Complex dislocation of the first metatarsophalangeal joint

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Dislocation of the first metatarsophalangeal (MTP) joint is uncommon. Jahss has classified these dislocations based on the dislocation of hallux with or without disruption of the sesamoid mass. In this study, we described a case of type I complex dislocation of the MTP joint. It was irreducible by closed manipulation and required open reduction achieved through a dorsal approach.

CASE REPORT

A thirty-two-year old male presented himself in our emergency department with pain and swelling in the MTP region of the left foot. He had suffered a motorbike accident but had no other injuries. On examination, the head of the first metatarsal joint was prominent on the plantar aspect of the foot. The great toe appeared to be dorsally placed with apparent shortening of the first ray (Figs. 1A and 1B). There was a transverse laceration on the plantar aspect of the great toe, but no neurovascular deficit was found. Radiographs revealed dorsal dislocation of the first MTP joint. The sesamoids were displaced dorsally with plantarflexion of the first metatarsal. There was also an undisplaced fracture of the second metatarsal neck (Figs. 2A, 2B and 2C). Immediate closed reduction was attempted under local anaesthesia. Despite several attempts, reduction was not achieved. Therefore, the patient was taken up for reduction under general anaesthesia. Close reduction was again attempted, but it was still unsuccessful. An open reduction was then planned. A dorsal longitudinal incision was made in the first web space and branches of the deep peroneal nerve were carefully isolated. The two sesamoids, the intersesamoid ligament and the volar part of the capsule, were seen lying dorsally to the neck of the first metatarsal which was plantarflexed. The volar plate and the intersesamoid ligament were intact as the conjoint tendons of the various muscles were. Traction along the axis of the first ray caused further tightening of the buttonholed first metatarsal, which led to the irreducibility of the dislocation. The deep metatarsal ligament extending from the second metatarsal to the conjoint tendon was then cut and tagged. Now the sesamoid complex was lax and the metatarsal could be reflected dorsally with the sesamoid complex reverting back to its original plantar position. After reduction, the stability and the range of movement (ROM) were checked and found to be satisfactory. The length of the first ray also appeared to be restored (Fig.3). The deep transverse ligament was repaired and the wound was closed in layers. For additional stability, fixation of the MTP joint was performed with a Kirschner wire and a below knee cast was applied. The wire and the cast were removed after four weeks and weight-bearing exercises started. One year after injury, the patient was asymptomatic and had full ROM of the MTP joint.

DISCUSSION

Traumatic dislocation of the first MTP joint is a rare injury. Jahss has classified these injuries on the basis of their anatomy. In type I or complex dislocation, there is an intact sesamoid complex which dislocates dorsally onto the neck of the first metatarsal thus leading to the buttonholing of the metatarsal. This leads to the irreducibility of this type of dislocation with closed means, requiring open reduction with the surgical release of the structures which are tightened. Type II dislocation involves the discontinuity of the sesamoid complex either by a break in the intersesamoid ligament or a fracture of the sesamoid which is usually reducible by closed manipulation. Type I injuries are less common than type II injuries with less than 30 cases reported in literature till date.

Our case had type I dislocation as the sesamoid complex was found to be intact without any fracture or...
breakage, thus leading to irreducibility by closed reduction. Type I dislocation should be suspected if on the radiographs there is no wide separation of the sesamoids or no fracture of the sesamoids.

**Fig.1.** Clinical picture of the dislocated great toe showing apparent shortening and dorsiflexion of the phalanges.

**Fig.2.** Radiographs of the first MTP joint showing the plantarflexion of the first metatarsal, dorsal dislocation of the two sesamoids and the maintenance of the intersesamoid distance with no evidence of any fracture in the sesamoid mass. Fracture of the neck of the second metatarsal is also noted.

**Fig.3.** Post reduction picture showing restoration of the great toe length.

Brunet in his large series of eleven cases of type I MTP dislocation found that very severe trauma localized to the intrinsically stable articulation of the first MTP joint is responsible for these dislocations. He postulated that forefoot hyperextension and midfoot hyperflexion from axial loading are the mechanism of injury for such dislocations. This severe trauma can also have frequently associated injuries to the midfoot and forefoot, which should be looked for in all cases of MTP dislocations. In our case also, there was associated second metatarsal neck fracture which was undisplaced. In cases of concomitant injury to the tarsometatarsal joint, it is easier to reduce the MTP dislocations by closed means provided it is done before managing the proximal injury. This is because of the lax tendons and ligament structures due to the tarsometatarsal injuries thus aiding reduction of the MTP
dislocations. The severe injury and the high impact may lead to the associated laceration on the plantar aspect of the metatarsal head as seen in our case. This dislocation can be considered to be similar to the complex dislocation of the MTP dislocation in hand, where the release of the transverse metacarpal ligament from the volar plate allows reduction of the volar plate from the dorsum of the metacarpal.

The most consistent approach used to reduce this type of dislocation is the dorsal approach. It is considered to be more direct and safer approach than the plantar approach. Better visualization of the sesamoids conjoint tendon complex along with the required release of the tightened structures can be easily performed through the dorsal approach. This was also appreciated in our case. Further, plantar incision may injure the plantar neurovascular structures and cause a painful sensitive scar on the weight-bearing aspect of the metatarsal pad. The laceration on the plantar aspect of the foot also precluded the use of plantar approach through a contaminated area in our case.

Long follow-up of these injuries has showed good results with very less morbidity in cases approached through the dorsal incision and in which there is no major damage to the articular surface or the periarticular soft tissues.

Proper evaluation of the clinical and radiographic evidence is essential to classify the type of MTP dislocation, which is helpful in deciding the type of reduction method required to treat this rare injury. Concomitant injuries should also be looked for while treating this injury which may aid in closed reduction.

REFERENCES


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