Section: Orthopaedics

Case Series

OPEN REDUCTION AND INTERNAL FIXATION FOR NEGLECTED LISFRANC INJURIES: A RETROSPECTIVE CASE SERIES OF 8 PATIENTS

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Abstract

Background: Lisfranc injuries are relatively uncommon and commonly overlooked or missed. Little is known about the treatment of these missed injuries. The management of such neglected Lisfranc injuries are always challenging. **Materials and Methods:** A retrospective study analyzed eight patients with a neglected or delayed Lisfranc's fracture dislocation who were operated on between 2016 and 2023. All of them had open reduction and internal fixation with Kirschner wires and cancellous screws. The functional outcome was assessed using the AOFAS midfoot scale and VAS. **Result:** The mean delay between injury and surgery was 7.1 weeks (range 6-12 weeks). The mean follow-up was 12 months (range 9-14 months). The average AOFAS midfoot score was 92 (range 90-94) and the VAS was 1 (range 0-3). The VAS and AOFAS midfoot score improved significantly after the surgical procedure ($p<.05$). The delay in injury surgery interval has no significant impact on the functional outcome ($p>0.05$). One patient had delayed wound healing and two had Kirschner wire pin track infections, that settled with wire removal at 8 weeks. None of the patients had radiological features of arthritis or recurrence of deformity. **Conclusion:** Open reduction and internal fixation may be considered as one of the surgical options for delayed Lisfranc's fracture dislocation.

INTRODUCTION

Lisfranc's fracture dislocations are missed in 20-40% cases and they are overlooked and treated as foot sprains.[1-6] These patients develop planus or planovalgus deformities associated with forefoot abduction, cavus deformity, painful malunion, arthritis and impaired function.[1-5] Closed reduction and plaster immobilization, percutaneous fixation, open reduction internal fixation with wires, screws, and dorsal plates and primary arthrodesis are the treatment modalities for Lisfranc's fracture dislocations.[1-5] There is no consensus on the time when Lisfranc injuries should be treated. Also, little is known about the management of delayed or neglected injuries. The functional outcome is significantly inferior when surgery was performed six months after the injury.[1-5]

Several studies have documented that open reduction and internal fixation gives satisfactory results.[5,6] Also, primary arthrodesis is considered for cases of severe comminuted fractures or ligamentous dislocations.[1-3]

The aim of the study was to analyze the functional outcome of delayed or neglected
Lisfranc's fracture dislocations treated by open reduction and internal fixation.

Figure 1: Radiographs shows a right foot Lisfranc injury in a 42-year-old male.

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Figure 2: Radiographs shows a right foot Lisfranc injury in a 46-year-old female.

MATERIALS AND METHODS

Patients, setting, and ethics

Between 2016 and 2023, eight patients who presented late with Lisfranc's fracture dislocations were treated by primary open reduction and internal fixation. This was the retrospective study that analyzed the functional outcome and the visual analogue score (VAS).

Table 1 - Demographics

Factors		Value/mean	P value
Age		48	1.0[b]
Gender	Male	5	1.0[b]
	Female	3	
Side	Left	5	1.0[b]
	Right	3	
Mechanism of injury	Trivial fall	4	1.0[b]
	Road traffic injury	4	
Time injury- surgery (weeks)		7.5	0.2[a]
Initial treatment (delay)	Quack oil bandage	5	1.0[b]
	Neglected	3	

a- Mann Whitney/ Wilcoxon Two- Sample test (Kruskal- Wallis test for two groups)
b- Fisher-Exact test

Inclusion Criteria

Lisfranc's fracture dislocations of more than 6 weeks are included in the study.

Exclusion Criteria

Acute Lisfranc's fractures, ankle and midfoot sprains and extra-articular fractures are excluded.

The injury mechanism, delay in injury-surgery interval, radiographs, and preoperative VAS score were noted. The patient's data were collected during their visit to the hospital, and pictures were taken with consent. No patient was lost to follow-up.

Surgical Technique

All patients were operated under spinal anaesthesia with a thigh tourniquet control. A dorso-medial incision was made in the first webspace and the underlying adhesions and fibrous tissues were removed. The first and second tarsometatarsal joints were reduced and stabilised with 3.5 mm titanium plates and screws. Multiple Kirschner wires stabilises the intermetatarsal joints. The reduction was confirmed under image intensifier and wounds were closed in layers.

Figure 3: Radiographs shows intra-operative pictures of the procedure

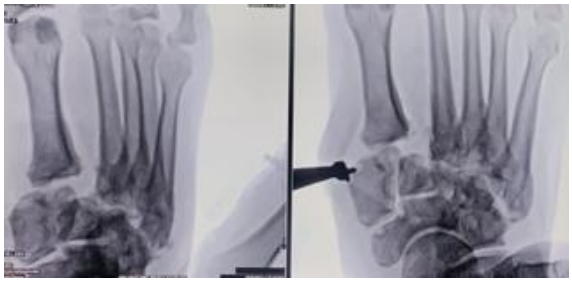

Figure 4: Radiographs shows intra-operative pictures of the procedure

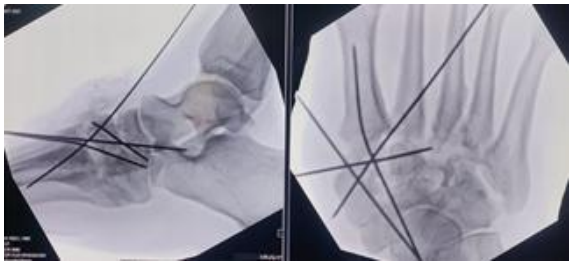

Figure 5: Radiographs shows intra-operative pictures of the procedure

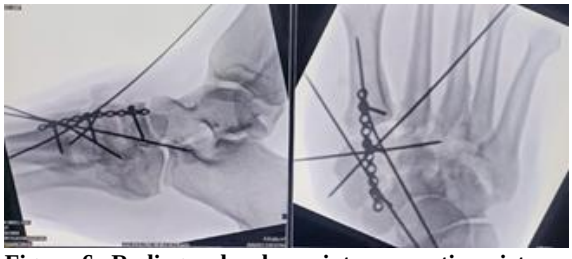

Figure 6: Radiographs shows intra-operative pictures of the procedure

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Figure 7: Radiographs shows intra-operative pictures of the procedure

Postoperative Care: All patients had a non-weight bearing cast immobilisation for 8 weeks. Radiographs were taken at monthly interval to assess the union and fracture alignment. The cast and Kirschner wires were removed at 6 weeks and partial weight bearing was started. The patients were allowed full weight bearing ambulation at three months after the surgery.

Figure 8: Radiographs shows intra-operative pictures of the procedure

Follow-up: The functional outcome was assessed using the AOFAS score (scores, 0-100) In addition, the pain was assessed on a visual analogue scale (VAS) and return to work was noted.

Figure 9: Radiographs show the immediate postoperative images of the internal fixation of the tarsometatarsal joint with plates, screws and K-wires.

Figure 10: Radiographs shows the post-operative follow up images after 3 months and the clinical pictures.

Figure 11: Radiographs shows the post-operative follow up images after 3 months and the clinical pictures.

Statistics: The data were analyzed with CDC epi info software and expressed as mean and standard deviation. Fisher exact tests were used to compare categorical variables. Students-t test was used for statistical analysis to compare two independent means of the AOFAS midfoot score and VAS. A p-value of 0.05 or less was considered significant.

Figure 12: Radiographs shows the post-operative follow up images after 3 months and the clinical pictures.

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RESULTS

Patients and deformity characteristics

The mean age of patients in our study was 48 years (range, 37-55 years) [Table 1]. The most common mechanism of the injury was road traffic injury (n=4). The mean time between injury and surgery was 7.5 weeks (range 6-12 weeks).

Table 2 - Functional outcome

Factors	Preop/ early (mean)	6 months follow up (mean)	P value (t-test)
AOFAS midfoot score/scale	41	85.5	p < .05
VAS	9.3	0.3	p < .05

VAS- visual analogue scale

Outcomes: The mean follow-up of our study was 12 months (range 9-14 months). All patients achieved good radiological union after the surgery. The mean AOFAS score was 92 (range 90-94) and the VAS was 1 (range 0-3). The VAS and AOFAS midfoot score improved significantly after the surgical procedure ($p<.05$) [Table 2]. The delay in injury surgery interval has no significant impact on the functional outcome ($p>0.05$). One patient had delayed wound healing and two had Kirschner wire pin track infections, that settled with wire removal at 8 weeks. None of the patients had radiological features of arthritis or recurrence of deformity. All patients were ambulant and returned to their previous work at an average of five months (range 4-7 months) after the initial surgery.

DISCUSSION

Delayed or neglected Lisfrancs fracture dislocations are treated by arthrodesis to achieve a painless foot. Kale et al,[4] reported a one month delayed lisfrancs injury treated by open reduction with 4mm cancellous screws and augmented with a Wagner distractor device. Their patient had a good outcome at 12 months follow up. The removal of cancellous screws, weight bearing protocols and follow up imaging were the limitation of their study. Tantray et al,[5] used a staged distraction for a 3-month-old neglected Lisfrancs injury. They performed an Illizarov ring fixator in the initial stage and subsequently removed the Illizarov fixator and performed an open reduction, internal fixation with K wires. They reported good functional outcomes at 3 months after the treatment. The first stage over distracted all tarsometatarsal joints and the follow up is short to understand the long-term benefits.

In our study, we performed open reduction and stabilized the tarsometatarsal and with 3.5mm titanium plates and screws. Additionally, we utilized K wires to stabilize the intermetatarsal joints. All patients achieved good radiological and functional outcome at an average follow up of 12 months. Pin track site infections and delayed wound healing were noted in our study. None of the patients required secondary procedures.

The strength of the article lies in using plates and cancellous screws for the tarsometatarsal joints in neglected or untreated Lisfranc's injury and achieving good outcomes. Such injuries were once considered for primary arthrodesis, our case series recommended open reduction to achieve a painless and mobile joint for a stable plantigrade foot.

Our study's limitations are the small sample size, retrospective design, and lack of a control group. There is a possibility that all our cases might have post-traumatic arthritis in the future and a long-term study is essential to assess the reliability. There might be situations where symptoms and radiographic findings do not correlate in these injuries. A larger prospective study is mandatory to know more about these complex and rare injuries and their symptom-radiographic relationship (post-traumatic arthritis). Despite these limitations, our study documented that open reduction and internal fixation for delayed or neglected Lisfranc's fracture dislocations is a reliable surgical option to achieve good radiological and functional outcome.

CONCLUSION

Open reduction and internal fixation may be considered as one of the surgical options for delayed Lisfranc's fracture dislocation.

REFERENCES

1. Komenda GA, Myerson MS, Biddinger KR. Results of arthrodesis of the tarsometatarsal joints after traumatic injury. J Bone Joint Surg [Am]1996;78-A:1665–76
2. Mulier T, Reynders P, Dereymaeker G, Broos P. Severe Lisfrancs injuries: primary arthrodesis or ORIF? Foot Ankle Int 2002;23:902–5.
3. Yamamoto H, Furuya K, Muneta T, Ishibashi T. Neglected Lisfranc's joint dislocation. J Orthop Trauma. 1992;6:129–31
4. Kale DR, Khadabadi NA, Putti BB, Jatti RS. One Month Old Neglected Lisfrancs Fracture Dislocation Treated with Wagner's External Fixator and Percutaneous Screw Fixation : A Case Report. J Orthop Case Rep. 2014 Apr-Jun;4(2):42-6. doi: 10.13107/jocr.2250-0685.166. PMID: 27298958; PMCID: PMC4719373.
5. Tantray MD, Kangoo K, Nazir A, Baba M, Rameez R, Tabish S, Shahnawaz S. An old mismanaged Lisfranc injury treated by gradual deformity correction followed by the second-stage internal fixation. Strategies Trauma Limb Reconstr. 2017 Apr;12(1):59-62. doi: 10.1007/s11751-016-0273-3. Epub 2017 Jan 5. PMID: 28058661; PMCID: PMC5360672.
6. Amirthalingam S, Suriyakumar S, Harshavardhan JKG. Six-Week Old Neglected Homolateral Lisfranc Injury - A Case Report. J Orthop Case Rep. 2023 May;13(5):55-59. doi: 10.13107/jocr.2023.v13.i05.3644. PMID: 37255642; PMCID: PMC10226627.

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