

## Does Hallux valgus severity change after medial capsulotomy? Intraoperative Analysis

Ruben Radkievich, MD, Nathaly Caicedo, MD, Andres Keller Díaz, MD, Rafael Calvo, MD, Pablo Wagner, MD, Emilio Wagner, MD

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**Introduction/Purpose:** Most treatment algorithms for hallux valgus surgery consider the intermetatarsal angle (IMA) and the metatarsophalangeal (MTP) angle to help decide which technique to choose. Some guidelines are more stringent, and some use different absolute values to decide between one technique and another. Every open approach includes a medial metatarsophalangeal capsulotomy to gain access to the joint and perform some type of osteotomy. No study is available which measures hallux valgus deformity after an intraoperative metatarsophalangeal capsulotomy, which may change our surgical technique depending on the algorithm in use. Our hypothesis was that when performing a medial capsulotomy, the hallux valgus deformity would increase.

**Methods:** We analyzed 20 feet in 14 hallux valgus patients operated between April to June 2017, average age 57 years, 13 women and 1 men. Patients with previous hallux valgus surgery, arthritic changes, knee or hip comorbidities were excluded. Fluoroscopic images were taken in a standardized manner, simulating weight bearing images, with knee and hip in flexion, stabilizing the foot over the mini C arm in maximal ankle dorsiflexion. All the images were taken by the same observer. Digital images were analyzed, and the IMA and MTP angles were measured by two independent observers. The average preoperative IMA was 13.6 degrees, and the average MTP angle was 23.4 degrees. Statistical analysis was performed using SPSS software,  $p < 0.05$ .

**Results:** After opening the medial capsule, we observed a significant increase in the IMA (mean 2.78 degrees, 2.4 - 3.1 degrees 95% confidence interval) and in the MTP angle (mean 4.4 degrees, 3.6 - 5.2 degrees 95% confidence interval). No correlation was found between the severity of the deformity and the relative increase in angular measurements. There was no significant variability between the two observers.

**Conclusion:** When using algorithms for treatment decision making in hallux valgus surgery, it is important to clearly define the severity of the deformity to choose appropriately the technique to be used. When choosing a technique near its correction limit, if we consider that the deformity will increase after opening the medial capsule, it may be possible to underestimate the deformity and therefore use an underpowered technique, leading to a suboptimal result. We recommend therefore to add 3 and 5 degrees to the IMA and MTP angle measurement respectively, and then choose the appropriate technique.