

Versatility of the EasyClip™ SI

in Fixation of Reconstructive Foot Surgery: Use in Triple Arthrodesis

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INTRODUCTION

One of the most extensive and challenging reconstructive surgical procedures involving the foot is the triple arthrodesis. This complete reconstruction of the hindfoot is utilized as a corrective procedure for a wide variety of complex pathologies, including but certainly not limited to advanced collapsing pes plano valgus, salvage for comminuted calcaneal fractures, pes cavus deformities, definitive treatment for congenital coalition, as well as traumatic hindfoot arthropathies. Fixation for this procedure typically consists of one or two screws oriented from the plantar posterior calcaneus traversing the subtalar joint into the talar body. Additionally, the calcaneocuboid and talonavicular joint are fixated with two crossing screws or various other means. These fixation methods become increasingly difficult when the alignment requires wedge resection of the joint, or when bone grafting is employed. With the advent of super elastic fixation implants such as the EasyClip™ SI implant from MMI (Memometal Technologies, Inc.), the fixation process is greatly simplified even with difficult alignment and grafting at the arthrodesis site. This device may be utilized in a variety of positional arrangements to ensure a rigid construct with no micromotion thus enabling complete arthrodesis. Ultimately, this simplification of the fixation process produces consistent results with decreased surgical time.

PATIENT PROFILE

JG is an otherwise healthy and active 16 year old male who suffered from a combination of severe collapsing pes plano valgus deformity and associated subtalar joint middle facet coalition. He previously underwent subtalar joint coalition resection by another physician nearly 2 years prior. Unfortunately, the coalition recurred, confirmed by CT scan. In addition, the patient presented with severe, degenerative pes plano valgus changes with extensive talar head uncovering and marked abduction deformity of the forefoot. In essence, the entire midfoot medial column had substantial collapse with talonavicular joint sag and shortening of the lateral column.

Due to the recurrence of the coalition, and preliminary degenerative changes in the hindfoot noted by the CT scan, the decision was made to perform a triple arthrodesis with bone grafting to obtain appropriate correction instead of a standard flatfoot reconstruction to correct the triplane deformity. In addition, a percutaneous tendo-Achilles lengthening would be employed to correct the equinus deformity.



20mm EasyClip™ SI

SURGICAL METHOD

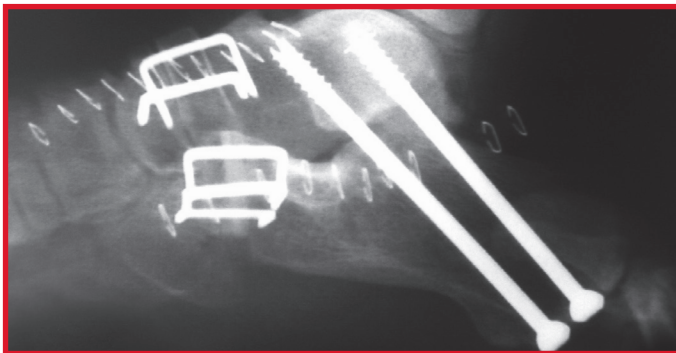
Incision line placement is per standard technique for a triple arthrodesis. One curvilinear lateral incision was performed from the inferior fibular tip extending into the sinus tarsi region for direct exposure. Deep dissection was utilized to identify the subtalar and calcaneocuboid joints. Using a power saw, the base of the cuboid and the associated articulating surface of the calcaneus was resected in order to receive a bone graft later to correct the lateral column shortening. Then, the subtalar joint coalition was resected with osteotomes and rongeur technique. The cartilage of the subtalar joint was denuded with rongeur and rasps. Lastly, a curvilinear medial incision was performed from the anterior medial talotibial joint to the navicular body. Deep dissection was used to identify the talonavicular joint. Using a power saw, the head of the talus and base of the navicular were resected in an opening base plantar wedge fashion. Again, later this would provide sagittal plane correction of the medial column after bone graft placement.

Fixation of the triple arthrodesis proceeded with the historic two screw fixation across the subtalar joint as described above, with the hindfoot corrected from extreme valgus to approximately 2 degrees of valgus. Next, using tricortical iliac crest strut graft, an 11 millimeters wedge tapered to 6 millimeters was placed in the calcaneocuboid joint resection site, thereby correcting the lateral column. Three EasyClip™ SI super elastic devices were quickly and easily



Pre-Op X-Ray

utilized to fixate the arthrodesis site as well as fixate the bone graft. Then, an additional tricortical iliac crest strut graft approximately 4 millimeters across tapered to 2 millimeters was placed in the talonavicular joint. Two EasyClip™ SI devices were used to fixate the arthrodesis and bone graft site. Lastly, a percutaneous tendo-Achilles lengthening resolved the equinus deformity.



Post-Op X-Ray

OUTCOME

Upon follow-up, the patient was progressing very well. He was maintained non-weight bearing in a compressive dressing and posterior splint as he recovered from the surgical procedure. Clinically, upon loading the foot, there is excellent correction of the pes plano valgus deformity with no motion across either bone graft arthrodesis site, nor along the subtalar joint. He has a very visible medial arch with loading of the foot. He is currently experiencing no pain at any of the three surgical areas of concern. He began ambulating in a fracture boot after eight weeks post-operatively, and then transitioned to athletic type shoegear 4 weeks after that time point.

DISCUSSION

This type of surgical procedure lends itself very well to the use of the EasyClip™ SI compression device. Once satisfactory anatomical alignment is achieved, a drill guide is used to drill the two holes for the legs, a depth gauge is used to measure each hole, and the correct size configuration is selected. The EasyClip™ SI is then loaded into the supplied forceps, distracted such that each prong is straight (90 degree angle), inserted in the pre-drilled holes, and released from the forceps. Once released, immediate compression is noted.

The obvious usage is a rapidly placed fixation device across a joint with excellent compression and stability. But, in a case such as this where a bone graft further complicates fixation, the EasyClip™ SI device becomes a perfect solution. Whereas standard cross screw fixation risks damage to the bone graft, and plate fixation risks incomplete compression of the graft to the adjacent joint margins, the super elastic characteristic EasyClip™ SI device provides fixation and compression without damage to the bone graft, and with a low-profile design which is not irritating to the adjacent tissue. It accomplishes this with rapid placement time which ultimately, reduces overall operative time.



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