GERIATRIC HALLUX VALGUS REPAIR: An Ambulatory Approach To The High IM Angle With Long Term Follow-Up

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INTRODUCTION

It has been observed that, "the bunion deformity in the geriatric patient is usually one of a fixed nature with partial range of motion and subsequent partial joint degeneration."[1] The combination deformity is often the end-result of a progressive change in structure along the first ray, destabilized by an associated flexible flatfoot condition.

One of the perplexing problems encountered when surgically treating a geriatric hallux valgus (HV) deformity is how to approach the associated metatarsus primus abductus (MPA). Reduction of the intermetatarsal angle (IMA) must be addressed in order to assure lasting success in the correction of the first metatarsophalangeal joint deformity. The challenge in surgically treating geriatric hallux valgus with a high intermetatarsal angle is to keep the patient ambulatory during healing.

JOINT PROCEDURE SELECTION

Several factors influence the selection of procedures for the geriatric HV/MPA patient[1]. These factors include joint rigidity, loss of articular integrity and bone mass (osteoporosis), and diminished physical activity. Strong consideration must also be given to the elderly patient's ability to function throughout the recovery of surgery.

In advanced cases of geriatric hallux valgus, reduction of the deformity about the great toe joint must take into account severe and prolonged subluxation with loss of articular congruity, as well as some measure of joint degeneration. In the presence of a high but flexibly reducible intermetatarsal angle (greater than 16° to 18°), this can be successfully addressed with either a Keller hallux valgus repair, a Regnauld enslavement procedure, an arthrodesis of the first metatarsophalangeal joint, or a double-stem hinge implant arthroplasty.

ADDRESSING METATARSUS PRIMUS ADDUCTUS

The challenge in correcting a more rigid type of geriatric metatarsus primus adductus, is to keep the patient weight bearing during the postoperative recovery period. Poor balance, decreased strength, and limited resources for personal care at home make bipedal ambulation most desirable. Thus, the imposition of non-weight bearing on one limb can place both the patient and surgical outcome at risk.

Allowing patients to bear weight postoperatively leaves a very limited number of corrective

procedures by which to reduce the more rigid intermetatarsal angle. The Kalish modified Austin procedure is not applicable beyond 18°. The SCARF Z-osteotomy, although quite stable to walk on, has a limited IMA reduction capability, and aggressive osseous translocation often leads to a troughing effect in diaphyseal bone. A base wedge osteotomy or Lapidus fusion procedure is far too unstable to allow weight bearing, due to the effective long lever arm forces acting on the osteotomy site.

Several factors must be evaluated when deciding how to reduce the first intermetatarsal angle. These factors include the flexibility of the first metatarsal in the transverse plane, degree of metatarsus adductus, abutment of the base of the first metatarsal to the second metatarsal, and the metatarsocunieform joint angle (medial deviation of the joint).

MEDIAL CUNEIFORM CLOSING WEDGE OSTEOTOMY PLUS FIRST MPJ IMPLANT ARTHROPLASTY

In the collapsed, end-stage flatfoot where there is a low first metatarsal declination angle, as well as a low calcaneal inclination angle, the following combination of procedures can be considered to reduce the intermetatarsal angle, while allowing postoperative weight bearing. The procedures have a limited application in that the patient must be virtually apropulsive, expect a low level of activity, and be able to tolerate further collapse or destabilization of the medial column.

In the first procedure, a laterally-based closing wedge osteotomy of the distal medial cuneiform is performed. This essentially floats the first metatarsal bone and allows reduction of the intermetatarsal angle. Rigid fixation of the osteotomy is not routinely performed, however the integrity of the first metatarsocuneiform is preserved with this procedure.

The second part of this procedure involves the replacement of the first metatarsophalangeal joint with a double-stem hinged silicone implant. This effectively maintains the corrected alignment of the first metatarsophalangeal joint, while correcting the hallux abducto valgus deformity. The patient's low activity level limits the risk of implant failure. (Figures 1-3)

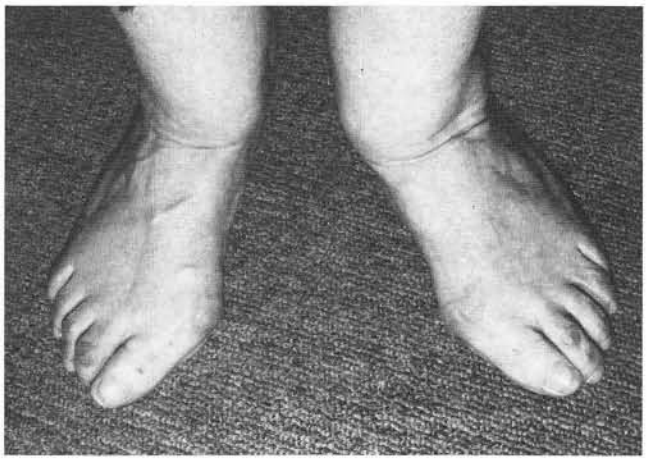

Figure 1A. Preoperative clinical appearance.

Figure 1B. Preoperative radiograph, DP view.

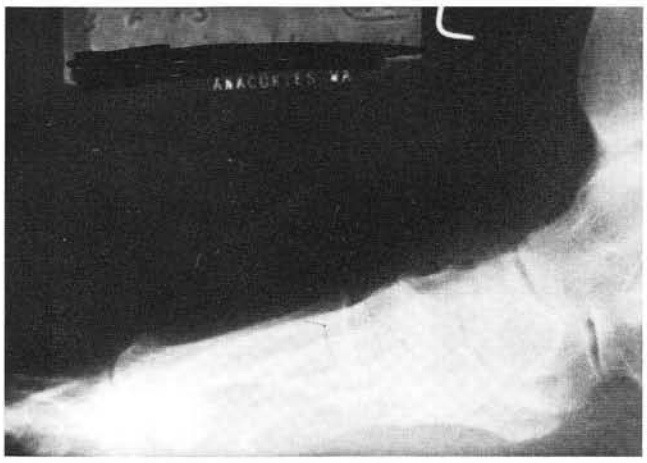

Figure 1C. Preoperative radiograph, lateral view.

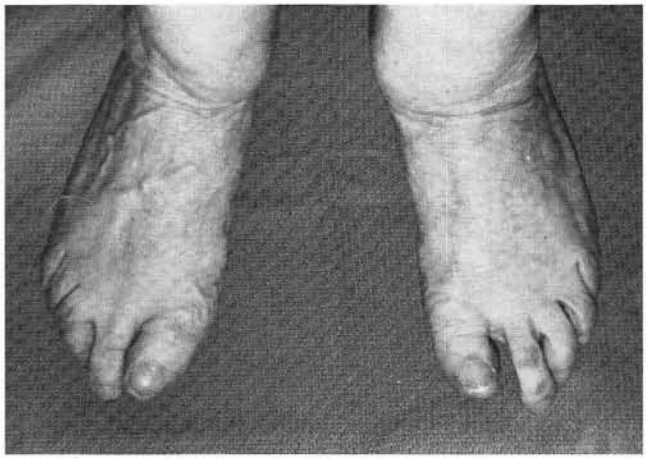

Figure 2A. Postoperative clinical appearance.

Figure 2B. Postoperative radiograph, DP view.

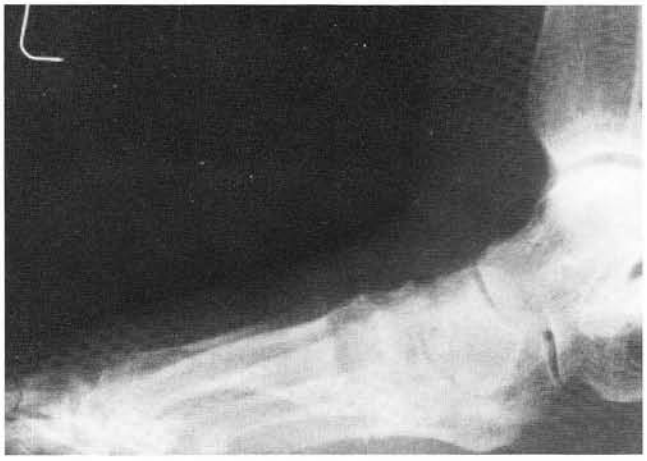

Figure 2C. Postoperative radiograph, lateral view.

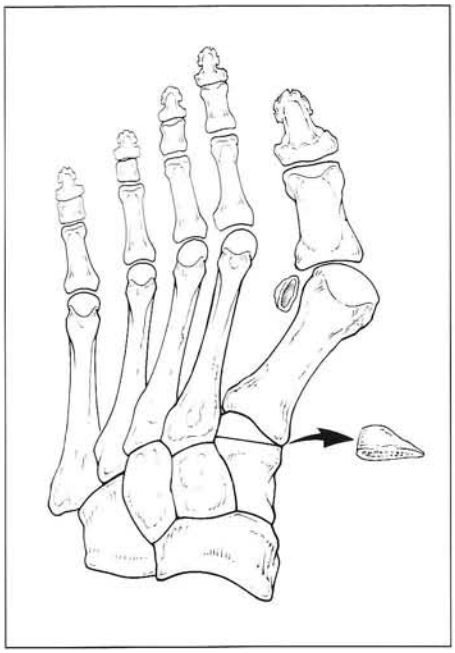

Figure 3A. Preoperative illustration of deformity with luxated MPJ and accentuated increase of the intermetatarsal angle.

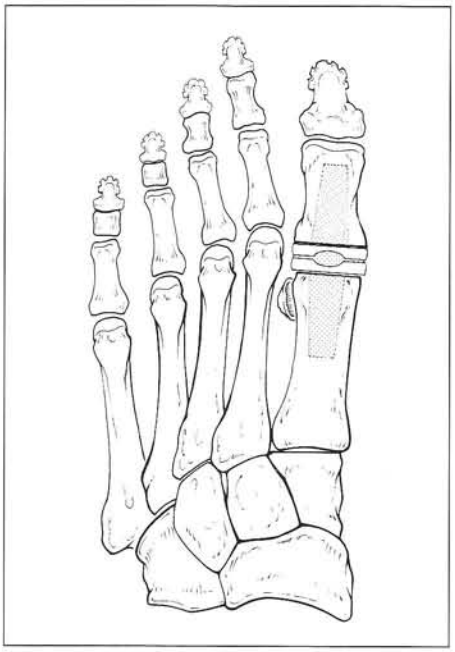

Figure 3B. Implant inserted with anticipated reduction of the intermetatarsal angle attributed to joint decompression and relaxation of retrograde buckling forces.

PATIENT POPULATION AND FOLLOW-UP

The described method of correction was performed on seven feet (six patients, all female), between 1983 and 1989. The average patient's age at the time of surgery was 71.6 (range 56-79). All patients, upon evaluation, met the aforementioned preoperative criteria.

Long term follow-up (average 65 months, range 34-81 months) has been preformed on four feet in these patients. One patient developed unrelated gait instability and is continuing to be evaluated, while another is deceased. The youngest patient (56 years old) required a first metatarsocuneiform joint arthrodesis at 6 months postoperative due to persistent pain, and although asymptomatic at 81 months post-revision, radiographic pseudarthrosis persists. The three patients (four feet) in the long term follow-up remained asymptotic, ambulating in a closed shoe with an accommodative orthotic device.

The average intermetatarsal angle was reduced from 19.6° to 9.7° while the average hallux abductus angle was decreased from 47.6° to 11°. The average metatarsal declination angle changed from 21.1° to 16.5° while the calcaneal inclination angle remained approximately the same, 17.9° to 16.8°. One foot had a high metatarsus adductus angle (30°) but a relatively low intermetatarsal angle (16°). This case was complicated by multi-joint degenerative arthritic changes of the midfoot secondary to jamming.

CONCLUSION

Satisfactory results were obtained in 4 of the 7 feet and perhaps two more where follow-up evaluation remains incomplete. One foot was a failure requiring arthrodesis. From this preliminary study, it appears that this two-part procedure has limited application based on specific preoperative criteria. It should be reserved for the elderly, sedentary patient with hallux valgus in conjunction with metatarsus primus adductus and an end-stage flatfoot condition. The younger more active patient is more likely to experience failure. Analysis of a larger patient sample is necessary to further define the patient criteria for this procedure.

BIBLIOGRAPHY

McDonough MW: Geriatric hallux valgus deformity. In McGlamry, ED, Banks AS, Downey MS (eds): *Comprehensive Textbook of Foot Surgery*, 2nd ed, Baltimore, Williams & Wilkins, 1992, p. 578.