

Functional Outcome of Lisfranc Injury Managed With Arthrodesis

Jayesh Chouhan¹, Kuldeep Dhankhar², Nandlal Bharwani^{3*}, Ramniwas Bishnoi⁴, Mahesh Bhati⁵

¹Senior Resident, Department of Orthopaedics, Dr. S. N. Medical College, Jodhpur, Rajasthan, India

²Assistant Professor, Department of Orthopaedics, Dr. S. N. Medical College, Jodhpur, Rajasthan, India

³Senior Resident, Department of Orthopaedics, Dr. S. N. Medical College, Jodhpur, Rajasthan, India

⁴Associate Professor, Department of Orthopaedics, Dr. S. N. Medical College, Jodhpur, Rajasthan, India

⁵Senior Professor and Head of Department, Department of Orthopaedics, Dr. S. N. Medical College, Jodhpur, Rajasthan, India

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Abstract

Purpose- Though injuries around foot and ankle joint are seen commonly in orthopaedic outdoors and emergency rooms, but tarso-metatarsal joint injury or lisfranc injury merely accounts for 0.2% of the fractures. It is commonly seen that these injuries are missed on initial presentation and may lead to interference with daily routine activities which occurs as a result of pain, deformity. In present study can arthrodesis obviate the need for revision surgery and to see the difference in functional outcome. **Method-** We conducted a prospective study from 1st January 2017 to 30th June 2021 including ten patients (7 males and 3 males) with Lisfranc fractures. In our study, arthrodesis was performed in all cases. At final follow-up functional outcome was evaluated using "AOFAS- Midfoot score", "VAS score" and radiological assessment. **Results-** All ten patients had good functional outcome at final follow-up and found no difficulty in routine activities. Routine clinical and radiological assessment were also done at final follow-up. **Conclusion-** Closed Lisfranc injuries treated with arthrodesis has good functional outcome in terms of function if managed properly.

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Introduction

Though injuries around foot and ankle joint are seen commonly in orthopaedic outdoors and emergency rooms, but tarso-metatarsal joint injury or lisfranc injury merely accounts for 0.2% of the fractures[1,2]. It is commonly seen that these injuries are missed on initial presentation and may lead to interference with daily routine activities which occurs as a result of pain, deformity[3,4]. Most common mode of injury is high velocity trauma (road traffic accident, fall from height)[5]. It occurs following plantar-flexed foot with rotational injury or axial loading of foot[5].

Purely ligamentous, bony injury or both are common presentation of lisfranc injuries. Till date various classifications have been used but none of them have shown relation with functional outcome[4,6].

Proper management of lisfranc injury helps in early return to daily routine activities and maintenance of function and biomechanics of foot joint.

Aim

To study the functional outcome of arthrodesis for lisfranc injuries and its complications.

Materials and Methods- This prospective study was conducted in the Department of Orthopaedics in a tertiary health care centre between 1st January 2017 to 30th June 2021. A total of ten patients (7 males and 3 females) with lisfranc injury with or without metatarsal fractures.

All cases with open fractures and with neuro-vascular compromised limb were excluded from this study. Four of them were referred from peripheral health centres and rest six came in emergency room of our

hospital. All the patients were assessed clinically (swelling, plantar ecchymosis, deformity around ankle and foot, overlying skin, neuro-vascular status of limb) and radiologically (gap between first and second metatarsal, tarso-metatarsal joint) (Fig.1).

After proper assessment below knee plaster were given and limb elevation was advised.

Arthrodesis performed in all ten patients using standard dorsal incision between 1st and 2nd metatarsal and second incision around base of 4th metatarsal if required and fixation with 4mm cannulated cancellous screws after removal of cartilage and fibrous tissue between tarso-metatarsal joints.

After two weeks suture removal was done followed by below knee cast for four weeks and removal of K-wires at 4-6 weeks if used to fix 4th & 5th metatarsal.

Rehabilitation

Post-operatively below knee cast was used for four weeks, then after removal of cast, full range of motion was started gradually, followed by partial weight-bearing from 6th – 8th week and full weight bearing from 10th week.

Follow-up protocol

The patients were followed up every month for first 3 months, followed by every 3 months till 1 year after arthrodesis. AOFAS-Midfoot score and VAS score were calculated at 1 year follow-up. At each visit patients were assessed clinically and radiologically (Fig.2 and 3).

*Correspondence

Dr. Nandlal Bharwani

Senior Resident, Department of Orthopaedics, Dr. S. N. Medical College, Jodhpur, Rajasthan, India

E-mail: nandlalbharwani21@gmail.com



Fig.1 AP and Oblique radiograph of foot showing Lisfranc injury



Fig.2 Postoperative AP and Lateral radiograph of foot showing Primary arthrodesis



Fig.3 Postoperative AP and Lateral radiograph of foot at 1 year follow up treated with Primary arthrodesis

Results

A total of ten patients were included in our study (7 males, 3 females). The mean follow-up period was 17± 4.88 months (range 10-26 months). The mean age of study group was 39± 12.30 years (range 16-55 years). Six (60%) patients were injured during road traffic accident (RTA), Three (30%) patients had history of fall from height

and One (10%) had history of sports injury. Two patients had metatarsal fractures in the same foot while two patients had calcaneum fracture in opposite limb and one patient had calcaneum fracture in same limb. All the patients reported within 10 days from the day of injury (Table1).

Table-1 showing follow-up of patients.

Cases	Age (Years)	Sex	Mode of injury	AOFAS-Midfoot score	VAS score	Injured side	Complication
1	16	M	RTA	80	1	R	Symptomatic hardware
2	35	F	RTA	83	2	L	-
3	45	M	Fall from height	70	2	L	-
4	27	M	RTA	85	1	R	-
5	38	F	RTA	78	3	L	-
6	50	M	Fall from height	69	2	L	Post-operative edema
7	30	F	Sports injury	82	1	R	-
8	55	M	RTA	70	1	L	-
9	42	M	Fall from height	83	2	L	Post-operative edema
10	52	M	RTA	68	3	R	-

The “AOFAS-Midfoot score” and “VAS score” were used for evaluation of function and pain. The mean AOFAS-Midfoot score was 76.8± 6.78 and “VAS score” was 1.80± 0.79.

In our study, two patients had post-operative edema which was resolved within 6 months post-operatively and one patient had symptomatic hardware.

Discussion

Lisfranc injury is a form of complex injury that is rarely encountered by orthopaedicians in out-patient settings and emergencies[4]. Of all fractures, it merely accounts for 0.2% and this can be only ligamentous, bony or bony-ligamentous involvement[1,2].

In, initial presentation these injuries are commonly missed on routine radiographs which accounts for approximately 20% of missed injuries, therefore stress view and weight bearing X-rays are used[7]. Lisfranc fractures/injuries occurs due to rotational injury in plantarflexed foot or axial loading of foot[3,4].

In present study of ten cases with lisfranc injuries, most cases were male (7:3) which was similar to studies conducted in past had 127(65%) males and 66(35%) out of 193[8].

High energy trauma and lisfranc fractures are related significantly such as road traffic accident, fall from height. In present study, six out of ten (60%) had history of RTA, three out ten (30%) had history of fall from height and one(10%) had history of sports injury which were similar to study by Sheibani- Rad et al. in which mode of injury was RTA in 57%, fall from height in 21% and other cause like sports activity(9%), work related(8%), crush injury(5%)[8].

Lisfranc injuries can be associated with osseous injuries like metatarsal and tarsal fractures. In previous studies, CT-scan proved to be fruitful for additional injuries like tarsal and metatarsal fractures. In present study, CT-scan was used for all patients which helps in finding additional injuries like metatarsal base, head fractures and calcaneum fractures[9].

Proper anatomic reduction is of utmost importance for good functional outcome[10,11].

In our study, medial column was fixed with 4mm cannulated screws which helps in achieving rigid fixation whereas to preserve the mobility of lateral column fixation was done with help of K-wires.

Till date existing studies, favours arthrodesis as primary treatment for these injuries as good results achieved for injuries with bony and ligamentous involvement, less time required to resume activities, decrease rate of revision procedures[12,13].

In present study, all ten patients were treated with arthrodesis for lisfranc injuries and had good functional outcome (AOFAS-Midfoot score) 76.8+6.78 which was comparable to studies by Qiao et al[14](25 patients), Ly and Coetzee et al¹²(41patients) and Kuo et al[15](15 patients).

In present study, two patients had postoperative edema which resolved at six months post-surgery and one patient had symptomatic hardware for which removal was advised and none of the patient had implant failure and need for revision procedure whereas study by Ly and Coetzee et al[12] 4 out of 21 cases had implant removal as a result of symptomatic hardware.

In existing studies, patients with arthrodesis developed degenerative arthritis around surrounding joints whereas in our study, one patient had similar finding.

In present study, VAS score at final follow-up was 1.80+0.79 which was comparable to study by Reinhardt et al[16] on primary arthrodesis and study by Del Vecchio et al[17] with ORIF had slight better VAS score at final follow-up.

Arthrodesis performed primarily turned fruitful for management of these complex injuries and helps in restoring foot functions and biomechanics and are associated with less complications, revisions procedures, early return to activities of daily-living[8,12,13,18].

The limitation of our study is less number of patients and short follow-up period, so we cannot comment much upon complications like delayed union, non-union, pseudoarthrosis.

Conclusion

Lisfranc injuries are rare injuries and commonly missed in orthopaedic emergency room, has male predominance as associated with high velocity trauma (RTA, FFH and sports related activities). For these injuries arthrodesis as first option is treatment of choice with good functional outcome, less revisions, complications and easy return to work.

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Conflict of interest

None

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