

Lisfranc Injury

**AO Advanced Principles of Fracture Management
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What to learn...

- Identify, recognize and diagnose the injury/fracture
- Select surgical approaches to treat these injuries
- Fixation techniques
- Complications of these injuries

Lisfranc Injuries - Mechanism of Injury

- Forced abduction of forefoot
- Axial load to plantar flexed foot
- Combined
- Crush (dorsum)



Diagnosis

- Marked tenderness
- Intense pain
- Excessive swelling
- Plantar bruise

X-ray evaluation

- Up to 40% overlooked initially
- AP: TMT1, 2



X-ray evaluation



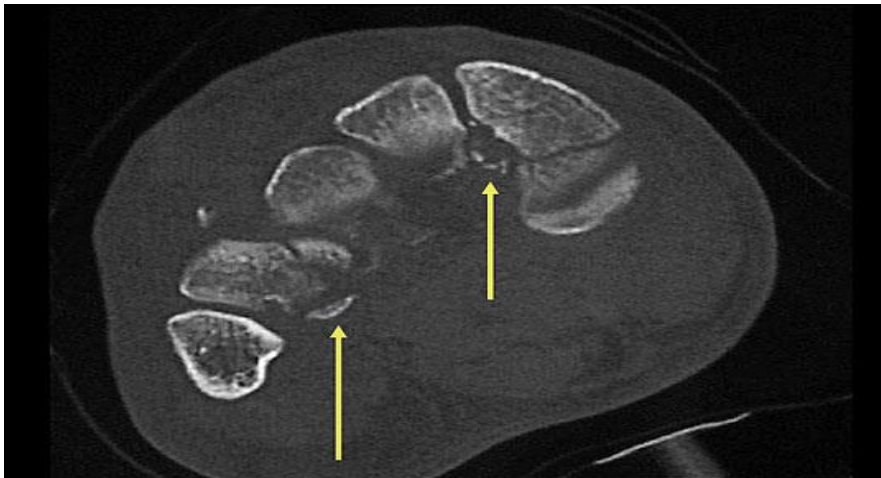
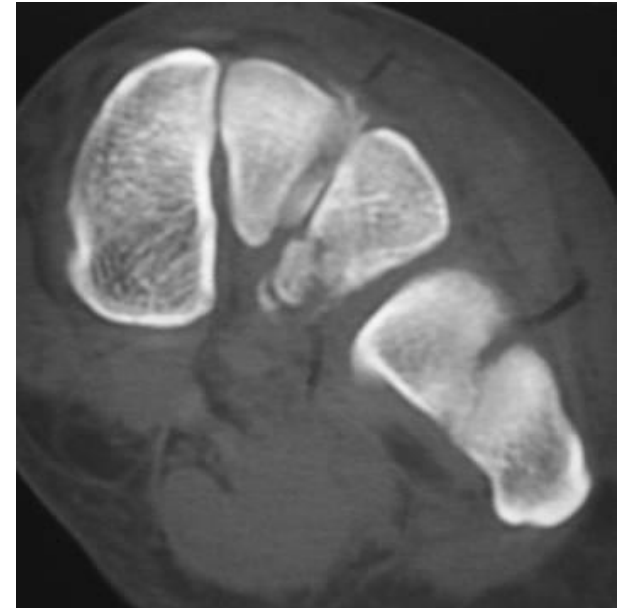
X-ray evaluation



CT

CT evaluation is essential

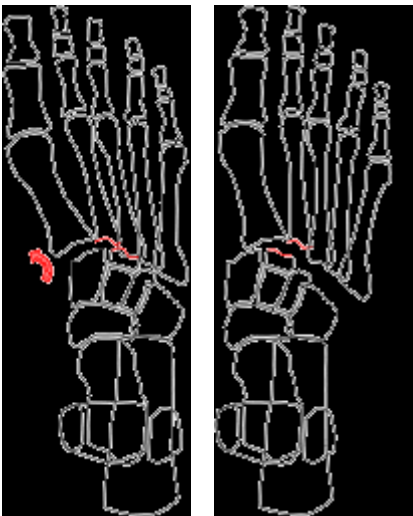
- 2-D and 3-D reconstructions:
 - Avulsions
 - Displacement
 - Cuboid/cuneiforme fractures



Classification

- The classification in most common use is that of Quenu and Kuss (1909) as modified by Hardcastle (1979). Myerson (1986) relabelled the classification:
- Total incongruity (type A) - can be either medially or laterally displaced
- Partial incongruity, either medial (type B1) or lateral (type B2) – the commonest group
- Divergent displacement, either partial (type C1) or total (type C2)

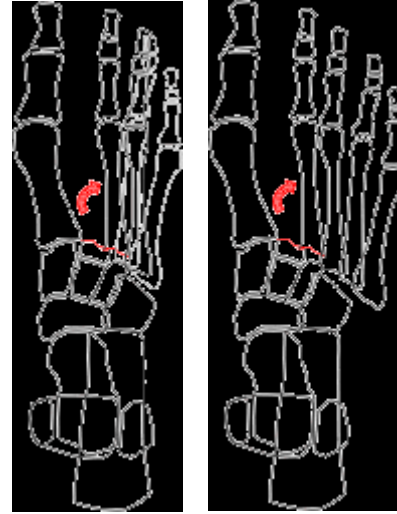
Type A 8 (med./lat)



Type B1



Type B2 (partial/complete)



Type C1



Type C2



Treatment

- Risk of foot compartment syndrome
- Consider de-compression
- Timing of surgery



Conservative Treatment

- Undisplaced or minimally displaced injuries with no malalignment of TMT-joint
- Co-morbidity
- Dysvascularity

- Cast – non-weight-bearing 6-8 weeks (close follow-up with X-rays)

Surgical Treatment

- Anatomical reduction and stable fixation !!!!!!!
- Multiple screws or/and plating
- Screw position variable
- **Increased failure with K-wires alone**



Surgical treatment

- If you use tourniquet:
 - Mark out DP pulse
 - Fluoro, guidepin—mark out incisions
- Dorsal longitudinal incisions
- Straight down without undermining



Intraoperative technique

Dangers:

- Deep/superficial peroneal nerves
- Extensor hallucis longus (EHL)
- Vascular anastomosis:
 - Between 1st and 2nd MTs
 - Dorsalis pedis\plantar arteries



ORIF Technique

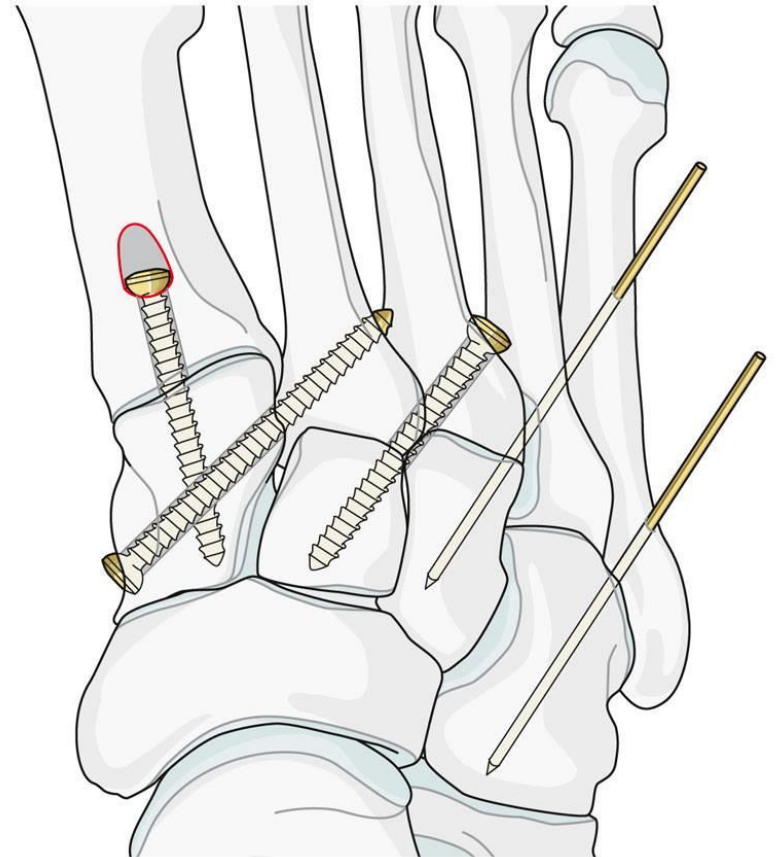
Reduction sequence

- 1st, 2nd metatarsals, then 3rd, 4th, 5th
- Remove entrapped ligament, small chondral/bony fragments
- Provisional fixation (stiff K-wires)
- Confirm accurate reduction with x-rays (AP, lateral, oblique)



ORIF technique

- 3.5/4.0 cortical screws for the medial column
- K-wires
 - Useful for 4th/5th TMT joints



Operative Technique

- A “pocket hole” is made along the dorsal base of the first metatarsal
- This allows the screw head to engage the cortex without breaking the dorsal cortex

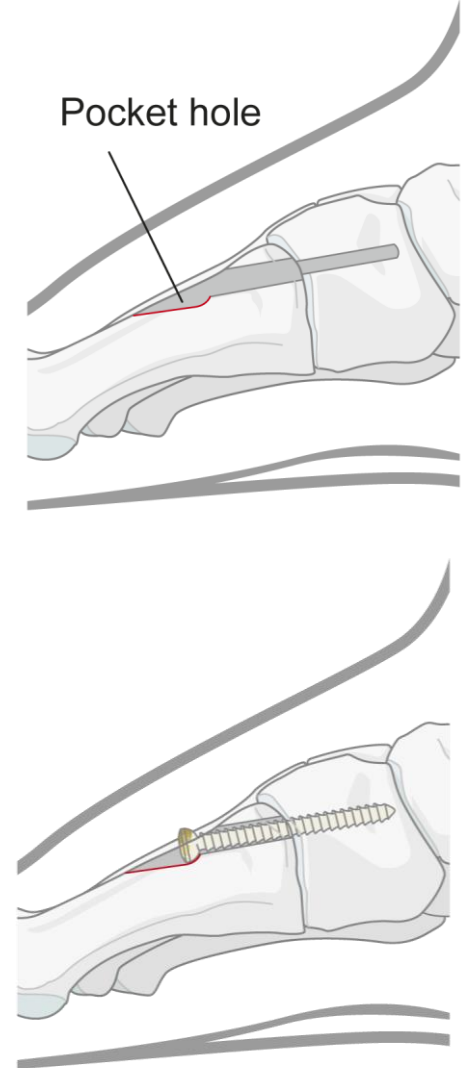


Plate Fixation



Acta Ortop Bras. 2014; 22(6): 315–320.

doi: 10.1590/1413-78522014220600576

PMCID: PMC4273957

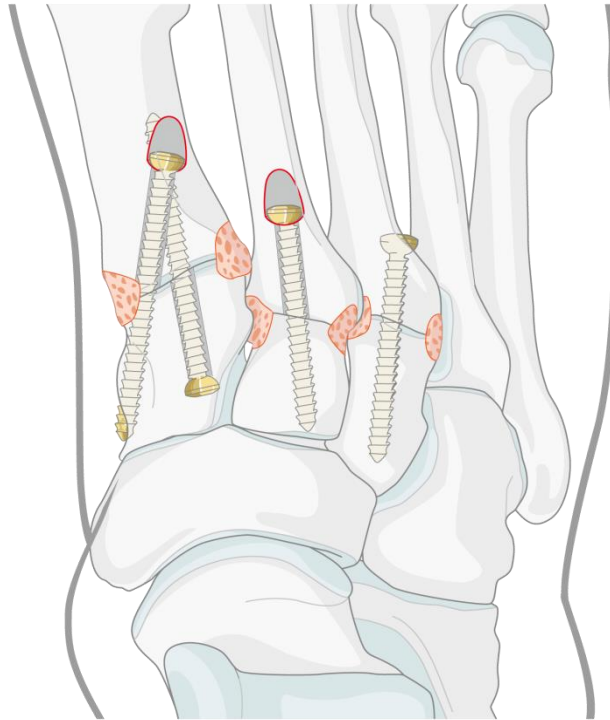
Outcome comparison of Lisfranc injuries treated through dorsal plate fixation versus screw fixation

Sun-jun Hu, 1 Shi-min Chang, 1 Xiao-hua Li, 1 and Guang-rong Yu 2

Ligamentous Lisfranc Joint Injuries: A Biomechanical Comparison of Dorsal Plate and Transarticular Screw Fixation

Foot Ankle Int June 2005 26: 462-473,

Pure Ligamentous Injuries



- No fracture at the base—postinjury arthrosis is more likely
- Immediate primary fusion of the 1st, 2nd, and 3rd TMT is considered by some to be preferred

J Bone Joint Surg Am. 2006 Mar;88(3):514-20.
Treatment of primarily ligamentous Lisfranc joint injuries: primary arthrodesis compared with open reduction and internal fixation. A prospective, randomized study.
Ly TV1, Coetzee JC.

Postoperative Treatment

- Casting for 6-8 weeks without weightbearing
- K-wires removed after 6 weeks
- Full weight bearing after 6-8 weeks with arch support
- Medial screws removed after 4-6 months

Prognosis???

- Stiffness
- Pain
- Flatfoot
- Posttraumatic arthritis (10-20% symptomatic)

P.Sanchez-Gomez et al. Lisfranc fracture-dislocation. Screw vs. Wire fixation. Rev. esp. cir. ortop. traumatol. 2008;52:130-6

Kuo et al. Outcome after open reduction and internal fixation of Lisfranc Joint Injuries. J Bone and Joint Surg. Vol 82A, 1609-1618 Nov. 2000

Case - Maila



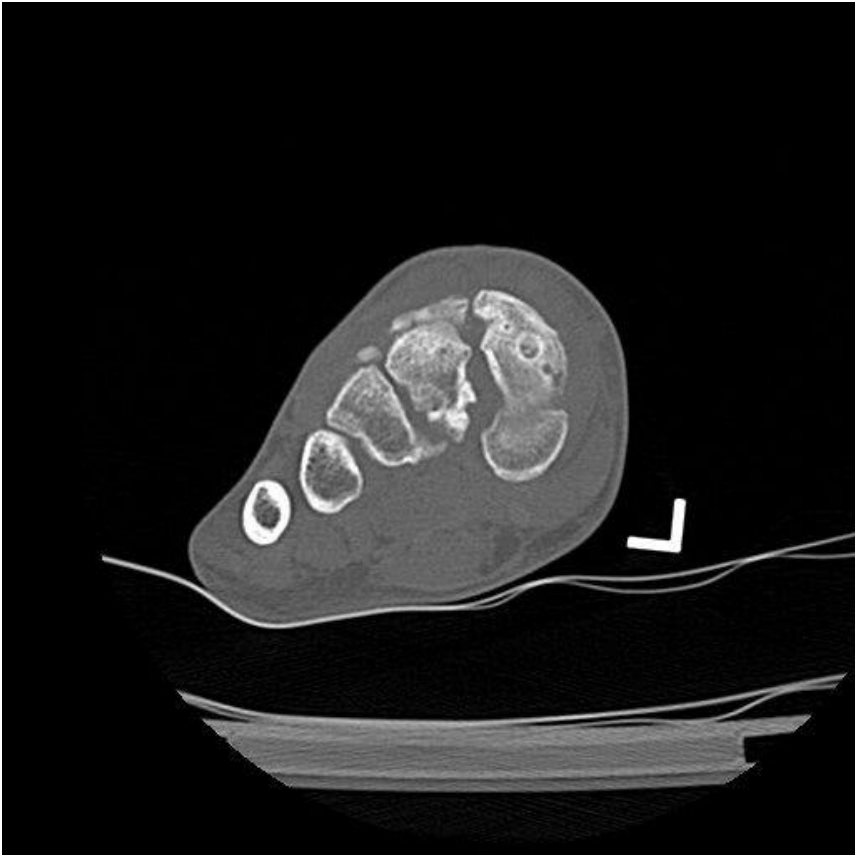
Case - Maila



Case - Maila



Case - Maila



Take Home Message

- Rare, often missed, serious injuries
- Beware of compartment syndrome
- CT is mandatory !!!
 - Evaluation of injury
 - Often other injuries
 - If the clinical signs are more impressive than the X-rays
- OPEN reduction, dorsal incisions
- Multiple screws + K-wires lat. or/and plates
- Remove the screws again

Thank You

