Orthopedic Research and Reviews

Dovepress
Taylor & Francis Group

Open Access Full Text Article

CASE REPORT

Arthroscopic Management of Primary Synovial Chondromatosis of the Ankle: A Case Report and Review of the Literature

Antoine Saber[1], Hafez Saade[1], Firas Hassan[1], Hady Ezzeddine[1], Wendy Ghanem[1], Ramzi Moucharafieh[1,2], Riad R Fakih[1–3]

[1]Department of Orthopedics and Traumatology, Faculty of Medicine, University of Balamand, Beirut, Lebanon; [2]Department of Orthopedic Surgery, Clemenceau Medical Center Affiliated to Johns Hopkins Medical International, Beirut, Lebanon; [3]Department of Orthopedic Surgery, Clemanceau Medical Center Affiliated to Johns Hopkins Medical International, Dubai, UAE

Correspondence: Antoine Saber, Department of Orthopedics and Traumatology, Faculty of Medicine, University of Balamand, Beirut, Lebanon, Email saberantoine@gmail.com

Abstract: Synovial chondromatosis (SC) is a rare, benign condition characterized by the formation of cartilaginous nodules within the synovial membrane of joints. We present a case of primary SC of the ankle in a 49-year-old female who experienced persistent ankle pain and restricted range of motion. She was successfully treated with arthroscopic removal of loose bodies and synovial debridement. A review of the literature since 2010 was conducted to compare outcomes between open and arthroscopic management of ankle SC. The findings suggest that while both approaches are effective and have similar long term outcomes, arthroscopy may offer slight advantage in terms of reduced morbidity, faster rehabilitation, and improved patient satisfaction.

Keywords: synovectomy, loose cartilaginous bodies, arthrotomy, synovium

Introduction

Synovial chondromatosis (SC) is a slowly progressing, self-limited disorder of unknown etiology, characterized by synovial metaplasia within an otherwise healthy joint, resulting in the formation of loose cartilaginous bodies.[1] If left untreated, SC may lead to debilitating degenerative changes and, in rare instances, malignant transformation into chondrosarcoma.[2]

The estimated prevalence of SC is approximately 1 in 100,000 individuals.[2] It is defined by metaplastic transformation of the synovial membrane, tendon sheath, or bursae into intra-articular or juxta-articular cartilaginous or osteocartilaginous nodules.[3] The disease progresses through three stages as first described by Milgram: (1) early disease without loose bodies; (2) transitional disease with active proliferation and loose bodies; and (3) late-stage disease with multiple loose bodies but no active synovitis.[4]

SC typically affects individuals between 30 and 50 years of age, with a male-to-female ratio of approximately 2:1.[1] The most commonly involved joints are the knee (65%), hip (20%), shoulder (10%), and elbow (5%).[5] Ankle involvement is exceedingly rare, with only around 50 cases reported in the literature.

In this paper, we present a case of ankle SC in a 49-year-old female, managed arthroscopically. We also conduct a review of the literature since 2010 with the purpose of providing an updated, clinically relevant, critical synthesis comparing outcomes between open and arthroscopic approaches for surgical treatment. Relevant studies including both intra-articular and extra-articular SC of the ankle were identified through a non-systematic search of the PubMed, Embase, and Scopus databases from 2010–2024.

Case Presentation

A 49-year-old female with a medical history of palmoplantar psoriasis presented to our clinic following referral from her rheumatologist. She initially presented to her rheumatologist complaining of a 12-month history of progressively worsening

https://doi.org/10.2147/ORR.S544850
Received: 5 June 2025
Accepted: 18 December 2025
Published: 23 January 2026

right ankle pain and described a sensation of "walking on pebbles". She also noted reduced ankle range of motion, particularly in dorsiflexion, and anterior ankle pain after prolonged standing. There was no history of trauma or previous foot or ankle injuries. Her rheumatologist then placed her on a course of nonsteroidal anti-inflammatory medications and referred her to physical therapy for conservative treatment. Plain x-ray radiographs followed by MRI were also ordered. She presented to our clinic after 14 months of her initial onset of symptoms.

Institutional approval was not required as written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Physical Exam

Physical examination revealed an antalgic gait with tenderness and mild edema over the anterior tibiotalar joint. The patient had approximately 8° of active and 10° of passive dorsiflexion, and 28° of active and 40° of passive plantarflexion. The dorsalis pedis pulse and light touch sensation were intact. There were no abnormalities in the distal interphalangeal joints, and the contralateral ankle examination was unremarkable.

Imaging

Initial radiographs showed anterior calcified loose bodies (Figure 1). Given these findings, her rheumatologist ordered an MRI, which revealed multiple intrasynovial loose bodies (1–2 cm) and synovial thickening (Figures 2–4). When the patient presented to our clinic 14 months following initial symptoms, repeat imaging confirmed persistent loose bodies, synovial hypertrophy, and moderate joint effusion prompting surgical management.

Surgical Technique

Under general anesthesia, the patient was positioned supine with the right lower limb supported on a well-padded bolster. The limb was scrubbed and draped in a standard sterile fashion. Standard anteromedial and anterolateral portals were established for ankle arthroscopy.

Arthroscopic inspection revealed extensive calcified synovial loose bodies in the anterior ankle compartment along with severely inflamed synovium. Complete debridement of inflamed synovial tissue was performed, with care to avoid injury to adjacent neurovascular and tendinous structures. All accessible loose bodies were excised and sent for pathological evaluation (Figure 5). The joint was thoroughly irrigated and inspected to confirm removal of all visible loose bodies. Upon completion, passive dorsiflexion showed marked improvement. The portals were closed and a sterile dressing applied. The patient was transferred to recovery in stable condition and was allowed immediate full weight-bearing as tolerated postoperatively.

Figure 1 AP (**a**), lateral (**b**), and oblique (**c**) radiographs of the right ankle showing anterior calcified bodies specified by the yellow arrows. (R) refers to right. (KH) refers to radiology technician initials.

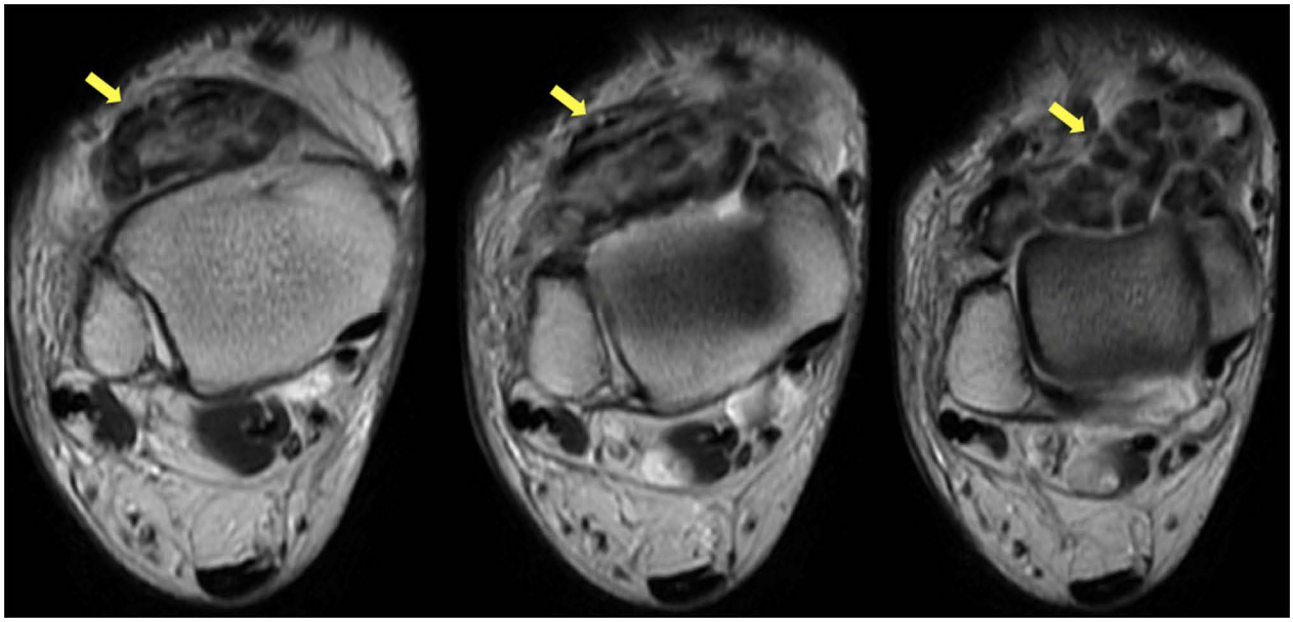

Figure 2 Axial MRI T2 of the right ankle showing anterior calcified loose bodies specified by the yellow arrows.

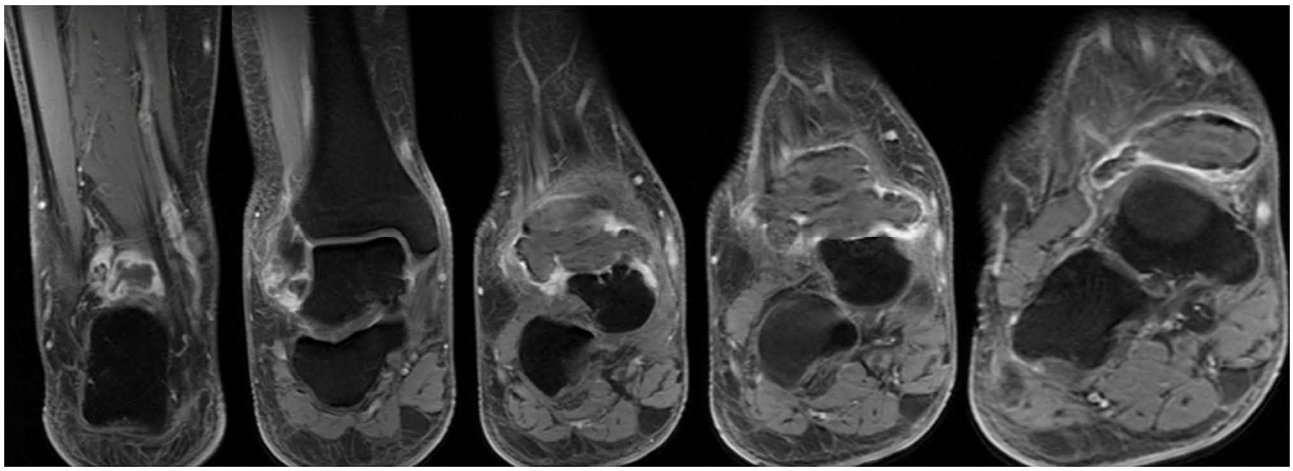

Figure 3 Coronal MRI T2 of the right ankle showing anterior calcified loose bodies.

Histopathological Result

Osteochondroid nodules consistent with loose bodies measuring 0.6–1cm (Figure 6) showing lobules of hyaline cartilage. Graded as Milgram stage 3 with no atypia.

Follow Up

At one-year follow-up, the patient reported significant symptomatic improvement, including enhanced ankle stability, increased range of motion, and reduced pain. Physical examination revealed improved ankle motion with 15° of active and 20° of passive dorsiflexion, and 40° of active and 50° of passive plantarflexion. She had completed multiple sessions of physical therapy with satisfactory outcomes.

Figure 4 Sagittal MRI of the right ankle with anterior calcified loose bodies specified by the yellow arrows.

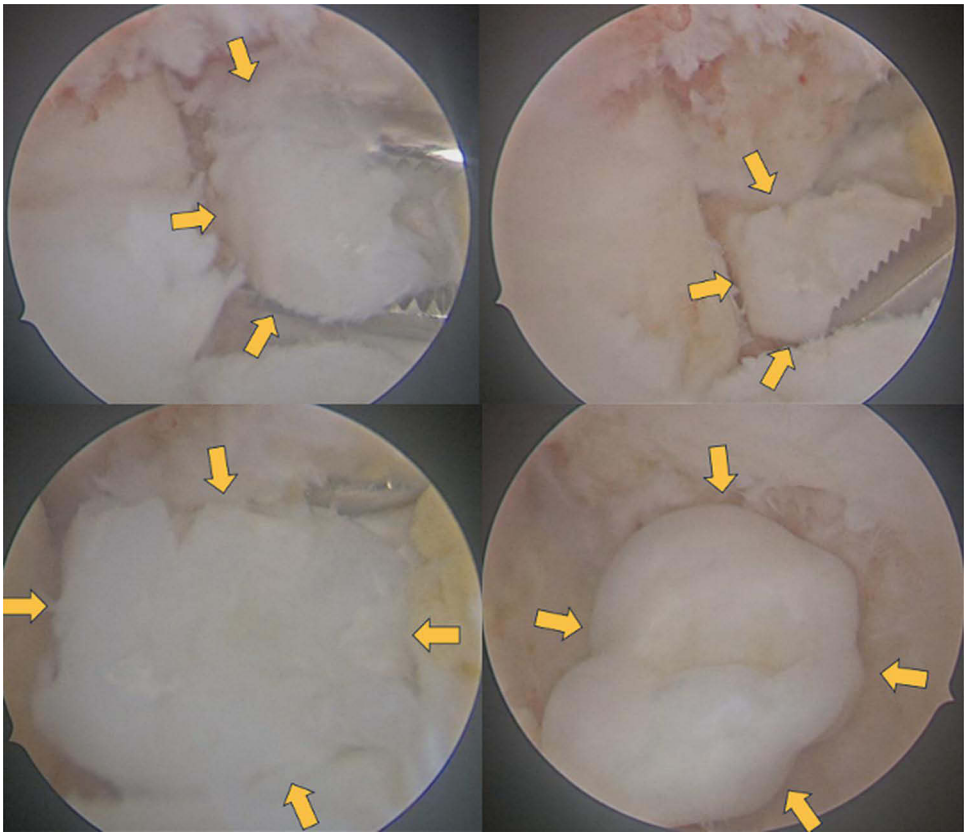

Figure 5 Arthroscopic views of the loose bodies found in the ankle specified by the yellow arrows.

Figure 6 A total of 15 loose bodies extracted from the ankle joint.

Discussion

Synovial chondromatosis (SC), also known as Reichel's syndrome, is a rare, predominantly benign arthropathy affecting bursae, tendon sheaths, and joints. It is a metaplastic disorder in which synovial tissue transforms into cartilaginous or osteocartilaginous nodules.[3]

SC can be classified as either primary or secondary. Primary SC results from direct synovial metaplasia into chondrocytes, whereas secondary SC occurs secondary to chronic joint diseases such as osteoarthritis, osteochondritis dissecans, rheumatoid arthritis, or tuberculosis.[6] Our case represents primary SC, as there was no history of trauma or preexisting joint disease.

Milgram's pathological classification, introduced in 1977, describes SC in three stages: (1) active intrasynovial disease without loose bodies, (2) transitional disease with synovial proliferation and free bodies, and (3) multiple osteochondral bodies without active synovial disease.[7] This staging guides management. Surgical excision is recommended for stages 2 and 3, with or without synovectomy.[8] Conservative management may be considered in stage 1, but no cases in the literature report complete resolution without surgery.[9]

The exact pathophysiological and genetic factors contributing to the development of synovial chondromatosis are not entirely understood. However, several papers have attempted to explain certain aspects related to the genetic and molecular basis of this disease. While being traditionally considered a benign process, some of these studies suggest that SC may in fact be a neoplastic condition driven by specific genetic alteration and molecular pathways. One of the key pathological events reported by Agaram et al is the recurrent fibronectin 1 (*FN1*) and activin receptor 2A (*ACVR2A*) gene fusion, identified in a significant number of cases, which serves as a leading molecular driver of the disease.[10] Additionally, a study by Buddingh et al has reported recurrent karyotypic abnormalities on chromosome 6 in 3 cases of SC.[11] Both of these aforementioned studies may indicate a neoplastic origin of SC rather than metaplastic. At a cellular level, there is abnormal proliferation and differentiation of specific progenitor cells. A paper by Li et al identified an increased proportion of CD34+ fibroblasts within the synovium, which exhibit a high osteogenic differentiation potential and may be central to the formation of osteochondral nodules. This abnormal differentiation appears to be regulated by complex pathways related to TGF-β signaling.[12] Collectively, these molecular and genetic findings may provide a basis for future research aimed at better understanding the pathophysiology of SC.

Ankle involvement is rare, with only ~50 cases reported. Affected joints include the tibiotalar, subtalar, calcaneocuboid, naviculocuneiform, tarsometatarsal, and metatarsophalangeal joints. SC may also occur extra-articular, complicating diagnosis due to vague symptoms.[13,14] Clinical presentation includes pain, swelling, stiffness, locking, decreased range of motion, or palpable mass. One case even linked SC of the subtalar joint to ankle instability,[15] highlighting the need for a high index of suspicion, especially in patients with repetitive trauma or ligamentous injury.[16]

Radiographs detect calcified nodules in 75–95% of cases.[17,18] These nodules are typically round, smooth, and uniform in size.[17] When calcification is absent, radiographs may only show soft tissue swelling.[18] CT is useful for visualizing both calcified and non-calcified nodules and distinguishing primary from secondary SC.[17] MRI is superior for evaluating early SC and determining lesion extent, bone erosion, and marrow invasion.[14]

SC complications include recurrence and potential malignant transformation to chondrosarcoma. Recurrence rates vary from 11% to 37%, while malignant transformation occurs in ~5% of cases. The risk increases with repeated recurrence.[19] Among the 48 ankle SC cases we reviewed, recurrence occurred in only two: Isbell et al reported recurrence at 2 years, managed with repeat arthroscopy, and Gatt et al described recurrence at 9 months following open excision without documented synovectomy, ultimately managed conservatively.[20,21] Al Farii et al also reported a single recurrence at 10 years among 22 cases.[22] No malignant transformations of ankle SC were found in our sample. However, Galat et al reported malignant transformation in 2 of 8 foot and ankle SC cases,[13] indicating this remains a potential concern.

Arthroscopy versus Arthrotomy

Traditionally, ankle SC has been managed through open arthrotomy with excision of loose bodies and, in some cases, synovectomy. This approach often necessitates postoperative immobilization.[23] However, advances in minimally invasive surgery over the past two decades have facilitated arthroscopic treatment, which offers reduced morbidity, faster recovery, and greater patient satisfaction.[23,24]

Our literature review identified 33 cases managed arthroscopically and 11 cases treated with open arthrotomy (Table 1). Recurrence was reported in two open cases: one by Isbell et al at 2 years post-op, and another by Gatt et al at 9 months.[20,21] No recurrence was noted in the arthroscopically treated cases.

While these findings suggest a potential advantage for arthroscopic treatment, the sample size is limited, and outcomes depend heavily on surgical expertise, disease stage, and joint involvement. Ultimately, no technique has been definitively proven superior. Nevertheless, arthroscopy is associated with less pain, lower infection rates, shorter hospital stays, and faster return to function, making it a favorable option when feasible.[24]

Table 1 Case Reports Listed in the Literature Including Method of Surgical Removal (Arthroscopy vs Arthrotomy), Whether Synovectomy Was Performed, Histopathological Staging Based on the Miller Classification, and Complications

Year	Author	Number of Patients	Technique	Synovectomy	Stage	Complications	Follow up (months)
2010	Scholl, DM.[25]	1	Open	No	3	None	12
2013	Santiago, T.[26]	1	Open	No	3	None	4
2013	Brodsky, JW.[15]	1	Open	Total	3	None	100
2014	Ozmeric, A.[27]	1	Arthroscopy	NA	NA	NA	NA
2014	Pallav, M.[28]	1	Arthroscopy	Partial	3	None	12
2015	Sedeek, M.[19]	1	Open	No	3	None	12
2016	Lui, TH.[29]	1	Arthroscopy	Total	NA	NA	NA
2017	Shetty, MS.[30]	2	Arthroscopy	NA	3/3	None	12/18
2017	Kunzler, DR.[4]	1	Arthroscopy	Total	3	None	3
2017	Isbell, JA.[20]	1	Open	Total	3	Recurrence (2years)	36
2018	Peixoto, D.[24]	1	Arthroscopy	Partial	NA	None	12
2018	Kembhavi, R.[31]	1	Open	Total	NA	None	12

(*Continued*)

Table 1 (Continued).

Year	Author	Number of Patients	Technique	Synovectomy	Stage	Complications	Follow up (months)
2019	Monestier, L.[32]	2	Open	No	3	None	12
2020	Moorthy, V.[23]	1	Arthroscopy	Total	NA	None	8
2020	Al Farii, H.[22]	22	Arthroscopy	Total	3	None	~27
2020	Fetih, TN.[19]	1	Arthroscopy	Total	NA	None	8
2020	Zmerly, H.[33]	1	Arthroscopy	Partial	NA	None	12
2020	Khan, AA.[14]	1	Open	No	NA	None	3
2021	Gatt, T.[21]	1	Open	NA	NA	Recurrence (9months)	9/21
2021	Coulshed, N.[16]	1	Open	Total	NA	None	2
2022	Palaniappan, RM.[34]	1	Open	No	NA	None	12
2022	Diop, B.[35]	1	Open	Total	2	None	NA
2023	El Afram, R.[36]	1	Arthroscopy	Partial	NA	None	12
2023	George, J.[37]	1	Open	No	NA	None	NA
2024	Manizhe A.[38]	1	Open	NA	1	None	NA

Note: NA refers to information not available in the case report listed.

Synovectomy versus No Synovectomy

Among the reviewed literature, 17 studies explicitly stated whether synovectomy was performed (Table 1). Of the 35 patients who underwent either partial or total synovectomy, one experienced recurrence at two years. Similarly, among the 9 patients who did not undergo synovectomy, one recurrence was reported at 9 months.[20,21]

Although this sample is too small to draw statistically significant conclusions, some authors advocate synovectomy in cases with active synovitis to reduce recurrence and postoperative pain.[18] Based on our findings, while synovectomy may be beneficial in selected cases, further comparative studies are needed to determine its definitive role in surgical management of SC.

Conclusion

Both arthroscopic and open surgical approaches are effective for treating ankle synovial chondromatosis. While no approach has shown definitive superiority in recurrence prevention, recent papers favor arthroscopic management due to potentially lower morbidity, faster rehabilitation, and greater patient satisfaction.[23,24]

The role of synovectomy remains debated. Some evidence suggests that it may reduce recurrence in patients with active synovitis, but current data are insufficient to recommend routine use in all cases.[21] Furthermore, while malignant transformation is rare, it underscores the need for timely diagnosis and long-term surveillance.[13,19]

This case report contributes to the existing body of literature that supports functional recovery at one year post-operatively, in terms of symptoms and quality of life. Further high-quality, longitudinal studies are warranted to clarify optimal surgical techniques, the utility of synovectomy, and risk factors for malignant transformation.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas; took part in drafting, revising or critically

reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

No funds, grants, or other support were received during the preparation of this manuscript.

Disclosure

The authors have no relevant financial or non-financial interests to disclose for this work.

References

1. Bojanić I, Plečko M, Mataić A, Dimnjaković D. Anterior and posterior arthroscopic treatment of primary synovial chondromatosis of the ankle. *Foot Ankle Int*. 2021;42(4):440–447. doi:10.1177/1071100720970961
2. Evans S, Boffano M, Chaudhry S, Jeys L, Grimer R. Synovial chondrosarcoma arising in synovial chondromatosis. *Sarcoma*. 2014;2014:647939. doi:10.1155/2014/647939
3. Ethiraj D, Pandiaraj IJ, Indiran V. Primary synovial chondromatosis: ankle joint. *Indian J Rheumatol*. 2020;16(1):111. doi:10.4103/injr.injr_156_20
4. Kunzler DR, Shazadeh Safavi P, Warren BJ, Janney CF, Panchbhavi V. Arthroscopic treatment of synovial chondromatosis in the ankle joint. *Cureus*. 2017;9(12):e1983. doi:10.7759/cureus.1983
5. Murphey MD, Vidal JA, Fanburg-Smith JC, Gajewski DA. Imaging of synovial chondromatosis with radiologic-pathologic correlation. *Radiographics*. 2007;27(5):1465–1488. doi:10.1148/rg.275075116
6. Afzal S, Kazemian G, Baroutkoub M, Amouzadeh Omrani F, Ahmadi A, Tavakoli Darestani R. Arthroscopic management of ankle primary synovial chondromatosis (Reichel's syndrome): a case report with literature review. *Int J Surg Case Rep*. 2023;111:108832. doi:10.1016/j.ijscr.2023.108832
7. Milgram JW. Synovial osteochondromatosis: a histopathological study of thirty cases. *J Bone Joint Surg Am*. 1977;59(6):792–801.
8. Tan JH, Lui TH. Arthroscopic management of anterior ankle synovial osteochondromatosis. *Arthrosc Tech*. 2022;11(2):e183–e188. doi:10.1016/j.eats.2021.10.002
9. Shearer H, Stern P, Brubacher A, Pringle T. A case report of bilateral synovial chondromatosis of the ankle. *Chiropr Osteopat*. 2007;15:18. doi:10.1186/1746-1340-15-18
10. Agaram NP, Zhang L, Dickson BC, et al. A molecular study of synovial chondromatosis. *Genes Chromosomes Cancer*. 2020;59(3):144–151. doi:10.1002/gcc.22812
11. Buddingh EP, Krallman P, Neff JR, Nelson M, Liu J, Bridge JA. Chromosome 6 abnormalities are recurrent in synovial chondromatosis. *Cancer Genet Cytogenet*. 2003;140(1):18–22. doi:10.1016/s0165-4608(02)00636-2
12. Li X, Sun H, Li D, Cai Z, Xu J, Ma R. CD34+ synovial fibroblasts exhibit high osteogenic potential in synovial chondromatosis. *Cell Tissue Res*. 2024;397(1):37–50. doi:10.1007/s00441-024-03892-9
13. Galat DD, Ackerman DB, Spoon D, Turner NS, Shives TC. Synovial chondromatosis of the foot and ankle. *Foot Ankle Int*. 2008;29(3):312–317. doi:10.3113/fai.2008.0312
14. Khan AA, Kushwaha SS, Pandey A, Singh GK. Giant extra-articular synovial chondromatosis of the ankle joint - a rare case report. *J Orthop Case Rep*. 2020;10(8):44–47. doi:10.13107/jocr.2020.v10.i08.1854
15. Brodsky JW, Jung KS, Tenenbaum S. Primary synovial chondromatosis of the subtalar joint presenting as ankle instability. *Foot Ankle Int*. 2013;34(10):1447–1450. doi:10.1177/1071100713490674
16. Coulshed N, Sivakumar B, Mittal R, Wines A, Symes M. More than just an ankle sprain: a case of synovial chondromatosis of the ankle. *ANZ J Surg*. 2022;92(5):1263–1265. doi:10.1111/ans.17272
17. Libbey NP, Mirrer F. Synovial chondromatosis. *Med Health R I*. 2011;94(9):274–275.
18. Sedeek SM, Choudry Q, Garg S. Synovial chondromatosis of the ankle joint: clinical, radiological, and intraoperative findings. *Case Rep Orthop*. 2015;2015:359024. doi:10.1155/2015/359024
19. Fetih TN, Mekhemar AA, Hashad RM. Challenging arthroscopic management of ankle synovial chondromatosis: a case report. *J Orthop Trauma Rehabil*. 2020. doi:10.1177/2210491720961115
20. Isbell JA, Morris AC, Araoye I, Naranje S, Shah AB. Recurrent extra- and intra-articular synovial chondromatosis of the ankle with tarsal tunnel syndrome: a rare case report. *J Orthop Case Rep*. 2017;7(2):62–65. doi:10.13107/jocr.2250-0685.752
21. Gatt T, Portelli M. Recurrence of primary synovial chondromatosis (Reichel's Syndrome) in the ankle joint following surgical excision. *Case Rep Orthop*. 2021;2021:9922684. doi:10.1155/2021/9922684
22. Al Farii H, Doyle-Kelly C, Marwan Y, Volesky M, Turcotte R. Arthroscopic management of synovial chondromatosis of the ankle joint: a systematic review of the literature. *JBJS Rev*. 2020;8(9):e2000045. doi:10.2106/JBJS.RVW.20.00045
23. Moorthy V, Tay KS, Koo K. Arthroscopic treatment of primary synovial chondromatosis of the ankle: a case report and review of literature. *J Orthop Case Rep*. 2020;10(6):54–59. doi:10.13107/jocr.2020.v10.i06.1874
24. Peixoto D, Gomes M, Torres A, Miranda A. Arthroscopic treatment of synovial chondromatosis of the ankle. *Rev Bras Ortop*. 2018;53(5):622–625. doi:10.1016/j.rboe.2018.07.001
25. Scholl DM, Taddie KL. Asymptomatic synovial chondromatosis of the ankle: an incidental finding. *J Foot Ankle Surg*. 2010;49(6):565.e13–565.e5.65E17. doi:10.1053/j.jfas.2010.08.002
26. Santiago T, Mariano C. Primary synovial chondromatosis of the ankle joint presenting as monoarthritis. *BMJ Case Rep*. 2013;2013:bcr2013202186. doi:10.1136/bcr-2013-202186
27. Ozmeric A, Aydogan NH, Kocadal O, Kara T, Pepe M, Gozel S. Arthroscopic treatment of synovial chondromatosis in the ankle joint. *Int J Surg Case Rep*. 2014;5(12):1010–1013. doi:10.1016/j.ijscr.2014.10.083

28. Mishra P, Mishra PK, Pandey D, Tripathi BN. Primary ankle synovial chondromatosis in a young post-partum female. *J Orthop Allied Sci*. 2014;2(2):60–62. doi:10.4103/2319-2585.145605
29. Lui TH. Endoscopic resection of the lateral ankle bursa with synovial chondromatosis. *Arthrosc Tech*. 2016;5(3):e489–e493. doi:10.1016/j.eats.2016.01.025
30. Shetty MS, Kumar MA, Yogesh K, Doshi K. Ankle synovial chondromatosis: case report of 2 cases with 139 and 12 lose bodies treated arthroscopically. *J Health Allied Sci*. 2017;07(03):049–053. doi:10.1055/s-0040-1708724
31. Kembhavi R, James B. Primary intraarticular and extraarticular synovial chondromatosis at foot and ankle: a case report and review of literature. *J Clin Diagn Res*. 2018;12(4):RD01–RD03. doi:10.7860/JCDR/2018/24651.11400
32. Monestier L, Riva G, Stissi P, Latiff M, Surace MF. Synovial chondromatosis of the foot: two case reports and literature review. *World J Orthop*. 2019;10(11):404–415. doi:10.5312/wjo.v10.i11.404
33. Zmerly H, Mauela M, Akkawi I. Ankle synovial chondromatosis in anterior and posterior compartments. A Case report. *Acta Biomed*. 2020;91(4–S):267–270. doi:10.23750/abm.v91i4-S.9528
34. Palaniappan Ramanathan RM, Robert C, Michael H. Recurrent synovial chondromatosis managed with Subtalar Fusion. *Int J Foot Ankle*. 2022;6(2):076. doi:10.23937/2643-3885/1710076
35. Diop B, Daffe M, Sarr N, et al. Primary synovial chondromatosis of the ankle: a case report. *Int J Surg Open*. 2022;43:100478. doi:10.1016/j.ijso.2022.100478
36. Elafram R, Sghaier M, Romdhane MB, Hamdi A. Isolated synovial chondromatosis of the ankle: a case report. *Int J Surg Case Rep*. 2023;112:108876. doi:10.1016/j.ijscr.2023.108876
37. George J, Paul N, Kaganur R, Gopurathingal A, Jirel A. Synovial chondromatosis ankle - a case report. *J Orthop Case Rep*. 2023;13(4):21–24. doi:10.13107/jocr.2023.v13.i04.3600b
38. Kachuee MA, Mohseni I, Emtiazi N, Sharifi Y. Ankle synovial chondromatosis: clinical, radiological, and surgical findings: a case report. *Radiol Case Rep*. 2024;19(8):3227–3230. doi:10.1016/j.radcr.2024.04.048