Introduction:
Disorders of the 2nd MTP joint may lead to varus deviation of the toe. Lesser metatarsal osteotomies are generally the treatment of choice for a cross over toe deformity.

Several lesser metatarsal osteotomies have been described. The distal metatarsal sliding osteotomy was presented by Weil in 1992 in Europe, and Barouk first published it in 1996. Other lesser metatarsal shortening osteotomies have been described early by Borggreve, Giannestras (Giannestras), and recently Garg.

Indications:
3. For a transverse plane instability a extraarticular shortening osteotomy (Garg) is indicated in combination with a capsular release
4. For sagittal and transverse plane instability a intraarticular osteotomy (Weil) is indicated

Contraindications:
1. Destroyed or severe osteoporotic metatarsal heads
2. General contraindications for surgery

Technique:
The procedure is generally performed under peripheral nerve blockade with or without Esmarch tourniquet.

A: Extraarticular shortening Osteotomy (Garg)

A dorsal incision is made over the MTP joint and the distal metatarsal. Usually a release of the medial collateral ligaments is necessary. Subperiosteal dissection around the metatarsal neck is performed and 2 Hohmann retractors are inserted around the metatarsal neck. Two oblique parallel osteotomies are made at a 45 degree angle to the distal metatarsal. A segment of the appropriate size to shorten the metatarsal is removed. The Osteotomy is fixed with a 2.4 mm screw.
B Weil osteotomy
A dorsal incision is made and the extensor tendons are lengthened. The joint capsule is opened dorsally, depending upon necessity judged by the contracture and dislocation of the joint, the collateral ligaments are also released.

The phalanx is now plantarflexed to expose the metatarsal head. To avoid undesired plantarflexion of the metatarsal head, a slice should be removed. In order to do so first a cut on the dorsal aspect of the metatarsal head, but the plantar cortex is not penetrated yet. A second cut is now made 2 mm plantar and parallel to the first. Finally the dorsal cut is finished. The slice is now removed.

The plantar fragment is now shifted proximally to achieve the requisite amount of shortening that was measured preoperatively on the dorsoplantar radiographs. The osteotomy is then secured with special 2mm Titanium "Spin screws". The resulting dorsal protuberance over the metatarsal head remnant is now removed.

Weightbearing with a postoperative shoe was allowed after the second postoperative day.

Outcomes:
Trnka et al. reported in 2001 a series 31 consecutive patients were treated with a Weil osteotomy. Results of the survey of patient satisfaction revealed excellent results in 21 patients (42 osteotomies). A major complication was plantar penetrating hardware in 10 cases. According to their short-term results, the Weil osteotomy is a satisfactory and method for correction of metatarsalgia caused by dislocation of the MTP joint.

In 2005 Hofstätter and Trnka prospectively evaluated the one and seven-year results of the Weil Osteotomy for the treatment of metatarsalgia with sub/dislocated MTP joints in 25 feet of 24 patients. Good to excellent results were achieved in 84% (21/25) after one year and in 88% (22/25) after seven years. The AOFAS score significantly improved from 48(±15) points prior to surgery to 75(±24) at one year, and to 83 (±18) at seven years post surgery. The procedure significantly reduced pain, diminished isolated plantar callus formation and increased the patient’s ambulatory capacity. Redislocation of the MTP joint was seen in 8% (2/25) after one year and in 12% (3/25) after seven years post surgery. Although floating toes and restricted metatarsophalangeal joint motion may be encountered, we conclude that the Weil osteotomy is a safe and effective method for the treatment of the dislocated MTP joint.

Garg et al. presented in 2008 a series of segmental resection osteotomies. Between 2004 and 2006, 48 patients underwent the segmental resection osteotomy with a mean followup of 13 (range, 6 to 26) months. The postoperative AOFAS forefoot score was an average of 87.6 (range, 59 to 100; SD, 10.97) and the overall satisfaction rate was 85.4%. The complication rate was 18.8% for transfer metatarsalgia, 27.1% for floating toes, 35.4% for toe weakness, 14.6% for infection, and 10.4% for wound healing problems.

Complications:
Complications include floating toe, transfer lesions, redislocations, joint stiffness

Literature:
1, 5, 6, 9, 10, 8, 7, 11


6. **Melamed, EA; Schon, LC; Myerson, MS; Parks, BG**: Two modifications of the Weil osteotomy: analysis on sawbone models. Foot Ankle Int, 23:400-405, 2002.


