



Dorsal L-Plate Fixation for Enhanced Stability in Chevron Bunionectomy: A Five-Case Series

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Statement of Purpose

The purpose of this poster is to highlight the use of dorsal L-plate fixation in five chevron bunionectomy cases to optimize stability, increase correction power, and to consider its future role in addressing failed minimally invasive bunionectomy.

Literature Review

The distal chevron osteotomy is a widely utilized technique for correction of mild-to-moderate hallux valgus with generally favorable outcomes^{1,2}. Despite satisfactory short-term results, recurrence of hallux valgus remains a clinically relevant complication, with reported recurrence rates of approximately 5–10% in mid- to long-term follow-up studies^{2,3}. Failure following chevron bunionectomy is most commonly related to recurrent deformity due to loss of correction, inadequate lateral translation, or insufficient stabilization of the osteotomy, with additional causes including hardware irritation and, less commonly, nonunion or malunion^{3,4}. Fixation method plays an important role in maintaining osteotomy stability. Traditional fixation techniques using K-wires or screws have been associated with fragment displacement, loss of correction, and symptomatic hardware^{3,5}. Dorsal locking plate fixation has been introduced to improve construct rigidity and maintain alignment through fixed-angle stability, potentially reducing micromotion and loss of correction at the osteotomy site^{5,6}. Minimally invasive (MIS) bunion techniques report overall complication rates of approximately 10–20%, with recurrence and revision rates comparable to open techniques, highlighting that stable fixation and adequate correction remain critical regardless of surgical approach^{7,8}.

Case Study

Five female patients were included in this case series. The mean age was 58.0 years (range, 48–68). Mean height was 160.4 cm (range, 152.4–170.2), and mean weight was 72.4 kg (range, 53.2–112.5). The mean body mass index was 27.9 kg/m², with values ranging from 21.6 to 38.9. No significant past medical history was noted. Physical exam findings showed enlarged medial eminence with pain to palpation, and pain with ambulation/shoegear. Radiographs showed moderated HAV deformity (IM angle ~14 degrees, HAA ~19 degrees) (Figure 1). No signs of degenerative joint disease. Of note, two patients had recurrent bunion deformities from prior procedures. All procedures were performed by a single surgeon using a standardized dorsal plate fixation technique.

Surgical Technique

A medial incision was made over the first metatarsophalangeal joint (MTPJ), and the joint was exposed in standard fashion. A medial T-shaped capsulotomy was performed, followed by resection of the prominent medial eminence. A distal 60° chevron osteotomy of the first metatarsal head was created using a sagittal bone saw. The capital fragment was translated laterally to the desired degree of correction and temporarily stabilized with a 0.045-inch Kirschner wire (Figure 2). Definitive fixation was achieved using an L-shaped locking plate applied dorsally with standard AO technique (Figures 3, 4). Residual medial shelf bone and medial capsulorrhaphy was performed.



Figure 1



Figure 2



Figure 3



Figure 4

Results

All five patients achieved satisfactory radiographic alignment and clinical correction of hallux valgus deformity. The dorsal L plate provided stable fixation without loss of correction or hardware failure. Patients were able to progress with immediate postoperative weight-bearing, and no cases of nonunion, malunion, infection, or symptomatic hardware were observed during the follow-up period. At 12 month follow-up, there were no issues/complaints.

Analysis and Discussion

Screw and pin fixation are commonly employed for distal metatarsal osteotomies (DMOs); however, traditional fixation may be inadequate in certain clinical scenarios. A distal L-locking plate offers an alternative in cases requiring maximal transposition, frontal plane correction, compromised bone quality (e.g., osteoporosis or large bone cysts), or intraoperative fixation challenges. Compared with screw fixation, the L-plate locking construct provides enhanced stability and helps prevent dorsal, plantar, and lateral displacement of the metatarsal head⁹. This technique is particularly advantageous in revision settings, including revisions of minimally invasive surgery (MIS) bunion procedures, where reliable salvage options are often necessary. Potential disadvantages include increased hardware cost, longer operative time, and the absence of direct osteotomy compression; however, no major complications were observed in this series.

References

1. Barg A, Zwicky L, Knupp M, Henninger HB, Hintermann B. Total joint preservation in hallux valgus surgery: recurrence and outcome analysis. *Foot Ankle Int.* 2013;34(7):847-856.
2. Jeuken RM, Schotanus MGM, Kort NP, Deenik A. Long-term follow-up of distal chevron osteotomy for hallux valgus: recurrence and clinical outcomes. *Foot Ankle Surg.* 2016;22(3):172-177.
3. Trnka HJ. Osteotomies for hallux valgus correction. *Foot Ankle Clin.* 2005;10(1):15-33.
4. Goughlin MJ, Jones CP. Hallux valgus: demographics, etiology, and radiographic assessment. *Foot Ankle Int.* 2007;28(7):759-777.
5. Acevedo JJ, Vora AM. Fixation techniques in hallux valgus surgery. *Foot Ankle Clin.* 2014;19(2):187-200.
6. Kim Y, Kim JS, Young KW, Cho HK. Comparison of fixation methods after chevron osteotomy for hallux valgus. *Foot Ankle Int.* 2013;34(11):1515-1521.
7. Dayton P, Kauwra M, Feilmeier M, Hirschi J. Minimally invasive hallux valgus surgery: a systematic review of outcomes and complications. *J Foot Ankle Surg.* 2019;58(2):276-283.
8. Verniss J, Redfern D. Percutaneous surgery for hallux valgus. *Orthop Traumatol Surg Res.* 2016;102(8 Suppl):S211-S220.
9. Andrews BJ, Fallat LM, Kish JP. Screw Versus Plate Fixation for Chevron Osteotomy: A Retrospective Study. *J Foot Ankle Surg.* 2016 Jan-Feb;55(1):81-4.