



Case Report

Jahss type one posterior first metatarsophalangeal dislocation treated with open reduction without fixation: A case report[☆]

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ARTICLE INFO

Keywords:

First metatarsophalangeal
Dislocation

Introduction

Dorsal dislocation of the first metatarsophalangeal joint is very uncommon [1,2]. It is caused by severe hyperextension injury to the toe and because of the complex ligamentous and tendon anatomy around this joint and associated sesamoid bones fracture or dislocation which add to the complexity of this type of fractures and make closed reduction nearly impossible [1,3]. In 1980, Jahss classified this type of dislocation into type I: dislocation with normal sesamoid bone ligament complex, type IIA and B: with intersesamoid ligament tear or sesamoid fracture respectively, and type IIC with disruption in both of the ligament and the sesamoid [2,4]. We reported a case of type I postero-lateral dislocation with an intact sesamoid mass.

Case report

A 33 years old female patient non-smoker, diabetic on insulin, and hypertensive presented to the University hospital emergency room with severe pain and limited motion of the left great toe with a skin dimple on the plantar aspect of the sole over the metatarsophalangeal joint with a shortened and dorsiflexed left big toe (Fig. 1). She gave history of a motor vehicle accident that she was in the front seat of a van that had crashed into another from the front. She felt severe pain in left foot, left knee, and had a nose bleed after a hit to her nose. The patient said “I felt my big toe on the dorsum of my foot”. The patient was awake, fully conscious, oriented to time place and person, and with stable vital signs. The patient had tenderness over her left knee, left big toe with limited left big toe motion. After a full poly-trauma survey had been done, the patient was cleared of all injuries except for foot radiographs showing left first metatarsophalangeal postero-lateral dislocation with dislocated sesamoids (Fig. 2).

Procedure

The patient was taken to the operating room and after a failed trial of closed reduction, we made a dorsal approach over the first metatarsophalangeal joint between extensor hallucis longus and brevis (Fig. 3) and opening of the joint capsule the two sesamoids were found dislocated on the dorsum of the first metatarsal with intact intersesamoid ligament (Fig. 4). We did axial traction and applied a blunt hohmann retractor from under the intersesamoid ligament on the head of the first metatarsal to lever the proximal

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Fig. 1. deformed left foot first ray with skin dimple at the metatarsophalangeal joint.



Fig. 2. Plain X-ray films showing dorsal dislocation of the first metatarsophalangeal joint with dislocation of the sesamoids.



Fig. 3. Dorsal incision between extensor hallucis longus and brevis.



Fig. 4. dorsal dislocation of the sesamoids and intersesamoid ligaments on the dorsal aspect of the metatarsal head.



Fig. 5. A Hohmann retractor placed behind the metatarsal head below the intersesamoid ligament with leverage and traction to reduce the joint.

phalanx back in its place on the head of first metatarsal (Fig. 5) and we successfully reduced the joint and the toe restored its length. The joint was stable in all flexion, extension, valgus stress, and varus stress. We did not pin the joint and repaired the capsule then closed the wound in layers. We dressed the wound and postoperative radiographs showed reduced both the metatarsophalangeal joint and the sesamoids (Fig. 6).

Postoperatively, we did a below knee extended slab, recommended non-weight bearing for two weeks and we allowed patient to begin range of motion and full protected weight bearing from the first follow up at two weeks. Further follow up was scheduled at 2 weeks, 4 weeks, 6 weeks, 2 months, 3 months and 6 months. The revised foot function index (FFI-R) was measured at each follow up (Table 1) [5].

At 4 weeks follow up patient was full weight bearing with slight limping and avoidance of bringing the big toe on the ground especially in the toe-off phase of gait cycle also there was pain at end of range of big toe motion, but the most distressing to the patient was edema especially at night and electric-like sensation with tingling on the plantar side of the first web space mostly Morton's neuroma. At two month follow up patient regained full non painful range of motion and moved without limp. The only complain was the need to increase the size of the footwear for comfort with normal daily activity and resumed her work normally. Although the case did not differ too much at three-month follow up, the patient did not think much about her big toe injury. At six-month follow up patient big toe improved much and the patient even forgot that she had a big toe accident with only pain on severe exertion. Examination showed no varus or valgus instability with nearly full big toe range.



Fig. 6. Post reduction X-rays showed reduction of the first metatarsophalangeal joint and the sesamoids.

Table 1
revised foot function index (FFI-R) at serial follow up.

	2 weeks	4 weeks	2 months	3 months	6 month
Pain score	47	36	20	17	10
Stiffness score	35	8	8	8	8
Difficulty score	83	66	32	32	20
Activity score	16	16	13	13	13
Personnel score	43	43	36	37	36
Total	224	169	109	107	87

Discussion

Traumatic dorsal dislocation of the first metatarsophalangeal joint is an uncommon injury. The most accepted mode of trauma is hyper-extension of the toes together with axial load resulting in dorsal displacement of the metatarsophalangeal joint [1,2,6]. In 1980 Jahss classified dorsal dislocation of the first metatarsophalangeal joint into two types (Table 2) [2].

Table 2
Jahss classification of first metatarsophalangeal dislocation.

Type I	Dislocation with intact sesamoid mass.
Type IIA, B	Dislocation with either a ligament tear or sesamoid fracture respectively.
Type IIC	Dislocation with both sesamoid fracture and ligament tear.
Type IIC described by Copeland and Kanat in 1991 [16].	

Dislocation of the first metatarsophalangeal joint is not that simple, careful assessment of associated soft tissue and sesamoid bones injuries is always required as this will determine the method of reduction. Intersesamoid ligament tear or avulsion usually aids closed reduction, on the other hand intact ligament hinders closed reduction, and so careful assessment of the sesamoid ligament complex is a crucial step in treatment of these injuries. Although difficult closed reduction suggests that the ligaments and the plantar plate are intact, radiological assessment prior to surgical intervention can lead to a better decision and a definitive idea about the associated soft tissue injury. Although plain radiographs are usually sufficient to diagnose sesamoid fractures and dislocations, magnetic resonance imaging can aid assessment of the associated ligamentous, capsular, and plantar plate injuries which need surgical repair to avoid instability and postoperative pain [7,8,9]. Also MR arthrography claimed to be the best in identification of plantar plate and capsular tears of the first metatarsophalangeal joint [10,11]. Trikha et al. reported a similar case of type one dislocation with failed closed reduction as the intersesamoid ligament was tense and required release of the deep transverse ligament [12]. Giannikas et al. used a transverse planter incision to reduce the dislocation in which intact collateral ligaments prevented closed reduction [5]. Isefuku et al. achieved closed reduction of the dislocation as the fibular sesamoid was fractured but needed a plantar approach to repair the sesamoid ligament complex [13]. Chafik et al. reduced the dislocation through a planter incision and did pinning of the metatarsophalangeal joint after noting instability [14]. Tosun et al. used medial approach to reduce the joint with an associated sesamoid fracture and also did not pin the joint [3].

We recommend careful assessment of the sesamoid ligament complex in first metatarsophalangeal dislocation. Although sesamoid fracture or intersesamoid ligament tear usually facilitates closed reduction of the dislocation, they usually need surgical repair. Sesamoids and plantar plates are easily accessible through plantar surgical approach, but dorsal approach is easier and safer with better scar and safer on the digital nerves [4,6,13,15]. However, Nery et al. and Jastifer et al. suggested that repair of plantar plate via dorsal approach even without osteotomy via a suture passer or arthroscopy had good outcomes [8,15].

In conclusion, We thought that dorsal first metatarsophalangeal dislocation always require surgical intervention either for reduction or for associated soft tissue injury repair. The degree of soft tissue injury determine the plan of treatment,so need to be fully investigated. Dorsal approach is preferred especially with intact sesamoid ligament complex with the resort to the planter and medial approach in the associated soft tissue injuries repair.

Conflict of interest

The authors declare that they have no conflict of interest.

Funding

There is no funding source.

Ethical approval

Patient consent was obtained before the study and ethically approved.

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