



A Case of Simultaneous Traumatic Dorsal Dislocation of All Five Metatarsophalangeal Joints Treated Successfully With Closed Reduction



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ABSTRACT

Simultaneous dislocation of multiple metatarsophalangeal joints is a rare injury, because of the impediment presented by the anatomy of the lesser metatarsophalangeal joints. To the best of our knowledge, only 1 case of simultaneous dislocation of all 5 metatarsophalangeal joints has been previously reported in peer-reviewed studies. Owing to the same anatomic structures that obstruct relocation, closed reduction has been known to fail in a large proportion of cases. We report a case of simultaneous dorsal dislocation of all 5 metatarsophalangeal joints of the right foot after a motor vehicle accident. The highlight of our case was successful closed reduction after application of the reduction maneuver to all lesser metatarsophalangeal joints simultaneously in the second attempt with the patient under anesthesia. On confirming the stability of the reduction, the foot was immobilized in a short-leg, posterior slab cast for 3 weeks without placing Kirschner wires across the joints. At the 3-month follow-up evaluation, the patient had reacquired their preinjury level of activity with a good range of motion. At the 2-year follow-up evaluation, this range of motion was maintained with no radiologic evidence of arthrosis. We have inferred that the reduction was successful the second time because the maneuver freed the soft tissue structures from the contiguous impingement in the metatarsophalangeal joints by the exact reversal of the mode of injury using simultaneous application of the maneuver to all the lesser metatarsophalangeal joints. We encourage a trial of this modification of the closed reduction method in the emergency setting before proceeding to open reduction, because the results of closed reduction can be biologically rewarding without the risks associated with open surgical dissection.

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Traumatic dislocations of the metatarsophalangeal joints are generally associated with high-velocity, direct trauma. Most of these are isolated dislocations of the first metatarsophalangeal joint (MTPJ), with dislocations of single or multiple lesser MTPJs being less common. Only 1 case of simultaneous dislocation of all 5 MTPJs has been previously reported in peer-reviewed studies, and it was treated using open reduction for all 5 joints (1).

We report the case of traumatic dislocation of all 5 MTPJs of the right foot of an adult male who had been in a motor vehicular accident. The highlight of the case management was successful closed reduction during the second attempt, using a modified technique in which the reduction maneuver was applied to all the digits and MTPJs simultaneously.

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Case Report

A 47-year-old male presented to the outpatient department of our tertiary care hospital in Chennai City, South India, in February 2013, 3 hours after being involved in a motor vehicle accident. The patient reported that his 2-wheel automobile had tipped over, and he had landed squarely on his right forefoot, with his body weight thrown forward. He complained of pain, swelling, an inability to move his toes, and an inability to walk owing to the pain in his right foot. The patient gave no history of previous right foot injury. Systemic ligamentous laxity was ruled out, because the patient did not have hyperextension of his knees or elbows nor was he able to touch his thumb passively to his forearm.

Clinical examination revealed swelling of the dorsum of the right foot with disruption of the normal parabolic cascade of the toes, and all 5 toes were hyperextended and in valgus (Fig. 1). Movement of all 5 toes was extremely painful and severely restricted. A clean, shallow laceration was present that measured 40 mm long, 15 mm wide, and 5 mm deep on the medial side of his right forefoot, extending



Fig. 1. Clinical photograph of the right foot at presentation.

anteroposteriorly from 10 mm anterior to the first MTPJ to 30 mm posterior to it, exposing the ligaments, which were grossly intact. Sensation over all the toes was normal, and capillary refill was also normal, clinically ruling out neurovascular compromise. Dorsoplantar and oblique radiographs exhibited dorsal dislocation of all 5 MTPJs without an associated fracture (Fig. 2).

Closed reduction was attempted under ankle block regional anesthesia (0.5% bupivacaine plain) by initially hyperdorsiflexing, first the great toe, followed sequentially by the second through fifth

toes, applying minimal traction, and then applying plantar translation force to the toes. Only the fifth MTPJ appeared to be reduced after this attempt at closed reduction (Fig. 3). Subsequently, the reduction maneuver was performed under the same ankle block anesthesia simultaneously on the remaining 3 lesser MTPJs, by hyperdorsiflexing all the toes and simultaneously applying minimal traction. Maintaining the traction, plantar translation force was then applied to all the toes. This resulted in successful reduction of the remaining 3 lesser MTPJs. The first MTPJ was subsequently reduced separately. A palpable “thud” was noted when the intermediate 3 MTPJs relocated; hence, no Kirschner wires were used to stabilize the reduction of any MTPJ. The success of the closed reduction maneuver was confirmed by repeat dorsoplantar and oblique radiographs (Fig. 4). Clinically, the movements of all the MTPJs were normal after reduction. The dorsoplantar translation test was applied to each toe individually, and the excursion was found to be similar to that of the corresponding contralateral toes, compared individually. The laceration was thoroughly washed and left to heal by secondary intention.

A below-the-knee plantar plaster-of-Paris slab, extending to the tip of the toes, was applied, with a window for wound care, which was continued for 3 weeks. The patient was allowed to bear partial weight assisted by crutches. At 1 week, the wound was clean, with healthy granulation tissue appearing on its floor; it had completely healed by 6 weeks. The patient began toe and ankle mobilization exercises with full weightbearing in a shoe with a wide toe box at 3 weeks. The patient underwent physiotherapy for 4 weeks, which yielded good restoration of function. At 6 weeks, the patient was comfortable in his daily activities, with only mild stiffness of the first MTPJ. At 3 months, he had returned to his preinjury level of activity. At the 2-year follow-up evaluation, he had full activity with no stiffness, and radiographs showed well-maintained reduction with no evidence of arthrosis (Fig. 5). The American College of Foot and Ankle Surgeons score module 1 (first metatarsal and first ray) and module 2 (second to fifth metatarsals and rays) were applied to each toe individually, and the findings are listed in the Table (2,3).

The patient was informed in the language he spoke and understood that the data concerning his case would be submitted for publication, and he readily provided his consent.



Fig. 2. Dorsoplantar (A) and oblique (B) radiographs of the right foot at presentation.

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