ON THE ROAD AGAIN

Recognition and management of common orthopedic injuries of the foot and ankle.

ZACK LERNER, DNP, APRN

Functional Dry Needling

Husband to Krista

DNP University of Kansas 2021

Father (Max 7, Mia 4, Avi 2)

Pets Murphy (Musky) 10, Millie (Great Dane) 9

Orthopedics:

7 years 1st assist with total joints, trauma, sports injury.

Pain Management “chronic non-operative orthopedics”:

6 years pharmacological and interventional

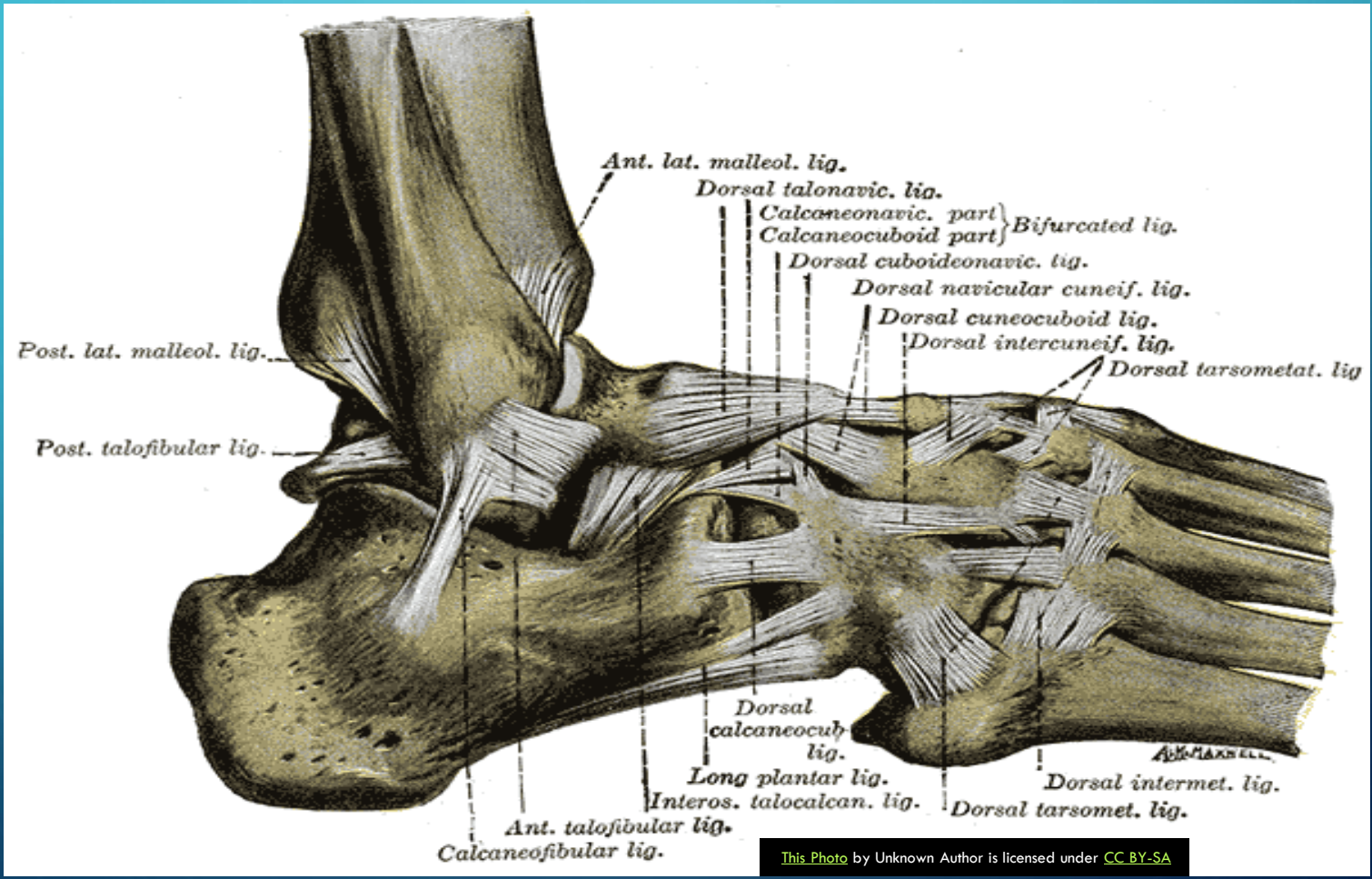
DISCLOSURES

I have no personal, financial or commercial relationships or messages to disclose. All relevant financial relationships have been mitigated.

OBJECTIVES

- Demonstrate a basic ankle exam
- Briefly explain proprioception and describe its importance for ankle recovery/rehab
- Compare and contrast the difference between treatments in stable vs. unstable ankle injury (syndesmosis, distal fibula fracture, etc.).
- Describe 2 treatments for a 5th metatarsal fracture based on a specific zone.

THE FOOT



THE ANKLE

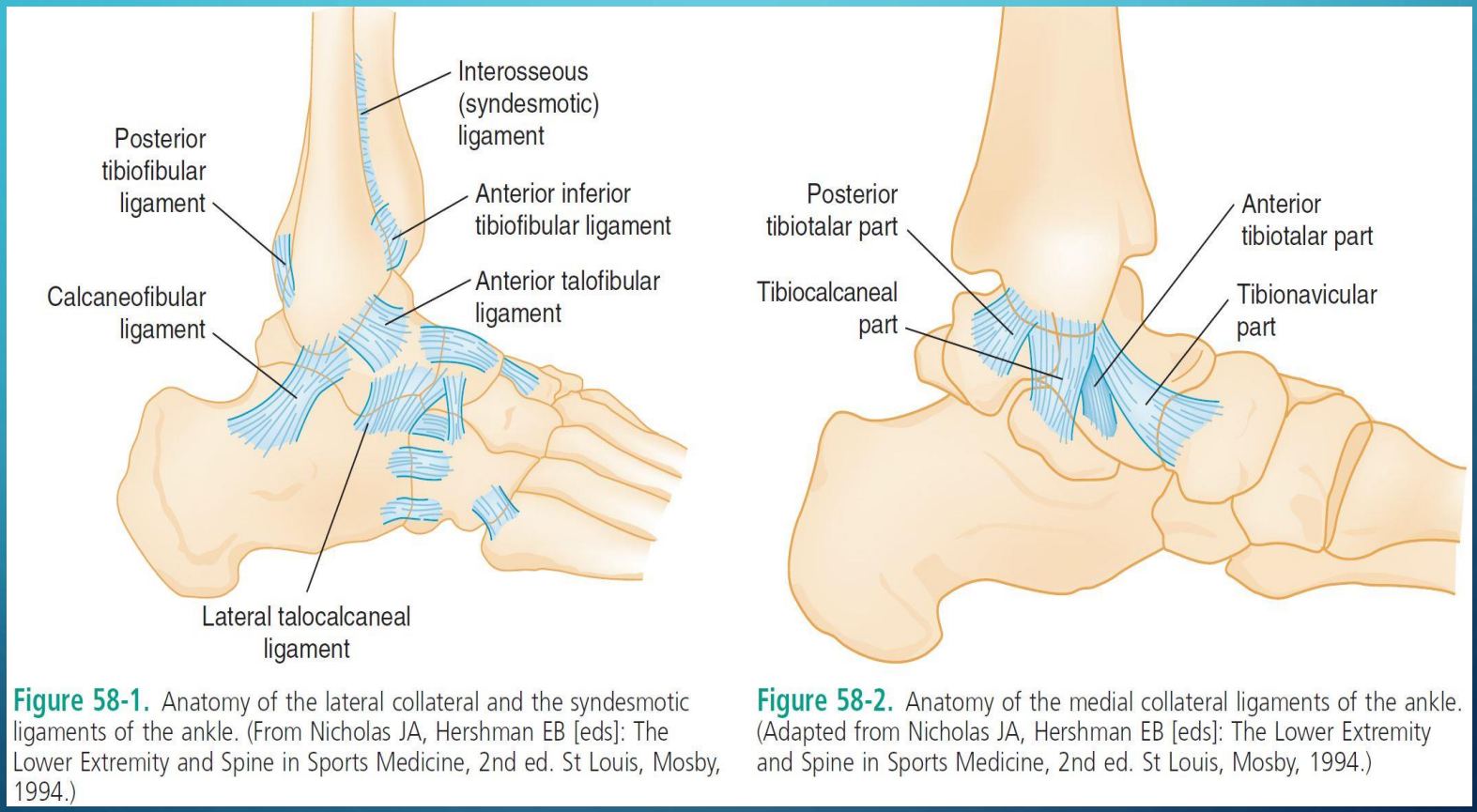


Figure 58-1. Anatomy of the lateral collateral and the syndesmotic ligaments of the ankle. (From Nicholas JA, Hershman EB [eds]: The Lower Extremity and Spine in Sports Medicine, 2nd ed. St Louis, Mosby, 1994.)

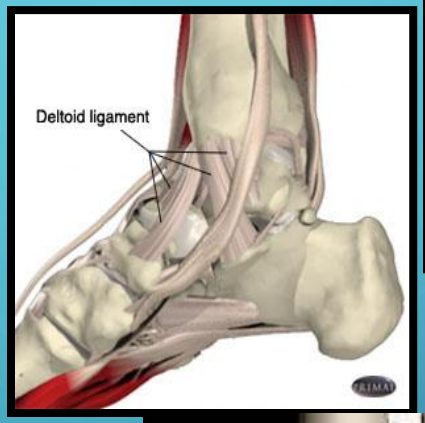
Figure 58-2. Anatomy of the medial collateral ligaments of the ankle. (Adapted from Nicholas JA, Hershman EB [eds]: The Lower Extremity and Spine in Sports Medicine, 2nd ed. St Louis, Mosby, 1994.)

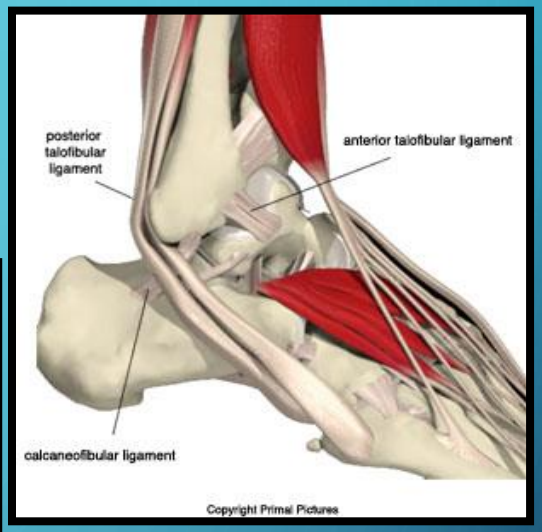
EPIDEMIOLOGY

- >2 million ankle sprains every year in US
- 40-45% of sports injuries are ankle injuries
- 85% inversion sprains (rolling the ankle)

ANATOMY

- Lateral ligaments
  - ATFL
  - CFL
  - PTFL
- Medial ligaments
  - Deltoid
- Syndesmosis
  - AITFL, PITFL, transverse, interosseous membrane



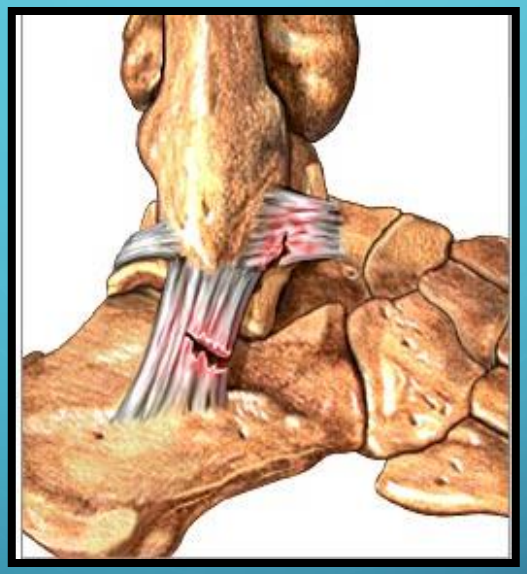


NORMAL ANKLE ROM AND SPECIAL TESTS

- ROM
  - Plantar flexion: 30-50
  - Dorsiflexion: 20-30
  - Supination (inversion): 45-60
  - Pronation (eversion): 15-30
- Special tests
  - Squeeze test: fracture or high ankle sprain
  - Ankle drawer test: ligamentous instability
  - Transverse drawer test: ligamentous instability
  - Thompson: Achilles tendon

CLASSIFICATION

Grade I



Grade II

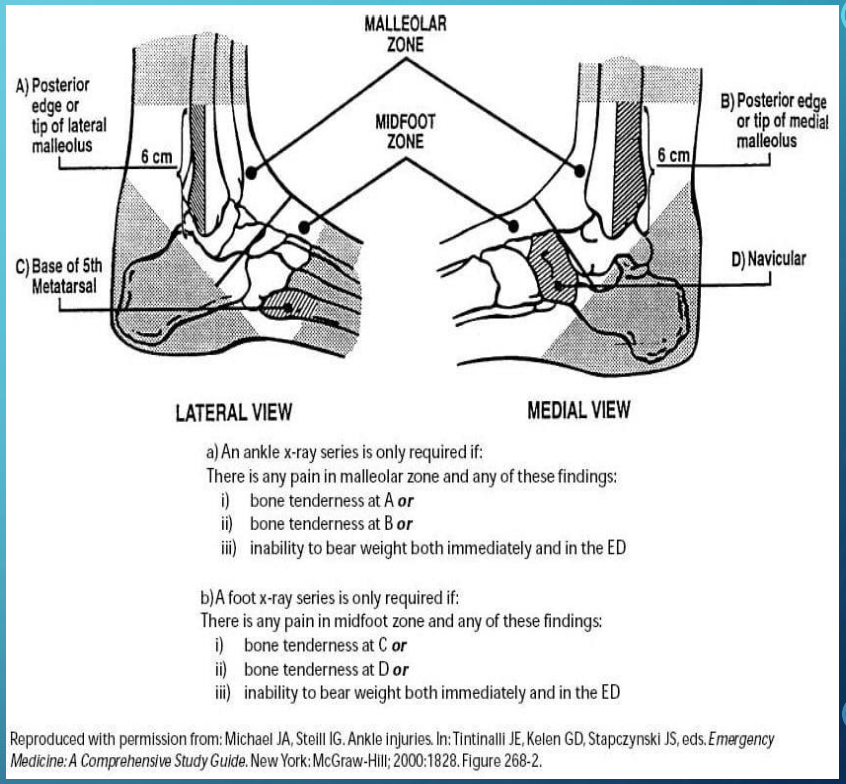
Grade III

INITIAL EVALUATION

- Palpate the ankle and the foot!
  - Bones
  - Ligaments
  - Tendons
- Gentle ROM testing
- X-rays ankle +/- foot
  - Can’t walk
  - Suspicious tenderness
  - If you’re in Ortho

OTTAWA RULES

- X-ray indicated if:
  - Bony Tenderness
  - Unable to walk at time of injury, then at evaluation (four steps)
- If in doubt, have patient f/u in 5-10 days
- "Beware of the unreliable patient"



INITIAL TREATMENT

- RICE
  - Rest, Ice, Compression, Elevation
  - New RICE studies
- NWB vs WBAT
  - Unstable fracture
  - Unstable Sprain
- Ankle supports
  - Lace up
  - Air Cast
  - Walking boot
- Functional Rehabilitation
  - ALWAYS if non-surgical and stable

PROGNOSIS

- Grade I: 8 days, Grade II: >2 weeks, Grade III: >6 weeks
- 40% of ankle sprains will have symptoms for at least **6 months**

- 15-30% will have persistent ankle symptoms
  - 19% recurrent inversion sprains
  - 4% experience pain at rest
  - About 99% treated non-op

ANKLE INSTABILITY

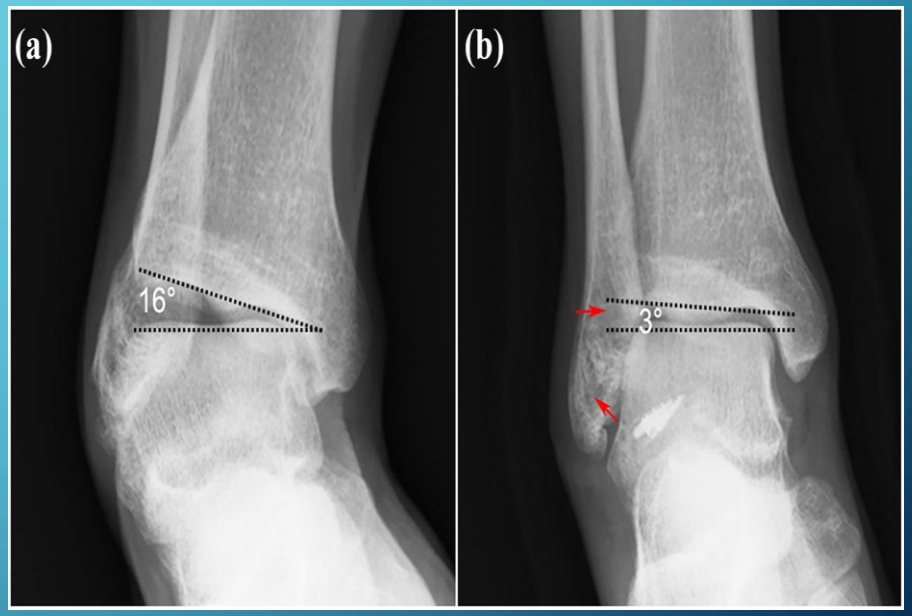
- **Mechanical**
  - Ligamentous failure
  - Frequent inversion sprains, even on even surface
  - Long term consequences to ankle joint
- **Functional**
  - Subjective sense of "ankle giving out"
  - Diminished proprioception of the ankle. (Body preparing for movement)

ANKLE INSTABILITY

- **Anterior Drawer**
  - Perform with ankle @ 10° Plantar flexion
  - > 8mm forward shift(> 3mm to contralateral side)

ANKLE INSTABILITY

- **Talar Tilt**
  - Perform with ankle @ 10° Plantar flexion
  - > 9° tilt (twice the angle of the contralateral side)



ANKLE INSTABILITY

- **Treatment**
  - PT
    - Most important
  - Bracing
  - Shoewear mod/orthosis
    - Somewhat controversial in the field
  - Surgery
    - Ligament repair
    - Tendon reconstruction
      - Last resort

SYNDESMOTIC INJURY

- “High ankle sprain”
- External rotation injury
- Squeeze & external rotation test
- Stable:
  - rest, PT
  - Recovery 2x longer
- Unstable: surgery

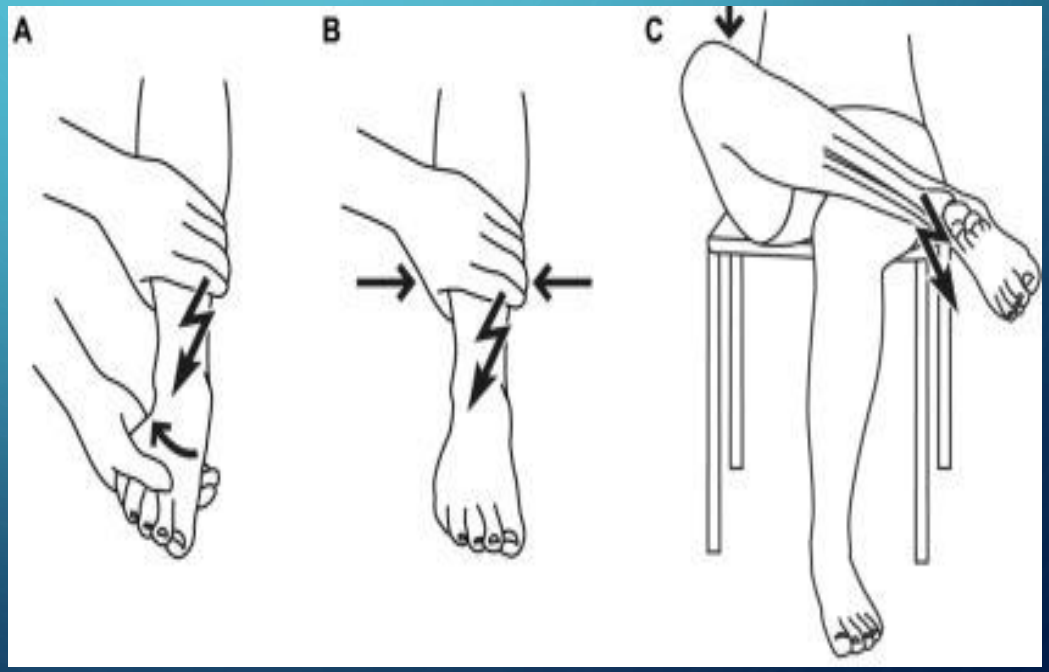
PHYSICAL EXAM

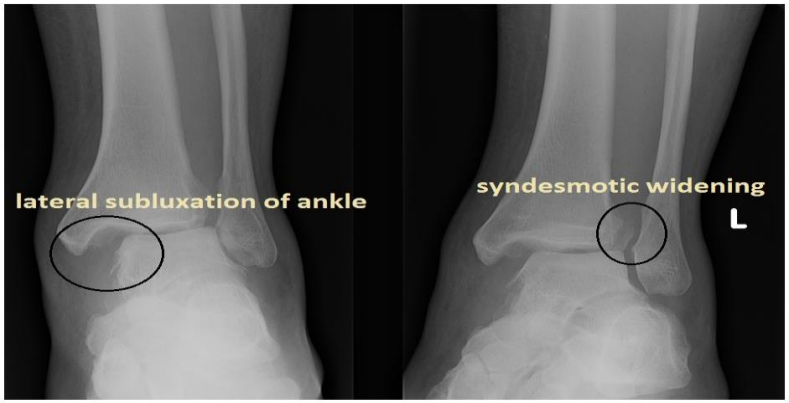
- Various Methods:

A) ER stress

B) Calf Squeeze

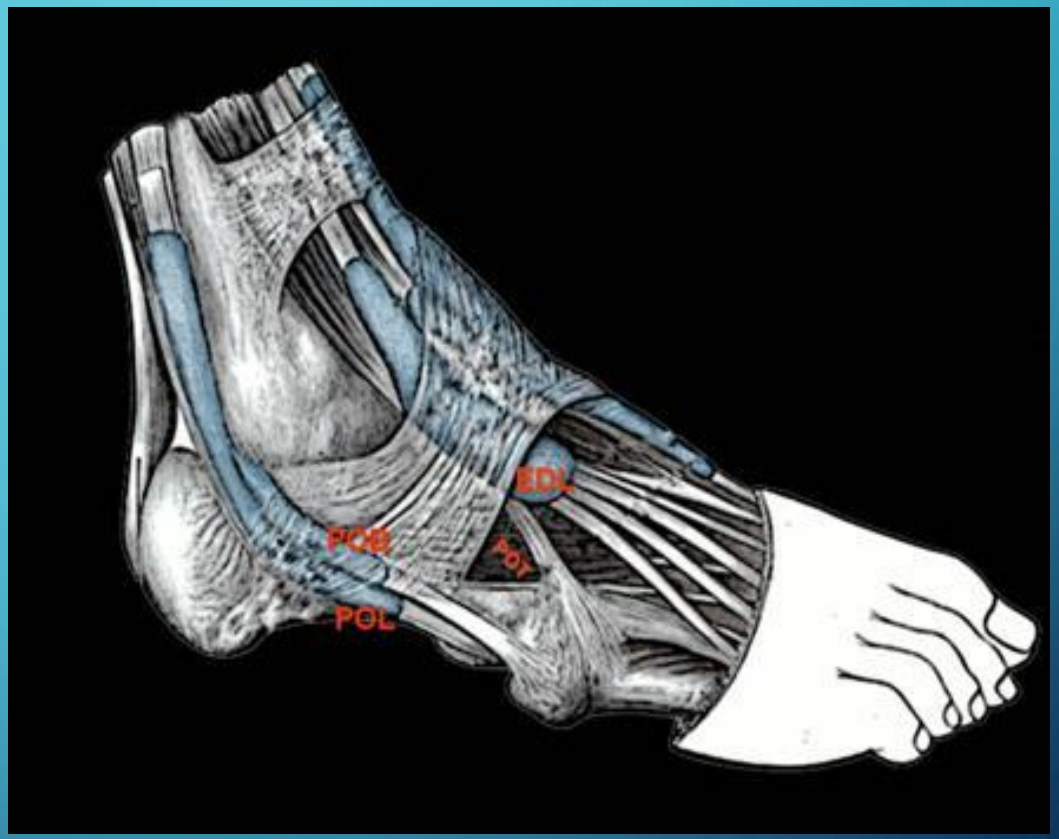
C) Cross-legged test





PERONEAL TENDON PATHOLOGY

- Tears
- Tenosynovitis
- Subluxation



PERONEAL TENDON PATHOLOGY

- Diagnosis
  - Pain to palpation
  - Crepitus
  - Instability to resisted eversion or circumduction of ankle
  - Imaging: xrays, MRI

PERONEAL TENDON PATHOLOGY

- **Treatment**
  - Rest
  - Lateral heel wedges
  - Bracing
  - NSAIDS
  - Cold therapy
  - PT
  - Surgery
    - Debridement of synovitis, repair tear, repair groove

UNDETECTED TRAUMA

- **FRACTURES:**
  - Lateral process of talus
  - Anterior process of calcaneus
  - Cuboid
  - Fifth metatarsal

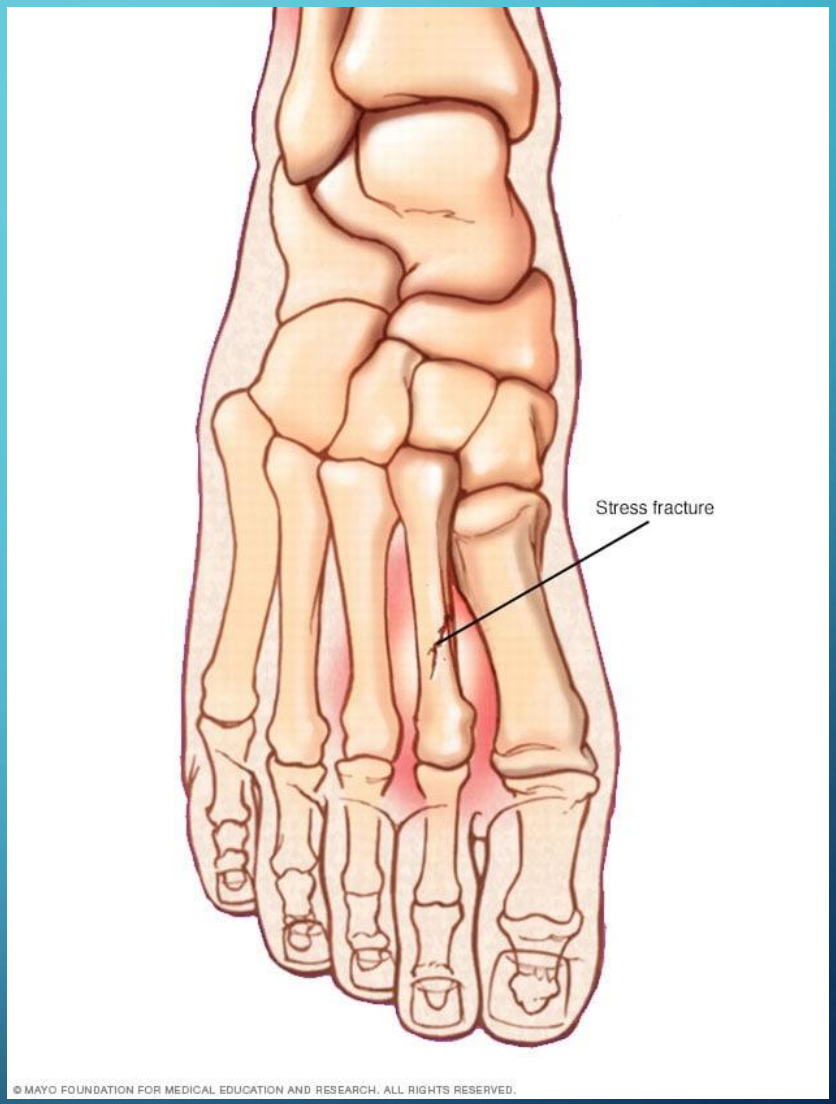
DON'T MISS FRACTURES

- Jones
- Lis Franc
- Navicular Fractures
- Ankle Fracture
- Talus Fracture

Long term disability and highest potential litigation

STRESS FRACTURE

- Overuse injury in the foot, commonly the metatarsals, that is often not seen with radiographic imaging.
  - Runners, Dancers, Prior stress fracture, Osteoporosis, Nutritional deficit

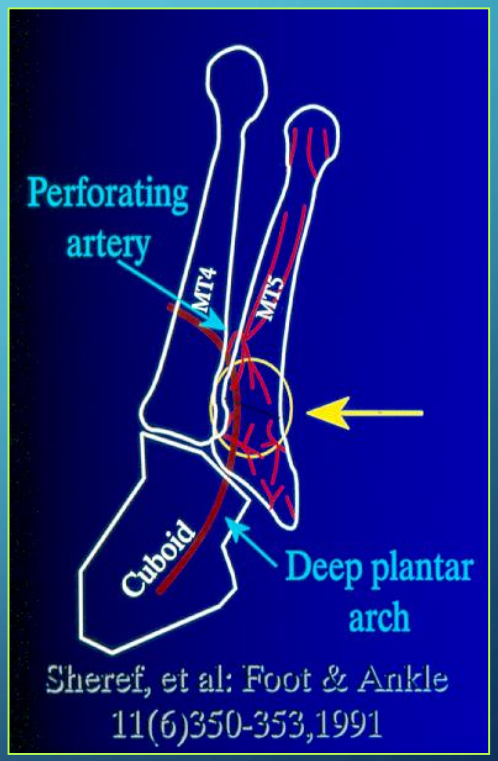


PLAN OF CARE

- Imaging
  - Radiographs
  - Possible CT/MRI
  - Bone density scan
- Labs
  - Vit D.
  - Thyroid/Parathyroid
  - CBC
  - CMP
- Treatment
  - Vit. D and Calcium supplementation
  - Boot with weight bearing for 6 weeks
  - Repeat radiographs if stress fracture was visible
  - Nutrition consult

5TH METATARSAL FRACTURES

- Most common foot fracture
- 3 types
- Seen on foot x-ray (may be missed on ankle x-ray)



5TH METATARSAL ZONES

- Zone 1 (Avulsion): Minor—Tip of the base of the metatarsal. Bone fragment pulls away from the main bone (93%). Usually non-operative with boot or hard soled shoe x 6 weeks.

- Zone 2 ("Jones Fracture"): Larger—Proximal shaft. Poor blood supply=less likely to heal and increased surgical intervention. Can treat with a boot or hard soled shoe and crutches with non-weight bearing x 6 weeks initially if well approximated and minimally displaced.

- Zone 3 (Mid-shaft or dancer's fracture): Mid-distal metatarsal shaft. Usually non-operative with boot or hard soled shoe x 6 weeks.

5TH METATARSAL FRACTURES

5TH MT – "JONES" FRACTURE

(metaphyseal-diaphyseal)

Associated with high nonunion rate

Treatment

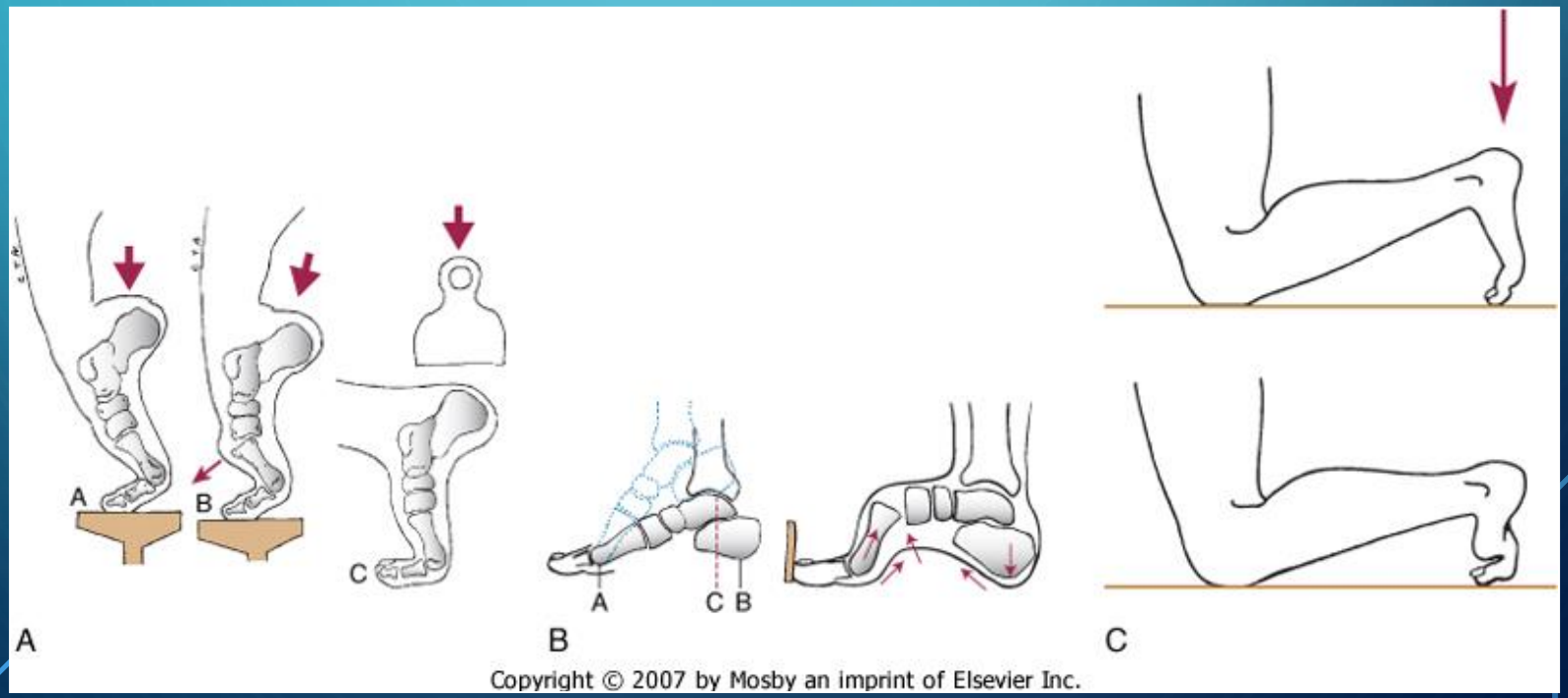
- Cast and non-weightbearing
- Surgery may be indicated

LIS FRANC LIGAMENT INJURIES

- Tarsometatarsal Joints
- High energy or low energy
- High index of suspicion
- At least 20% missed on initial evaluation

LIS FRANC INJURY

- Direct
  - Crush injury
  - High impact ankle or foot trauma
- Indirect
  - Axial loading of plantar flexed foot
  - Severe abduction



LIS FRANC

Physical exam

- Variable degree of swelling
- Pain with weight bearing
- Midfoot tenderness
- Pain with forced pronation and abduction
- **Occasional mid-arch ecchymosis**

LIS FRANC

Radiographs

- AP, lateral and oblique views are mandatory
- Weight bearing!
- Comparison films are very helpful
- “Fleck sign”


1. Ratio: 26.3
L
CH
STANDING

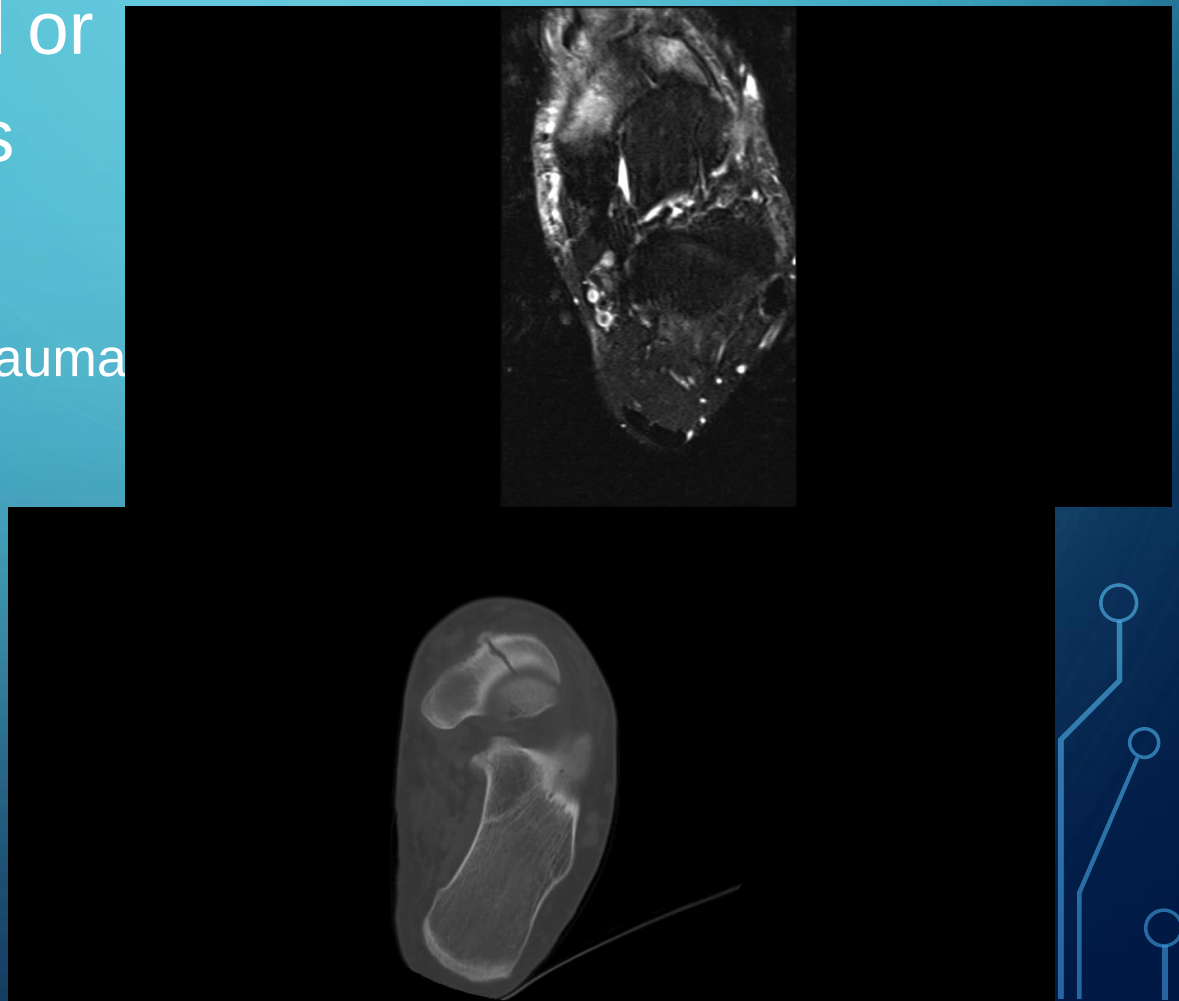

R
CH
STANDING

LIS FRANC

- Surgery indicated for any displacement
- Persistent pain and arthritis not infrequent

NAVICULAR FRACTURES

- Commonly Missed or Delayed Diagnosis
  - “C sign”
  - Stress fx versus trauma
  - High non-union rate



TREATMENT

NWB -cast

Displaced fracture ORIF

Non displaced possible ORIF

A previous navicular fracture results in a greater risk of developing posttraumatic osteoarthritis.

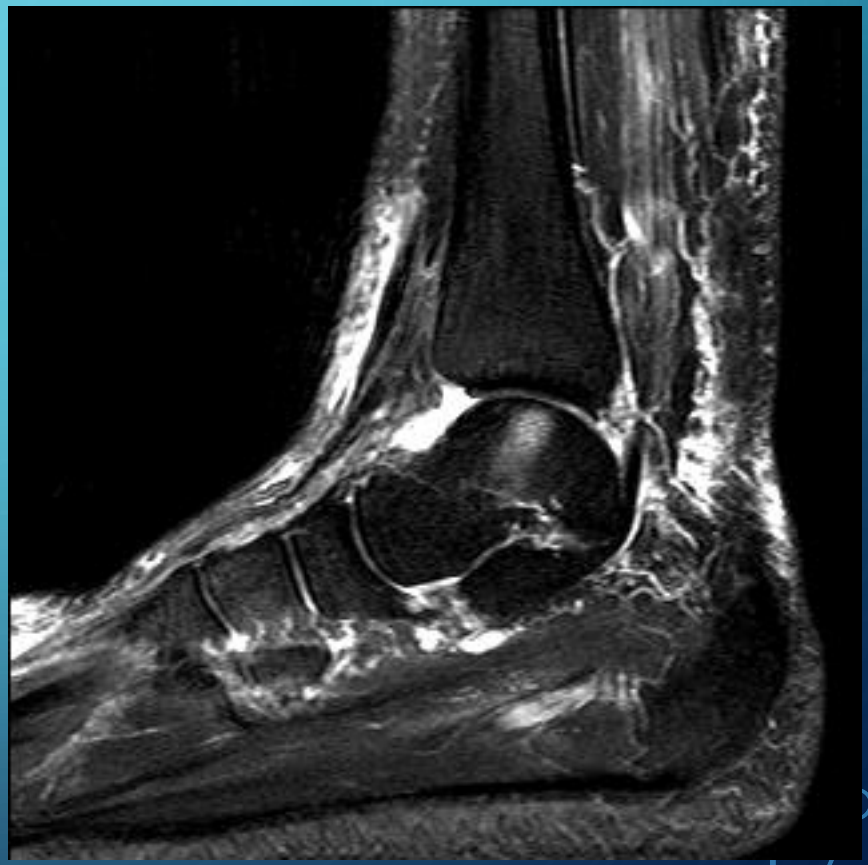
THE SPRAIN THAT WON'T GET BETTER

- Ongoing pain and swelling
- Ankle feels unstable
- Catching and Locking

- (Consider MRI)

BONE CONTUSION

- Ongoing pain and swelling
- Edema seen on MRI (X-rays negative)
- May take 6 months to feel better

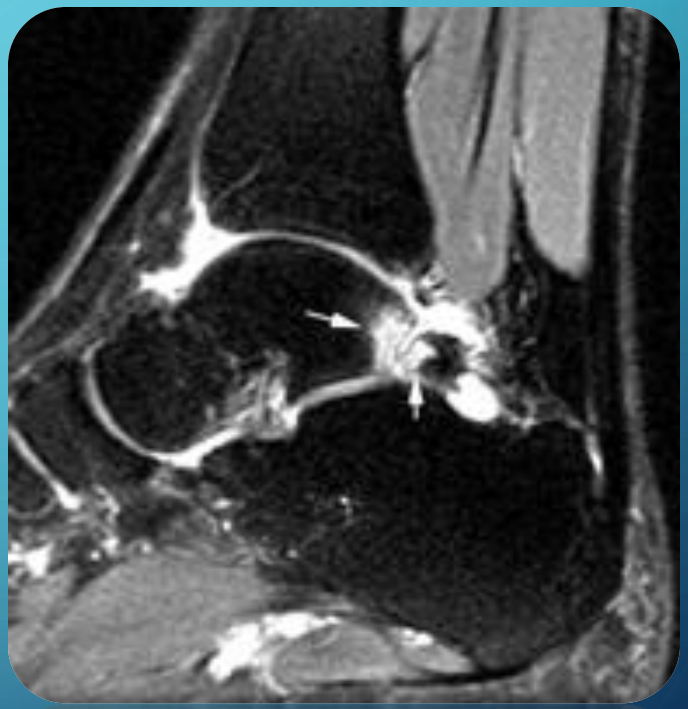


ANKLE IMPINGEMENT

- Anterolateral/Anteromedial
  - Chronic inflammation - adhesions, hypertrophied synovium, ligament injury
- Anterior
  - Anterior tibia & talar neck osteophytes

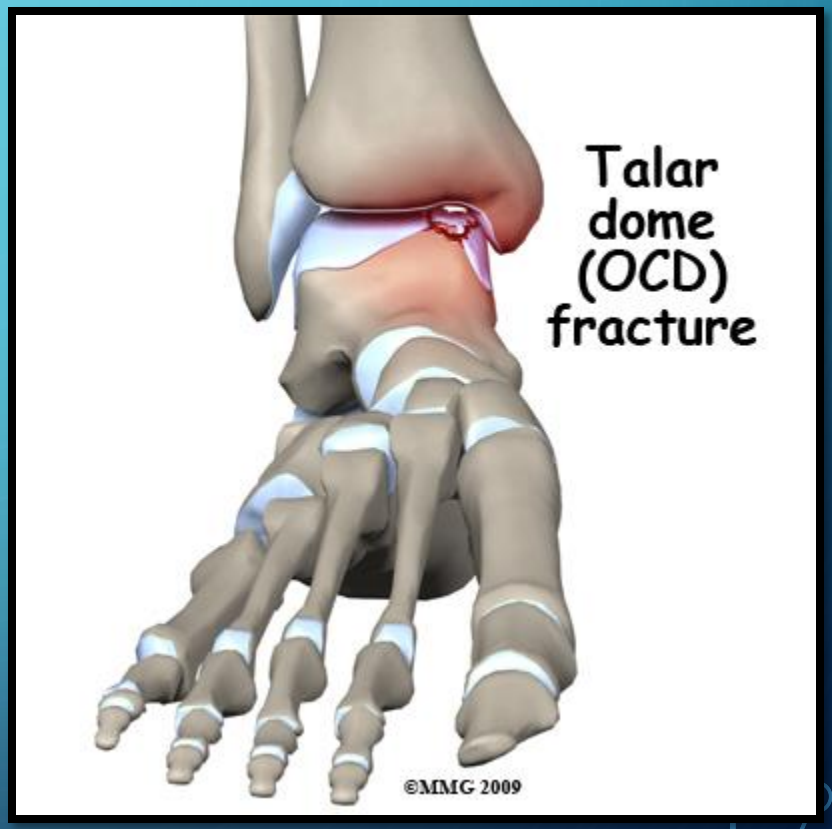
ANKLE IMPINGEMENT

- Posterior:
  - Inflammation of synovium
  - Osseous injury (os trigonum, lateral tib tubercle)
  - FHL tenosynovitis



OSTEOCHONDRITIS DISSECANS(OCD)

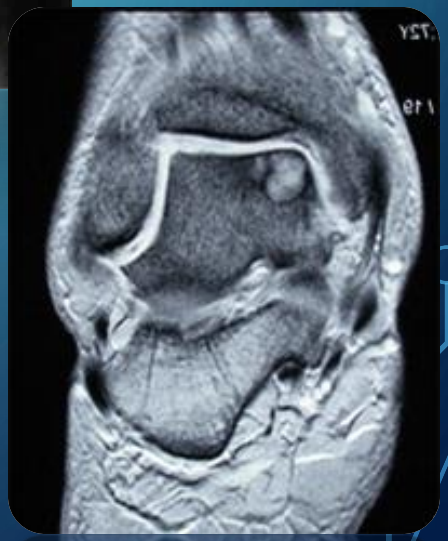
- Most commonly a result of a trauma
- Occur in 2-6% of ankle sprains
- Most asymptomatic
- Medial lesions most common



OSTEOCHONDRAL LESIONS OF THE TALUS (OLT)

- Swelling, stiffness,
- Clicking or locking
- +/- instability
- Joint line tenderness?

- Imaging
  - 3 WB views ankle
  - MRI - cartilage
  - CT- bone



TREATMENT

- Conservative
  - Immobilization
  - Physical therapy
- **Surgery**
  - Loose-body removal, +/- fibrocartilage growth stimulation (microfracture)
  - Hyaline cartilage growth stimulation with autograft (OATS), allograft, or cell culture

ACHILLES TENDON TEAR

- Classic presentation
  - Involved in some sort of activity, often athletic.
  - Feeling of being kicked or hit in the calf with a 2x4 or baseball bat.
- Pully system.
  - The pully is damaged so the mechanism will not function.

THOMPSONS TEST

- Patient prone
- Knee is flexed
- Squeeze the calf muscles
- No response=Achilles tendon tear.
- Sensitivity 96-100%
- Specificity 93-100%

ACHILLES TEAR PLAN OF CARE

- Tall walking boot with a heel lift
- STAT follow up with surgeon (in this case lower extremity specialty)
- Advanced imaging?
- MRI ankle w/o contrast

REVIEW

- Comprehensive examination
- Obtain WB radiographs
- Adjuvant imaging
  - MRI, CT (Consider WB for lis franc or Syndesmosis) stress radiographs
- Consider trial of conservative management & PT
- Counsel patient on appropriate expectations

WHEN TO REFER…..

- Severe joint line tenderness & effusion
- Obvious deformity
- Failed conservative therapy
- Unclear diagnosis

CASE STUDY

- 45-year-old female
  - She stepped off a curb 3 days ago and thinks she rolled her ankle but is not entirely sure what happened. She knows she felt immediate pain followed by nearly immediate swelling and instability. She limped to her car, drove home, and took 600mg ibuprofen, elevated, and iced. While the swelling has decreased a little, she continues to have severe pain, trouble bearing weight, and bruising around the lateral foot and ankle. She presents for further evaluation of the problem since she needs to return to work and is not improving.

CASE STUDY

- No medical/surgical history
- No medications/allergies
- Reduced ankle ROM due to painful exam
- Painful inversion and plantar flexion
- Pain with palpation of the lateral ankle
- Ankle drawer testing negative

IMAGING

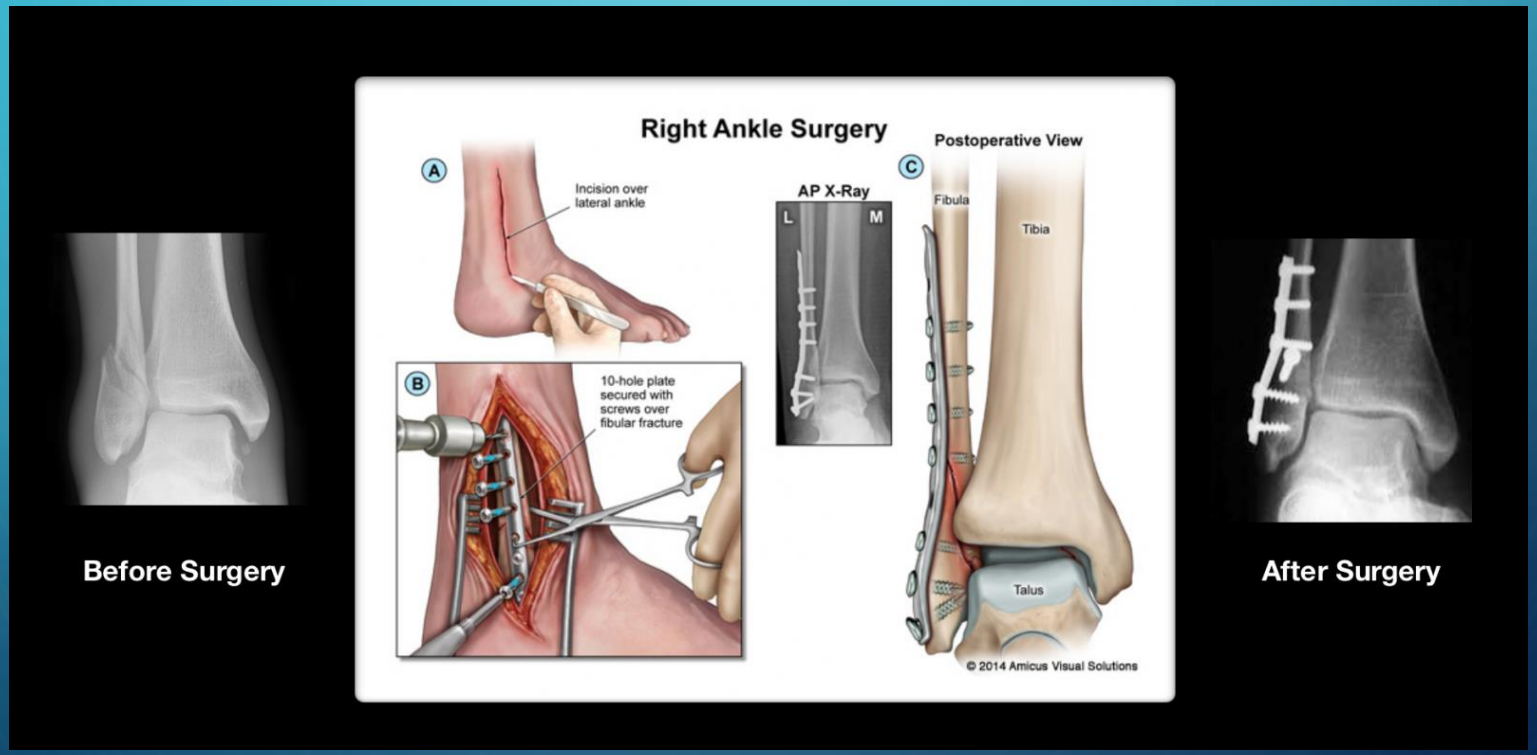
PLAN

- Dx: Lateral malleolus fracture.
  - Stable in appearance and with exam
- Treatment
  - Tall boot with all activity (4-6 weeks) as well as with sleep (1-2 weeks). Okay to remove to shower and for elevating and icing while at rest
  - NSAIDS
    - Ibuprofen 600mg 1 PO TID-QID
    - Acetaminophen 500-1000mg PO TID-QID
    - RICE
      - Rest
      - Ice
      - Compress
      - Elevate
    - Follow up with repeat imaging at 2 weeks and 6 weeks post injury

WHAT IF?

Wheeless Online, (2022).

THEN THIS



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