

ALGORITHM FOR THE REPAIR OF THE OVERLAPPING SECOND TOE

Alan S. Banks, DPM

Several attendees at recent Podiatry Institute meetings have requested information or recommendations on an algorithm for repair of an overlapping second toe deformity. This author, as well as others, has provided a discussion of repair techniques at these meetings, and at times a sequence of steps that could be used to accomplish repair. The condition of the overlapping second toe is perhaps one of the most vexing problems in the forefoot, and one for which there is no ideal technique that seems to work categorically. Secondly, it would be impossible to provide a specific cookbook algorithm for such a condition, there are many variables, and only so much can be determined through a review of radiographs and static clinical images. Nonetheless, there may be instances where one may make some general statements about this condition, and scenarios where some surgical techniques may prove more reliable than others. Toward that end, this article will present a brief synopsis of the current protocol used by this author.

PLANE OF DEFORMITY

As a general rule, patients with purely sagittal plane subluxation/dislocation of the second metatarsophalangeal joint (MPJ) tend to respond more readily to repair techniques than those who have significant transverse plane deformity. It is the belief of the author that the difference is based upon the aberrant medial displacement of the long flexor tendon in the more pronounced transverse plane conditions. Once the long flexor is displaced medial to the midline of the MPJ, then any muscle action will only serve to perpetuate the deformity of the toe, and persistent medial positioning of the long flexor may be a source of failure of surgical repair. Therefore, the alignment and function of this structure will be a component in the management of more advanced deformities. In addition, a more global view of the forefoot may need to be considered. Obviously, if there is a significant hallux valgus deformity then this may need to be repaired, especially in the face of sagittal plane MPJ deformity.

SINGLE TOE/TWO TOES, MILD DEFORMITY

This is typically a patient who presents with a symptomatic hammertoe deformity with associated medial deviation of the second and/or third toes. Arthrodesis of the toe will remedy the sagittal plane condition, but does nothing to address the transverse plane deviation, which tends to persist. The author's preferred technique in these situations is to perform a joint release with reefing of the lateral capsule as has been described by John Ruch, DPM. The dorsal and medial capsule is incised, and then a 2-0 Ethibond suture is employed to tighten the lateral capsule. At times a single over-and-over suture will suffice, but in other instances a second suture is helpful. In these circumstances it is almost as if the first suture removes the laxity at the capsular level, and the second suture then provides the actual correction.

If the patient has a symptomatic capsulitis then this technique may be combined with a Weil osteotomy. In fact, the addition of the Weil procedure appears to provide for better maintenance of correction long term. Usually the long flexor is not involved as a deforming influence at this time, and the medial deviation of the toe is typically a result of intrinsic imbalance.

MODERATE DEFORMITY, SINGLE TOE

As the deformity progresses, a critical phase is reached relative to the relationship of the tendinous structures around the joint, and flexor digitorum longus also begins to displace medially. There have been several methods described to address this particular problem. Various osteotomy techniques have been employed to displace the head of the metatarsal medialward so that the joint is more effectively realigned. This author has described a transfer of the flexor tendon beneath the flexor plate to the lateral capsule or base of the proximal phalanx so as to realign this deforming vector of force into a more advantageous

position. Either of these techniques may prove successful, and the preference is simply a function of the philosophy of the surgeon. However, when the deformity involves multiple digits then the situation is more complicated. Usually the reduction of the primary site of deformity will assist in the reduction of the adjacent joints, so that a combination of techniques may be employed at different levels. For example, flexor transfer or osteotomy may be performed at the second ray, with MPJ capsulotomy and lateral capsular reefing for the third and fourth MPJ as needed, especially if the deformity is milder at these other segments.

ADVANCED DEFORMITY

In more advanced deformities, the toe and soft tissues have adapted to the deformed position. This may include contracture of the skin, and is a component of the condition not mentioned by many authors. In some instances as one attempts to reduce the second toe into a more rectus position, the surgeon may note that the skin is actually taunt dorsomedially. The adaptive skin contracture is usually seen in senior citizens. In addition, the long flexor tendon is typically a major influence in the maintenance of deformity, and in the author's experience, must be addressed in some manner. In addition, if the skin is a factor then one may alleviate this problem via one of two general approaches. Theoretically, one may lengthen the dorsal tissues with a skin plasty, a technique that this author has not employed, or the osseous structures may be shortened sufficiently to provide adequate correction.

For several years the author employed a base resection of the second toe with syndactyly of the second and third toes in older patients, only to witness recurrent medial deviation of the second toe. It was at that time that the medial displacement of the long flexor was noted, and subsequently this structure was simply tenotomized at the time of surgery with improved results.

However, as noted, syndactyly is usually recommended when the base of the proximal phalanx is removed, and while most patients function quite well with this approach, it was not necessarily a favored technique for the patients. The author then began to focus on the other side of the joint, and a partial metatarsal head resection was then

employed to alleviate deformity and provide correction. A Kirschner wire is employed across the MPJ for fixation for approximately 4 weeks. If the toe has undergone arthrodesis, then the wire is retrograded across the MPJ and into the toe for an additional 2 weeks. Initially the author stabilized the toe across the MPJ for 6 weeks, but in some patents a great deal of stiffness was encountered at the joint level. This problem has been largely obviated with transfixation across the MPJ space for 4 weeks, yet without attendant loss of correction. A transposition of the long flexor into the lateral joint capsule is often required, particularly if there is varus rotation of the toe.

The advantage of this technique is that it can be employed in adjacent joints, as opposed to base resection. Fibrosis develops at the MPJ level and will assist in the maintenance of correction. The partial metatarsal head resection does not alter the weightbearing surface of the forefoot. Transfer pressures or pain has not been a problem.

ADVANCED DEFORMITY IN MULTIPLE SEGMENTS

Advanced subluxation/dislocation in multiple or adjacent segments typically will require more radical means of repair, and in some instances a pan metatarsal head resection is a good option. If this involves only the second and third metatarsophalangeal joints then the author has employed a partial metatarsal head resection of the second and third ray, with lateral transfer of the long flexor for the second toe. Lateral capsular reefing is performed thereafter at both levels.

ADDITIONAL THOUGHTS

When the author discusses a partial metatarsal head resection the intent is to remove just the cartilage cap from the bone. This is the amount of bone removed with the initial cut, and for most patients this will prove sufficient. In greater levels of deformity, another couple of millimeters may need to be resected to allow for adequate space without jamming of the MPJ space. A hand rasp is then used to round off the medial and lateral margins of the metatarsal head. The author does not interpose capsule into the MPJ space.