

## Neglected dislocation of the interphalangeal joint of the hallux (A report of 2 cases)

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### Abstract

Dorsal dislocation of the interphalangeal joint (IPJ) of the great toe is quite rare, and it results from a hyperextension injury to the joint. Closed reduction is often attempted in the emergency setting, but this measure is seldom successful because of invagination of the sesamoid-plantar plate complex into the interphalangeal space. Generally, open reduction is indicated when closed reduction fails. The literature is poor regarding this problem, and there are very few articles that relate to this issue. We report in this article two cases of an unreducible IPJ of the hallux due to its chronicity, which needed a surgical treatment by a bone fixation using K-wires followed by a capsulodesis. The two patients had a good result after one year of follow-up.

**Keywords:** Hallux; Fixation; Fracture; Injury; Kirschner Wire; Reduction

### 1. Introduction

Dislocation of the IP hallux joint is a rare injury. Most cases reported in the literature are dorsal dislocations resulting from hyperextension injuries. Closed reduction should be attempted, but often fails due to interposition of the palmar plate or sesamoids in the joint. Irreducible dislocation of the interphalangeal joint (IPJ) of hallux is an uncommon injury due to the inherent stability of the joint.[1] Invagination of the sesamoid-plantar plate complex into the interphalangeal space is the main reason for unsuccessful closed reduction attempts.[2] Open reduction is the commonly used technique in the literature following unsuccessful closed reduction of the IPJ. However, percutaneous reduction of the dislocated IPJ could be an option.[3] However there are very few published cases of neglected interphalangeal dislocation of the Hallux and its treatment. In this article we present two cases of neglected interphalangeal dislocation of the Hallux treated surgically with open reduction and internal fixation using Kirschner K-wires.

### 2. Case 1

This is the case of a 26-year-old patient who consulted us for a deformity of the left hallux that had been neglected for 4 years following a sports accident. Discomfort when putting on shoes and the unsightly appearance were the main reasons for consultation. Clinical examination revealed varus of the hallux interphalangeal joint, painless to palpation and reducible on mobilization. The standard radiograph confirmed the dislocation and showed external tearing of the head of P1 (a sign of chronicity).

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**Figure 1** Clinical and radiological aspect of the deformity



**Figure 2** X-ray showing the reductibility of the dislocation

The patient underwent surgical treatment, firstly on the bone by arthrorise after anatomical reduction under scope, and secondly on the soft tissue by external capsulodesis of the interphalangeal joint. 2 months later, the patient was seen with a good follow-up radiograph, and the pins were removed. The latest follow-up at 1 year showed a very satisfactory patient.



**Figure 3** Clinical and radiological outcome of the surgery

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### 3. Case 2

This 22-year-old patient presented with a hallux deformity following a 6-month-old trauma.

Clinical examination revealed an irreducible dorsal sinus angulation deformity of the right hallux, pain on palpation and no downstream vasculo-nervous disorders.

The patient underwent a standard radiograph of the forefoot, showing a dorsal dislocation of the interphalangeal joint of the right hallux.

In the operating room, after spinal anaesthesia, the hallux extensor tendon was reclinced and the fibrosis was curetted with debridement of the interphalangeal space, and reduction with arthrodesis was performed using two cross-wires under image intensifier control.



**Figure 4** Radiological aspect of the deformity.



**Figure 5** Clinical and radiological aspect after a 45 days follow up.

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#### 4. Discussion

The great toe IP joint is stabilized by the capsule, collateral ligaments, extensor hallucis longus, flexor hallucis longus, and the volar plate (plantar accessory ligament). These structures limit passive hyperextension beyond 20° at the great toe IP joint, as demonstrated by Miki et al. The accessory sesamoid found in the volar plate is not intratendinous and articulates with the proximal and distal phalanx [4].

The mechanism of injury causing dislocation at the great toe IP joint is an axial load with a hyperextension force. Rupture of the volar plate from its insertion into the proximal and distal phalanx precedes invagination of the volar plate and accessory sesamoid into the hyperextended IP joint. [5,6]

During the closed reduction, the IPJ is dorsiflexed under longitudinal traction and the deformity is exaggerated. Then, a gentle plantar flexion is applied as the longitudinal traction continues. This maneuver may produce a click sound indicating the reduction of the IPJ.[7]

Instability and re-dislocation are common problems following closed reduction. Frequently, temporary arthrodesis of the IPJ with a K-wire is required.[8] Arthroscopic reduction of the irreducible IPJ dislocation of the hallux has been

reported.[16] However, it is technically demanding and has no clear advantage compared to fluoroscopy-guided percutaneous surgery regarding soft tissue protection.[9, 10].

Our patients had presented neglected dislocations of the IPJ complicated by soft tissue retraction with needed the fixation of the bone using K-wires, then a capsulodesis.

Percutaneous reduction technique is advantageous over open reduction since EHL tendon, dorsal capsule and surrounding soft tissue are not disrupted during the procedure.[11,12] However, percutaneous reduction technique could be used in selected patients. It is not a feasible technique if the sesamoid is not visible radiographically since

fluoroscopic confirmation is mandatory. Also, it is not recommended in chronic dislocations, open dislocations, and multiple trauma patients. [13]

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## 5. Conclusion

When an irreducible dislocation of the IP joint of the big toe is encountered, it is important to obtain a clear history to discern the mechanism of injury. X-rays should be examined for a sesamoid bone incarcerated in the joint. If there is no radiographic explanation for the dislocation, and closed reduction fails, open reduction allows assessment of the anatomy of the disrupted IP joint.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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