

THE ASYMMETRIC "V" FOR HALLUX LIMITUS/RIGIDUS REPAIR

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The asymmetric "V" is a subcapital osteotomy indicated for painful hallux limitus/rigidus. Although I have been performing the osteotomy for eight years, credit for description and publication of a similar osteotomy should be given to Lauff and Weinraub (*Journal of Foot and Ankle Surgery*, 1996) who published the original description of an osteotomy performed for lesser metatarsal surgery. My general repertoire for osteotomies for hallux limitus include: Youngswick, modified Green Reverdin, plantarflexory base wedge osteotomy, and offset "V" osteotomy.

The indications for the asymmetric "V" osteotomy include painful hallux limitus, elevatus of the first ray, and a long first metatarsal. Advantages of the osteotomy include 1, 2, and 3 plane correction, decompression of the first metatarsophalangeal joint, weightbearing osteotomy, rigid screw fixation, avoidance of a base osteotomy, and avoidance of a cast.

PROCEDURE

The procedure uses a dorsal liner incision over the first metatarsophalangeal joint and subsequent dissection using standard fashion to access the first metatarsophalangeal joint. Once the joint is entered, multiple osteophytes and hypertrophic bone are resected. Appropriate subchondral drilling or abrasion is performed on any denuded and irregular chondral surfaces. The dorsal one-third of the first metatarsal is identified. A .045mm Kirschner-wire (K-wire) used as the apical axis guide is placed in the surgical neck and directed in the plane the surgeon wishes to displace the capital fragment (Figures 1A, 1B). An asymmetric "V" osteotomy is performed with the apex at the surgical neck. The medial arm of the osteotomy is placed medial to the K-wire exiting the medial cortex at about 45 degrees to the long axis of the first metatarsal. The lateral arm is placed at 65 degrees to the long axis of the first metatarsal exiting at the distal one-third of the lateral cortex of the first

metatarsal (Figure 2). The K-wire is removed. The apical osteotomy is completed and the capital fragment is now displaced inferiorly allowing for shortening and appropriate plantar displacement of the capital fragment (Figure 3). Two 2.7mm cortical screws directed from medial to lateral are used to stabilize the osteotomy. The excess dorsal first metatarsal shaft is remodeled and the wound is closed in the usual manner (Figures 4A-D). For excessively long first metatarsals, shortening of the osteotomy may be accomplished by removing a section of bone in line with the angle of the osteotomy arm at the time the osteotomy is performed.

Postoperative care involves placing the patient in a Darby wedge shoe to reduce pressure at the distal one-third of the first ray and metatarsophalangeal joint for approximately two weeks. Range of motion of the first metatarsophalangeal joint is started after the seventh day. Guarded weightbearing in a sneaker or modified surgical shoe is allowed after two weeks. At six weeks, radiographs are taken to determine if appropriate healing is occurring. Once this is noted, the patient is allowed to increase activity. After a radiograph at 3 months shows appropriate consolidation, increased activity is allowed.

There are several possible complications that can occur with this osteotomy, including transient floating hallux that usually resolves with time (Figure 5), short hallux (Figure 6), subsecond metatarsal lesion or metatarsalgia, first metatarsal lesion as a result of too much plantar flexion of the capital fragment, second ray stress fracture (Figure 7), hardware loosening, (Figure 8). The author has preformed the procedure on 5 patients, (7 feet) with a mean thirty month follow-up study. Results have generally been excellent.

The following complications have been identified by the author: short hallux that was minimally cosmetically disheartening to one patient, loosening of hardware in one patient, prominent screw head five years after surgery in one patient.

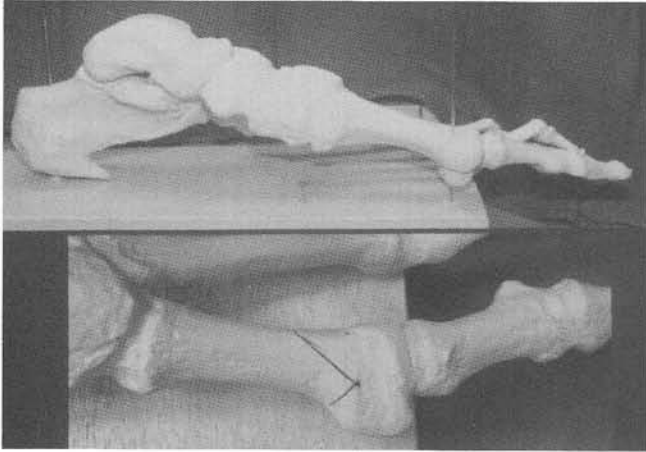


Figure 1A. The K-wire is placed at the surgical neck of the metatarsal, slightly medial to the midline of the longitudinal bisection of the first metatarsal and serves as the apical axis guide. The axis is perpendicular to the transverse plane.

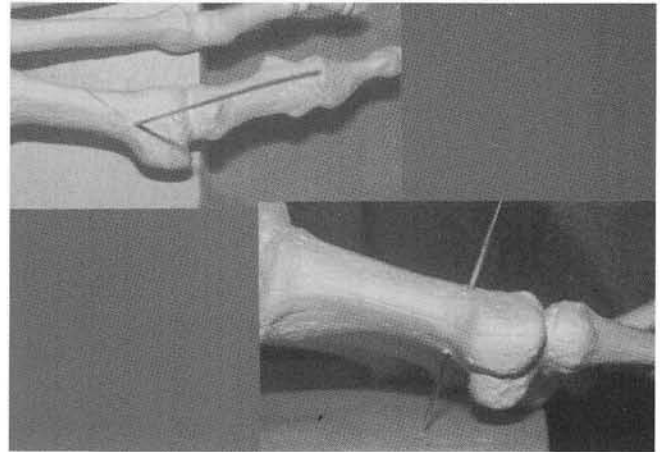


Figure 1B. The axis is perpendicular to the long axis of the metatarsal. More shortening can occur with capital displacement as the metatarsal slides inferior-posterior.

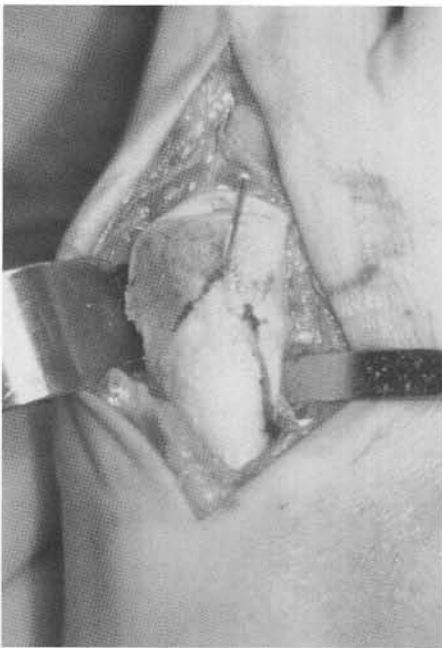


Figure 2. Intraoperative marking of proposed osteotomy. Note short medial arm (45 degrees) and longer lateral arm (65 degrees).

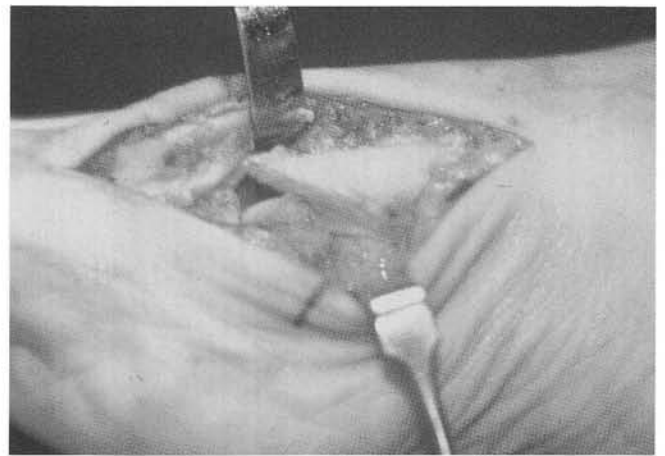


Figure 3. After the capital fragment is displaced inferior-proximal, the remaining shaft is overlapping dorsally.

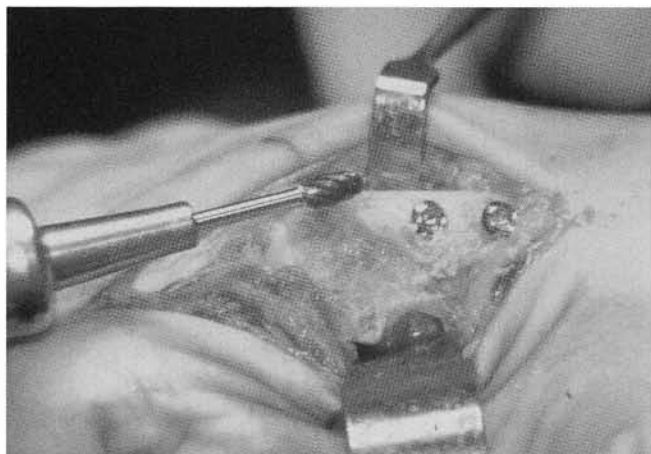


Figure 4A. Remodeling of the dorsal metatarsal overlap after placement of two 2.7mm cortical screws stabilizing the osteotomy.

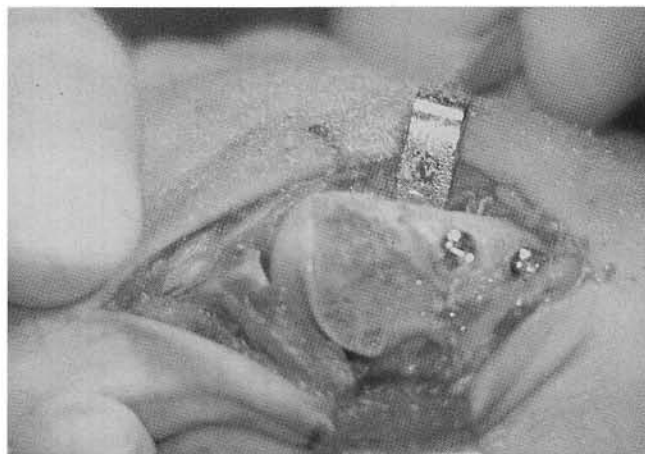


Figure 4B.



Figure 4C. Postoperative radiograph, identifying two 2.7 cortical screws stabilizing the osteotomy.



Figure 4D. Postoperative radiograph, lateral view.

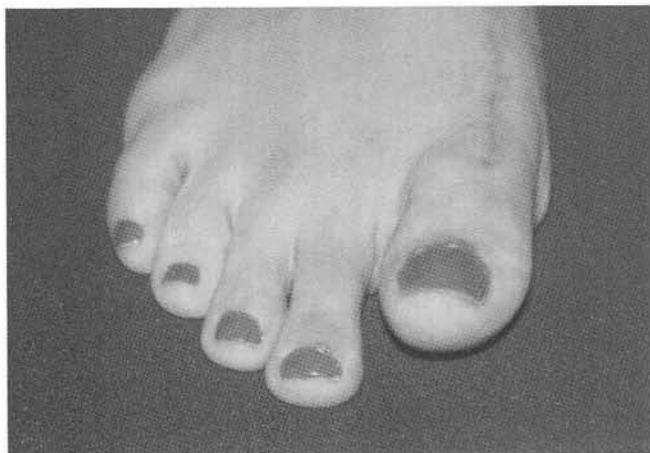


Figure 5. Note at six weeks postoperative, the hallux is not completely purchasing the floor. This is transient hallux extension as a result of shortening of the first metatarsal, and inferior displacement of the capital fragment. This usually resolves within six months.

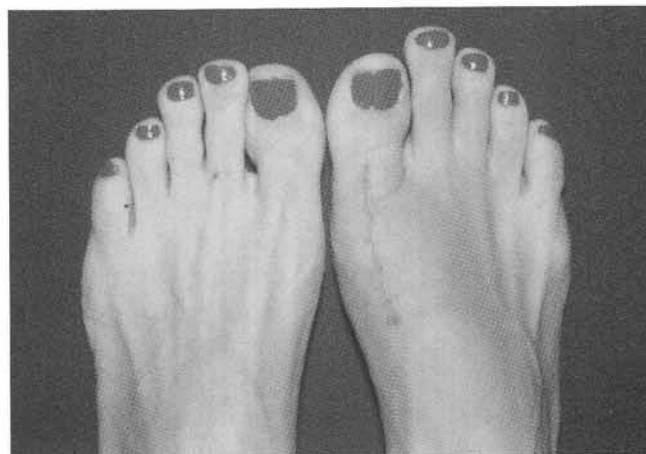


Figure 6. Bilateral case following asymmetric "V" osteotomy. Note the hallux is shorter. This patient walks 3 miles, 4 times a week, and gets some irritation on the end of the second digit of the right foot.



Figure 7. Healing stress fracture of the second metatarsal one year after surgical procedure.



Figure 8. Loosening of the proximal screw in the first metatarsal postoperatively.