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Case Report

Para-Articular Osteochondroma of Hoffa's Fat Pad: A Case Report and Review of the Literature

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ABSTRACT

Para-articular osteochondromas originating in Hoffa's fat pad are extremely rare, often presenting with nonspecific symptoms that can delay diagnosis. This case report highlights the clinical presentation, diagnostic process, and successful treatment of an osteochondroma within Hoffa's fat pad, contributing valuable insights to the limited literature on this condition. A 61-year-old female presented with a six-month history of progressive anterior and medial knee pain, exacerbated by activities such as walking and stair climbing. Examination revealed tenderness over the patellar tendon and restricted knee flexion. Imaging studies, including X-ray, CT, and MRI, identified a calcified mass within Hoffa's fat pad. The patient underwent surgical excision of the lesion, with histopathology confirming the diagnosis of a para-articular osteochondroma. Postoperatively, the patient reported significant improvement in knee pain and regained a normal range of motion. This case underscores the importance of considering para-articular osteochondroma in the differential diagnosis of persistent knee pain with a calcified mass on knee radiographs. Surgical excision is effective in symptom relief and functional recovery, with a low risk of recurrence.

Keywords: Anterior knee pain, Hoffa's fat pad, intra-articular tumor, para-articular osteochondroma, surgical excision

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INTRODUCTION

Hoffa's fat pad (HFP), also known as the infrapatellar fat pad, is a well-vascularized, intracapsular, and extrasynovial structure located posterior to the patellar tendon and anterior to the femoral condyle. It is susceptible to a variety of pathological changes, including trauma, inflammation, and neoplasia, which can cause significant clinical symptoms, primarily anterior knee pain. The intricate anatomy and function of HFP render susceptible to intrinsic and extrinsic pathological processes, with entities such as osteochondromas and synovial chondromatosis being rarely documented.[1]

Osteochondromas are benign bone tumors that most frequently occur in the metaphysis of long bones. However, rare extraskeletal variants, such as para-articular osteochondromas, have been documented. These develop in the soft

tissues surrounding joints without direct osseous attachment.[2] Intraarticular extrasynovial osteochondromas originating from Hoffa's fat pad are even rarer. These lesions often manifest as slowly growing masses that can restrict knee motion and cause localized pain.[3,4] The pathogenesis of these lesions is believed to be linked to cartilaginous metaplasia induced by trauma or chronic irritation, although other mechanisms have also been proposed.[5,6]

Diagnosing para-articular osteochondroma can be challenging due to its non-specific clinical presentation and potential to mimic malignant processes, such as chondrosarcoma.[7,8] Imaging modalities, including MRI and CT scans, are crucial in identifying the characteristic features of these lesions, such as ossified masses within the infrapatellar fat pad, and differentiating them from other soft tissue pathologies.[9,10] Surgical excision is often necessary for definitive diagnosis and treatment. Complete resection generally yields favorable outcomes without recurrence.[4,11,12]

This report presents a case of a large intra-articular extra-synovial osteochondroma arising from Hoffa's fat pad, highlighting the clinical presentation, imaging findings, surgical management, and a review of the existing literature on this rare entity.

CASE REPORT

A 61-year-old female patient presented to our outpatient clinic with complaints of right anterior knee pain that had been progressively worsening over the past six months. The pain, primarily localized to the anterior and medial side of the knee, had become increasingly bothersome during long-distance walking, stair climbing, and several daily activities. The patient had no significant past medical history, and a physical examination of the knee revealed no deformity. However, tenderness was identified during palpation of the patellar tendon, and the patient exhibited restricted range of motion, with knee flexion limited to 100° and severe anterior knee pain extending beyond that range. Full knee extension was possible, and a knee ligament examination revealed no evidence of laxity. The McMurray test for the medial meniscus was positive. The patient scored 22 on the Oxford Knee Score assessment.

Radiographic imaging revealed the presence of a well-defined, round, calcified mass located posterior to the patellar tendon. Mild narrowing of the medial joint space, consistent with Kellgren-Lawrence Grade 1 osteoarthritis, was also observed (Fig. 1). Computed tomography (CT) scans showed that the lesion was located within Hoffa's fat pad and exhibited mature bony characteristics (Fig. 2). Conversely, magnetic resonance imaging (MRI) revealed a heterogeneously edematous

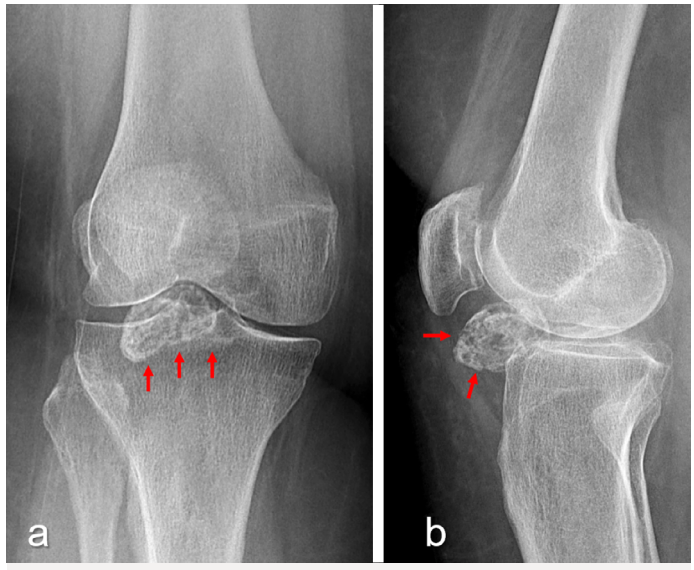

Figure 1. Anteroposterior **(a)** and lateral **(b)** knee radiographs demonstrate a well-defined, round, calcified mass located posterior to the patellar tendon (red arrows). Mild narrowing of the medial joint space, consistent with Kellgren-Lawrence Grade 1 osteoarthritis, is also observed. The radiopaque lesion projects into the joint space, suggesting potential joint impingement.

appearance of Hoffa's fat pad, with a 29x27x16 mm mass characterized by a hypointense center on all sequences and hyperintense signal in fluid-sensitive sequences, suggesting the presence of a para-articular osteochondroma. Post-contrast MRI images demonstrated mild signal enhancement surrounding the lesion and evidence of synovitis in the suprapatellar bursa (Fig. 3).

Given these findings, a surgical excision was planned with a presumptive diagnosis of Hoffa's osteochondroma. The mass was approached through a longitudinal incision medial to the patellar tendon, allowing access to the joint and subsequent removal of the osteochondral fragment from Hoffa's fat pad (Fig. 4). The postoperative course was uneventful. Histopathological examination confirmed the diagnosis of osteochondroma (Fig. 5).

After a 15-month follow-up period, the patient reported no recurrence of anterior knee pain. However, medial knee pain persisted, attributed to moderate osteoarthritis. The Oxford Knee Score improved from 22 preoperatively to 39 postoperatively, and the range of motion had fully recovered. Walking ability and performance of daily activities had improved compared to the preoperative status. Follow-up radiographs showed no recurrence of the lesion (Fig. 6).

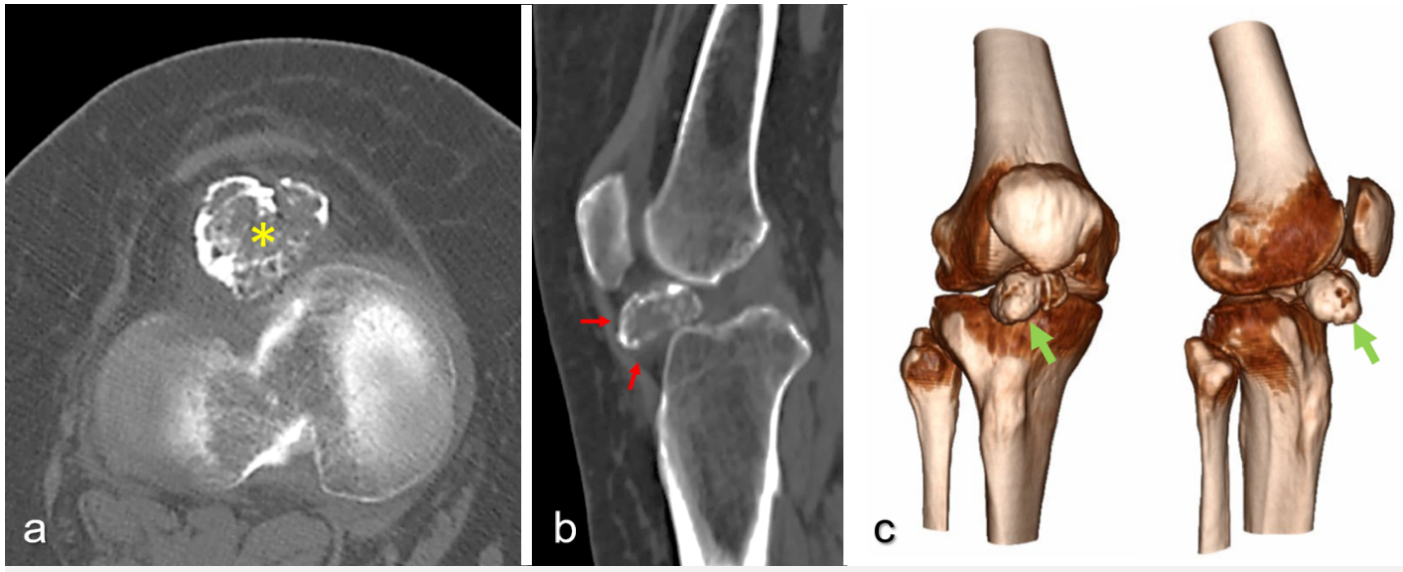

Figure 2. Computed tomography (CT) imaging demonstrated a lesion within Hoffa's fat pad, exhibiting mature bony characteristics. **(a)** Axial CT scan shows the calcified lesion (yellow asterisk). **(b)** A sagittal CT scan highlights the lesion (red arrows). **(c)** Three-dimensional reconstructed CT images further delineate the lesion's location and morphology (green arrows).

DISCUSSION

This case underscores the diagnostic and therapeutic challenges associated with para-articular osteochondromas of Hoffa's fat pad, a rare entity often mimicking more common knee pathologies. The combination of clinical symptoms, imaging findings, and successful surgical management in our patient provides valuable insights into the diagnosis and treatment of these lesions. In the ensuing discussion, we will juxtapose our case's clinical presentation, imaging characteristics, and surgical outcomes with previously reported cases in the literature. A comprehensive review of this rare condition will enhance clinical understanding and management strategies.

Compared to previously reported cases of para-articular osteochondroma or related lesions of the infrapatellar fat pad, the present case provides several distinctive contributions. First, the diagnostic workup included both CT and contrast-enhanced MRI, enabling precise anatomical localization, detailed tissue characterization, and identification of concurrent synovitisfeatures that are rarely documented in earlier reports, which often relied solely on plain radiographs. Second, the lesion was excised via a longitudinal medial open approach, allowing for the complete removal of a relatively large (29×27×16 mm) ossified mass without compromising the patellar tendon—a surgical technique seldom highlighted in the literature. Third, unlike most prior reports that focus primarily on symptomatic relief, our case includes a 15-month follow-up demonstrating objective functional improvement, evidenced by an increase in the Oxford Knee Score from 22 preoperatively to 39 postoperatively. Lastly, this study synthesizes findings from over 60 previously published cases, consolidating diagnostic terminology and illustrating the clinical, radiological, and histopathological spectrum of para-articular osteochondromas. Collectively, this case enriches the existing literature through its comprehensive evaluation, long-term clinical outcome, and integrative analysis of previously dispersed data.

Epidemiology

A thorough review of the extant literature revealed a total of 61 cases dispersed across 47 articles (Table 1).[2-48] Of these cases, 26 occurred on the left side, 31 on the right, one was bilateral, one was on the ankle, and two had no reported laterality. These lesions have been observed to be more prevalent in large joints, particularly the knee, and typically affect middle-aged people to older adults, with a median age of 52. From an epidemiological perspective, there is no evident gender predilection, with 31 male and 28 female cases reported and two cases having no info, suggesting that hormonal or genetic factors do not play a substantial role. Our patient, a 61-year-old female, falls within this demographic range, aligning with previous reports of para-articular osteochondromas in older adults.

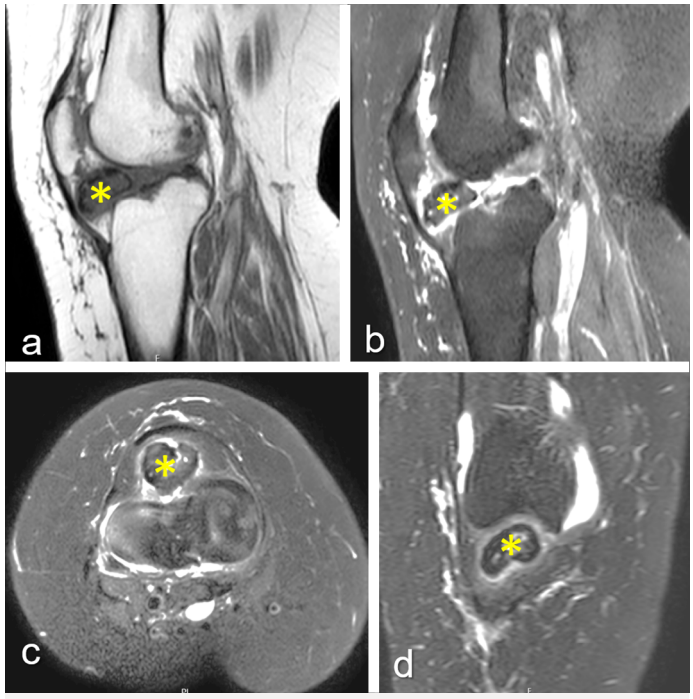

Figure 3. Magnetic resonance imaging (MRI) demonstrated a heterogeneously edematous appearance of Hoffa's fat pad, with a 29×27×16 mm mass (yellow asterisk) characterized by a hypointense center on all sequences and a hyperintense signal in fluid-sensitive sequences, suggestive of a para-articular osteochondroma. **(a)** Sagittal T1-weight MRI shows the hypointense lesion. **(b)** Sagittal T2-weighted fat-suppressed MRI highlights the hyperintense fluid-sensitive signal surrounding the lesion. **(c)** Axial T2-weighted fat-suppressed MRI provides a cross-sectional view of the lesion. **(d)** Post-contrast sagittal MRI reveals mild peripheral signal enhancement and associated synovitis in the suprapatellar bursa.

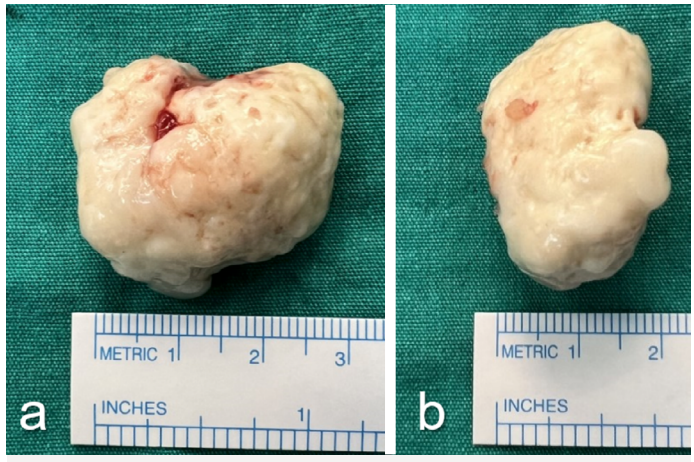

Figure 4. Intraoperative gross specimen of the excised mass was consistent with a presumptive diagnosis of Hoffa's osteochondroma. **(a)** Anterior view of the lesion showing a well-defined, lobulated surface. **(b)** Lateral view of the lesion reveals its mature osteochondral characteristics.

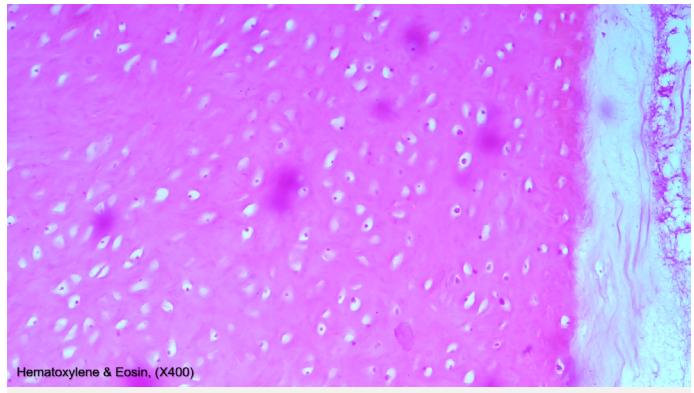

Figure 5. Chondroid tissue with a lobular smooth border is seen. Hypercellularity or cellular atypia is not detected in chondrocytes.

Clinical Symptoms

Osteochondromas in Hoffa's fat pad present with persistent anterior knee pain, often described as a dull ache that worsens with activities that increase joint pressure, such as walking, stair climbing, or kneeling. Advanced cases may also present with a palpable mass or a sensation of fullness, which can contribute to discomfort and functional limitations. Restricted knee flexion is common due to mechanical obstruction, leading to a reduced range of motion. Physical examination reveals localized tenderness in the infrapatellar region, particularly along the patellar tendon.[13,14]

Imaging Findings and Differential Diagnosis

The diagnosis of para-articular osteochondromas relies on radiography, computed tomography (CT), and magnetic resonance imaging (MRI). Initial plain radiographs typically reveal a well-defined, ossified mass with cortical and medullary continuity, though this feature may be less apparent in intra-articular locations.[7,49] However, radiographs alone may not provide an adequate assessment of soft tissue involvement or distinguish between benign and malignant processes.

CT is crucial for determining lesion size, location, and bony characteristics, offering high-resolution images that confirm the ossified nature of the osteochondroma and its relationship to adjacent structures. It is particularly useful in identifying the absence of an osseous attachment in extraskeletal variants, distinguishing them from skeletal

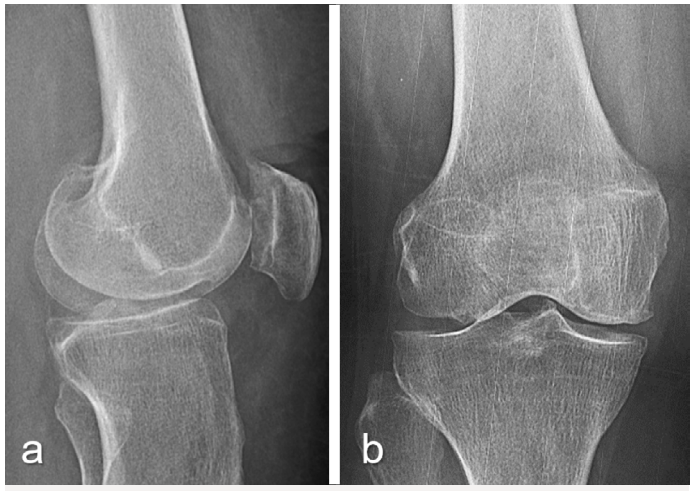

Figure 6. Follow-up radiographs at 15 months postoperatively. **(a)** Lateral view and **(b)** anteroposterior view demonstrate no recurrence of the previously excised lesion.

osteochondromas. Detailed anatomical mapping through CT facilitates surgical planning by clarifying the lesion's spatial orientation and potential implications for surrounding soft tissues.[2]

MRI is the preferred modality for evaluating soft tissue involvement, cartilaginous components, and potential malignant transformation. Osteochondromas typically appear as areas of low signal intensity on T1-weighted images and variable signal intensity on T2-weighted images due to their mixed cartilaginous and bony composition. MRI also helps identify associated features such as surrounding edema, synovial irritation, or mild synovitis, which may indicate chronic mechanical irritation. Contrast-enhanced sequences can further support a benign diagnosis by revealing mild peripheral enhancement.[49]

The differential diagnosis for a calcified mass within Hoffa's fat pad includes synovial chondromatosis, pigmented villonodular synovitis, and malignancies such as chondrosarcoma. Synovial chondromatosis typically presents with multiple intra-articular loose bodies and can sometimes resemble an osteochondroma on imaging. Pigmented villonodular synovitis is characterized by a lobulated mass with hemosiderin deposition, best identified on gradient-echo MRI sequences. Chondrosarcoma, a primary bone malignancy, may mimic osteochondroma but often exhibits aggressive features, such as bone marrow invasion and irregular enhancement patterns on MRI.[1] The absence of these aggressive characteristics helps confirm a benign para-articular osteochondroma.

Pathological Findings

The definitive diagnosis of para-articular osteochondroma relies on histopathological examination, which confirms imaging findings and characterizes the lesion. Osteochondromas are benign bone tumors composed of mature bone covered by a cartilaginous cap, typically measuring less than 2 cm in thickness. A thicker cap may raise suspicion for malignant transformation, such as chondrosarcoma. Histologically, para-articular osteochondromas exhibit lobular hyaline cartilage, well-formed trabecular bone with cortical organization, and hematopoietic elements within the bone marrow spaces, confirming their benign nature. Unlike skeletal osteochondromas, para-articular variants lack continuity with the medullary cavity and are embedded within soft tissue, such as Hoffa's fat pad.[15]

Surrounding soft tissue analysis often reveals chronic inflammation, mild fibrosis, and reactive synovitis, which may contribute to associated symptoms, such as synovial effusion or bursitis. Importantly, there is no evidence of malignancy, such as cellular atypia, increased mitotic activity, or soft tissue invasion.

Treatment Options, Prognosis and Complications

Surgical excision is the preferred treatment for symptomatic para-articular osteochondromas, particularly when they cause mechanical obstruction, significant knee pain, or restricted range of motion. The primary goal is to completely remove the lesion, including the cartilaginous cap, to prevent recurrence and avoid complications such as joint dysfunction or damage to adjacent structures. Both open and arthroscopic techniques are viable options depending on lesion size and location.[16,17] Open excision is generally favored for larger or complex tumors, offering better visualization and access. On the other hand, arthroscopic excision may be suitable for smaller or more accessible lesions, providing benefits such as reduced postoperative pain, shorter hospital stays, and quicker recovery. Postoperative rehabilitation, including physical therapy to restore knee flexion and strengthen the quadriceps, is essential for optimal recovery.

The prognosis following surgical excision of intra-articular osteochondromas is generally favorable, with most patients experiencing significant pain relief and improved knee function.[1-17] Recovery timelines vary depending on lesion size, preoperative joint condition, and adherence to rehabilitation. Most patients regain their pre-symptom activity levels, and recurrence is infrequent when the cartilaginous cap is completely removed. However, close follow-up is recommended, as incomplete excision may lead to regrowth and recurrent symptoms.

Table 1. List of previously reported cases

Case	Author	Year	Age	Sex	Side	Main symptom	Imaging Findings	Pathological findings	Treatment	Prognosis and Recurrence
1	Robillard (18)	1941	35	F	L	Pain, swelling, restricted ROM	Large, calcified mass	-	SE	Asymptomatic, no recurrence noted
2	Roth (19)	1944	69	M	R	Tender mass, stiffness	Dense opaque mass	ossifying synovial chondroma	SE	Asymptomatic, no recurrence noted
3	Kautz (20)	1945	54	F	L	Pain, restricted rom	Bony tumor	Mature bone and cartilage tissue, blood vessels and fibrous tissue	SE	No info
4			51	F	L	Pain, stiffness	well delineated shadow of bony density	Mature bone and cartilage tissue, blood vessels and fibrous tissue	SE	Asymptomatic, no recurrence noted
5			47	M	L	Pain, tenderness	well delineated ovoid bony shadow beneath the patella	Mature bone and cartilage tissue, blood vessels and fibrous tissue	SE	Asymptomatic, no recurrence noted
6			27	M	L	Knee gave away?	torn cartilage	Mature bone and cartilage tissue, blood vessels and fibrous tissue	Patient refuse operation	No info
7	Mosher et al. (21)	1966	23	F	R	Vague discomfort, mass	Radiopaque areas in the infrapatellar region on radiographs	Extrasynovial chondroma with fibrous capsule	SE	No recurrence, asymptomatic 3 years post-op
8			66	M	L	Mild arching, mass	Small, irregular, indistinct opacities	Extrasynovial chondroma with fibrous capsule	SE	No recurrence, asymptomatic 3 years post-op
9			65	M	R	Intermittent pain, flexion loss	Infrapatellar radiopaque mass	Enchondral bone formation	SE	No recurrence, full rom after 6 years
10	Sarmiento & Elkins (22)	1975	67	M	L	Pain, mass	Large bone mass	Giant intra-articular between patella and tibia, displacing the patellar tendon	Surgical excision with osteochondroma patellar removal	Full range of motion regained minor discomfort
11	Milgram & Jasty[23]	1983	59	M	L	Painless mass	Large bony mass in soft tissue, patchy calcification, and trabeculated bone pattern	Benign proliferation of cartilage and bone within the capsule Para-Articular Osteochondroma of the Knee	SE	Asymptomatic, no recurrence noted

Table 1. List of previously reported cases (Cont.)

Case	Author	Year	Age	Sex	Side	Main symptom	Imaging Findings	Pathological findings	Treatment	Prognosis and Recurrence
12	Böstrnan et al. (24)	1985	29	M	R	Painless swelling	Infrapatellar mass with irregular calcification on radiographs	Extraskeletal ossifying chondroma	SE	Complete recovery, asymptomatic 1-year post-op
13	Krebs & Parker (25)	1994	52	M	L	Stiffness, swelling	Infrapatellar calcification	Enchondral ossification	Arthroscopic resection	Asymptomatic at 1-year follow-up, no recurrence
14	Rodriguez-Peralto et al. (15)	1997	52	F	L	Firm, painless mass	Multilobulated calcified mass, eroded patellar surface	Hyaline cartilage nodules with enchondral ossification	SE	No recurrence at follow-up
15	H. Sakai et al. (4)	1999	64	F	L	Slow-growing mass, pain	Calcified soft-tissue mass, well-demarcated on MRI	Cartilage with areas of ossification, fibrous connective tissue	SE	No recurrence at 2-year follow-up
16			47	M	R	Pain, palpable mass	Calcified mass inferior to the patella, erodes anterior cortex of the proximal end of tibia	Lobular cartilaginous tissue demonstrates enchondral ossification.	SE	No recurrence at 2-year follow-up
17	M.S. Dhillon et al.[2]	1999	60	M	L	Swelling, restricted ROM	Irregular calcified mass, separate from patella and tibia on CT	Bony trabeculae with cartilage, no hypercellularity	SE	No recurrence at 1.5 years, 120° knee flexion
18 Case 1	González-Lois et al.[26]	2001	68	M	R	Painful, slow-growing mass	Large suprapatellar ossified mass on radiographs, well-defined on MRI	Mature trabecular bone surrounded by hyaline cartilage	SE	No recurrence, asymptomatic at 2 years
19 Case 2	González-Lois et al.	2001	43	M	R	Mass	Infrapatellar mass with very low signal areas in the center consistent with calcification	Hyaline cartilage, endochondral ossification, mature trabecular bone	SE	No info
20 Case 3	González-Lois et al.	2001	37	F	L	Slow growing mass	İnfrapatellar mass	Intracapsular and para-articular chondroma composed of fibrocartilage.	SE	No info

Table 1. List of previously reported cases (Cont.)

Case	Author	Year	Age	Sex	Side	Main symptom	Imaging Findings	Pathological findings	Treatment	Prognosis and Recurrence
21	Cohen et al. (27)	2001	67	M	L	Pain, clicking, mass	Partially calcified loose body, large full-thickness defect on femoral condyle	Synovial osteochondroma with scattered calcifications	SE	Full ROM restored, no recurrence at 1 year
22	Neves et al. (28)	2004	59	F	R	Mechanical pain, swelling	Infrapatellar mass with central radiolucency and peripheral calcification on CT	Lobules of hyaline cartilage with endochondral ossification	SE	Complete recovery, no recurrence at 4 years
23	Jui-Yuan Hung et al. (8)	2005	46	M	R	Swelling, limited motion	Well-circumscribed calcified mass in the infrapatellar fat pad on MRI	Cartilage cap with underlying mature bone	SE	No recurrence, full ROM at 1-year post-op
24	Francesco Oliva et al. (29)	2006	53	M	L	Anterior knee pain, limited motion	Nodular calcific mass displacing the patellar tendon, well-circumscribed on radiographs and MRI	Extra-osseous osteochondroma-like soft tissue mass	SE	No recurrence, full ROM at 2 years post-op
25	Giacomo Rizzello et al. (6)	2007	42	F	R	Knee pain, limited motion	Popcorn-like calcifications in Hoffa's fat pad, confirmed by MRI	Cartilaginous tissue with multifocal endochondral ossification	ART-E	Asymptomatic, no recurrence at follow-up
26	Turhan et al. (12)	2008	25	M	L	Swelling, restricted ROM	Well-delineated osseous mass in infrapatellar fat pad, MRI showed granulation and chondroid matrix	Osteocartilaginous lesion with fibrosis, end-stage Hoffa's disease	Marginal excision	Full recovery, no recurrence at 1-year post-op
27	Carmont et al. (30)	2008	61	M	R	Pain, swelling	Peritendinous calcification in the infrapatellar region, dark on T1 and T2 MRI with cartilage component	Dense fibrocollagenous tissue with focal ossification	Marginal excision	No recurrence, asymptomatic at follow-up
28	Aditya V. Maheshwari et al. (31)	2009	27	M	R	Posterior knee swelling	Extraskeletal mineralized mass in posterior knee on radiographs, bR T2 MRI signal	Hyaline cartilage and mature bone with enchondral ossification	Marginal excision	No recurrence at 2 years post-op

Table 1. List of previously reported cases (Cont.)

Case	Author	Year	Age	Sex	Side	Main symptom	Imaging Findings	Pathological findings	Treatment	Prognosis and Recurrence
29	Demir et al. (32)	2009	60	F	R	Painless swelling	Infrapatellar mass with central radiolucency on X-ray	Extraskeletal para-articular osteochondroma	Excisional biopsy	No recurrence, asymptomatic at follow-up
30	Ozturan et al. (33)	2009	60	F	L	Swelling, pain on flexion	Well-circumscribed mineralized mass, compressin patellar tendon on MRI	Osteochondromatous lesion	SE	Pain-free, no recurrence 12 months post-op
31	Singh V.K. et al.[34]	2009	55	M	L	Chronic anterior knee pain	Calcification in Hoffa's fat pad, soft tissue mass containing chondroid calcification with erosion of inferior pole of patella on MRI	Extraskeletal ossifying chondroma	SE	Asymptomatic, no recurrence at 3 years
32	Habib Nouri et al. (35)	2010	42	F	R	Pain, instability	Infrapatellar calcification, heterogeneous signal on MRI	Intracapsular osteochondroma	SE	No recurrence
33	Hyojeong Mulcahy et al. (36)	2010	25	F	R	Activity-related pain, mass	Ovoid calcified mass in Hoffa's fat pad on MRI	Extraskeletal para-articular osteochondroma	Marginal excision	Pain resolved, no recurrence at follow-up
34	Veras et al. (37)	2010	54	F	L	Painful mass, restricted ROM	Calcified soft tissue mass suggestive of chondrosarcoma	Synovial osteochondroma	Surgical resection	No signs of recurrence at follow-up
35 Case 1	F. De Maio et al.[7]	2011	58	F	R	Painful subcutaneous mass	Large, calcified mass replacing Hoffa's fat pad on CT	Intra-articular extrasynovial osteochondroma	Marginal resection	No recurrence, full ROM restored
36 Case 2	F. De Maio et al.	2011	71	F	L	Pain, restricted ROM	Calcified neoformation	Intra-articular extrasynovial osteochondroma	Marginal resection	no recurrence, full ROM after 4 years
37	Koichi Ogura et al. (38)	2011	56	F	R	Anterior knee pain, hard mass	Multilobulated osseous lesion within infrapatellar fat pad	Para-articular osteochondroma	Marginal excision	No local recurrence, symptoms resolved
38	Ingabire et al.[9]	2012	64	F	R	Chronic anterior knee pain	Large mass displacing the patellar tendon	Soft tissue chondroma with areas of ossification	Surgical excision	No recurrence, full recovery at follow-up

Table 1. List of previously reported cases (Cont.)

Case	Author	Year	Age	Sex	Side	Main symptom	Imaging Findings	Pathological findings	Treatment	Prognosis and Recurrence
39	Benny Xu Zhang et al.[5]	2012	47	F	R	Painful mass, limited knee flexion	Calcified suprapatellar mass, heterogenous signal on MRI	Para-articular osteochondroma	Marginal excision	No recurrence at 6 months post-op
40	Maj Debraj Sen et al.[39]	2012	43	M	L	Pain, clicking sound	Ovoid bony mass in Hoffa's fat pad, no osseous continuity	Giant intra-articular osteochondroma	Total excision	No recurrence at 6 months follow-up
41	Roop Singh et al. (40)	2012	52	M	L	Large slow-growing mass, restricted flexion	Well-delineated mass on MRI, infrapatellar location	Para-articular osteochondroma	En-bloc resection	No recurrence at 2 years
42	Ali Kemal Sivrioglu et al. (41)	2013	23	M	R	Mild anterior knee pain	Enlarged infrapatellar fat pad, hypointense on T1, hyperintense on T2	Hoffa's disease	ART-E	Symptoms resolved, no recurrence
43	Mozella et al. (42)	2015	78	F	L	Progressive knee pain	Calcified mass in infrapatellar region, degenerative changes	Synovial chondromatosis	TKE and mass resection	No complications, full recovery
44	Ankur Mittal et al. (11)	2015	65	F	R	Anterior knee pain, restricted flexion	Nodular calcific mass involving patella, well-defined on imaging	Extra-osseous osteochondroma	Surgical excision	No recurrence at 36 weeks
45	Bombaci et al. (43)	2015	52	F	R	Mass after trauma	Ossified mass in infrapatellar fat pad, lobular shape	Para-articular osteochondroma	Total excision	No recurrence at 10-year follow-up
46	Nathan Evaniew et al. (44)	2015	70	F	R	Slowly growing palpable mass	Ossified mass with fluid between the mass and the patellar tendon	Para-articular osteochondroma	SE	No recurrence, full recovery
47			47	F	L	Pain and swelling	Encapsulation	Para-articular osteochondroma	SE	No recurrence, full recovery
48			54	F	R	Stiffnes and slowly enlarging mass	Irregular large mass	Para-articular osteochondroma	SE	No recurrence, full recovery
49	Paolo Fornaciari et al. (16)	2015	17	M	L Ankle	Slow-growing mass, restricted ROM	Ossified mass on imaging, not attached to joint	Intra-articular osteochondroma	Excision via arthrotomy	Pain-free, no limitations post-op
50			39	F	R Knee	Slow-growing mass, restricted ROM	SOC of HFP	Enchondral ossification	Excision via arthrotomy	No pain, no restriction

Table 1. List of previously reported cases (Cont.)

Case	Author	Year	Age	Sex	Side	Main symptom	Imaging Findings	Pathological findings	Treatment	Prognosis and Recurrence
51	Lauren O'Connell et al. (10)	2017	33	M	R	Anterior knee pain, mass, locking	Non-homogeneous lesion on MRI, synovial chondroma	Solitary synovial osteochondroma	Excisional biopsy	Pain-free, no recurrence
52	Khaled Zitouna et al. (45)	2019	64	M	R	Painless knee stiffness	Calcified mass on MRI, Hoffa's fat pad	Intracapsular and paraarticular chondroma	Open resection	Full ROM recovery, no recurrence at 3 years
53	Natesan Rajkumar et al. (46)	2019	60	F	Bilateral	Knee pain, mass below patella	Bony mass on imaging, associated osteoarthritis	Para-articular osteochondroma	SE + TKA	Excellent outcome, no recurrence
54	Kazuhiko Hashimoto et al. (13)	2020	56	F	R	Large elastic mass, restricted ROM	Mosaic-intensity mass on MRI, patellar tendon involvement	Synovial osteochondroma	Marginal resection	No recurrence, full function restored
55	Takahiro Nishimura et al. (3)	2020	35	M	R	Anterior knee pain, mass	Osseous lesion	Para-articular osteochondroma	SE	No recurrence, restored ROM
56			38			No info				
57			55			No info				
58	M. Badraoui et al. (17)	2021	36	M	R	Firm, mobile mass, knee pain	Encapsulated lesion on MRI, calcifications	Intracapsular chondroma	SE	Pain-free, no recurrence
59	Sunil Panta et al. (14)	2021	19	M	R	Activity-related knee pain, deformity	Ovoid, corticated mass on imaging, extraskeletal	Para-articular osteochondroma	Marginal excision	Full ROM recovery, no recurrence
60	El Mokhtari Kamal et al. (47)	2023	29	M	L	Anterior knee pain, mass	Bone-like mass behind the patellar tendon on X-ray, no bony attachment	Giant osteochondroma, end-stage Hoffa's disease	Surgical excision	No recurrence, full recovery
61	Unnikrishnan Ramachandran et al. (48)	2023	26	M	L	Knee swelling, restricted flexion	Calcified mass in Hoffa's fat pad on MRI	Extraskeletal para-articular osteochondroma	Excision	Pain-free, functional improvement at 5-month follow-up
62	Current Case	2025	61	F	R	Anterior knee pain, mass, restricted ROM		Para-articular osteochondroma	SE	No recurrence and full recovery at 15 months follow-up

While the risk of complications is low, potential issues should be discussed before surgery. These include joint stiffness, particularly after extensive dissection, and a small risk of postoperative infection despite proper aseptic techniques. Patients with pre-existing osteoarthritic changes may continue to experience some discomfort or mechanical symptoms unrelated to the excised osteochondroma, typically managed conservatively. Additionally, rare complications such as patellar tendon dysfunction or neurovascular injury should be considered when planning the surgical approach.

CONCLUSION

Para-articular osteochondromas of Hoffa's fat pad are rare entities that can cause significant anterior knee pain and functional impairment. Given their nonspecific clinical presentation, accurate diagnosis relies on a combination of imaging modalities, with MRI being beneficial for differentiating these lesions from other intra-articular pathologies. Surgical excision remains the definitive treatment, offering substantial symptom relief and functional recovery, with a low risk of recurrence when complete resection is achieved. While the overall prognosis is favorable, close follow-up is recommended to monitor for potential complications. Increased awareness of this condition can facilitate early diagnosis and effective management, ultimately leading to improved patient outcomes.

DECLARATIONS

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Informed Consent: Informed consent was obtained from the participant.

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ABBREVIATIONS

AP – Anteroposterior

CT – Computed Tomography

HFP – Hoffa's Fat Pad

MRI – Magnetic Resonance Imaging

OA – Osteoarthritis

OKS – Oxford Knee Score

ROM – Range of Motion

T1W – T1-Weighted

T2W – T2-Weighted

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