

Early weightbearing with utilization of locking plate technology for fifth metatarsal osteotomies: A case report



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Statement of Purpose

We present a novel technique in fixating proximal fifth metatarsal osteotomies for tailor's bunions utilizing multiple-hole locking plate system. The construct provides excellent stability, minimum periosteal dissection, and allows for early weight-bearing without complications.

Introduction

A Tailor's bunionette is defined as an osseous and soft-tissue prominence at the lateral aspect of the fifth metatarsal head (1). The condition is characterized by splaying of the fifth metatarsal, which is exacerbated by bursal inflammation and localized hyperkeratosis. Operative options for this deformity include, but are not limited to, exostectomies, arthroplasty techniques, and metatarsal osteotomies at various levels (2).

Mann and Coughlin recommended osteotomies over the use of exostectomies for more predictable outcomes (3). Proximal osteotomies provide a larger amount of deformity correction but they traditionally require post-operative immobilization and carry increased risk of bone healing complications. Some of the reported fixation techniques are Kirschner wires, cortical lag screw fixation, and rods. Complications due to painful hardware and nerve entrapment have also been documented (4).

Between 2009 and 2012, the primary author has utilized a construct comprising of locking plate and screw fixation for oblique proximal fifth metatarsal osteotomies. The patient outcomes were rated as good to excellent as patients were able to bear weight early and demonstrate radiographic evidence of osseous consolidation. The laterally-based plate provides resistance as it adds stability at its tension sites. The screws are also staggered, which further strengthens the construct and provides multiple points of fixation through different angles. In addition, by performing the osteotomy proximal, **the fifth MTP joint capsule is maintained** and thereby removes a host of potential complications including, but not limited to, staking of the fifth metatarsal, joint contracture, neuritis, subluxation of the joint, stiffness, and medial deviation of the fifth toe (5,6).

Case Presentation

A 58 year-old caucasian female presented to the office of the principal author with chief complaint of a painful tailor's bunion deformity to her left foot. Her past medical and surgical history was unremarkable and she presented with no other musculoskeletal complaints. The deformity resulted in difficulty standing, walking, and performing daily functional activities. Pain was also exacerbated by shoe-gear irritation.

On clinical examination, she demonstrated a pronated foot-type when weight-bearing, clinical lateral deviation of the 5th metatarsal bone, and pain on palpation to the lateral area of the 5th metatarsal head.

Initial Presentation



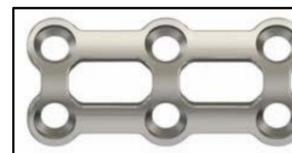
Palpable 5th metatarsal head bursa with notable lateral deviation of the metatarsal

AP X-ray demonstrating increased IM 4-5 and varus orientation of the 5th toe at the level of the MTP Joint



Locking Plates

Locking plate technology does not depend on forces of friction existing between the opposing surfaces of the plate and bone to obtain compression and stability.



Technique

A 4-cm dorsolateral incision is made over the area of the fifth metatarsal **without penetrating the MTP joint**. The soft-tissue is dissected off the bone medially and laterally. An oblique osteotomy is then made at the proximal metaphyseal portion of the fifth metatarsal bone. Temporary fixation is achieved using 0.62 K-wire. An eight-hole locking plate is applied at the lateral aspect of the metatarsal. The fixation is secured with locking variable-angle screws and an oblique cortical-screw through the osteotomy site.



Proximal closing base wedge osteotomy temporarily stabilized with a K-wire



Locking plate construct demonstrating stable fixation with variable angle screws



Results

Patient was immediately weight-bearing as tolerated in a CAM-boot for approximately four weeks prior to transitioning into regular shoes. Serial postoperative radiographs confirmed osseous consolidation, stable fixation, and excellent alignment with demonstrated deformity correction.



AP X-ray demonstrating consolidation across the osteotomy site, stability of the fixation, and correction of the structural deformity

Discussion

The treatment goals of tailor's bunion surgery are to correct the underlying deformity, relieve pain, prevent recurrence, and improve function with early weight-bearing (5). Coughlin in 1991 described an oblique diaphyseal osteotomy of the fifth metatarsal in his series of patients with a total of 30 feet. He used combinations of K-wire fixation alone, lag screw fixation, and combination of K-wire and screw fixation. Overall, he reported a reduction of the fourth-fifth angle of 9.8 degrees and correction of the fifth metatarsophalangeal angle of 15.5 degrees. He reported 93% good to excellent results in that series (6). London et al. similarly reported successful outcomes of 94% in their series of 16 patients, with a construct of two 2.0 mm cortical lag screws. They did, however, report that 16% of their patients experienced co-morbidities including superficial infection, irritation from protruding screws and entrapment of nerve (4). The inherent nature of the proximal osteotomy allows for preservation of the MTP joint capsule and thus, a more predictable correction (6). However, complications of delayed union, non-union, transfer lesions, and potential for a longer postoperative recovery time are present (7, 8, 9).

The locking plate construct presented allows for early weight-bearing secondary to stable fixation at the osteotomy site with confirmed radiographic evidence of osseous consolidation. The approach allows for multiple points of fixation and stacking of the screws, which enhances stability and minimizes risk of dorsal displacement with contraction of the soft tissue. Furthermore, the low-profile nature of the construct minimizes risk for irritation.

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