

# New modified technique of osteotomy for hallux valgus

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## ABSTRACT

**Purpose.** To improve the technique of osteotomy for hallux valgus (bunion).

**Methods.** 38 cases of a new modified osteotomy procedure for hallux valgus were performed for 22 patients (21 women and one man). During a 3-year (range, 2-5 years) follow-up, the patients underwent physical examination; and their American Orthopedic Foot and Ankle Society hallux-metatarso-phalangeal-interphalangeal scale scores and standard foot radiographic measurements were recorded.

**Results.** 20 of the 22 patients (38 cases) had no pain, achieved good cosmesis, and were completely satisfied with the results of the operation. The remaining 2 patients had occasional mild discomfort. The mean hallux-metatarso-phalangeal-interphalangeal scale score was 93 points (range, 78-100 points). The mean preoperative and postoperative metatarsophalangeal angles were 34 degrees and 11 degrees, respectively. The mean postoperative reduction of the inter-metatarsal angle and metatarsophalangeal angle were 6 degrees and 23 degrees, respectively.

**Conclusion.** The new technique of osteotomy achieved even greater stability and accurate correction of the deformity in our 38 cases. Furthermore, it was more effective than conventional 'chevron' osteotomy in terms of correction of the deformity. Therefore, it should be used more widely.

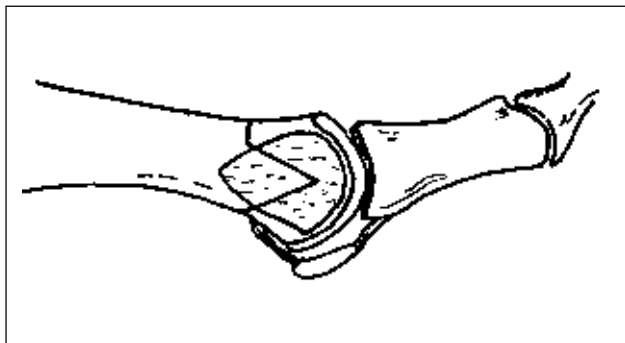
**Key words:** hallux valgus; osteotomy

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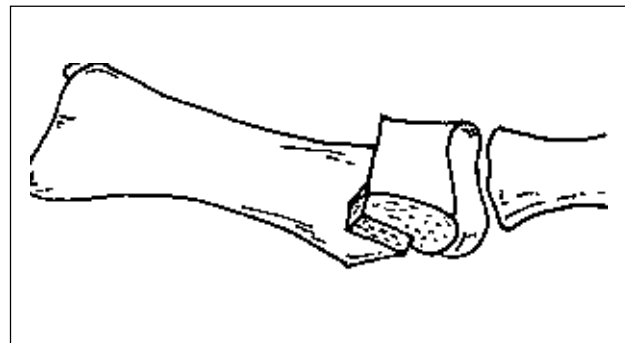
## INTRODUCTION

Distal osteotomy of the first metatarsal is widely performed to treat symptomatic hallux valgus (bunion). Corless<sup>1</sup> reported a modification of the technique described by Mitchell et al.,<sup>2</sup> in which the osteotomy uses a V-shape to provide greater stability. Johnson et al.<sup>3</sup> also reported excellent relief of pain and cosmetic correction with this modified 'chevron' osteotomy technique on 26 feet (18 patients).

We further modified this technique to provide even greater stability at the osteotomy site, as well as more effective and accurate correction of the



**Figure 1** A transverse osteotomy just proximal to the neck is made at a depth of 2 mm perpendicular to the long axis of the metatarsal (lateral view).



**Figure 2** The osteotomy is performed with an oscillating saw. The distal fragment is displaced laterally by digital pressure and the proximal fragment is grasped with tower clip (apical-oblique view).

deformity than conventional modified chevron osteotomy. Our technique is a transverse osteotomy that performs just proximal to the neck to a depth of 2 mm perpendicular to the long axis of the metatarsal.

## MATERIALS AND METHODS

In our modified method, a dorsomedial incision, about 5 cm long, was made from the distal one third of the first metatarsal to the metatarsophalangeal joint. Care was taken to protect the sensory branch of the musculocutaneous (superficial peroneal) nerve in this area by retracting this nerve and its vascular bundle as well as the extensor hallucis longus tendon to the dorsum. After exposing the capsular structures, we created a V-shaped flap, with its base (the wide end) attached to the proximal phalanx. The metatarsal head was exposed, and the bunion was removed with an oscillating saw. A transverse osteotomy was performed just proximal to the neck to a depth of 2 mm perpendicular to the long axis of the metatarsal (Fig. 1).

The apex of the V-shape extended just distal to the centre of the metatarsal head, and the upper arm ideally extended from the apex to a point 2 mm below the metatarsal neck. The lower arm of the V-shape extended to the inferior portion of the metatarsal neck. The appropriate angle between upper arm and lower arm was 60°. During osteotomy, the proximal fragment was grasped with a tower clip and the distal fragment was displaced laterally by digital pressure (Fig. 2). The amount of lateral displacement was determined by the correction needed and could be as far as 6 to 8 mm.

Any bone that protruded medially from the shaft could be removed with a saw; the capsular flap was then proximally advanced through drill holes and sutured with interrupted sutures. Routine closure was



**Figure 3** Operative photograph of the new modified technique of osteotomy for hallux valgus. The distal fragment is displaced laterally as much as the correction needs.

performed, and the foot was incorporated in a bulky compression dressing. Ambulation was begun in a short leg-splint on the second postoperative day. Starting in the second postoperative week, a short leg-walking cast was worn for 4 weeks.

The advantage of this new modified osteotomy technique was that the distal fragment could be easily displaced and controlled. It allowed more effective and accurate correction than the conventional osteotomy could achieve; it also allowed a more stable result than the modified chevron osteotomy did (Fig. 3). Between March 1998 and December 2000, a total of 38 cases of our modified osteotomy procedure were performed for hallux valgus among 22 patients, 16 of whom underwent surgery of both feet. 21 of the 22 patients were women, whose ages ranged between 18 and 65 years, and one patient was a 41-year-old man. After surgery, patients were asked whether they were satisfied with the result, and whether pain had been alleviated. During 3 years of follow-up, the patients underwent physical examination, and their American Orthopedic Foot and Ankle Society hallux-metatarso-

phalangeal-interphalangeal scale scores<sup>4</sup> and standard foot radiographic measurements<sup>5</sup> were recorded.

## RESULTS

After the new modified technique of osteotomy, all 22 patients said they were completely satisfied with the results and all reported alleviation of pain. 20 of the 22 patients (38 cases) had no pain, achieved good cosmesis and were satisfied with the results of the operation, according to the clinical rating systems of Kitaoka et al.<sup>4</sup> The remaining 2 of the 22 patients had occasional mild discomfort.

At the 3-year follow-up, the mean score according to the hallux-metatarso-phalangeal-interphalangeal scale<sup>4</sup> was 93 points (range, 78–100 points). Radiographs of the forefoot were also obtained during the follow-up period. The mean preoperative intermetatarsal angle was 14° (range, 11°–23°), which decreased to 8° (range, 5°–14°) after osteotomy; the mean correction was 6°. The mean preoperative metatarsophalangeal angle was 34° (range, 16°–48°), and the mean postoperative angle was 11° (range, 7°–15°); the mean correction was 23°. No osteonecrosis of the metatarsal head was visible at the 3-year follow-up.

## DISCUSSION

Many kinds of first metatarsal osteotomy accompanied by bunionectomy and soft-tissue reconstruction for the treatment of symptomatic hallux valgus have been described and performed, but the choice of operation is difficult.<sup>6,7</sup> Although reviews of various operative procedures are available in the literature, the choice of operative technique is in fact made by the surgeons, on the basis of their training background and practical experience. Multiple variations of metatarsal osteotomy have been devised, but the distal osteotomy by Mitchell et al.<sup>2,8</sup> remains widely used. Klosok et al.<sup>9</sup> has compared the chevron and Wilson metatarsal osteotomy approaches of managing hallux valgus, and showed better functional results in the Wilson group than in the chevron group.

Conventional osteotomy is not stable and requires internal fixation with wires or passage of a heavy suture through offset drill holes.<sup>10</sup>

Modified chevron osteotomy seems to produce anatomical correction similar to that of our technique and to result in improved stability; however, it does not prevent dorsal angulation, medial and lateral tilting, and shortening.<sup>10</sup> Displacement of the distal fragment, dorsal angulation, nonunion, and avascular necrosis have been reported as complications of the modified chevron osteotomy.<sup>10,11</sup> Trnka et al.<sup>11</sup> reported that 4 of 46 patients had intra-operative instability at the chevron osteotomy site. Metatarsal shaft osteotomy, preferred by many surgeons, is the procedure performed in the Wilson operation.<sup>12</sup>

Our new modified technique of osteotomy of the first metatarsal can prevent dorsal angulation, as well as medial and lateral tilting and shortening at the osteotomy site. For this reason, we believe that compared with other authors,<sup>10,11</sup> our modified approach achieves a more stable result at the osteotomy site, and much more accurate correction is possible. Furthermore, in our series of patients, there were no cases of significant shortening of the first metatarsal. We had no complications of thrombophlebitis, nonunion of osteotomy site, or avascular necrosis of the metatarsal head. Disability after this operation has been so minimal that most patients could return to their full activity 6 to 8 weeks after surgery.

## CONCLUSION

38 cases of osteotomy for symptomatic hallux valgus, in which our new modified technique were performed among 22 patients, all of whom experienced satisfactory pain relief and acceptable cosmesis.

The mean postoperative reduction in the intermetatarsal angle was 6° and that in the metatarsophalangeal angle was 23°. There was no loss of correction during the follow-up period. This new modified technique of osteotomy afforded higher mechanical stability, and more accurate and effective correction of the deformity was possible, compared with other techniques. Therefore, we recommend that our technique can be used more widely.

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