Lateral Approach to Percutaneous Posteroanterior Fixation of Type I Haraguchi Posterior Malleolus Fractures

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The posterior malleolus can be fractured in isolation or as a part of more complex ankle fractures. The decision to perform open reduction and internal fixation of the fracture fragment(s) rather than nonsurgical management is based on surgeon preference and is patient-specific; however, recent biomechanical and clinical studies have shown the effectiveness of posterior fixation of posterior malleolus fractures. The typical approach to a posterior fixation construct, whether lag screw(s) or a posterior buttress plate, is posterolateral. This video describes a technique for posterior fixation of posterolateral-oblique type posterior malleolus fractures with the use of a lag screw via a lateral approach rather than a posterolateral approach. This technique is associated with several advantages, such as minimizing the risk of soft-tissue damage and reducing surgical time by allowing for supine patient positioning.

Technique Description

Cheating slightly posterior, a 12-cm lateral incision was made over the distal fibula and the lateral malleolus. A comminuted Weber type C fracture of the fibula was identified, reduced, and fixed according to basic AO principles. A hole in the plate was left open for future syndesmotic fixation. Next, attention was shifted to the medial side, in which a 6-cm anteromedial incision was made, through which the deltoid ligament was found to be ruptured; therefore, it was repaired. Attention was then shifted again laterally, and the posterior malleolus fracture was addressed through the lateral incision.

Deep dissection posterior to the fibula was undertaken. The peroneal tendons were undermined and pushed posteriorly with the use of a Freer elevator. The posterior malleolus fragment was felt with the use of the Freer elevator and digitally palpated. The fragment was held in reduction with the surgeon's finger.

While holding the posterior malleolus fragment reduced, a Kirschner wire (K-wire) was directed toward the finger, from anteromedial to posterolateral. The K-wire insertion point was 1 cm above the joint line, just medial to the tibialis anterior tendon. The K-wire was directed with the goal of achieving a trajectory perpendicular to the fracture line.

As the K-wire was advanced into bone, it pushed against the fracture fragment, at which point the surgeon could feel the resistance of the K-wire as it crossed the fracture line. At this point, the surgeon removed his finger, and the K-wire could be advanced into the posterior cortex of the tibia. A fluoroscopic image was obtained to assess the quality of reduction and the appropriate direction of the K-wire. If appropriate reduction and trajectory were achieved, before advancing the K-wire, care was taken to ensure the peroneal tendons were not at risk. The K-wire was then advanced toward the posterior skin. To avoid injury to the sural nerve near the skin, an incision was made at the site at which the K-wire was tenting the skin before it was advanced out of the skin.

Posteriorly, a soft-tissue protector was placed on top of the K-wire, and a Freer elevator was used to visualize the soft-tissue protector, all the way down to bone.

A cannulated drill was used to drill posterior to anterior. A 4.0-mm cannulated, partially threaded screw with longer threads was selected. The typical length is 34 to 38 mm. A washer was used to provide even distribution of forces across the posterior malleolus fracture fragment. The screw can be started with the drill on power; however, because these fractures tend to occur in spongy bone, the authors of this video recommended advancing the screw by hand after resistance is felt to avoid iatrogenic fracture and unwanted screw advancement.