

Minimally Invasive Distal Metatarsal Osteotomy vs Chevron Osteotomy for the Treatment of Hallux Valgus: A Systematic Review

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Introduction

Hallux abducto valgus (HAV) is one of the most common deformities in the foot with over 100 different published methods for correcting it. Traditionally, HAV correction is performed as an open surgery with distal chevron (Austin) osteotomy as one of the most frequently utilized procedures but previous studies on the Austin have shown that complication rates can be as high as 20% (1). Minimum incision technique (MIT), a subset of minimally invasive surgery, is regularly performed outside of the United States for HAV correction but has yet to become popular domestically which may be explained by the relative lack of studies demonstrating its efficacy (2). With a procedure time as short as 5 minutes and an incision less than a third of the size of what would be found in an Austin, the MIT is a favorable procedure for medically at-risk patients. By using only a single Kirschner wire for fixation, unlike an Austin which typically requires one or two cortical screws, significant cost-savings for the healthcare system are possible.

Statement of Purpose

The aim of this study is to compare the clinical and radiographic outcomes of MIT to the Austin osteotomy for HAV correction.

Procedure

A 1-cm incision is made at the medial aspect of the first metatarsal neck and the tissue is retracted. An oscillating saw is used to make a complete, transverse subcapital osteotomy and the distal fragment is moved laterally. A 2-mm Kirschner wire is drilled distally through the medial soft tissue of the hallux. The hallux is placed into a rectus position and the Kirchner wire is drilled in a retrograde fashion through the medullary canal and secured into the metatarsal base. The hallux is dressed in an overcorrected position and weight-bearing in a postoperative shoe is allowed the following day.

Methods

This study reviewed five MIT studies (3-9) with a total of 913 patient and 1336 procedures as well as three Austin studies (8-10) with a total of 191 patients and 250 procedures. All studies were case series which had follow-up periods of at least 1.5 years. Outcome data were pooled and mean values were calculated for the intermetatarsal (IMA) and hallux abductus (HAA) angles, tibial sesamoid position (TSP), American Orthopaedic Foot and Ankle Society (AOFAS) scores, complication and revision rates.

Results

The mean pre- and postoperative AOFAS scores in the MIT group were 46.5 and 87.3, respectively, and 49.1 and 89.9, respectively, in the Austin group. An identical increase of 40.8 in the mean AOFAS score was found for both groups postoperatively (Figure 1). The mean correction in the IMA and HVA in the MIT group was 7.3° and 21.8°, respectively, compared to 6.8° and 17.9°, respectively, for the Austin group. The MIT had a lower mean complication rate than the Austin, 10.8% and 13.7%, respectively, but had a slightly higher revision rate, 1.1% and 1.0%, respectively (Table 1).

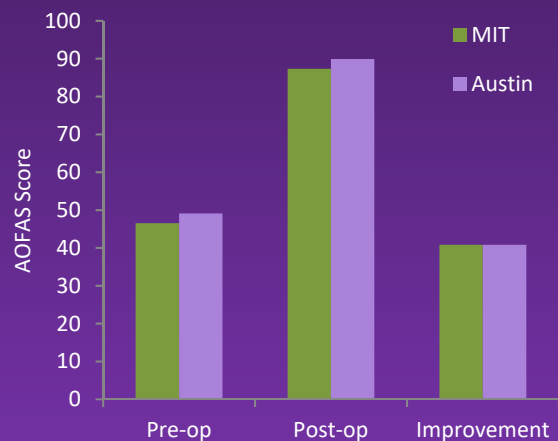


Figure 1. Mean pre- and postoperative AOFAS Score

| | MIT | | Austin | |
|-------------------|--------|---------|--------|---------|
| | Pre-op | Post-op | Pre-op | Post-op |
| IMA (°) | 14.7 | 7.4 | 14.6 | 7.8 |
| HAA (°) | 33.1 | 11.8 | 30.1 | 12.2 |
| Complications (%) | 10.8 | | 13.7 | |
| Revisions (%) | 1.1 | | 1.0% | |

Table 1. Mean pre- and postoperative radiographic measures, complication and revision rates.

Conclusions

These findings suggest that the MIT has similar clinical and radiographic outcomes when compared to the Austin osteotomy. When the benefits of a smaller incision and cost-savings in fixation are taken into consideration, the MIT can serve as a viable alternative to the Austin osteotomy for HAV correction.

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