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Decreased Recurrence Rate with 1st Metatarsal to Intermediate Cuneiform Screw Fixation Compared to Traditional Fixation in the Lapidus Bunionectomy

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Abstract:

The lapidus bunionectomy has been extensively reported in the literature as a reliable means of addressing a severe bunion deformity with hypermobility. The procedure while powerful in its ability to correct the deformity has a variable recurrence rate of up to 12% as reported in the literature. The current study set aims to evaluate the rate of recurrence using a modified construct involving a first metatarsal to intermediate cuneiform screw. At one year we found that less than none of our 21 patients had a recurrence.

Introduction:

First tarsometatarsal joint arthrodesis has been well established in the literature as a reliable procedure for addressing hallux valgus when the deformity involves a intermetatarsal angle of greater than 15° and/or hypermobility. The procedure has proven itself to be reliable in its ability to reduce the deformity with reproducible results.

Although a good procedure in the appropriate setting, it is not without its own complications. Specifically, recurrence rates of the deformity upon weight bearing have been reported between 3.3% and 12% when only the first tarsometatarsal joint has been fused.

The modified technique with added fixation from the first metatarsal to the intermediate cuneiform was found by Hyer and colleagues to offer less sagittal plane mobility as compared to traditional cross screw fixation. Furthermore, while not the focus of our review, mobility at the arthrodesis site is also considered one of the main culprits behind non-union and an added point of fixation may help to decrease the rate of nonunion as well in patients undergoing first TMT arthrodesis. This notion was demonstrated by the work of Blitz and colleagues who found 100% union rate in their patients with this modified construct in 80 patients.

The current study was a retrospective analysis of 21 patients who underwent lapidus bunionectomy with a modified fixation construct to include a first metatarsal to intermediate cuneiform fixation.

Materials and Methods:

The current study was a retrospective analysis of 21 patients who underwent lapidus bunionectomy with a modified fixation construct to include first metatarsal to intermediate cuneiform fixation.

Charts, and radiographs of five surgeons in our group were reviewed for all patients who had undergone a modified Lapidus arthrodesis performed from January of 2016 to December of 2016. To be included in the review, patients were required have undergone modified Lapidus arthrodesis with or without other procedures of the first ray (i.e. muscle-tendon procedures, distal metatarsal osteotomy or Akin osteotomy). Patients who underwent modified Lapidus arthrodesis in conjunction with other procedures that did not focus on the first ray, with the exception of autogenous calcaneal bone graft, were excluded.

The following data were collected: pre and postoperative radiographic measurements from weight-bearing films were recorded for the following radiographic angles: first intermetatarsal angle (IMA), sesamoid position and hallux valgus angle (HVA). The HVA was obtained using the Hardy and Clapham technique. Radiographic measurements were made by the senior author..

A total of 21 patients underwent a modified first TMT arthrodesis by placing a 4.0 mm partially threaded cannulated screw from the base of the first metatarsal to the proximal lateral corner of the intermediate cuneiform after reduction of the deformity and preparation of the first TMT joint were performed. This was followed by a plate with locking screw construct that spanned the first TMT (Figure 1). No screws were placed across the first TMT. General anesthesia and a thigh tourniquet were used in all cases. The medial eminence was resected in all cases with capsulo-tendinous balancing at the first MPJ.

The postoperative protocol was the same for all surgeons, and involved a period of non–weight bearing in a posterior splint or CAM walker for about 6 weeks postoperatively with non weight bearing range of motion exercises during this period. This was followed by a period of weight bearing as tolerated in CAM for 4 weeks and finally weight bearing as tolerated in normal shoes. Radiographs were taken immediately postoperatively and at 2, 6 and 10 weeks. For the purposes of this study the immediate films were compared to the films at 1 year post operatively.

Results:

The mean preoperative, immediate postoperative, and final postoperative radiographic measurements for IMA, HAA and sesamoid position are shown (Figure 2).

While we did see a statistically significant change in our measurements and positioning between immediately postoperative and final, we did not see those as clinically significant or being classifiable as recurrence of deformity. Furthermore, we saw the most increase in measurements in the HAA, which we viewed as not directly reduced and influenced by our lapidus construct. It should also be noted that we did not perform any phalangeal osteotomies in any of the included patients for this review.

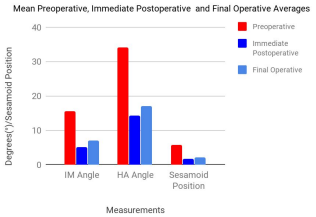

Figure 2. Mean preoperative, immediate postoperative and final IMA, HAA and sesamoid position.

Discussion:

In Lapidus' original 1934 paper, he described fixation with heavy cat gut suture and had patients weight bearing almost immediately. Unsurprisingly, his complications included migration of the first met and reported time to union of up to three months; although he didn't report any formal data on his union rates and rates of recurrence.

In the current study, we found no recurrence clinically or radiographically in any of our # patients. This suggests that in comparison to the reported rates of recurrence in the literature of 3.3%-12%, we have found a fixation method that reduces the incidence of recurrence of the deformity.

Indeed much has changed since 1934 and as in this current review, we know that indeed not only is fixation key to a satisfactory outcome, but the type of fixation may also play a role. Admittedly, our study will need to include a larger sample size and future studies will need to be carried out in a prospective randomized control trial setting for any definitive conclusions to be drawn.

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