



Percutaneous dorsal closing wedge osteotomy of the metatarsal neck in management of metatarsalgia



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ABSTRACT

Introduction: Metatarsalgia can be caused by plantarflexion of a central metatarsal or discrepancies in the metatarsals' length. Nonsurgical management is usually sufficient to achieve satisfactory results. For those recalcitrant cases, metatarsal osteotomy is needed to relieve the pain. We describe a technique of percutaneous dorsal closing wedge osteotomy of the metatarsal to manage the recalcitrant metatarsalgia. A case series was reviewed retrospectively.

Materials and methods: From March 2010 to March 2013, percutaneous dorsal closing wedge osteotomy of the metatarsal neck has been performed in 33 patients. Thirty six feet with 63 metatarsals were operated on. Thirty two second metatarsals, 22 third metatarsals, 5 fourth metatarsals and 4 fifth metatarsals were operated on.

Results: All the osteotomy sites healed up without any transverse plane deformity. The painful callosities subsided except in one operated metatarsal. Recurrence of painful callosities occurred in 2 operated metatarsals. Transfer metatarsalgia occurred in 2 feet. Floating toe deformity occurred in 2 operated rays. There was no nerve injury noted. Two patients had delayed wound healing with serous discharge and the wounds were eventually healed up with wound dressing.

Conclusion: Percutaneous dorsal closing wedge osteotomy of the metatarsal neck is an effective and safe surgical treatment of recalcitrant metatarsalgia.

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1. Introduction

Metatarsalgia is one of the most common problems faced by foot and ankle surgeons. This pain is confined to the area across the plantar forefoot, including the second through to fifth metatarsal heads. There are two main biomechanical causes:

- (1) Plantarflexion of a central metatarsal produces pain during the stance phase of gait. Callosities are located directly beneath the head of metatarsal (Fig. 1).
- (2) Discrepancies in metatarsal length produce pain during the propulsive phase of gait. In this case keratoses are located plantar and distal to the affected heads [1,2].

Nonsurgical management including periodic debridement of callosities, functional foot orthoses, shoe modifications, lifestyle changes, and/or physical therapy is usually sufficient to achieve

satisfactory results [2–4]. However, often the symptomatic plantarflexed or elongated metatarsal will be recalcitrant to conservative treatment and require surgical intervention [2]. A percutaneous technique of dorsal closing wedge of the metatarsal neck to relieve the pressure underneath the metatarsal head of the central ray is described in this manuscript.

2. Description of technique

The patient was put in supine position and no tourniquet was required. A 3 mm incision was made at the side of the metatarsal neck. Whether the incision was made at the medial or lateral side of the metatarsal neck depended on the laterality of the operated foot and the hand dominance of the surgeon. The incision was made at the lateral side of the metatarsal neck in the illustrated case. Two bone tunnels were made from the distal dorsolateral corner of the metatarsal neck to the proximal plantar-medial and proximal plantar-lateral corner of the metatarsal by means of a 2 mm drill bit (Fig. 2). A 2 mm Isham straight burr (Vilex Inc.) was then inserted into the bone tunnels and the lateral, medial and dorsal cortices were cut with the burr. The plantar cortex was left intact (Fig. 3). The dorsal wedge can be closed up by plantar force (Fig. 4).

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Fig. 1. A case of metatarsalgia with callosity underneath the third metatarsal head. X-rays showed no discrepancy in the metatarsal length.

Post-operatively, the patient was allowed to start weight-bearing walking as pain tolerated with a wooden based post-operative sandal for 4 weeks before going into his/her own shoe. The patient was reviewed with an X-ray post-operatively at 2 weeks, 4 weeks and then every 4 weeks till the osteotomy healed radiologically.

3. Case series

From March 2010 to March 2013, percutaneous dorsal closing wedge osteotomy of the metatarsal neck had been performed in 33 patients (27 females and 6 males). The average age at

operation was 56 year (22–83) and the mean follow-up was 22.5 months (12–36). Thirty six feet with 63 metatarsals were operated on. The metatarsals that needed to be operated on were decided by the location of painful callosities. There was no toe deformity of the osteotomized rays. Thirty two second metatarsals (51%), 22 third metatarsals (35%), 5 fourth metatarsals (8%) and 4 fifth metatarsals (6%) were operated on. Concomitant corrective surgery of hallux valgus, bunionette or Charcot midfoot deformity was performed in 17 patients (52%). All the osteotomy sites healed up both clinically and radiologically without any transverse plane deformity (abduction or adduction). The average radiological union

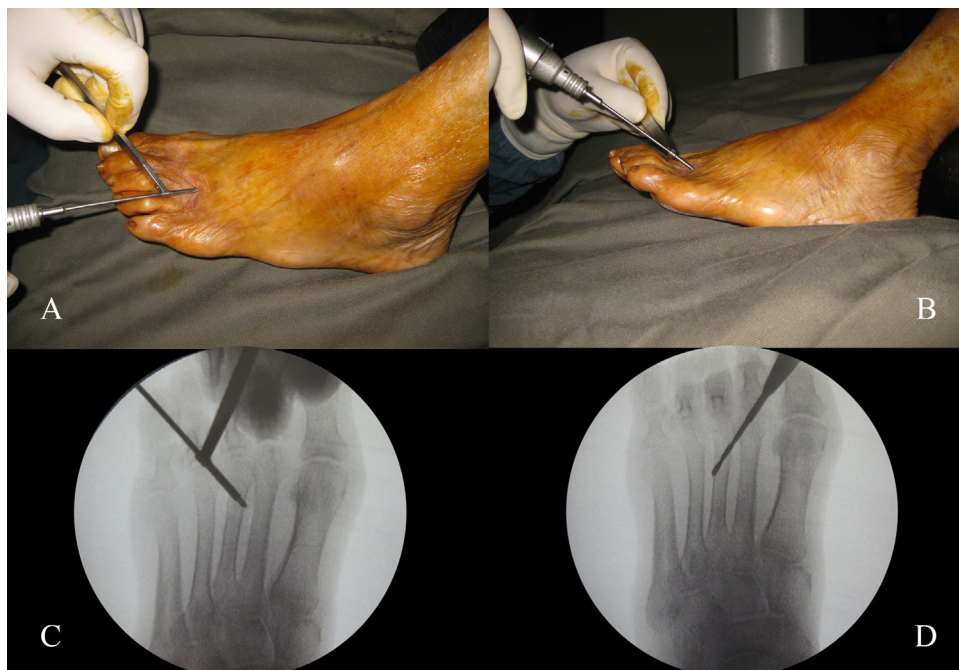


Fig. 2. (A–D) A 3 mm stab wound was made at the side of the metatarsal neck. Two bone tunnels were made from the distal dorsolateral corner of the metatarsal neck to the proximal plantar-medial and proximal plantar-lateral corner of the metatarsal by means of a 2 mm drill bit.

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