

Iliotibial band syndrome following hip arthroscopy: An unreported complication

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ABSTRACT

Background: Hip arthroscopy is considered a safe procedure, considering the relatively low rate of complications. Despite several complications have been described following this surgical procedure, the present event has not yet been described. The purpose of the present study is to report an unpublished complication following hip arthroscopy, after reviewing 162 hip arthroscopies and finding iliotibial band syndrome (ITBS) in the knee during followup.

Materials and Methods: A retrospective review of 162 hip arthroscopies performed between September 2007 and June 2011 was carried out, evaluating patients who presented ITBS during followup. Indication for hip arthroscopy was failure of conservative treatment in patients with symptomatic femoroacetabular impingement.

Results: During a minimum followup of 2 years, nine patients (5.5%) developed ITBS. All patients were diagnosed with ITBS within the first 45 postoperative days. Conservative treatment was successful in 6 patients while 3 had to undergo surgery. The increased internal rotation, synovitis and increased adduction of the hip can be attributed as predisposing factors to the development of ITBS.

Conclusions: This is a newly described observation within followup of hip arthroscopy. These findings may help orthopedic surgeons when planning rehabilitation after hip arthroscopy, including stretching exercises to prevent this syndrome.

Key words: Hip arthroscopy, iliotibial band syndrome, postsurgical complications, unreported complication

MeSH terms: Arthroscopy, postoperative complications, hip joint, rehabilitation

INTRODUCTION

An exponential increase in hip arthroscopy has been observed worldwide during the more recent years. This is possible partially due to the improvements of surgical instrumentation and the greater knowledge of pathologies such as femoroacetabular impingement (FAI).¹ Hip arthroscopy is not only a less-invasive surgery but also allows an excellent visualization of the intraarticular pathology. The evaluation of pain or stiffness in functional tests has shown that arthroscopy's outcomes can be compared to those obtained following open surgery due

to the continuous improvement within arthroscopy.^{2,3} However, our group has observed a syndrome following hip arthroscopy that, to our knowledge, has not yet been described in the current literature. Iliotibial band syndrome (ITBS) in the knee was observed in a group of patients who had undergone hip arthroscopy.

ITBS is commonly caused by a repeated movement in patients who practice sports such as cycling or runners, secondary to increasing tension over the fascia lata in its adjacent portion to the lateral femoral condyle. Treatment is usually conservative with nonsteroidal anti-inflammatory drugs (NSAIDs) and physical therapy and when conservative treatment fails, the preferred surgical correction is a Z-plasty. This syndrome has not yet been described in patients who have undergone a hip surgery.

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Resolution of the joint's stiffness, with resection of the femoral head and neck, can reduce the joint's mobility restriction and thus contribute to an increased tension over the fascia lata, increasing tensions in more areas of friction such as the lateral femoral condyle area.

The aim of the present study is to present the appearance of ITBS following hip arthroscopy, an unreported complication of this procedure. Our hypothesis is that ITBS may appear due to surgical modifications during hip arthroscopy; the surgical correction of FAI caused by early degenerative changes of the joint.

MATERIALS AND METHODS

A retrospective review of 162 hip arthroscopies performed between September 2007 and June 2011 was carried out, evaluating patients who presented ITBS during followup. The same orthopedic surgeon performed all hip arthroscopies. As part of our clinical protocol, Tönnis classification for osteoarthritis was used in all patients preoperatively [Tables 1 and 2].⁴ Inclusion criteria for the present study were age over 18 years old, symptomatic FAI with joint stiffness and failure of conservative treatment and thus proposing hip arthroscopy. Exclusion criteria were other indications for hip arthroscopy. No Tönnis III was included in the present study as hip arthroscopy was not an indication in these patients. Furthermore, internal rotation values were recorded before and after surgery to evaluate any existing significant difference.

In the present study, ITBS diagnosis was made upon clinical history and physical examination, which revealed selective pain of distal femoral fascia, adjacent to the lateral epicondyle of the femur. In addition, ultrasound imaging was performed in all patients, revealing moderate thickening of the iliotibial band next to the lateral femoral condyle as well as disruption of the posterior fibers. The same operator

Table 1: Classification of patients according to their Tönnis grade

Tönnis classification	Number of patients
0	82
I	61
II	19

Grade 0: No signs of osteoarthritis. Grade I: Increased sclerosis, slight joint space narrowing (not less than 2 mm). Grade II: Moderate joint space narrowing (less than 2 mm). No patient was of Grade III (severe joint space narrowing with severe deformity of the femoral head)

Table 2: Type of femoroacetabular impingement in the group of patients included

Type of lesion	Number of patients
Cam	104
Combined Cam-pincer	35
Pincer	23

performed ultrasonography in all cases. The diagnosis of pain over the iliotibial band could be made given the early symptoms, due to the difference of clinical symptoms with neurological lesions. Neurological injuries produce dysesthesias or hypoesthesia within the proximal thigh and not in the distal part of the thigh as defined in the ITBS.

Patients were not evaluated with electromyography; diagnosis was based upon medical history and physical examination (including Ober test).

Conservative treatment was conducted in all ITBS patients. This consisted of oral NSAIDs and physical therapy, including stretching exercises for the iliotibial band and abductor and adductor muscles combined with toning of the hip flexors and knee extensors. Patients who did not show improvement with the conservative method were treated with two local corticosteroid injections. Eventually, if symptoms continued, surgical treatment to lengthen and release the iliotibial band was performed [Figure 1]. Most patients responded to the conservative treatment within 3 weeks of treatment. Those patients who continued with their painful symptoms that prevented them from continuing with physical therapy were suggested for surgical treatment (Z-plasty). The surgically treated patients had a minimum conservative treatment of 8 weeks.

The outcome scores were performed before surgery and after surgery at 3, 6, and 12 months and yearly afterward.

Student's *t*-test was used to assess differences within internal rotation before and after surgery.

The present study meets the ethical standards.

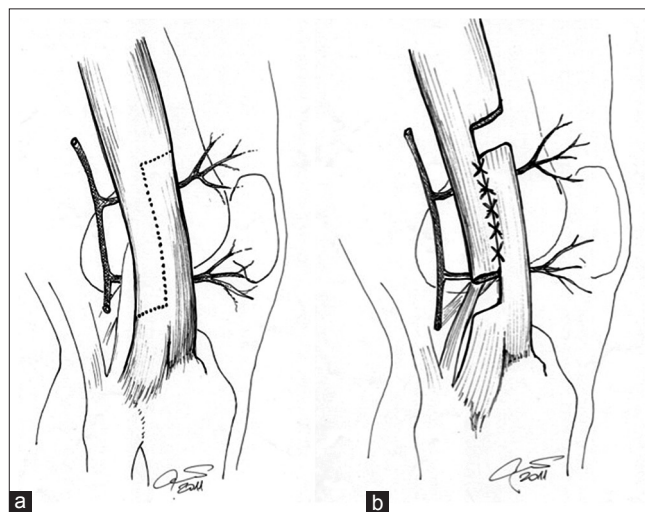


Figure 1: Schematic diagram showing (a) Approach over the iliotibial band to perform a Z-plasty. (b) Final result after the suture with the new position of both bundles of iliotibial band

RESULTS

ITBS was observed in 9 of 162 patients (5.5%) following hip arthroscopy. Demographic and functional description of these 9 patients was collected [Table 3].

All patients were diagnosed with ITBS within the first 45 postoperative days. None of the 9 patients had previous related medical history. Six patients of nine diagnosed with ITBS resolved their symptoms with 3 months of physical therapy and the association of local corticosteroid injections in three cases. Of the remaining three cases, after an absence of clinical improvement with conservative treatment and two corticosteroid injections, a surgical treatment was performed. Conservative treatment was performed during at least 8 weeks in these three patients.

Only one patient (1 in 9, 11.1%) did not regain their level of activity prior to the lesion and underwent hip arthroscopy again. The patient was diagnosed with fibromyalgia during the later followup. All patients remained asymptomatic regarding ITBS during the 2-year followup [mean 28.4 months [standard deviation 7.8], once their ITBS had been resolved.

Regarding the overall outcomes of the 162 hip arthroscopies included in the present study, 24 ended in total hip arthroplasty (14.81%) during a 2-year followup. All cases experienced an improvement in pain following hip arthroscopy although clearly unacceptable for the patient who chose joint replacement. Neurological lesions occurred in 12 cases of 162 (7.4%); 2 patients showed perineal affection presenting as penile dysesthesias and the remaining 10 affecting the lateral femoral cutaneous nerve, of which 2 have remained up until now with regional hypoesthesia of the thigh.

About 3.08% of the patients who underwent hip arthroscopy (5/162) did not experience improvement of their pain and complain of greater pain since surgery.

These cases were later orientated, during followup, with other clinical diagnosis (pudendal nerve neuropathy, radiculopathy due to spinal disc herniation and 3 cases with unclear diagnosis).

Regarding internal rotation results, statistically significant differences ($P = 0.02$) were found between preoperative internal rotation values and postoperative. Individual scores are shown in Table 3.

DISCUSSION

Over time indications for hip arthroscopy have been increasing,⁵ already suggesting in some series indication for more advanced stages of osteoarthritis (Tönnis II)^{2,6} compared to open surgery in which the results are not as satisfactory as expected due to the established chondral lesions.^{7,8} It is mostly young patients, with greater functional demand, that could benefit from treatment with arthroscopy which may well alter the natural course of the joint and slow down the move toward open surgery, osteotomy, or total hip arthroplasty. The appearance of early ITBS after hip arthroscopy due to a hip pathology with a previous limited range of motion in most cases makes us believe that the increase in range of motion together with the local inflammatory changes secondary to the surgical process could contribute to ITBS.

Complications in hip arthroscopy are largely transient and range between 0.5% and 6.4%.^{9,10} Hip arthroscopy is considered as a low-risk surgical procedure. However, several complications of different stages have been described and must be taken into consideration.¹¹⁻¹⁴

The iliotibial band is a thick extension of the tensor fascia latae and gluteus maximus muscles. It expands to join the lateral patellar retinaculum before crossing the lateral joint line to attach to Gerdy's tubercle.¹⁵ It functions as an extensor and flexor of the knee, depending on the angle of knee flexion. ITBS is caused by increased compression of a highly

Table 3: Demographic and functional description of the nine patients included in the study who developed iliotibial band syndrome following hip arthroscopy

Gender	Age (in years)	Indication for arthroscopy	Tönnis	ROM 1 (° F/IR)	ROM 2 (° F/IR)	Time between hip arthroscopy and diagnosis of ITBS (days)	Surgical treatment (Z-plasty of the iliotibial band)
Male	35	Combined Cam-Pincer	II	70/-20	100/10	18	No
Male	20	Cam	II	70/-20	100/10	22	No
Female	40	Cam	I	140/30	140/40	35	Yes
Male	47	Combined Cam-Pincer	II	120/20	120/20	20	No
Female	42	Pincer	0	140/40	140/40	14	No
Male	56	Cam	II	80/-20	100/10	6	Yes
Female	28	Cam	0	140/40	140/40	5	No
Female	49	Cam	I	140/40	140/40	40	Yes
Male	31	Combined Cam-Pincer	II	140/20	140/40	28	No

ROM=Range of motion, 1=With ITBS, 2=Once the symptoms had been resolved, F=Flexion, IR=Internal rotation, ITBS=Iliotibial Band Syndrome

vascularized and innervated layer of fat and loose connective tissue that separates the ITB from the epicondyle.^{16,17}

Factors associated with ITBS include training errors, anatomical factors, footwear, and surfaces. There is a higher risk of developing acute ITBS after an abrupt change to a training routine. Pronation of the feet or genu varus increases tension of the iliotibial band on the lateral epicondyle.¹⁸ ITBS patients complain of pain over the lateral aspect of the knee during activity [Figure 2]. Pain may limit activity and is usually exacerbated by running or sloping surfaces, hills or stairs. Repetitive flexion and extension during cycling can start symptoms. Typically, patients are painless during rest. A detailed study of the major muscle groups of the lower extremity should be conducted to identify the weakest muscles and assess the flexibility of the tensor fascia lata/iliotibial band using the Ober test and the flexibility of the iliopsoas, rectus femoris, hamstrings, and gastrocnemius.¹⁹

Significant differences were found regarding internal rotation before and after surgery within the group of patients diagnosed of ITBS. Despite not finding differences in every individual case, a global significant difference was observed. Thus, an improved internal rotation should be considered as a possible cause for the appearance of ITBS, and this syndrome should be included as a potential complication following hip arthroscopy. Further studies addressed to search for a possible relationship are required.

Ferber *et al.*²⁰ in their study of the kinematics of the hip and knee in runners with ITBS observed that in these cases,

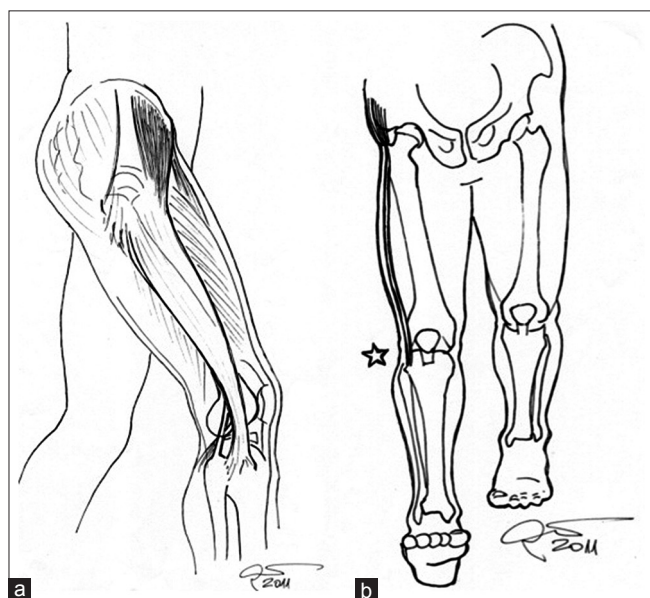


Figure 2: Schematic diagram showing (a) Anatomic view of iliotibial band in lateral view. (b) Pain location (marked with a star) after the hip arthroscopic procedure in those patients complaining of iliotibial band syndrome

there is an increase in hip adduction, leading to increased tissue tension at its distal femoral insertion,²¹ which could explain the findings that have been described in the present manuscript. This alteration increases abductor muscle weakness.²²⁻²⁴

Another difference to consider is the variation of the axle loads of the lower limb when performing an osteotomy or during a total hip replacement, which unloads the external compartment of the knee and by doing so, changes the biomechanics, thereby decreasing the possible cases of ITBS. The fasciotomy performed during surgery is a way of releasing the fascia lata and of removing the stress placed on the band.

Although pathogenesis may be different, ITBS has already been described following an orthopedic surgical procedure, specifically total knee replacement.²⁵ Luyckx *et al.* observed 7.2% ITBS in a series with over 1000 patients who had undergone total knee replacement, explaining this finding as a result of the change in tibial rotation that increased tension over the iliotibial band.²⁵

Hip arthroscopy can produce improvements in pain, improving mobility or at least, decreasing joint tension that can ease a major demand of hip rotations. This increased rotation can be related to increased tension over the fascia lata or give symptoms in the more distal region of the fascia lata, and thus favoring ITBS.

Treatment of ITBS has a wide disposal, starting with modifying the activities that exacerbate or cause the actual pain and ending in surgery in specific cases where pain does not improve with conservative therapies. Other treatments include relative rest, stretching and strengthening exercises of the hip, ice, NSAIDs, or corticosteroid injections.¹⁹ Runners with ITBS have less strength in the hip abductor muscles in comparison to the healthy limb. In fact, the authors acknowledge a significant improvement to ITBS after 6 weeks of strengthening the hip abductor muscles. In patients who undergo hip arthroscopy, mobility improves significantly, especially internal rotation, a very similar situation to the predisposing factors of ITBS. In contrast, when performing open surgery, such as total hip arthroplasty, internal rotation decreases, therefore avoiding the appearance of this syndrome. The problem that we encountered in our series has not been reported in any of the series reviewed.²⁴

Future research should focus in identifying residual pain of these patients, detect possible associated lesions with the surgical technique, or the mechanisms of traction that could damage the knee and cause the described complications.

The limitations of the study are postoperative pain may be multicausal, but we observed that where pain was absent during the first 3 postoperative weeks, ITBS appeared when the patient started walking without crutches, evidently causing pain. A possible alternative explanation for this pain could be the use of crutches during the initial period of 3 weeks, which causes weakness of the abductor muscles (similar to the findings in runners with ITBS). This muscular weakness can carry an increase in adduction and thus an increase of the pressure over the femoral epicondyle region. Furthermore, differences within internal rotation before and after surgery were not evaluated in the remaining patients without ITBS. Thus, significant differences in internal rotation can only consider as a feasible cause but cannot be guaranteed. Further studies comparing internal rotation in patients without ITBS should be carried out to draw better conclusions. Regarding neurological complications, these are usually detected during the immediate postoperative period, and pain over the anterolateral aspect secondary to an injured lateral femoral cutaneous nerve is characteristically over the proximal thigh. ITBS affects more distally in the thigh, over the lateral femoral condyle. Moreover, the type of pain is mechanical, contrary to the neurological injury where pain is less mechanical and is associated to hypoesthesias or dysesthesias.

Increased internal rotation, synovitis, and increased adduction of the hip could be predisposing factors to the development of ITBS following hip arthroscopy. ITBS should be kept in mind when conducting rehabilitation following hip arthroscopy. Specific stretching exercises of the iliotibial band should be included in the rehabilitation to prevent occurrence of this syndrome.

This is a newly described observation within followup of hip arthroscopy and may be useful as a reference for further series focusing on this detail. These findings may help orthopedic surgeons when planning rehabilitation after hip arthroscopy, including stretching exercises to prevent this syndrome. In conclusion, ITBS could be a postoperative complication following hip arthroscopy and should be taken into consideration.

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Conflicts of interest

There are no conflicts of interest.

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