

**CASE REPORT**

# Extra-articular Lateral Talar Dome Osteochondral Fracture: A Case Report and a Review of Literature

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**Abstract**

The lateral talar dome osteochondral fracture has been described as shallow or wafer-shaped and is more likely to have an associated flake fracture than medial injuries. Displacement into the extracurricular space, however, is a rare occurrence. We present a case of ankle trauma with persistent pain and edema. A CT scan revealed a displaced osteochondral fracture of the lateral dome of the talus and an avulsion fracture of the tip of the medial malleolus. After appropriate dissection and exposure, the fragment was found below the skin, outside the ankle joint capsule. The fragment was fixed to the neck of the talus, and the deltoid ligament and anterior inferior tibiofibular ligament were repaired. After a one-year follow-up, full recovery was achieved without pain, stiffness, or osteonecrosis of the displaced fragment. Although the extra-articular displacement of lateral talar dome osteochondral fractures is rare, it should be considered when assessing ankle trauma.

**Level of evidence: IV**

**Keywords:** Cartilage injury, Osteochondral fracture, Osteochondral lesions of the talus, Talus fracture

**Introduction**

Peripheral talar fractures, comprising 0.3% to 1% of all ankle injuries, are the most common talar fractures.<sup>1,2</sup> The radiological evaluation of almost 150 talar fractures showed that 18% were attributed to lateral process fractures and 16% to posterior process ones.<sup>3</sup> Lateral talar dome osteochondral fractures usually occur due to ankle trauma from axial loading or sudden severe dorsiflexion with the hindfoot inversion. This produces a shearing force transmitted from the calcaneus to the lateral process of the talus.<sup>4</sup>

Lateral lesions are shallower and more likely to have an associated wafer or flake fracture than medial ones. Considering the smaller size of lateral lesions, displacement into the extra-articular space is rare.<sup>5</sup>

Here, we present a late-diagnosed lateral talar dome fracture with an extra-articular displacement.

**Case Presentation**

An 18-year-old man was referred to our clinic due to ankle trauma. He had a motor vehicle accident history for which the emergency medical service performed primary care, including temporary immobilization with a short leg slab. Initially, the rural orthopedic surgeon on call was suspicious of an avulsion fracture of the lateral malleolus. However, the patient was referred to a foot and ankle specialist due to severe edema and pain.

Our department initially suspected the fracture to be an avulsion fracture of the superior peroneal retinaculum. Rest, elevation, an ice pack, and a short leg slab were recommended until the swelling subsided. He presented to our practice after one week. The physical examination showed that the peroneal tendons had not dislocated from the peroneal groove. The above diagnosis appeared incorrect based on the physical examination, and a CT scan was

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requested.

The CT scan revealed an osteochondral fracture of the lateral dome of the talus and an avulsion fracture of the tip of the medial malleolus [Figure 1].



**Figure 1. Lateral osteochondral fracture and the avulsion fracture of the medial malleolus in a CT scan**

The patient was then scheduled for surgery. An ankle arthrotomy was performed through an anterolateral approach to the ankle joint [Figure 2].



**Figure 2. Defect on the superolateral dome of the talus**

There was a defect on the superolateral dome of the talus and a detachment of the tibial side of the anterior inferior tibiofibular ligament (AITFL). After further dissection, the fragment was located below the skin, outside the ankle joint capsule. The fragment was then retrieved and found to match the talar defect perfectly. As the diameter of the fragment was small and absorbable and pins were not available in our center, the fragment was fixed with Vicryl sutures to the neck of the talus. After fixation, stability was confirmed. The AITFL was then secured to the insertion point with a 2-mm suture anchor. Furthermore, the medial malleolus was evaluated through a medial approach. There was a partial detachment of the deltoid ligament. The avulsion fracture was removed, and the remnant of the deltoid ligament was attached to the medial malleolus with

a suture anchor [Figure 3].



**Figure 3. Post-operative ankle anteroposterior view X-ray**

After closing the skin layer by layer, a short leg cast was applied for six weeks with non-weight-bearing ambulation. After six weeks, the cast was removed, and progressive weight-bearing was allowed. After one year, the patient presented to our clinic for a routine follow-up with a full range of motion and without any pain, stiffness, or limitation in daily activities or any evidence of osteonecrosis of the fragment [Figure 4]. The American Orthopedic Foot and Ankle Society Ankle-Hindfoot score was 100.



**Figure 4. Anteroposterior (A) and Lateral (B) views of the ankle in the one-year follow-up**

Postoperative rehabilitation differed among patients; however, generally, shoulders were immobilized for the first two to six weeks, followed by physical therapy targeting supervised progression of active and passive range of motion. Strengthening exercises started at two to three months after surgery and return to collision sports was allowed at six months.

### Discussion

The talar dome is one of the most common sites for

osteocondral lesions.<sup>6</sup> The most common cause of these lesions is trauma.<sup>7</sup> Almost all previous studies have estimated that the prevalence of osteochondral fractures is higher on the medial side of the talar dome than on the lateral.<sup>8,9</sup> In a meta-analysis study, this ratio was reported to be 58% versus 42%, respectively.<sup>10</sup> As for the exact location, although many have identified posteromedial and anterolateral areas as the most common, according to the study by Steven et al., equator areas of both the lateral and medial sides are the most common in the development of talar dome lesions.<sup>5</sup>

The importance of identifying the location of a fracture lies in the diversity and severity of different areas of the fracture and, consequently, the variety in its management. Based on classic findings, posteromedial fractures occur with milder trauma, but the lesions are deeper and larger, whereas anterolateral fractures are shallower flake or wafer-shaped.<sup>11</sup> One of the reasons for this contrast could be the divergent mechanisms of damage in different regions. Medial talar dome fractures usually occur following inversion injuries due to plantarflexion or direct and severe trauma to the bone. In contrast, fractures of the lateral side, which are related to dorsiflexion, usually occur following shearing injuries.<sup>8</sup> In addition to the mechanism of injury, dissimilar contributions of different parts of the bone to stress tolerance during activity and trauma have also been hypothesized to cause the severity of injury in different regions.<sup>5</sup> Therefore, lateral talar dome osteochondral fractures are expected to be minor and stable. The vast majority of practical experiences also live up to this expectation, which is in contrast to our reported case. Although previous reports<sup>12,13</sup> have shown instances of unusual talar dome osteochondral fractures, including extra-articular ones, as far as we know, this is the first reported case of this type of fracture arising from the lateral side of this bone.

To express the severity of osteochondral lesions, in addition to the qualitative descriptions mentioned above, a classification has also been proposed by Berndt and Harty.<sup>14</sup> Based on this classification, the severity stages of the lesions are defined as follows: local compression of the subchondral bone (Stage I), partial detachment of the

osteocondral tissue (Stage II), complete detachment of the osteochondral tissue but remaining in bed (Stage III), and complete displacement of the fragment from its place (Stage IV). This classification does not differentiate intra-articular detachment from extra-articular detachment. It is suggested that IVa be used for intra-articular components and IVb, as in our case, for extra-articular fractures. This is the flaw that Herscovici et al. have pointed out in the past and suggested Stage V for extra-articular fractures.<sup>12</sup>

### Conclusion

In summary, the lateral talar dome osteochondral fracture may rarely occur outside the joint. Physicians should be aware of the possibility of such fractures, suspect them based on the patient's clinical findings, and request further evaluations. Finally, it should be noted that perfect reduction is the most significant factor regarding the prognosis rather than the fixation device or the duration between the injury and surgery.

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