Foot & Ankle Pain

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*Nothing to disclose

Quiz

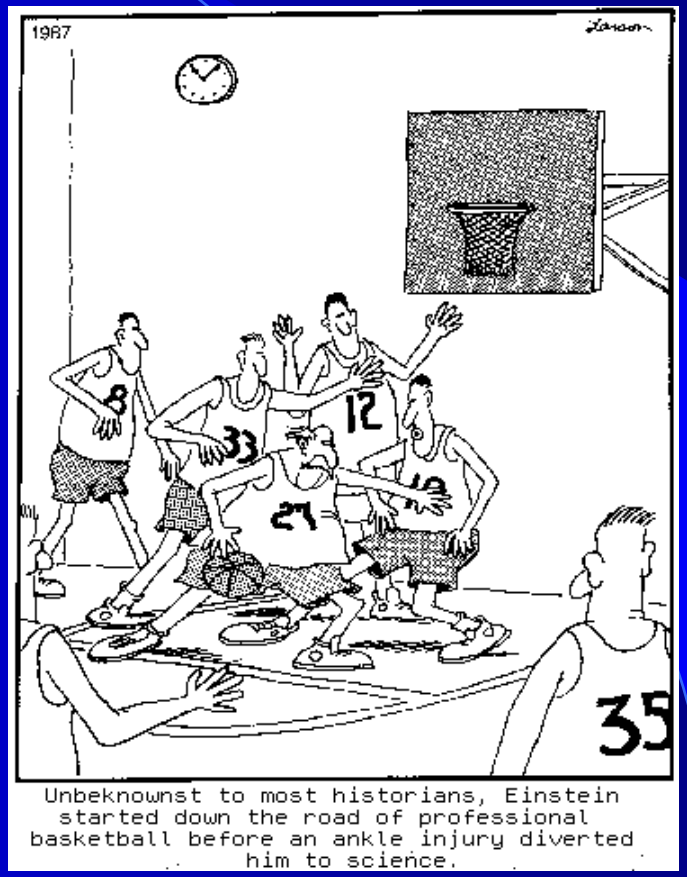
- What is the most common ligament torn in ankle sprains?
- The Ottawa ankle rules palpate the med, lateral malleoli, base of 5th MT and ???
- What percent of ankle sprains have pain after 6 months?
  - 20% 33% 56% 73%
- Which location is more common for Talar dome OCD?

EPIDEMIOLOGY

- Most Common Sports Injury
- Basketball, Soccer, Football
- 85% Ankle Injuries involve Ligament Sprain
- 2nd Most Common Office MSK Chief Complain (1st LBP)

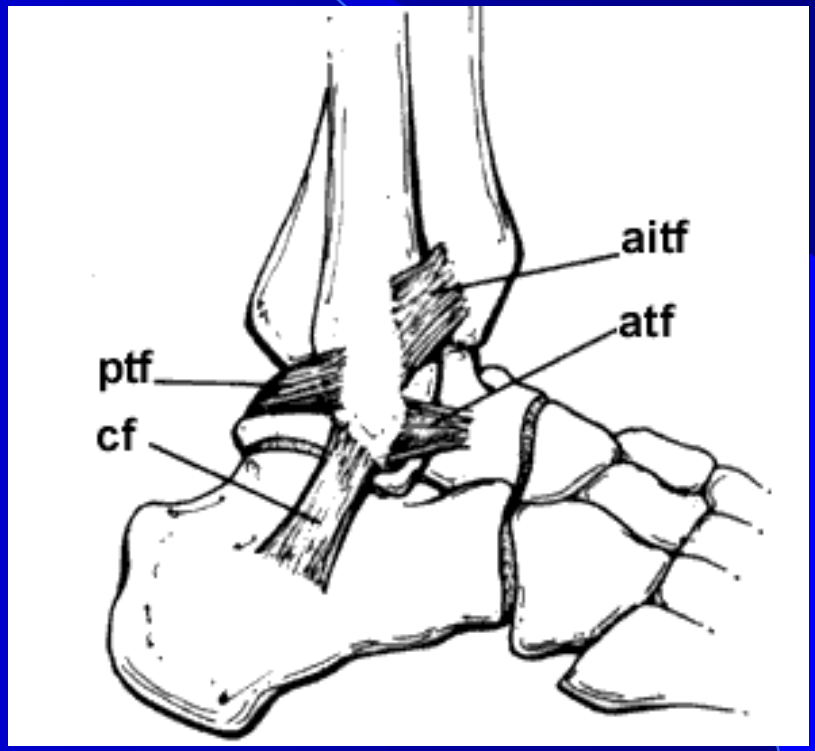
LATERAL ANKLE SPRAIN

- 85-90% Ankle Sprains
- 45% Basketball Injuries
- 17-31% Soccer Injuries



ANATOMY

- Anterior Talofibular Ligament(ATFL)
- Calcaneofibular Ligament(CFL)
- Posterior Talofibular Ligament(PTFL)

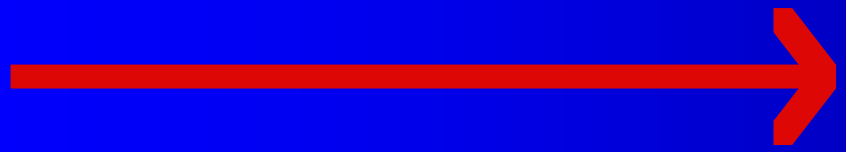


MECHANISM OF INJURY

- Unloaded Foot and Ankle
- Plantar Flexion>Neutral> Dorsiflexion
- Inversion
- 2018 Volleyball study-blocking landing on other player foot NOT in plantar flexion

PLANTAR FLEXION

INCREASING FORCE

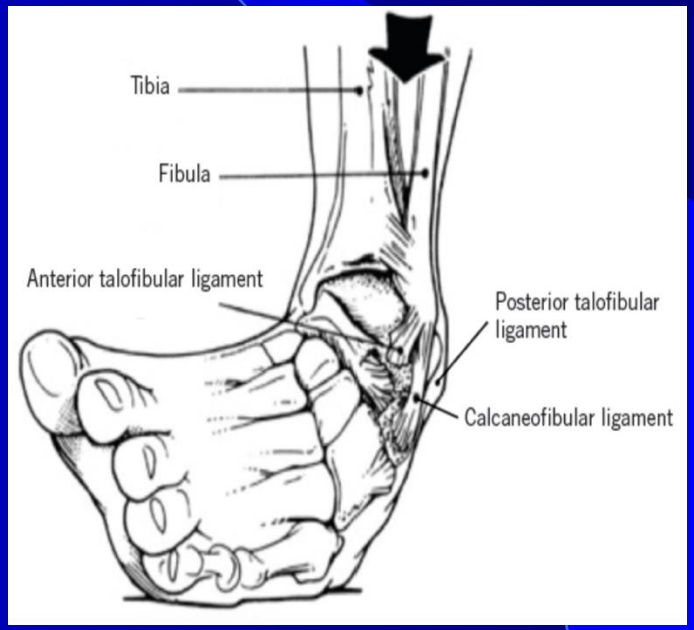


ATFL → CFL → PTFL → DELTOID

DORSIFLEXION

INCREASING FORCE

PTFL → CFL → ATFL



HISTORY

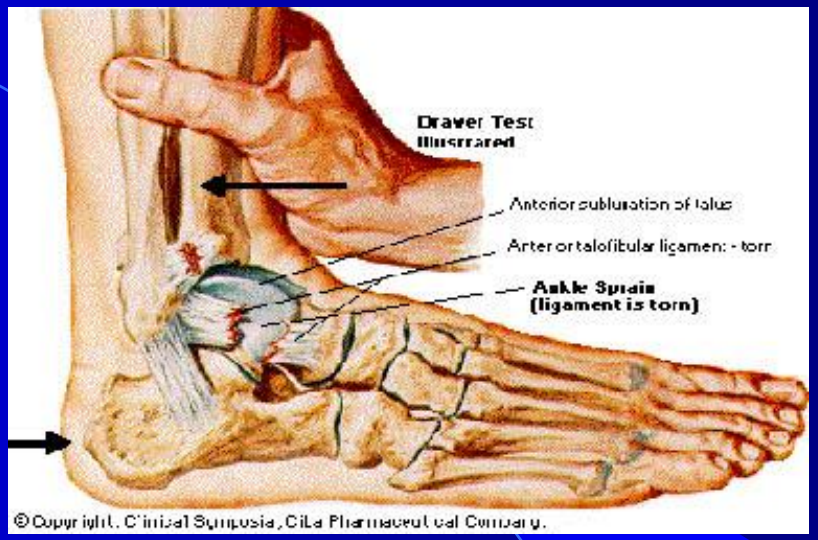
- Mechanism
- Instability
- Pop/Tear
- Pain location
- Ability to ambulate/finish activity

PHYSICAL EXAM

- Inspection
  - Swelling
  - Eccymosis
- Tenderness
- Neurovascular

PEx

- Stability Testing
  - Anterior Drawer
  - Talar Tilt



XRAYS

- Ankle Series
  - AP
  - LATERAL
  - MORTISE
- Standing View
- Stress Views

CLASSIFICATION

- GRADE I
  - Ligament stretch, no laxity
- GRADE II
  - Ligament tear, mild laxity
- GRADE III
  - Complete tear and significant laxity

TREATMENT

- ACUTE
  - Protection
  - Rest (Relative)
  - Ice
  - Compression
  - Elevation

TREATMENT

- Joint protection
  - Immobilization vs. Stabilization?
    - Swedish Study1966 Wrapping>Casting
  - Options
    - Rigid: Cast, Boot
    - Semi-rigid: Air-cast, brace
    - Flexible
      - DJO
      - Bioskin (Trilock)
      - ASO
    - Duration; 6 weeks-6 months

TREATMENT

- REHAB
  - ROM
  - Strengthening
  - Proprioception
  - Sport Specific Drills
- SURGERY?

TREATMENT

- Return To Sports
  - Variable
    - 0 days to 6 weeks
    - Injury Grade
  - Guidelines
    - Intact Strength & Proprioception
  - Taping vs. Bracing

P	**Pain severity** • During sport participation • Over last 24 hours
A	**Ankle impairments** • Ankle range of motion • Ankle muscle strength, endurance and power
A	**Athlete perception** • Perceived ankle confidence/reassurance • Perceived ankle stability • Psychological readiness
S	**Sensorimotor control** • Proprioception • Dynamic postural control/balance
S	**Sport/functional performance** • Hopping and jumping • Agility • Sport-specific activities • Ability to complete a full training session

BJSM Acute Lateral Ankle Sprain 2021

Prevention

- Fitness
- Proprioception
- Shoewear
- Taping
- Spraino
  - 53% lower incidence, safe
  - Low-friction patch
  - BJSM 2021

Figure 2: Spraino, Front (A) and Rear (B)

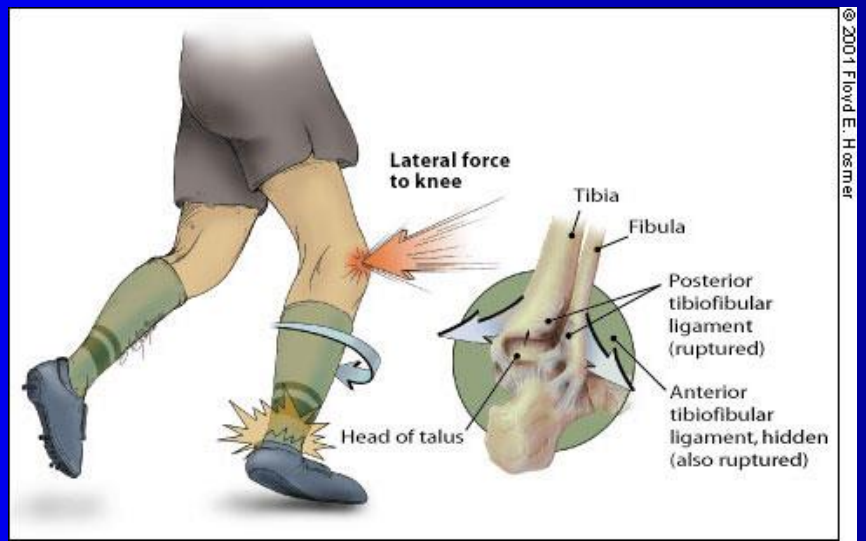
MEDIAL ANKLE SPRAIN

- EPIDEMIOLOGY
  - Isolated Injury <10%
  - Often associated with:
    - Syndesmotic Injury
    - Severe Lateral Sprain
    - Fibular Fracture
- MECHANISM OF INJURY
  - Forced Eversion

INJURY SEQUENCE

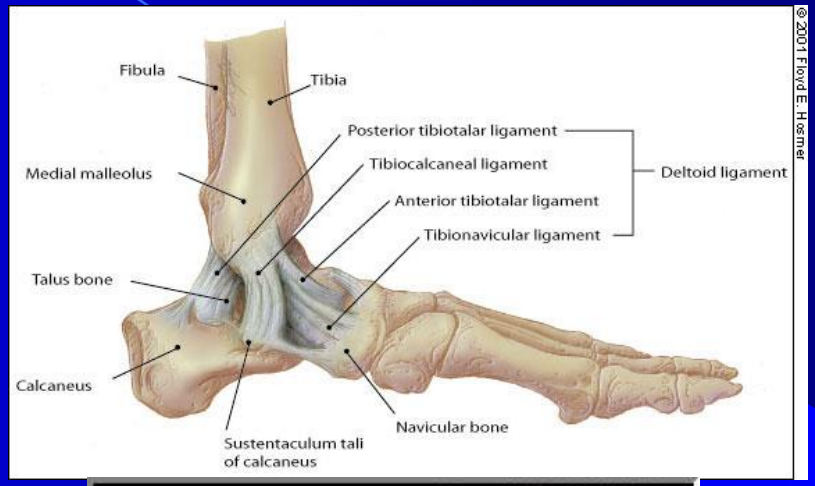
INCREASING FORCE

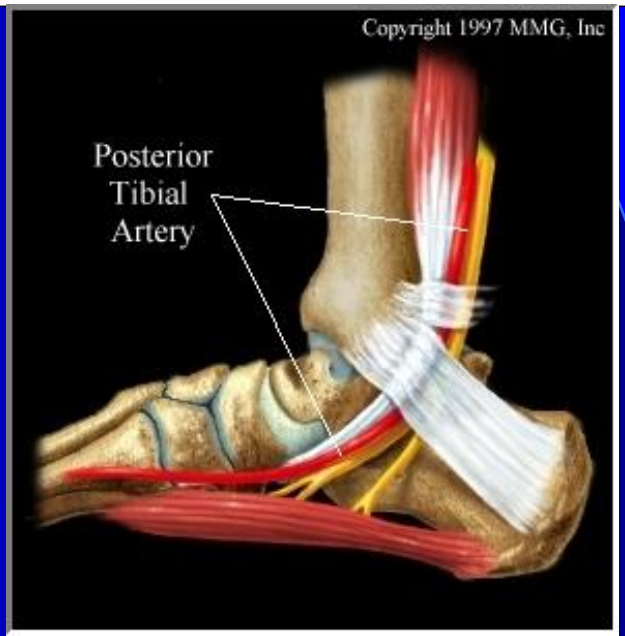
DELTOID → TIB/FIB COMPLEX → FIB FX



MEDIAL SPRAINS

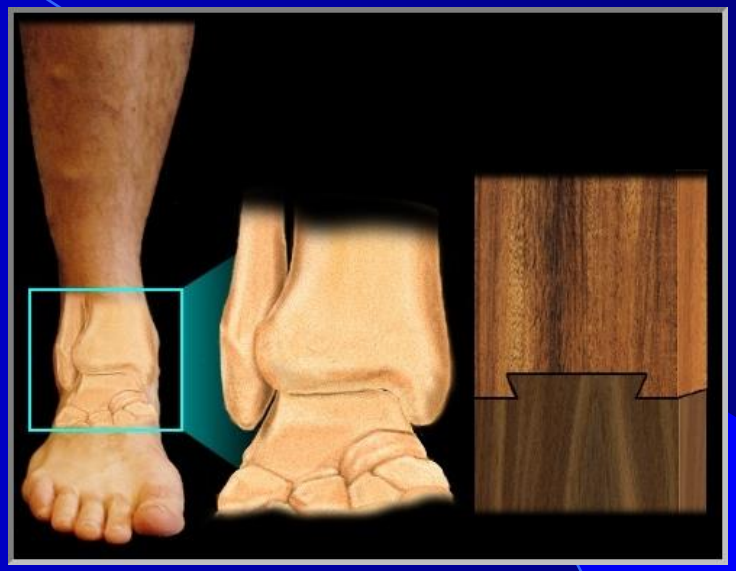
- PHYSICAL EXAM
  - Posterior tibialis tendon
  - Nerve injury: tibial/peroneal
  - Proximal Squeeze test
  - External Rotation test





MEDIAL SPRAINS

- XRAYS
  - Weight-bearing Views
  - LOOK OUT FOR:
    - Mortise widening
    - Lateral malleolar fracture
    - Maissoneuve (prox. fib fx)



MEDIAL SPRAINS

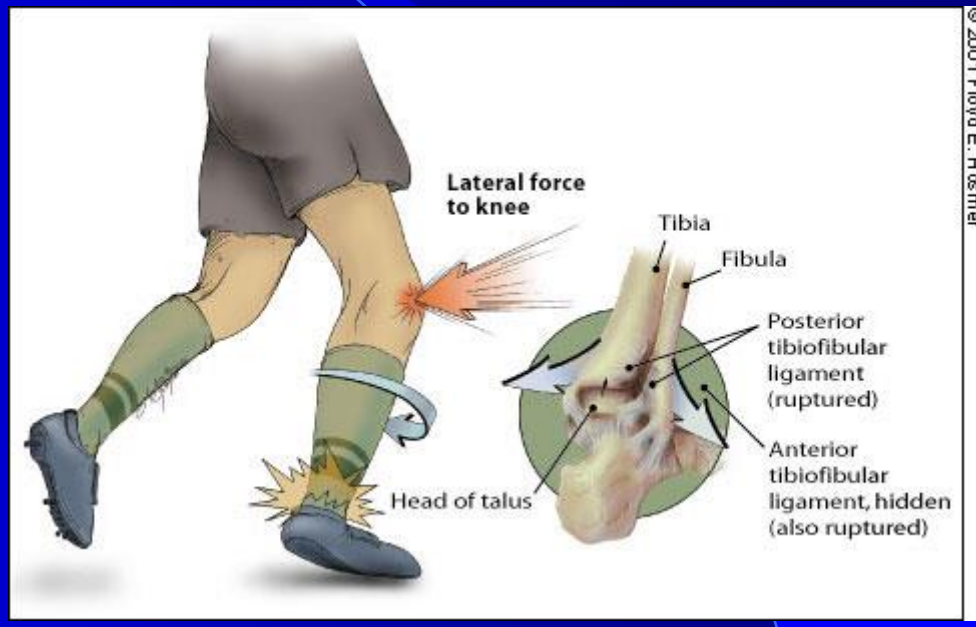
- TREATMENT
  - Similar to lateral sprains
  - Typically longer recovery time
  - General timeline:
    - Grade I: 2-6 weeks
    - Grade II/III: 6-8 weeks

Not Just a Sprain?!

- DON'T MISS:
  - Syndesmotic injuries
  - Fractures
  - Tendon injuries

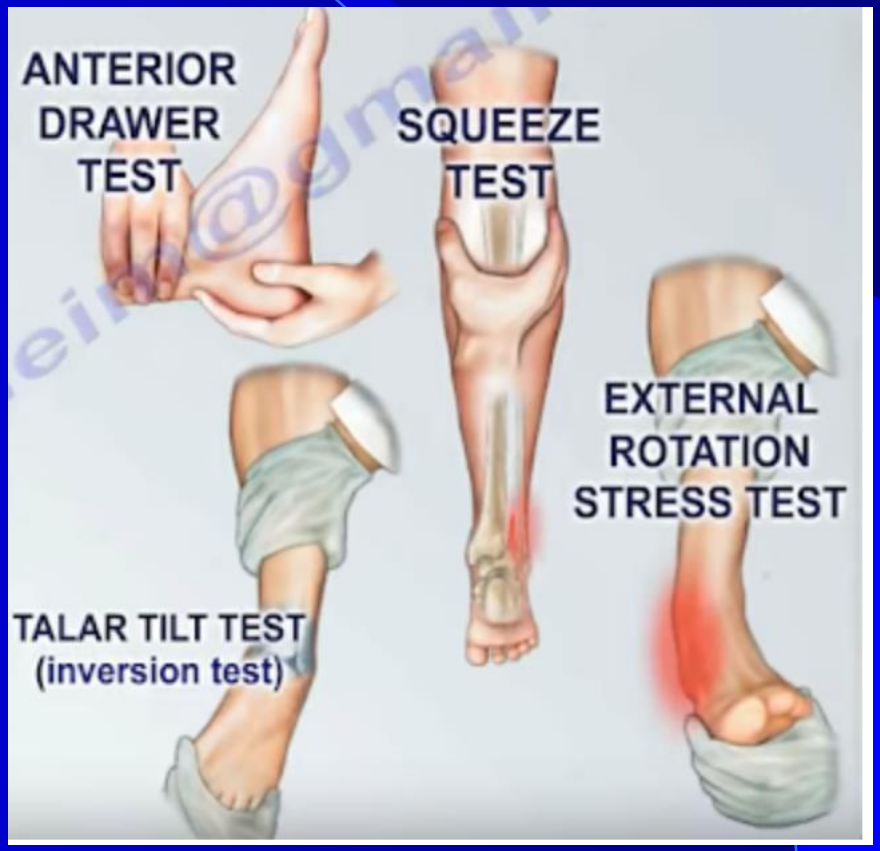
Distal Tib/Fib Syndesmosis

- Mechanism:
  - High Energy Medial/Lateral Sprains
- Isolated Injury Uncommon
  - Typically occurs with medial &/or lateral ankle sprains
- Anatomy
  - Anterior & Posterior Inferior Tibiofibular Ligament (AITFL, PITFL)
  - Interosseus Ligament/Membrane (IOM)



Syndesmotic Sprains

- PEX
  - Tenderness
  - Proximal Squeeze
  - External Rotation



XRAYS

- Weightbearing Views
  - AP/Lateral/Mortise
- Abnormal Mortise
  - >6mm Tib/Fib Clear Space on AP/Mortise
  - <1mm Tib/Fib Overlap on Mortise
  - Compare with uninjured side

Syndesmosis Sprains

- TREATMENT
  - Normal Mortise
    - Protection via Stirrup brace vs. Boot/Cast
    - Weight bearing as tolerated
    - Return to Sports: 1-3 months
  - Abnormal Mortise
    - Operative Stabilization
      - Syndesmotic Screws or Arthrex Tightrope (braided polyethelene core); Elastic hook
    - Return to Sports: 4-6 months post-op

Peroneal Tendon Subluxation

- Diagnosis
  - tenderness posterior to lateral malleolus
  - Pain with resisted eversion
  - Palpate subluxation with active resisted eversion
- Treatment
  - Acute
    - Immobilize 4 weeks
  - Chronic
    - Surgery

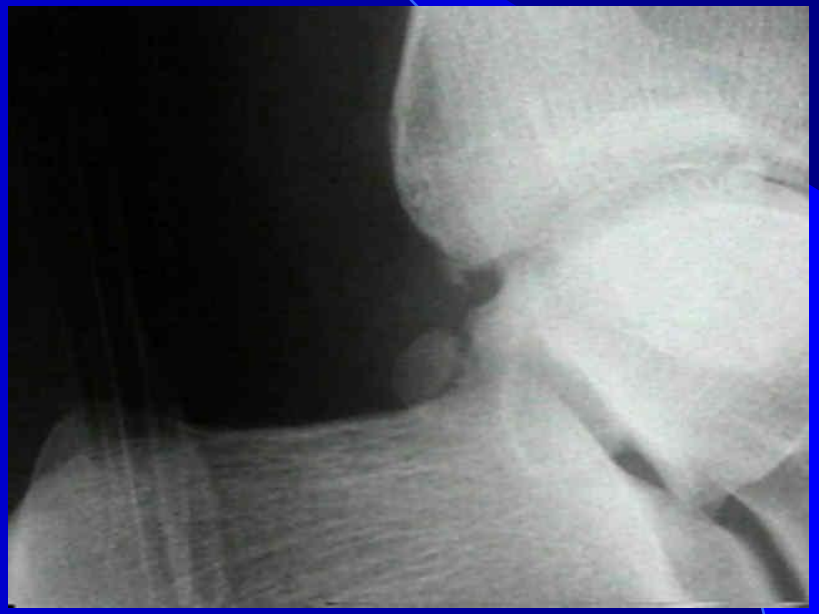
Curt Schilling bloody sock Game 6 ALCS 2004

Talus Fractures

- Lateral Process
  - Snowboarders
  - MOI: forceful inversion with dorsiflexion
  - Dx
    - lateral talar tenderness/eccymosis
    - Xrays: lateral/mortise views of ankle
    - CT scan
  - Tx
    - Small, non-displaced: cast
    - Large, displaced: ORIF

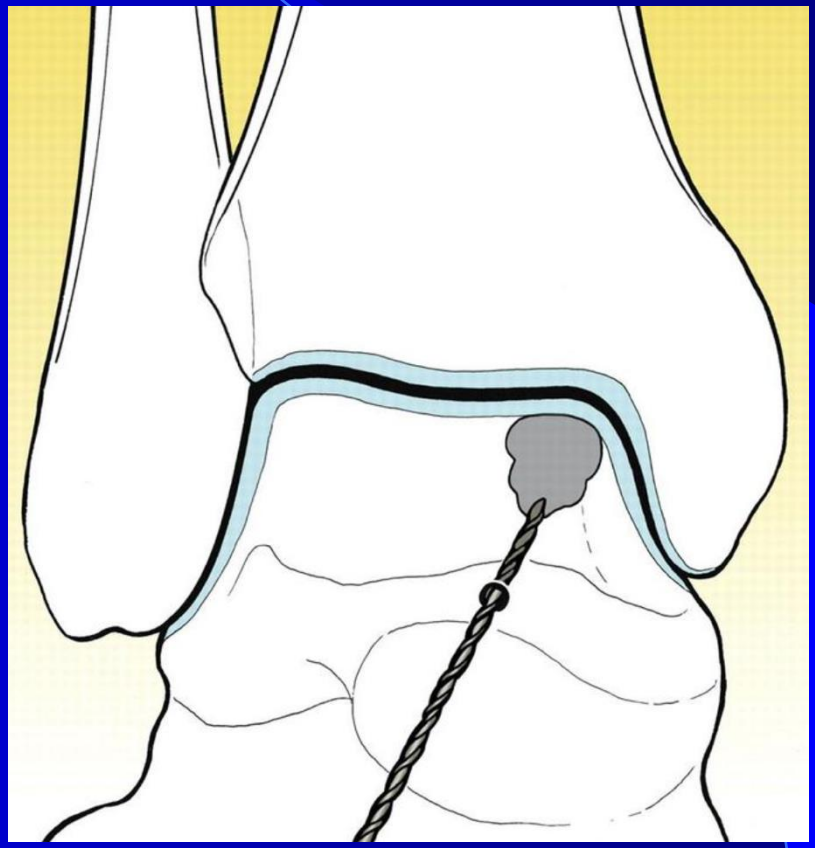
Talus Fractures

- Posterior Process (Os Trigonum)
  - Acute
    - MOI: forced plantar flexion
    - DX: posterolateral pain/tenderness, increases with plantar flexion
    - XRAY
      - 10% have seperate ossicle
      - bilateral views
    - Bone Scan
    - Tx: Immobilize 4-6 weeks



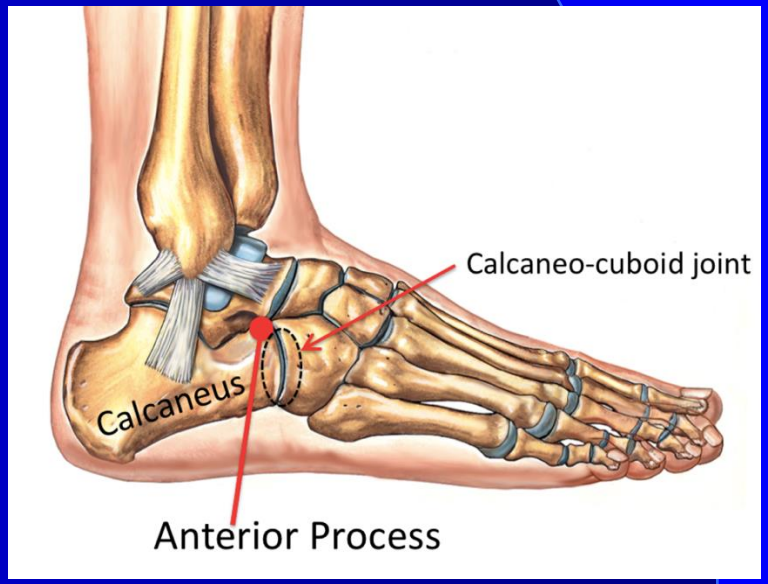
Talus Fractures

- Osteochondral
  - posteromedial>anterolateral (2:1)
  - MOI: inversion with impaction of talus
  - PEX:
    - effusion
    - anterolateral: tender dome in plantar flexion
    - posteromedial: tough to palpate, try extreme plantar flexion
  - Tx: Referral



Calcaneus Fracture

- Anterior Process
  - MOI:
    - 1) 'nutcracker' - compression across calcaneocuboid joint with forceful abduction of the foot
    - 2) distraction causing ligament to avulse bone
  - PEX: swelling/tenderness 1.5-2.5 cm inferior to lateral malleolus
  - XRAYS: lateral foot/ankle
  - TREATMENT
    - small fx: stirrup brace
    - large fragment, displaced or >40% articular=ORIF



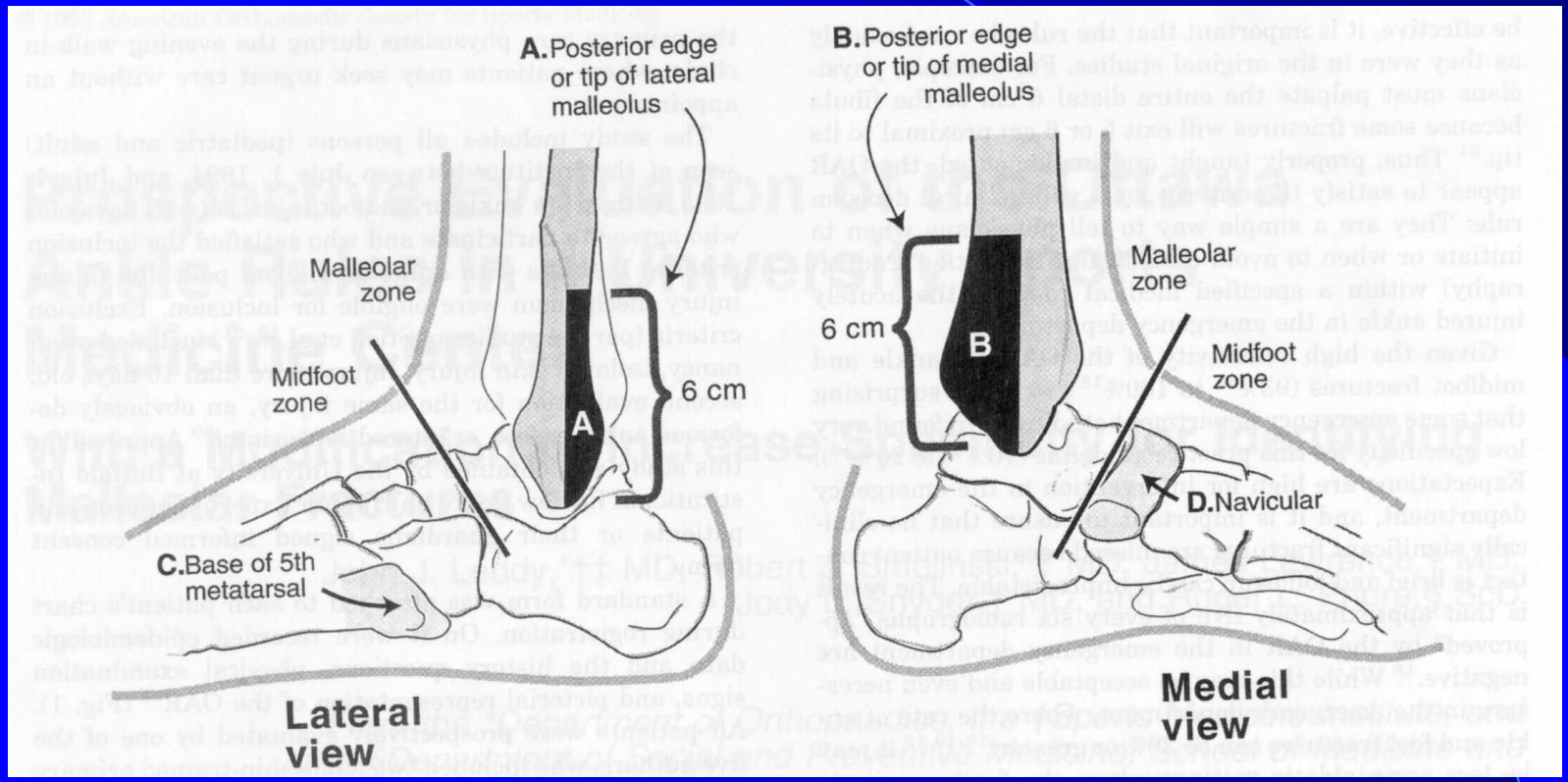
Ankle Sprain Masquerades

- 5th Metatarsal Fx
- Tendon Ruptures
  - Achilles
  - Post. Tibialis
  - Peroneal
  - Flexor Hallucis Longus
- Growth Plate Fracture
  - majority of tenderness above ligaments

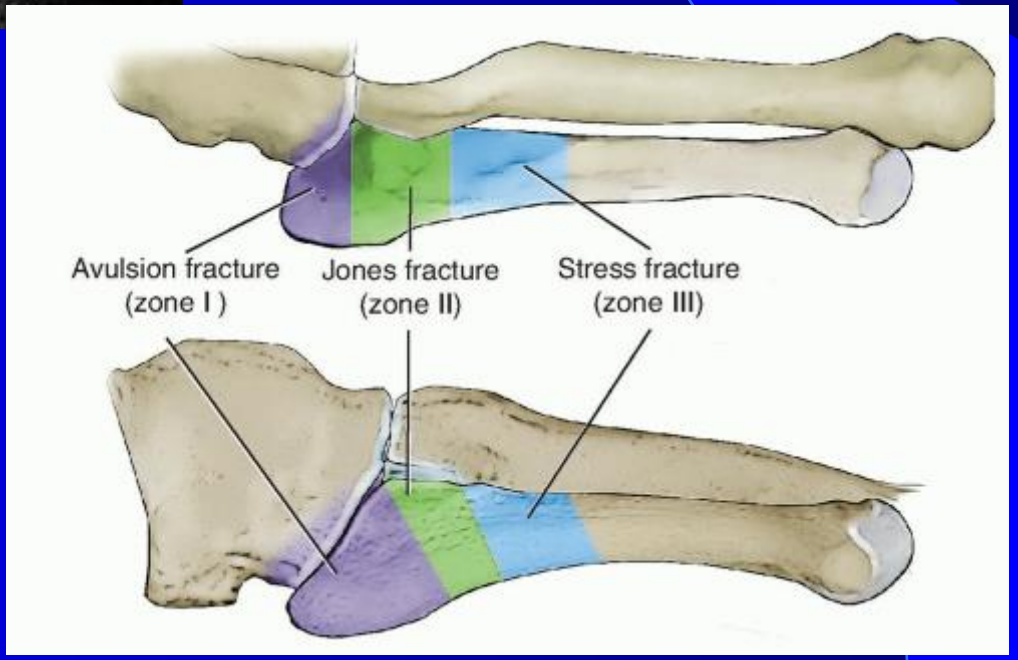
Ottawa Ankle Rules

- Exclusion Criteria
  - <18 yrs, Pregnant
  - Injury > 10 days old
  - returned for reassessment
- XRAY if?
  - tenderness posterior egde/tip of either Malleolus OR
  - tenderness base of 5th Metatarsal, or Navicular OR
  - inability to bear weight after injury AND in the Emergency Room (4 steps)
- 100% Sensitivity for clinically sign. fractures

Ottawa Ankle Rules



- Buffalo Rule raises specificity by only palpating bony ridge

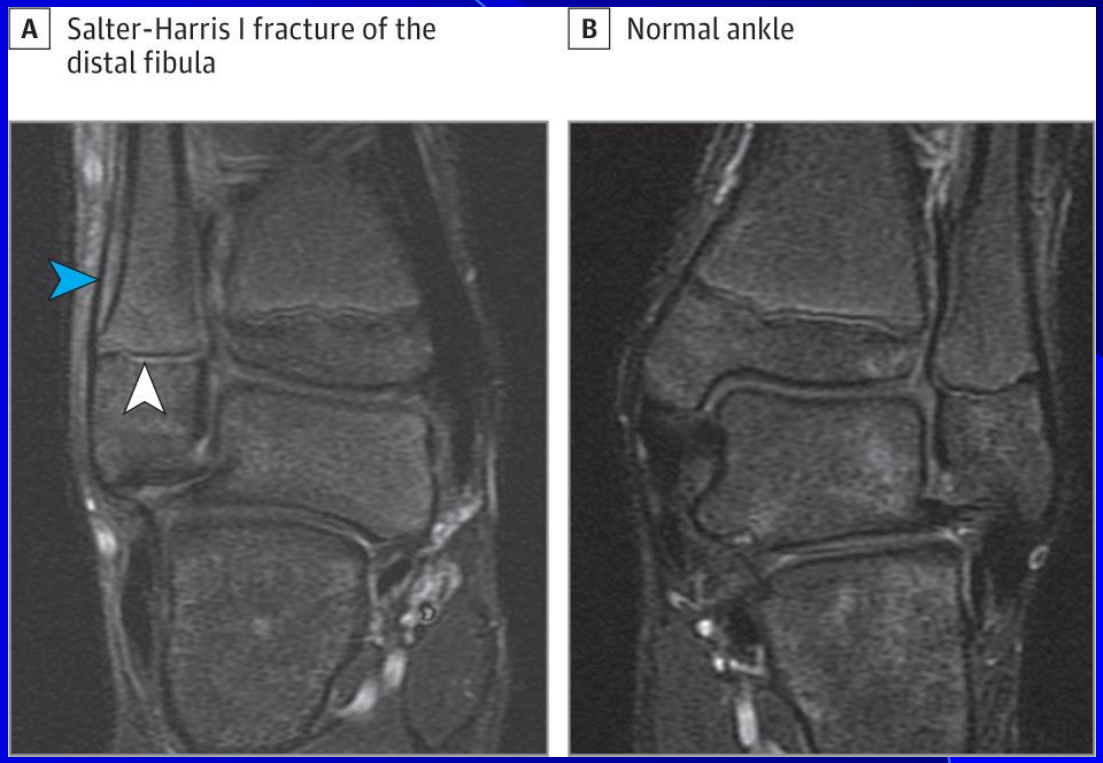

Avulsion fracture
(zone I)
Jones fracture
(zone II)
Stress fracture
(zone III)

Pain after Sprain?

- Missed Dx: Talar dome or other Fx, etc
- 72.6% Ankle Sprains had residual symptoms 6-18 months post injury
  - Braun BL. Effects of Ankle Sprain in a General Clinic Population 6 to 18 Months after Medical Evaluation. Arch Fam Med Apr 1999

Salter-Harris type 1 Distal Fib (SH1DF)

- SH1DF
  - 2016 Peds JAMA study
  - 5-12 y/o with lateral ankle injury suspected SH1DF
  - MRI
    - 3% SH1DF
    - 80% ligament
    - 22% Bone contusions
    - RTP similar for SH1DF fx and no fx



Quiz

- What is the most common ligament torn in ankle sprains?
  - ATFL
- The Ottawa ankle rules palpate the med, lateral malleoli, base of 5th MT and ???
  - Navicular
- What percent of ankle sprains have pain after 6 months?
  - 73%
- Which location is more common for Talar dome OCD?
  - Posteromedial> Anterolateral (2:1)

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