Retrospective Analysis of the Modified Lapidus Arthrodesis by a Single Surgeon over a 10-year Span in 680 Consecutive Patients

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Abstract

The Lapidus bunionectomy is a powerful procedure used for treatment of severe hallux valgus and midfoot arthritis. There are many different constructs for arthrodesis of the first tarsometatarsal joint. Here we present a retrospective study of 680 consecutive patients who underwent first tarsometatarsal joint arthrodesis by single a surgeon over the past 10 years using only two cross screws. The average follow-up period was 12 months. There was a non-union rate reported of 16 patients (2.35%). All non-union patients underwent revision arthrodesis with successful resolution of pain and deformity. This is one of the largest studies conducted on first tarsometatarsal joint arthrodesis. Our study shows that a simple cross screw construct is a reliable method of fixating the fusion site with low rates of nonunion and any other complications.

Literature

First tarsometatarsal joint arthrodesis was originally described by Paul Lapidus in 1934 (1). First tarsometatarsal joint arthrodesis is reserved for severe bunion deformities. In prospective study performed by Coetzee and Wickum (2), an average intermetatarsal angle of 18 degrees was corrected to 8.2 degrees at the most recent follow-up with use of the Lapidus procedure (2). In a retrospective study performed by Kopp and colleagues (3) there was 93% satisfaction with pain improvement and 86% were satisfied with the cosmetic appearance after the procedure (3). In a large multicenter review, 367 patients underwent Lapidus bunionectomy and were allowed to begin early weightbearing (< 21 days) or delayed weightbearing (> 21 days). They reported 24 non-unions, 13 in the early weightbearing group and 11 in the delayed group. They concluded that early weightbearing does not increase the risk of non-union after Lapidus bunionectomy (4). King et al. (5) reported a nonunion rate of only 2.2% after performing a Lapidus bunionectomy in 136 patients using a 2-screw construct and allowing partial weightbearing 12 days after (5)

Statement of Purpose

The aim of this study was to show the results of the Lapidus procedure with crossed screw fixation performed by a single surgeon over the past 10 years.

Level of Evidence

Level 3, Retrospective Study

Methods

- Retrospectively, 680 consecutive patients underwent a modified Lapidus bunionectomy between May 5, 2005 and September 25, 2015. Average follow-up 12 months.
- All patients received two 4.0 solid core, stainless steel, fully threaded AO screws placed in a crossing, bi-cortical fashion across the 1st TMT joint.
- Exclusion criteria included any other modification made to the Lapidus construct.
- Surgical Procedure: A single incision was made from the 1st TMT joint to the 1st MPJ, the medial eminence was resected followed by a lateral release. Thereafter, a meticulous joint prep was performed using a combination of joint curettage, saw resection, subchondral drilling, fish-scaling, and shear-straining. Each patient was then fixated with two 4.0 solid core screws.
- All patients were placed in a short-leg posterior splint, instructed to remain non-weightbearing for 4-6 weeks. Patients were then placed in a CAM walker and were transitioned to partial weightbearing. They were then transitioned to full weightbearing in the CAM boot followed by full weightbearing in normal shoe gear by week 8-10. Full activity was resumed at 14-16 weeks postoperatively
- Non-union rate was documented and defined as: absence of osseous trabeculation across the fusion site, diastasis, and/or sclerosis at the fusion site 6 months following the procedure

Results

- 16 non-unions (2.35%) were reported with a 97.65% union rate.
- 7 non-unions were symptomatic, all were revised with successful fusion.
- Post-operative complications were not found to be statistically significant.

Post-surgical complications	Subjects
Non-union	16 (9 Asymptomatic)
Delayed union	5
Hallux Varus	16 (8 Asymptomatic, 8 revised)
Hallux Malleus	1
Fracture	3
Stress Riser	1
DVT	3
Malignant Hyperthermia	1

Conclusion

- The modified Lapidus arthrodesis has been a workhorse procedure for foot and ankle surgeons attempting to correct severe hallux valgus deformities.
- Multiple studies have demonstrated low nonunion rates with use of two crossed screws, our study reports a 2.35% nonunion rate and less than 1% reoperation rate.
- Despite the industry pushing towards more complicated and expensive internal fixation constructs, the crossing screw technique remains effective and more cost-conscientious.

References

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