

TENSION BAND WIRE FIXATION OF FIRST METATARSOPHALANGEAL ARTHRODESIS

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First metatarsophalangeal joint (MTPJ) fusion is a useful technique in the management of painful rheumatoid arthritis. A complete review of first MTPJ arthrodesis is currently available.¹ Proper positioning of the hallux on the first metatarsal is critical to the success of the arthrodesis. Functional alignment following successful fusion is generally achieved with the hallux positioned in approximately 25° of dorsiflexion and 15° of abductus. The frontal plane position of the hallux should be neutral. Although many fixation techniques can be used to achieve a solid arthrodesis of the first MTPJ, application of the tension band wire method has been shown to be an effective option. This method of fixation is extremely useful in cases involving decreased bone stock, and is therefore an acceptable choice for use in medically stable rheumatoid arthritis patients. Arthrodesis of the first MTPJ also lends stability to the forefoot in cases requiring pan metatarsal head excision (excision of metatarsal heads II - V).

The specific tension band wire technique recommended for the first MTPJ employs the concomitant use of two Kirschner wires in conjunction with a single intraosseous cerclage wire. Because a non-weight bearing postoperative course is recommended during the initial phase of bone healing, no significant dynamic eccentric loading of the bone should occur, and the Kirschner wires are necessary to affect rigid inter-

nal compression fixation across the fusion site. Moreover, the fusion interface is essentially a shallow ball and socket and is, therefore, considerably stable. It is important to avoid excessive plantar protrusion at the distal end of the axial Kirschner wires as they exit the base of the proximal phalanx. Thus, complications related to weight bearing, following stable arthrodesis, will be prevented.

CASE PRESENTATION

A 56 year-old caucasian male presented on referral from his rheumatologist with severely debilitating and painful foot deformities. His rheumatoid arthritis was satisfactorily controlled through the use of systemic steroid and methotrexate therapy. Clinical findings were significant for bilateral rheumatoid forefoot deformities (Figures 1, 2) including painful limitus of all MTPJ's, severe metatarsalgia with subcutaneous nodules, heel pain with posterior and plantar subcutaneous nodules, and an apropulsive pedestal gait.

Radiographs revealed changes consistent with rheumatoid arthritis, including periarticular decreased bone density, and generalized diminished bone stock. Initial therapy consisted of silicone toe crests and a prescription for extra-depth, straight last oxford shoes with plastazote insoles and tapered crepe rocker bottom soles. The patient was also referred to occupational therapy

for additional training and education regarding his disease.

Approximately 3 months later, the patient underwent surgical reconstruction, consisting of lesser metatarsal head excisions II - V, first MTPJ arthrodesis, digital fusions of all lesser toes, and excision of plantar and posterior (distal leg along achilles tendon) subcutaneous nodules. Rheumatology co-management was provided perioperatively, and preoperative prophylactic cefazolin was administered. The patient tolerated surgery well, which was performed under local anesthesia with intravenous sedation. Immediate postoperative radiographs revealed satisfactory bone resection and fixation alignment. (Figures 3-5) Postoperative management involved non-weight bearing ambulation on the operative foot, with the use of crutches. Despite a non-suppurative dehiscence involving the posterior leg wound, the patient progressed well.

At two weeks and one month postoperative, surgical revision of the posterior wound was performed. Initially, a delayed primary closure was attempted, however following initial failure, a fasciocutaneous flap closure was successful performed. Wound dehiscence was attributed to the anti-metabolic and steroid therapy which were maintained throughout the surgical course, as wound cultures failed to demonstrate an infecting organism.

The remaining surgical sites healed in a satisfactory time frame, including the first MTPJ fusion site. The patient was permitted to bear weight at seven weeks postoperative, with the use of a built-up surgical shoe incorporating a Korex rocker bottom sole. (Figures 6-8) Following rehabilitation, full activity was reached at eleven weeks postoperative, with the use of a modified extra-depth shoe. Six months following the initial surgery, the patient underwent identical procedures on the contralateral foot, and the recovery was unremarkable. At the time of this writing, the patient is beyond two years postoperative for both feet and maintains full activities, including golfing on a regular basis.

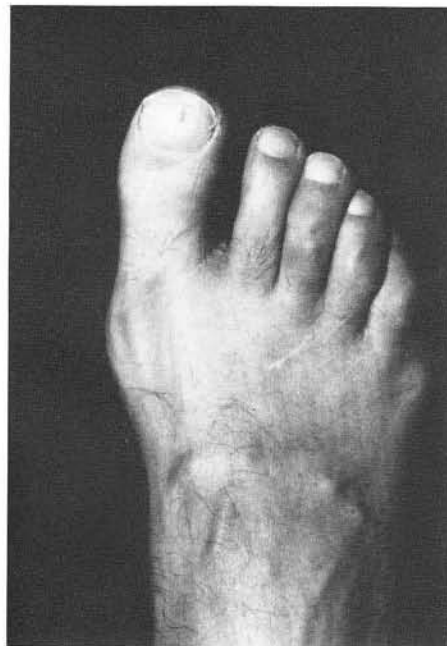


Figure 1. Preoperative clinical appearance from the dorsal aspect of the right foot.



Figure 2. Plantar aspect of the right foot demonstrating prominent metatarsal heads with overlying rheumatoid nodules.

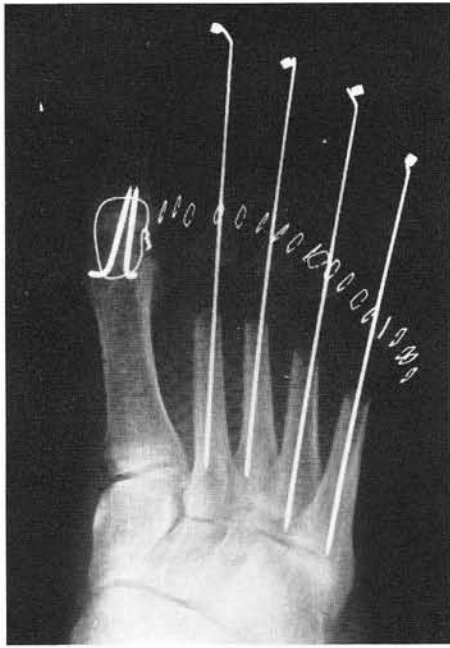


Figure 3. Immediate postoperative DP radiograph of the right foot. Note the alignment and orientation of the fixation devices and the stability of the 1st MTPJ arthrodesis site.

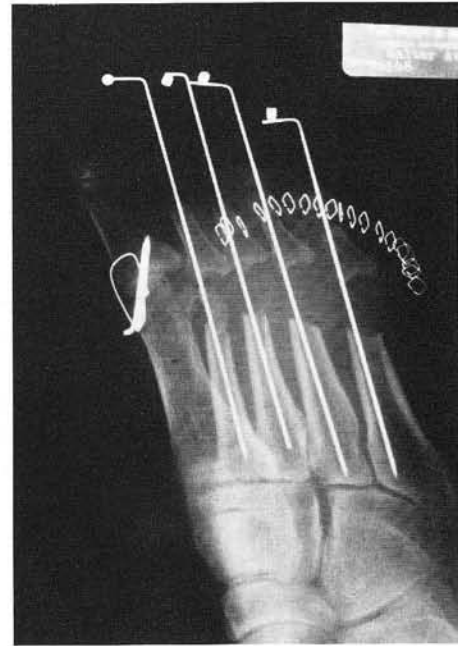


Figure 4. Immediate postoperative lateral oblique view.

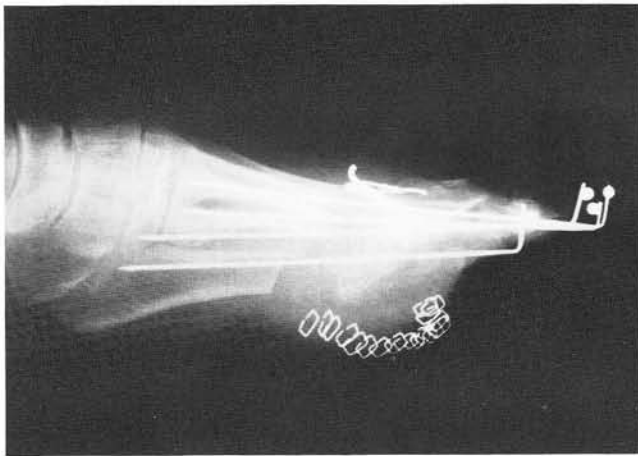


Figure 5. Immediate postoperative lateral projection of the right foot.

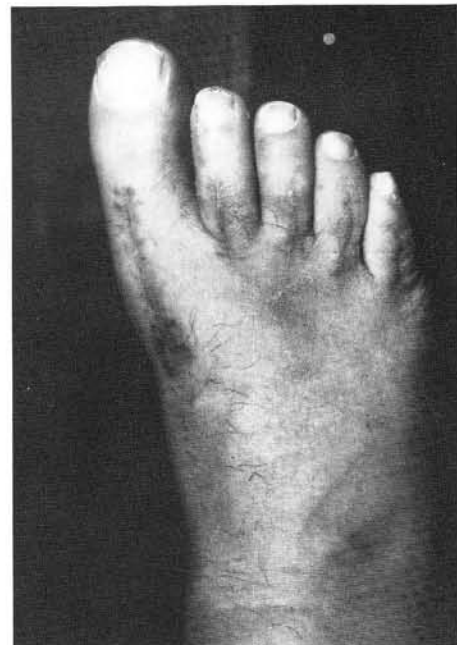


Figure 6. Clinical appearance at 7 weeks post-operative from dorsal view.



Figure 7. Clinical appearance, plantar view, at 7 weeks postoperative.



Figure 8. Osseous fusion is evident at the 1st MTPJ arthrodesis site on DP radiograph.

REFERENCES

1. Yu GV: First metatarsophalangeal arthrodesis. In McGlamry ED, Banks AS, Downey MS (eds): *Comprehensive Textbook of Foot Surgery*, 2nd ed., Williams & Wilkins, Baltimore, 1992, pp. 545-565.