CASE REPORT
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Severe Weakness of Hip Flexor after Iliopsoas Tenotomy: Two Case Reports

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Hip arthroscopies are becoming a standard surgical technique, with psoas tenotomy being a relatively common procedure during this operation. A 37-year-old male and a 42-year-old female with internal hip snapping came to our department. Arthroscopic partial psoas tenotomy of the iliopsoas portion of the conjoint tendon was performed, but its results were bad. Patients reported preoperative unilateral low-back pain and weakness when flexing the hip. Unilateral atrophy of the lumbar psoas and fatty multifidus were detected in both cases. Patients at risk of unsatisfactory outcomes after psoas tenotomy should be ideally identified prior to surgery. Warning symptoms, physical examination, and imaging studies should be considered to avoid unsatisfactory results.

Key Words: Hip, Arthroscopy, Psoas muscles, Tenotomy, Patient reported outcome measures

Iliopsoas disorders can be an important source of anterior groin pain. These pathologies include iliopsoas bursitis, tendonitis, impingement, and snapping. Conservative management such as stretching, physical therapy, ultrasound, and corticosteroid injections should be indicated[1]. When the iliopsoas tendon impinges on the acetabular labrum, a focal labral lesion located at the iliopsoas notch can be produced. After at least 3 months of an unsuccessful dedicated conservative program, surgical treatment should be considered, and arthroscopic psoas tenotomy should be performed[1].

Clinical studies have reported favorable outcomes after this procedure[2-5]. However, other authors have found less satisfactory outcomes after arthroscopic psoas tenotomy[6], and do not recommend routine psoas tenotomy[7].

We experienced two cases of bad results after arthroscopic iliopsoas tenotomy. We present here the possible causes and the warning signs of these results.

CASE REPORT

A 37-year-old male and a 42-year-old female came to our consultation due to anterior groin pain while sitting and after exercise. On physical examination, negative impingement test, tenderness with manual compression over the iliopsoas, painful internal snapping from full hip flexion to extension through external rotation were also observed.

Preoperative radiographs revealed no signs of bony impingement. Alpha angle and lateral center-edge angle values were normal, joint space was greater than 2 mm, and Tönnis grade was 0 in both patients (Fig. 1). A preoperative magnetic resonance arthrogram showed an isolated labral

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tear in coronal views and psoas tendon just over the labrum coinciding with labral tear in axial cuts (Fig. 2).

Both patients were unresponsive to non-surgical treatment. A physiotherapy program was established, which included stretching exercises, manual myofascial treatment, as well as electrotherapy including ultrasound and transcutaneous electric nerve stimulation. Three ultrasound-guided corticosteroid psoas infiltrations were performed prior to the indication for surgical treatment.

We performed hip arthroscopy in the supine position with a fracture table. We used two standard portals, anterolateral and mid-anterior. There was a labral tear, and we performed labral repair and partial psoas tenotomy of the iliopsoas portion of the conjoint tendon. However, because there was no bony deformity, we did not perform any bony procedure (Fig. 3).

The postoperative period and rehabilitation program were issue-free. Ipsilateral low-back pain together with anterior thigh and rectus femoris muscle discomfort were still present 3 months after surgery in both patients. Preoperative points of anterior groin pain caused by labral tear disappeared, but new symptomatic trigger points appeared, which were located at the anterior superior iliac spine, deep beneath the rectus abdominis, and at the proximal insertion of the

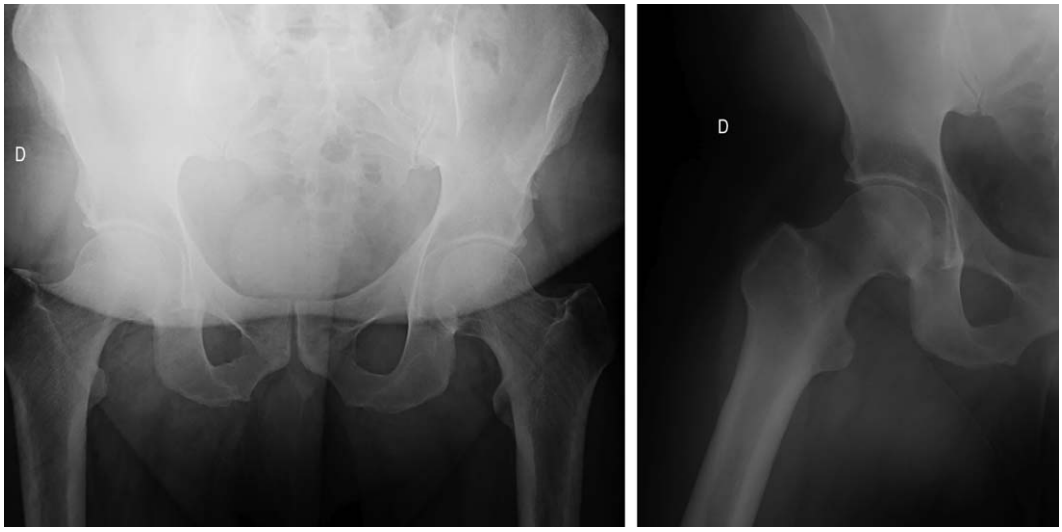

Fig. 1. Right hip anteroposterior and axial radiological views. No signs of femoroacetabular impingement were noted. Alpha and lateral center-edge angles were normal. Joint space was greater than 2 mm.

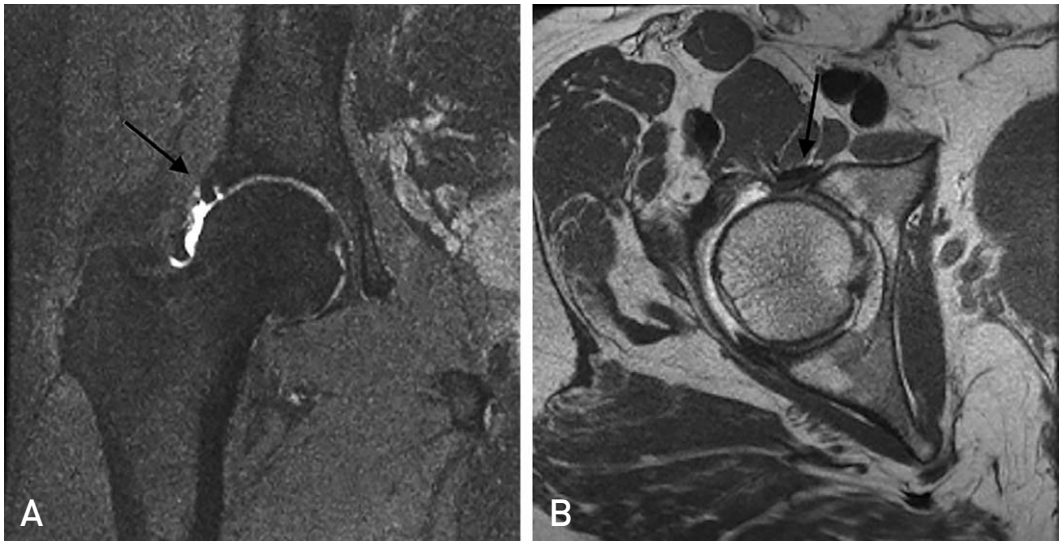

Fig. 2. Preoperative right hip magnetic resonance arthrogram. (**A**) Coronal view with labral tear (arrow). (**B**) Axial view with the psoas tendon just over the labrum coinciding with the labral tear (arrow).

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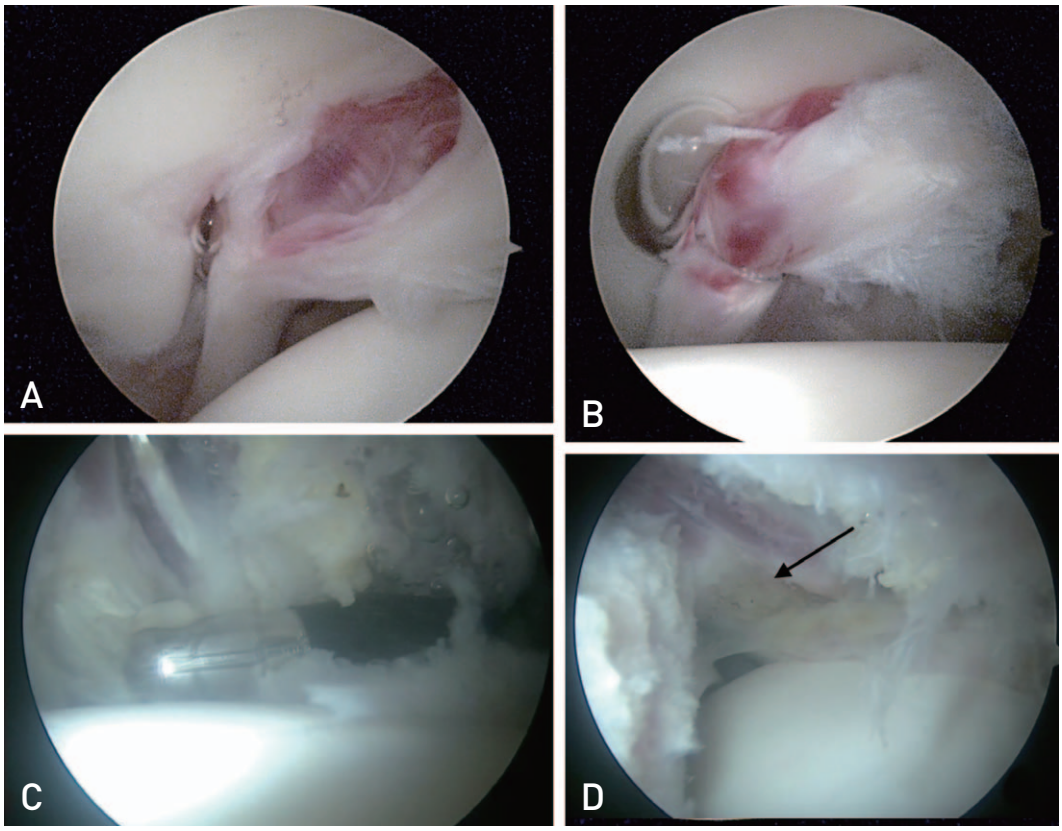

Fig. 3. Intraoperative images of the right hip from the anterolateral portal. (**A**) Labral tear. (**B**) Labral repair. (**C**) Iliopsoas tendon beneath the tip of the radiofrequency probe introduced through the mid-anterior portal. (**D**) Psoas tenotomy (arrow).

Fig. 4. Postoperative lumbar magnetic resonance imaging. Axial view at the L4-L5 level showing severe right psoas muscle atrophy (arrow).

lumbar psoas and lumbar quadratus.

Because of the appearance of these unilateral trigger points, new hip and lumbar magnetic resonance imaging (MRI) were indicated in both patients. No notable relevant hip lesions were observed, although severe unilateral atrophy of the lumbar psoas and fatty multifidus were present in both cases. No disc pathology other than degenerative signs typical for patients of this age was present addressed at the L4-L5 and L5-S1 levels (Fig. 4).

A review of preoperative history indicated that low-back pain had been referred by both patients. Patients also reported weakness when flexing the hip in the sitting position and needed to lean slightly forward when flexing the affected hip while standing. This was clear when the patients were asked to act as if they had to put on their footwear or pants, a test we have termed the “sock-on test” (Fig. 5). Patients also showed weakness when performing what we have termed a “climb-on-a-chair test” (Fig. 6): this test shows patient’s difficulty to flex the affected hip enough to place their foot on a chair seat in comparison with the healthy hip. These symptoms worsened after surgery in both patients, especially unilateral low-back pain

Fig. 5. Sock-on test. This test shows any weakness when flexing the hip in the sitting position. The patient needs to lean slightly forward when flexing the affected hip to put on their footwear or pants.

Fig. 6. Climb-on-a-chair test. This test shows patient's difficulty to flex the hip enough to place the foot on a chair seat in comparison with the healthy hip.

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at the proximal insertion of the lumbar quadratus.

DISCUSSION

Heyworth et al.[8] first described iliopsoas impingement as a pathomechanical process whereby an excessively tight iliopsoas tendon impinges on the underlying acetabular labrum. Later, Domb et al.[2] defined the pathophysiologic mechanism of this phenomenon. In that study, investigators identified 25 patients with direct anterior labral tears at the 3-o'clock position (right hip) in the absence of bony abnormalities. The location of the labral abnormality corresponded to the iliopsoas notch[2]. Tey et al.[9] described several diagnostic pearls associated with labral pathology caused by psoas impingement.

A typical symptom can be anterior groin pain, especially when sitting, and can be elicited during straight leg rising with the patient supine or standing. Another (less frequently observed) painful manoeuvre is snapping while the patient is walking or stair climbing. Other patients may complain of lumbar or anterior-thigh pain during exercise or walking (trigger points)[1].

Surgical treatment focuses on iliopsoas lengthening and labral repair. Some authors have reported favorable results. Domb et al.[2] stated that 95% of the patients reported their physical ability as "much improved" and none reported worse symptoms at a 21-month follow-up. For 16 hips with a minimum 6-month follow-up, Cascio et al.[3] reported an improvement in HHS score from 70 preoperatively to 94 postoperatively. Nelson and Keene[4] reported a modified HHS score greater than 80 points in 23 of 30 patients (77%). Anderson and Keene[10] reported a 100% return to recreational (10 patients) and competitive (5 patients) sports 9 months after surgery. But others have reported worse outcomes. Fabricant et al.[6] found an association with worse modified HHS and HOS sports subscale scores and femoral anteversion greater than 25˚ in 67 patients with a minimum of a 6-month follow-up. They concluded that some patients may be at risk of a less satisfactory clinical outcome after psoas lengthening. Finally, El Bitar et al.[5] stated that 81.8% among 55 patients reported good or excellent satisfaction after a minimum of a 2-year follow-up, whereas 18.2% had persistent internal snapping and less satisfactory outcomes.

Psoas atrophy can be seen in lumbar MRI sagittal cuts in patients with persistent and untreatable unilateral low-back pain[11,12]. Chronic tendon impairments are frequently attributed to repetitive motion and overuse[13]. It is possible that atrophy of the lumbar psoas causes iliopsoas overloading and tightens the iliopsoas tendon, which rubs the labrum just beneath it. This mechanism of impingement could be the cause of the labral tear.

We did not check lumbar preoperative MRI. Psoas tenotomy is associated with a decrease in hip flexion, however some studies have shown a recovery of function of the hip after several months[14,15]. Another study noted a process of tissue repair with tendon regrowth on MRI after a mean follow-up of 23 months[16]. So, it does not seem likely that psoas atrophy should develop after psoas tenotomy.

Care should be taken in patients with weakness when flexing the hip so as not to confuse their condition with common psoas impingement. We encourage indicating lumbar MRI if the patient shows unilateral lumbar pain with either of the previously described tests (sock-on test and climb-on-a-chair test) being positive. If lumbar psoas atrophy or multifidus fatty infiltration is observed, these patients should be considered at risk of a less satisfactory clinical outcome after psoas lengthening. They should be warned of possible lumbar pain worsening despite anterior groin pain–caused by the labral tear–disappearing or lessening. An alternative to psoas tenotomy may be a deepening of the psoas tunnel as described by Spiker et al.[7] for increased incursion of the psoas tendon. Another option would be just labral repair in the impingement zone combined with conservative treatment.

Psoas tenotomy should be reserved for a selected patient population, and not recommended routinely. Patients at risk of unsatisfactory outcomes should be ideally identified prior to surgery.

A patient candidate for psoas tenotomy should be enquired about chronic and persistent unilateral low-back pain. If so two easily performed tests (the "sock-on" and "climb-on-a-chair" tests) should be carried out. The presence of functional asymmetry may be considered a reliable indicator of lumbar psoas atrophy and a lumbar MRI must be performed. In case of psoas atrophy presence in MRI, psoas tenotomy should be carefully discouraged due to low scores in patient's satisfaction scales because of worsening low-back pain despite hip symptoms being solved.

The authors confirm that the patients provided informed consent for publication of this case report.

CONFLICT OF INTEREST

The authors declare that there is no potential conflict

of interest relevant to this article.

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