PRIMARY MIDFOOT ARTHRODESIS FOR TRAUMATIC LIS FRANC INJURIES

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Lis Franc Injury
Definition: An bony or ligamentous injury to the tarsometatarsal joints of the foot

Anatomy
2 ARChES: LONGITUDINAL + TRANSVERSE
2ND METATARSAL SHAPED TO FUNCTION AS A KEystone
2ND METATARSAL LOCKS INTO MORtISE CREATED BY THE CUNEIFORMS
STABILITY PROVIDED BY TENDONS AND LIGAMENTS
**Lis Franc Injury**

Rare Injury:
- Incidence: 0.2% 1 in 5000

Most likely:
- MVA (40-62%)
- Crush (0-14%)
- Falls from height (13.5%-14.5%)

**Mechanism:**
- Direct - crushing
- Indirect - Axial loading in plantar flexion
- High Energy
- Low Energy


**Radiographic Analysis**

[Images of x-rays]

**Radiographic analysis**

[Images of x-rays]
ORIF ARTHRODESIS

Kuo et al, 2000: JBJS
-Retrospective review of 48 patients after ORIF
-52 mo follow-up
-15 injuries were purely ligamentous
-33 were combined ligamentous and osseous
-the bottom line is AOFAS midfoot scores better (82vs71, p=0.05)
-incidence of lower OA (16%) vs. 30%, p=0.04 with anatomic reduction

12 patients (25% of the ORIF lis fractures) had evidence of posttraumatic arthritis in the midfoot
-6 required midfoot arthrodesis
ORIF ARTHRODESIS

Anatomic Reduction and Stability are key

SMH So Now What

MULIER ET AL. 2002

- Retrospective review (surgeon randomized) of 28 severe Lisfranc fracture-dislocations with 30 mo follow-up
- Compared primary partial fusion (6), primary complete fusion (6), and ORIF (16)

- ORIF group had less pain and better function scores than the complete fusion group but no difference compared to the partial fusion group
- Authors conclude that ORIF is TOC with complete fusion reserved for salvage
- But equivalent results with partial primary fusion and ORIF
- At final (av 94%) of the ORIF group already had radiographic DJD which could be expected to become symptomatic at some point

Mulier T, Reynders P, Dereymaeker G, & Broos P. Severe Lisfranc injuries: Primary Arthrodesis or ORIF. Foot Ankle Int 2002 23: 902

LY&COETZEE, 2006 RESULTS

- Prospective, randomized trial comparing functional outcome of ORIF vs. primary arthrodesis
- n=41, primarily ligamentous injury
- 42.5 mo follow-up
- AOFAS Midfoot scale
- Radiographs
- Clinical questionnaire

AOFAS scores better with arthrodesis at 2 yrs. 88 vs. 66; p<0.001
Level of post-op activity closer to pre-op level 82% vs. 41% (p=0.001)
72% of ORIF group had some degree of loss of correction, increasing deformity, and radiographic DJD
5 patients in the ORIF were converted to fusion

Conclusion: Primary arthrodesis is better for select patients with primarily ligamentous injury

Ly T, Coetzee C. Treatment of primarily ligamentous Lisfranc injuries: Primary arthrodesis compared to ORIF. JBJS, 2006; 88:514-520.
**Treatment**

HENNING JA ET AL., 2009

- Prospective randomized trial
- 40 pts. with acute TMT joint fractures and fracture-dislocations treated with either PORIF or PA; 2 yr. follow-up

**Results**
- Study was underpowered (needed 60 pts.)
- No difference in functional outcome scores
- Tended towards increased physical & social functioning with decreased disability
- More planned and unplanned 2nd surgeries in the PORIF group
- 78.6% vs. 16.7% (mostly for ROH and revision of or conversion to fusion)

Conclusion: Both are reasonable approaches but PORIF results in more 2nd surgeries if ROH is routinely performed

Henning JA, Jones CB, Siemens OJ, Sneyd DJ, Ayoub AJ. Open Reduction Internal Fixation vs. Primary Arthrodesis for Lisfranc Injuries: A Prospective Randomized Study. Foot Ankle Int 2009

**Treatment**

REINHARDT, ET AL. 2012

Retrospective review
- 25 pts. treated with partial primary fusion
- 12 purely ligamentous
- 13 combined osseous/ligamentous
- 42 mo average follow up

**Results**
- Average AOFAS score 81
- 85% return to pre-injury level of activity
- 84% overall patient satisfaction
- No difference between purely ligamentous and combined injuries

Conclusion: Both primary ligamentous and combined Lis franc injuries do well with primary partial fusion


**Did I make the case for primary arthrodesis?**

IT SEEMS SO

- Less secondary surgery
- Outcomes similar
- AOFAS Scores comparable
- Primary partial fusion not complete fusion
Primary Arthrodesis

INDICATED:
Primary injury if see severe cartilage damage

Patient wants decrease risk of second procedure to remove hardware and possibility of fusion in the future

When not to fuse

Athletes participating at a high level in cutting sports
Risks of participation in sports after midfoot arthrodesis include:
- Periarticular arthrosis
- Failure of arthrodesis
- Stress fractures

VERTULLO & NUNLEY
FAI 2002

103 AOFAS members polled
Only:
- 54% rec return to running
- 64% rec return to football
- 62% rec return to basketball

McMahon et al., Return to Sport and Physical Activities After Primary Partial Arthrodesis for Lisfranc Injuries in Young Patients. FAI, June 2016

Vertullo CJ, Nunley JA. Participation in sports after arthrodesis of the foot or ankle. FAI. 2002
Conclusion

Data continues to be limited

Primary arthrodesis in a patient with a Lis franc injury is justifiable in the correct patient.

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Thank You