Functional Outcome of Open Reduction and Internal Fixation with Primary Arthrodesis for Injuries to the Tarsometatarsal Joint Complex

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Introduction

- Injuries to the Tarsometatarsal complex
  - Ligamentous +/- bony injury that occur along a spectrum with varying degrees of chondral injury
  - Lack of consensus regarding optimal treatment

- ORIF versus ORIF with Primary Arthrodesis
Purpose

- To evaluate the clinical and radiographic outcomes of a consecutive series of patients with injuries to the tarsometatarsal complex treated by ORIF/primary arthrodesis

Hypothesis

- ORIF with primary arthrodesis would lead to good to excellent functional outcomes with low rates of subsequent surgeries

- Functional outcomes would be decreased in patients with high energy injury mechanisms.
Methods

- Reviewed all patients with injuries to the TMT joint complex undergoing treatment by single surgeon (M.P.C) from 2005 - 2015.
- All injuries treated with ORIF with primary arthrodesis with at least 1 year follow up.
- 68 patients underwent ORIF with primary arthrodesis for acute injury in the study period.
- Patients underwent fixation via a dorsal approach in which articular cartilage was removed and reduction was held with 3.5 and 2.7 mm screws placed in lag fashion. If comminution was present dorsal bridge plating was utilized.
- If instability was present in the lateral column, CRPP of 4th and 5th TMT with 1.6mm K wire was utilized. ORIF of cuboid fractures were performed when indicated.
Functional Outcomes were collected at latest clinical follow up and/or telephone interviews

1) AOFAS Midfoot score

2) Foot and Ankle Ability Measure (FAAM)
   - Validated
   - Sport subsection
Results

- 51 patients available for evaluation at a mean follow up of 5.8 years (1.5-9.8)
- 50 of 51 patients (98%) went on to radiographic union following the index procedure.
- Groups were divided based on mechanism:
  - Low Energy: Sports, GLF, Direct
  - High Energy: Fall > 4 ft, Crush, MVC, MCC
AOFAS Midfoot

Low Energy: 89
High Energy: 87

p = 0.667
Foot and Ankle Ability Measure

Low Energy: 94
High Energy: 89

p = 0.021
Injury to the lateral midfoot necessitating fixation was less likely in the low energy group compared to the high-energy group (7.5% versus 37.0%; $p=0.0032$). Fixation of lateral column did not significantly affect functional outcome scores.
Results

- **18 of 51 patients participated in sports preoperatively.**
- **All were able to return to their previous sport**

Additional Surgery

- **Low Energy -** 3/32 (9.3%)
  - Removal of implants - 2
  - Revision of 1st TMT nonunion - 1
- **High Energy -** 5/19 (26%)
  - Removal of implants - 3
  - 4th/5th TMT interposition arthroplasty - 1
  - Open tendoachilles lengthening with posterior capsulotomy - 1

Complications

- **Low Energy -** 2/32 (6.2%)
  - 1st TMT nonunion - 1
  - Superficial wound breakdown - 1
- **High Energy -** 1/19 (5%)
  - Superficial wound breakdown - 1
**Strengths**

- **Largest series** of patients examining the functional outcome of ORIF with primary arthrodesis
- Validated functional outcome score
- Follow up - 5.8 years

**Limitations**

- Lack of radiographic follow up
- Long term results?

**Summary**

**ORIF with primary arthrodesis**

Functional results in the good to excellent range at mean 5.8 year follow up

Low energy mechanism = higher functional scores and lower rates of subsequent surgery

But outcomes remained good to excellent in both groups.