

# Combination Lapidus and Chevron Osteotomy Procedure on Hallux Valgus Deformity in Female: A Case Report

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## ABSTRACT

**Introduction:** Hallux valgus is a common forefoot deformity involving lateral deviation and pronation of the great toe, often causing pain, impaired joint function, and footwear limitations, especially in females with ligamentous laxity or hypermobility.

**Case Presentation:** A 45-year-old female presented with a two-year history of left hallux valgus deformity and ankle pain, worsening over the past year with swelling. Pain intensified during walking and shoe use. Conservative treatment, including steroid injection, failed. Surgical correction using combined Chevron and Lapidus procedures achieved satisfactory realignment and symptom improvement.

**Discussion:** Hallux valgus is a complex deformity often treated conservatively. In this case, combined Chevron and Lapidus osteotomies were chosen for correction, achieving excellent clinical and radiographic outcomes. This combination significantly reduced the HVA angle and improved cosmesis, supporting its potential as an effective option in severe deformities.

**Conclusions:** In this case, hallux valgus treated with combined Lapidus and Chevron osteotomies showed good functional and

cosmetic outcomes. Further studies with larger samples are needed to validate the effectiveness of this combined approach.

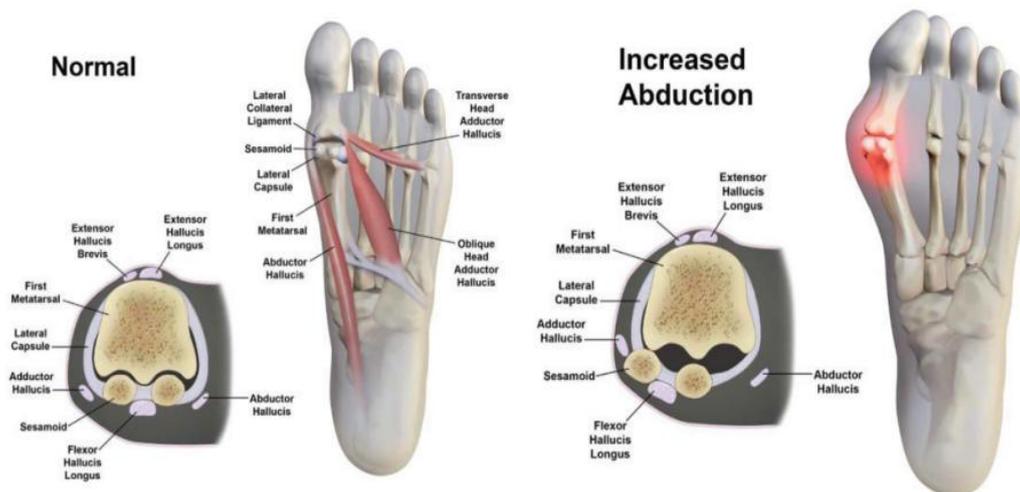
**Keywords:** Hallux Valgus, Chevron Osteotomy, Lapidus Procedure, Foot Deformity Correction

## INTRODUCTION

A frequent disease called hallux valgus (HV) is caused by a complicated positional malformation of the first ray. One aspect of the 3-dimensional deformity is the bunion or medial protrusion that comes from the hallux's lateral displacement and pronation. Huge amounts of discomfort and changed joint mechanics can result from hallux valgus. It's still unclear what causes biomechanical problems exactly. (Ray et al., 2019) Female sex, age, restrictive footwear, and family history are risk factors. Females are more likely to have hallux valgus than males, which is probably due to the latter's different osseous architecture, generalized ligamentous laxity, and first ray hypermobility. (Ray et al., 2019) Inflammation of the medial bursa, synovitis of the metatarsophalangeal (MTP) joint, degeneration of the cartilage covering the central and plantar metatarsal head and sesamoids, and/or entrapment of the medial

dorsal cutaneous nerve are just a few of the painful sequelae associated with this condition. (Heineman et al., 2020) Patients may complain of an uncomfortable sensation in their metatarsal head, which goes away when they take off their shoes.

During ambulation, the metatarsal can be excruciatingly painful, and a physical examination will typically reveal the great toe to be obviously malformed, whether or not there is an overlaying callous or skin discoloration. (Kennedy, n.d.)



**Figure 1. Medial deviation of the metatarsal head, axial rotation of the sesamoids, and lateral deviation of the hallux are shown in this illustration of the normal and pathological anatomy of the foot (Heineman et al., 2020)**

Although many healthcare professionals view HV as a cosmetic issue, patient self-reported functional outcome measures have shown that HV is linked to higher degrees of foot discomfort and disability, as well as worries about one's appearance and limited footwear options. However, it can make it uncomfortable to move the affected joint or difficult to perform routine joint activities. The great toe and distal phalanx pressing against the second toe causes pain. When a patient presents with a deformity that is painless and not progressing, the initial course of treatment should be conservative. Only if the issue continues will surgery be required. Clinical realignment of the great toe and pressure relief for the second toe are the goals of surgery. (Kennedy, n.d.) There is no complete article that covers the validity of these quantitative assessments, surgical treatment choices, and related postoperative consequences, despite the fact that several research provide measurements for the assessment of HV. There are more

than 100 techniques listed for treating hallux valgus; most frequently, they include fusions, bone osteotomies, and soft tissue balancing operations. Here, we discuss a case of Hallux valgus with associated flat foot deformity that failed non-operative therapy. We combine the Chevron and Lapidus procedures in this patient.

### CASE PRESENTATION

45 years old female complained that his left big toe was bent, the complaint was crooked accompanied by pain in the left ankle was felt for about 2 years, the pain disappeared and began to aggravate for 1 year of exposure, pain accompanied by swelling. The patient had pain in her right great toe's medial side, especially when walking and donning shoes. There is no history of trauma over the left foot. The patient has previously received a steroid injection, but the discomfort has not subsided.



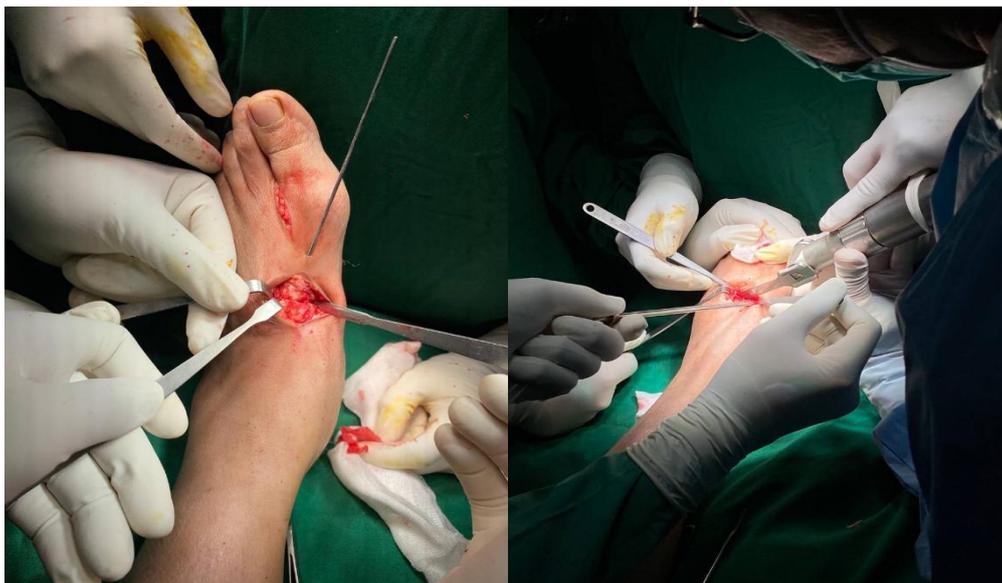
Figure 2. Clinical Picture of Left Hallux Valgus Deformity



Figure 3. Clinical radiograph of the left foot

We do the surgical correction with a combination chevron and lapidus procedure for these cases. In the supine position, the patient had surgery while under regional anaesthetic. First incision over the proximal part of the first metatarsal to expose the bone, and then we did the lapidus procedures using a miniplate and screw, along with two K-wires. A longitudinal

incision was made over the medial part of the distal metatarsophalangeal joint and the line between the first and second digits. In order to expose the osteotomy site, the joint capsule is being deepened, then we do the V-shaped osteotomies over the distal part of the first metatarsal and fix it with screws using two K-wires.



**Figure 4. Clinical picture during operation (Lapidus Osteotomies)**



**Figure 5. Clinical picture during operation (Chevron Osteotomies)**



**Figure 6. Radiograph post operation**

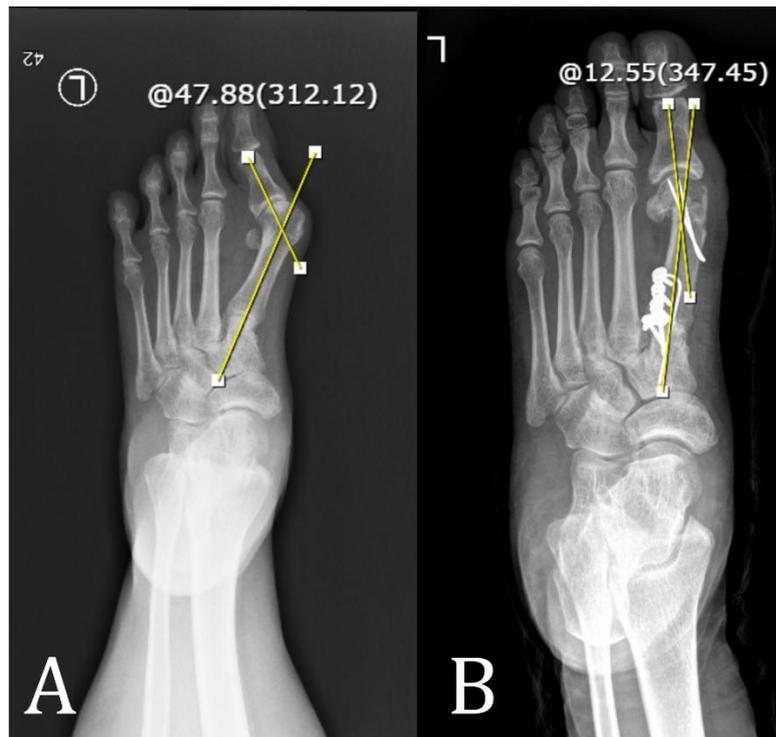


Figure 7 (A) HVA Angle before correction. (B) HVA Angle after correction

## DISCUSSION

A frequent disease called hallux valgus is caused by a complicated positional malformation of the first ray. One aspect of the 3-dimensional deformity is the bunion or medial protrusion that comes from the hallux's lateral displacement and pronation. Usually this case is asymptomatic, but because great toe and distal phalanx pressing against the second toe causes pain. When a patient presents with a deformity that is painless and not progressing, the initial course of treatment should be conservative. Only if the issue continues will surgery be required. There are so many procedures to treat the HV, but in this case we choose to use the Chevron and Lapidus osteotomy procedures. (Ray et al., 2019)

Lapidus osteotomy is a method for treating hallux valgus that entails arthrodesis of the first tarsometatarsal joint and the bases of the first and second metatarsals. Over the medial hallux and first metatarsal, a straight 9 to 10 cm longitudinal incision is created, which leads to the abductor hallucis muscle. Defended and retracted is the medial cutaneous nerve. At this stage, if more

resected bone chips are required, they are implanted in between the first and second metatarsals. And at the end we use the miniplate with 5 holes and use one k-wires. (figure 4) (Kennedy, n.d.)

Chevron osteotomy is a V shaved osteotomy in the distal part of the first metatarsal. Examining the cartilage requires exposing the metatarsal head. An oscillating saw is used to cut away the exostosis parallel to the shaft. The medial plantar sulcus has to be protected for the medial sesamoid. A 1.6 mm K-wire is hammered or drilled into the bone two millimeters dorsal to the center of the metatarsal head, perpendicular to the plane of the initial incision and to the metatarsal shaft. A 12 mm blade is used with an oscillating saw. The bone slices are guided by the K-wire. The metatarsal head is moved laterally 5- 6 mm once the osteotomy is finished. Pulling the toe distally and moving the head laterally with the thumb make this easier. In contrast, the first and second metatarsal shafts can be separated from one another by squeezing them together with the thumb and index finger. And then we end the Chevron with

fixed it using two k-wires (figure 5) (Clemente et al., 2022)

According to Megan et al., patients with hallux valgus who undergo the lapidus treatment have improved physical function (as measured by PROMIS Physical Function Scores) and have a higher likelihood of recovering a normal intermetatarsal angle after surgery. The Lapidus and scarf osteotomies were contrasted in a different study. The outcomes revealed that compared to scarf osteotomies, lapidus osteotomies had much more improvement. Meary's angle, Seiberg index, and sagittal IMA corrections were much higher in the Lapidus group. (Reilly et al., 2021) According to Marcelo et al., the first group underwent arthrodesis between the first metatarsal base and the medial cuneiform as well as between the bases of the first and second metatarsals, while the second group underwent fusion only between the first metatarsal base and the medial cuneiform. They claimed that operations using only the medial cuneiform and the first metatarsal were safer and more likely to be functioning properly. (Pires Prado et al., 2019)

Shiyong Zhang and colleagues found that Chevron osteotomies increased the AOFAS Score from 54.40 to 94.30 and reduced the VAS Scores from 6.30 to 0.15 in their patients. There were no recurrences in this research over the five postoperative years, and the aesthetic outcomes were either great or satisfactory. (Zhang et al., 2022) Another study by Pablo Clemente et al. revealed that proximal chevron osteotomies offer a bigger IMA correction than distal chevron osteotomies and that chevron osteotomies provide a better HVA correction than scarf osteotomies. But distal chevron osteotomy offers a smaller AOFAS correction than lingdren osteotomy. (Clemente et al., 2022) A series of fortythree patients (fifty-seven foot) with preoperative, two-year, and five-year follow-up were described by Trnka et al. in 2000. According to radiographic analysis, the preoperative average HV angle was 29 degrees and the preoperative average

IM angle was 13 degrees. The HV and IM angles were 15° and 8° on average during the two-year follow-up. The average HV and IM angles during the five-year follow-up were 16° and 9°. The results from these two follow-up periods demonstrated that there are no age-related changes in the effectiveness of the chevron osteotomy for treating mild to moderate hallux valgus deformity. A series of 112 feet (73 patients) with a minimum follow-up of ten years were described by Schneider et al. in 2004. The outcomes were contrasted with those from an interim follow-up of 5.6 years for 47 feet (30 patients). After a mean of 12.7 years, the AOFAS-score increased from a pre-operative mean of 46.5 points to a mean of 88.8 points. The mean preoperative value of the first metatarsophalangeal (MTP) angle was 27.6 degrees, and it was improved to 14.0 degrees. The preoperative mean value of the initial intermetatarsal (IM) angle decreased from 13.8 degrees to 8.7 degrees. On a scale from 0 to 3, the mean pre-operative grade of sesamoid subluxation was 1.7 and afterwards improved to 1.2. The first MTP joint's arthritis increased from a mean value of 0.8 to 1.7 on a scale from 0 to 3. It was statistically significant that the first MTP joint's arthritis progressed between 5.6 and 12.7 years after surgery. Excellent clinical outcomes after chevron osteotomy not only proven to be reliable, but also improved even more with prolonged follow-up. Without the deformity returning, the mean radiography angles remained unchanged. The clinical outcome has not yet been impacted by the statistically significant advancement of first MTP joint arthritis, although more monitoring is required. (Trnka & Hofstaetter, 2007)

Until now, there has been no case report that conveys the treatment of hallux valgus with a combination of lapidus and chevron. Therefore, here we try to use two procedures that, in some studies, show good results. In this case, it was found that there was a significant change from the HVA angle, which was initially 48 degrees, to 12

degrees. On the other hand, from a cosmetic point of view, we also get satisfactory results for patients, so with these results, it is expected to increase the functionality of the patient himself.

## CONCLUSION

In this case, Hallux valgus, which was treated with a combination of lapidus and chevron osteotomies, showed satisfactory results both functionally and cosmetically. But in the future, it will be necessary to conduct research using this combination procedure in many cases so that the results can be more representative.

### Declaration by Authors

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**Conflict of Interest:** No conflicts of interest declared.

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