The Distal Metatarsal Articular Ankle (DMAA) remains a measurement of controversy in the world of hallux valgus correction. Much of the controversy surrounds our ability to accurately measure the DMAA, which has been shown to be affected by rotation of the metatarsal head. Thus, in a pronated first ray, the true DMAA may be measured as one angle, which may change to a different angle after the first ray is de-rotated during the course of bunion corrections. This is less of an issue in lower intermetatarsal angle bunion corrections, where pronation of the first metatarsal head is much less significant.

Generally, if the DMAA goes uncorrected, it creates increased hallux valgus deformity with correction of the intermetatarsal angle. In that case, the surgeon, in order to make the great toe straight, will create an incongruent first metatarsophalangeal joint, with the medial portion of the proximal phalanx uncovered by the first metatarsal head. This type of overpull of the proximal phalanx leads to one of two results:

1) osteoarthritis/stiffness developing at the incongruent 1st metatarsophalangeal joint
2) movement of the great toe into a position where it becomes congruent, creating significant hallux valgus and overlap of the lesser toe digits.

Neither circumstance is acceptable to the patient. If (1) appears, the great toe generally undergoes 1st metatarsophalangeal joint arthrodesis. This can be done without correcting the incongruent joint or increased DMAA, by reaming the metatarsal head with a conical reamer, creating an appropriately shaped 1st metatarsal head. If (2) appears, the forefoot must be corrected to avoid a progressive crossover 2nd toe or dislocation of the great toe MTP joint. Correction depends on the index osteotomy.

1) If the osteotomy is proximally based, and the intermetatarsal angle is reduced to anatomic, then the 1st metatarsal head must undergo a separate osteotomy to correct the elevated DMAA. Generally, it is preferable to perform a closing wedge 1st metatarsal head osteotomy, though the main consequence becomes shortening of the first metatarsal. This may have a positive effect on increasing...
the 1st MTP motion, but may have a negative effect at creating an unstable digit that can have secondary deformity recurrence. However, I prefer the closing wedge osteotomy, as the healing rates are higher in this already compromised bone. Creating a greenstick osteotomy (not completing the osteotomy through the lateral cortex) is best, as the metatarsal head stays stable, with better fixation and a better union rate.

2) If the osteotomy is distally based, a revision biplanar Chevron works best. Again, shortening may be a consequence, but again, decompressing the 1st metatarsal does help with motion. This is a more stable osteotomy, through it should be fixed to ensure appropriate reduction of the DMAA, and better union rates.

3) In both circumstances (1) and (2), one should consider adding lesser metatarsal head distal shortening osteotomies to decompress the lesser toe MTP joints (if the 1st metatarsal is shortened). If that is not addressed, the lesser toes will drift into varus, creating increased pressure on the potentially unstable hallux and creating hallux varus. Thus, this becomes a critical step.

If the intermetatarsal angle is NOT reduced at the time of surgery, it must be reduced simultaneously with the correction of the DMAA. The IMA is reduced first (generally by a Lapidus procedure in a revision situation such as this), followed by the metatarsal head closing wedge osteotomy. I will warn you that this does create even further shortening, and as such, the surgeon should give strong consideration to shortening osteotomies of the lesser metatarsal heads as well.

An alternative to shortening may be done with the pediatric procedure of performing an opening wedge osteotomy of the medial cuneiform. This procedure will help to maintain length (or increase it), which might create too much tension on the 1st MTP joint, creating stiffness. However, this operation required correction of the increased DMAA still, which can be done through the closing wedge 1st metatarsal head osteotomy. This lengthening-shortening phenomenon will result in a balanced 1st MTP joint that glides more freely.

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