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ORIGINAL ARTICLE

Modified Mitchell osteotomy alone does not have higher rate of residual metatarsalgia than combined first and lesser metatarsal osteotomy

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Abstract Transfer metatarsalgia (TM) is a common forefoot disorder secondary to hallux valgus (HV). Some authors suggest that a combined lesser metatarsal osteotomy while undergoing HV surgery improves metatarsalgia, whereas others concluded that isolated HV corrective osteotomy can improve symptomatic metatarsalgia. The main purpose of this retrospective study was to compare clinical outcomes in patients with and without combined lesser metatarsal osteotomy while receiving HV correction surgery. We retrospectively reviewed the patients who underwent osteotomy for HV correction between January 2000 and December 2010. All patients underwent HV correction with modified Mitchell osteotomy. Clinical evaluations including the American Orthopaedic Foot and Ankle Society score and residual metatarsalgia were assessed, and radiographic measurements were carried out. Sixty-five patients (83 feet) meeting the selection criteria were enrolled. Thirty feet receiving a combined lesser metatarsal osteotomy were classified as the combined surgery (CS) group, and the others were classified as the control (CN) group (53 feet). The overall rate of persistent symptomatic metatarsalgia was 19.28% after operative treatment. There were six feet with residual metatarsalgia in the CS group, and 10 feet in the CN group. There was no significant difference in the rate of persistent symptoms between the two groups ($p = 0.9$). According to this result, modified Mitchell osteotomy alone did not have a higher rate of residual metatarsalgia than CS. We also found that the average recovery rate of TM was about 80.7% and those patients

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whose preoperative HV angle was $> 30^{\circ}$ had the higher risk of residual metatarsalgia after surgery.

Introduction

Transfer metatarsalgia (TM) is a common forefoot disorder secondary to hallux valgus (HV) because decreased loading on the first metatarsal head leads to lateral shift of weight to lesser toes [1]. Although corrective osteotomy for HV is common, the best treatment option for symptomatic TM combined with HV remains controversial. Some authors suggest that a combined lesser toe osteotomy during HV surgery decreases postoperative metatarsalgia or improves preoperative painful plantar callosity [2–4]. However, other authors suggested that isolated HV corrective osteotomy alone improved symptomatic plantar callosity on lesser toes [5,6].

Because of the different viewpoints concerning treatment of HV with TM, the main purpose of this retrospective study was to compare clinical outcomes in patients with HV and TM who received combined osteotomy with those who underwent corrective osteotomy for HV alone. We also evaluated several parameters to find the predictive factors of residual metatarsalgia after surgery, which were not included in previous studies.

Methods

We retrospectively reviewed the medical records and radiographs of patients who underwent osteotomy for HV correction between January 2000 and December 2010 at the Department of Orthopaedics, Kaohsiung Medical University Chung-Ho Memorial Hospital (Kaohsiung, Taiwan). We included patients who were scheduled to undergo surgery for HV correction combined with lesser toe metatarsalgia. Patients with hallux rigidus, rheumatoid arthritis, gouty arthritis, a previous surgery on the affected toe, or psychologic diseases were excluded.

All patients underwent HV correction with modified Mitchell osteotomy. The surgical procedures carried out are described elsewhere [7]. The modified Mitchell osteotomy was performed by double step-cut osteotomy through the neck of the first metatarsal, leaving a lateral piece of cortex. Some patients received operative correction for TM simultaneously. We used a sliding oblique metatarsal osteotomy [8] to treat the metatarsalgia in patients who received a combined lesser metatarsal surgery. In all cases, the surgeries were performed by two experienced surgeons.

All patients consented to participation in this study, and all aspects of the study were approved by the Institutional Review Board of kaohsiung Medical University Hospital. Regular follow-up (at 2 weeks, 6 weeks, 3 months, 6 months, and 1 year) was scheduled for each patient after discharge. Nonweight-bearing on the first metatarsal head for 6 weeks was instructed. We removed sutures at the 2-week follow-up and removed the pin for lesser toe metatarsal osteotomy at the 6-week follow-up. Partial weight-bearing was instructed after the 6-week follow-up, and full weight-bearing was allowed after the osteotomy site was confirmed to be stable at the 3-month follow-up.

The clinical evaluations including the American Orthopaedic Foot and Ankle Society (AOFAS) score [9] and residual metatarsalgia were assessed at each follow-up. Series radiographic examinations including anteroposterior and lateral weight-bearing views were assessed to determine the HV angle (HVA), first to second intermetatarsal angle (IMA), metatarsal shortening (MS), and plantar shifting (PS) of the metatarsal head. All radiographic parameters were measured by two independent investigators who were not involved in the surgery. The values of the measurements at the 1-year follow-up were averaged to produce the radiographic results. HVA is defined as the angle between the longitudinal axis of the first metatarsal and the proximal phalanx, and first to second IMA was measured as the angle formed by the intersection of the axis of the first and second metatarsal [10] (Figs. 1 and 2). The PS was measured on lateral radiograph and defined as the difference in the distance between the dorsal cortex of metatarsal shaft and plantar-displaced metatarsal head related

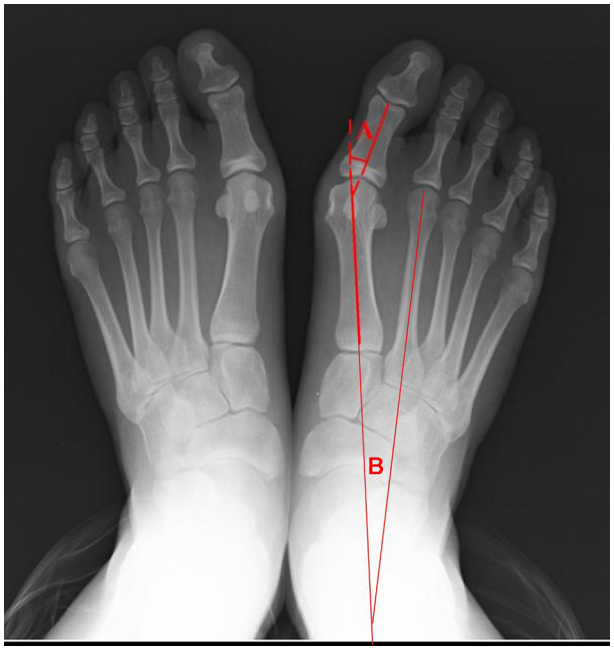

Figure 1. The preoperative X-ray shows the measurements of hallux valgus angle (∠A) and 1–2 intermetatarsal angle (∠B).