

Structures at Risk from an Intermetatarsal Screw for Lapidus Bunionectomy: A Cadaveric Study

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Introduction/Purpose: The Lapidus procedure is a common procedure for the treatment of hallux abducto valgus. Traditional fixation consists of two crossing screws in the sagittal plane. Despite arthrodesis of the first tarsometatarsal joint, recurrence of the hallux abducto valgus deformity remains a concern. A transverse screw spanning the base of the first metatarsal to the base of the second metatarsal has been advocated to provide transverse plane stability. However, the neurovascular bundle is located within the proximity of this screw. The literature is sparse with a standard technique to safely provide appropriate fixation. An anatomic cadaver study was undertaken to assess the risk of injury to the neurovascular bundle.

Methods: Ten unmatched cadaveric limbs that had been disarticulated at the knee were used. Under fluoroscopic guidance, the guide wire to a 4.0-mm screw was driven across the base of the first metatarsal and into the second metatarsal. A 4.0-mm screw was inserted, taking care to obtain osseous purchase into the second metatarsal. A longitudinal incision was made and careful dissection was carried to identify the neurovascular bundle and screw. The neurovascular bundle was inspected for trauma and the proximity of the screws was measured using a digital caliper.

Results: There were three left-sided and seven right-sided specimens. Five of the specimens were male and five were female. The mean age of the specimens at date of death was 71.4 years. The mean body mass index was 20.5. The mean distance from the 4.0-mm screw to the first metatarsal base 11.24 mm distal to the first tarsometatarsal joint. The deep plantar artery and deep peroneal nerve was free from injury in 10/10 (100%) specimens. However, the screw was measured to be less than 5 mm in three specimens. In these instances, the average distance of the screw distal to the first tarsometatarsal joint was 12.1 mm.

Conclusion: The addition of the intermetatarsal screw for Lapidus bunionectomy is widely accepted clinical practice. Descriptions of the operative technique for the placement of hardware into the second metatarsal have not included specific recommendations to avoid potential risk to the neurovascular bundle as it courses between the bases of the first and second metatarsals. According to this cadaveric study, the neurovascular bundle was avoided with placement of the intermetatarsal screw, if placed approximately 11.24 mm distal to the first tarsometatarsal joint. Further study is warranted to evaluate the optimal distance distal to the first tarsometatarsal joint.