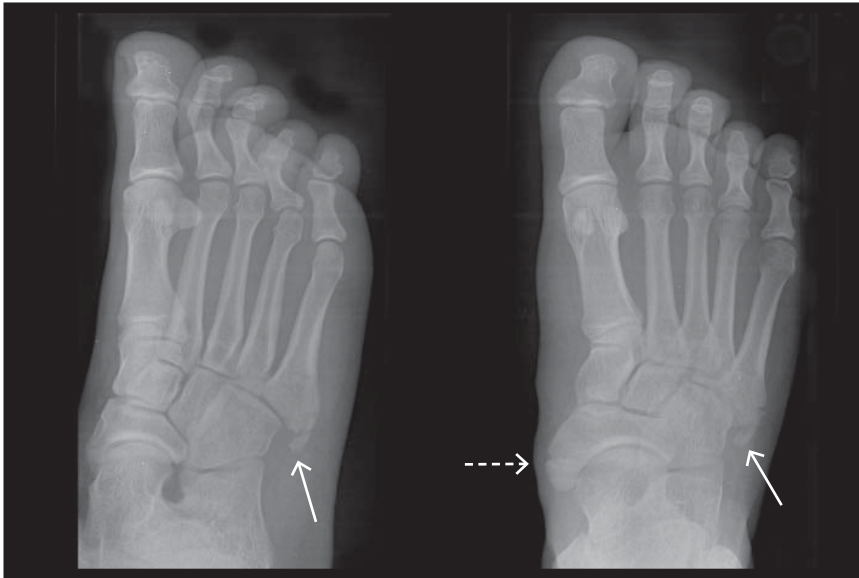


# Diagnostic Imaging Review

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**FIGURE 1.** Oblique (left) and anteroposterior (right) radiographs of a skeletally mature right foot demonstrate a fracture along the proximal base of the fifth metatarsal (arrow). An os naviculare is also visible (dashed arrow).

## Persistent foot pain after a skateboarder's fall

### CASE

A 21-year-old male was riding on his skateboard when he sustained a mechanical fall. He complained of right forefoot swelling and pain along the dorsolateral aspect of his midfoot. A radiograph taken at the local emergency department revealed "a fracture," but the patient did not seek any further care at that time. Two weeks after the injury, he presented to the urgent care clinic for follow-up of continuing mild foot pain.

On examination, his gait was slightly antalgic and he had some

minor difficulty bearing full weight on the affected limb. Minor swelling was observed over the dorsolateral portion of his midfoot. However, the patient did not have significant midfoot tenderness on palpation. He was neurovascularly intact distally, and the ankle and knee of the affected extremity demonstrated full range of motion. Resolving ecchymosis was visible along the site of injury. Plain radiographs were obtained at this visit (Figure 1). **What does this image reveal?**

### DISCUSSION

The avulsion fracture seen on the radiograph is consistent with a pseudo-Jones fracture. Alignment of the Lisfranc and Chopart joints was within normal limits. Also noted was an os naviculare, which was nontender on palpation. The foot was placed in a functional brace and healed uneventfully.

A total of 26 bones are located in the foot: two in the hindfoot (calcaneus, talus), five in the midfoot (navicular, cuboid, three cuneiforms), and 19 in the forefoot (five metatarsals, 14 phalanges). The foot may also display sesamoid bones, including the os trigonum, os tibiale externum, os peroneum, and os vesalianum pedis.

As early as 1902, Sir Robert Jones contributed to the discussion and understanding of fractures in the fifth metatarsal after he suffered a foot injury while dancing. With advancements in radiographic imaging, clinicians are now able to accurately identify fracture location along the fifth metatarsal. This precision enables the physician to determine the various types of fifth metatarsal fractures (ie, Jones and pseudo-Jones), each of which has different treatment and prognostic implications.

**A pseudo-Jones fracture**, also called a *tennis fracture*, occurs at the proximal base of the fifth metatarsal.<sup>1</sup> It should not be confused with a Jones fracture, which occurs transversely at the base of the fifth metatarsal, 1.5 to 3 cm distal to the proximal tuberosity. Jones fractures typically occur at the junction between the metaphyseal portion of the proximal fifth metatarsal and its adjoining diaphysis. These fractures require more aggressive management and treatment, including non-weight-bearing immobilization and/or surgery.<sup>2</sup>

Relatively more common than Jones fractures, a pseudo-Jones fracture occurs when the foot or ankle sustains an inversion injury. In the past, students have been taught that when the ankle inverts, the pull of the peroneus brevis

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tendon causes this avulsion fracture. However, recent evidence suggests that pull on the lateral cords of the plantar aponeurosis generates this same avulsion pattern.<sup>3</sup> Because pseudo-Jones fractures occur in cancellous bone, the blood supply is excellent, allowing for successful and uncomplicated healing. This vascularity is not as abundantly noted with the Jones fracture, which exists in a vascular watershed area, and thus incidences of delayed union and nonunion are higher.

Patients with a pseudo-Jones fracture will report pain and tenderness over the affected area. Treatment is usually symptomatic, and patients are permitted to bear weight as tolerated.<sup>1</sup> Such comfort measures as an elastic wrap, a functional brace, or a short-leg walking cast can be utilized.<sup>1</sup> Radiographic

evidence of union may take significantly longer than resolution of pain. The fracture typically heals by bony union or an asymptomatic fibrous union in 6 to 8 weeks.<sup>2</sup> Surgery is needed only if significant bone displacement has occurred, which is rare. The prognosis for nondisplaced fractures is excellent.

**A Jones fracture** is less common than a pseudo-Jones fracture, and more problematic. Jones fractures can result when the patient generates a pivoting movement with weight transfer onto the metatarsal heads.<sup>2</sup> Physical examination also reveals tenderness along the base of the fifth metatarsal, which makes the distinction between a Jones fracture and a pseudo-Jones fracture difficult. Nondisplaced fractures are treated with non-weight-bearing

ambulation in a short-leg cast for 6 to 8 weeks;<sup>2</sup> however, internal fixation may be indicated for patients who participate in high-demand activities. Unfortunately, because of the tenuous blood supply to the area where the fracture occurs, the rates of delayed union and nonunion are higher in patients with Jones fractures.<sup>1,2</sup> **JAAPA**

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## REFERENCES

1. Dameron TB Jr. Fractures of the proximal fifth metatarsal: selecting the best treatment option. *J Am Acad Orthop Surg.* 1995;3(2):110-114.
2. Fetzer GB, Wright RW. Metatarsal shaft fractures and fractures of the proximal fifth metatarsal. *Clin Sports Med.* 2006;25(1):139-150.
3. Theodorou DJ, Theodorou SJ, Kakitsubata Y, et al. Fractures of proximal portion of fifth metatarsal bone: anatomic and imaging evidence of a pathogenesis of avulsion of the plantar aponeurosis and the short peroneal muscle tendon. *Radiology.* 2003;226(3):857-865.