

Radiological Evaluation and Comparative Analysis of First Metatarsal-Cuneiform Fusion Constructs: Assessing Outcomes and Stability Across Varied Fusion Techniques

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Background: The Lapidus procedure has become a cornerstone in the surgical management of hallux valgus, especially in cases with associated tarsometatarsal instability. This study investigates and compares the radiographic outcomes following three distinct Lapidus constructs, aiming to provide valuable insights into the optimal fusion configurations for achieving long-term stability improvement and maintaining intermetatarsal angle post operatively.

Methods: In this retrospective study, the objective is to assess and compare the outcomes of three different fusion constructs employed in the Lapidus procedure: Group 1: Transverse screw fixation, Group 2: Metatarsal cuneiform screw fixation, and Group 3: Combined transverse and metatarsal cuneiform screw fixation. The study encompasses a total of 32: 11 feet in group 1, 8 feet in group 2, and 13 feet in group 3. The primary focus is to evaluate postoperative stability through radiographic imaging, complemented by clinical assessments and an examination of complications. Statistical analyses were used to compare outcomes across the three fixation groups at immediate post-op, 3 months, 6 months, and 1-year post-op.

Results: The study found that TMT fusion using these 3 constructs was effective in correcting the hallux valgus deformity and restoring medial midfoot stability to the tarsometatarsal joint. Radiographic assessments demonstrated successful fusion, and patients reported improvements in pain, function, and overall satisfaction with the procedure. Complication rates were within an acceptable range. The intermetatarsal angle (IMA) in all three groups exhibited a significant reduction postoperatively compared to preoperative measurements. Group 3, characterized by combined transverse and metatarsal cuneiform screw fixation, demonstrated a notably stronger initial reduction in the intermetatarsal angle compared to Groups 1 and 2. This difference became evident by the 3-month mark and persisted, maintaining significant distinctions among the three techniques at the final follow-up. Radiological assessments indicated that Group 3 maintained stable IMA values and exhibited a lower recurrence rate compared to the other two groups.

Conclusions: The findings of this study endorse the utilization of TMT fusion with these 3 constructs, particularly with combined transverse and metatarsal cuneiform screw fixation, as a dependable and efficacious surgical approach in addressing hallux valgus with concomitant tarsometatarsal instability.