AMERICAN ORTHOPAEDIC FOOT & ANKLE SOCIETY®

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POSTION STATEMENT
Minimally Invasive Surgery for Hallux Valgus Deformity

Position Statement

The American Orthopaedic Foot & Ankle Society (AOFAS) recognizes minimally invasive surgery (MIS) as an option for the correction of mild to moderately severe hallux valgus (HV) deformity. We do not consider this procedure to be experimental.

The AOFAS is a medical specialty society of 2,500 members, primarily orthopaedic surgeons, specializing in the operative and nonoperative treatment of injuries, disease, and other conditions of the foot and ankle. The AOFAS promotes quality patient care through education, research, and training of orthopaedic surgeons and other healthcare providers, and serves as a resource for government, industry, and the healthcare community on issues concerning the medical and surgical care of the foot and ankle.

Background

Hallux valgus (HV) is the most common deformity of the forefoot with a global prevalence of close to 19%.[3] Surgical correction is indicated when non-surgical management fails. More than 150 different techniques have been described for open surgical correction. Open surgery has been associated with prolonged recovery times, scarring, risk of avascular necrosis, nonunion, and postoperative pain secondary to the extent of soft tissue dissection. Hence, there has been increasing interest in the use of minimally invasive surgery (MIS) to correct HV deformities.[1]

MIS for HV deformity uses small skin incisions through which a low speed-high torque burr can be used to perform an osteotomy of the first metatarsal, followed by deformity correction with or without stable internal fixation.[6,8] As techniques evolve and improve over time, MIS for HV deformity is steadily gaining interest. Compared to 1st generation (1G) MIS (intra-articular osteotomy with no fixation) and 2nd generation (2G) MIS (extra-articular osteotomy with K-wire stabilization) techniques, there is growing evidence that 3rd generation (3G) and 4th generation (4G) techniques with improved instrumentation and fixation are safe, reproducible, and associated with rapid improvement in pain scores, early weightbearing, significant deformity correction, high patient satisfaction, and low frequency of complications.[5,8,10,12,14]

Third generation (3G) MIS HV techniques are a modification of the chevron-type osteotomy, with the addition of one or two screws to gain extra stability, allowing faster rehabilitation with minor complications. Different modifications of 3G MIS technique have been described and used with promising results. Some modifications of 3G MIS HV surgeries described in the literature include Minimally Invasive Chevron-Akin (MICA); Percutaneous Extra-articular Reverse-L Chevron (PERC); Percutaneous Chevron/Akin (PECA); and Percutaneous Intra-articular Chevron Osteotomy (PeICO).[4,8-10] Recently, Lewis et al. described a 4G MIS HV surgery which includes a multiplanar rotational deformity correction achieved through manipulation of an extra-articular distal first metatarsal osteotomy that is held with rigid fixation using 2 fully threaded screws, of which one must be bicortical to provide rotational and biomechanical stability.[11]

Recent evidence has shown MIS surgery to be safe with good clinical and radiographic outcomes comparable to traditional open techniques for symptomatic mild to moderately severe HV deformity. Potential advantages of MIS over open surgery that have been shown include decreased recovery and rehabilitation times and less soft tissue trauma.[1,7,12,14]

Peer-Reviewed Publications on Minimally Invasive Surgery (MIS) for Hallux Valgus (HV)

The efficacy and safety of MIS for HV deformity with the use of 3G techniques, including screw fixation of the osteotomies have been well documented.[7- 9,13,14,16] MIS for HV is recognized as a viable alternative to traditional open techniques, based on a Level I systematic review and meta-analysis by Alimy et al., using the best available evidence to date (6 RCTs and 1 prospective comparative study). In a total of 395 feet, the authors found no differences in open surgery versus MIS for HV in terms of clinical or radiographic outcomes, complication rate or severity, and surgical duration.[1]

Kaufmann et al. analyzed two groups of patients undergoing MIS HV surgery (25 patients) and open Chevron osteotomy (22 patients). They found that both operative techniques achieved significant correction of the deformity. No significant differences were observed between the groups based on predetermined outcome parameters. With the minimally invasive chevron osteotomy, radiographic and clinical outcome were comparable to the open technique.[7] Neufeld et al. reported on a consecutive series of 94 patients undergoing MICA for HV. They found the MICA osteotomy was a safe and reproducible technique, associated with rapid improvement in pain scores, early weightbearing, significant deformity correction, high patient satisfaction, and low frequency of complications.[14]

Lewis et al. performed a Level IV, retrospective case series of 78 consecutive patients undergoing primary isolated 3G PECA osteotomy for HV by a single highly experienced MIS surgeon, followed for at least 5 years. They demonstrated a radiographic recurrence rate of 7.7% which is comparable to other previously published midterm results for open HV correction and previous generations of MIS for HV deformity (3.6%-11.3). Three recurrences occurred in the 9 feet with severe preoperative deformity (HVA >40 degrees). Their patient satisfaction scores, VAS scores, and Manchester Oxford Foot Questionnaire Scores (MOXFQ) remained high and comparable to other 3G studies with shorter duration of follow-up.[9] In a Level IV prospective case series, the same authors reported on patients treated with 4G evolution of the MIS HV technique using a transverse osteotomy instead of a chevron in 47 feet with mean follow-up of 1.3 years. One recurrence was reported prior to 6 months, and no angular progression in any feet after 6 months. Easier rotational correction and a lower risk of fixation loss from lateral wall fracture compared to chevron osteotomy was credited.[11]

In a Level III retrospective comparative study, Yoon et al. compared the radiographic and clinical outcomes of mild to moderate (HVA<40 degrees, IMA<16 degrees) and severe HV (HVA>40 degrees, IMA>16 degrees) treated with Minimally Invasive distal metatarsal Transverse Osteotomy (MITO) by a single surgeon. A total of 116 feet were included in this study with a median follow-up of 29 months (range, 24-52 months). Both groups showed significant improvements in all radiographic parameters postoperatively, with the degrees of correction greater in the severe group than in the mild to moderate group. Overall clinical outcomes were comparable to those of conventional treatments.[16]

Mazzotti et al. analyzed the clinical and radiographic results of the Simple Effective Rapid and Inexpensive (SERI) technique, a linear distal metatarsal osteotomy with Kirschner wire fixation, a 2G technique for treating severe HV. The SERI technique applied to 117 feet with severe HV showed positive clinical and radiographic outcomes. The authors emphasized that careful patient selection and no more than low grade first MTPJ arthritis are essential to obtain favorable results.[13]

The learning curve to reach technical proficiency for 3G PECA and MICA osteotomies was described as steep by Lewis et al., with the mean number of cases thought to be around 38 cases.[10] However, they demonstrated that the complication rate does not correlate to the number of cases performed, therefore surgeons interested in learning MIS can be reassured that there is unlikely to be an additional risk of harm to a patient during the learning curve. Toepfer et al. analyzed their first 50 consecutive MICA procedures. They concluded that although the learning curve of 3G MICA is flat and requires specific training and intensive practice, the rate of complications is not elevated compared to other percutaneous HV techniques. In their review, the learning curve showed a continuous improvement with respect to surgery time and use of fluoroscopy (after 40 procedures, the surgery time consistently dropped under 45 minutes and required less than 100 fluoro-shots).[15] Baumann et al. performed a systematic review of Level I-III studies to examine the learning curve associated with MIS for HV deformity and any potential influence on outcome. They found an average of 35.5 surgeries (range 27 – 40) are needed to reach the plateau phase of the learning curve of MIS for HV. While the learning phase is associated with a significant increase in operative time and fluoroscopy usage, it is not associated with decreased outcomes nor higher complication rates.[2]

Conclusions

1. The use of 3G and 4G MIS HV surgery is steadily gaining popularity, with recent evidence showing satisfactory outcomes and a safe complication profile.

2. The AOFAS recognizes MIS HV surgery as a viable option for the surgical management of HV deformities.

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