

MEASURING CORRECTION IN HALLUX VALGUS SURGERY

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Proper correction of hallux valgus is typically measured by several well-accepted radiographic parameters. First metatarsophalangeal joint congruity, sesamoid position, hallux valgus, and intermetatarsal angles help define successful correction of bunion deformities. However, a study by Throdarson et al in 2005, looked at patient satisfaction using both subjective and objective scoring systems. They compared McBride, distal chevron, and Lapidus bunionectomies with somewhat surprising conclusions. “The magnitude of preoperative deformity, postoperative deformity, and magnitude of correction did not significantly influence the amount of improvement in any score, and the type of operation did not influence outcome.”

Although most patients presenting to the office would like their foot to have a cosmetically acceptable appearance, their primary concerns are pain and the inability to wear shoes comfortably. Pain is a function of both the width of the foot and the dimensions of the toe box. From current radiographic parameters we can only infer the amount of narrowing that occurs.

In the current study, I measure the width of the foot both preoperatively and postoperatively. The results compare a distal Austin osteotomy, a mid-shaft Scarf osteotomy, and more proximal closing base wedge osteotomy and Lapidus arthrodesis.

METHODS

The width of the foot was measured from the preoperative radiograph in millimeters. The two reference points were the distal medial most aspect of the first metatarsal and the lateral-most portion of the fifth metatarsal head (Figure 1). Postoperatively, the same points were utilized (Figure 2). The intermetatarsal angles were also recorded. Two different measurements were taken postoperatively of the Austin and Scarf osteotomies. The traditional postoperative measurement was obtained by bisecting the metatarsal head and base of the first metatarsal. An additional proximal angle was calculated. The first metatarsal shaft was bisected proximal to the osteotomy and at the base (Figure 3).



Figure 1. Preoperative measurements.

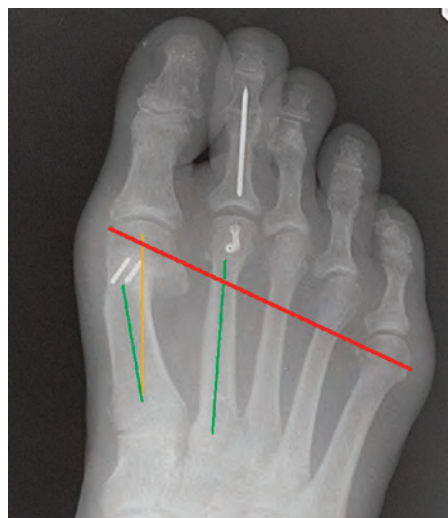


Figure 2. Postoperative measurements.

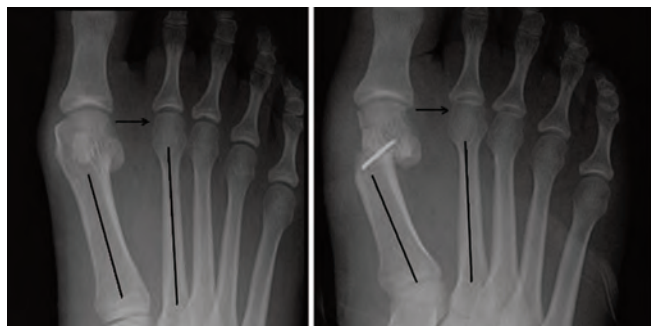


Figure 3. Demonstrates significant transposition of the metatarsal head but the distance between the first and second metatarsal heads has not been reduced postoperatively. There is an increase in the proximal intermetatarsal angle.

RESULTS

Lapidus arthrodesis (16 feet)

- Preoperative intermetatarsal angle (IMA) 16.23°
- Postoperative IMA 8.75°
 - -7.6° correction
- Preoperative 1-5 distance 97.9 mm
- Postoperative 1-5 distance 83.6 mm
 - -14.2 mm narrowing of the foot
 - 1.88 mm narrowing per degree intermetatarsal reduction

Closing base wedge osteotomy (13 feet)

- Preoperative IMA 15.4°
- Postoperative IMA 8.8°
 - -6.6° correction
- Preoperative 1-5 distance 94.8 mm
- Postoperative 1-5 distance 87.02 mm
 - -7.8 mm narrowing of the foot
 - 1.23 mm narrowing per degree intermetatarsal reduction

Scarf osteotomy (14 feet)

- Preoperative IMA 14.6°
- Postoperative IMA (traditional) 5.2°
 - -9.4° correction
- Postoperative IMA (proximal) 12.9°
 - -2.7° correction
- Preoperative 1-5 distance 94.3 mm
- Postoperative 1-5 distance 88.1 mm
 - -6.2 mm narrowing of the foot
 - .65 mm narrowing per degree of intermetatarsal reduction

Austin osteotomy (15 feet)

- Preoperative IMA 14.7°
- Postoperative IMA (traditional) 6.5°
 - -8.2° correction
- Postoperative IMA (proximal) 17.73°
 - +3.03° correction
- Preoperative 1-5 distance 90.98 mm
- Postoperative 1-5 distance 86.3 mm
 - -4.68 mm narrowing of the foot
 - .57 mm narrowing per degree of intermetatarsal reduction

DISCUSSION

The Scarf and Austin bunionectomies provided the greatest degree of intermetatarsal angle correction, but the least amount of narrowing of the foot. The more proximal osteotomies provided the greatest degree of narrowing per degree of intermetatarsal angle correction.

Examination of the postoperative radiographs of the Austin and to a lesser extent the Scarf, demonstrated an overall increase in the proximal intermetatarsal angle. It appears in distal osteotomies that the lateral displacement of the metatarsal head causes a retrograde pressure on the proximal metatarsal resulting in an increase of the intermetatarsal angle (Figure 3). Although distal osteotomies are effective in correcting bunions, they provide the least amount of narrowing of the foot. In this study the more proximal osteotomy did not reduce the intermetatarsal angle as much as a more distal procedure, but produced the narrowest foot postoperatively.