

A Technical Tip for Ensuring Parallel Screw Fixation of the Medial Malleolus

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Abstract

Parallel screw alignment can be challenging. We describe a simple, reproducible technique for the fixation of the medial malleolar fragment with two parallel screws, using a 1.6mm K-wire and the small fragment AO drill-guide.

Keywords: Ankle; Fracture fixation; Internal

Introduction

Medial malleolus fractures with more than 2mm of displacement are associated with a non-union rate of 5-15% [1]. Surgical fixation of these fractures is considered standard practice in Orthopaedic trauma surgery. Whilst single screw fixation is an option, the AO Foundation recommend two parallel, partially threaded cancellous screws to prevent rotation of the fragment [2]. In order to maximise inter-fragmentary compression, the screws should be placed perpendicular to the fracture plane [2]. Achieving parallel screw alignment can be challenging.



Figure 1: AO Small Fragment Drill-guide mounted over the 1.6mm K-wire using the aperture adjacent to the 2.5mm drill sleeve.



Figure 2: Mortise view radiograph demonstrating parallel internal fixation of the medial malleolar fragment. Note the combined use of K-wire and partially-threaded cancellous screw.



Figure 3: Lateral view radiograph demonstrating parallel internal fixation of the medial malleolar fragment.

Technique

Following anatomical reduction, a 1.6mm smooth K-wire is passed through the centre point of the malleolar fragment and into the tibial metaphysis perpendicular to the plane of the fracture. Once applied, we advise fluoroscopic assessment to ensure that the K-wire is in an adequate position and not penetrating the joint. The small fragment AO drill-guide has an aperture adjacent to the 2.5mm drill sleeve that is oriented parallel to the sleeve itself (Figure 1). When mounted over the guidewire using the described aperture, the drill-guide can then be rotated around the axis of the K-wire facilitating parallel drill holes that are perpendicular to the fracture plane (Figures 2 & 3). In cases where the malleolar fragment is too small to accommodate two screws, the initial stabilising K-wire can be eccentrically placed and left in situ to prevent rotation (Figures 2 & 3).

Discussion

Parallel screw alignment can be challenging. In our department

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Received November 19, 2011; **Accepted** January 02, 2012; **Published** January 10, 2012

Citation: Yates E, Foley G, Thomas C (2011) A Technical Tip for Ensuring Parallel Screw Fixation of the Medial Malleolus. J Trauma Treat 1:106. doi:[10.4172/2167-1222.1000106](https://doi.org/10.4172/2167-1222.1000106)

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this technique has improved our ability to stabilise the medial malleolar fragment with perfectly placed parallel screws. Importantly, we have found this an easy, safe and reproducible technique. In addition, our technique avoids the need for a relatively expensive cannulated screw system, where the K-wires are more flexible, less predictable and therefore difficult to place in parallel fashion.

References

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