Foot & Ankle-
A Case-based Approach

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Objectives:

- Discuss relevant anatomy, clinical presentation, and basic management of
  - Lateral ankle sprain and fracture
  - 5^{th} mt/navicular fracture
  - Compartment syndrome
  - Plantar fasciitis
  - Syndesmotic ankle sprain
  - Lisfranc injury

Case 1.

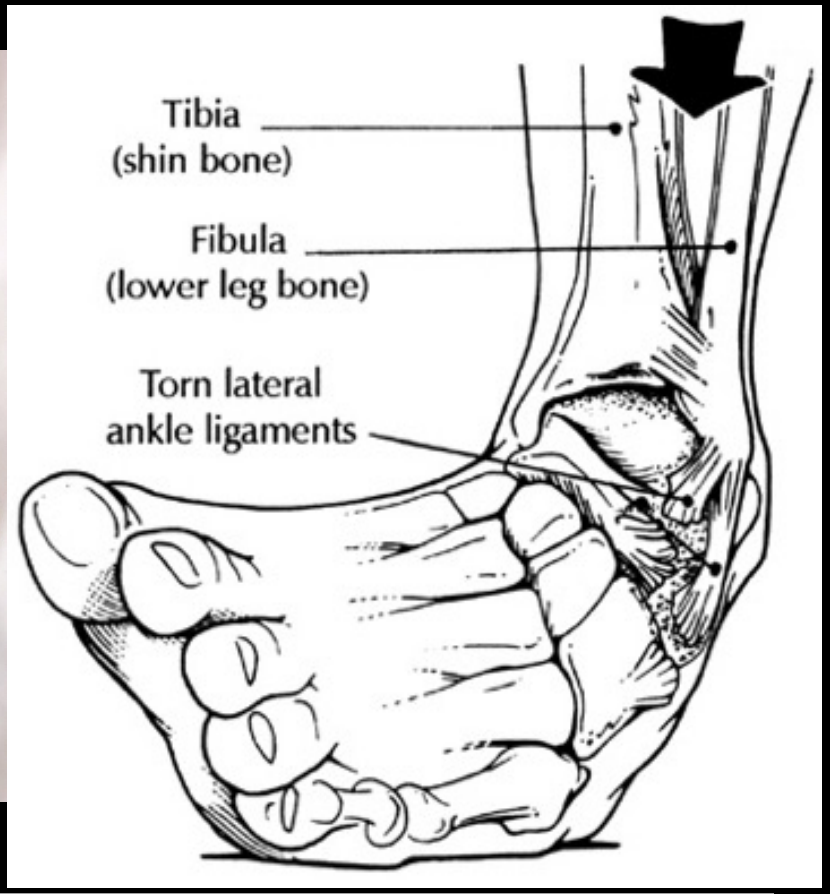
- 25 year old soccer player cut, pivoted, and inverted their L ankle
- Felt/heard a pop, weightbearing possible but painful
- PE-
  - R ankle within normal limits
  - L- mild lateral soft tissue swelling
  - Mild tenderness to palpation over ATFL
  - ROM/strength limited by pain
  - Ligament testing (anterior drawer, talar tilt, eversion) negative

Ankle sprains- why do we care?

- One of the most common injuries presenting to PCP and ED

Lateral ankle sprains

Mechanism of injury (MOI): Inversion force



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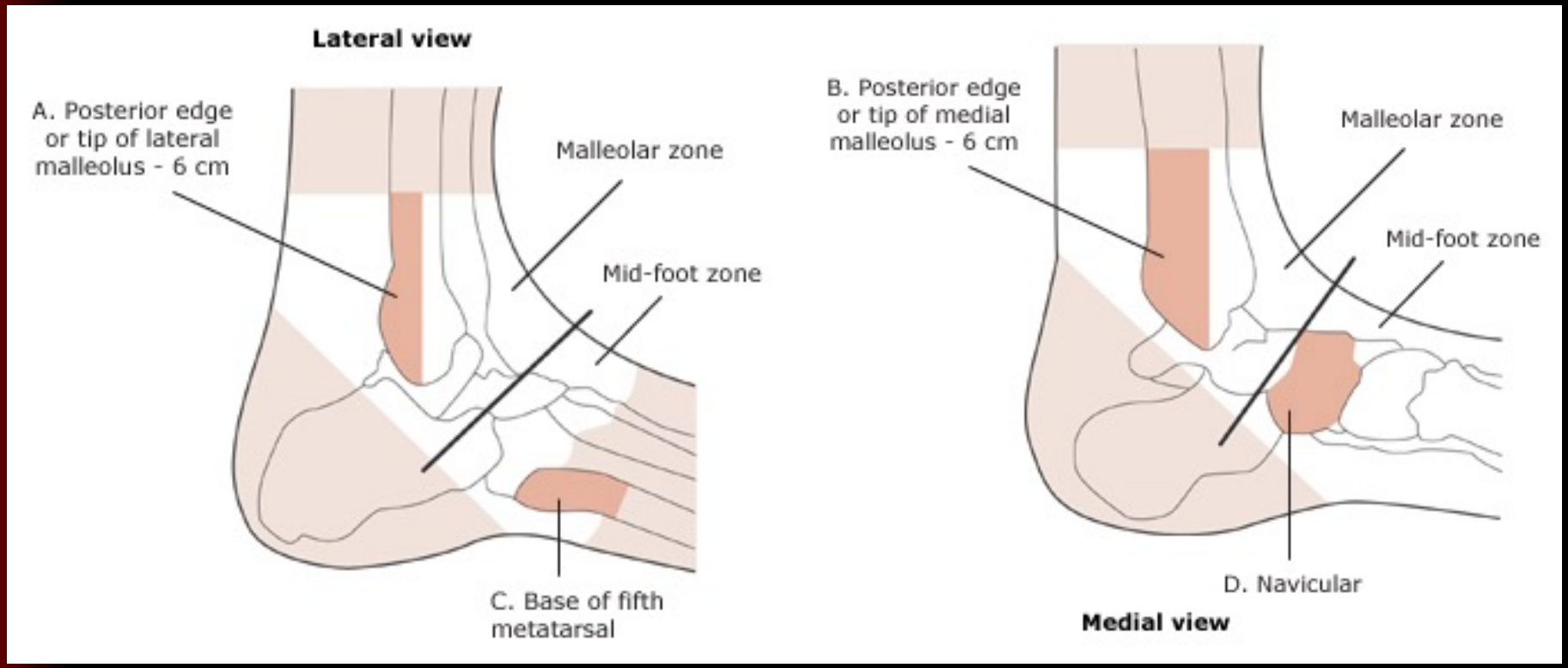
Lateral ankle sprains

- History
  - How did you do it?
  - Did you feel/hear a pop?
  - Where exactly does it hurt the most?
  - Any numbness/tingling?
    - Peroneal tendon strain, peroneal nerve stretch
  - How many prior sprains have you had?
    - Are you experiencing regular ankle instability?

Ottawa Ankle Rules



- or inability to bear weight 4 steps immediately and in ED

Lateral ankle sprains

Treatment:

- Reduce inflammation (RICE, NSAIDS)
- Healing (immobilization, splint/brace?, NWB?)
- Function (PT, proprioception)
- Surgery? (very very rare-- depends on stability)

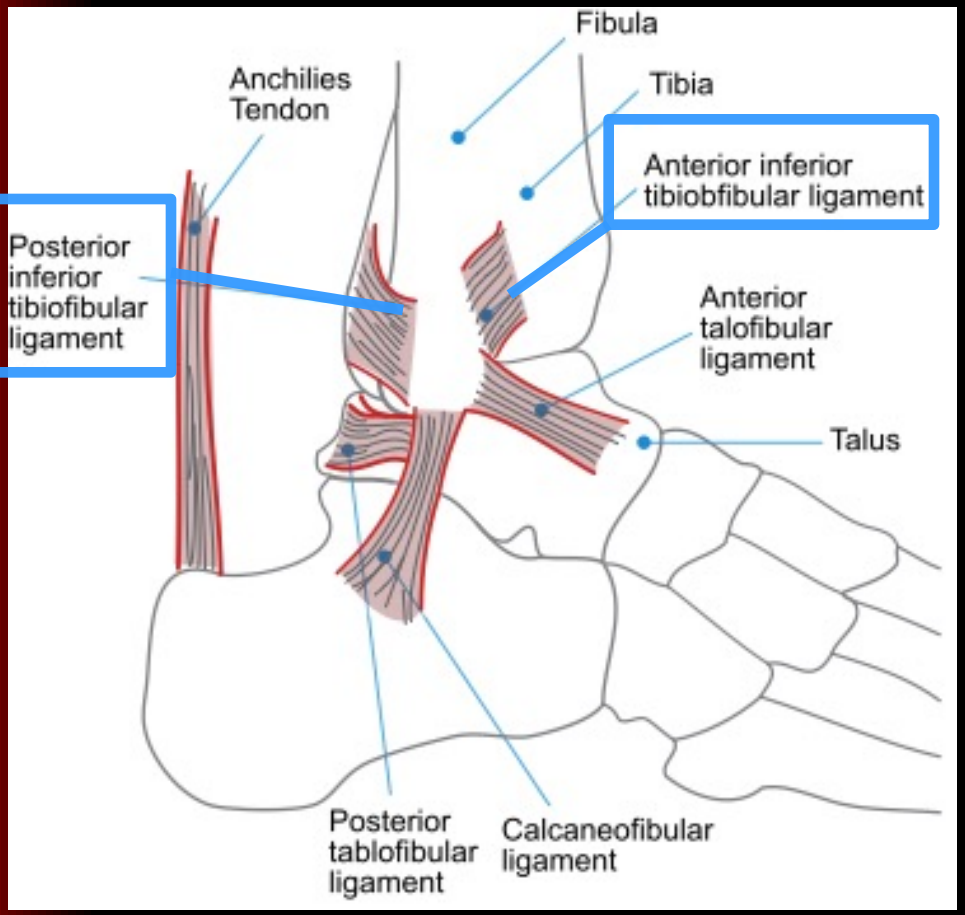
Case 2.

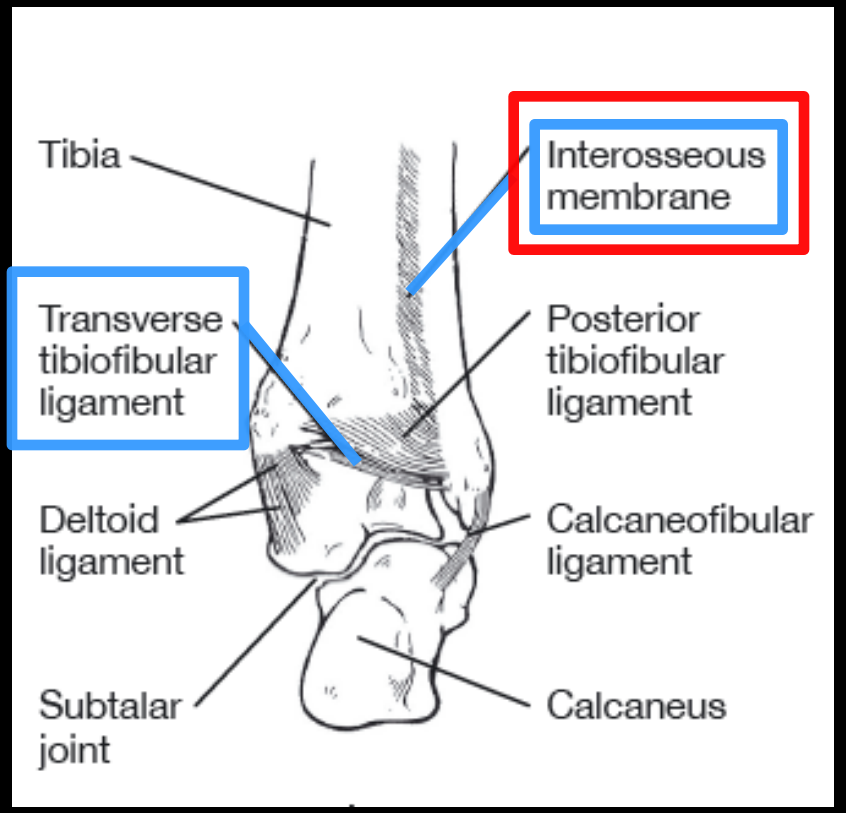
- 20 year old football player was tackled with his foot in a hyper-everted position. He needed assistance getting off the field.
- PE-
  - Mild medial soft tissue swelling
  - Tender over medial ankle, distal tib-fib/syndesmotic area, no pain over the proximal tibia/fibula
  - Ankle/foot ROM/strength normal but painful
  - Pain with passive eversion
  - No numbness/tingling, NVI

Syndesmotic (high) ankle sprains

External rotation/dorsiflexion

Syndesmosis





Syndesmotic (high) ankle sprains

- History
  - How did you do it?
  - Did you feel/hear a pop?
  - Where exactly does it hurt the most?
  - How many prior sprains have you had?
    - Are you experiencing regular ankle instability?
    - What have you done for treatment of those injuries?

Syndesmotic (high) ankle sprains

- Evaluation:
  - NWB x-rays- if obviously surgical, refer
  - WB x-rays- assess alignment

High ankle sprains

Initial management:

- Reduce inflammation (RICE, NSAIDS)
- Boot immobilization, early NWB?
- Function (PT, proprioception)
- Surgery for unstable injuries
- Patient education- these can take a long time…

Case 3.

- 20 year old football player was tackled with his foot in a hyper-plantarflexed position. He needed assistance getting off the field.
- PE-
  - Mild dorsal soft tissue swelling
  - Tender over midfoot/proximal 1st/2nd metatarsals
  - Ankle/foot ROM/strength normal but painful, NVI

Lisfranc injuries

Lisfranc injuries

- Why do we care?
- History-
  - How did you do it?
    - Most commonly hyperplantarflexion
  - Did you feel/hear a pop? Where?
  - Where exactly does it hurt the most?
    - Midfoot- not ankle

Lisfranc Injuries

Evaluation:

- NWB x-rays- if obviously surgical, refer
- WB x-rays- assess alignment


Lt

Lisfranc injury (midfoot sprain)

SUMMARY

- MOI: plantar flexion with axial load
- H&P, widening of 1st and 2nd metatarsals, possibly avulsion fracture

Management:

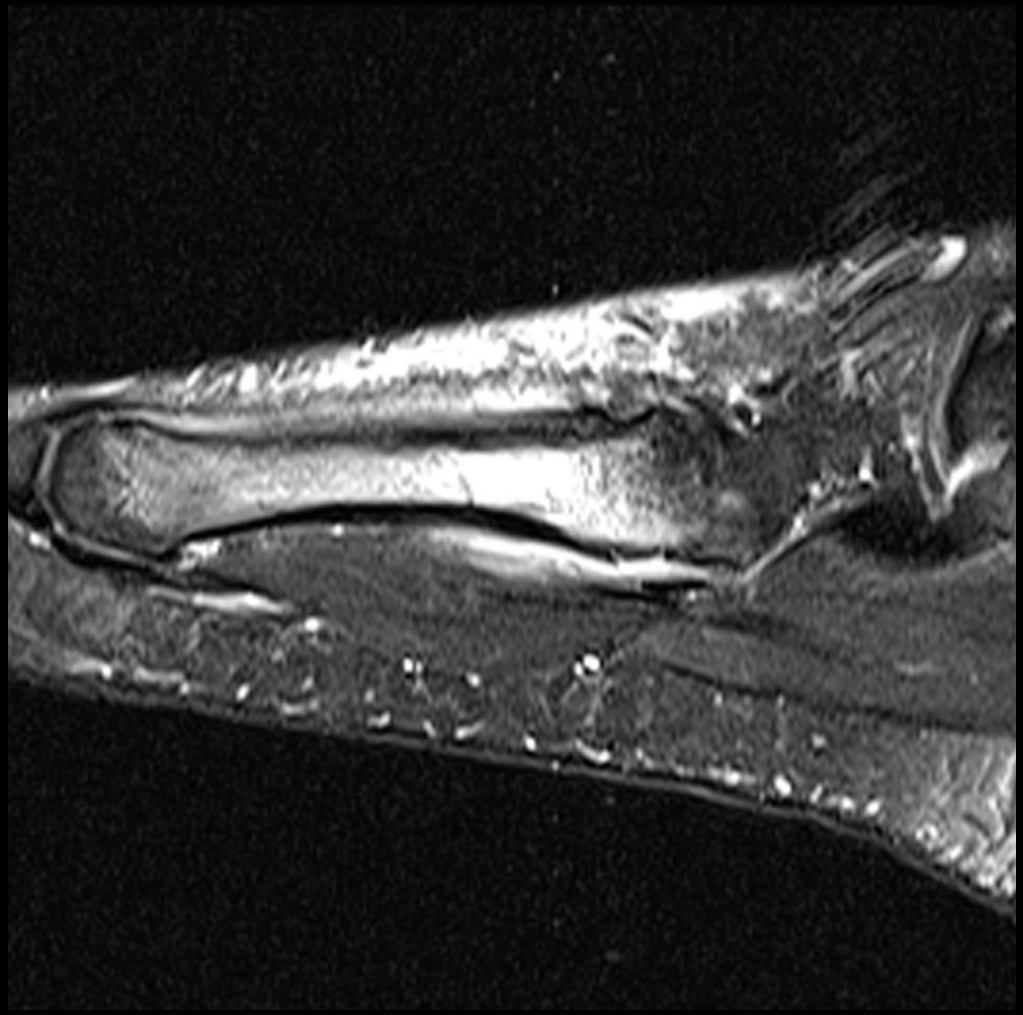
- NWB
- Consider early referral for surgical consultation
- Consider early advanced imaging
- DOCUMENT WELL

Case 4.

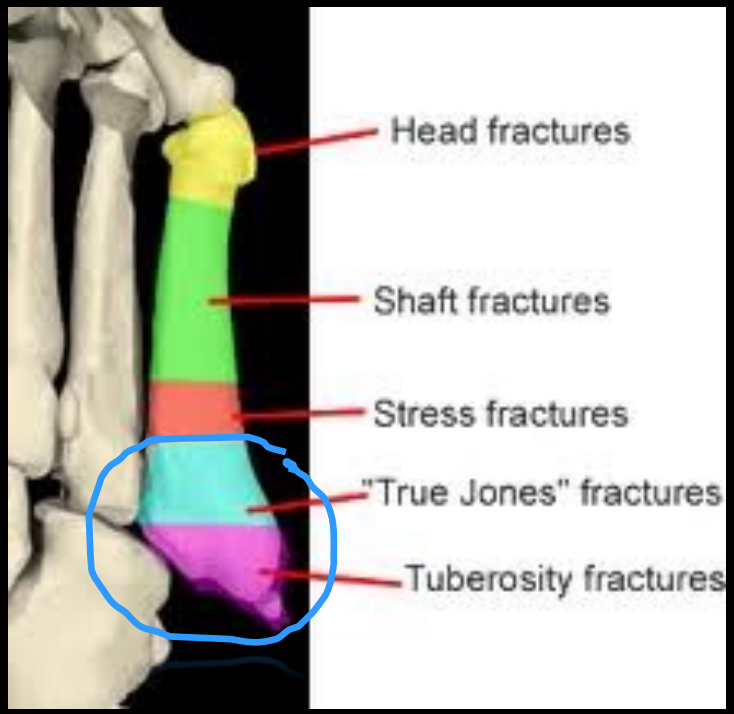
- 25 yo professional ballet dancer presents with 2 days of foot pain
  - Felt “snap” upon landing from jump
- On further history- mild pain x 8 weeks
- Oligomenorrhea x 18 mo
- Takes calcium/vit D, no recent weight change

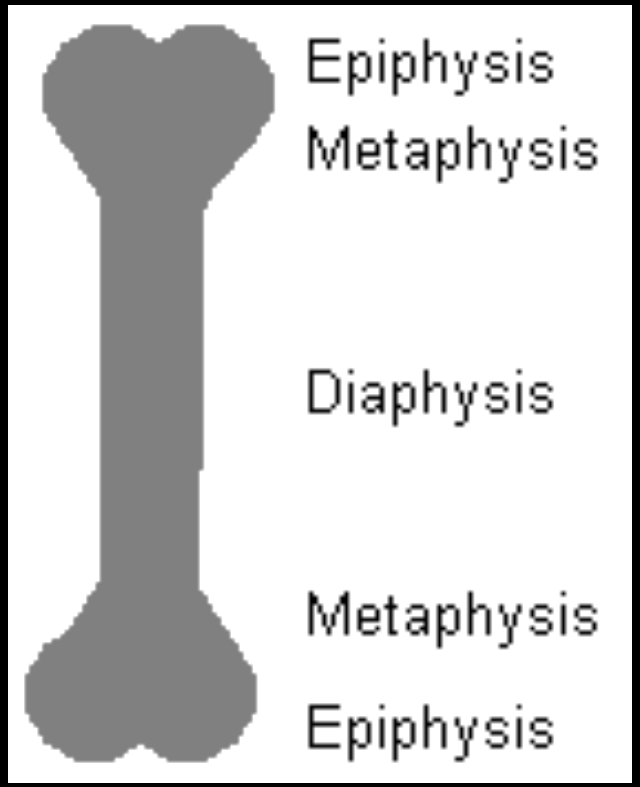
Case 4.

- PE: BMI 19
- MSK:
  - R foot WNL
  - L foot:
    - Inspection- mild swelling/erythema over proximal 5th MT
    - Palpation- very TTP over proximal 5th mt
    - ROM- WNL
    - Strength- WNL, pain w/resisted eversion
    - Special tests- WNL



5th metatarsal fracture



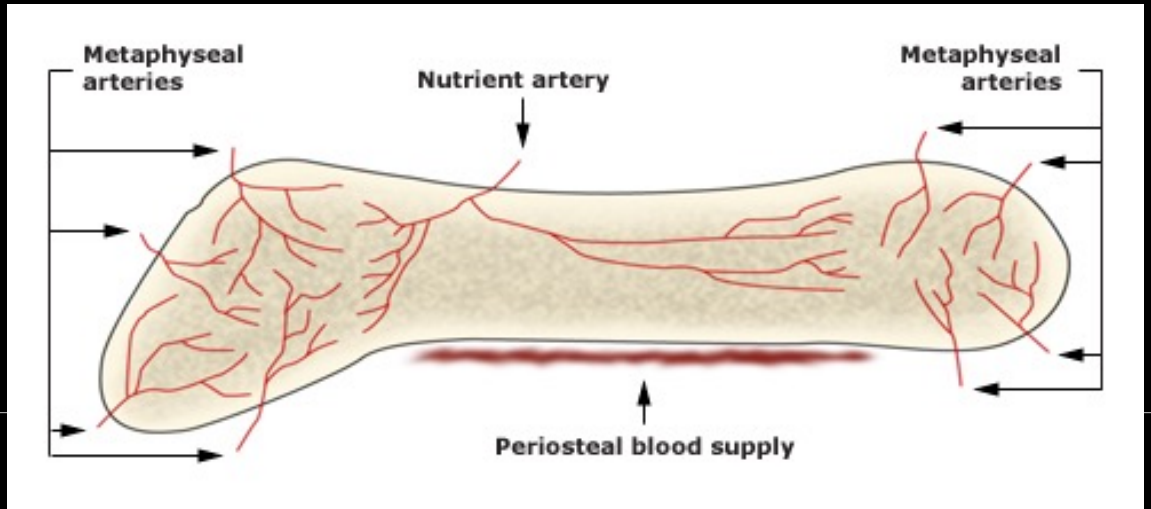


Avulsion fracture

Jones fracture

Why is this a big deal?

- Proximal tuberosity (avulsion fx)
  - Blood supply from metaphyseal vessels & branches of nutrient artery
- Metaphysis/diaphysis (Jones/stress fx)
  - Only blood supply from nutirent artery (fx in this area more likely to disrupt tenuous blood supply)



On another note…

- Navicular stress fracture
  - Bone vasculature supplied by anterior and posterior tibial arteries
  - Watershed area in central waist, which sees the greatest mechanical stress
  - Medial ankle pain in runners, basketball players
  - Point tenderness over bone

Case 2.

- 55 year old woman presents with medial ankle pain for 5 weeks.
- No injury
- No change in activity
- Increased pain with walking
- No prior problems

Case 2.

- PMH- DM II
- PSH- hysterectomy 2007
- Meds- metformin
- All- NKDA
- Soc Hx- RN
- Family hx- non-contributory
- Activity Hx- sedentary

Case 2.

- PE:
  - Gen- NAD. BMI 35
  - MSK: R foot WNL, pes planus
    - L foot: inspection- planus, medial erythema
      - Palpation: TTP post tib
      - ROM WNL
      - Strength- pain w/resisted inversion/plantarflexion
      - Special testing- WNL


L
MO


L
STAAND

Posterior Tibialis Tendon Dysfunction

- Acquired flatfoot deformity
- Etiology not exactly clear – repetitive overload?
- Failure of posteromedial structures:
  - Posterior tibial tendon
  - Spring ligament
- Characteristically in women >40y.o.

Posterior Tibialis Tendon Dysfunction

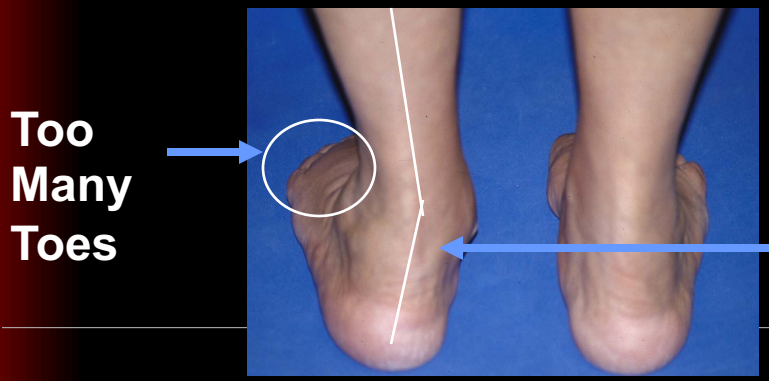
TYPICAL HISTORY

- Long-standing flatfeet (progressive worsening over years)
- Posteromedial pain, worse with activities
- Symptoms not improving with time
- +/- acute event, commonly acute on chronic

Posterior Tibialis Tendon Dysfunction

TYPICAL PHYSICAL EXAMINATION

- Point tenderness below medial malleolus (distal posterior tibial tendon course)
- Flattened medial longitudinal arch
- + “too many toes” sign



Posterior Tibialis Tendon Dysfunction

TYPICAL PHYSICAL EXAMINATION

- Inability to perform single leg heel rise

  = incompetent posterior tibial tendon

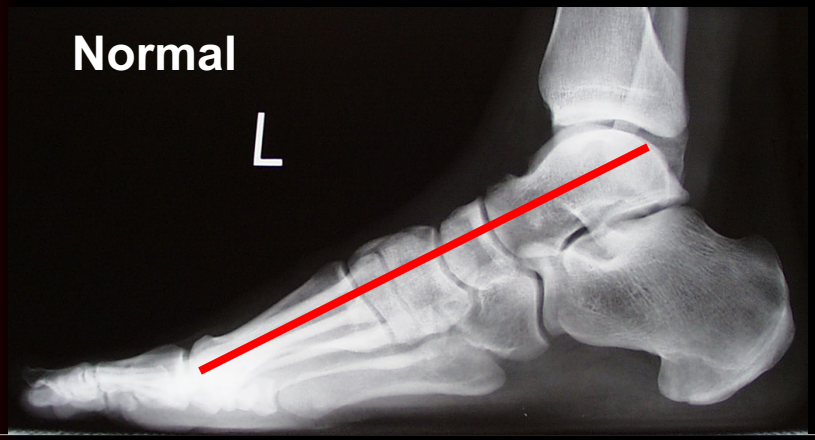
Normal Single Leg Heel Rise
Heel Rises and inverts
Opposite foot is off the ground

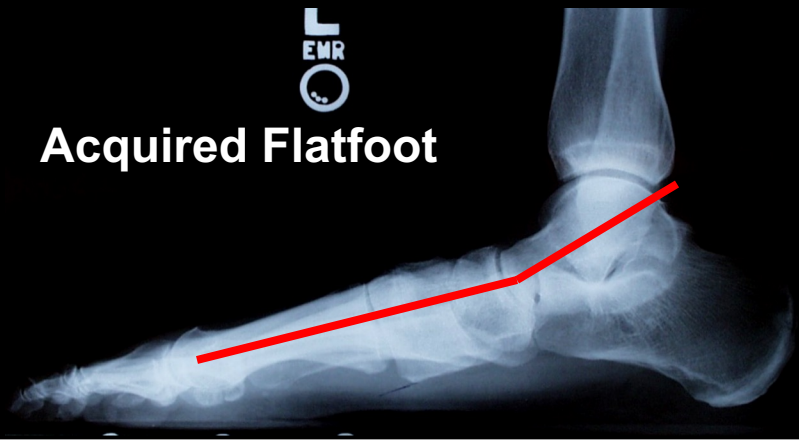
Unable to Perform <u>Single</u> leg Heel Rise
-Heel does Not Invert

Posterior Tibialis Tendon Dysfunction

X-Rays

- Must be weight bearing to assess bony alignment
- AP and Lateral Foot Views





Management

- Nonsurgical
  - Temporary immobilization
  - Partial weightbearing
  - Physical therapy
  - Arch supports
- Surgical
  - For more advanced cases

Case 5.

- 55 year old runner presents with 4 weeks of right foot pain
- Denies injury, change in activity
- Not training for anything specific
- Runs about 30 miles/week

Case 5.

- PE:
  - Left foot normal
  - Right foot
    - Inspection- normal
    - Palpation- tender over proximal plantar fascia
    - ROM- normal
    - Strength- normal
    - Special tests- none

Plantar Fasciitis

- Very common
- Plantar heel pain, pain on palpation
- Insidious onset
  - Ddx- calcaneal stress fracture, Achilles tendinopathy, inflammatory arthritis (SpA)
- Management-
  - PT: eccentric strengthening/stretching
  - Activity modification
  - Avoid barefoot walking
  - Time

Summary

- Describe clinical presentation, evaluation, and basic management of:
  - Ankle sprains, including Lisfranc and syndesmotic injuries
  - Posterior tibialis tendon dysfunction
  - 5^{th} mt/navicular fracture
  - Plantar fasciitis

Thank you

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