

Fifth Metatarsal Base Fractures and Sural Neuritis

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STATEMENT OF PURPOSE

Fifth metatarsal fractures are commonly treated conservatively or with open reduction internal fixation. During surgery, care is taken to avoid the sural nerve, however, sometimes neuritis or sural nerve entrapment is overlooked when fifth metatarsal fractures are treated conservatively. This case series documents several fifth metatarsal fractures with clinical symptoms of sural nerve entrapment.



Image 1 and 2: Plain radiographs of fifth metatarsal fractures with clinical sural neuritis

LITERATURE REVIEW

Fractures of the fifth metatarsals are one of the most common forefoot injuries encountered by surgeons and complications of sural nerve injury of the lateral dorsal cutaneous (LDCN) branch are underreported in literature.¹ It is important to understand the anatomy to assess for injury of the nerves secondary to trauma. The sural nerve is the union of the medial and lateral cutaneous nerves of the lower extremity and originates from the tibial and common peroneal nerves. The site of the bifurcation of the sural nerve into the medial and lateral branches is at the level of the fifth metatarsal base² leaving it susceptible to injury with trauma.

Multiple cadaveric studies have been performed to assess the location of the sural nerve in relation to the fifth metatarsal. Aktan et al found that the most common variation was innervation of the lateral half of the fifth digit by the sural nerve which was shown in 18 out of 30 specimens (60% of the specimens) in a cadaveric study.³ Fansa et al assessed the distance between the lateral dorsal cutaneous nerve and the superior border of the peroneal brevis tendon and showed that the LDCN was superficial and lateral and noted to be inferior to the superior border of the peroneus brevis tendon in all specimens and at all reference points used.¹ Donley et al dissected 10 cadaver specimens after open reduction internal fixation with 4.5 mm screws and showed that the screw head was within 2 mm of the dorsolateral branch of the sural nerve in 5 specimen and within 3 mm in eight specimen.⁴

CASE SERIES

For this study the patient population was isolated using a retrospective chart review within a private multi-physician foot and ankle surgery practice from January 2015 to September 2018. Parameters for inclusion criteria included patients with fifth metatarsal fractures with concomitant sural neuritis. A minimum of 12 months follow up was required and post injury course was reviewed through electronic medical records and follow up care.

Eleven patients with confirmed fifth metatarsal fractures on radiographs with clinical sural neuritis symptoms were included in this study. The average age was 51.36 years old. Of these patients, 7 were female and 4 were male. Standard x-rays revealed mild to severe displacement of the confirmed fifth metatarsal fractures. Injury to the sural nerve was confirmed via clinical signs and symptoms of paresthesias, positive Tinel's sign, numbness, shooting, or burning pain to the distribution of the sural nerve.

Seven out of the eleven included patients had mild to moderate displacement of the fifth metatarsal fracture. Five of the eleven patients went on for further intervention including open reduction with internal fixation (ORIF) of the fifth metatarsal fractures, with four out of the five ORIF patients relating a decrease or elimination of sural nerve symptoms post operatively. The remaining six patients had continuous conservative treatment for their fractures.

Patient	Gender	Age	Clinical Fracture Description	Laterality
1	Male	44	Minimally displaced fifth metatarsal base	Left
2	Female	30	5th metatarsal base fracture, mild displacement	Left
3	Male	63	5 th metatarsal fracture, displaced dorsal laterally	Right
4	Female	63	5th metatarsal base fracture	Right
5	Female	62	Minimally displaced 5 th metatarsal fracture	Left
6	Female	53	Extra articular base 5 th metatarsal	Right
7	Female	22	Fifth metatarsal base, gapping mildly displaced	Left
8	Female	42	Comminuted, displaced fracture base of 5 th met	Left
9	Male	85	Jones fracture, 5 th metatarsal base with 3 mm gapping	Left
10	Female	44	Jones fracture, 5 th metatarsal with 2 mm gapping	Left
11	Male	57	Oblique proximally, medially displaced 5 th met base fracture	Left

Table 1: Fifth metatarsal fractures with clinical sural neuritis data

ANALYSIS AND DISCUSSION

Fractures of the fifth metatarsal are one of the most common forefoot injuries encountered. The sural nerve is the communication of the medial and lateral cutaneous nerves of the lower extremity at level of the fifth metatarsal. Injuries to this area including, but not limited to fractures of the fifth metatarsal, can compress or even damage the sural nerve. There are limited clinical and anatomic studies examining the incidence of sural nerve injuries concomitant with fifth metatarsal fractures. More studies are needed to assess the need for surgical versus conservative management of fifth metatarsal fractures with sural neuritis. Examining a patient with a fifth metatarsal fracture with care to evaluate signs of sural neuritis is important to decrease the risk of sural nerve injury and can guide further treatment for these injuries.



Images 3, 4, 5: Plain radiographs of fifth metatarsal fractures with incidence of sural neuritis

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