Knock Their Socks Off: Foot & Ankle Pathologies You May Be Missing

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DISCLOSURES

I have no personal or financial interests to declare.

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OUTLINE

1. Morton's Neuroma
2. Lisfranc Injury
3. Achilles Rupture
4. 5th Metatarsal Fractures
   - avulsion
   - Jones
   - stress

INTRO

Ankle special tests (we'll come back to these later)

PRE-TEST QUESTION #1

Which of the following is a simple special test maneuver that may help confirm Morton's neuroma?

A. Thompson test
B. metatarsal compression test
C. Kleiger's test
D. anterior drawer test
E. inversion stress test

PRE-TEST QUESTION #2

What mechanism of injury is known to cause a Lisfranc fracture/dislocation?

A. direct blow to the foot
B. hyper dorsiflexion of the foot/ankle
C. excessive external foot rotation
D. axial load on a plantar flexed foot

PRE-TEST QUESTION #3

Which of the following statements is true about 5th metatarsal fractures?

A. stress fractures are most common
B. avulsion fractures are most common
C. Jones fractures are most common
D. fractures of this bone are rare

INTRODUCTION & BACKGROUND

WHY DO WE CARE?

- foot and ankle susceptible to both ***acute injury*** and ***overuse syndromes***

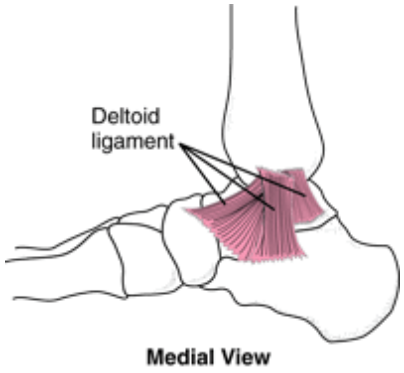
- foot/ankle dysfunction = disability, altered gait

- ***~25% of all sports injuries*** occur at the foot/ankle

ANATOMY - LIGAMENTS

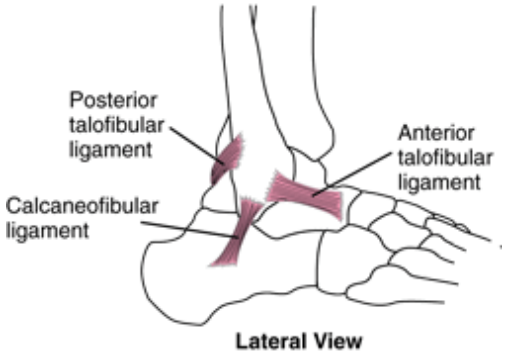
Medially (*big, thick, strong*)

- deltoid ligament



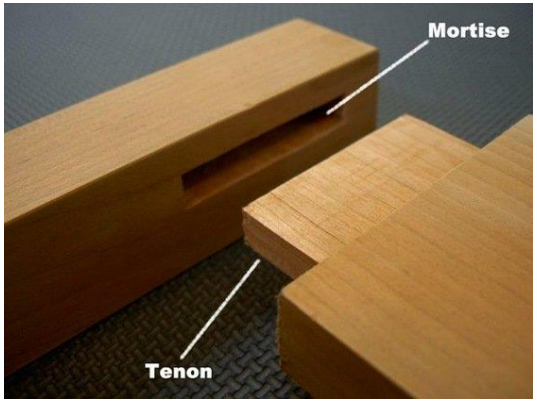
Laterally – three distinct ligaments (*puny, weak*)

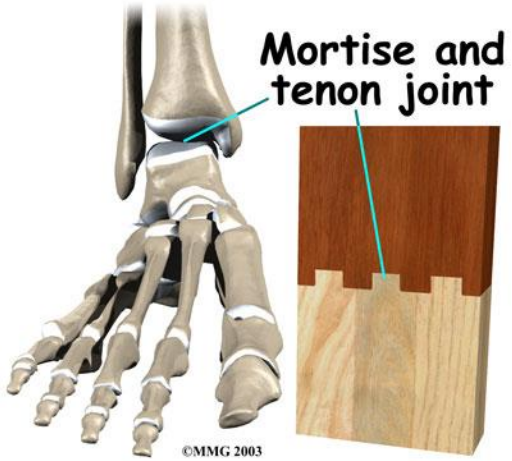
- anterior talofibular ligament (ATF)
- posterior talofibular ligament (PTF)
- calcaneofibular ligament (CF)



ANATOMY

Ankle *“mortise”* joint

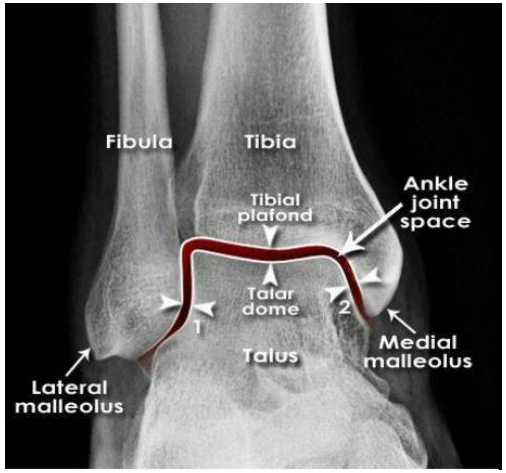


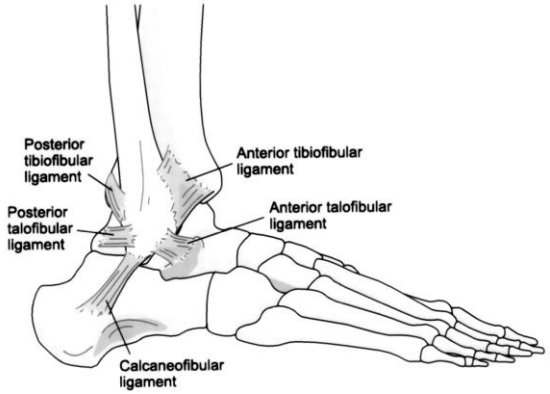


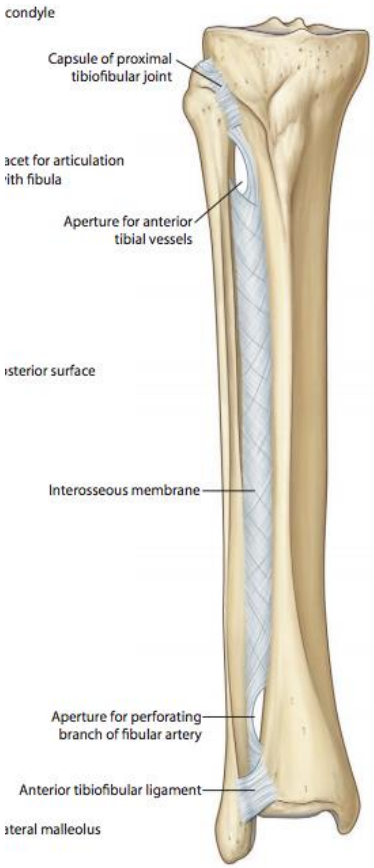
ANATOMY

Ankle *“mortise”* joint

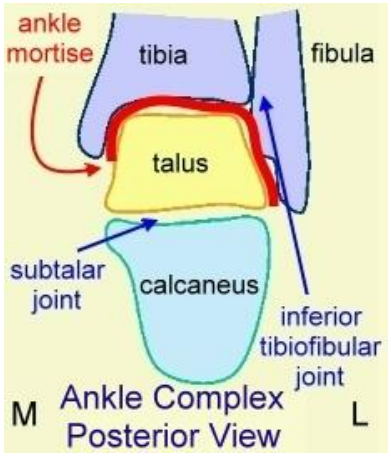
- anterior tibiofibular ligament
- posterior tibiofibular ligament
- interosseous membrane

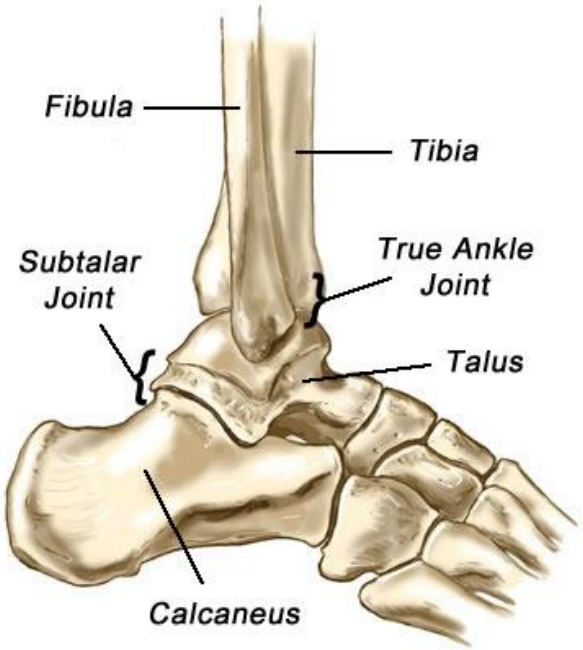






ANATOMY: TWO "ANKLE" JOINTS





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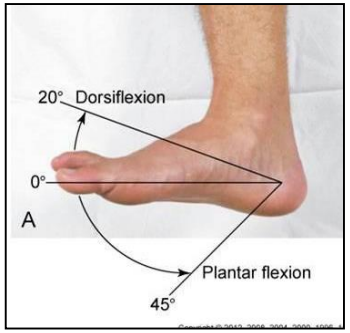
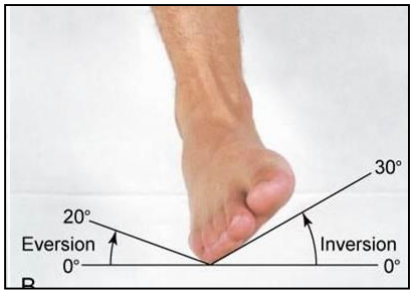


Ankle

- dorsiflexion & plantarflexion
- inversion & eversion



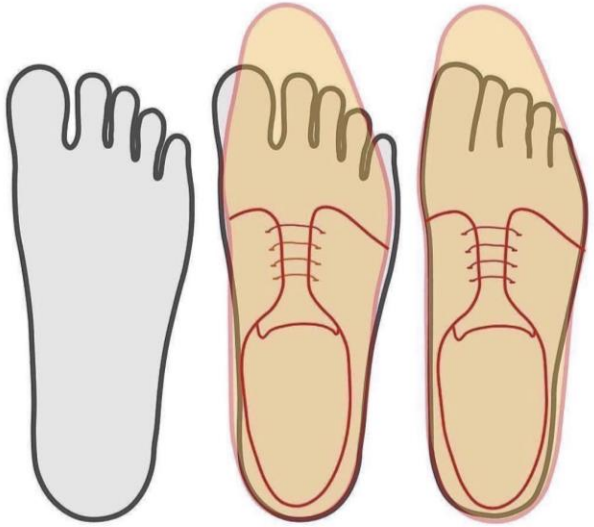
Foot

- internal (medial) rotation
- external (lateral) rotation

MORTON'S NEUROMA

entrapment/compression of inter-digital nerve

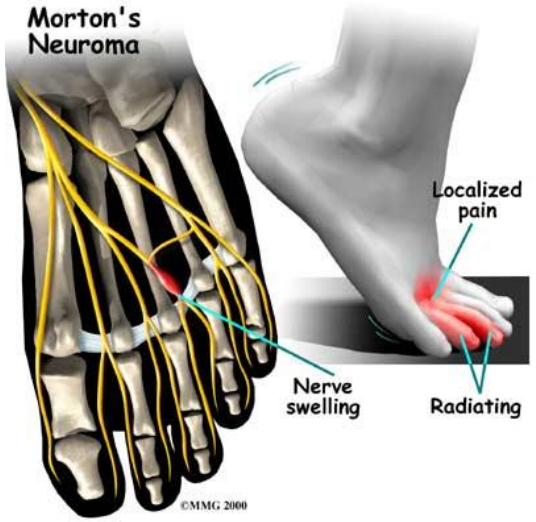
- causes: running, ballet, high heels, narrow toe box shoes
- 2nd and 3rd web spaces most common
- incidence: females > males



MORTON'S NEUROMA

History

- burning, stinging pain
- worse with WB
- numbness/tingling into toes



MORTON'S NEUROMA

Physical Exam

- specific tenderness on area between metatarsals
- Metatarsal Compression Test

Imaging

- X-rays not helpful
- ultrasound/MRI show most, not all

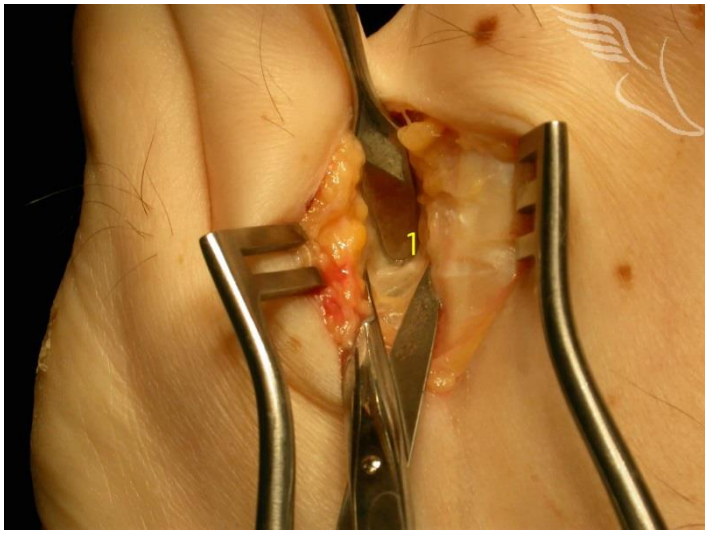
MORTON'S NEUROMA

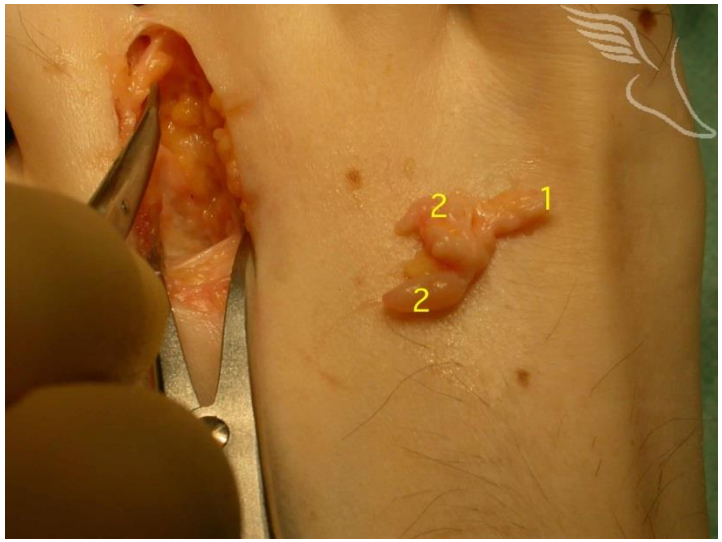
Conservative treatment

- wide shoes, no heels
- metatarsal pads
- corticosteroid injections

Surgical treatment

- neuroma excision

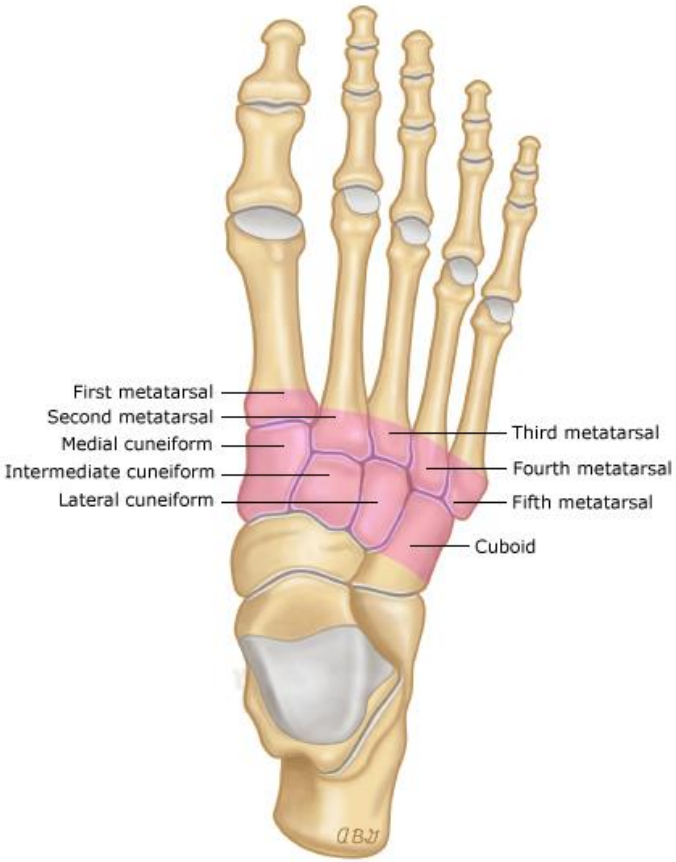




LISFRANC INJURY

Tarsometatarsal (Lisfranc) joint complex

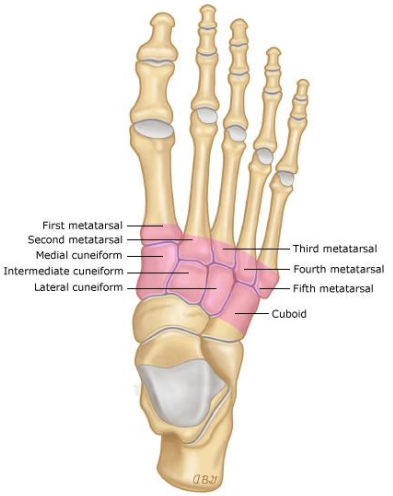
- injuries here are ***not common***, but ***frequently missed***
- legal ***liability***

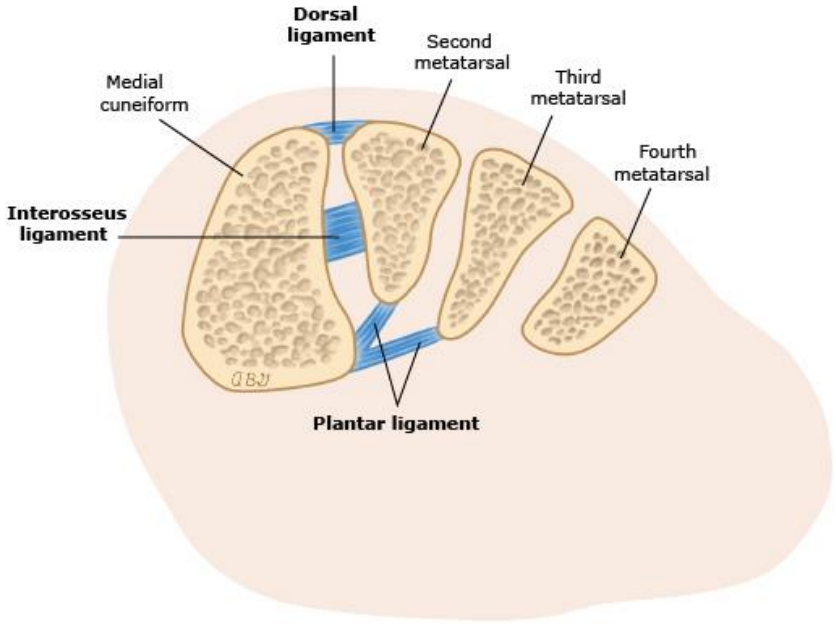


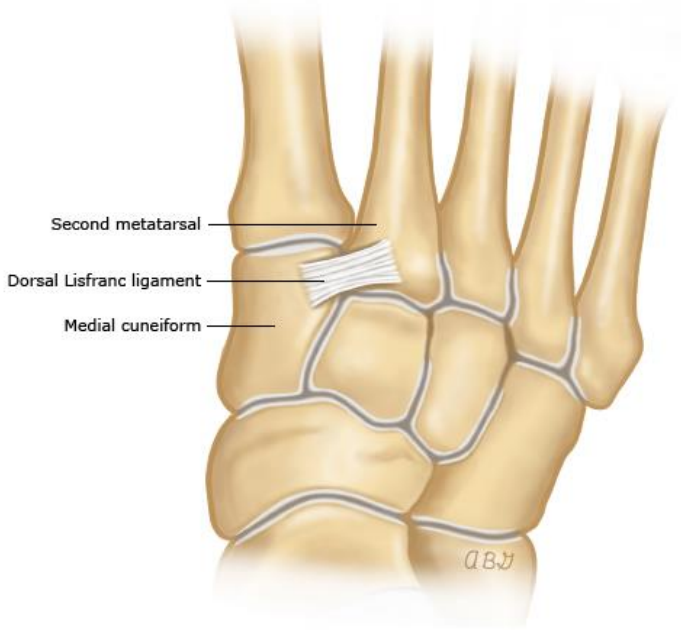
LISFRANC INJURY

Tarsometatarsal (Lisfranc) joint complex

- ***dorsal*** ligament is most important







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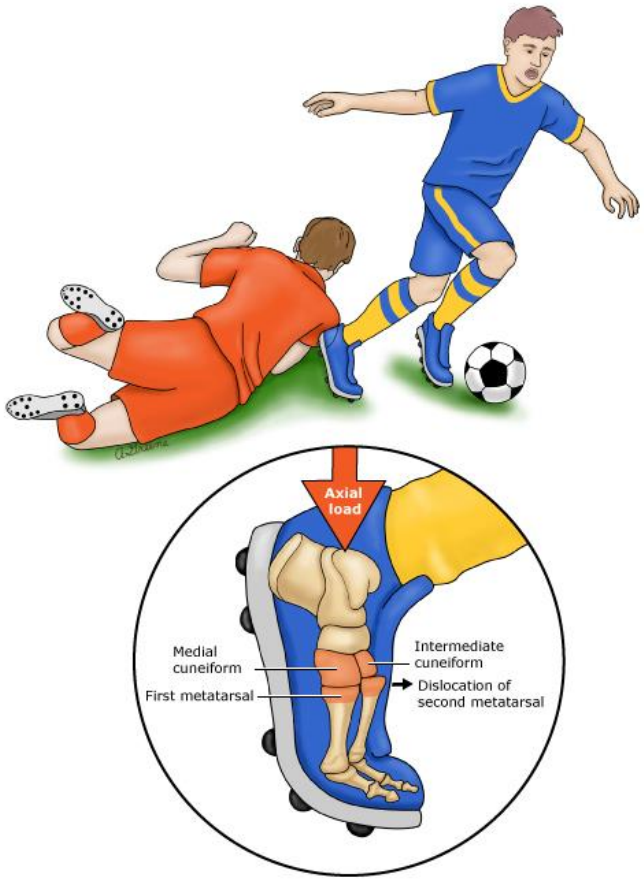
LISFRANC INJURIES

Tarsometatarsal (Lisfranc) joint complex

- mechanism of injury: trauma (***axial load***)
  - MVCs
  - falls
  - athletics



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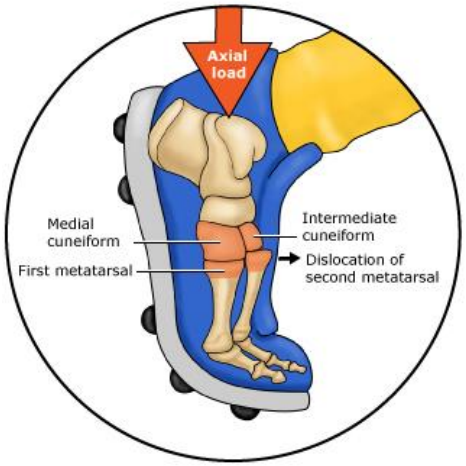
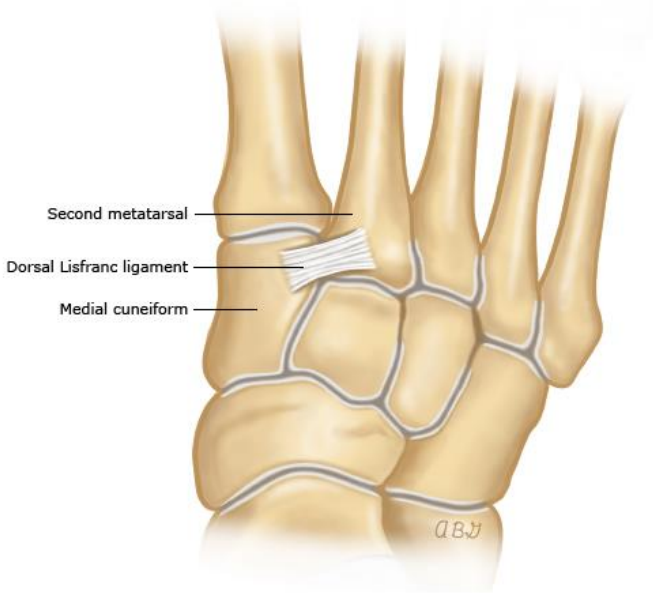
LISFRANC INJURY

Tarsometatarsal (Lisfranc) joint complex

- ***terminology*** can be confusing:
  - Lisfranc fracture
  - Lisfranc dislocation
  - Lisfranc "injury"





LISFRANC INJURY

History

- MOI (mechanism of injury)
- pain & swelling at TMT joint
- worse w/ weight bearing (often ***cannot*** walk)

LISFRANC INJURY

Physical Exam

- point tenderness at TMT joint
- swelling & ***ecchymosis***
- ↓ ROM
- ↓ strength

LISFRANC INJURY

"diastasis" = widening

LISFRANC INJURIES

LISFRANC INJURIES

LISFRANC INJURY

Imaging

- X-rays: three views (AP, lateral, oblique)
  - often misread as “normal”
  - findings can be quite ***subtle***

AP View: normally, medial borders of ***2nd MT*** and ***middle cuneiform*** should align

LISFRANC INJURY

Imaging

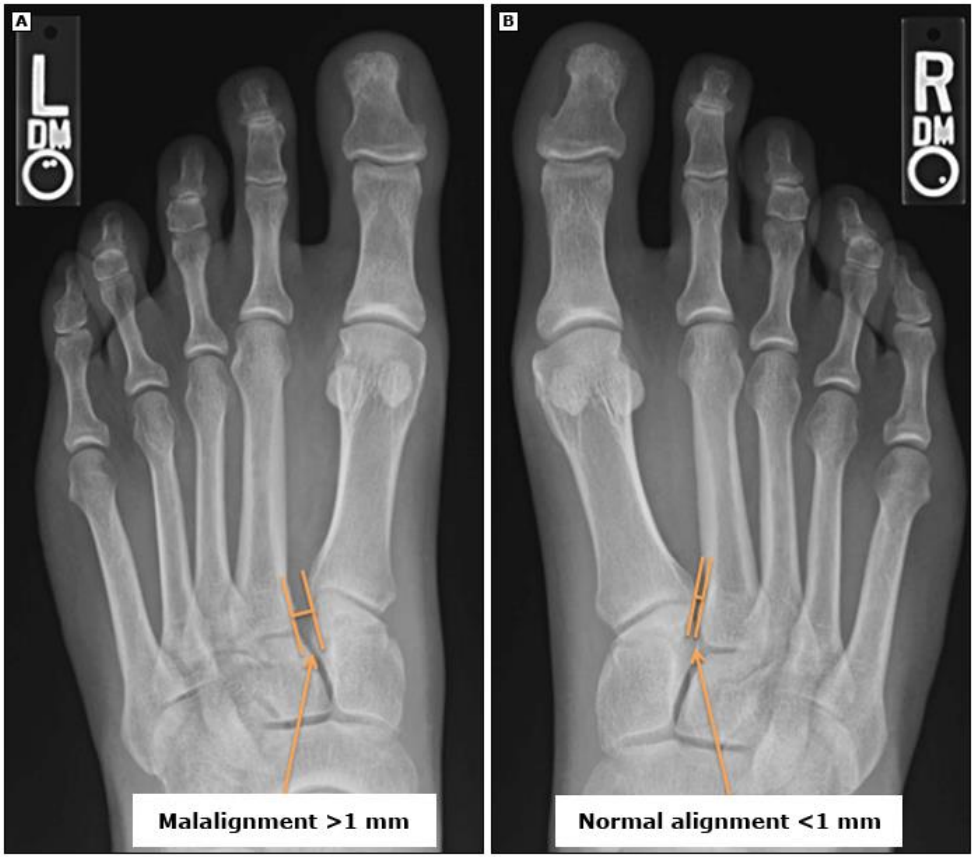
- X-rays: three views (AP, lateral, oblique)
  - often misread as “normal”
  - findings can be quite ***subtle***

Oblique View: normally, medial borders of ***4th MT*** and ***cuboid*** should align

LISFRANC INJURY

Imaging

- ***50%*** of athletes with midfoot injuries have normal ***non-weight bearing*** radiographs
- Order ***weight bearing X-rays on single cassette***



LISFRANC INJURY

LISFRANC INJURIES

LISFRANC INJURY

Imaging

- *But wait, there's more!!*

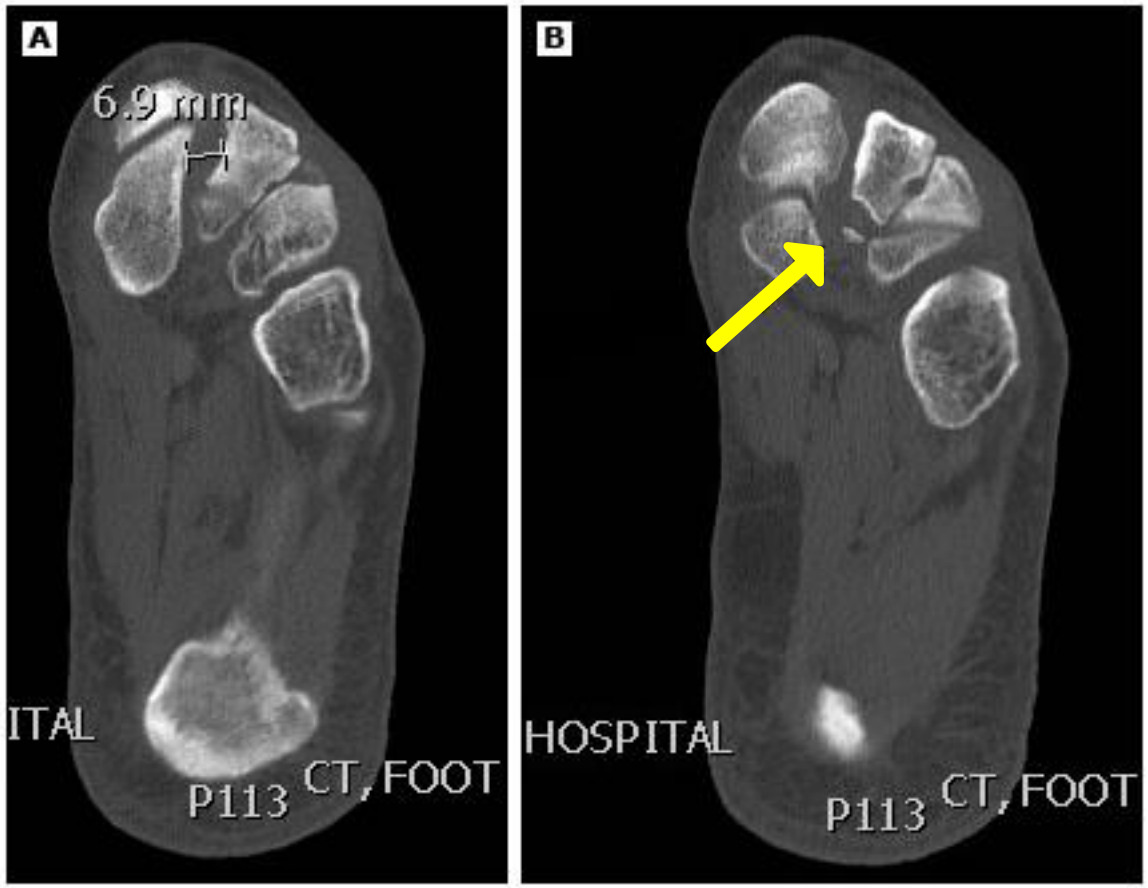
- Multiple studies demonstrate: <u>even properly performed weight-bearing radiographs</u> have ***limited specificity & sensitivity*** for detecting TMT injuries

- Obtain advanced imaging: ***CT or MRI***

LISFRANC INJURIES

Imaging

- Example of a CT



LISFRANC INJURY

Classification system?

Acute Management

- immobilize (splint or CAM walker)
- non-weight bearing: crutches
- referral to Orthopedics

LISFRANC INJURY

Long-term Management

Soft Tissue Injury & Non-displaced fractures	Dislocations & Displaced Fractures
Non-operative	Operative
Immobilize 6-10 weeks, then physical therapy	Open reduction, internal fixation (ORIF)

ACHILLES RUPTURE

- at risk with running, jumping, & ***sudden acceleration/deceleration***
- at risk when current Achilles tendonitis/tendonosis

Incidence

- General population: 0.01%

  (80% of these are during recreational sports)

- Competitive athletes: 8.3%
  - sprinters: 18%
  - decathletes & soccer: 17%
  - T&F jumpers: 12%
  - basketball: 12%

ACHILLES RUPTURE

- ↑ recreational sport participation = ↑ rate of tendon ruptures
- peak age: 30 to 40 years (male & female)
  - this might be when ***degenerative changes*** & ***high stress from sports*** coincide
- rupture ***4-5x*** more common in men

ACHILLES RUPTURE

Glucocorticoids

- oral ***systemic*** steroids and/or ***local*** injections increase risk of rupture

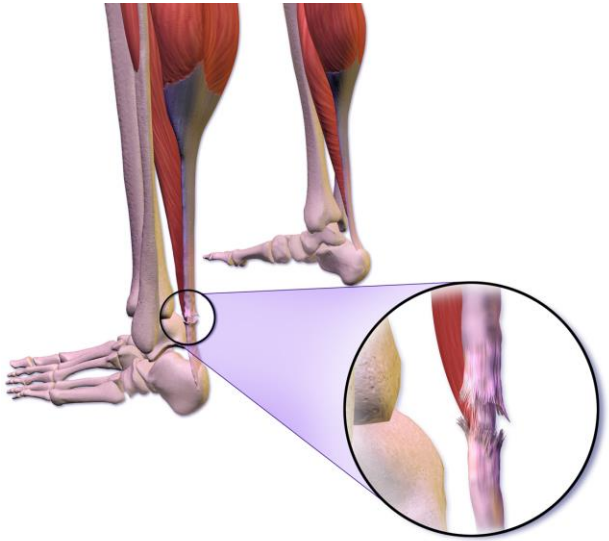
Fluoroquinolones

- incidence of rupture is overall rare: 12 per 100,000 (0.012%)
- but, risk is ***3x higher during first 90 days*** of taking for the ***1st time***

ACHILLES RUPTURE

"water shed" area

- poor blood supply: 2 - 6 cm above the insertion point
- most ruptures occur here



ACHILLES RUPTURE

History

- ***Sudden*** pivoting or rapid acceleration/deceleration

- Struck violently in the back of ankle??
  - "got kicked from behind"
  - "someone shot me"
  - "hit by a 2x4"

- Feel & hear a ***loud "pop"***

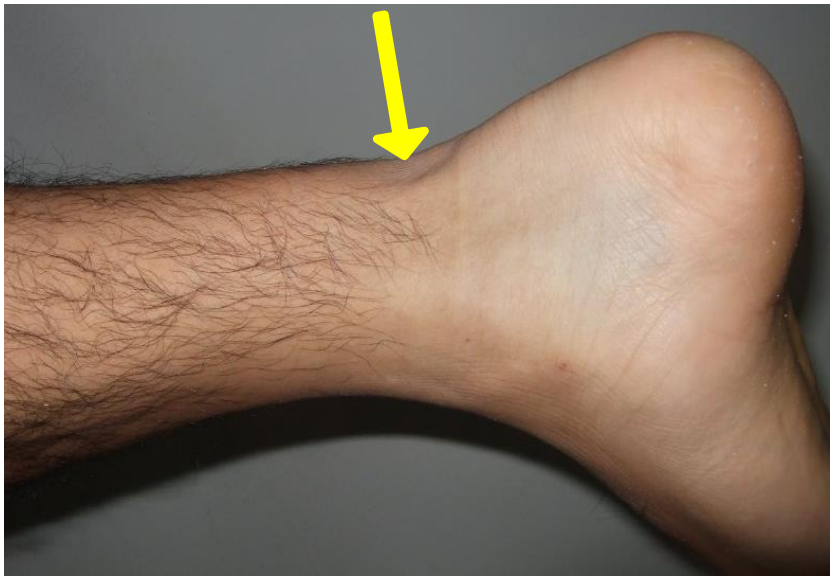
- Sharp pain, then less pain

ACHILLES RUPTURE

Physical Exam

- Straightforward, but don't be fooled!

- Achilles tendon easily identified & palpated
- Palpate for ***tenderness*** and for ***defect***

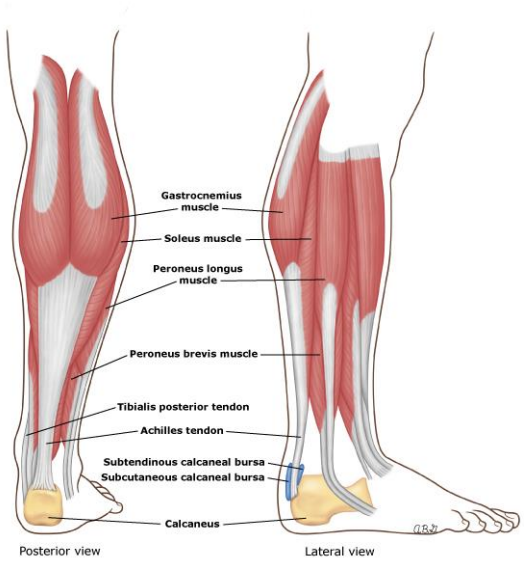


ACHILLES RUPTURE

Physical Exam

- Straightforward, but don't be fooled!

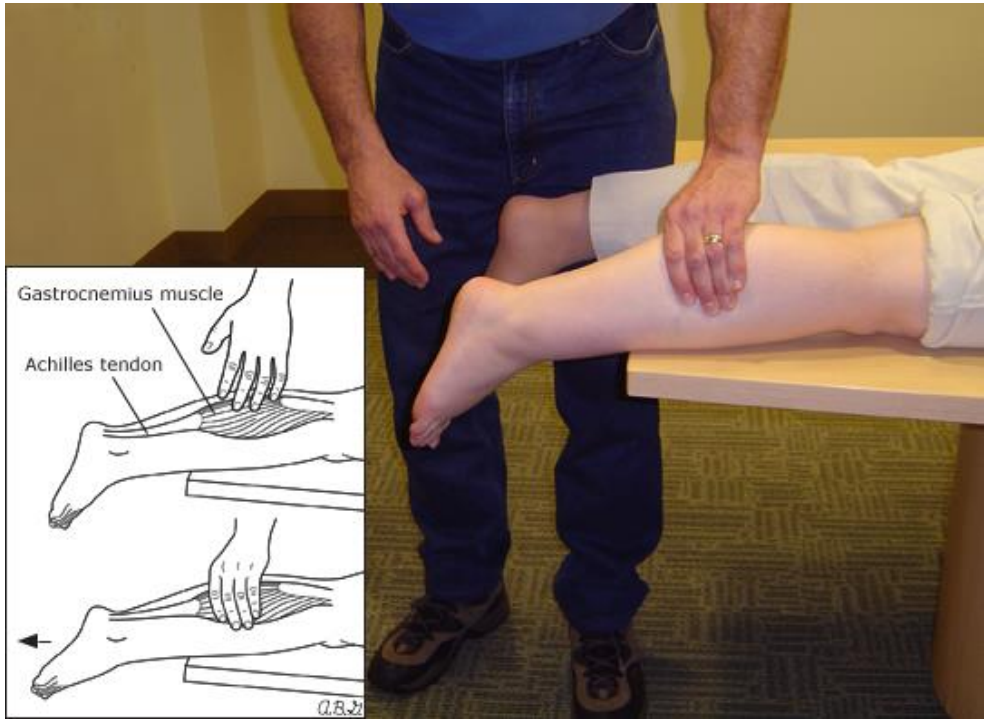
- UTD: "*sizable minority of patients with complete rupture are able to ambulate*"
  - Many are able to actively plantarflex too…how?



ACHILLES RUPTURE

Physical Exam

- Thompson (calf squeeze) Test
  - therefore, ***more reliable*** than a patient's inability to walk or plantarflex

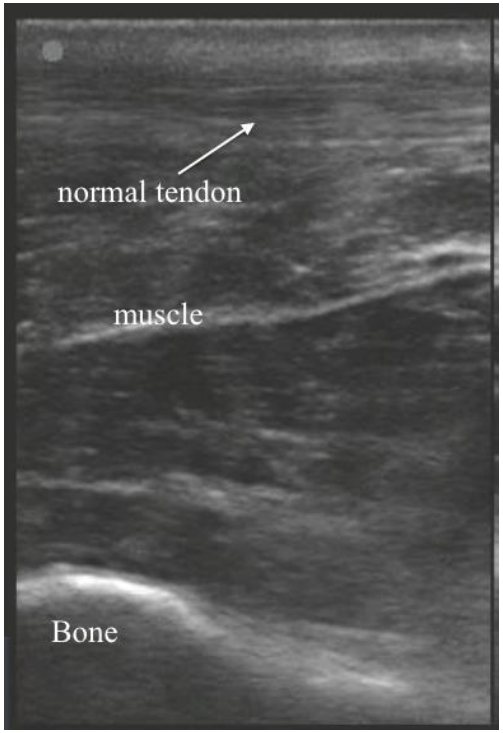


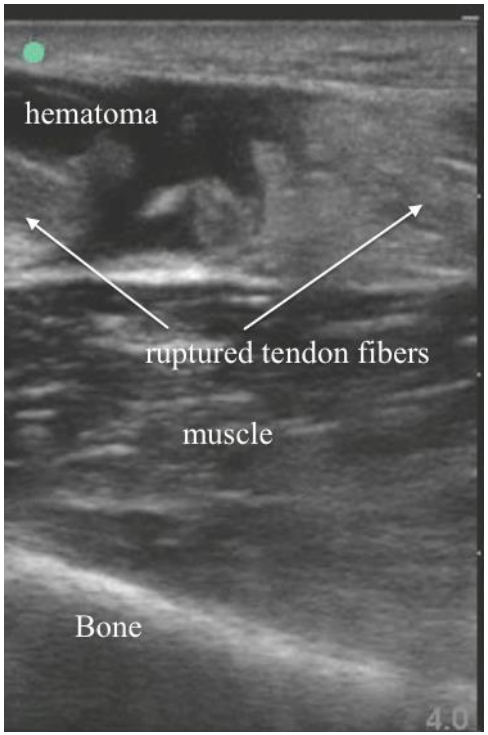
Sens	Spec
96%	93%

ACHILLES RUPTURE

Imaging (acutely)

- Not necessary emergently, Achilles tendon rupture may be diagnosed ***solely on clinical exam***
- Ultrasound enables rapid confirmation at bedside
  - 100% sensitivity, 83% specificity

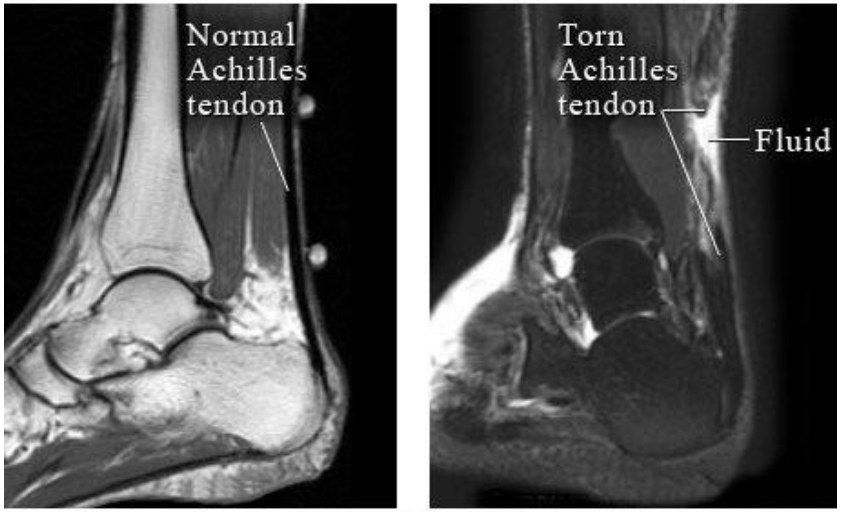




ACHILLES RUPTURE

Imaging (follow-up)

- Magnetic Resonance Imaging (MRI)
- Confirmatory, surgical planning



ACHILLES RUPTURE

Acute Management

- immobilize (splint or CAM walker)
- ***heel lift***
- non-weight bearing: crutches
- referral to Orthopedics ***(1-2 days)***

ACHILLES RUPTURE

Long-term Management

a) Non-operative: immobilize 6-8 weeks with heel lift
b) Operative: repair vs. reconstruction

5TH METATARSAL FRACTURES

Any metatarsal can fracture…

…but the 5th metatarsal is the most common to fracture

Acute (traumatic) fracture

Stress fracture

5TH METATARSAL FRACTURES

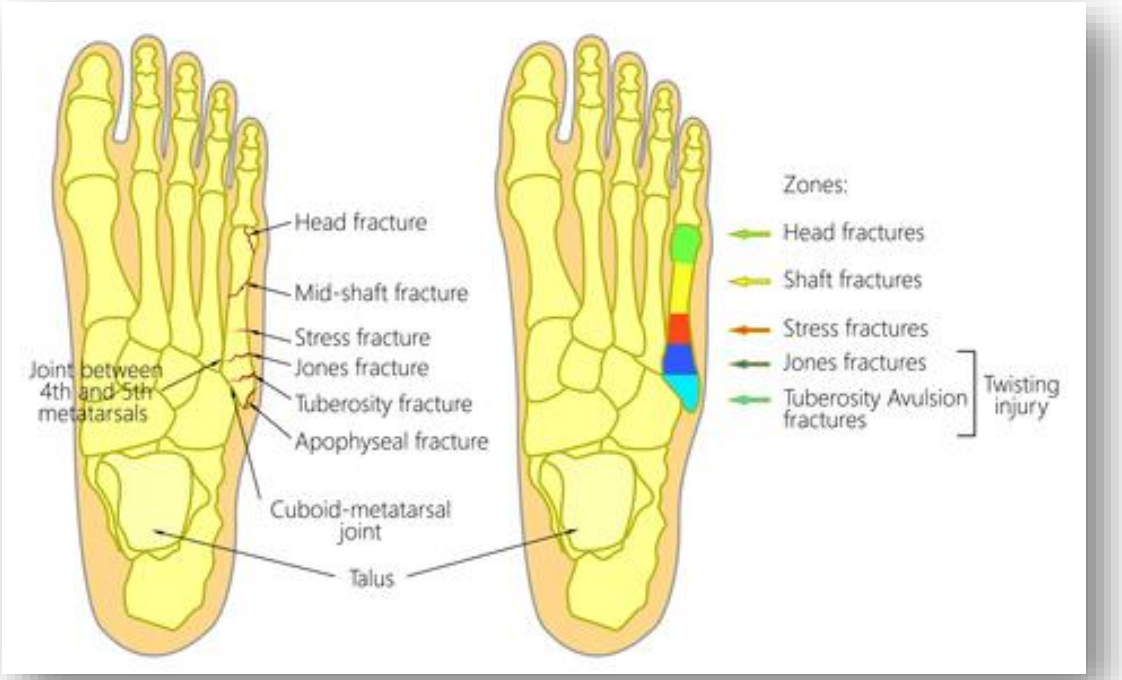
Traumatic 5th metatarsal fractures are often from:

- inversion ankle injuries
- direct blow
- twisting of the foot (stepping on uneven surface)

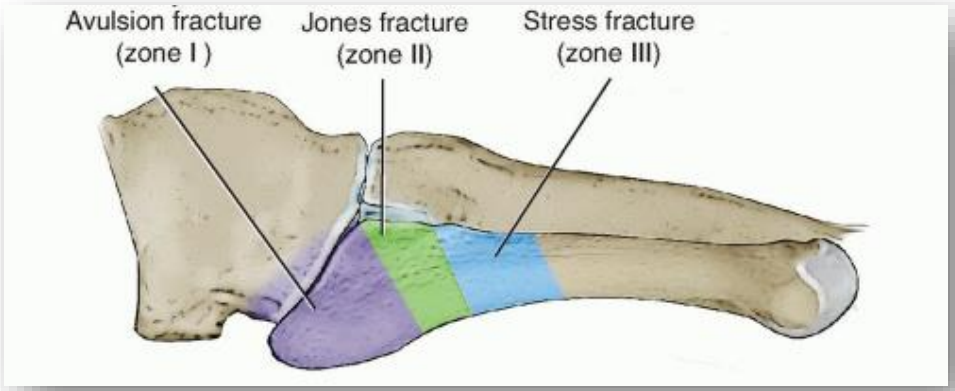
5TH METATARSAL FRACTURES

Can fracture anywhere, but commonly:

1. mid-diaphyseal (shaft) or head fractures (trauma)
2. proximal portion of diaphysis (stress fx)
3. junction of metaphysis & diaphysis (trauma), AKA “Jones fx”
4. tubercle (base) avulsion fractures (ankle sprain)



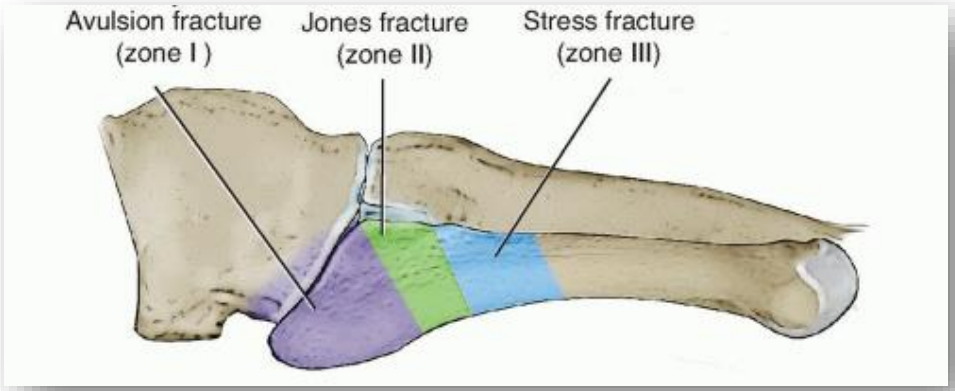
5TH METATARSAL FRACTURES



Relative Frequency

- Zone 1: 93%
- Zone 2: 4%
- Zone 3: 3%

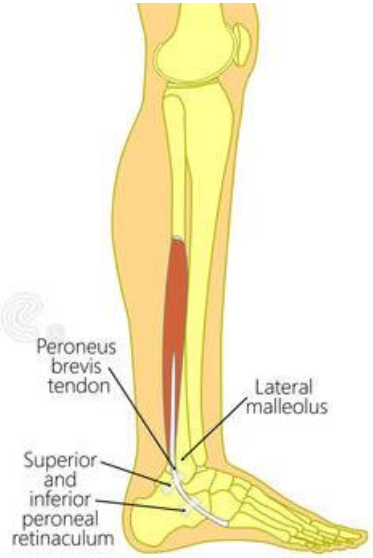
5TH METATARSAL FRACTURES



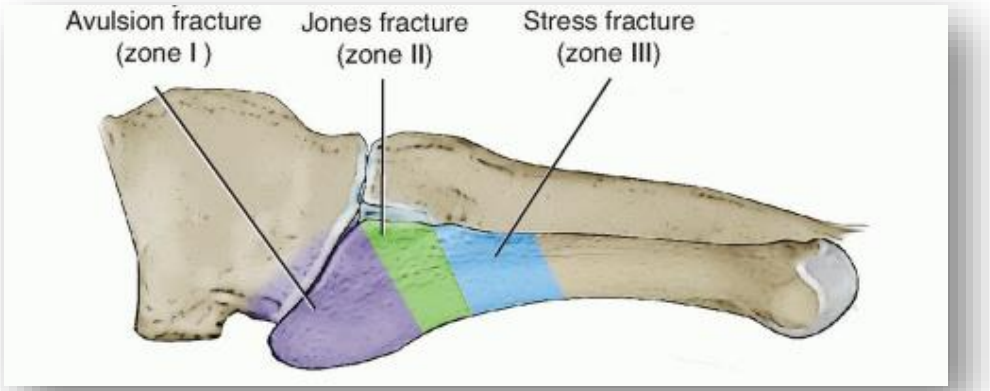
Relative Frequency

- Zone 1: 93%
- Zone 2: 4%
- Zone 3: 3%

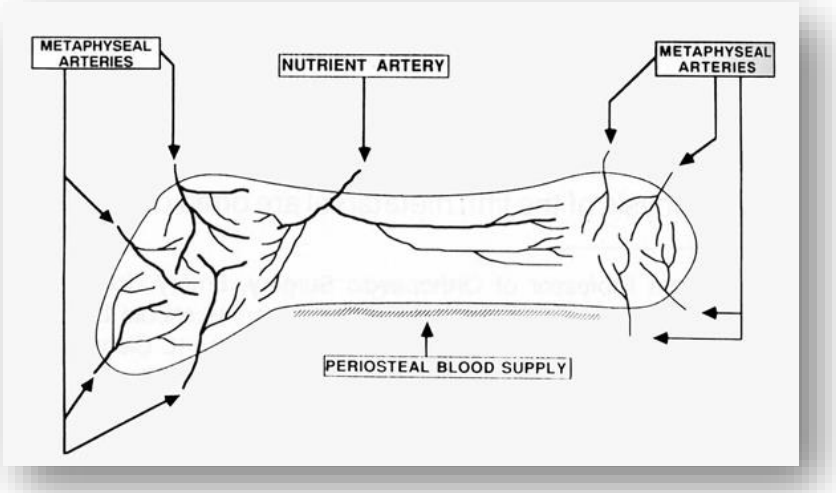
- Why are most avulsion fractures?



5TH METATARSAL FRACTURES



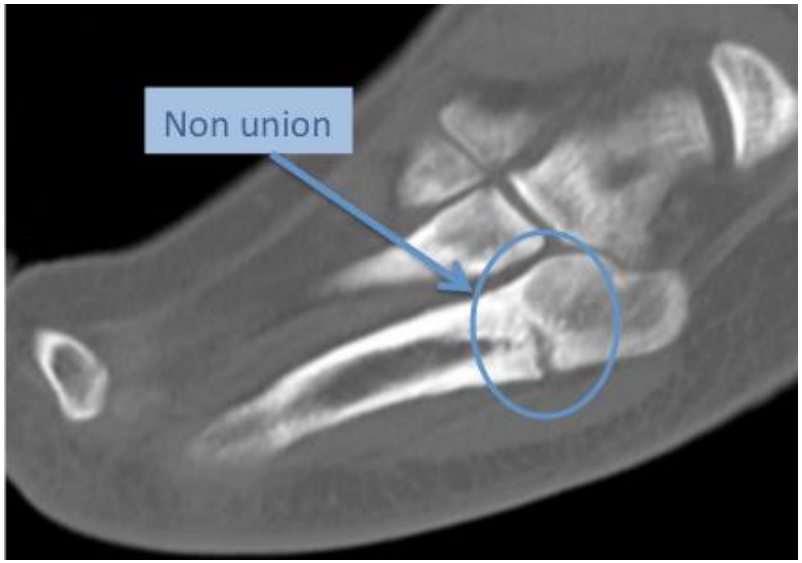
- Fractures in ***Zone 2*** aka "***Jones*** fractures"
  - problematic due to poor blood supply ("watershed area")



5TH METATARSAL FRACTURES

Jones fractures

- increased risk of non-union (25%)
- weight bearing too early associated with increased non-union

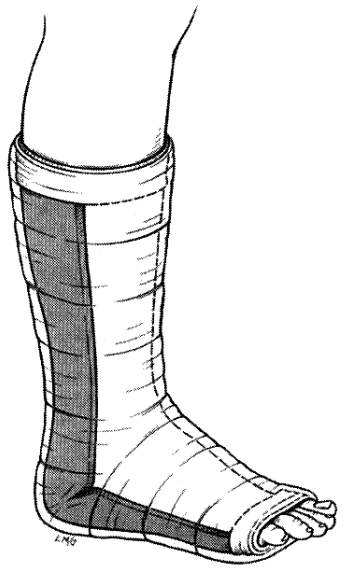


5TH METATARSAL FRACTURES

Acute Treatment of Jones Fracture

- Non-weight bearing
- Splint: posterior short leg splint or western walker boot

1. keep ankle at 90° (very important!!)
2. begin at metatarsal heads
3. wrap around posterior heel
4. stop at level of fibular head



5TH METATARSAL FRACTURES

Definitive Treatment of Jones Fracture

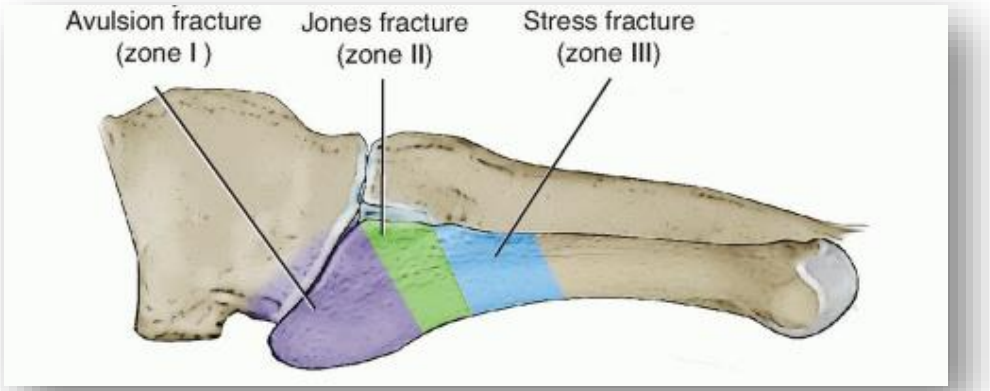
Non-operative

- cast or western walker boot, ***but avoid early weight bearing***
- bone stimulator

Operative

- bone graft
- medullary screw

5TH METATARSAL FRACTURES



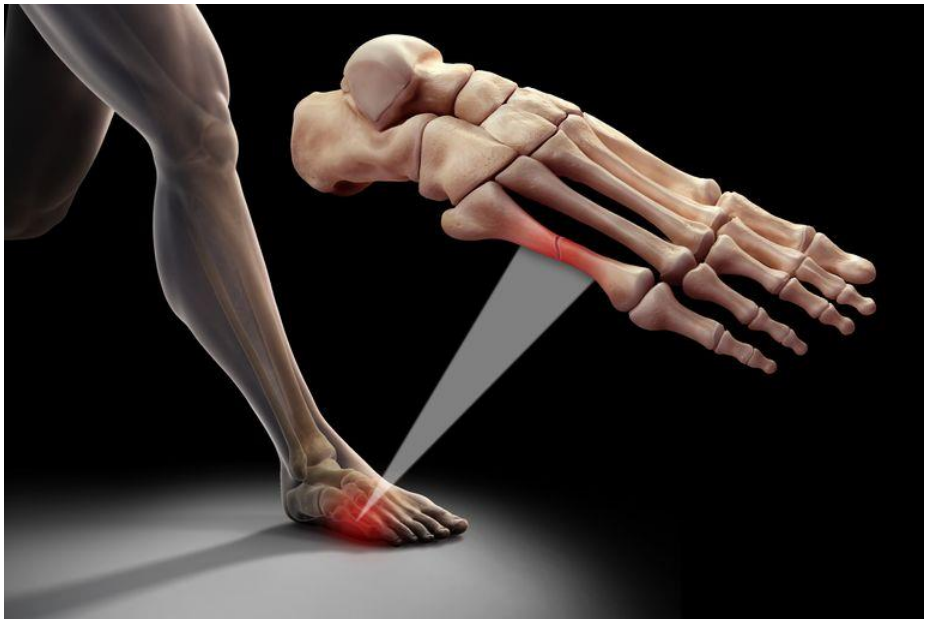
Zone 3: common area for stress fractures

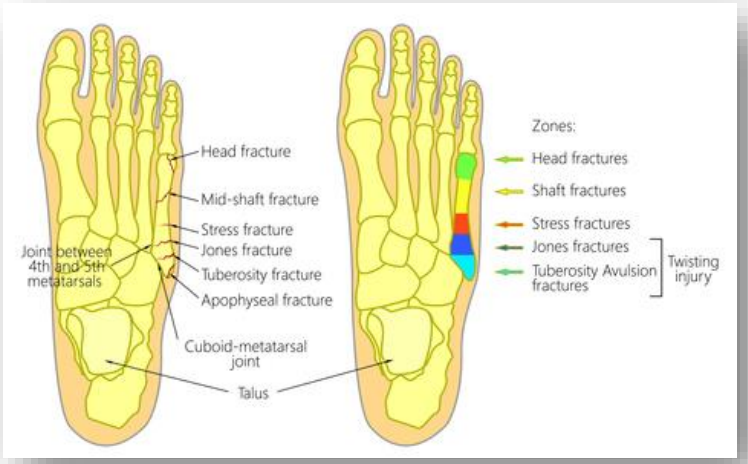
- common in running athletes
- treat like all other stress fractures…
  - REST: non-weight bearing with crutches, western walker boot
  - cross-training
  - bone stimulator
  - consider female athlete triad
  - may need surgery if not healing w/ conservative measures

5TH METATARSAL FRACTURES

Can fracture anywhere along the 5th metatarsal

- treat any other ***acute, traumatic*** fracture like any other fracture…

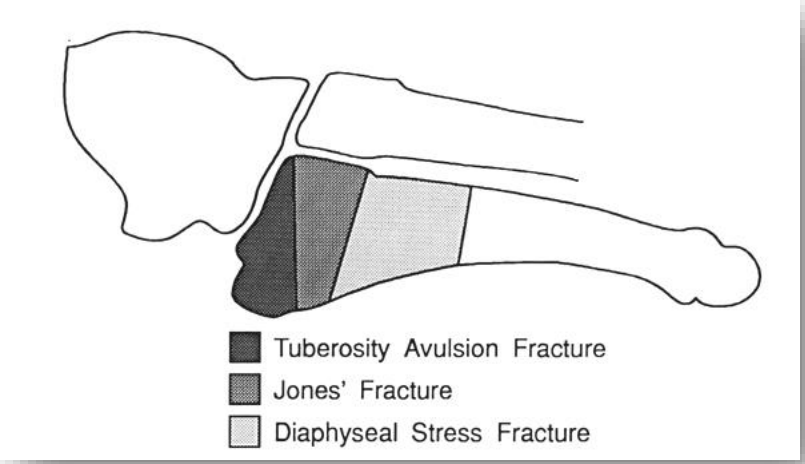




5TH METATARSAL FRACTURES

Summary

- Zone 1: non-operative, can Tx in Primary Care (treat the ankle sprain)
- Zone 2: non-operative or operative, refer to Orthopedics b/c of high incidence of non-union
- Zone 3: non-operative at first, can treat in Primary Care. If not healing, refer to Ortho for possible operative treatment



SUMMARY: KEY POINTS

Morton's Neuroma	• narrow toe box • 2nd & 3rd web spaces • metatarsal compression test
Lisfranc Injuries	• rare, but frequently missed = legal liability • tarsometatarsal joint complex • often cannot weight bear • subtle X-ray findings
Achilles Rupture	• most occur in athletes or with recreational sports • most common in males, ages 30 – 40 • surprise at suddenness of injury • Thompson test • must refer to Ortho quickly
5th Metatarsal Fractures	• Zone 1, Zone 2, & Zone 3 • Jones fracture – watershed area

POST-TEST QUESTION #1

Which of the following is a simple special test maneuver that may help confirm Morton's neuroma?

A. Thompson test
B. metatarsal compression test
C. Kleiger's test
D. anterior drawer test
E. inversion stress test

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B. ***metatarsal compression test***
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POST-TEST QUESTION #2

What mechanism of injury is known to cause a Lisfranc fracture/dislocation?

A. direct blow to the foot
B. hyper dorsiflexion of the foot/ankle
C. excessive external foot rotation
D. axial load on a plantar flexed foot

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POST-TEST QUESTION #3

Which of the following statements is true about 5th metatarsal fractures?

A. fractures of this bone are rare
B. stress fractures are most common
C. avulsion fractures are most common
D. Jones fractures are most common

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Which of the following statements is true about 5th metatarsal fractures?

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