

FIRST METATARSOPHALANGEAL JOINT FUSION MADE EASY

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INTRODUCTION

The first metatarsophalangeal joint (MPJ) fusion is an ideal procedure for pathology of this joint that requires a definitive correction. Commonly, the pathology will include severe arthritic changes of the joint or a deviation of the joint that can not be surgically repaired without fusion such as a long-term hallux varus (Figures 1, 2). This procedure can be done in a simple way that provides for good correction and a high fusion rate without extensive use of hardware, and it also allows the patient to bear weight in a post-operative shoe during recovery.

The keys to success in the first MPJ fusion are the same as in any type of arthrodesis foot surgery. Anatomic dissection for good visibility, good apposition of bone with stable fixation, and ideal position make the procedure a success.

COMMON COMPLICATIONS OF FIRST MPJ FUSION

Common complications of the first MPJ fusion include nonunion, wound dehiscence, painful internal fixation, iatrogenic ulcer formation, and pain. Some of the complications are a result of patient noncompliance or co-morbidities. Other times the complications are a result of the application of the procedure itself. The solution is to apply the procedure with minimal trauma to the tissues with optimal position and the least amount of fixation as needed.

Nonunions of the first MPJ fusion may come from either inadequate joint resection or unstable fixation. The fixation may allow for too much motion or it may actually gap the fusion site. Wound dehiscence in a patient with healthy tissue can be a result of too much dissection or pressure from large amounts of hardware like plates or prominent screws or wires. When the fixation is prominent or becomes loose this can also lead to pain, which will require removal of the fixation.

The position of the joint in the fusion of the first MPJ is paramount to the success of the procedure. When the toe is too close to the ground, this can result in pain due to the pressure, or in some cases can cause the fixation to break down and create a painful nonunion. Poor correction in the



Figure 1. Preoperative radiograph of hallux varus.



Figure 2. Post surgical view after the wire is pulled.

sagittal plane can also cause a contracture of the hallux interphalangeal joint (IPJ) or in the case of too much plantar flexion, an ulcer at the hallux IPJ.

Malposition in the transverse plane can cause shoe irritation in the case of a varus position, or ulceration in the first web space from pressure against the second digit.

Either an under lapping or over lapping second digit can also be a result of under correction in the transverse plane.

DESCRIPTION OF PROCEDURE

The incision is placed directly over the joint and only needs to be long enough to get access to the joint for complete resection, usually 3 to 4 cm. Because the fixation is placed completely within the fusion site and through the end of the digit, extensive periosteal dissection is not needed (Figure 3).

The subcutaneous tissue is dissected and reflected medially and laterally. The extensor tendon and joint capsule are identified and the capsular incision is made on either side of the extensor tendon to expose the joint. The tendon is preserved and reflected to the side (Figure 4).

The amount of dissection at this point depends on the amount of bone resection needed.

Joints with a great deal of periarticular spurring will need more resection of the periosteum to get adequate bone exposure.

The joint is then saw-resected to place the hallux in the corrected position. Parallel block cuts will be the most stable and will assist in limiting motion at the fusion site due to the buttressing position of the bone contact. In cases of pseudo arthrodesis, just the stability of the bone cuts will limit motion and may make the procedure a success (Figure 5). The author prefers that the hallux should be positioned slightly off the ground and generally parallel to the second digit, if it is in good alignment, in the transverse plane.

The exposed bone needs to be good bleeding cancellous bone with plenty of cortical bone on the edges of the bone cuts for stability of the fusion site. In cases where extensive bone resection is needed the Kirschner wires may need to be positioned deeper into the first metatarsal for stability since some of the cortical bone around the fusion site was removed.

Once the desired position is achieved, the fixation is placed across the fusion site.

A 0.062 Kirschner wire is driven from the base of the proximal phalanx through the end of the hallux and stopped flush with the bone surface. A second wire is driven and placed in similar fashion but slightly nonparallel to the first wire. Having the wires placed nonparallel to each other will help prevent motion along the wires at the fusion site. The



Figure 3. Incision placement.



Figure 4. Subcutaneous dissection.

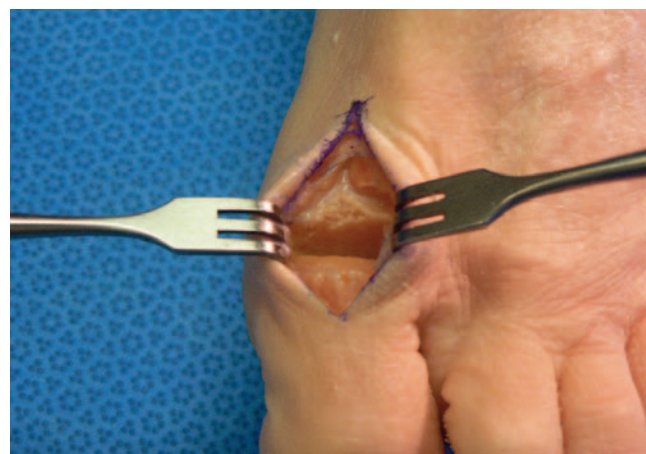


Figure 5. Joint resection.

fusion site is then tightly approximated and each wire is then driven into the first metatarsal to the base or out the side through the cortex (Figure 6). The position should be checked with a C-arm to make sure the fusion site is not gapping and that the position of the fusion site is appropriate as well as the fixation.



Figure 6. Kirschner wire shown at the base of the proximal phalanx.



Figure 7. Radiographic view of the fusion site fixated with Kirschner wire.

POSTOPERATIVE CARE

Following the procedure a sterile soft dressing is applied. The patient is able to perform some limited ambulation in a rigid postoperative shoe. The dressing should be changed weekly until the incision is healed and needs to stay dry until the Kirschner wires are removed at the 6 week mark. Periodic radiographs should be taken to determine the healing status and to see if there has been any change in position of the fusion site (Figures 7, 8).

CONTRAINDICATIONS

Although this simplified procedure has many indications, it is not recommended for revisional first MPJ fusions or in patients with poor bone quality. Patients that have profound neuropathy should have strict limitations on weight-bearing activities.

CONCLUSION

A successful outcome of a first MPJ fusion does not require extensive hardware and cast immobilization. When the bone cuts are made and positioned in a stable construct with Kirschner wire fixation and the foot is immobilized in a postoperative shoe, fusion of the first MPJ can be achieved.

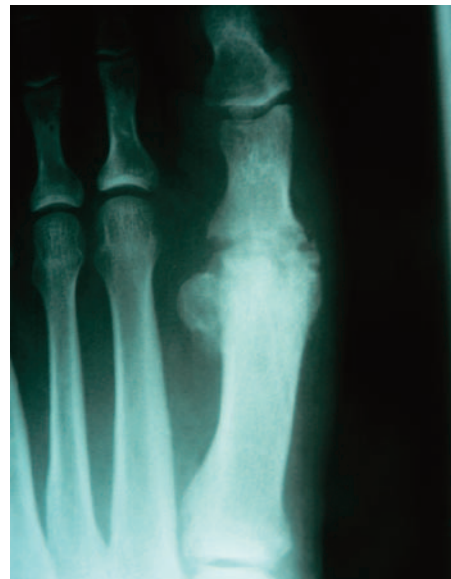


Figure 8. Fused joint after Kirschner wire removal.