



# Distal Fifth Metatarsal Fractures: Should Conservative Care Remain the Standard?



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## STATEMENT OF PURPOSE

Historically, distal fifth metatarsal diaphyseal fractures have been treated with conservative management. This can be successful but often requires a prolonged period of healing, which in turn can lead to a prolonged return time to full activity, especially in high performance patients. Our purpose was to compare surgical versus conservative treatment of these fractures in both the athletic and non-athletic patients.

## METHODOLOGY & HYPOTHESIS

A retrospective review of patients with isolated diaphyseal fifth metatarsal fractures was undertaken. Patient electronic medical records at our institution were searched and reviewed from January 2009 to October 2013. 41 patients with either surgical or conservative treatment of isolated diaphyseal fifth metatarsal fractures were included. Exclusion criteria included those with less than 10 months of follow up from date of injury (DOI) or date of surgery (DOS), 5<sup>th</sup> metatarsal stress fractures, Jones fractures, 5<sup>th</sup> metatarsal avulsion/base fractures, those with additional foot or ankle fractures and pediatric patients. Data was recorded to include age, sex, tobacco use, time to clinical union, time to radiographic union, athletic versus non-athletic status, time to return to full activity, surgical fixation method and complications. Athletes were defined as active duty military personnel, high school, college or professional athletes. Radiographic and clinical union definitions were used as reported in prior literature (1). Radiographic union was defined as the presence of new bone formation with bridging trabeculae across the fracture site. Clinical union was defined as a nontender fracture site, the absence of pain with ambulation without assistive devices and radiographic evidence of healing. Return to full activity (RTA) was defined as return to all activities the patient was doing prior to the injury to include running and jumping activities/sports for the athletic population.

Our hypothesis was that surgical treatment of 5<sup>th</sup> metatarsal diaphyseal fractures would heal sooner and more predictably than conservative treatment as well as returning patients to their prior activities quicker than those patients treated with conservative measures.

## PROCEDURES

Conservative treatment consisted of immobilization with any combination of non-weight bearing or weight bearing short leg cast, cast boot or postop surgical shoe as dictated by the attending physician. Surgical treatment was open reduction internal fixation with use of any combination of screws, plates, cerclage wire, and/or Kirschner wires (k-wires). Choice of fixation method was determined at the time of surgery by the attending physician. Both groups of patients were followed radiographically until full clinical and radiographic union was achieved and the patients were able to return to full activity.

## LITERATURE REVIEW

There is abundant literature pertaining to Jones fractures and proximal diaphyseal 5<sup>th</sup> metatarsal fractures to support surgical treatment as a method to decrease healing time and complications. Conversely, literature regarding surgical treatment of fifth metatarsal diaphyseal fractures is limited. The general consensus is that these types of fractures have extremely high healing rates as well as satisfactory outcomes with conservative treatment in part due to thick periosteum of the fifth metatarsal and the increased mobility of the fifth tarso-metatarsal joint (2,3). In a prospective, cohort study by Aynardi et. al, long-term outcomes of 142 displaced oblique spiral fractures of the fifth metatarsal shaft were studied (4). Non-unions, occurred in 1.4% of patients. Clinical healing occurred at an average of 6 weeks. Activities of daily living outcome scores averaged 95.5/100 (FAAM scale) at 2 years. The authors did not report on time to return to activity in their patients. O'Malley et. al conducted a retrospective study of 35 ballet dancers with distal shaft fractures of the fifth metatarsal (5). 4 patients were treated surgically with k-wires and 31 conservatively. All patients averaged a return to full ballet performance in 19 weeks. Return to activity between the surgical and conservative groups were not compared. Although conservative treatment of this injury is an effective treatment, the time to heal (19 weeks), can be detrimental for some populations, such as athletes or soldiers, where being unable to perform activities at the required level can potentially impact their career or athletic course. Similar to Jones fractures, surgical treatment of these fractures may allow for shorter healing time and earlier return to activities, although this has yet to be proven in the literature.

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## RESULTS

- 41 pts, 16 athletes, 25 non athletes, 14 male, 27 female
- 12 surgical and 29 conservative patients
- Complications:
  - Surgical: 3/12 (25%), 1 minor dehiscence, 1 refracture, 1 painful hardware
  - Conservative 9/29 (31%) 8 delayed unions, 1 RSD, 1 metatarsalgia

### All Patients

	N	Age	CU (wks)	RU (wks)	RTA (wks)
<b>Surgical</b>	12	31.8	7.8	10.6	12.3
<b>Conservative</b>	29	48.2	16.3	25.0	20.8
<b>P value</b>		0.020	<0.001	<0.001	0.021

### Athletes

	N	Age	CU (wks)	RU (wks)	RTA (wks)
<b>Surgical</b>	8	27.5	7.6	11.2	12.1
<b>Conservative</b>	8	32.3	18.9	25.2	23.5
<b>P value</b>		0.394	0.045	0.079	0.063

### Non-athletes

	N	Age	CU (wks)	RU (wks)	RTA (wks)
<b>Surgical</b>	4	40.5	8.0	9.0	12.5
<b>Conservative</b>	21	54.3	15.3	24.9	19.5

N = Number of patients, CU = Avg time to clinical union, RU = Avg time to radiographic union, RTA = Avg time to return to activity

## CONSERVATIVE TREATMENT CASE



Initial injury



22 weeks s/p injury with delayed union

## ANALYSIS & DISCUSSION

Literature comparing conservative versus surgical treatment of distal fifth metatarsal diaphyseal fractures is minimal. A majority of the published literature looking at these types of fractures has shown conservative treatment to be successful for a majority of patients, but many have also shown that there is a prolonged recovery times. O'Malley found an average of 19 weeks RTA in his study of high performance athletes although he did not separate them into conservative and surgical groups (5). We found conservative treatment to have a RTA time of 19.5 weeks in non-athletes and 23.5 weeks in athletes. RTA is vastly different in these two populations, where the athletes needed to be able to run, jump and in the case of the active duty soldier carry heavy loads (up to 100lbs) on uneven terrain long distances to RTA, while in some of the non-athletes RTA means being a community ambulator without assistive devices. Although our complication rate was high, 25% in athletes, one was a minor dehiscence treated with local wound care, one was hardware removal of a cerclage wire done 1 year after surgery with the patient having a RTA at 11 weeks, the third was a refracture that needed revisional surgery. The complications in the conservative group were more significant including, 8 delayed unions needing treatment with bone stimulators and 1 RSD. Age was statistically significant between the two groups when looking at all patients which most likely increased healing and RTA time in the conservative treatment group. When looking solely at the athletic population there was no statistical difference in age between the groups but RTA was nearly double in the conservative treatment group. Although conservative treatment does eventually heal distal fifth metatarsal diaphyseal fractures, this study shows that surgical treatment can significantly decrease healing time and potentially help both athletes and non-athletes get back to their pre-injury activity level in nearly half the time.

## REFERENCES

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## SURGICAL TREATMENT CASE



Initial Injury



4 weeks s/p surgery



8 weeks s/p surgery

