Reduction of Foot Width with Triplanar Tarsometatarsal Arthrodesis for Hallux Valgus Deformity

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INTRODUCTION

- Foot width reduction is a desirable cosmetic and functional outcome for patients with hallux valgus.
- Triplanar tarsometatarsal (TMT) arthrodesis achieves this by three-dimensional correction of the deformity.

- The **purpose** of this study was to evaluate changes in osseous and soft tissue width in patients undergoing triplanar TMT arthrodesis.

METHODS

- After receiving IRB approval, charts were retrospectively reviewed for skeletally mature patients undergoing primary triplanar TMT arthrodesis for hallux valgus deformity at a single institution between 2016 and 2019.
- Patients who underwent concomitant first metatarsal head osteotomies (e.g., Silver or Chevron) or fifth metatarsal osteotomies were excluded.
- Preoperative and postoperative anteroposterior weight-bearing radiographs were compared to evaluate for changes in bony and soft tissue width.
- Bony width was defined as the distance from the most medial aspect of the first metatarsal head to the most lateral aspect of the fifth metatarsal head.
- Soft tissue width was defined as the distance from the most medial soft tissue overlying the first metatarsal head to the most lateral soft tissue overlying the fifth metatarsal head.
- Demographics collected included patient age, sex, diabetes diagnosis, smoking status, body mass index (BMI), and laterality were all collected.

RESULTS

- 45 feet from 41 patients (49.91 ± 2.2 years, 95.12% female) met inclusion criteria.
- Preoperative osseous foot width was 94.2 mm, compared to 87.0 mm postoperative ($p < 0.0001$).
- Preoperative soft tissue width was 105.9 mm, compared to 99.7 mm postoperative ($p < 0.0001$).
- Postoperatively, patients had an average 7.2 ± 0.6 mm reduction (7.68% reduction) in osseous width and average 6.2 ± 0.6 mm reduction (6.26% reduction) in soft tissue width.

TABLES

Variable	Number of Patients (%)
Patients	41
Feet	45
Laterality	
Right	27
Left	18
Sex:	
Female	39 (95.12%)
Male	2 (4.89%)
Age (years)	49.91 ± 2.2
Body Mass Index	28.71 ± 0.9
Diabetes	2 (4.89%)
Active smoking	1 (2.44%)
Osseous foot width (mm)	
Preoperative	94.2 ± 1.1
Postoperative	87.0 ± 1.2
Average decrease	7.2 ± 0.6
Soft tissue foot width (mm)	
Preoperative	105.9 ± 1.1
Postoperative	99.7 ± 1.2
Average decrease	6.2 ± 0.6
Time to postoperative radiograph (days)	214.3 ± 10.0

Table 1: Demographics and statistics for patients undergoing triplanar tarsometatarsal arthrodesis

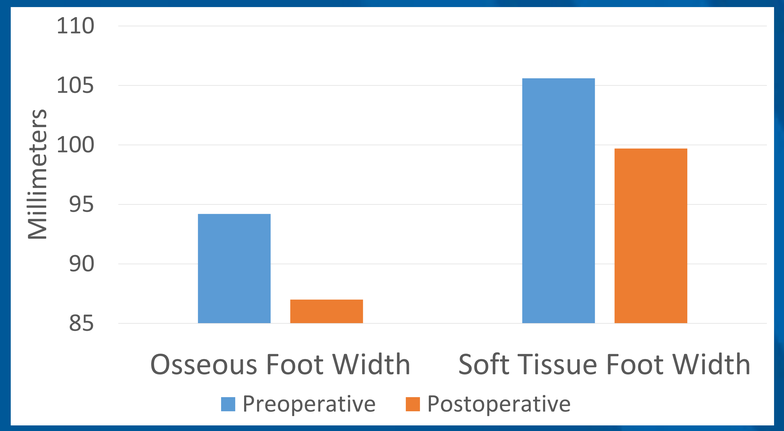

Table 2: Pre- and postoperative osseous and soft tissue widths

FIGURES

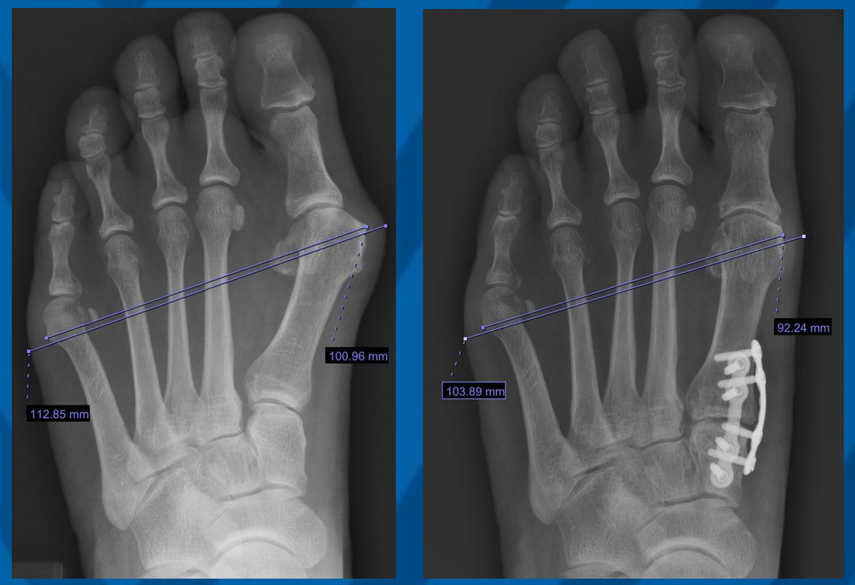

Figure 1a-b: pre- and postoperative AP weight-bearing radiographs

CONCLUSIONS

1. Triplanar TMT arthrodesis provides a significant reduction in both osseous and soft tissue foot width, an average reduction of 7.2mm and 6.2mm, respectively.
2. Further studies are needed to evaluate the long-term efficacy of this procedure and maintenance of correction. A multi-center study is currently underway.

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