

INTRODUCTION

The trough technique for fractures or surgical symptomatic non-unions have been described in hand and upper extremity. However, little has been published utilizing the trough technique for lower extremity symptomatic non-unions. Similar procedures have been described utilizing a trephine or dowel autograft plug for arthrodesis and non-unions. We describe our trough technique utilizing rotary burr and curettage for metatarsal non-unions.

METHODOLOGY

Two cases of metatarsal non-unions from fractures which were treated with the trough technique are described. We describe our trough technique involving debridement and evacuation of sclerotic bone utilizing a burr and curettage but maintaining one cortex intact, harvesting and placement of calcaneus cancellous autograft and buttress plate and screw fixation. With this technique, a trephine is not required.

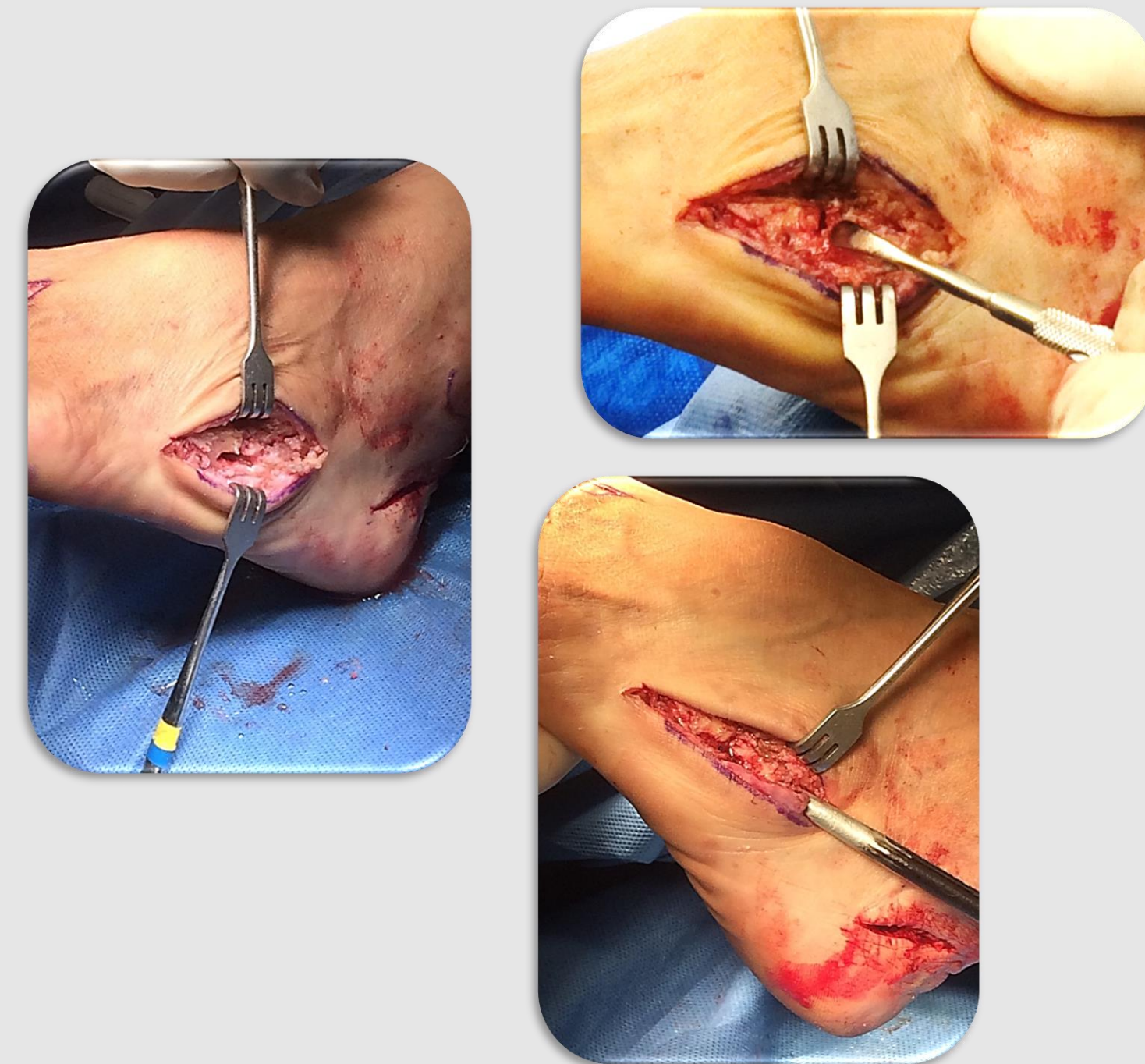
CASE #1 : M.V.

A 54 year-old active female with thyroid disease (M.V.) presented with a chronic non-healing left foot 5th metatarsal Jones fracture for the past 2 years. Initial fracture was sustained after stepping off a curb and twisted her foot. She was initially immobilized in a weight bearing boot for 6 weeks. Two years later, she still experienced pain with activity, sports, and running.



M.V. SURGICAL APPROACH

M.V. was taken to the operating room for evaluation of the non-union fracture site, troughing of the fracture site utilizing a rotary burr, cortical drilling, and curettage, and harvesting and application of calcaneal autograft. One 4.5 cannulated screw was applied for stability.



M.V. POST-OPERATIVE PROTOCOL

M.V. was advised to remain partial weightbearing with a boot and crutches, transitioning to full weight bearing with the boot at week 3. She then transitioned out of the boot with an ankle brace and tennis shoe and physical therapy. Her fracture site healed in 5 weeks. The patient then returned to her usual activities of daily living and sports with little limitations. M.V. was pain free by 12 months.



CASE #2: A.K.

A 47 year-old type II diabetic male (A.K.) presented with a chronic, non-healing left foot 5th metatarsal Jones fracture despite open reduction, internal fixation 3.5 years prior. Initial fracture was sustained after jumping into a pool and feeling a pop.



CASE #2 SURGICAL APPROACH

A.K. was taken to the operating room for hardware removal, evaluation of the non-union fracture site, troughing of the fracture site and harvesting and application of calcaneal autograft. A plate and screws were added for stability.



A.K. POST-OPERATIVE PROTOCOL

A.K. was advised to weightbear to tolerance with a boot for 6 weeks. He then transitioned out of the boot with an ankle brace and tennis shoe and physical therapy. His fracture healed in 4.5 weeks with stable hardware. The patient returned to his usual activities of daily living with no limitations. At 12 months, A.K. was pain free.



RESULTS OVERALL

After immobilization for three weeks followed by weightbearing to tolerance in a boot for three to four weeks followed by Physical Therapy, both patients returned to their daily activities with no limitations. Complete radiographic union was achieved and appreciated in both patients. Both patients were followed-up by 12 months and were asymptomatic.

CONCLUSION

Metatarsal fracture symptomatic non-unions, whether from fractures or surgical sites, are challenging. Treatments are complex and must be individualized to the patient. When conservative treatments such as immobilization or bone stimulators fail, surgery should be considered. Allografts may be utilized. To optimize osteogenic potential, efficiency of incorporation, and non-immunogenicity, autogenous bone is the gold standard. Treatments for metatarsal non-unions should consider the trough technique.

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