Midfoot Arthrodesis

Donald R. Bohay, MD, FACS
Professor, Michigan State University College of Human Medicine
Private Practice: Orthopaedic Associates of Michigan, PC
Director, Grand Rapids Orthopaedic Foot and Ankle Fellowship
Grand Rapids, MI

Midfoot Arthrodesis Introduction
- Common procedure among foot and ankle surgeons
- Indications include:
  - Osteoarthritis
  - Post-traumatic arthritis
  - Rheumatoid arthritis
  - Psoriatic arthritis
  - Deformity
  - Medial column instability
- Conservative treatment:
  - Activity modifications
  - NSAID
  - Longitudinal arch supports
  - +/- injection

Lisfranc Injuries
- Diagnosis:
  - Tender, swollen midfoot
  - Pain with weight bearing
  - Plantar ecchymosis

Surgical Treatment Options
- Fusion 1st tarsometatarsal (TMT) joint
- Can be applied to:
  - Hallux valgus
  - Pes planus
  - Arthritis
- Hypermobile first ray treatment
  - Instability of first TMT joint
  - Cause for symptoms
  - Fusion joint
  - Modified Lapidus procedure
  - Correct deformity

Difficulties of Midfoot Arthrodesis
- Technically challenging
- Plagued with complications:
  - Shortening first ray
  - MTP stiffness
  - Dorsal malunion
  - Recurrence
- Criticism:
  - High non-union rate (10-12%)
  - First TMT joint

Single Joint Midfoot Arthrodesis: Technique Tips
- Be sure to denude the entire joint. Do not miss the plantar joint surface.
  - 30 mm deep
- Avoid shortening of the first metatarsal
Postoperative Course
- Splint 2 weeks
  - NWB
- Cast 4 weeks
  - Weight of leg
- Fracture boot 4 weeks
  - Progressive weight bearing
- Total 10 weeks immobilized
  - More complex foot reconstructions require 8 weeks NWB

In the literature: FAI 2005 Sep:26(9):698-703, Thompson IM, Bohay DR, Anderson JG
- Union rate 96%
- Non-union 4%
  - 50% previous surgery
- Revision rate 2%

1st TMT Fusion: Important Points/Summary
- Early weightbearing
  - Predispose to nonunion
- Achilles contracture
  - ↑ stress midfoot
- Surgical technique/Post op protocol
  - Safe
  - Effective
  - Predictable & acceptable union rates
  - Few complications
- Previous bunion surgery
  - May increase risk for non-union?

Medial Column Stabilization
- Solution for midfoot sag
- Hypermobility
- Concurrent bunion deformity

Medial Column Stabilization: Technique Notes
- Tarsometatarsal/Naviculocuneiform joints
  - Screws and/or Plates
  - Stress relief bone graft
- Pocket / Countersink “Manoli” Hole
  - Prevents dorsal cortical breakout as screw head engages
- Os calcis osteotomy
- Lateral column lengthening

Neuropathic Midfoot Collapse
- Complicated by other co-morbidities i.e. obesity, diabetes, vascular insufficiency
- Usually significant deformity refractory to conservative measure
- Surgical indications include:
  - Non-healing ulcer
  - Pending ulcer
  - Instability
  - Unbraceable deformity
  - Pain
Neuropathic Midfoot Collapse: Patient Case
- 35 y/o female
  - 2 month history foot pain and deformity
  - No known neuropathy
  - Surgical correction
    - TMTJ 1-3, ICJ, NCJ fusions with LCL and gastrocnemius recession

Research Report: Midfoot Reconstruction for Primary Atraumatic Arthritis: Analysis of Outcomes
- Hypothesis:
  - Midfoot arthrodesis is an excellent procedure for primary midfoot arthritis and can achieve good results with acceptable rate of complications.

  - Retrospective Chart Review: Methods
    - 95 patients (104 feet)
    - Male/female (18/77)
    - Mean age 61 (20 – 80)
    - 297 total joints fused
    - 77.9% gastroc recession
    - 55.8% forefoot

- Results
  - 92.4% union rate
  - 99% union rate after revision (7 patients)
  - Statistical Significance ($p < 0.05$):
    - VAS improvement: 6.9 pre-op → 2.3 post-op
    - AOFAS improvement: 32 pre-op → 79 post-op
    - Satisfaction: BMI ≥ 30 7/35 & BMI < 30 1/39

- Conclusions
  - Limitations
    - Retrospective study
    - 28% loss to followup
    - Did not correlate outcome to correction achieved
  - Hypothesis is sound

Lis Franc: Mechanism of Injury
- Direct loading
  - Load parallel to joint surfaces
  - Significant soft tissue disruption
- Indirect loading
  - Axial load along metatarsals
  - Variable bony fracture involved

To fuse or not to fuse?
- The “gold standard” of ORIF has been based on the assumption that the patients “all do well”
- In reality a fair percentage develop a chronic disability despite anatomic reduction, early treatment and accurate diagnosis
- Be careful in your decision making; significant instability, articular damage, higher energy, ligamentous lisfrancs and complex fracture dislocations may do better with ORIF with fusion
Research Report: Primary Open Reduction Internal Fixation vs. Primary Arthrodesis of Lisfranc Joint Injuries: A Prospective Randomized Trial

Introduction/Purpose
- Lisfranc/TMT joint injuries are associated with long-term disability, subsequent painful osteoarthritis, and residual deformity, surgical management is Primary ORIF (PORIF).
- The purpose of this study is to compare standard PORIF to salvage primary arthrodesis (PA).

Prospective Randomized Study: Methods
- 40 patients (32 complete)
- PORIF/PA (14/18)
- PA: 17% 3 HW removals
- PORIF: 114% req. addtl. Surgery

Results
- PORIF
  - No infections, loss of fixation, neural injury, or malalignment were noted
- PA
  - 1 delayed union associated with a broken first TMT joint screw, healed at the six month mark
  - 1 non-union of a first TMT joint was treated non-operatively
  - No deep infections

Surgical Evaluation

<table>
<thead>
<tr>
<th>Category</th>
<th>PORIF</th>
<th>PA</th>
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<tbody>
<tr>
<td>Anatomic Reduction</td>
<td>14/14 (110%)</td>
<td>17/18 (94%)</td>
</tr>
<tr>
<td>Solid Fusion</td>
<td>N/A</td>
<td>17/18 (94%)</td>
</tr>
<tr>
<td>Addtl. Surgery</td>
<td>15 (114%)*</td>
<td>3 (17%)*</td>
</tr>
<tr>
<td>Delayed/Non-Union</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Hardware Failure</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

*p < 0.05
- SF-36 & SMFA
  - No statistical difference between ORIF and PA at 3, 6, 12, or 24 months
- Phone survey: 21/32 patients were very satisfied or satisfied

Results/Discussion
- PA may lead to less revision surgery than PORIF
- PA: viable treatment option, investigator’s next steps:
  - Possible longer follow-up analyses
  - Adjacent arthritis
  - Gait analysis

Lisfranc Fractures: To fuse or not to fuse?
- When treating a closed displaced and unstable fracture of the tarsometatarsal joints, management includes all but one of the following:
- anatomic ORIF
- delayed surgical treatment secondary to soft tissue constraints
- preoperative evaluation including radiographs and CT scan
- consider EUA
- anatomic ORIF with fusion

Conclusion
- Safe procedure with excellent union rate
- High patient satisfaction and acceptable complication rate
- Outcomes/ satisfaction reduced with complications
- Elevated BMI may correlate with poor outcomes

Final Tips/Notes
- Recreate the “tripod”
- Address bony deformity
- Spare the essential joints

**IF IT LOOKS LIKE A FOOT, IT WILL WORK LIKE A FOOT!**


