Technical Note

External Snapping Hip Syndrome Endoscopic Treatment: "Fan-like" Technique as a Stepwise, Tailor-made Solution

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Abstract: Classically, external snapping hip syndrome (ESHS) is considered to be caused by friction of a tight iliotibial band (ITB) over the greater trochanter (GT), which leads to pain, inflammation, and palpable or audible snapping. Surgical treatment remains a gold standard in patients resistant to conservative measures. Many surgical procedures addressing ESHS exist in the literature, but the vast majority of them involve only plasties of the ITB. However, observations led us to the conclusion that friction of the ITB over the GT may not be the only cause of ESHS and other structures like gluteal fascias or an anterior scarred part of gluteus maximus may be involved. The aim of this article is to provide a detailed description and video demonstration of an endoscopic surgical procedure using a "fan-like" cut to treat the ESHS. Its greatest advantage is the ability to gradually increase the extent of surgery based on intraoperative observations. It turns the procedure into a tailor-made surgery, which offers good and reproducible results.

External snapping hip syndrome (ESHS), known also as coxa saltans externa or Dancer's Hip, is a relatively common condition that usually develops in young people,[1] more frequently in women, and it is usually painless. An actual incidence of the snapping hip is unknown because only a minor number of patients comes to the orthopaedist's office for pain and reduced range of motion.[2-6] Friction of a tighten iliotibial band (ITB) over the greater trochanter (GT) seems to be a direct cause of the snapping phenomenon and becomes painful as the GT bursa becomes inflamed.[1-4,6-11] Several pathologies, including postural defects, the hip joint bony anatomy, and ITB structure are taken into consideration as a possible reason for tightening of the ITB.[2,9,10] These pathologies should be precisely diagnosed and addressed during physiotherapy treatment. If conservative treatment fails, surgery should be proposed.

The vast majority of surgical techniques described in the literature are open surgeries, which are associated with an extensive approach, significant site morbidity, and cosmetic considerations. The aim of these procedures is to reduce tension of the ITB by cutting, elongating, or partially releasing it.[1,2,4,7,8,10] However, the dynamic evolution of arthroscopic and endoscopic surgical techniques made it possible to treat the ESHS by minimizing the surgical approach, morbidity, and the risk of wound complications postoperatively. Because a typical patient is a young woman in her teens, 20, or 30s, an excellent cosmetic effect is important as well. Moreover, both open and endoscopic surgical techniques described in the literature are focused mainly on releasing the ITB, regardless of which anatomical structures are actually responsible for snapping in the particular patient. Careful endoscopic inspection of this region allowed us to observe that ESHS is not a homogenic pathology and different structures can play a role, for example, a gluteal fascia or an anterior scarred

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The authors report no conflicts of interest in the authorship and publication of this article. Full ICMJE author disclosure forms are available for this article online, as supplementary material.

Received April 17, 2020; accepted June 8, 2020.

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2212-6287/20617

https://doi.org/10.1016/j.eats.2020.06.017

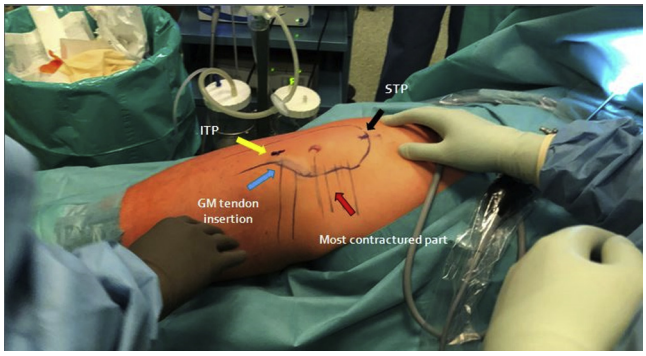

Fig 1. The left hip of the patient in the lateral decubitus position. At the beginning of the procedure, the position of the STP 1 to 2 cm above the tip of the greater trochanter and inferior trochanteric portal 5 to 7 cm below the greater trochanter are marked. (GM, gluteus maximus; ITP, inferior trochanteric portal; STP, superior trochanteric portal.)

part of gluteus maximus (GM). This led to the development of a "fan-like" technique, which allows gradually extending the surgery depending on the structures directly involved in ESHS.

The aim of this article is to provide a detailed description of an endoscopic surgical fan-like technique that allows for elimination of direct causes of ESHS with maximal respect to surrounding soft tissues. It provides good and reproducible outcomes with reducing the risk of complications. This is a tailor-made surgery that allows the surgeon to extend the procedure by subsequent steps as necessary to achieve complete elimination of the snapping during intraoperative physical examination.

Surgical Procedure

Indications

- Painful snapping over the GT
- Poor results after initial conservative treatment
- Tight contracture of the ITB leading to reduced adduction in the hip
- Massive trochanteric bursitis
- Abductor ligaments tears coexistent with ITB symptoms

Procedure

The surgery is performed under spinal or general anesthesia. The patient is placed in a lateral decubitus position with the operated extremity draped so that it will not jeopardize performing provocative tests in a full range of motion during the surgery. The operated leg is draped in a sterile fashion.

Endoscopic ITB Release for Treatment of ESHS

At the beginning, physical examination under anesthesia is performed to determine the area where snapping can be palpated most clearly. It is marked on the skin. Usually, it is over the most prominent part of GT and one can feel it in low grades of flexion (Video 1). Two portals, superior trochanteric portal (STP) 1 to 2 cm proximal to the tip of GT and inferior trochanteric portal 5 to 7 cm distal to GT[4,5] are made (Fig 1). The working space for arthroscopic instruments is created by blunt dissection over the surface of ITB through the inferior portal (Video 1). Then the 30° arthroscope (Arthrex, Munich, Germany) is introduced through this portal and the injection needle is inserted percutaneously before the STP is performed (Fig 2). A shaver (Conmed, Warsaw, Poland) is inserted through the STP and is used to remove residual connective fibers between the subcutaneous tissue and the ITB and then hemostasis is performed using a radiofrequency (RF) probe (Smith & Nephew, London, UK) (Video 1). This moment is critical for the whole procedure and skipping it may significantly reduce vision, leading to disorientation, increasing the time of surgery, and making the procedure more difficult. The longitudinal incision of the ITB is made along the natural course of its fibers using the RF probe (Fig 3). It starts from the level of vastus tubercle in neutral hip rotation and extends proximally to the level of upper border of the GT and not more distally than the point of femoral insertion of GM tendon. Special attention must be paid not to make an injury to tensor fasciae latae muscle belly. The incision of ITB is placed over the most prominent part of GT to the level of skin portals. Next, the RF probe is used to make a posteriorly directed incision perpendicular to the first one at the level of the most contracted tendinous tissue (Fig 4A). The length of the

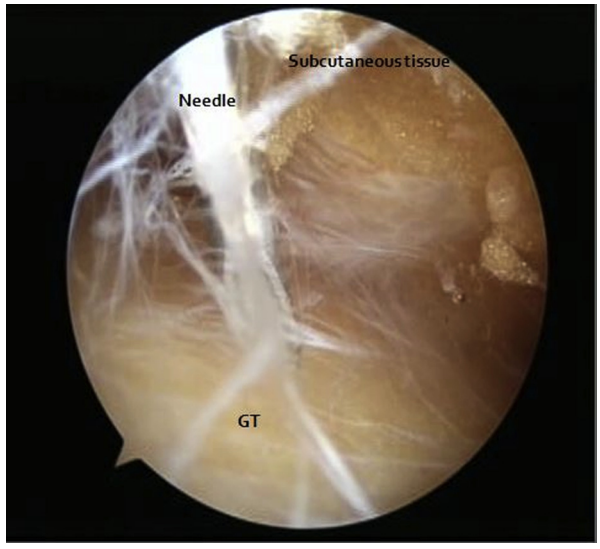

Fig 2. Arthroscopic view from the inferior trochanteric portal in the left hip in the lateral decubitus position. Formation of the superior trochanteric portal under direct visual control using an injection needle for proper position. (GT, greater trochanter.)

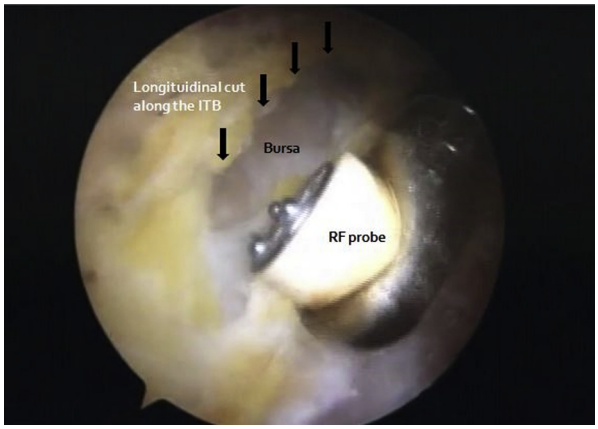

Fig 3. Arthroscopic view from the inferior trochanteric portal in the left hip in lateral decubitus position. An RF probe introduced through superior trochanteric portal is used to perform a longitudinal cut along the natural course of the fibers of the ITB over the greater trochanter. (ITB, iliotibial band; RF, radiofrequency.)

incision depends on the intraoperative "snapping" examination and is extended close to the posterior wall of GT until the snapping stops or red tissue of GM belly is reached (Fig 4B). It is crucial that the incision should be limited only to "white" fibrous structures of the ITB and GM fascial complex. At this point, an inflamed trochanteric bursa may be excised, if necessary. Metzenbaum scissors (Praxisdienst) introduced through STP can be used to carefully release some visible additional layers of fibrous, adhesive tissue that cover the tendinous insertions on GT (Fig 5). In some cases, the point of contracted tissue may be located posteriorly to the GT, which corresponds to engagement of the GM and its fascial complex. Then snapping occurs in bigger angles of flexion (Video 1). In these cases, longitudinal and perpendicular cuts are made as described previously and additional oblique incisions directed posterosuperiorly and posteroinferiorly can be made subsequently if the previously described steps have not eliminated the snapping. It is usually correlated with posterior position of the most evident snapping in relation with GT during initial clinical examination under anesthesia (Video 1). The posterosuperior and posteroinferior cuts are performed obliquely at a 45° angle to the longitudinal one in the manner described previously. The starting points for these incisions are again in the most contracted and "snapping" part of GM fascial complex (Fig 6). It could create a fan-like shape of performed incisions (Fig 7). When all presented steps fail, it may be necessary to perform a salvage procedure that is a partial proximal GM tenotomy right next to its femoral insertion.

On every step of the procedure, a provocative test of snapping is performed to determine the necessity of subsequent steps (Video 1). The procedure is executed in the described order until the snapping is eliminated. Usually, well-planned longitudinal and posterior cuts are sufficient to relieve symptoms and not all the steps may need to be performed.

Rehabilitation

The patient is allowed to weight bear with crutches as tolerated on the first postoperative day. Full flexion and adduction stretching exercises are gradually introduced starting from the second postoperative day as tolerated. If muscle control is sufficient, walking on crutches is discontinued from the third postoperative week. In the first 6 weeks, stretching, strengthening, and cocontraction supervised exercises and scar mobilization are performed. Sport activities start at the sixth postoperative week with complete comeback to preoperative level around the twelfth week after surgery.

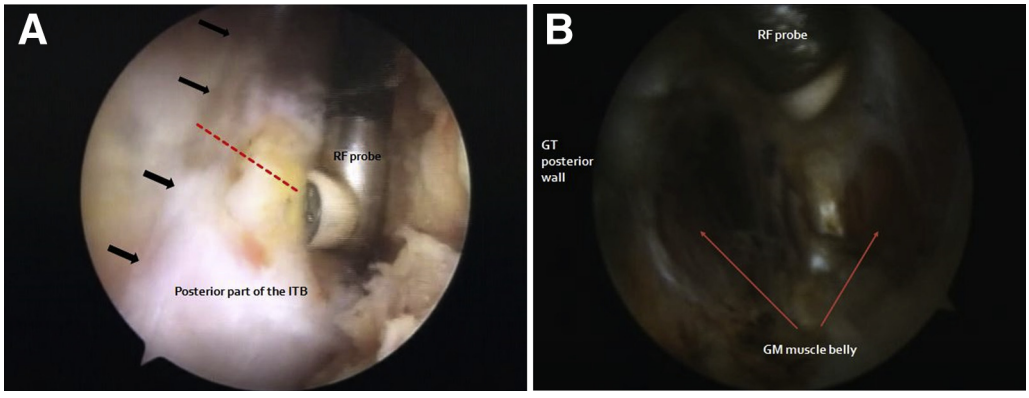

Fig 4. Arthroscopic view from the inferior trochanteric portal in the left hip in lateral decubitus position. (A) An RF probe introduced through superior trochanteric portal is used to perform a perpendicular incision to previous one as a second part of the "fan-like technique." (B) The dissection is continued depends on the intraoperative "snapping" examination and is extended close to the posterior wall of GT until the snapping stops or red tissue of GM belly is reached. Black arrows: posterior wall of the longitudinal cut; red line: the direction of perpendicular cut. (GM, gluteus maximus; GT, greater trochanter; ITB, iliotibial band; RF, radiofrequency.)

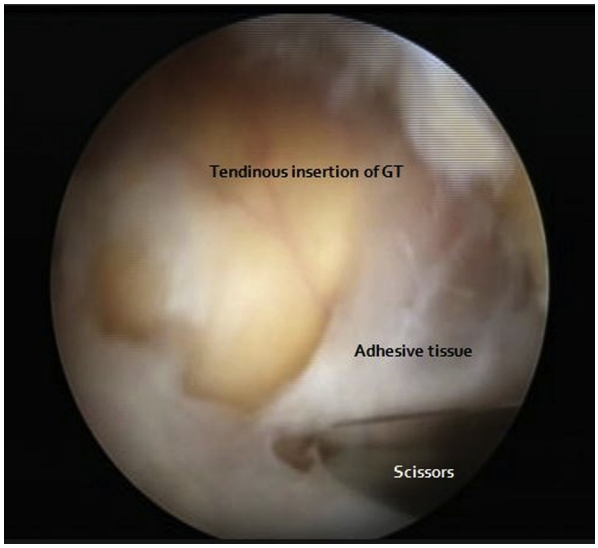

Fig 5. Arthroscopic view from the inferior trochanteric portal in the left hip in lateral decubitus position. In some cases, Metzenbaum scissors can be used to carefully release some visible additional layers of fibrous adhesive tissue that cover tendinous insertions on the GT. (GT, greater trochanter.)

Discussion

Many surgical techniques bring very good results, yet none in all cases. There is still a "gray zone." There is no doubt that there are many indirect causes of painful snapping in the lateral area of the hip in motion and these may vary in patients resulting from pathological changes of different anatomical structures.[2,3,6,9,11,12] Until now, very little is known about the actual reasons for ITB contracture; it may rather be the result than the cause of the pathology.[5,13,14] This is why we were looking for a type of procedure that would allow one to preserve the structure and function of the ITB on the one hand and to reduce the band's tension to a degree required by specific conditions existing in the particular patient on the other hand. The endoscopic fan-like technique seems to meet these expectations to a certain degree. Our method involves mainly incising the structures, avoids total releases, and does not require removing tissue fragments, with the exception of the inflamed trochanteric bursa, if necessary.

This is a customized procedure not limited to a single part of the complex. It may be expanded to other structures such as the ITB, the tendon or the anterior fibrotic part of the GM, the aponeurotic part of the GM fascia, and the trochanteric bursa and distal attachment of GM if necessary. All of these elements may be performed in varying proportions, depending on the preoperative and especially the intraoperative findings. We believe that our

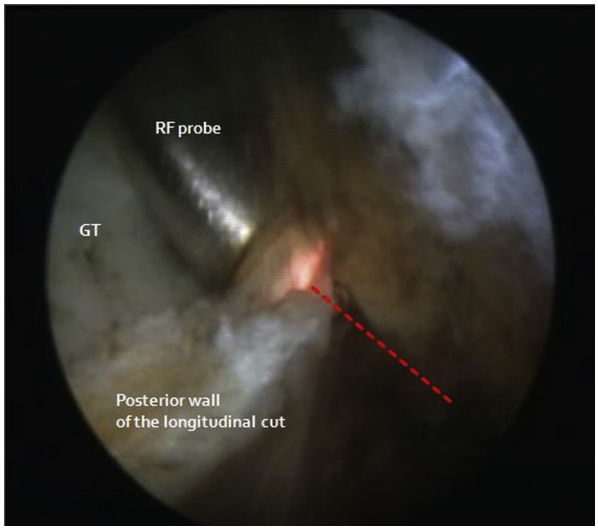

Fig 6. Arthroscopic view from the inferior trochanteric portal in the left hip in lateral decubitus position. The RF probe is used to perform an additional posterosuperior incision (red line). The cut is performed when longitudinal and perpendicular cuts were not enough for eliminate snapping. (GT, greater trochanter; RF, radiofrequency.)

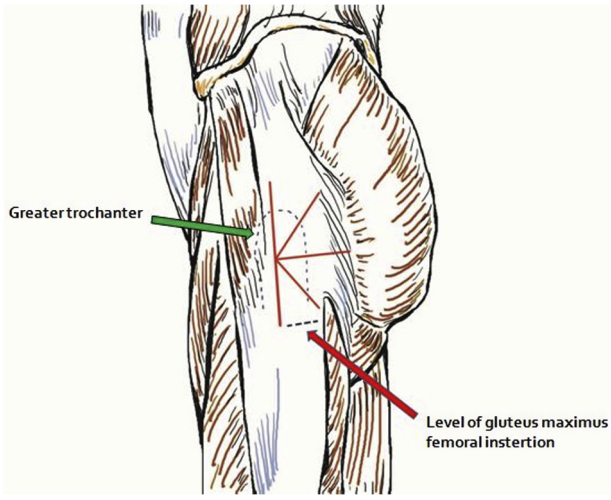

Fig 7. Diagrammatic drawing of the idea of fan-like incision technique for external snapping hip syndrome. The left hip is presented.

Table 1. Advantages and Disadvantages of Endoscopic Fan-like Technique for the Treatment of External Snapping Hip Syndrome

Advantages	Disadvantages
Staged procedure tailored for the case. Subsequent incisions are introduced if previous ones have not eliminated snapping.	Increased difficulty and total duration of the procedure.
Possibility to release deep contracted tissues with their direct visualization	A risk of excessive hematoma formation in case of accidental muscle fibers cut.
Direct evaluation of most contracted tissue	Theoretical risk of sciatic nerve and gluteal vessels iatrogenic injury.
Good cosmetic effect.	Buttocks asymmetry possible after excessive release.

technique saves most of the structure of the ITB complex for its future function and offers the chance to avoid potential harm to the patient in the long term. Moreover, the procedure requires only a basic arthroscopic instrumentation set. The use of arthroscopic instrumentation and portals provides very good cosmetic results, reduces the operating site morbidity and the risk of complications like intraoperative blood loss.

Postoperative hematoma that needs to be evacuated, asymmetry of the gluteal area, temporary numbness of the lateral thigh and self-limited pain in the trochanteric area were the only observed side effects in our series. The first can be avoided using a meticulous hemostasis throughout the whole procedure. No major complications such as neurovascular injuries were observed in our group and patients did not report weakness of abduction during follow-up.

We are still learning about preoperative planning and how to interpret the clinical tests and imaging scans to decide which anatomical structures should be addressed during the surgery. We hope that this approach will lead to further reducing the number of unnecessary operations in the future. Table 1 summarizes most advantages and disadvantages of the presented technique.

Summary

The fan-like technique is relatively simple, customizable, and has a steep learning curve. It provides very good results when there is a thorough preoperative analysis of possible reasons for symptoms and careful inspection of the regression of the symptoms intraoperatively. The procedure requires only a basic arthroscopic instrumentation set.

This procedure does not leave extensive postoperative scars and thus offers a very good esthetic effect.

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