

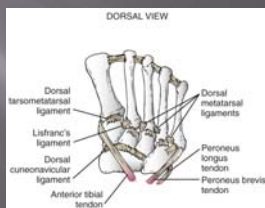
PRIMARY MIDFOOT ARTHRODESIS FOR TRAUMATIC LIS FRANC INJURIES

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Lis Franc Injury

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

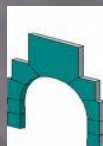


Mann's Surgery of The Foot and Ankle - Philadelphia, PA: Saunders/ Elsevier, 2014



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



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Lis Franc Injury

Rare Injury:
Incidence- 0.2% 1 in 55,000


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



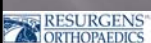

Wilson DW: Injuries of the tarso-metatarsal joints: etiology, classification, and results of treatment. J Bone Joint Surg [Br] 54:677-686, 1972.
Thompson ME & Morris M: Injury to the tarsometatarsal joint complex. J Am Acad Orthop Surg, 2003;11:260-267.



Radiographic Analysis



Radiographic analysis







Treatment

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. 60%, p=.004) with anatomic reduction

Group	No. of Patients	Average AOFAS Score (point)	Average MFA Score (point)	Percentage of Patients with Posttraumatic Osteoarthritis
Open reduction and internal fixation	42	80.2	18	14
Ligamentary arthrodesis	6	58.2	25.2	100
Total (n=48)	48	77	19	25

*AOFAS = American Orthopedic Foot and Ankle Society, and MFA = Metatarsal-Navicular Functional Assessment

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

RESURGENS ORTHOPAEDICS #ResurgensMD

So what should we do?

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 f/u 94% of the ORIF group already had radiographic DJD which could be projected to become symptomatic at some point

Mulier I, Reijnders P, Dereymaeker G, & Broos P. Severe Lisfranc Injuries: Primary Arthrodesis or ORIF. Foot Ankle Int 2002 23: 902




Treatment

LY & COETZEE, 2006

- 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

Ly T, Coetzee C. Treatment of primarily ligamentous Lisfranc joint injuries: Primary arthrodesis compared with open reduction and internal fixation: a prospective, randomized trial. JBJS, 2006; 88:514-520



RESULTS

AOFAS scores better with arthrodesis at 2 yrs. (88 vs. 68.6, p=0.005)

Level of post-op. activity closer to pre-op level (92% vs. 65%, p<0.005)

75% of ORIF group had some degree of loss of correction, increasing deformity, and radiographic DJD with

5 patients in the ORIF were converted to fusion

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

Treatment

HENNING JA ET AL., 2009


- Prospective randomized trial
- 40 pts., with acute TMT joint fracture 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
- Trended 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, Sietsma DB, Bohay DB, Anderson JG. Open Reduction Internal Fixation vs. Primary Arthrodesis For Lis Franc 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

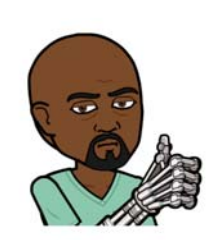

Reinhardt KR, Oh L, Schottel P, Roberts MM, Levine D. Treatment of Lis Franc Fracture-Dislocations with Primary Partial Arthrodesis. Foot Ankle Int 2012;33:50.



Did I make the case for primary arthrodesis?

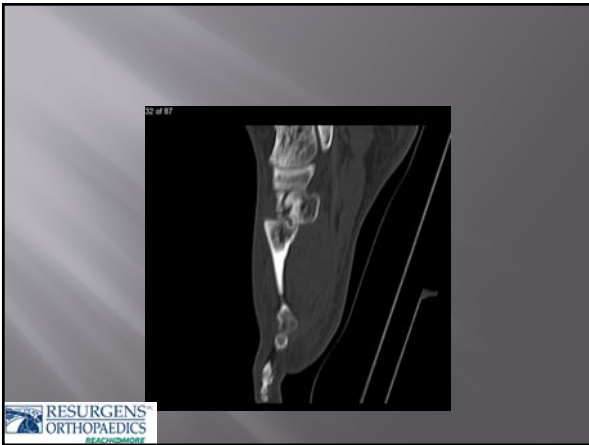
IT SEEMS SO

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

22 year old construction worker





ORIF









Primary Arthrodesis

INDICATED:

58 Y/O PILOT

Primary injury if see severe cartilage damage

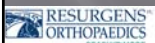
Patient wants decrease risk of second procedure to remove hardware and possibility of fusion in the future

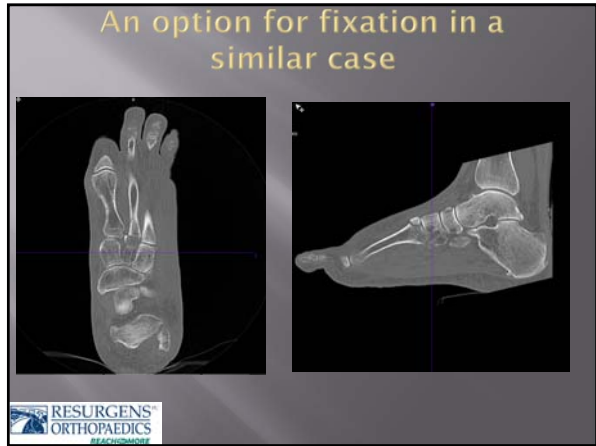


Sheilbani-Riad, S, Coetzee JC, Giveans MR, DiGiovanni Christopher.
Arthrodesis versus ORIF for Lis franc Fractures. Orthopedics, June 2012

58 y/o pilot











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

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

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



17 y/o ballet dancer





Conclusion

Data continues to be limited

Special thanks to
Keith Wapner, MD
Sourendra Raut, MD
David Scott, MD

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



Thank You