Instability of the lesser metatarsophalangeal (MTP) joints is a spectrum of disease including synovitis, subluxation and dislocation of the lesser metatarsophalangeal joints. The adequate position of the toe in relation to the MTP joint depends on a delicate balance between dynamic factors (the extensor tendon and the intrinsic tendons, interossei and lumbricals) and static factors (capsule, collateral ligaments and plantar plate). The plantar plate of the MTP joint inserts with two bands to the base of the proximal phalanx of the toe. It is composed basically of fibrocartilage, with type I collagen. Synovitis of the second MTP joint is commonly associated with attritional changes in the plantar plate. This could be due to a long second ray, high heel footwear and narrow toe box. If unstable, the second toe may deviate from its original position. The direction of displacement of the proximal phalanx can be either in the horizontal or in the sagittal plane. It will depend on which supporting structures are affected the most. Pain under the metatarsal head is the most common complaint in patients with MTP instability.

After conservative approaches have failed, surgical treatments are considered. There is no surgical alternative which delivers always good results, and all of them recover joint stability through periarticular postoperative stiffness. We don’t know yet of any surgical reconstruction for the MTP plantar plate which delivers better results than decompressing the joint and promoting stiffness, either through a tendon transfer and/or the use of a kirschner wire for 6 weeks. We strive to obtain as much motion postoperatively as possible, and therefore, we try not to use kirschner wires.

We generally address the metatarsalgia with a modified Weil osteotomy, removing a slice of bone, achieving more elevation if needed displacing the metatarsal head distally along the osteotomy plane, before fixing it. If both shortening (for a dislocated toe) and elevation is needed, we increase the size of the slice removed, and allow back displacement of the head after the osteotomy is done (Figure 1). The stability is reinforced with a Girdlestone Taylor transfer or an extensor digitorum brevis tendon transfer. For the Weil osteotomy, good results have been published for unstable and dislocated lesser metatarsophalangeal joints, with an 85% rate of good to excellent results. It has been shown to be effective reducing pressure under the metatarsal heads, but up to 15% of recurrent dislocations has been reported.

MTP joint stable – no deformity: our main goal is relief of pain. We proceed with a modified weil osteotomy where we basically elevate the head, with almost no shortening. Removing a slice of 3 mm elevates the metatarsal head in 1 mm and shortens 3 mm; to increase the elevation and decrease shortening, we displace the head distal along the osteotomy plane, where leaving the head 4 mm distal to the shaft will elevate it in 3.4 mm. We always add a synovectomy. When doing it, the articular cartilage of
the metatarsal head should be examined. Any defect should be treated with drilling to promote fibrocartilage growth.

**MTP joint unstable – reducible:** First a dorsal release of the contracted structures should be performed as in the case of MTP hyperextension of hammer and claw toes, following the order presented by Myerson, starting with the extensor tendons, followed by the dorsal capsule and collateral ligaments. Then we add a modified weil osteotomy, removing a slice of bone, achieving shortening and elevation of the head. The slice is of 3 mm generally, and we allow the head to reduce against the shaft (vis-a-vis). After this procedure, we observe the balance of the proximal phalanx. The stability has to be checked with intraoperative plantar flexion – dorsiflexion of the ankle. Depending on the deviation of the base of the proximal phalanx, we will choose a different procedure:

If there is still a dorsal subluxation, we will add a Girdlestone Taylor transfer.

If there is medial deviation, we will add an extensor digitorum brevis transfer, and finally reef the opposite elongated capsule in order to obtain a well-aligned toe.

The Girdlestone-Taylor transfer has been well described for the stabilization of the lesser MTP joints and its usefulness has been showed in vitro. The clinical success ranges from 61% to 71%. The percent of not satisfied patients is basically due to MTP pain and mild recurrence of the deformity. The extensor tendon transfer that has been described uses the extensor brevis tendon transferred under the intermetatarsal ligament. In this study it was compared to the classic Girdlestone-Taylor transfer, and it was shown that the postoperative pain and the postoperative stiffness was less in the extensor brevis group. Recently Fuhrmann reported 78% of MTP reduction with this technique, where the failures were present mainly in cases of concomitant non treated hallux valgus.

**MTP joint dislocated – fixed:** after releasing all the dorsal contracted structures, an evaluation of the metatarsal shortening needed to achieve MTP reduction has to be done. If a shortening over 5 mm has to be performed, a shortening osteotomy as shown by Maceira may be used. After performing the osteotomy, the MTP stability has to be checked. A similar approach as the one mentioned for the unstable reducible case is done, adding tendon transfers as needed.

We routinely don’t use kirschner wires to hold any MTP or PIP joints. Postoperatively we keep our patients weight bearing as tolerated, with adhesive bandages kept on place for 4 to 6 weeks, performing plantar flexion exercises as soon as tolerated.

References

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