

# Bilateral Ischiofemoral Impingement: A Case Report and Literature Review

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## Review Article

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## Abstract

**Background:** Ischiofemoral Impingement (IFI) is rare disease and more common in females than in males. It is characterized by hip and groin pain with abnormalities of the quadratus femoris muscle. The narrowing of ischiofemoral space (IFS) and quadratus femoris space (QFS) are the main causes. It is easy to be missed diagnosis in daily clinical works.

**Case Report:** We report the case of a 16 years old girl without trauma, pain in the right hip region only under loading. In MRI there exist an obvious narrowing IFS and QFS with edema in quadratus femoris muscle. The measurement of the neck-shaft angles is also greater than normal.

**Conclusions:** IFS should be paid more attention when the hip or groin pain occurred. MRI is the best methods for the diagnosis of the IFI. The main treatments include conservative treatment, operation treatment and steroid injection but no ideal one. Further study should be taken to find a better treatment of IFI.

**Keywords:** Ischiofemoral Impingement; Ischiofemoral space; Quadratus femoris space; Neck-shaft angles

## Introduction

Ischiofemoral Impingement (IFI) is rare disease and more common in females than in males. It is characterized by hip and groin pain with abnormalities of the quadratus femoris muscle. Slow onset of the disease and normally without a history of trauma. The narrowing of ischiofemoral space (IFS) and quadratus femoris space (QFS) are the main causes. It is easy to be missed diagnosis in daily clinical works. IFI was first reported by

Johnson in 1977 [1]. A clear definition about Ischiofemoral Impingement (IFI) Syndrome was given by Torriani in 2009 [2]. The narrowing of ischiofemoral space (IFS) and quadratus femoris space (QFS) in MRI can be diagnosed as ischiofemoral impingement syndrome.

### Case presentation

We report the case of a 16years old girl without trauma, activity football player. The pain about the right hip region continues for 4-5 weeks only under loading without nocturnal pain and rest pain. Since 1 week ago, there is a limitation of motion in football training, appeared 3 times. The physical examination: The patient is in normal gait with slightly limping. The level of pelvic is normal. Lower extremity ante torsion is  $15^{\circ}$  in both sides. External rotation is  $20^{\circ}$ . The movement of hips is normal. The treatment included physiotherapy, rest, stopping playing football and 6 weeks following up.

In MRI there exist obvious narrowing IFS and QFS with edema in bilateral quadratus femoris muscle (Table 1, Figure 1 a-b, Figure 2 a-d). The IFS are 23.38 mm on the left side and 20.53 mm on the right side. Results of QFS are 11.40 mm on the left side and 10.07 mm on the right side. The coxavalga is evaluated by neck-shaft angle. The measurement of the neck-shaft angles is also greater than normal, the neck-shaft angles are  $144.11^{\circ}$  on the left and  $144.40^{\circ}$  on the right side respectively (Table 1, Figure 3 a-b). Bilateral ischiofemoral impingement was diagnosed on that basis.

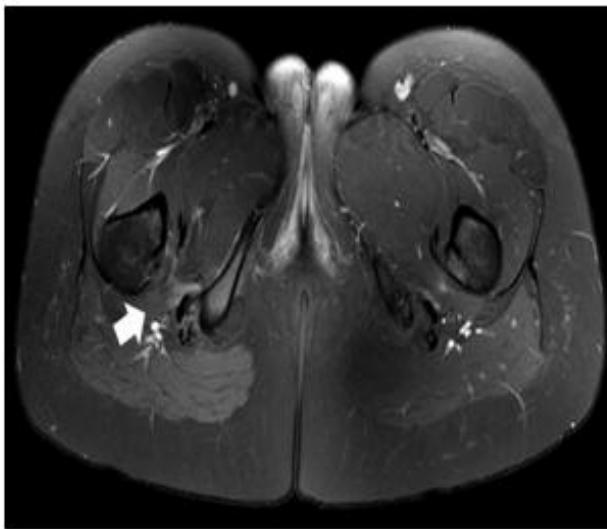


Figure 1a

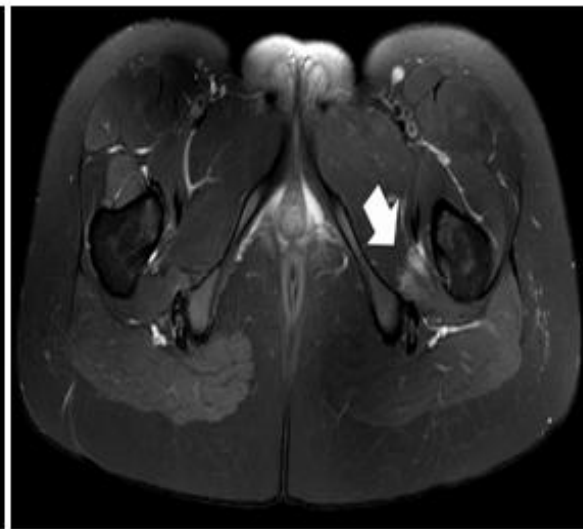


Figure 1b

Figure 1: The edema in bilateral quadratus femoris muscle axial T2- Weighted magnetic resonance imaging (MRI) images of the hips.

	IFS (mm)	QFS (mm)	Neck-shaft angle ( $^{\circ}$ )
Left	23.38	11.40	144.11
Right	20.53	10.07	144.60

Table 1: The measurement results about IFS, QFS and Neck-shaft angle.

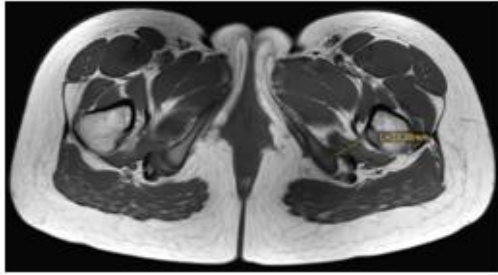


Figure 2a

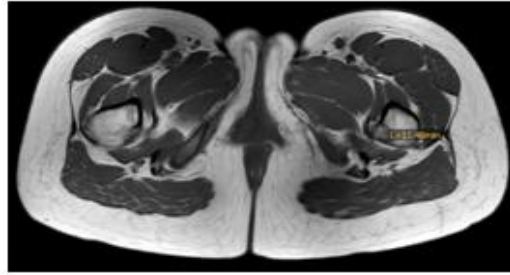


Figure 2b

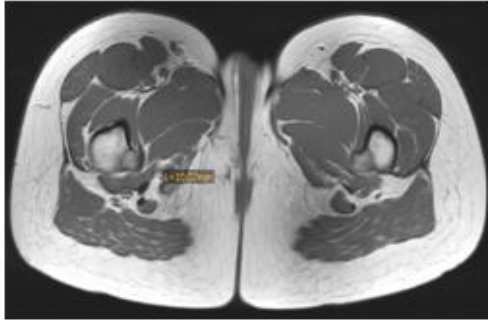


Figure 2c

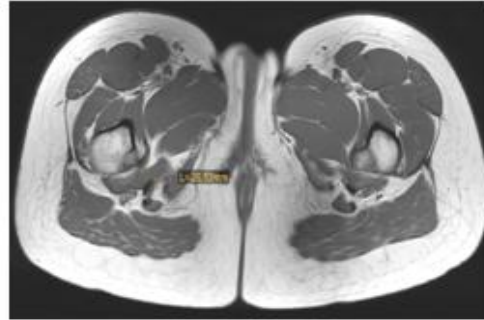


Figure 2d

Figure 2 a-d: The measurement of the IFS and QFS in bilateral. (Measured in mm).  
 a. QFS on the left side; b. IFS on the left side;  
 c. QFS on right side; d. IFS on right side.

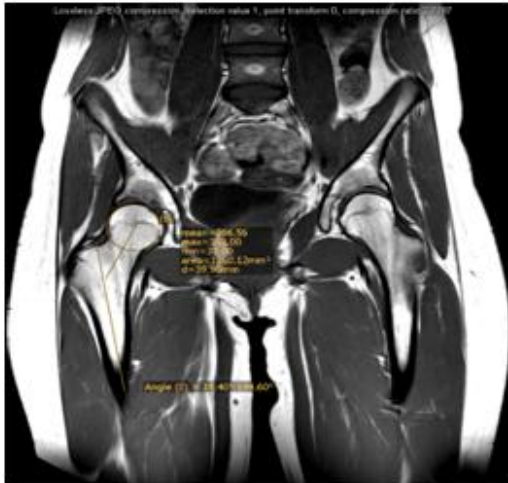


Figure 3a

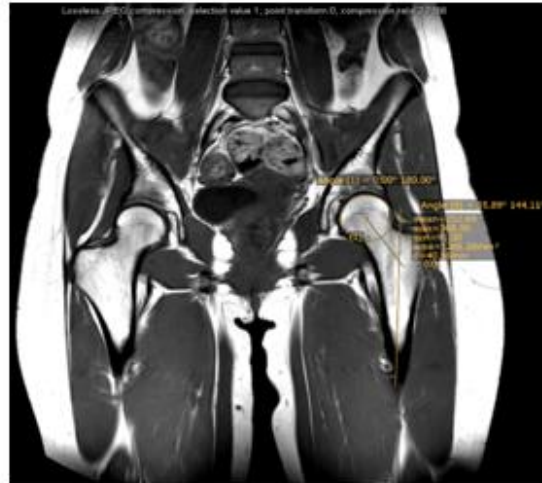


Figure 3b

Figure 3 a-b: The measurement of the Neck-shaft angles. (Measured in mm)  
 a. Right side results of Neck-shaft angles.  
 b. Left side results of Neck-shaft angles.

## Discussion

IFI was first reported by Johnson in 1977 [1]. He reported 3 patients with continuous pain after the hip operations. The x-ray showed that the distance between ischial tuberosity and the femoral lesser trochanter was obviously narrowed due to the hip operations. After the femoral lesser trochanter resection of these three patients, the pain was completely relief. Thus we recognized that the abnormal impingement between ischial tuberosity and the femoral lesser trochanter may cause the hip pain.

A clear definition about Ichiofemoral Impingement (IFI) Syndrome was given by Torriani in 2009 [2]. The narrowing of ischiofemoral space (IFS) and quadratus femoris space (QFS) in MRI can be diagnosed as ischiofemoral impingement syndrome.

The quadratus femoris muscle is a flat, quadrilateral skeletal muscle. It is a strong external rotator and adductor of the thigh, and also acts to stabilize the femoral head in the acetabulum [3]. It is located on the posterior side of the hip joint, between the ischiofemoral spaces. Normally the space between ischial tuberosity and the femoral lesser trochanter is enough, when the narrowing of ischiofemoral space occurred; the quadratus femoris would experience a repeated friction by ischial tuberosity and the femoral lesser trochanter and get injured. The normal distance between ischial tuberosity and the femoral lesser trochanter is approximately 20mm [1].

In order to evaluate the space between ischial tuberosity and the femoral lesser trochanter more accurately. We need to measure the IFS (Ischiofemoral Space) and QFS (quadratus femoris space) [2,4-7]. There are many research focuses on their point to the IFS and QFS measurement. A meta-analysis with 217 IFI shows that cases of IFI showed significantly smaller IFS and QFS compared to controls ( $14.91 \pm 4.8$  versus  $26.01 \pm 7.98$  and  $9.57 \pm 3.7$  versus  $15.97 \pm 6.07$ , respectively) [8]. In our study, the IFS are 23.38 mm on the left side and 20.53 mm on the right side. And the QFS is 11.40 mm on the left side and 10.07 mm on the right side.

Coxsvalga is considered play an important role in IFI, especially in adolescent case [9]. The femoral neck inclination (femoral neck-shaft angle) is also known as Center-Collum-Diaphysis angle (CCD angle), it is greater in newborns (approximately  $150^\circ$ ) and smaller in adulthood (approximately  $120^\circ$ ) [10]. Normally in 15 years old, the neck-shaft angle is nearly  $130^\circ$ . In our case,

the neck-shaft angles are  $144.11^\circ$  on the left and  $144.40^\circ$  on the right side. A higher prevalence of extra-articular impingement has been found for coxavalga. Patients with IFI show increased femoral neck-shaft angle compared with controls, suggesting that increased femoral neck-shaft angle may lead to the narrowing of the IFS [9,11-13].

MRI now is the best methods for the diagnosis of the IFS. In the recent researches, the ultrasound has been proved to have the similar measurements results with MRI [14]. And ultrasound-guided injections can also relieve the pain of hip [15]. However, the MRI findings of IFI not only include a narrowed space between the lesser trochanter of the femur and the ischial tuberosity but also the edema or atrophy in the quadratus femoris muscle. The most important is that we can evaluate the whole hip joint and given a clear result.

The main causes for the narrowing of the ischiofemoral space are postural, congenital and acquired reason. Postural reason means when patient in a position like internal/external rotation, adduction/abduction and flexion/extension, the different position will cause the narrowing of the IFS [2,11]. Compared to male, the anatomy structure of the female pelvis has a longer transverse diameter, a shorter anteroposterior diameter and a wider ischial tuberosity, so the IFS is smaller and with less tolerance for further narrowing [16]. The acquired reason are common in operation which can influence the femoral lesser trochanter, serious osteoarthritis of the hip and tumor [1,5,6,17].

For the treatment of the IFI, there was also lack of efficient treatment. According to the symptom of the patient we can choose conservative treatment or operation treatment.

CT-guided/Ultrasound-guided steroid injection was also mentioned in some reports.

The conservative treatment included rest, physiotherapy, NSAIDs, and limitation the activity of the patient [17,18], and normal used in the mild case. For this patient, our treatment included physiotherapy, rest, stopping playing football and 6 weeks following up.

The operation treatment included opening operation and arthroscopy operation. The main aim is to get more space between ischium and the femur through the resection of femoral lesser trochanter. But the operation will cause the hip flexor weakness and the relevant operation complication [4,16,19]. New researches of treatments focus more on the temporary relief of the pain.

For example, CT-guided steroid and local anesthetic injection around the quadratus femoris can relieve the pain temporary [16], but was not recommended as a first choice. Ultrasound-guided corticosteroid injection of the quadratus femoris muscle can also relieve the pain of the hip. However, the long term following up is also needed [15]. Other new treatment like prolotherapy with polyoxy ribonucleotide are also reported useful, but also lack long term following up and repeatability [20].

## Conclusion

IFS should be paid more attention when the hip or groin pain occurred. MRI is the best methods for the diagnosis of the IFI. The main treatments include conservative treatment, operation treatment and steroid injection but no ideal one. Further study should be taken to find a better treatment of IFI.

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