

SECURITY OF THE SCARF BUNIONECTOMY

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Patients electing to undergo bunion surgery want two definitive results and both are actually purely subjective. They want it to look good and they want it to feel good. How we as surgeons achieve that while minimizing the risks for complications and disruption in the activities of daily living for the patients has been debated for decades. There is no consensus on the ideal bunion procedure correction for said severity of deformity and the variables inherent in the evaluation of each individual patient are further clouded by the variabilities in the technical skills of foot and ankle surgeons world-wide.

So how do seasoned surgeons choose the bunion procedures they do with most regularity? They naturally migrate and stay with what works. What works is, of course, dependent on that procedure(s) to which they have become proficient. How surgeons arrive at that point is the same as the learning curve of any activity. They do what they have become consciously competent at. The learning curve may be defined as a progression from a state of unconsciously incompetent to consciously incompetent to consciously competent to unconsciously competent (1). This progression is the very role of residency training and then continued life-long learning as a practitioner.

The likely reality is that surgeons do their favorite bunion procedure 100 times in a row and between 2 to 3 months after surgery can no longer even remember the name of 95% of the patients. The patients have done well and are discharged. However, approximately 5 of the 100 patients have had some mild to severe complication that reminds the surgeon for 6 to 18 months that perfection remains elusive. These arbitrarily-categorized 5 of 100 patients are the focus of my personal shift over the last 10 years to the scarf bunionectomy as my vastly preferred operation for hallux valgus correction.

It should not be construed that the scarf bunionectomy allows any increased intermetatarsal angle increase over other procedures. It does not, and that is not a factor in why I have migrated to it. The reliability of the intermetatarsal angle and procedural choice and correction has been effectively challenged as well (2, 3). The reasons are more varied than that. In a general sense, the ideal bunion correction will achieve several goals. First, it should give reliable and lasting complete correction of the intermetatarsal angle. Second, it should provide reorientation of any articular set deformity or

cartilage deviation of the metatarsal head as necessary. Third, it should be amenable to standard concepts of rigid internal compression fixation to allow advancement to rehabilitation as promptly as possible. Fourth, it should allow immediate weightbearing in a surgical shoe or boot from postoperative day 1 and be amenable to bilateral surgery as desired by the surgeon or patient. Lastly, maneuvers of lengthening, shortening, rotational corrections and even elevation and plantarflexion should all be possible without affecting any of the above parameters. The scarf osteotomy when performed correctly and with repeatable technically sound execution achieves these goals more reliably than any other procedure.

How and when will a graduating resident or a practitioner know what is their own most reliable procedure, that one which they can repeatedly do well, get consistent results, and essentially be consciously competent at? I submit to the reader that clinical decision point between the underlying fundamental tenet of all of medicine “primum non nocere” and the more colloquial euphemism “what would you do to your own mother.” Whatever procedure we repeatedly choose in that context has become our go-to procedure. The author’s personal experience is that the scarf is the procedure I repeatedly use where that earlier mentioned 5 out of 100 cases just simply are not tolerable. Classic examples from my private practice are avid serious athletes with high functional demands, patients that have had a complication on one foot yet still want the other foot operated on, revisional cases of a personal complication, revisional cases of a colleague’s complication, the request by a colleague to operate on their family member, cases with previous bone healing issues such as second metatarsal stress fractures, and lastly unique cases where multiple manipulations of the first metatarsal segment are required (Figures 1-8).

The logical question then is “Why?” has the scarf become my procedure of choice as illustrated with the above cases. The answer is because it resists what I term “the unholy triad” of first metatarsal osteotomies better than any other osteotomy and they are the potential for shortening, elevation and/or rotation of the capital fragment (Figure 9). The geometry of the scarf cut resists these potential deviations better than any other procedure when performed correctly in the modified sense.

In the 1980s and early 1990s the scarf fell out of favor



Figure 1. Preoperative and postoperative antero-posterior radiographs of a competitive female soccer player. Note there is excellent clinical alignment and no shortening of the first ray.



Figure 3. Preoperative and postoperative antero-posterior radiographs of a competitive marathoner.



Figure 2. Preoperative and postoperative lateral radiograph of same soccer player. Note no elevation of the capital fragment.



Figure 4. Preoperative and postoperative lateral radiographs of same marathoner. In both cases even the slightest tendency toward shortening, elevation or rotation of the capital fragment must be avoided to consistently get high patient satisfaction and excellent outcomes.



Figure 5. Intra-articular fracture post chevron bunionectomy with reintervention and multiple Kirschner wire fixation. The patient later desired surgery on the other foot and a short scarf bunionectomy was chosen to take advantage of the dense metaphyseal cancellous bone and reduce the risk of the impaction of the capital fragment with lateral transposition of the head.



Figure 6. Failed tightrope procedure where the suture broke and the subsequent revision via a long scarf bunionectomy.



Figure 7. A substantial shortening scarf osteotomy (double cut distally, double cut proximally) combined with multiple Weil osteotomies to effect a longitudinal decompression of the foot with joint preservation versus a panmetatarsal head resection approach.



Figure 8. Preoperative and postoperative radiographs of a patient with a history of recurring second metatarsal stress fractures. The scarf was chosen as absolutely no elevation or shortening could be permitted of the first ray as it would likely complicate or cause further aggravation of her stress fractures.



Figure 9. An exaggerated example of the rotation and shortening that is possible the farther one “pushes” a chevron osteotomy. This tendency is not uncommon as the apical bone of the proximal fragment is frequently of poor quality especially in older patients. As the head is transposed laterally past the medial cortex of the proximal fragment, the head will frequently subside into the apex of the chevron cut on the first metatarsal.

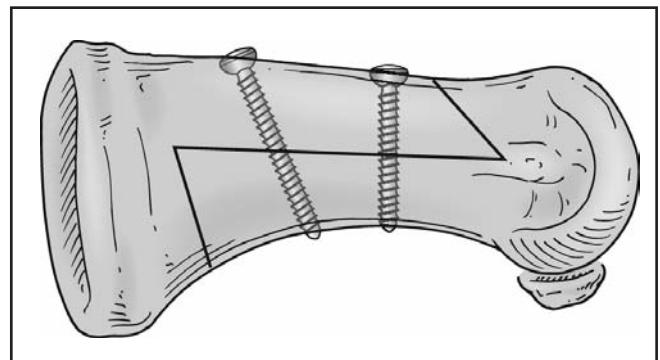


Figure 10. The original scarf cut that led to the complication of troughing.

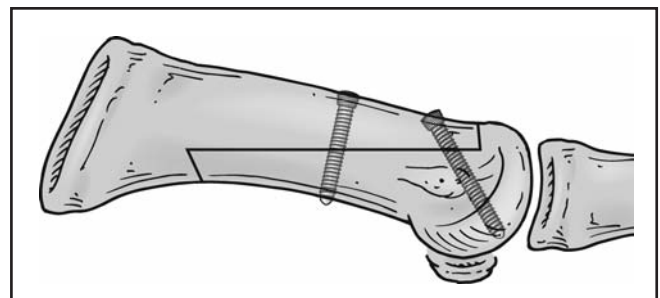


Figure 11. The modified and current scarf cut that makes the central cut parallel to the ground and the distal cut very high and distal compared to a standard chevron cut.

due to the potential for troughing where the dorsal fragment could subside into the plantar fragment. This was due to the mid-diaphyseal nature of the central cut and the dorsal distal exit point in the same location of the traditional chevron osteotomy that did not take advantage of the dense compact cancellous bone of the metaphyseal region

(Figure 10). The modified scarf cut has several important characteristics. The distal cut is very high and very distal to be purposefully in the dorsal cortical dense metaphyseal zone of the metatarsal. The central cut is oblique to the long axis of the first metatarsal and parallel to the ground, which maximizes bone to bone contact and allows for ground

reactive forces to be inherently compressive forces. The proximal inferior cut may be at varying lengths to effect a short scarf, medium scarf, or long scarf. It may even be avoided if necessary effectively rendering the osteotomy a long plantar-arm chevron cut with emphasis still on a clear understanding that the dorsal distal cut is more distal and dorsal than a traditional chevron cut (Figure 11). It is wise to use a commercially available osteotomy guide to enhance reliability and reproducibility of the cut.

The procedure is typically performed through a medial incision, which readily allows a transarticular release of the fibular sesamoidal ligament and the portion of the abductor tendon between the fibular sesamoid and the base of the proximal phalanx (Figure 12). Additionally the potential manipulations of the osteotomy to allow for shortening (double cut distally and proximally), PASA correction and even modest lengthening as necessary are readily observable (Figure 13).

This report is intended to simply share the variety of cases and the reasons for which the author routinely turns to the scarf bunionectomy as his procedure of choice. The security and stability of the cut has eliminated any concerns for shifting, rotation, elevation or shortening of the capital and articular fragment. Although those complications were infrequent with the author's use of the chevron for over 10 years the occasional occurrences led to less than satisfactory outcomes that I have never experienced since, with the consistent use of the scarf osteotomy.

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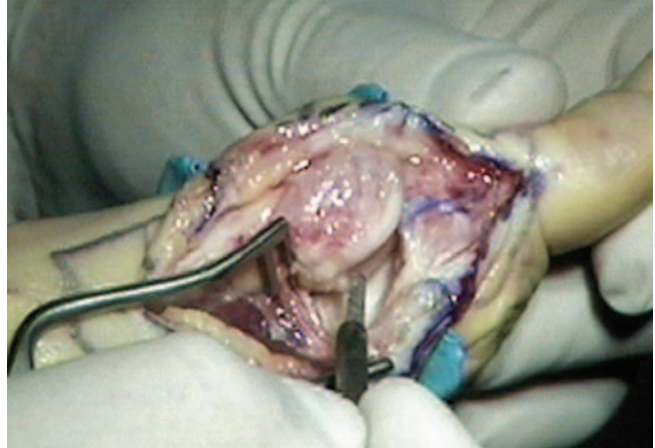


Figure 12. The transarticular interspace release between the metatarsal head and sesamoids that effectively allows for release of the fibular sesamoidal ligament and the adductor tendon portion between the fibular sesamoid and the base of the proximal phalanx.

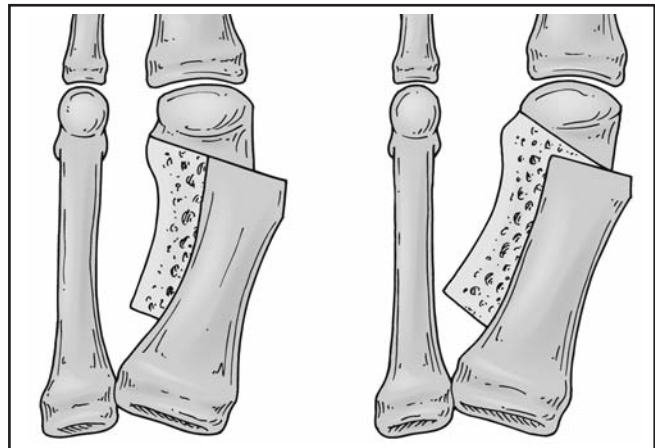


Figure 13. An example of the manipulations of the capital fragment via the geometry of the scarf cut.