Screw in Lisfranc Ligament

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Introduction/Purpose: The Lisfranc ligament is an interosseous ligament connecting the medial cuneiform with the second metatarsal. Current treatment of displaced Lisfranc injury is rigid fixation using a transarticular screw. The purpose of this study was to observe the amount of ligamentous disruption with the placement of a transarticular screw from the second metatarsal to the medial cuneiform.

Methods: This cadaveric study included a total of 15 preserved cadavers and 23 feet. Blunt dissection down to bone, with removal of soft tissue, was performed on each foot for visualization of the Lisfranc joint. A guide-wire was inserted in a dorsolateral to plantar medial direction from the base of the second metatarsal into the medial cuneiform. Then over the guide-wire a 40mm, 4.0 partially threaded, cannulated screw was inserted. The Lisfranc ligament was then carefully identified with more dissection. The screw was then removed. Separation of the second metatarsal from medial cuneiform was performed by transecting the dorsal, Lisfranc (interosseous), and plantar ligaments. Digital photographs of the Lisfranc ligament, medial cuneiform and second metatarsal articular surfaces were recorded and measurements were taken.

Results: Of the 23 feet, the screw came in contact with the Lisfranc ligament in 20 feet. The screw fully penetrated the ligament in 7 feet, partially disrupted it in 4 feet, and had <1mm of contact in 9 feet. In 3 feet, there was no contact with the ligament with an average distance of 1.5mm.

Conclusion: Our results reveal the amount of disruption a transarticular screw, placed in a dorsolateral to plantar medial direction, will have on the Lisfranc ligament. Although the screw came into contact with the ligament in 20 out of 23 feet, only 13 feet had partial disruption or minimal contact and 3 feet had no contact at all. This is clinically relevant because ligamentous damage due to insertion and/or presence of screw in anatomic location of the ligament may interfere with its healing.

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