

Valderrabano V, Herrera-Pérez M, Santini S, Plaass C, Stukenborg-Colsman C, De Carvalho Neto J, de Cesar Netto C, Godoy-Santos AL, Ferkel E (eds): Forefoot Disorders. Basic Considerations and Treatment Strategies. Basel, Karger, 2024, pp 112–115 (DOI: 10.1159/000540561)

Technique 2: Akin Osteotomy

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Abstract

Akin osteotomy is a medial closing wedge osteotomy of the proximal phalanx. It is rarely performed as an isolated surgical procedure. Being the Akin an extra articular osteotomy, it preserves the metatarsal phalangeal joint. Akin first described this procedure for correcting of hallux valgus deformity in 1925 and now it is widely used as an adjunct to various other bunion surgeries. The original procedure involved resection of the medial prominence of the first metatarsal head and medial-based closed wedge osteotomy of the proximal phalanx of the great toe. Since then, variations to the original technique have been used with changes to the osteotomy and fixation methods.

In this review, we outline the indications, contraindications, surgical technique, complications, and results of the Akin osteotomy. © 2024 S. Karger AG, Basel

- Hallux interphalangeus extensus [1] and hallux rigidus [2].
- Isolated hallux valgus interphalangeus [3] (Phalangeal pathology in hallux valgus is often overlooked due to hyperpronation of the phalangeal bone in moderate to severe hallux valgus) [4].

Contraindications

- Isolated procedure for severe metatarsus primus varus.
- Incongruent distal metatarsal articular angle.
- Severe degenerative osteoarthritis of the first metatarsal phalangeal (MTP) joint [5].
- Open epiphysis or anatomically short proximal phalanx.

Indications

- Hallux valgus with hallux valgus interphalangeus [1].
- Reducing overlying or underlying second toes [1].

Technique

- General or regional anesthesia.
- Patient supine on the operating table.
- Pneumatic tourniquet as preferred.

- Longitudinal incision over the medial aspect of great toe from the mid portion of the proximal phalanx to the MTP joint.
- The MTP joint capsule is exposed and a longitudinal capsulotomy is performed. The proximal and dorsal capsular attachments are released from the proximal phalanx. Two Hohmann retractors are placed subperiosteally in the dorsal and plantar plane before the osteotomy, protecting the extensor hallucis longus (EHL) and the flexor hallucis longus (Fig. 1).
- The osteotomy consists of two cuts forming a wedge with the apex based laterally while maintaining the lateral cortex as a hinge. The first cut is done from medial to lateral, at the proximal one-third of the proximal phalanx, perpendicular to the longitudinal axis of the phalanx on the sagittal and coronal plane. The second cut is done 2–3 mm distally and angulated toward the lateral aspect of the first cut (Fig. 2). A varus stress is applied to the phalanx to reduce the wedge osteotomy and if the correction is inadequate, further bone can be resected (Fig. 3).
- Fixation: A cannulated screw (3.0 Cannulated Compressing Screws, Medartis, Extent, PA) is placed obliquely from the proximal medial plantar aspect to dorsal lateral with care to avoid penetrating the joints (Fig. 4).

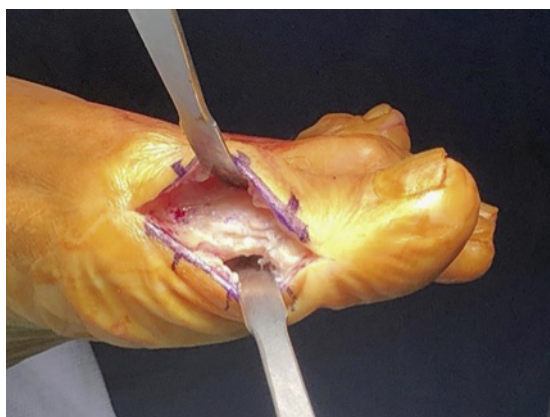


Fig. 1. The MTP joint capsule is exposed and a longitudinal capsulotomy is performed. The proximal and dorsal capsular attachments are released from the proximal phalanx. Two hohmann retractors are placed subperiosteally in the dorsal and plantar plane prior to the osteotomy, as protection for EHL and FHL.

PA) is placed obliquely from the proximal medial plantar aspect to dorsal lateral with care to avoid penetrating the joints (Fig. 4).

After Treatment

A light bunion Spica dressing is applied and the patient. Weight-bearing in hard sole shoe. Early

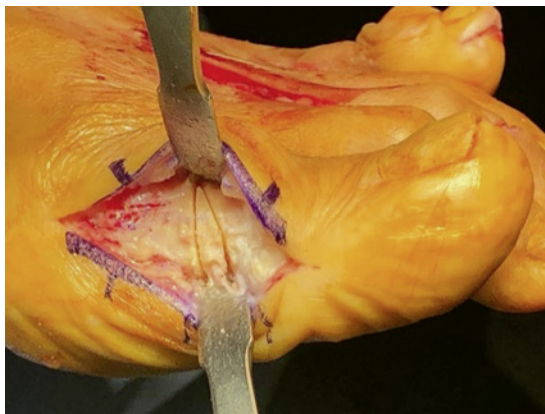


Fig. 2. The osteotomy consists of two cuts forming a wedge with the apex based laterally while maintaining the lateral cortex as a hinge.



Fig. 3. A varus stress is applied to the phalanx to reduce the wedge osteotomy and if the correction is inadequate, further bone can be resected. A cannulated screw (3.0 Cannulated Compressing Screws, Medartis, Extent, PA) is placed obliquely from the proximal medial plantar aspect to dorsal lateral with care to avoid penetrating the joints.



Fig. 4. Final X-ray result.

range-of-motion exercises are commenced at 14 days, and the patient is changed to a flexible shoe.

Complications [6]

- MTP joint instability.
- Shortening.
- Intraarticular fracture.
- Plantar angulation.
- Nonunion.

Results

Hunt and Anderson reported good or excellent results in 26 of 29 feet [7]. Kaufmann et al. compared a loss of correction between isolated

scarf osteotomy group and combined scarf/akin osteotomy, they observed in cases of abnormal proximal to distal phalangeal articular angle a high recurrence rate in isolate scarf group [8].

Lechler et al. studied retrospectively the clinical outcome after isolated chevron versus chevron/akin osteotomy in 74 patients with mild to moderate hallux valgus. They concluded that the combined Chevron-Akin double osteotomy is safe and effective for the treatment of hallux valgus and concomitant hallux interphalangeus [9].

Chacon et al. reported crossed k wires to be the most rigid fixation construct [10].

Statement of Ethics

Written informed consent for publication was obtained by author VV.

Conflict of Interest Statement

The author VV is a Medartis consultant and IBRA lower extremity director. The other authors have no conflicts of interest to declare.

Funding Sources

This research received no external funding.

Author Contributions

Conceptualization, FA, RPPL; Validation, JYCC, VV; Investigation, JVYR; Writing – Original Draft Preparation, FA; Writing – Review, CCN. All authors have read and agreed to the published version of the manuscript.

References

- 1 Frey C, Jahss M, Kummer FJ. The akin procedure: an analysis of results. *Foot Ankle*. 1991;12(1):1–6. <https://doi.org/10.1177/107110079101200101>.
- 2 Thomas PJ, Smith RW. Proximal phalanx osteotomy for the surgical treatment of hallux rigidus. *Foot Ankle Int*. 1999;20:3–12. <https://dx.doi.org/10.1177/107110079902000102>.
- 3 Coughlin M, Mann R, Saltzman C. *Surgery of the foot and ankle*. 8th ed. Philadelphia (PA): Mosby; 2007. p. 282–9.
- 4 Park JY, Jung HG, Kim TH, Kang MS. Intraoperative incidence of hallux valgus interphalangeus following basilar first metatarsal osteotomy and distal soft tissue realignment. *Foot Ankle Int*. 2011;32(11):1058–62. <https://dx.doi.org/10.3113/FAI.2011.1058>.
- 5 Coughlin MJ. Hallux valgus. *J Bone Jt Surg Am*. 1996;78(6):932–66. <https://dx.doi.org/10.2106/00004623-199606000-00018>.
- 6 Cohen MM. The oblique proximal phalangeal osteotomy in the correction of hallux valgus. *J Foot Ankle Surg*. 2003;42(5):282–9. [https://doi.org/10.1016/s1067-2516\(03\)00309-0](https://doi.org/10.1016/s1067-2516(03)00309-0).
- 7 Hunt KJ, Anderson RB. Biplanar proximal phalanx closing wedge osteotomy for hallux rigidus. *Foot Ankle Int*. 2012;33(12):1043–50. <https://doi.org/10.3113/fai.2012.1043>.
- 8 Kaufmann G, Hofer P, Braitto M, Bale R, Putzer D, Dammerer D. Effect of akin osteotomy on hallux valgus correction after scarf osteotomy with hallux valgus interphalangeus. *Foot Ankle Int*. 2019;40(8):1182–8. <https://doi.org/10.1177/1071100719855043>.
- 9 Lechler P, Feldmann C, Köck FX, Schaumburger J, Grifka J, Handel M. Clinical outcome after Chevron-akin double osteotomy versus isolated chevron procedure: a prospective matched group analysis. *Arch Orthop Trauma Surg*. 2012;132(1):9–13. <https://dx.doi.org/10.1007/s00402-011-1385-3>.
- 10 Chacon Y, Fallat LM, Dau N, Bir C. Biomechanical comparison of internal fixation techniques for the Akin osteotomy of the proximal phalanx. *J Foot Ankle Surg*. 2012;51(5):561–5. <https://dx.doi.org/10.1053/j.jfas.2012.05.001>.

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