Delayed presentation LisFranc Injury - is it too late to fix, or must it be fused?

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Introduction:

Common traumatic foot injury
Can be miss diagnosed and delayed in diagnosis
Understand history and mechanism of injury to increase suspicion
Can be subtle in presentation or dramatic

History/Mechanism:

MVA, slam on break, head on collision
Sport: 1º Football (40-60 of surgical), BB (10-20%), all sports reported
Misstep, off curb, miss last step on stairs,

Exam: (crucial)
Swelling in midfoot and arch
Ecchymosis in distal toes or plantar arch
Skin OK? Most of time is fine, can be subtle changes
Tender to palp at Lis franc ligament and midfoot (TMT joints)
Inc pain with abduction stress,

**Radiographic Evaluation:**

Standing 3 views of the involved foot with comparison standing AP
   Know criterion, 1st TMT align, 2nd TMT alignment, Beware of medial column dislocation and proximal extension.

One legged standing AP on follow up
MRI--> Disruption of Lis franc’s ligament, fluid filled gap, bone edema
CT, helpful to suggest if peri-articular TMT “chip fractures”, WB CT may have place in this area for diagnosis
Repeat standing AP Xrays til “back to normal activity”, late diastasis
Stress Xrays with foot/ankle block or in OR.

**When is it considered Delayed?:**

4 weeks post injury - traditional cut off, Less than 4 weeks, ORIF if meets criterion
≥ 8 weeks – traditionally move to fusion and 4-8 debatable

Better techniques, new and better instrumentation led many to expand ORIF

Bridge plating to stay out of joint surface, use also on 2-3 TMT joints

Controversy re; Tight ropes with extended indication for ORIF (YES for me)

Now, up to 4-6 months ORIF has been successful

Consider Bone scan or MRI to determine joint surface stress

What does the data say?

ORIF delayed Lisfranc

- Calder et al JBJSbr 2004
  - 25 pts ≤ 3 months, ORIF, 22/25 G, 3/25 P
- Thordarson F/A Disorders 2000
  - More difficult, rigid fix,
  - Screws in for 6 months
- Chiodo & Myerson OCNA 2001
  - Up to 1 year after injury, if anatomic
  - Fuse if OA or malunited fxs
- Harris, etal UCLA FAI’16 ORIF 8pts
  - 2-7 months from injury, avg=40yo, healthy
  - Screws, bridge plate, 1 suture button
  - None went to fusion, 1-5.5 yr f/u
- Porter, unpublished 25 active pts (23.7yoa)
  - 4wk to 6mo, ORIF, 11 with suture button w/ORIF
  - 0/25 went on to fusion, AAOS 90.5

What does the data say?

Fusion of Chronic Lisfranc

- Komeda, Myerson, etal JBJS ‘96
  - 10 delayed, fusion, AOFAS 41 82
- MacMahon FAI 2016
  - Primary fusion young ath (31.8yoa)
  - 38 pts, FAOS worse if diff with activity (25%)
- Ly & Coetzee JBJS 2006
  - PRCS 21 Fusion, 20 ORIF
– Fusion > ORIF estimated activity
  • Calder et al JBJSbr 2004
    – 17 pts ≥ 6 months, Fusion,
    – 9/17 G 53%, 8/17 P 47%
  • Sangeorzan et al FAI ‘90
    – 16 pts, reconstruction, 11/16 G/E
    – 3/16 at least one nonunion (20%)
    – 15/16 improved, ret ADL

Workup and Considerations with Delayed Presentation:
What are the demands, concerns, wishes of patient?
  Athlete, recreational or competitive
  Active laborer, younger,
  Low demand, older, prior injuries, existing arthritis?
  Medical issues, contra-indications to surgery, fusions, ORIF

Workup and Considerations with Delayed Presentation:
What does the foot and anatomy show?
  Normal alignment, no swelling, good toe raise?
  Early collapse, swelling, poor toe raise, poor pushoff?
  Pain even at rest, early CRPS, antalgic gait,
  Nerve pain, later CRPS, severe collapse

Workup and Considerations with Delayed Presentation:
Radiographic evaluation, plain Xrays, CT, MRI, Bone Scan
  Wide at Lisfranc joint, what type/pattern (medial column disloc-poor)
  Spurs? Early OA or irregular/incongruent articular surfaces? Assoc fx
  Joint space narrowing, collapse of longitudinal or transverse arch?
Look at Nav-cuneiform joint, incongruity, early OA
CT to assess subtle fracturing, spurs, early OA, cysts
MRI to look for articular surface cartilage changes, edema
Bone Scan, less helpful unless has hardware, CRPS

Treatment Plan approach: NON-Op
NON-operative treatment (mild instability, mild pain, NOT fit for surgery)
Rehab-PRT, CFP or possible even Fixed ankle AFO with orthoses, strengthening, biking, weight training, swimming, OTS “rocker shoes”

Consider nerve pain- Have seen some that pain was all in DPN, inxn/release
Consider nerve pain- Early CRPS try Neurontin/Lyrica, antidepressants

**Treatment Plan approach: Surgical**

Decide if can consider ORIF

No arthritis, no collapse (?), no significant joint space signal (BS OR MRI)

Higher demand patient, athlete, wants to return to sports

I have tried to do reconstruction/repair

Similar approach with acute presentation

ORIF all unstable joints, 4.5mm screws in Lisfranc and intercunieform

Bridge plate 1<sup>st</sup>, I use tight rope stacked with 4.5 mm screw (Med Cun-2<sup>nd</sup>)

At 3-4 months, exchange MC-2<sup>nd</sup> screw with another tight rope (large)

RTS 6-10 months

**Treatment Plan approach: Surgical**

Fusion does work if not a competitive athlete

Good if early OA, severe collapse, spurs already, early cysts on CT

IF collapse, consider medial 1<sup>st</sup> TMT plate to bring out of abduction

Screws and plates 1<sup>st</sup> and possibly 2<sup>nd</sup> TMT, intercunieform fusion – screws

Bone graft – tibia or ICBG, bone stimulator if any question

NWB 4-6 weeks, boot, can do some early ankle ROM, toes curls, DSSM

Boot for 8-12 weeks, bike at 6 weeks with boot, SM/Ellip at 3 months, walk/run 4-6 months. 10% nonunion rate of at least one joint.
**Treatment Plan approach: Who do you fuse and who do you ORIF?**

Younger and more active patients up to 4-6 months with no collapse or OA

I give them a chance to try ORIF, maybe get functional, fibrous fusion?

But doesn’t impact other joints. I have been pleasantly surprised at outcomes

10 athletes 4 weeks to 4 months, ROH after 4 months at least (leave in?)

Tight rope anecdotally helped, no science, others don’t use

If you use mini tight rope after screw, endo button not hold?

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**Treatment Plan approach: ORIF patients after delayed presentation**

15 Athletic patients

Age 23.7

Patterns  MC-6  Prox Ext-6  Trad-13  Same % as DAP data

Sports  FB-10  BB-5  other-10

Tight rope  YES-11  NO-14

Questionnaire data LE mod-99 n=5,  F/A mod-90.5 n=14

**NO FUSIONS** in Athletic patient population

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**Conclusions:**

**So should we fuse? Or should we fix?**

It depends!

**IF** you can do ORIF in younger patient **DON’T FUSE**

**IF** you can do ORIF in athletic patient **DON’T FUSE**

**IF** you can do ORIF in active patient, no OA, no collapse **DON’T FUSE**

**IF** there is collapse in non-athlete, OA, existing deformity, patient wants fusion and only one surgery, high risk injury (intra-artic fx), then **DO FUSE!**

**CAN** always fuse, **CAN’T Un Fuse!**
REFERENCES


