



Case Report

# Mega-Exostosis of the Anteroinferior Iliac Spine in Young Athlete

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## Abstract

**Introduction:** Extra-articular hip impingement caused by the anterior inferior iliac spine (AIIS) is an uncommon cause of groin pain in young athletes. Calcific tendinopathy of the direct head of the rectus muscle, labral tears, and bone tumor are some causes of hip pain.

**Case Report:** We report a case of mega-exostosis of right AIIS in a young football player with no clear history of sports injury. Although the most common treatment for femoro-acetabular impingement is arthroscopic decompression, we used the modified Smith Petersen small anterior approach. Through the detachment of the rectus tendon and osteotomy, this technique allowed us to remove the voluminous exostosis.

**Discussion:** The patient benefited extensively from the chosen treatment returned to competitive activity, with an improvement of 34 points in the modified Harris Hip Score. The bone formation was a consequence of unrecognized fracture/avulsion of AIIS and was the cause of hip impingement.

**Keywords:** Exostosis; Hip impingement; Sport injury; Orthopedic

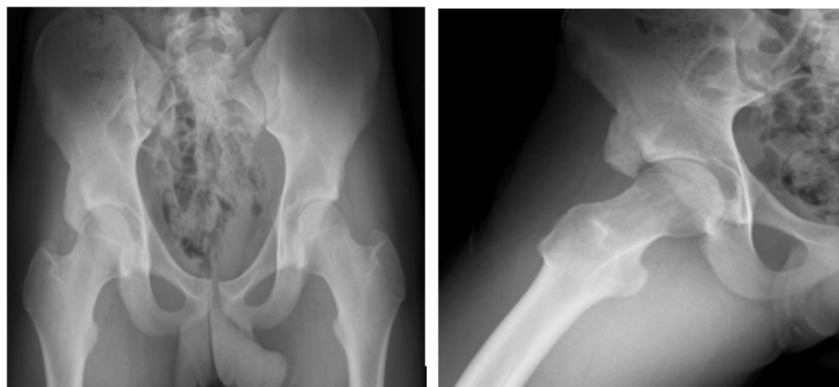
## Case Report

### Introduction

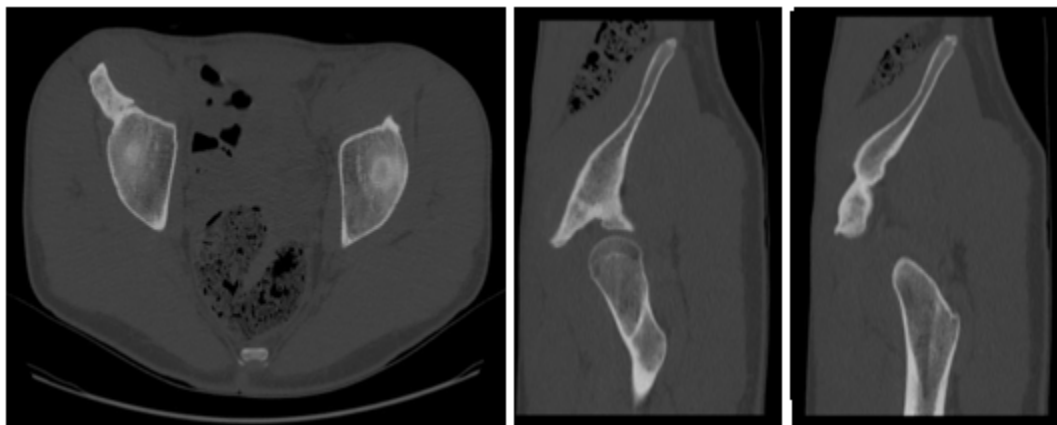
Femoroacetabular impingement (FAI) is a frequent cause of mechanical hip pain, in the last few years a lot of attention has been paid to it. The cause of FAI is the abnormal contact between the femurs against the acetabular rim secondary to intra-articular or extra-articular factors. The abnormalities in the femoral head-neck junction (cam lesion), acetabulum (pincer lesion), or a combination of both are part of the intra-articular causes [1,2]. Whereas, extra-articular causes of hip impingement, including anterior inferior iliac spine (AIIS) impingement, psoas impingement, greater trochanteric–pelvic impingement, and ischio-femoral impingement [3].

A 16-year-old male non-agonistic football player presented with a 1-year history of right hip pain exacerbated after simple hip hyperflexion trauma. He rated his pain as a 7 on a 10-point scale (0, no pain; 10, most pain imaginable). The pain was irradiated along the course of the rectus femur muscle. He did not remember direct or indirect trauma to the right hip in the past, nor sports injuries. There was no history of fever, lack of appetite, or weight loss. The past medical history was insignificant; there was no history of antecedent surgery or radiation exposure. The general physical and systemic examinations were within normal limits. Recently he presented with antalgic limps, running and jumping aggravated the pain, as well as sitting for a long period of time. He gave up on sports activities. Objectively he presented pain and

hard swelling on palpation over the AIIS. The range of motion (ROM) of the right hip was limited to 85° of flexion, 10° of internal rotation, 40° of external rotation and 30° of hip abduction compared with the contralateral side which had normal ROM values (120°, 30°, 45°, and 45° respectively). The right hip extension was equal to the contralateral hip. Initial standard anteroposterior (AP) and Dunn lateral view were obtained. Radiographs demonstrated an irregular bone formation at the level of the AIIS (Figure 1). The exostosis of AIIS with an anteroinferior course and contiguity with the origin of the anterior rectus muscle was confirmed by computed tomography (CT) scan (Figure 2). The MRI findings showed signal modifications at the level of AIIS without periwound reaction or edema and without influences on the surrounding tissue. The hematological and biochemical tests were within normal limits. The tests performed suggested a benign lesion, most probably an exostosis. Excisional surgery of the exostosis and histological examination were suggested to the young patient.



**Figure 1:** Standard AP Xray (A) and Dunn lateral view (B).



**Figure 2:** CT scan view on transverse (A) and sagittal (B,C) reconstructions.

Excision surgery was performed through a 10 cm incision with an anterior, modified Smith-Petersen approach. The tensor fascia was incised, the deep layers were dissected until the lesion was reached. High attention was aimed at not harming the lateral femoral cutaneous nerve and the femoral nerve. The mass was removed using an osteotome, it was of compact consistency and macroscopically the separation between compact and spongy bone was clearly evident. It was sent for histopathological examination. The direct head of the rectus femoris, previously collected, was reinserted at the AIIS base through an 5,5mm PEEK anchor (Figure 3). After surgery we performed standard X-ray (Figure 4). Partial weight-bearing was permitted and was advised to avoid hip hyperextension and maximum rotations. The patient's recovery period of 4 weeks has fully re-integrated him into his daily activities. He returned to sports activities in three months without pain. The histopathologic findings were as follows: cortical cancellous bone fragment with mature cells pattern. The young athlete underwent a clinical and radiological (X-ray) follow-up at one and two years. The situation was the same: he leads a normal life, free from functional limitations and pain. He practices competitive sports at a level comparable to boys of his age. The ROM

of the right hip was: 115° of flexion, 20° of internal rotation, 50° of external rotation, and 55° of hip abduction. Values fully comparable to the contralateral hip. Radiographs demonstrated radiographic anatomy of the hemipelvis comparable to postoperative control. No appearance of heterotopic ossification or bone recurrence was present.



**Figure 3:** Bone exostosis removed (A), macroscopically the separation between compact and spongy bone was clearly evident. Modified Smith-Petersen approach (B) and use of 5,5mm PEEK anchor to reinsert the direct head of rectus femoris tendon (C).



**Figure 4:** Pelvic standard AP Xray after surgery.

## Discussion

Femoroacetabular impingement (FAI) is a frequent cause of hip pain and attention has been paid to it in recent years. Abnormal morphology of the AIIS in adolescent population may result from nonunion or malunion after an acute avulsion fracture or may be secondary to repetitive traction injury leading to apophysitis [4,5]. Typically, pelvic avulsion fractures heal without surgery. Open reduction with internal fixation has been recommended for fractures displaced more than 2 cm. Conservative treatment with protected weight bearing may become complicated with persistent pain and nonunion. The formation of an exostosis after fracture of the AIIS is a rare but well-recognized phenomenon [6]. This study described a case of AIIS idiopathic hypertrophy in a young patient who presented us with chronic hip pain. He remembered no direct or indirect trauma to the right hip in the past. Pathologies arising in the AIIS include muscle/tendon tears and avulsion injuries, tendinopathy, myositis ossificans, and bone/soft tissue tumors like solitary osteochondroma [4,7,8]. Given the radiographic characteristics of the lesion, the intraoperatively observed contiguity with the rectus tendon and the histologic findings, we believe that an unrecognized fracture/avulsion was the cause of impingement. Although as many as 22% of patients with AIIS avulsion fracture develop pain 3 months or more after the initial injury, there are only isolated case reports of surgical treatment of adolescent patients with subspine FAI secondary to a hypertrophic AIIS [9]. Hip arthroscopy is a technically challenging procedure with the advantage of exposure and treatment of intra-articular pathology, including labral tears when present. This technique is appropriate for post-traumatic ossifications or calcific tendinopathy of the rectus femoris [10]. The conspicuous size of the lesion in our patient prompted us to use a modified Smith Petersen small anterior approach [11]. This approach is widely known by most pediatric orthopaedic surgeons and allows for full exposure of the AIIS as well as to the femoral head-neck junction if treatment of a cam-

FAI deformity is required [12]. Our patient benefited extensively from the chosen treatment, without complications and relapses at follow-up. From the evaluation of the modified Harris Hip Score, he started from a score of 66 (poor) to reach a maximum score of 100 (excellent). While from the evaluation of the NAHS score (non-arthritis hip score) it reached the maximum score of 100 starting from 53.75 points before surgery. Exostosis of AIIS should be considered in the differential diagnosis for atypical groin pain, and radiographic assessment be undertaken even in the absence of a clear sports injury history. Persistent symptoms after acute avulsion of the AIIS are rare but a potential source of dysfunction in the adolescent athlete. The arthroscopic approach can be considered a feasible and effective option provided the lesion is of limited size. The modified Smith Petersen small anterior approach allows a broader view and evaluation of the exostosis and a subtotal excision. In case of unknown bone lesions, open surgery allows obtaining samples more suitable for histology. When extra-articular impingement from a prominent AIIS is identified, the combined open surgical treatment and rehabilitation described herein may be considered as the treatment of choice.

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