The Presentation of an Anterior Tibial Osteotomy (plafondplasty) to Allow Access to Central Talar Osteochondral Lesions

Ashmi H. Patel, DPM[1], Alan W. Sue, DPM, FACFAS[2], Kyle W. Willson, DPM, AACFAS[3], and Shannon M. Rush, DPM, FACFAS[4]

[1,3]Kaiser Permanente Vallejo, [2,4]Palo Alto Medical Foundation

Statement of Purpose

This is a presentation of a modified technique to allow access to difficult to reach central talar dome osteochondral lesions (OCLs) without the need for an invasive malleolar osteotomy, that requires minimal technical difficulty, and that reduces postoperative complications and morbidity.

Literature Review

Central talar dome lesions can be difficult to access with arthroscopy or an open arthrotomy unlike most anterolateral lesions and often require a medial malleolar osteotomy for adequate exposure[1]. There are many complications of this procedure, such as tendon impingement, incongruity leading to secondary osteoarthritis, nonunion/ malunion, and potential hardware removal requiring a second procedure[2,3,4]. As a result, there have only been a couple described techniques utilizing a temporary removal of a bone block to allow direct visualization of the ankle joint with less risk of complications.

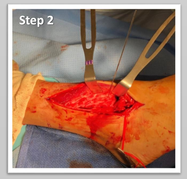
Case Study

In our case series, 8 patients underwent this modified technique to directly visualize challenging central talar dome lesions with a 2 year follow up. Radiographs and clinical exam were used to determine post-operative outcomes.

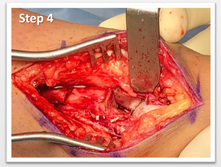
The procedure was performed as follows:

1) An arthrotomy was performed at the site of the of the talar dome lesion to expose the projected bone block from the distal tibia.

2) The central portion of the planned distal tibial osteotomy was predrilled to achieve precise refixation of the osteotomy after treatment of the OCL.



3) A sagittal saw blade was utilized to make a square osteotomy (*15 mm wide x 15 mm height x 15-20 mm deep*). First, the two vertical parallel saw cuts were made with care taken to avoid the talar cartilage. Then, the proximal cut was made connecting the two vertical cuts and was completed with an osteotome.



4) The tibial window was removed with an osteotome and the talar cartilage defect was visualized.

5) Autologous bone graft was harvested from the tibial window as needed.

6) The osteotomy was replaced and fixated with a headless compression screw.

At 2 year follow-up, all patients had union at the osteotomy site without pain, supple ankle joint range of motion without pain, no radiographic evidence of osteophytosis, and improved activity level. They were all satisfied with their post-operative outcomes and were able to return to their previous work.

2 year follow-up

Final x-rays demonstrated preservation of joint space without significant advancement of arthrosis. There were no recorded post-operative complications to date, however we are continuing to follow these patients for long-term results.

Analysis & Discussion

Our findings suggest that good radiographic and clinical results can be achieved with this technique with low morbidity and few intraoperative (no incidence of tibial fracture) and postoperative complications that are otherwise noted with previously described methods. This modified technique allows direct visualization of difficult to access lesions with minimal technical difficulty.

There have been many techniques developed that describe temporary removal of a distal tibial bone block to obtain access to the ankle joint for hard to reach OCLs. One of the first known methods was described by Flick & Gould in 1985 where the anteromedial articular surface of the tibia overlying the talar lesion is grooved with a narrow gouge, approximately 4-5 mm wide anteriorly by 6-8 mm deep[5]. They did not replace this portion of the articular surface which weakened the tibial plafond. This distal tibial window allowed medial OCLs to be treated without the need for an invasive medial malleolar osteotomy. However, this method was not applicable for larger lesions located on the posterior talar dome.

Sammarco and Makwana et al. were the first to describe a method involving removal and replacement of a tibial bone block to access the talar dome[6]. They created a rectangular wedge shaped bone block including the articular surface that was 10mm wide, 20mm deep, and 30 mm height from the distal anterior tibia. The graft was then incorporated back and secured with 2 absorbable pins.

They did not pre-drill their osteotomy however they also did not have reported incidence of malunion. Of their 12 patients, 2 patients underwent subsequent arthroscopic debridement for impinging osteophytes at 6 and 12 months post-operatively.

Kreuz et al. described a central articular triangular pyramidal bone block (4.5cm height x 1.5cm width) which was fixated with two absorbable pins that were pre-drilled[7,8]. 3 years post operatively, there was no decrease in joint space and no osteophytosis of the anterior ankle joint. There was good integration of the tibial bone block on MRI 3 and 5 years post operatively without evidence of avascular necrosis, incongruency to the surrounding tibial articular surface, or degeneration of the articular surface over the bone block. Although this technique has less articular involvement, we suspect it may limit exposure to the talar dome and is a less stable osteotomy with a larger margin for malalignment.

Conclusion: We advocate to predrill the osteotomy to prevent complications of malunion and subsequent osteoarthritis. We also experienced our square osteotomy to be adequate to achieve appropriate exposure of the talar dome avoiding the need to make a large distal tibial osteotomy into the metaphysis and increase risk of delayed healing by stripping the periosteum. The long-term results of our technique are still yet to be determined but our short-term results are promising.

References

1. Ray RB, Coughlin EJ (1947): Osteochondritis dissecans of the talus. J Bone Joint Surg 29:697–706
2. Gaulrapp H, Hagena FW, Wasmer G. Postoperative evaluation of osteochondrosis dissecans of the talus with special reference to medial malleolar osteotomy. Z Orthop Grenzgeb 1996; 134: 346–353
3. Schenck RC, Goodnight JM. Current concepts review – osteochondritis dissecans. J Bone Joint Surg [Am] 1996; 78: 439–456
4. Ziran BH, Abidi NA, Scheel MJ. Medial malleolar osteotomy for exposure of complex talar body fractures. J Orthop Trauma 2001; 15: 513–518
5. Flick AB, Gould N. Osteochondritis dissecans of the talus (transchondral fractures of the talus): review of the literature and new surgical approach for medial dome lesions. Foot Ankle 1985; 5: 165–185
6. Sammarco GJ, Makwana NK. Treatment of talar osteochondral lesions using local osteochondral graft. Foot Ankle Int 2002; 22: 693–698
7. Kreuz PC, Steinwachs MR, Edlich M, Kaiser T, Mika J, Lahm A, Südkamp NP. The anterior approach for the treatment of posterior osteochondral lesions of the talus: comparison of different surgical techniques. Arch Orthop Trauma Surg 2006; 126: 241–246
8. Kreuz PC, Steinwachs MR, Edlich M, Kaiser T, Mika J, Lahm A, Südkamp NP. Tibial Wedge Osteotomy for Osteochondral Transplantation in Talar Lesions. Int J Sports Medicine 2008; 29: 584–589

Financial disclosures: *None*