

First Metatarsal Base Osteotomies for Hallux Abducto Valgus Deformities

Jason Morris, DPM, AACFAS^{a,*}, Michael Ryan, DPM^b

KEYWORDS

• Proximal • Bunion • Wedge • Base • Hallux valgus • Crescentic

KEY POINTS

- Proximal first metatarsal osteotomies allow effective correction of hallux abducto valgus deformities by correcting closer to the apex of deformity.
- Common complications are nonunion, first metatarsal elevation, difficulty with fixation, and first metatarsal shortening.
- Opening wedge plates and crescentic osteotomies provide significant deformity correction with minimal shortening or even lengthening of the metatarsal.
- Advances in fixation have allowed predictable results and have limited the complications commonly associated with proximal osteotomies.

Selection of the appropriate surgical procedure for hallux valgus deformities relies on many factors and the large variation of osteotomies provides surgeons with seemingly unlimited surgical options. The hallux abducto valgus deformity incorporates many entities that must be acknowledged when surgical intervention is considered. Increase in intermetatarsal angle, hallux abductus angle, mobility of the first ray, patient age, patient health status, activity level, previous surgical procedures, surgeon skill level, and so forth are all factors in determining the best procedural choice. The goal is to restore functional, physiologic anatomy and to minimize complications, providing the patient with a long-lasting successful outcome.

A protocol for hallux valgus surgery that used to be commonly used is distal osteotomy for intermetatarsal angles of less than 13° to 15° and proximal osteotomy for angles greater than 13° to 15°. However, selecting the appropriate procedure is more complicated than radiographic evaluation and intermetatarsal angle. This process is as complex as the cause and characteristics of the deformity. As understanding of the hallux valgus deformity has continued to progress, procedural options have also

^a University Foot and Ankle Institute, 2121 Wilshire Boulevard Suite 101, Santa Monica, CA 90403, USA; ^b Private Practice, 2021 Freeport Road, Arnold, PA 15068, USA

* Corresponding author.

E-mail address: drjmorris@footankleinstitute.com

advanced. Adaptations of osteotomies, improvements in surgical technique, and use of procedure-specific hardware have made proximal first metatarsal osteotomy an appealing procedure for correction of hallux valgus deformities. For this reason, proximal metatarsal osteotomies should not necessarily be limited to the traditional procedural selection criteria of large intermetatarsal angles.

INDICATIONS

Large Intermetatarsal Angles

The most common application of a proximal metatarsal procedure for hallux valgus correction is with a large intermetatarsal angle. In the past, this was considered for measurements greater than 13° to 15° . Distal osteotomies tend to have an inherent limitation of translation because they are restricted by the width of the metatarsal shaft. In general, it is recommended that distal osteotomies should not exceed 25% to 50% translation in relation to the metatarsal shaft. Exceeding this translation leads to instability of the capital fragment and limitations on fixation.^{1,2} Jahss and colleagues³ evaluated the geometric principles of first metatarsal osteotomies. With a distal chevron type osteotomy, instability of the construct occurred with any intermetatarsal angle correction greater than 5° . In comparison, a proximal osteotomy allowed greater correction because the center of rotation is closer to the origin of deformity.⁴

Because the correction occurs proximally and closer to the axis of rotation, a greater level of correction can be obtained using proximal procedures.⁵ The geometric placement of the osteotomy allows for a greater distance between the hinge and the most distal point of the metatarsal. A longer radius arm creates a greater lateral correction of the distal metatarsal for each degree of correction at the proximal osteotomy site, which allows the first metatarsal head to come in closer proximity to the second metatarsal and thus reduces the intermetatarsal angle to a greater extent.

Jahss⁶ discussed general geometric principles in relation to metatarsal osteotomies. In translational or transpositional osteotomies such as a chevron, for each 1 mm of lateral displacement of the distal portion of the osteotomy there is 1 mm of intermetatarsal angle. Both distal and proximal translational osteotomies result in the same amount of correction of metatarsus primus varus. Because of this, they recommended limiting this type of osteotomy to intermetatarsal angles of less than 12° . For rotational osteotomies, such as the crescentic procedure, a base osteotomy has 5 times greater transverse plane effect on the metatarsal head compared with a neck osteotomy. Jahss⁶ showed that 15° of rotation at the metatarsal neck results in 2.5° of correction, but 12.5° of correction when performed at the metatarsal base. Wedge osteotomies provide a closer ratio of correction. A 5-mm closing or opening wedge at the neck and base provide approximately 7.5° and 10.25° of correction, respectively. The amount of correction, especially in base procedures, also depends on the length of the first metatarsal because a longer lever arm allows a greater amount of intermetatarsal reduction when performed close to the axis of correction.⁶

Short First Metatarsal

Although shortening of the metatarsal is a common result of some base osteotomies, such as the closing base wedge, other procedures allow minimal shortening or lengthening of the metatarsal. The crescentic osteotomy has traditionally been an osteotomy that provided minimal shortening. Because the osteotomy relies on closure of the intermetatarsal angle through rotation along the osteotomy as opposed to removal of bone, shortening is limited to the thickness of the osteotomy blade plus any amount

Download English Version:

<https://daneshyari.com/en/article/3461795>

Download Persian Version:

<https://daneshyari.com/article/3461795>

[Daneshyari.com](https://daneshyari.com)