Minimally Invasive Surgery for joint preparation and subsequent percutaneous intra-medullary nailing for stabilization of the hind-foot

Miss Ros Miller FRCS Tr&Orth
Consultant Orthopaedic Surgeon
Hairmyres Hospital, NHS Lanarkshire, Scotland, UK
My disclosure is in the Final AOFAS Mobile App.
I have no potential conflicts with this presentation.
rosmiller@doctors.org.uk

Dr Joël Vernois*
Consultant Orthopaedic Surgeon
Sussex Orthopaedic NHS Treatment Centre
West Sussex, England, UK
My disclosure is in the Final AOFAS Mobile App.
I have potential conflicts with this presentation.
Introduction

Tibio-talar arthrodesis (hind-foot fusion) for ankle and subtalar arthritis. This type of surgery carries with it the risk of complication which can be potentially high risk for the patient and include the risk of amputation.

The risk are significantly increased in neuropathic patients, most commonly diabetics, but also, B12 deficiency secondary to alcohol, and spinal pathology.

Minimally Invasive Surgery has been described for forefoot pathology.
We present a technique, using Minimally Invasive Surgery, to prepare the joint surfaces percutaneously, before insertion of a hind-foot arthrodesis nail.

Aim

To describe a new technique for Minimally Invasive percutaneous preparation of the ankle and subtalar joints, for hind-foot arthrodesis
Technique

PRE-OP
• Inpatient
• General anaesthetic with popliteal block
• Antibiotics at induction

POST-OP
• Post-op mobilisation in a back-slab for 2 weeks, weight-bearing as able
• Moonboot for 6-12 weeks
• Orthotic assessment at 6 weeks
• Clinical and radiograph at 3 and 6 months
1. Under fluoroscopic guidance (Mini-C arm), both the ankle joint and the subtalar joints are identified.

2. Where a corrective osteotomy is required for varus or valgus deformity within the ankle joint, K-wires are inserted from the medial aspect of the ankle, to determine the boundaries of the wedge osteotomy.
Technique

3. A 1cm percutaneous stab incision is made on the dorso-medial aspect of the ankle joint. A similar incision is made on the lateral aspect of the ankle to access the subtalar joint.

4. Using 2 & 3 x 20mm Minimally Invasive Shannon Burrs, the joint surfaces are initially prepared to remove any residual cartilage.

Minimally Invasive hand-piece, burrs, wedges, screws and bone graft
Wright Medical
5. The 3.1 and 4.1 mm Wedge burrs are used to convert hard bone to bone paste.

6. A mixture of cancellous bone graft from the calcaneum and ‘Allomatrix’ Bone substitute are also instilled into both the ankle and subtalar joints.

7. The hind-foot fusion nail is then inserted in the standard fashion.
Case 1

Middle aged male

Bilateral ankle arthritis

Previous total ankle replacement

Significant fixed hind-foot varus
Case 2

Middle aged male

IDDM

Ankle fracture which failed initial fixation

Probably Charcot arthropathy of the hind-foot
Case 3

Middle aged male

Alcohol dependence

Ankle fracture which failed initial fixation and subsequent external fixator

Probably Charcot arthropyathy of the hindfoot
Case 4

32 year old male, Fall from ladder

Infected fixation for Pilon fracture with subsequent failure of metalwork

Following removal of metal work and eradication of infection, both circular frame and amputation were discussed with patient

Minimally Invasive Hind-foot fusion was performed
Results

POST-OP
• All patients were discharged home with in 24 hours.
• 1 patient had a superficial infection on the plantar aspect of the foot
• 2 patients had pain at the insertion of the cross-screw in the heel, and are awaiting screw removal.
• No deep infections
• No DVT or PE
• All patients fully – weight-bearing at 6 weeks.
• All patient had routine input from orthotics at 6 weeks

Conclusion

We present a case series of a technique, designed to reduce potential wound complications associated with foot and ankle surgery for diabetic / neuropathic patients.

Further audit and research is required, to refine the technique and also to assess long term fusion rates and wound complications.
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