

Dislocation of Fifth Metatarsophalangeal Joint with an Adjacent Forth Metatarsal Neck Fracture

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Abstract

Fracture dislocations in the foot region may be complex and it is difficult to recognize all injuries in standard radiographic examinations. This report represents a case with an irreducible fifth metatarsophalangeal dislocation and associated fracture of forth metatarsal neck. A closed reduction of metatarsophalangeal joint was not possible because of trapped fifth metatarsal head between adjacent forth metatarsal neck fracture fragments.

Keywords: Metatarsophalangeal dislocation, Metatarsal fracture, Irreducible dislocation, Foot injury

Introduction

Metatarsophalangeal dislocations are rare injuries and usually occur in dorsal direction [1,2]. Dislocations of the great toe metatarsophalangeal joint are more common than the lesser toes [1]. Irreducible dislocation of fifth metatarsophalangeal joint is extremely rare and only one case have been reported [3]. Injuries to these joints generally occur in response to a high-energy hyperextension mechanism [4]. There is a rareness of literature concerning metatarsophalangeal joint dislocations also there

is not any well-defined methodology concerning these injuries. This report represents a case with an irreducible fifth metatarsophalangeal dislocation where a closed reduction of the metatarsophalangeal joint was impossible because of trapped fifth metatarsal head between adjacent forth metatarsal neck fracture fragments.

Case Report

16 year old girl presents to the emergency department sustaining an injury of her right foot after a fall from stairs. At initial presentation she was in significant pain and inability to weight-bearing. On examination there were swelling and tenderness to the dorsal and plantar aspect of the foot. Sensation and vascularity of the foot were normal. Radiographs of the injured foot showed dislocation of the fifth metatarsophalangeal joint with significant displacement of the head of the fifth metatarsus under the plantar aspect of the foot (Figure 1). Additionally there was a fracture of forth metatarsal neck. Since associated tarsometatarsal dislocation suspected a computerized tomography assessment of the foot ordered in emergency department. 3D reconstruction of the computerized tomography showed fifth metatarsal head was trapped between forth metatarsal fracture sites (Figure 2). The patient was operated on the same day. As closed reduction of the metatarsophalangeal joint of the fifth toe could not be achieved, an open reduction of the metatarsophalangeal joint was performed with a dorsal incision between fourth and fifth metatarsals. The extensor tendon was retracted and the anterior capsule was opened. Fifth metatarsal head was in between distal and proximal fragment of forth metatarsal neck fracture, traction to the forth toe and manipulating the fifth metatarsus laterally we achieved reduction. Reduction was stabilized with transarticular Kirschner wire (Figure 3). A below-the-knee cast was applied postoperatively. The cast was removed in 6 weeks, progressive weight-bearing was started at 6 weeks after removing the Kirschner wire, and the patient was full weight-bearing at the end of 2 months.



Figure 1: Anteroposterior radiography of right foot; dorsal dislocation of the fifth metatarsophalangeal joint, fracture of forth metatarsal neck.



Figure 2: 3D reconstruction of the computerized tomography showed fifth metatarsal head trapped under forth metatarsal fracture gap.

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Received August 26, 2013; **Accepted** October 28, 2013; **Published** November 02, 2013

Citation: Ercin E, Baca E, Bilgili MG, Tanriverdi B (2013) Dislocation of Fifth Metatarsophalangeal Joint with an Adjacent Forth Metatarsal Neck Fracture. Clin Res Foot Ankle 1: 119. doi: [10.4172/2329-910X.1000119](https://doi.org/10.4172/2329-910X.1000119)

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Figure 3: Postoperative anteroposterior radiography of right foot.

Discussion

Foot injuries requiring orthopedic attention have been rising in recent years. These injuries if not properly treated can have a destructive impact on the ability to use the entire lower extremity. These injuries can lead to significant long term problems of stiffness, posttraumatic arthritis, pain and instability if left untreated. Metatarsophalangeal joints are quite stable, dislocations are rare. These joints have stabilizers such as articular capsule, collateral, dorsal, and plantar ligaments. Also medial and lateral collateral ligaments, intermetatarsal ligaments, interosseous tendons, lumbricals, flexor tendons, extensor digitorum longus and brevis give additional support [5,6]. Because of these stabilizers metatarsophalangeal joint dislocations are rare. These dislocations often occur in the first, second, or third toe [3,7]. Dislocations of lesser metatarsophalangeal joints are very rare and are almost always dorsal in direction [1,2] although horizontal [8] and plantar [3,4] dislocations have been described. Injuries to these joints generally occur in response to a significant high velocity force. One of the keys to identification of these injuries is the mechanism of injury. There is not any well-defined mechanism of injury concerning metatarsophalangeal joint dislocation in the literature. Dislocations of the lesser toes occur with high energy dorsiflexion and axial loading mechanism. Also lateral, medial and plantar displacement forces have role in these dislocations [9,10]. Extreme planter flexion injuries or crush injuries results in planter flexion dislocation [4]. Also this forceful dorsiflexion and axial loading mechanism can cause additional fractures even dislocations of other joints. In our case additional supination of the foot with dorsiflexion and axial loading is probably the mechanism of fifth metatarsal head trapped under forth metatarsal neck fracture site. Such complex mechanism of these dislocations may be study point of future work. The majority of metatarsophalangeal joint dislocations can be reduced by closed manipulation. For closed reduction of dorsal metatarsophalangeal joint dislocations longitudinal traction and planter translation should be useful. Sometimes an exaggeration of this deformity needed to unlock the impaction of joint. However there are several factors interfering closed reduction. Interposed planter capsule by the metatarsal head [11,12], flexor digitorum longus interposition under metatarsal head, interposition of the deep transverse ligament and planter capsule [13] are some of these factors. Also In a case report of irreducible planter dislocation of third metatarsophalangeal joint authors mentioned extensor digitorum longus and brevis tendons trapped underneath the plantar aspect of the third metatarsal head [4]. Fracture dislocation in the foot region may be complex and difficult to recognize all injuries in standard radiographic examination. There is a high incidence of associated injuries such as tarsometatarsal dislocations, floating metatarsal and fractures of metatarsal heads [14,15]. Missed diagnosis can occur up

to 20% of patients with foot injury [16]. The anatomic relations of tarsal and metatarsal joints should be examined carefully and computerized tomography assessment should be considered to address additional injuries. The position of proximal phalanx is also important to predict whether this location is caused by flexor digitorum longus interposition- on this situation proximal phalanx displaced dorsolateral- such as in our case if proximal phalanx is in normal position irreducible dislocations may have other causes in our case trapped in fracture gap.

In conclusion all dislocations of the metatarsophalangeal joint should be suspicious for additional foot fractures and dislocations. Computerized tomography assessment should be considered if radiographic evaluation stays uncertain. Proximal phalanx position in radiographies can give an idea if closed reduction is possible or not.

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