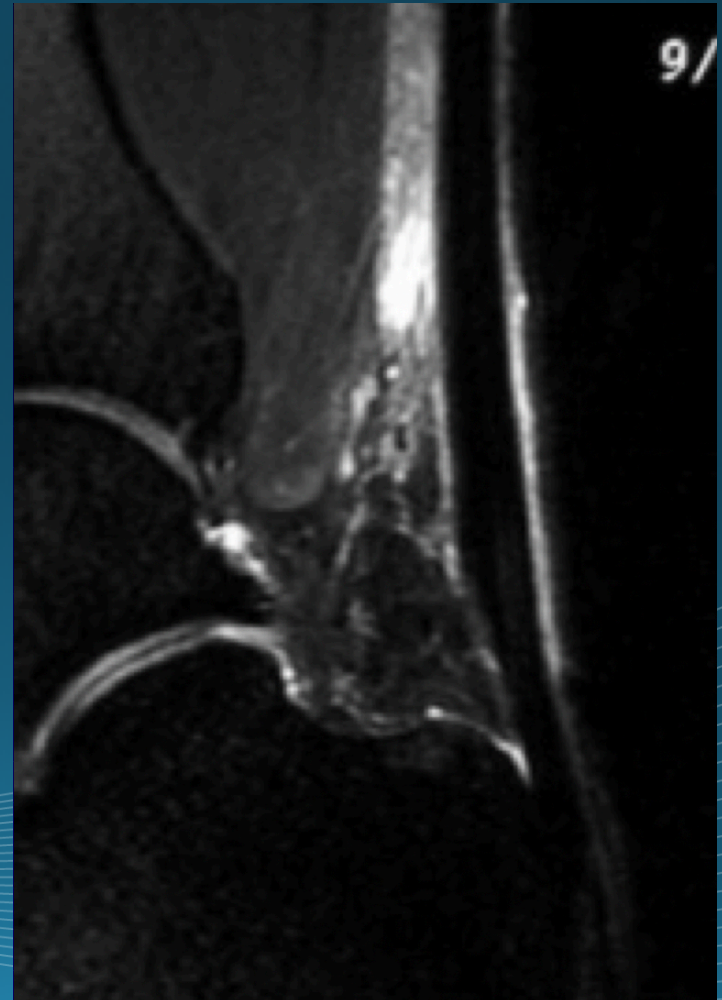
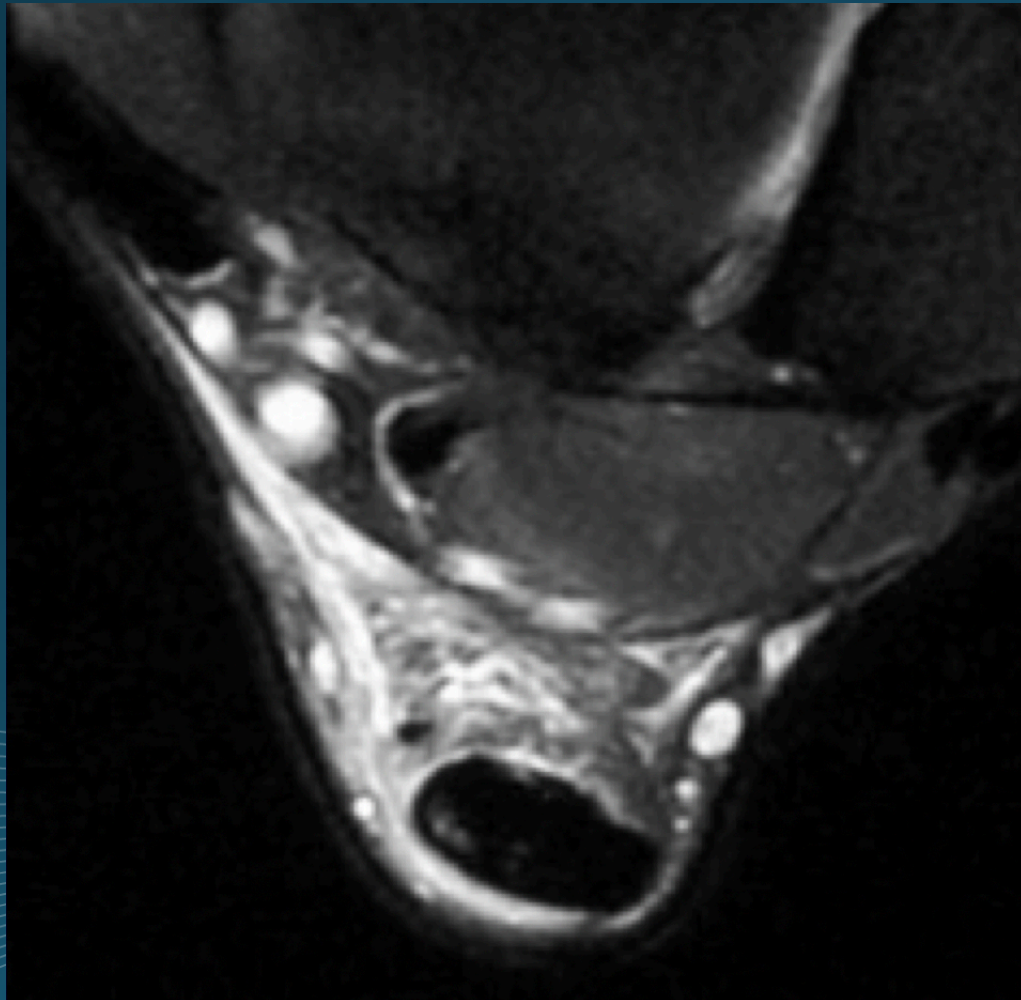
Hindfoot Pain

- Achilles tendon
- Haglunds Disease
- Posterior Impingement
- Plantar Fasciitis
- Fractures

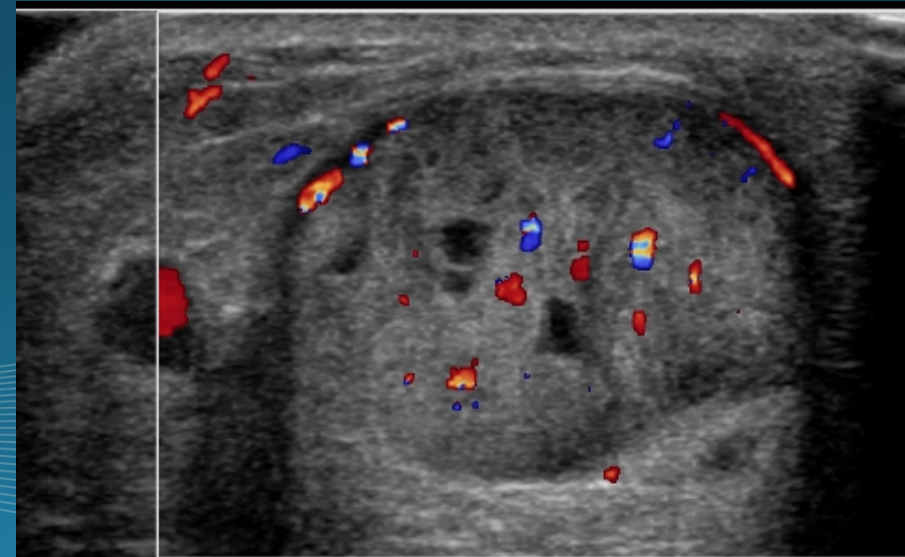
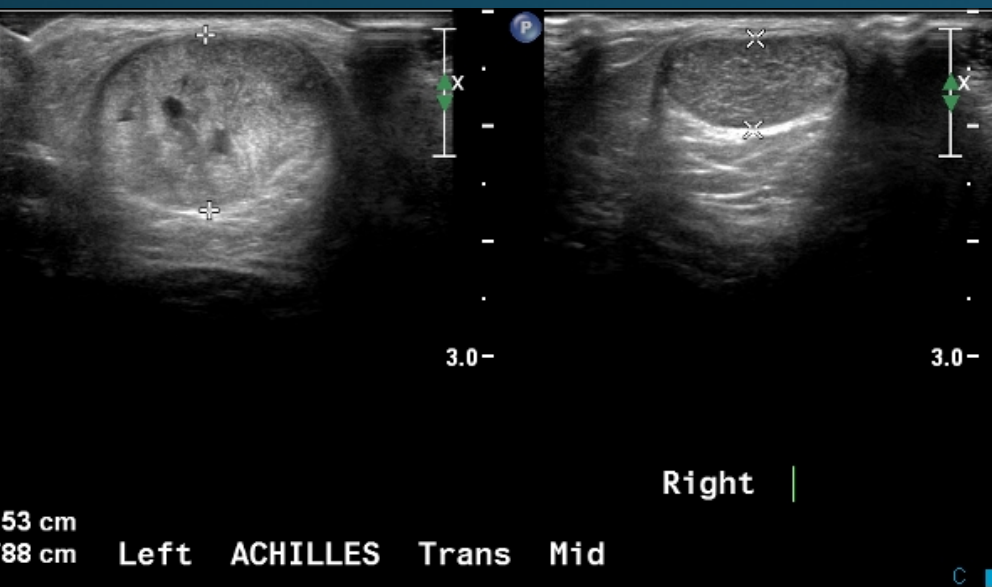
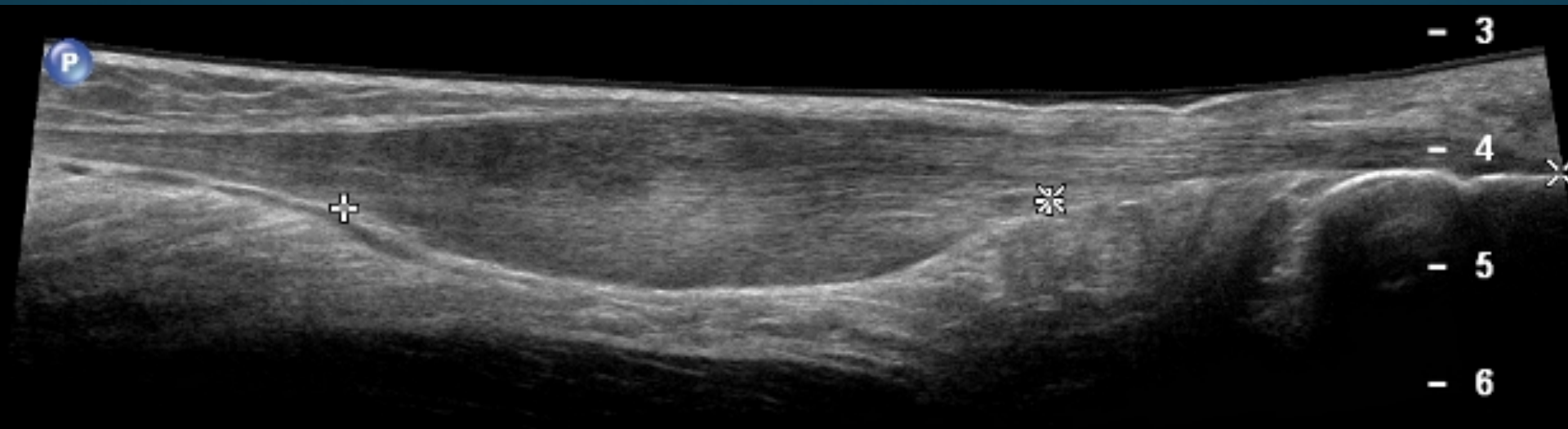
AchillesTendon:Paratendonitis



Achilles Paratendonitis



Achilles Tendinosis



Haglund's Deformity

- Abnormal prominence of posterosuperior surface of calcaneus → bursitis
- Inflammation can → calcaneal erosions / Achilles tendinosis
- Common adolescent females
- Other causes : Gout/RA/calcific tendinitis / Reiters / osteomyelitis.

Haglund's Deformity

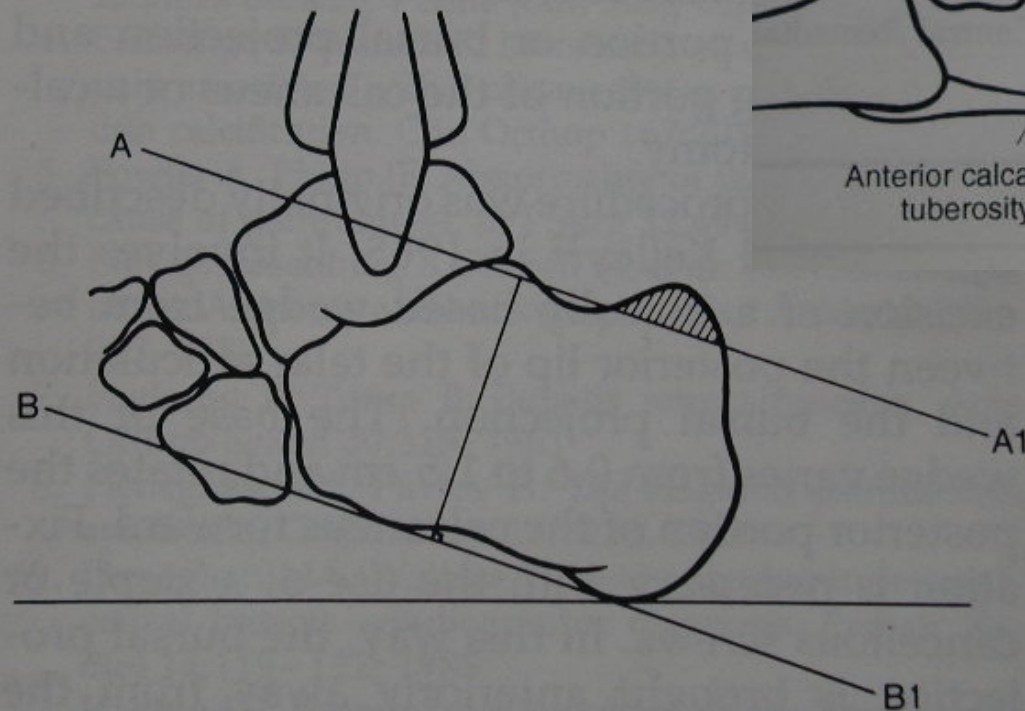
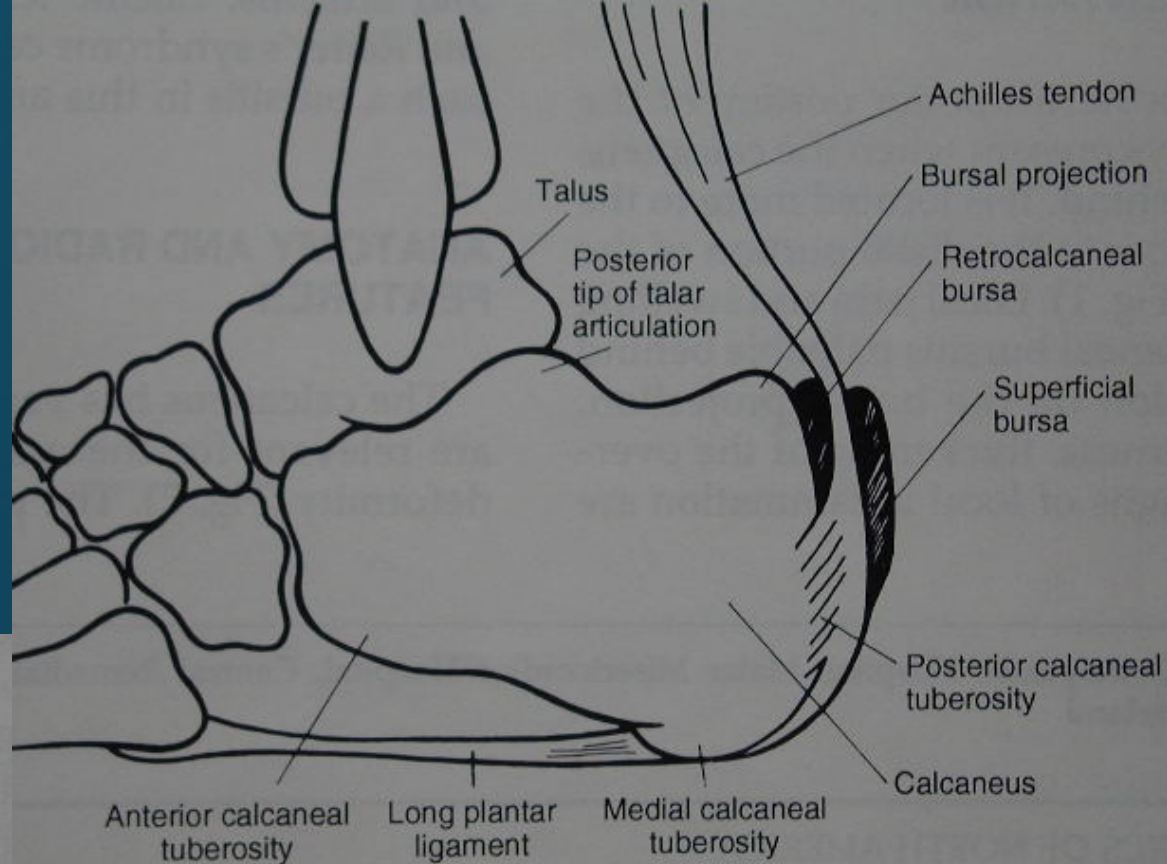
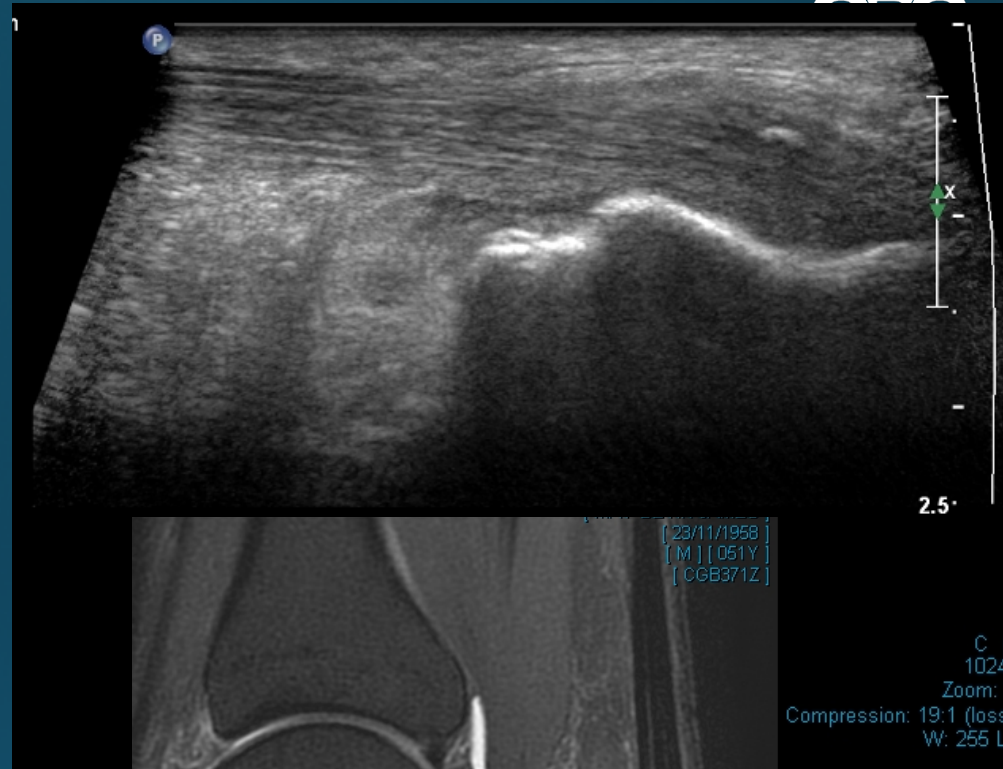
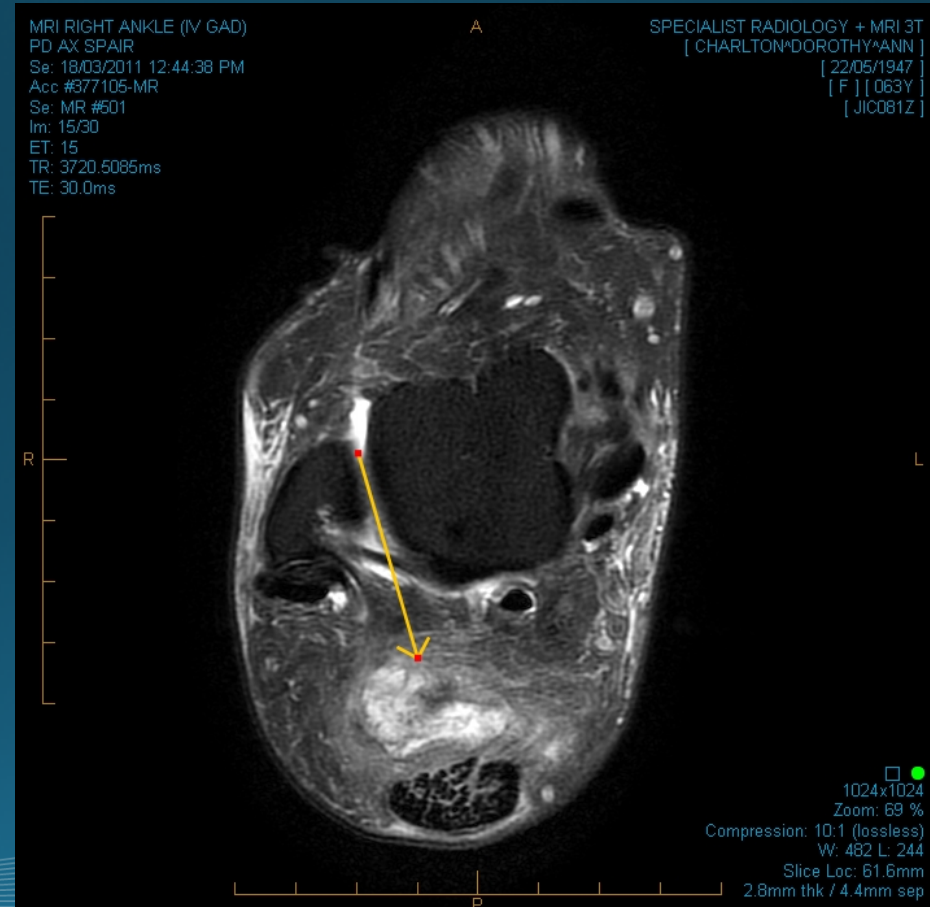
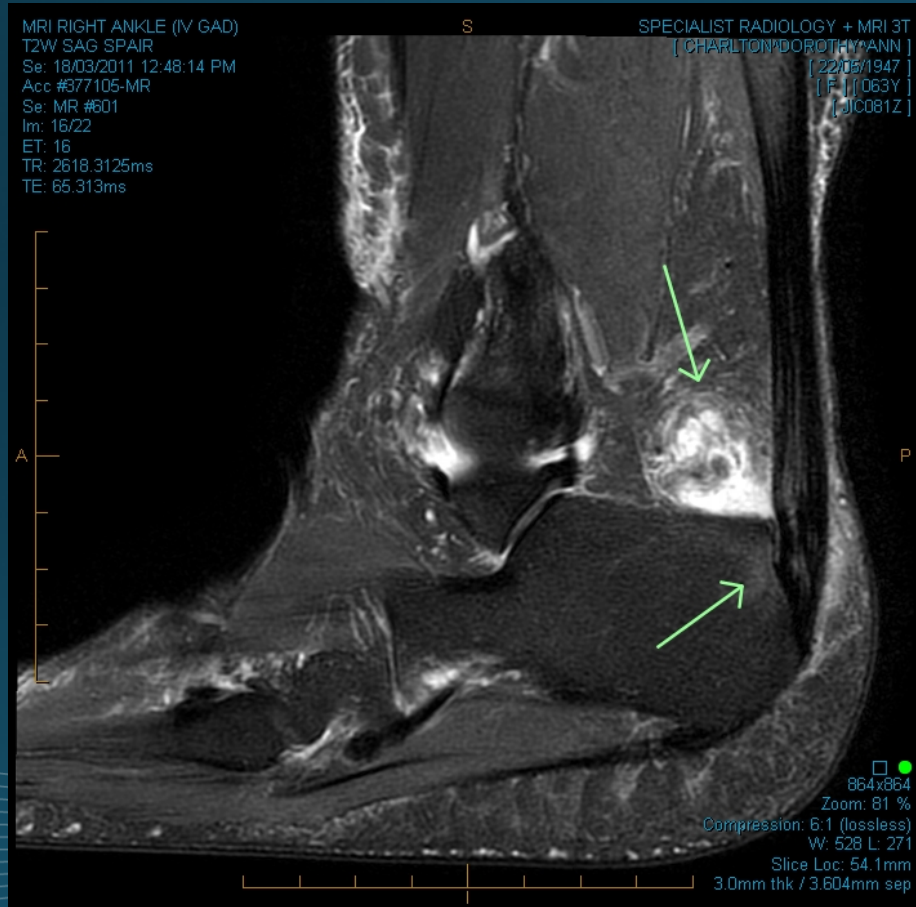


Figure 4. Parallel pitch lines.

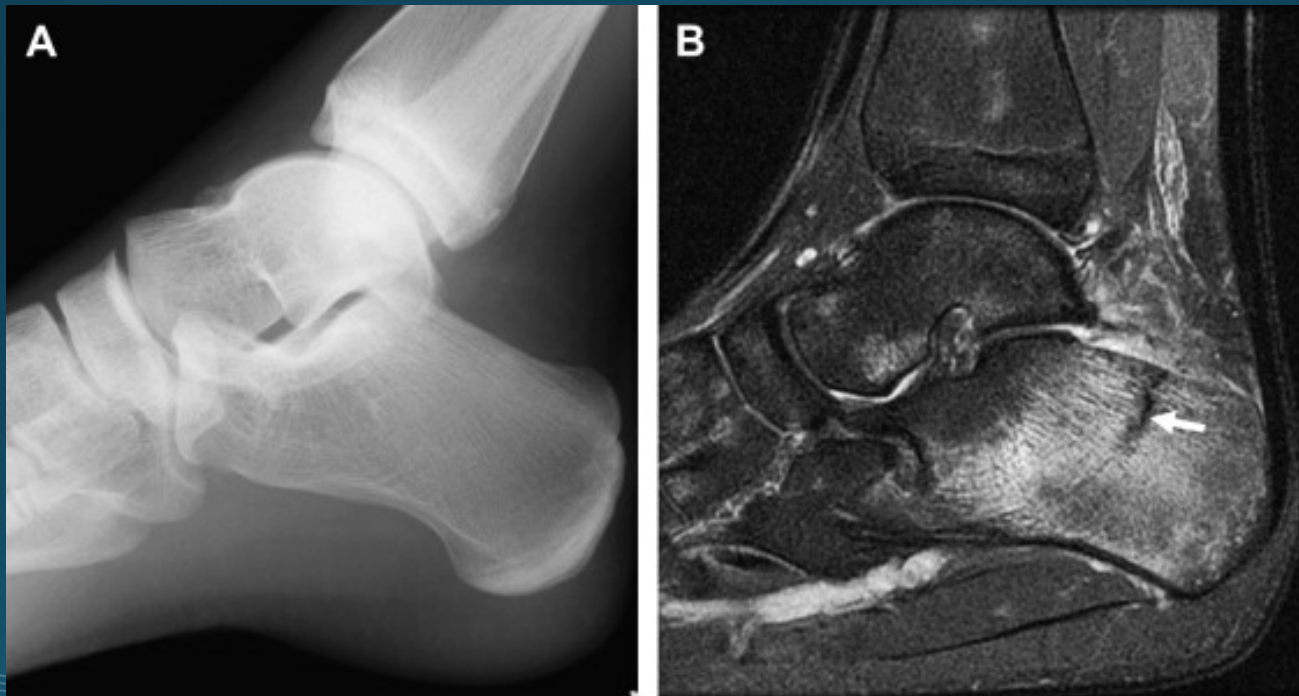
Haglund's Disease



Haglund's Disease



Calcaneal Stress Fracture



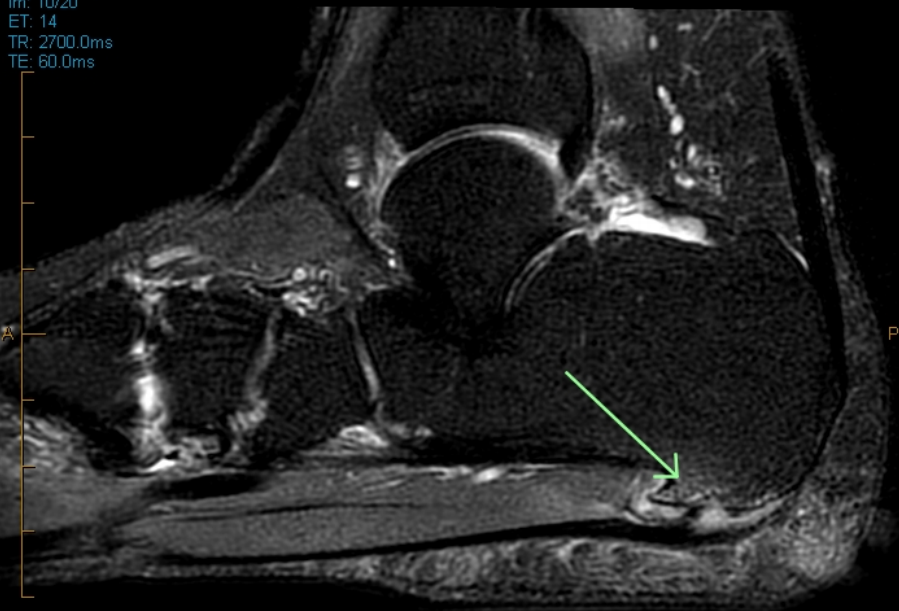
Plantar Fasciitis

- One of most common causes of subcalcaneal heel pain
- Runners/obese
- Low grade inflammation- PF + perifascial
- Fusiform swelling
- Mechanical/degenerative/systemic
- Repetitive microtrauma- traction periostitis /microtears-chronic degen inflammation
- Heel spurs/medial plantar n entrapment / steroids

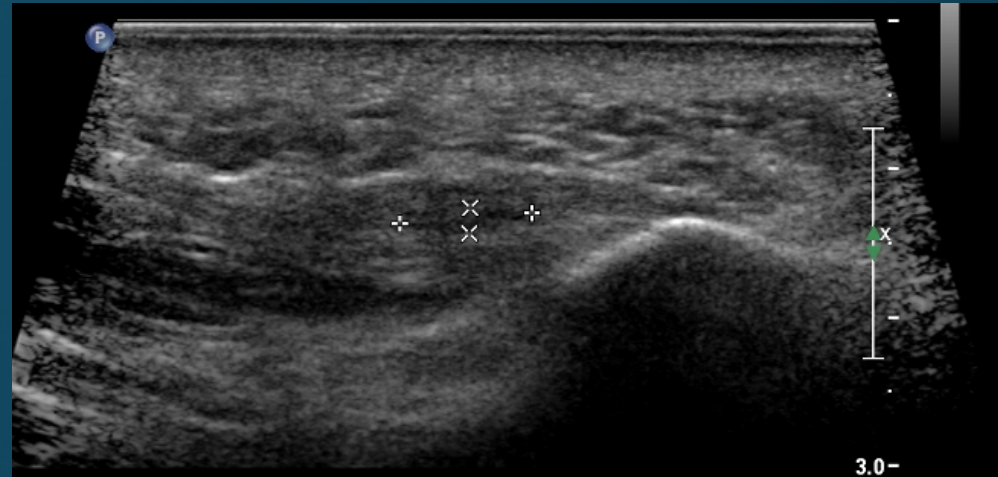
Plantar Fasciitis

MRI RIGHT ANKLE
T2W SAG SPAIR P FASCIA
Se: 14/06/2012 10:07:21 AM
Acc #403208-MR
Se: MR #1201
Im: 10/20
ET: 14
TR: 2700.0ms
TE: 60.0ms

SPECIALIST RADIOLOGY + MRI 3T
[DHARAN*URMILLA]
[30/01/1953]
[F] [059Y]
[RFM5275]



768x768
Zoom: 92 %
Compression: 7:1 (lossless)
W: 354 L: 203
Slice Loc: 19.8mm
2.0mm thk / 2.2mm sep



0.894 cm
0.173 cm

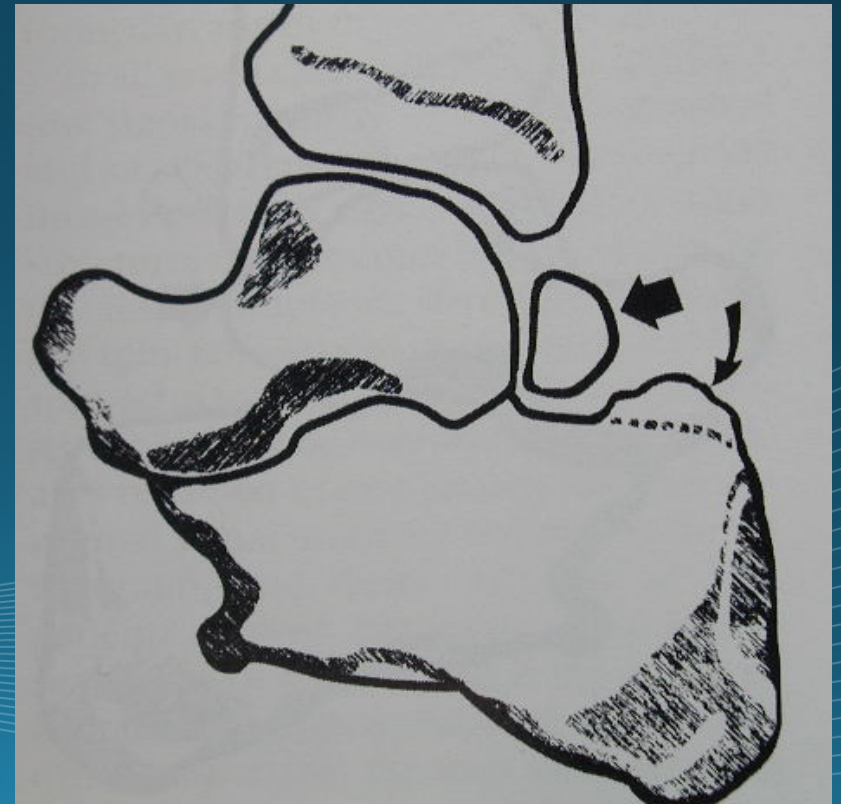
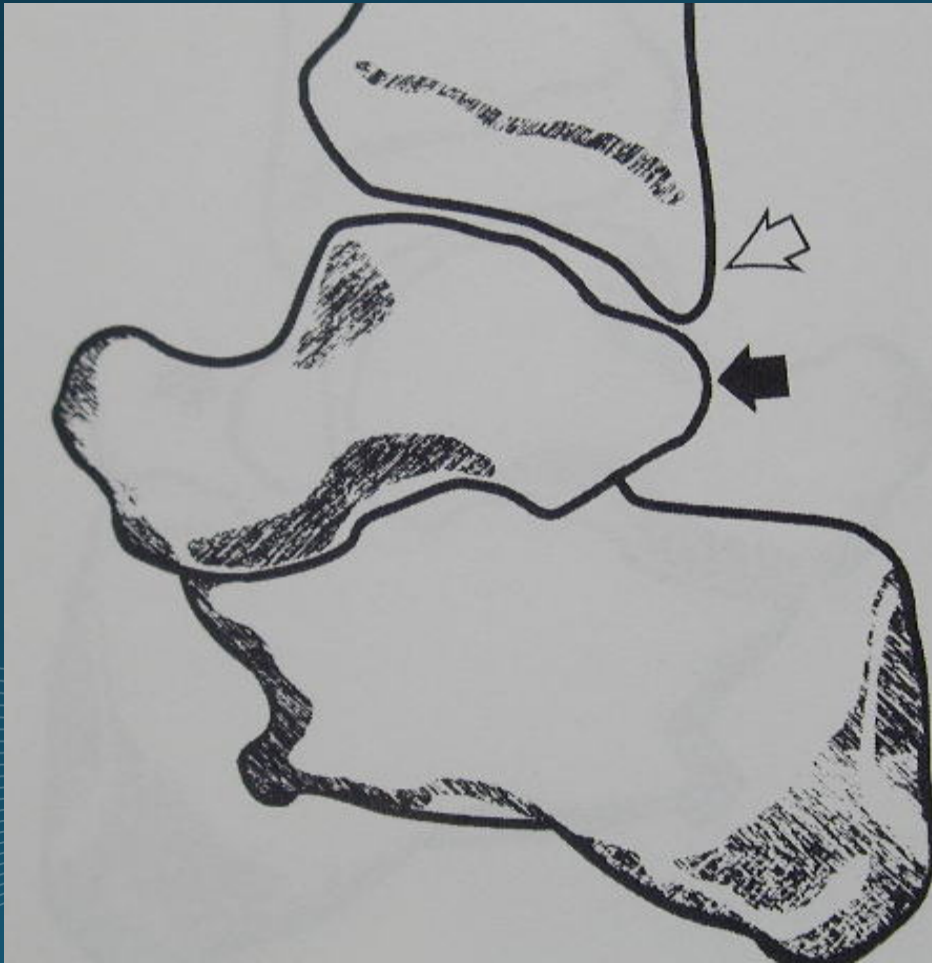
CENTRAL BAND
Left PLANTAR FASCIA Long Prox



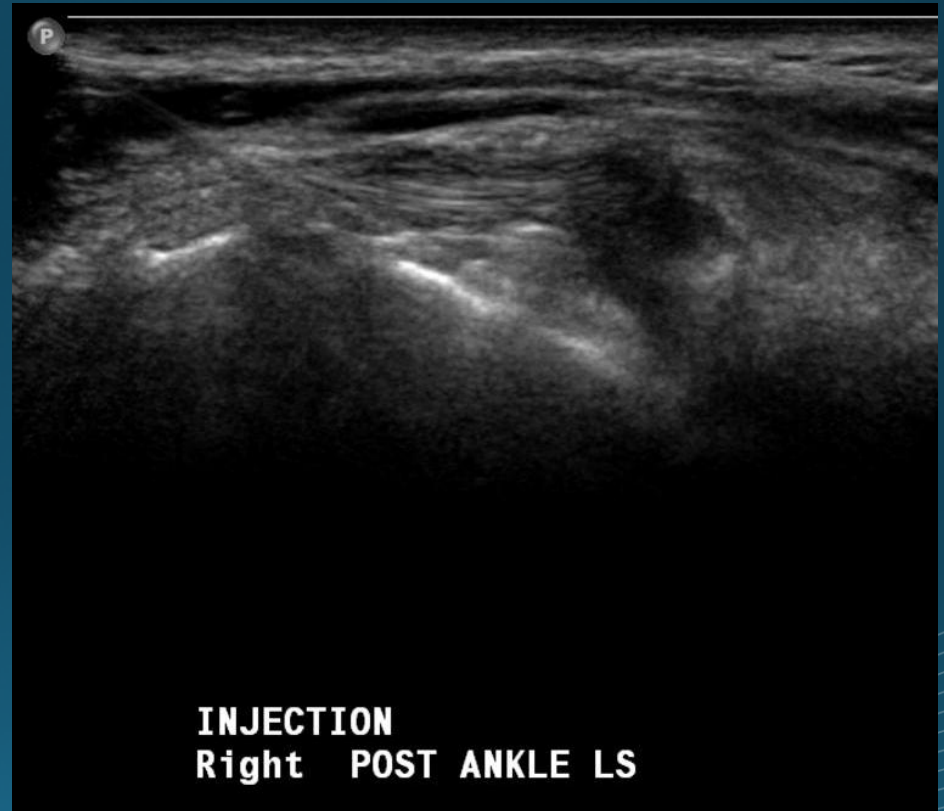
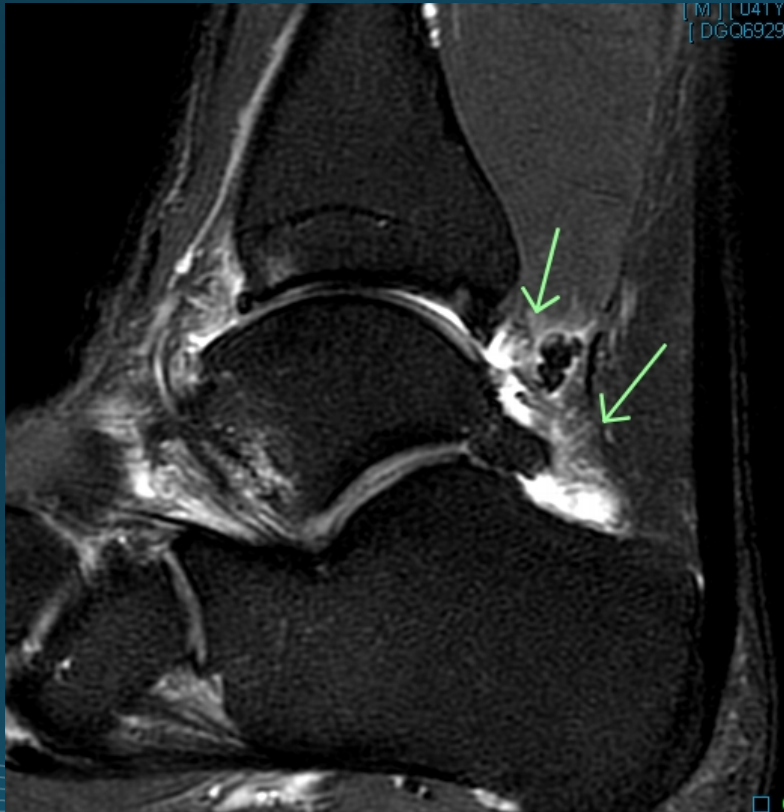
Posterior Ankle Impingement

- Posterior talus and soft tissues compressed between tibia and talus during plantar flexion
- Lateral talar tubercle/FHL/os trigonum/post recesses of ankle and subtalar jts
- ▲diag: Achilles tendinopathy, retrocalcaneal bursitis, FHL stenosing tenosyn, peroneal tendon subluxation, TTS, arthritis, Haglund's

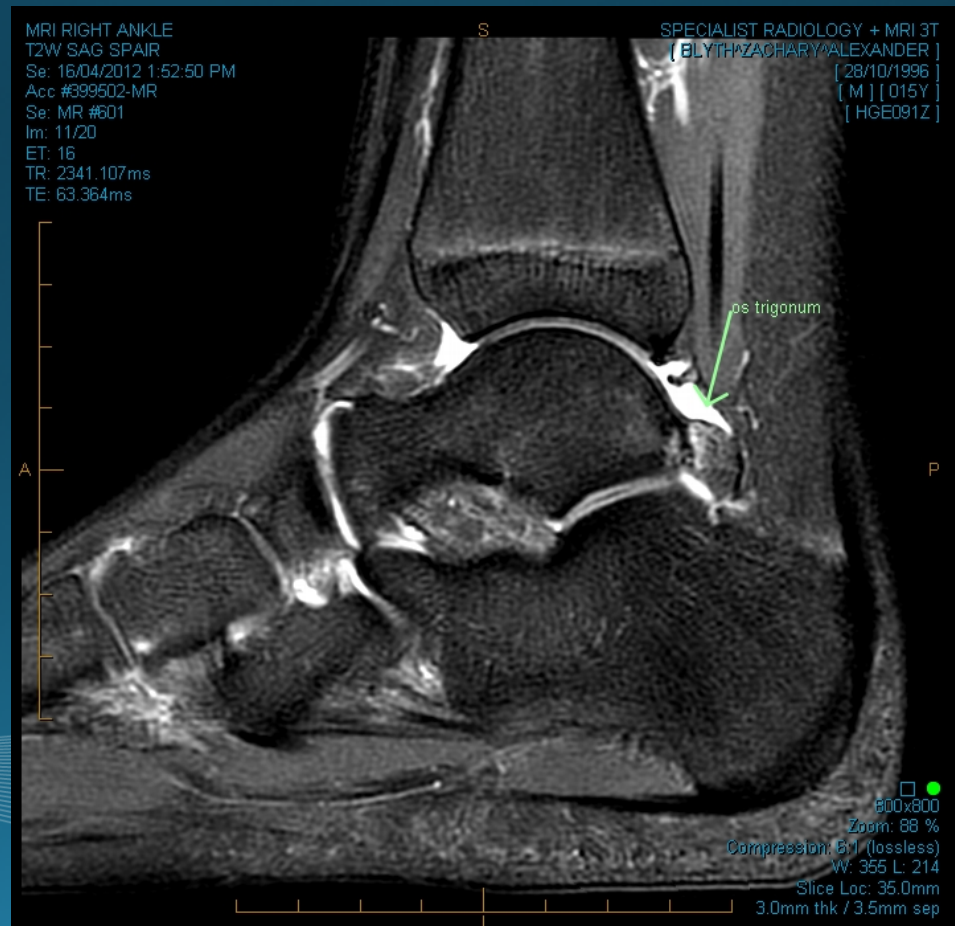
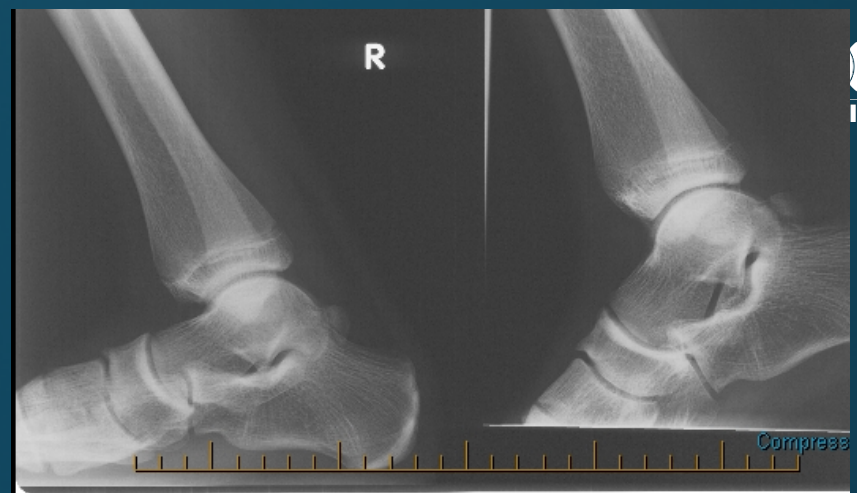
Posterior Ankle Impingement



Posterior Impingement



Os Trigonum



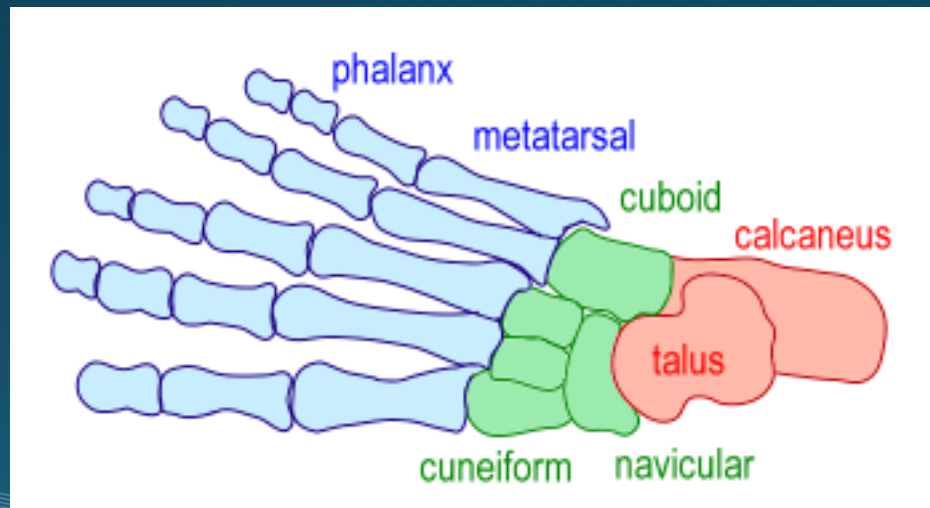


COMMON FOOT PATHOLOGY

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Musculoskeletal Radiologist

Midfoot Anatomy

- Complex anatomy
- Navicular, cuboid and cunieforms
- Bounded by Lisfranc and Chopart joint.

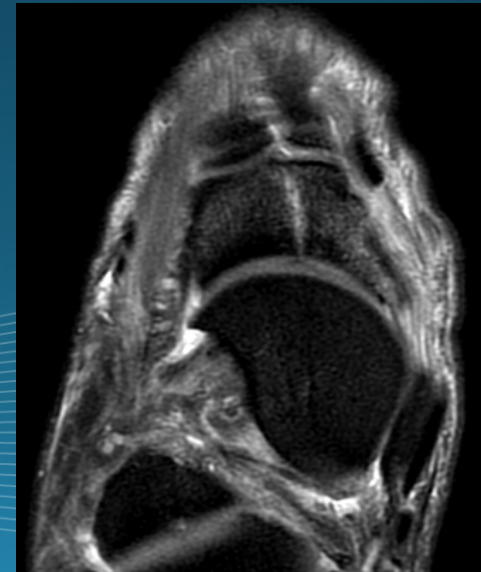
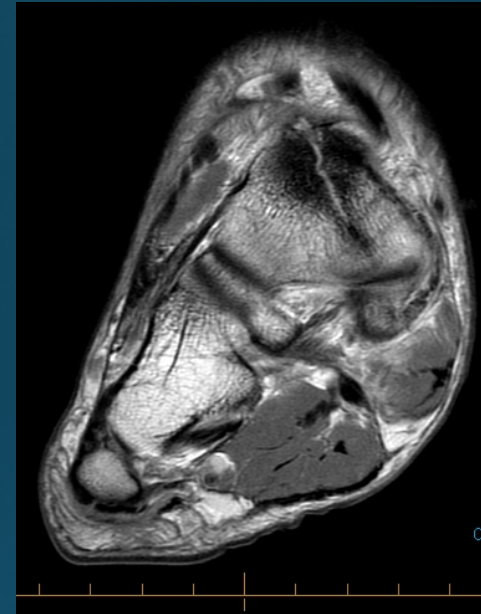
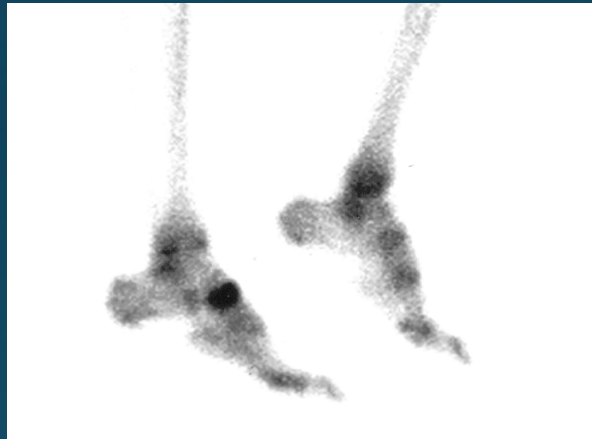


Midfoot Pain

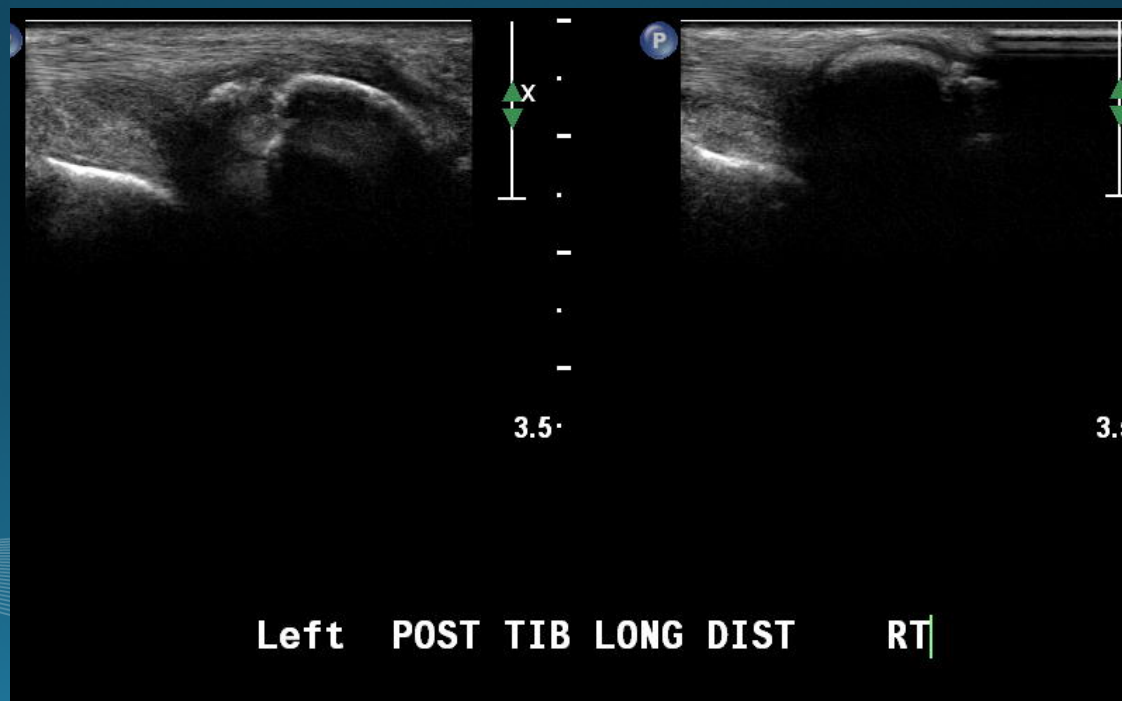
- Osteoarthritis
- Lisfranc ligament
- Spring ligament/Post tibial tendon complex
- Stress fracture
- Accessory navicular
- Os peroneum
- Fractures

Tarsal Navicular Stress Fr

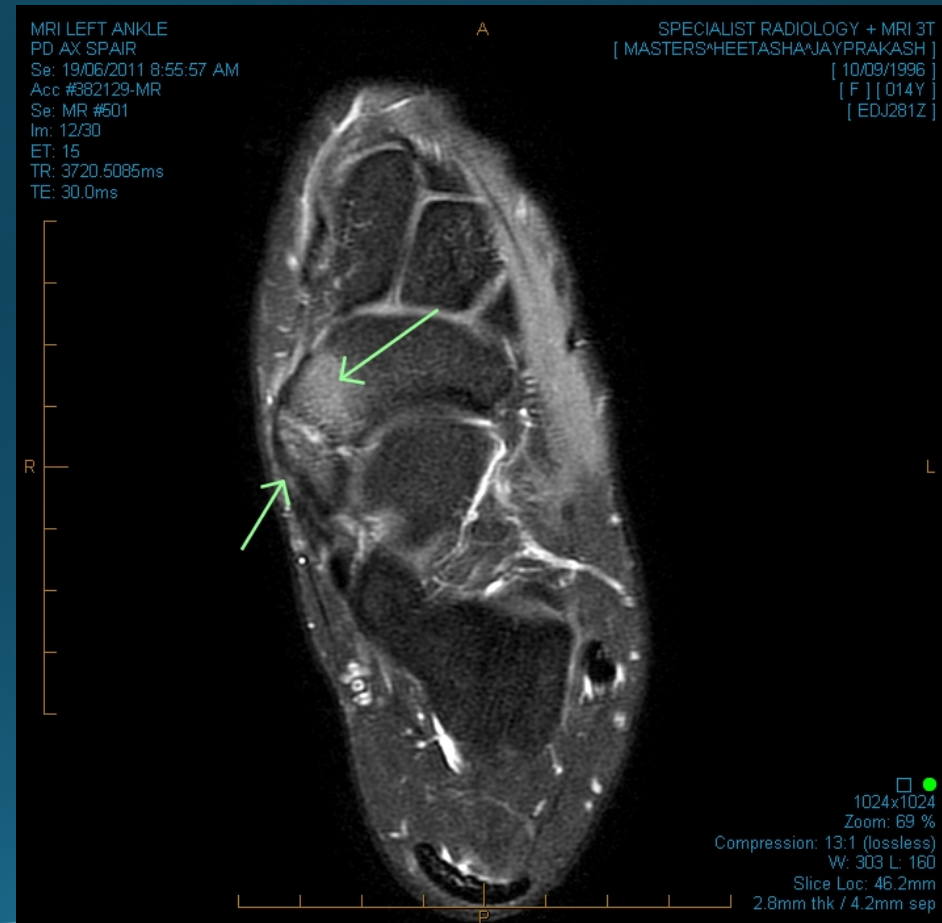
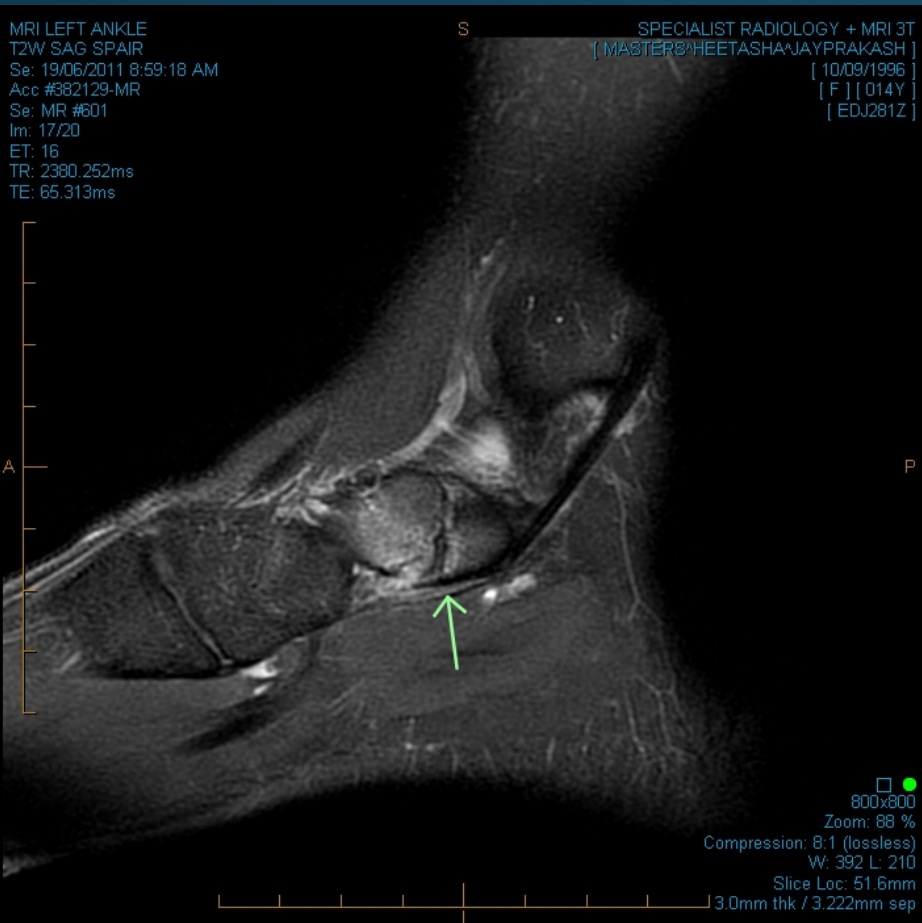
- X-rays usually negative
- Bone scan vs. MRI vs. thin cut CT



Type II Accessory Navicular



Accessory Navicular



Lisfranc Ligament Injury



Os Peroneum Fracture



Forefoot Pain

- Hallux valgus
- Halux rigidus
- Sesamoids
- Mortons neuroma/Intermetatarsal bursitis
- Fat pad overload
- Plantar plate
- Freibergs infraction

Routine Foot Views

- AP
- Lateral
- Oblique
- Additional
 - Harris Beath
 - Sesamoid
 - Plantodorsal

Types of Proximal 5th MT Fractures



Base of 5th Metatarsal

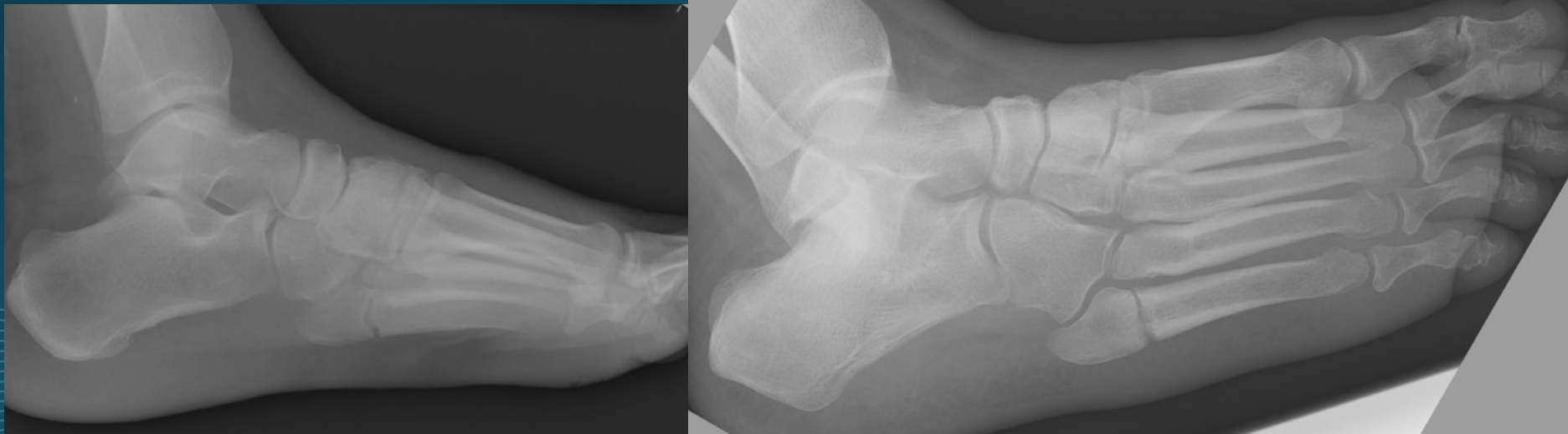


**5th
metatarsal
stress
fracture**



Metatarsal Fractures

- Jones Fracture
 - Proximal metatarsal shaft
 - Poor blood supply delayed/fibrous union

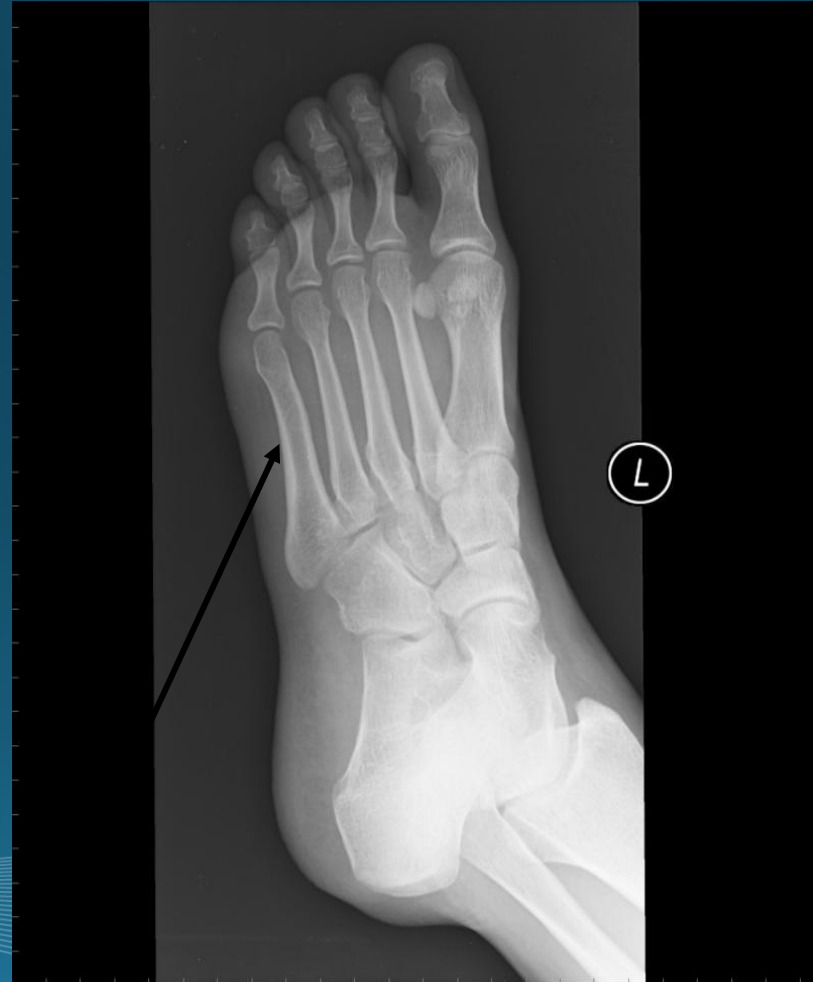


STRESS FRACTURE IMAGING

X-ray

- Only ~ 30% positive on initial examination
- 10 - 20% never show up on plain films
- If a positive x-ray
 - Localized periosteal reaction
 - Radiolucent line
 - Cancellous bone - band-like focal sclerosis

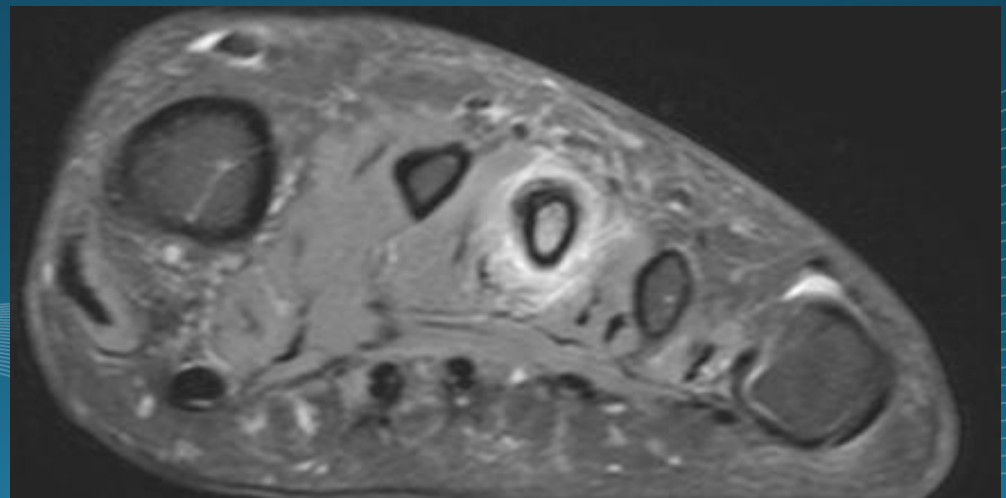
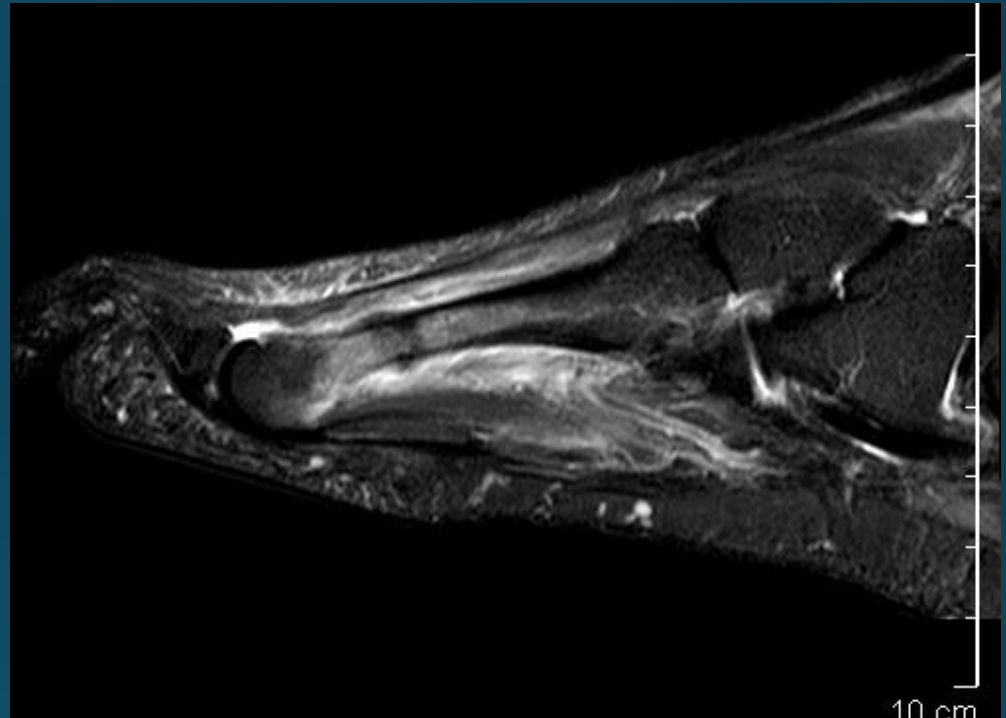
Early Metatarsal Stress Fracture



One Week Later.....



Metatarsal Stress Fracture





Overload Stress Response



Mgmt. of 5th Metatarsal Stress Fx

- High risk for delayed union or nonunion
- Non-weight-bearing cast for 6 weeks versus IM screw fixation

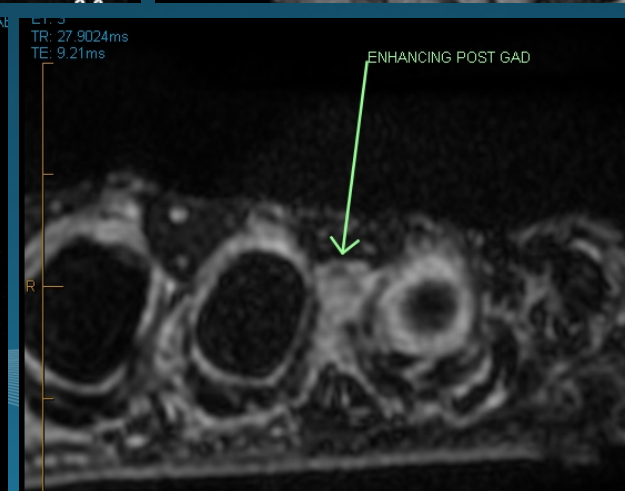
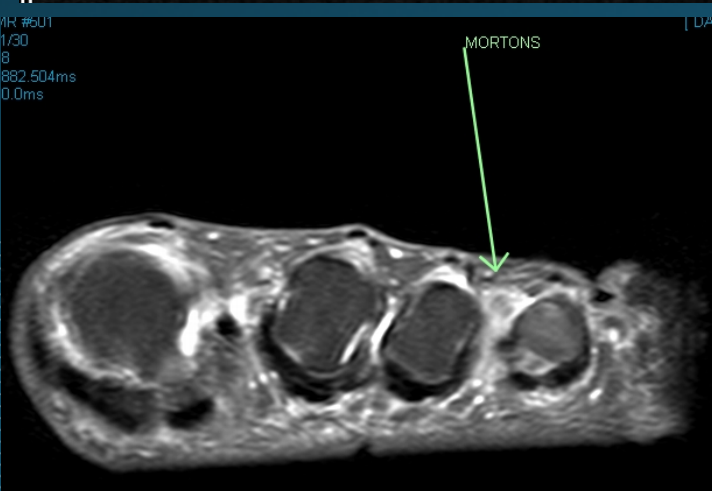
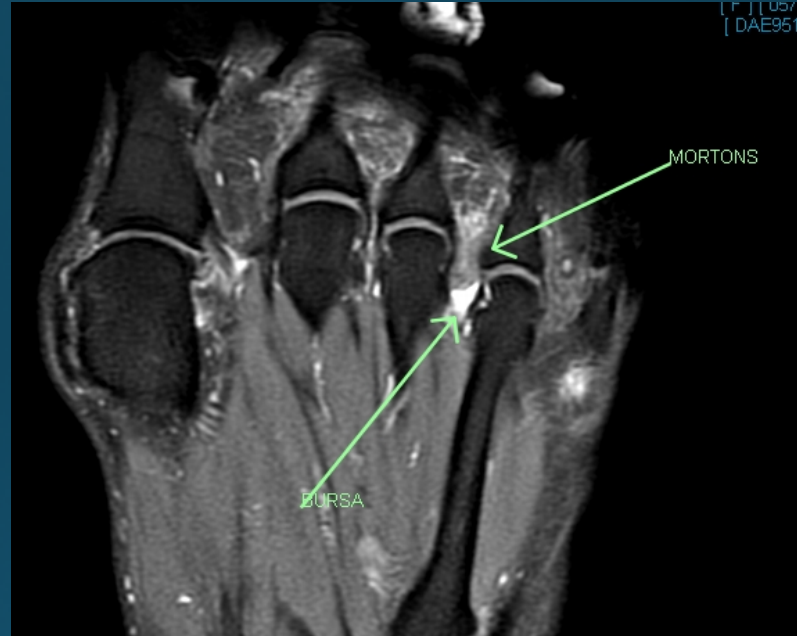
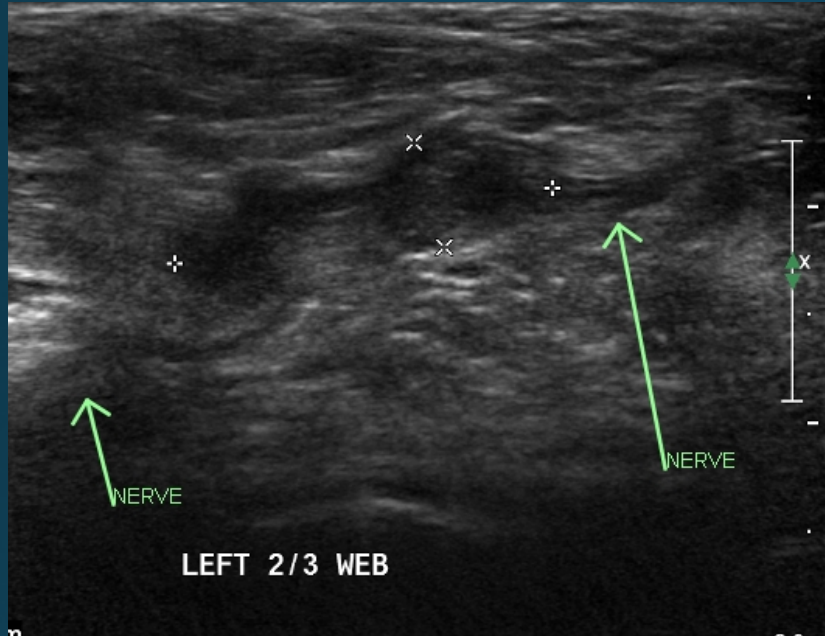
Fat Pad Overload



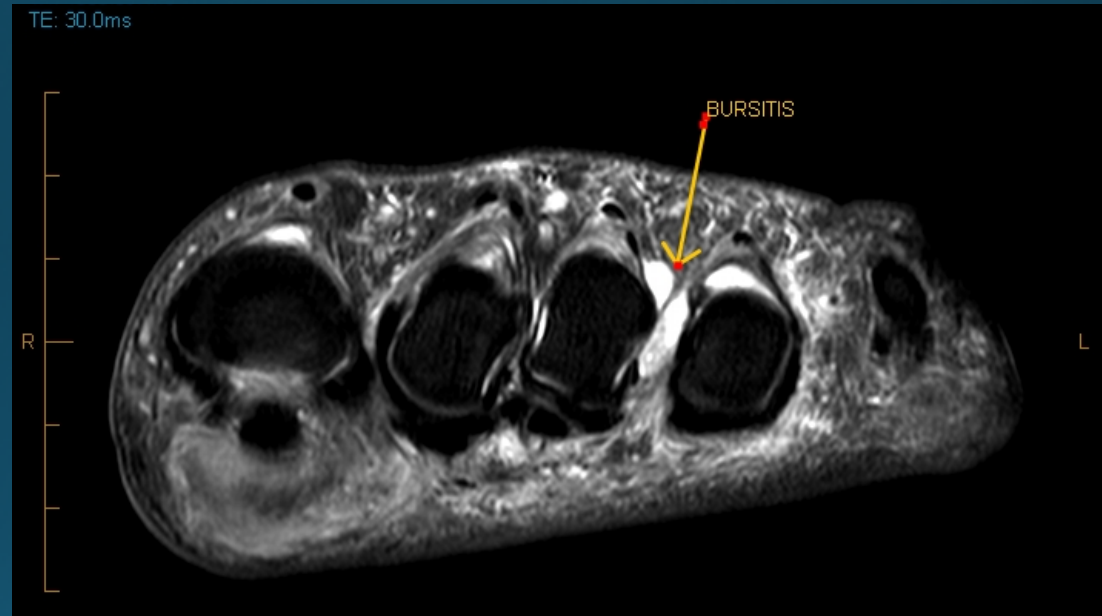
Mortons Neuroma

- Ovoid mass at level of metatarsal heads
- Compressive neuropathy interdigital nerve
- Impingement beneath intermetatarsal lig
- Fusiform enlargement -usually<20mm
- 3/4 or 2/3 webspace most common
- burning,shooting,tingling,cramping
- Tinel's,Mulder's signs
- Δ diag internet bursa, nerve tumour, tendon sheath ganglion,Freibergs,stress #

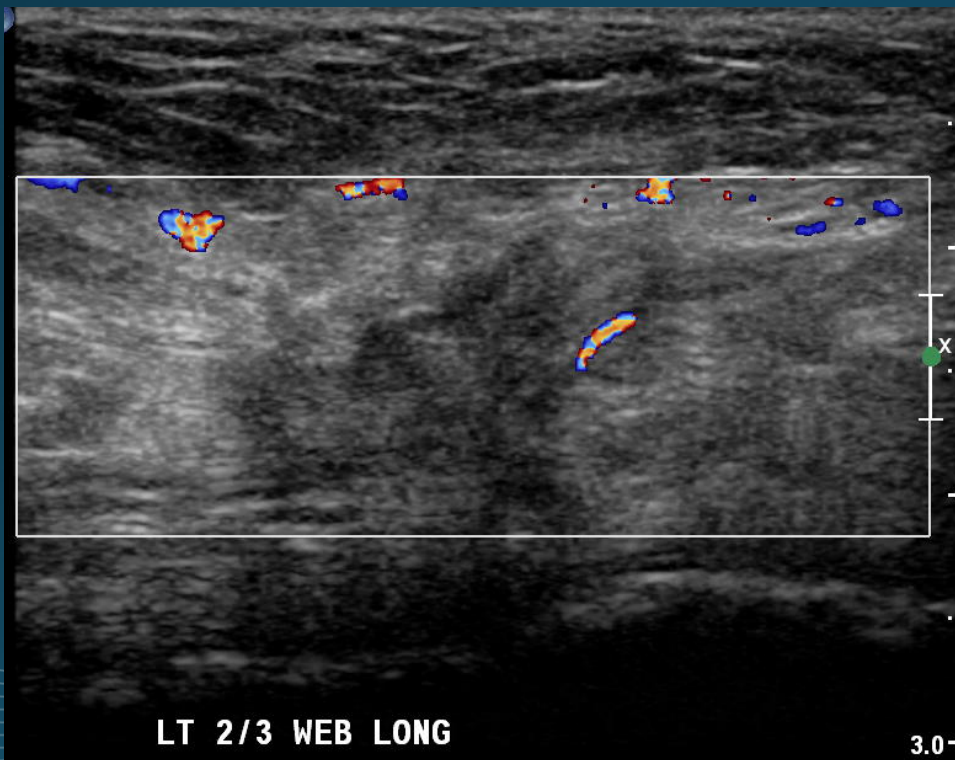
Mortons Neuroma



Intermetatarsal Bursitis



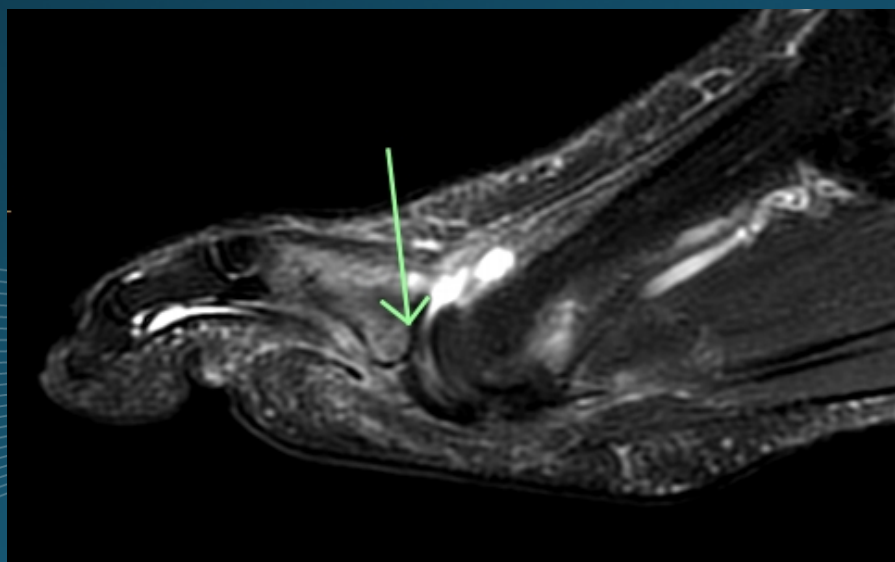
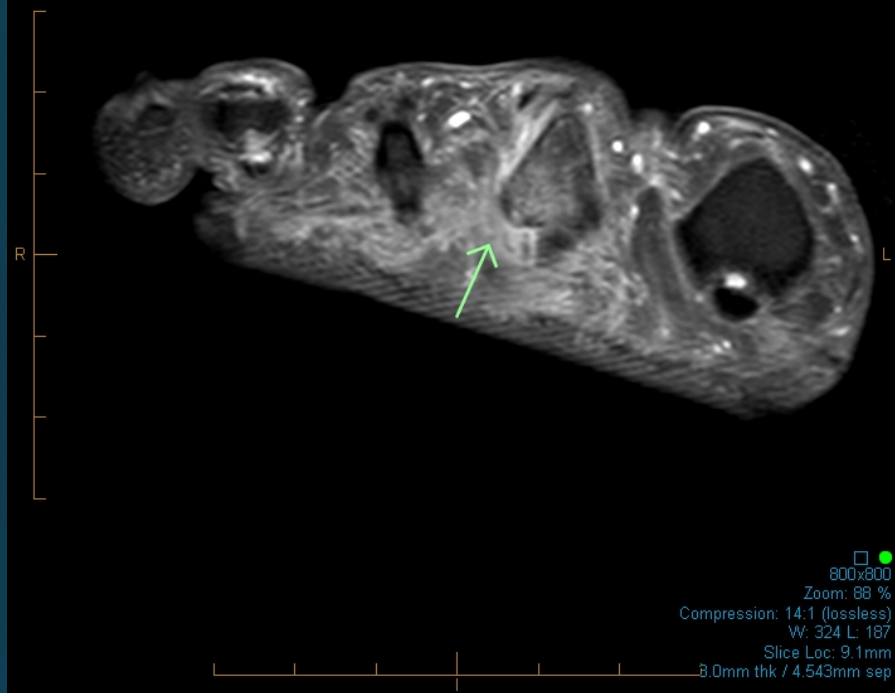
Morton's Neuroma Injection



MR RIGHT FOREFOOT (IV GAD)
PD SA SPAIR
Se: 11/08/2011 1:00:57 PM
Acc #385121-MR
Se: MR #601
Im: 3/30
ET: 18
TR: 3897.957ms
TE: 30.0ms

SPECIALIST RADIOLOGY + MRI ST
[LOVERIDGE*LYNDSAY*VAL]
[20/08/1945]
[F] [065Y]
[FCF381Z]

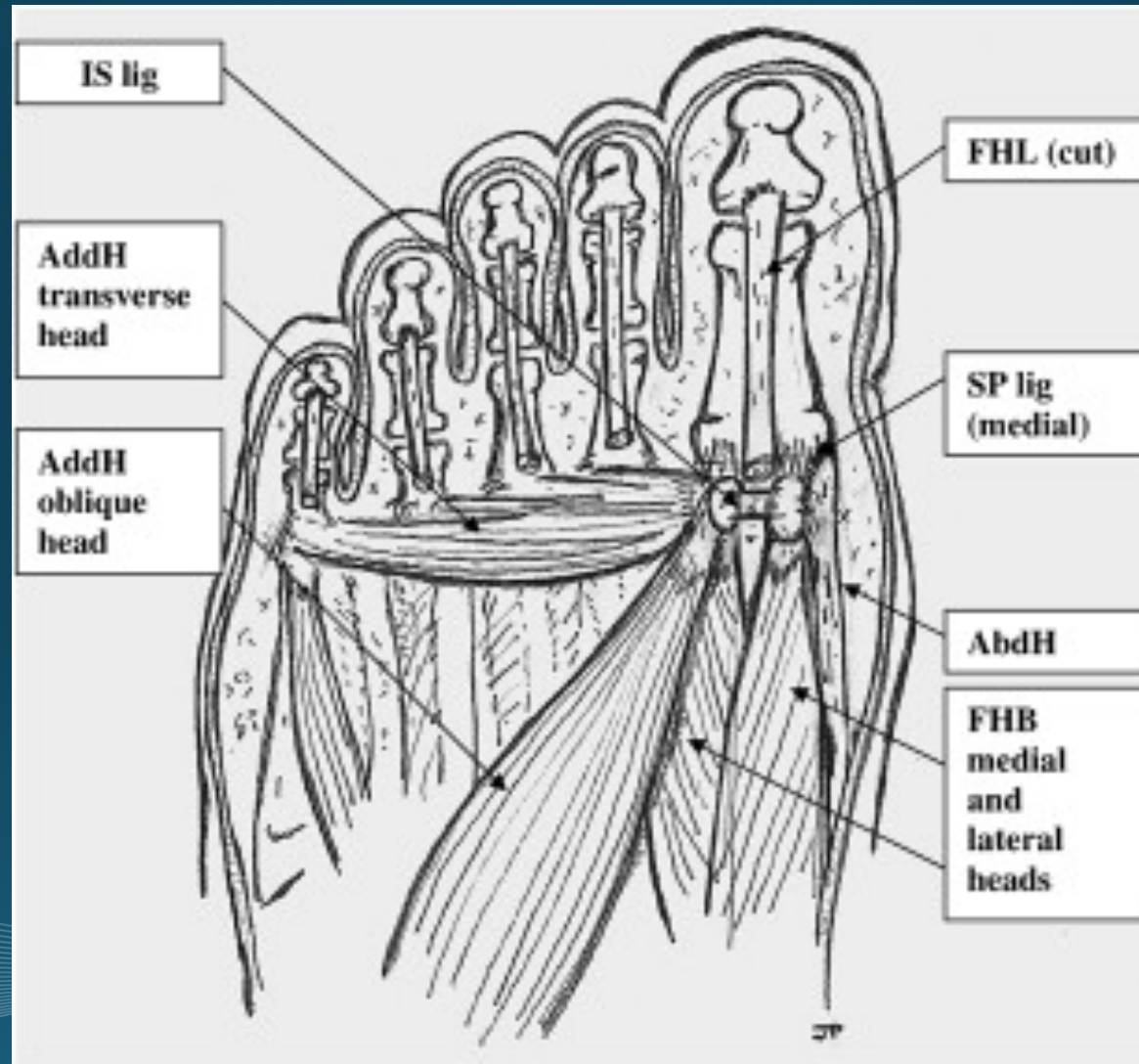
Plantar Plate Tear



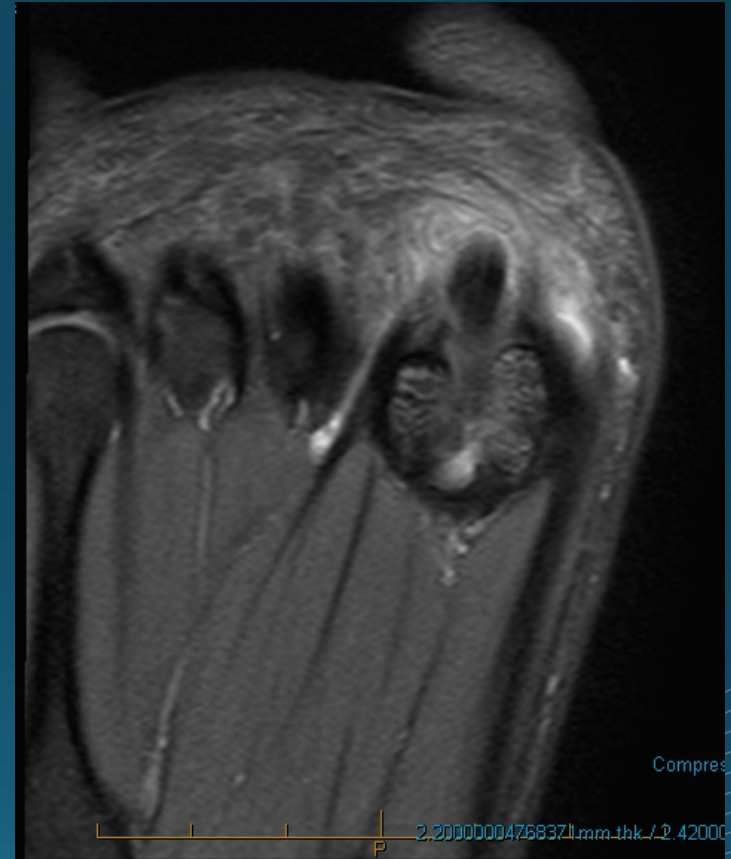
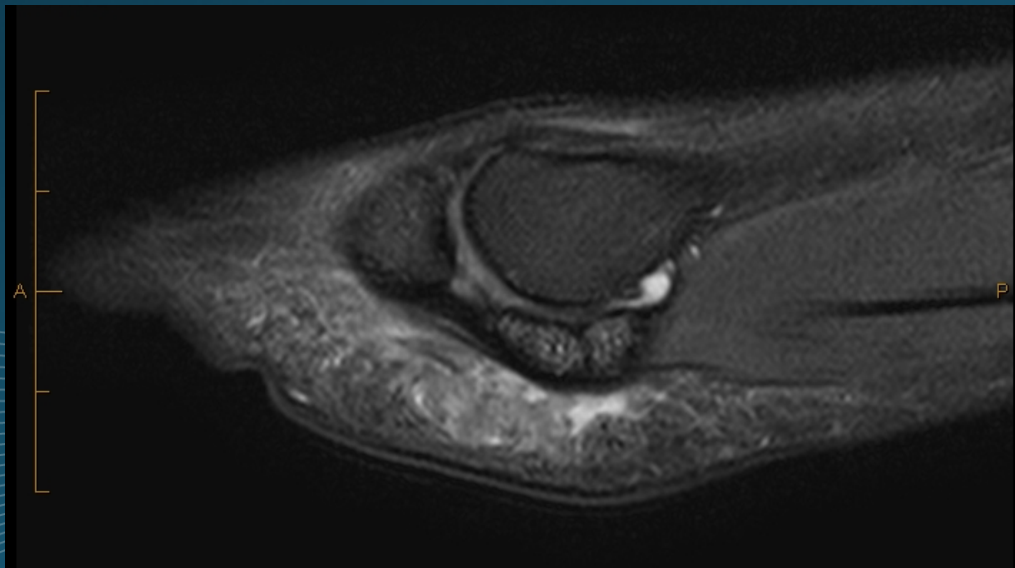
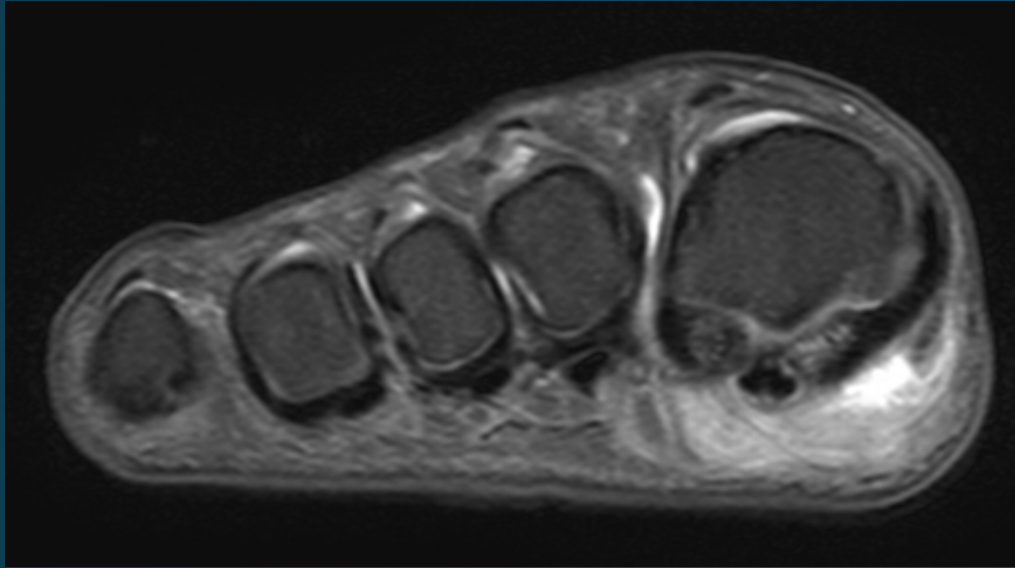
Sesamoid Dysfunction

- Bipartite
- Fractures
- Turf Toe
- Osteochondritis/AVN
- Sesamoiditis
- Arthritis
- Don't forget Hallux Rigidis/Valgus

Anatomy



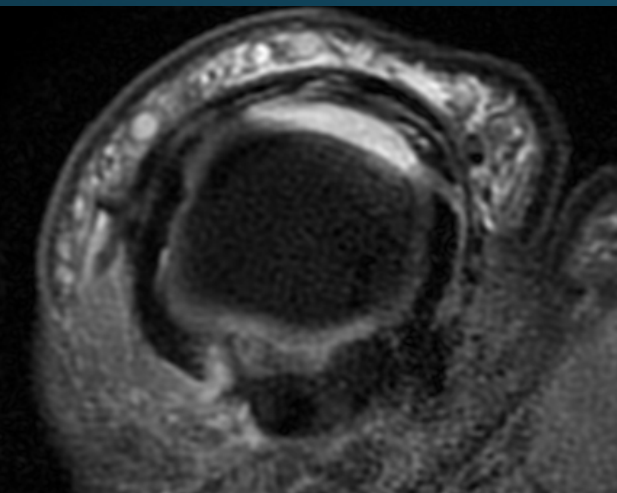
Sesamoiditis



Sesamoid stress Fx

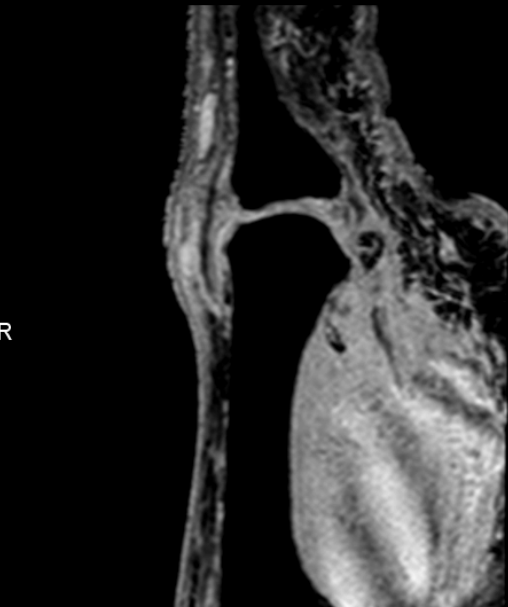
- Risk: Sudden start-stop sports
- Repetitive forced dorsiflexion
- **Conservative tx rarely effective**
- Tx: Non-weight bearing x 6 weeks, 2-4 weeks protected weight bearing
- Sick sesamoid syndrome: failure to respond -Surgery indicated

Medial Sesamoid Fracture

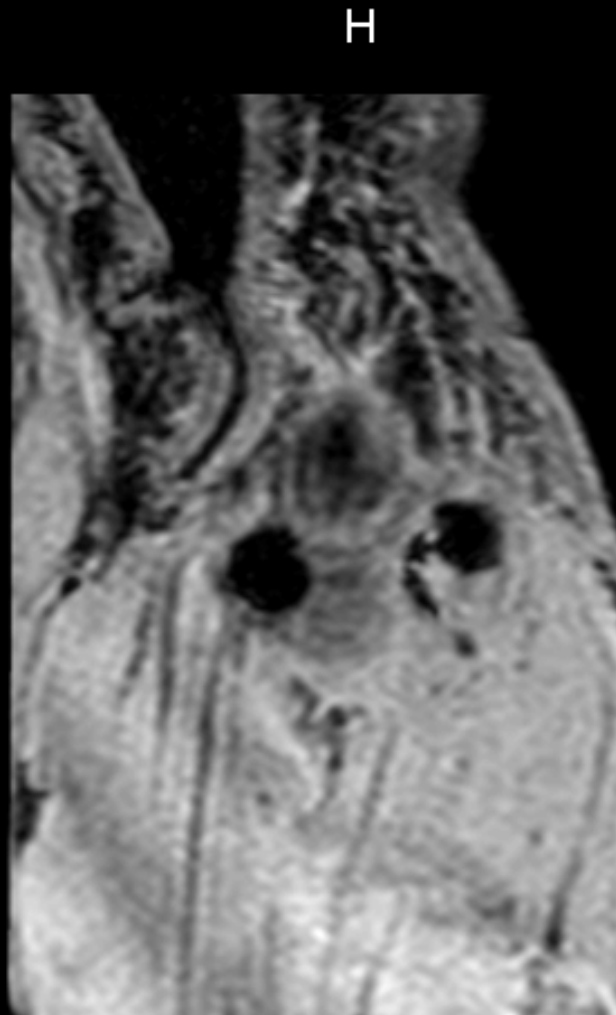


H

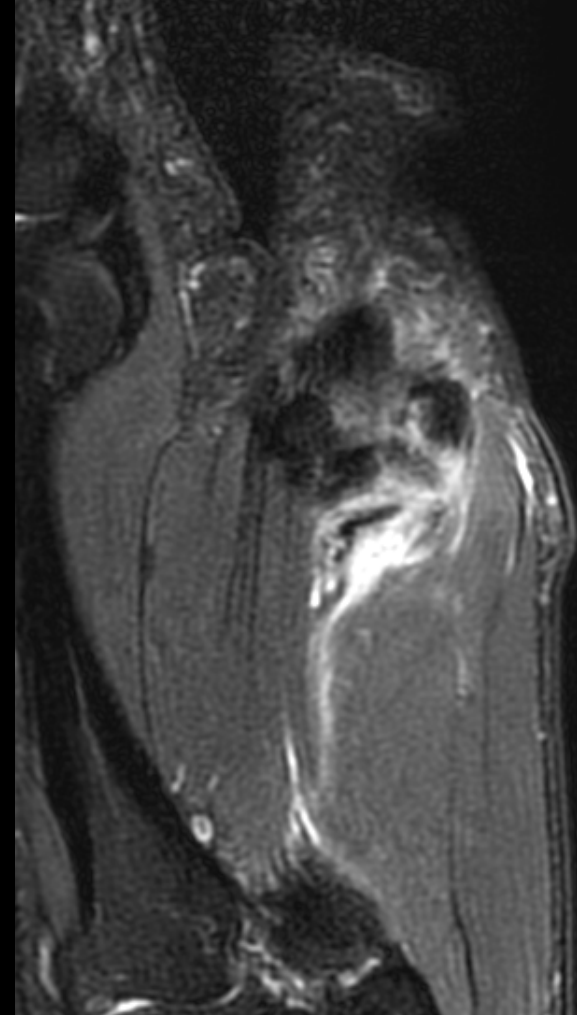
IMAGE
15.5
Series 1



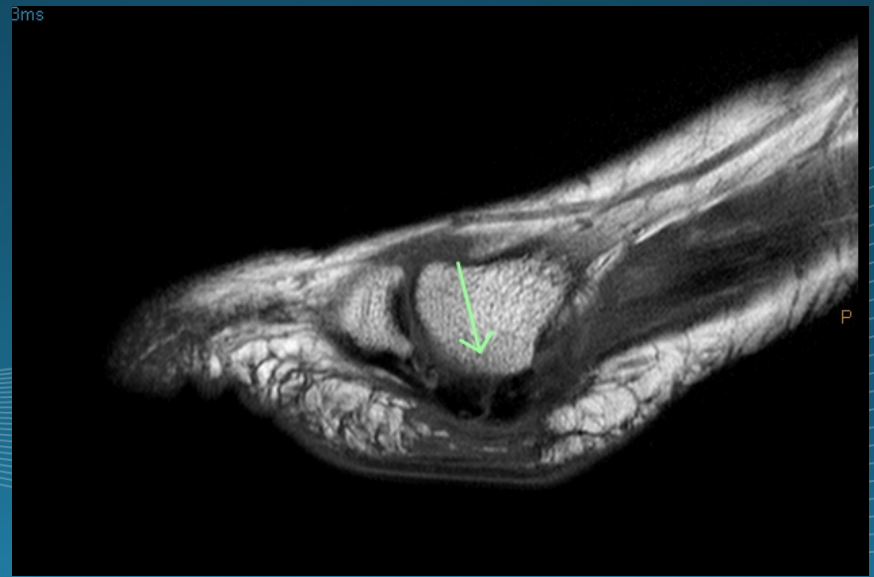
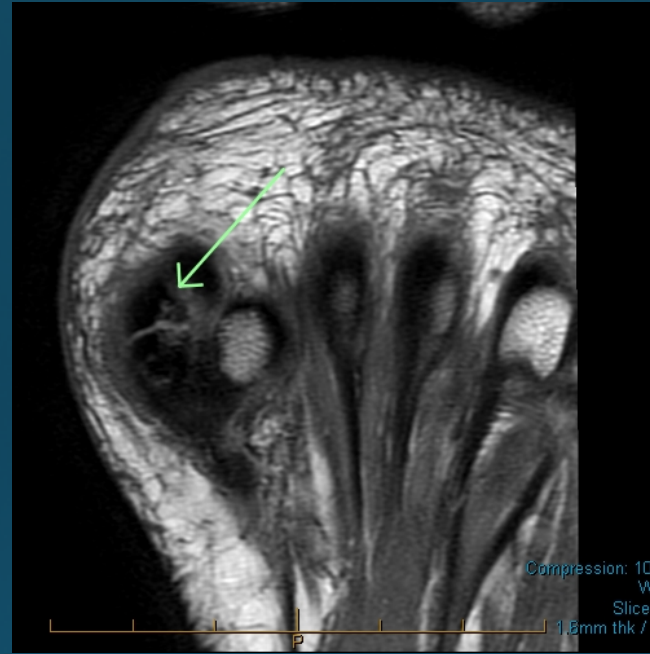
5 cm



H



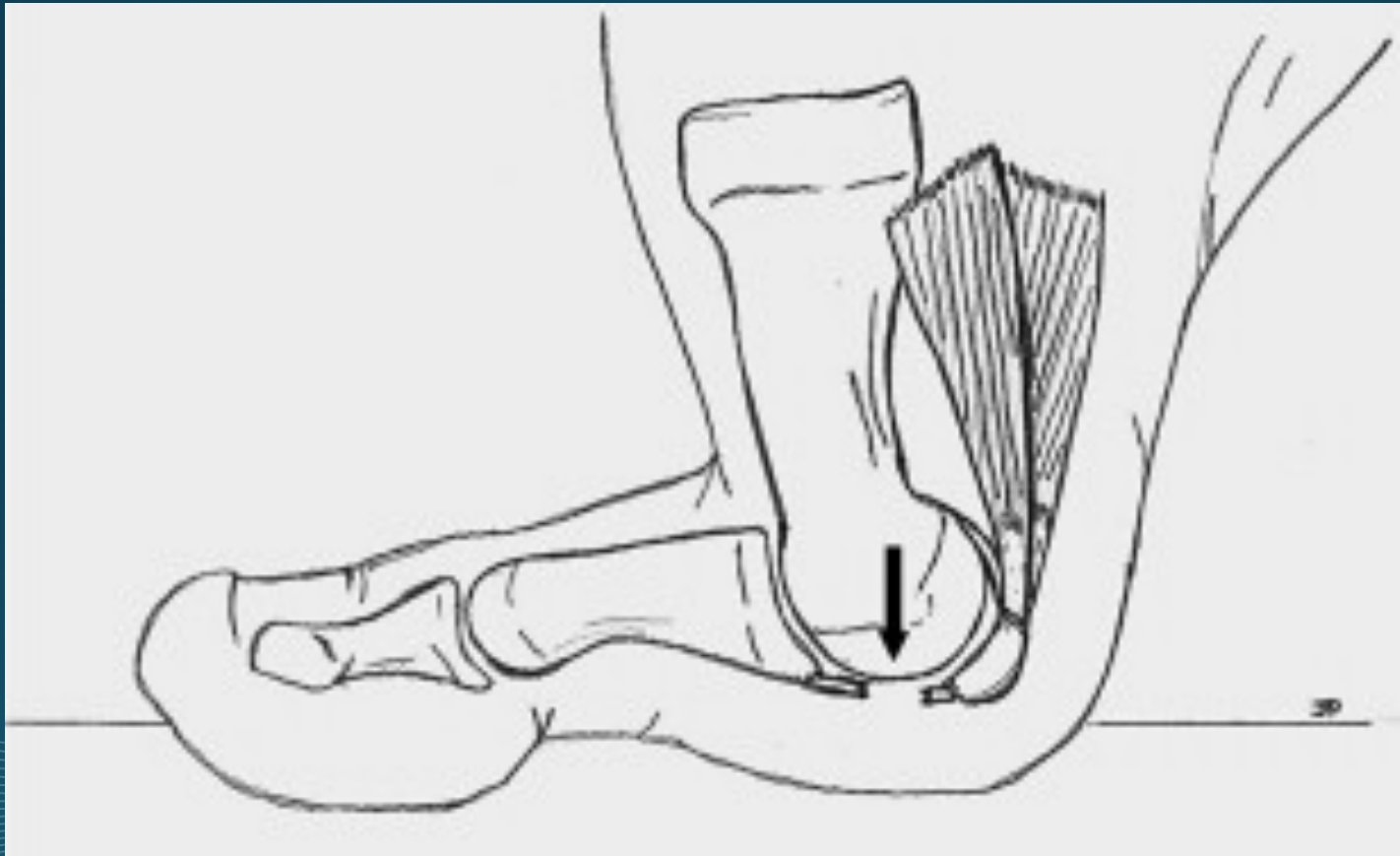
Sclerotic Med Sesamoid



Turf Toe

- Sprain of plantar capsuloligamentous complex of 1st MTP Joint
- Hyperextension of plantar capsule most common mechanism
- Combined mechanisms eg valgus/varus

Turf Toe: Mechanism of Injury



Turf Toe



Sesamoid Phalangeal Ligament

