Case Report

Pennig and Preventogen
Minifixator

A True MIS Approach to Hallux Valgus Correction Utilizing a Minifixator with the Application of an Elastomeric Microbicidal Barrier

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Case Presentation

A female presented with a severe hallux valgus deformity that was confirmed on x-ray. Due to a history of smoking and poor skin turgor, the patient had a high-risk of would dehiscence. In addition, the patient's history of smoking augmented her postmenopausal osteoporosis (Fig.1).

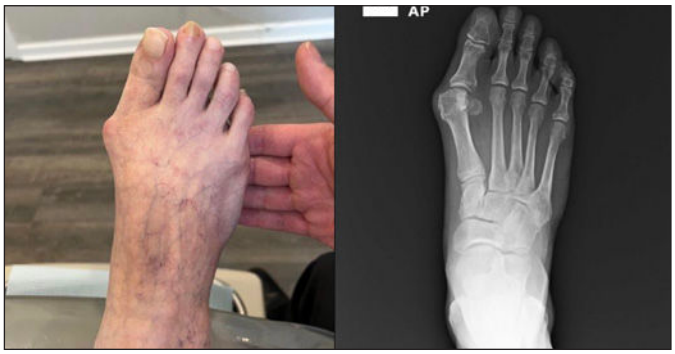

Fig. 1 Preoperative picture and X-ray

Treatment Strategy

Upon consultation, the patient elected for operative treatment of her deformity. Based on the condition of her soft-tissue envelope and higher risk of wound dehiscence, a MIS surgical approach was planned with medial application of a Pennig Minifixator. An osteotomy in the distal metaphyseal region of the 1st metatarsal was performed with a low-speed, high-torque burr to mitigate damage to surrounding soft-tissue structures, such as nerves and blood vessels. The mini ex-fix was then fixated to the bone via insertion of six 2.5mm-3.0mm conical threaded Schanz pins; two each in the proximal and distal segments of the osteotomized 1st metatarsal, along with two through the medial cuneiform. The pins were connected to a threaded bar via a series of three clamps (2 Schanz pins per clamp). Multiplanar reduction of the 1st metatarsal deformity was then achieved by manipulating the two pins in capital fragment by hand before reaffixing them through the distal clamp. Finally, compression was applied across the two bony fragments at the level of the osteotomy using the fixator's Compression-Distraction Nut mechanism (Fig.2).

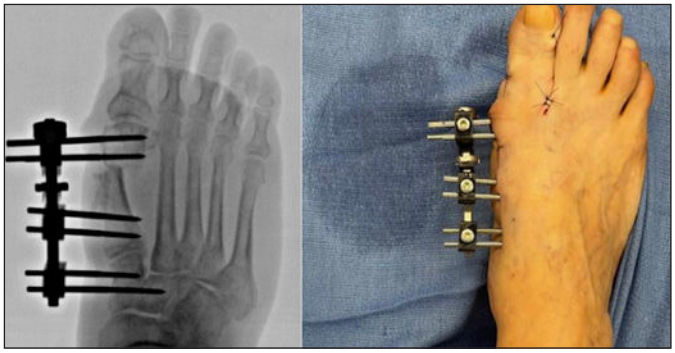

Fig. 2 Intraoperative X-rays and picture

The pins sites were then wiped clean and an elastomeric liquid polymer (PREVENTOGEN, Prevent-Plus) was applied to serve as a microbicidal barrier to the area of the skin surrounding each pin (Fig.3).

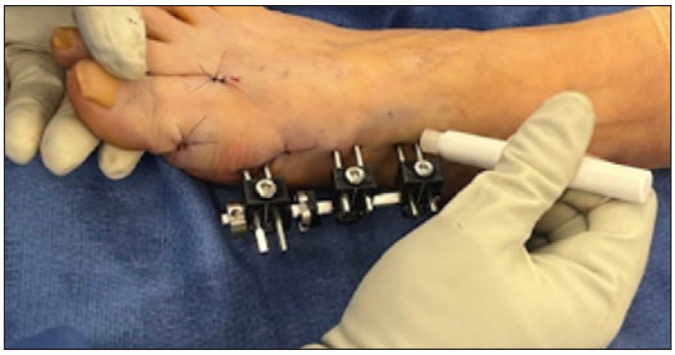

Fig. 3 Application of PREVENTOGEN to pin sites

Follow-Up

The patient was seen in clinic once per week during the first two weeks post-operatively and again at week five for removal of the fixator. During this period PREVENTOGEN (Prevent Plus) was reapplied to the areas of skin around the patient's pin sites by the surgeon, once at each of their first two follow-up visits. The patient was then instructed to re-apply twice each week for the following three weeks. All pin-sites remained clean throughout the five-week duration, with mild skin irritation observed around the most proximal pin (Fig.4).

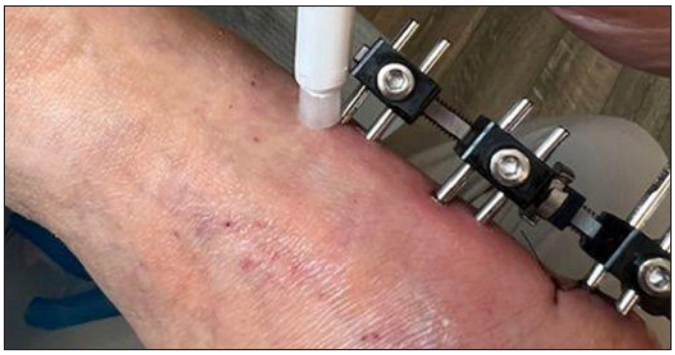

Fig. 4 Follow up visit at 1 week after surgery

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Full weightbearing was permitted while in a surgical shoe during the five-week period the ex-fix was applied to the patient and throughout the duration of their healing process while in a tennis shoe. Bridging callous was first observed on x-ray at two weeks post-op and bony union was determined to have occurred at 11 weeks (Fig.5).

Excellent realignment and ROM of the 1st MTPJ was observed via radiographs and clinical observation (Fig.6).

The AOFAS Hallux-MP-IP Scale was used to evaluate the patient's pain, function and alignment at the end of treatment. A score of 90 was calculated for this patient, meaning a high-level of function and good anatomic alignment with minimal pain was the outcome of this procedure.

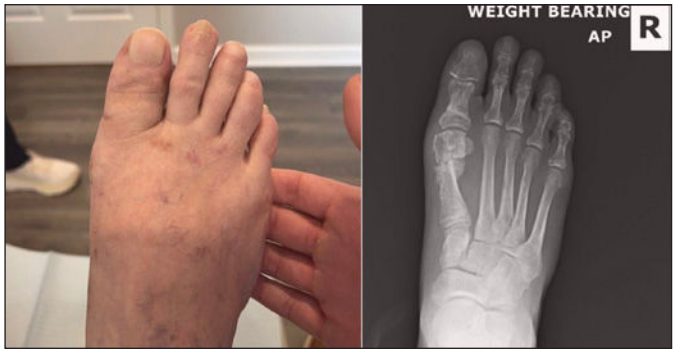

Fig. 5 Follow up at 11 weeks after surgery

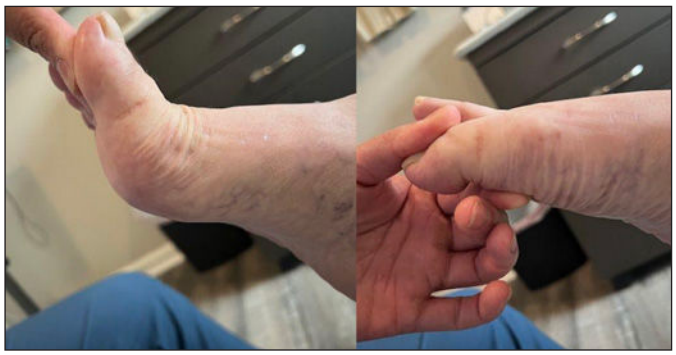

Fig. 6 Follow up at 11 weeks after surgery

SURGEON'S COMMENTS

A myriad of approaches for surgical correction of hallux valgus have been well documented in literature. With all these techniques, the most important component for achieving a successful outcome remains thorough preoperative planning; precise deformity analysis and identification of the optimal level to perform the osteotomy. Utilization of a mini ex-fix represents a true MIS approach that respects the biology of soft-tissue structures through minimal dissection and elimination of periosteal stripping. Tri-planar correction can be achieved through a "joystick" approach by manipulating the first metatarsal head via the shafts of the Schanz pins. Two pins fixated through each segment of bone on opposing sides of the osteotomy is optimal for maintaining stability and alignment in all planes. To prevent suboptimal placement and stabilization of the fixator, proper positioning of the foot and careful fluoroscopic assessment throughout the procedure are often overlooked but critical.

Pin-site infection remains a common complication and deterrent for surgeons considering external fixation constructs. With the procedure described in this case the most common area of concern is the skin around the most proximal pin. This is due to its' proximity to the insertion of the tibialis anterior tendon and resulting pistoning of the skin around the pin. While there a numerous topical agents and protocols available to help mitigate infection, the most effective are often those that enable a simple and quick application for patients at home. This patient reported that Preventogen "was easy to use" during at-home applications. This considered, the easier the protocol is to follow, the more likely the patient is to comply.

Contributing surgeon: Dr. Khoa Nguyen, DPM, Griffin Hospital (Derby, CT) is a paid consultant for Orthofix

Prevent-Plus, LLC is the Manufacturer of Record for Preventogen.

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Orthofix Products Featured in Report: Pennig Minifixator (Orthofix SRL) and Preventogen (Prevent Plus).

Note: This case report shows an individual's response to treatment. The information contained in this case report is provided for informational and educational purposes. It is not intended to guarantee the response other people may have to the treatment as responses to treatment can and due vary. Proper surgical procedure is the responsibility of the medical professional. Each surgeon must evaluate the appropriateness of a technique based on his or her personal medical credentials and experience.

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