Arthroscopic Management of Talar Dome Lesions Using a Transmalleolar Approach

John Grady, DPM*
David Hughes, DPM†

Surgical treatment of posteromedial talar dome lesions is frequently necessary for Berndt and Harty grade IV osteochondral defects and nondisplaced osteochondral fragments resistant to conservative modalities. When operative intervention is indicated, the approach and management can be complicated by the location and extent of the injury. The operative technique we advocate allows direct exposure of the lesion and minimizes damage to healthy articular cartilage and surrounding soft tissue. Use of a drill guide assists the surgeon in precisely placing a transmalleolar portal through the tibia for subchondral drilling of osteochondral defects when the lesions are inaccessible through traditional arthroscopic portals. (J Am Podiatr Med Assoc 96(3): 260-263, 2006)

Operative management of posteromedial osteochondral lesions of the talus can be a formidable challenge for the surgeon. Throughout the years, a variety of techniques have been used to treat these lesions.[1-7] Until the early 1980s, open techniques were the mainstay of the surgical treatment of most talar osteochondral defects.[2, 8-10] Facilitated by instrumentation advances in the past 25 years, arthroscopy of the ankle has become an increasingly common treatment for intra-articular abnormalities. Arthroscopic surgery of the ankle allows direct visualization of intra-articular structures and causes much less surgical trauma than open arthrotomy or malleolar osteotomy.[12, 14-16] Excision, curettage, and subchondral drilling have proved to be effective in active patients with talar dome defects.[8, 11, 12, 17-24] Furthermore, an arthroscopic approach significantly reduces morbidity compared with open surgical techniques.[4, 12, 14, 16] Despite recent innovations, certain intra-articular abnormalities, such as posteromedial talar dome lesions, are still difficult to manage arthroscopically owing to anatomical considerations (Fig. 1). Placement of a transmalleolar portal facilitated by a drill guide (MicroVector; Smith & Nephew Inc–Endoscopy Division, Andover, Massachusetts) allows precise drilling of osteochondral defects in this difficult-to-access region of the talus.

*Department of Podiatry, Department of Veterans Affairs Chicago, Westside, Chicago, IL.

†Foot and Ankle Treatment Center of San Antonio, San Antonio, TX.

Corresponding author: David Hughes, DPM, Foot and Ankle Treatment Center of San Antonio, 10130 Huebner Rd, San Antonio, TX 78240.

Operative Technique

The technique we advocate for the difficult-to-access posteromedial talar dome lesion is an arthroscopic approach followed by establishment of a transmalleolar portal immediately superior to the defect. Arthroscopy is performed with the patient in the supine position using the traditional anteromedial and anterolateral portals.[25] After portals are established for arthroscopy, further distention of the ankle is achieved using a noninvasive distraction device. The posteromedial defect is visualized, and the fragment is removed from the joint (Fig. 2). Synovectomy is performed using the full-radius resector. Care is taken not to disrupt any intact cartilage present on the talar dome when passing instruments over the talar dome.

Next, the drill guide probe is inserted into the anteromedial portal and is placed centrally over the os-

Figure 1. Anatomical cross-section of the ankle joint.

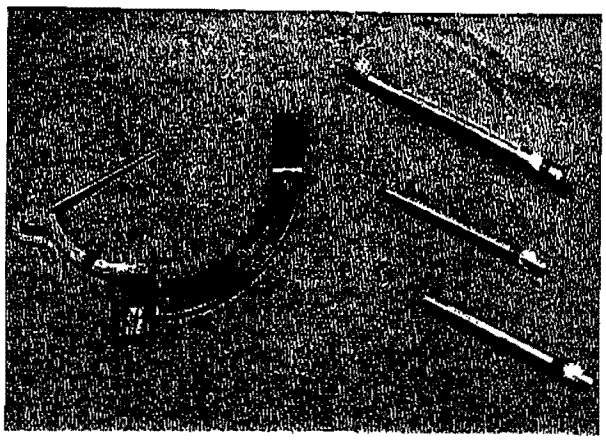

Figure 3. MicroVector drill guide.

teochondral defect using arthroscopic guidance (Figs. 3 and 4). The guide arm is articulated to the desired point of entry on the medial malleolus. Positioning is secured by tightening the thumbscrew at the junction of the probe and guide arm. A 0.062 Kirschner wire is inserted percutaneously through the medial malleolus, directed toward the probe tip, which is retracted immediately before contact using the probe lever. The surgeon must be careful not to move the ankle joint at this time to avoid breaking the Kirschner wire, which is now placed securely from the talar dome defect out the medial malleolus. The anterior cruciate ligament guide is removed. A No. 15 blade is used to make a stab incision immediately surrounding the percutaneous 0.062 Kirschner wire. Blunt dissection is performed to the periosteum, which is carefully preserved. A 5.1-mm trephine is placed over the Kirschner wire, and a circular periosteal incision is made around the trephine to allow the periosteum to be used as an anchor by suturing it to the remaining tibial periosteum after treatment of the lesion. The trephine is advanced completely through the tibia, using arthroscopic visualization to prevent passage into the talus (Fig. 5). Periosteal tissue, cortical bone, and medullary bone, as well as the centrally located Kirschner wire, are now removed from the patient and are maintained for placement later in the operation. In this manner, intact cartilage from the medial tibial plafond is unaltered.

Arthroscopy-guided drilling of the defect is performed using a 0.062 Kirschner wire. Once adequate bleeding is seen, the trephined plug of cartilage bone and periosteal tissue is reinserted into the tibial void. 3-0 Vicryl sutures are used to sew periosteal tissues from the plug to the remainder of the tibia (Fig. 6). This adequately maintains placement of the plug

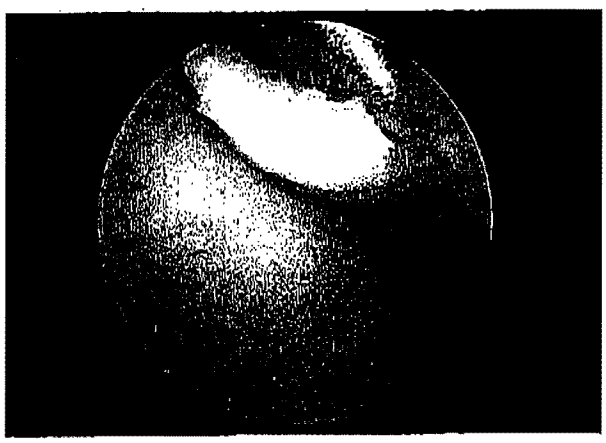

Figure 2. Arthroscopic removal of the osteochondral defect.

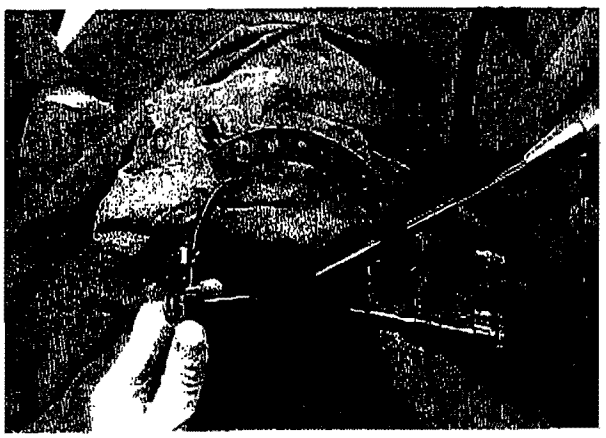

Figure 4. Appropriate placement of the drill guide.

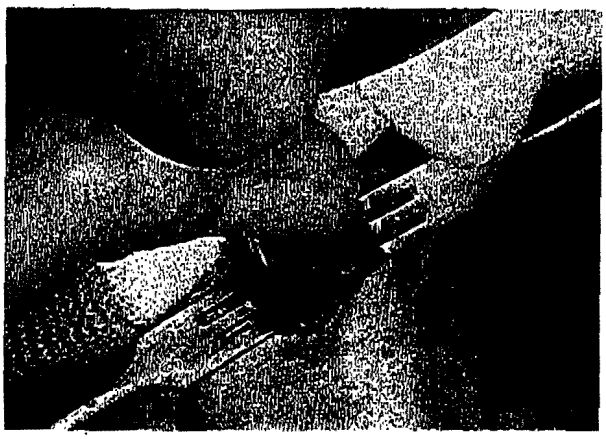

Figure 5. The trephine is advanced through the medial malleolus.

without the need for further fixation. The arthroscope is removed, all incisions are closed, and distraction is stopped. A dressing consisting of a nonadherent contact layer, 4 × 4-inch gauze, roll gauze, and a posterior mold is applied. The posterior mold is maintained for 2 weeks before the patient is placed in a nonweightbearing below-the-knee cast, which is worn for 4 weeks. Weightbearing to tolerance is allowed thereafter in a cast boot for 2 additional weeks. Physical therapy consists of gentle stretching, range-of-motion, and light resistance exercises.

Discussion

More than 250 years ago, William Hunter, MD, stated, "Ulcerated cartilage is a troublesome thing—once destroyed it is not repaired."[26] Multiple studies[27-30] on the physiology of articular cartilage have since proved this insightful statement to be true. Curettage and subchondral drilling of osteochondral defects to stimulate the body's intrinsic reparative process was initially described by Ray and Coughlin[5] in 1947 and is still a plausible treatment modality today. Although subchondral drilling facilitates fibrocartilage growth across the injury site and relieves pain, the degree of actual healing is highly variable.[28-33] Furthermore, the reparative substance is less durable and much less smooth than hyaline cartilage.[33-36] Although the results of arthroscopically treated transchondral talar dome fractures have been very good in the short term,[9, 12, 13, 20, 22] long-term fibrocartilage repair of a defect is under scrutiny. In 1999, Baker and Morales[9] published a long-term follow-up study that showed good or excellent results in 10 of 12 patients at an average follow-up of 10 years. This study's conclusion lends optimism to the long-term results of subchondral drilling, but many practitioners remain appropriately skeptical. Hyaline cartilage replacement by autologous means is a promising option in more severe osteochondral deficits. Intermediate-term studies[37-39] show favorable results in these procedures. Young, active patients with larger defects may benefit more from mosaicplasty[40] or an osteochondral autograft transfer system procedure[37-39] (Arthrex Inc, Naples, Florida) than from drilling alone. For these reasons, we use the described treatment modality only for lesions less than 1 cm in diameter.

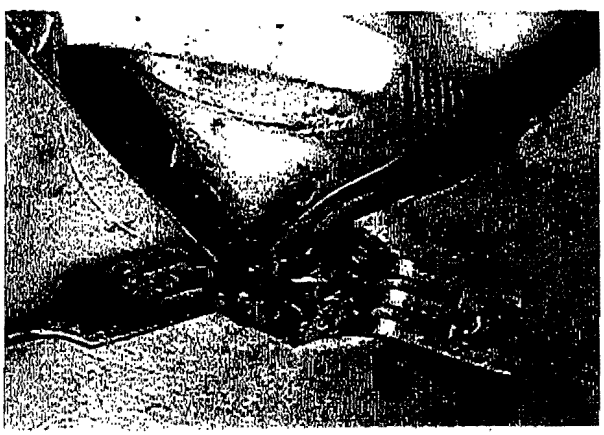

Figure 6. Replacement of the plug into the medial malleolus.

In general, long-term results of arthroscopic subchondral drilling are similar to those of drilling by means of an open technique.[13] Malleolar osteotomy does not seem to affect the results of treatment, but it improves postoperative management and decreases perioperative morbidity.[4] In smaller lesions, where drilling is the surgeon's treatment of choice, a procedure with minimal morbidity and a relatively short recovery time, such as the procedure described here, is an enticing option. For these reasons, the operative strategy we advocate can be an attractive possibility for the management of posteromedial talar dome lesions.

References

1. Davidson AM, Steele HD, MacKenzie DA, et al: A review of twenty-one cases of transchondral fracture of the talus. J Trauma 7: 878, 1967.
2. 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 5: 165, 1985.
3. Mendicino RW, Lee MS, Grossman JP, et al: Oblique medial malleolar osteotomy for the management of talar dome lesions. J Foot Ankle Surg 37: 516, 1998.
4. O'Farrell TA, Costello BG: Osteochondritis dissecans

of the talus: the late results of surgical treatment. J Bone Joint Surg Br **64:** 494, 1982.
5. Ray RB, Coughlin EJ: Osteochondritis dissecans of the talus. J Bone Joint Surg **29:** 697, 1947.
6. Spatt JF, Frank NG, Fox IM: Transchondral fractures of the dome of the talus. J Foot Surg **25:** 68, 1986.
7. Wallen EA, Fallat LM: Cresentric transmalleolar osteotomy for optimal exposure of the medial talar dome. J Foot Surg **28:** 389, 1989.
8. Schuman L, Struijs A, van Dijk N: Arthroscopic treatment for osteochondral defects of the talus. J Bone Joint Surg Br **84:** 364, 2002.
9. Baker CL, Morales RW: Arthroscopic treatment of transchondral talar dome fractures: a long-term follow-up study. Arthroscopy **15:** 197, 1999.
10. Berndt AL, Harty M: Transchondral fractures of the talus. J Bone Joint Surg Am **41:** 988, 1959.
11. Parisien JS: Arthroscopic treatment of osteochondral lesions of the talus. Am J Sports Med **14:** 211, 1986.
12. Pritsch M, Horoshovski H, Farine I: Arthroscopic treatment of osteochondral lesions of the talus. J Bone Joint Surg Am **68:** 862, 1986.
13. Vanbuecken K, Barrack RL, Alexander AH, et al: Arthroscopic treatment of transchondral talar dome fractures. Am J Sports Med **17:** 350, 1989.
14. Ferkel RD: "Articular Surface Defects, Loose Bodies, and Osteophytes," in *Arthroscopic Surgery: The Foot and Ankle*, ed by RD Ferkel, TL Whipple, p 291, Lippincott-Raven, Philadelphia, 1996.
15. Guhl J: "Surgical Technique," in *Ankle Arthroscopy: Pathology and Surgical Techniques*, p 95, Slack, Thorofare, NJ, 1988.
16. Loomer R, Fischer C, Lloyd-Smith R, et al: Osteochondral lesions of the talus. Am J Sports Med **21:** 13, 1993.
17. Alexander H, Lichtman D: Surgical treatment of transchondral talar dome fractures (osteochondritis dissecans). J Bone Joint Surg Am **62:** 646, 1980.
18. Baker CL, Andrews JF, Ryan JB: Arthroscopic treatment of transchondral talar dome fractures. Arthroscopy **2:** 82, 1986.
19. Bryant DD, Siegel MG: Osteochondritis dissecans of the talus: a new technique for arthroscopic drilling. Arthroscopy **9:** 238, 1993.
20. Chin TW, Mitra AK, Lim GH: Arthroscopic treatment of osteochondral lesions of the talus. Ann Acad Med Singapore **25:** 236, 1996.
21. Lahm A, Erggelet C, Steinwachs M, et al: Arthroscopic management of osteochondral lesions of the talus: results of drilling and usefulness of magnetic resonance imaging before and after treatment. Arthroscopy **16:** 299, 2000.
22. Martin DF, Baker CL, Curl WW, et al: Operative ankle arthroscopy: long-term followup. Am J Sports Med **17:** 16, 1989.
23. Ogilvie-Harris DJ, Sarrosa EA: Arthroscopic treatment of post-traumatic cysts of the talus. Arthroscopy **16:** 197, 2000.
24. Stetson WB, Ferkel RD: Ankle arthroscopy: II. Indications and results. J Am Acad Orthop Surg **4:** 24, 1996.
25. Drez D, Guhl J, Gollehon DL: Ankle arthroscopy: approaches and technique. Orthopedics **6:** 1150, 1983.
26. Hunter W: On the structure and diseases of articulating cartilage. Phil Trans R Soc Lond B Biol Sci **24:** 514, 1743.
27. Hunziker EB, Rosenberg LC: Repair of partial-thickness defects in articular cartilage: cell recruitment from the synovial membrane. J Bone Joint Surg Am **78:** 721, 1996.
28. Parisien JS, Vangsness T, Feldman R: Diagnostic and operative arthroscopy of the ankle: an experimental approach. Clin Orthop Relat Res **224:** 228, 1987.
29. Kim HK, Moran ME, Salter RB: The potential for regeneration of articular cartilage in defects created by chondral shaving and subchondral abrasion. J Bone Joint Surg Am **73:** 1301, 1991.
30. Hunziker EB: Biologic repair of articular cartilage: defect models in experimental animals and matrix requirements. Clin Orthop Relat Res **367** (suppl): S135, 1999.
31. Mankin HJ: The reaction of articular cartilage to injury and osteoarthritis. N Engl J Med **291:** 1285, 1974.
32. Minas T, Nehrer S: Current concepts in the treatment of articular cartilage defects. Orthopedics **20:** 525, 1997.
33. Shapiro F, Koide S, Glimcher MJ: Cell origin and differentiation in the repair of full thickness defects of articular cartilage. J Bone Joint Surg Am **75:** 532, 1993.
34. Toth AP, Easley ME: Ankle chondral injuries and repair. Foot Ankle Clin **5:** 799, 2000.
35. Altman RD, Kates J, Chun LE, et al: Preliminary observations of chondral abrasion in a canine model. Ann Rheum Dis **51:** 1056, 1992.
36. Byers P, Conteponti C, Farakas T: A post-mortem study of the hip joint. Ann Rheum Dis **29:** 15, 1970.
37. Bobic V: Arthroscopic osteochondral autograft transplantation in anterior cruciate ligament reconstruction: a preliminary clinical study. Knee Surg Sports Traumatol Arthrosc **3:** 262, 1996.
38. Matsusue Y, Yamamuro T: Case report: arthroscopic multiple osteochondral transplantation of the chondral defect in the knee associated with anterior cruciate ligament disruption. Arthroscopy **9:** 318, 1999.
39. Outerbridge HK, Outerbridge AR: The use of a lateral patellar autologous graft for the repair of a large osteochondral defect in the knee. J Bone Joint Surg Am **77:** 65, 1995.
40. Hangody L, Kish G, Karpati Z, et al: Treatment of osteochondritis dissecans of the talus: use of the mosaicplasty technique: a preliminary report. Foot Ankle Int **18:** 628, 1997.

Additional References

Feiwell L, Frey C: Anatomic study of arthroscopic portal sites of the ankle. Foot Ankle Int **14:** 142, 1993.

Ferkel RD, Sgaglione NA, DelPizzo W, et al: Arthroscopic treatment of osteochondral lesions of the talus: technique and results. Orthop Trans **14:** 172, 1990.

Frank A, Cohen P, Beutils P, et al: Arthroscopic treatment of osteochondral lesions of the talar dome. Arthroscopy **5:** 57, 1989.

McCullough CJ, Venugopal V: Osteochondritis dissecans of the talus: the natural history. Clin Orthop Relat Res **144:** 264, 1979.

Saito A, Kikuchi S: Anatomic relations between ankle arthroscopic portal sites and the superficial peroneal and saphenous nerves. Foot Ankle Int **19:** 748, 1998.

Shea MP, Manoli A: Osteochondral lesions of the talar dome. Foot Ankle **14:** 48, 1993.