

Conservative Management of Proximal Fifth Metatarsal Fractures (Jones fracture)

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ABSTRACT

Objective: To determine the outcome of proximal fifth metatarsal fracture treated by POP (Plaster of Paris) cast.

Study Design: Descriptive Cross-sectional study

Place and Duration of Study: This study was conducted in the Department of Orthopaedics & Traumatology of Khyber Teaching Hospital, Peshawar from Jan 2012 to Jan 2013

Materials and Methods: Hundred patients with fracture of proximal fifth metatarsal bone (Jones fracture) were managed conservatively with plaster cast immobilization. Fracture healing and functional outcome was assessed.

Results: The mean age of the patients was 53 years. The clinical and radiological union rates at 6 months of follow up were 97% and 95.3% respectively. A progressive improvement in AOFAS (American Orthopaedic Foot and Ankle Society) mid foot scale score was seen. Overall 92% patients were satisfied with the outcome. Four patients had malunion and only one had nonunion.

Conclusion: Acute fracture of proximal fifth metatarsal can be effectively managed by plaster cast immobilization.

Key Words: Proximal fifth metatarsal fracture, Cast immobilization, Functional outcome.

INTRODUCTION

Fracture of the proximal fifth metatarsal is a common orthopaedic trauma of the foot. Sir Robert Jones first drew attention to this fracture when he incurred the injury while dancing around a maypole at a military garden party in 1896. In 1902, Jones described the location of the fracture as the three-quarter-inch (1.5-cm) segment of the shaft on the fifth metatarsal bone distal to the styloid.¹ Since then, virtually all fractures of the proximal fifth metatarsal have been labelled as 'Jones fractures'. Stewart meticulously defined the true Jones fracture as "a transverse fracture at the junction of the diaphysis and metaphysis, without extension distal to the fourth and fifth intermetatarsal articular facet, but should not be diagnosed if the main fracture line extends into the metatarsocuboid joint".² This is an area with relatively watershed vascularization and high stress.^{3,4}

A 5th metatarsal fracture commonly occurs in association with a rolled ankle, particularly when the ankle has rolled inwards and when significant weight bearing forces are involved.^{4,5} They may also occur due to an awkward landing from a jump (particularly on uneven surfaces), due to a fall or following a direct blow to the outer foot.^{5,6} These are common in running and jumping sports involving change of direction such as football, soccer, rugby, basketball and netball and in dancing (e.g. ballet).^{6,7,8}

Various treatments have been suggested: elastic bandage and early weight bearing (Kavanaugh et al. 1978⁹, Zelko et al. 1979)¹⁰ plaster cast and no weight bearing for 6-8 weeks (Torg et al. 1984)¹¹ or osteosynthesis (Kavanaugh et al. 1978, DeLee et al. 1983¹¹). Operative treatments such as intramedullary

screw fixation with or without bone grafting have been advocated for such fractures, especially for those occurring in high-performance athletes.^{12,13}

MATERIALS AND METHODS

Hundred patients presenting to the Department of Orthopaedics & Traumatology of Khyber Teaching Hospital, with diagnosis of Jones fracture, were recruited to the study. Written informed consent was taken from all patients. A detailed history was taken from all patients and a thorough clinical examination was carried out. Patients with old fractures (of more than 4 weeks) or multiple traumas that impaired walking ability, and those who were not functional walkers before incurring the fracture (as defined by constant assistance from others during ambulation) were excluded from the study. Patients were treated with POP (Plaster of Paris) casting and were instructed to perform non-weight-bearing ambulation with for the first 2 weeks.

Outcomes were measured at the second, sixth, twelve weeks and six months. Patients were allowed partial weight bearing at 2 weeks and full weight bearing from 6 weeks onwards. At each follow up visit, The American Orthopedic Foot and Ankle Society (AOFAS) midfoot scale score, evidence of clinical and radiological fracture union, and visual analogue scale scores for pain and satisfaction were documented. Clinical union of fracture was defined as a fracture site that was nontender when palpated. Radiological union was defined by the presence of bridging callus, according to the consensus of the two consultant orthopedic surgeons, who independently assessed the X-rays while blinded to the clinical information. The visual analogue scale for pain ranged from 0 (no pain)

to 10 (worst pain imaginable). The visual analogue scale for satisfaction also ranged from 0 to 10, representing increasing satisfaction about the progress of recovery. Patients who failed to achieve radiological union of their fracture 16 weeks post injury were given extra consultations.

RESULTS

Hundred patients were recruited into the study. The mean age of was 53 years (range, 21 to 76 years). There were 32 females and 68 males. The mean time interval between the injury and the first day of consultation was 9 days (range, 1 to 18 days). Right foot was involved in 62% and left foot in 38% cases. Only a minority (17.6%) of the patients had occupations that required heavy exertion. None of the patients was a professional athlete.

Table No. 1: Distribution of patients with Jones fracture by demographic characteristics

Age (years)	Mean=53	
Sex	Males=68	Females=32
Laterality	Right=62%	Left=38%
Time since fracture (weeks)	Mean= 9	

The mean American Orthopedic Foot and Ankle Society (AOFAS) mid foot scale score at 2 weeks and 6 weeks was 34.5/100 and 58.9/100 respectively. An improvement in score was seen at 12 weeks and the mean score had increased to 84/100. At the end of 6 months 96% patients had AOFAS score above 95.

The mean pain score on visual analogue scale was 6.5, 5.8, 4.9 and 1.2 at 2 weeks, 6 weeks, 12 weeks and 6 months respectively. Majority (98%) of the patients were pain free at 6 months post treatment. Overall 92% of patients were satisfied with the outcome at 6 months.

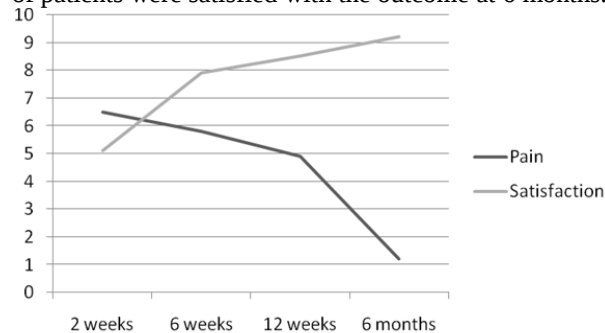


Figure No. 1: Mean pain and satisfaction scores on Visual Analogue Scale at each follow up visit

Clinical union was observed in 56% patients at 6wks. At the end of 6 months, in 97% patients signs of clinical union were present. The clinical union rate at each follow up visit correlated with AOFAS mid foot scale score.

Fourty three percent patients had evidence of radiological union at 6 weeks and 67% at 12 weeks. By

the end of 6 months almost 95.3% had achieved satisfactory union. Four patients hadmalunion and only one nonunion.

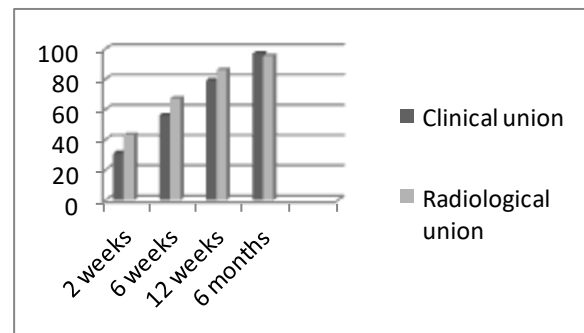


Figure No. 2: Mean number of patients with clinical union and radiological union at 2, 6, 12 weeks and 6 months after POP casting.

DISCUSSION

Fracture of the proximal fifth metatarsus is a commonly encountered presentation among orthopaedic surgeons. History and physical examination may provide useful clinical information to derive the diagnosis with the help of X-rays. Although making a diagnosis is straightforward, the treatment offered could be arbitrary. This randomness is attributable to the lack of understanding of the heterogeneity of the fracture and the behaviours of different sub types towards fracture healing. The term 'Jones fracture' has been used indiscriminately to describe different types of proximal fifth metatarsal fracture. Jones¹ reported 5 cases, including his own, and he was credited with the fracture name. However, there has been much controversy and debate regarding the fracture's diagnosis and pathomechanics; the importance of acuity and prodromal symptoms; the incidence and potential causes of delayed unions and non-unions; and the optimal methods of treatment.² The classification system for proximal fifth metatarsal fracture proposed by Quill has been the most commonly adopted one. According to this scheme, there are tuberosity avulsion fractures, acute Jones fractures, and proximal diaphyseal stress fractures. Each subtype has its own characteristics in terms of the mechanism of injury, location, incidence, chronicity, formulation of treatment strategy, and prognosis for healing.¹⁴

The true Jones fracture consists of a transverse fracture at the junction of the diaphysis and metaphysis. The injury occurs when the ankle is plantar-flexed and a strong adduction force is applied to the foot. It should be regarded as an acute injury and should have no history of prodromal symptoms. Jones fractures are thought to have a higher chance of delayed union and non-union than other fractures. Several authors have reported the frequent incidence of delayed union and non-union when conservative treatment is adopted for

managing acute Jones fractures.^{4,11,15} Thus, operative treatments such as intramedullary screw fixation with or without bone grafting have been advocated for such fractures, especially for those occurring in high-performance athletes.¹³ Nevertheless, Rosenberg and Sferra argued that most of the so-called '(acute) Jones fractures' in registries are actually diaphyseal stress fractures that warrant more aggressive treatment.¹⁶ For instance, Kavanaugh et al, in their series of 22 patients with 23 fractures of the proximal part of the diaphysis of the fifth metatarsal, claimed that delayed union occurred in 12 of 18 patients (66.7%) who were treated conservatively.⁹ These authors labeled all cases as 'Jones fractures'. However, a vast majority of the patients were athletes 9 of the 22 patients (40.9%) had prodromal symptoms and 11 of them (50.0%) had re fractures as many as 4 times following the initial injury. Zelko et al made similar comments on the increased incidence of delayed union in Jones fracture.¹⁰

Nevertheless, the distribution of patients who were recruited was heterogeneous and skewed: 20 of the 21 patients (95.2%) were young male athletes; 14 of them (66.7%) had radiographic evidence of stress fractures and 10 (47.6%) sustained re-injuries.

Many authors have recommended treating acute Jones fracture with cast immobilisation and non-weight bearing walking for 4 to 8 weeks.¹⁷ Josefsson et al offered no treatment or an elastic bandage to their 40 patients with Jones fracture.¹⁸ Full weight-bearing was also permitted. Those authors claimed favourable results without a single case of non-union or pseudoarthrosis at subsequent follow-up.

In our study we studied the outcome of Jones fracture treated with cast immobilisation. In our study, radiological union was documented in 95.3% patients at the end of 6 months which is close to that reported by Woo SB¹⁹. Furthermore this is equal to that achieved with operative fixation documented by David A. Porter et al¹³

Many authors have recommended treating acute Jones fracture with cast immobilisation and non-weight bearing walking for 4 to 8 weeks.^{17,18} In our study we used non weight bearing for 2 weeks followed by partial weight bearing for the next four weeks. Many patients are not willing to tolerate non weight bearing ambulation for the full 6 weeks as they and their carers consider it to be a trivial fracture. Similar observation was made by Nunley et al suggested using weight-bearing orthosis rather than the inconvenience of non-weight-bearing ambulation.²⁰

In our study, all the patients sustained acute Jones fracture after trauma. There was no case of stress fracture although we did not explicitly set it out in our exclusion criteria. This was further supported by the fact that none of our patients was a professional athlete. The study was done in a government tertiary care hospital. Most of the patients that come here

belong to low socioeconomic class and professional athletes are seldom seen here.

Our study had several limitations. Compliance to non-weight-bearing ambulation could not be accurately documented. The 2-week period of fracture immobilisation and non-weight bearing ambulation was an arbitrarily chosen one. Whether a shorter or longer period of immobilisation would make a difference remains unanswered. Finally, since none of our patient was a professional athlete we could not do a generalization of cast immobilization of Jones fracture as the best treatment modality in every patient. We therefore recommend individualization of treatment for each patient.

CONCLUSION

Plaster cast immobilization is a safe and effective treatment strategy for acute traumatic Jones fracture. Satisfactory radiological union can be obtained at 3 months. However, treatment should be individualised according to the needs of the patient. Although operative treatment might be indicated for delayed union, nonunion, and stress fractures among high-performance young athletes, it should not be offered lightly to middle-aged non-athletes.

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