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Operative Techniques in
Orthopaedics

The Fibula Nail for the Management of Unstable Ankle Fractures

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Surgery for unstable ankle fractures comes with risks of infection and painful, prominent hardware not infrequently requiring further surgery to remove plates and screws. The fibula nail offers the opportunity for lower profile hardware and minimally invasive surgical techniques. The technique for using the fibula nail is illustrated in detail; in addition, recent literature pertaining to the fibula nail is reviewed.

KEYWORDS Ankle fractures, Minimally Invasive, Fibula Nail

Introduction

The traditional method of open reduction and internal fixation (ORIF) of ankle fractures has changed very little since the 1960s. The technique has known complications, including wound dehiscence and infection, especially in patients with higher risk such as those who are immunocompromised or with diabetes. Bulky plates in combination with tenuous skin around the lateral malleolus have led to infection rates or wound problems as high as 30% in some series.[1] A technique of fibula nailing has been developed that requires minimal incisions around the ankle and much lower profile hardware.[2] Several studies have supported the use of the fibula nail and have shown complication rates to be lower than that in traditional ORIF.[3]

Indications

Indications for the use of the Acumed (Hillsboro, OR) fibula nail are any displaced ankle fracture that involves the lateral malleolus. We typically do not use it for a higher Weber C type fracture as it is treated with syndesmotic screws alone. It can also be used for fixation of lateral malleolus fractures with an associated tibial pilon fracture. The fibula nail offers the possibility of placing syndesmotic screws through the nail, which is an advantage over prior fibula nails that were commercially available. One must use caution in trimalleolar fractures involving a large posterior fragment, as these patterns tend to do better with direct open posterior plating. In these cases, a standard one-third tubular plate is used as the surgical approach for the fibula has already been performed and the advantage of minimal incisions is no longer beneficial.

Patient Positioning

Patients are positioned supine on a radiolucent table with a small bump under the greater trochanter to allow easier access to the lateral ankle. A tourniquet is placed but rarely inflated. Once the operative extremity has been prepared and draped, a small stack of towels can be placed under the heel to elevate the ankle to allow easier access for gaining the entry point for the fibula nail.

Surgical Approaches

A 0.5-1.0-cm incision should be made just distal to the tip of the fibula (Fig. 1). Blunt dissection can be performed with a small schnidt to avoid injuring the peroneal tendons although they are typically located posterior and distal to the incision. A 1.2-mm Kirschner wire is inserted into the distal fibula just at the tip and in midline. It is important to check a lateral view to insure that the entry point is not too anterior or posterior (Fig. 2). A cannulated drill is then passed over the k-wire to

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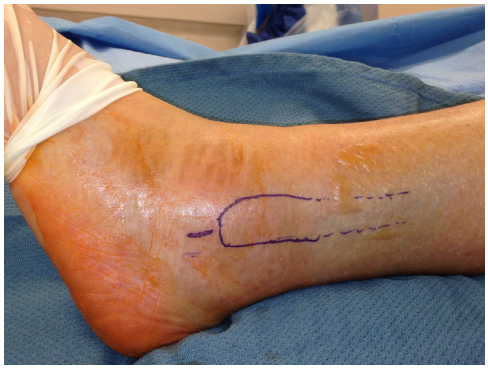

Figure 1 Incision for fibula nail insertion just inferior to tip of lateral malleolus. (Color version of figure is available online.)

open the canal approximately 2 cm in length (Fig. 3). Alternatively, an awl can be used to establish an entry point (Fig. 4).

Figure 3 A cannulated drill is passed over the k-wire distal to the fracture.

Reduction Techniques

Percutaneous reduction clamps can be placed around the fracture to hold it reduced before reaming and placing the nail (Fig. 5). Once the fracture is reduced the fibula canal is reamed with a 3.1-mm hand reamer (Fig. 6). If there is little resistance using the 3.1-mm reamer, a second 3.6-mm reamer can be used, which allows the use of a larger fibula nail (3.5 mm in diameter).

Fixation

The fibula nail is now inserted using a percutaneous insertion guide (Fig. 7). Overall, 1 or 2 anterior to posterior screws are now placed through the nail. Fibula length can be assessed intraoperatively using a c-arm and by assessing the talocrural angle. Obtaining intraoperative images of the contralateral ankle can be helpful for comparison. If the fibula appears shortened, longitudinal traction can be placed on the guide after an anterior-posterior (AP) screw has been placed (Fig. 8). Once the length has been restored a blocking screw is placed at the proximal tip of the nail to maintain it (Fig. 9). Alternatively once the length has been established and there is evidence of a syndesmotic widening, 1 or 2 screws can be placed through the nail to both maintain length and stabilize the syndesmosis. A temporary large pointed reduction clamp is used to hold the syndesmosis reduced before instrumentation (Fig. 10). After placing the AP screw and a blocking screw at the tip of the nail, stress views are routinely taken intraoperatively to assess the syndesmosis. Any widening or talar shift warrants surgical fixation with up to 2 screws, which can be percutaneously placed through the nail using the insertion guide. Once the nail has been secured, the surgeon can address the medial malleolus fracture if present. We have found that it can be

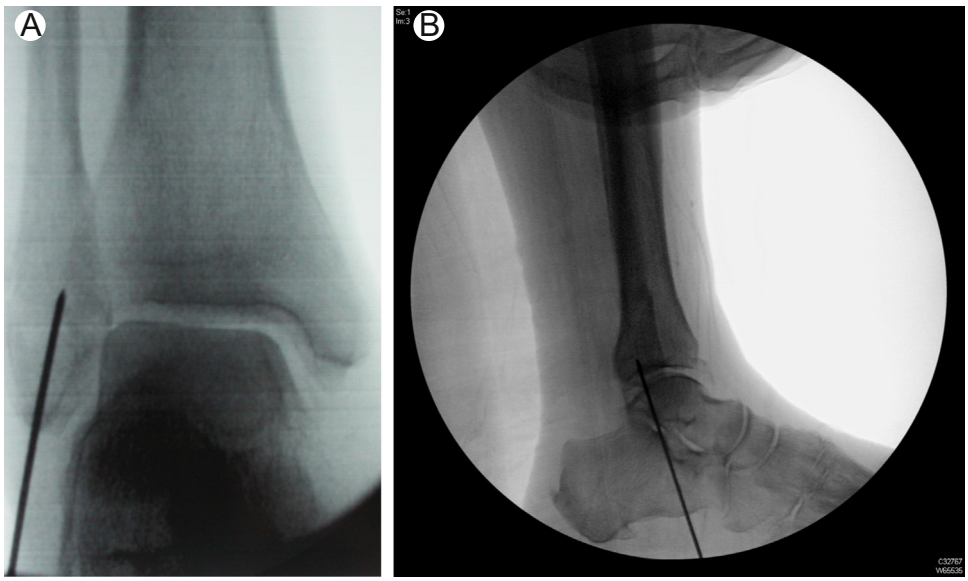

Figure 2 (A) A 1.2-mm K-wire is inserted just at the tip of the lateral malleolus with the aid of intraoperative fluoroscopy. (B) The lateral view ensures that the k-wire is at the center of the fibula. (Color version of figure is available online.)