

Case Study

Open Reduction Internal Fixation of Lisfranc Fracture Dislocation and Primary Arthrodesis of Comminuted Second Metatarsal Base Fracture Using the ExtremiLock Lisfranc Dorsomedial Plate



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Dr. Majdanski graduated from the New York College of Podiatric Medicine in 2011. He then completed a 4 year residency program at Wyckoff Heights Medical Center where he served as chief resident during his final year. Shortly after graduating he founded LocalFootDoc, where he currently practices. He has continued to as a teaching attending at Wyckoff Heights Medical Center and became chief of the podiatry service at the hospital in 2024.

Case Presentation

A 35-year-old healthy male sustained a Lisfranc dislocation with a comminuted intra-articular second metatarsal base fracture. The patient tripped over a forklift and fell forward twisting the foot under his body. Radiographic imaging revealed diastasis between the lateral aspect of the medial cuneiform and the base of the second metatarsal, with a large fleck sign present. Patient was seen and referred for a CT scan to evaluate for the extent of articular involvement. The CT scan revealed a comminuted intra-articular fracture at the base of the second metatarsal. Due to Lisfranc dislocation and an intra-articular fracture, a plan for open reduction and internal fixation with primary arthrodesis of the second tarsometatarsal joint (TMTJ), with possible bone grafting and use of anatomic Lisfranc plating, was then discussed with the patient and his consent was obtained.

Operative Findings and Approach

The patient was placed in a supine position following administration of general anesthesia. A one-incision approach was planned, and a longitudinal incision was made over the second TMTJ. A careful sharp and blunt dissection was performed, making sure not to violate the underlying neurovascular bundle. The incision was carried down to the joint and the periosteum was elevated off the underlying bones at the second TMTJ. Sub-periosteal dissection was carried down medially, thus exposing the first TMTJ. Diastasis as well as a comminuted fracture was noted at the base of the second metatarsal at the second TMTJ. The first TMTJ was placed through stress maneuvers and was noted to be stable. The articular surface of the second metatarsal base was comminuted and non-salvageable. It was decided to prepare the joint for arthrodesis. Utilizing a sagittal saw, the articular surfaces at the base of the second metatarsal and the distal aspect of the intermediate cuneiform were excised, and the remaining surfaces were fenestrated with a 2.0 mm drill. A reduction clamp was then used to reduce the diastasis at the Lisfranc ligament and the second metatarsal was transposed medially. A 5 mm cotton wedge allograft was placed in the void at the second TMTJ. An appropriate-size dorsomedial bridge plate was then placed subperiosteally at the medial aspect of the medial cuneiform and over the second TMTJ. Reduction and plate placement were confirmed with intra-op fluoroscopy, utilizing A/P, medial oblique, and lateral views, and congruency of the second TMT joint was confirmed. Olive wires were placed into the second metatarsal and intermediate cuneiform to stabilize the plate. The plate was then secured into the intermediate cuneiform utilizing a locking screw. A 3 mm x 34 mm cortical screw was then placed percutaneously through the distal hole from the medial cuneiform to the second metatarsal, thus stabilizing the Lisfranc dislocation. The clamp was removed and the reduction was maintained, as was confirmed with fluoroscopy. Following this, the remaining screw holes were filled with a combination of locking and nonlocking screws. Screw placement was confirmed with fluoroscopy.

Preoperative



Postoperative



The surgical sites were flushed with copious amounts of sterile saline, the site was closed in layers, and dry sterile dressing was applied, followed by a posterior splint. The patient was discharged.

Follow-up

The patient remained non-weight-bearing for four weeks in a posterior splint and was transferred into a cam walker boot four weeks after surgery. After transitioning into a cam boot, he was allowed to remove the boot for range-of-motion (ROM) exercises. At six weeks he was allowed to ambulate in his cam boot. He was referred to physical therapy at the eight-week mark. Patient transferred to sneakers at 12 weeks and returned to normal activities with fusion noted at the second TMTJ and alignment maintained at the Lisfranc joint.

Discussion

The variety of Lisfranc fracture dislocations and the levels of severity dictated the need for a wide variety of tools, fixation techniques, and products to maximize patient outcomes. The ExtremiLock™ Lisfranc Dorsomedial Plate for Lisfranc dislocations allowed me to choose a tailor-made implant for this particular fracture pattern to aid in the reduction, stabilization, and fixation of this patient's pathology.





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