Lisfranc fracture-dislocations

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“It’s just a foot”

- Why should we care?
  - 28 multiply-injured patients with foot injuries compared with 28 without.
  - Outcomes scores uniformly worse in those with foot injuries
  - More attention needs to be paid to these injuries

Do Foot Injuries Significantly Affect the Functional Outcome of Multiply Injured Patients?

Diana C. Tavakoli, Emil H. Schenck, Michael D. McKee, and James P. Waddell
Take home points

- Architecture of midfoot is critical for normal foot function
- Goal of treatment of midfoot injuries is restoration of alignment and architecture
- "Normal" foot function reliant upon medial stability and lateral mobility

Objectives

- Describe goals of treatment for Lisfranc injuries
- Describe a rational approach to their treatment
- Describe technical issues related to surgical management

Lisfranc Injuries

- Dislocation or fracture-dislocation of tarsometatarsal joints
- Have a high index of suspicion after high-energy mechanism with foot pain/edema
- Up to 20% are missed despite adequate radiographs
Lisfranc injuries are high energy dislocations/fractures

Lisfranc Treatment Goals: Medial stability, lateral mobility

Anatomy

- Tarsometatarsal joints:
  - “Roman Arch”
  - Inherently unstable
  - 2nd metatarsal base is keystone
Anatomy

Listerc ligament: C1 → M2

Stress exam –
Look for break in linearity!

Associated Injuries

- Approximately 95% of patients have metatarsal fractures
- Up to 39% have fractures of cuneiforms, cuboid and/or navicular
- Intercuneiform instability common
Lisfranc injuries - treatment

• Desired outcomes:
  – Functional, painless foot
  – Obtain and maintain anatomical reduction

• Respect the soft tissues!

• Technique:
  – Closed reduction and casting: unreliable
  – Closed or open reduction and K-wires: poor fixation, loss of reduction
  – ORIF: accurate reduction, reliable fixation

AGAIN: Lisfranc Treatment Goals:
Medial stability, lateral mobility

Lisfranc ORIF - technique

• Dorsal incisions
• Maintain thick flaps
• Watch for 1st dorsal metatarsal and deep plantar arteries (branches of dorsalis pedis)
• 1/2, 3/4 interspaces standard
• Closure at end:
  – Skin only
  – Donati-Allgower
Lisfranc disruption is always obvious!

Treatment

- Screws across 1st, 2nd, 3rd TMT joints
- K-wires across 4th and 5th TMT joints
- STOUT screws (4.0 cortical)
- Remember 2nd metatarsal base fractures
  - Intercuneiform screw(s)

2nd tarsometatarsal joint

- Fracture of 2nd metatarsal base is common (plantar)
  - “Fleck sign”
- Screws placed antegrade may not gain good purchase
- “Lisfranc” screw may not gain good purchase, either
ORIF Method

- Inspect all 5 joints before implants placed
- Reduce all 5 joints – medial to lateral
- Clamp first, K-wires second, then drill for screws
- Countersink or notch!!!!!!

Lisfranc - injury

Lisfranc – intraop provisional reduction and fixation
Timing of Surgery

• Respect the soft tissues!
• Provisional fixation with external fixator if closed reduction required and cannot be maintained
• Formal ORIF after 10-21 days, or longer!

Etiology of primary fixation failures?

• Poor correction of medial column
  – Do a better job
• Inadequate fixation
  – Use STOUT screws (4.0 mm)
• Residual 1st TMT instability
  – Use crossed screws across 1st TMT joint
• Early screw removal
  – Leave screws in longer/permanently
• Residual gastrocnemius tightness (?)
  – Strayer/slide
Keep plantar joint from gapping!

Role of Primary Fusion???
Purely Ligamentous Lisfranc

- Kuo et al., JBJS (A) 2000
  - Subset (6 / 15 pts)
  - Ligamentous injury did poorly

2 RCT’s
- Ly and Coetzee, JBJS (A) 2006
  - Fusion better than ORIF
    - AOFAS midfoot
    - PT subjective rating
- Henning et al., F & A 2009
  - Fusion: fewer secondary surgeries
  - Fusion = ORIF
    - SF-36, SMFA
    - Prematurely discontinued study

Conclusion

- Goals of treatment: medial stability, lateral mobility, anatomical reduction
- Technique: medial-to-lateral
- Technical issues:
  - Stout fixation
  - Countersunk screw heads
  - Address all injuries
Take home points

• Architecture of midfoot is critical for normal foot function
• Goal of treatment of midfoot injuries is restoration of alignment and architecture
• “Normal” foot function reliant upon medial stability and lateral mobility
• How we get there is up to us

Thank you