

Outcomes of the Bone-Block Lapidus Arthrodesis (LapiCotton) in the Treatment of the Collapsed Foot

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INTRODUCTION:

Progressive collapsing foot deformity (PCFD), Hallux Valgus (HV), and Midfoot Arthritis (MA) are diseases that benefit from the Lapidus procedure due to its capability to provide a stable medial column while correcting the underlying deformity. However, the technique does not go without complications. First metatarsal shortening/dorsiflexion are not uncommon, which could be exacerbated by local anatomy/revision surgery settings. Restoring length and sagittal plane position (plantarflexion) of the first ray when treating these pathologies is paramount. Performing a primary distraction and plantarflexion fusion with an allograft wedge (LapiCotton) has been advocated in the literature, potentially allowing improved deformity correction, but with the risk of increased nonunion rate. The objective of this study was to report medium-term follow-up results of the LapiCotton in patients with collapsed feet.

METHODS:

This IRB-approved comparative prospective study assessed patients diagnosed with PCFD, HV, and MA undergoing a Lapidus bone-block fusion (LapiCotton) between August 2020 and November 2022. All patients were operated on by a single fellowship-trained foot and ankle surgeon after clinical evaluation and a weight-bearing computed tomography (WBCT). After adequate joint preparation and trials, a Lapidus pre-shaped wedge allograft was placed and fixed using available implants. Adjunctive procedures were carried out as needed. Patients were kept non-weight-bearing for six weeks and followed clinically, performing a WBCT at three months and subsequent follow up. Nonunion and complications were documented. Bone healing was determined by at least 50% of bone trabeculae crossing both graft interfaces at the WBCT. Forefoot arch angle (FFA), Meary's angle, talonavicular coverage angle (TNCA), middle facet subluxation (MFS), and foot and ankle offset (FAO) were also obtained. Two fellowship-trained readers performed all assessments. P-values >0.05 were considered significant.

RESULTS: Fifty-eight patients (60 feet) were included, mean age 53.87 (range:18-77)/BMI 31.70 (SD:7.96). Twenty-four PCFD, 19 HV, and 17 MA had an average 15.47 months (4-31) follow up. Cuneiform-Post implants were used in 62%, plates/screws in 25%, and Lapidus nails in 13%. Median allograft size was 9mm (mode:8mm,5-19mm). Minor complications were observed in 3% (two superficial dehiscences) and major in 7% (three deep infections [5%], and one EHL contracture [2%]). Healing at the 3-month WBCT occurred in 94.8% and only in 66% at the most-recent WBCT (mean:11.08 months; 6-20). The clinical nonunion rate demanding reoperation was 13% (8 cases). Mean FFA (pre:6.89,SD:6.63; postop:14.21,SD:5.48; p<0.001), Meary (pre:15.17,SD:8.12; postop:6.31,SD:5.61; p<0.001), TNCA (pre:26.75,SD:11.77; postop:11.59,SD:7.91; p<0.001), MFS (pre:36.3,SD:26; postop:23.49,SD:17.35; p<0.001), and FAO (pre:6.71,SD:5.81; postop:2.2,SD:4.33; p<0.001) improved after the interventions.

DISCUSSION AND CONCLUSION:

Although the Lapidus bone-block arthrodesis (LapiCotton) restored many of the markers associated with foot collapse and alignment, nonunion rate was noted in 13% what is on the top range of nonunion rates reported in the literature for Lapidus arthrodesis. The use of allograft wedges in the fusion site probably explains our findings. The fact that the sample was heterogeneous and composed of considerably severe deformities should also be considered. Also, important to highlight that WBCT findings of fusion site healing was initially 94% at 3-months and only 66% at most recent follow up). Additional studies and longer-term follow up are needed.

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