



Comparison of Chevron and Distal Oblique Osteotomy for Bunion Correction

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ABSTRACT

The chevron osteotomy is a standard procedure by which bunions are corrected. One of us routinely performs a distal oblique osteotomy, which, to the best of our knowledge, has not been described for the correction of bunion deformities. The purpose of the present study was to compare the short- and medium-term results of the distal oblique and chevron osteotomies for bunion correction. We performed a retrospective clinical and radiographic comparison of patients who had undergone a distal oblique or chevron osteotomy for the correction of bunion deformity. In addition, a prospective patient satisfaction survey was undertaken. A total of 55 patients were included in the present study and were treated from January 2012 to November 2014. Of the 55 patients, 27 (49.2%) were in the chevron group and 28 (50.8%) in the distal oblique group. Radiographically, no statistically significant difference was found between the 2 groups with respect to postoperative first intermetatarsal angle ($p < .0001$) and hallux valgus angle ($p < .0001$), but a greater change was found in the intermetatarsal angle in the distal oblique group ($p = .467$). Prospective patient satisfaction scores were available for 33 patients (60%), 16 (29%) in the chevron group and 17 (31%) in the distal oblique group. When converting the satisfaction score to a numerical score, the chevron group scored 3.3 ± 1.1 and the distal oblique group scored 3.2 ± 0.8 ($p = .812$). We found that the distal oblique osteotomy used in the present study is simple and reliable and showed radiographic correction and patient satisfaction equivalent to those in the chevron osteotomy.

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Bunion deformity, or hallux abductovalgus (HAV), is the most common pathology affecting the first ray and has been reported to occur in $\leq 30\%$ of the adult population. Most often, conservative measures will fail to relieve the pain, and surgical correction will be indicated. Many different procedures have been recommended for the correction of symptomatic HAV, from simple exostectomy, osteotomy of the metatarsal and/or proximal phalanx, to arthrodesis (1). One of the most common methods to correct a bunion is the chevron osteotomy. This method has a long history and provides consistent results (2–5). In addition, modifications have been proposed to plantarflex, shorten, and provide metatarsal articular angle correction (with shortening) (6,7). Although the procedure is effective and predictable, complications have been reported, and concern exists for the vascular supply because of perfusion of the capital fragment of the first metatarsal (8).

Because the chevron osteotomy is the standard by which many bunion procedures are tested against, many comparative studies have been performed when evaluating other osteotomies (9–12). Although nearly all reports have discussed the clinical findings (e.g., callosities, pain, recurrence, and range of motion) and radiographic correction (e.g., the first intermetatarsal angle [IMA], hallux abductus [HA] angle, and distal metatarsal articular angle [DMAA]), few studies have addressed patient satisfaction using validated outcome measures (13,14). This is an important aspect of surgical success, and clarity is lacking regarding the best choice procedure for achieving the optimal alignment (15,16).

One of us (B.M.S.) has begun using a distal oblique osteotomy through the first metatarsal head in cases of mild to moderate HAV. This single osteotomy line at the distal first metatarsal is made from dorsally to distally and plantar to proximally and is fixated with 1 or 2 screws. It resembles a very distal Mau osteotomy (17) or a modification of a Weil osteotomy (18) used for lesser metatarsals but has not been described in this fashion for bunion correction to the best of our knowledge. This is a versatile osteotomy that provides for shortening or lengthening, elevation or plantar displacement, and articular angle correction. It might also be more protective of the vascular supply owing to the location of the osteotomy. The present study compared

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the chevron osteotomy with this novel distal oblique osteotomy using the clinical and radiographic parameters. In addition, we included a patient satisfaction survey used in other similar studies (9). We hypothesized that this simple and versatile osteotomy will provide measures of satisfaction and objective outcomes comparable to those with chevron osteotomy.

Patients and Methods

The institutional review board approved (approval no. 15-49E) the present study. A review of the medical records and radiographs was performed of consecutive patients who had undergone either a chevron osteotomy or a distal oblique osteotomy by 1 of us (B.M.S.) for the correction of mild to moderate HAV. The patients were identified by medical record search using the Current Procedure Terminology code 28296. A review of each patient's medical record then placed them into the appropriate group and included patients undergoing surgery from January 12, 2012 to November 20, 2014. The inclusion criteria were skeletal maturity, preoperative and postoperative weightbearing films taken ≥ 6 months from surgery, and complete medical record information available. The exclusion criteria were a lack of sufficient medical record or radiographic information, revision surgery, proximal osteotomy in addition to distal osteotomy, and a distal osteotomy different from that of the study groups. The use of an adjunctive procedure was not an exclusion criterion, and all such procedures were recorded. One of us (B.M.S.)

searched and abstracted all data and determined which patients were eligible for inclusion.

After identification of the patients, a retrospective patient satisfaction telephone interview was performed by an independent research assistant not involved with the surgeons, patients, or practice. A script was read, and the patients were asked to classify their satisfaction as "very satisfied," "satisfied," "somewhat satisfied," or "not satisfied," as previously reported (9). This was then converted to a numerical score: very satisfied, 4; satisfied, 3; mildly satisfied, 2; and not satisfied, 1.

Surgical Technique

All operations were performed by 1 surgeon (B.M.S.) for both groups. A dorsomedial incision was used for both operations to expose the medial capsule of the first metatarsophalangeal joint. An L-shaped capsular incision was created over the dorsomedial aspect of the first metatarsophalangeal joint. A lateral capsular release was performed through the same dorsomedial incision for both operations.

For the chevron osteotomy, a 60°, V-shaped osteotomy was used. The apex was directed distally and the base proximally. The osteotomy was shifted laterally 4 to 6 mm and fixated with one 3.0-mm headless screw directed proximally to distally. The medial bone shelf was then resected and a medial capsular plication performed (Fig. 1).

For the distal oblique osteotomy, an oblique osteotomy was performed from the dorsal distal aspect to the plantar proximal aspect of the metatarsal head. The osteotomy was started at the dorsal cartilaginous–osseous junction of the metatarsal



Fig. 1. Preoperative (A) anteroposterior and (B) lateral views of a foot before intervention with a chevron osteotomy. Postoperative (C) anteroposterior and (D) lateral views of the same foot after the chevron osteotomy.

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