LOWER EXTREMITIES:

Case Presentation

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www.jprad.com

Welcome

- New to the team
- Xrays
  - To give best care and solutions>>biomechanical evaluation
  - ‘Typical’ imaging protocols and guidelines=medical model
  - No one gives biomechanical eval and fingerprint exam
  - AP and lateral radiographs

- Personal Experience
  - Injured athlete>>>>chiropractic and Foot Levelers= increased recovery time
  - Learned early that meds don’t work

- My Background

- My lectures: young to mature athlete

FOOT LEVELERS

Today

- Lower Extremity
- Lumbar Spine
- Cervical Spine

FOOT LEVELERS

Outline

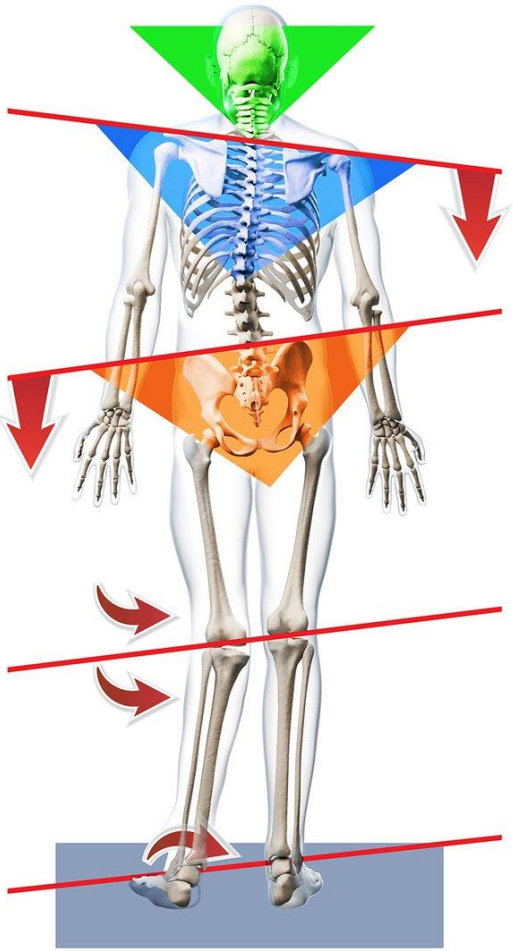
- Toes to the Hip:
  - Foot/toes
  - Ankle
  - Knee
  - Hip/Pelvis
- Patient positioning
- Case studies: Congenital anomalies, degenerative changes, and injuries

FOOT LEVELERS

Dysfunction

- Start at the base

- Increased stress above and below= chronic pain; increase likelihood of injuries or poor recovery from injuries
  - Poor recovery time



Check It Out

- www.footlevelers.com
  - Under ‘Resource Center’

- Research articles of the extremities and spine

FOOT LEVELERS

Before We Get Started

- MRI
- CT
- US
- Xray

FOOT LEVELERS

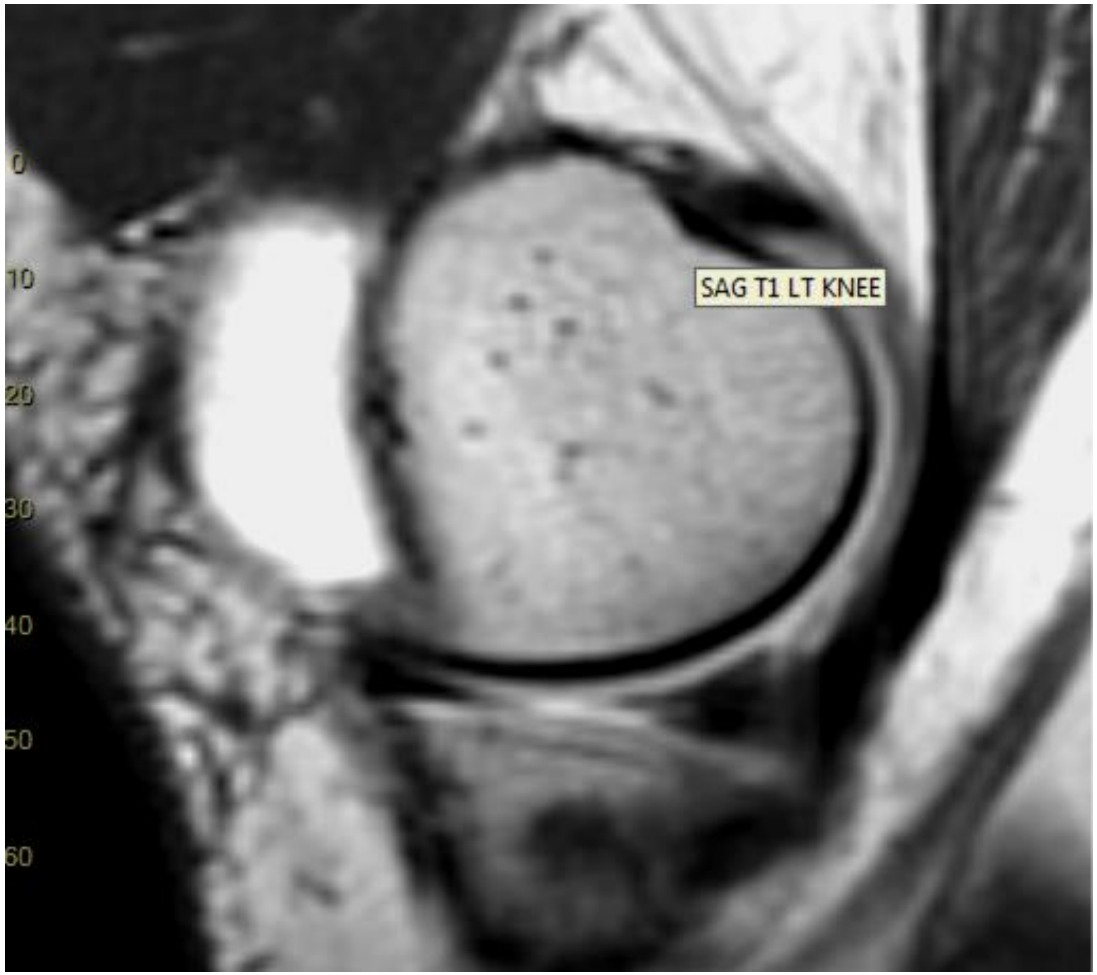
MR of Extremities

- **Criteria:**
  - Extremities- trauma of soft tissue and bone
    - Bone contusion/ stress fracture
    - Ligament/tendon, labrum, meniscus, musculature, vasculature, etc
  - Subacute to chronic head/brain trauma; neurological pathology; mass

MR of Extremities

- **Contrast**
  - Arthrography: joint capsule
  - Most common joints: knee with prior meniscectomy; labral tear of hip; shoulder.

Example of Arthrography of Knee



Foot

FOOT LEVELERS

Foot Views

- DP
- Medial Oblique
- Lateral

FOOT LEVELERS

DORSOPLANTAR FOOT (DP)

- **FFD** 40-2
- **CR** 3rd MT base
- Tilt 10˚ cephalad

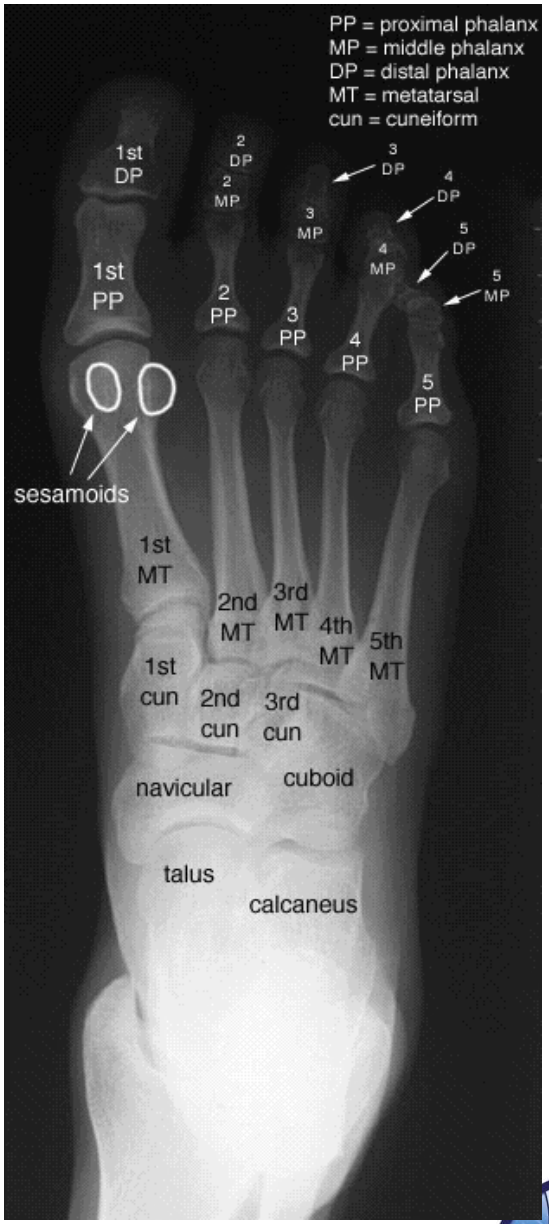
DORSOPLANTAR FOOT (AP)

Structures Visualized

- Cuboid
- Calcaneus
- Talus
- Navicular
- 1st-3rd Cuneiform
- 1st-5th metatarsals
- phalangeal bones

FOOT LEVELERS

DORSOPLANTAR FOOT - Labeled



FOOT LEVELERS

MEDIAL OBLIQUE FOOT

- **FFD** 40-2
- **CR** 3rd MT base
- **Tube tilt** 10 ° cephalad

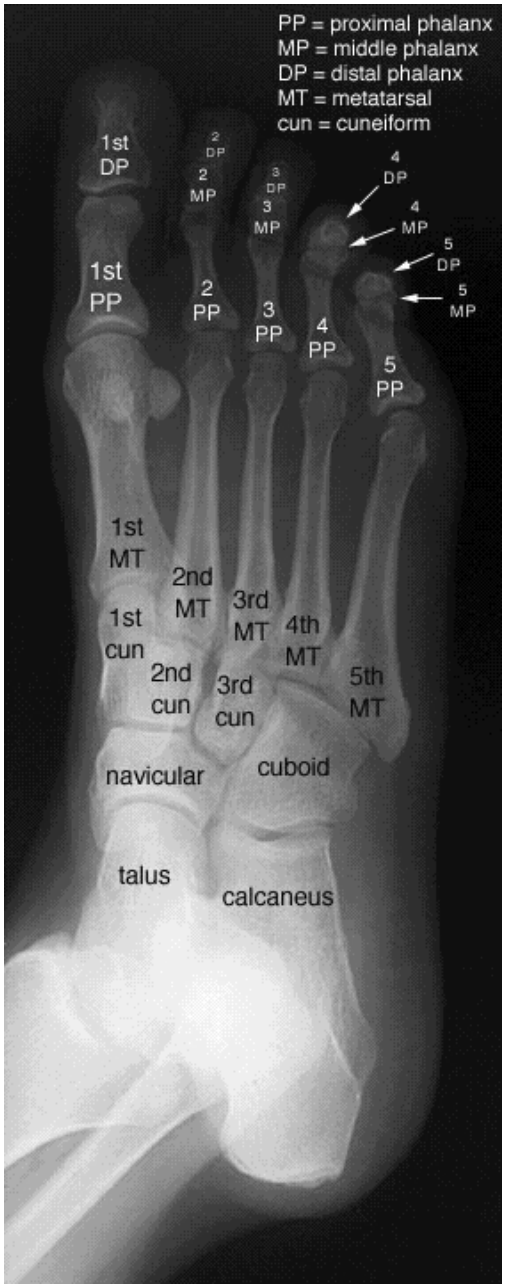
FOOT LEVELERS

MEDIAL OBLIQUE FOOT

Structures Visualized

- Calcaneus
- Talus
- Navicular
- Cuboid
- 1st-3rd Cuneiforms
- Metatarsals and sesamoids
- Phalanges

MEDIAL OBLIQUE FOOT - Labeled



FOOT LEVELERS

LATERAL FOOT

- **FFD** 40”
- **CR** navicular
- **Tube tilt** none

FOOT LEVELERS

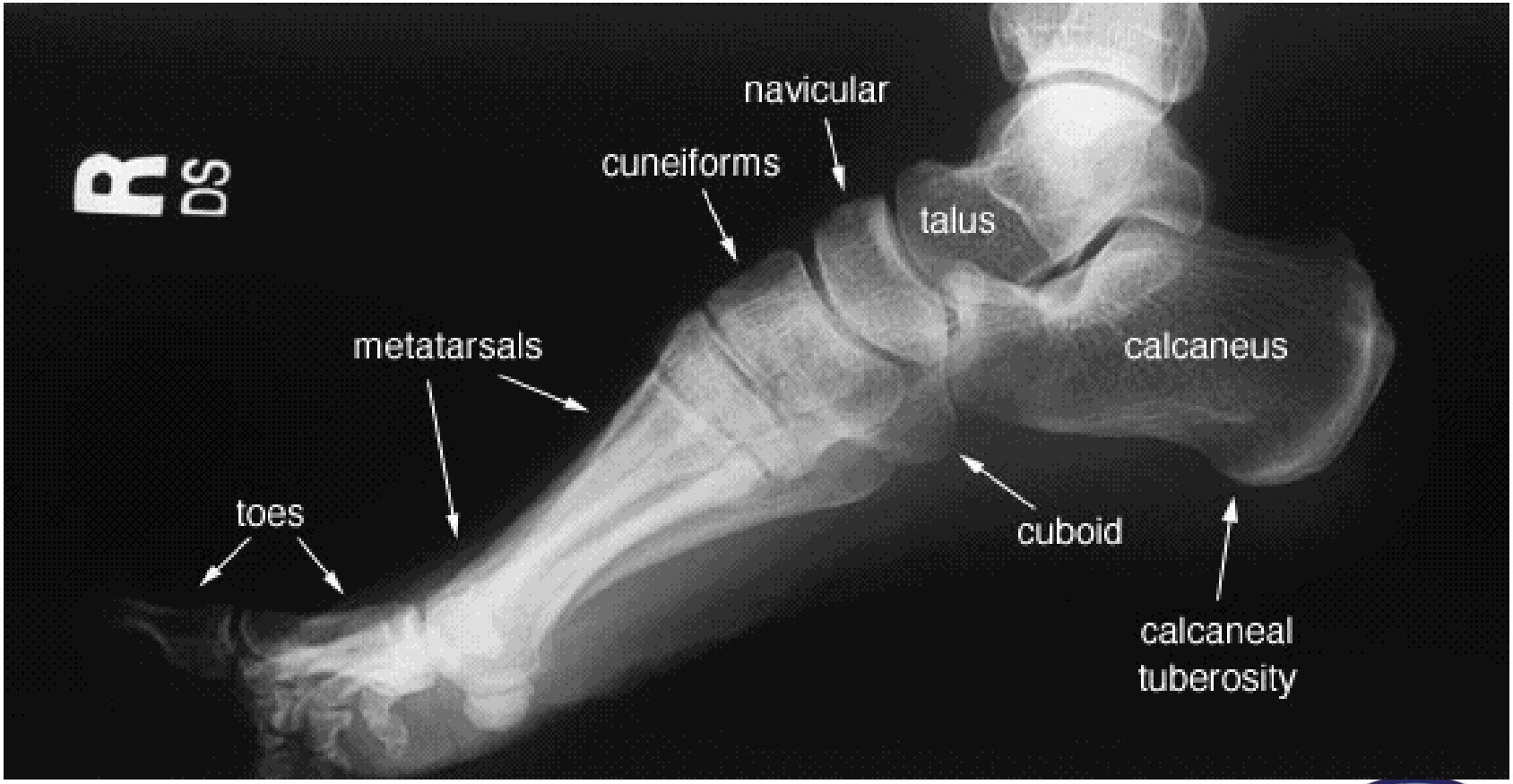
LATERAL FOOT

Structures Visualized

- Calcaneus
- Talus
- Navicular
- Cuboid
- Metatarsals

FOOT LEVELERS

LATERAL FOOT - Labeled



FOOT LEVELERS

Case

- Foot and ankle pain
- Congenital anomalies known

FOOT LEVELERS

DP Radiograph

Diagnosis

- Brachydactyly- congenital shortened toes/fingers Or Brachymetatarsia (shortened metatarsals)

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Treatment

- Conservative treatment
  - **Foot Levelers**
  - Maintain function

Case

- Wrestling barefoot
- Foot pain

FOOT LEVELERS

DP Foot

Donated by Dr. L. Nicholson

Magnified

Donated by Dr. L. Nicholson

Diagnosis

- Fracture of 4th proximal phalanx
- Bipartite sesamoid, normal variant
  - Check for symptoms: Avascular necrosis; Inflammation
  - If pain, tendon tears; Altered biomechanics of foot
- **Mild valgus deformity at the 1st MTP jt**

FOOT LEVELERS

Treatment

- Conservative
- Foot Levelers
  - Improve biomechanics and recovery time

FOOT LEVELERS

The Big Point of the Story

- Trauma (Acute or Chronic)
  - Increase recovery and restore function= Foot Levelers

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Case

- Dull, achey foot pain for several weeks

FOOT LEVELERS

FOOT LEVELERS

Another Stress Fracture

FOOT LEVELERS

Diagnosis

- 2nd metatarsal Aka March fracture
- Osteopenia, disuse
- **Lateral (fibular deviation of sesamoid bones).**
- Degenerative changes of intertarsal and tarsometatarsal joints.

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Stress Fracture

- Not seen on xrays, unless callous formation

- Treatment: Conservative care/Rest; Foot Levelers
  - There are signs of altered biomechanics
  - Evaluate above the area

Case

- Athlete twisted his/her foot

FOOT LEVELERS

FOOT LEVELERS

Evaluation

- Alignment of 1st metatarsal to 1st cuneiform; and 2nd metatarsal to 2nd cuneiform

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Another patient

Patient fell off a horse.

www.feinbergnorthwestern.edu

FOOT LEVELERS

Normal vs Abnormal

FOOT LEVELERS

Normal vs Abnormal

FOOT LEVELERS

Lisfranc Dislocation

- MOI: Twisting with plantar flexion of forefoot or direct blow.
- Swelling and pain over region; unable or difficult to bear weight; dropped arch
- Disruption of the tarsal-metatarsal (TMT) joint with or without associated fracture.

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Lisfranc Fx/Dislocation

- Lisfranc ligament is a major stabilizer of the TMT joint, disruption causes midfoot instability
  - Origin: first cuneiform
  - Insertion: medial aspect of the base of the second metatarsal.

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X-ray of Lisfranc Joint

- Evaluation
  - Alignment of 1st metatarsal to 1st cuneiform; and 2nd metatarsal to 2nd cueiform
  - Weight bearing DP view, 10 cephalad tube tilt
- Widening of 1st-2nd metatarsal interspace
- Lateral dislocation of the metatarsals
  - Severe Lisfranc Injury

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Treatment Lisfranc

- Rest; boot>>>6-8 weeks or more
  - Laser, etc
  - Foot Levelers, once weightbearing
- Advanced Imaging
  - MRI- ligament and bone marrow edema
  - CT-fracture fragments or dislocation
- Surgical
  - Unstable- percutaneous wire fixation
  - If displaced, open reduction, internal fixation with screws.

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MRI of TMT ligament

www.radsource.us

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Case

- Heel pain

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Lateral Radiograph

Diagnosis

- Enthesophyte or traction osteophyte formation at the calcaneal attachment site to the plantar aponeurosis/ fascia= Heel Spur.

Lateral Radiograph

FOOT LEVELERS

Another Example

FOOT LEVELERS

Another Heel Spur

- Enthesophyte or traction osteophyte at the calcaneal attachment site to the Achilles Tendon.

FOOT LEVELERS

Heel Spur

- Cause: repetitive stress, obesity, altered biomechanics, hereditary, previous trauma, inflammatory arthritis, etc.

- Complication: Inflammation or tearing of the plantar fascia or Achilles Tendon>>>plantar fasciitis or Achilles Tendinitis

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Treatment

- Minimize stress to region
- Modalities
- Foot Levelers

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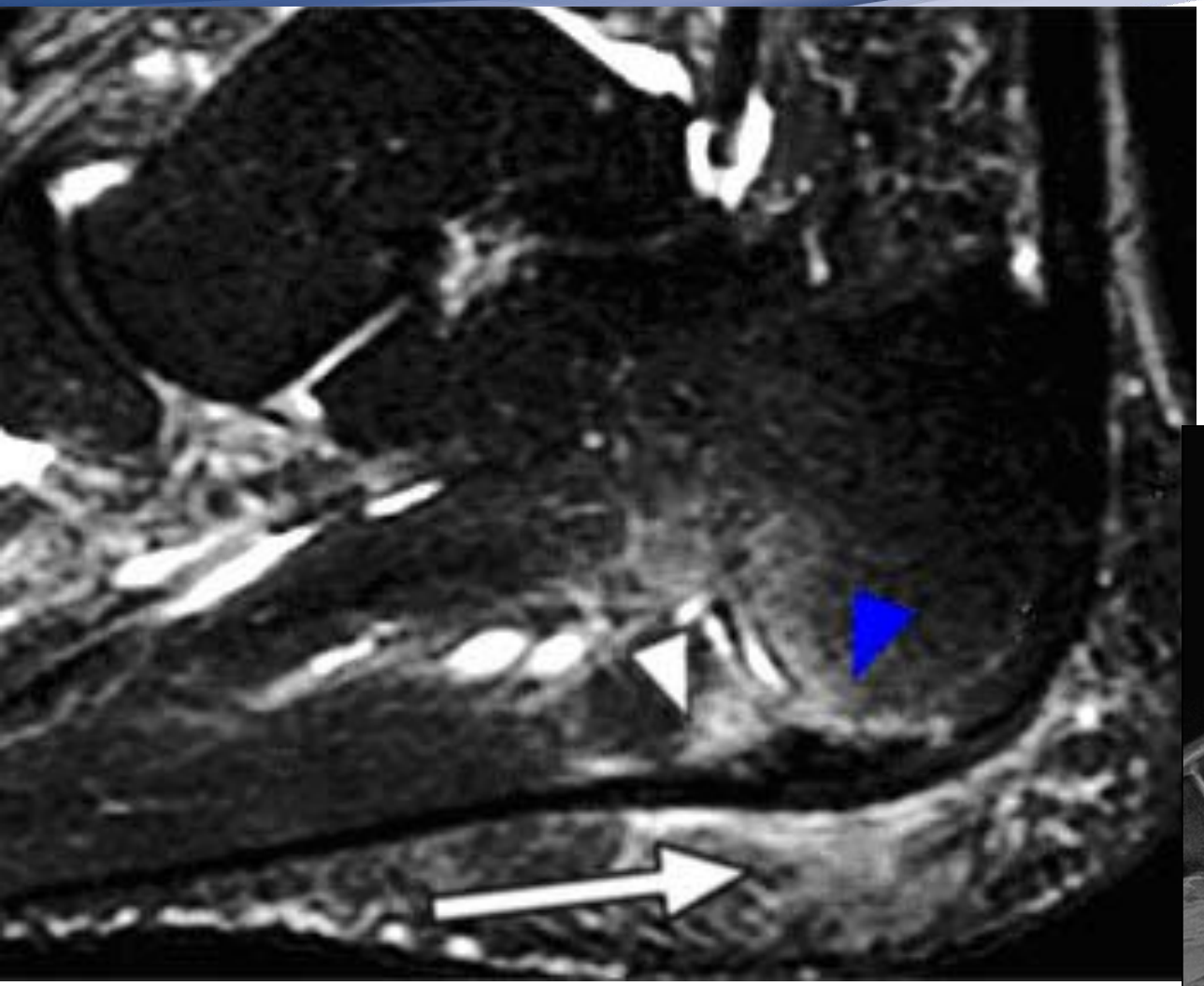
Plantar fasciitis & Achilles Tendinitis

- Advanced imaging: MR

Normal MR of Achilles & Plantar Fascia

FOOT LEVELERS



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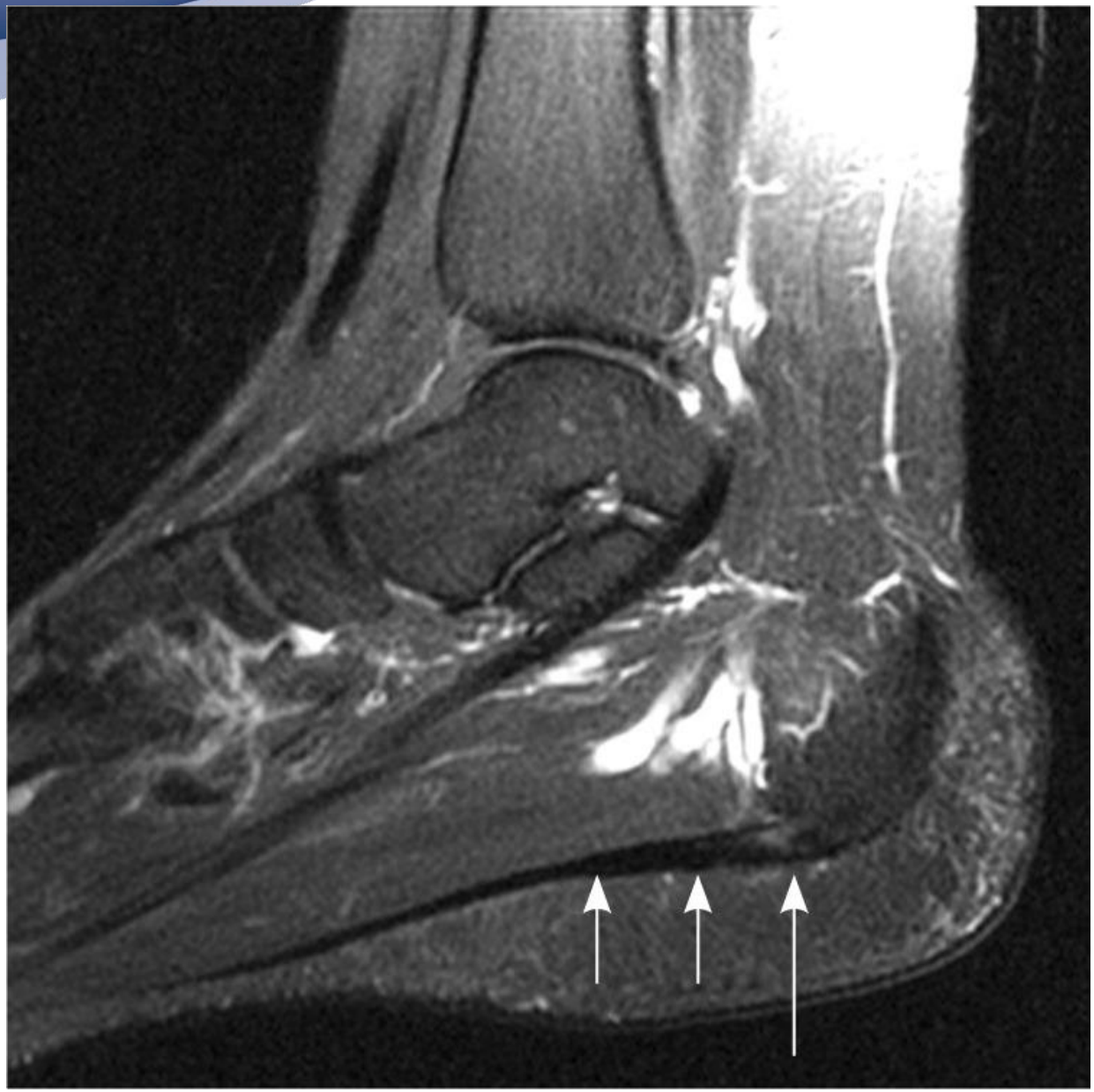
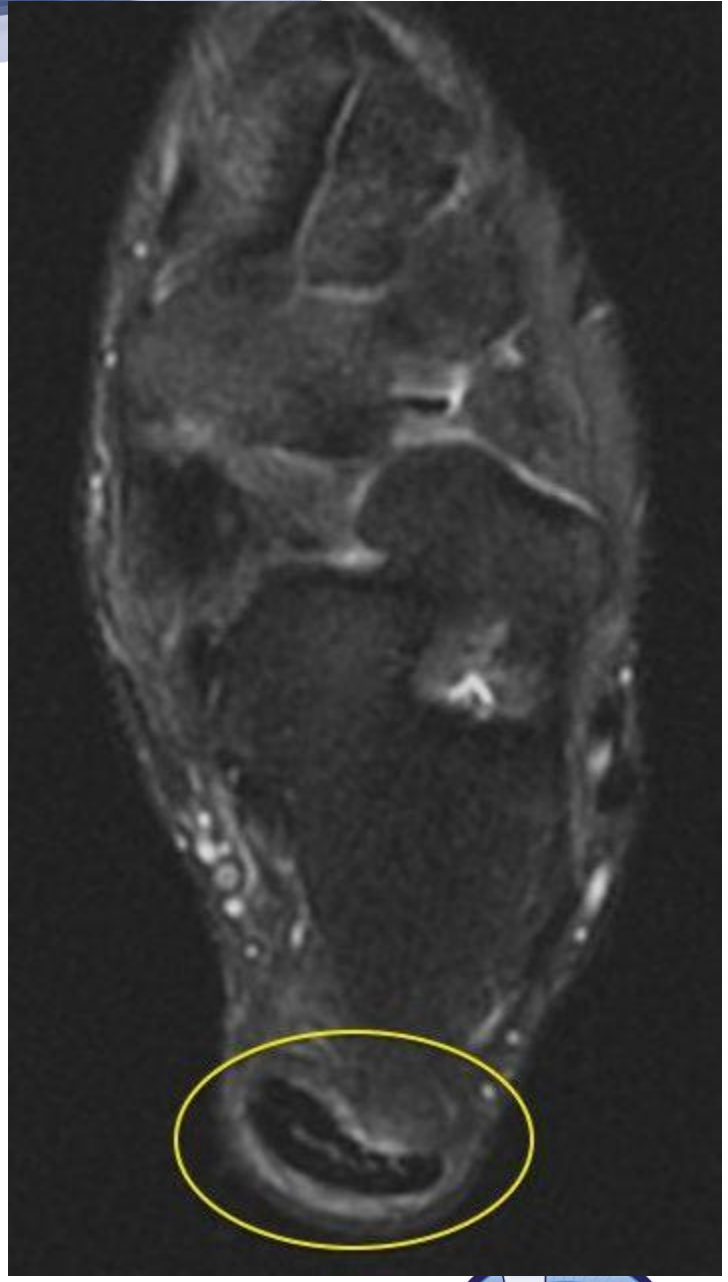


www.aafp.org

FOOT LEVELERS



FOOT LEVELERS

Normal Achilles

Posterior impingement

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Coalition

- Foot pain (2 different patients)

FOOT LEVELERS

FOOT LEVELERS

FOOT LEVELERS

FOOT LEVELERS

Normal Anterior Calcaneus

FOOT LEVELERS

Types of Coalition

- Talocalcaneal
  - Talar beak sign due to impaired subtalar movement
  - Involves the middle facet
- Calcaneonavicular
  - Anterior process of the calcaneus

FOOT LEVELERS

Talocalcaneal Coalition

- Talar beak
- Heel Spur
- Osteopenia

FOOT LEVELERS

Calcaneonavicular

- Bilateral
- Pes planus

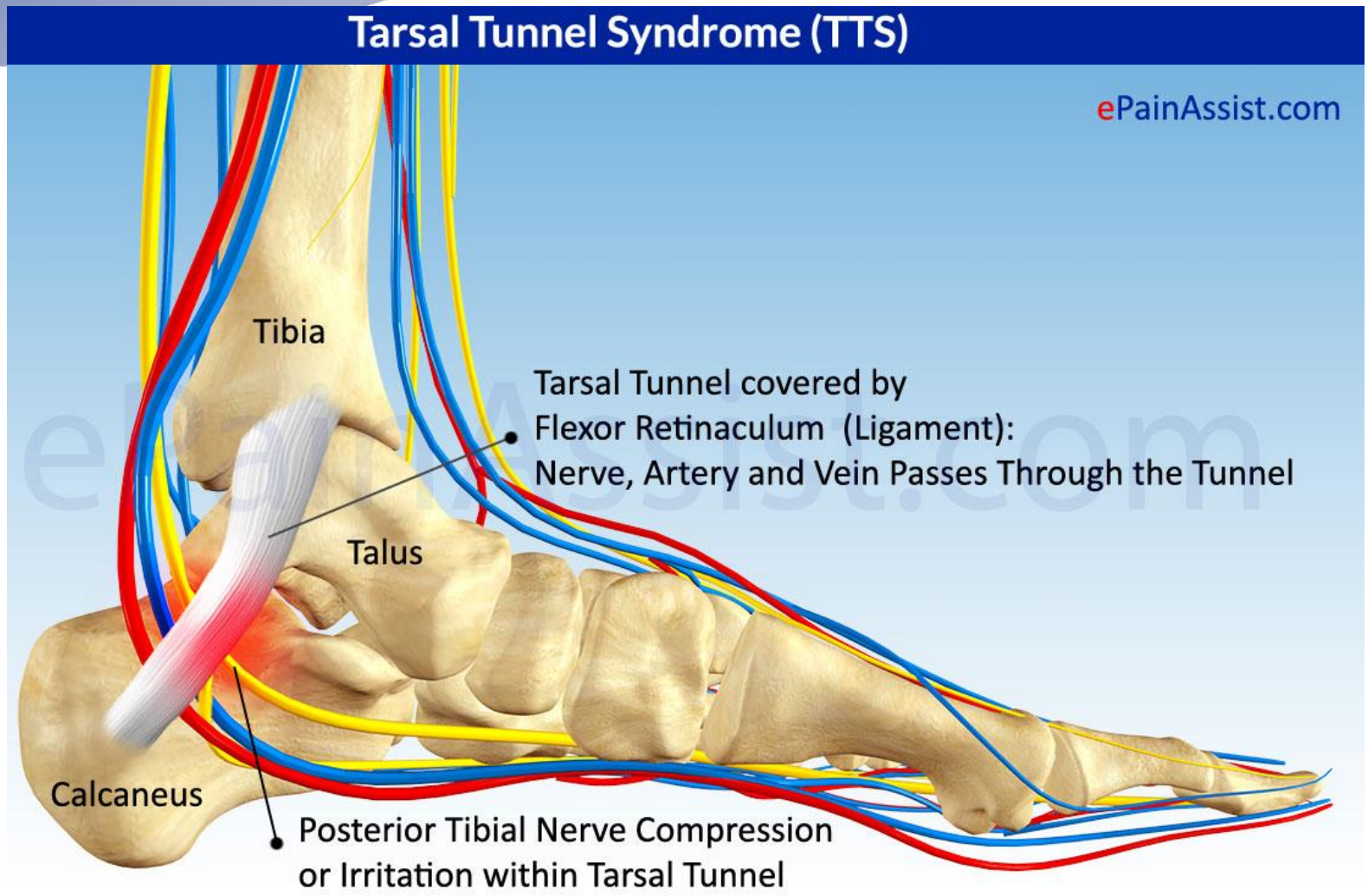
Complications

- Pain & Altered biomechanics

- Tarsal tunnel syndrome
  - Posterior tibial nerve through the flexor retinaculum, inside portion of ankle
- Peroneal tendon spasm (peroneal brevis, longus and tertius tendons)- lateral tendons

FOOT LEVELERS

Posterior tibial nerve



FOOT LEVELERS

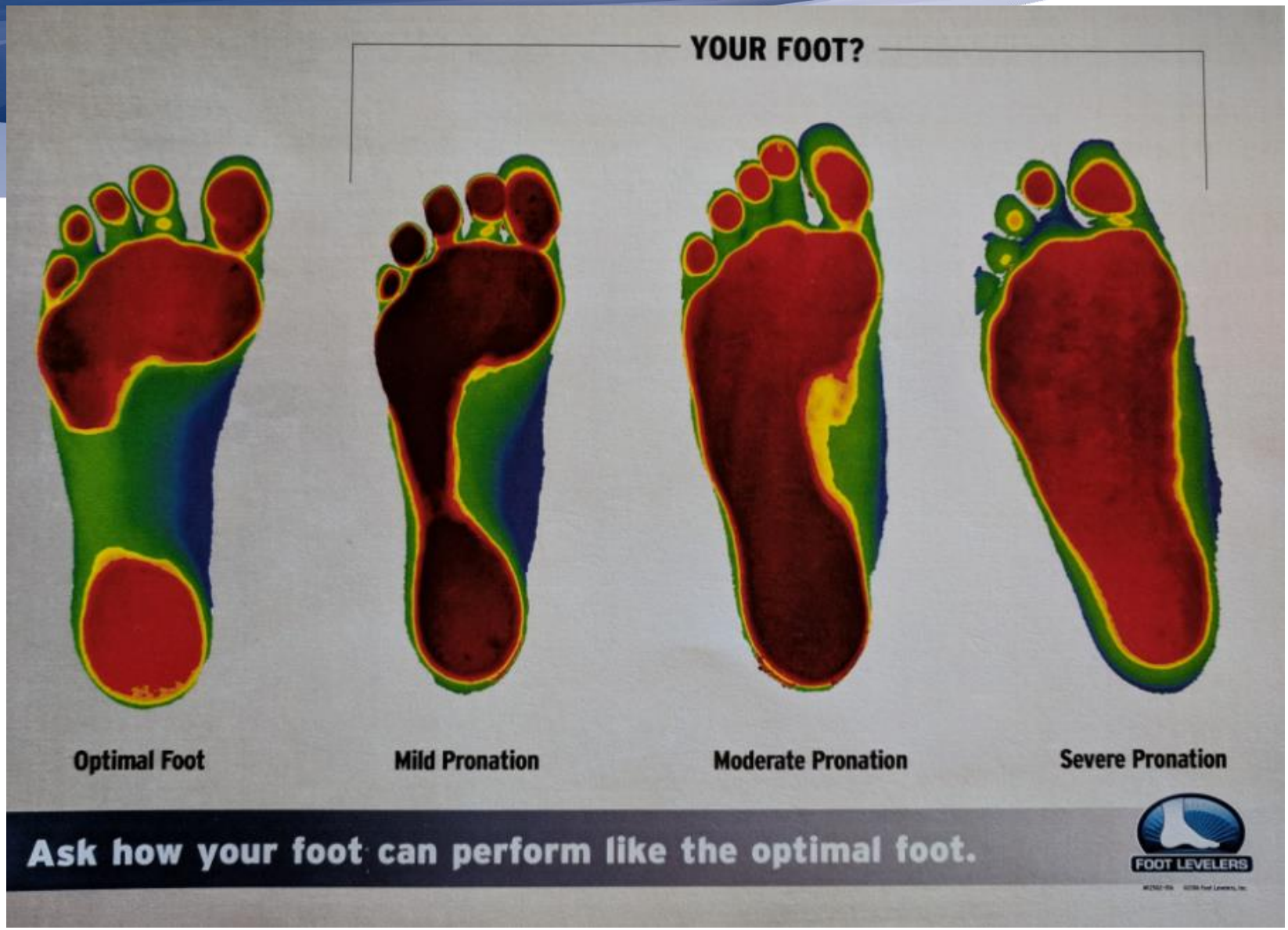
Complications

- Pes planus
  - Causing outward tilting of the calcaneus, impingement on posterior tibial nerve
- Secondary osteoarthritis

FOOT LEVELERS

Treatment

- Difficult to treat; Surgical vs. Nonsurgical
  - Cannot change the coalition
- Foot Levelers
  - Stability and maintain arch
  - Decrease impingement to nerve



3-D Scanner: Specific to your patient; Validates treatment

FOOT LEVELERS

Ankle

FOOT LEVELERS

Ankle Views

- AP
- Medial Oblique
  - Optional: Lateral oblique
- Lateral

FOOT LEVELERS

AP View

- **FFD** 40”
- **CR** between the malleoli
- **Tube tilt** none

FOOT LEVELERS

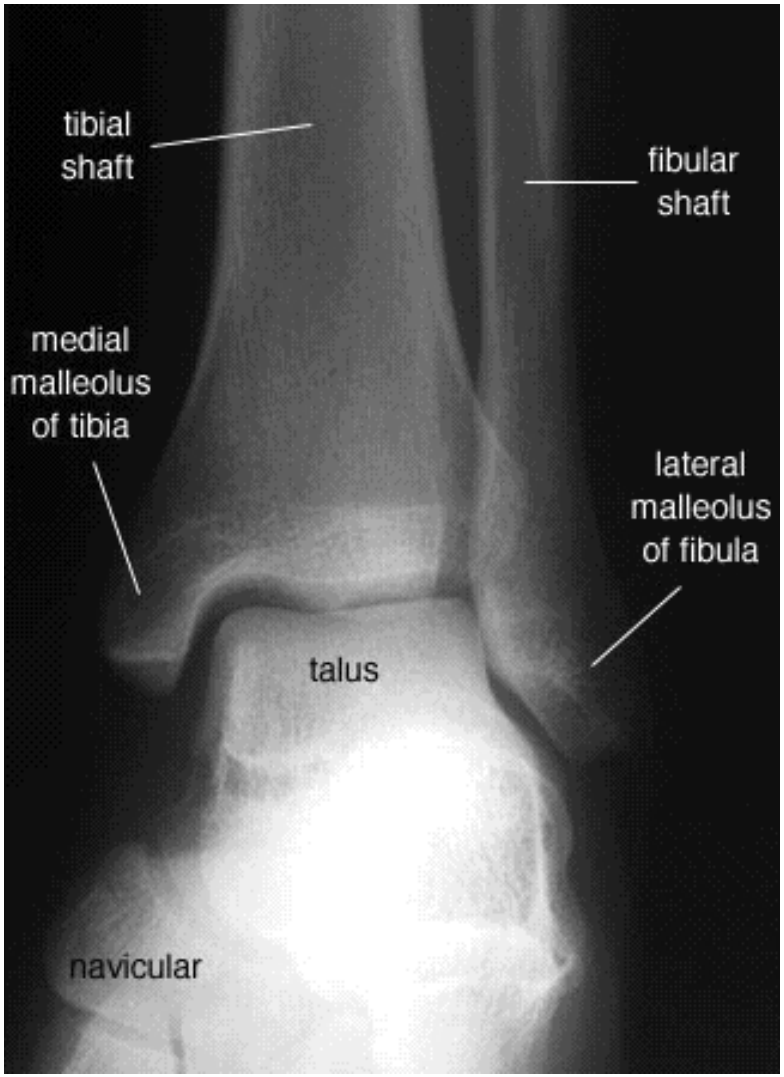
AP ANKLE

Structures Visualized

- Talar Dome
- Navicular
- Medial, Lateral and Posterior Malleoli
- Tibial shaft
- Fibular Shaft
- Tibial Plafond

FOOT LEVELERS

AP ANKLE - Labeled



FOOT LEVELERS

MEDIAL OBLIQUE ANKLE

- **FFD** 40”
- **CR** between malleoli
- **Tube tilt** none

FOOT LEVELERS

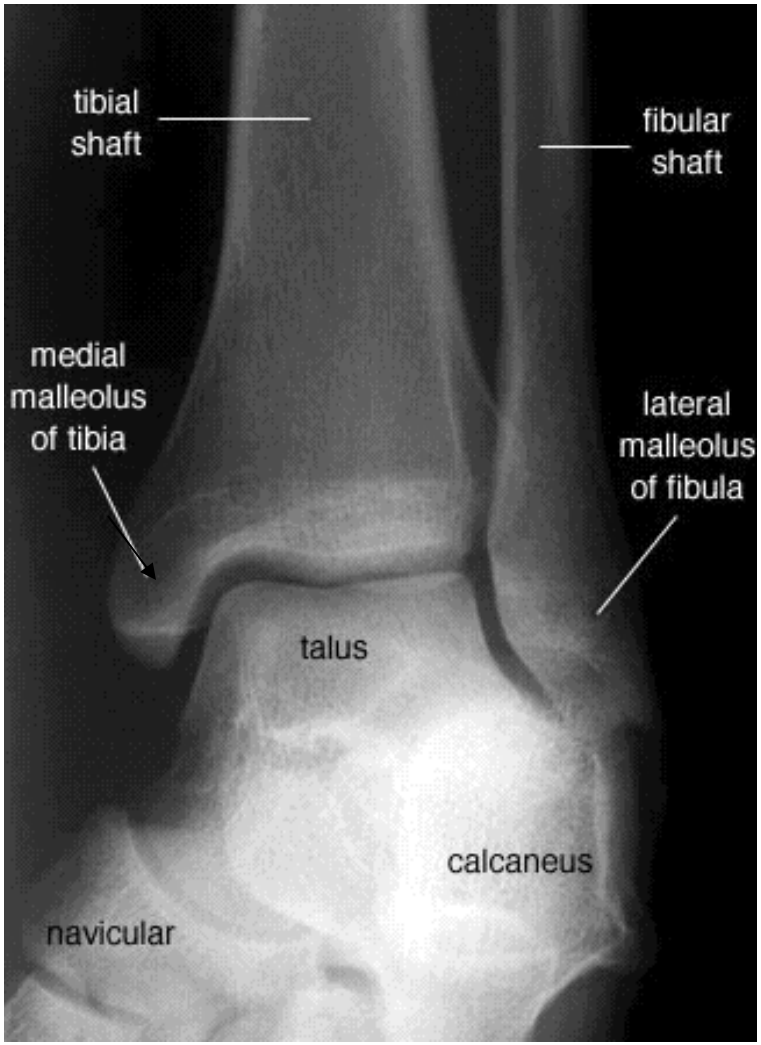
MEDIAL OBLIQUE ANKLE

Structures Visualized

- **Talar Dome**
- Medial, Lateral and Posterior Malleoli
- Tibial Plafond
- Navicular
- Calcaneus
- Tibia and Fibula

FOOT LEVELERS

MEDIAL OBLIQUE ANKLE - Labeled



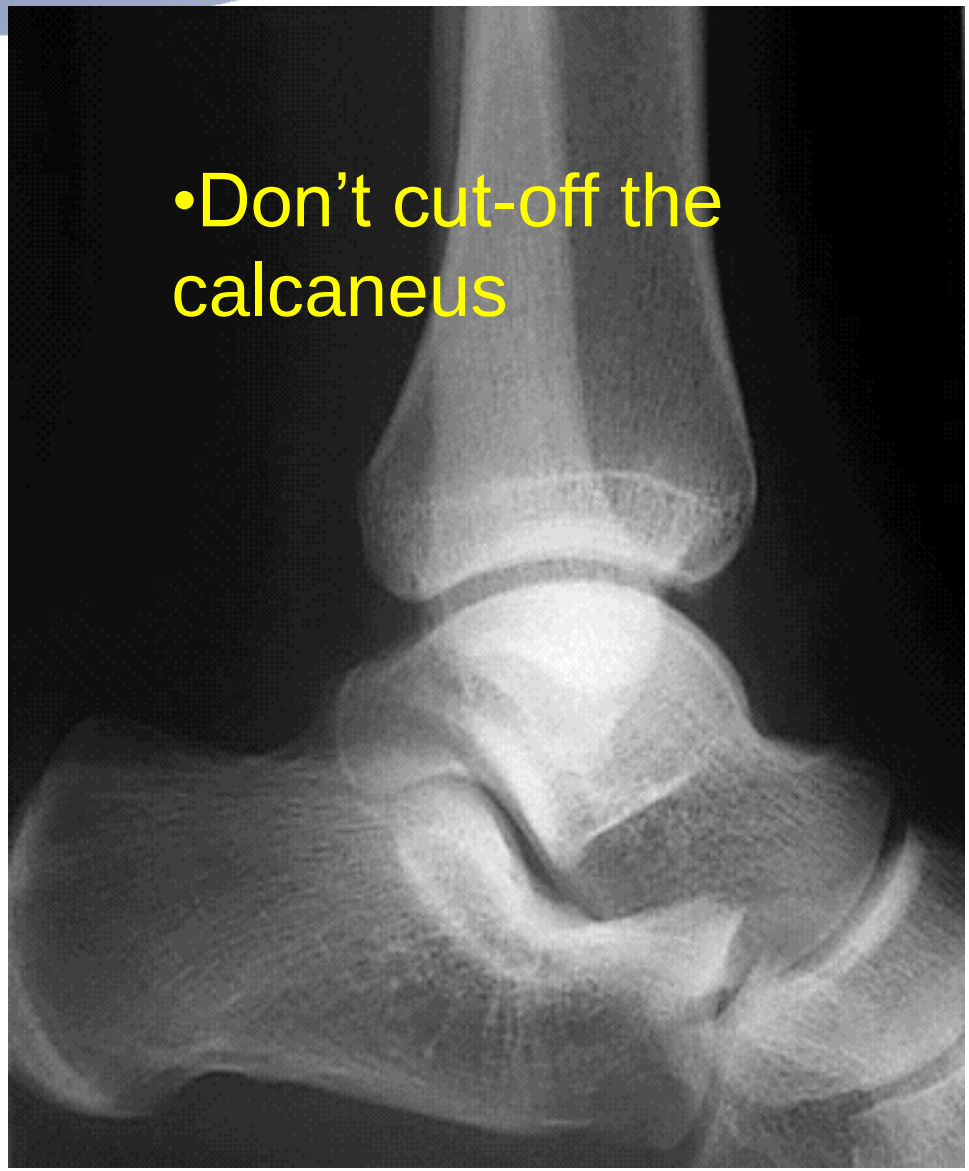
FOOT LEVELERS

LATERAL ANKLE

- **FFD** 40”
- **CR** medial malleolus
- **Tube tilt** none

FOOT LEVELERS

LATERAL ANKLE

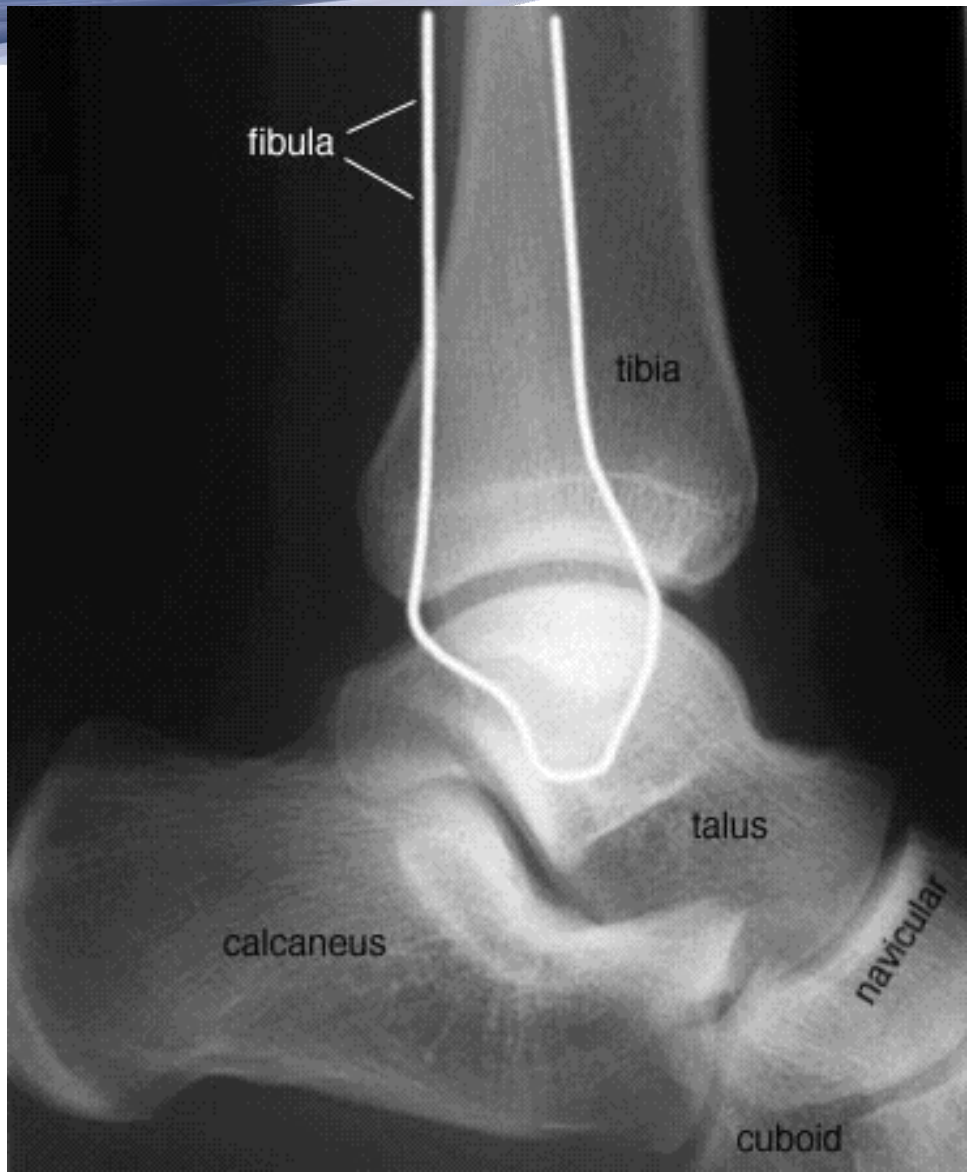


Structures Visualized

- Tibia
- Fibula
- Talus
- Calcaneus
- Navicular
- Cuboid

FOOT LEVELERS

LATERAL ANKLE - Labeled



FOOT LEVELERS

Case

- Long distance runner with foot and ankle pain

FOOT LEVELERS

Lateral Ankle

FOOT LEVELERS

Findings

- Linear zone of sclerosis
- Soft tissue swelling, Kager's fat pad

FOOT LEVELERS

What’s Next

- Advanced imaging

FOOT LEVELERS

Stress Fracture of the Calcaneus

- Linear sclerosis or no xray findings
- MRI
  - Bone marrow edema, high T2 and STIR signal intensity

FOOT LEVELERS

Normal MR of Calcaneus

FOOT LEVELERS

Treatment

- Rest>>>>Non-weightbearing activity
- Chiropractic & FL (Foot Levelers)

Case

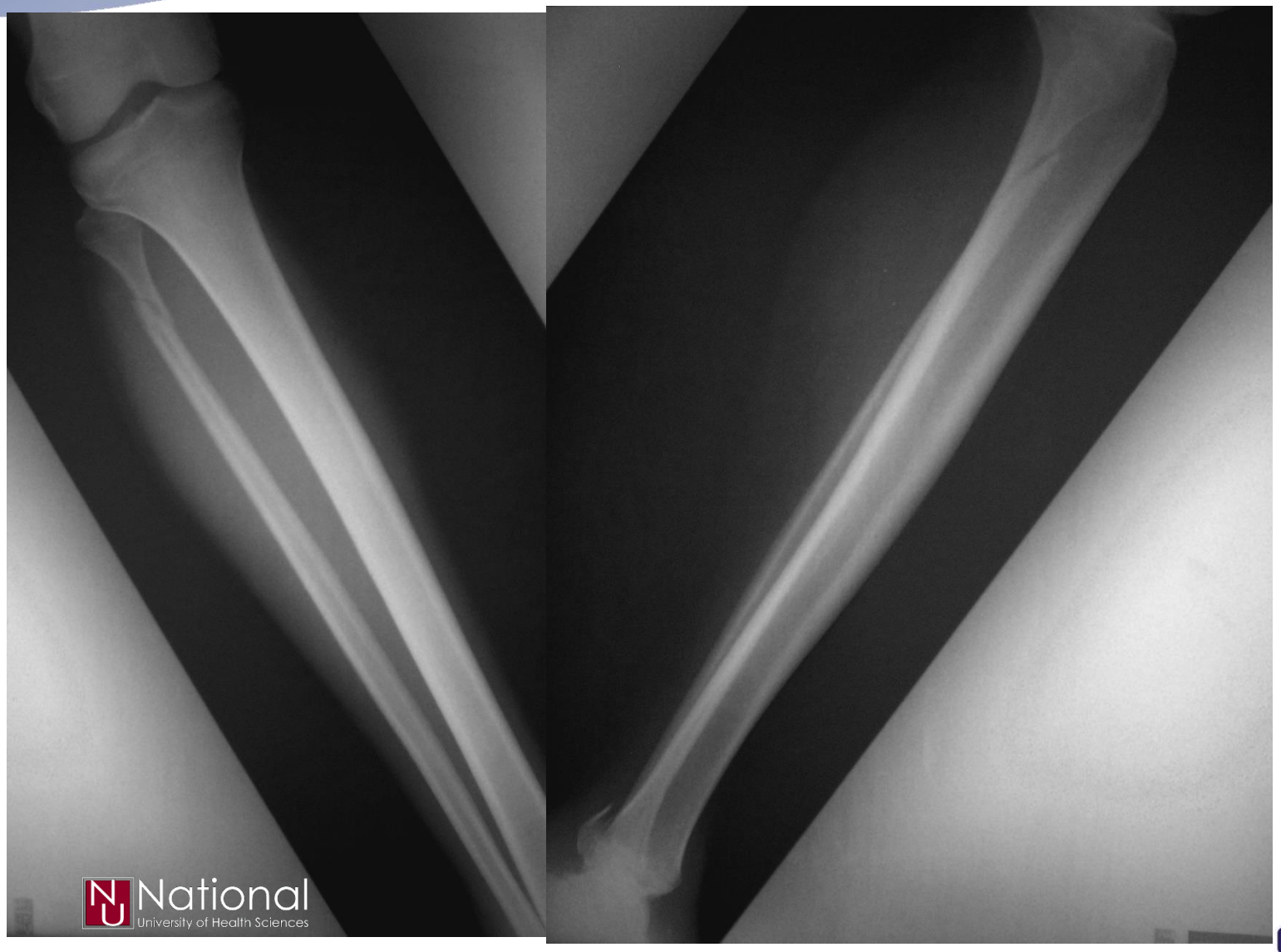
Hx: 23 yom, soccer player twisted his ankle

Diagnosed with high ankle sprain.

FOOT LEVELERS

AP and Lateral Ankle

AP and Lateral Tib/Fib



FOOT LEVELERS

Masseoneuve Fracture

- Fracture of the medial malleolus extending posteriorly & Fracture of proximal fibula

- Associated with disruption of interosseous membrane & tibiofibular syndesmosis; deltoid ligament (medial); joint widening

Treatment

- Closed reduction (set/reduce) & cast
- Chiropractic & when weightbearing, Foot Levelers

FOOT LEVELERS

Case

Hx: 32 yom playing tennis and felt a sharp pain in the back of the lower leg.

Lateral View

Findings

- Arteriosclerosis of the posterior and plantar vessels
- Indistinct Achilles tendon margins with soft tissue swelling
- Painful with dorsiflexion (mimicking high arch)

FOOT LEVELERS

Achilles tendon rupture

- S/S: Indentation of tendon, weakness or loss of motion

- MRI and/or diagnostic ultrasound

FOOT LEVELERS

Normal MRI vs abnormal

www.musculoskeletalmri.blogspot.com

www.faoj.org

FOOT LEVELERS

Rupture of Achilles Tendon

- Tx: Conservative therapy or surgical
- Conservative: non-weight bearing with cast for 6 weeks; followed by short walking cast for 2 weeks
- Rehab for 6 months; heel lift

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Achilles Tendon Injury

- Conservative tx restores strength 49-84%
- Surgical tx restores strength 71-101%

- Conservative tx restores function 75-80%
- Surgical tx restores function 75-90%

FOOT LEVELERS

After Surgery

- They need your help!

- Reduced motion of ankle and foot, hypertonic musculature, weakness, etc.
- Scar tissue
- Altered biomechanics
  - Treatment: Foot Levelers, Soft tissue/myofascial, adjust, laser, kinesiotape, etc.

FOOT LEVELERS

Knee

FOOT LEVELERS

Knee Views

- AP
- Tunnel
- Lateral
- Tangential (Sunrise)

FOOT LEVELERS

AP Knee

- **CR**
  patellar apex
- **Tube tilt** 5 °
  cephalad
- Standing; or if PA, 15 degree cephalad tilt.

FOOT LEVELERS

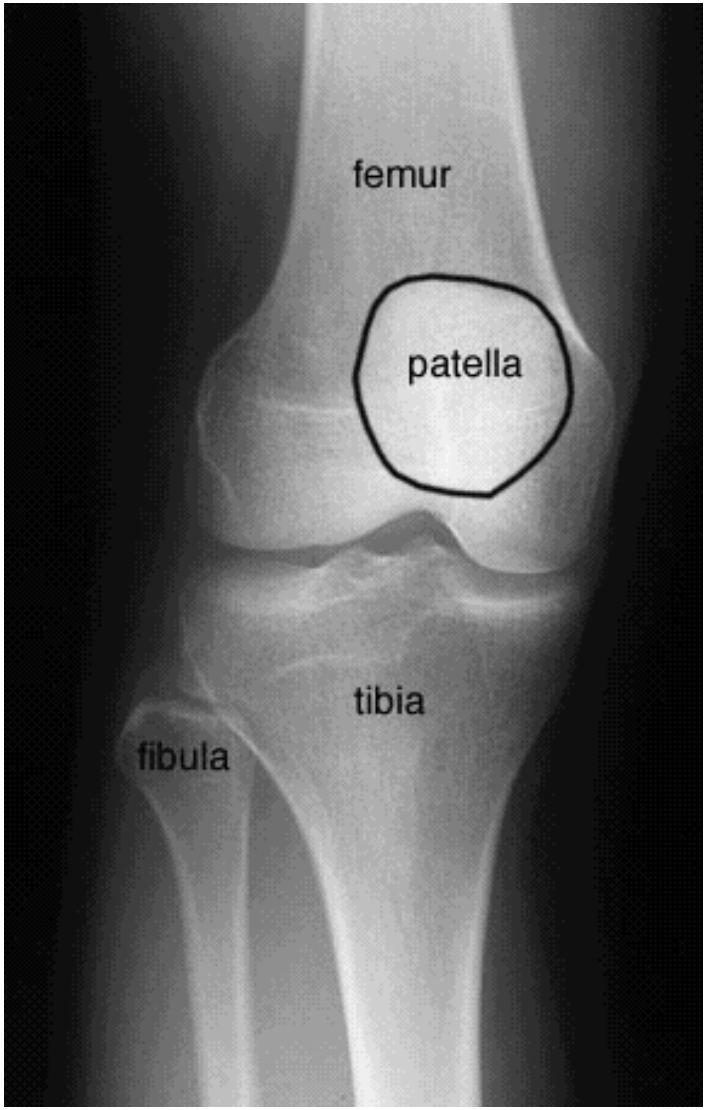
AP KNEE

Structures Visualized

- Patella
- Femur
- Tibia
- Fibula
- Condyles of the Tibia and Femur
- Adductor tubercle
- Joint Space

FOOT LEVELERS

AP KNEE - Labeled



FOOT LEVELERS

LATERAL KNEE

- **FFD** 40”
- **CR** joint line
- **Tube tilt** none
- Knee flexion of 90-120 degrees

FOOT LEVELERS

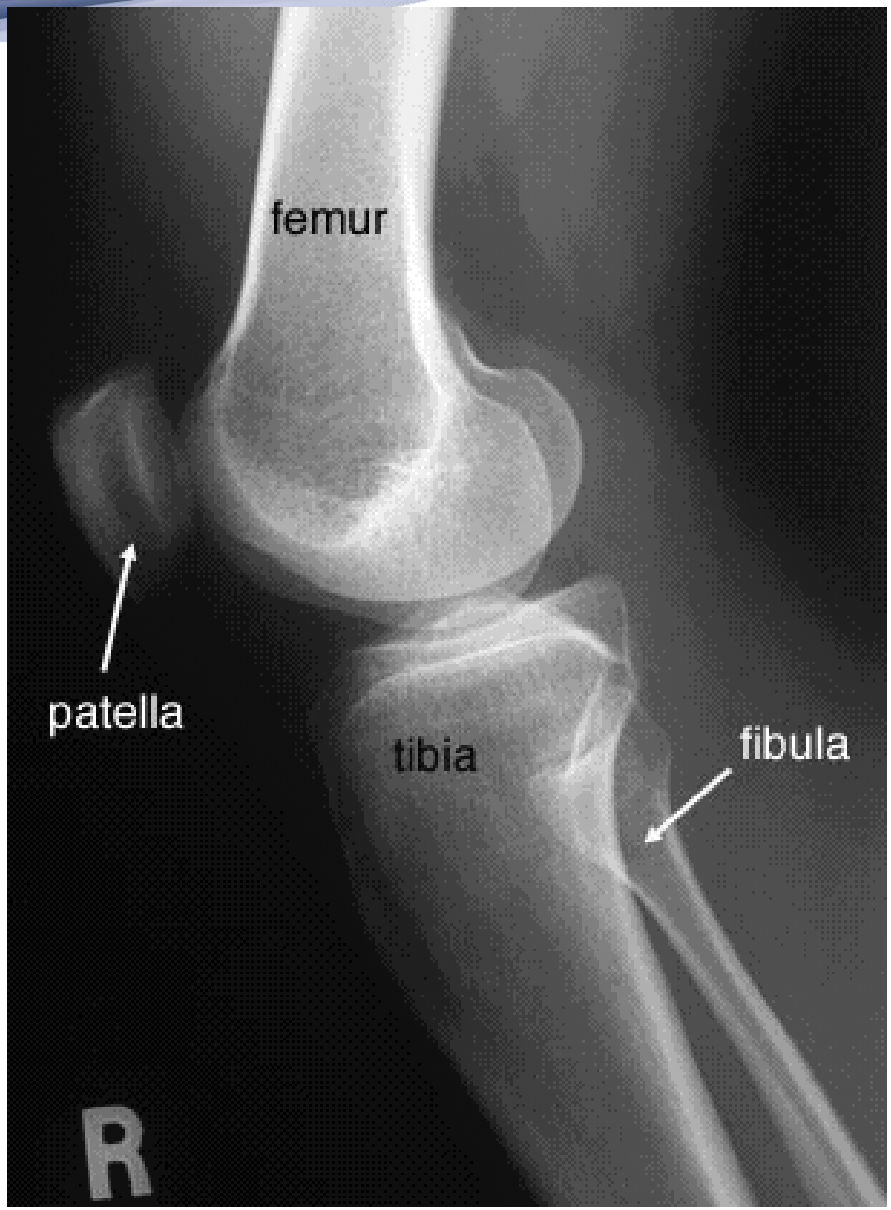
LATERAL KNEE

Structures Visualized

- Patella
- Femur
- Tibia
- Fibula
- Infra & Supra Patellar Fat Pads

FOOT LEVELERS

LATERAL KNEE - Labeled



FOOT LEVELERS

Tunnel View

- **FFD** 31
  (corrected 40-9)
- **CR** Joint line
- **Tilt:** 45 degree caudad
- Measure from mid-hamstring to anterior knee (not just through popliteal fossa)

FOOT LEVELERS

TUNNEL VIEW (KNEE)

Structures Visualized

Intercondylar notch

Femoral condyles

Intercondyar eminences

Tibia

Fibula

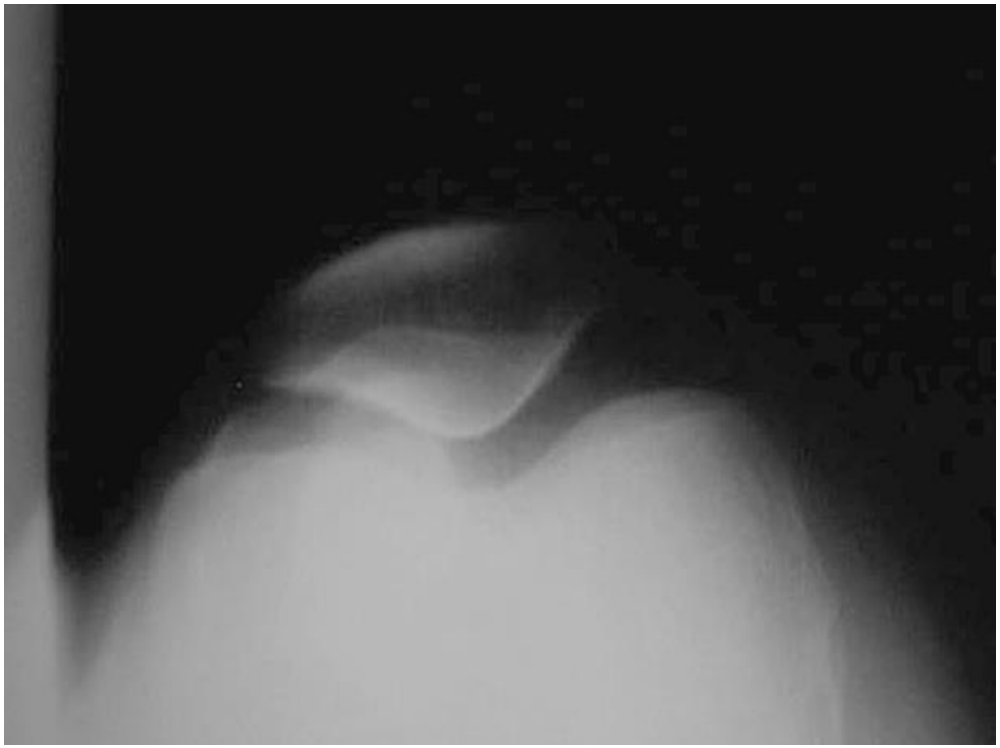
FOOT LEVELERS

Sunrise/ Tangential View

- **FFD** 40”
- **Film size** 8x10
- **CR** PF joint
- **Tilt** varies

FOOT LEVELERS

TANGENTIAL (SUNRISE) VIEW



Structures Visualized

- Medial and Lateral Patellofemoral Joint
- Patella
- Patellar facets
- Trochlear groove
- Femoral Condyles

FOOT LEVELERS

Case

- Boy fell off his bike and has knee pain

FOOT LEVELERS

AP and Sunrise View

NORMAL OR ABNORMAL?

www.wikiradiography.com

FOOT LEVELERS

Bipartite Patella

- Normal variant, superolateral aspect of the patella
  - Any other location of the patella= fracture
- Smooth margins
- MC bilateral

Bipartite Patella

- If symptomatic, MRI

FOOT LEVELERS

Case

- 15 yof with knee pain

FOOT LEVELERS

AP and PA Tunnel View

Recumbent

Sunrise (patellofemoral) View

FOOT LEVELERS

Patellar Fracture-Dislocation

- MOI- twisting; direct blow

- Advanced Imaging
  - Medial patellar retinaculum
  - Bone contusion/ bone marrow edema along medial patella and lateral femoral condyle

Treatment

- Surgical

- Chiropractic & Foot Levelers
  - Evaluate above and below the area
  - Biomechanics & Function

FOOT LEVELERS

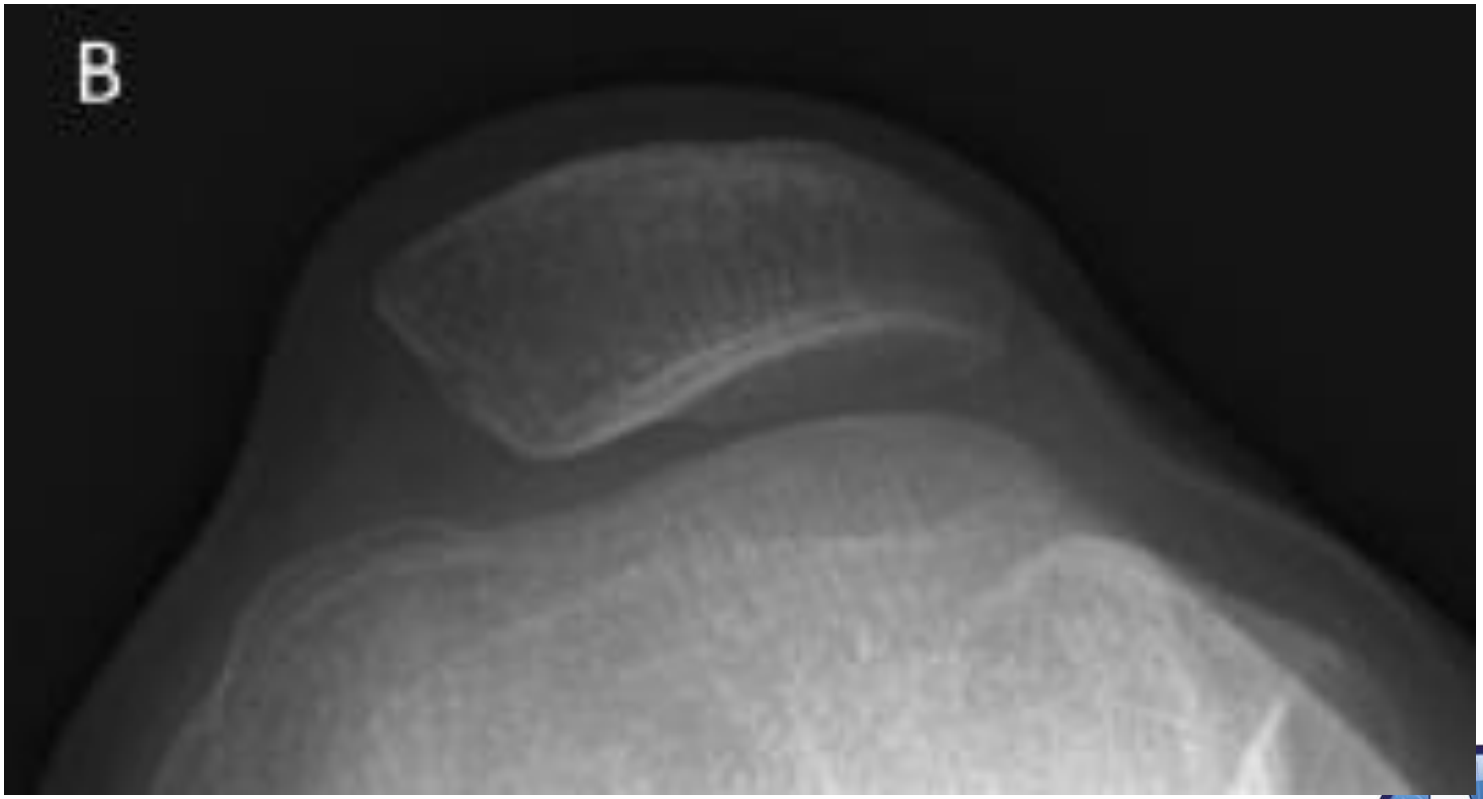
Case

- 15 year old female with chronic knee pain; active in sports

FOOT LEVELERS

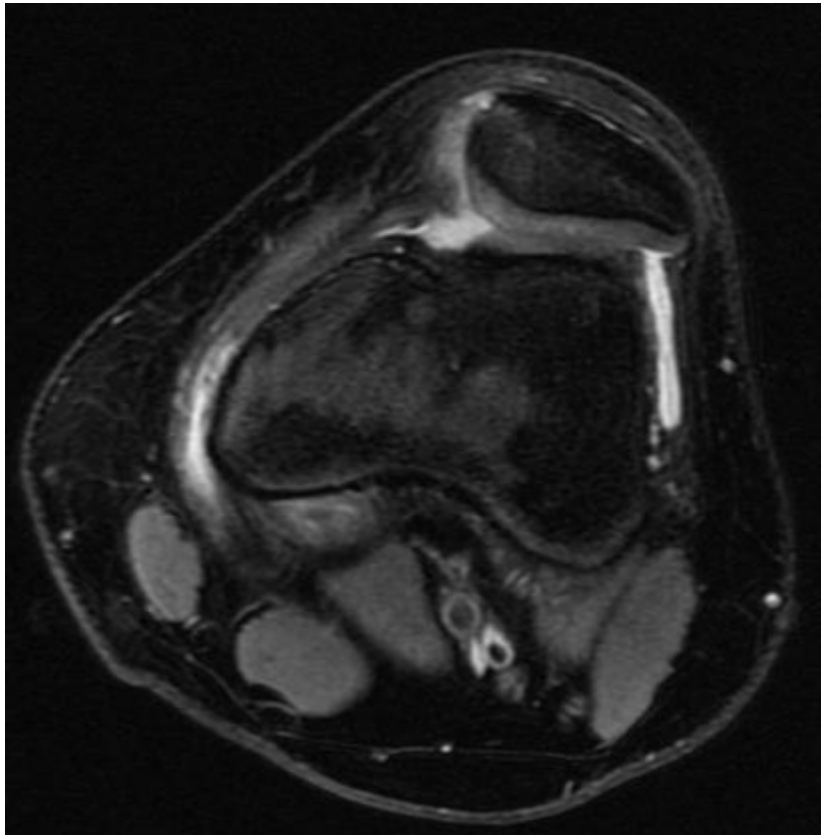
Tangential Radiograph

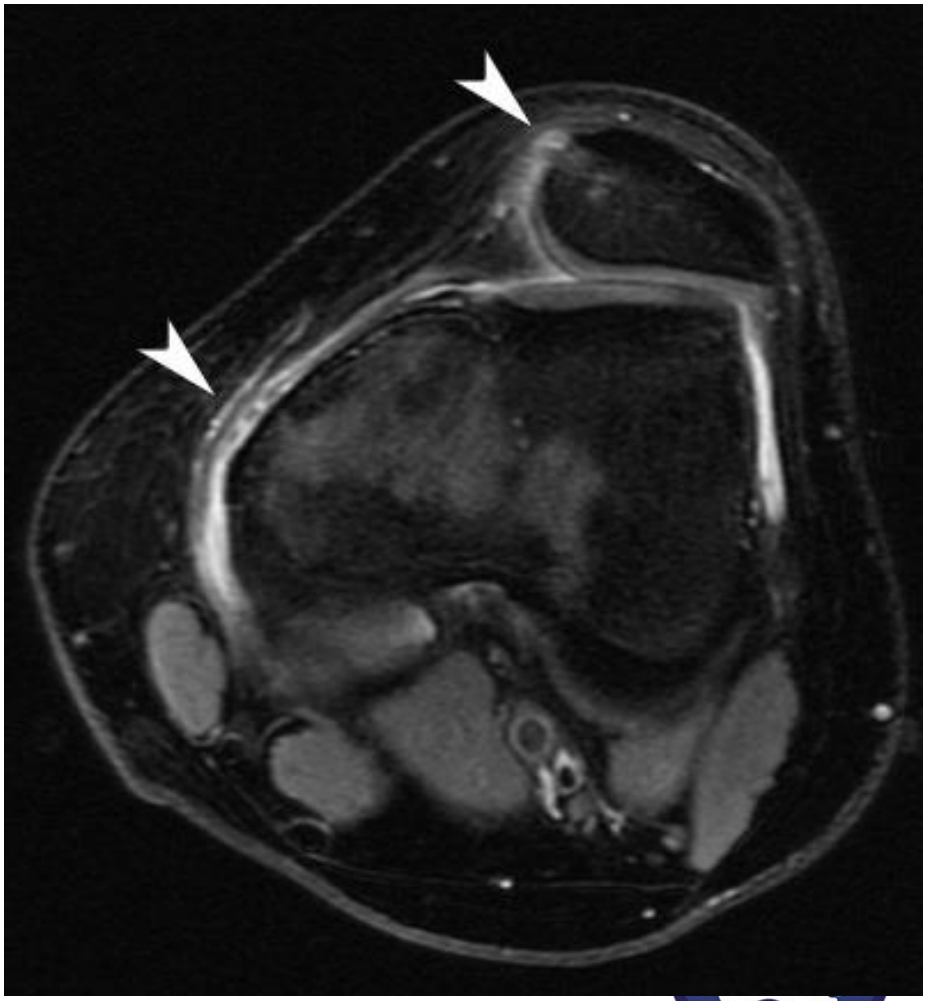
What is wrong with the trochlea groove?



FOOT LEVELERS

Shallow Trochlea Groove





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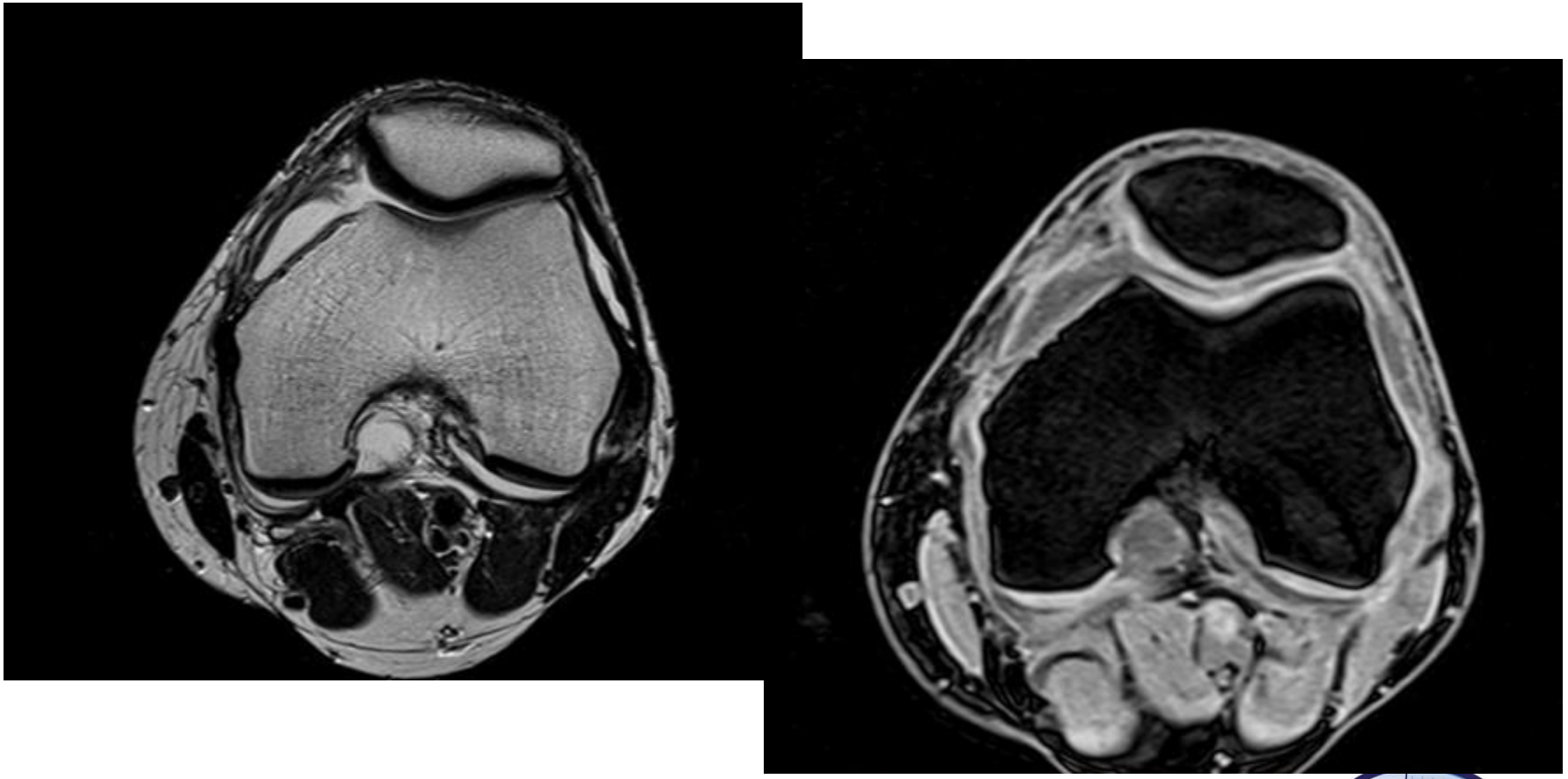
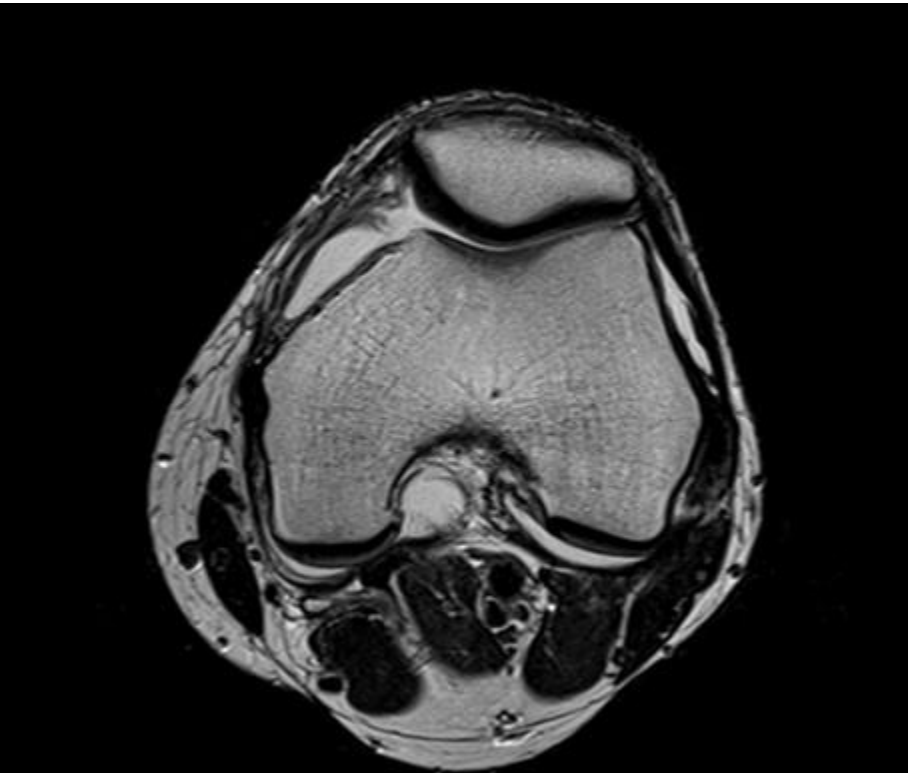
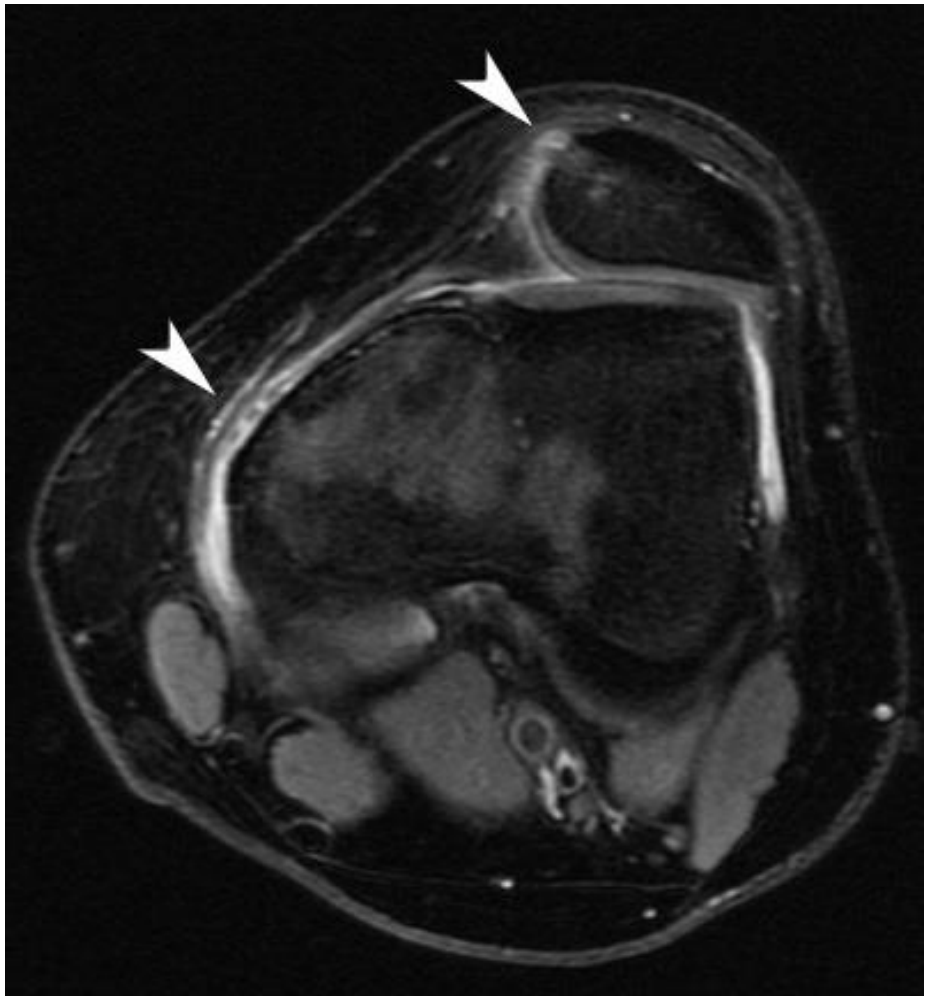
FOOT LEVELERS

Normal Patellofemoral Joint



Comparison





FOOT LEVELERS

Congenital Shallow Trochlea

- Complications
  - Early degenerative changes; chondromalacia
  - Lateral dislocations
  - Tear of the medial patellofemoral ligaments/retinaculum
  - Weakness or overactive Quadriceps

FOOT LEVELERS

Follow-up

- Treatment
  - Surgical: secondary and recurrent dislocations.
  - Conservative:Chiropractic & FL (Foot Levelers)>>altered biomechanics; and need to evaluate above and below area
- Xray/Clinical: May see lateral displacement or drift of the patella

FOOT LEVELERS

Case

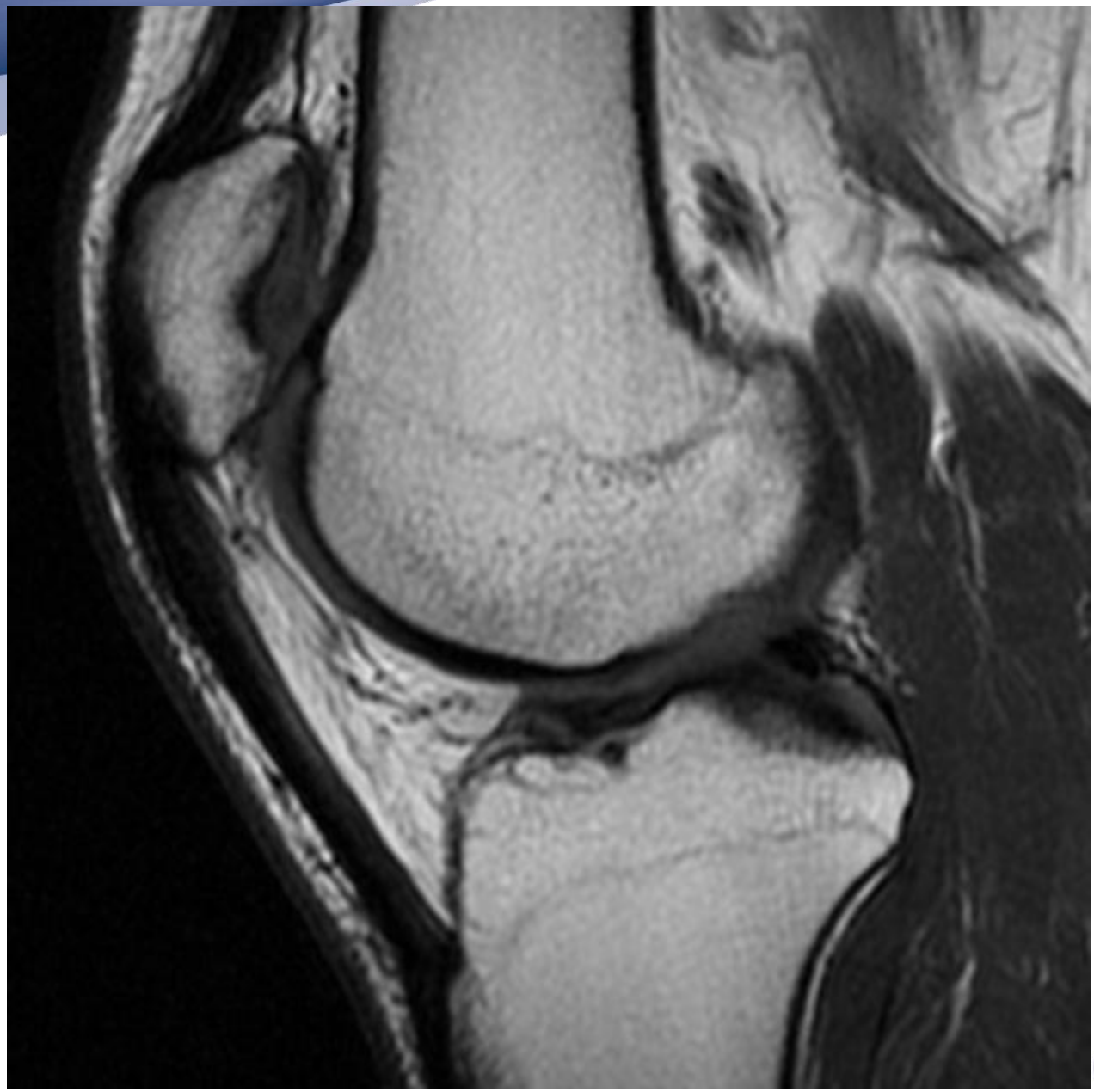
- Chronic knee pain

FOOT LEVELERS

Lateral Radiograph

Lack of knee flexion, patient positioning

FOOT LEVELERS



www.radiopaedia.org

Patella Alta

- Congenital anomaly (if no disruption of patellar tendon)
  - Increased length of the patellar tendon

- Complication
  - Early degenerative changes; chronic pain and joint effusion
  - Possible dislocation of patella, not in the trochlear groove
  - Patellar tendinitis

FOOT LEVELERS

- Insall Salvati Ratio= divide length of tendon (LT) by length of patella (LP)
  - with 30 degree knee flexion

- Greater than 1.2

FOOT LEVELERS

Treatment

- Chiropractic & FL to provide stability and balance.

Case

Hx: Twisted knee

FOOT LEVELERS

AP and Lateral View

Findings

- Radiolucency along the lateral aspect of the medial femoral condyle, near tunnel.

Coronal T2 Weighted

FOOT LEVELERS

Osteochondral Dissecans

- Age: 10-20
- Define: Necrosis of bone followed by reossification and healing
- Flap fragment with defect of the articular cartilage and fluid on MRI>>>unstable
  - surgical

FOOT LEVELERS

OCD

- MOI: shearing and rotary forces

- Tx:
  - Intact cartilage: Walking with crutches, beneficial for the reconstitution of cartilage.
    - And Chiropractic and FL
  - Fragment/Defect in Cartilage: surgical
    - Joint locking

FOOT LEVELERS

Case

- 12 yom limping with knee pain

FOOT LEVELERS

FOOT LEVELERS

Findings

- Soft tissue effusion of Hoffa's and suprapatellar bursa
- Thickening of the patellar tendon
- Fragmentation and displacement tibial tuberosity
- Knee positioning &/or HPT quads= patella alta.

FOOT LEVELERS

Osgood-Schlatter's Disease

- Traction apophysitis*: Overuse injury* **age 9-14**.

- Repetitive strain from running, basketball, or other repetitive sports leads to chronic avulsion of the apophysis of the tibial tubercle.
  - Callous formation with prominent tender tibial tuberosity

FOOT LEVELERS

Osgood-Schlatter's

- S/S: Tenderness; tight quads; patella alta
- 2-6 months of conservative treatment; eliminate stressful activity
  - No jumping, running
  - Evaluate above and below the knee
  - Foot Levelers, laser, etc.
- Severe cases= tendon tear repair, surgical excision of ossicle.

Treatment

- Chiropractic & FL

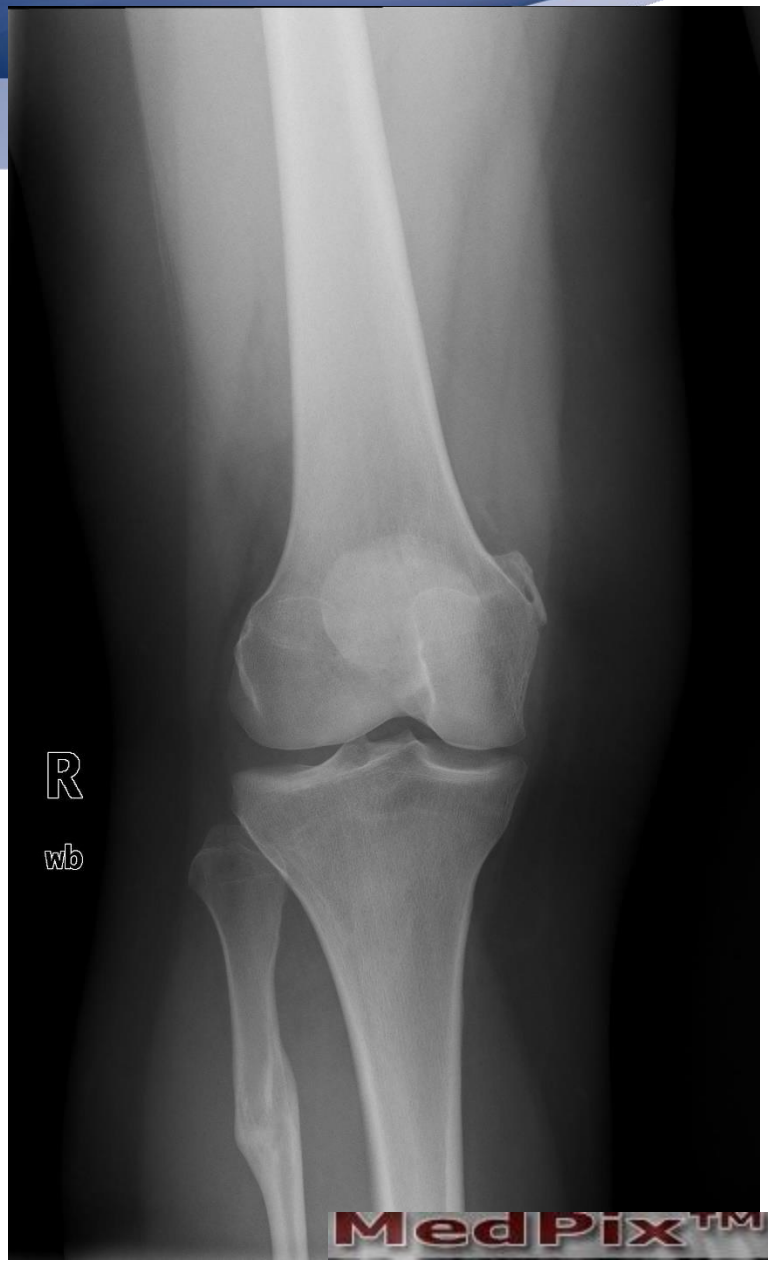
Osgood-Schlatter's

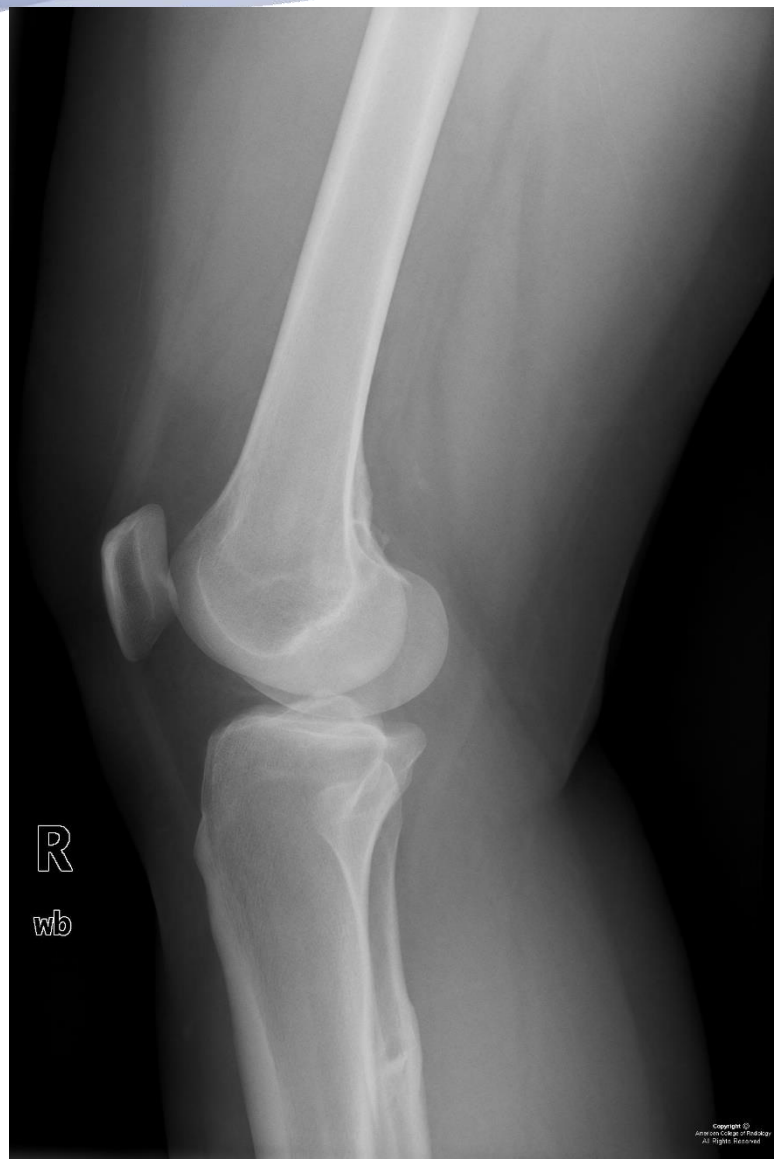
FOOT LEVELERS

Case

- Chronic knee pain; previous trauma

FOOT LEVELERS





FOOT LEVELERS

Findings

- Post-traumatic calcification along the medial femoral condyle= Pellegrini Stieda syndrome
- Malunion of proximal fibula from previous fracture.

Pellegrini Stieda Syndrome

- Avulsion (chronic) of the medial collateral ligament
- Associated with ACL and meniscal tears
- **Altered biomechanics, etc.**
- MRI

FOOT LEVELERS

Example: Medial meniscal Tear

- Tear PH & body of medial meniscus

FOOT LEVELERS

Follow-up & Treatment

- Previous trauma with chronic tears
  - MRI if necessary
  - Orthopedic Surgeon

- **Treatment**
  - **Evaluate above and below the knee**
  - **Chiropractic & FL>>>old injuries=altered biomechanics**

FOOT LEVELERS

Case

- Long jumper with knee pain and cannot extend the knee

www.feinberg.northwestern.edu

FOOT LEVELERS

Findings

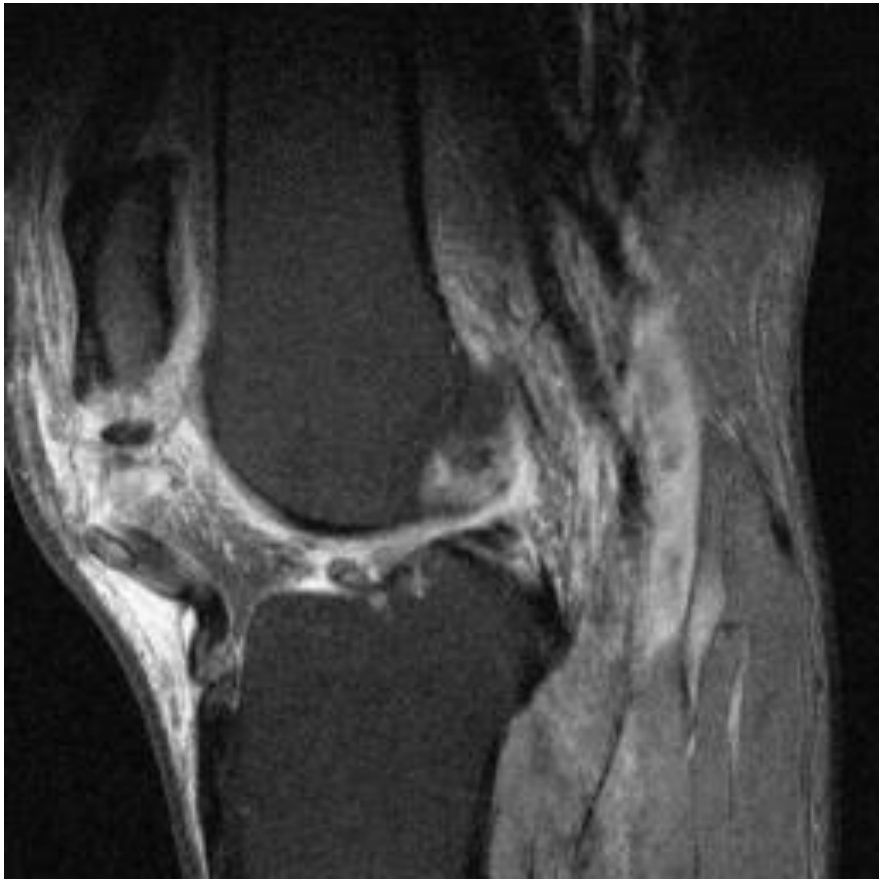
- Soft tissue swelling
- Cephalad migration of patella
- Calcific densities: avulsion fragment

Avulsion of the Patellar Tendon

- Rupture of the patellar tendon
- MRI
- Orthopedic referral

FOOT LEVELERS

Tears of Patellar Tendon



FOOT LEVELERS

Post Surgical Treatment

- They need You! They are a mess!
- Evaluate above and below the knee
- Chiropractic & FL

FOOT LEVELERS

Hip & Pelvis

FOOT LEVELERS

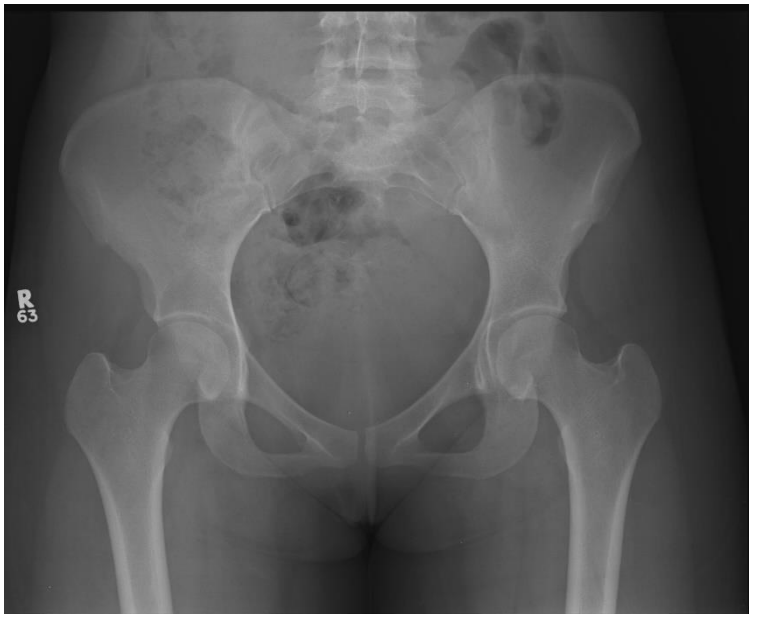
Hip & Pelvis Views

- AP Pelvis
- AP spot view of hip
- Lateral Frog-leg view of hip

FOOT LEVELERS

Radiographs of the Hip and Pelvis

- **3 Projections**
  - AP view of the pelvis
    - Bilateral internal rotation of the femur 20 degrees
  - AP and lateral frog-leg spot views
    - AP- internally rotated femur 20 degrees.



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AP Pelvis

- **FFD** 40”
- **CR** top light
- at iliac crest
- **Hips internally rotated 20°**

FOOT LEVELERS

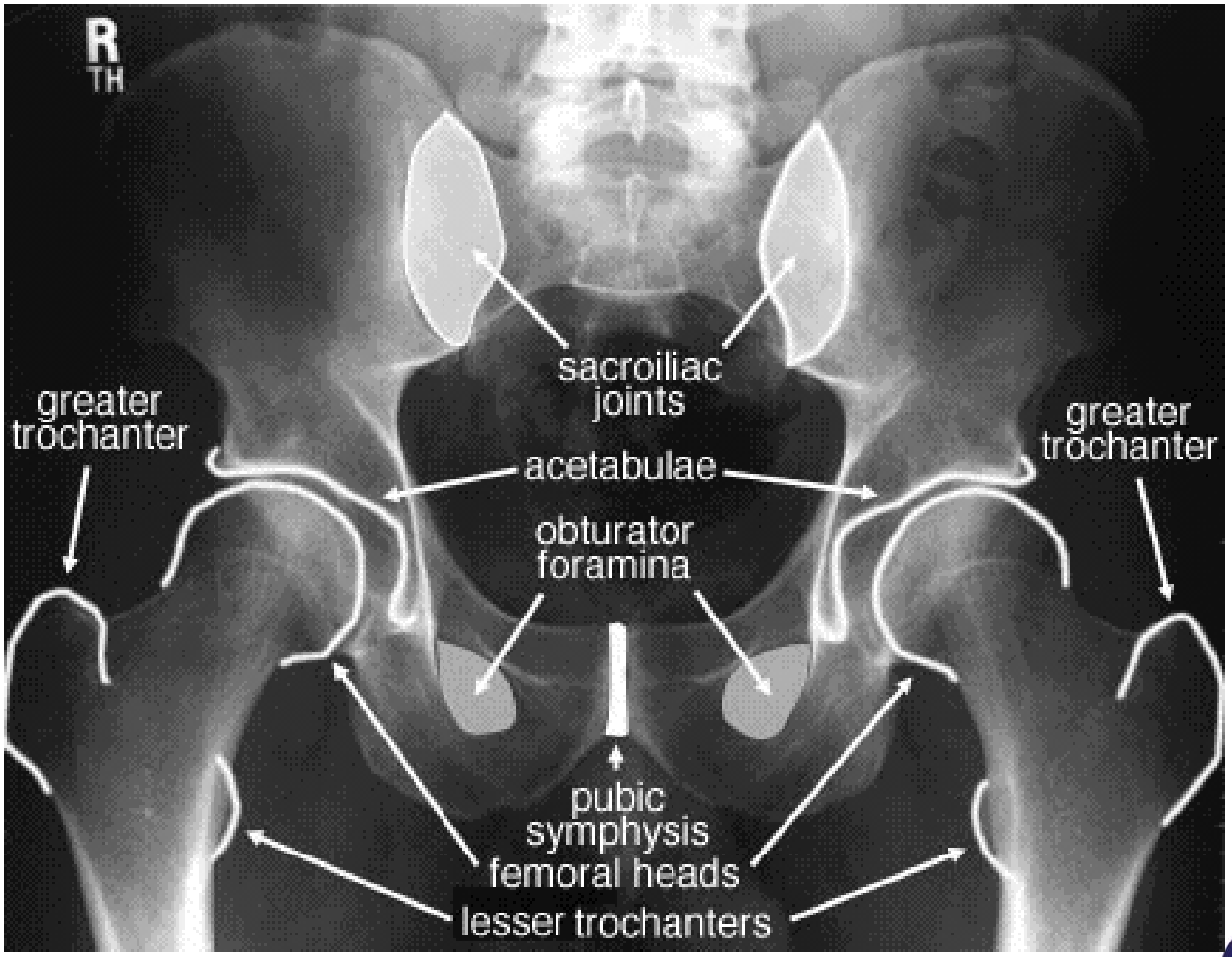
AP PELVIS

Structures Visualized

- SI Joints
- Hip Joints
- Pubic Symphysis
- Greater and Lesser Trochanters
- Obturator Foramen
- Femoral Heads

FOOT LEVELERS

AP PELVIS - Labeled



FOOT LEVELERS

AP Spot View of the Hip

- **FFD** 40”
- **CR** Femoral pulse

- **Femur internally rotated 20°**

FOOT LEVELERS

AP SPOT HIP

Structures Visualized

- Femoral Head
- Femoral Neck
- Greater and Lesser Trochanter
- Femoral Shaft
- Kohler's Teardrop
- Pubic Rami
- Iliac Fossa

FOOT LEVELERS

LATERAL FROG-LEG VIEW

- **FFD** 40”

- **CR** Femoral pulse

FOOT LEVELERS

FROG-LEG (HIP)

Structures Visualized

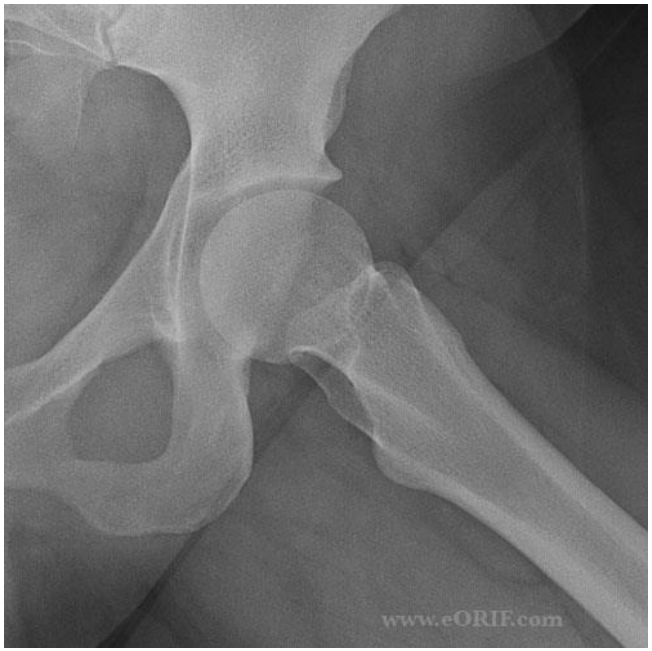
- Femoral head
- Femoral Neck
- Hip Joint space
- Kohler's Teardrop
- Pubic Rami
- Obturator Foramen
- Femoral Shaft

FOOT LEVELERS

Lines of Interest

- Iliofemoral, Klein's, and Shenton's line

- Iliopectineal line and ilioischial line



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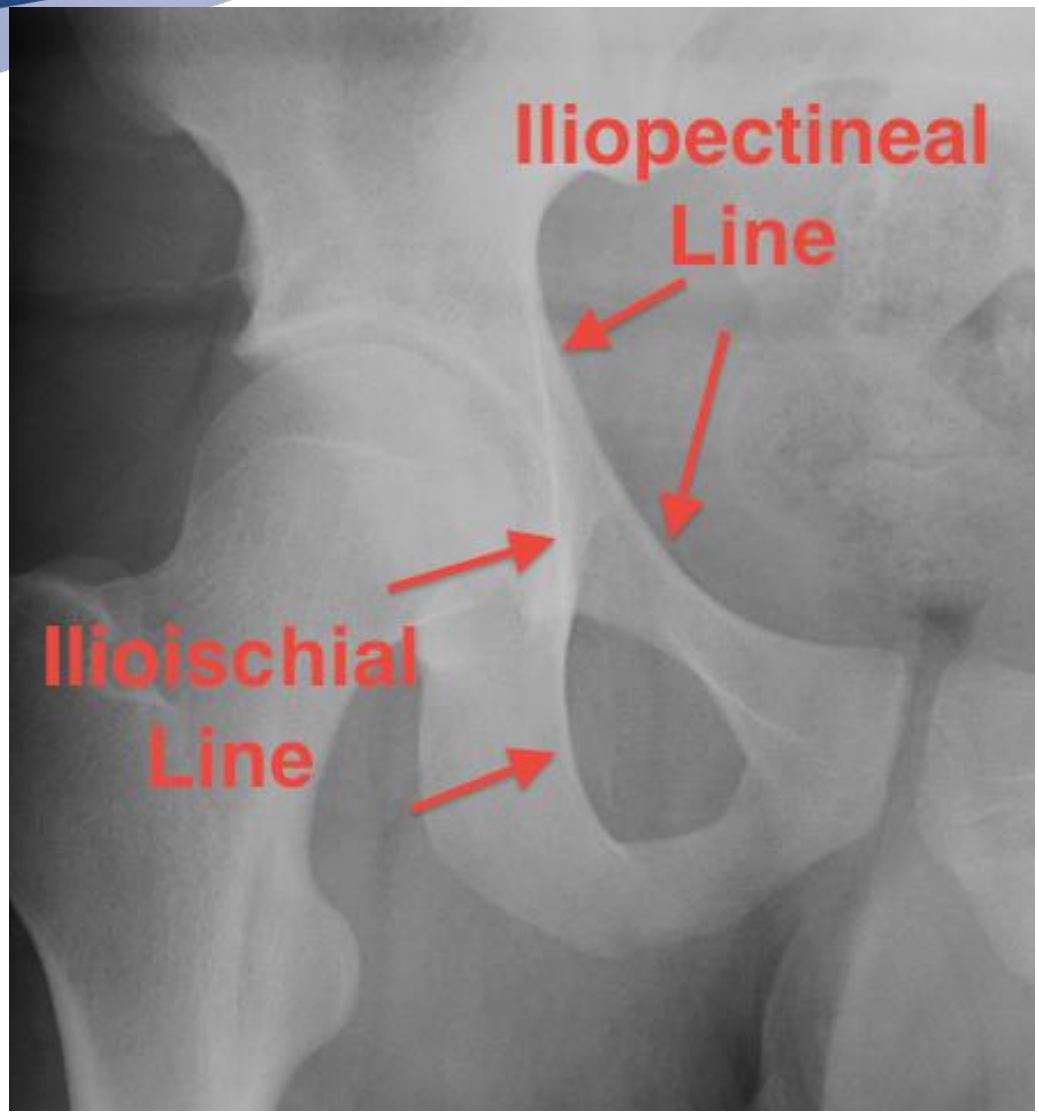
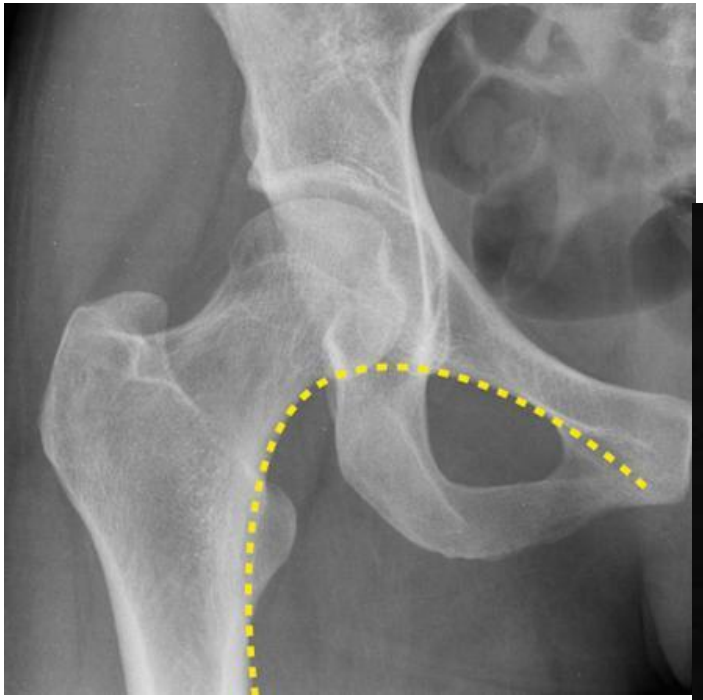
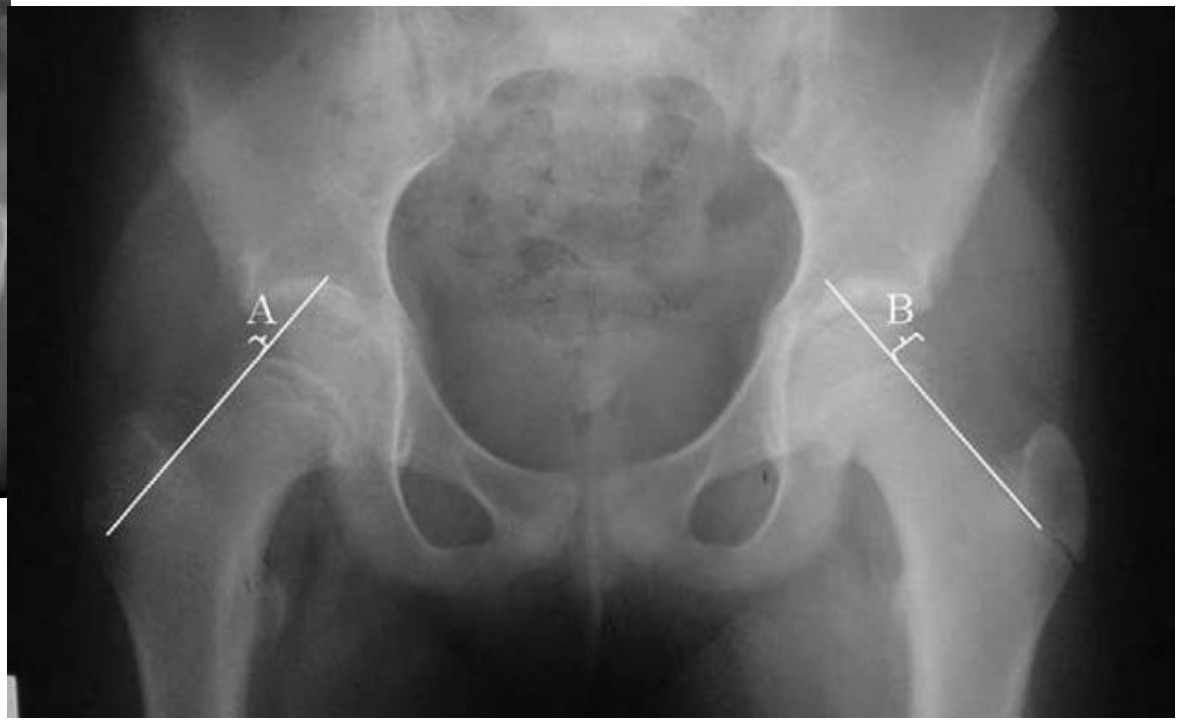


FOOT LEVELERS

Line of Shenton and Klein





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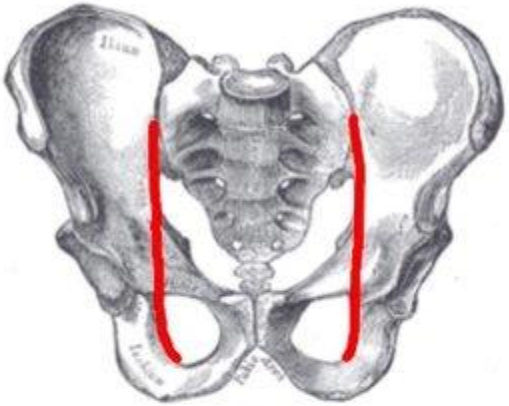
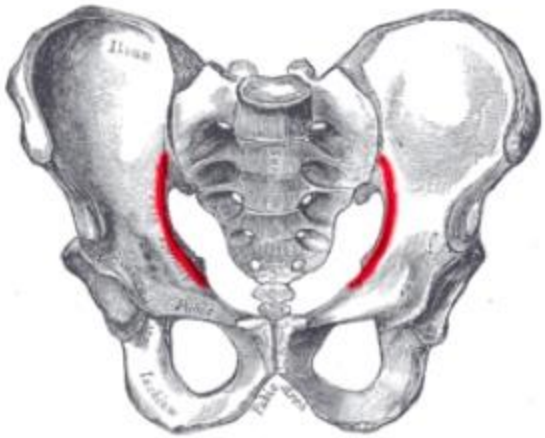


Ilioischial Line

If abnormal, be concerned for posterior column fracture (the stronger of the two columns, extends posterior to acetabulum and includes sacrum, SI joints, and



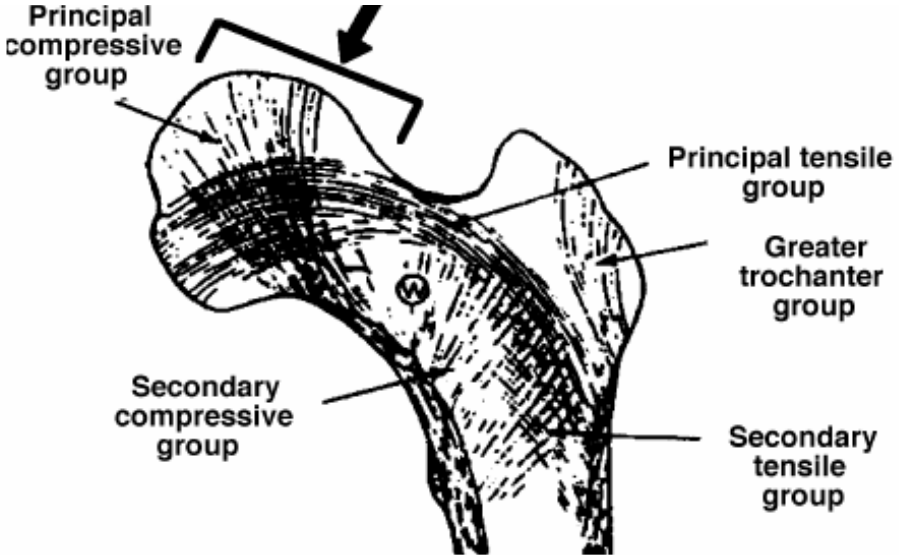
Iliopubic (Iliopectineal) Line

If abnormal, be concerned for anterior column fracture (the weaker of the two columns, extends anterior to acetabulum and includes pubic rami, symphysis and anterior ilium)

FOOT LEVELERS

Lines of Interest

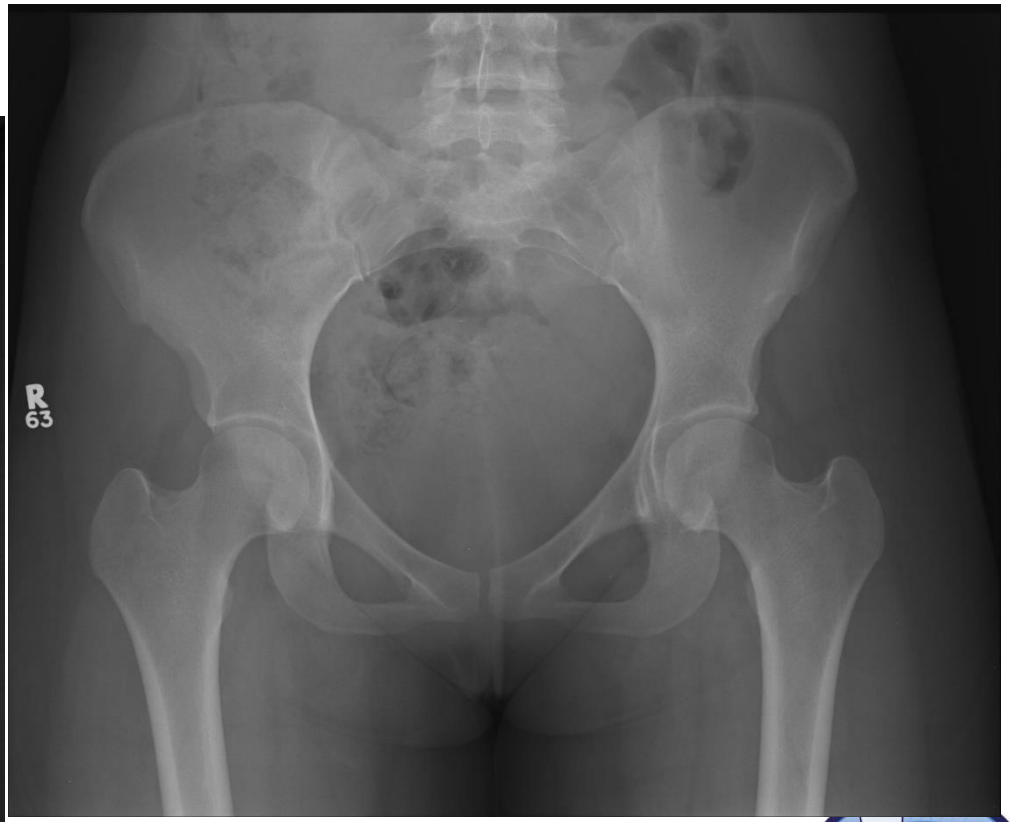
- Trabecular pattern



Journal of Biomedical & Pharmaceutical Engineering 1:1 (2007) 45-51

FOOT LEVELERS

- Capsular fat pads- iliopsoas, gluteus, and obturator internus



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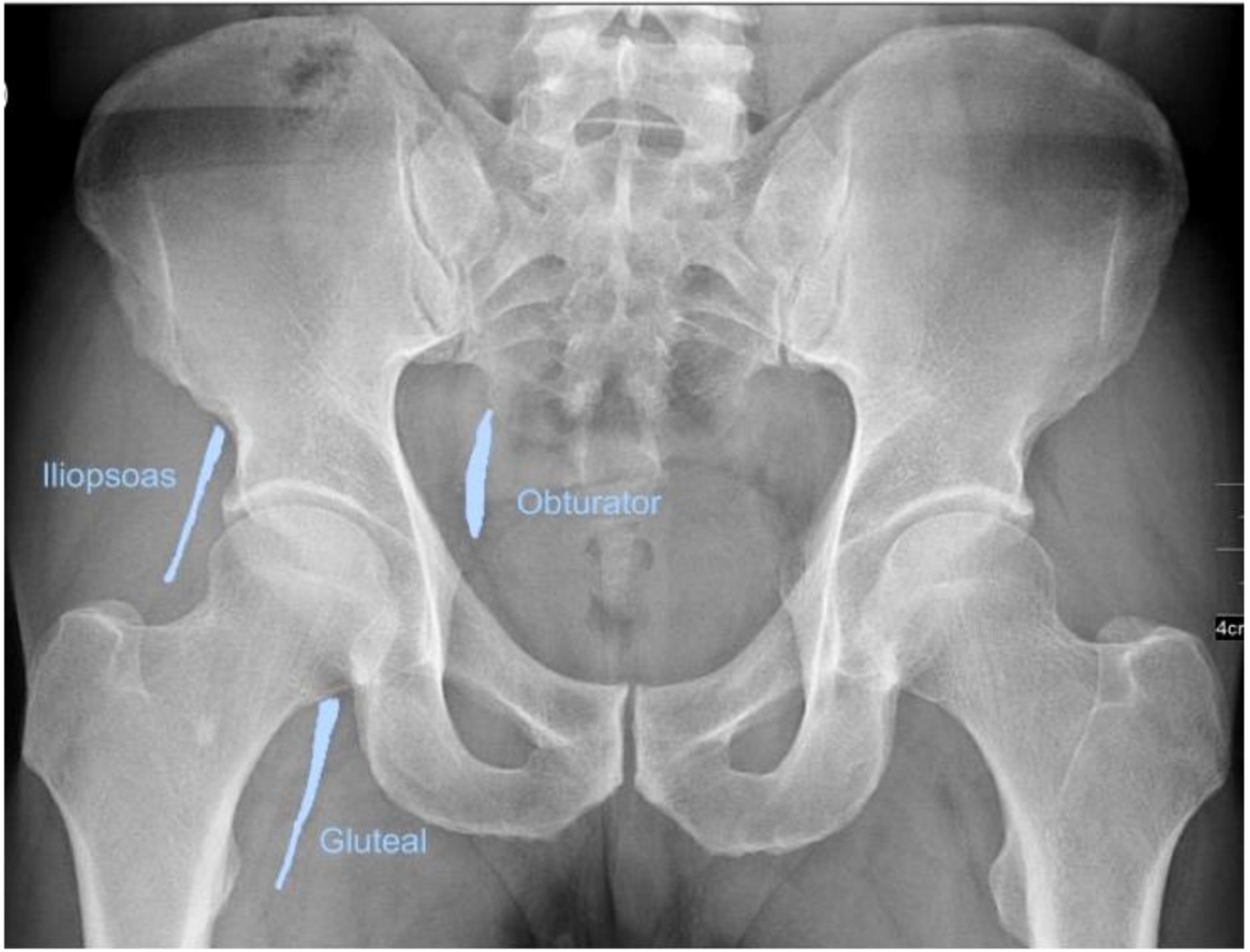
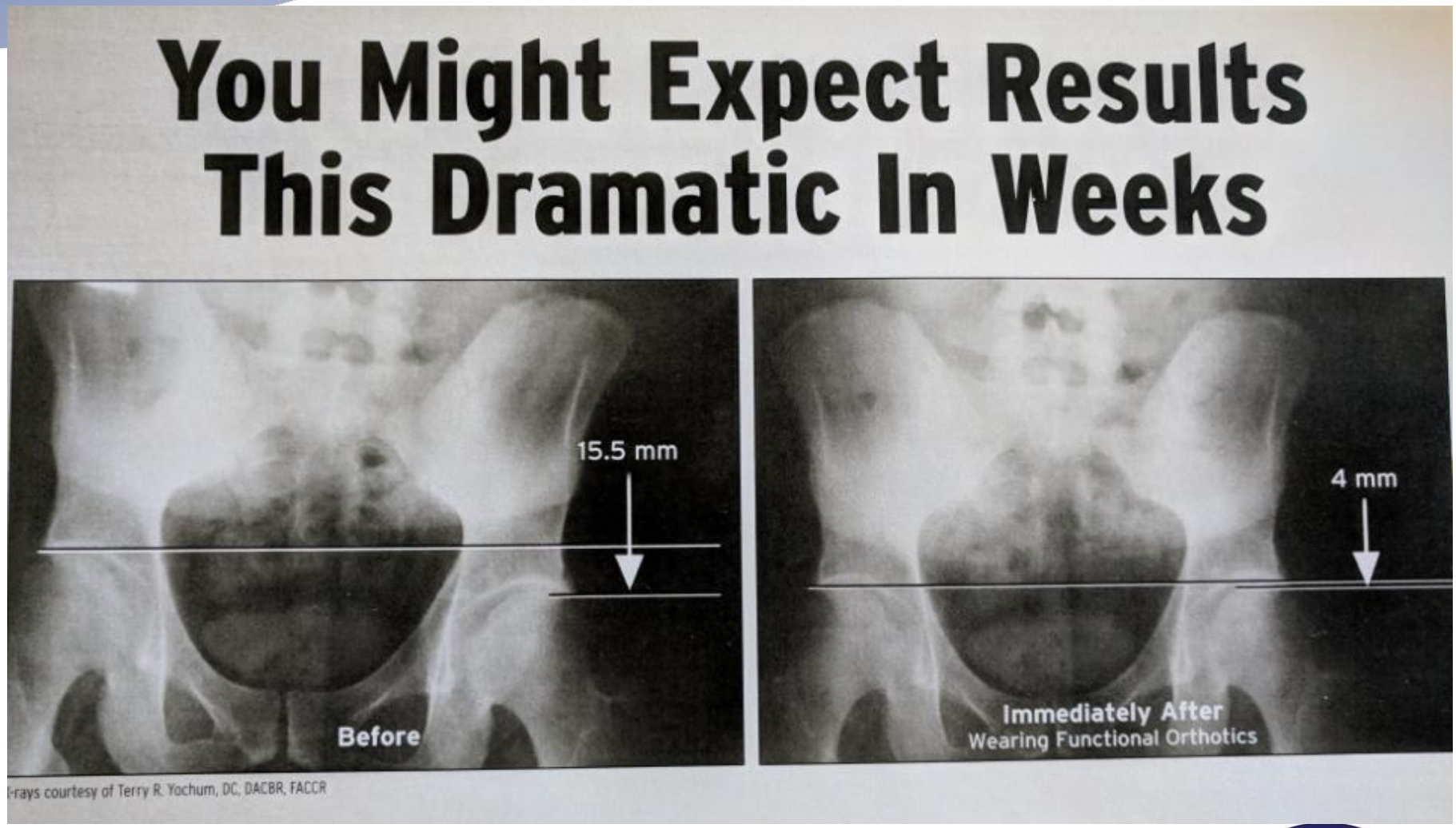
FOOT LEVELERS



FOOT LEVELERS

Foot Levelers



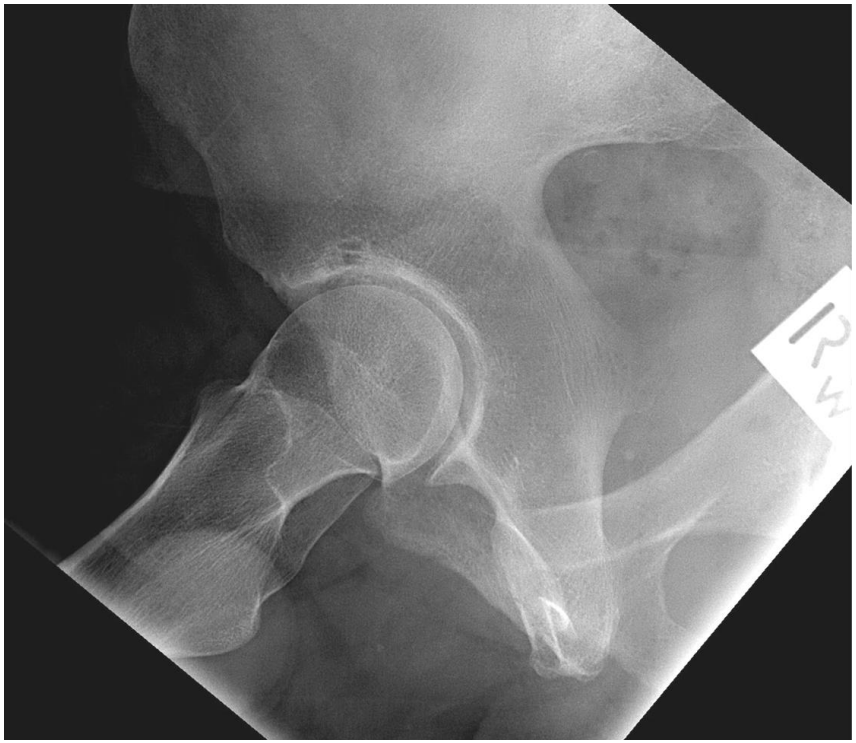
FOOT LEVELERS

Case

- Chronic groin pain

FOOT LEVELERS

AP Pelvis and Right Frogleg Lateral



FOOT LEVELERS

Different Patient

FOOT LEVELERS

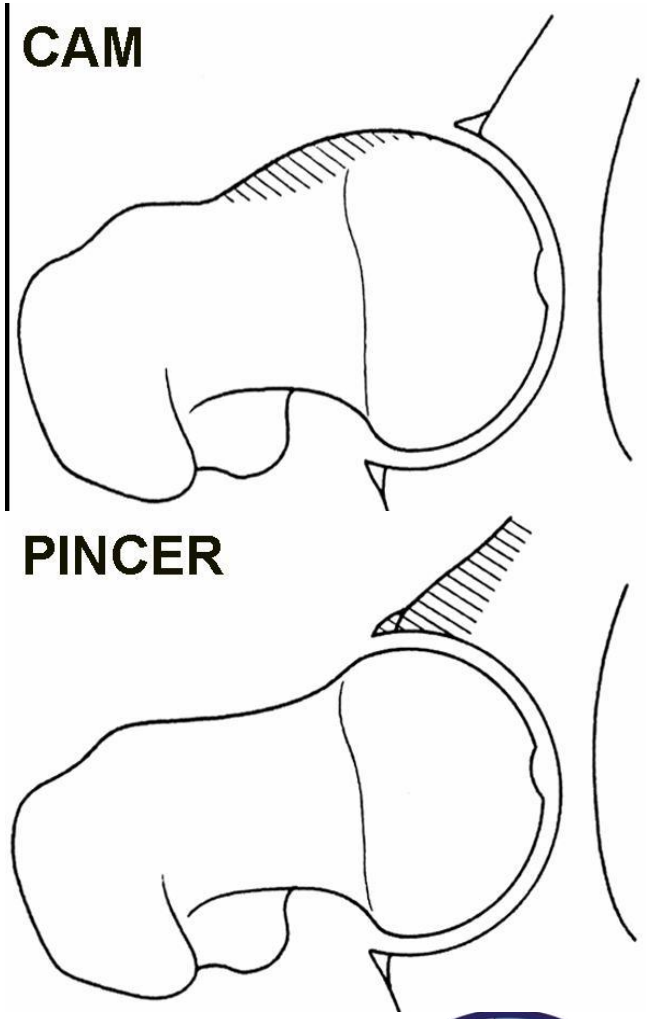
Femoroacetabular Impingement

- FAI, cam type with secondary degenerative joint disease
  - Osseous bump at the lateral aspect of the head-neck junction of the femur

FOOT LEVELERS

Femoroacetabular Impingement

- Lateral osseous bump along the femoral head-neck junction= **cam**
  - *"Pistol grip" deformity*
- Osseous extension of the lateral aspect of the acetabulum resulting in *overcoverage* of the femoral head= **pincer**
- Previously diagnosed as degenerative joint disease or congenital dysplasia



Radiographic Findings

Associations:

- Os acetabuli
- Herniation pits along the lateral aspect of the femoral head-neck junction

FOOT LEVELERS

Clinical Findings

- Age: 20-40
  - Pincer type is common of females

- **Chief Complaint:** groin pain with hip rotation in the sitting position or during/after sports; or trochanteric pain radiating to the lateral thigh.
  - Decreased range of motion: **flexion and internal rotation**

FOOT LEVELERS

Complications of FAI

- Decreased joint clearance between femoral neck and acetabulum
- Possible premature degeneration, and tears in the labrum and adjacent articular cartilage

Filigenzi F and Bredella M. MR imaging of Femoroacetabular Impingement. Applied Radiology, April 2008, 12-19.

Tannast M, et al. Femoroacetabular Impingment: Radiographic Diagnosis-What The Radiologist Should Know. AJR:188;1540-1552, June 2007.

FOOT LEVELERS

Follow-up

- **MRI with arthrography:** evaluate for labral tears, and articular cartilage damage

- Orthopedic surgeon **consultation**
  - Osseous resection
  - Labral repair/refixation with suture anchors or labral debridement

Larson C and Giveans M. Arthroscopic Management of Femoroacetabular Impingement: Early Outcome Measures. J of Arthroscopic and Related Surgery, May 2008, 24 (5); 540-546.

FOOT LEVELERS

Treatment

- **Chiropractic & FL**
  - **Altered biomechanics; Muscle imbalances**
  - Evaluate above and below region

FOOT LEVELERS

Case

Hx: 13 yom complains of *knee* pain

FOOT LEVELERS

AP Pelvis

FOOT LEVELERS

Recumbent Bilateral Lateral Frog-leg View

FOOT LEVELERS

Radiographic Findings

- Medial migration of the right femoral epiphysis
- Decrease in femoral epiphyseal height
- Positive Klein's Line

FOOT LEVELERS

Slipped Capital Femoral Epiphysis

- Age: 10-17 yoa of boys; 8-15 yoa of girls
  - Left hip most commonly affected

- **Causes**
  - Overweight
  - New activity- strenuous exercise
  - Growth spurt
  - Trauma

Resnick D. Diagnosis of Bone and Joint Disorders, 4th ed. 2002; 2729-34.

FOOT LEVELERS

SCFE

Complications

- Severe varus deformity and foreshortening
- Osteonecrosis
- DJD; ALTERED BIOMECHANICS

Follow-up

- If surgical>>>post surgical chiropractic care & FL
- Orthopedic surgeon consultation
  - Pin the femoral epiphysis at the current location

FOOT LEVELERS

FOOT LEVELERS

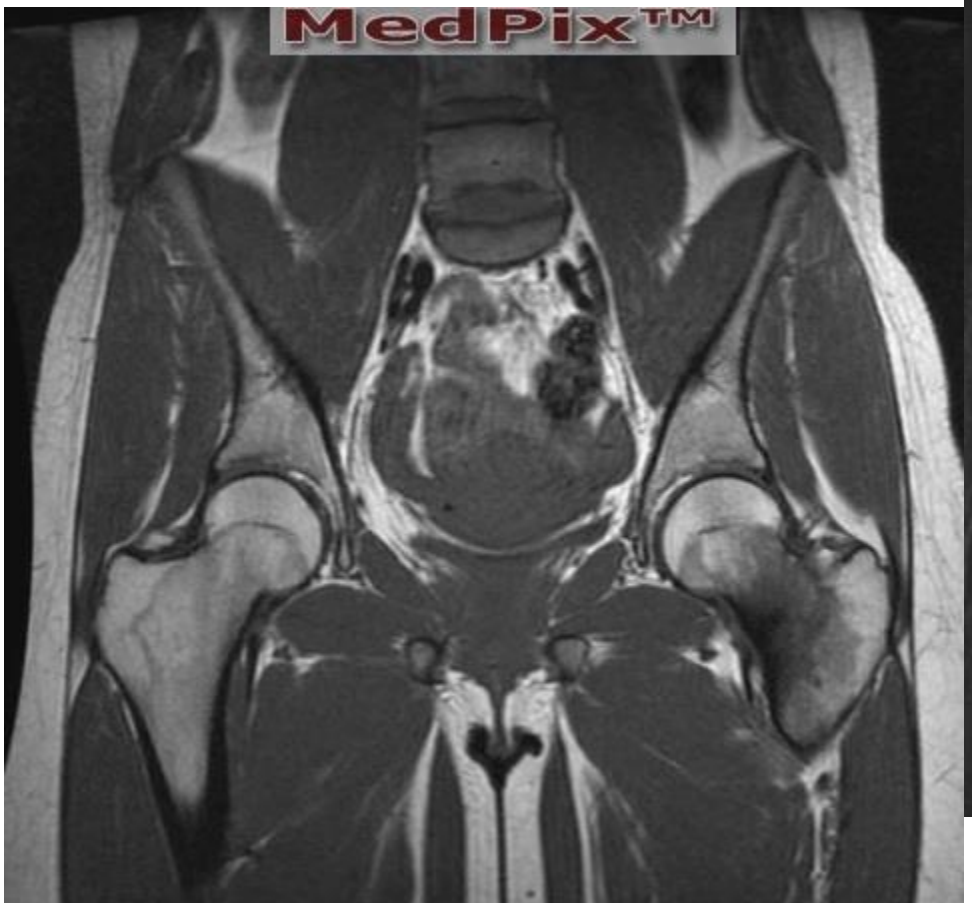
Case

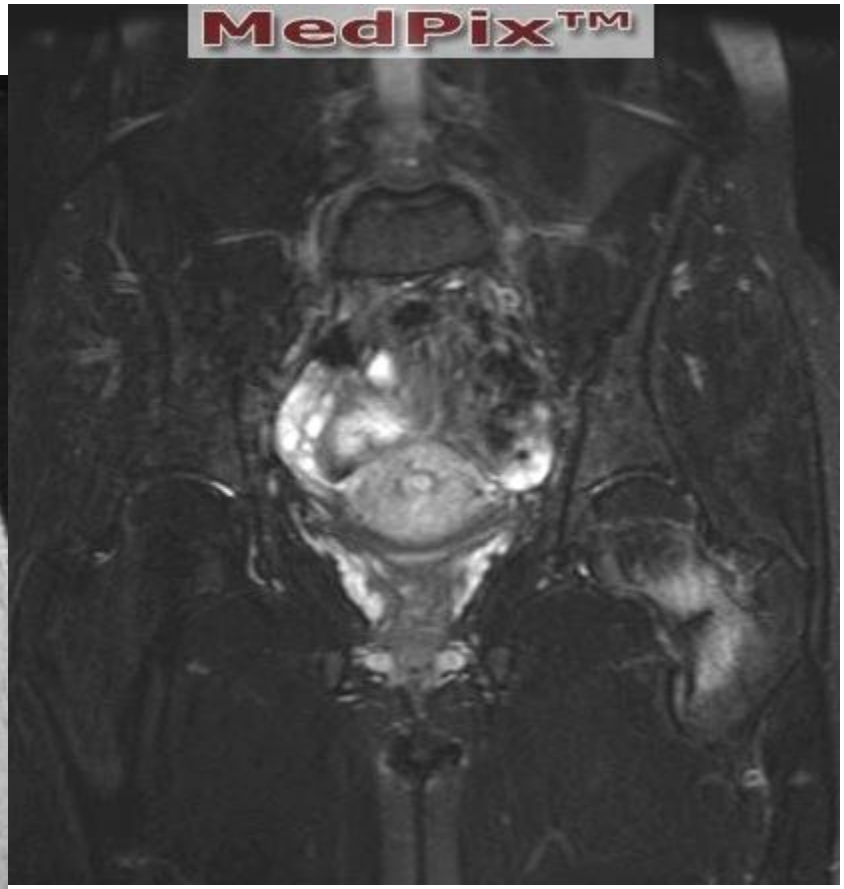
Hx: 18 yof athlete complains of hip pain; cross country runner

FOOT LEVELERS

AP Pelvis

Coronal T1 & T2 Weighted





FOOT LEVELERS

Stress Fracture

- Normal density with abnormal stress
- Bone scan and MRI- positive
- Non-weight bearing activity

FOOT LEVELERS

Treatment

- “Rest”
- Chiropractic
- Foot Levelers

Case

Hx: 33 yom suffers from hip pain after 30 mile run

FOOT LEVELERS

AP Pelvis

FOOT LEVELERS

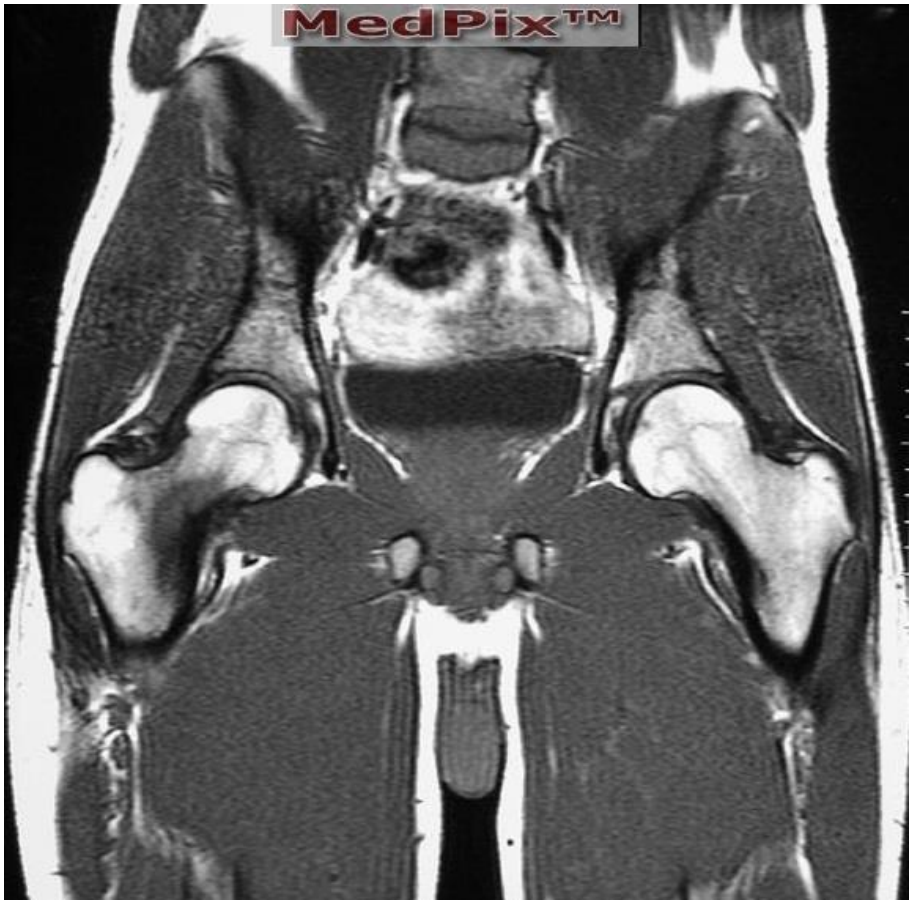
Magnified

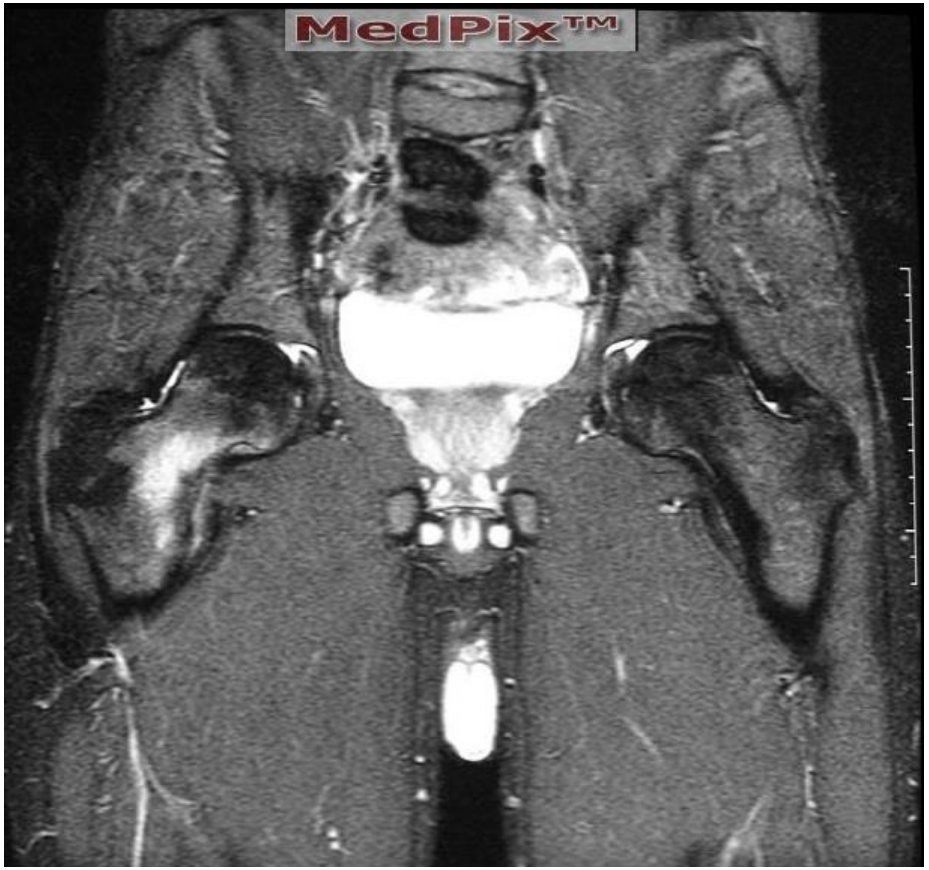
What is next?

- Advanced Imaging

FOOT LEVELERS

Coronal T1 & T2 Weighted





FOOT LEVELERS

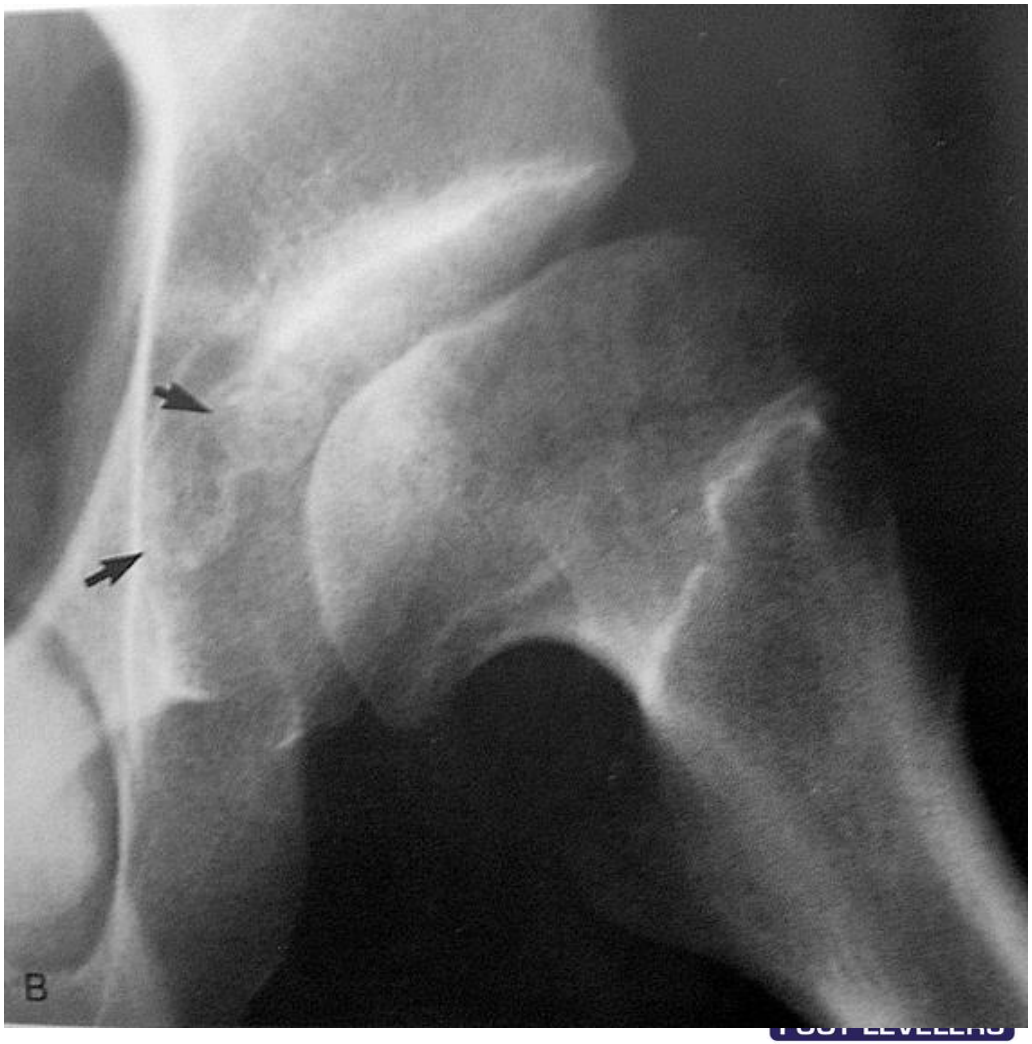
Stress Fracture

- Quality of bone is normal with abnormal stress.

FOOT LEVELERS

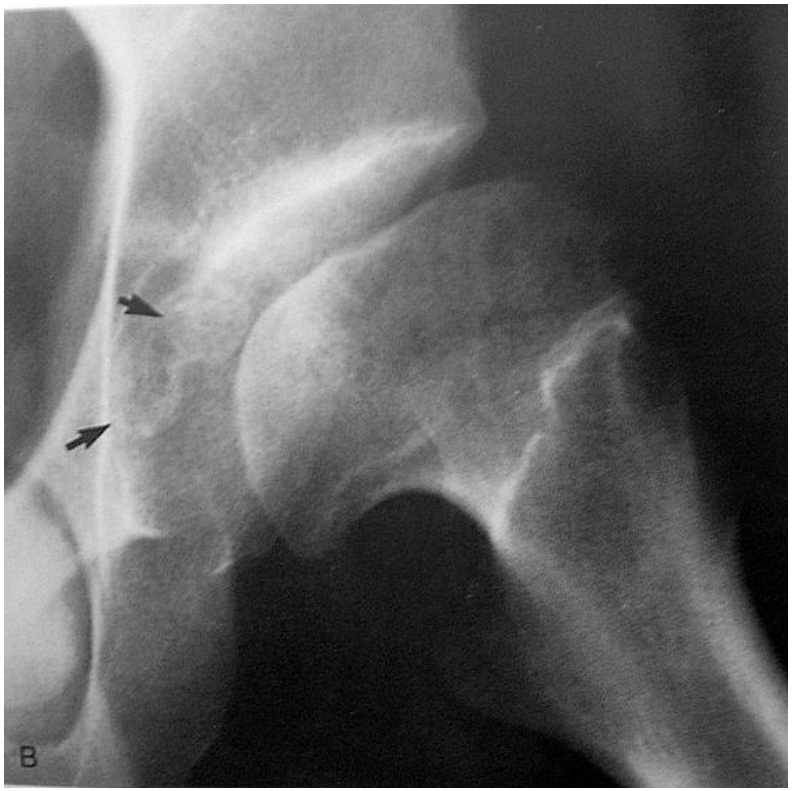
Case

- 29 year old male with hip pain



OLD LCP

- **Flattened deformity** of the femoral epiphysis (coxa plana)= mushroom cap
- Widened and **shortened** femoral neck
- Flattened acetabular margin
- Secondary osteoarthritis
- Intra-articular **osseous bodies**



Resnick D, MD. Diagnosis of Bone and Joint Disorders,4th ed. 2002

FOOT LEVELERS

60 YOM: Old LCP

Resnick D, MD. Diagnosis of Bone and Joint Disorders,4th ed. 2002

FOOT LEVELERS

AP Pelvis

FOOT LEVELERS

Radiographic Findings

- Smaller epiphysis
  - Collapse/flattening of the left femoral epiphysis
- Multiple lucencies within the epiphysis and proximal metaphysis
- Widened femoral neck
- Medial joint space widening
- Smaller obturator foramen

ACR Learning File

FOOT LEVELERS

Legg-Calve-Perthes

- Age: 3-12 yoa; mc 4-8 yoa & male
- MC cause of LCP is idiopathic

Clinical Associations

- Limp and groin pain; pain may travel to the anteromedial aspect of the knee
- Prognosis is better at younger age of onset; less than 6 yoa.
- Bilateral 10%

FOOT LEVELERS

LCP

Old LCP—early degenerative changes, eventually hip replacement

-altered biomechanics above and below the hip;

-Chiropractic and Foot Levelers.

Follow-up for early LCP

- MRI bilateral hips- for early marrow changes
  - Anterosuperior portion of the femoral head

FOOT LEVELERS

Hip Dysplasia

Treatment/Outcome in LCP

- Surgery; Bracing to provide traction; Rest
- Foot Levelers age of 10-12.

- Reconstitution
  - Less than 50% involvement of the femoral epiphysis= better prognosis

FOOT LEVELERS

Case

FOOT LEVELERS

Fracture of left femur

FOOT LEVELERS

Surgical hardware

- Altered biomechanics/compensatory
- Pelvic unleveling/ altered femoral heights
- Degenerative changes of lumbar spine; Postural alterations

FOOT LEVELERS

Follow-up/Treatment

- Check hardware for loosening; healing of fracture

- Chiropractic & Foot Levelers
  - Improve recovery time

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FOOT LEVELERS

THANK YOU

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