

Transverse Medial Slide Osteotomy for Bunionette Deformity: Long-Term Results

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ABSTRACT

Background: Bunionette deformity of the fifth metatarsal infrequently requires operative treatment. This study presents the long-term results of a simple operative technique. **Methods:** Forty-four distal metatarsal medial slide osteotomies with pin fixation were performed for symptomatic bunionette deformity in 30 patients. After an average of 7 years and 8 months (range 69 to 110 months), 30 feet in 21 patients were available for clinical and radiographic evaluation. **Results:** The patients' subjective assessment was excellent and good in 81% and fair and poor in 19% of feet. The mean pain score on a visual analogue scale was 1.8 (range 0 to 7) and the mean American Orthopaedic Foot and Ankle Society (AOFAS) score was 88.2 (range 47 to 100). Postoperative complications included pin track infection in three feet and delayed union in one. One patient developed transfer metatarsalgia and another patient had repeat surgery for recurrent symptoms on both feet after 5 years. **Conclusions:** This procedure combines technical simplicity with satisfactory and predictable long-term results in the operative treatment of bunionette deformity in the lateral forefoot.

Key Words: Bunionette Deformity; Long-Term Results; Surgical Technique

INTRODUCTION

Davies originally described the painful lateral eminence in the forefoot in conjunction with digitus quintus varus.⁴ It has since been given various names such as tailor's bunion or bunionette indicating a perceived similarity with its hallux counterpart. Radiographically three types are distinguished:

enlargement of the lateral aspect of the fifth metatarsal head (type 1), lateral bowing of the fifth metatarsal shaft (type 2), and increased 4–5 intermetatarsal angle (type 3)³ (Figures 1 through 3).

When conservative measures fail, treatment is operative. However, because the condition is less common than hallux valgus, outcome series of specific procedures in the literature often are small. Furthermore, a large number of different techniques have been used, scoring systems are

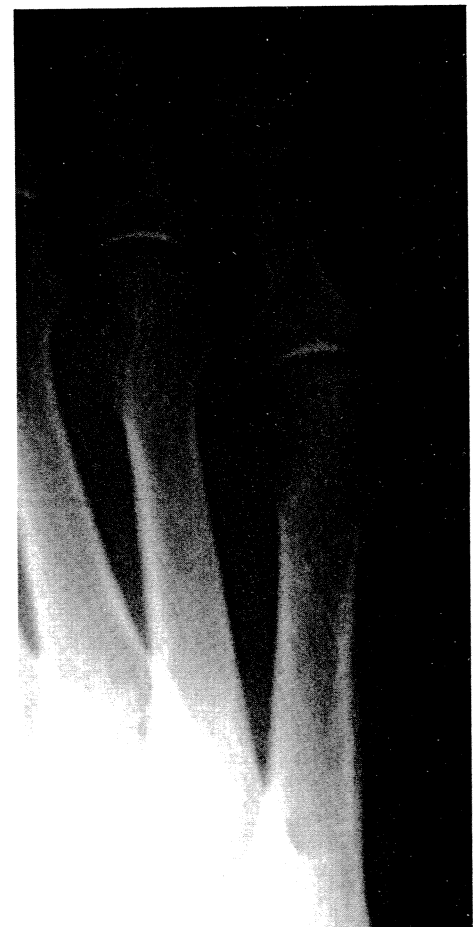


Fig. 1: Type 1 deformity with lateral metatarsal head prominence.

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Fig. 2: Type 2 deformity with laterally bowed distal metatarsal.



Fig. 3: Type 3 deformity with increased 4–5 intermetatarsal angle.

multiple, and long-term results beyond 5 years are not available.¹¹

Among the proposed treatments, resection of the metatarsal head gives the poorest results.^{9,12} Simple lateral condylar excision,⁸ as well as metatarsal osteotomies (proximal, diaphyseal or distal), achieve a predictably satisfactory outcome but all seem to have their limitations.¹¹ Lateral bunionectomy causes problems with insufficient resection and metatarsophalangeal joint instability. Basal and diaphyseal osteotomies achieve the best deformity correction at the expense of increased technical complexity, stability of fixation, and delay in bone healing.^{3,11,15} Distal osteotomies tend to be easier technically and more stable, but are limited in the amount of correction they can offer. The oblique sliding^{2,11,16,18} and the chevron osteotomies^{1,7,11,13} are among the most popular distal techniques and all have been described with and without fixation.

We report our experience with a simple transverse medial shift osteotomy at the fifth metatarsal neck using intramedullary percutaneous pin fixation. The advantages and limitations of this technique are discussed and its long-term results presented.

MATERIALS AND METHODS

From September, 1994, to February, 1998, 30 patients had corrective surgery for bunionette deformity. The average age was 40.2 (range 15 to 80) years; 26 were women and four were men. Fourteen patients had bilateral surgery, totaling 44 feet. The indication in all patients was a painful lateral eminence associated with either type 2 or type 3 deformity that was not controlled by conservative treatment. All had a transverse osteotomy followed by medial shift and intramedullary Kirschner-wire fixation at the fifth metatarsal neck (Figures 4 and 5).

One patient had previous bilateral resection of the lateral condyle. Nine had previous hallux valgus or lesser toe deformity correction. Another nine patients had other simultaneous forefoot procedures, demonstrating that a bunionette is commonly associated with other painful forefoot deformities.

The operative procedure was performed through a lateral approach under regional anesthesia using a tourniquet. After capsular opening, the lateral condyle was retained to allow better bone-to-bone contact after the transverse osteotomy and medial shift of the distal fragment. A 1.6-mm Kirschnerwire was inserted retrograde through the lateral soft tissues of the little toe and passed through the medullary canal into the base of the fifth metatarsal, acting as a buttress



Fig. 4: Pin in-situ after osteotomy.

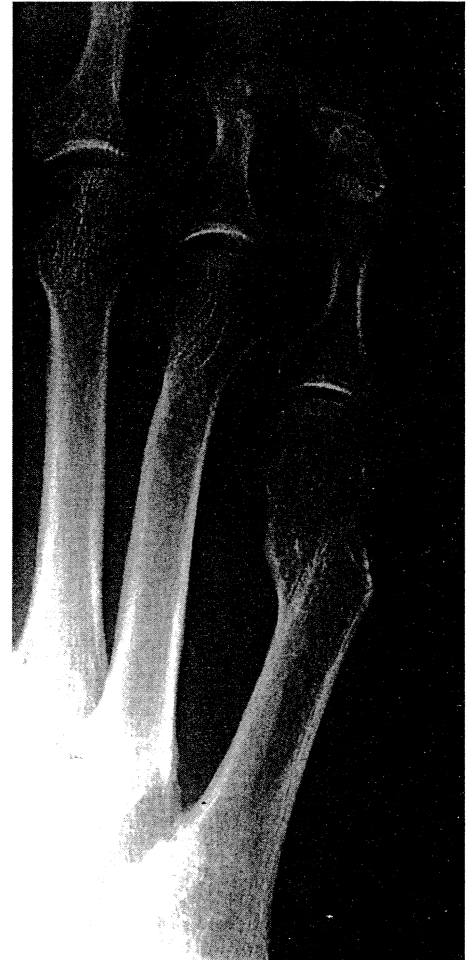


Fig. 5: Remodelled fifth metatarsal.

to prevent loss of position of the distal fragment. The wire was cut and left protruding distally. Postoperatively, the patient was mobilized in a hard-soled shoe for 6 weeks, at which point the wire was removed in the outpatient department, and the patient was discharged.

The patients' notes and radiographs were reviewed retrospectively at an average of 7 years and 8 months after surgery (range 69 to 110 months). The outcome of surgery was assessed by interview, asking patients about their overall satisfaction with the result and whether they rated it as excellent, good, fair, or poor. In addition, we asked them to complete a visual analogue scale (VAS) for current pain or discomfort. A postoperative American Orthopaedic Foot and Ankle Society (AOFAS) Forefoot score also was calculated. Radiographically, preoperative and postoperative (6 weeks) and followup values were obtained for the lateral deviation, intermetatarsal, and metatarsophalangeal angles according to the method of Nestor et al.¹⁴

Twenty-one patients (30 feet) were available for followup at an average of 7 years and eight months (range 69 to 110 months) after the operative procedure. One patient had died and eight had moved away and could no longer be contacted. Sixteen were seen in the outpatient clinic by the first author (SW), who also interviewed five patients over the phone who were unable to attend.

RESULTS

The average result on the visual analogue pain scale was 1.8 (range 0 to 7). For 16 feet, patients rated the outcome as excellent, nine as good, two as fair, and three as poor. The mean AOFAS score was 88.2 at followup. The time to return to work or school ranged from 2 weeks to 3 months depending on whether or not additional surgery had been performed and other personal factors.

Radiographic analysis revealed in 12 feet with type 1 deformities correction of the mean lateral deviation angle of 9.6 (range 7 to 13) degrees preoperatively to 3.1 degrees postoperatively and 3.7 degrees (range 1 to 7) at followup. In 10 feet with type 2 deformities, the mean intermetatarsal angle changed preoperatively from 14.8 (range 10 to 18) degrees to postoperatively 9.0 degrees and 8.1 degrees (range 5 to 12) at final followup. The mean metatarsophalangeal angle in all feet changed from 17.6 degrees preoperatively to -7.1 degrees postoperatively (radiographic valgus) and measured 1.5 degrees at followup. In eight feet there was dorsal displacement of approximately 1 to 3 mm of the metatarsal head fragment on postoperative radiographs, although this was difficult to measure with accuracy, and in four feet

with medial tilt. Only one patient with dorsal shift developed transfer metatarsalgia later. Neither of the remaining feet had a poor clinical result.

As an early postoperative complication, pin track infection occurred in three feet requiring oral antibiotics achieving complete resolution. There was a radiographic delayed union in one elderly patient 8 weeks after surgery without significant discomfort or limiting mobility. One patient complained about recurrent symptoms at the lateral border of both forefeet and underwent lateral shaft eminence excision 5 years after the initial surgery with good success. Two patients were dissatisfied, one with the cosmetic result with no pain and the other with persistent transfer metatarsalgia under the third and fourth metatarsal heads.

DISCUSSION

Hohmann⁵ first described a simple transverse neck osteotomy with medial shift of the fifth metatarsal head without fixation for treatment of bunionette. Modified versions of his technique have been used to increase the stability of the osteotomy.^{10,17} To our knowledge, long-term results of the original technique with added pin fixation have not been reported in the literature. We used longitudinal Kirschner-wire fixation, splinting the lateral soft tissues of the fifth toe and using the proximal part of the wire as an intramedullary buttress against lateral drift of the medially displaced metatarsal head.

Advantages include the large amount of correction possible (usually more than 50% of neck width), helped by the fact that the lateral condyle is not resected. In comparison, the chevron osteotomy, although inherently more stable, usually allows no more than 3 to 4 mm of medial shift,¹³ resulting in potentially less correction of the intermetatarsal angle. In our study, the average medial displacement was 5 mm. In one elderly patient, however, the shift was nearly 100% producing instability that led to delayed bone union. This probably can be explained by a poorer stabilizing soft-tissue envelope in older patients. Care should, therefore, be taken with our technique to avoid too great a shift and overcorrection, especially in the elderly.

Unlike the oblique sliding technique or the step-cut technique of osteotomy, this procedure produces no shortening of the metatarsal and, therefore, limits the risk of transfer metatarsalgia. In one series using an oblique metatarsal osteotomy without stabilization transfer lesions occurred in 36% of cases.⁶ There was one patient in our series with about 2 to 3 mm of dorsal displacement of the head fragment (Figure 6) who developed transfer metatarsalgia postoperatively. The limited control of the head fragment in the sagittal plane could be a potential problem of this technique. However, a further seven patients, in whom we noted slight dorsal displacement on postoperative radiographs, were asymptomatic after surgery.



Fig. 6: Undesired dorsal shift of distal fragment.

There were no cases of osteonecrosis, which we attributed to the minimal soft-tissue stripping on the distal fragment with this technique.

The surgical technique is straightforward and safe to perform and, therefore, suitable for trainee surgeons. In our series 10 different surgeons including trainees performed this procedure.

A potential shortfall of this method is the fact that the intramedullary Kirschner wire position makes it difficult to remove excess bone at the lateral aspect of the distal end of the proximal fragment, which can lead to a step palpable at the lateral foot border typically visible on postoperative radiographs. This metatarsal edge prominence required removal in both feet of one of our patients 5 years later. Beveling of this prominent edge has since been incorporated in the primary technique. Infection is a further concern with percutaneous techniques. Minor pin site sepsis occurred in three feet, all of which resolved with oral antibiotics.

A large number of different, mostly non-validated scoring systems have been used to assess results of surgery.¹¹ The AOFAS score at the last followup demonstrated satisfactory long-term results for pain relief, maintained function, and alignment. Only one patient had further surgery for bilateral residual metatarsal shaft prominence, and a second patient is considering revision surgery for transfer metatarsalgia in one foot. However, the subjective satisfaction rate (good and excellent results) remained high at over 80% after a minimum of over 6 years postoperatively. This compares well with results in published series of more complex metatarsal osteotomies for bunionettes.^{1-3,7,10,11,13,15,16-18} We acknowledge the difficulty of comparing our results with other series given the variety of outcome measures and scoring systems used. We are further aware that our relatively high loss-to-followup rate is a potential source for outcome bias, and conclusions drawn from this study are limited by the retrospective nature of data analysis.

Despite concerns about potentially limited stability with percutaneous Kirschner-wire stabilization after transverse displacement osteotomy, we found this technique to be an

alternative to more complex procedures in the treatment of bunionette deformity. It combines excellent potential for deformity correction with technical simplicity and offers good long-term results beyond 7 years.

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