CHAPTER 12

EXTRA-ARTICULAR FIBULAR OSTEOTOMY FOR EXPOSURE TO POSTEROLATERAL OSTEOCHONDRAL LESIONS OF THE TALUS

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INTRODUCTION

There are a variety of surgical treatments for osteochondral fractures of the talar dome. The results of these procedures have been well documented in the literature and their individual application is beyond the scope of this paper.[1-3] Medial transmalleolar osteotomy has been the mainstay for access to postero-medial lesions, however no such standardized approach exists for exposure to the centro-lateral and postero-lateral talar dome defects. This region is well protected by the fibula and the syndesmotic complex which precludes access to the talar surface and creates significant difficulty for the open treatment of symptomatic lesions. Anterolateral tibial osteotomy has been advocated for this problem; however it violates the articular surface and is technically difficult to perform.[4] Other authors have recommended access to this region through turn down style osteotomies of the distal fibula.[5,6] This approach disrupts the syndesmosis requiring trans-syndesmotic fixation, prolonged immobilization, and a secondary operative procedure for screw removal. In addition, extensive dissection of the fibula and soft tissue devitalization may lead to exaggerated healing times. Posterolateral lesions have also been approached through a traditional medial malleolar osteotomy that prohibits optimal exposure and perpendicular instrumentation required for current osteochondral transplantation systems.[7] The author describes a technique originally presented by Hansen for exposure to the lateral aspect of the talus that may not be possible through traditional means.[8]

Figure 1. Incision placement

This procedure is indicated for exposure of posterolateral talar dome lesions that are otherwise inaccessible via simple arthrotomy or arthroscopic measures. It may also be utilized for cartilage replacement techniques in which the delivery methods necessitate a 90° orientation for graft placement.

OPERATIVE TECHNIQUE

The procedure is performed under general or spinal anesthesia with the patient positioned in the supine position. A large bump is placed beneath the ipsilateral hip to facilitate exposure to the lateral ankle. Under tourniquet control, a 9 to 10 cm oblique incision is created laterally from the posterior border of the fibula terminating 2 cm anterior and distal to the syndesmosis (Figure 1). Dissection is carried into the subcutaneous tissues with care taken to avoid the superficial peroneal nerve which is frequently encountered in the mid and distal portions of the wound. The deep fascia is incised and the anterior muscle group is gently retracted medially to expose the deep

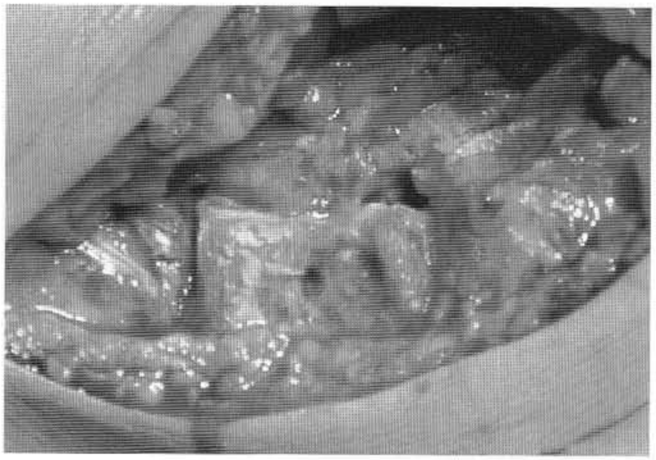

Figure 2. Appearance following fibular ossteotomies.

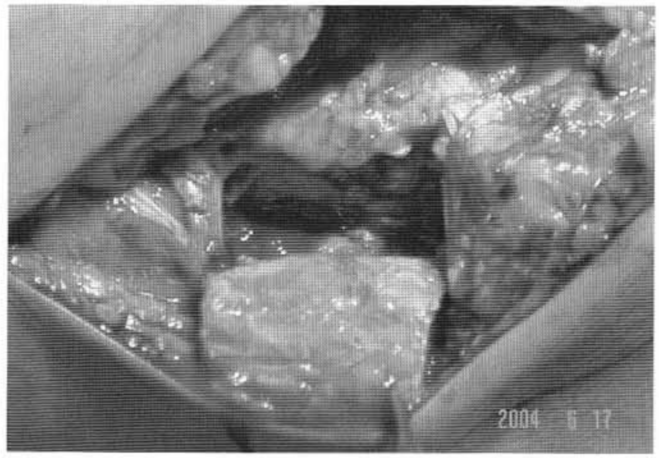

Figure 3. Posterior rotation of fibular window.

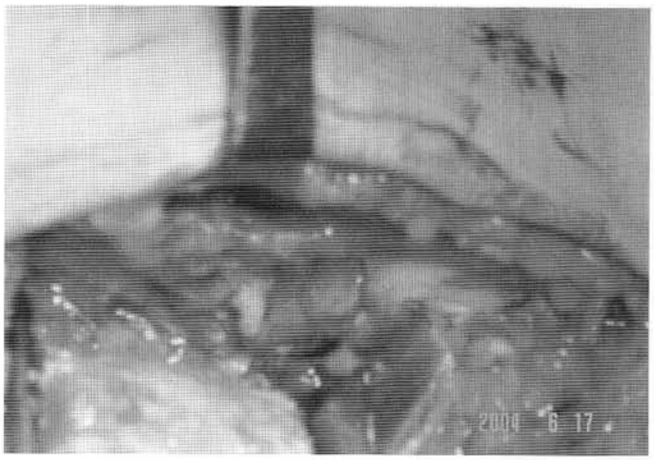

Figure 4. Exposure of talar defect through fibular osteotomy.

Figure 5. Intraoperative fluoroscopy.

ligamentous capsular structures of the ankle joint. Special care is taken to identify the anterior syndesmotic ligament (AITFL), anterolateral ankle joint capsule and the peroneal tendons as these serve as landmarks for osteotomy placement.

Osteotomies may be marked with a skin marker or electrocautery. The distal fibular osteotomy will be created 5 mm proximal to the tibial plafond and the proximal fibular osteotomy is 3 cm proximal to this. A small ankle arthrotomy is created anterolaterally to identify the tibial plafond and inferior margin of the AITFL, confirming placement of the distal osteotomy. A one-third tubular plate is secured to the lateral border of the fibula maintaining a minimum of two screws between osteotomy sites preventing rotation of the fibular window. Typical rules of fibular fixation are followed with screws purchasing four to six cortices above and below the osteotomy sites. Locking, fixed angle plates may be employed to improve fixation. Hardware placement is confirmed under fluoroscopy. The plate is then removed and the osteotomies are carried out.

Under iced-saline, an oscillating saw is used to create the pre-marked bone cuts (Figure 2). The periosteum on the fibula is incised anteriorly and elevated medially which allows the central fibular segment to rotate posteriorly (Figure 3). Care is taken to preserve the lateral periosteum as well as a posterior periosteal hinge to improve vascularity and healing. A lamina spreader is placed between the proximal and distal fibular segment gaining access to

Figure 6. Preoperative radiograph.

Figure 7A Sagittal CT image of talar lesion.

Figure 7B. Coronal CT image of talar lesion.

the talar dome (Figure 4). If there is difficulty with visualization of the lesion or instrument orientation, a 4-5mm Schantz pin or large Steinman pin may be placed just anterior to the articular cartilage in the talar neck. Following repair of the chondral defect, the fibular segment is returned to its anatomic position and secured with the previously inserted hardware. The osteotomy sites are packed with bone graft if necessary and the periosteum is closed. Incomplete apposition of the osteotomies will delay consolidation. The anterior syndesmosis and arthrotomy sites are repaired and well as the deep fascial envelope. The remainder of the wound is then closed in typical fashion. Intraoperative imaging is used to confirm fibular alignment (Figure 5).

CASE PRESENTATION

An otherwise healthy 16-year-old male was referred to our office for the treatment of persistent ankle pain four months following an inversion ankle injury. The patient complained of continual pain and recurrent instability. Physical examination revealed point tenderness overlying the postero-lateral talar dome and a grossly positive anterior drawer test. Radiographs demonstrated a large cystic lesion of the posterolateral talar dome (Figure 6). CT examination confirmed a 9 by 6 mm lesion of the lateral talar dome posterior to the midcoronal line (Figure 7). This represents a stage V lesion as described by Scranton.[3] Due to the age of the patient and the size and location of the lesion, autologous osteochondral transplantation was chosen to restore the talar articular surface. Access to this lesion was achieved by fibular osteotomy as described above. Prior to donor plug harvest from the ipsilateral knee, the recipient bed was prepared by curettage and cannulated reamer systems. The lesion was then grafted orthogonally though the fibular osteotomy (Figures 8, 9).

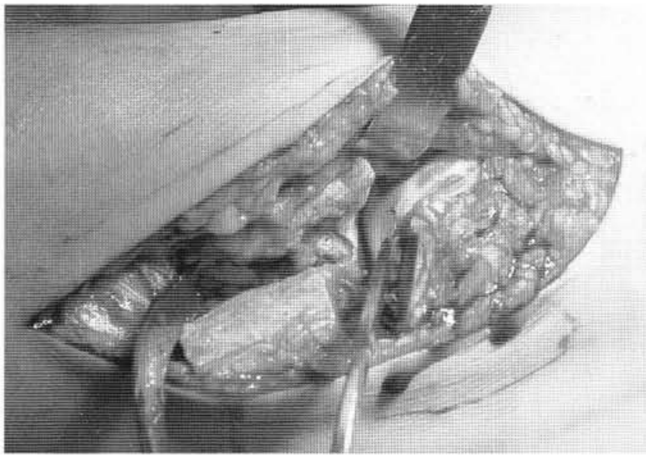

Figure 8. Restoration of talar dome following graft insertion

Figure 9A. Postoperative radiograph

Figure 9B. Postoperative radiograph

Postoperative Management

Postoperatively patients are placed in a Jones dressing and modified AO splint. The wounds are inspected within the first week and sutures are removed at 14 days. When the incisions are sealed, the patients are placed into a cam walker and active ankle range of motion is begun. Progressive weightbearing may begin at six weeks if radiographic healing is evident. Gait training and supervised physical therapy are encouraged and the patient is gradually transitioned into an air stirrup. Further immobilization may be required if mosaicplasty is performed as osseointegration of multiple grafts may have longer healing times.

Complications

Complications specific to fibular osteotomy include delayed and nonunion, malunion, symptomatic hardware, disruption of the syndesmosis, entrapment syndromes of the superficial peroneal nerve, and posttraumatic arthritis of the ankle joint. Intraoperative complications may include distal placement of the osteotomies which prevents the necessary space for perpendicular orientation of the instrumentation. Likewise, decreased distance between osteotomies produces a shorter intermediate fragment which will not allow for appropriate fixation of the individual fibular segments.

REFERENCES

1. Stone JW. Osteochondral Lesions of the Talar Dome. *J Am Acad Orthop Surg* 1996; 4:63-73.
2. Kumai T, Takakura Y, Higashiyama I, et al. Arthroscopic drilling for the treatment of osteochondral lesions of the talus. *J Bone Joint Surg Am* 1999;81:1229-35.
3. Scranton PE Jr, McDermott JE. Treatment of type V osteochondral lesions of the talus with ipsilateral knee osteochondral autografts. *Foot Ankle Int* 2001;22:380-4.
4. Tochigi Y, Amendola A, Muir D, Saltzman C. Technique Tip: Surgical Approach for Centrolateral Talar Osteochondral Lesions with an Anterolateral Osteotomy. *Foot Ankle Int* 2002;23:1038-9.
5. Draper SD, Fallat LM. Autogenous bone grafting for the treatment of talar dome lesions. *J Foot Surgery* 2000;39:15-23.
6. Gautier E, Kolker D, Jakob RP. Treatment of cartilage defects of the talus by autologous osteochondral grafts. *J Bone Joint Surg Br* 2002;84:237-44.
7. Ove PN, Bosse MJ, Reinert CM. Excision of posterolateral talar dome lesions through a medial transmalleolar approach. *Foot Ankle Int* 2002;23:1038-9.
8. Hansen ST Jr. Functional Reconstruction of the Foot and Ankle. Philadelphia: Lippincott Williams and Wilkins; 2000. p. 496-7.