

Extra-articular soft-tissue impingement of the hip joint

Izvanzglobni sindrom sraza u području kuka

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Abstract. Conservative therapy is the gold standard for treatment of painful extra-articular snapping abnormalities of the hip. If these treatments are not successful, surgical interventions may be necessary. Arthroscopic tenotomy, bursectomy or tract release may be indicated. In addition to open techniques, various arthroscopic techniques have been described. Iliopsoas tendon impingement following a complete hip replacement is a new syndrome that has been described. This involves an atypical tear of the labrum at the anterior rim of the acetabulum. Arthroscopic tenotomy is an excellent alternative here to the complex hip-socket replacement with good results and fewer complications than acetabular cup replacement. The therapy involves arthroscopic refixation of the labrum using suture anchors and tenotomy of the psoas tendon. Open or arthroscopic procedures are recommended for performing a bursectomy or a tract release in the trochanter region. There are currently no comparative studies. Arthroscopic psoas tendon tenotomy is an effective method for treating internal snapping hip and mechanical psoas irritation after THR if conservative treatment fails. The scientific evidence in other extra-articular abnormalities of the hip remains poor. Bursectomies and tract release in external snapping hip can be carried out using open and arthroscopic techniques with similar outcomes.

Key words: arthroscopy; hip replacement; impingement syndrome

Sažetak. Konzervativna terapija predstavlja zlatni standard u liječenju ekstraartikularnih uzroka zdjelice. Ako takva terapija ne poluči rezultate u obzir dolaze kirurški zahvati kao što su artroskopska tenotomija, burzektomija ili oslobađanje traktusa iliotibialisa. Ovi zahvati mogu se raditi otvoreno ili artroskopskim tehnikama. Sraz tetive iliopsoasa nakon ugradnje totalne proteze kuka (TPK) nedavno je opisani sindrom. Ovaj sindrom nastaje zbog atipične lezije labruma na prednjem rubu acetabuluma. Umjesto zahtjevnih realoartroplastika uspješnim su se pokazale i artroskopske tenotomije. Zahvat uključuje artroskopsku refiksaciju labruma pomoću sidara i tenotomiju m. psoasa. Otvoreni ili artroskopski operacijski zahvati indicirani su pri burzektomijama ili oslobađanju traktusa iliotibialisa u području velikog trohantera. Trenutno ne postoje usporedne studije za ove dvije metode. Artroskopska tenotomija m. psoasa učinkovita je metoda u liječenju zdjelice ili mehaničkoj iritaciji nakon ugradnje TPK-a. Znanstveni dokazi o ulozi artroskopije pri liječenju drugih izvanzglobnih poremećaja nedostaju. Burzektomija i oslobađanje traktusa iliotibialisa uspješno se može liječiti artroskopskim i otvorenim tehnikama sa sličnim rezultatima.

Ključne riječi: artroskopija; sindrom sraza; totalna proteza kuka

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INTRODUCTION

Extra-articular soft tissue impingement is divided into mechanical irritations of the psoas tendon¹ and impingement and changes in the peritrochanteric gliding space².

In many cases, the snapping abnormalities caused by the iliotibial tract can be cured by applying conservative therapeutic measures. If symptoms persist, open and arthroscopic therapies can yield successful results.

PSOAS IMPINGEMENT OF NATIVE HIP JOINT

The snapping of the psoas tendon, which is also known as internal coxa saltans, is a common syndrome and occurs in approximately 10-20 % of patients. The condition is not significant if it causes no pain. There are two theories to explain the snapping of the tendon:

1. The psoas tendon snaps over the anterior acetabular rim lateral to the iliopectineal eminence. When the leg is actively extended with simultaneous internal rotation from a flexed and externally rotated position, the tendon snaps medially over the eminence^{1,2} (Figure 1).

2. The tendon snaps over a head modified by femoro-acetabular impingement (FAI)³. This is referred to as psoas tendinitis if the tendon or the psoas tendon sheath becomes irritated as a result of the recurrent snapping.

Snapping syndromes caused by loose joint bodies, tears of the labrum and a rupture of the ligament at the head of the femur (ligamentum capitis femoris) need to be considered as differential diagnoses for snapping of the psoas tendon. Psoas tendon impingement is a relatively new pathology. This indication was first described by Domb in 2011⁴. It involves an atypical tear of the labrum directly anterior (3 o'clock) and in close proximity to the psoas tendon. Patients complain about anterior hip pain which becomes more intense with active flexion. Compression or traction of the chondrolabral complex by the psoas tendon is suspected as a hypothesis for the origin. Typically, no femoral-acetabular impingement and no other deformity of the hip or trauma are found. Verification is provided by an arthroscopic MRT investigation. Therapy is carried out by fixation of the labrum and psoas tenotomy.

Examination

The clinical examination involves the hip being positioned with 90-100° flexion and slightly rotated

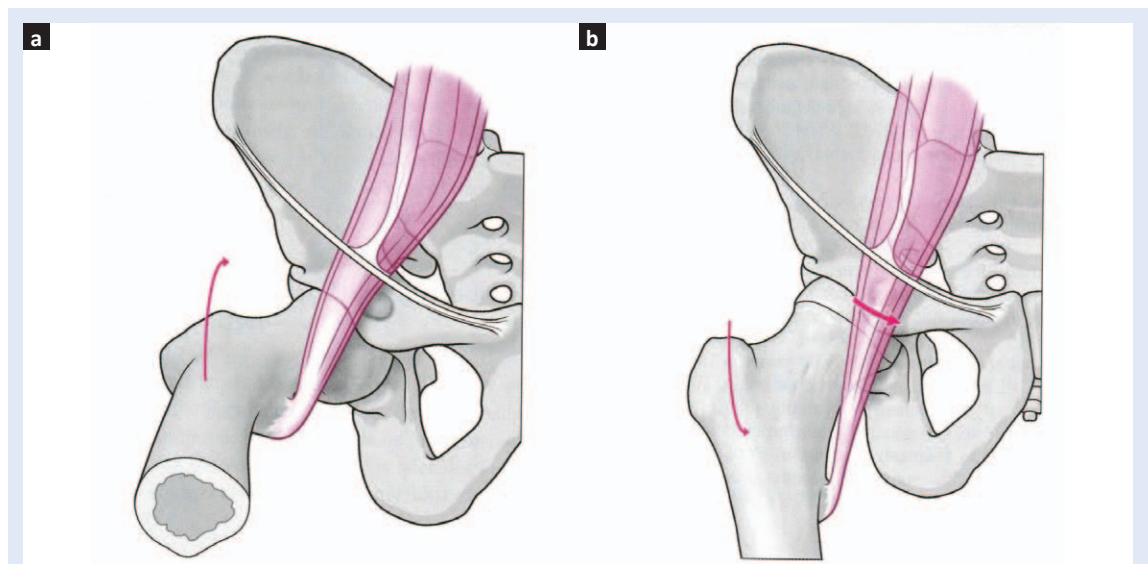


Figure 1. Snapping of the psoas tendon: Initially, bending and external rotation of the leg (a), active extension with simultaneous internal rotation (b), the tendon slides medially over the eminence
(Taken from: Dienst M. *Lehrbuch Hüftarthroskopie [Textbook of Hip Arthroscopy]*. 2009, page 234 Fig. 15-1; by kind permission of ELSEVIER)

externally. Actively extending the knee and hip joint with internal hip rotation at the same time produces an audible and tangible clunk between 20 and 40° in the area of the groin (Figure 1).

A pelvic overview and an axial X-ray of the hip joint are also necessary in addition to the clinical examination. An MRI (arthroscopic) to assess the intra-articular pathologies should also be carried out.

Conservative therapy

Initial treatment of symptomatic external coxa saltans is always conservative. Patients are frequently disconcerted and they are reassured by an explanation for the origin of the snapping. Basic conservative measures include the avoidance of painful movement, extension of the psoas tendon and correction of the position of the pelvis with the assistance of a physiotherapist. Infiltration of corticosteroids into the tendon sheath can be carried out as a supplementary therapy. In most cases, the symptoms generally die down after 6 months⁵.

If conservative therapy is not successful, a psoas tendon tenotomy may be necessary.

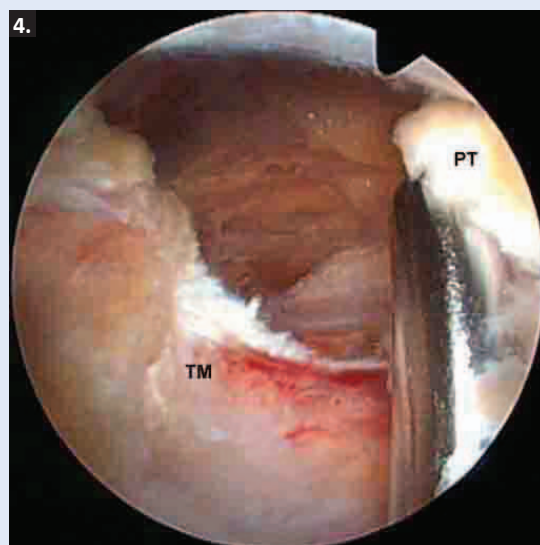
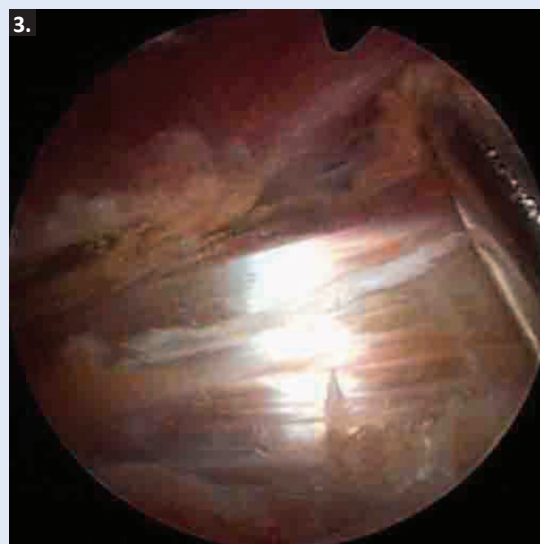
Surgical therapy

Arthroscopic psoas tendon tenotomy

Psoas tenotomy used to be performed through open accesses. Today, tenotomy is carried out arthroscopically because this procedure causes less tissue trauma and fewer complications are likely. Three different procedures have been described for the arthroscopic technique. The central and the peripheral compartments are initially visualized in these methods so that additional pathologies can be identified and treated. These are described in 50 % of cases⁶. Psoas tenotomy is performed at the end of the intervention because fluid extravasation and significant swelling of the periarticular tissue can occur after the capsule is opened.

Extra-articular technique

The tendon insertion at the lesser trochanter is visualized through two distal ventrolateral portals. The iliopectineal bursa is debrided. The tendon is then transected just proximal to the insertion using an electric knife⁵ (Figures 2-4). The



Figures 2-4. X-ray view of the psoas tendon at the level of the lesser trochanter, arthroscopic visualization before and after tenotomy
 TM = lesser trochanter (trochanter minor)
 PT = psoas tendon

advantage of this method is that the psoas tendon can be completely transected. Disadvantages include additional accesses, detachment of the iliopsoas muscle and the risk of heterotopic ossification (HO)⁷.

Transcapsular technique

The medial synovial plica is visualized through the peripheral compartment. The capsule is opened ventral to the plica or proximal or distal to the annular ligament and the psoas tendon is visualized. The tendon is transected medial to lateral with an electric knife⁸ (Figures 5-7). The advantage of this method is that the created portals can be used. The transcapsular transection of the tendon leaves approximately 55 % of the musculotendinous complex intact². This results in fewer functional deficits after the operation has been carried out.

Central technique

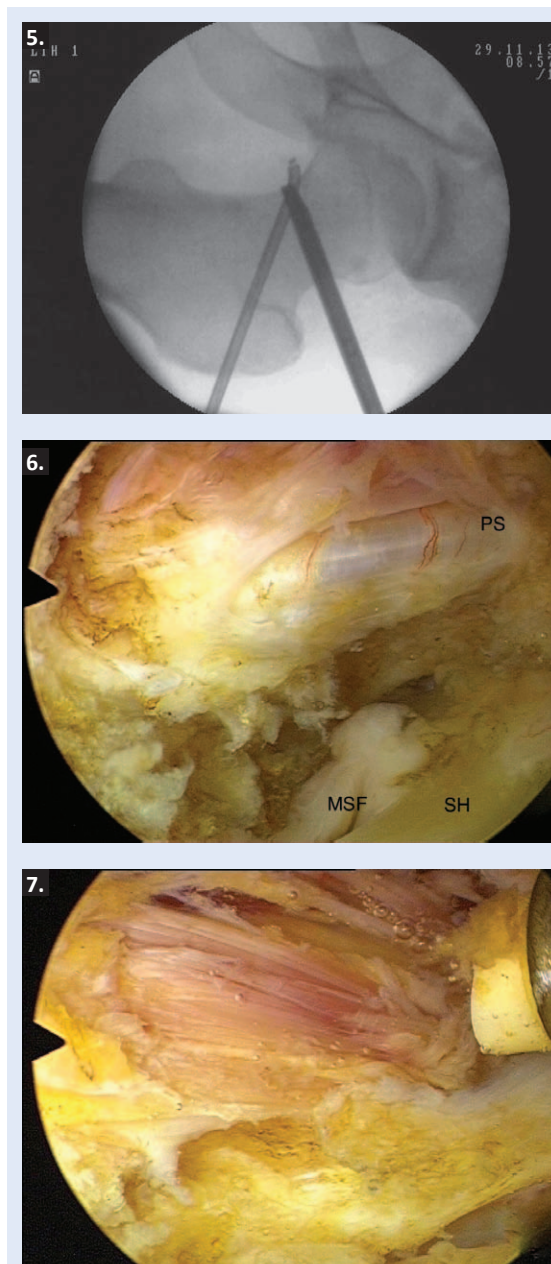
The ventral acetabular rim is visualized through the central compartment with joint distraction. The capsule is opened at approximately 3 o'clock at the anterior acetabular rim and the psoas tendon is visualized. This can then be transected with the electric knife⁹. The advantages are the same as in the transcapsular technique. The disadvantage is the necessary distraction of the joint.

Follow-up treatment

The degree of hip flexion weakness determines the follow-up treatment. Forearm crutches are necessary for a period of about 2 to 4 weeks. After this period of time has elapsed, the leg can generally be actively raised again. Strengthening the hip flexor with the assistance of physiotherapy is recommended. The flexion strength generally returns to normal again after 3 months.

Results

Ilizaturri carried out a prospective study comparing the transcapsular and extra-capsular techniques which showed that the same outcomes are achieved with no differences¹⁰. The results have been well described by different authors and they found no complications and no recurrence of the psoas snapping syndrome¹⁰⁻¹¹.



Figures 5-7. Transcapsular X-ray view of the psoas tendon, arthroscopic visualization before and after tenotomy

MSF = medial synovial fold

PS = psoas tendon

SH = femoral neck

Lynch reported on poor outcomes in patients with acetabular dysplasia and significant anteversion of the femoral neck. In such cases, the psoas tendon acts as a dynamic stabilizer. Up to 30 % functional loss of strength occurs accompanied by pain, and tenotomy should not therefore be carried out in this group of patients¹³.

PSOAS IMPINGEMENT AFTER HIP ARTHROPLASTY

Mechanical irritation of the psoas tendon may occur if the acetabular cup implant replacement projects in the area of the anterior wall (Figure 8). This can occur if the implant is lateralized or has been inserted with too much retroversion, or if there is a defect of the anterior acetabular rim. The patient complains about pain in the groin region when actively lifting their leg (e.g. when getting in and out of a car).

Examination

If the patient actively lifts their extended leg from the resting position they experience pain, whereas lifting the leg passively is not painful. Radiological analysis involves an X-ray of the pelvis, a

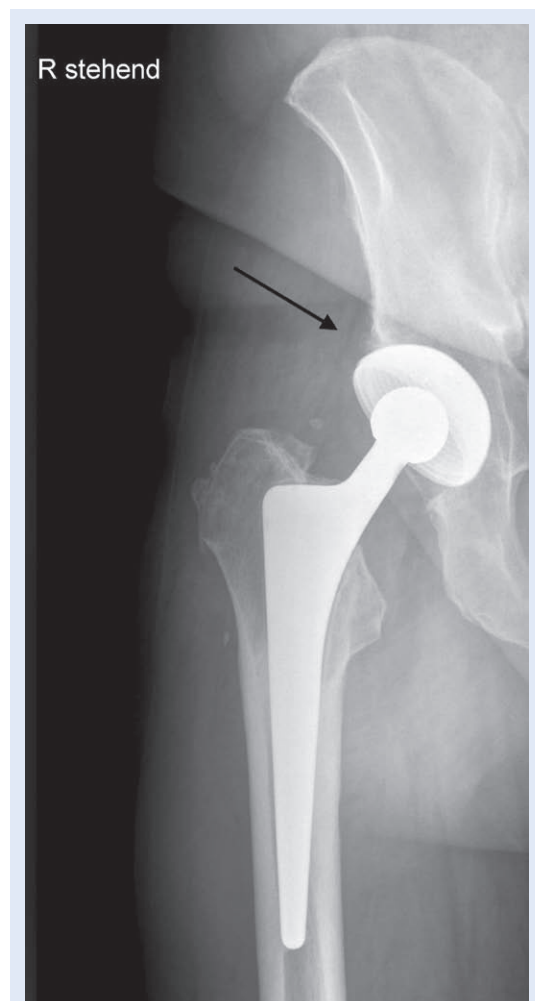


Figure 8. Projection of the acetabular cup replacement (see arrow)

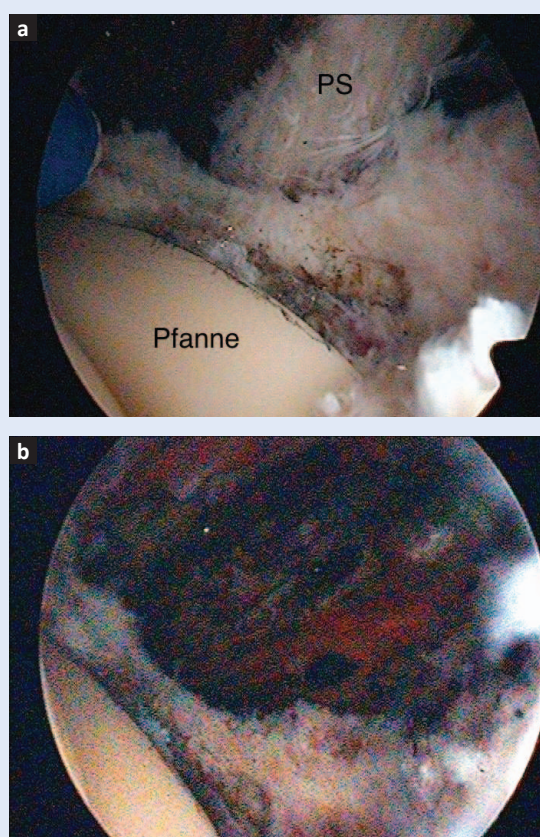
Lauenstein view and false profile (oblique) X-ray. Any loosening, an infection and mechanical impingement of the prosthetic components need to be excluded.

Conservative therapy

An attempt at conservative therapy should always be carried out over a period of 6 to 12 months with support from physiotherapy. Diagnostic/therapeutic infiltration of the anterior acetabular rim under radiological control is effective and also provides a secure diagnosis.

Surgical therapy

The anterior acetabular rim with protrusion of the implant and the psoas tendon can be visualized through a transcapsular portal (see above). The surgeon can then use an electric knife to perform tenotomy of the psoas tendon in vision (Figure 9). Postoperative scarring can also be removed.



Figures 9a,b. Transcapsular view of the acetabular cup replacement and the psoas tendon before and after tenotomy

PS = psoas tendon

Results

Dora was able to demonstrate that open tenotomy achieved better outcomes and resulted in fewer complications than replacing the acetabular cup implant¹⁴. A total of 28 patients from our own patient population have so far been treated with the transcapular technique. Check-ups were carried out on the first 11 patients with an average follow-up period of 25 months. The pain was significantly reduced with an increase from 1.4 to 7.2 on the VAS Scale. A clinical weakness of the hip flexor was no longer identifiable after 2 months. These results were confirmed by Jerosch in a larger patient collective and with a longer follow-up period¹⁵.

IMPINGEMENT AND CHANGES IN THE PERITROCHANTERIC GLIDING SPACE

Trochanteric bursitis

A physiologically generated synovial bursa can lead to inflammation if it is continuously under pressure or is subject to overload. These conditions may be associated with the production of fluid in the bursa. This is located between the iliotibial tract (outer margin) and the bony structures of the greater trochanter (inner margin). A contusion of the bursa can also lead to a hematoma in this area as a consequence of direct trauma. Problems of this nature can accumulate in elite sports people who mainly train by lifting weights when bending (e.g. weightlifters) and competitive endurance athletes (cross-country skiers).

Examination

The patients complain about increasing pain when they lie down on the affected side and they also report an increase in pain over the greater trochanter when they exercise. This is frequently associated with radiation in the lateral section of the thigh. When the hip joint is examined, it can generally be moved freely. A local pressure pain may be triggered through or slightly distal to the greater trochanter. The bursa and the liquid volume can be well visualized using ultrasound. Small bony growths revealed on the greater trochanter in X-ray examination may indicate the occurrence of chronic bursitis. Magnetic resonance imaging is also helpful in determining the extent

and the precise localization of the inflammatory reaction and other pathological changes, such as ruptures in the gluteal muscles.

Conservative therapy

Post-traumatic cases of bursitis frequently subside following resorption of the hematoma after 2 to 3 weeks of conservative treatment (reduction of swelling by manual lymph drainage and anti-inflammatories) so that further therapeutic measures are no longer necessary. In some cases, puncture with subsequent compression to relieve the pressure in the bursa is effective. Cases of bursitis due to malfunction or over exertion frequently prove to be resistant to conservative treatment. Anti-inflammatory drugs, local infiltrations and physical measures combined with a reduction in stress may lead to a decline in symptoms. There is no clear evidence demonstrating whether chronic inflammation of the iliotibial tract caused by the mechanical impact of the fluid-filled bursa leads to a so-called "external snapping syndrome". In many cases, hardness of the tract is associated with changes to the bursa if conservative therapeutic measures have not resulted in a reduction of the symptoms and surgical treatment has become necessary.

Surgical therapy

In addition to open removal of the bursa, arthroscopic methods have been increasingly described in recent years for these extra-articular problems. The arthroscopic minimally invasive approach presents advantages in the lower level of traumatization through stab incisions. The surgeon needs to be experienced in order to precisely target the bursa. In cases of chronic bursitis, differentiating from the surrounding tissue is not always an easy matter. Osteophytes from the trochanter region can also be removed. Alternatively, the open approach continues to be recommended if the bursa can be accessed easily by making a longitudinal incision and splitting the iliotibial tract, and it can then be completely resected in vision.

Results

Individual studies are available on arthroscopic treatment of chronic cases of bursitis (recalcitrant

trochanteric bursitis, RTB). The procedure was described as free of complications and efficient in 27 patients with a follow-up period of at least 5 years¹⁶. Wiese reports on 45 cases of which 37 could be examined after a period of at least 30 months. The best results were obtained in the group of patients who also had osteophytes removed from the trochanter. After the operation, 75 % of the patients were in a position to lie on the affected side without any pain. 4 cases of secondary bleeding not requiring surgery are described¹⁷. Baker describes an open revision with 25 patients¹⁸. There are no comparative studies between the arthroscopic and open approach¹⁹. Farr also recommends an additional release of the iliotibial tract in cases where no external coxa saltans is present in order to reduce the rate of recurrence²⁰. However, scientific verification of this cannot be provided.

Conclusion

The arthroscopic approach may be regarded as an alternative to the open procedure. Assuming that a minimally invasive procedure may be able to reduce the formation of scarring, it is undoubtedly a good option in the hands of an experienced surgeon. However, as yet there is no evidence-based verification for the superiority of one of the two methods being applied in relation to this indication.

EXTERNAL COXA SALTANS

Conditions involving mechanical irritation between the greater trochanter and the iliotibial tract can lead to pain and snapping abnormalities. Clearly defined causes can frequently not be identified²¹. The accumulations described in the section on bursitis also apply to external coxa saltans (snapping hip).

Examination

In addition to local pain caused by pressure over the greater trochanter, a mechanical snapping abnormality may also be initiated which can be influenced by manual fixation of the tract. Contrary to the position with internal coxa saltans, an acoustic effect cannot generally be identified here. Ultrasound, X-ray diagnostics, and MRI may

also show inflammatory changes or thickening²². However, in many cases no morphological correlates can be identified in the imaging.

Conservative therapy

Detonizing techniques and measures to promote blood flow are a top priority when selecting methods involving physiotherapy. Local infiltrations can be used in diagnosis to precisely determine sources of pain and in therapy to reduce any concomitant inflammatory reaction.

Surgical therapy

An indication for surgical therapy is provided if a conservative approach carried out over at least 4-6 months fails to result in any alleviation of symptoms. Surgical procedures relate to a release of the iliotibial tract with Z-plasty of the tract²³⁻²⁵. Arthroscopic procedures have been recently put forward^{26,27}. A proximal and a distal trochanter portal is created without traction of the leg. After insertion of the 30-degree telescope into the distal portal (distal trochanter portal, DT) the proximal portal is created after localization with a needle (proximal trochanter portal PT (Figure 10a). After visualization of the tract, a vertical transection of the iliotibial band allows

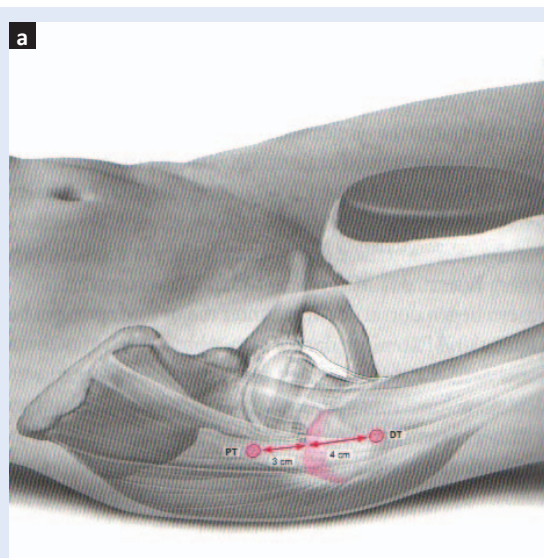


Figure 10a. Portals for peritrochanter space: Distal trochanter portal (DT), proximal trochanter portal (PT). (Taken from: Dienst M. *Lehrbuch Hüftarthroskopie* [Textbook of Hip Arthroscopy]. 2009, page 234 Fig. 15-28; by kind permission of ELSEVIER)

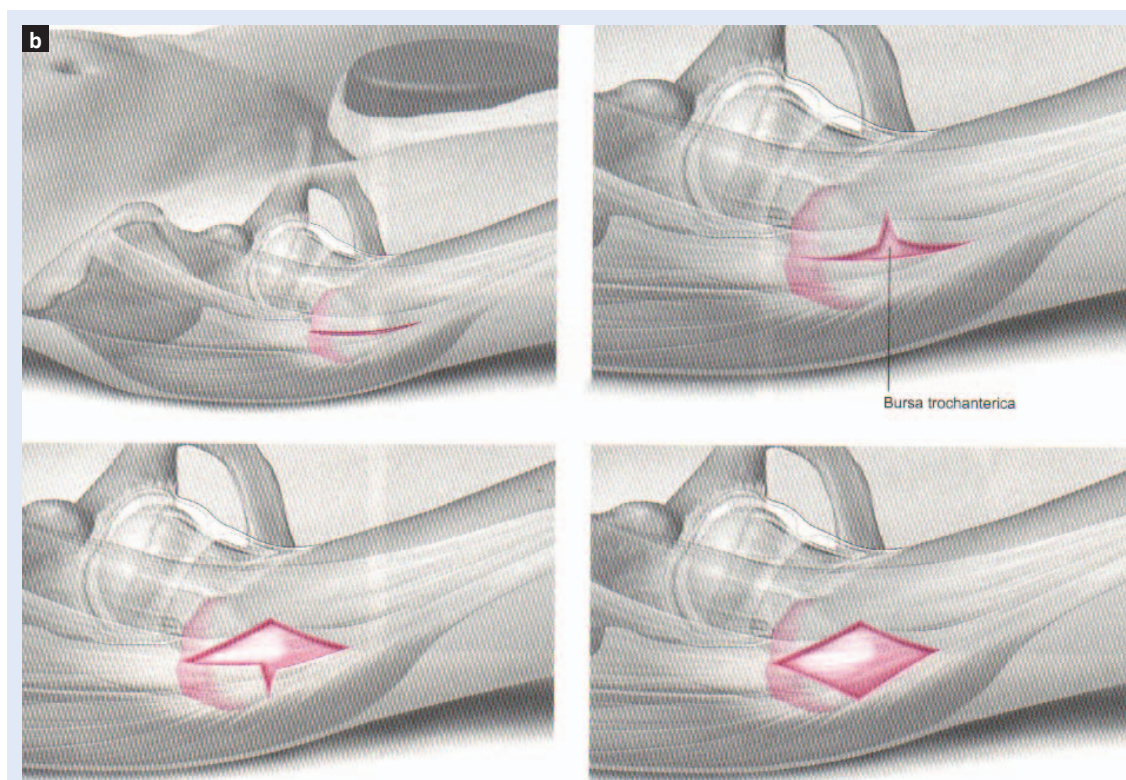


Figure 10b. Steps in an endoscopic release of the right iliotibial tract.

(Taken from: Dienst M. *Lehrbuch Hüftarthroskopie [Textbook of Hip Arthroscopy]*. 2009, page 234 Fig. 15-30; by kind permission of ELSEVIER)

this to be underpassed and the tension in the connective tissue is reduced with a lateral separation. This prevents “snapping”. The four flaps are resected while retaining a diamond-shaped defect²⁶ (Figure 10b).

Results

Conservative measures can bring about a cure in most cases²⁸. Open procedures yield good results^{25,29}. Few studies have addressed arthroscopic procedures. In a case series of 10 patients with a follow-up period of 25 months, the pain was reduced in all patients, one recurrence occurred, and the average operating time was 80 minutes¹⁴. An arthroscopic tract release with bursectomy resulted in alleviation of pain³⁰.

Apart from the isolated occurrence of bursitis and the isolated occurrence of external coxa saltans, a combination of these entities has been found. Furthermore, when making a differential diagnosis, it is important to also consider ruptures of the gluteal musculature which can be visualized using ultrasound and magnetic reso-

nance imaging. Ruptures of this nature can generally be cured with conservative treatment modalities.

Conclusion

In many cases, the snapping abnormalities caused by the iliotibial tract can be cured by applying conservative therapeutic measures. If symptoms persist, open and arthroscopic therapies can yield successful results. There are no comparative studies. Existing results to date reveal similar outcomes for open and arthroscopic procedures.

Conflicts of interest statement: The authors report no conflicts of interest.

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