The Journal of Foot & Ankle Surgery

"Tips, Quips, and Pearls" is a special section in The Journal of Foot & Ankle Surgery which is devoted to the sharing of ideas to make the practice of foot and ankle surgery easier. We invite our readers to share ideas with us in the form of special tips regarding diagnostic or surgical procedures, new devices or modifications of devices for making a surgical procedure a little bit easier, or virtually any other "pearl" that the reader believes will assist the foot and ankle surgeon in providing better care. Please address your tips to: John M. Schuberth, DPM, Editor, The Journal of Foot & Ankle Surgery, American College of Foot and Ankle Surgeons, 515 Busse Highway, Park Ridge, IL 60068-3150; Fax: 847-292-2022; E-mail: JFASeditor@aol.com

Medial Incision Approach to the First Metatarsophalangeal Joint

Paul Dayton, DPM, FACFAS,[1] Angela Glynn, DPM,[2] and John LoPiccolo, DPM[3]

Adequate exposure is an integral part of all surgical procedures. Incision placement must be chosen to allow full access to the structures being surgically manipulated and designed not to hinder recovery or result in complication. Minimal disruption of blood supply and careful handling of the soft tissues is a basic principle of bone surgery (1). Standardized approaches to an anatomic region usually take these factors into account along with other factors such as orientation of the incision to relaxed skin tension lines.

The first metatarsophalangeal joint (MTPJ) and the distal first metatarsal can be exposed from several approaches. The dorsal-medial approach is the most widespread technique taught for first MTPJ exposure. The *Comprehensive Textbook of Foot Surgery* (2) advocates the "universal" dorsal-medial approach to allow full exposure to all critical areas in bunion repair. The incision is placed following the contour of the deformity lying just medial to the extensor hallucis longus tendon. The lateral first interspace is accessed by mobilizing the incision laterally, thus allowing direct visualization and extracapsular release of the conjoined tendon of the adductor hallucis and associated soft-tissue contractures. The adductor tendon can be eventually transferred to the medial joint capsule to maintain the sessamoids in their anatomic grooves under the metatarsal head (2).

The isolated lateral exposure is not sufficient to allow osteotomy of the first metatarsal or complete access to the first MTPJ and both sesamoids. However, it has been used extensively for lateral release and fibular sesamoid excision either as the primary procedure or as an adjunct to other procedures performed. The medial approach has rarely been discussed and detailed descriptions are lacking in the current literature. Elleby et al. (3) have recommended a plantar medial curvilinear approach to the first MTPJ with an intracapsular release of lateral soft-tissue contractures. Kramer et al. (4) also advocated a medial plantar approach and listed several advantages and disadvantages of the medial approach. However, both papers were descriptions of variations of metatarsal osteotomies and the incisional approaches used were not the primary focus of either paper. Some authors advocate the medial incision and discourage the use of the dorsal-medial incision due to the unacceptable incidence of scarring and contracture (5). Mann and Coughlin (6) describe a medial approach to the first MTPJ in combination with a dorsal lateral incision between the first and second metatarsal heads to obtain lateral soft-tissue release.

We feel that the medial incision approach to the first MTPJ is an excellent technique for exposure in distal metatarsal osteotomy, midshaft osteotomy, resection arthroplasty, sessamoid excision, and soft-tissue mass excision. The advantages of the medial approach include: 1) versatility to provide exposure for numerous surgical procedures, 2) ease of access for tibial or fibular sesamoid removal, 3) improved early range of motion (ROM) with hallux abductovalgus (HAV) surgery because of preservation of the dorsal synovial fold, 4) reinforcement of medial hallux correction in HAV surgery, 5) superior cosmetic

Address correspondence to: Paul Dayton, DPM, FACFAS, Trinity Regional Hospital, 804 Kenyon Road, Suite 320, Fort Dodge, IA 50501.
[1] Director, Podiatric Medical Education, Trinity Regional Hospital, Fort Dodge, IA.
[2] Podiatry Associates, Indianapolis, IN.
[3] Second year resident, Trinity Regional Hospital.
The Journal of Foot & Ankle Surgery 1067-2516/01/4006-0414$4.00/0

result of the medial scar, and 6) excellent protection of the vascular supply to the first metatarsal head which may reduce the incidence of avascular necrosis.

The drawbacks may include: 1) hypertrophic scarring would be more irritating in shoe gear, 2) approach of lateral soft tissues for release can be technically demanding, and 3) difficulty in accessing the first interspace.

Technique for Medial Approach

The incision begins proximally as far as necessary to give adequate exposure for the planned procedure and lies between the dorsal and plantar neurovascular bundles. It is easily marked at the medial midline of the metatarsal by grasping the metatarsal dorsal and plantar with the thumb and forefinger and marking the midpoint (Fig. 1). The incision courses distally and bisects the midpoint of the first metatarsal head between the dorsal and the plantar edges of the joint. The resultant curvilinear approach concludes at the midshaft level of the proximal phalanx at the medial longitudinal bisection of the bone (Fig. 2).

Careful subcutaneous dissection ensures protection of the neurovascular bundles both dorsal and plantar. Once the neurovascular structures are raised in the flaps, the remainder of the dissection can be subcapsular or subperiosteal, eliminating the need for extensive subcutaneous dissection. This will also preserve the perforating blood supply to the first MTPJ soft-tissue structures.

A linear longitudinal incision is placed in the periosteum and capsule referencing the same anatomic landmarks used for the skin incision. Minimal or no dissection of the capsule is performed dorsally to preserve the dorsal synovial fold (Fig. 3). Medial dissection of the capsule is completed to allow for removal of the eminence and placement of the osteotomy. The extensive plantar attachments to the first metatarsal head are also preserved (Fig. 4).

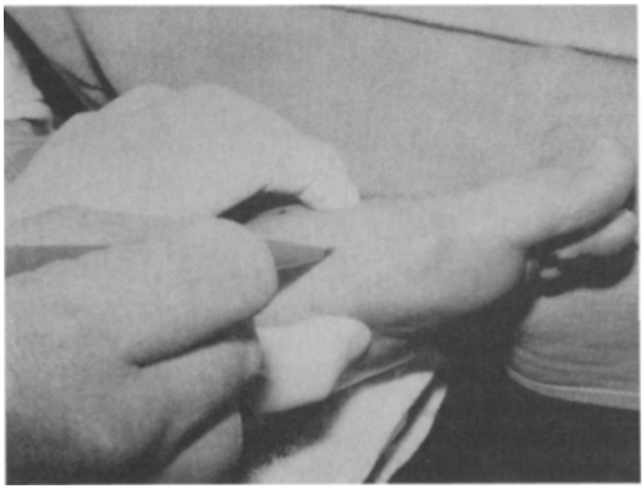

FIGURE 1 Technique to determine landmarks for the incision.

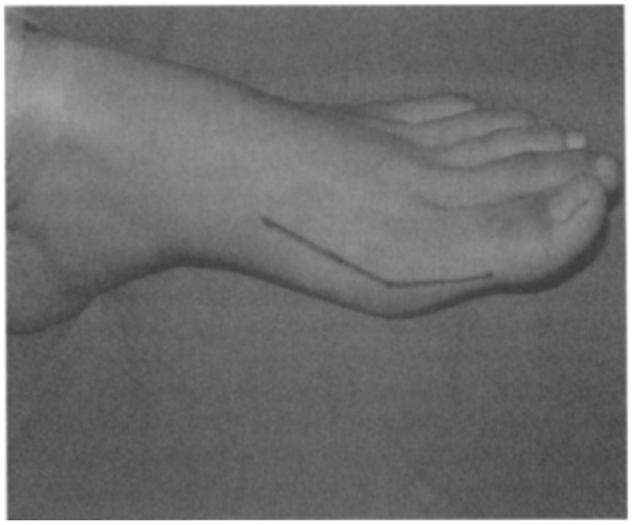

FIGURE 2 Appearance of the incision medially.

Lateral soft-tissue release can be performed through an intracapsular approach. The plantar joint pouch is entered to make a small capsulotomy in the lateral joint capsule from within the joint with curved scissors. The fibular sesamoidal-metatarsal ligament is released first to allow the sesamoid apparatus to drop plantarly. This facilitates giving exposure for the remainder of the release including the conjoined tendon of adductor hallucis. If the fibular sesamoid is grossly arthritic or completely displaced into the first interspace, it can be removed. Continuity of the flexor hallucis longus tendon is easily maintained throughout the dissection as the blade parallels the tendon, directing it into the interspace at all times.

The medial approach has most commonly been used for bunionectomy procedures (3, 4, 7) but can also be used for other surgical conditions about the first MTPJ. We have excised soft-tissue masses plantar and medial to the first metatarsal head and performed bursectomies utilizing this approach. During isolated fibular or tibial sesamoidectomy, it is much easier to avoid the long flexor tendon. In instances such as chronic plantar ulceration, combined medial and lateral sesamoidectomy can be carried out to relieve local pressure. The medial incision maintains the surgical scar off the weightbearing surface, which is a distinct advantage in that plantar incisions preclude weightbearing during early recovery.

When performing isolated fibular sesamoidectomy, the lateral sesamoidal attachments are sectioned first to allow the sesamoid apparatus to drop down and provide more room to complete the procedure. The intersesamoid ligament is then released just lateral to the long flexor followed by dissection at the distal and proximal poles of the sesamoid. We have found that rotating or "flipping"

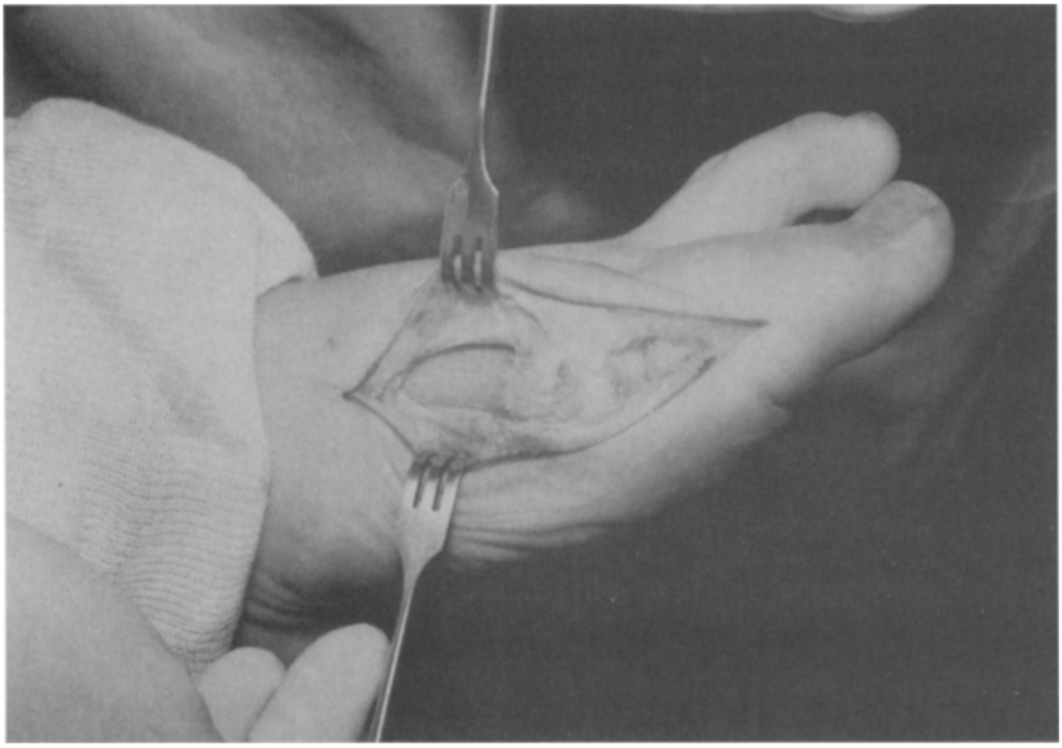

FIGURE 3 Minimal subcutaneous separation is required to expose the medial capsule and shaft.

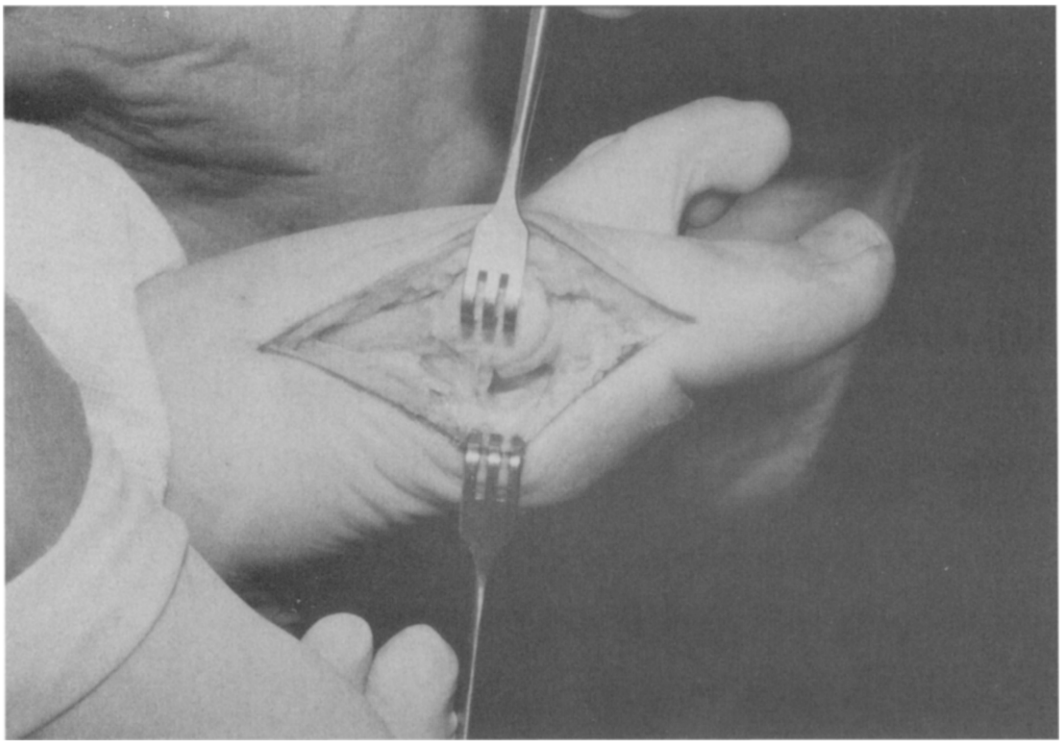

FIGURE 4 Exposure for osteotomy with preservation of dorsal and plantar soft-tissue attachments to the first metatarsal head. The intracapsular access for lateral release and sessamoidectomy can also be seen.

the sesamoid back into the interspace such that the plantar surface is exposed allows easier sectioning of the plantar attachments. The sesamoid is then allowed to return to its normal resting position where it is easily grasped and extirpated. A potential complication of this approach is articular damage to the plantar metatarsal head or phalangeal base. Care must be taken not to pry on the joint during dissection.

The medial approach to the first MTPJ is felt by the authors to have several advantages over the standard dorsal incision for HAV surgery. First, any contracture of soft tissues (i.e., capsule and skin) tends to reinforce the correction of the osteotomy because it is placed in the plane of the deformity and may serve to maintain the corrected hallux position. With the standard dorsal-medial approach, access to the lateral soft tissues for extracapsular release requires a fair amount of mobilization of the skin and subcutaneous tissue. This tends to increase dorsal scarring and may increase soft-tissue contracture with healing and loss of hallux purchase.

Another benefit of medial incision is enhanced early and late ROM. This is thought to occur because little if any dissection is required dorsally where most joint motion occurs. The first MTPJ functions in the sagittal plane as a ginglymoarthrodial type joint (8). One of the conditions that can disrupt this gliding motion is dorsal ankylosis of the first MTPJ. Utilizing the standard dorsal-medial approach, scarring or surgical ankylosis at the dorsal synovial fold tends to tether or limit the amount of dorsiflexion by preventing gliding of the phalanx on the first metatarsal. We have noted exceptionally good early ROM and much less pain with early ROM exercises over the first 2–4 weeks postoperatively in these patients.

Cosmesis is another advantage we have noted with a medially based incision. When viewed from directly above, the incision is usually less visible to the patient. Hypertrophic or painful scarring has not been problematic in the senior author's 10 years experience with the technique. As well, dehiscence has not been a prominent complication of healing in the medial approach. In over 300 cases performed by the senior author, only two instances of dehiscence have occurred to date. These went on to heal following appropriate wound care without significant compromise of the overall result.

The medial approach also allows preservation of vascular integrity to the first metatarsal. The blood supply to the distal first metatarsal is from the first dorsal metatarsal artery, the plantar metatarsal artery, and the superficial branch of the medial plantar artery (9). The dorsal and plantar metatarsal arteries provide branches into the capsule from the dorsal lateral and plantar lateral aspects of the first metatarsal head. The superficial branch of the medial plantar artery provides inconsistent branches to the medial aspect of the metatarsal head. Therefore the majority of the extraosseus blood supply to the first metatarsal head comes from the lateral aspect of the joint. The intracapsular approach for lateral soft-tissue release lessens the chance of vascular interruption. The standard dorsal approach usually entails an extracapsular "web splitting" release of these structures and theoretically increases the likelihood of avascular necrosis.

Conclusion

Medial dissection of the first MTPJ offers excellent exposure as well as functional results. Although it has largely been overlooked as a useful approach, the medial incision offers several logical benefits including excellent exposure, superior cosmesis, protection of vascular supply, and ease of early joint mobilization.

References

1. Muller, M. E., Allgower, R., et al. *Manual of Internal Fixation*, pp. 1–2, Springer-Verlag, Berlin, 1991.
2. McGlamry, E. D., Banks, A. S., Downey, M. S. *Comprehensive Textbook of Foot Surgery*, pp. 470–479, Williams & Wilkins, Baltimore, 1992.
3. Elleby, D. H., Barry, L. D., Helfman, D. N. The long plantar wing distal metaphyseal osteotomy. J. Am. Podiatr. Med. Assoc. 82:501–506, 1992.
4. Kramer, J., Barry, L. D., Helfman, D. N., Mehnert, J. A., Pokrifcak, V. M. The modified Scarf bunionectomy. J. Foot Surg. 31:360–367, 1992.
5. Myerson, M. *Foot and Ankle Disorders*, pp. 232–238, W.B. Saunders, Philadelphia, 2000.
6. Mann, R., Coughlin, M. *Surgery of the Foot and Ankle*, pp. 206–211, Mosby, St. Louis, 1993.
7. Schwartz, N., Groves, E. R. Long term follow up of internal threaded Kirschner-wire fixation of scarf bunionectomy. J. Foot Surg. 26:313–316, 1987.
8. Root, M. L., Orien, W. P., Weed, J. H. Normal and abnormal function of the foot. In *Clinical Biomechanics*, Vol. 2., pp. 1–63, Clinical Biomechanics Corp., Los Angeles, 1977.
9. Sarrafian, S. K. *Anatomy of the Foot and Ankle: Descriptive, Topographic, Functional*, pp. 294–355, J.B. Lippincott, Philadelphia, 1993.