MTP Plantar Plate Direct Reparation

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The Plantar Plate is a rectangular fibrous structure that provides a cushion to the MTP joint. The distal attachment of the plantar plate to the proximal phalanx appears to be its strongest insertion directly to the bone. Although the synovial attachment to the metatarsal head is thin, the plantar plate is connected to the longitudinal bands of the plantar fascia. The collateral ligaments insert directly into the medial and lateral sides of the plantar plate helping to maintain the stability of the joint. The intermetatarsal ligament fibers insert in the plate in the plantar portion adding lateral stability to the conjunct.

The weight-bearing nature of the foot as well as the chronic hyperextension malpositioning of the MTP joint can predispose the plantar plate to attenuation or different degrees of rupture leading to instability.

There is no consensus in the literature about the best treatment for this condition. The flexor tendon transfer has been reported as the most consistently successful treatment, eliminating pain and restoring the stability of the joint. The primary repair of the MTP plantar plate has been compared with other procedures and has proven to be a promising option to address this problem.

Based on these observations we are convinced that the best way to treat the different stages of the plantar plates can be by the direct action over the attenuated or torn tissue. We always start the procedure with an MTP arthroscopy to confirm the type and extent of the plantar plate lesion. At this time of the procedure we can remove the hypertrophic (inflammatory or fibrotic) synovial tissue.

The open part of the surgery starts with a dorsal italic “S” shape incision over the MTP joint. The EDL tendon is lengthened in a “Z” manner and the dorsal MTP articular capsule is opened with a “T” shape incision, exposing the metatarsal head. In the sequence, a distal Weil metatarsal osteotomy is performed retracting the metatarsal head proximally, creating room to see and touch the plantar plate and its lesion (A).
Two 1.2mm holes are made at the base of the proximal phalanx with K wires. Two 4.0 Vycril sutures are passed through the distal border of the plantar plate detached from the base of the phalanx.

With the help of flexible steel wire loops inserted into the bone holes, the sutures are pulled up dorsally (B). The sutures are tight at the dorsum of the proximal phalanx while the toe is kept at 20 degrees of flexion at the MTP joint (C). The metatarsal head is then fixed with a small screw taking care to reestablish the physiologic metatarsal parabola.

The articular capsule is closed and the EDL tendon is sutured in the appropriate length to permit the toe 20 degrees of plantar flexion. Some cases require the use of a K wire to keep the toe in the correct position for 6 weeks.

Tapping and bandages are usually enough to keep the toe in the appropriate position. (Some clinical results will be presented to the audience during the oral presentation).

REFERENCES
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 well 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