

# Osteoid Osteoma of the Femoral Neck Mimicking Monarthrititis and Causing Femoroacetabular Impingement

**Osteoidní osteom krčku kosti stehenní napodobující monoartritidu a způsobující femoroacetabulární impingement syndrom**

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## SUMMARY

Different aetiologies including the femoroacetabular impingement (FAI) may cause a painful hip, especially in young patients. Two general types of femoroacetabular impingement have been described, the pincer- and the cam type impingement. The latter is characterized by a femoral deformity, usually a bump on the head-and-neck junction that impinges on the acetabular rim. The authors describe the case of a 21-year-old male, bodybuilder, suffering from progressive hip pain with impairment of exercise tolerance, gait and other daily activities. Besides limitation of hip internal rotation physical examination was normal. He had a transitory response to non-steroid anti-inflammatory drugs. Initially performed MRI of the pelvis shows predominant inflammation of the hip joint. In external performed arthroscopy the biopsies of the capsule demonstrated chronic synovitis. In the follow up hip pain remains, however, diagnosis was still unclear. Re-evaluation of the formerly performed and a follow up MRI, and of an additional CT, the findings were compatible with an osteoid osteoma in the femoral cervico-cephalic transition causing itself a cam impingement and monarthrititis. The adopted therapeutic strategy consisted on arthroscopic excision of the nidus and trimming of the femoral neck, with clinical recovery after surgical intervention.

**Key words:** femoroacetabular impingement, FAI, osteoid osteoma, monarthrititis.

## INTRODUCTION

Pathology of the hip is a significant source of pain and dysfunction especially among athletic individuals and femoroacetabular impingement is often a causative factor; early-age-onset osteoarthritis in their fourth and fifth decades is often attributed to this process (1).

Cam impingement refers to the cam effect caused by a nonspherical femoral head rotating inside the acetabulum (4, 10). This may occur as a sequela of childhood disorders such as slipped capital femoral epiphysis, but most commonly is attributed to eccentric closure of the capital epiphysis in adolescence (8, 12).

In rare cases an underlying tumor such as an osteoid osteoma as described in the following case is causing cam impingement and is mimicking an inflammatory monarthrititis.

## CASE REPORT

Our patient was a 21-year-old athletic man (bodybuilder) with a history of a progressively worsening painful right hip for the last two years. Nocturnal pain was evident, and his work and sports activities were progressi-

vely limited due to the hip pain. A physical examination revealed pain with rotation at 90° of flexion, internal rotation was limited to 0° and external rotation was not impaired.

Initially performed MRI of the pelvis shows an inflammation of the hip joint with synovitis and joint effusion; a rheumatologic diseases was suspected as the underlying causative. An additional CT scan was not performed. As the laboratory test were all negative, an arthroscopy was performed to reach diagnosis. However, histologically biopsies of the capsule showed “nothing more” than an unspecific synovialitis.

Two years later patient was transferred to our hospital in cause of continuous and progressive hip pain. Clinical examination was as previously described, the anterior impingement test was positive.

Radiographs unveiled a cam deformity at the anterosuperior side of the femoral head and mild degenerative changes on the acetabular side (Fig. 1a, b). A repeated MRI was performed as well as the re-evaluation of the primarily MRT was done. The MRIs show synovitis including joint effusion in the hip joint, and the enhancing nidus of an osteoid osteoma in the lateral aspect of the femoral neck. Mild bone marrow edema was evident (Fig. 2a, b).

The additionally CT clearly demonstrated the well defined round nidus with low attenuation (Fig. 3). An

area of high attenuation may be seen centrally, a finding that represents mineralized osteoid.

Arthroscopic intervention was performed to address the joint damage and underlying impingement: the bone was reshaped, re-creating the normal concave relations-hip at the junction of the articular surface, eliminating the osteoid osteoma suspected cam lesion (Fig. 4) which was confirmed in the histologic examination of the resected bone (Fig. 5).

Patient clinically recovered after surgical intervention.

## DISCUSSION

Femoroacetabular impingement (FAI) is a condition characterized by a repetitive abnormal contact of the acetabular rim with the femoral head-neck region, which leads to the development of early osteoarthritis of the hip (4, 6). Although the etiology of FAI is still unclear, a variety of causes have been described, such as excessive sporting activities and post-traumatic or congenital deformities (for example, developmental dysplasia of the hip). In rare cases other causatives such as tumors are responsible for the impingement

There are three types of FAI: cam type, pincer type, and mixed type. When ossifications of the acetabular rim causes overcontainment of the hip, this is referred to as



Fig. 1a, b. Preoperative anteroposterior radiograph of the pelvis and lateral view of the left hip: The osseous prominences on the left femoral head at the lateral head-neck junctions (arrows) reflect the cam component.

a | b

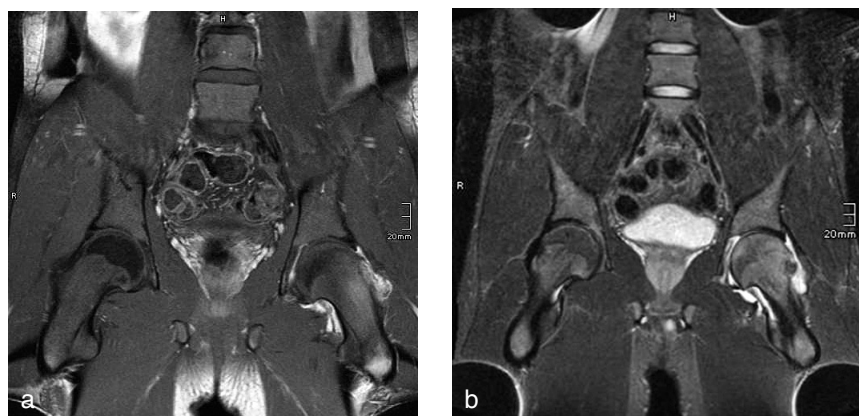


Fig. 2a, b. Cortical osteoid osteoma of the femoral neck. (a) Coronal T2-weighted fat-suppressed MR image shows a calcified nidus (arrow) in the right femoral neck with mild bone marrow edema, synovitis and joint effusion (b) Gadolinium-enhanced T1-weighted fat-suppressed MR image shows the calcified nidus (arrow) and synovial enhancement.



Fig. 3. At CT, the nidus is well defined and round or oval with low attenuation. An area of high attenuation may be seen centrally, a finding that represents mineralized osteoid.

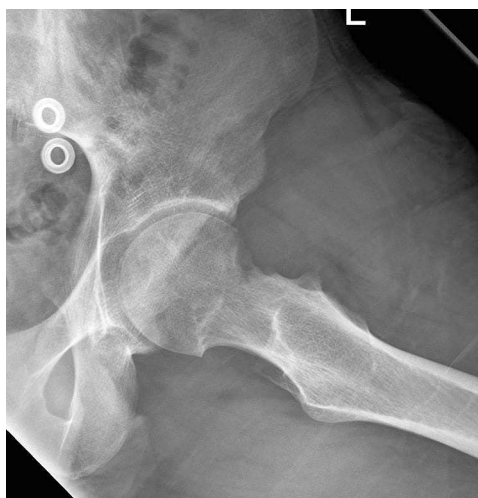


Fig. 4. Postoperative radiograph in the lateral view demonstrated removed cam-type deformity from the femoral neck.

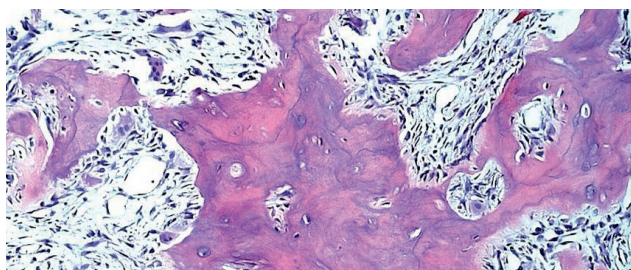


Fig. 5. Histologic features of osteoid osteoma. Photomicrograph of nidus containing irregular, randomly orientated trabeculae of osteoid and woven bone. Abundant osteoblasts and osteoclasts border the trabeculae ( $\times 100$ ; Hematoxylin-eosin stain).

a pincer type FAI. Cam type FAI refers to deformations of the femoral head that reduce the head-neck offset. The two types have been reported to occur simultaneously in 86% of patients (3). However, recent evidence indicates that cam and pincer hips are distinct pathoanatomic entities (6).

FAI is diagnosed on the basis of history, clinical assessment and imaging evidence from radiographs, magnetic resonance imaging, ultrasound scans and computed tomography (7).

Treatment options vary, and include surgical dislocation and arthroscopic surgery. Satisfactory outcome is reported to range from 90% to 100% for arthroscopic management and from 68% to 80% for open surgery (11). Early diagnosis and appropriate treatment of FAI make it possible to halt the development of osteoarthritis of the hip.

However, the osteoid osteoma itself can be a causative of an inflammatory arthritis and a cam impingement, as demonstrated in our case.

Osteoid osteoma is a benign bone tumor that occurs most frequently in male patients between 5 and 24 years old. Most patients experience pain that worsens at night and is promptly relieved by the administration of salicylates (1).

They usually occur in the shaft of the long bones, especially the femur and tibia (1, 13).

Osteoid osteoma are classified as cortical, medullary (cancellous), or subperiosteal on the basis of radiographic findings. Typical radiographic findings include an nidus, which may display a variable amount of mineralization, accompanied by cortical thickening and reactive sclerosis in a long bone shaft. Located intraarticular, the sclerosis may be not much prominent.

The radiolucent focus often is referred to as the nidus because the focus usually is located in the center of an area of reactive sclerosis. The nidus is round or oval and usually smaller than 2 cm. Bone density may be decreased because of disuse due to pain (5).

At CT, the nidus is well defined and round or oval with low attenuation. An area of high attenuation may be seen centrally, a finding that represents mineralized osteoid. Reactive sclerosis is apparent and ranges from mild cancellous sclerosis to extensive periosteal reaction and new bone formation, which may obscure the nidus (5).

MR imaging depicts not only the nidus and accompanying sclerosis but also adjacent bone marrow and articular abnormalities (9, 13). The nidus has low to intermediate signal intensity on T1-weighted images and variable signal intensity on T2-weighted images, depending on the amount of mineralization present in the center of the nidus. Edema in adjacent bone marrow and soft tissue and joint effusion also may be seen (5). The nidus also may demonstrate strong enhancement after the administration of gadolinium-based contrast material (13).

Intraarticular osteoid osteoma most commonly involve the hip joint. The ankle, elbow, wrist, and knee are less commonly affected (2). It is rare, and its clinical manifestations may be puzzling. Pain is not necessarily worse at night in patients with intraarticular osteoid osteoma, and joint pain that is relieved by salicylates may have other causes. Joint tenderness, joint effusion, extensive bone marrow and soft-tissue edema may be prominent, and these symptoms may contribute to the diagnostic confusion (5). Findings such as these may cause radiologists to suspect an entity other than osteoid osteoma.

In our case initially the presence of synovial hypertrophy and joint effusion was suspected for a rheumatic disease and the first (external) arthroscopy was made to reach the diagnosis histologically.

To make a correct diagnosis, it is essential to identify the nidus and be open to the possibility of an osteoid osteoma, as seen in our case when re-evaluating the radiographs.

## CONCLUSION

Pathology of the hip is a significant source of pain and dysfunction and femoroacetabular impingement (FAI) is often a causative factor. Even an osteoid osteoma may have an imaging and clinical appearance similar to those of the FAI and should be included in the differential diagnosis.

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