

Associated Lateral Process and Posteromedial Tubercle Talus Fractures: A Case Report and Literature Review

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Abstract

This article describes the case of a 39-year-old man who sustained both a lateral process and a posteromedial tubercle talus fracture. Both fractures were treated with open reduction and internal fixation resulting in a satisfactory clinical outcome. Although this combination of injuries has been reported in the literature, this is the first reported case to describe surgical fixation of both fractures.

Lateral process and posteromedial tubercle fractures of the talus are both rare. Simultaneous occurrence of these fractures has been reported twice before; one of the cases was treated nonoperatively, and only the posteromedial tubercle fracture was surgically addressed in the other.^{1,2}

This article describes the case of a 39-year-old man who sustained a lateral process fracture and a posteromedial tubercle talus fracture in a motorcycle accident. The fractures were diagnosed with radiography and computed tomog-

raphy (CT) scan and addressed by open reduction and internal fixation (ORIF). The patient provided written informed consent for print and electronic publication of this case report. This article also includes a brief review of the literature and describes mechanism of injury, pertinent anatomy, and surgical fixation.

Radiographic and CT examinations confirmed both a lateral process and a posteromedial tubercle fracture of the left talus (Figures 1–3). The lateral process fragment was 1.4×1.3×1 cm and 2 mm to 5 mm displaced; the posteromedial tubercle fragment was 1.5×1×1.4 cm, approximately 5 mm displaced, and involved the posterior facet of

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CASE REPORT

A 39-year-old man presented to the emergency department (ED) reporting left ankle pain after a low-speed motorcycle accident. On radiologic and CT evaluations in the ED, he was found to have fractures of both the lateral process and posteromedial tubercle of the talus. He could not recall the position of the ankle at time of injury. He was splinted and sent to our orthopaedic clinic for definitive evaluation.

Past medical history was non-contributory. The patient smoked half a pack of cigarettes a day as well as medicinal marijuana. On evaluation, approximately 1 week after the injury, the left ankle had significant circumferential swelling but no open wounds or fracture blisters. The patient was able to dorsiflex and plantarflex the ankle, but subtalar motion was decreased secondary to pain. Neurovascular examination was unremarkable.

the subtalar joint. Before surgery, the patient placed Comfrey leaves circumferentially on the ankle. These leaves produced a significant erythematous rash, so surgery was delayed approximately three weeks from the date of injury.

The lateral process fracture was approached through an Ollier incision made from the dorso-lateral aspect of the talonavicular joint extending along the skin crease approximately 1 cm below the fibula. Sharp dissection was carried through the inferior extensor retinaculum. The extensor digitorum brevis was bluntly dissected as a flap, and sinus tarsi subcutaneous tissue was excised. The lateral process of the talus fragment was then visualized, hematoma and scar tissue were evacuated, and the fracture was reduced. There was no evidence of any soft-tissue attachment. The lateral process was repaired with 2.0 mm and 2.8 mm lag screws.

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Figure 1. Anteroposterior, mortise, and lateral radiographs of left ankle. Lateral process and posteromedial tubercle talus fractures are best seen on anteroposterior and lateral radiographs, respectively.

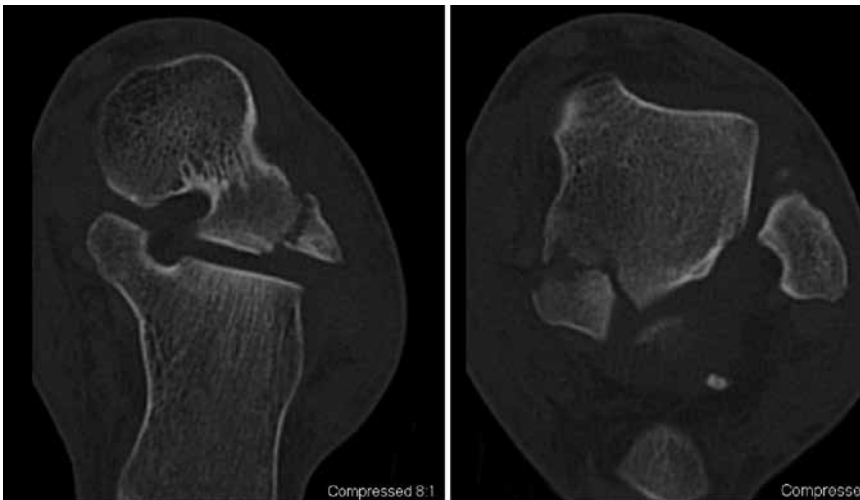


Figure 2. Axial computed tomography shows lateral process of talus fracture involving subtalar joint (first panel) and displaced posteromedial tubercle talus fracture (second panel).



Figure 3. Coronal computed tomography shows lateral process talus fracture (first panel) and posteromedial tubercle talus fracture (second panel).

Next, the medial side was approached with a retromalleolar “hockey-stick” incision. Dissection was carried down to the flexor retinaculum, which was sharply incised. The fracture was best visualized between the tibialis posterior and flexor digitorum longus superiorly and the neurovascular bundle inferiorly. The sheath of the tibialis posterior was sharply incised to mobilize the tendon for added exposure. Part of the tibialis posterior tendon was interposed between the fracture fragments and subsequently released. After removal of the interposed tendon, scar tissue was removed from the fracture site. There was no attachment of the posterior talotibial ligament to the posteromedial tubercle fragment. The fracture was reduced and stabilized with two 2.0-mm lag screws. The tibialis posterior tendon sheath was repaired.

Intraoperative fluoroscopy confirmed satisfactory reduction of both fractures, and on-axial views of all screws confirmed their position out of the joint (Figure 4). The wounds were irrigated and closed with Vicryl 2-0 and Monocryl 3-0. The patient remained in the hospital for 24 hours postsurgery for antibiotics and pain control. At the patient’s 2-week postoperative visit, the wounds showed no signs of infection. A 6-week postoperative CT (not shown) confirmed maintenance of the reduction and evidence of fracture healing. The patient was started on ankle and subtalar range-of-motion (ROM) exercises and was advanced to 25% partial weight-bearing, with advancement to 50% weight-bearing 8 weeks after surgery. By postoperative week 8, the patient had advanced himself to full weight-bearing. He had approximately -5° to 30° of dorsiflexion/plantarflexion, full subtalar ROM, and no pain with weight bearing. Radiographs at 3-month follow-up were satisfactory and unchanged from before (Figure 5). By 6 months after surgery, the patient was biking pain free.



Figure 4. Anteroposterior, mortise, and lateral intraoperative fluoroscopic images show lag-screw fixation of both talus fractures. On-axial images of lateral process screws demonstrate no subtalar joint penetration (not shown).



Figure 5. Anteroposterior, mortise, and lateral radiographs almost 12 weeks after open reduction and internal fixation.

DISCUSSION

The lateral process talus fracture was first described in 1943 by Marotolli³ and later by Bonnin,⁴ Milch and Milch,⁵ Dimon,⁶ and Cimmino.⁷ The largest initial series was reported by Hawkins⁸ in 1965. This fracture has been referred to as snowboarder's fracture, and the mechanism of injury was initially thought to be from an axial load with the ankle in dorsiflexion and inversion. However, more recent studies have demonstrated that the fracture is reproduced with the ankle in dorsiflexion and eversion/external rotation.^{9,10} The lateral process is attached to the lateral talocalcaneal ligament and articulates with the subtalar joint inferomedially and the fibula dorsolaterally. The fracture can extend into the subtalar joint and can result in pain and loss of subtalar motion. A common complication of lateral process talus fracture is a non-

union with chronic pain and need for excision. Hawkins⁸ identified 3 categories of these fractures: nonarticular chip fracture; large fragment involving the talofibular and subtalar articulations; and comminuted fracture involving both articulations. Treatment is based on fracture size and displacement. Large, unreduced fractures typically do not unite and can cause chronic pain and decreased ROM. Von Knoch and colleagues,¹¹ reporting on a cohort of 23 snowboarders with a mean follow-up of 3.5 years, found that outcomes were favorable with early diagnosis and treatment. The index patient had a large, displaced lateral process fracture fragment involving both the talofibular and subtalar joints.

Posteromedial talus fractures are rare. This injury was first reported by Cedell¹² in 1974. Cedell described the mechanism of action as dorsiflexion-pronation with

strain on the posterior talotibial ligament and subsequent bony avulsion. Ebraheim and colleagues¹³ described 4 cases of posteromedial tubercle talus fractures, 2 of which had been missed, with painful nonunions resulting. Those authors recommended cast treatment for nondisplaced fractures and for fractures without significant subtalar joint involvement and ORIF for displaced fractures with significant subtalar joint involvement. Wolf and Heckman¹⁴ also described an isolated posterior medial tubercle fracture with subsequent nonunion treated successfully with surgical excision. Kanbe and colleagues¹⁵ described 2 fractures repaired with ORIF. Berkowitz and Kim¹⁶ and Kim and colleagues¹⁷ also supported early ORIF, as their missed fractures did poorly and improved only after excision. Most authors agree on early ORIF for displaced fractures, while others describe satisfactory outcomes for nonoperative treatment of nondisplaced fractures.

Benmansour and colleagues¹ described these associated fractures in a case report. The mechanism of the posteromedial tubercle fracture was pronation-dorsiflexion with avulsion by the posterior talotibial ligament, and the lateral process fracture occurred through compression between the lateral malleolus and calcaneus. The index patient could not recall the position of his ankle (inversion vs eversion) at the time of injury but stated there was a direct impact on the heel in dorsiflexion. The mechanism of injury was likely similar to what Benmansour and colleagues described, but in this patient's case there was no evidence of soft-tissue attachment to the medial tubercle fragment suggesting bony avulsion. Benmansour and colleagues treated the posteromedial tubercle with ORIF, while the lateral process was treated nonoperatively. The index patient's lateral process fracture fragment was of significant size and displacement, and thus, war-

ranted ORIF. Although this case report describes operative fixation of these rare talus fractures, Idrissi and colleagues² describe minimally displaced talus fractures treated nonoperatively with satisfactory outcomes.

Our case is unique in that it is the first to report surgical fixation of both the lateral process and posteromedial tubercle talus fractures. The patient had no postoperative complications and, at 6-months follow-up, demonstrated increased ROM and no pain.

CONCLUSION

We have described the case of a 39-year-old man with simultaneous fractures of the posteromedial tubercle and lateral process of the talus. Both fractures were treated with ORIF and healed with a satisfactory clinical outcome.

AUTHORS' DISCLOSURE STATEMENT

The authors report no actual or potential conflict of interest in relation to this article.

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