Radiographic and Clinical Results of Minimally Invasive Transverse Distal 1st Metatarsal Osteotomy for Symptomatic Hallux Valgus

Christopher W Hodgkins, Dino Fanfan, Christian Guevara[1], Claire Margaret Callan, Daniel Murray[2], Thomas P San Giovanni[3], Cary B Chapman[4]

[1]Herbert Wertheim College of Medicine, [2]Northwell Health, [3]Miami Orthopedics & Sports Medicine Institute, [4]Baptist Health Orthopedic Instititue

INTRODUCTION: Minimally invasive techniques for surgical treatment of hallux valgus has gained popularity over the past few years. Most published reports involve combined minimally invasive Chevron and Akin osteotomies (MICA) performed by a single surgeon. This study reports radiographic and clinical results on patients who underwent minimally invasive transverse distal 1st metatarsal and Akin osteotomies by 3 fellowship trained Foot & Ankle orthopedic surgeons. A minimally invasive transverse distal 1st metatarsal osteotomy has advantages over MIS chevron osteotomy as it is less technically demanding and in theory, the surgeon can control 1st metatarsal head rotation to improve sesamoid position.

METHODS: 192 consecutive patients between 2019 and 2022 with symptomatic Hallux valgus without 1st tarsometatarsal or metatarsal phalangeal joint arthritis or TMT joint instability were followed for at least **one year**. Primary radiographic outcomes include pre and postoperative hallux valgus and 1-2 intermetatarsal angles. Pain relief was measured by VAS scores. Patient Reported Outcomes (PROMS) used were Foot and Ankle Mobility (FAAM) scores in the dimension of activities of daily living (ADL) and sports. PROMS measured at one year follow-up. Radiographic recurrence was defined as a change in HVA >2.6 degrees between any 2 postoperative radiographs and an HVA >15 degrees. Z-Scores were calculated depending on the patient's demographics based on normative values to assess the deviation from a normal population FAAM scores.

RESULTS: Additional procedures were performed on 83 feet (39%), the most common being lesser metatarsal osteotomies, which was performed in 88% of those patients. Among corrected bunions, 8.5% were classified as severe (HVA >40 degrees) and 79% were moderate (HVA >20 and <40 degrees). Average pre-op HVA and IMA were 28.4 and 12.8 degrees and improved to 8.4 and 4.2 degrees ($p < 0.001$). Average pre-op HVA and IMA were 24.9 and 12.2 degrees respectively and improved to 8.43 and 5.86 degrees ($p < 0.01$) at 3 months. From the 3 months to 12 months, the patients' HVA and IMA average was 9.39 and 6.85, but this change was not statistically significant ($p = 0.35$). VAS scores improved from 5.37 preoperatively to 1.9 at final follow up ($p < 0.01$). The average postoperative FAAM ADL score was (86.34 +/- 17.18) and z-score was (-0.08 +/- 1.16). The average postoperative FAAM sport score was (66.12 +/- 30.93) and z-score was (-0.26 +/- 1.94).

DISCUSSION AND CONCLUSION: Overall, the results of the study affirm the literature that fourth generation MIS hallux valgus surgery remains a good option. This study showed no infections in patients undergoing MIS hallux valgus surgery and the correction of the hallux valgus angles that persisted at 12 months with low recurrence rates. At this time, the results show a trend toward lower sports FAAM scores postoperatively but the difference from a normal population is not significant in any subscore domain from a normal population. Longer follow-up is needed to evaluate the trend further.