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Treatment of Acute Jones Fractures Without Weightbearing Restriction

Geoffrey S. Marecek, MD [1], Jeffrey S. Earhart, MD [2], William P. Croom, MD [3], Bradley R. Merk, MD [4]

[1] Assistant Professor, Department of Orthopaedic Surgery, University of Southern California Keck School of Medicine, Los Angeles, CA
[2] Assistant Professor, Rush University Medical Center, Rockford Orthopedic Associates, Rockford, IL
[3] Department of Orthopaedic Surgery, University of Southern California Keck School of Medicine, Los Angeles, CA
[4] Associate Professor, Department of Orthopaedic Surgery, Northwestern University Feinberg School of Medicine, Chicago, IL

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ABSTRACT

Jones fractures are reportedly prone to nonunion and generally treated with a period of non-weightbearing or operative treatment. Extended non-weightbearing can have adverse effects, and operative treatment poses various risks. We report the clinical results of patients treated without weightbearing restriction. All patients treated for metatarsal fractures by a single surgeon from January 1, 2000 to December 31, 2009 were identified through the clinical billing records by International Classification of Diseases, ninth revision, code. Through a radiographic and medical record review, 27 consecutive patients with acute Jones fractures treated without weightbearing restriction were identified. The demographic information and clinical and radiographic results were recorded. Of the 27 patients, 24 (89%) had achieved clinical union at a mean of 8.0 ± 2.6 weeks. Complete radiographic union was noted in 13 (48%) patients, and 13 (48%) others had made significant progress toward radiographic union but had not yet reached it. Two (8.3%) patients were lost to follow-up. One patient (4%) developed nonunion. Patients with acute Jones fractures can be treated without weightbearing restriction. This protocol results in rapid clinical union and a low rate of nonunion.

Fractures at the base of the fifth metatarsal pose many challenges for the treating surgeon. Although they are the most common of all foot fractures (1), considerable disagreement still exists regarding the optimal treatment method for these injuries. In 1902, Sir Robert Jones (2) described a proximal fifth metatarsal fracture from indirect trauma. The term *Jones fracture* has been variously ascribed to fractures at the distal extent of the fourth to fifth intermetatarsal articulation (3), proximal avulsion fractures (4), and the proximal metadiaphyseal junction (5).

Many investigators have described the inherent difficulty in treating proximal fifth metatarsal fractures (3–10). The reported rates of nonunion have ranged from 20% to 28% (4,8,11,12), with delayed union rates of ≤20% to 59% (4,6,8,13). Early reports suggested that the method of treatment did not matter (3,6,9); however, a landmark study by Torg et al (8) demonstrated decreased rates of nonunion with a strict non-weightbearing (NWB) protocol. However, patients might be unwilling to comply with NWB restrictions (14). Moreover, prolonged NWB has been associated with worse functional outcomes (15), muscle atrophy (16), decreases in bone mineral density (17), and ankle stiffness (15). Operative treatment has been proposed to avoid these problems, in particular, in athletes (12,18–21).

After observing these issues in his patients, the senior author (B.R.M.) has permitted weightbearing as tolerated (WBAT) for patients with acute Jones fractures. The purpose of the present study was to describe the results of this treatment protocol.

Patients and Methods

The institutional review board at our institution approved the present study. Using billing rosters of patients with the International Classification of Diseases, ninth revision, diagnosis code of 825.25 (closed fracture, metatarsal), we identified all patients with fractures at the base of the fifth metatarsal treated by the senior author (B.R.M.) from January 1, 2000 to December 31, 2009. The potential subjects were identified through a review of the written medical record. The specific mention of a Jones fracture or proximal metadiaphyseal fracture merited inclusion in the present study.

Fractures treated with the WBAT protocol were further screened using plain radiographs. The fractures were defined as a Jones fracture if the fracture line did not extend distally to the fourth to fifth intermetatarsal articulation or enter the metatarsocuboid joint (3,5), corresponding to zone 2 in the classification system of Lawrence and Botte (5) and Quill (7) (Fig.). Two of us (G.S.M., J.S.E.) independently reviewed all the radiographs for inclusion. In cases of disagreement, a senior author (B.R.M.) adjudicated.

Patients were excluded from the study if they had concomitant lower extremity injuries that prevented WBAT, previous surgery on the fifth metatarsal, previous treatment of the current injury by a different surgeon, incomplete medical records, if the fracture was not acute in nature (e.g., reporting a prodrome of pain or evidence of stress fracture), or if they had chosen primary surgical treatment.

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Conflict of Interest: Geoffrey S. Merk is a consultant for Stryker Orthopaedics and is a speaker on behalf of Stryker Orthopaedics and DePuy Synthes.

Address correspondence to: Geoffrey S. Marecek, MD, Department of Orthopaedic Surgery, University of Southern California Keck School of Medicine, 1200 North State Street, GNH 3900, Los Angeles, CA 90033.

E-mail address: marecek@usc.edu (G.S. Marecek).

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Fig. Oblique radiographs of a 42-year-old female who had sustained a twisting injury to her right foot. A fracture line entering the fourth to fifth intermetatarsal articulation is visible at injury (*A*) and had subsequently healed approximately 7 weeks later (*B*). The solid black lines in (*A*) denote the region of interest for the present study.

The medical records were reviewed for demographic information, such as age, gender, mechanism of injury, body mass index, the use of tobacco, and the presence of medical comorbidities. We specifically noted the time to clinical union, alterations in the treatment plan, repeat fracture, and the follow-up length. Foot alignment was not regularly noted in the medical record but was recorded when available. Information about bone health (e.g., vitamin D or bisphosphonate use) was not available. Clinical union was defined as the absence of tenderness to palpation and painless ambulation. If the medical notes mentioned a "healed" fracture, this was recorded. Radiographic union was defined as bridging in 2 of 3 (medial, lateral, plantar) cortices by 2 of us (G.S.M., J.S.E.). In cases of disagreement, a senior author (B.R.M.) adjudicated.

The patients were placed into a removable walking boot and prescribed WBAT in which they were allowed to resume ambulation as it became comfortable. Follow-up examinations were performed at the discretion of the treating surgeon, usually at 4- to 6-week intervals until healing had occurred. Follow-up examinations were not routinely performed in patients with clinically united, but radiographically incomplete, fractures if progress toward union was evident.

The initial review using the International Classification of Diseases, ninth revision, code revealed 328 patients. The clinical and radiographic review yielded 49 patients with acute Jones fractures. Of these, 2 records had no specific mention of weightbearing protocol, 8 had undergone a restricted (partial or NWB) weightbearing protocol, 9 were seen only for a single visit, 1 had bilateral fractures, 1 had a radiation-related fracture, and 1 had a subacute fracture. No patient underwent primary surgery. This left 27 patients with 27 fractures for review.

Of the 27 patients, 6 (22%) were male and 21 (78%) were female. The median age was 49 (range 25 to 80) years. Of the 27 fractures, 18 (67%) were right- and 9 (33%) were left-sided injuries. The mechanism of injury was reported to be mechanistically as a twist in 15, inversion in 4, and the result of a fall in 8. The mean body mass index was 27.6 ± 4.8 kg/m^2 (mean $\pm$ standard deviation). No patient had diabetes mellitus, 1 reported steroid use, and 1 reported tobacco use. Concomitant injuries included a lateral malleolar fracture in 1 patient and fractures at the base of the third and fourth metatarsals in 1 patient. The patient characteristics are listed in Table 1.

Results

Of the 27 patients, 24 (89%) had achieved clinical union at a mean of 8.0 ± 2.6 weeks. Complete radiographic union was noted in 13 patients

Table 1
Demographic information

Variable	Value
Patients	27 (100)
Female gender	21 (78)
Right foot	18 (67)
Age (y)	
Median	49
Range	25 to 80
Mean body mass index (kg/m^2)	27.6 ± 4.8
Steroid use	1 (3.7)
Tobacco use	1 (3.7)
Diabetes mellitus	0

Data presented as n (%) or mean $\pm$ standard deviation, unless otherwise noted.