Open Reduction and Internal Fixation of Purely Ligamentous Lisfranc Injury in a Rugby Player: A Case Report

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ABSTRACT

Objective: Lisfranc injuries are found in various injury patterns, especially in athletes. These injuries are the second most common type of foot injuries in athletes. However, the treatment decision differs and is essential in athletes for a good outcome. The main controversies in surgical management include whether to execute open or close reduction, fixation technique, and arthrodesis’ role in athletes.

Case Report: A previously healthy 21 Years Old Malay gentleman sustained a sports injury diagnosed with pure ligamentous Lisfranc injury with an incomplete, partial lateral dislocation. The patient was treated with Open Reduction and Internal Fixation (ORIF) using a dorsal bridge Lisfranc locking plate.

Conclusion: Early diagnosis and appropriate treatment are crucial to achieving stability in unstable Lisfranc injuries. Anatomical reduction and Lisfranc joint restoration are the keys to a good outcome. Open reduction and internal fixation are preferred methods where most athletes can return to their previous level of sports.

Keywords: Case Report, Lisfranc Injury, Tarsometatarsal Dislocation, Lisfranc Plating

INTRODUCTION

Lisfranc injury is one or more metatarsal dislocations of tarsal bones (1). A French surgeon and gynaecologist first described the level of amputation at the midfoot (1). Lisfranc injuries are found in various injury patterns, especially in athletes; unusual mechanisms are the typical presentation (2). These injuries are the second most common type of foot injuries in athletes (3). However, the treatment decision differs and is essential in athletes for a good functional outcome. The main controversies in surgical management include whether to execute open or close reduction, fixation technique, and arthrodesis’ role in athletes (3). With this, we report a case of pure ligamentous Lisfranc injury in a rugby player, treated by open reduction and internal fixation.

CASE

A previously healthy 21 Years Old Malay gentleman was admitted to University Hospital following a sports injury. The patient was representing his university in a rugby tournament. While trying to tackle his opponent, he fell down with a twisted foot. Post-trauma sustained pain over the left midfoot. No other injuries were noted. The patient was brought to the emergency department immediately after the trauma. The patient’s left foot was grossly swollen and deformed (Figure 1). There was plantar ecchymosis seen. The compartment was soft and distal pulses were palpable. We proceeded with a plain radiograph (Figure 3) which revealed partial Lisfranc injury with lateral column displacement. The left foot was protected with below knee backslap, and subsequently, the patient was admitted to the Orthopaedic ward for observation of the swelling and further treatment. A plain computerized tomography (CT) scan was performed on day 2 of admission. CT scan (Figure 4) was reported as a pure ligamentous injury with an incomplete incongruity of the tarsometatarsal joints with lateral displacement of the 2nd-5th metatarsal bones. Open reduction and internal fixation proceeded under general anaesthesia. The patient was positioned supine on a radiolucent table.
A prophylactic antibiotic was served. A longitudinal incision was made over the first web space. First, tarsometatarsal dislocation was identified, reduced, and stabilized with a k-wire size of 1.8mm (Figure 5). Subsequently, dislocation was reduced, and wire was inserted over the first metatarsal to intermediate cuneiform and medial cuneiform to the second metatarsal. Another longitudinal incision was made over the fourth web space, the third metatarsal dislocation was reduced, and K wire was inserted from the base of the third metatarsal to lateral cuneiform (Figure 6).

3.5mm Dorsal bridging Lisfranc plate inserted and fixed with two cortical and four locking screws. A headless compression screw is inserted over the base of the third metatarsal to lateral cuneiform. Temporary K-wires removed. Two K-wires were inserted into the cuboid bone from the 4th and 5th metatarsal bone. Reduction and fixation were confirmed with the image intensifier. The medial contour and arch of the foot were restored. A post-operative check x-ray (Figure 7) was done. Alignment and reduction were acceptable. On post-op day 2, the patient was discharged home with a below knee back slab and strict non-weight bearing crutches ambulation. Informed consent for the publication of the research details and clinical images was obtained from the patient.
Figure 5: Intraoperative picture shows first tarso-metatarsal dislocation reduced and stabilized with K-wire size 1.8mm diameter.

Figure 6: Intraoperative picture shows tarso-metatarsal dislocation reduced and stabilized with 4 K-wires size 1.8mm diameter.

Figure 7: Immediate post-operative X-Ray images of the left foot. (A) Anteroposterior, (B) Oblique, and (C) Lateral view.
DISCUSSION

Lisfranc injury is damage to the tarsometatarsal joint (TMTJ) (3). This injury is typical in the athletic population, with an incidence of 4% among football players (3). The stability of the Lisfranc complex is provided by bony and ligamentous attachment (3). There is no inter-metatarsal attachment between the 1st and 2nd metatarsal bases predisposing to the injury (3). The ultimate purpose of operative management for Lisfranc injury is an anatomical reduction and restoring the Lisfranc joint (1). The quality of anatomical reduction of Lisfranc injuries reduces the risk of post-traumatic osteoarthritis (1). The classical method for fixation of Lisfranc injuries is ORIF; however, primary partial arthrodesis is proven to have a better functional outcome in pure ligamentous Lisfranc injuries and reduces the risk of re-operation as well (1). The most common cause of re-surgery in ORIF would be a fixation for post-traumatic OA and non-union in patients treated with primary arthrodesis (1). In a prospective and randomized trial performed in patients with pure ligaments Lisfranc injuries, better functional short- and medium-term outcomes were obtained at about 92% of their earlier level of activity in patients who were treated with primary arthrodesis fixation compared to the patients who were treated with ORIF which is only about 65% in the general population (1). However, in clinical practice, data has shown that Orthopaedic surgeons are often unwilling to decide on primary arthrodesis on young and active patients with mild injuries of the Lisfranc joint (1). Several other studies have discovered no significant differences in the functional outcome of both constructs in athletes (3). Fixation of Lisfranc injury may be better stabilized with plate constructs or a flexible fixation device for an athlete where hardware removal is not required. Postoperatively, a period of immobilization minimum of 6-8 weeks was given for both soft tissue rest and osseous healing (3). Then, progressive weight bearing in custom moulded orthosis for up to 10-12 weeks (3). Patients can progress from line running to sport-specific activity when pain-free, usually between 3 to 4 months after surgery (2). In cases of ORIF, implant removal is typically done 4-6 months post-op (3). Lisfranc injuries are common in sports injuries. Early detection of diagnosis and appropriate treatment is crucial to achieving stability in unstable Lisfranc injuries. Anatomical reduction and Lisfranc joint restoration are the keys to a good functional outcome (3). Open reduction and internal fixation are preferred methods where most athletes can return to their earlier level of sports (3).

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REFERENCES


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