

# Nonoperative Treatment of an Os Peroneum Fracture in a High-level Athlete

## A Case Report

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### Abstract

**Background** The os peroneum is a sesamoid bone in the peroneus longus tendon. Fractures of the os peroneum are rare. Some authors recommend surgery for active patients.

**Case Description** A 41-year-old male professional tennis coach sustained a minimally displaced fracture of the os peroneum. He was treated with restricted weightbearing for 2 weeks, followed by physical therapy and gradual return to activities. He returned to tennis 8 weeks after injury. Followup 7 years after the injury showed he had full strength, full motion, and a radiographically healed os peroneum. The American Orthopaedic Foot and Ankle Society (AOFAS) Ankle-Hindfoot Scale score was 100 and Ankle Activity Score and Tegner Activity Level Scale were unchanged from those before injury.

**Literature Review** Fracture of the os peroneum is a rare injury and treatment recommendations are based largely on very small series and case reports. Proposed treatment strategies for fracture of the os peroneum include nonoperative treatment, fixation of the fracture, excision of the

bone with direct repair of the tendon, and tenodesis of the peroneus longus to the peroneus brevis.

**Purposes and Clinical Relevance** Although some surgeons suggest fracture of the os peroneum should be treated operatively in active patients, this case shows nonoperative treatment allowed pain-free return to activities in a high-level athlete with a minimally-displaced fracture.

### Introduction

The os peroneum is a sesamoid found in the peroneus longus tendon, typically adjacent to the lateral or plantar aspect of the cuboid [16]. Anatomic and radiographic studies have identified an os peroneum in 5% to 26% of the population [3, 4, 19, 24, 27]. This accessory bone is often unilateral and radiographically has rounded edges in uninjured patients [5, 6, 20].

Fracture of the os peroneum is a rare injury that may occur with direct trauma, strong muscle contraction, or an inversion injury to the ankle [1, 29]. The incidence of this injury is difficult to ascertain, as there are only case reports and small case series in the literature. There may be varying amounts of fracture displacement. If there is proximal migration of part of the ossicle, a functional rupture of the peroneus longus should be suspected [5, 27, 29]. Treatments for an os peroneum fracture include nonoperative management, fixation of the fracture, excision of the bone with direct repair of the tendon, and tenodesis of the peroneus longus to the peroneus brevis [7, 9, 10, 15, 18, 20–23, 27, 29, 30]. Some studies recommend surgical treatment in active patients owing to concern for incompetence of the peroneus longus tendon, associated loss of eversion strength, and first metatarsal plantar flexion strength [2, 4, 23].

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The purpose of this case report was to show that a competitive athlete with a minimally displaced fracture of the os peroneum can be treated successfully with nonoperative management. Our institution approved the reporting of this case and all investigations were conducted in conformity with the institution's ethical principles of research. Informed consent for participation in the study was obtained from the patient.

### Case Report

A 41-year-old male professional tennis coach sustained an injury to his right foot. The patient was cutting hard from right to left when he felt a pop and pain along the lateral aspect of his foot. On evaluation one day after the injury,

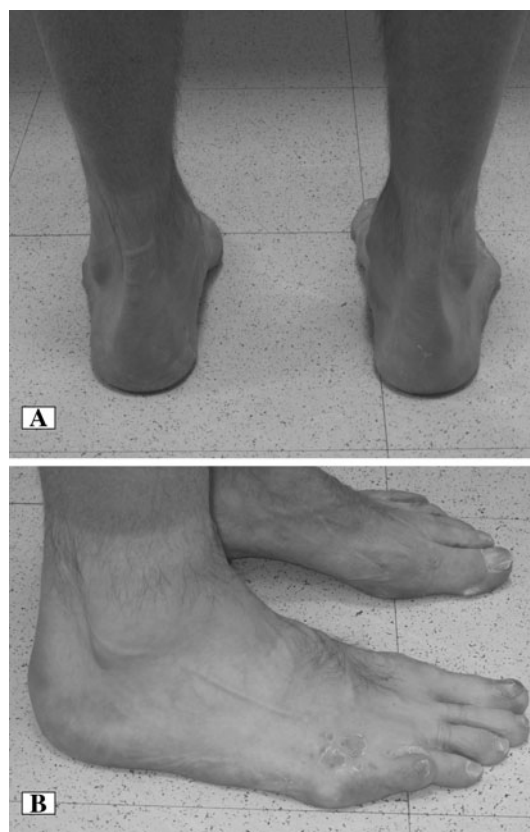
he had bruising, swelling, and tenderness at the lateral midfoot and pain with active foot eversion. Radiographs revealed a minimally displaced os peroneum fracture (Fig. 1) without evidence of stress fracture healing response or associated injuries. He had no prior foot or ankle injury but used custom orthotics bilaterally for mild pes cavus. He was otherwise healthy and took no medications.

The patient wore a walking boot on his foot and did not bear weight for 2 weeks. He began active dorsiflexion and plantar flexion ankle exercises immediately. He began weightbearing at 2 weeks, light jogging and lunging at 4 weeks, cutting activities at 6 weeks, and tennis at 8 weeks.

We obtained followup 7 years later, specifically to assess the long-term outcome of this injury. He had returned to full competitive tennis 2 months after the injury and had no residual limitations. Physical examination revealed a normal gait, mild bilateral pes cavus, and a slightly varus heel (Fig. 2). Single-leg heel rise, plantar flexion, and foot eversion were without pain or hesitation. He was nontender with a stable ankle and peroneal tendons.



**Fig. 1A–D** (A) AP, (B) lateral, and (C) oblique radiographs of the right foot at the time of injury show a minimally displaced fracture of the os peroneum (arrows). (D) The fracture can be seen better in this enlarged view of the inset shown on the oblique radiograph in Illustration C.



**Fig. 2A–B** (A) Heel and (B) side views of the patient's feet obtained at the latest followup show a mild pes cavus and a slight varus heel deformity.



**Fig. 3A–D** (A) AP, (B) lateral, and (C) oblique radiographs obtained 7 years after injury show a healed os peroneum without deformity. (D) The healed fracture can be seen better in this enlarged view of the inset shown on the oblique radiograph in Illustration C.

Radiographs showed a healed fracture of the os peroneum without deformity or displacement (Fig. 3). He had a score of 100 on the AOFAS Ankle-Hindfoot Scale [11, 12, 25], 8 on the Ankle Activity Score [8], and an activity level of 8 on the Tegner Activity Level Scale [26]. The Ankle Activity Score and Tegner Activity Level Scale were unchanged from preinjury.

## Discussion

We have presented the case of a healthy professional tennis coach who sustained a minimally displaced fracture of the os peroneum treated nonoperatively. The patient returned to high-level tennis several months after the injury and has had no limitations related to the fracture. At followup 7 years after his injury, the patient had a normal physical examination and excellent functional outcome scores using the AOFAS Ankle-Hindfoot, Ankle Activity, and Tegner

Activity Level Scales. Although the Tegner Activity Level Scale initially was designed for outcomes assessment of patients with knee ligament injuries, it has been used to assess function after ankle injuries as well [13, 14, 17, 28]. The score of 100 was the maximal for the AOFAS Ankle-Hindfoot Scale; the score of 8 on the Ankle Activity Score represents tennis at the “top level – international elite, professional, national team, or first division” [8]; and level 8 on the Tegner Activity Level Scale represents “competitive sports such as racquetball or bandy, squash or badminton, track and field athletics, downhill skiing” [26].

We report this case in part to emphasize the effectiveness of nonoperative treatment for a minimally displaced fracture of the os peroneum. This patient was a high-level athlete before the injury and returned to his sport at the same level. Some studies have suggested active patients do not tolerate nonoperative treatment of this injury well [2, 4, 23]. This is thought to be partly attributable to a functional disruption of the peroneus longus with associated weakness of eversion and plantar flexion of the first metatarsal. Although nonoperative treatment might be poorly tolerated if there is true functional incompetence of the peroneus longus musculotendinous unit, as can be assumed if the proximal os peroneum fragment migrates more than 6 mm [5], our patient did very well with nonoperative treatment of a minimally displaced fracture. Therefore it is important to distinguish between these two injury patterns.

In this case, the fracture occurred when the patient stepped out with his right foot and then cut hard to the left. As opposed to direct trauma or an inversion injury, the mechanism of injury in this case presumably was eccentric dorsiflexion loading of the peroneus longus. Prior case reports have speculated as to the contribution of a cavus foot to an os peroneum fracture, and similarly, we wonder if a mild pes cavus deformity might have contributed to our patient’s injury [27]. The mechanical consequences of pes cavus include decreased subtalar and transverse tarsal joint motion during gait, resulting in a more rigid foot. The increased rigidity is partly attributable to a more vertical axis of rotation of the subtalar joint. The pes cavus in our patient, although mild, may have resulted in the peroneus longus tendon pulling around a stiffer midfoot fulcrum. This mechanism would be consistent with the association between peroneal tendinopathy and cavovarus foot position [4].

We believe it is appropriate to consider nonoperative treatment for a minimally displaced os peroneum fracture as operative repair can pose technical challenges [23]. Obtaining adequate exposure can be problematic and may require an extensile plantar exposure, which can compromise the ligaments providing structural stability to the plantar-lateral midfoot and lead to lateral column instability [23]. Additionally, the lateral plantar artery and nerve

and the lateral plantar cutaneous nerve are in the field of dissection and are at risk of injury [20].

Fracture of the os peroneum is a rare injury and treatment recommendations are based largely on very small series and case reports [7, 10, 15, 18–24, 27, 29, 30]. Although some authors suggest fracture of the os peroneum should be treated operatively in active patients owing to concern of incompetence of the peroneus longus musculotendinous unit [23], this case report shows nonoperative treatment of a fracture of the os peroneum can be successful in a high-level athlete.

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