MODIFIED 5TH METATARSAL OSTEOTOMY FOR CORRECTION OF TAILOR'S BUNION

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In 1978, Throckmorton and Bradlee[1] documented a transverse, sliding chevron osteotomy for surgical repair of tailor's bunion deformity. This technique was similar to the traditional 60° Austin for surgical repair of tailor's bunion deformity. The technique involved limited resection from the lateral aspect of the 5th metatarsal head. Following resection, the chevron osteotomy was performed with a recommendation for only 2mm of medial translocation of the distal fragment. The proximal lateral cortical wedge was then resected. If fixation was not used, four weeks weight bearing in a below-knee cast was recommended, followed by three weeks in a surgical shoe.

The limitations of this procedure were as follows: The procedure offered insufficient correction with only 2mm of translocation. If a narrow metatarsal neck existed, additional displacement beyond 2mm was not possible to provide sufficient bone-to-bone contact and stability of the osteotomy. Troughing of the distal cortical fragment and proximal metaphyseal zone occurred in the presence of excessive translocation. Prolonged rehabilitation and casting were necessary when fixation was not utilized.

The technical ease and consistency of reproducing the technique from patient to patient were advantages of the procedure. The procedure also avoided the potential hinge fracture associated with some hinge-type procedures while demonstrating intrinsic stability, and the ability to resist musculo-tendinous telescoping forces. An accelerated recovery period without casting when fixation was used was an additional advantage.

In light of the previous discussion, the traditional chevron osteotomy of the 5th metatarsal was modified to accentuate the advantages and decrease the limitations of the procedure. Although additional technical expertise is required to perform the modified procedure, the technique is consistently reproducible and has a rapid learning curve. By extending the dorsal wing of the distal fragment, the surgeon may utilize rigid internal fixation to provide enhanced stability. This variation will allow accelerated recovery and eliminate the need for below-knee immobilization of the extremity. The author manages the typical patient in a surgical shoe for two to three weeks followed by a sneaker, until previous street wear can be worn.

Since rigid fixation is employed, greater than 2mm of translocation of the distal fragment can be performed. However, when an excessive narrowing of the 5th metatarsal neck exists 2mm may be a maximum.

CLINICALLY ILLUSTRATED TECHNIQUE

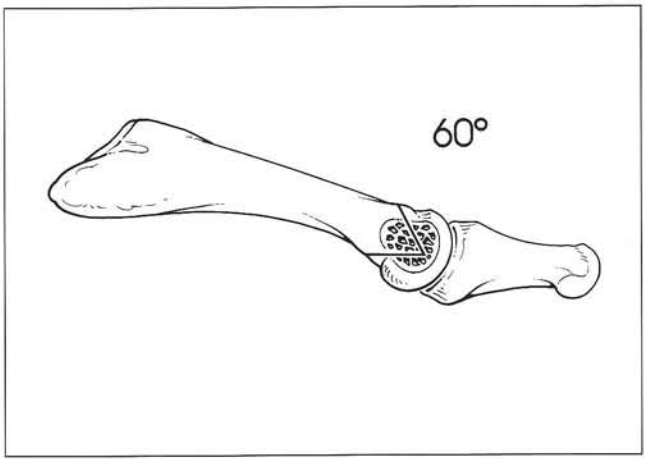

Figure 1A. Traditional Modified Austin 5th Metatarsal Osteotomy

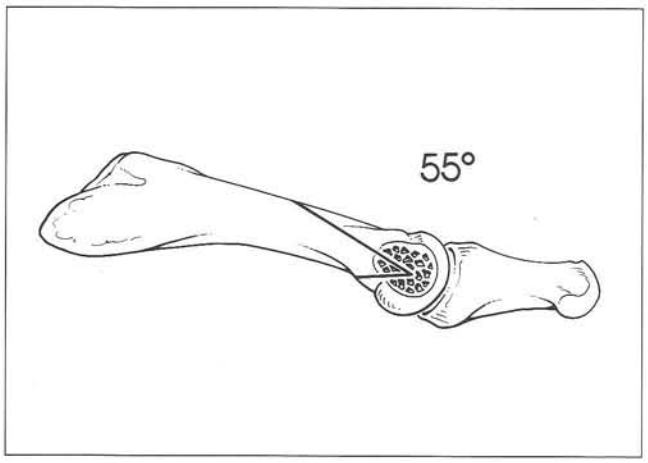

Figure 1B. Modified Austin 5th Metatarsal Osteotomy

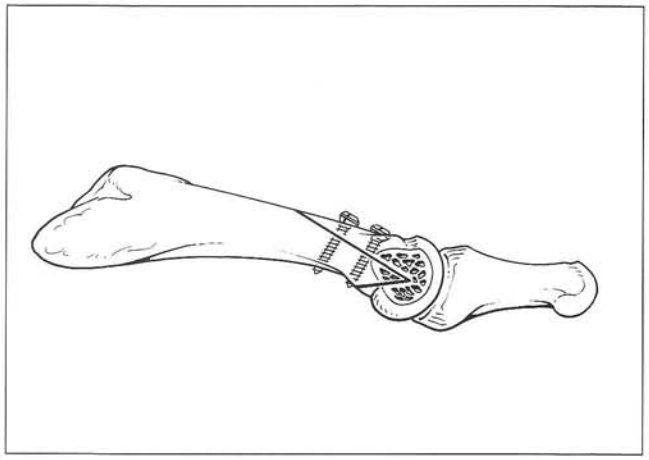

Figure 1C. Modified Austin 5th Metatarsal Osteotomy with 2.0 AO Fixation

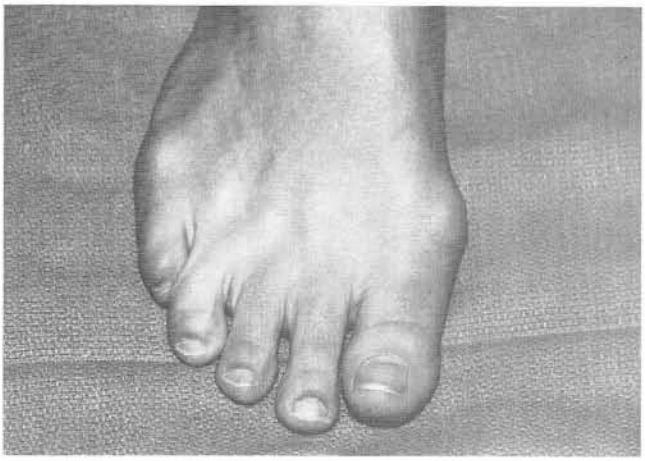

Figure 2. Preoperative clinical exam demonstrates prominence of 5th metatarsal head as well as increased 4th intermetatarsal space angle and splaying of 5th metatarsal. Notice adduction of 5th digit secondary to flexor/extensor adductory pull being exaggerated by abducted 5th metatarsal position.

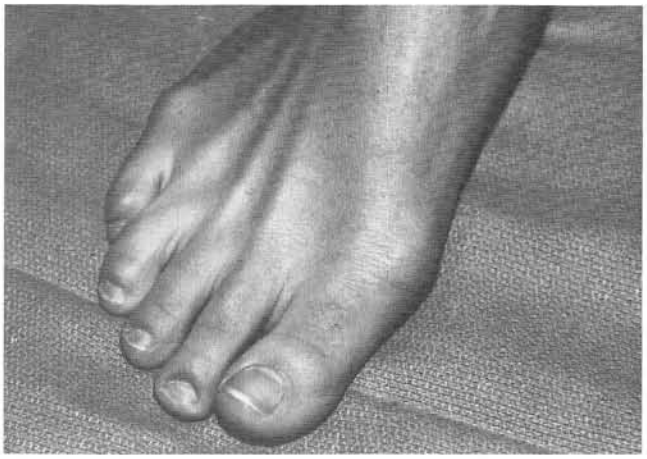

Figure 3. Prominent 5th metatarsal head and increased 4th intermetatarsal space angle in combination with hallux abducto valgus.

Figure 4. Preoperative radiograph demonstrating lateral bowing of 5th metatarsal and increased 4th intermetatarsal angle.

Figure 5. Preoperative incision planning located at dorso-lateral aspect of 5th metatarsophalangeal joint and extending from just distal to 5th metatarsophalangeal joint proximally to 5th metatarsal proximal diaphysis.

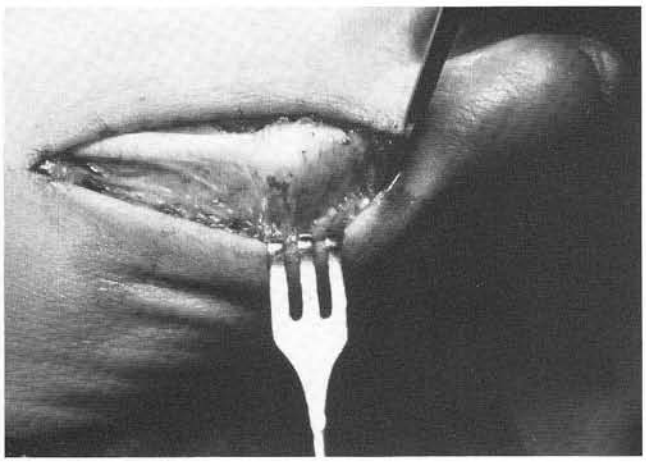

Figure 6. Anatomical dissection to the level of the natural separation between the subcutaneous layer and the deep fascia. A natural pocket is created at the dorso-lateral level of the 5th metatarsophalangeal joint to facilitate separation of two layers. Attention to this technique will preserve hemostasis and decrease injury to vital structures.

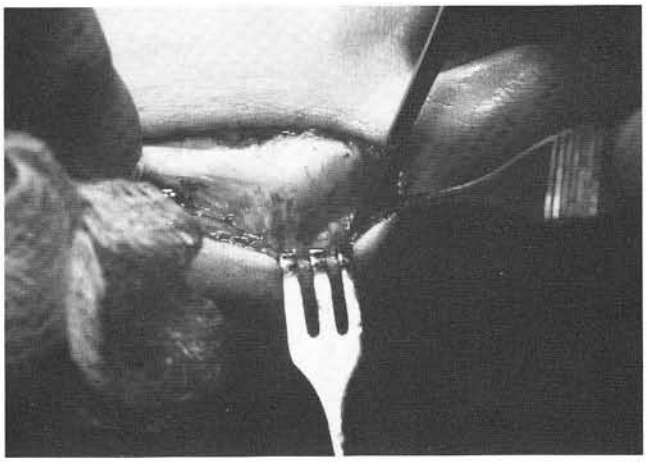

Figure 7. Further dissection of deep fascia from the subcutaneous layer provides increased exposure for performance of the osteotomy while preserving vital neurovascular structures.

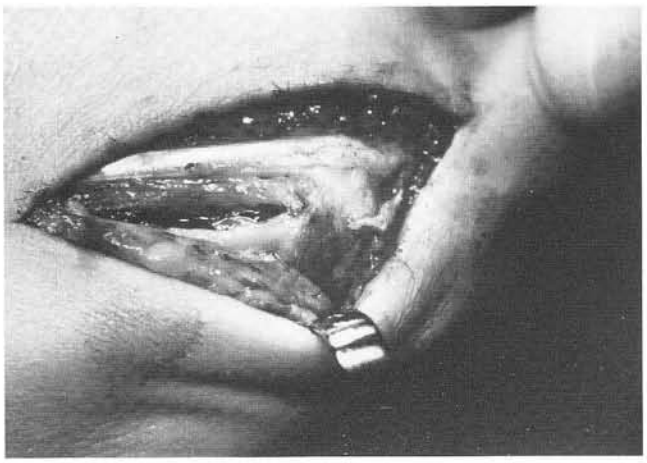

Figure 8. A linear deep fascial/periosteal incision is made in combination with an inverted vertical "L" capsular incision. This provides exposure of the 5th metatarsal head and distal metaphysis.

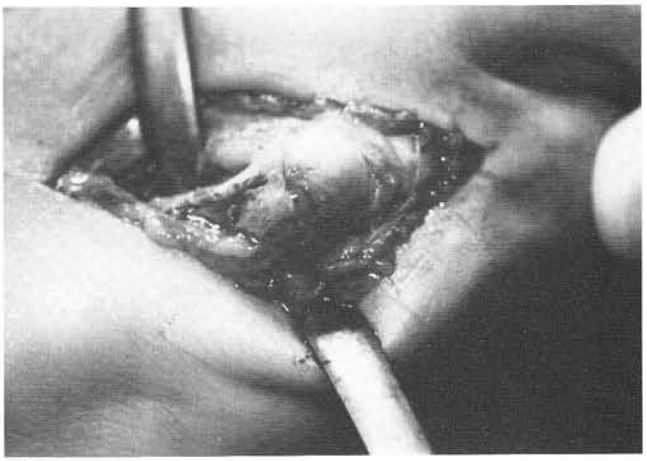

Figure 9. Capsular tissues have been freed from the 5th metatarsal head.

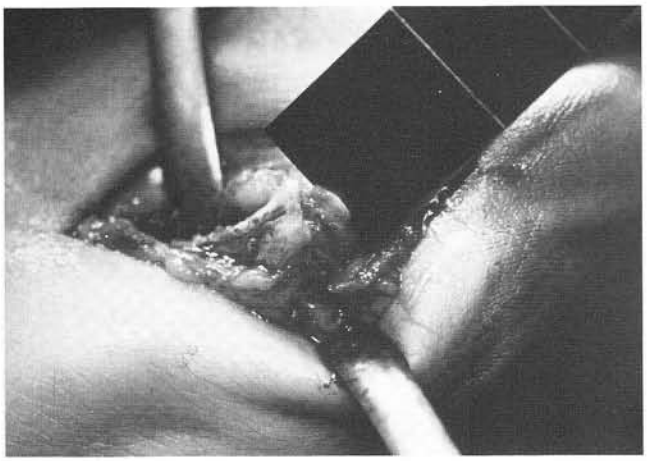

Figure 10. Minimal 5th metatarsal dorso-lateral exostectomy is performed to avoid staking the narrow head and metaphysis. Minimal exostectomy helps prevent the increased potential of digiti quinti varus associated with significant intermetatarsal space correction.

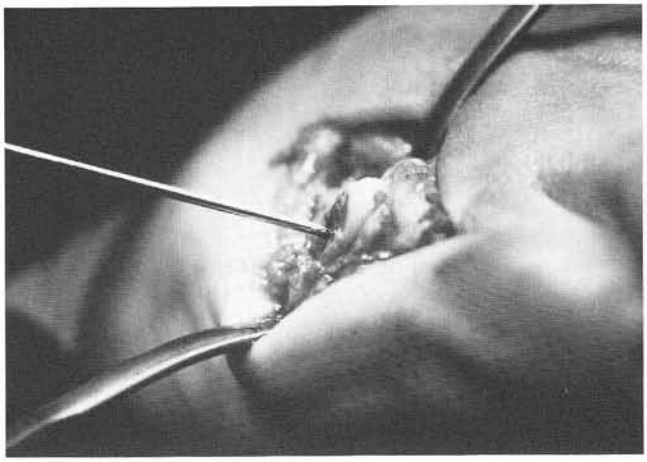

Figure 11. A .045 K-wire is placed into the lateral 5th metatarsal head to serve as an osteotomy axis guide.

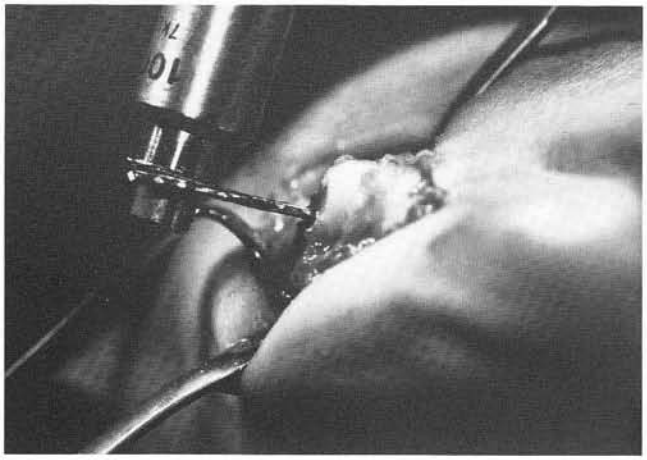

Figure 12. The dorsal arm of the osteotomy is performed with the saw blade being placed in alignment with the axis guide.

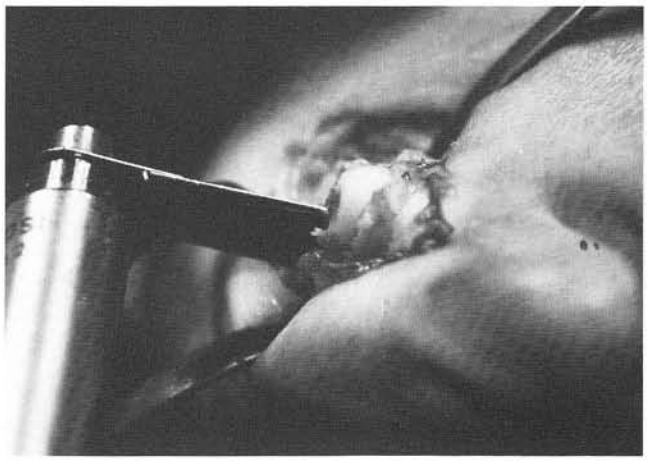

Figure 13. The plantar arm of the osteotomy is performed following the alignment of the axis guide wire. The apex angle is approximately 55°.

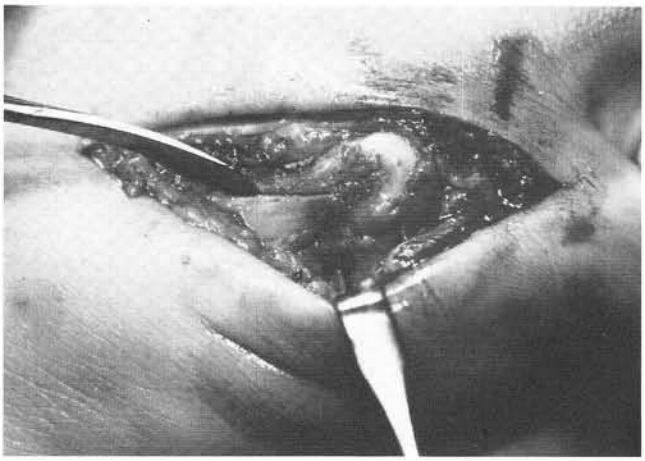

Figure 14. After the osteotomy has been performed, the capital fragment is medially translocated to reduce the intermetatarsal angle.

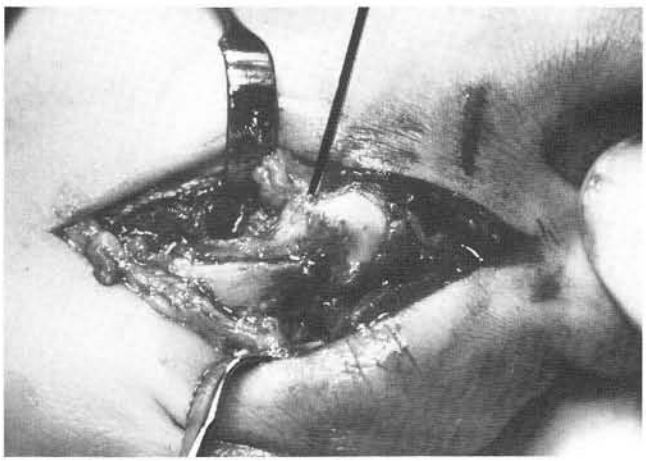

Figure 15. A .045 K-wire is placed through the capital fragment and distal metaphysis to serve as temporary fixation of the osteotomy. The direction of the wire is from dorsal-medial-distal to plantar-lateral-proximal to allow sufficient K-wire purchase of the metatarsal shelf.

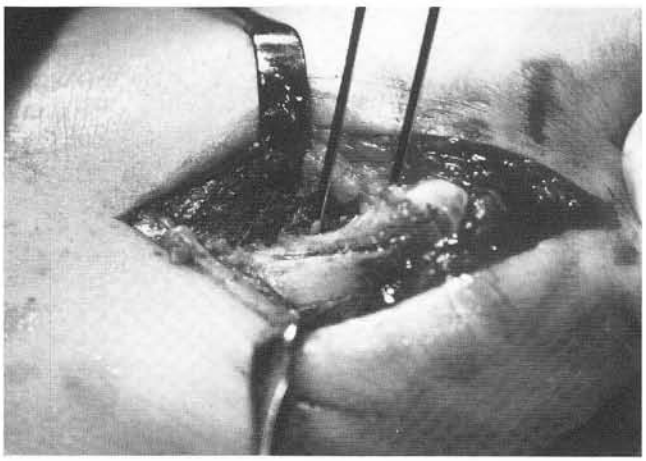

Figure 16. A second .045 K-wire is placed proximal to add stabilization and provide a pilot hole for subsequent 2.0 AO screw fixation.

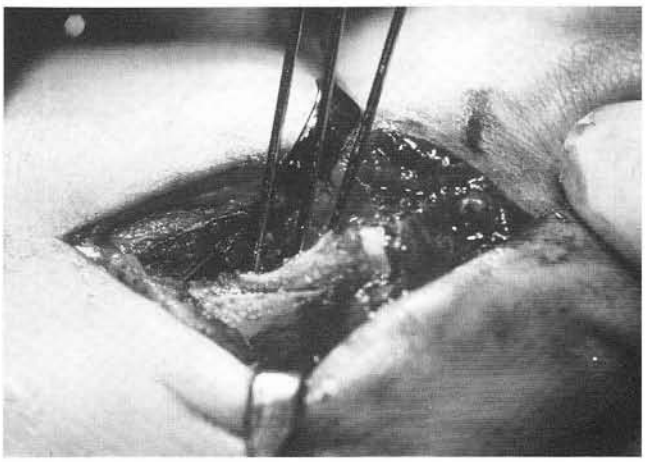

Figure 17. A third .045 K-wire is utilized to create a pilot hole between the two previously placed K-wires.

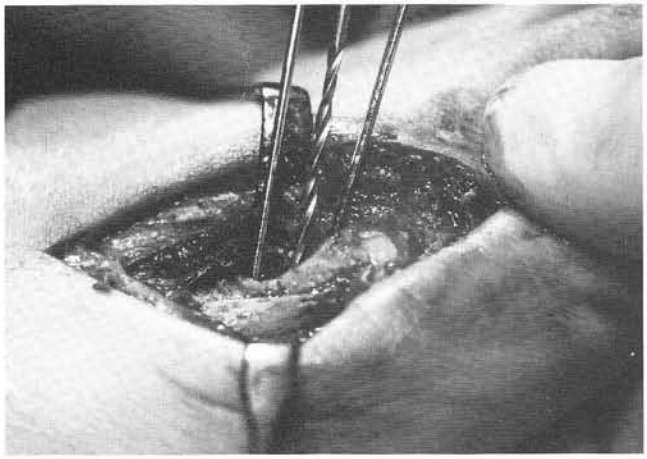

Figure 18. A 1.5 mm drill bit prepares the pilot hole.

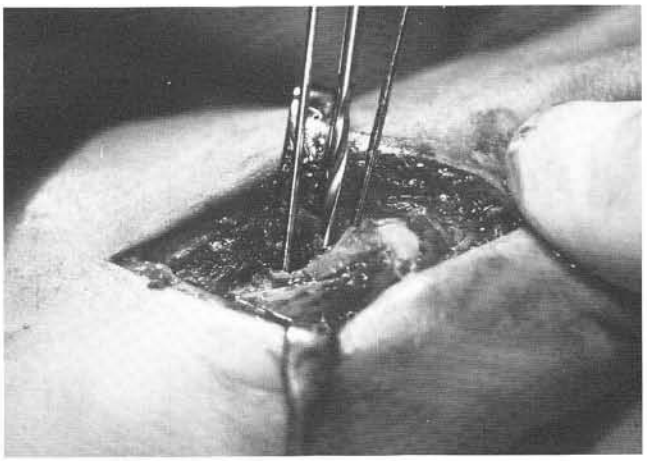

Figure 19. A 2.0 mm drill bit over-drills the proximal cortex to allow lag compression.

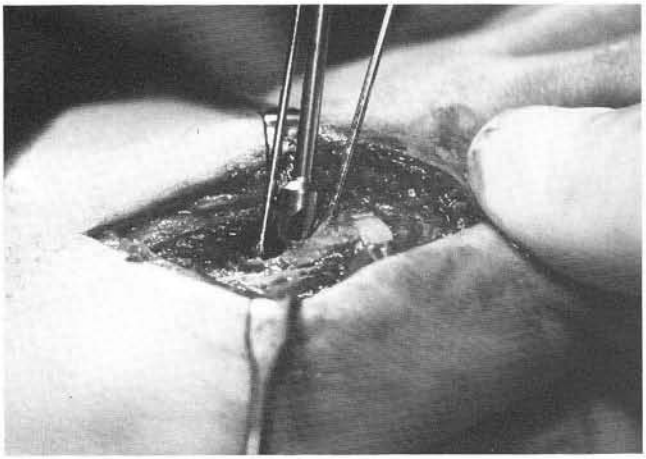

Figure 20. The countersink is utilized to reduce stress on the proximal cortex.

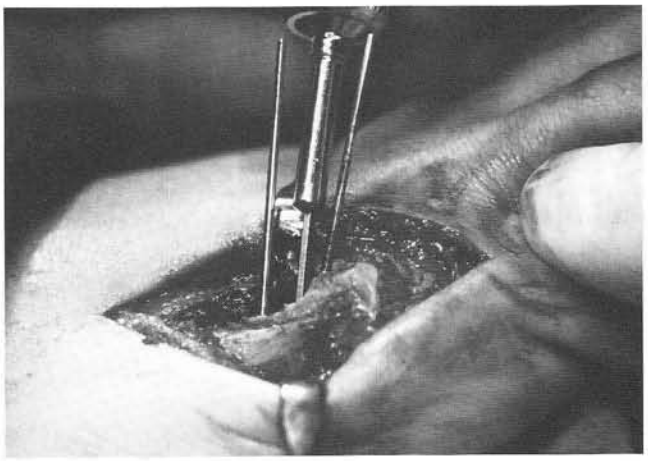

Figure 21. A depth gauge ascertains screw length from proximal to digital cortex.

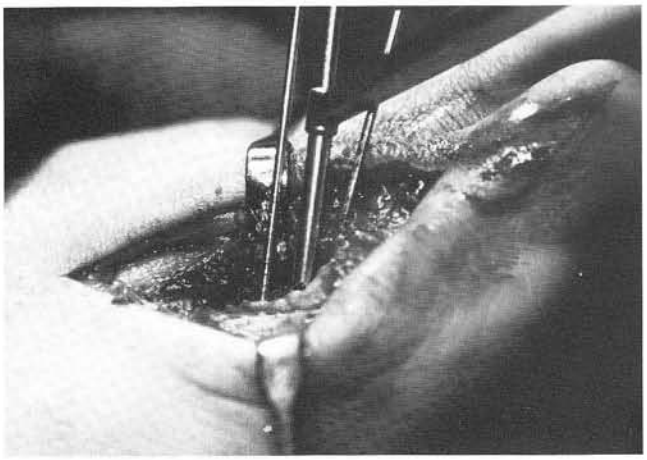

Figure 22. The 2.0 mm tap is then utilized to prepare the distal cortex.

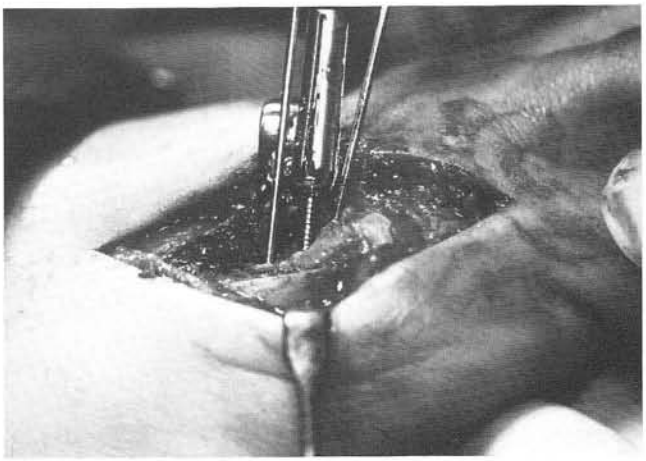

Figure 23. Finally, the 2.0 mm screw is inserted.

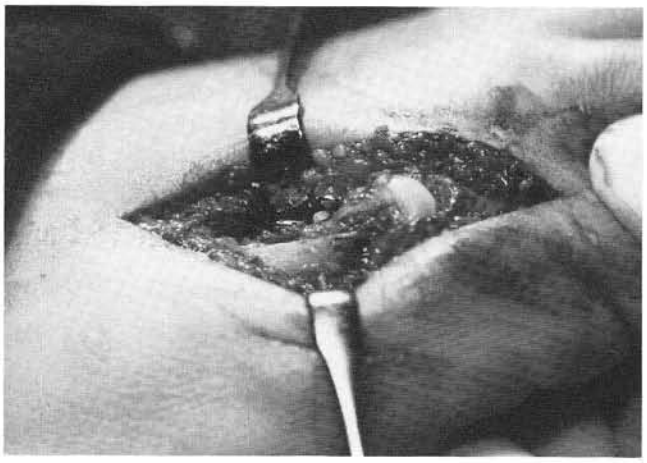

Figure 24. The previous sequence is then repeated for the proximal .045 K-wire, and the temporary distal wire is removed.

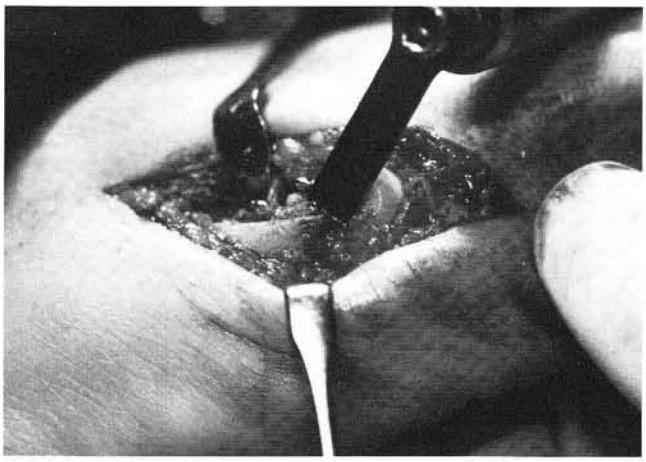

Figure 25. The remaining lateral cortical wedge is transected.

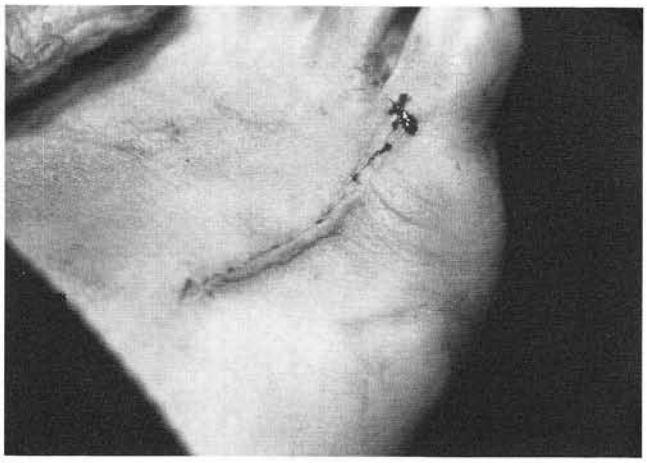

Figure 26. Subcuticular closure of the incision site.

Figure 27A. Preoperative radiograph.

Figure 27B. Postoperative radiograph. Note the decreased 5th metatarsal bowing and reduced 4th intermetatarsal angle.

CONCLUSION

This procedure is most effective for correction of mild to moderate tailors bunion deformity with concurrent increased 4th intermetatarsal space or lateral bowing of the distal 5th metatarsal. In the presence of moderate to severe tailor's bunion deformity, hinge type procedures should be employed versus the modified 5th metatarsal Austin procedure.

REFERENCE

1. Throckmorton JK, Bradlee N: Transverse V sliding osteotomy: A new surgical procedure for the correction of Tailor's bunion deformity *J Foot Surg* 18:117-121; 1978.