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## Musculoskeletal

# Progressive retraction of a fractured os peroneum suggesting repetitive injury to the peroneus longus tendon

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## ABSTRACT

The os peroneum is an accessory ossicle within the peroneus longus tendon. Prior reports have discussed fracture of the os peroneum with associated tears of the peroneus longus tendon. When the ossicle fractures, there can be varying degrees of retraction of the tendon, which can be diagnosed by malposition of the ossicle or the ossicle fragments. We report a case of a man with recurrent eversion ankle injuries with progressive retraction of a fractured os peroneum, implying injuries to the superior and inferior peroneal retinacula and the peroneus longus tendon.

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## Introduction

The os peroneum is an accessory ossicle located within the peroneus longus tendon along the lateral aspect of the cuboid [1–4]. The peroneus longus tendon contributes to eversion and plantar flexion of the foot. The tendon is held in place by 3 different structures as it courses from the lateral lower leg to its attachment on the plantar aspect of the medial cuneiform and the first metatarsal base; these include the superior and inferior peroneal retinacula and the long plantar ligament. The os peroneum is found in about 25% of the population, can be bipartite or multipartite, and can be a source of lateral foot and ankle pain. The painful os peroneum syndrome has been described as a spectrum of conditions resulting in chronic lateral plantar foot pain, including fracture, stress response, or diastasis of a multipartite os peroneum or injury to the peroneus longus tendon [2,5]. Several papers have described fracture of

the os peroneum that can be diagnosed by radiography, and these fractures can be associated with tears of the peroneus longus tendon [3,6,7]. Identifying malposition of an intact os peroneum can also suggest injury to the peroneus longus tendon [8] and its supporting structures.

## Case report

We report the case of a 74-year-old man with a history of type 2 diabetes mellitus, peripheral neuropathy, alcohol abuse, and frequent falls. He reported multiple recurrent eversion injuries of the ankle with associated acute-on-chronic lateral ankle pain. Because of his complex psychosocial history, he was seen irregularly by his primary care provider and did not obtain routine follow-up care.

The patient initially presented in June 2015 with pain along his lateral ankle distal to the lateral malleolus. He reported that

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**Fig. 1 – (A)** Oblique radiograph of the right foot from June 2015 demonstrates an os peroneum at the expected level of the calcaneocuboid joint (arrow). The ossicle appears intact without evidence of fracture. **(B)** Oblique radiograph of the right foot from October 2012 demonstrates the os peroneum in a similar position (arrow).



**Fig. 2 –** Oblique radiograph of the right foot from May 2016 after an acute ankle injury demonstrates a fractured os peroneum. The predominant fracture fragment has migrated proximally along the lateral calcaneus (arrow). A tiny fragment of the original ossicle remains adjacent to the cuboid.



**Fig. 3 –** Frontal **(A)** and mortise **(B)** radiographs of the right ankle obtained 1 week following the images obtained in [Figure 2](#), after a subsequent ankle injury. The previously seen predominant os peroneum fragment has now migrated more proximally to the level of the lateral talar process (arrows in **A** and **B**). This suggests injury to the inferior peroneal retinaculum but an intact superior peroneal retinaculum.

he went for a long walk wearing flip-flop sandals, and his foot had been hurting ever since. Radiographs were obtained at the time demonstrating an intact os peroneum in the expected position adjacent to the cuboid ([Fig. 1A](#)). Notably, the patient had prior radiographs of his foot in 2012, where the os peroneum can be seen in a similar position ([Fig. 1B](#)). There was no acute fracture or dislocation. Moderate osteoarthritis at the first metatarsophalangeal joint was noted. The patient returned in May 2016, with pain in the same location after he reported twisting his ankle and falling. Radiographs obtained at that time ([Fig. 2](#)) demonstrated a fractured os peroneum. The larger proximal fracture fragment had migrated proximally along the lateral aspect of the calcaneus. He declined further treatment at that time, including referral to podiatry. One week later, he returned again after another fall. This time he reported tripping in a hole while walking across the street and again rolling his ankle. Radiographs were obtained ([Fig. 3](#)), which



**Fig. 4 – Lateral radiograph of the right ankle obtained in January 2017, following another acute injury to the ankle. The os peroneum is now located above the lateral malleolus along the distal fibula (arrow). This suggests injury to the superior peroneal retinaculum with further proximal migration of the ossicle.**

demonstrated that the fractured os peroneum fragment had migrated further proximally to the level of the lateral process of the talus. Ligamentous injury to the peroneus longus was suggested, and conservative management was recommended.

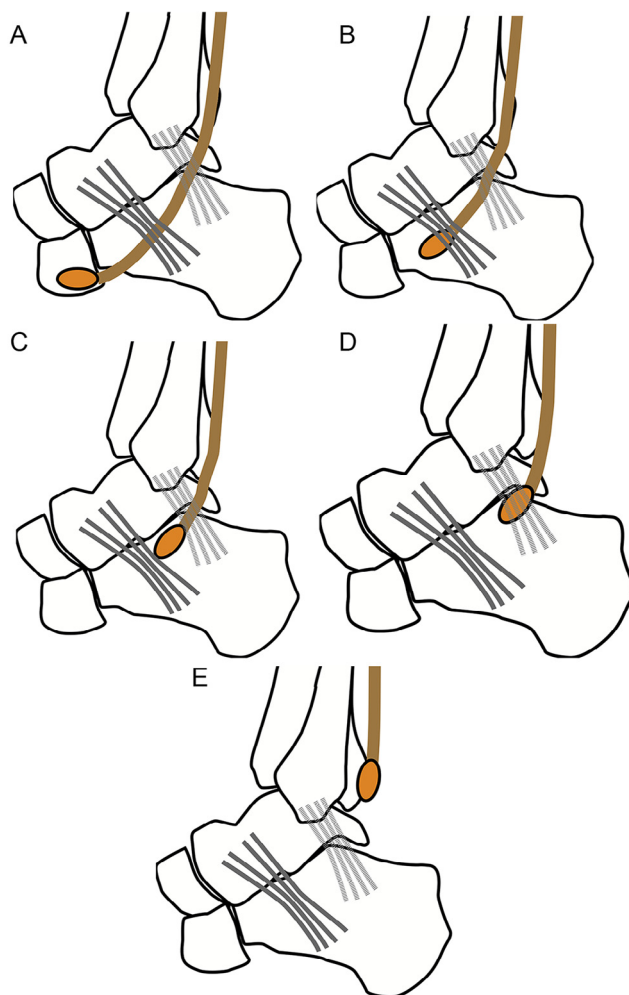
In January 2017, the patient returned again after another fall that occurred while crossing the street. In addition to pain in his right ankle, he also reported pain in his right wrist and shoulder since he fell onto an outstretched arm. Radiographs of his right ankle obtained at that time (Fig. 4), demonstrated the predominant os peroneum now located above the level of the lateral malleolus, lateral to the distal fibula. A referral was made to podiatry. The patient followed up with podiatry several days later but elected for conservative management, given that his right ankle pain was abating and he wanted to deal with his other medical and social concerns. Notably, his peripheral neuropathy was of more concern to him. No further imaging was obtained.

## Discussion

The os peroneum is an accessory ossicle whose malposition can suggest injury to the peroneus longus tendon and can be diagnosed with radiography. Fractures of this ossicle can also occur and can be associated with tendon injury, but must be distinguished from bipartite or multipartite ossicles. Additionally, with chronic and severe injuries to the peroneus longus tendon, there can be varying degrees of retraction of the tendon and the ossicle, which can suggest injury to other structures such as the inferior and superior peroneal retinacula. Figure 5 shows graphical representations of the peroneus longus tendon

and potential locations of the os peroneum, depending on the degree of retraction. This can help determine which structures might be injured along the lateral ankle.

When the ossicle or ossicle fragments are retracted alongside the lateral calcaneus, this implies that the inferior peroneal retinaculum remains at least partially intact. If the inferior



**Fig. 5 – Diagrams showing the progressive retraction of the os peroneum, implying injury to the inferior and superior peroneal retinacula (A-E). (A) The orange ossicle is depicted in its expected position along the lateral cuboid within the peroneus longus tendon (brown). The inferior peroneal retinaculum (dark gray lines) and the superior peroneal retinaculum (light gray lines) are also shown. (B) The ossicle is retracted proximally, suggesting injury to the peroneus longus tendon, but remains at the level of the lateral calcaneus because the inferior peroneal retinaculum is intact. The ossicle may be fractured, as in our case above. (C) The ossicle has retracted proximally between the inferior and superior peroneal retinacula, suggesting injury to the inferior peroneal retinaculum. (D) The ossicle is within or just adjacent to the superior peroneal retinaculum. (E) The ossicle is displaced proximally along the lateral fibula, implying injury to the superior peroneal retinaculum with further retraction of the peroneus longus tendon.**

peroneal retinaculum is disrupted but the superior peroneal retinaculum remains intact, the ossicle can be retracted along the lateral ankle distal to the lateral malleolus. When the superior peroneal retinaculum is disrupted, the ossicle can migrate even further proximally into the lower leg along the distal fibula, as in this case. These findings would imply progressively more severe injuries to the peroneus longus tendon.

The os peroneum is a potential source of lateral plantar foot pain, and its appearance and position should be closely scrutinized on imaging in patients with pain in this location.

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