CHAPTER **28**

MEDIAL MALLEOLAR OSTEOTOMY FOR OSTEOCHONDRAL DEFECT DEBRIDEMENT

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INDICATIONS

Access to medial osteochondral defects can be difficult due to the typical posterior location of these lesions. Although computed tomography and magnetic resonance imaging are helpful to diagnose osteochondral lesions, they are often not sufficient planning tools in deciding whether or not a transmalleolar approach is necessary. For anterior located lesions, an anterior arthrotomy is usually sufficient to access the lesion. For central to posterior lesions, a transmalleolar osteotomy is often required.

Patients vary in regard to their ankle joint range of motion, and this factor must be considered when evaluating a patient for surgery. The author uses a stress plantarflexion lateral ankle radiograph to assess the available range of motion (Figure 1). If the lesion is accessible from an anterior arthrotomy, the radiographs will usually demonstrate an access portal, whereby there will be direct access to debride the lesion without compromising the medial malleolus (Figure 2).

SURGICAL TECHNIQUE

The patient is positioned supine on the operating table. A pneumatic calf tourniquet is often utilized for hemostasis (typical inflation pressures 250-275 mm Hg). External hip rotation assists in accessing the medial ankle. The bony landmarks are identified and marked – medial ankle gutter, inferior tip of medial malleolus, and posterior aspect of the medial malleolus.

A longitudinal incision is made approximately 7-cm in length, centered over the medial malleolus, extending just distal to the tip of the malleolus (Figure 3). There is very little subcutaneous fascia in this location. The deep fascia and periosteum are united at this level. The saphenous vein and nerve are anterior to the incision. The deep fascia/periosteum is exposed anteriorly and posteriorly. A small incision is made anteriorly to identify the medial ankle joint corner of the gutter, and a small incision is made posteriorly and inferiorly to identify the posterior aspect of the medial malleolus. These are the locations of the exit of the proposed osteotomy (Figure 4). It is important to clearly identify the posterior exit point of the osteotomy, and to retract the tibialis posterior tendon posteriorly, in order to prevent inadvertent laceration of the tendon.

The osteotomy is then planned such that there is an angle of approach to enter the ankle joint. A Kirschner-wire

Figure 1. Stress plantarflexion lateral ankle radiograph demonstrating the medial talar OCD and the ability to directly access the lesion from an anterior approach. This patient does not require a malleolar osteotomy.

Figure 2. Anterior arthrotomy and debridement of a medial talar osteochondral defect through a direct approach, and maximally plantarflexing the ankle.

(K-wire) is used as an axis guide, creating an approximately 90 degree angle, and the angle of the wire is intended for the osteotomy to enter the medial plafond of the ankle at the level of the medial gutter. The angle should be sufficient to enter the joint, but not too far as to enter the middle of the joint.

Next, a periosteal incision is made connecting the axis K-wire to both the anterior and posterior exposure sites. A small amount of periosteal reflection is done with a periosteal elevator, mostly in the superior direction, to allow access for the saw blade. Preserverence of the deltoid ligament and periosteum is essential for blood supply to the medial malleolus and stability of the ankle joint (Figure 5).

The osteotomy is made along the direction of the axis wire, entering the anterior and posterior exit points. The osteotomy is a compound angle converging on the K-wire and entering the ankle joint. Care is taken to not pass the saw blade too far into the joint, avoiding cutting the talar dome. An osteotome is used to pry apart the osteotomy site. The medial malleolus is then retracted downward, accessing the ankle joint (Figure 6).

The osteochondral defect is then visualized, and the margins of the defect are delineated using a Freer elevator. Bone curettes are used to debride the lesion, and a copious saline flush is done to remove any free fragments of bone and cartilage. The margins of the cartilage defect are sloped inward to create a smooth transition edge toward the underlying subchondral bone (Figure 7).

The medial malleolus is then reduced back to its original position and seated in place manually. Two 1.6-mm K-wires are then placed from the inferior aspect of the medial malleolus, angling upward and laterally, perpendicular to the osteotomy, and parallel to one another. Care is taken to not enter the ankle joint with the wires. Fluoroscopy is then used to verify the location of the wires, which are then sequentially removed and

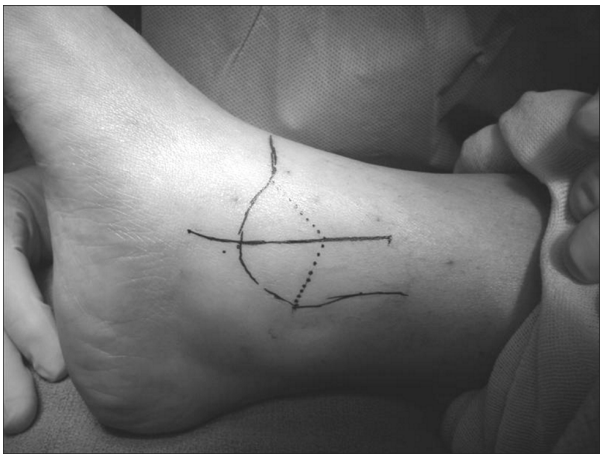

Figure 3. Identification of medial malleolus, proposed osteotomy, and skin incision.

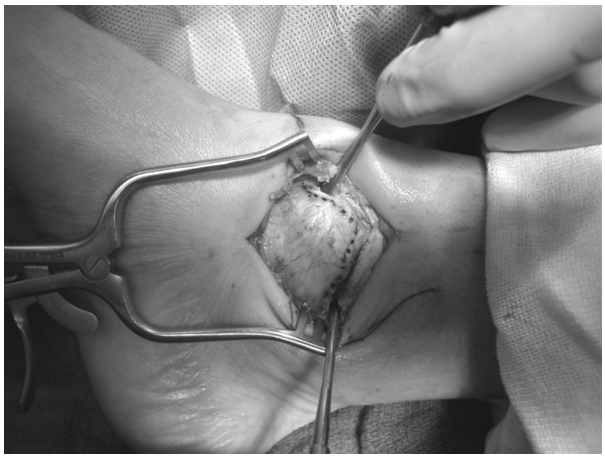

Figure 4. Identifying the anterior and posterior locations for the exits of the osteotomy, and marking of the proposed osteotomy.

Figure 5. Kirschner-wire axis guied placement and periosteal reflection.

Figure 6. Opening the osteotomy to expose the ankle joint and osteochondral defect.

Figure 7. Debridement of the osteochondral defect.

Figure 8. Reduction of the osteotomy and placement of two 4.0-mm partially-threaded cancellous screws.

Figure 9. Periosteal closure with 3/0 absorbable suture.

Figure 10. Radiograph of consolidated medial malleolar osteotomy at 3 months postoperative.

replaced with two 4.0-mm partially-threaded cancellous screws (Figure 8). Fluoroscopy is again used to verify the reduction and placement of screws.

Closure of the deep fascia/periosteum is performed with 3/0 suture, followed by subcutaneous (4/0) and skin closure (5/0), all absorbable sutures (Figure 9). If a tourniquet is used, deflation is performed prior to closure so that hemostasis can be achieved. Steri-strips are applied, followed by soft dressings and a cast or posterior splint.

The patient is maintained nonweightbearing for 4-6 weeks, and transitional weightbearing is done for 3-4 weeks using a walker-boot. Osteotomy consolidation is assessed with periodic reaiographs (Figure 10), and range of motion exercises are encouraged once the cast/splint is removed. Full recovery should be achieved in 3-4 months, with resumption of unrestricted weightbearing sporting activities in 4-5 months.

SUMMARY

Medial malleolar osteotomy for debriding a medial talar dome osteochondral defect is used when there is insufficient ankle plantarflexion to access a direct approach via an anterior arthrotomy. Anatomic landmark identification is essential to protect the tibialis posterior tendon, preserve blood supply to the malleolus, and plan a safe and effective osteotomy. A wire axis guide is strongly recommended to direct the location and angle of the osteotomy. Anatomic reduction and stable fixation of the osteotomy will assure timely bone consolidation and preserve the integrity and function of the ankle joint.