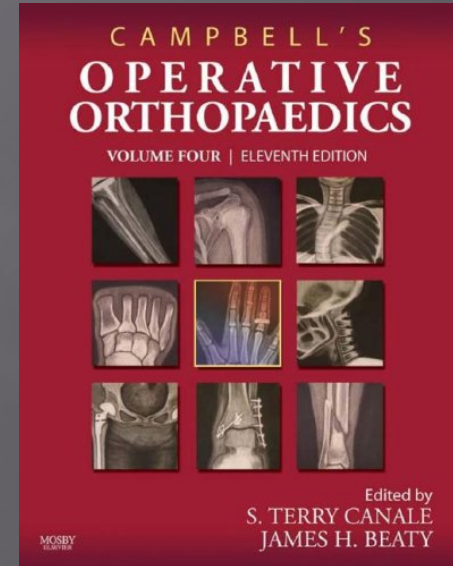


# ANKLE INJURIES

Jason E. Lake, M.D.

# Background

- ▣ Medical School
  - U of A
- ▣ Orthopedic Surgery Residency
  - UT/Campbell Clinic
- ▣ Foot and Ankle Fellowship
  - Cleveland Clinic



# Current Practice

- ▣ Fellowship Director - OFAI
- ▣ Foot and Ankle Consultant
  - Phoenix Suns
  - Arizona Cardinals
  - Arizona Diamondbacks
  - Multiple Phoenix Area High Schools
- ▣ Interests
  - Sports, Trauma, Reconstructive
  - Dance Population

Ortho**Arizona**  
Foot and Ankle Institute

# Fractures

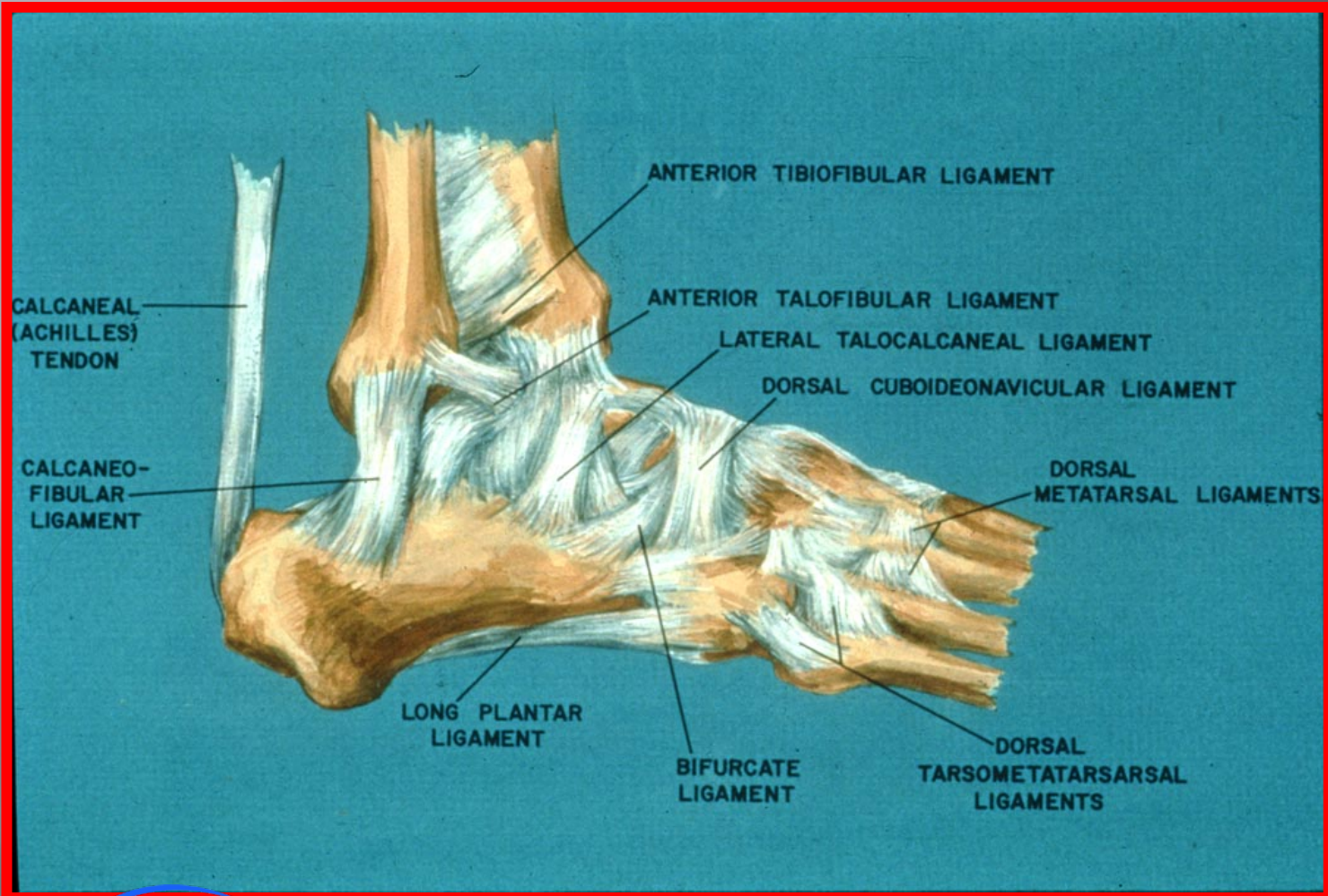


# Ankle Bones

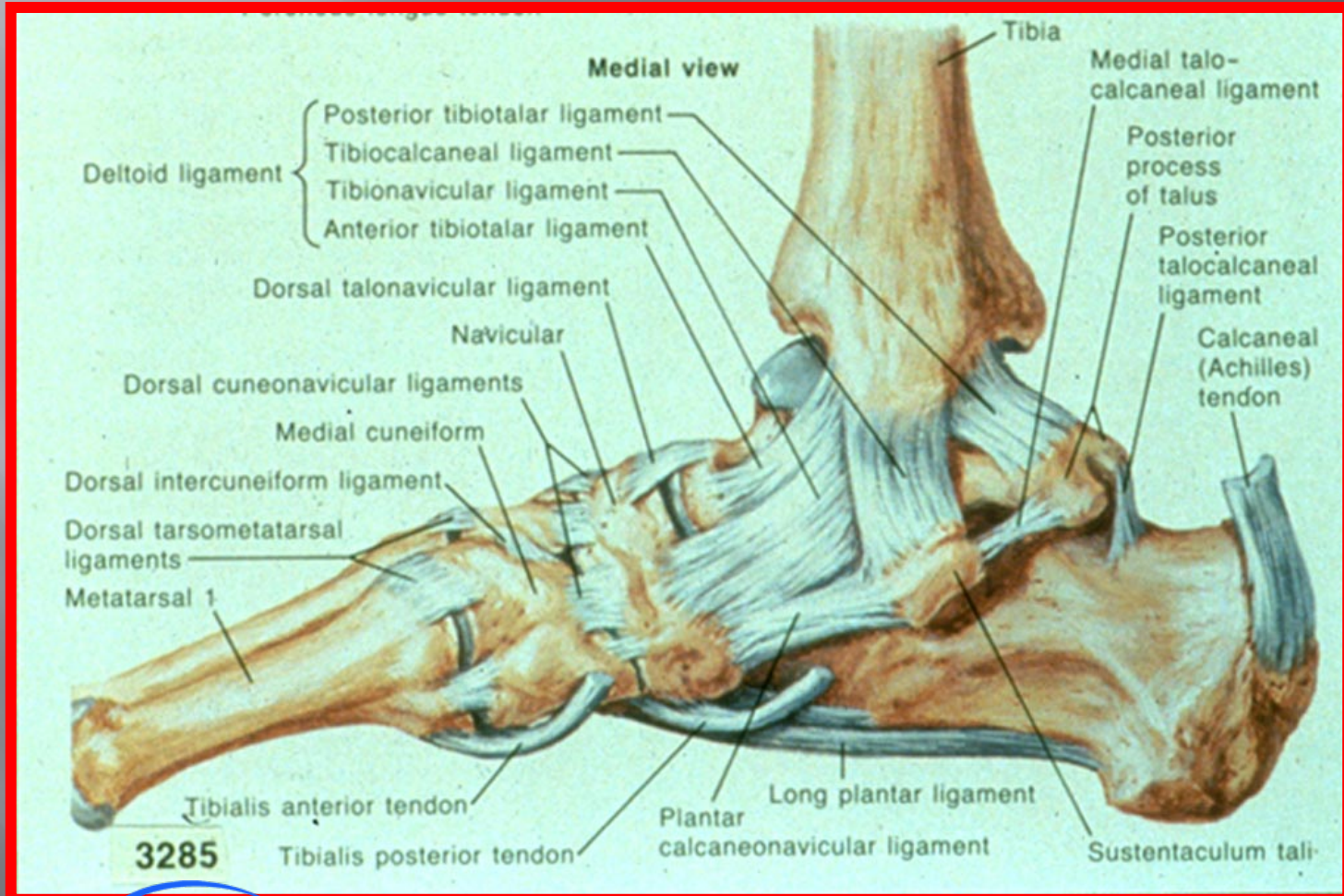




# Lateral Ligaments



# Medial Ligaments





# Fibula fractures- Mid/Proximal Weber C

- ▣ Twisting injuries
  - Often external rotation
    - ▣ Wrestling
    - ▣ Football
- ▣ Exam
  - Check deltoid
  - Syndesmosis





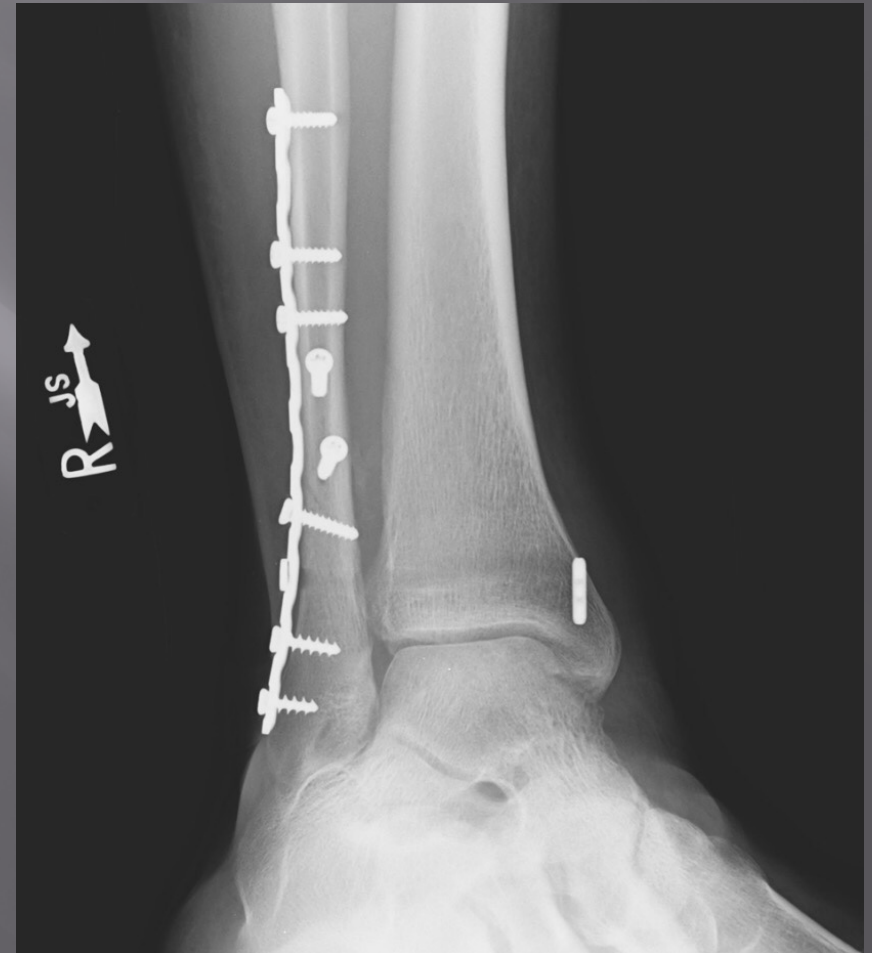
# Fibula fractures- Mid/Proximal Weber C

- ▣ Xray
  - Look for medial clear space widening
  - Deltoid avulsion
  - Post mal avulsion
  - **Lateral view is key**
  - Occasional MRI



# Fibula fractures- Mid/Proximal Weber C

- ▣ Tx
  - Direct Blow
    - ▣ Nonop WBAT in boot  
4-6 weeks
  - Assoc with deltoid or syndesmosis
    - ▣ ORIF
- ▣ When to refer
  - Any fracture that is displaced
  - Any fracture that is not a direct blow



# Lateral Malleolus Fractures Weber B

- ▣ Mechanism
  - Twisting injury
  - Inversion
    - ▣ Foot supinated
    - ▣ Leg internally rotates
      - Relative external rotation of foot
- ▣ Exam
  - Always check medially
  - **Base of 5<sup>th</sup>, ant process calc**



# Weber B





# Weber B



Again →  
Lateral View

# Lateral Malleolus Fractures Weber B

- ▣ Tx
  - Based on stability
  - Stable
    - ▣ Nonop
    - ▣ 6 weeks boot
    - ▣ Occasional cast early
    - ▣ Never Operative



# Lateral Malleolus Fractures Weber B

- ▣ Tx
  - Unstable
    - ▣ Define
      - Stress test
      - Widening medial clear
      - **Check Lateral XRAY**
    - ▣ Operative
    - ▣ Also consider risk factors
      - Compliance
      - Socioeconomic
      - Smoking
      - DM
      - PVD
  - When to Refer
    - Any displacement



# Lateral Malleolus Fractures Weber A

- ▣ Mechanism
  - Usually inversion injuries
  - Similar to ankle sprain
- ▣ Exam
  - TTP lateral mainly
  - Sometimes medially
    - ▣ Bone contusion
    - ▣ Occ deltoid
    - ▣ Always check ant drawer and talar tilt





# Lateral Malleolus Fractures

## Weber A

- ▣ Tx
  - Usually Non-op
    - ▣ Watch closely
  - Operative
    - ▣ Large displacement
    - ▣ Considerable instability
    - ▣ Increasing displacement on XRAYs
- ▣ When to refer?
  - Greater than 1 mm displacement



# Weber A ORIF



# Medial Malleolus Fractures

- ▣ Mechanism
  - Adduction
  - Sometimes inversion
  - Sometimes pronation, external rotation
- ▣ Exam
  - TTP medially
  - Always check ENTIRE fibula



# Medial Malleolus Fractures

- ▣ Tx
  - Non-op
    - ▣ Non-displaced
    - ▣ Certain risk factors
    - ▣ No syndesmosis injury



# Medial Malleolus Fractures

- ▣ Tx
  - Operative
    - ▣ Displaced
    - ▣ Fx associated with lig injury
    - ▣ Vertical shear
    - ▣ Those with Varus alignment of distal tibia
    - ▣ Cavovarus foot
    - ▣ Severe Pes PlanoValgus
- ▣ When to refer
  - Any displacement
  - Any foot deformity
  - Any hint of syndesmosis injury
    - ▣ May require fluoro exam



# Bimalleolar Ankle Fractures

- ▣ Almost always operative
  - Exception is certain risk factors
- ▣ Ankle joint local injection
- ▣ Splint posterior with stirrup
  - No risk factors – outpatient f/u
  - DM, Neuropathic, PVD
    - ▣ Send to ED or ensure follow-up in < 24 hours



# Trimalleolar Ankle Fractures

- ▣ Same as Bimalleolar ankle fractures





# Posterior Malleolus Fractures

- ▣ Mechanism
  - Direct Plantar flexion
  - Fall from height
  - Associated with all other previous mechanisms
- ▣ Exam
  - General ankle TTP
    - ▣ Not just posterior





# Posterior Malleolus Fractures

- ▣ Tx
  - Non-op
    - ▣ Non-displaced
    - ▣ Follow closely
    - ▣ Look for associated injuries
      - Syndesmosis
      - calcaneus
  - Operative
    - ▣ Displaced
- ▣ When to refer
  - Large fragments
  - Any displacement

# Syndesmosis Injuries

- ▣ Mechanism
  - Usually fixed foot and external rotation of body
  - **High Ankle Sprain**
    - ▣ Grade I, II, III
- ▣ Exam
  - Tender higher up leg
  - Sometimes TTP medial and along ATFL
  - Check entire fibula with XRAY if tender
  - Usually cannot bear weight early



# Syndesmosis Injuries

- ▣ Tx
  - Non-op
    - ▣ Grade I, Grade II
    - ▣ Most of these get MRI
    - ▣ Sometimes confirm stability with fluoro if deltoid sprain as well
    - ▣ Boot 2-6 weeks
  - Operative
    - ▣ Grade III
- ▣ When to refer
  - Grade II, III



# Maisonneuve





# Achilles Tendon Rupture

- ▣ 2 age groups
  - Weekend warrior (males)
  - Elderly
    - ▣ Less explosive trauma
- ▣ Many can walk
- ▣ Exam
  - Always check malleoli
  - Lat Xray
  - Don't get MRI!!!
  - When prone with knee flexed
    - ▣ Thompsons
    - ▣ Resting Equinus
    - ▣ Gap



# Achilles Tendon Rupture

- ▣ Nonop
  - Smokers
  - Obese
  - DM, PVD
  - **Regular people too???**
    - ▣ **See Surgeon in <24-48 hours for possible nonoperative**
- ▣ Operative
  - Young/Active
  - Maybe better tension/strength
  - Maybe lower rate of re-rupture



# Ankle Sprain

- ▣ Grades
  - I – mild
    - ▣ Stretch/minimal tearing
  - II – moderate
    - ▣ Partial tear
    - ▣ May require XRAY
  - III – complete tear
    - ▣ Often unable to bear weight
    - ▣ Need an XRAY



# When to XRAY

- ▣ TTP along posterior aspect of medial malleolus
- ▣ TTP along posterior aspect of lateral malleolus
- ▣ Unable to WB immediately or during exam
  
- ▣ Include foot XRAY
  - TTP at 5<sup>th</sup> metatarsal base
  - TTP at anterior process of calcaneus
- ▣ I like WB XRAYS if possible



# Ankle Sprain Initial Tx

- ▣ Immobilize
  - Splint, brace, boot, ace wrap
- ▣ Ice
  - Only if you use a flip phone!!!
- ▣ Elevation
- ▣ Compression – Light
- ▣ Gentle ROM
  - Not PF/Inversion
- ▣ Crutches prn



# Ankle Sprain RTP

- ▣ Functional rehab
  - Reduce swelling/pain
  - ROM
  - Strength
  - Proprioception
  - Sport specific
- ▣ Grade I – few days
- ▣ Grade 2 – 1-4 weeks
- ▣ Grade 3 – 4-8 weeks
- ▣ Grade 3
  - Consider immobilizing in a boot to limit PF/Inversion for a couple of weeks →

# Proprioception

- ▣ Ability of the body to sense location, movement, position, orientation of its parts



THANK YOU!!!

Questions???