

# Lisfranc Injuries

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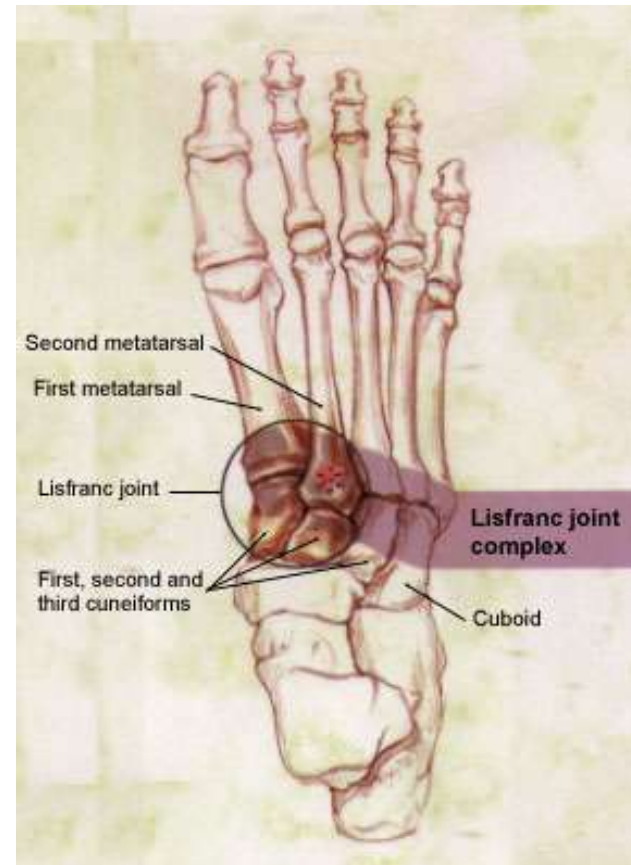
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# Lisfranc

- First described by French surgeon, Jaques Lisfranc serving in Napoleons's army on the Russian front
- Described a method of forefoot amputation for management of gangrene
- Some reports suggest that there was no osteotomy across the tarsometatarsal joints as previously thought!

# Lisfranc joint

- Lisfranc ligament- spans articulation of medial cuneiform and 2nd MT base
- No transverse ligament exists between 1st and 2nd MT bases
- “Keystone” wedging of 2nd MT into cuneiform- support for entire tarsometatarsal articulation
- “Weak link”

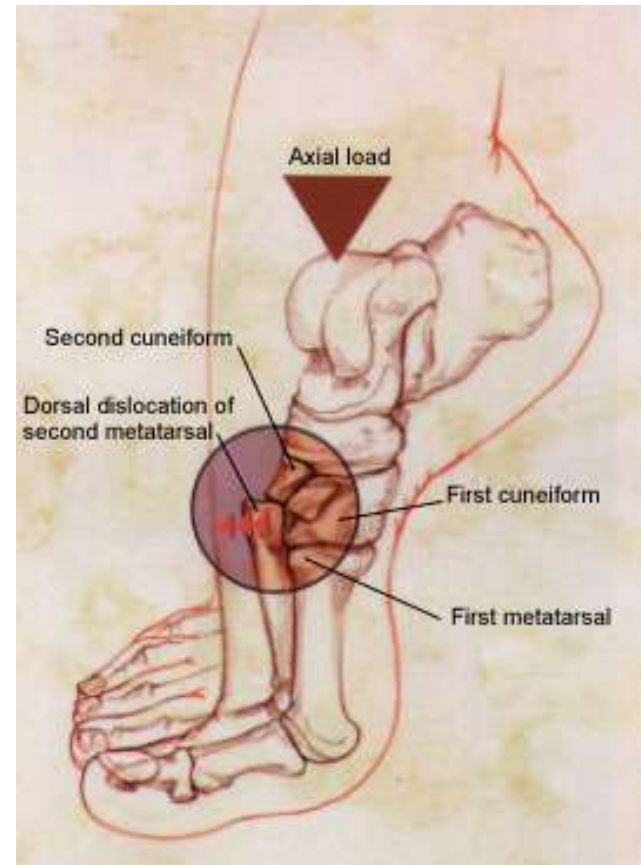


# Lisfranc function

- Promotes energy dissipation
  - Allows force to be transmitted between midfoot and forefoot
- Stable axis for rotation
- Key for plantar flexion and dorsiflexion

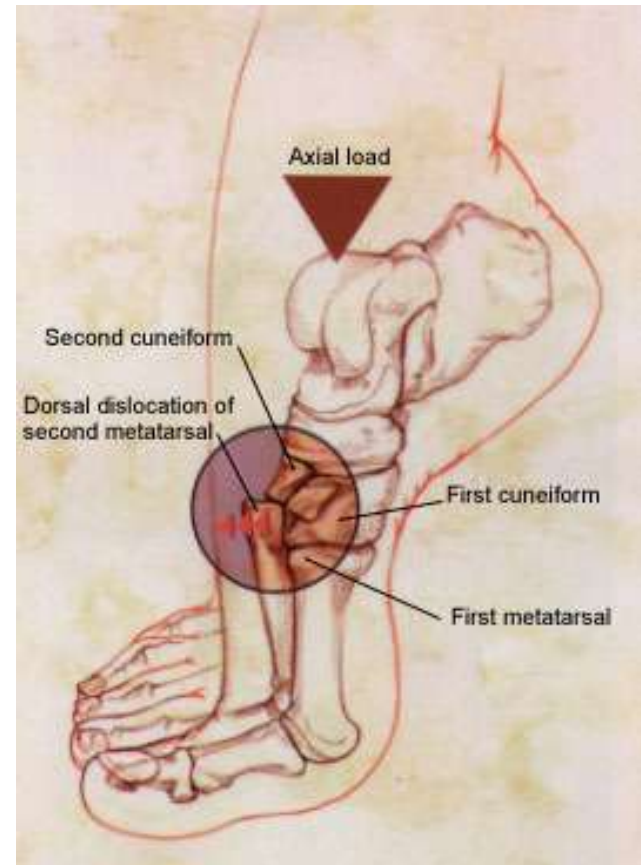
# Mechanisms of Injury

- Direct trauma
- Indirect trauma
  - Stationary foot with weight of body becoming deforming force by torque, rotation, compression
- High energy forces
- Falling forward on plantar flexed foot



# Mechanisms of Injury

- Athletic: axial loading on hyperplantarflexed foot
  - Foot ball
  - Gymnastics
  - Ballet
  - Track and field
- Neuropathic
  - Subacute diastasis can occur over time without significant pain
  - Loss of “keystone”



# Lisfranc injuries

- Sprains
  - 1st and 2nd degree: Partial ligament tears with no instability and normal radiographs
  - 3rd degree: Instability and diastasis  $> 2\text{mm}$  on AP
- Fractures
  - Isolated: 1 or 2 MTs displaced
  - Homolateral: all MTs displaced in same direction
  - Divergent: MTs are displaced in sagittal or coronal plane
- Joint dislocations

# Symptoms and Exam

- Swelling and pain in midfoot
- Inability to bear weight
- Midfoot instability
- Suspect when mechanism is consistent and swelling or pain persists 5 or more days from initial injury
- Pain at joint with gentle pronation and abduction of the foot
- Make sure to palpate DP pulse and cap refill



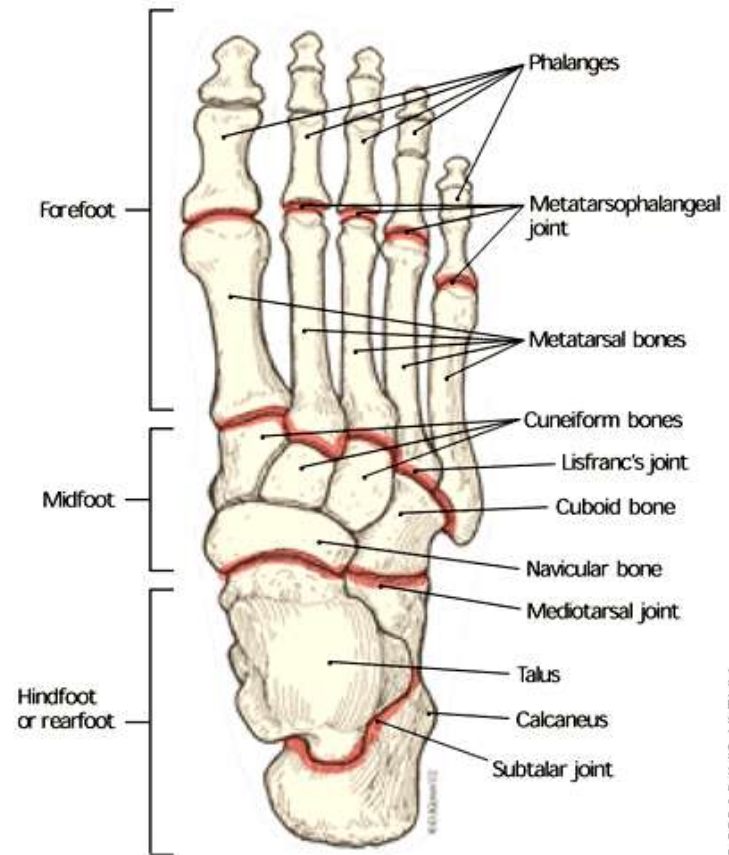


# Radiographs

- Weight bearing AP
- Lateral
- 30 degree oblique
- CT scan or bone scan if x rays unrevealing and suspicion is high

# Normal Lisfranc

- Medial edge of 2nd MT base should line up with the medial edge of middle cuneiform
- Medial edge of 3rd MT should line up with medial edge of 3rd cuneiform
- Medial edge of 4th MT base should be in line with medial edge of cuboid



# Weight bearing AP

- Medial border  
2nd MT in line with medial border middle cuneiform

QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.

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# Lateral

- 1st and 2nd MTs in line with cuneiforms



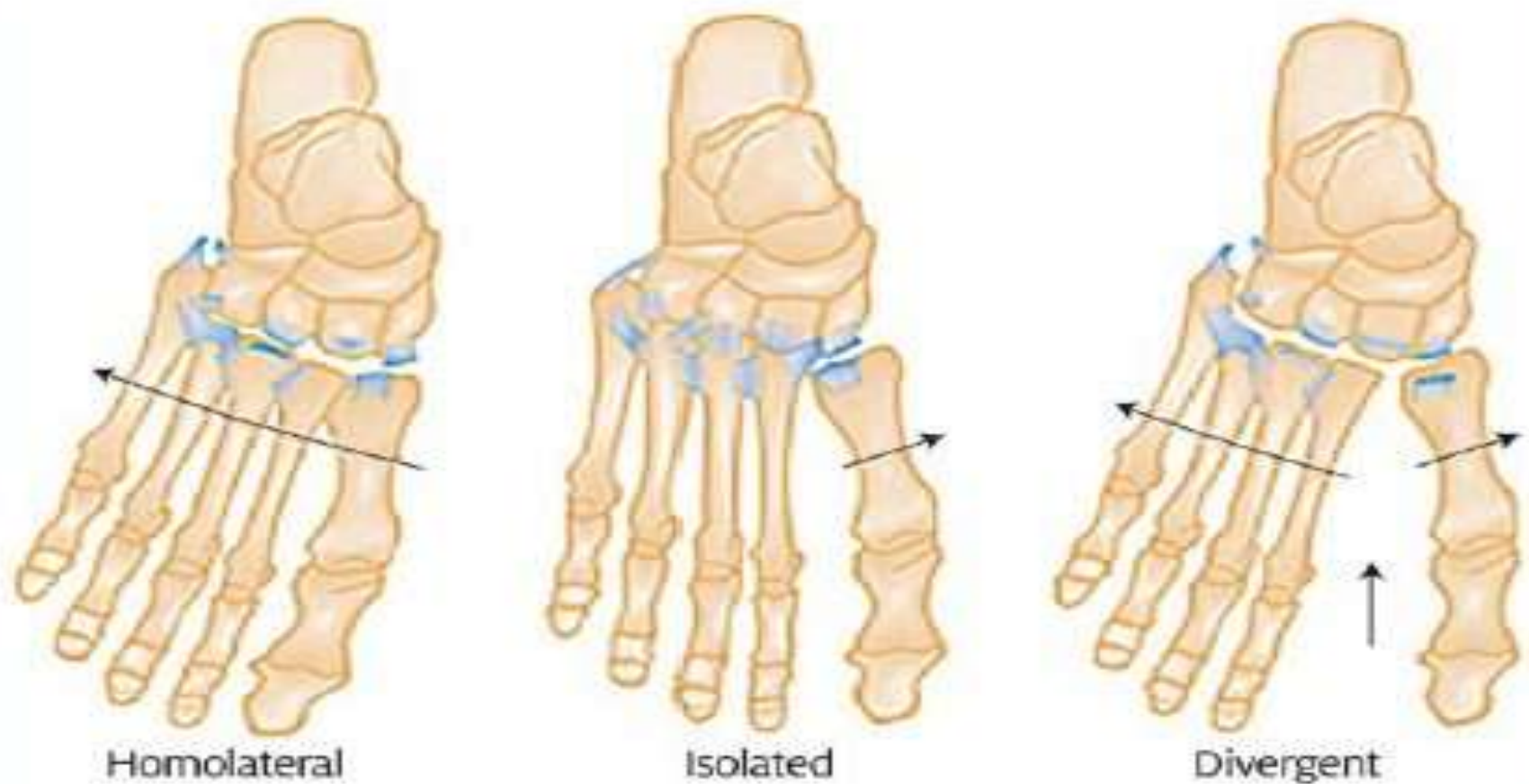
# Oblique

- Medial border of 4th MT in line with medial border of cuboid

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Figure 4. Classification of Lisfranc injuries.

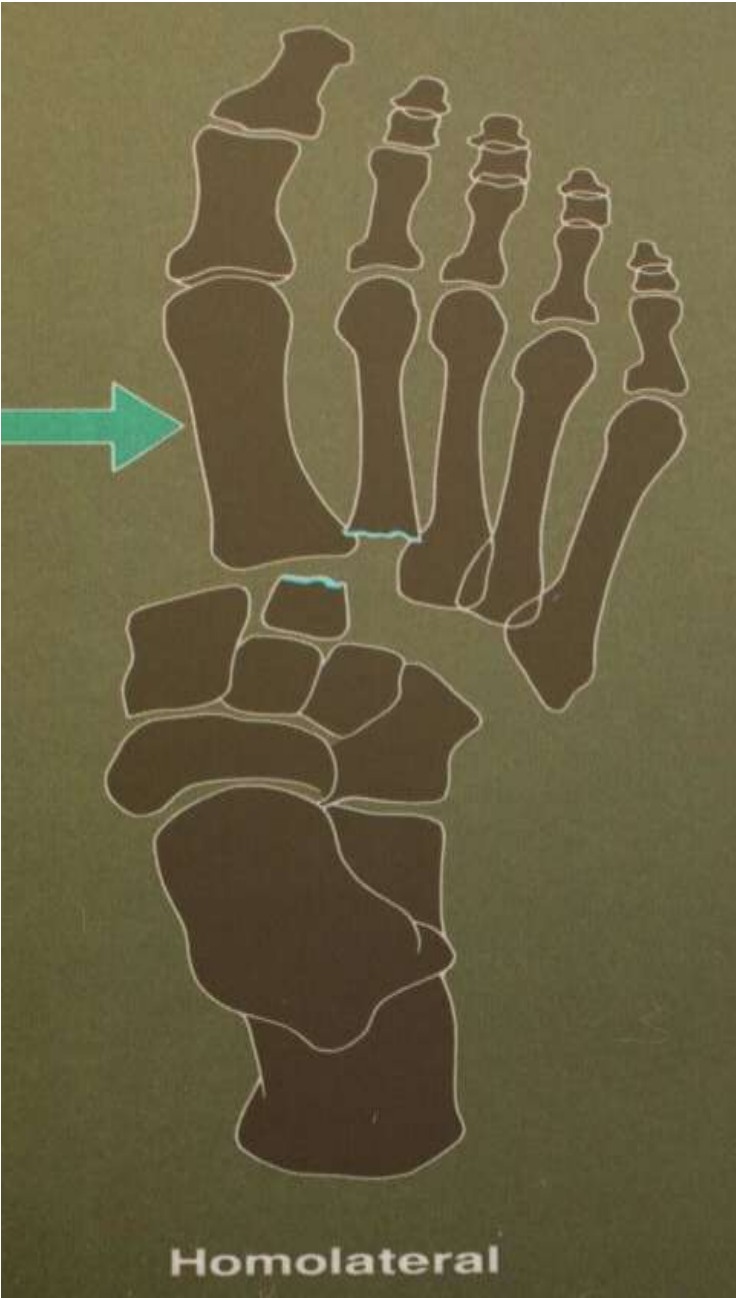


The ligamentous anatomy of the Lisfranc complex is also depicted. Source: Hardcastle PH, Reschauer R, Kutscha-Lissberg E, et al. Injuries to the tarsometatarsal joint: Incidence, classification and treatment *J Bone Joint Surg Br.* 1982;64:349-356.



Case

#1





AUG 94

Case



0528  
©

Case #3: 63 y/o M





NT

Case #4: 23 v/o M



Case

remains 0000  
1 (04 10 01) 000  
W 230 6 251

AP  
Foot AP





RT/AT



Case #6

1.42533=LGM  
W2854 L 1506

AP  
Toe AP FOOT






Case #7 63 y/o M







Case  
#8

W1



Case #9: 13 y/o F



**b**  
AMWT



Case #10

Neuropathic





Case #11: 64 y/o M with DM

WT BEARING

L  
RH



L  
RH



Case #12: 57 y/o M with DM





1 month later

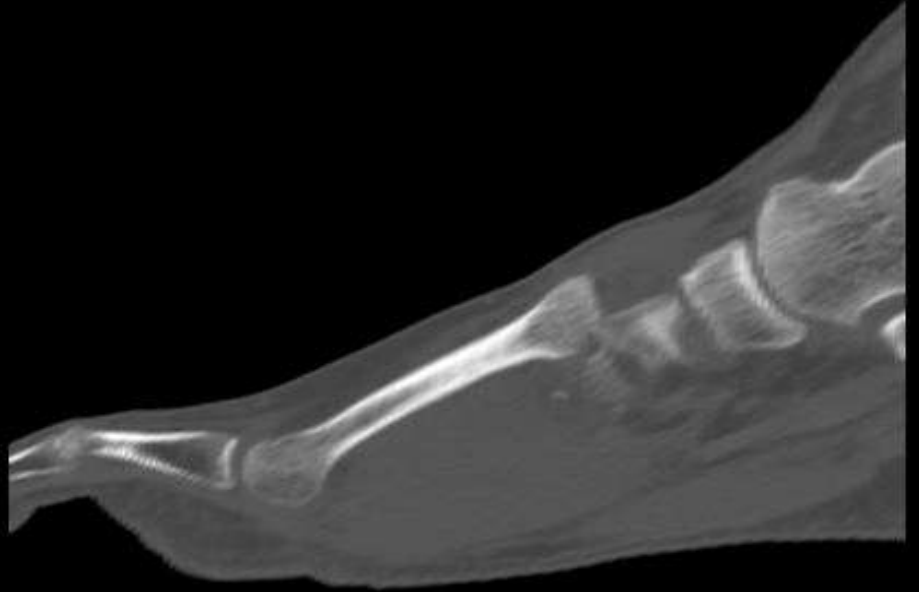




Case #13: Rocker Bottom feet



Case #14: Convergent



CT Scan





MRI



# Treatment

- Early diagnosis!!
- Nonoperative
  - probability of sprain with no e/o diastasis then immobilize with non weight bearing cast for 4-6 wks, followed by short-leg walking cast for 2-4 weeks
  - Progressive ambulation and rehab
  - If pain persists up to 2 weeks after rehab has begun, then repeat x rays

# Operative Tx

- Displacement more than 2mm
- Should be done within first 12-24 hrs vs 7-10 days after the injury
- ORIF
  - cast with toe touch weight bearing for 8-12 weeks
  - - protective shoe for 3 months after cast removed
- Closed fixation with percutaneous K wires







# Complications

- Post-traumatic arthrosis
  - directly related to degree of comminution of the articular surface
- Flat foot deformity with instability with weight bearing
- Neuromas
- Painful hardware, hardware failure
- RSD
- Skin necrosis and sloughing, vascular injury, compartment syndrome

# References

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- Banerjee R, Nickisch F, et al. Browner: Skeletal Trauma, 4th ed. 2008 W.B. Saunders Co. Chapter 61- Foot injuries
- Burroughs K, Reimer C, et al. Lisfranc injury of the foot: A commonly missed diagnosis. AAFP 1998 Jul; 58(1): 118-24
- Helms C. Fundamentals of skeletal radiology, 3rd ed. 2005, Elsevier. Chapter 5: Trauma: 111-112
- Special thanks to Dr. Tudor Hughes of UCSD Bone Radiology for providing the radiographs