

COMPLICATIONS OF THE KALISH-AUSTIN

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INTRODUCTION

The Kalish-Austin along with other "mid-shaft" osteotomy techniques have enjoyed a certain degree of popularity in the most recent discussions of hallux valgus surgery. These osteotomy techniques have initially been recommended for the mild to moderate deformity and are now being promoted for moderate to severe deformity. The stated advantages of these techniques include the ability to correct more severe deformities previously treated by basal osteotomies and still allow the patient to be weight bearing. However, as the indications for these "innovative" procedures are increased, so is the incidence of postoperative complications. In 1992, Downey described some of the early complications associated with the Kalish-Austin procedure.

The Kalish-Austin modification is used as a primary technique by a significant number of the Podiatry Institute's faculty. The purpose of this paper is to review some of the major categories for potential complication with this technique and present a number of interesting cases that will illustrate some of the actual problems encountered.

Downey identified three major areas for complication in the Kalish-Austin. The first category of complications occurred with failure to observe specific indications, the second included technical failures, and the third major category involved postoperative complications.

FAILURE TO OBSERVE INDICATIONS

The expanded indications for the modified Kalish-Austin procedure that have been commonly described include:

1. Hallux abductus angle great than 15 degrees
2. Metatarsus primus adductus angle - up to and including 15 to 20 degrees
3. Pain free range of motion without significant osteophytes or significant degenerative joint disease
4. Adequate bone stock

In general, possible complications that can occur with failure to observe "normal indications" can include (but are not limited to): recurrent hallux valgus deformity; hallux varus deformity; hallux limitus/rigidus; and restriction of sesamoid apparatus.

TECHNICAL FAILURES

There are several potential complications of surgical technique. Inaccurate axis guide placement and alignment can lead to fracture of the capital fragment, instability of the osteotomy, and functional pathology. Additional complications include: inaccurate osteotomy techniques, fixation failures, delayed union, non-union and mal-union.

Axis Guide Placement

The use of the axis guide for execution of Chevron osteotomies allows the surgeon to create multi-planar correction with a single osteotomy while avoiding excess bone resection. If the axis

guide is improperly aligned, the end result will be greatly affected.

When performing a plantarflexory osteotomy or adding plantar displacement to the lateral shift of the metatarsal head, the axis guide is directed inferiorly as it is passed from medial to lateral. It is important in these cases, to initiate penetration of the metatarsal head in a higher or more superior location on the metatarsal head. This will prevent violation of the sesamoidal articulation, as the axis guide, and ultimately the osteotomy, exit the lateral aspect of the metatarsal head. This complication can easily lead to degenerative arthrosis of the sesamoidal articulation, ankylosis, hallux limitus and even recurrence of the original hallux valgus deformity.

Osteotomy Technique

The osteotomy design consists of a short plantar wing which exits proximal to the sesamoid apparatus, and a longer dorsal wing. The angulation of the apex has been described and recommended at 55 degrees. Selection of the exit sites is extremely important in creating a functional and effective osteotomy.

Fixation Technique

When performing the dorsal osteotomy, it is important to keep in mind that the dorsal wing usually needs to accommodate two screws or two points of fixation. This usually requires more dissection and reflection of soft tissue, not only for execution of the osteotomy but also for insertion of internal fixation. The original fixation of the Kalish-Austin utilized two 2.7 mm cortical screws, but this process has been modified by almost every surgeon that has performed the procedure.

One problem that has been infrequently described is fracture of the dorsal wing as a result of the placement of two 2.7 mm screws into a fragile dorsal cortex. This complication has been

all but eliminated by the use of a 2.0 mm screw for the more proximal point of fixation. Fracture of the dorsal wing usually requires an alternative means of fixation such as a K-wire, as well as an alteration in postoperative management including restriction or elimination of weight bearing.

Delayed Union, Non-union, Mal-union

Delayed union, non-union and mal-union can occur as a result of inadequate internal fixation. Callous formation is one notable postoperative finding that can be attributed to fixation failure. In cases when there is obvious loss of purchase, irritation callous is likely to occur. This finding is most often associated with a delayed union. In some cases of single screw, and occasionally double screw fixation, bone callous has developed at the proximal aspect of the osteotomy. This can be attributed to micro-motion or instability at the most proximal aspect of the dorsal wing. It is possible that this complication occurs more commonly with correction of large deformities where there has been significant lateral translocation of the capital fragment.

POSTOPERATIVE COMPLICATIONS

In general, postoperative complications encountered with the Kalish-Austin are not much different than those of any other hallux valgus surgery. The complications that will be demonstrated include: loss of rigid fixation and stability, joint limitus, lack of hallux purchase, sesamoid adherence and prominence, delayed union and non-union, and avascular necrosis.

As with any surgical technique, inherent complications of the Kalish-Austin also include scar formation, allergic reaction, infection, hematoma, nerve entrapment, postoperative limitus as well as delay in healing of soft tissue and bone. To date, there have been no reported cases of avascular necrosis.

CASE ILLUSTRATIONS

Case 1

A 58-year-old female underwent a Kalish-Austin Bunionectomy with two screw fixation.



Figure 1A. Preoperative hallux valgus deformity.



Figure 1B. Postoperative result.



Figure 1C. Lateral radiograph following a Kalish-Austin Bunionectomy.



Figure 1D. Postoperatively, the patient sustained a severe impaction injury to great toe joint. Lateral displacement of metatarsal head occurred following impact injury.



Figure 1E. Lateral radiograph following impact injury.



Figure 1F. As a result, a second surgical intervention was performed. The osteotomy was realigned and stabilized. During the initial surgery, the fibular sesamoid was removed.



Figure 1G. Postoperatively, the patient experienced a significant prominence of the tibial sesamoid, as well as restriction of proximal movement of the sesamoid apparatus resulting in lack of full hallux purchase.



Figure 1H. The patient underwent subsequent revision including removal of screws and planing of the tibial sesamoid. Intraoperative findings were consistent with adhesive fibrosis at the proximal metatarsal sesamoid articulation.



Figure 1I. Lateral radiograph following screw removal.

Case 2

A 45-year-old female developed significant post-operative limitus following a Kalish-Austin bunionectomy in spite of full range of motion on the operating room table. The patient subsequently experienced fracture of the tibial sesamoid. This complication was attributed to restricted motion of the 1st MPJ.



Figure 2A. Immediate postoperative radiograph. Note the adequate joint space.



Figure 2B. Dorsoplantar radiograph at 8 weeks postoperative. Note the narrowed joint space.



Figure 2C. An axial sesamoid view.

Case 3

A 56-year-old female underwent a Kalish-Austin bunionectomy for severe HAV. An inappropriate placement of the axis guide resulted in excessive plantarflexion. Complications from excessive plantarflexion of the metatarsal head included; a prominent tibial sesamoid, restricted proximal excursion of the sesamoid apparatus, lack of hallux purchase and hallux malleus deformity with extension contracture of the MPJ and flexion contracture of the hallux interphalangeal joint.

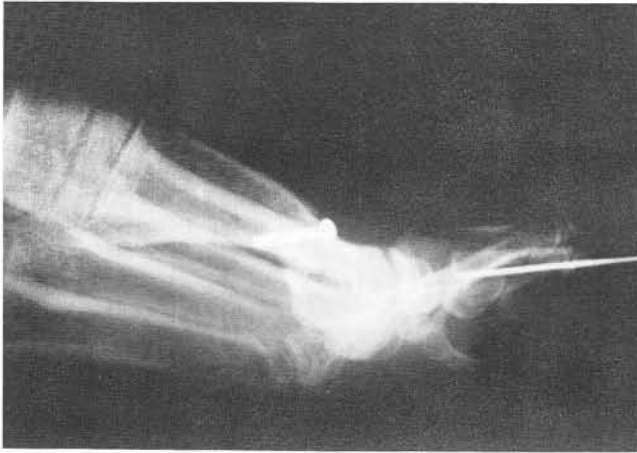


Figure 3A. Initial postoperative lateral radiograph demonstrating significant plantar displacement of the metatarsal head.

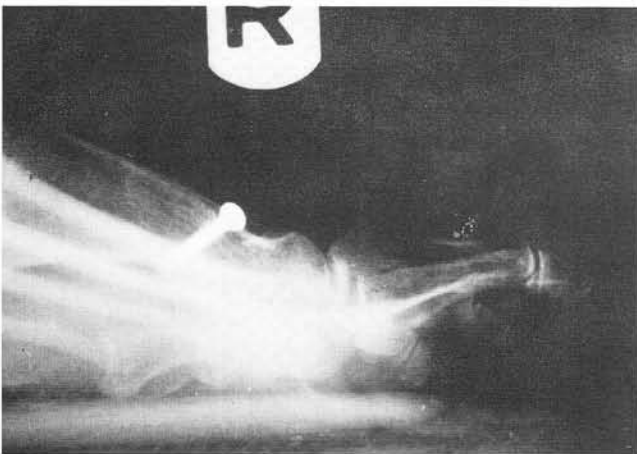


Figure 3C. Healed postoperative radiograph demonstrating hallux malleus deformity.



Figure 3B. Oblique radiograph demonstrating similar displacement.



Figure 3D. Dorsoplantar radiograph.

Case 4

A Kalish-Austin Bunionectomy was performed on a 67-year-old female. At the time of the surgery, the distal screw exited proximal to the osteotomy interface resulting in poor screw purchase. Backup fixation was accomplished with a 24 gauge intra-osseous wire loop. Rigid fixation was attained.



Figure 4A. Preoperative radiograph.



Figure 4B. Postoperative DP radiograph of combined fixation technique.



Figure 4C. Postoperative lateral radiograph.

Case 5

A 75-year-old female with a severe HAV deformity underwent a Kalish-Austin bunionectomy with adductor tendon transfer and fibular sesamoidectomy. While the initial postoperative radiograph gave little indication of a problem, the patient went on to develop a full hallux varus.



Figure 5A. Preoperative radiograph with a severe IMA.



Figure 5B. Initial postoperative DP radiograph. Note the absence of the fibular sesamoid, the slight lateral tilt of the metatarsal head, the subtle medial seating of the MPJ, and the overall hallux rectus or slight varus alignment.



Figure 5C. The ultimate hallux varus deformity.

Case 6

A 64-year-old female with mild rheumatoid Arthritis underwent a Kalish-Austin bunionectomy for correction of her HAV deformity. Fixation was accomplished with a single 2.7 mm cortical screw and supplemented with a 1.6 mm Kirschner wire. At approximately three weeks postoperative, the patient noted some recurrence of her bunion even though she was wearing sneakers and was asymptomatic. Follow-up radiographs revealed loss of screw purchase and lateral rotation of the

metatarsal head. The patient was treated with a period of protected weight bearing and went on to successful union. The fixation screw was ultimately removed and the patient recovered uneventfully. Postoperative management included orthotic control. Upon review of the long-term postoperative radiograph, the question is raised as to whether the cystic changes in the metatarsal head are the result of the underlying RA or an early indication of avascular necrosis.



Figure 6A. Immediate postoperative radiograph.



Figure 6B. 6C. Three weeks postoperative radiographs revealing loss of fixation and correction.



Figure 6C.

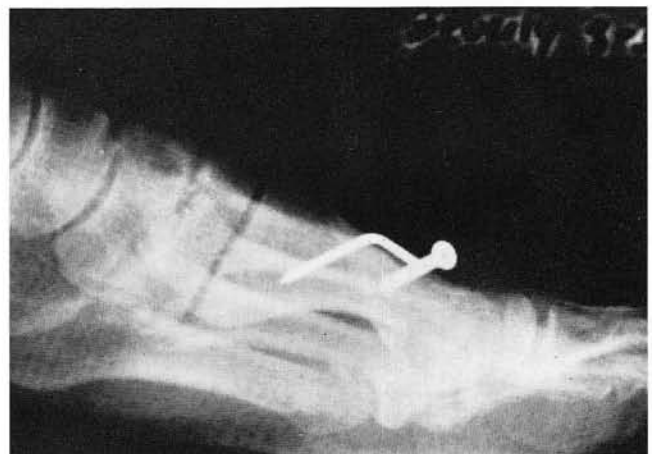


Figure 6D. Lateral radiograph.



Figure 6E. Healed DP radiograph with maintenance of correction.



Figure 6F. Lateral radiograph.



Figure 6G. Long-term lateral radiograph revealing cystic changes within the metatarsal head.

Case 7

A 36-year-old female with a moderate to severe HAV deformity underwent a Kalish-Austin bunionectomy with adductor tendon transfer and two screw fixation (2.7 mm). The patient's postoperative course was unremarkable with the exception of significant bone callous formation. The patient experienced a similar response when the opposite foot was corrected.



Figure 7A. Preoperative radiograph.



Figure 7B. 3 month postoperative view with evidence of callus formation but no loss of correction or shift of internal fixation.



Figure 7C. 8 month postoperative view with successful union.

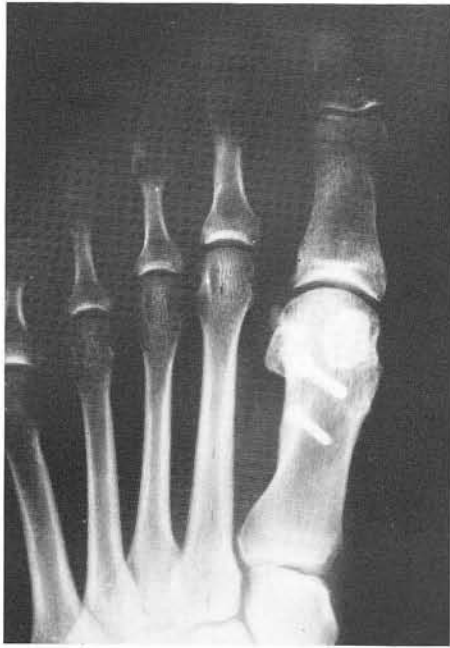


Figure 7D. 2 years postoperative with consolidation.



Figure 7E. Similar response in the opposite extremity.

SUMMARY

The Kalish-Austin is a popular procedure for the correction of hallux valgus. Like most surgical procedures, as the range of application increases, so does the probability of complications. By avoiding the pitfalls and problems described, gratifying results are attainable.

BIBLIOGRAPHY

- Cain TD, Boyd D: Defining the Limits of the modified Austin Bunionectomy. In DiNapoli DR (ed) *Reconstructive Surgery of the Foot and Leg-Update '90*. Tucker, GA, Podiatry Institute Publishing, 1990, pp. 128-134.
- Downey MS: Complications of the Kalish Bunionectomy. In Ruch JA, Vickers NS (eds) *Reconstructive Surgery of the Foot and Leg-Update '92* Tucker, GA, Podiatry Institute Publishing, pp 248-254, 1992.
- Kalish SR, Bernbach MR: Modification of the Austin Bunionectomy. In McGlamry ED (ed) *Reconstructive Surgery of the Foot and Leg-Update '87* Tucker, GA, Podiatry Institute Publishing, 1987, pp. 86-89.