

Innovations in Bone Compression Devices

Simplify the Fixation of LisFranc Fractures/Dislocations

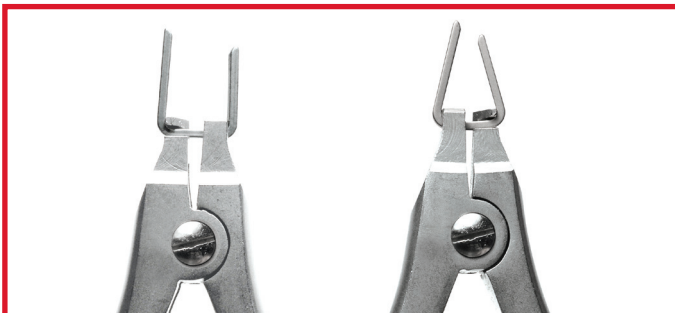
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INTRODUCTION

The surgical management of LisFranc Fractures/Dislocations is a challenging task for the foot and ankle surgeon. Existing methods to fixate these complex injuries all have their own inherent challenges. When a new technology arises that can offer simplification of the fixation process, patients and surgeons alike can benefit from decreased surgical time and a consistent, quick means of osseous stabilization. The EasyClip™ SI from MMI (A Memometal Technologies, Inc. Company) is a memory bone compression device that can be utilized to facilitate a rigid construct in the repair of these complicated foot injuries.

PATIENT PROFILE

WW is a 36 year-old male who suffered a Hardcastle C1 injury to his right tarsal-metatarsal joint complex (Figures 1, 2). The first metatarsal base had a comminuted fracture with gross dorsal angulation of the metatarsal shaft. Metatarsals 2 and 3 were dislocated at their respective cuneiform articulations with the 3rd metatarsal being severely displaced laterally and the 3rd metatarsal-cuneiform joint found to be highly comminuted making fixation exceptionally challenging.



Patented forceps that provide a secure hold and a stop to allow the correct angle for insertion.

The accident occurred in January 2008 when the driver of a car WW was getting in to drove off before he was safely inside. WW suffered some minor back, shoulder, and upper extremity abrasions and was found to

have an unremarkable past medical history other than a 10 cigarette per day habit. He was admitted to the hospital where he was treated with elevation, ice, and compression to his right foot before proceeding to the operating room.

SURGICAL METHOD

Surgical exposure is usually based upon the architecture of the particular fracture/dislocation pattern being treated as well as the local soft tissue envelope. In this case, a two incision approach was utilized with one incision being placed dorsal-medially over the 1st metatarsal-cuneiform joint and the second placed over the interval between the 2nd and 3rd metatarsal-cuneiform joints.

Once adequate reduction of the 1st metatarsal-cuneiform joint was accomplished, the 1st metatarsal base fracture was stabilized with a single EasyClip™ SI oriented medial to lateral. The 1st MC joint was then fixated with a second EasyClip™ SI oriented distal-proximal. A plantar-lateral fragment of the 1st metatarsal base could not be adequately reduced without performing excessive soft tissue dissection. Therefore, this fragment was purchased with a partially threaded k-wire followed by a partially-threaded cannulated screw to lag the structures. This resulted in satisfactory alignment although the distal screw protruded into the soft tissues once the screw compressed the fragments



20mm EasyClip™ SI



Figure 1

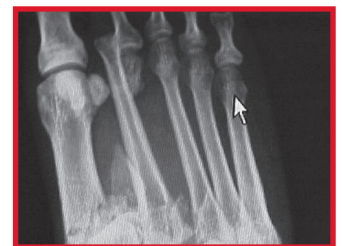


Figure 2

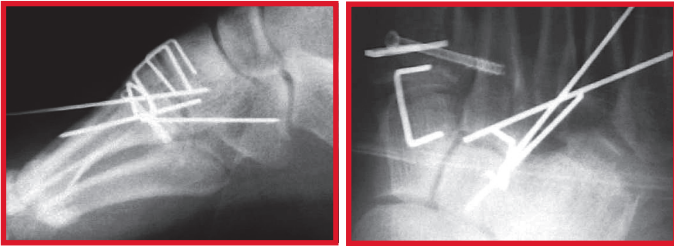


Figure 3

Figure 4

Next, the 2nd MC joint was reduced and fixated with a third EasyClip™ SI oriented distal-proximal. The 3rd MC joint was reduced and fixated with a fourth EasyClip™ SI. Once the forcep was removed from the compression device allowing it to compress the joint, comminution and instability of the 3rd cuneiform was appreciated. This compression device was easily removed and the joint was fixated with multiple k-wires. The joint space was packed with bone graft to encourage arthrodesis at this level (Figures 3, 4). The wounds were irrigated, closed in layers, and the foot was bandaged in the usual manner. This was followed by a posterior-splint.

OUTCOME

This patient is presently in his early post-operative period. He is being maintained non-weightbearing with compression dressings and a removable cast boot to allow ankle range of motion. He will be brought back to the operating room for hardware removal prior to initiating weight bearing.

DISCUSSION

The surgical stabilization of LisFranc fractures/dislocations lends itself to the simplicity and reliability of the EasyClip™ SI memory compression device. Once satisfactory anatomical alignment is achieved, a drill guide is used to drill the two holes for the compression device's legs, a depth gauge is used to measure each hole, and the correct compression device configuration is selected. The EasyClip™ SI is then loaded into the supplied forcep, distracted such that each prong is straight (a 90 degree angle), inserted into the pre-drilled holes and released from the forcep. Once released, immediate compression of the osseous segment is created.

The use of EasyClip™ SI obviates the need for oblique screw placement which can be challenging for the physician. It also provides a more rigid, secure construct than the solitary use of k-wires for neutralization. Foot and ankle surgeons will find that EasyClip™ SI memory compression devices are a powerful adjunct to the operative care of tarsal-metatarsal injuries.



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