

# Case Report: Avascular Necrosis of the Talus After Using Subchondroplasty for Treatment of a Subchondral Cyst and Bone Marrow Lesion

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## Abstract

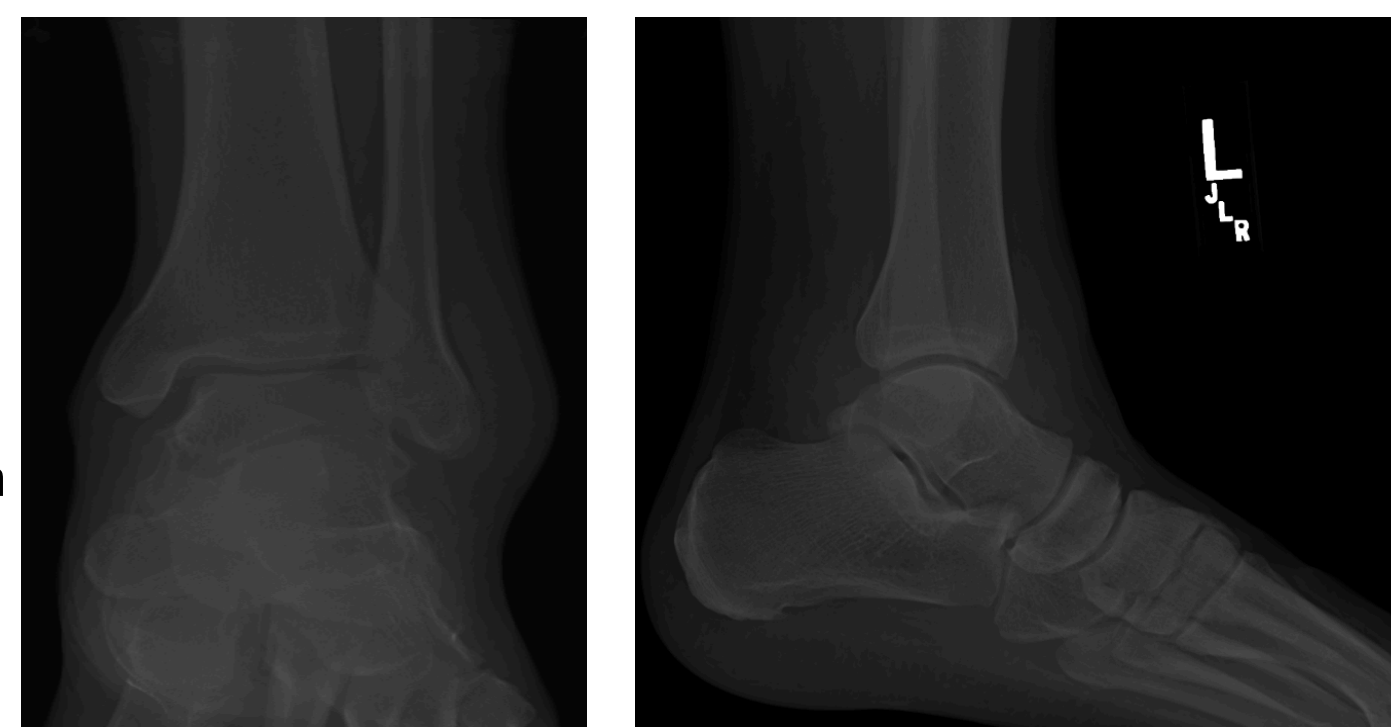
The use of calcium phosphate as a bone graft substitute has been widely used in foot and ankle surgery without severe complications. We present a case on a patient who developed avascular necrosis of the talus after using injectable calcium phosphate to treat a subchondral cyst and bone marrow lesion of the talus. The patient was found to have AVN of 85% of talus confirmed on MRI 6 months after surgery. About 13 months from the diagnoses of AVN of the talus, a repeat CT showed continued revascularization and 75% healing of the fractures in the talus. The patient was transitioned to partial weight bearing in a CAM boot. The patient had no pain with partial weightbearing and was transitioned to full weightbearing in an ankle foot orthosis. The patient has been able to walk up to 3 miles with mild discomfort.

## Introduction

Avascular necrosis (AVN) of the talus is typically traumatically induced, but has been associated with atraumatic causes such as steroid use, sickle cell anemia, and alcoholism. It is a devastating complication that could lead to collapse of the articular surface and fragmentation of the talar dome and body.

The calcium phosphate (CaP) is a synthetic bone void filler that undergoes an endothermic reaction that allows the CaP to crystallize and mimics cancellous bone, overtime this scaffold is remodeled into bone.

The purpose of this paper was to describe the first case of avascular necrosis of the talus after the use of injectable calcium phosphate for the treatment of a subchondral cyst and chronic bone marrow edema.



**Figure 1.** Post Ankle Inversion Radiographs with no osseous fractures

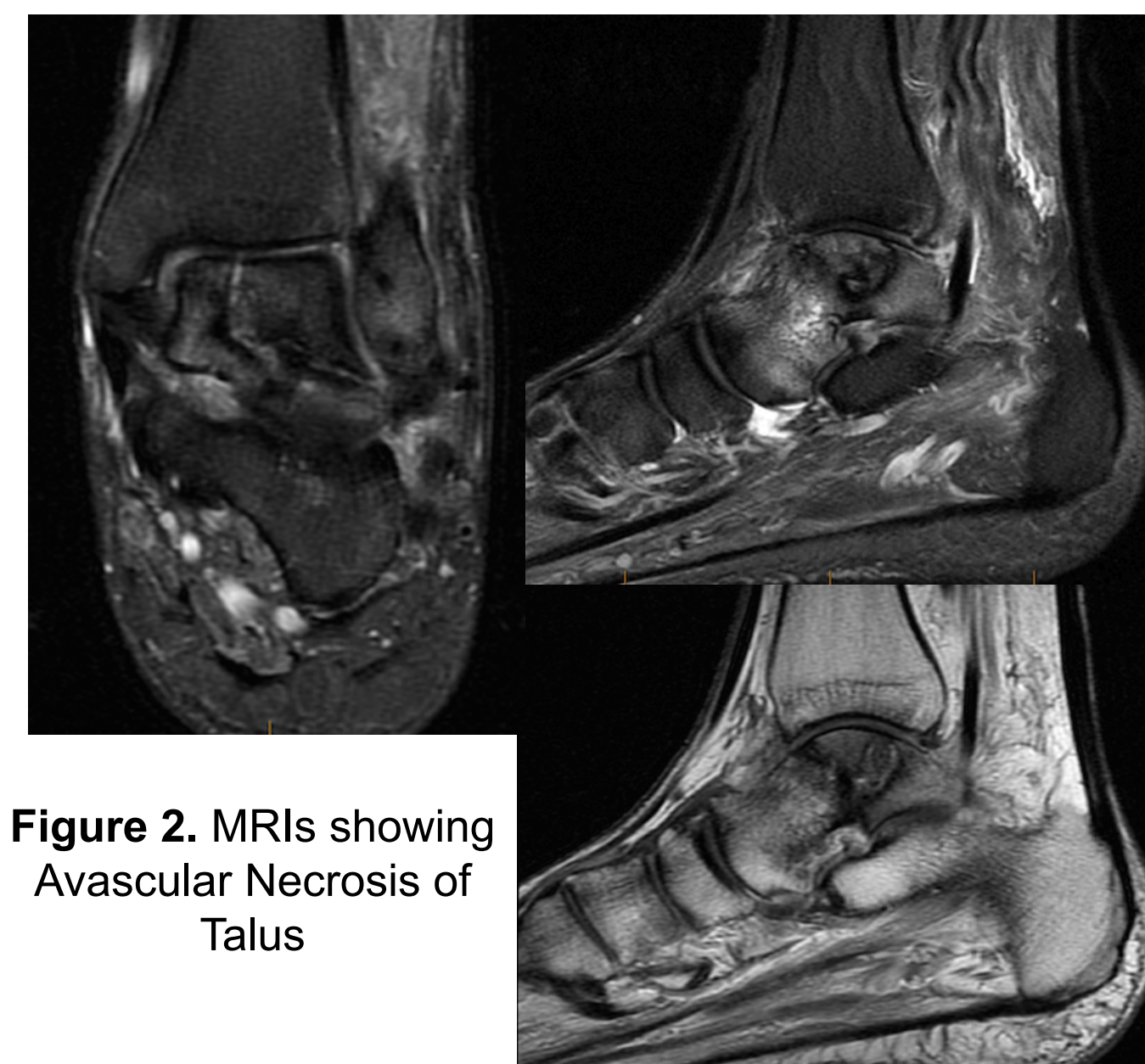
## Case Report

On May 2017 a 55 year old male presented to an urgent care after inversion ankle injury and was diagnosed with an ankle sprain. The patient continued to have pain with 4 months of conservative treatment and underwent an MRI that showed a medial central talar osteochondral lesion with underlying bone cyst, diffuse bone marrow edema throughout the talar body, kissing lesion of adjacent tibia, longitudinal split tear of peroneus brevis, and injury to anterior talofibular ligament.

Five months from initial injury (10/2017) the patient underwent arthroscopic ankle debridement with abrasion chondroplasty of osteochondral lesion, subchondroplasty (1cc) to fill bone cyst and to treat the bone edema, debridement of peroneus brevis, and Broström Gould lateral ankle stabilization.

On 04/2018 an MRI was ordered due to continued pain and a prominent focus of avascular necrosis through 85% of the talar body with no subchondral cortical collapse of talar dome and non-displaced fracture in the talar body and dome was found. The patient was kept non-weightbearing, started on aledronate 75mg PO weekly, and daily bone stimulator use.

The patient underwent serial CTs and on 05/2019 the patient was transitioned to partial weight bearing in a CAM boot due to improved revascularization of talus and 75% trabeculation across the fracture sites. Follow up CT on 08/2019 showed continuing improvement of fracture healing and patient had no pain with partial weightbearing in a CAM boot, so he was transitioned to full weight bearing in an ankle foot orthosis. The patient has been able to walk with mild discomfort and has been restricted from high impact activities.



**Figure 2.** MRIs showing Avascular Necrosis of Talus



**Figure 3.** CT from 05/2019 with 75% healing of fractures with no talar dome collapse.

## Discussion

Reports of avascular necrosis as a complication of subchondroplasty in the talus have not been reported, but a single case report of AVN in the knee has been described. Chirichella et al. treated a 61 year old female with chronic left knee pain secondary to osteoarthritis with bone marrow lesion within the medial femoral condyle. The patient was treated with injectable calcium phosphate, which was complicated by extravasation and persistence of pain syndrome. The patient continued to have knee pain, which prompted further investigation. An MRI showed focal sclerotic lesion in the medial femoral condyle indicating AVN. The lesion was treated and at seven weeks follow up the patient noted significant improvement in pain with resolution of pain with ambulation.<sup>[3]</sup>

There is no evidence that shows the use of calcium phosphate as a cause of avascular necrosis. Rather it has been used as an adjunct after core decompression for treatment of avascular necrosis and prevention of articular collapse of the femur with promising results.<sup>[4-7]</sup> Many studies have used calcium phosphate as fillers for bone cyst or synthetic bone graft after tumor resection with great clinical outcomes, bone ingrowth, and integration.<sup>[8-10]</sup>

In conclusion, this is the first reported case of AVN of the talus after the use of an injectable calcium phosphate.

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## Disclosure

- No financial disclosures.