An Arthroscopic Guided Trans-Tibial Technique to Treat Challenging Osteochondral Lesions of the Talus with a Threaded Titanium Implant: A Cadaveric Study and Review

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Background

Osteochondral lesions of the talus (OLT) are defects of the articular cartilage and/or the underlying subchondral bone of the talus. Over half of these are caused by traumatic events and can lead to a very painful ankle joint for patients. Surgical treatment is guided by size and location. Up to a quarter of OLTs can be found in the posteromedial portion of the talus. Access to these lesions can be very challenging based on location which can necessitate extensive adjunctive procedures like a medial malleolar osteotomy. The medial malleolar osteotomy can injury to the tibial plafond and possible hardware irritation. A transmalleolar approach through the medial malleolus has been described in the text to avoid an osteotomy with good results. Complications of the transmalleolar approach include cyst formation or subchondral insufficiency of the tibial plafond which may require repeat surgery. The objective of this article is to illustrate, not just a trans-malleolar, but a trans-tibial minimal approach to reach any challenging OLT in the talus to avoid more extensive procedures.

Methods

A simple and challenging approach was performed on sawbones followed by a cadaver leg to demonstrate a minimally invasive and trans-tibial approach. Standard ankle arthroscopy was used to identify and debride the lesion and assist in implantation of the device. Size of the lesion is obtained with a small ruler to choose the correctly sized implant to fill the lesion. A guide wire was then drilled, using a micro vector guide, anterograde through the distal tibia and into the OLT, perpendicular to the lesion. A cannulated reamer was then anterograded over the wire through the tibia to create a canal. The talar lesion was then drilled for the implant which was then passed down the canal and screwed into the talus. A second implant was then anterograded down the tibial canal to fill the defect made in the tibial plafond as a "kissing implant." The canal was then back filled with the autograft removed from the tibial reaming. Dermal graft was not applied during this demonstration.

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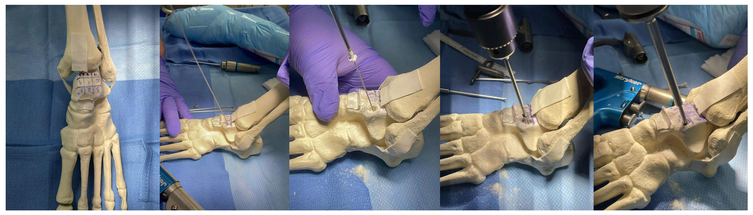
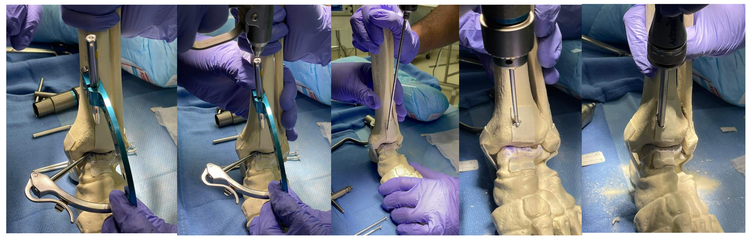
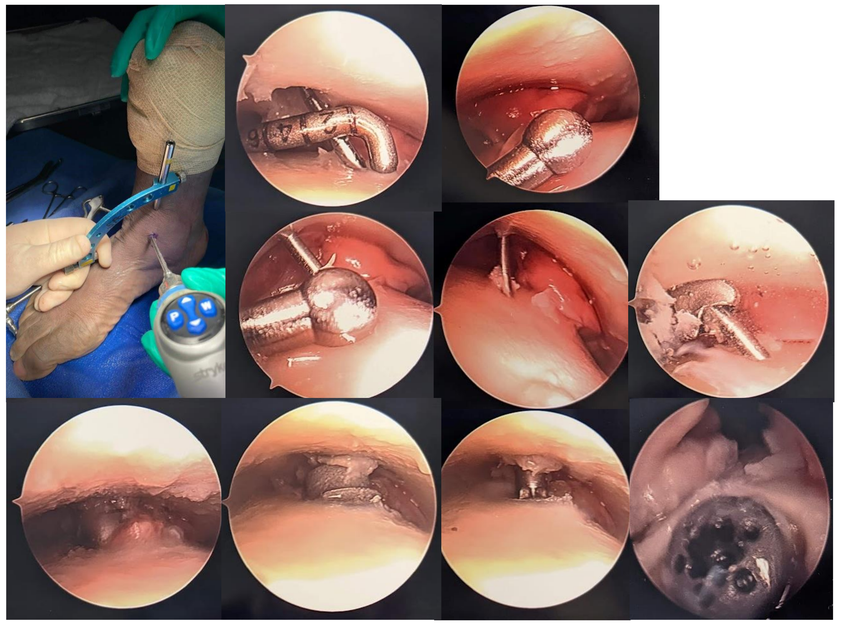
Procedure



A simple anterolateral portal approach was demonstrated on sawbones. First, identifying the lesion, sizing, guide wire, countersink drill, ream, and then inserting the implant.



A trans-tibial approach demonstrated for a central talar lesion on saw bone. Once the lesion is sized arthroscopically, a micro-vector guide is placed over the lesion and kept as close to 90 degrees as possible. A guide wire is then placed through the guide, through the tibia and into the lesion. A large bore reamer, 1mm larger than the implant needed, is then used to drill the tibial side to allow the reamer and implant to pass easily through the tibia. Standard reaming is done into the talus, through the tibial canal, and the implant is inserted.



A trans-tibial approach with arthroscopic guidance is demonstrated for a posterior central talar lesion on cadaver. A standard arthroscopic approach is performed with anteromedial and anterolateral portals. The lesion is first delaminated and sized for implant selection (not shown). The micro-vector guide is then placed over the lesion and guide wire is drilled trans-tibial into the lesion. The upsized reamer is drilled through the tibia to create the working canal. The lesion is the reamed for the size of the implant which is then passed down the canal and inserted into the talus. The tibial lesion can then be filled with a second, larger implant, inserted in a flipped position down the tibial canal in the (not shown).

Discussion and Conclusion

This technique guide successfully demonstrated a simple maneuver to treat a hard-to-reach OLT by replacing it with a threaded titanium implant on cadaver leg. Larger and difficult to reach OLTs can necessitate taxing adjunctive procedures for access. Medial malleolar osteotomies are sizeable procedures which cause injury to the tibial plafond and require hardware fixation. Osteochondral autograft transplantation (OATs) is also an extensive procedure which has high donor site morbidity. This technique provides a relatively quick and easy way to fill challenging OLTs with a titanium implant with minimal incisions and hardware. This technique also provides a solution to the main complication of the transmalleolar technique; replacing the tibial cartilage and subchondral plate of the drilled canal to avoid cyst formation.

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