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# Buttress plate stabilisation of posterior malleolar ankle fractures: a familiar technique through an unfamiliar approach

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**KEYWORDS**
Ankle;
Posterolateral approach;
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**Summary**
*Introduction:* The approach to the distal radius to apply a volar buttress plate for a volarly displaced distal radius fracture is a familiar procedure for orthopaedic surgeons. The stabilisation of distal tibia posterior malleolar fractures is commonly performed by inserting lag or cannulated screws into the posterior fragment from anteriorly.
*Method:* We discuss the similarity of the application of a posterior buttress plate to the distal tibia via a posterolateral approach compared with a distal radial approach.
*Conclusions:* The posterolateral approach is easy, safe and allows good access and accurate direct fracture reduction. We recommend this method be considered for the stabilisation of a posterior malleolar fracture.


## Introduction

The application of a volar buttress plate to the distal radius to stabilise a volarly displaced fracture e.g. Smith's or Reverse Barton's fracture,[1,2] is an operation familiar to the majority of orthopaedic surgeons.[3] The posterolateral approach to the distal tibia is less appreciated and inexperienced surgeons may shy away from this surgical approach for fear of complications and technical difficulty.[4]

We would like to highlight the rarely used posterolateral approach to the ankle to stabilise posterior malleolar fragments (Fig. 1) and compare it to the much more frequently used volar approach to the wrist.

## Surgical technique

The patient is positioned prone; with an above knee tourniquet. Skin preparation and sterile drapes are applied as routine. Skin markings include the lateral malleolus and the lateral border of the Achilles tendon. The sural nerve crosses the lateral border of the Achilles tendon at 9.8 cm from its insertion into the calcaneum and passes distally relatively close to the tendon. At its insertion the nerve is only 18.8 mm lateral to the lateral border of the tendon.[5]

A skin incision is made midway between the posterior aspect of the lateral malleolus and the Achilles tendon

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**Figure 1** A large posterior malleolar fragment comprising a significant portion of the tibial articular surface, requiring stabilisation.

(Fig. 2). This extends distally to the tip of the malleolus and proximally as required. The peroneal fascia (Fig. 3) is released longitudinally to expose the peroneal tendons (Fig. 4). Initially these are reflected laterally and the base of the peroneal compartment is released to allow access to the deep posterior compartment of the calf. Flexor hallucis longus is visible beneath the fascia (Fig. 5). The fascia is released (Fig. 6) and the muscle belly is reflected laterally to expose the distal tibia (Fig. 7) and the posterior malleolar fracture fragment. The muscle belly is frequently contused due to bone fragment displacement during injury. The lip of the posterior malleolus and the gently convex curving slope of the distal tibia are now visualised.

The fracture is reduced distally under direct vision using a ball ended pusher and the position is maintained by K wires and checked for reduction of the distal tibia articular surface with fluoroscopy. An appropriately sized buttress plate is selected and fixed proximally to the tibia using cortical screws (Fig. 8). This buttress plate maintains reduction, preventing superior migration of the posterior malleolar fragment (Fig. 9). Additional screws may prevent

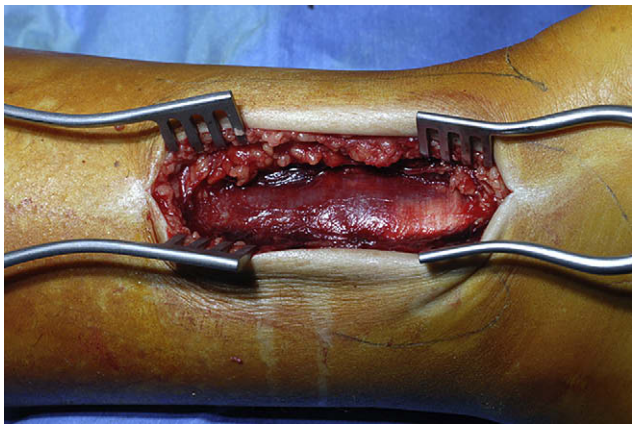

**Figure 3** Careful subcutaneous dissection allows the peroneal fascia to be exposed.

fragment rotation. When placing screws distally they must be angulated approximately 20 deg cephalad to prevent penetration of the concave tibial plafond.

The peroneal tendons may then be reflected posteriorly to allow exposure of the posterior surface of the fibula (Fig. 10). Any fibula fracture can then be stabilised using standard techniques (Figs. 11 and 12). Closure is performed as standard.

## Discussion

Posterior malleolar fractures of the ankle occur relatively commonly.[6] These may be small ligamentous avulsions or much larger bone fragments comprising a significant portion of the articular surface. The stabilisation of the posterior malleolar fragment adds significant stability to ankle fracture fixation, although this is controversial.[7] Standard texts would recommend that these be stabilised by internal fixation when the avulsed posterior malleolar fragment comprises more than 25 to 30% of the tibial articular surface.[8] These may be indirectly reduced by accurate restoration of the normal fibular length and fixation of the fibula by lag screw and derotation plate.[8] The posterior malleolus is pulled into position by the intact posterior tibiofibular

**Figure 2** The Skin incision is made 1 cm posterior to the posterior border of the fibula.

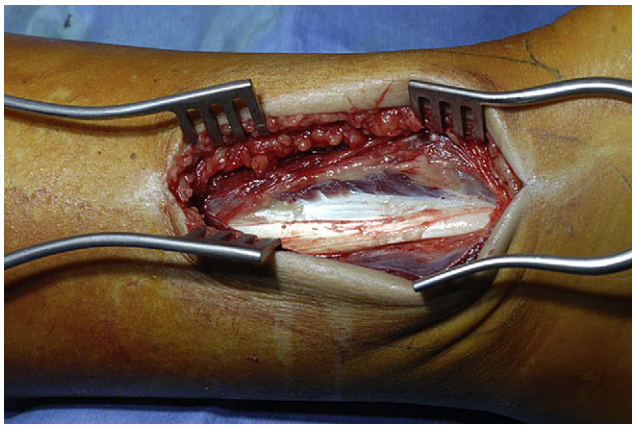

**Figure 4** The peroneal fascia is released to expose the peroneal tendons.