The extensor digitorum brevis (EDB) tendon transfer and its modifications are useful for deformity correction about the lesser metatarsophalangeal (MTPJ). The modified EDB tendon transfer with specialty suture supplementation provides powerful and lasting correction about the MTPJ including deformities of varying severity and in multiple digits. The purpose of this review and case report was to provide a detailed review and description of an uniquely severe case of MTPJ deformity about the lesser MTPJ.

Schwartz originally described the first extensor tendon transfer for stabilization of a lesser MTPJ. The patient was commencing to bear weight through the affected toe and was able to bear weight through the toes to plantar to the metatarsal to produce a static stabilizer to the MTPJ. This technique was performed on just eight patients in ten digits and only for deformity of the fifth MTPJ.

Haddad et al described 2 techniques for lesser digit deformity correction, comparing the flexor digitorum longus (FDL) tendon transfer to the EDB tendon transfer. In the EDB transfer they proximally transected the tendon and routed the distal end lateral to the plantar to planar to the transverse metatarsal ligament and then tied to the proximal portion via end-to-end repair. These findings demonstrated to the extensor tendons reported less pain and stiffness and did note a higher rate of recurrence with increasing severity of deformity. Haddad et al described a modification of the EDB tendon transfer by routing the distal stump of the EDB tendon to the lateral side of the proximal phalanx through the involved metatarsal to the plantar to the metatarsophalangeal joint under the digital neurovascular bundle and to the plantar to the metatarsal head. The EDB tendon is then passed plantar to the intermetatarsal ligament and sutured to the proximal stump of the EDB tendon with side-to-side anastomosis.

Myers and Schoen described a modification utilizing a mini bilateral tenodesis screw for tendon fixation into the metatarsal neck, but without the creation of a phalangeal bone tunnel. Rather, the EDB slip was routed deep to the extensor apparatus, and this was performed with a concomitant W osteotomy. Finally, Haddad et al described the modified EDB tendon transfer wherein the tendon is harvested as proximal as possible and routed through bone tunnels in both the proximal phalanx and metatarsal neck and secured to protect under corrective tension with the use of a bilateral tenodesis screw in the metatarsal neck.

**References**


**Conclusion**

Multi-planar lesser metatarsophalangeal joint deformities are a common cause of forefoot pain and sequelae and afford a great deal of frustration to patients and surgeons alike. These deformities are caused by various factors including the pathogenesis of the joints and their anatomic and dynamic stabilizers of the MTPJ. For these patients with severe lesser multi-planar metatarsophalangeal joint deformity who fail conservative treatment, the Extensor Digitorum Brevis tendon transfer with specialty suture supplementation provides impressive MTPJ deformity reduction, stability, and a more normal functional correction without necessitating a metatarsal osteotomy. However, a thorough understanding of the anatomy and pathology of lesser metatarsophalangeal joint deformity is essential in determining the appropriate management course, achieving and maintaining correction and decreasing the likelihood of recurrence. The well planned and executed isolated case report the EDB tendon transfer is a powerful and durable technique for multi-planar MTPJ deformity and may be a useful instrument of the foot and ankle surgeon's armamentarium.

**Abstract**

The extensor digitorum brevis (EDB) tendon transfer and its modifications are useful for deformity correction about the lesser metatarsophalangeal (MTPJ). The modified EDB tendon transfer with specialty suture supplementation provides powerful and lasting correction about the MTPJ including deformities of varying severity and in multiple digits. The purpose of this review and case report was to provide a detailed review and description of an uniquely severe case of MTPJ deformity about the lesser MTPJ.

**Literature Review**

The EDB transfer, initially described as a selective treatment for second toe crossover, was found to be superior to flexor-to-extensor transfer in securing the lateral column and providing correction in other patients with pain in EDB transfer versus flexor-to-extensor transfer. Authors noted, however, that in the case of rigid deformity, FDL transfer provides more postoperative stability and is therefore the preferred procedure.

Schwartz originally described the first extensor tendon transfer for stabilization of a lesser MTPJ. In this preliminary study the author utilized the extensor digitorum longus (EDL) tendon harvested proximal to Lister's joint level and routed through bone tunnels in the proximal phalanx and metatarsal neck and subsequently sutured the tendon to the surrounding soft tissue dorsalis to the metatarsal to produce a static stabilizer to the MTPJ. This technique was performed on just eight patients in ten digits and only for deformity of the fifth MTPJ. Haddad et al described 2 techniques for lesser digit deformity correction, comparing the flexor digitorum longus (FDL) tendon transfer to the EDB tendon transfer. In the EDB transfer they proximally transected the tendon and routed the distal end lateral to the MTPJ and planar to the transverse metatarsal ligament and then tied to the proximal portion via end-to-end repair. These findings demonstrated to the extensor tendons reported less pain and stiffness and did note a higher rate of recurrence with increasing severity of deformity. Haddad et al described a modification of the EDB tendon transfer by routing the distal stump of the EDB tendon to the lateral side of the proximal phalanx through the involved metatarsal to the plantar to the metatarsophalangeal joint under the digital neurovascular bundle and to the plantar to the metatarsal head. The EDB tendon is then passed plantar to the intermetatarsal ligament and sutured to the proximal stump of the EDB tendon with side-to-side anastomosis.

Myers and Schoen described a modification utilizing a mini bilateral tenodesis screw for tendon fixation into the metatarsal neck, but without the creation of a phalangeal bone tunnel. Rather, the EDB slip was routed deep to the extensor apparatus, and this was performed with a concomitant W osteotomy. Finally, Haddad et al described the modified EDB tendon transfer wherein the tendon is harvested as proximal as possible and routed through bone tunnels in both the proximal phalanx and metatarsal neck and secured to protect under corrective tension with the use of a bilateral tenodesis screw in the metatarsal neck.

**Case Report**

We present the case of a 49 year old Female with chronically recalcitrant severe multplanar 4th and 5th digital deformities s/p previous 4th and 5th metatarsal head resections (Figure 1). She presented with a history of Diabetes Mellitus Type 2 with Charcot’s Neuropathy and has undergone previous medial column fusion and partial digital #2 amputation, complete digital #3 amputation and metatarsal head resection #3, #4 and #5. Her chief complaint was her lack of ability to purchase shoes with her current foot shape and an inability to successfully navigate appropriate shoes.

The decision was made to pursue surgical reconstruction at MTPJ #4 and #5 with a modified Extensor Digitorum Brevis Tendon transfer. Considering the patients previous pedal amputations, it was theorized that there may be inadequate bone structures for corrective tunneling and there may be abnormal EDB tendon anatomy. Remaining EDB tendon was harvested proximally. Metatarsal tunnels were created using the 1.5mm drill in a dorsal-proximal-medial to plantar-distal-lateral through the dorsal and medial -plantar to plantar through the proximal phalanx and the EDB and specialty suture were secure in place under minimal tension utilizing Kirshner wire fixation (Figure 3). The patient was place non-weight bearing for a period of 4 weeks at which time the temporary K-wires were extracted and postoperative observation commenced. After a period of 14 months the patient maintained EDB and specialty suture fixation with excellent triplanar deformity correction (Figure 3).