Curved Retrograde TTC Fusion Nails: Neurovascular Structures at Risk.

Cesar de Cesar Netto, M.D., Ph.D.
Clinical Fellow, Dept. of Orthopaedic Surgery
University of Alabama at Birmingham (UAB)

Background
The purpose of this study was to assess the incidence of iatrogenic injury to plantar neurovascular structures of the foot during insertion of a curved retrograde tibiotalocalcaneal (TTC) fusion nail.

Material and Methods
Ten below-knee thawed fresh-frozen cadaveric specimens underwent curved retrograde nailing of the ankle. Shortest distance between the nail and the main plantar neurovascular branches and injured structures were recorded during dissection. We also evaluated the relative position of these structures along two lines (AB connecting the calcaneus to the first metatarsal, BC connecting the first and fifth metatarsal).

Results
The lateral plantar artery was found to be in direct contact with the nail 70% of the time, with a macroscopic laceration 30% of the time. Baxter’s nerve was injured 20% of the time as was the lateral plantar nerve. The medial plantar artery and nerve were never injured. The most proximal structure to cross line AB was Baxter’s nerve followed by the lateral plantar artery, the nail, the lateral plantar nerve, and the medial plantar nerve.

Conclusion
Our cadaveric anatomical study shows that the most common structures at risk for iatrogenic injury by lateral curved retrograde TTC fusion nails are the lateral plantar artery and nerve, and Baxter’s nerve. Determination of a true neurovascular safe-zone is challenging and therefore warrants careful dissection to minimize neurovascular injuries.