CHAPTER **13**

THREADED KIRSCHNER-WIRE FIXATION OF THE AUSTIN BUNIONECTOMY: Simplified Technique

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INTRODUCTION

The distal chevron osteotomy (Austin bnionectomy) is the mainstay of current procedures for repairing the majority of bunion deformities. Myriad procedure modifications have surfaced over the past 25 years – from soft tissue balance to osteotomy design to fixation methods. The advent of modern internal fixation devices in orthopedic surgery has produced more predictable outcomes for our patients, not just in elective surgery but also in trauma management.

Each individual indication for bone fixation, regardless of the location in the body, has certain area-specific or bone-specific nuances that lend favor to one form of fixation over another. Every bone does not respond to one form of fixation all the time. Certain bones or osteotomies or fractures lend themselves to screw fixation, while others heal better with intra-medullary nails, and some do better with staples or screws and plating.

The Austin osteotomy is inherently stable in its design. However, it is not a purely cortical osteotomy and not a purely metaphyseal osteotomy – it is a transitional region of bone that crosses from cortex to metaphysis, both dorsally and plantarly. As such, no one form of fixation is specifically designed to stabilize such an osteotomy. It has been demonstrated that transfixation of the plantar arm of the osteotomy renders it most stable. Screw fixation and memory compressive staples provide the best compressive stabilization of this type of osteotomy, however staples are awkward to place in this location without being prominent. Screws in this orientation have weaker bone to engage on the plantar surface than the dorsal cortex, and the angle of placement requires aggressive countersinking of the dorsal cortex to avoid screw head prominence. Simple smooth Kirschner-wire (K-wire) fixation has been shown to be effective, with modifications that lock the wire to the bone cortex dorsally, but this comes at a loss of compression, and relies on the design of the osteotomy to allow compression with weightbearing, not through the fixation device. Dorsally bent and cut K-wires can also rotate and become prominent, and they can retract out of the bone and become symptomatic. In short, there is no one form of fixation for the Austin osteotomy that is clearly universal in its effectiveness.

As the fixation devices become more sophisticated, they often enlarge the reaming of bone needed to place them. Also, more points of smaller fixation are better than fewer but larger points of fixation. And with osteoporotic bone, fixation loses its stability and can lead to large deficits in the bone if they are not effective and must be replaced with an alternate form of fixation.

Hardware prominence will always be a concern in bunion surgery due to the thin layer of subcutaneous fascia in this anatomic region, compounded by the compressive and restrictive nature of footwear. In general, one would choose a form of fixation that is stable, compressive, low profile, nonmigrating, nonreactive, and easily removed if necessary.

The author will present a technique for stabilizing the Austin osteotomy with a buried threaded K-wire which is broken off at the surface of the dorsal cortex, without having to cut the wire or burr down a prominent piece of metal. In contrast to newer fixation devices, this form of fixation is readily available, inexpensive, versatile, and reliable.

Additional wires can be placed if necessary without compromise to the surrounding bone strength. The technique of fatigue-bending and break-off of the wire leaves the end of the wire slighly bent, thus preventing rotation or migration into the bone and joint. Manual compression is maintained with this technique, and the need for wire removal is rare.

Wire removal can be facilitated by use of a cannulated drill that fits over the diameter of the K-wire, reaming a small tube of bone away from the pin and allowing for a clamp to be secured to the wire for reversing the wire out of the bone.

Threaded K-wires come in three universally available sizes – 0.045", 0.054", and 0.062". The author uses the 0.062" K-wire for the standard first metatarsal osteotomy, and the 0.045" K-wire for a reverse-Austin tailor's bunionectomy.

The technique for success in bunion surgery is far more important to the outcome than the technology for fixation

of the osteotomy. Appropriate procedure selection for each specific patient, anatomic dissection with accurate hemostasis, adequate lateral contracture reduction, well-balanced medial capsulorrhaphy, precise osteotomy design and execution, and preservation of soft tissue attachments and blood supply to the bone are all equally important factors that must be given full consideration, attention, and respect.

SURGICAL TECHNIQUE

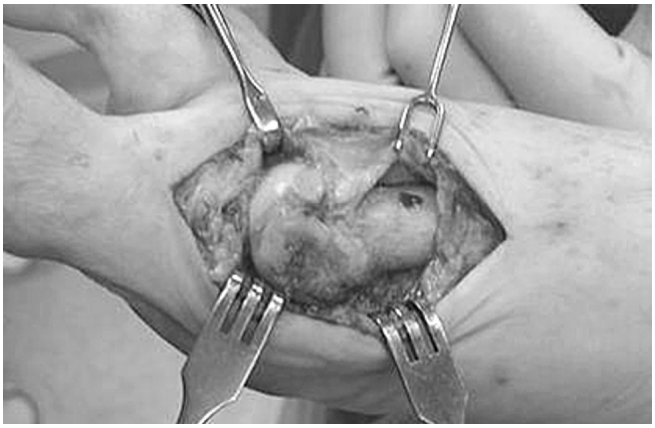

Figure 1. Accurate dissection of the first metatarsophalangeal joint preserving dorsal and plantar synovial folds.

Figure 2. Austin osteotomy with lateral shift of metatarsal head and impaction of osteotomy site.

Figure 3. Predrill the dorsal cortex with a 0.045" smooth Kirschner-wire.

Figure 4. While impacting the osteotomy with the left hand, the right hand drives the 0.062" threaded Kirschner-wire across the osteotomy site, entering into the joint.

Figure 5. The wire driver is engaged on the wire, and the right hand lifts the wire and bone dorsally to gain visual access to the end of the wire, while the left hand uses a Freer elevator to feel the wire retract within the subchondral bone, while the wire is reversed with the wire driver.

Figure 6. Stability of the osteotomy is manually tested. If there is any motion, a second wire is driven in a similar fashion parallel and lateral to the first wire.

Figure 7. A Freer elevator is slid down the bone surface to the bone-wire interface, pressing the elevator tightly against the bone.

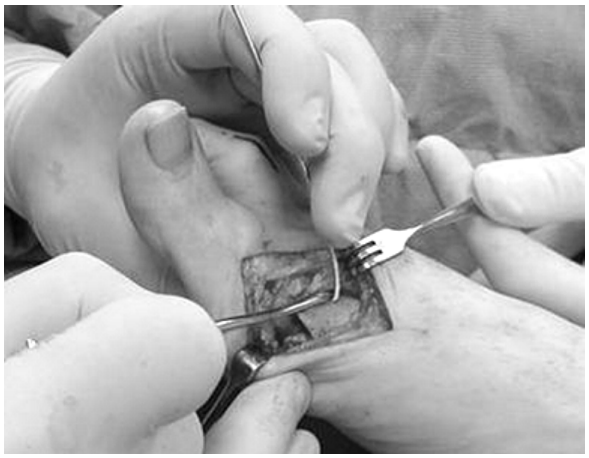

Figure 8. The wire is bent distally while the elevator stabilizes the bone-wire interface.

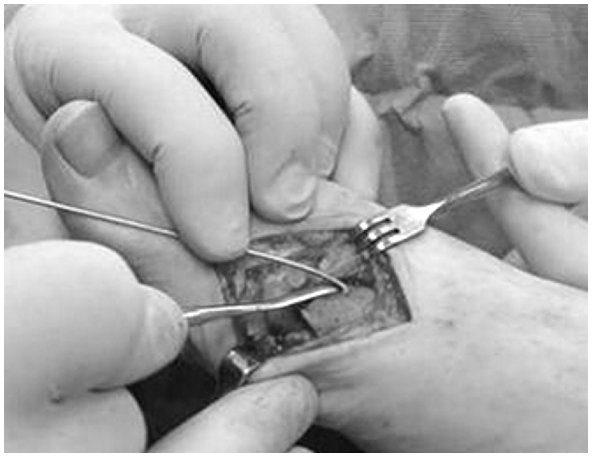

Figure 9. The bend is completed as far plantarly as possible.

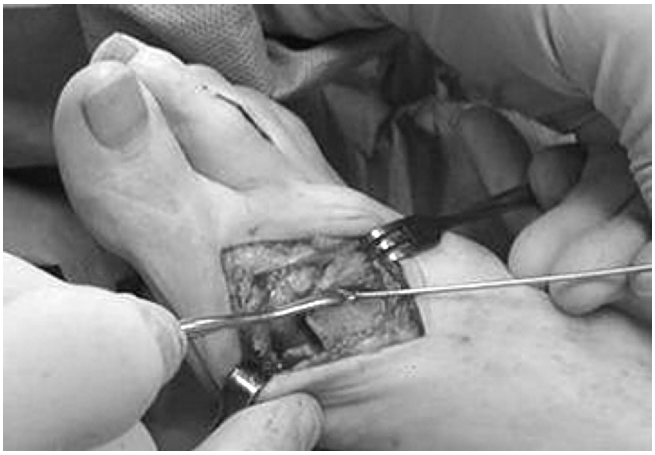

Figure 10. The wire is bent back dorsally and automatically breaks free from the bone, flush to the dorsal cortex.

Figure 11. The wire and osteotomy is again tested for stability. Redundant medial bone is resected, followed by layered closure.

Figure 12. Preoperative and 3 month postoperative view of Austin bunionectomy with threaded 0.062" Kirschner-wire fixation.