CRACKING THE FOOT AND ANKLE CODE

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- Florida Bone and Joint Specialists
- Andrews Institute Physician Provider
- Regional Medical Provider US Olympic Team

- June 24, 2022

DISCLOSURES

- Consultant to Zimmer
- Consultant to Arthrex
- Consultant to Bioventus

- No bearing on this lecture

LEARNING OBJECTIVES

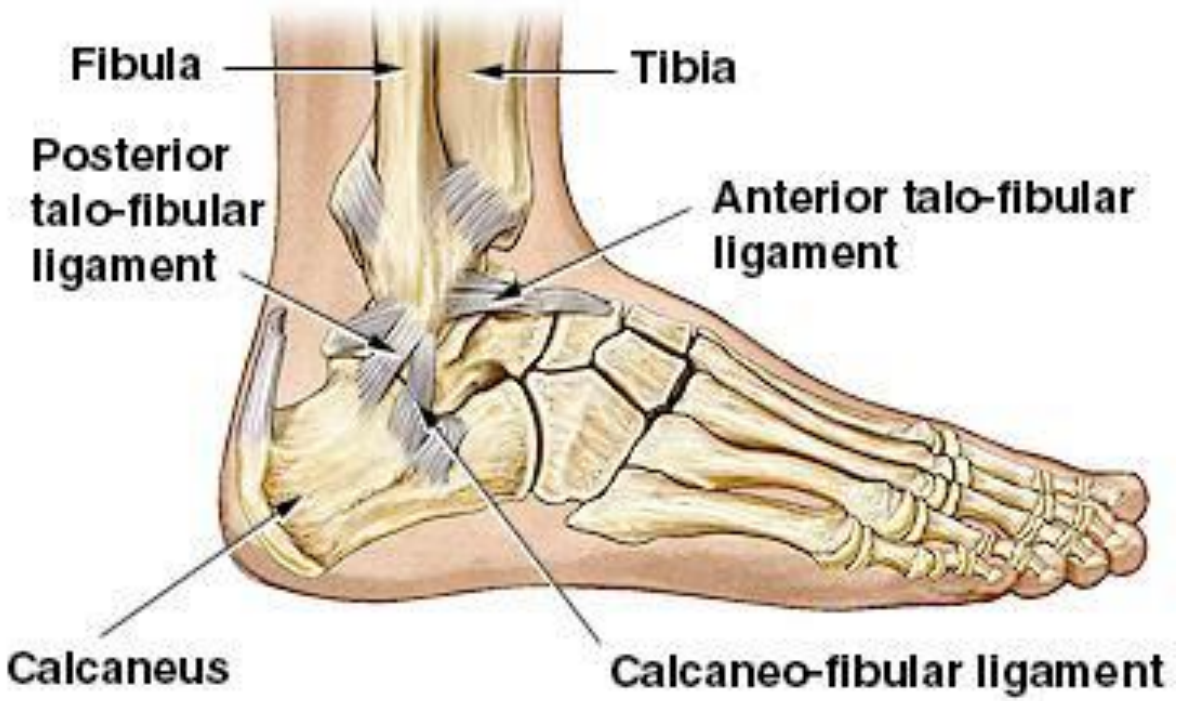
- Identify critical anatomy of the foot and ankle and its relevance to common pathologies
- Have a better understanding of foot and ankle issues that require referral
- Provide non-operative care and treatment of common foot and ankle pathologies

NOT JUST YOUR REGULAR SPRAIN

THE MOST COMMON INJURIES YOU'LL HOPE YOU "SEE"

- The Low Ankle Sprain
- The High Ankle "Sprain"
- Lisfranc injuries
- Achilles ruptures
- Tarsal Navicular Fractures

LATERAL LIGAMENT ANKLE ANATOMY



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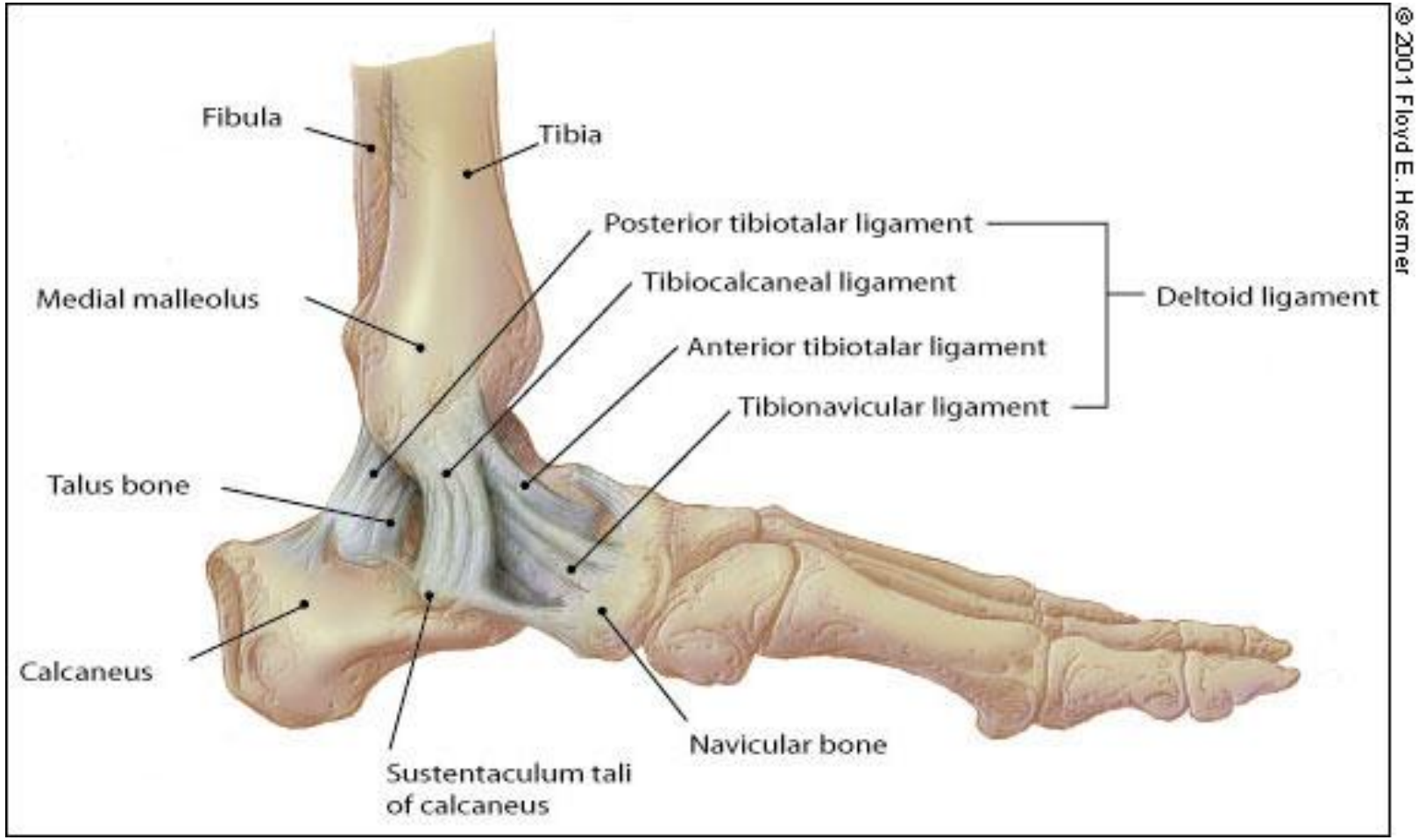
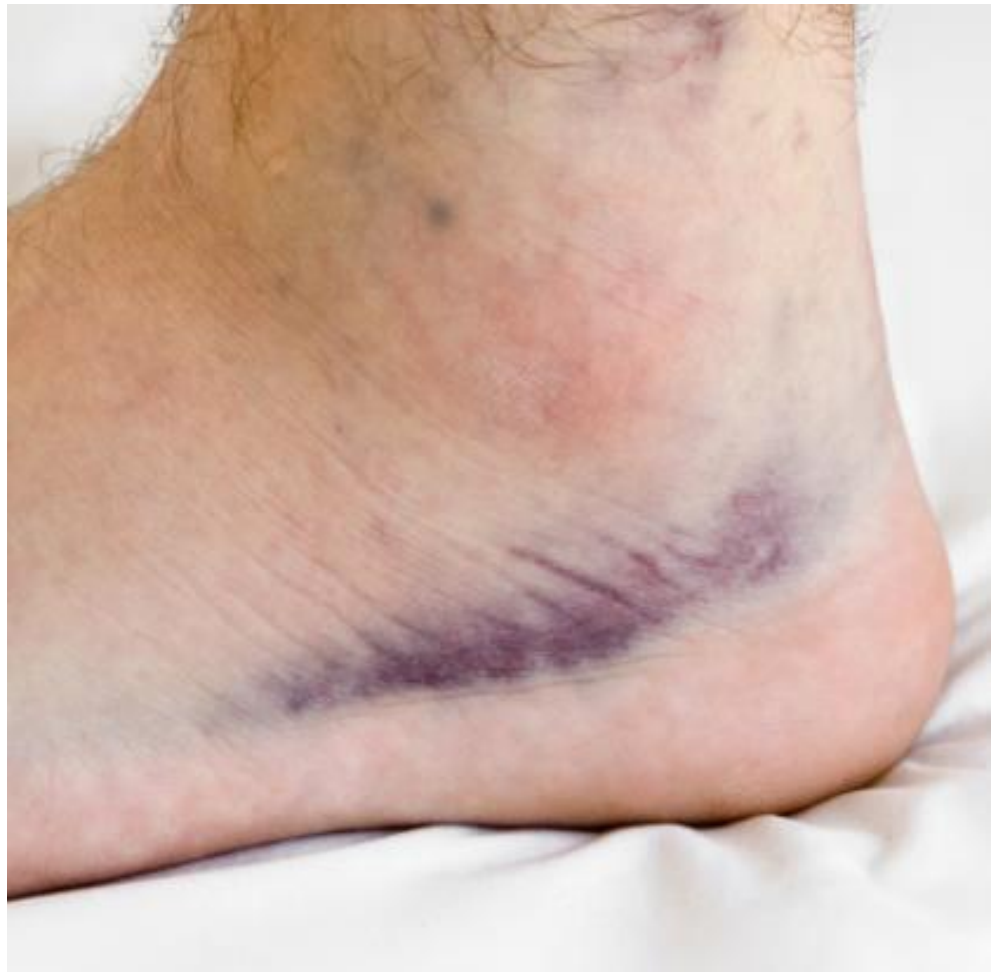
MEDIAL LIGAMENT ANKLE ANATOMY



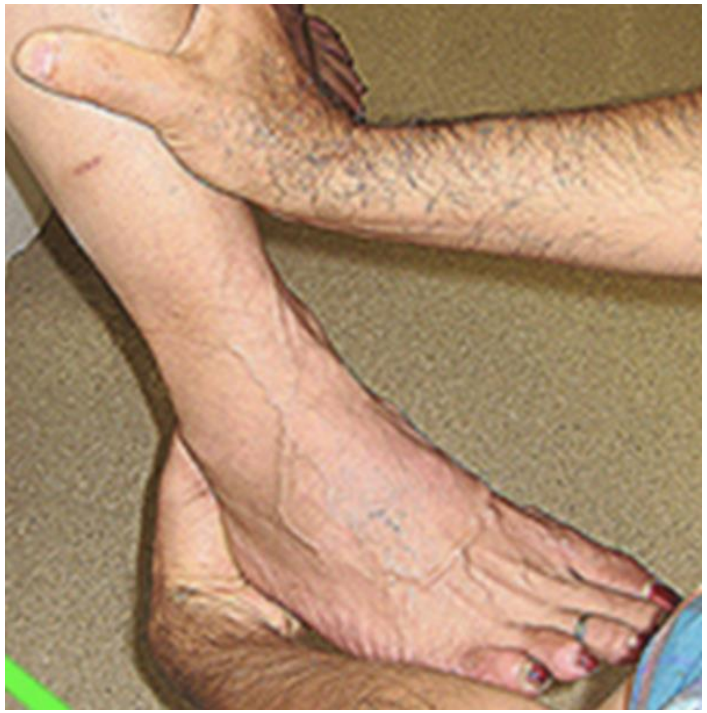
THE "LOW" ANKLE SPRAIN

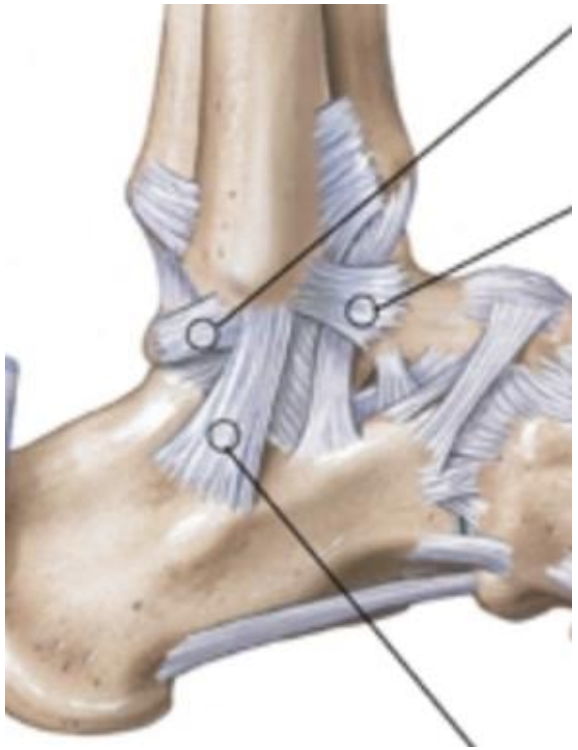
- Most common; > 90% of sprains
- ATFL and CFL
- Look out for
  - OLT
  - Peroneal tendon injury
  - Deltoid injury
  - Anterior process calc Fx's
  - Lateral talus fx's
  - 5th metatarsal fx's



LOW ANKLE SPRAIN

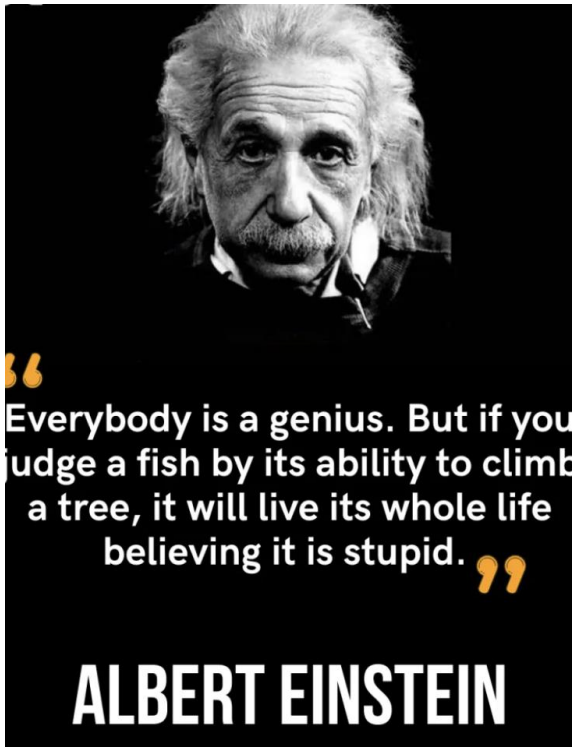
- ATFL most commonly injured
    - PF and Inv
    - Anterior drawer in PF
- CFL 2nd
    - DF and Ever
    - Anterior drawer in DF





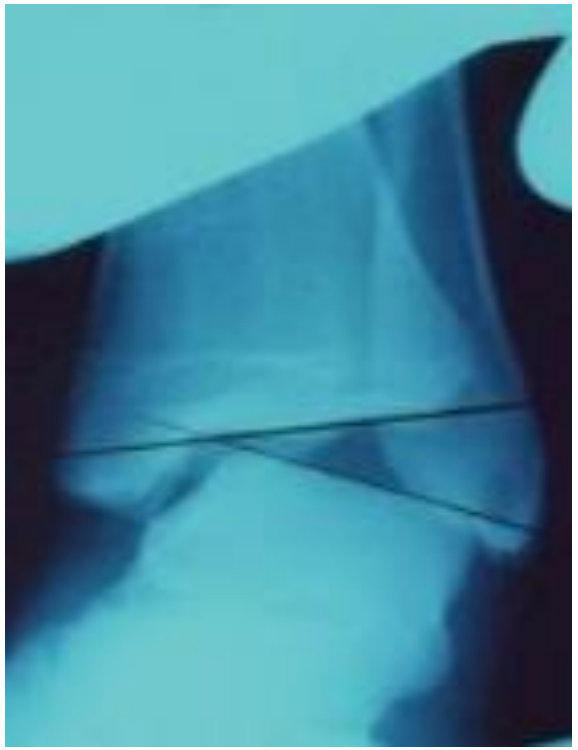
LOW ANKLE SPRAIN: GRADING

- Grade 1
  - Minimal swelling
  - No pain with WB
  - No ligament tear
- Grade 2
  - Moderates welling
  - Mild pain with WB
  - Ligament stretch
- Grade 3
  - Severe swelling and pain
  - Complete ligament tear



LOW ANKLE SPRAIN

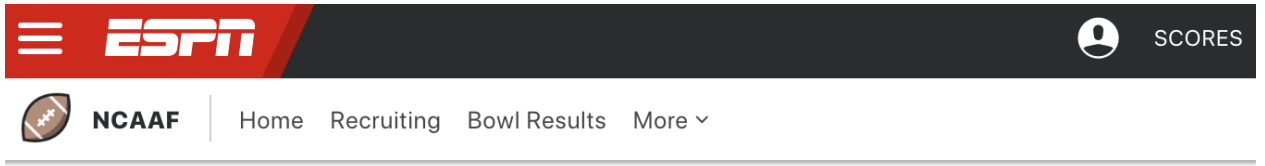
- Physical Exam
  - Pain
  - Swelling
  - Mechanical symptoms
  - Drawer test
- Imaging
  - WB xrays (3 views of ankle)
  - Stress xrays
  - MRI if > 8 weeks (peroneals, OLT)
- Treatment
  - Non-op
  - EARLY WB and functional rehab(CAM boot about 1-2 weeks)



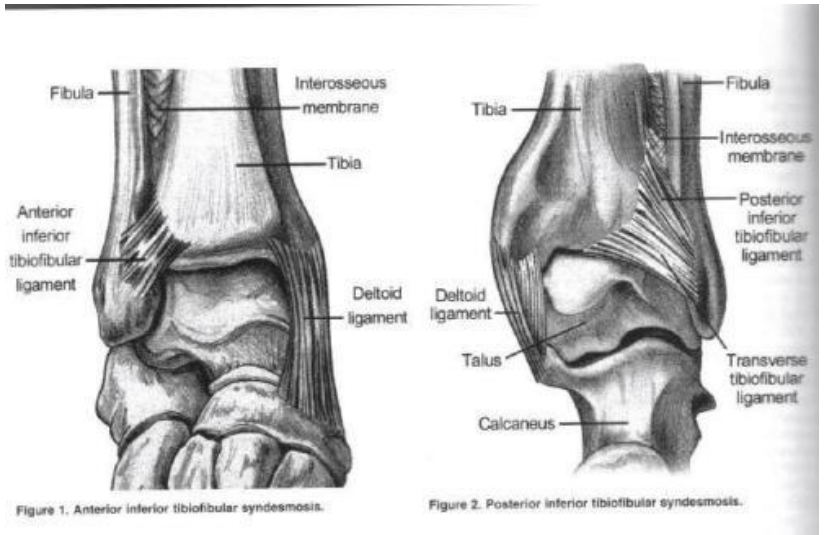
THE HIGH ANKLE SPRAIN

- Syndesmosis
  - Anterior inferior tib/fib ligament
  - Posterior interior tib/fib ligament
  - Transverse ligament
  - Interosseus ligament
  - Interosseus membrane
- Sprain "above" the ankle
- Connection of the tibia and fibula

https://twitter.com/barstoolradio/status/1187055708463869952

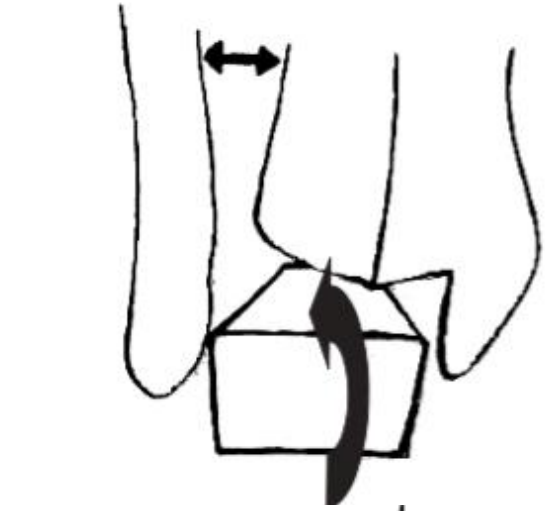


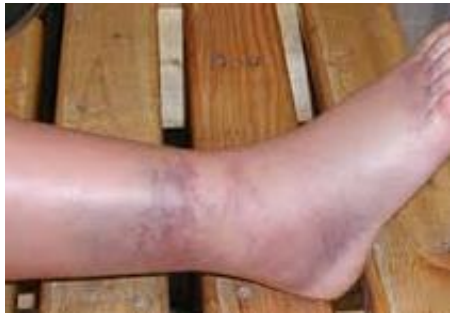
Alabama QB Tua Tagovailoa undergoes surgery for high-ankle sprain



PRESENTATION

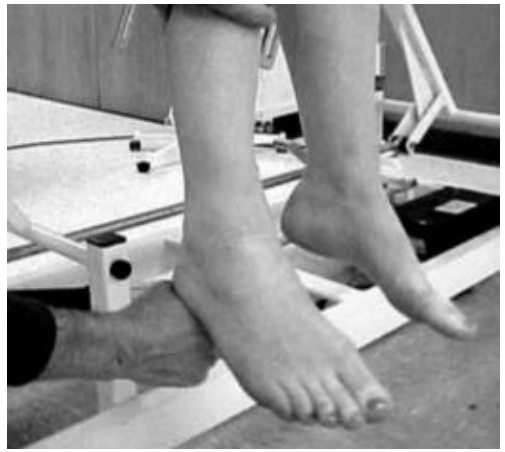
- Twisting or rotational
  - Most commonly ER
- May or may not have a fracture
- May WB
- Pain above ankle
- Don't forget pain at deltoid

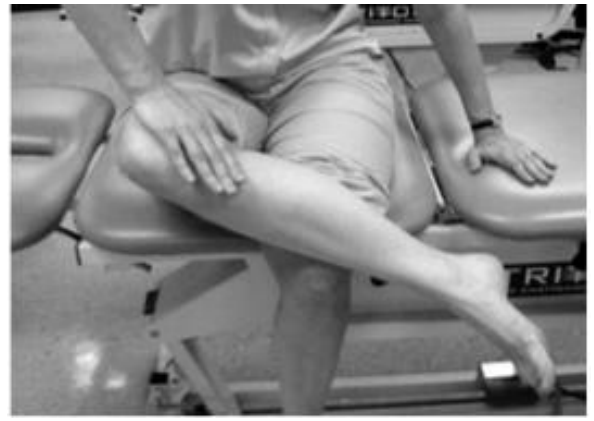




EXAM TOOLS…

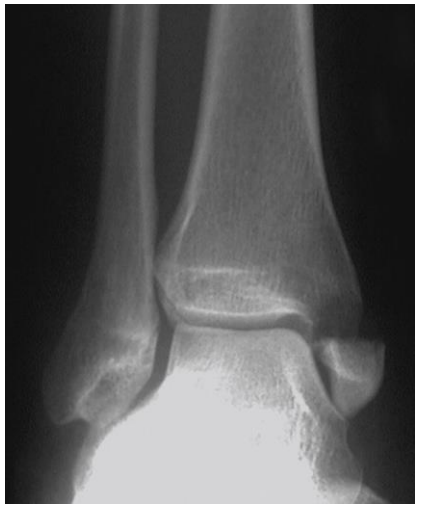
- Squeeze test
- ER stress test
- Syndesmosis palpation
- Heel thump test
- Cross leg test

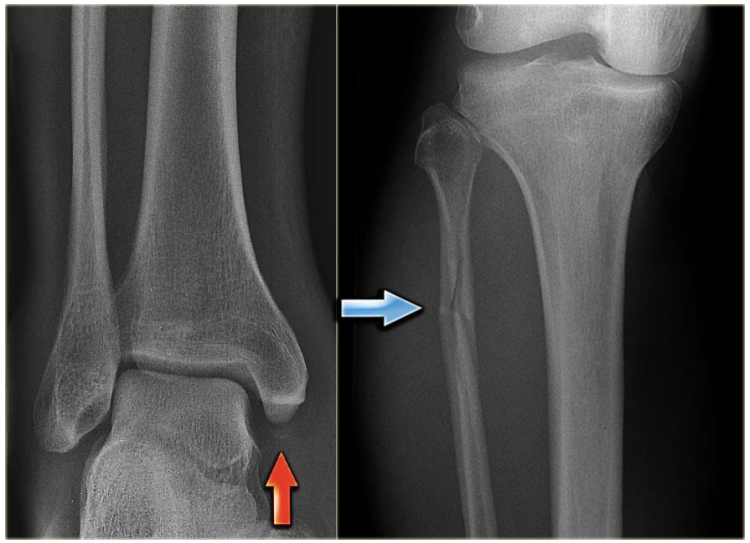


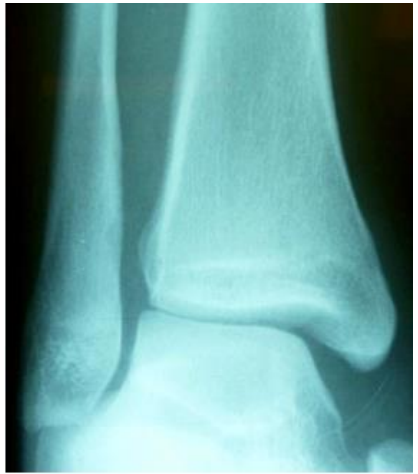


ALWAYS ON YOUR MIND

- Don't forget the tib/fib xray AND 3 views of the ankle
- Beware the isolated medial malleolus fracture
- Beware the isolated posterior malleolus fracture
- Go the distance!!!
  - Measure the distance/space
  - Contralateral xray
  - Stress xray

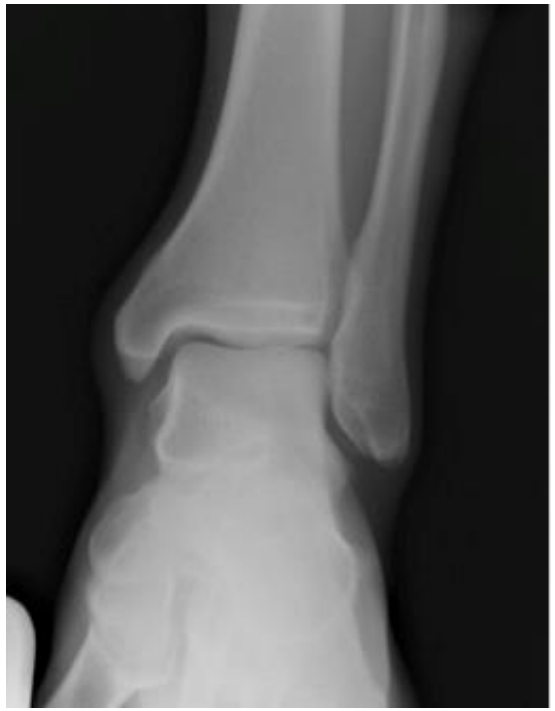


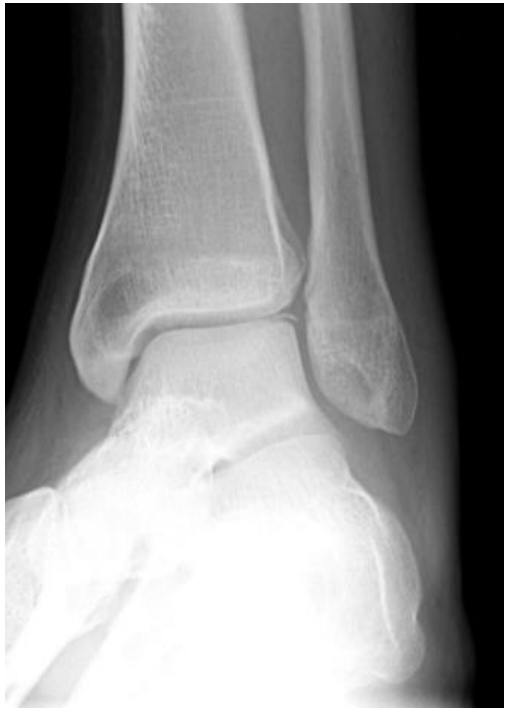


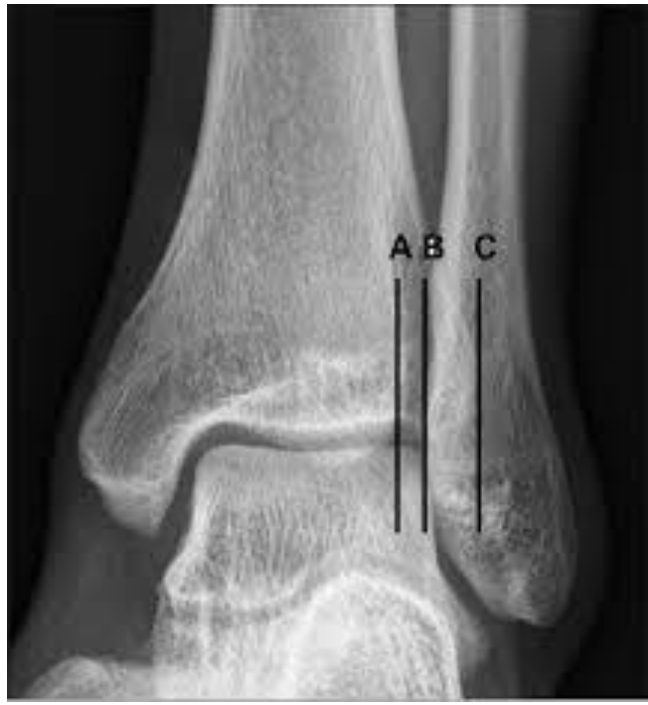


GO THE DISTANCE!

- AP
  - 42%!!!!
- Mortis
  - Tib/fib overlap
    - > 1mm
  - Tib/fib clear space
    - < 5 mm

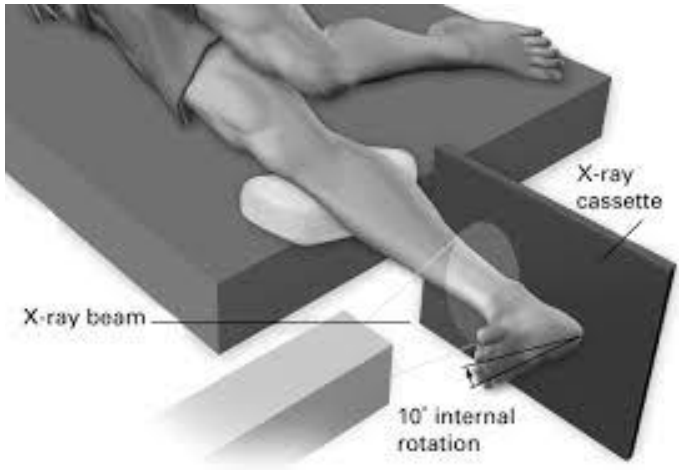


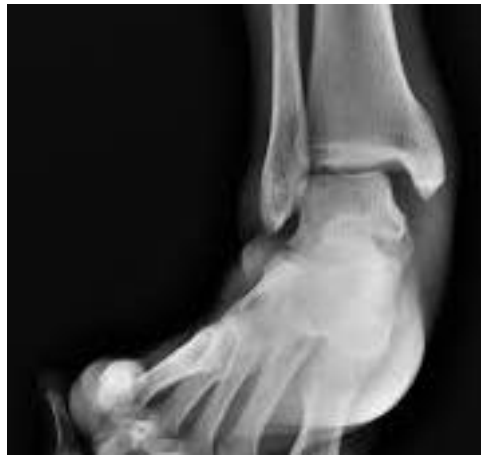


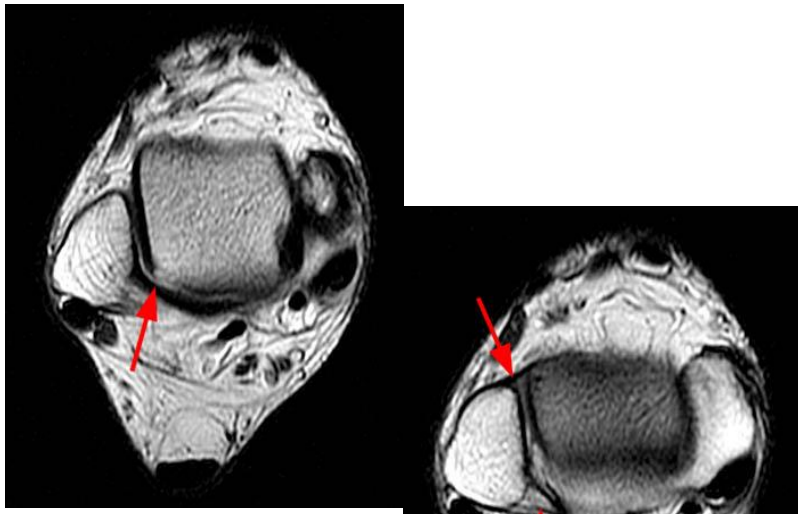


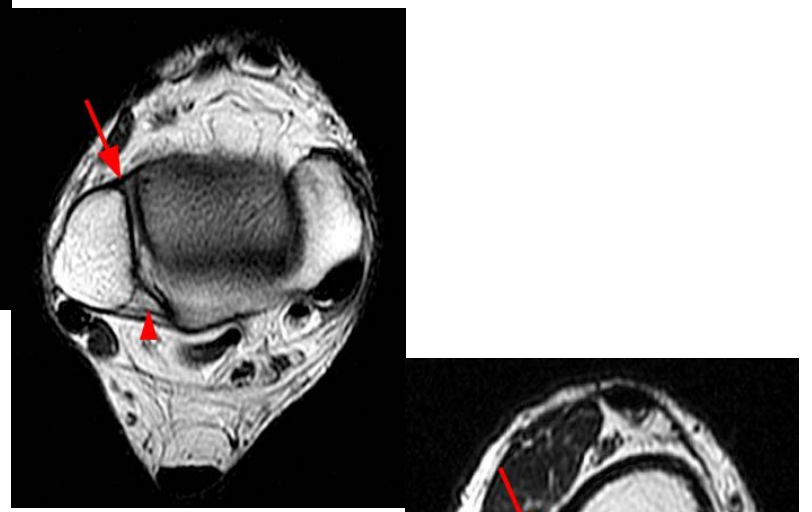
ARE MRI'S THE END ALL BE ALL?

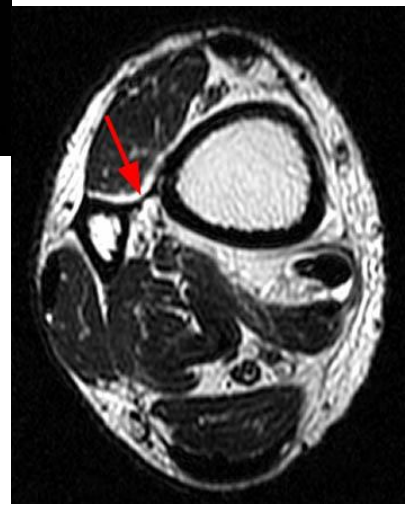
- Consider the mechanism
- Apply to patient
- Correlate exam
- Understand the static limitation
- Convert to a dynamic diagnosis



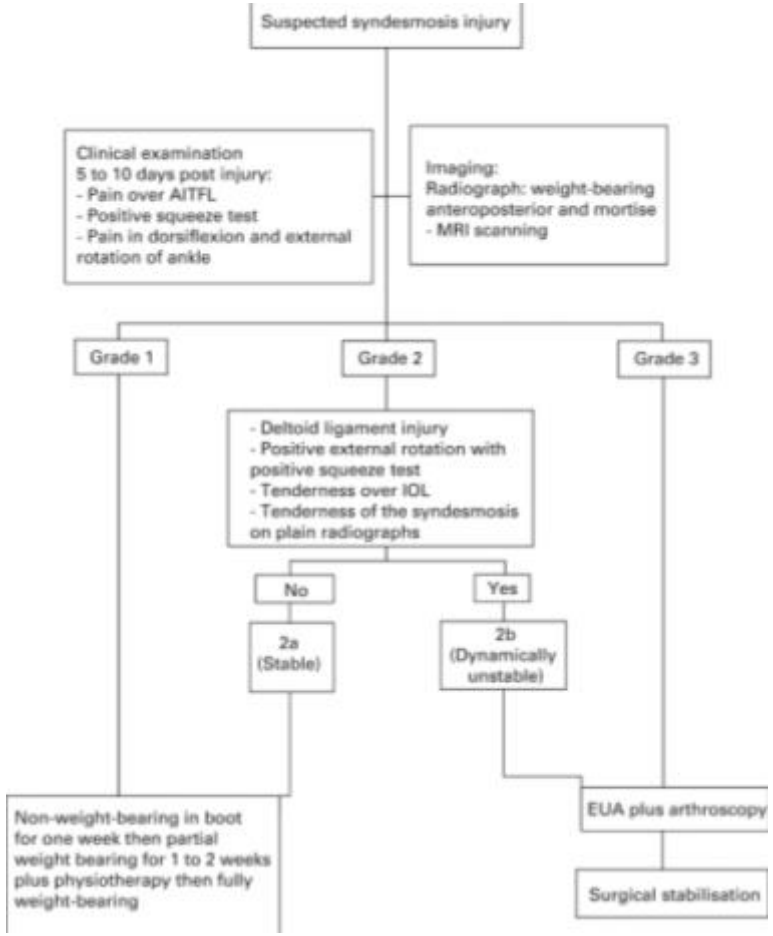






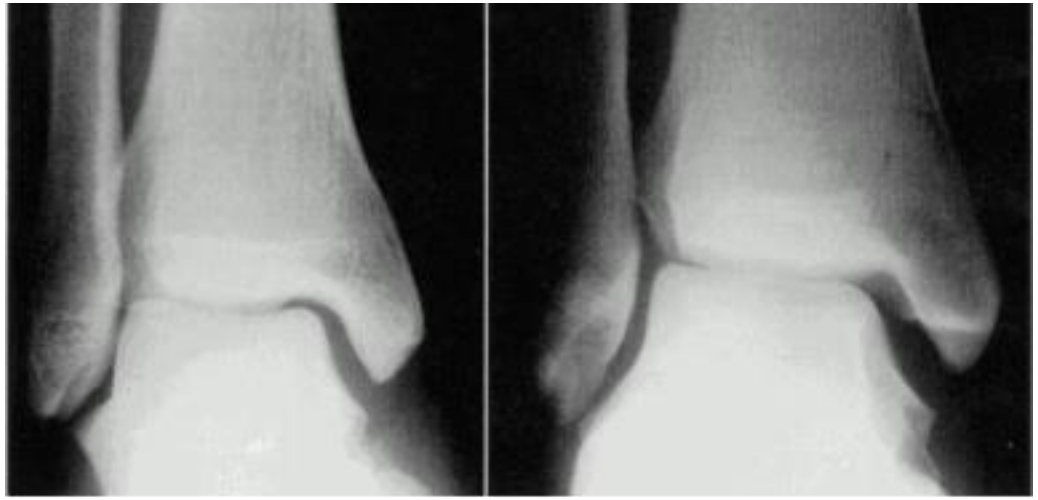


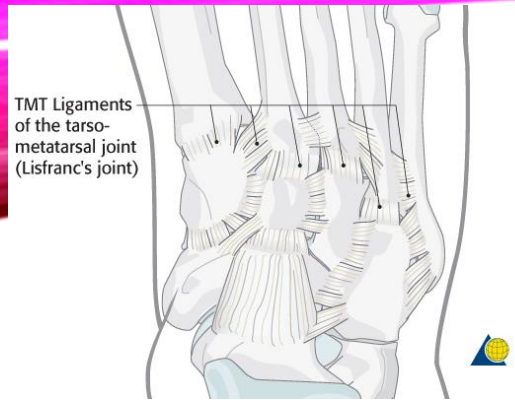
REFERRAL ALGORITHM



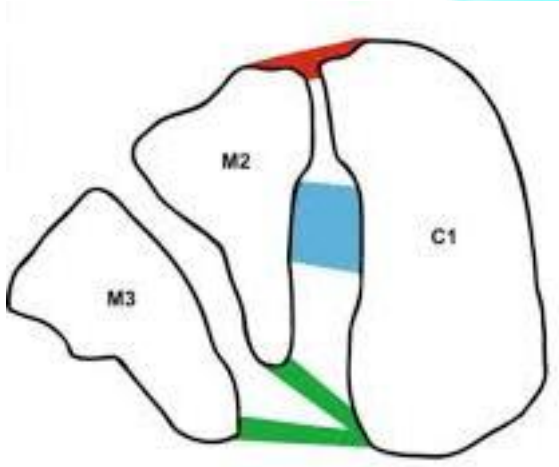
TAKE HOME POINTS

- Always be thinking of it
  - Sometimes not just the low ankle sprain
  - Exam is key
- Don't forget the WB or stress xray
  - Even subtlety
- MRI to assist when needed
- Consult when in doubt

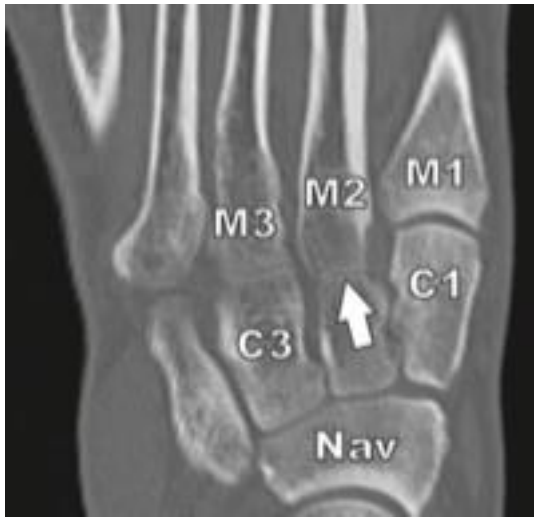


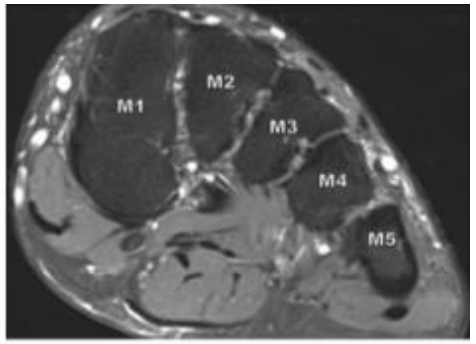


THE LISFRANC



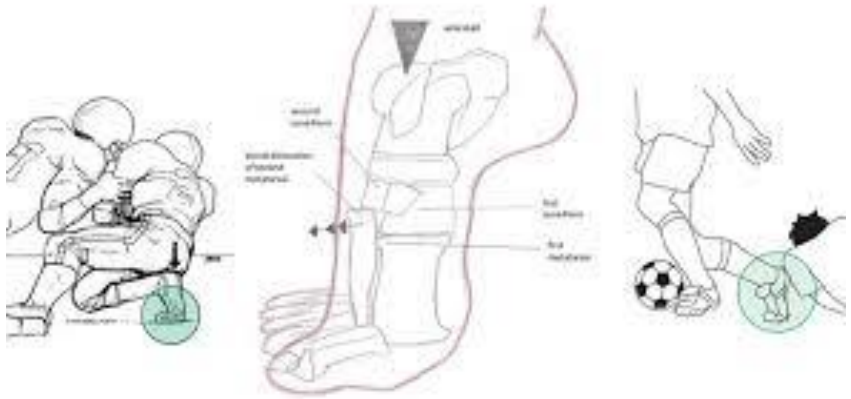
- Jacques de Lisfranc de St Martin-Napoleonic army
- Can be high or low energy
- Beware the low energy
- Keystone critical
- Soft tissue strength/stability
- No connection of first to second metatarsal

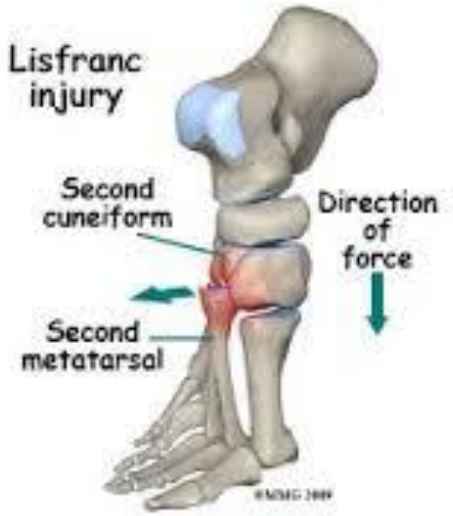


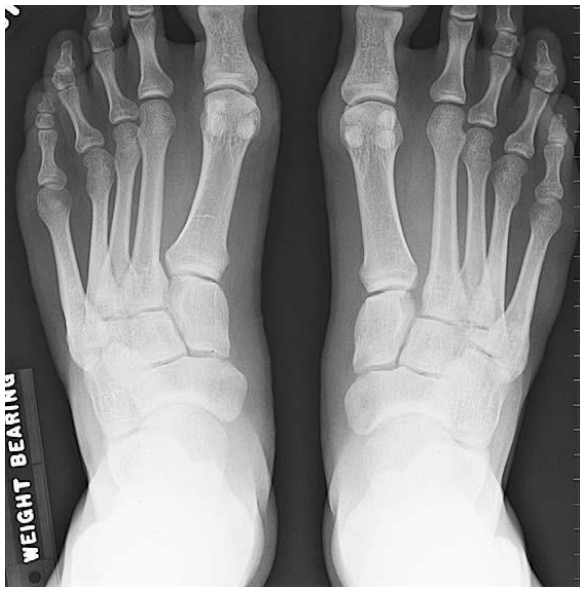


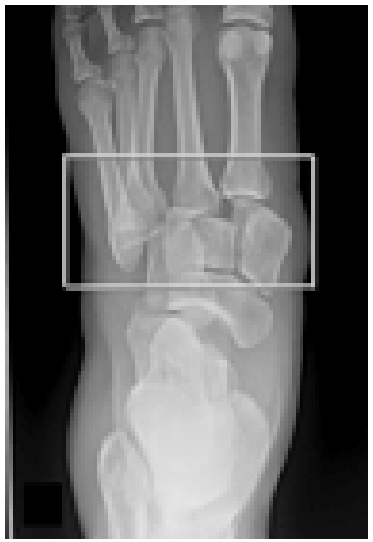
MECHANISM??-EVERYTHING FAIR GAME

- Football and soccer common
- Twist and fall
- Hyperplantarflexed axial load
- Fall from height



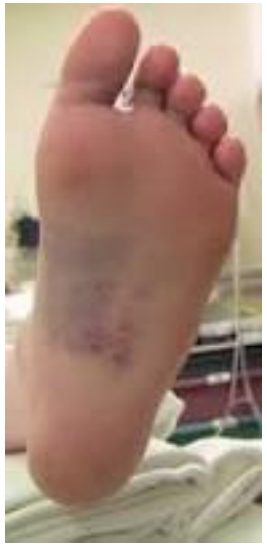


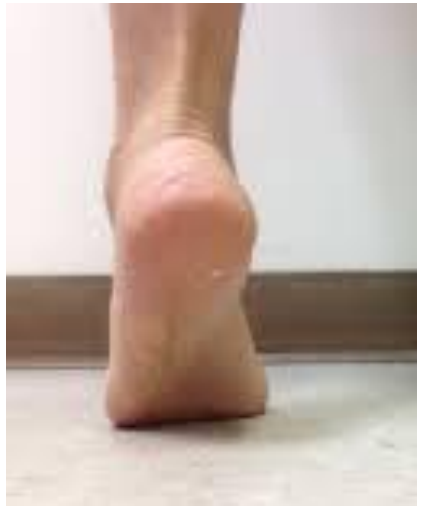


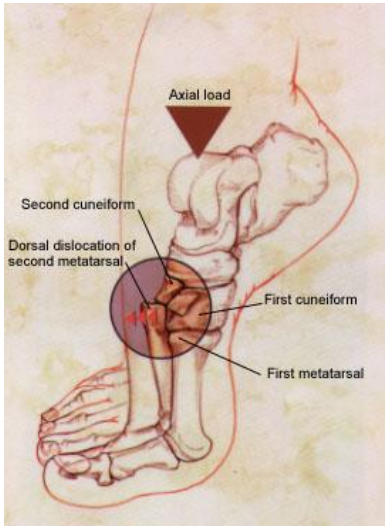


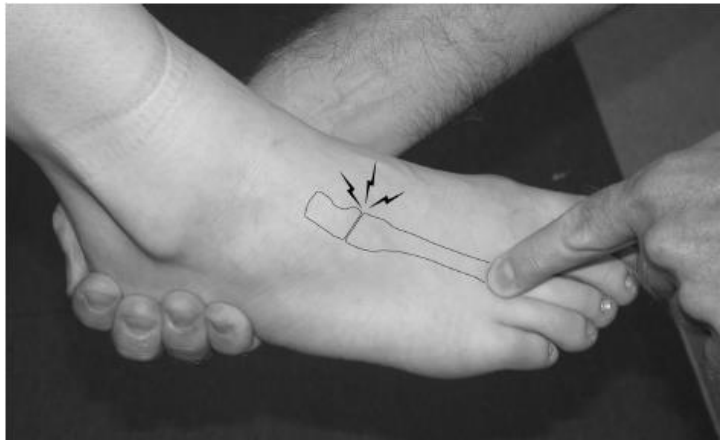
IT WILL OR HAS SEEN YOU!

- Plantar ecchymosis
- Pain with palpation of midfoot
- Abduction pain
- Piano key test
- Single rise
- Fleck sign



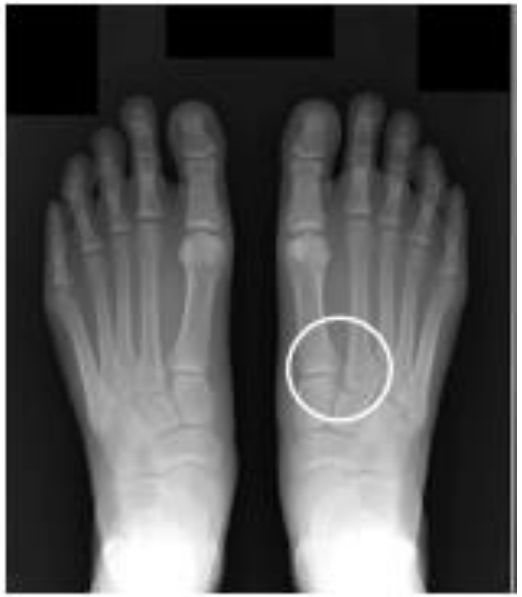


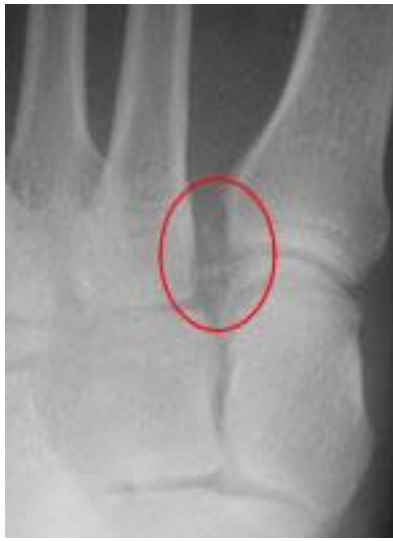


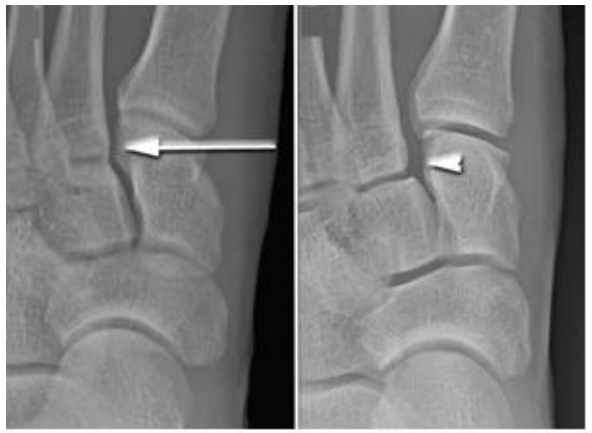


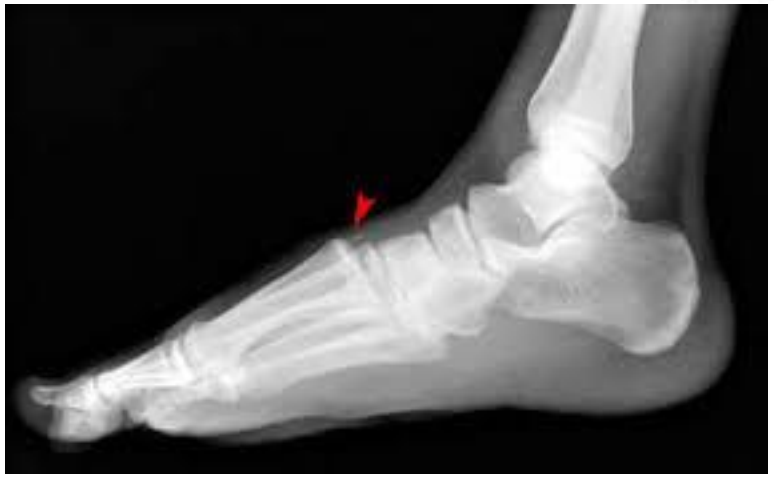
AGAIN… ALWAYS BE THINKING…

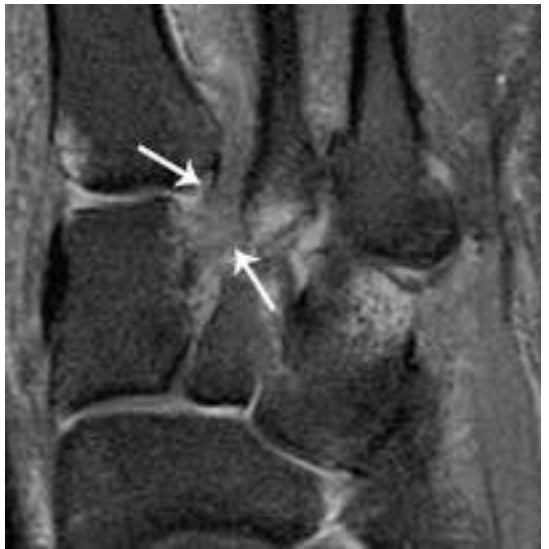
- Get a WEIGHT BEARING xray
- Comparison views WB
- 3 views of the foot
- Fractures that are suspicious=CT
- Normal xrays with suspicious exam=MRI





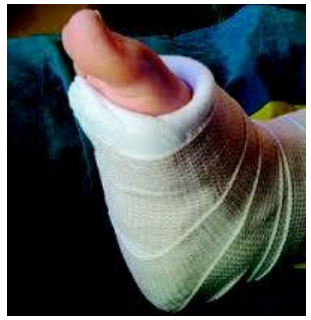






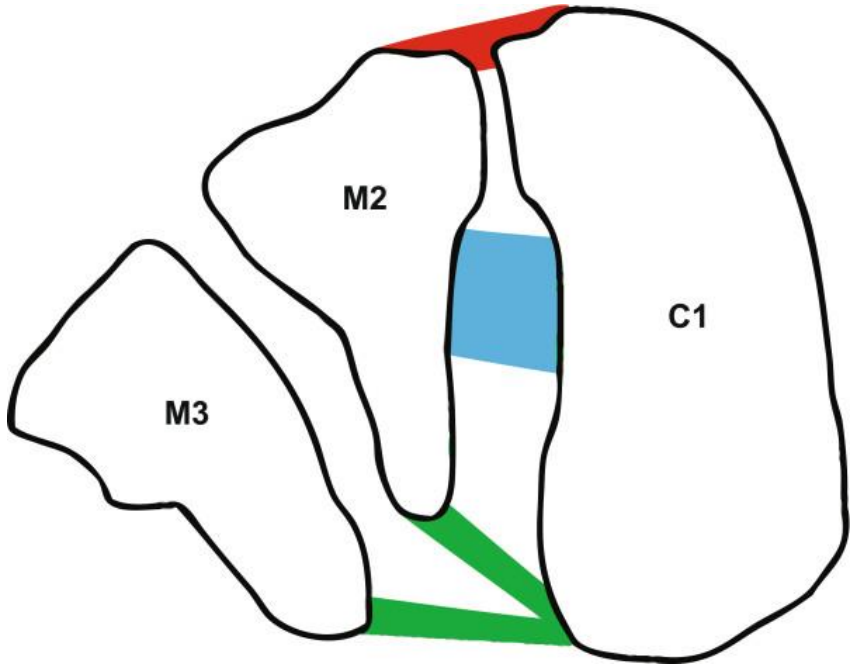
IF DIAGNOSED…

- BIG PAT ON THE BACK
- Keep patient non-weight bearing
- No boot if possible
  - Needs soft tissue rest
  - Elevation



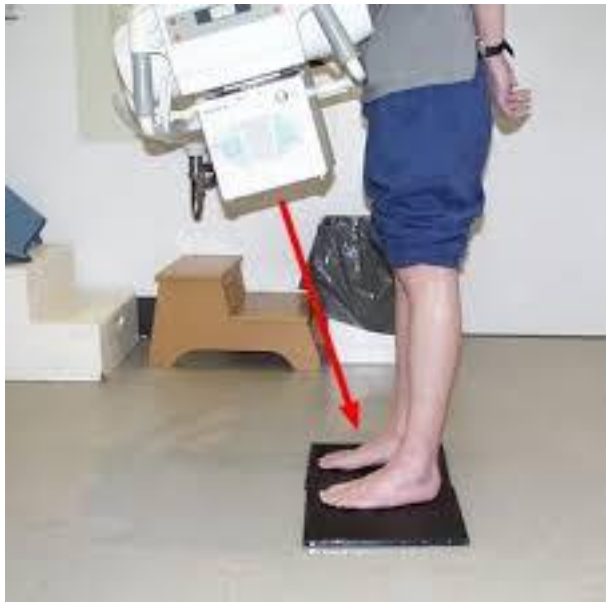
WHAT NOW?

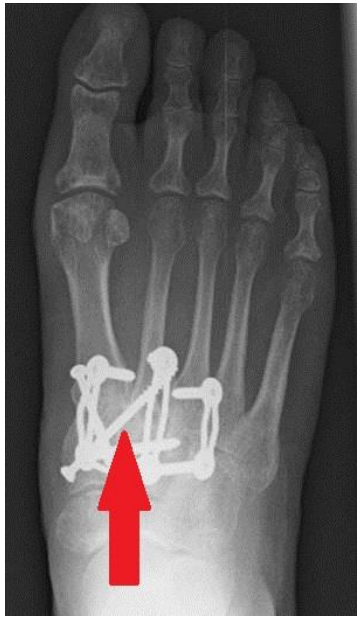
- If wide/instability on Xray ?
  - **Refer** because likely surgery
- No widening + high suspicion?
  - Think about imaging
  - Close f/u and repeat xray
  - Plantar ligament injury = BAD
  - Isolated dorsal ligament injury = BETTER
    - May be conservative
    - NWB for 6- 8 weeks

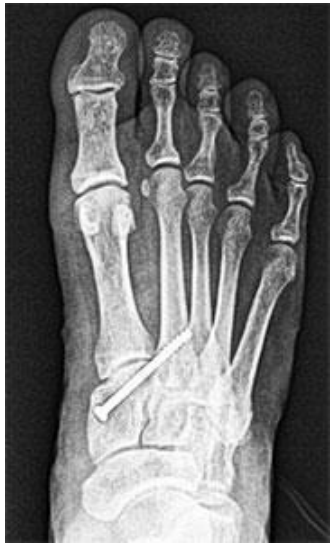


SUMMARY POINTS

- Don't be scared to do the WB xray
- MRI or CT if suspicious
- Keep them NWB until you are sure
- Rest the soft tissues
  - Splint
- Refer with ANY instability



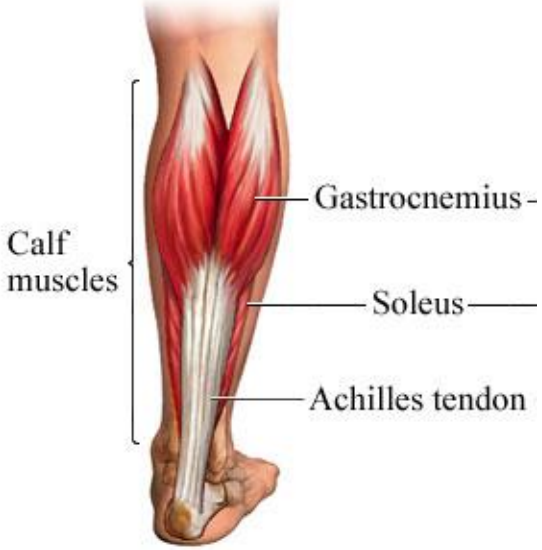


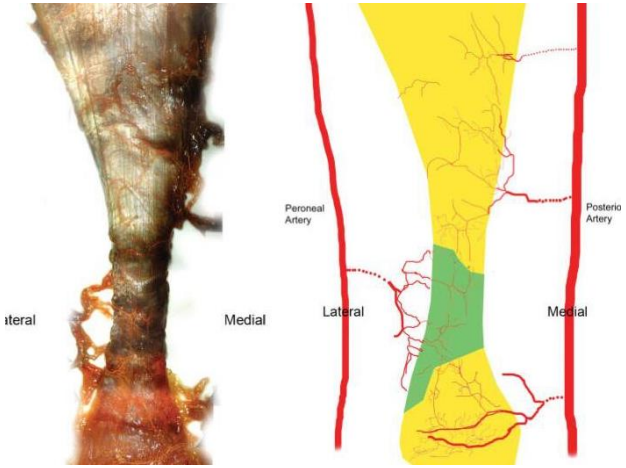


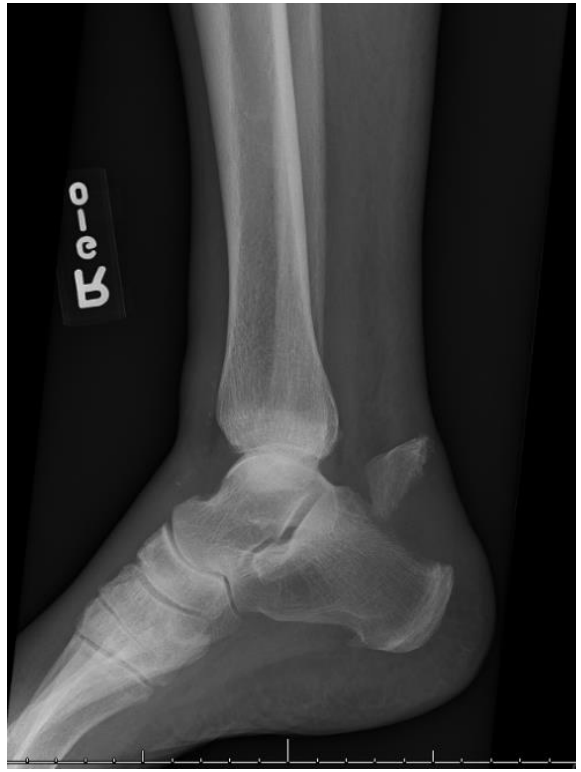
CAN YOU IMAGINE THE FORCE?

ACHILLES RUPTURES

- Largest tendon in the body
- Vulnerable to injury
  - Blood supply
- Gastroc/soleus to calcaneus
- Most common watershed
- Beware the avulsion!!
  - Surgical emergency
- MTJ do better
  - ? More vascular

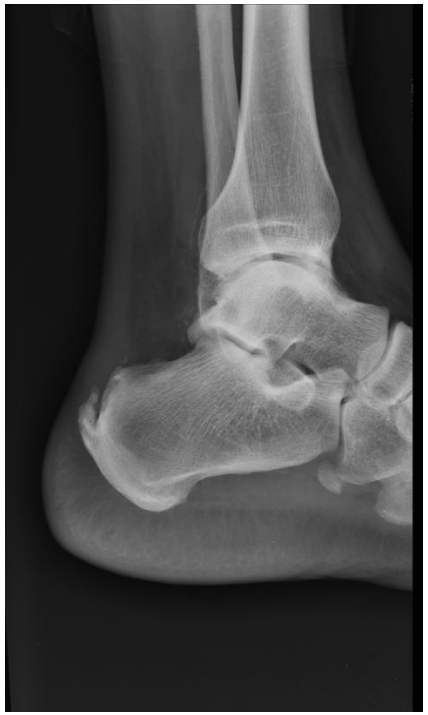






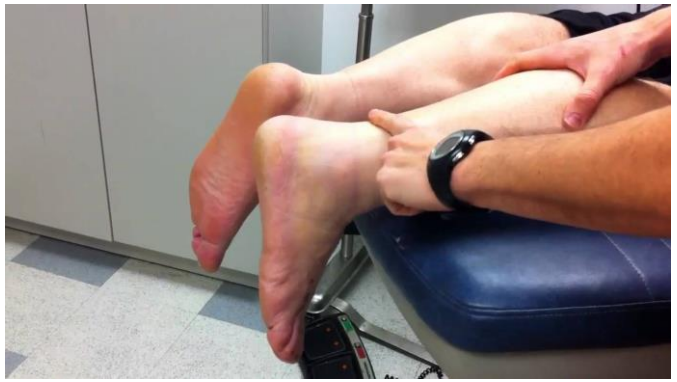
HISTORY HELPS!

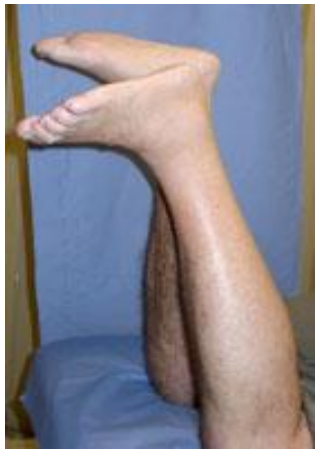
- Injections?
- Antibiotics?-Quinolones
- Pre-existing disease?
- Audible pop-"felt like I was kicked"
- Sometimes can walk
- I was "told it was just a sprain"

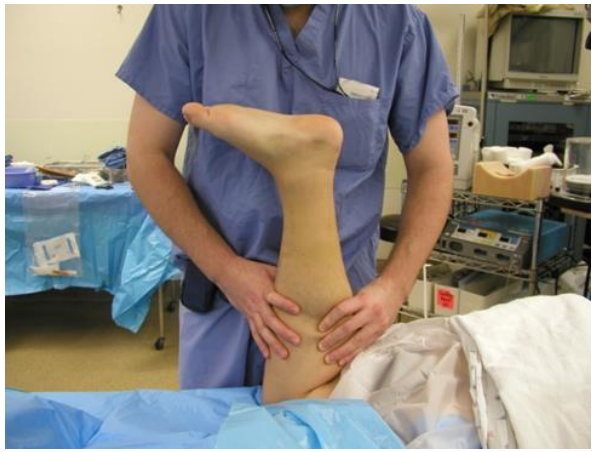


BEST DIAGNOSTIC AIDS(IN MY OPINION)

- Contour
- Palpable defect
- Thompson test
- Matle's Test





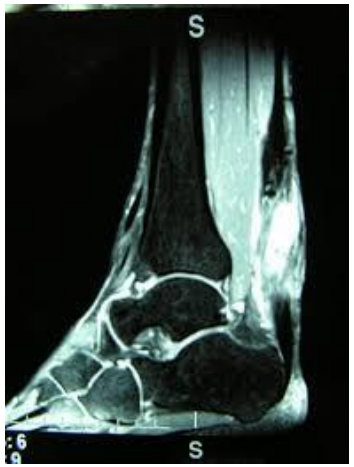


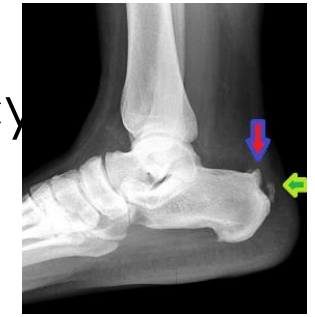
AFTER YOU RECOGNIZE IT…

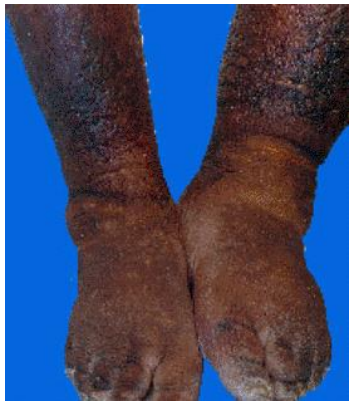
- Forget plantigrade
- **EQUINUS** immobilization or equinus WB
- WEDGE!!!!!!
- MRI only if needed
  - If you do get it, do it STAT!

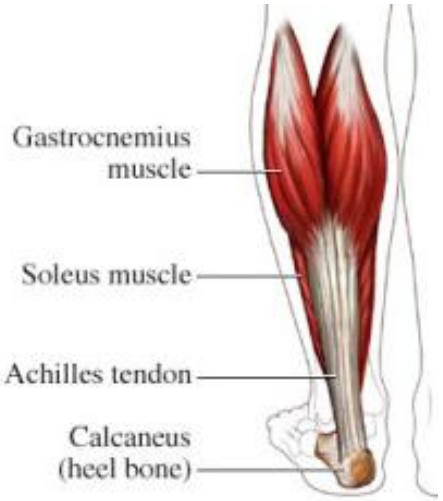
CAN I TREAT THESE?

- YOU SHOULD ALWAYS FEEL COMFORTABLE REFERRING HOWEVER…
- Great evidence suggesting nonop management
  - *** HAVE TO HAVE functional rehab
- Athlete?-referral if in doubt
- Quicker return to sport?-referral
- Comorbid-non-op
- Splinted in PF and want nonop-non-op
- Musculotendinous junction?-non-op
- Insertional?-refer(Beware the emergency
- Diseased tendon?-refer



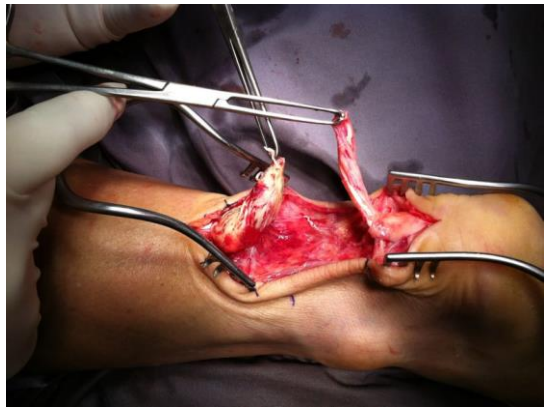


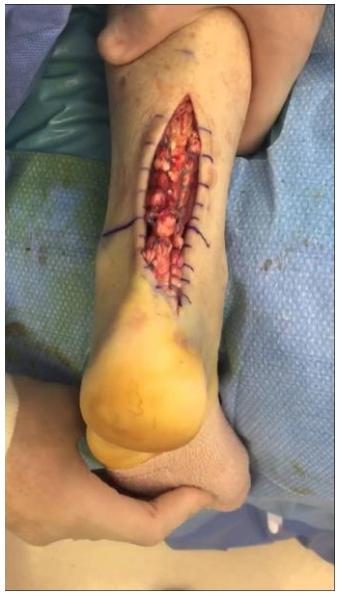


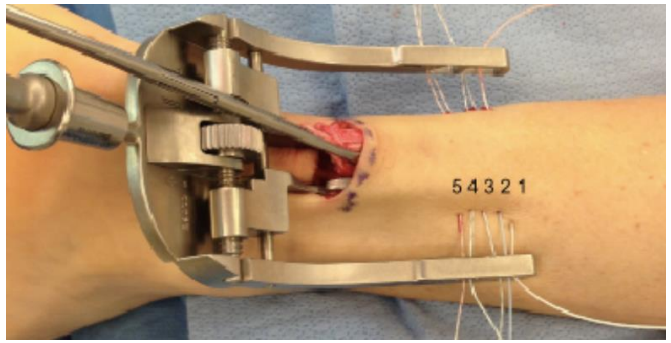


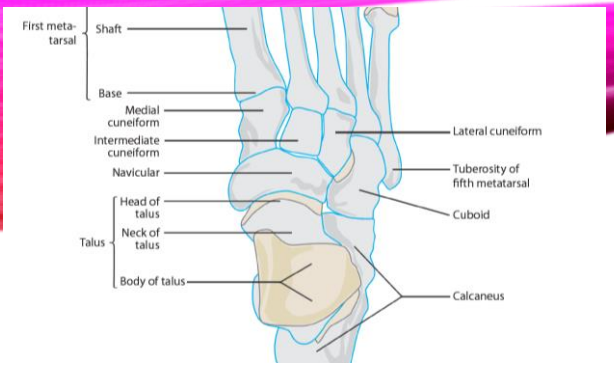
SUMMARY OF THE ACHILLES FACTS

- No harm done if place in plantarflexion
  - May need surgery but won't burn bridge if not
- Don't delay for an MRI-GET IT ASAP if needed
  - Remember your reliable tests!
    - Matle's
    - Thompson
    - Palpate
- Remember good evidence to suggest non-op management



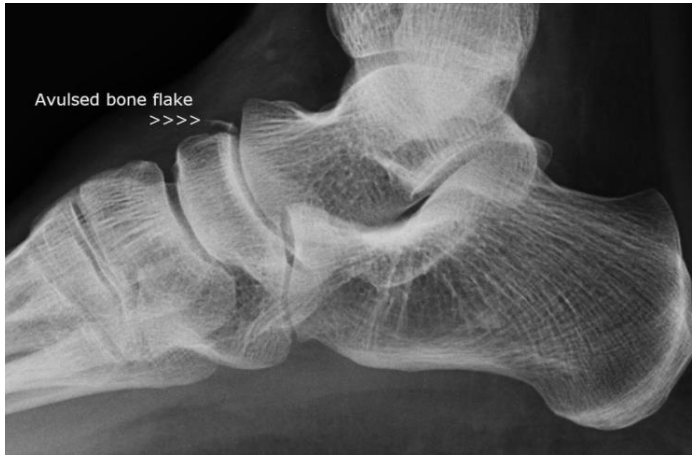




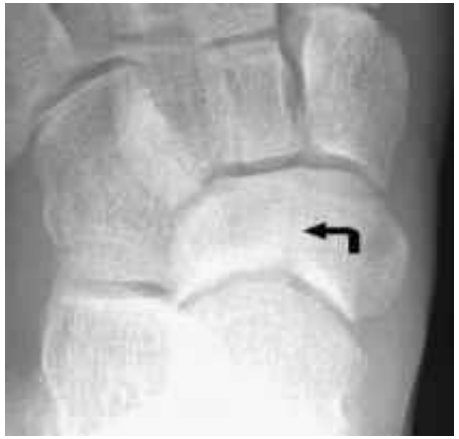


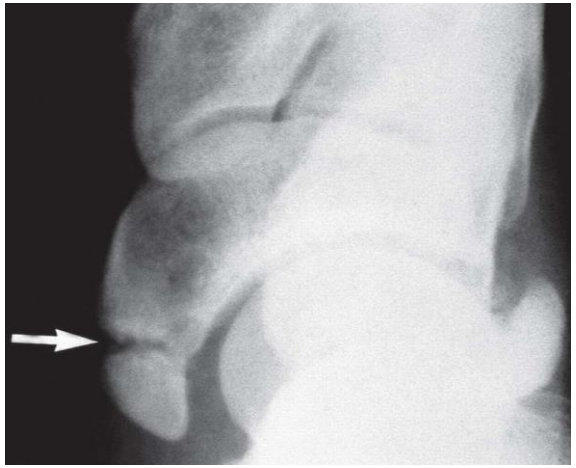
THE LAST "DON'T MISS" INJURY

- **The Tarsal Navicular Fracture**



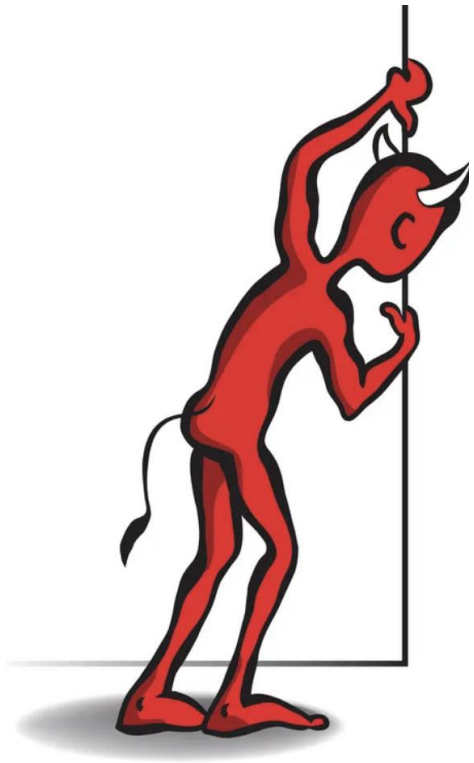
- Traumatic
  - Avulsions-plantarflexion
  - Tuberosity-acute eversion/forced PTT
  - Body-axial load
- Stress Fracture
  - Chronic overuse
  - High risk of AVN
  - Running and baseball

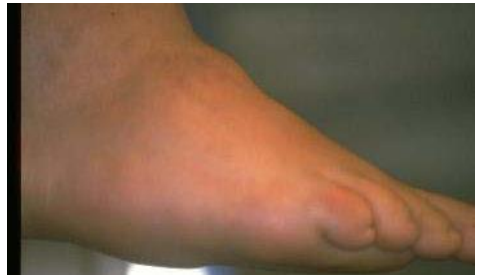


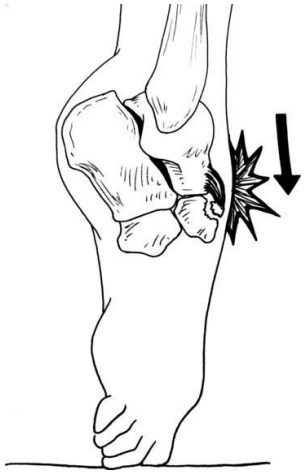


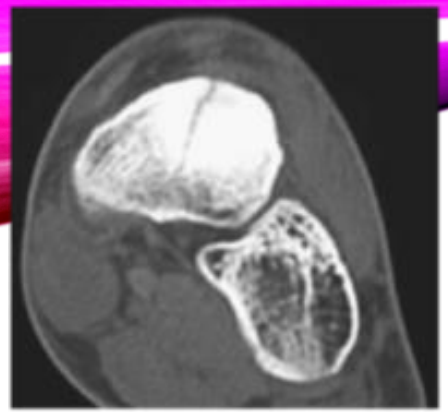
PRESENTATION-LOOK FAMILIAR?

- Beware of vague midfoot pain
- Midfoot swelling
- Usually full motion
- Take time with the history



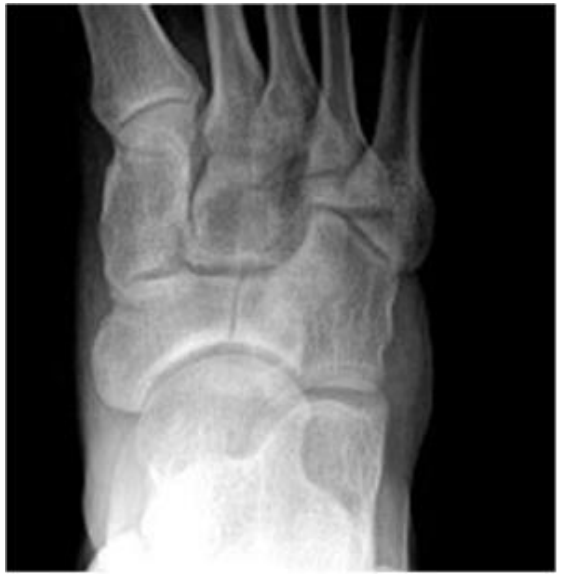


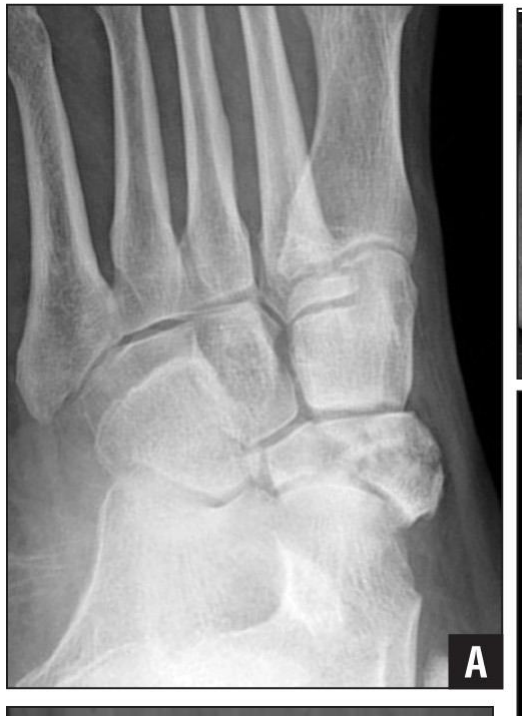


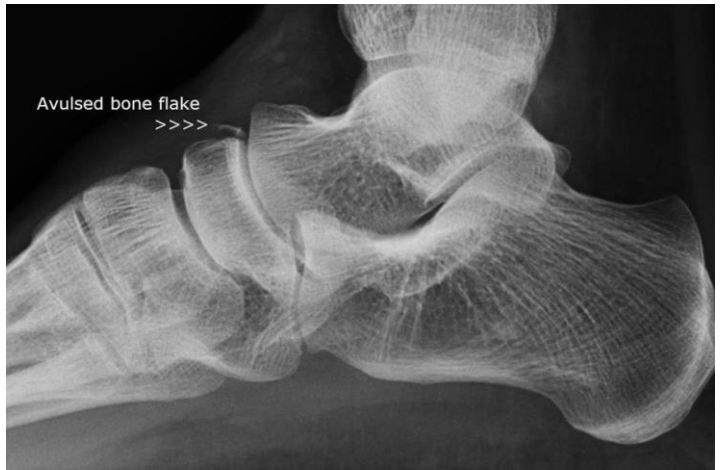


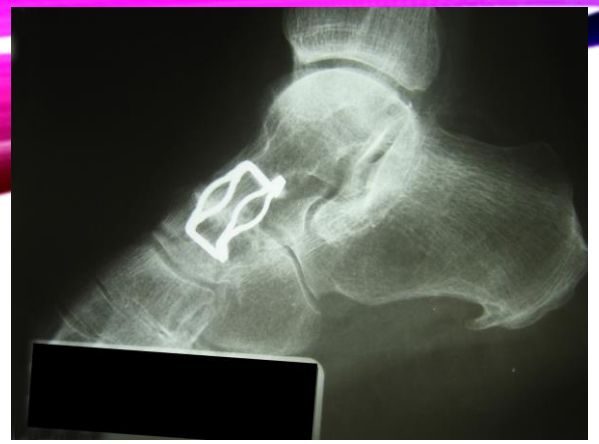
NEED IMAGING

- Often MISSED!
- Look at ALL views
  - Avulsions on lateral
  - Tuberosity on oblique
- CT-Get anytime you have a suspicion!!!!
- MRI-will show edema or stress reaction



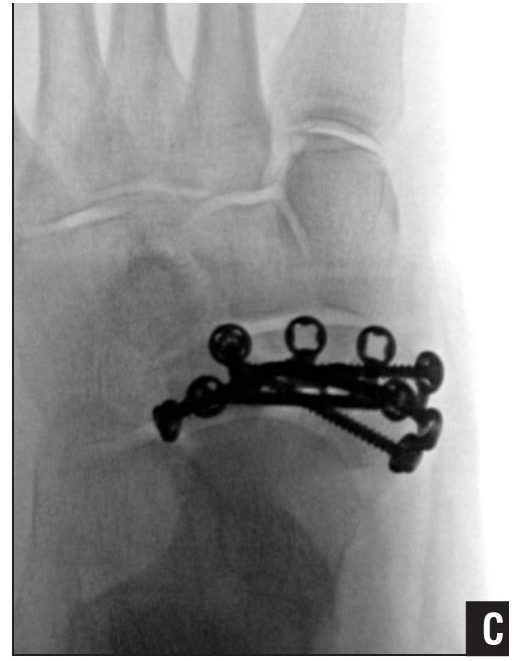






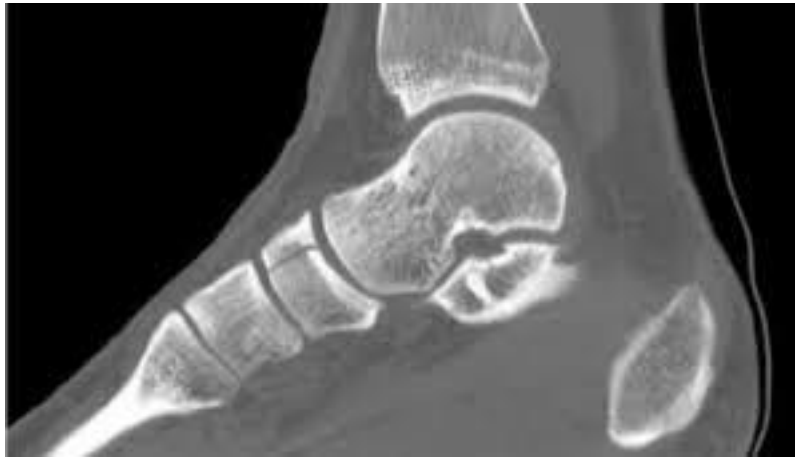
TREATMENT

- STRICT NWB
  - Any initial stress fx(unless pro athlete)-6-8 weeks
  - Acute avulsion
  - Most tuberosity
  - Nondisplaced and minimally displaced body fx's
- Fragment excision
  - Avulsions that fail to improve
  - Nonunion of tuberosity
- ORIF
  - Avulsions with > 25% articular surface
  - Tuberosity > 5 mm distraction
  - Displaced body fx's
- ORIF/fusion
  - Significant comminution and non-salvageable joint



THE NAVICULAR FRACTURE- SUMMARY

- Have high suspicion
- Don't hesitate to get advanced imaging
- If suspicious, make then NON weight bearing ASAP



THE END:
THANK YOU!