

HALLUX ABDUCTO VALGUS SURGERY: A Chronology of Complications

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INTRODUCTION

Hallux valgus surgery is a commonly performed podiatric surgical procedure. There is extensive literature relating to complications associated with this procedure. However, most surgeons recognize the necessary degree of finesse, attention to detail, and strict adherence to basic surgical tenets that are essential for a successful outcome. The following case history details how deviations from these principles and subtle errors in technique can result in significant complications requiring multiple revisional surgeries.

CASE HISTORY

A 55-year-old female presented with a chief complaint of pain and sagittal plane limitation of the first metatarsophalangeal joint. A secondary complaint described a circumscribed area of dysesthesia over the dorsal medial aspect of the joint that radiated to the dorsomedial-distal hallux. The patient related a history of surgical hallux valgus correction in 1995. A distal metaphyseal osteotomy was performed and fixated with an external K-wire. She described a brief period of postoperative relief from symptoms, which quickly returned. Severe pain, aggravation with weightbearing activity and medial shoe gear pressure were subjective complaints. The patient denied a history of trauma. The patient's past medical history was essentially unremarkable.

Physical Examination

The patient was a well-nourished, middle-aged female. Vascular examination revealed strong pedal pulses with a brisk CFT to the digits. Epicritic sensation was grossly intact. There were no gross motor or sensory deficits, and lower extremity deep tendon reflexes were graded as +2/4. A positive Tinel's sign was elicited with percussion of the first proper dorsal digital nerve at the level of the first metatarsophalangeal joint of the right foot.

Dermatologic examination revealed appropriate turgor and texture without lesions or hyperkeratoses. There was a 3.5 cm fine line cicatrix directly medial at the first metatarsophalangeal joint bilaterally. Musculoskeletal examination revealed 40 degrees of dorsiflexion and 15 degrees plantarflexion with range of motion of the first metatarsophalangeal joint. The joint motion was without crepitus.

The hallux was minimally abducted with a slight valgus rotation. There was a moderate medial eminence. Radiographs revealed an intermetatarsal angle of 11 degrees. The hallux abductus angle was 28 degrees. The tibial sesamoid position was 5. The joint was deviated. This is a combined deformity type with osseous and soft tissue contributions. The metatarsal parabola demonstrated an elongated first metatarsal. There was no metatarsus primus elevatus. The patient elected to have the deformity surgically revised in 1998. The following is a chronology of the events.

Surgery 1:

Hallux Abducto Valgus—>Hallux Limitus

A retrospective review of the original surgery suggests several areas of planning and technique that may have lead to the patient's sequence of problems. A Chevron-type transpositional osteotomy was performed in 1995. The patient had a lateral deviation of the sesamoid apparatus preoperatively which did not appear to be corrected. In addition, the length of the first metatarsal appears to have been maintained. A relatively long first metatarsal has been recognized as a potential contributing factor to hallux limitus. The technique of medial capsular repair, by imbricating the capsule into a medial drill hole in the metatarsal head may have also contributed to restriction of the joint motion postoperatively. Entrapment of the first proper dorsal digital nerve can occur with any dorsal or medial approach to the first metatarsophalangeal joint. Therefore, meticulous dissection techniques must be employed regardless of incision placement to avoid damage to the structure. (Figs. 1,2)



Figure 1. Original DP radiograph depicting moderate, structural hallux valgus deformity with a long first metatarsal.



Figure 2. Postoperatively, the sesamoid apparatus is laterally deviated and the hallux abductus angle is closed down. The first metatarsal continues to be elongated.



Figure 3. Following the Austin, (Youngswick modification) the sesamoids are relocated plantar to the first metatarsal head. The metatarsal parabola is restored.



Figure 4. The hallux is drifting into varus even though the tibial sesamoid is still under the first metatarsal.

Surgery 2: Hallux Limitus—>Hallux Varus

The first revisional procedure performed in 1998 included an Austin bunionectomy with Youngswick modification. Rationale for this approach included a transpositional, shortening plantarflexory osteotomy along with a sequential lateral release designed to decompress the first metatarsophalangeal joint as well as realign the transverse plane position of the joint. This procedure was performed through a dorsal-medial incision. Delamination of the tissue layers was also performed.

During the initial postoperative course, dorsiflexion of the first metatarsophalangeal joint was increased to 55 degrees and nerve symptoms improved. Later, the patient began to complain of stiffness and deep aching pain of the joint. Clinically a hallux varus deformity began to develop.(Fig. 3)

In retrospect, several different factors appear to have contributed to the chain of events that led to the multiple revision necessary to ultimately accomplish a satisfactory result for this patient. The loss of the sagittal groove and medial shoulder of the metatarsal head during the initial surgery may have contributed to the potential for hallux varus from subsequent revisional procedures. Over-correction with lateral transposition of the capital fragment and weakening of lateral structures by lateral release resulted in a near negative intermetatarsal angle. This overall set of circumstances appears to have set up the medial imbalance which led to hallux varus. The patient did well the first six postoperative months, however she began experiencing symptoms with subtle medial migration of the hallux at that point. Failure of conservative care resulted in the need for further surgical intervention.(Fig. 4)

Surgery 3: Hallux Varus—>Residual Hallux Varus with Joint Arthrosis

A Hawkins abductor hallucis tendon transfer was performed in 1999. The procedure also utilized a medial strap capsular lengthening with a lateral capsulorrhaphy. Postoperatively, the hallux varus recurred, dorsiflexion was limited to 35 degrees with crepitus and severe pain was present with range of motion. Additionally the patient developed pain in the sesamoid apparatus. In retrospect the underlying osseous relationship of a negative intermetatarsal angle was not corrected. The authors believe a more beneficial approach would have included a reverse Chevron osteotomy to

negate the primary influence of the negative intermetatarsal angle. Long-term prognosis was discussed, and the patient elected to proceed with definitive surgical correction.(Fig. 5)

Surgery 4: Recurrent Hallux Varus with Joint Arthrosis—> First MPJ Arthrodesis

Arthrodesis of the first metatarsophalangeal joint was accomplished utilizing crossed 4.0 partially-threaded cancellous screws. Successful arthrodesis was observed on radiographs at the eighth postoperative week. A lateral view of the foot revealed minimal dorsiflexion of the proximal phalanx on the metatarsal and the hallux was nearly parallel with the ground. Postoperatively the patient complained of sub-proximal phalangeal pain and lateral column discomfort. The authors believe the arthrodesis position was sub-optimal in the sagittal plane resulting in over-loading of the proximal phalanx. The patient was likely experiencing lateral column pain secondary to compensatory attempts to off-load the painful hallux. Multiple attempts to accommodate the position including accommodative orthotic devices with a first ray cutout were unsuccessful. A revisional arthrodesis was discussed with the patient, with the goal of improving the sagittal plane position. The patient elected to proceed with an additional surgery.(Figs. 6,7)



Figure 5. Hallux varus continues to progress despite rebalancing of the joint including an abductor hallucis transfer.



Figure 6. First metatarsophalangeal joint arthrodesis with crossing screws.

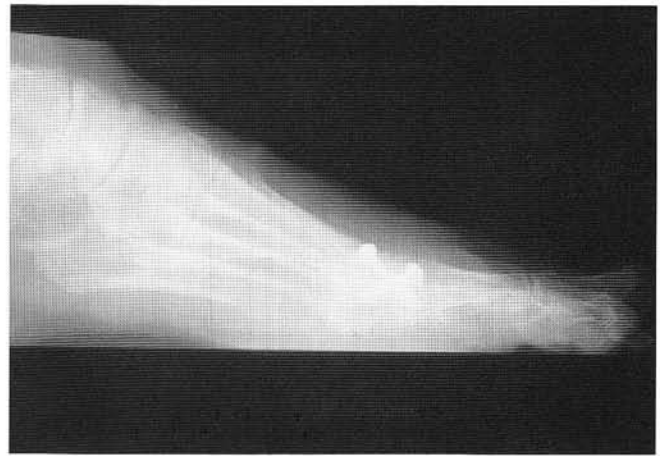


Figure 7. Lateral view shows near parallel orientation of the proximal phalanx to the ground.



Figure 8. Revisional arthrodesis with 10 degrees of dorsiflexion.

Surgery 5: Sub-Optimal First MPJ Arthrodesis Position—> Successful Union with Comfortable Ambulation

Intraoperatively the internal fixation was removed, and reciprocal planning with an oscillating saw was performed at the arthrodesis site. Care was taken to preserve a plantar hinge of the arthrodesis until adequate dorsiflexion was obtained. The final position was 10 degrees of dorsiflexion. The arthrodesis site was fixated with a single 4.0 cancellous screw. Postoperatively the patient proceeded to osseous consolidation at six weeks, and was able to ambulate without residual discomfort.(Fig. 8)

DISCUSSION

Significant pain, disability and psychological stress resulted from this patient's ordeal. Five years and five surgical procedures have elapsed since the original surgery. The patient currently relates a vast improvement in overall function with minimal clinical symptoms associated with the nerve entrapment. Despite multiple revisions performed via the same

incisional approach, the appearance of the foot does not reflect a loss of normal integument. Intraoperatively tissue layers were easily defined which is further testament to the benefit of anatomic dissection. The patient is now functioning adequately with an optimally positioned first metatarsophalangeal joint arthrodesis.

Basic variations in surgical philosophy and technique can produce subtle imbalances which can then lead to an extensive and complicated surgical course. Attention to detail and meticulous technique should always be the physician's method, and an uncomplicated surgical course, the goal.