

CASE REPORT

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## Intra-articular osteoid osteoma protruding from the acetabular fossa

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**Abstract** Osteoid osteoma is rarely found in the acetabular fossa. We treated a case of osteoid osteoma that had developed into a mass lesion and protruded from the acetabular fossa with synovitis. In this case, a well-defined bony tumor located in the acetabular fossa was detected by plain radiographs and computed tomography scans. Gadolinium-enhanced T1-weighted magnetic resonance (MR) images obtained with fat saturation indicated distinctive features in which the central area of the lesion and hyperemic synovium were enhanced. A surgical specimen contained the nidus, and osteoid osteoma was diagnosed. Retrospectively, this MR sequence demonstrated the characteristic nidus and synovitis, and it may thus be valuable in cases where diagnosis of intra-articular osteoid osteoma is difficult.

**Key words** Acetabular fossa · Intra-articular · Osteoid osteoma · Magnetic resonance (MR) images

### Introduction

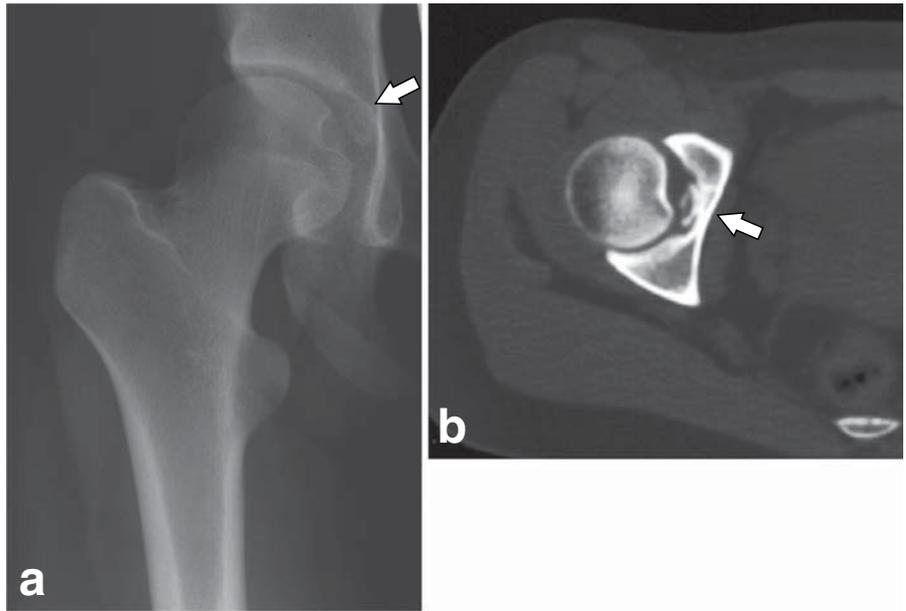
Frequently, osteoid osteomas are found in the diaphyses of long bones and are rarely located in the joints. Some authors have reported osteoid osteomas in the hip joint. We treated a rare osteoid osteoma case that protruded from the fossa of the acetabulum with synovitis. In this case, Gadolinium-enhanced T1-weighted MR images with fat saturation demonstrated the nidus and hyperemic synovium, suggesting an intra-articular osteoid osteoma. The MR sequence may prove valuable in cases in which the diagnosis of osteoid osteoma is difficult.

### Case report

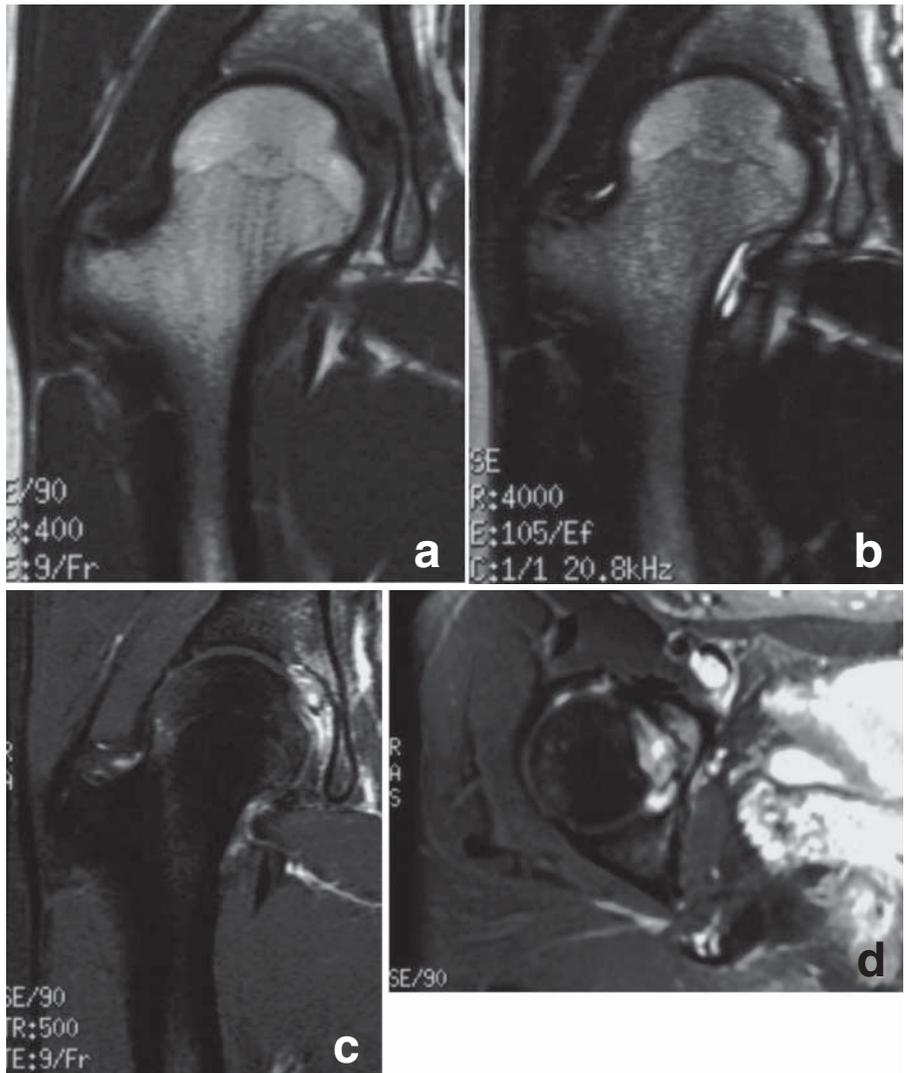
A 15-year-old girl complained of right hip joint pain and visited a nearby clinic. She reported occasional nocturnal pain that increased with joint motion or the bearing of weight. No history of trauma was indicated. No abnormal pathology was indicated on plain radiographs, and T1- and T2-weighted magnetic resonance imaging (MRI) revealed effusion in her right hip. Three months after her initial visit to a clinic, she suffered severe right hip pain during motion. She was therefore referred to our hospital. Internal and external rotation of the hip joint was limited. All laboratory studies were within normal ranges. Plain radiography and computed tomography (CT) scan demonstrated a well-defined oval and flat bone lesion that protruded from the floor of the acetabular fossa (Fig. 1), and we had diagnosed her hip lesion as synovial chondromatosis or joint mouse. After more than 1 month, an MRI of the hip joint revealed some changes. A hypointense mass was shown to occupy the acetabular fossa on both T1-weighted and T2-weighted images, and these findings indicated a space-occupying lesion in the acetabular fossa. With gadolinium-enhanced T1-weighted MR images with fat saturation, in which fatty tissues are hypointense and blood-rich tissues are clearly enhanced, the central area of the lesion was strongly enhanced and proliferative synovium was slightly enhanced (Fig. 2). With these MRI findings, preoperatively we suspected the lesion was osteoid osteoma or synovial chondromatosis. When arthroscopy was performed 5 months after the initial onset of symptoms, a smooth, bony lesion with synovial proliferation was seen on the fossa (Fig. 3). The lesion was removed by arthrotomy through a trans-trochanteric lateral approach. The base of the tumor was connected to the floor of fossa by a narrow cancellous bone. Pathological examination of the surgical specimen showed a central nidus, with surrounding sclerotic trabeculae with synovial proliferation. Osteoid osteoma with synovitis was diagnosed (Fig. 4). Eight years after the operation the patient no longer complained of pain and the range of motion of her hip joint had become almost normal. Plain radio-

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**Fig. 1.** Plain radiography (a) and computed tomography (CT) scan (b) demonstrated a well-defined oval and flat bone lesion protruding from the floor of the acetabular fossa (arrow)



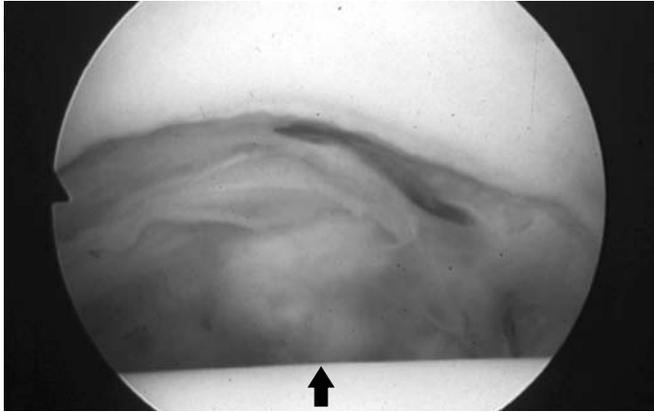
**Fig. 2.** T1-weighted (a) and T2-weighted (b) coronal images showed a hypointense mass lesion in the acetabular fossa. On the gadolinium-enhanced fat-suppressed T1-weighted coronal image (c) and axial image (d), the nidus was strongly enhanced and the proliferative synovium was slightly enhanced. The sclerotic bone between the nidus and synovium was hypointense



graphs and MRI showed no recurrence and femoral head osteonecrosis has not occurred as yet.

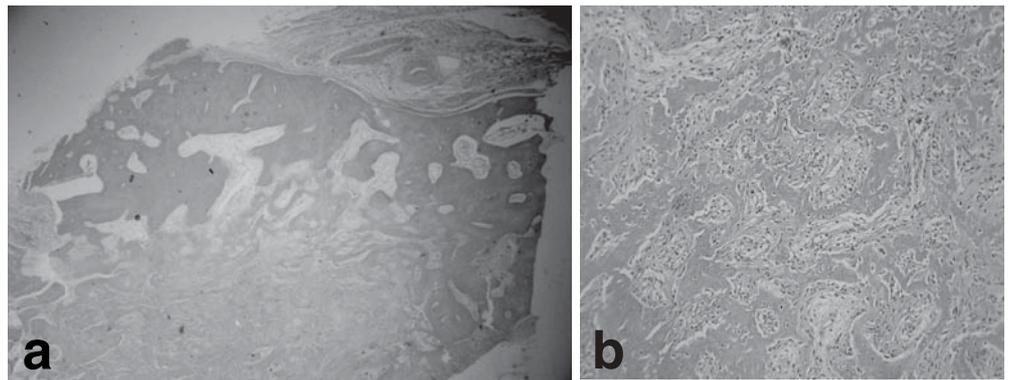
## Discussion

Although osteoid osteomas typically occur from metaphyseal or diaphyseal cortical bones, a few cases were reported in which intra-articular lesions had developed. Around the hip joints, the most common location of osteoid osteoma is intra-articular in the medial cortex, subperiosteal, or spongiosa of the femoral neck.<sup>1</sup> However, this condition rarely occurs in the acetabular fossa. Some authors have reported osteoid osteomas that develop in the cortical or cancellous bone of the acetabular fossa. Cohen and Rzetelny reported a 21-year-old man who developed osteoid osteoma in the acetabular wall, and a diagnosis of osteoid osteoma was suggested preoperatively.<sup>2</sup> Parlier-Cuau et al. reported three osteoid osteomas that developed within the medial part of the acetabular roof, the posterior part of the acetabular fossa, and anterior acetabular wall.<sup>3</sup> All of these were located within the acetabular bone. Gille et al. reported a 14-year-old girl and a 14-year-old boy with osteoid osteoma that developed from the acetabular wall to the



**Fig. 3.** Arthroscopic findings. A smooth, bony lesion with synovial proliferation on the acetabular fossa (arrow)

**Fig. 4.** Pathological findings. A central nidus with surrounding sclerotic trabeculae, with synovial proliferation. Hematoxylin-eosin stain



fossa.<sup>4</sup> In our case, the osteoid osteoma was narrowly connected with the floor of the acetabular fossa, so radiologically it seemed to be isolated and protrude into the joint space. Ninomiya et al. reported two cases of subluxation of the hip from osteoid osteoma.<sup>5</sup> Khapchik et al. reported arthroscopically assisted excision of osteoid osteoma involving the hip joint, and in one case the lesion was located in the acetabular fossa and protruded into the joint space.<sup>6</sup> The presence of bony lesions was detected by CT scans in most cases of osteoid osteoma of the acetabular fossa. However, preoperative diagnosis is not easy when using only radiographs and CT scans. Definitive diagnosis of osteoid osteoma can be determined by histological examination of the surgical specimen.

Although the value of MRI in diagnosis of osteoid osteoma is controversial,<sup>7</sup> images of intra-articular osteoid osteoma have been described recently. The nidus may be demonstrated by T2-weighted MR image (hyperintense, hypointense, isointense, or heterogeneous),<sup>8</sup> but in 21% of intra-articular osteoid osteomas the nidus is not identified, and is poorly identified in a further 29%.<sup>9</sup> Lee et al. reported osteoid osteoma from the tarsal cuboid of a 22-year-old man. The gadolinium-enhanced T1-weighted images obtained with fat saturation showed pronounced enhancement of adjacent bone marrow and soft tissue,<sup>10</sup> but the nidus was not well enhanced. Gaeta et al. diagnosed osteoid osteoma in a 22-year-old man with right hip pain. The lesion was located in the proximal femoral cortex, and gadolinium-enhanced fat-suppressed T1-weighted imaging revealed enhancement of the soft tissue and bone marrow edema and nidus, and therefore it was emphasized that the use of the fat-suppression technique permitted depiction of enhancement to a greater extent. However, the osteoid osteoma was located in the extra-articular cortex of the femur, and the synovium was not influenced.<sup>1</sup>

In our case T1- and T2-weighted MRI taken 2 months after the initial onset demonstrated little abnormality. However, after 4 months the gadolinium-enhanced T1-weighted images with fat saturation demonstrated features characteristic of intra-articular osteoid osteomas. On these images both the nidus and hyperemic synovium were hyperintense, and the nidus was very strongly enhanced. On the other hand, the sclerotic bone between the nidus and the

synovium was hypointense. The surgical specimen contained the nidus, and osteoid osteoma was diagnosed. Retrospectively, the gadolinium-enhanced T1-weighted MRI with fat saturation showed the characteristic central nidus and proliferative synovium, and this MR sequence may thus be valuable in cases in which diagnosis of intra-articular osteoid osteoma is difficult.

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## References

1. Gaeta M, Minutoli F, Pandolfo I, Vinci S, D'Andrea L, Blandino A. Magnetic resonance Imaging findings of osteoid osteoma of the proximal femur. *Eur Radiol* 2004;14:1582-9.
2. Cohen L, Rzetelny V. Osteoid osteoma of the acetabulum. *Clin Orthop* 1994;304:204-6.
3. Parlier-Cuau C, Nizard R, Champsaur P, Hamze B, Quillard A, Laredo JD. Osteoid osteoma of the acetabulum three cases treated by percutaneous resection. *Clin Orthop* 1999;365:167-74.
4. Gille P, Gross P, Brax P, Carcopino JM, Aubert D, Giordan H. Osteoid osteoma of the acetabulum: two cases. *J Pediatr Orthop* 1990;10:416-8.
5. Ninomiya S, Mamada K, Ozawa H, Ochiai N. Subluxation of the hip from osteoid osteoma. *Acta Orthop Scand* 1999;60:220-2.
6. Khapchik V, O'Donnell RJ, Glick JM. Arthroscopic assisted excision of osteoid osteoma involving the hip. *Arthroscopy* 2001;17:56-61.
7. Szendroi M, Kollo K, Antal I, Lakatos J, Szoke G. Intraarticular osteoid osteoma: clinical features, imaging results, and comparison with extraarticular localization. *J Radiol* 2004;31:957-64.
8. Allen SD, Saifuddin A. Imaging of intra-articular osteoid osteoma. *Clin Radiol* 2003;58:845-52.
9. Davies M, Cassar-Pullicino VN, Davies AM, McCall JW, Tyrrell PN. The diagnostic accuracy of MR imaging in osteoid osteoma. *Skelet Radiol* 2002;31:559-69.
10. Lee GK, Kang IK, Lee ES, Min SJ, Cho SW, Hwang DH. Osteoid osteoma of the Tarsal Cuboid mimicking Osteomyelitis. *AJR* 2004;183:341-2.