CHAPTER **5**

PEARLS FOR MAXIMUM CORRECTION OF HALLUX VALGUS USING DISTAL OSTEOTOMIES

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INTRODUCTION

Hallux valgus correction is one of the more complicated procedures performed in foot surgery because of all of the variables that exist in the deformity as well as the short comings of the corrective procedures themselves. Some of these variables include quality of the first metatarsal itself, the angle of deformity, the contracture, and the malleability of the soft tissue around the deformity. Adjacent deformities such as hammer toes or associated deformities of pes valgus or metatarsus adductus can also add to the unpredictability of the procedure chosen. No single procedure works for every hallux valgus deformity, however by determining the true aspect of the deformity that needs to be fixed instead of relying solely on the intermetatarsal angle, one can choose a procedure that provides maximal correction with minimal risk or complication.

COMPLICATIONS OF BUNIONECTOMY PROCEDURES

With any hallux valgus correction, complications may occur. These complications can be generally due to poor procedure selection, patient noncompliance, and even inadequate fixation. More specifically, complications include fracture through the osteotomy site, hallux varus, recurrent hallux valgus, postoperative infection, deep vein thrombosis, hallux limitus, nerve entrapment, painful or hypertrophic scar, floating digit, or internal fixation that can cause pain or loosen and become displaced. These are just a few of the complications that can occur and it is much easier to avoid them than to deal with them later.

TRADITIONAL GUIDELINES FOR BUNION PROCEDURES

When choosing a procedure for hallux valgus correction, the tradition is for a more proximal osteotomy for a wider intermetatarsal angle. Soft tissue needs to be taken into account as well as the width of the first metatarsal. With an adequate lateral release a wide first intermetatarsal angle may be easily corrected with a more distal procedure.

More distal procedures that are stable allow for the patient to ambulate in the immediate postoperative period and this reduces the possibility of deep vein thrombosis. A stable distal osteotomy also allows for early ambulation in a shoe that is more flexible like an athletic shoe and this will reduce the chance of losing motion in the first metatarsophalangeal joint gained from the procedure itself.

Fixation that provides compression and more than one point of fixation is ideal for the purpose of bone healing and limiting movement of the osteotomy. When arthritic changes occur in the first metatarsal cuneiform joint or hypermobility exists, a fusion of this joint provides the most stable and complete correction. Although a variety of fixation types work well for this procedure, it is critical that the patient is non-weightbearing until the fusion is complete.

SOFT TISSUE CONSIDERATIONS FOR OPTIMAL CORRECTION

Incision placement is the first consideration when dealing with the soft tissue in correcting hallux valgus. A dorsal medial incision allows for maximal exposure and minimal risk for nerve entrapment. The length of the incision should allow for adequate exposure for both the lateral release as well as the osteotomy (Figure 1). Careful anatomic dissection minimizes swelling and allows for the layers to maintain their function following closure.

Performing an adequate lateral release, such as releasing the adductor tendon from the base of the proximal phalanx and the fibular seasmoidal ligament from the first metatarsal will allow for easier lateral translocation of the first metatarsal at the osteotomy site. If additional release is needed, a lateral capsulotomy can be performed, but if possible leaving the capsule intact will help to prevent hallux varus.

The medial capsule work should be done and checked to make sure the joint alignment is in optimal position and not likely to shift into a varus position. In the rare case where skin contractures can limit correction, a skin plasty can be done to either tighten or loosen up the skin as needed.

Figure1. Incision length is appropriate for exposure needed for the procedure.

Figure 2A. Preoperative radiograph.

OSTEOTOMY CHOICE AND IMPLEMENTATION TO ACHIEVE MAXIMAL CORRECTION

The ideal osteotomy allows for correction of the deformity, but is stable enough to ambulate on. Although this is not possible in all circumstances, a head procedure cut with enough length and positioned in a rotational position instead of just a translocation can come close (Figure 2). By rotating the capital fragment, it also allows for correction of the proximal articular set angle without an additional procedure, and can reduce a very high intermetatarsal angle depending on the soft tissue release.

Osteotomies such as the Kalish, or Scarf work well for this correction. The most important part is to position the osteotomy correctly before the fixation is placed. The author prefers a very long dorsal osteotomy that is at least proximal to the mid-point of the first metatarsal. An axis guide is used to direct the cut for corrective translocation (Figure 3).

The dorsal cut is made first, then the plantar cut of the chevron is made in a position to allow for stability in the osteotomy when the patient is weightbearing. An instrument like an elevator is used to help with the rotational swing of the capital fragment (Figure 4). The proximal portion of the osteotomy acts as the swivel point and the distal portion swings around this point like a door on a hinge. Once the optimal position is achieved the capital fragment is compressed on the metatarsal and temporary fixation is placed such as with a Kirschner wire.

Figure 2B. Postoperative radiograph of a hallux valgus correction with a rotated capital fragment.

The lateral cortex of the metatarsal plays an important role in providing a stable buttress for the capital portion of the metatarsal. The dorsal portion of the capital fragment rests on both the medial and lateral cortices of the metatarsal

Figure 3. Axis guide for a chevron osteotomy.

shaft due to the rotation of the osteotomy. This construct prevents the capital fragment from collapsing into the middle of the metatarsal. The long dorsal wing of the osteotomy allows for several fixation options with plenty of room for back up plans in the event of fixation failure.

The author uses three 2.4mm cortical screws for fixation to utilize the full length of the osteotomy and minimize the risk of displacement (Figure 5). When remodeling the head of the metatarsal, it is important to angle the saw cut as to not take off too much bone from the metatarsal shaft. If too much bone is removed, the advantage gained from the long osteotomy is lost and a fracture will occur at the weakest point of the bone. This weak point is often just proximal to the apex of the shaft portion of the osteotomy. Once the fixation is achieved the soft tissue closure is performed and a dressing applied.

POSTOPERATIVE CARE

When a stable construct is achieved and the bone is not osteoporotic the patient can ambulate in a rigid postoperative shoe. When the radiograph shows adequate healing and there is no evidence of shift in the osteotomy, the author will allow the patient to wear a stable athletic shoe. Full activity is not recommended until the osteotomy is fully healed at the 6-week mark.

CONCLUSION

Hallux valgus correction needed for wide intermetatarsal angles and with large proximal articular set angle deformities can be achieved with stable long distal osteotomies. By careful use of the anatomy and stable fixation, the correction can be achieved without pushing the limits of the procedure and increasing the risk of complications.

Figure 4. Elevator used to help position the capital fragment in a rotated position, note the wider shift at the distal compared to the proximal area.

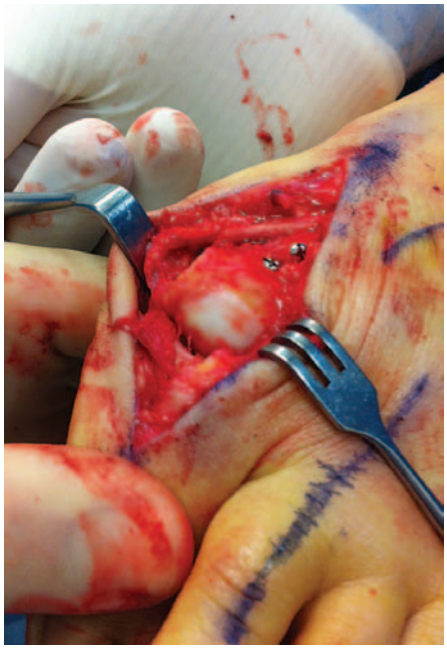

Figure 5. Fixation is achieved with 2.4 mm screws.