

Posterior Incision for Subtalar Arthrodesis

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The technique discussed is for subtalar distraction arthrodesis with structural bone graft. The primary indication for this procedure is calcaneal fracture malunion with resulting loss of calcaneal height. Restoring height in cases of calcaneal fracture malunion is a difficult challenge, but it is critical in providing a good result. Re-establishing height not only restores length, but also unloads the impinged anterior ankle, which helps provide more normal ankle motion. In severe deformities this is nearly impossible through a lateral incision and attempts to place a large structural bone graft through a linear lateral incision can be frustrating.

In terms of visualizing the posterior facet, resecting the joint surfaces, and placement of a large, height-restoring block of graft, the posterior incisional approach to the subtalar joint is far superior to a linear lateral incision. My initial reluctance for this approach was basically fear and lack of familiarity (if those can even be separated). Overcoming that fear has allowed me to help several patients with depressed, arthritic, calcaneal fracture malunions.

INCISION

The patient is placed on the operating room table in the prone position. General anesthesia and a thigh tourniquet are used (Figures 1, 2). A postero-lateral incision is made lateral to the Achilles tendon, medial to the sural nerve. The incision is kept full-thickness without undermining. I prefer the blade end of Senn retractors or Army-Navy retractors to rakes or self-retaining contractors (depending to some extent on the number and skill level of your assistants). The lack of muscle and significant hair follicles makes this an area of potential concern for wound dehiscence. One or 2 traversing veins are generally encountered. Otherwise this is a relatively “safe” surgical approach (obviously keep in mind the medial neurovascular bundle).

DISSECTION

Kager’s triangle is an inch-thick collection of fat located between the Achilles tendon and the posterior ankle joint. This is easily dissected with a Metzenbaum scissor. The posterior ankle joint capsule is incised longitudinally and the tibiotalar and talocalcaneal joints are seen. Arthritic spurring can be encountered here and must be removed to allow joint visualization. Using a large C-arm with a lateral projection, an osteotome is used to confirm the appropriate joint (this can be more difficult than you would think in

instances of significant joint depression and arthrosis). Gentle, repetitive working of the osteotome helps open the subtalar joint. Be patient. As the joint dilates open, the osteotome can be exchanged for a large elevator for greater strength. A smooth-ended lamina spreader can then be inserted to maintain the joint open for joint resection.

JOINT PREPARATION

At this point you will find yourself working in a bit of a hole. Long curettes and round power burrs are the easiest instruments to use for joint resection here. A sagittal saw or osteotome and mallet can certainly be used, but are more difficult to control in this small, deep space. A lateral C-arm projection is again used to ensure the desired plantarflexion



Figure 1. Preoperative axial view.



Figure 2. Preoperative lateral view.

of the calcaneus/height has been restored. Be sure to assess the calcaneal inclination, talar declination, and axial alignment. The void seen at the posterior subtalar joint on the lateral view is a little startling at first. This space can be easily measured. The inferior surface of the talus and the superior surface have to be exactly parallel from medial to lateral in order to correctly receive and place the block of structural bone graft. The most likely obstacle here will be the middle facet of the subtalar joint because of its location deep and medial within the surgical site. The middle facet must be carefully and completely resected.

GRAFT CONSIDERATIONS

After measuring the void, a corresponding block of femoral head allograft is cut and contoured for placement. The graft usually needs to be tapered distally, rather than being perfectly rectangular. My local hospital typically keeps 2 femoral head allografts on site, so I always call ahead to ensure one will be reserved. Once cut, the graft is tamped into place. This can be a bit of work because it is hard to distract the joint while tamping the graft. Use care to not crack the graft. An osteotome and a quality assistant are helpful here. Cancellous chips could be used, but I prefer the structural strength of femoral head. Allogeneic iliac crest will be too small to fill this volume except on a very slight patient. Autogenous iliac crest could also be used.

FIXATION

My preference is two 6.5-mm fully-threaded screws. This is one of the few times I place subtalar screws from inferior to superior. The patient being prone is the biggest factor. But this also allows the screws to be placed perpendicular to the bone to graft interfaces. A superior to inferior placement would put at least 1 of the screws too anterior for optimal positioning. The use of fully-threaded screws maximizes thread purchase into the talus. Whether these screws are parallel or divergent in any or all planes is a matter of individual preference. A countersink is not typically used because of the thin plantar cortex of the calcaneus. Both predrill and tapping are recommended to avoid distraction of the graft to bone interface either above or below the graft.

AVOID PROMINENT PLANTAR SCREW HEADS

Periarticular osteotomies have been described, but I do not have any personal experience in combining calcaneal osteotomies with this procedure. I have completed the procedure, closed the incisions, turned the patient to the supine position, and performed an open anterior ankle exostectomy.

POSTOPERATIVE MANAGEMENT

A popliteal block performed preoperatively can be helpful. I like to keep these patients overnight for pain control. Sutures are removed at 2 weeks. Strict nonweight-bearing is done for 8 to 10 weeks or until interpositional healing is evident. This is followed by 4 to 6 weeks partial weight-bearing in a CAM walker boot (Figures 3, 4). In the right patient, ankle range of motion exercises can be started at 4 to 6 weeks postoperative, but depends on your comfort level with patient compliance. The ankle becomes quite stiff after this procedure because of the effect the lengthening has on surrounding soft tissue and because of the prolonged immobilization. Physical therapy is useful here.



Figure 3. Postoperative axial view.



Figure 4. Postoperative lateral view.