Technical Section [TECHNICAL NOTES AND TIPS

A novel technique for supramalleolar osteotomy of the tibia using a circular frame

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BACKGROUND

Supramalleolar osteotomy of the distal tibia is indicated in the treatment of distal tibial malalignment and its sequelae, with good reported outcomes.¹ This is normally performed in a wedge or focal dome fashion.² Dome osteotomy is typically described through either a percutaneous or open approach. A specialised jig is used to create drill holes in an arc, centred around a pin parallel to the ankle joint line. We propose a novel method of focal dome osteotomy, using a ring fixator as a guide.

TECHNIQUE

One or two smooth wires are placed through the distal tibia, parallel to the ankle joint line in the coronal plane. This is then secured to a single full ring, also parallel to the ankle joint (Fig 1). A post is connected to the centre of the frame anteriorly. A five-hole rancho cube

Figure 1 The ring secured to the distal tibia, parallel to the joint line.

Figure 2 The completed construct.

is attached to this, separated by a washer/bolt, using a nylon nut to create a mobile hinge (Fig 2). This is used to make drill holes in a dome shape (Fig 3). The osteotomy is completed with an osteotome and secured with percutaneous screws (Fig 4). All of this is through minimal incisions.

DISCUSSION

We have used this technique in patients with hereditary multiple exostoses. The construct negates the need for a specialised jig, and the use of a ring provides a useful visual reference for alignment of the ankle joint.

Figure 3 The completed drill holes.

Figure 4 The completed osteotomy, fixed with two percutaneous screws. The prominence around the distal fibula is excised.

Figure 1 Removing the proximal fragment of the broken nail using the standard extraction tool.

References

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A novel technique to remove a broken tibiototalcalcaneal intramedullary nail using Moreland hip revision instrumentation

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ABSTRACT

Hindfoot intramedullary devices are increasingly used in tibiototalcalcaneal arthrodesis after failed total ankle arthroplasty or as a salvage procedure after complex trauma. Nail breakage is a well-described complication and numerous techniques for removal of broken parts can be found in the literature, especially for femoral and tibial nails. There is a relative paucity regarding techniques solving the challenge of removing a broken hindfoot intramedullary nail. We describe a novel technique using a curved thin hook from the Moreland hip revision set to remove the distal part of a broken tibiototalcalcaneal intramedullary nail.

KEYWORDS

Moreland – Broken nail – Hindfoot – Extraction – Technique

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Background

Hindfoot intramedullary devices are increasingly used in tibiototalcalcaneal arthrodesis after failed total ankle arthroplasty or as a salvage after complex trauma. Nail breakage is a well-described complication, with numerous techniques for removal of broken femoral and tibial nails. There are limited reports of a broken hindfoot intramedullary nail and we describe here a technique to remove its distal part.

Technique

First, remove the proximal part of the nail using the standard extraction equipment (Fig 1). We illustrate a Phoenix (Biomet Trauma) nail arthrodesis system (150 mm × 11 mm) used after failed total ankle arthroplasty that fractured in the dynamic proximal hole. To facilitate removal of the distal part of the nail we used the curved thin hook from the Moreland hip revision set (DePuySynthes; Fig 2). This is thinner and with sharper angle than the plain hook found in the same tray therefore more suitable for thin nail. The hook passes distal to the nail (Fig 3) and as it engages to its edge serial withdrawing movements (Fig 4) lead to nail removal.

Discussion

Use of ‘jammed’ guide wires has been described but this was not applicable due to the unavailability of suitably sized guide wires.¹ Only one case where part of Moreland set (tap extractor) was used for removal of an intact femoral nail can be found, which is a completely different scenario.² We did not use small fragment 3.5-mm tap as it was considered too small to engage and bigger ones were not suitable.³ Our technique uses readily available instruments, is cheap and reproducible enriching surgeon’s armamentarium.