

Combined Tarsometatarsal Joint fusion with First Metatarsal-Phalangeal Joint Hemi-implant Arthroplasty for the Treatment of Arthritic Bunion Deformity

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STATEMENT OF PURPOSE

As technology advances, joint implant arthroplasty has become increasingly popular among patients and surgeons, alike. Patients' desire to maintain anatomic motion of their native joints has led to increased implantation of total ankle joint implants and first metatarsal-phalangeal (MTP) joint implants. First MTP joint arthrodesis is reliable and has been the mainstay surgical treatment for arthritic bunion deformity for many years. This case calls attention to a successful combination of procedures that correct hallux valgus, midfoot hypermobility/instability, and degenerative joint disease of the first MTP joint as an alternative to MTP joint arthrodesis.

LITERATURE REVIEW

First metatarsal-phalangeal joint fusion is well documented in the literature as a viable surgical treatment for bunion deformities with advanced arthritis.^{1,2,3,4} The corrective power of isolated first MTP joint fusion or midfoot fusion has been extensively researched^{5,6} but combined distal and proximal procedures are seldom discussed.^{7,8} To the authors' knowledge, combined midfoot fusion with first MTP joint hemi-implant has not been previously reported.

CASE STUDY

The patient is a 67 year-old female who presented for a third opinion regarding surgical correction of a severe recurrent bunion deformity on her right foot. She underwent bunionectomy with first MTP joint enclavement 1.5 years prior (Figure 1). She reported that her bunion never fully went away and had been getting larger. She tried and failed all reasonable forms of conservative treatment but pain was still making her life unenjoyable. Both an Orthopaedic Foot and Ankle Surgeon and a Podiatric Foot and Ankle Surgeon had recommended first MTP joint fusion; however, she was adamant about maintaining motion at the first MTP joint based on her activity goals.

On physical exam, she exhibited moderate hallux abductovalgus deformity with painful palpation and manipulation of the first MTP joint. No sesamoid joint pain was noted. She had palpable pedal pulses and was neurologically intact.

Plain film radiographs demonstrated evidence of a prior bunionectomy and proximal phalangeal osteotomy. First MTP joint arthritic changes were also evident as well as an increased first intermetatarsal angle (IMA), laterally deviated hallux, and a prominent medial eminence (Figure 2).

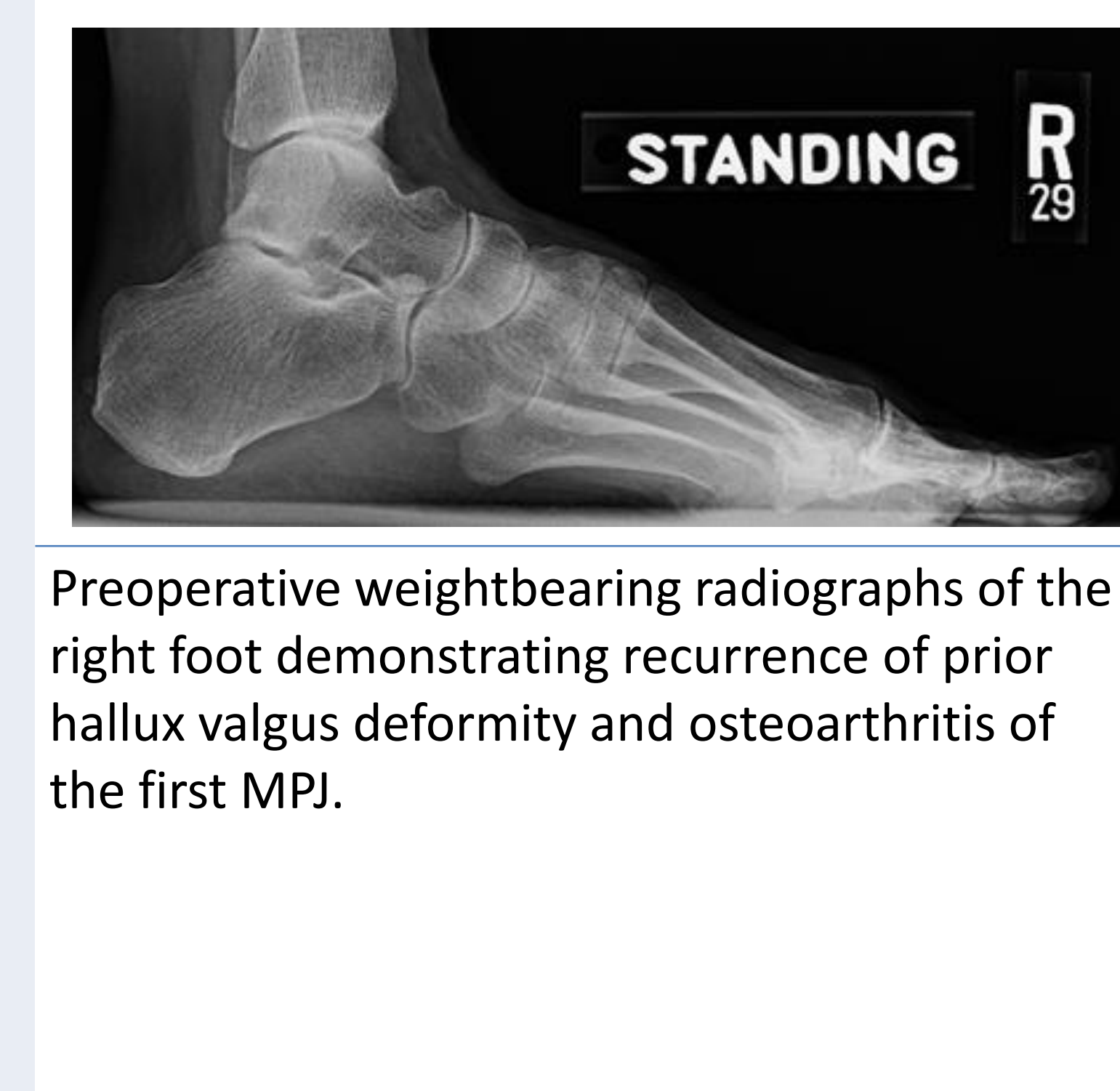
After a lengthy discussion about her options, first MTP joint implant hemi-implant arthroplasty and stabilizing midfoot fusion was offered as an alternative to first MTP joint arthrodesis.

Figure 1. X-rays Following Initial Procedure



X-rays following initial enclavement procedure 1.5 years prior to initial presentation to the surgeon involved in this study. There is evidence of a McBride bunionectomy with proximal phalangeal osteotomy and external temporary k-wire fixation.

Figure 2. Preoperative Weightbearing Radiographs



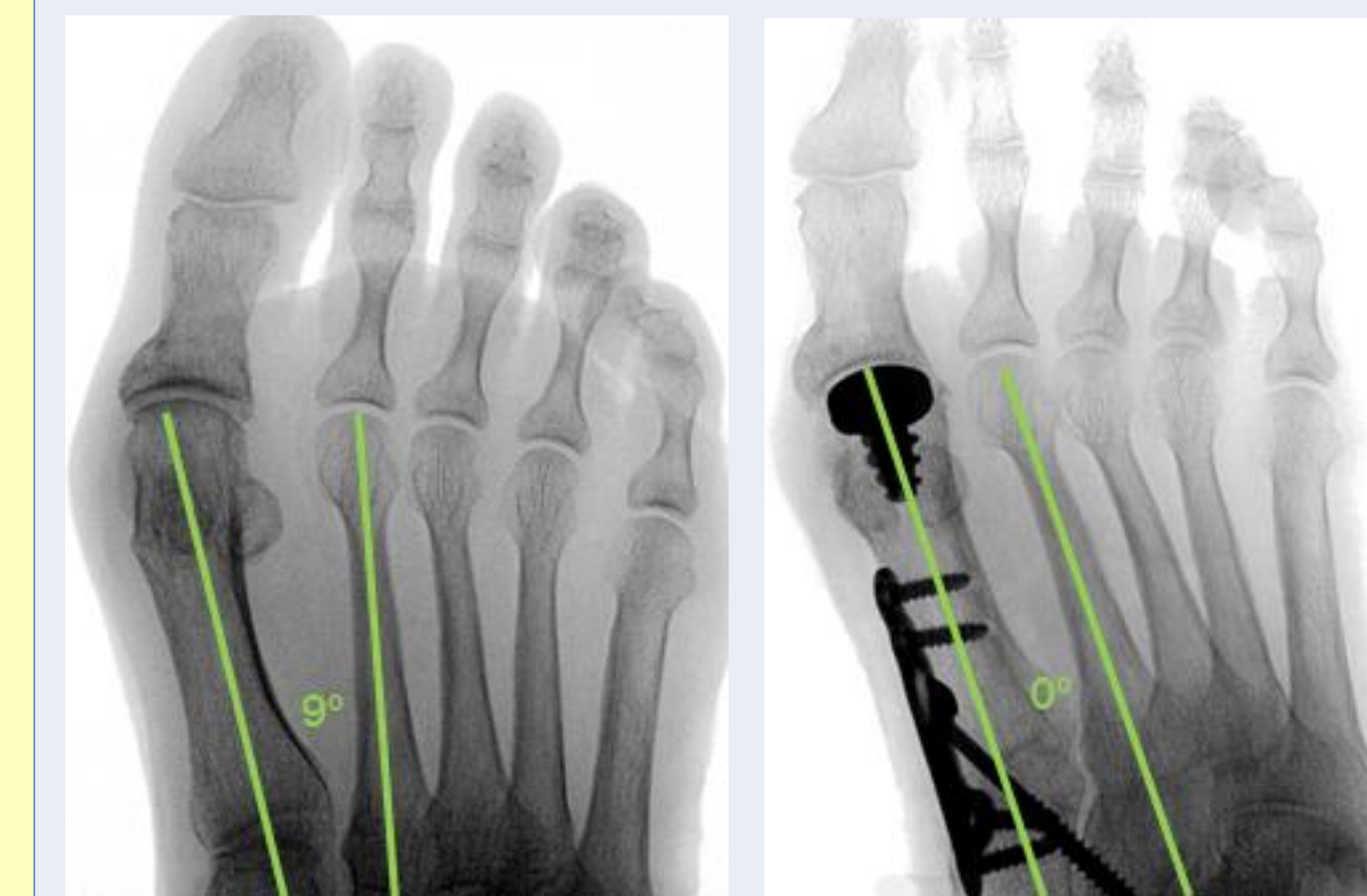
Preoperative weightbearing radiographs of the right foot demonstrating recurrence of prior hallux valgus deformity and osteoarthritis of the first MPJ.

Figure 3. Final Intraoperative Radiographs



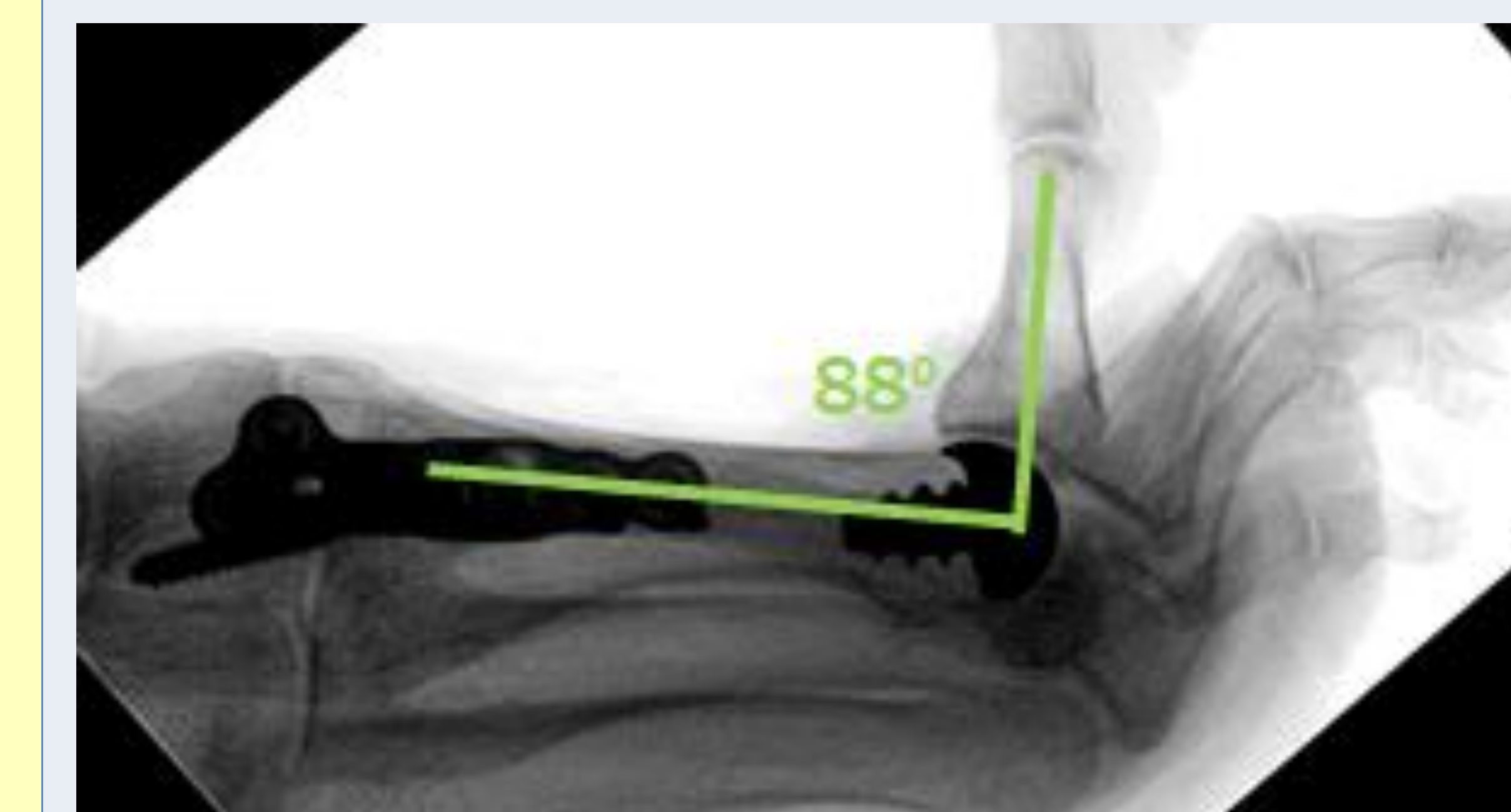
Intraoperative radiographs following final fixation of the first tarsometatarsal joint with a locking plate and oblique compression screw and 1st MPJ hemi-implant arthroplasty with resurfacing implant.

Figure 4. Intermetatarsal Angle Correction



Intermetatarsal (IM) angle correction is shown above. The first IM angle decreased from 9° preoperatively to 0° postoperatively.

Figure 5. Improvement in First MTP Joint Dorsiflexion



Dorsiflexion range of motion (ROM) improved from 35° preoperatively to 88° postoperatively.

Figure 6. Final Postoperative Weightbearing Radiographs at 16.5 months



Final postoperative weightbearing radiographs at 16.5 months after surgery. Solid osseous union is noted at the fusion site. There is no loss of first intermetatarsal angle correction or hallux abductus angle. There is no evidence of implant subsidence or loosening.

RESULTS

The patient underwent modified Lapidus bunionectomy and first MTP joint hemi-implant arthroplasty (Figure 3). The first intermetatarsal angle was reduced from 9° to 0° (Figure 4) and maximum sagittal plane dorsiflexion increased from 35° to 88° (Figure 5). The patient had an uneventful postoperative course. She was nonweightbearing for 6 weeks postoperatively, followed by progressive protective weightbearing in a CAM boot for 4 weeks. She achieved clinical and solid radiographic osseous fusion by 6 weeks postoperatively (Figure 6). She was followed for 16.5 months after surgery. There was no evidence of implant subsidence or loosening. She maintained significantly improved range of motion and intermetatarsal angle correction. She reported no pain over her surgical sites or hardware at final follow-up and reported that she was very pleased with her outcome. She verbalized that she would do the procedure over again if she needed to and would highly recommend it to a friend.

ANALYSIS & DISCUSSION

While appropriate patient selection remains paramount, combined tarsometatarsal joint fusion and first MTP joint hemi-implant arthroplasty may be a viable surgical alternative for patients with hallux valgus, midfoot instability, and first MTP joint arthritis without symptomatic sesamoid arthritis. This procedure combination is intuitively more functional than first MTP joint arthrodesis and allows patient to not only maintain range of motion but improve it significantly. Although our patient had an excellent outcome, further clinical research is needed with a larger patient population.

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