

A Novel Technique for Treating Osteochondral Lesions of the Talus with a Threaded Titanium Implant: A Case Study

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Background

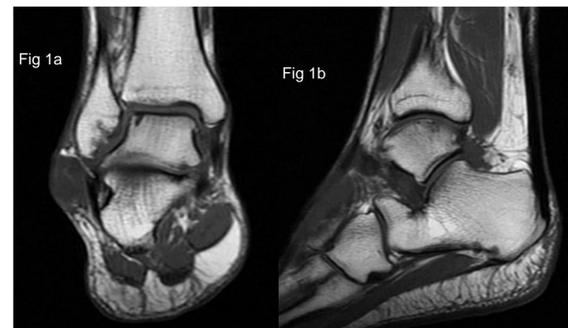
Osteochondral lesions of the talus are a debilitating pathological lesion in which the articular cartilage has poor regenerative potential. Due to the poor regenerative ability of the cartilage as well as the limited blood supply, it can be quite a challenge to treat. Treatment depends on the size and location of the lesion. A combination of radiographs, CT Scans and MRI are used to determine the prognosis of the lesion¹. The most common location of OLTs consist of the posteromedial and central-medial zones of the talus².

The gold standard of operative treatment consist of microfracturing for lesions <1.5cm². If a lesion is >1.5cm, repair or replacement with regeneration is indicated. Regenerative and replacement procedures include osteochondral autograft transfer system (OATS), autologous chondrocyte implantation (ACI), Matrix-induced chondrocyte implantation (MACI), allografting and juvenile allograft transplantation¹.

We present an innovative product that has been designed to reconstruct the foundation of a joint made from strong alloy "titanium" and is coated with hydroxyapatite, which assists in rapid bone integration of subchondral bone that it is threaded into. To our knowledge, there is little to no literature observing the post operative outcomes of this product. This study aims to present a new technique to treat easily accessible osteochondral lesions of the talus (OLTs) minimally invasively with a threaded titanium implant.

Methods

One patient with a symptomatic OLT, located in the mid-lateral zone, underwent arthroscopic surgical treatment by a single surgeon. The area of osteochondral defect was identified and subsequently debrided and deepened with a cannulated reamer. The deficit was measured and then fitted with a threaded titanium implant through the anteromedial portal. Dermal graft was attached to the surface of the implant prior to implantation. ATFL and CFL reconstruction was also performed for this patient. Postoperatively, the patient was NWB in a splint for 1 week and then slowly progressed to 100% WBAT in CAM boot over the next 5 weeks with PT. Patient then transitioned to regular shoe gear and then previous activity over the following 4 weeks and returned to full activity at 8-10 weeks.

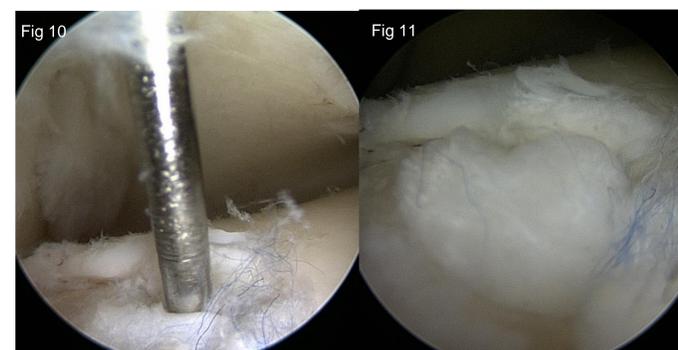
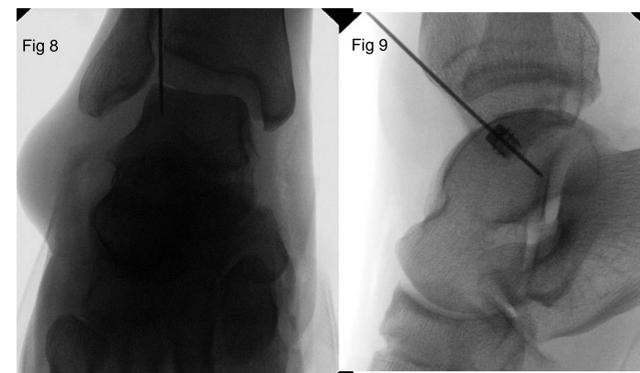
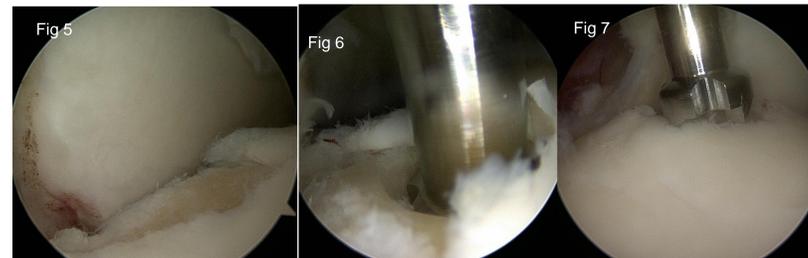
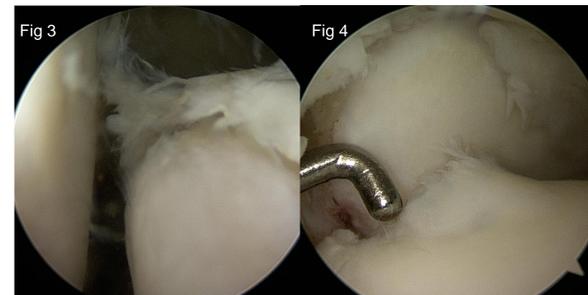


Figures 1a and 1b: pre-operative MRI demonstrating OLT in anterior-lateral surface of the talus. Figures 2a and 2b post-operative x-ray with implant in place

This research was supported (in whole or in part) by HCA Healthcare and/or an HCA Healthcare affiliated entity. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA Healthcare or any of its affiliated entities.

Procedure

Procedure is demonstrated below. The lesion is identified arthroscopically (Fig 3-4). The cartilage is then debrided, revealing the underlying subchondral bone (Fig 5). The lesion is then sized to open the correctly sized kit. The lesion is then reamed with the custom reamer (Fig 6-7). A cannulated guidewire is then fixated perpendicular to the joint into the reamed lesion for the implant (Fig 8-9). It should be noted that the graft is sutured onto the implant with 7-0 Monocryl on the back table. The implant is then screwed in with the graft attached (Fig 10-11). Adequate placement of the implant is confirmed under fluoroscopy (Fig 9).



Results

We present one patient with mid-lateral OLT treated with a threaded titanium implant without complication. Preoperative and 5 month postoperative AAOS lower limb assessment scores were 20 and 80 respectively; FAAM scores were 71% and 90% respectively. Patient demonstrated satisfaction with the procedure. No post-operative complications were observed over the one year follow up.

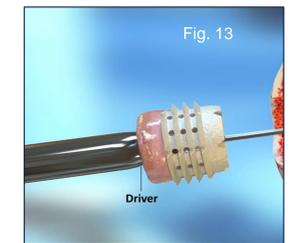
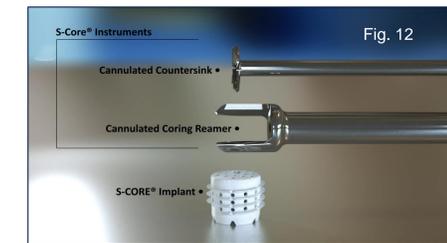


Figure 12: instruments included into the kit for the implant
Figure 13: implantation into bone
Figure 14: multiple sizes of the implant for best fit

Discussion and Conclusion

OLT treatment is still highly debated and difficult to treat. Size and location predominantly sway surgical technique. OATs, microfracture and biologic grafting techniques are used a majority of the time with variable success rates. Multiple studies have compared and created an algorithm with surgical treatment respective to the size and location of the OLT. Larger, more cystic lesions require sometimes two stage procedures such as autologous chondrocyte implantation (ACI) or autologous osteochondral transplantation (AOT). Alternatives include osteochondral allograft transplantation which is a preference of some surgeons because it avoids donor site morbidity³.

This study introduces a new, simple, and safe technique to treat OLTs with a stable titanium implant that can be performed open or minimally invasive with no adjunctive procedures. Although this report demonstrated positive outcomes with this surgical approach, there are limitations including limited follow up time as well as study population size. The long term success rate of these implants would make an interesting analysis. With further literature supporting this surgical technique for the management of OLTs, it can be a simpler less invasive method compared to the previously described procedures. It would be interesting to look at the long-term outcomes comparing this procedure to other forms of OLT repair, particularly the larger, cystic types.

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