



EVALUATION OF EFFICACY OF NONSURGICAL TREATMENT OF JONES FRACTURE

Orthopaedics

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ABSTRACT

Background: Jones fracture occurring within the metaphyseal-diaphyseal junction are difficult to treat because of its poor vascular supply. The use of operative versus non-operative treatments for these fractures has been a long-standing topic of debate in the literature. **Aims and Objectives:** The study aimed to find the effectiveness of conservative treatment method by duration of bone fracture healing and by utilizing patient-reported outcome measures (PROMs) to evaluate the outcomes of treatment. **Materials and Methods:** A study was conducted on 17 patients who suffered with traumatic Jones fracture of 5th metatarsal and were treated with non-weight bearing knee-below POP cast for 6 months. **Results:** There was 100% fracture healing with mean union time as 8.12 weeks (SD: 0.928). There was very weak non-significant correlation between age and union time ($r = 0.152$, $p = 0.561$). The mean AOFAS score at 6 weeks was 81.76 (SD = 4.323), which increased to 91.29 (SD = 2.024) at 12 weeks. The correlation between age and AOFAS at 6 weeks was ($r = -0.549$, $p = 0.022$) moderately negative and significant. However, correlation between age and AOFAS at 12 weeks ($r = -0.440$, $p = 0.077$) was weak negative and non-significant. **Conclusion:** The study showed that conservative treatment by non-weight bearing casting is a feasible and effective method of treatment for Jones fracture in low demand patients.

KEYWORDS

Jones Fracture, Union Time, AOFAS, Conservative Treatment

INTRODUCTION

Each foot has five metatarsals, numbered 1 to 5 from the medial side (great toe) to the lateral side. The metatarsal heads serve as the primary weight-bearing surfaces. Metatarsal fractures (43.3%) are common in forefoot injuries while Lisfranc injuries are more common among midfoot injuries and calcaneal injuries among hindfoot injuries.¹ The metatarsal bone fracture (International Classification of Diseases, Tenth Edition [ICD-10] code S92.3) accounts for 35% of all foot fractures.² Most of these fractures are observed in the fifth metatarsal bone followed by the third, second, first, and fourth metatarsal bones.³ Sir Robert Jones first described fractures of the fifth metatarsal base in 1902. These fractures, also known as 'Jones fracture' typically occur within the metaphyseal-diaphyseal junction ((within 0.75 inches from the base).⁴ There are differences in the opinions regarding management of Jones fractures. The use of operative versus non-operative treatments for these fractures has been a long-standing topic of debate in the literature. A variety of nonoperative modalities are available which include elastic dressing and a rigid shoe, short leg walking cast, posterior splint, or a hard plastic cast shoe with non-weight bearing or weightbearing as tolerated.⁵ Present study was conducted to find out whether conservative treatment with knee below cast is effective treatment method in the case of Jones fracture of base of 5th metatarsal by utilizing patient-reported outcome measures (PROMs) to evaluate the outcomes of treatment.

METHOD

The study was conducted at the Orthopaedic department of the MGM Medical college & MY Hospital, Indore, a tertiary care centre and involved 17 patients who had reported to the OPD or emergency at MY hospital with traumatic fifth metatarsal bone (Jones) fractures. History was taken from the patients regarding name, sex, age, associated illnesses like diabetes, hypertension, and cardiac condition, history of drug use etc. Patients were also asked about the mechanism of injury, capacity to bear weight on the injured side, and examined for any associated injuries. The patients were evaluated by plain radiograph in anteroposterior (AP) and oblique views of the foot (Fig 1 A). The participants provided written informed consent regarding participation in the study.



Fig: 1 X-ray at Presentation

Inclusion criteria: Isolated Jones fracture (zone II), Age: more than 18 years and less than 60 years.

Patients were immobilized in a below-knee P.O.P. cast with the ankle joint in a neutral position for 6 weeks (Fig 1B). Movement of the knee and hip were encouraged from the beginning to avoid venous thrombosis as well as muscular atrophy of lower extremity during immobilization.



Fig: 2 X-ray Post Treatment

Follow up X-rays of the anterior and posterior aspects and oblique angles of the foot were done to follow up union of the fracture at 6 weeks (Fig 2A) and 12 weeks (Fig 2B). AOFAS score was done at 6 weeks and 12 weeks to evaluate patient's pain and functional outcome. Cast was removed after 6 weeks. Occurrence of complication, if any, was also noted.

RESULTS

Patients were categorized into four age ranges: 18-30 years, 31-40 years, 41-50 years, and 51-60 years. The first, 2nd, 3rd and 4th groups contained 8, 6, 2 and 1 patient respectively. The mean age of the patients was 31.29 years, SD= 10.84. There were seven males (41.2%) and 10 females (58.8%) in the study patients. Twisting injuries were the most common, affecting nine patients (52.9%), road traffic accidents (RTA) accounted for 29.4% of cases while falls from height was found in 11.8% patients. Assault-related injuries were the least common occurring only in 5.9% cases. Right side was the dominating affected side.

Table 1 provides an analysis of union time in patients across different age groups. Mean union time was 8.12 weeks with Standard Deviation (SD)= 0.928, indicating moderate variability in healing times. There was very weak correlation between age and union time ($r = 0.152$, $p = 0.561$) indicating that age has little influence on healing time which is not significant.

Table 1: Comparison of Mean Union Time

Age Group	No. of pts	Mean Union time	SD
18 to 30 yrs	8	8.13	0.835
31 to 40 yrs	6	8.00	0.894
41 to 50 yrs	2	7.50	0.707
51 to 60 yrs	1	10.00	-
Total	17	8.12	0.928

Table 2 present AOFAS scores across different age groups at 6 weeks and 12 weeks post-treatment. The overall mean AOFAS score at 6 weeks was 81.76 (SD = 4323), and at 12 weeks, it increased to 91.29 (SD=2.024).

Table 2: AOFAS Scores of Patients According to Age

AOFAS	Age Group	No. of pts	Mean	SD	Range	
6 week	18-30	8	83.38	4.719	78	90
	31-40	6	81.83	2.927	79	86
	41-50	2	78.50	3.536	76	81
	51-60	1	75.00	.	75	75
	Total	17	81.76	4.323	75	90
12 week	18-30	8	91.63	1.685	90	95
	31-40	6	91.67	1.633	90	94
	41-50	2	92.50	2.121	91	94
	51-60	1	84.00	0	84	84
	Total	17	91.29	2.024	86	95

Table 3 presents AOFAS score classifications at 6 weeks and 12 weeks post-treatment for patients, categorized into four groups. It is observed that at 6 weeks only 1 patient (94.1%) was listed in the excellent category (90-100) and majority of patients (16 patients, 5.9%) fall into the good category (75-89). No patients had scores in the fair (60-74) or poor (<60) categories. Similarly at 12 weeks 16 patients (94.1%) achieved excellent scores (90-100) and only 1 patient (5.9%) remained in the good category (75-89). No patients fall into the fair or poor categories.

Table 3: AOFAS Score Categories

AOFAS	6 Weeks		12 weeks	
	No.	Percentage	No.	Percentage
Excellent (90-100)	1	94.1	16	94.1
Good (75-89)	16	5.9	1	5.9
Fair (60-74)	0	0	0	0
Poor (less than 60)	0	0	0	0

It was observed that at 6 weeks the correlation between age and AOFAS ($r = -0.549$, $p = 0.022$) of the patients was moderately negative which is statistically significant ($p = 0.022$). However, correlation between age and AOFAS at 12 weeks ($r = -0.440$, $p = 0.077$) was weak negative correlation which is not statistically significant ($p = 0.077$). This indicates that age still affects recovery, but not as much as at 6 weeks.

DISCUSSION

Youngest patient in the study was 18 years old, and the oldest was 60 years old and patients' mean age was 31.29 years. Chandran et al.⁶ reported the mean patient age as 38 years in his study on midfoot injuries. Mologne et al.⁷ and Chuckpaiwong et al.⁸ in their studies reported young populations with mean ages ranging from 25.6 years and 27 years respectively who suffered fracture of 5th metatarsal. The maximum number of cases fall in the 1st (18-30 yrs) and 2nd (31-40 yrs) groups. Chandran et al.⁶ also documented similar incidence where age group 20-40 years was most prone to this type of injury. This is pointing toward the fact that age group 20-40 years is the most active working class that sustains this type of injury.

Male were the dominating class in the present study which is comparable with Mologne et al.⁷, Adhikari et al.⁹ and Josefsson et al.¹⁰ The higher incidence of male patients in the study is due to the fact that in a developing country like India, mostly males are dominantly working-class and are the bread winners for their family.

In our study, the most common mode of injury was twisting followed by RTA. Abdelsalam¹¹ reported similar pattern. However, in his study, Kaushik et al.¹² noted that the most common mode of metatarsal injury was high-velocity road traffic accidents. The high incidence of injury due twist may be due to fact that in our study number of male patients was more than the female patients and lifestyle factors concerning male population in our society (physical activity etc.) may be reason of such results.

In the present study, incidence of right-side Jones' fracture was significantly higher than the left side 13 cases (35.3%). Similar incidences have been reported by Ali Ahmed Ali et al.¹³ and Mahajan et al.¹⁴

We assessed fracture union clinically by absence of pain and tenderness over the fractured site. Matson et al.¹⁵ also observed clinical union as plain film radiographic evidence of bone healing and minimal to no pain clinically. In our study clinical bony union in all patients was confirmed at an average of 8.12 weeks (range 7-10 weeks, SD = 0.928) with 100% union rate. Zogby and Baker¹⁶ found that mean clinical and radiographic union of chronic fractures was 9.4 weeks with short leg non-weight bearing cast. Chee-Kidd and Vivek¹⁷ in their retrospective study reported a union rate of 96% with conservative treatment, with a mean time to union of 7.8 ± 1.7 weeks.

Our results of union time in different age groups are comparable with Said¹⁸ who has documented similar pattern of fracture union in different age groups and they had age distribution nearly similar to the age distribution in this study. Our results reveal that age has a slight tendency to influence healing time, but not significantly and age is not a strong determining factor in union time. Bucknam et al.¹⁹ found that patient age had no effects on duration of radiographic bone union.

The mean AOFAS score of patients at 6 and 12 weeks post treatment indicates overall improvement in foot and ankle function over time. Chee-Kidd and Vivek¹⁷ documented that the functional outcome scores in the form of AOFAS clinical rating score was $95.6 \pm 7.7\%$ ($P < 0.005$) in the patients treated nonoperatively and they concluded that acute Jones fracture can be treated conservatively with good functional outcome.

In our study number of patients in excellent category of AOFAS score increased from one at 6 weeks to 16 patients at 12 weeks. Jiri et al.²⁰ found 4 and 6 patients in excellent category at 6 and 12 weeks post treatment respectively. The difference of our study results from Jiri et al.²⁰ may be due to difference in the demographic characteristics and severity of injury between the two studies. It is observed that at 12 weeks post treatment, 41-50 years age group had the highest mean score (92.50 ± 2.121) which is in line with Said¹⁸ who has reported highest AOFAS of 87 in 49-60 age group of conservative patients.

The correlation between age and AOFAS was found to be moderately significant negative and non-significantly week negative respectively at 6 and 12 weeks. Results of the present study are in line with Abdelsalam et al.¹¹ who found that age had statistically significant effect on the functional outcome according to AOFAS score at the end of follow-up. However, this is different from the previous studies showing no significant influence of patient age on the functional outcome.^{21,22}

The present study there was no major complication like delay union, non-union or refracture in patients at the end of the follow ups.

Managing a Jones fracture presents a significant challenge for orthopaedic surgeons due to the unique vascular anatomy of the fifth metatarsal. Controversy exists within the literature regarding the outcomes of nonsurgical and surgical treatment in patients with Jones fractures.

Rosenberg and Sferra²³ advocated for a conservative approach for treatment of Jones fracture through use of a non-weight-bearing short leg cast for 6 to 8 weeks among non-athletic patients. Similarly, in a study by Lee et al.²⁴, conservative treatment yielded favourable clinical outcomes for zone 1 fractures. Kim et al.²⁵ in his study also favoured conservative treatment which resulted in favourable clinical outcomes for zone 2 fractures.

CONCLUSION

The study showed that conservative treatment by non-weight bearing casting is a feasible and effective method of treatment for Jones fracture in low demand patients. This method decreases the need for surgery and it can be easily instituted in an outpatient fracture clinic.

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Conflict of Interest: None.

Ethical Clearance: The research was authorised by the Ethics and Scientific Review Committee of MGM medical college and MY Hospital, Indore, Madhya Pradesh India.

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