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CASE REPORT

Bipolar Dislocation of the First Metatarsal With Associated Lisfranc Injury: A Case Report and Literature Review

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Abstract

Bipolar dislocation of the first metatarsal ("floating first metatarsal") is an exceptionally rare injury resulting from high-energy trauma, characterised by simultaneous dislocation at both the tarsometatarsal (Lisfranc) and metatarsophalangeal (MTP) joints. Despite the well-documented nature of Lisfranc injuries, isolated bipolar dislocations remain extraordinarily rare, with fewer than 25 cases reported in the literature. This study presents a case of bipolar dislocation with an associated Lisfranc fracture-dislocation, highlighting diagnostic challenges, surgical management and functional outcomes. A 32-year-old woman presented after a fall from a height with a severe deformation of the forefoot and complete functional impairment. Imaging revealed a bipolar dislocation of the first metatarsal (Lisfranc and MTP joints) and a Lisfranc fracture-dislocation type B2 according to Myerson. A spiral fracture of the second metatarsal Emergency surgical treatment included: open reduction via dorsal approach; double pin fixation (M1-M2 and M2-cuneiform); ligament repair. The postoperative protocol included 6 weeks of immobilisation without weight bearing followed by progressive rehabilitation. At 12-month follow-up: AOFAS score improved from 0 to 86/100; MTP range of motion: 45° dorsiflexion (20° plantarflexion); radiographic consolidation with preserved alignment; no instability or arthritic changes observed. This case demonstrates that anatomic reduction with dual pinning fixation yields excellent functional outcomes for this rare injury pattern. Early diagnosis (aided by the identified "double discontinuity" radiological sign) and strict adherence to postoperative protocols are critical for optimal recovery. Long-term surveillance remains essential to monitor for post-traumatic sequelae.

Key words: Metatarsal bones; Injuries; Lisfranc injury; Joint dislocation, bipolar; Midfoot trauma; Surgical procedures, operative; Surgical fixation.

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Introduction

Bipolar dislocation of the first metatarsal is an exceedingly rare injury pattern, first described in isolated case reports and poorly documented in larger studies. It involves simultaneous dislocation at both ends of the first metatarsal—proximally at the tarsometatarsal joint and distally at the metatarsophalangeal joint.[1, 2] The mechanism of injury usually involves a combination of axial compression and torsional force, frequently occurring in the context of high-energy trauma.[3, 4] Due to its rarity, optimal management strategies remain unclear and individualised. Moreover, this injury may be overlooked when associated with more conspicuous injuries such as Lisfranc fracture-dislocations, which themselves can be challenging to diagnose and manage.[4-6]

Case history

A 32-year-old healthy female presented to the emergency department following a domestic fall from a height of approximately two meters. She reported acute pain in the right forefoot with inability to bear weight. Physical examination revealed significant swelling, forefoot deformity. There was exquisite tenderness over the first and second metatarsals, with gross instability.
Plain radiographs revealed (Figure 1):

- A homolateral Lisfranc fracture-dislocation involving the first three metatarsals and corresponding cuneiforms.
- A displaced mid-diaphyseal fracture of the second metatarsal.
- A complete bipolar dislocation of the first metatarsal, with dorsal MTPJ dislocation and medial displacement at the base.

The patient was taken urgently to the operating room. Under spinal anaesthesia, a dorsal approach was performed. Intraoperative findings confirmed bipolar dislocation of the first metatarsal and an unstable Lisfranc complex (Figure 2). The bipolar dislocation was reduced by clearing soft tissue interposition and realigning the metatarsal. A 1.6 mm Kirschner pin was inserted between the first and second metatarsals (M1–M2) for stabilisation. The Lisfranc injury was anatomically reduced and stabilised using a centromedullary pining from the second metatarsal into the cuneiforms. Postoperatively, a below-knee non-weight-bearing cast was applied for five weeks.

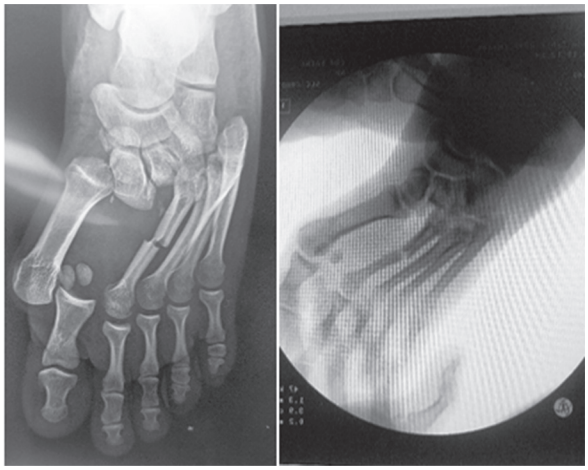

Figure 1: Preoperative foot X-ray

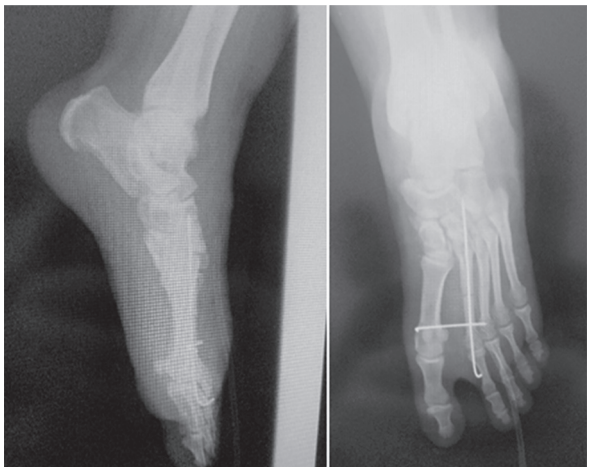

Figure 3: The radiological aspect of the osteosynthesis after four weeks

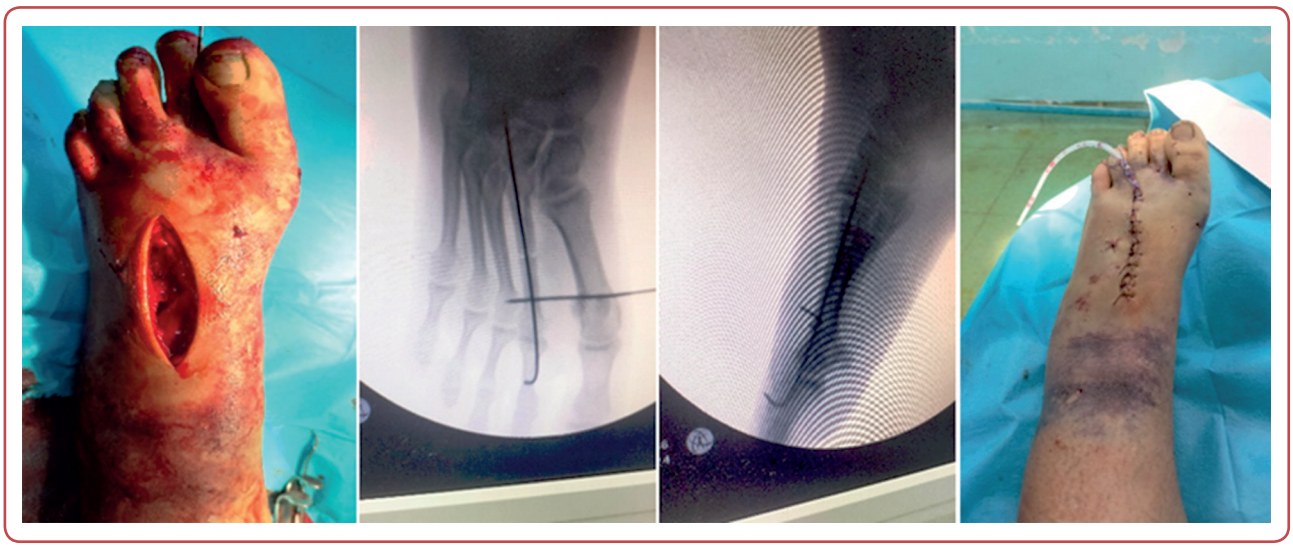

Figure 2: The approach and the aspect of the perioperative osteosynthesis

At 2 weeks: The surgical wounds were clean with no signs of infection. The X-rays confirmed the maintenance of the reduction.
At 6 weeks: The pins were removed. The patient started to bear weight gradually under the supervision of physiotherapy (Figure 3).
At 3 months: The patient was walking independently without pain. The examination showed preserved range of motion at the first MTP joint (dorsiflexion: 45°, plantar flexion: 20°). Slight stiffness at the Lisfranc joint was noted but with no functional impairment.
At 6 months: Full return to activity with a normal gait and no residual pain or instability. The final X-rays showed maintained alignment with no signs of osteoarthritis or subluxation.

Discussion

While Lisfranc injuries are relatively rare, their management is well-established, often requiring surgical stabilisation for optimal outcomes.[1, 5, 6] In contrast, bipolar dislocation of the first metatarsal is an extremely rare entity, with few cases reported in the literature.[2, 4, 7] The injury mechanism often includes high-energy trauma with combined axial loading and twisting forces, potentially causing disruption of both proximal and distal ligamentous structures.[3, 7]

Such dislocations are often irreducible by closed means due to interposition of sesamoids, the plantar plate, or joint capsule.[2, 4] In this case, open reduction was necessary and Kirschner pins fixation proved sufficient to maintain alignment during healing. This method is supported by prior studies emphasising the importance of restoring joint congruity in Lisfranc injuries to prevent long-term sequelae.[5, 8]

Presented experience supports previous findings that early surgical management and a structured postoperative protocol, including non-weight-bearing and physiotherapy, lead to satisfactory functional outcomes—even in complex injury patterns.[5, 6, 8]

Conclusion

This case highlights a rare but clinically significant injury—bipolar dislocation of the first metatarsal associated with Lisfranc fracture-dislocation. Timely diagnosis, appropriate imaging and prompt surgical intervention allowed for anatomical reduction and favourable recovery. Despite the complexity, conventional fixation techniques and immobilisation remain effective in treating such uncommon foot injuries.

Ethics

This study was approved by the Ethics Committee of the Batna University Hospital Centre decision No 30/CEDUB2/2025, dated 25 July 2025. A written informed consent for anonymised patient information to be published in this article was obtained from the patient.

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Conflicts of interest

The authors declare that there is no conflict of interest.

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Data access

The data that support the findings of this study are available from the corresponding author upon reasonable individual request.

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