

## Osteoid osteoma of the patella simulating knee arthritis: case report

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### Abstract

Osteoid Osteoma (OO) is an uncommon benign tumour and causes severe pain, being worse at night, and it responds dramatically to nonsteroidal anti-inflammatory medications. An osteoid osteoma of the patella is very rare and if it arises, close to chondral surface differential diagnosis may be challenging. Patients with OO of the patella often present with knee pain that is also a typical symptom of trauma or of other diseases such as arthritis, which are much more common than OO. We present the case of a 19-year-old woman, basket-ball-player, with a three year history of intense Anterior Knee Pain (AKP) that was first attributed to arthritis. A CT scan was performed that revealed the localization of an osteoid osteoma of the patella. The patient was successfully treated with open surgical technique, and the diagnosis was confirmed after histopathologic analysis. After one year of treatment, there was no relapse of the pain and no residual recurrent tumour. This unusual location was at the origin of unexplained pain and delayed diagnosis made so later. Although a rare entity, OO of the patella with its atypical clinical features could be included in the differential diagnosis of persistent anterior knee pain in the young adult. High clinical suspicion is necessary to avoid delay in diagnosis and irrelevant procedures for the patient.

**Key words:** Osteoid osteoma, Knee pain, Intra-articular, Patella, Tumour resection

### Introduction

Osteoid Osteoma (OO) is a benign osteoblastic tumour (11% to 14% of all benign bone tumours)<sup>1</sup> described by Jaffé in 1935<sup>2</sup>, that occurs mostly in children<sup>3</sup> and young adults, affecting men twice as often as women. History of nocturnally aggravating and salicylate-responding pain is characteristic for this tumour. The lesion is commonly found on the diaphysis or metaphysis of long bones, and its typical radiological appearance

is a radiolucent zone surrounded by sclerotic bone (nidus) smaller than 1.5cm in diameter<sup>1</sup>. Pathologically, variable osteoid tissue and immature bone trabeculation are observed in vascular mesenchymal tissue. As a rule, reactive bone is more vascularized than normal bone, and the periost, which takes place on it, become thick. Although the lesion is seen in fibula, humerus, vertebra, talus, and calcaneus at times, it is frequently located in femur and tibia<sup>4</sup>.

Intra- and juxta-articular OO are a diagnostic challenge for the physician, due to their rare appearance (13% of the lesions) and also their atypical clinical and radiological characteristics<sup>5</sup>. Misdiagnosis and delay till definitive treatment is a common problem, especially when the lesions arise in a subchondral location in the knee or the patellofemoral joint<sup>6</sup>.

We present the case of a patellar OO in a young woman that was treated by surgical ablation. The uncommon site in combination with the atypical clinical presentation caused 3 years interval between the onset of the symptoms and final treatment, especially since the initial MRI did not identify the lesion, unlike scintigraphy and computed tomography in millimeter sections.

The difficulties a clinician faces, in his effort to diagnose a rare entity presenting with a vague knee symptomatology and thus focus on crucial points in the diagnosis of intra- and juxta-articular OO, should be highlighted. The aim of this study is to report this rare case of patellar OO simulating knee arthritis along with a review of the literature.

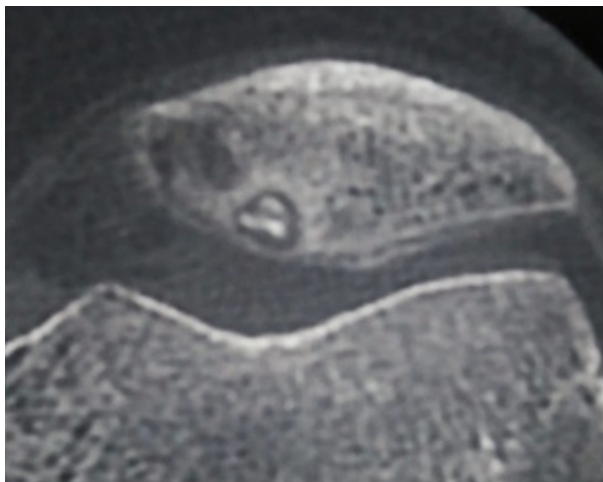
### Case report

A 19-year-old woman, presented to our institution with a three-year history of pain in her left anterior knee pain, that was predominantly nocturnal and sensitive to nonsteroidal anti-inflammatory drugs and attributed to a direct blow on the patella he had sustained during training. Later, a warm increase in the left knee was reported describing mono-arthritis, with knee Magnetic Reasoning Imaging

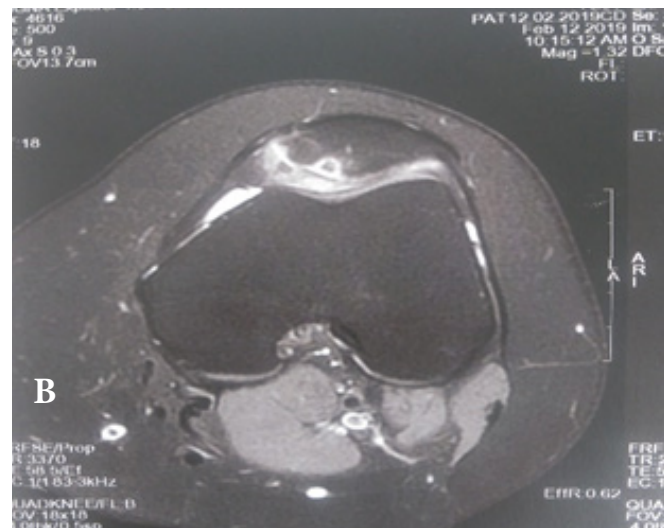
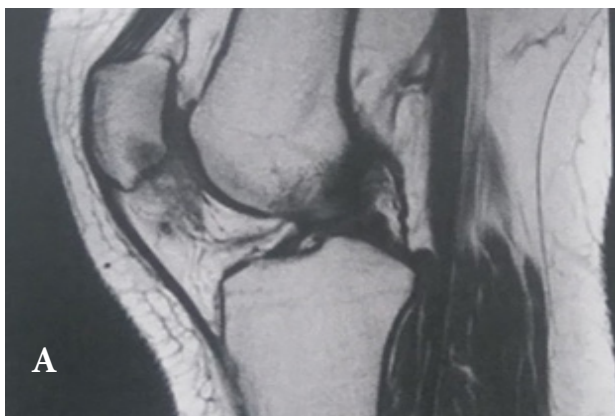
(MRI) showing an important inflammatory reaction with edema which could evoke an infectious focus. The patient treated as septic arthritis, seeing the absence of germs in the analysis of synovial fluid and the inefficiency of antibiotics, the diagnosis of spondyloarthritis was made and the patient was treated with sulfasalazine and then biotherapy without any clinical improvement. A clinical examination showed lameness while walking and swollen knee, hot and very painful to palpation, without patellar shock. This pain was aggravated by kneecap pressure and mobilization. Bending was limited to 90°. There was no quadriceps atrophy.

An X-ray of the knee had been obtained with unremarkable findings outside of a sub-patellar soft tissue densification with a left patella side flip. At the joint ultrasound, there was a sequellary inflammation of Hoffa's grease with involvement of the patellar fin and a pre-patellar bursopathy. A second MRI of the left knee with perfusion imaging, supplemented by Computed Tomography (CT) (Figures 1 - 2), objectified osteoid osteoma under lower cortical patellar crest. Bone scintigraphy (Figure 3) shows an aspect compatible with an active osteoblast transformation at the left patellar level, evoking osteoid osteoma in the first place.

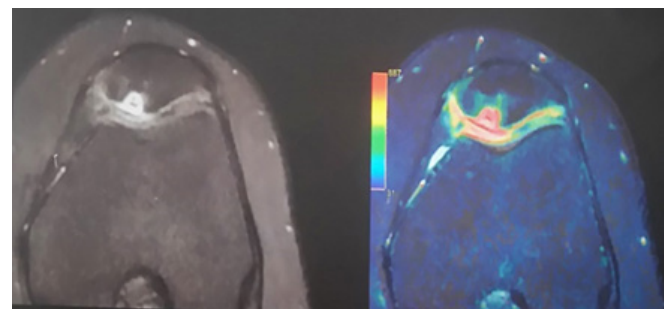
**Figure 1:** Axial CT scans show a round, well-margined sclerotic lesion with a hypodense rim and a centrally calcified nidus



**Figure 2:** stratified aspect achieving a target aspect, with a center in hypo signal T1 (a) and T2 (b) that increases intensely after contrast, corresponding to a nidus



**Figure 3:** MRI T2 with bone perfusion shows the presence of a central tumour blush corresponding to a nidus with early intense contrast taken parallel to arterial contrast taken with early and intense WASH IN



The patient had a surgical removal of the tumour, with good surgical follow-up. The anatomo-pathological examination of the operative room confirms the diagnosis. Currently, at one year in post-operative, the patient is totally asymptomatic, with total resumption of mobility of the left knee.

## Discussion

Osteoid Osteoma (OO) is a benign and painful skeletal tumour. It occurs mainly in children and young adults with 90% of cases seen before the age of 25 years and a male/female ratio of more than 2:1<sup>7</sup>. OO can occur everywhere in the skeleton both in the cortex and medulla<sup>7</sup>.

Intra-articular OO accounts for approximately 10% of all osteoid osteomas and mainly arises in the elbow, the ankle or in the hip joints<sup>8</sup>, and 2.5% of all paediatric lesions. Patellar OO is rare and only few cases are described in the literature<sup>8</sup>. It is a difficult lesion to diagnose, with misdiagnosis being very common and a resulting delay between the onset of symptoms and appropriate treatment, especially around the knee joint the diagnosis can be delayed for many months<sup>6</sup>. In our case, the interval between the first symptoms and diagnosis was 3 years.

The most common symptom when an OO arises around the knee joint is AKP. However, AKP is one of the most frequently met musculoskeletal disorders. Synovitis, stiffness or swelling of the soft parts and reduced joint

mobility are rare clinical manifestations. Each year many young athletes seen in primary care setting complain of some degree of knee pain, which is usually attributed to chondromalacia patella, patellar tendinitis, mediopatellar plica syndrome, Hoffa's syndrome, patellofemoral malalignment, osteochondritis dissecans, meniscal tears, or ligamentous injuries<sup>9</sup>. The pain encountered from an OO is the result of the high prostaglandin levels produced within the nidus<sup>10</sup>. The transmission of these prostaglandins from the nidus to synovium causes lymphofollicular synovitis, resembling histologically rheumatoid arthritis and clinically monoarthritis of infectious, degenerative, or rheumatologic origin. The diffuse pain due to synovitis and the lesion itself accompanied by non-specific symptoms as muscle atrophy or muscle spasm around the joint, limited range of motion, joint effusion and swelling, gait and postural disturbances may be misleading for the clinician<sup>11</sup>.

Szendroi *et al.*<sup>12</sup> compared diagnostic delays between OO and other localizations. The average time for intraarticular osteomas was 26.6 months, compared to 8.5 months for other locations. The radiological features of intraarticular osteomas are as many traps. The classic image of nidus, bordered by peripheral osteosclerosis is most often absent (50-75%). Conventional radiology is either normal or characterized by local periarticular osteopenia. The conventional radiological diagnosis of patellar OO is difficult due to the absence of periosteal reaction<sup>13</sup>.

Standard radiographs only provide subtle findings due to the absence of any perilesional sclerosis or periosteal reaction, unlike extra-articular locations. According to some authors, MRI remains the modality of choice for bone tumour exploration. On MR imaging, OO typically shows low signal intensity on T1 and T2-weighted images with bone marrow edema depicted around the nidus and high contrast enhancement after gadolinium administration. Intra-articular lesions may demonstrate synovial thickening apparent on MRIs, diagnosis being confirmed after gadolinium injection. However, precise localization of the nidus may not be easy. In 35% of the cases, the nidus cannot be detected since it is often hidden by the associated peri-lesional edema surrounding the lesion while in 50% of the cases, the nidus has an atypical presentation, which may lead to misdiagnosis. Our patient had to have two MRI's and a CT scan to make the diagnosis, because symptomatology was in reality misleading to be able to steer the diagnosis.

Bone scintigraphy is highly sensitive but demonstrates a lower specificity than CT scan particularly in case of intra-articular location because bone sclerosis around the nidus cannot be detected early since there is a less intense uptake due to the associated synovial reaction<sup>14</sup>. In the treatment of OO within this area; open curettage and excision of the nidus with minimal bone

loss and without damaging the articular cartilage, and if technical opportunities are sufficient, percutaneous nidus excision radiofrequency ablation using CT or three-dimensional navigation system can be applied<sup>4</sup>. Our patient has been treated by surgical ablation with total healing.

## Conclusion

Osteoid joint osteoma of the knee is a difficult lesion to diagnose. Clinical presentation is most often atypical. Errors of assessment are frequent, which make the bed to many inappropriate therapeutic procedures. Confrontation of the clinic and several imaging means is often necessary. Treatment should avoid causing cartilage damage. Percutaneous surgery is the reference technique for treating these lesions.

## References

1. Orth P, Kohn D. Diagnostik und Therapie des Osteoidosteoms. *Der Orthopäde*. [Internet]. 2017 Jun [cited 2020 May 7];**46**(6):510–521. Available from: <http://link.springer.com/10.1007/s00132-017-3428-0>
2. Jaffe HL. Osteoid-osteoma: a benign osteoblastic tumor composed of osteoid and atypical bone. *Arch Surg* [Internet]. 1935 Nov 1 [cited 2020 May 7];**31**(5):709–728. Available from: <https://jamanetwork.com/journals/jamasurgery/fullarticle/542493>
3. Jacopin S, Launay F, Viehweger E, Glard Y, Jouve J, Bérard J, *et al.* Hip subluxation and coxa valga secondary to an osteoid osteoma. *Revue de chirurgie orthopédique et réparatrice de l'appareil moteur*. 2009; **94**:758–762.
4. Bavaneh MK, Kiyak G, Balikci T. A review of literature: Mosaicoplasty as an alternative treatment for resection of patellar osteoid osteoma and cartilage reconstruction. *J Orthop*. 2018; **15**(3):768–771.
5. Ciftdemir M, Tuncel SA, Usta U. Atypical osteoid osteomas. *Europ J Orthop Surg Traumatol*. [Internet]. 2015 Jan [cited 2020 May 7];**25**(1):17–27. Available from: <http://link.springer.com/10.1007/s00590-013-1291-1>
6. Georgoulis AD, Papageorgiou CD, Moebius UG, Rossis J, Papadonikolakis A, Soucacos PN. The diagnostic dilemma created by osteoid osteoma that presents as knee pain. Arthroscopy: *J Arthroscopic Related Surg*. [Internet]. 2002 Jan [cited 2020 May 7];**18**(1):32–37. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S074980630211560X>
7. Chillemi C, Franceschini V, D'Erme M, Ippolito G, Farsetti P. Patellar osteoid osteoma as a cause of anterior knee pain in adolescents: A case report and literature review. *Case Reports Med*. 2013; **2013**:746472.



8. Franceschi F, Marinozzi A, Papalia R, Longo UG, Gualdi G, Denaro E. Intra- and juxta-articular osteoid osteoma: a diagnostic challenge : misdiagnosis and successful treatment: a report of four cases. *Arch Orthop Trauma Surg.* 2006; **126**(10):660–667.
9. Samim M, Smitaman E, Lawrence D, Moukaddam H. MRI of anterior knee pain. *Skeletal Radiology* [Internet]. 2014 Jul [cited 2020 May 7];**43**(7):875–893. Available from: <http://link.springer.com/10.1007/s00256-014-1816-7>
10. Kawaguchi Y, Sato C, Hasegawa T, Oka S, Kuwahara H, Norimatsu H. Intraarticular osteoid osteoma associated with synovitis: A possible role of cyclooxygenase-2 expression by osteoblasts in the nidus. *Modern Pathol.* [Internet]. 2000 Oct [cited 2020 May 7];**13**(10):1086–91. Available from: <http://www.nature.com/articles/3880202>.
11. Papagrigorakis E, Benetos IS, Bakalagos M, Rozis M, Pneumaticos S. A rare cause of anterior knee pain in a young athlete and a delayed diagnosis: Osteoid osteoma of the patella. *Cureus* [Internet]. [cited 2020 May 7];**11**(12). Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6970096/>
12. Szendroi M, Köllö K, Antal I, Lakatos J, Szoke G. Intraarticular osteoid osteoma: clinical features, imaging results, and comparison with extraarticular localization. *J Rheumatol.* 2004; **31**(5):957–964.
13. Greenspan A. Benign bone-forming lesions: osteoma, osteoid osteoma, and osteoblastoma. Clinical, imaging, pathologic, and differential considerations. *Skeletal Radiol.* 1993; **22**(7):485–500.
14. Scalici J, Jacquel A, Mukish P, Trouilloud P, Baulot E. Intra-articular osteoid osteoma of the hip misdiagnosed by MRI: An unusual cause of unexplained hip pain. *Orthopaedics & Traumatology: Surg Res.* [Internet]. 2011 Dec [cited 2020 May 7];**97**(8):881–885. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1877056811002246>