# Primary Synovial Osteochondromatosis in the Ankle: A Case Report

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## Abstract

**Primary synovial osteochondromatosis results from the metaplasia of synovial tissue into cartilaginous tissue. This cartilaginous tissue then undergoes calcification and ossification, producing multiple osteochondral nodules. The cause of the metaplasia is unknown.**

**Primary synovial osteochondromatosis is relatively rare and less common than secondary synovial osteochondromatosis. The primary form of the disease arises from the articular or tendon sheath synovium, whereas the secondary form is fragmented articular cartilage within the joint space.**

**Primary synovial osteochondromatosis most commonly occurs in people aged 30 to 40 years and is more prevalent in men. Symptoms include pain, swelling, and decreased range of motion. Because of their abundance of synovial tissue, larger joints are more likely to be affected than smaller joints. Knees are the most commonly affected joints, followed by, in no specific order, shoulders, hips, and elbows. The ankle and the joints of the hand are seldomly involved.**

**In the early stage of the disease, only active synovitis is present, and radiographs are negative. In the late stage, loose bodies can be detected on radiographs. Grossly, these bodies are consistent with ossified nodules. Microscopically, the nodules are composed of cartilaginous material lined by synovial tissue with a central area of calcification.**


A 37-year-old man presented with right ankle pain. The referring orthopedist's main concern was ankle pain in the setting of congruent increased fatigue and lassitude, new onset of mild night sweats, and recent unexplained 10-pound weight loss.

The ankle pain had progressed for 3 years. By the end of each day, the patient, a heavy laborer, was quite disabled by the ankle pain. When he originally reported it to his family practice physician, 6 months after it had begun, radiography and magnetic resonance imaging (MRI) showed no evidence of intra-articular calcification, loose bodies, joint space narrowing, or other conclusive findings. Past medical history was unremarkable for trauma or previous ankle complications.

On physical examination, the ankle was grossly swollen. There was a palpable mass on the dorsal aspect of the joint. The patient was able to dorsiflex the ankle only 10° and plantarflex it 30°, but he felt pain at these extremes. Positive impingement was noted anteriorly. There was no varus or valgus instability. Neurovascular function was intact.

Repeat plain radiographs (anteroposterior, lateral, and mortise) showed a large, spiculated calcified mass that appeared to be emerging from the anterior aspect of the ankle (Figures 1, 2). There was evidence of moderate tibiotalar osteophytosis and degenerative changes. MRI studies were not repeated. The radiographic appearance of the ankle was most consistent with the diagnosis of primary synovial osteochondromatosis. As with similar cases, mineralized lesions of soft tissue in the intra-articular joint space of the foot require a broad range of differential diagnoses: benign and malignant tumors of the foot and other soft-tissue pathologies.

During surgery, multiple white ossified nodules were extracted from the anterior aspect of the tibiotalar joint

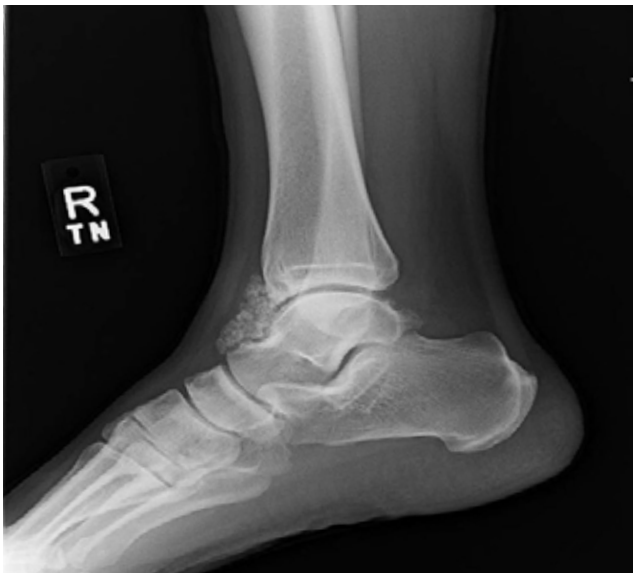


**Figure 1.** Lateral radiograph of right ankle shows spiculated mass on superior aspect of talus.

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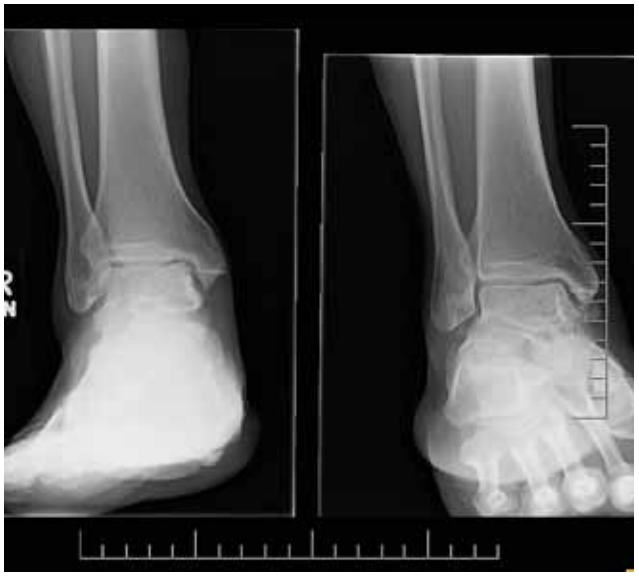


**Figure 2.** Anteroposterior and mortise views of right ankle show evidence of calcified mass on superior medial aspect of talus.


**Figure 3.** Gross appearance of osteochondral nodules.

(Figure 3). The osteochondral nodules were homogenous in appearance and measured 0.5 cm (mean) individually and 5.0×5.0×0.5 cm in aggregate. Pathology confirmed the diagnosis of primary synovial osteochondromatosis.

The patient provided written informed consent for print and electronic publication of this case report.

## Discussion

A broad range of differential diagnoses should be considered with any mass in the foot or ankle. Primary synovial osteochondromatosis is a self-limited intrasynovial process that runs a recognizable course from onset to resolution.[1-3] Benign and malignant tumors of the foot should be especially considered when radiographs show

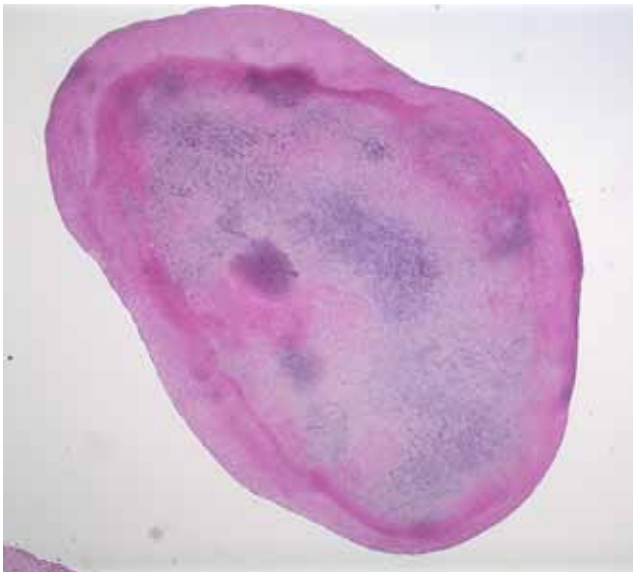
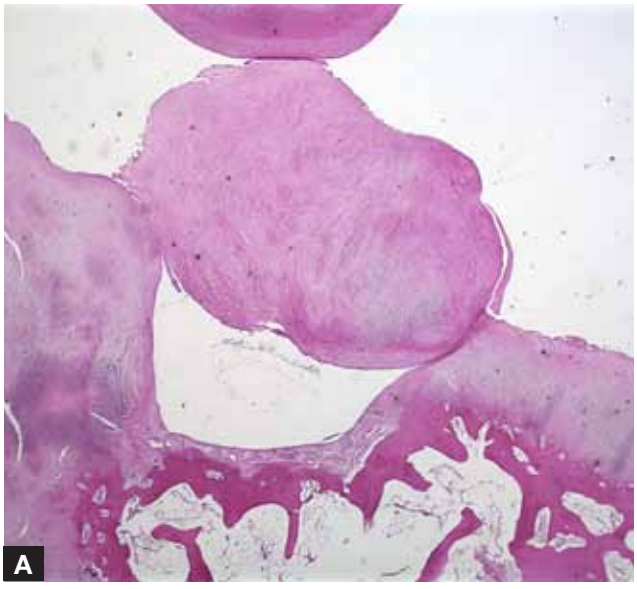
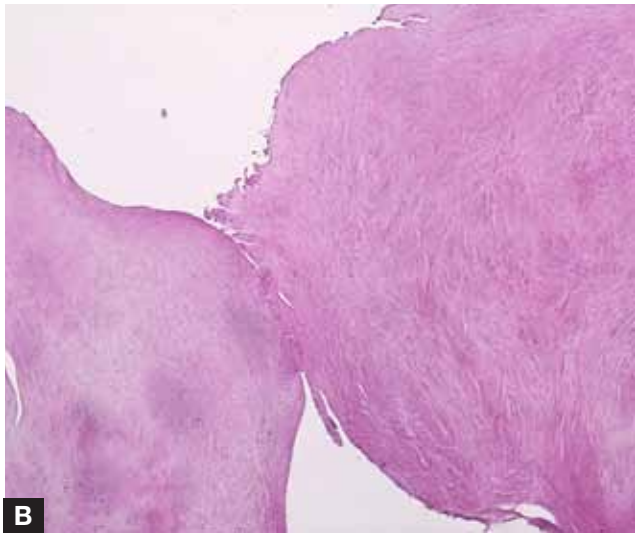


**Figure 4.** Microscopic appearance of one of the osteochondral nodules. Lesion has undergone some calcification. Magnification 2X.

intraosseous and extraosseous mineralization. Malignant tumors, such as synovial sarcomas and chondrosarcomas, and benign tumors, including ganglion cysts and fibromatosis, are all possibilities. Of the 83 soft-tissue tumors of the foot analyzed by Kirby and colleagues, 72 (87%) were benign, with ganglion cysts and plantar fibromatosis being the most common, and 11 (13%) were malignant, with 5 (45%) of these being synovial sarcomas.[4] Synovial sarcoma, the most common deep-seated sarcoma of the foot, seldom occurs within the intra-articular region. When radiographs show mineralization in the intra-articular joint space of the foot, tumors are less common. In these cases, the differential diagnosis should include synovial osteochondromatosis, osteochondral fracture, and a rare malignancy.[1] Combined features of mineralized densities in the soft-tissue mass on radiographs and an intra-articular fluid–containing lesion on $T_2$-weighted MRI should support a diagnosis of primary synovial osteochondromatosis. An incisional biopsy is recommended for heterogenous lesions in the absence of a specific radiographic diagnosis.[1]

Milgram[2] described early, transitional, and late phases in the development of primary synovial osteochondromatosis. In the early phase, synovitis is active, and nodular loose bodies are absent; the transitional phase involves both synovitis and loose bodies; in the late phase, loose bodies are present, and active synovitis is absent. Understanding this progression helps in correlating radiographic imaging and clinical symptoms. Diagnosing primary synovial osteochondromatosis in its early phases is difficult, perhaps impossible, because of lack of radiographic evidence. This certainly was the case when our patient saw his family practice physician 3 years earlier. Through histopathologic analysis, Milgram[2] hypothesized that primary synovial osteo-




chondromatosis begins with undifferentiated stem cells in the stratum synovial and fibroblasts forming a primitive chondral matrix. In our patient's case, interstitial cells within the chondroid matrix produced cartilaginous nodules, which then calcified to form osteochondral nodules (Figures 3, 4, 5). Treatment includes joint

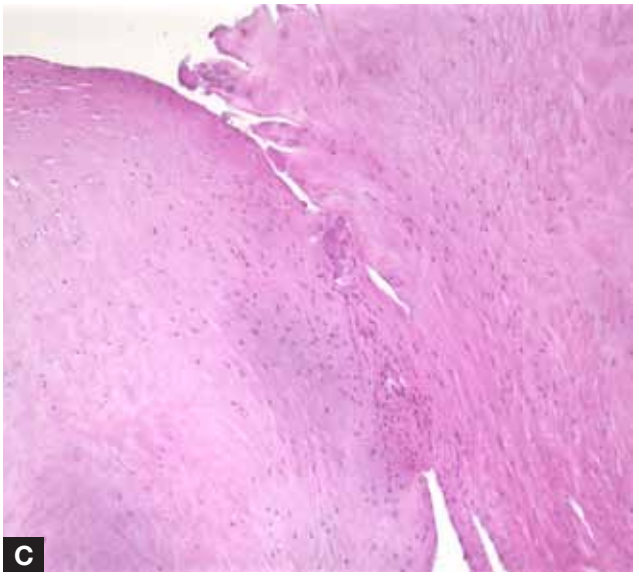



**Figure 5.** Osteochondral nodule extrudes from synovial lining, magnification 2X (A), magnification 4X (B), magnification 10X (C).

debridement of the ossified nodules—which should alleviate pain and restore range of motion. Open synovectomy and nodular débridement, performed when active synovitis is present, are usually unnecessary, as most treatment occurs during the late phase, when disease is detected and active synovitis is no longer present. Our patient's disease was in the late phase and thus did not require synovectomy.

## Authors' Disclosure Statement

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

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