

DECOMPRESSION AND TRANSPOSITIONAL OSTEOTOMY OF A METATARSAL HEAD FOR TRANSVERSE MTPJ DEFORMITY

Robert M. Goecker, D.P.M.

Transverse plane lesser metatarsophalangeal joint (MTPJ) deformity is a very common, challenging entity for foot and ankle surgeons. Painful digital deformity may occur in all three cardinal planes; however, the most challenging deformity to correct with long-term success is the transverse plane deformity. A decompression transpositional osteotomy of lesser metatarsal heads is another surgical approach to this challenging clinical entity which has been used by the author with success.

SURGICAL CONSIDERATIONS AND RATIONALE

Transverse plane hammertoe deformity can lead to significant clinical symptomatology that often is resistant to conservative treatment. The second MTPJ is the most commonly affected joint. (Fig. 1) If

untreated, the transverse plane deformity typically worsens over time as the medial MTPJ structures contract and the lateral structures stretch out. Also the plantar plate and flexor tendons drift medial to the vertical axis of the MTPJ, resulting in increased adduction and further propagation of the mechanical advantage of the medial structures. A variety of surgical techniques have been described for correcting transverse plane toe deformities. These procedures have attempted to address the underlying deforming forces on the lesser MTPJ. Some of the surgical procedures designed to correct this deformity have included arthroplasty, different tendon transfers, plantar plate repair, collateral ligament reconstruction and metatarsal head and shaft osteotomies.¹⁻⁴ The osteotomies classically described have either been transpositional to realign the metatarsal head back over the plantar plate (Fig. 2), angulational to reduce

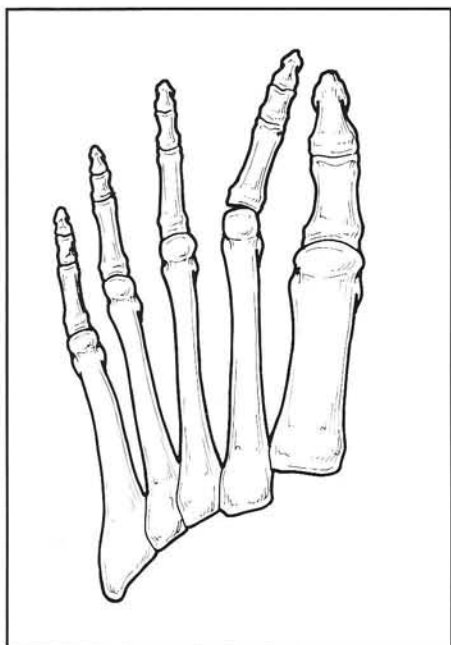


Figure 1. Transverse plane deformity.

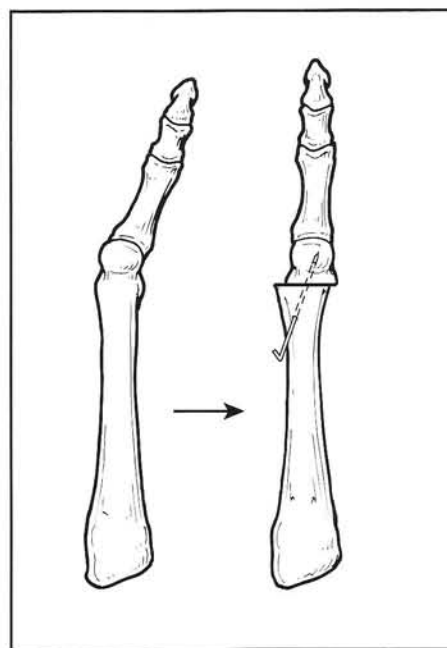


Figure 2. Transpositional osteotomy.

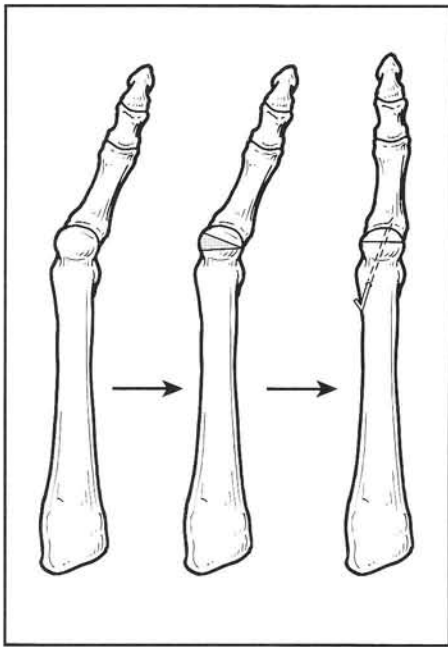


Figure 3. Angular osteotomy (CAP procedure).

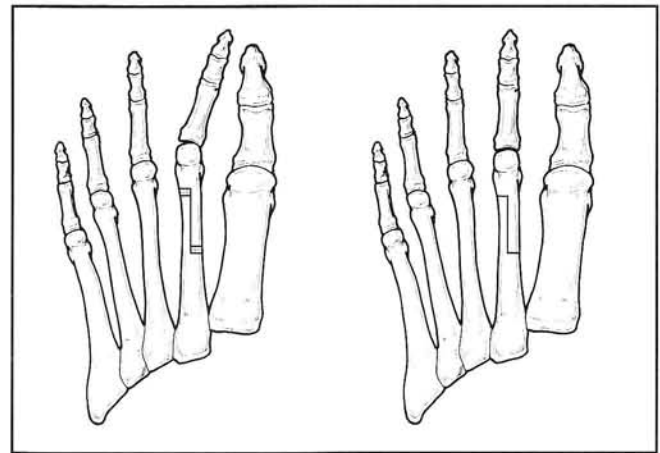


Figure 4. Shortening (decompression) osteotomy.

the medial cartilage adaptation (Fig. 3) or shortening (decompression) to decrease the deforming tension within the tight medial soft tissue.¹(Fig. 4)

It is important to understand that all of these procedures may be valid, depending on the circumstances of a particular case. Prior to selecting a procedure, it is important to ascertain the flexibility of the deformity and whether or not there are contributing structural abnormalities. In cases with a short first metatarsal and a severely medially subluxed lesser MTPJ, a shortening and transpositional osteotomy of a metatarsal head provides an advantage in allowing relaxation of the tight medial structures and also allows relocation of the plantar plate back under the metatarsal head. (Fig. 5) This type of procedure eliminates the medial vector force that the flexor tendons place on the deformed lesser MTPJ and also decreases the tension within the deep transverse intermetatarsal ligament, and at the same time restores the more normal metatarsal parabola.

SURGICAL APPROACH

A standard linear incision is made from the middle phalanx proximal to the metatarsal shaft. Anatomic dissection is carried through the subcutaneous tissue down to the deep fascia and the extensor tendon. A dissection technique similar to that demonstrated in the Podiatry Institute educational

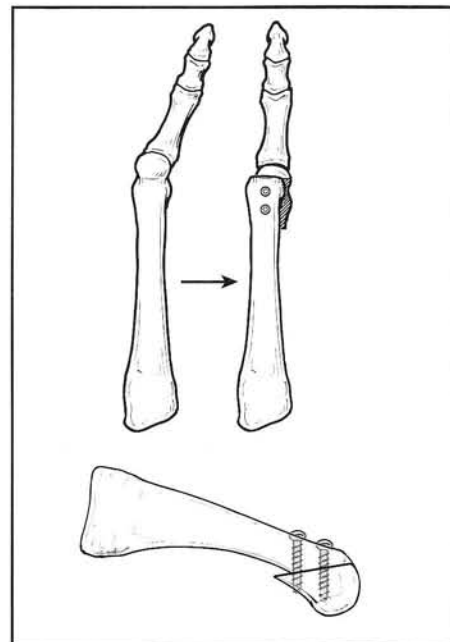


Figure 5. Shortening (decompression) and transpositional osteotomy of a metatarsal head.

video, *Refinements in Digital Surgery* is employed, releasing in a step-wise fashion the PIPJ, extensor hood, extensor tendon, medial capsule and medial plantar plate.³ This allows adequate soft tissue release around the MTPJ. Attention is then directed to the structural deformity.

The PIPJ is resected with hand instrumentation and prepared for an end-to-end arthrodesis. A K-wire is driven in a retrograde fashion taking care to not violate the MTPJ. It is the author's experience that a K-wire crossing the MTPJ after a release of a severely subluxed deformity alone will not maintain

long-term transverse plane deformity correction. Therefore, if a deforming force is still present, an osteotomy is performed with an oscillating saw from dorsal-distal to proximal-plantar. The osteotomy begins proximal to the dorsal articular cartilage and is angulated similar to a dorsiflexory wedge osteotomy however, the proximal hinge is violated allowing shortening, medial transposition and rotation if necessary. Once the osteotomy is properly aligned and the deformity is reduced, two 2.0mm cortical screws via standard AO technique are inserted from dorsal to plantar taking care to angulate the screws to avoid the plantar metatarsal cartilage and to have a solid purchase within the medially deviated metatarsal head. Closure is then accomplished in layers and any further soft tissue rebalancing performed as necessary. (Fig. 6)

POSTOPERATIVE CARE

The patient is placed in a non-weightbearing cast for 6 weeks. During this time standard postoperative care is provided. Serial x-rays are taken every three weeks to follow osteotomy healing and to monitor for potential complications. At six weeks the K-wire in the PIPJ arthrodesis is removed, as is

the cast and the patient is allowed to begin ambulating as tolerated (transitioning first from a surgical shoe to everyday shoe gear).

CONCLUSION

Transverse lesser MTPJ deformity can be treated with a variety of different surgical techniques. A combined shortening (decompression) and transpositional osteotomy is another surgical alternative in the approach to this clinical entity.



Figure 6A. Preoperative x-ray of a long-standing hallux varus, subluxing 2nd MTPJ and an obviously abnormal metatarsal parabola.



Figure 6B. Immediate postoperative x-ray.



Figure 6C. Final postoperative x-ray.

REFERENCES

1. Miller SJ: Transverse plane metatarsophalangeal joint deformity: Another etiology and solution. In Miller SJ, Mahan KT, Yu GV, Camasta CA, Vickers NS eds. *Reconstructive Surgery of the Foot and Leg, Update 1998*. Tucker, GA; The Podiatry Institute Publishing; Tucker, GA, 1998, pp. 124-128.
2. Ruch JA: Use of the EDB tendon for muscle-tendon balance of the lesser MPJ. In Camasta CA, Vickers NS, Carter SR eds. *Reconstructive Surgery of the Foot and Leg, Update 1995*. Tucker, GA; The Podiatry Institute Publishing; Tucker, GA, 1995, pp 114-118.
3. Ruch JA: A surgical technique for repair of the "pre-dislocation syndrome". In Vickers NS, Miller SJ, Mahan KT, Yu GV, Camasta CA eds. *Reconstructive Surgery of the Foot and Leg, Update 1997*. Tucker, GA; The Podiatry Institute Publishing; Tucker, GA, 1997, pp. 7-10.
4. Schubert JM, Jensen R: Flexor digitorum longus transfer for second metatarsal-phalangeal joint dislocation/subluxation. In Vickers NS, Miller SJ, Mahan KT, Yu GV, Camasta CA eds. *Reconstructive Surgery of the Foot and Leg, Update 1997*. Tucker, GA; The Podiatry Institute Publishing; Tucker, GA, 1998, pp. 11-14.