Introducing traumatic dislocations of the metatarsophalangeal joints are uncommon injuries. Few cases of dislocations involving the first metatarsophalangeal joint and one to two lesser metatarsophalangeal joints have been reported. Most of the reported cases were treated by closed reduction. We present a rare case of irreducible fourth metatarsophalangeal joint dislocation associated with fracture of the base of fifth metatarsal, which required open reduction of the dislocation.

Case report

A 27-year-old man sustained an injury to his right foot due to a fall from a ladder of about 6 feet. His foot was swollen with deformity of the fourth toe. There was no distal neurovascular deficit. Radiographic examination of the right foot revealed a fracture of the base of the fifth metatarsal with dorsolateral dislocation of the metatarsophalangeal joint of the fourth toe (Fig. 1). Closed reduction of the dislocation was attempted under digital block in the accident and emergency department without any success. Hence, under general anaesthesia after a trial of closed reduction, open reduction was performed using dorsal midline incision. The metatarsal head was found to be displaced plantarwards and entrapped between flexor tendons laterally and lumbrical tendons medially. The joint could be reduced after releasing the fibrocartilagenous plate and deep transverse metatarsal ligament. The plantar capsule and deep transverse metatarsal ligament were entrapped between the base of the proximal phalanx and the dorsal aspect of the metatarsal head. The joint was found to be stable once reduced and did not require any transfixation. The foot was immobilised without weight bearing for 3 weeks, following which the patient was started on functional exercises. At the last follow-up, 12 months after the injury, the right foot had attained good function with a normal range of movement. X-rays were normal (Fig. 2).

Discussion

Traumatic dislocations of the metatarsophalangeal joints are rare injuries. In most cases, the direction of the dislocation is dorsal of which lateral and medial dislocations have been described. Plantar dislocation is undoubtedly rare. Dorsal dislocation is usually caused by forced hyper-
extension of the joint. The direction of the lesser metatarsophalangeal joint dislocation is nearly always dorsolateral and is caused by medial or lateral injury. Likewise, a forced hyperflexion of the joint generally causes plantar dislocation of the metatarsophalangeal joints.

The majority of these dislocations can be reduced by closed methods but there are various reasons for the failure of a closed reduction. Reduction of the first metatarsophalangeal joint dislocation can be blocked by entrapment of the metatarsal head through a buttonhole of the capsule. Other mechanisms of entrapments in dorsal dislocations of the lesser metatarsophalangeal joints are also described\(^2,4,5\). Hynes et al.\(^3\) observed incarceration of the metatarsal head under the flexor digitorum longus. Stephenson et al.\(^7\) reported that entrapment of the extensor digitorum longus and extensor digitorum brevis tendons beneath the plantar aspect of the metatarsal head interfered with reduction. Rao and Banzon\(^5\) described the plantar capsule and deep transverse metatarsal ligament being entrapped between the base of the proximal phalanx and the dorsal aspect of the metatarsal head. The metatarsal head displaced plantarly was entrapped between flexor tendons laterally and the lumbrical tendons medially. Similar findings were seen in our case and reduction was achieved after surgical dissection of the fibrocartilagenous plate and deep transverse metatarsal ligament.

In the literature, the association of skeletal injuries, like avulsion fractures of the sesamoid, fractures of the proximal phalanges and metatarsal fractures with dislocation of metatarsophalangeal joints have been reported\(^6\). Obviously, in these cases the results can vary according to the severity of the fractures. In our case the associated fracture of the base of fifth metatarsal was undisplaced and did not require any intervention apart from immobilisation.

References

1. De Palma L, Santucci A, Marinelli M. Traumatic dislocation of metatarsophalangeal joints: report of three different cases. Foot Ankle Surg 2001;7940:229–34.
2. Gentless J, Joshi P, Caselli M, et al. First and second metatarsophalangeal dislocation, a case report. J Am Podiatr Med Assoc 1992;82:630–2.
3. Hynes D, D’Souza LG, Stephens M. Irreducible dislocation of the fifth metatarsophalangeal joint: a case report. Foot Ankle Int 1994;15:625–6.
4. Murphy JL. Isolated dorsal dislocation of second metatarsophalangeal joint. Foot Ankle 1980;1:30–2.
5. Rao JP, Banzon MT. Irreducible dislocation of the metacarpophalangeal joints of the foot. Clin Orthop 1979;145:224–6.
6. Silver SA., Mizel MS. Open reduction and internal fixation of the simultaneous lesser metatarsal fracture and MPJ dislocation. Foot Ankle Int 2000;21:520–1.
7. Stephenson KA, Beck TL, Richardson EG. Plantar dislocation of the metatarsophalangeal joint: case report. Foot Ankle Int 1994;15:446–9.