

## Statement of Purpose

Synovial chondromatosis is an extremely rare disorder occurring in the foot and ankle. One that leads to loose bodies affecting joints and surrounding synovium. Although there is no gold standard of treatment, typical treatment options include direct removal with synovectomy. The purpose of this study is to evaluate the open treatment method and outcomes of two case reports of synovial chondromatosis.

## Literature Review

Synovial chondromatosis is a benign and rare condition in which synovial linings undergo metaplasia resulting in the formation of cartilaginous loose bodies.<sup>1</sup> Synovial chondromatosis is of unknown etiology and was first described by Leannac in 1813. These loose bodies have been found in all areas of the body including the hip, knee, elbow, shoulder, and temporomandibular joints.<sup>2,3</sup> Synovial chondromatosis also doesn't just affect joints as any anatomic region with a synovial lining can develop these loose bodies. Some studies have described these lesions presenting extra-articularly.<sup>1</sup> When presenting within a joint, patients often complain of pain, crepitus, swelling, and diminished range of motion.<sup>3,4</sup>

The exact prevalence is unknown but synovial chondromatosis is twice as likely to present in males over females predominantly in their 3rd to 5th decades of life.<sup>2,4</sup> Stages include an early stage without the formation of loose bodies, a transitional stage with presence of intrasynovial nodules, and a late stage with multiple loose bodies. Further descriptions include primary without an identifiable pathology vs secondary which is associated with pre-existing joint pathology.<sup>5</sup>

Just as the etiology remains unclear, the treatment options are also not well described. Typically, surgical excision and removal of the loose bodies, either open or arthroscopically, have been documented in the past as effective techniques for relief and pain with low recurrence.<sup>2-4</sup> Kunzler et. al. described a case of a 54 year old male with ankle joint synovial chondromatosis treated with arthroscopic excision and synovectomy in which they removed 76 loose bodies.<sup>5</sup> Scholl et. al. alternatively presented a 58 year old female treated with open synovectomy and removal of 38 loose bodies within the ankle joint. Both patients did very well after the operation throughout the entirety of their follow up.<sup>2,5</sup>

## Case Study

**Case #1:** 61 year old female presented to the office with a chief complaint of persistent left rearfoot pain. Radiographs demonstrated a pes planus deformity with degenerative changes. CT scan was obtained and confirmed degenerative changes to the TN and STJ along with large irregular osteophyte in the posterior aspect of the STJ and ankle joints. Conservative care with bracing, injections, NSAIDs and rest were all attempted and failed to relieve symptoms. Surgery was scheduled as a staged procedure.

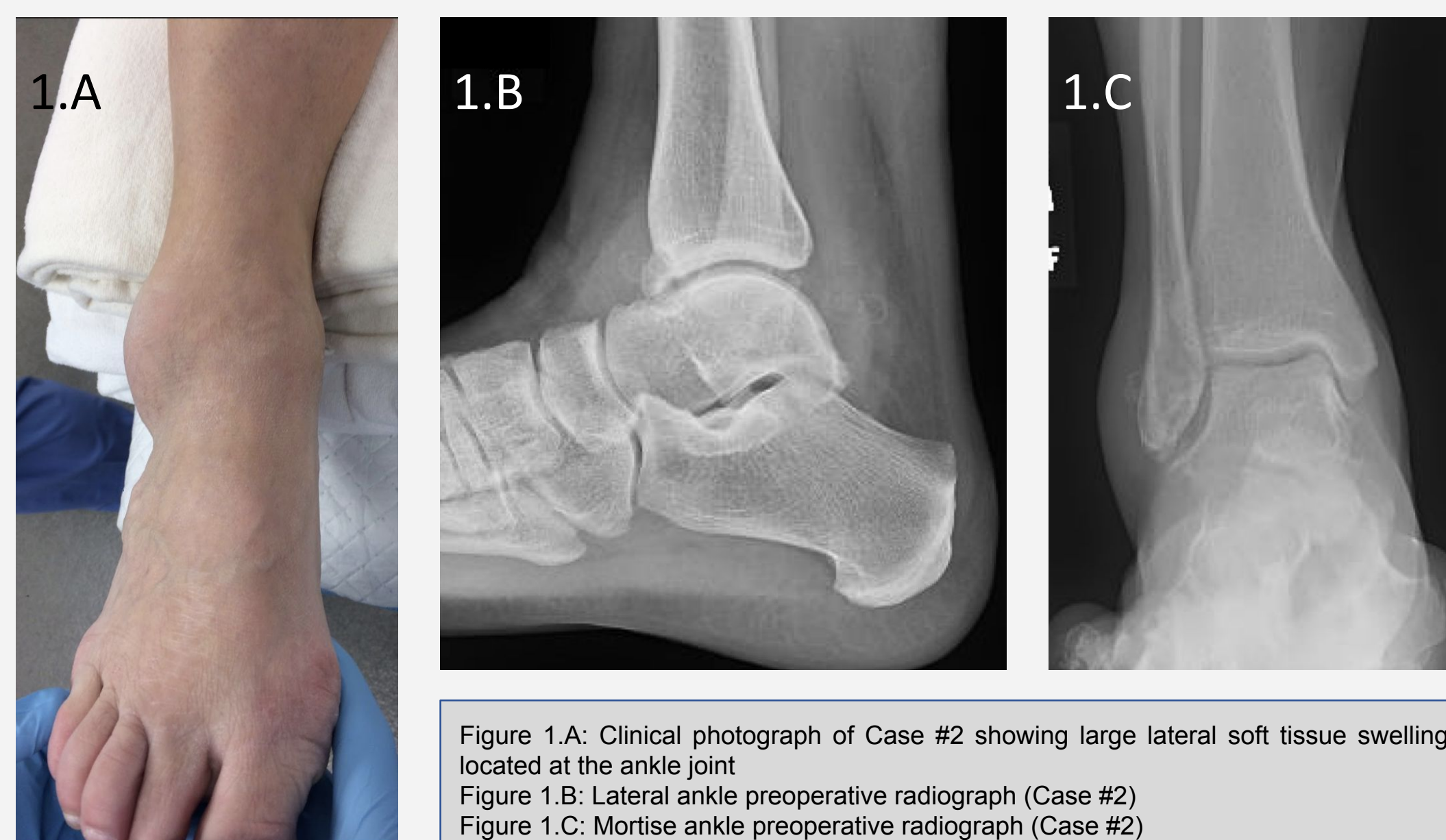


Figure 1.A: Clinical photograph of Case #2 showing large lateral soft tissue swelling located at the ankle joint  
Figure 1.B: Lateral ankle preoperative radiograph (Case #2)  
Figure 1.C: Mortise ankle preoperative radiograph (Case #2)

Stage one was to remove the large osteophyte to the posterior ankle and decompress the soft tissue structures involved including the tarsal tunnel and flexor tendons. Intraoperatively a large lobulated, multifragmented osseous body communicating with the posterior ankle joint was identified and removed along with 5-6 additional smaller loose bodies. A biopsy was taken and sent to pathology that revealed synovial tissue with chondroid metaplasia and ossification confirming synovial chondromatosis. Post operatively, the patient was placed in a posterior splint. She progressed throughout the postoperative period well and the second stage was carried out 12 weeks later. After the patient recovered her pes planus and degenerative rearfoot was corrected with a gastrocnemius recession and a STJ and TN fusion. Post operatively the patient was placed in a NWB splint and transition to a cast for 8 weeks. She did quite well going on to heal both of her fusion sites and reported significant pain relief to her left lower extremity.

**Case #2:** 50-year-old female presented to clinic with a chief complaint of right ankle pain. History of ankle sprain and trauma noted including distal fibula fracture. The patient reports that over the years her ankle has continued to increase in size. Pain noted to be 5/10 to medial and lateral malleoli. Radiographs note multiple loose bodies present laterally, anteriorly and posteriorly measuring up to 8mm. MRI scan has been previously completed and revealed numerous synovial osteochondral bodies with marked hypertrophy and degenerative arthropathy of the ankle joint. There was a chronic ATFL tear noted as well. This deformity has been progressively getting worse and her ankle and continued to increase in size. All conservative measures have been exhausted and surgical intervention was recommended.

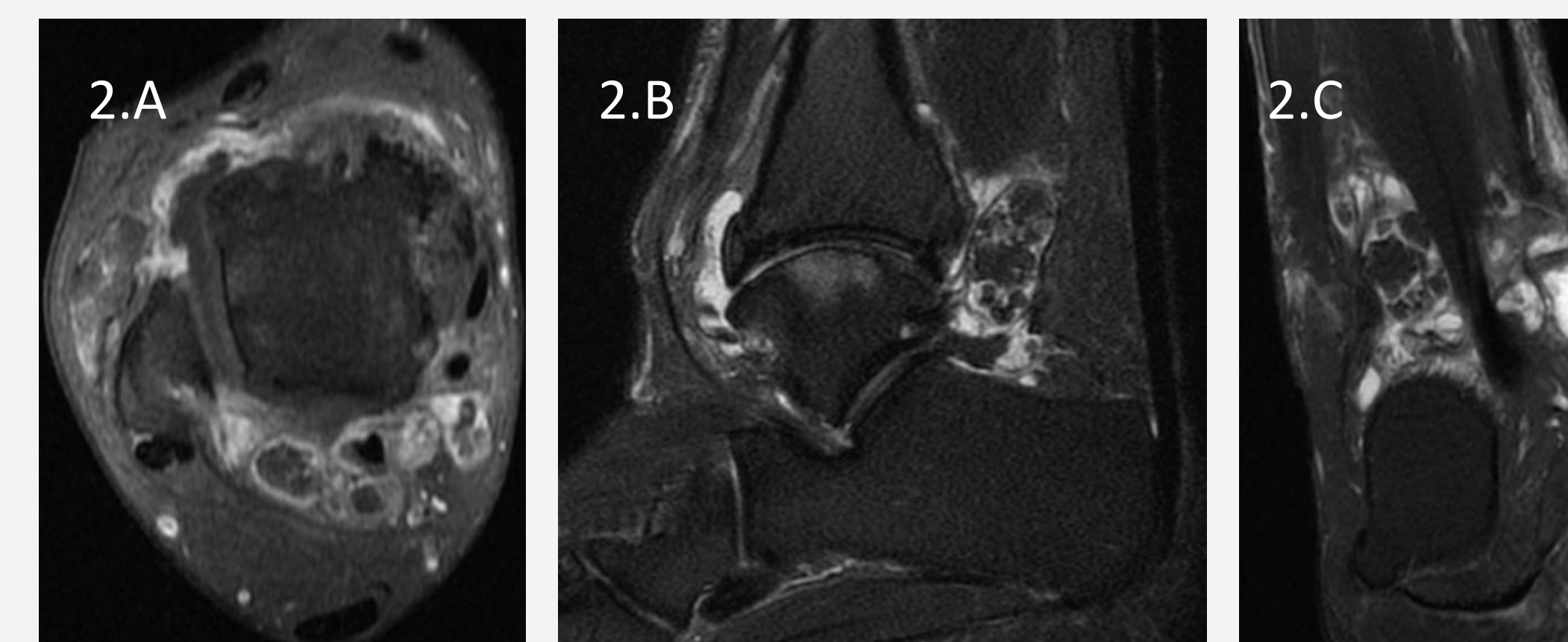


Figure 2.A: Transverse T2 weighted MRI image with extensive peri ankle joint involvement. (Case #2)  
Figure 2.B: Sagittal T2 weighted MRI image consistent with posterior SC and anterior effusion (Case #2)  
Figure 2.C: Coronal T2 weighted MRI image of posterior ankle. (Case #2)

An ankle arthrotomy with removal of loose bodies, biopsy and Brostrom-Gould was performed. A lateral utilitarian incision was placed over the lateral ankle to allow access to the posterior ankle joint as well as the anterior lateral portion. Greater than 15 loose bodies were identified and sent as pathological specimens. Synovial chondromatosis was the diagnosis with the largest measuring 0.4cm x 2.9 cm. The patient was then transitioned into a CAM boot and kept NWB for a total of 4 weeks postoperatively. She continued to progress well throughout the postoperative period transitioning out of the CAM boot and into physical therapy at 6 weeks. She was seen again at 3 months, 6 months and 12 months postoperatively. Upon discharge we did reiterate the potential need for a TAR vs. Ankle fusion in the future due to her history of trauma and degenerative changes to the ankle joint. She continued to progress as expected with excellent results.

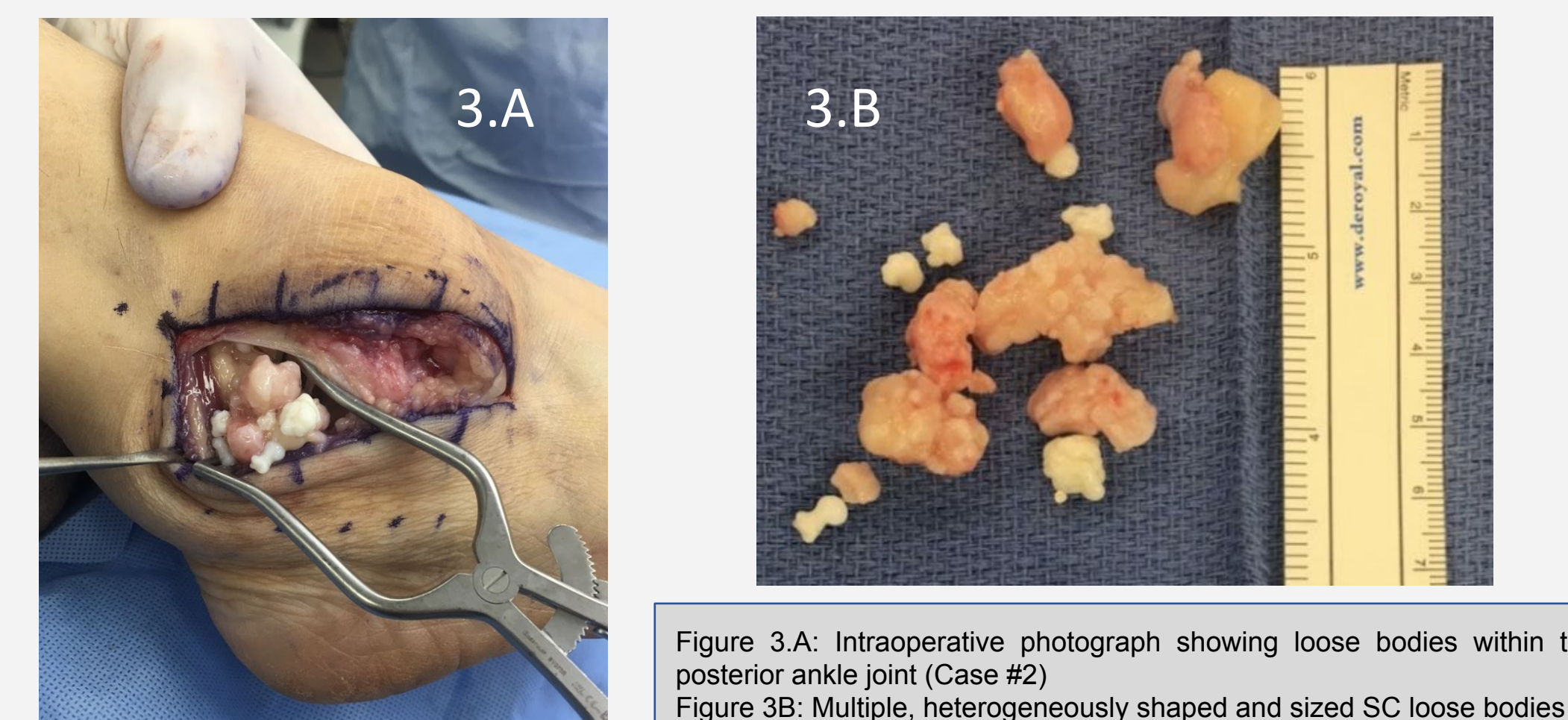


Figure 3.A: Intraoperative photograph showing loose bodies within the posterior ankle joint (Case #2)  
Figure 3B: Multiple, heterogeneously shaped and sized SC loose bodies

## Analysis and Discussion

Synovial chondromatosis is a rare, benign condition affecting synovial linings. Typically, synovial chondromatosis affects larger joints but has been described in the ankle and in even rarer cases, the smaller joints of the foot.<sup>1</sup> There are 3 stages associated with this condition as well as a primary vs a secondary form.<sup>5</sup> Literature has described a 5% risk of malignancy and recurrence ranges from 3-23%.<sup>4</sup> Prior research agrees that the most definitive treatment option includes synovectomy and removal of the loose bodies, rather than by arthroscopy or open arthrotomy.<sup>1-5</sup>

We describe two separate cases of synovial chondromatosis presenting within the ankle joint. Both cases presented with pain and decreased range of motion in which advanced imaging confirmed the formation of loose bodies within the joint. These patients did very well after being treated with open arthrotomies and removal of loose bodies.

Our reports align well with previous studies treated in a similar way. Our first patient benefitted from a staged procedure in order to correct her flat foot deformity. Our second patient had a history of ankle trauma requiring ancillary procedures to correct for ankle instability. Both patients were followed post operatively for over 12 months reporting excellent results in foot function and decrease in pain. Due to the reported recurrence rates and risk for malignancy, these patients will be followed on an annual basis for re-evaluation.

In conclusion, synovial chondromatosis in the foot and ankle is of rare occurrence. But a condition in which surgeons should be aware. The diagnosis is made with clinical suspicion and confirmed with advanced imaging. The best treatment option to decrease recurrence is surgical excision of the loose bodies with complete synovectomy. And due to reported recurrence, long term follow up is suggested.

## References

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## Conflicts of Interest

None