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Operative Techniques in

Sports Medicine

Snapping Hip

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Snapping hip syndrome is attributed to both the iliopsoas tendon and the iliotibial band. These are distinct entities, easily distinguished from one another. Both conditions are usually treated conservatively and often require little more than assurance to the patient that the snapping is not causing damage or indicative of future problems. Surgical intervention is rarely necessary but can be successful for recalcitrant cases. Symptoms from the iliopsoas tendon can be difficult to differentiate from hip joint pathology and the 2 may coexist. Endoscopic release of the iliopsoas can be effective. Advantages include the less invasive nature of the technique and also the ability to arthroscopically assess the joint for associated intra-articular pathology. A variety of procedures have been described for recalcitrant snapping of the iliotibial band with reasonably successful outcomes. A technique that preserves the structural integrity of the tendon has the advantage of facilitating early postoperative rehabilitation with minimal morbidity. Details of the assessment, pathomechanics, and management of these conditions are outlined.

KEYWORDS snapping hip, snapping iliopsoas, snapping iliotibial band, assessment, surgical treatment, results

The "snapping hip" is an entity described in the literature since the first third of the last century.[1-4] This was usually attributed to the iliotibial band until an article by Nunziata and Blumenfeld[5] proposed an alternate etiology caused by the psoas tendon slipping over the iliopectineal eminence. In general, "snapping hip" is a nebulous term that does nothing to describe the etiology or pathology of the diverse conditions that can be observed as snapping.

During the last 20 years, several reports have attempted to clarify the pathoanatomic features, assessment, and treatment of these various disorders. The most extensive contribution has been by Allen and various coauthors.[6-9] In 1984, they attempted to distinguish "external" from "internal" etiologies and in 1995 popularized the term "coxa saltans" as a general descriptor encompassing the different types.[6,9] It is important to understand this terminology because these terms are commonly used and frequently misused in discussions on this topic. However, because there is only 1 external type (iliotibial band) and 1 internal type (iliopsoas tendon), it is simpler to just describe the specific structure that is snapping.

With a growing awareness of intra-articular lesions as an etiology of hip symptoms, an "intra-articular" cause of snapping hip has been proposed.[9] However, snapping hip syndrome is most clearly associated with an extra-articular dynamic tendinous process and it is probably best not to try to categorize these in association with the various intra-articular disorders that are now recognized. Intra-articular lesions may occasionally create a snap, click, or pop, but, most commonly, it is the patient's sensation of catching, locking, or sharp stabbing pain that is characteristic.[10]

As a final caveat, although our understanding of snapping hip syndromes is much improved, occasionally, a clinician will encounter a patient with painful clicking-, popping-, or grating-type symptoms without identifiable intra-articular pathology or lesions of the iliopsoas tendon or iliotibial band. These idiopathic etiologies are less common with our improved understanding but still exist.

Iliopsoas Tendon

Snapping of the iliopsoas tendon can be difficult to differentiate from intra-articular pathology. This is because the source of symptoms emanates from deep in the anterior groin, immediately adjacent to the joint, and the character of the symptoms may mimic a mechanical intra-articular process.

It is estimated by these authors that snapping of the iliopsoas tendon is an asymptomatic incidental observation in 5%

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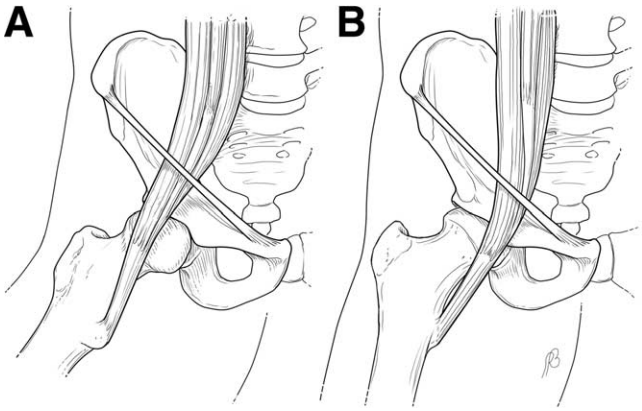

Figure 1 Illustration of the iliopsoas tendon flipping back and forth across the anterior hip and pectineal eminence. (A) With flexion of the hip, the iliopsoas tendon lies lateral to the center of the femoral head. (B) With extension of the hip, the iliopsoas shifts medial to the center of the femoral head.

to 10% of the population. During the course of preparticipation athletic screenings, it is commonly encountered among athletes without a history of injury and with no associated symptoms.

Keeping in perspective that this may be an incidental observation in a significant portion of the population, the clinician must also be aware that a patient may present with a hip joint problem and coincidentally have snapping of the iliopsoas tendon. Thus, it may call on all of one's diagnostic acumen to differentiate whether the problem is solely intra-articular, extra-articular, or both.

Etiology

The etiology of the snapping and the etiology of the pain may be the same or different, keeping in mind that painless snapping is often an incidental observation. Certain activities, such as ballet, may have a predilection for developing this process as an insidious overuse phenomenon.[11] Snapping may be present in both hips with progressive unilateral or bilateral pain. Some cases develop after acute trauma. Patients will usually recount that the popping did not exist before the injury, although it is possible that, in some cases, the asymptomatic snapping may simply have been unrecognized until it became painful.

Pathomechanics

It is well accepted that the snapping phenomenon occurs as the iliopsoas tendon subluxes from lateral to medial while the hip is brought from a flexed, abducted, externally rotated position into extension with internal rotation (Fig. 1).[9] The more controversial issue is which structure is responsible for transiently impeding the translation of the iliopsoas, thus creating the snapping phenomenon.[12,13] This topic has carried some importance as authors have proposed various surgical techniques based on which structure seems to be most responsible for the snapping.[14,15] To date, this argument is, at best, educated conjecture as no one has proven which structure is most commonly responsible. The most popular theories are that the tendon snaps back and forth across the anterior aspect of the femoral head and capsule or that it lodges across the pectineal eminence at the anterior brim of the pelvis.[8,14] A less commonly proposed concept is that it can snap across an exostosis of the lesser trochanter.[6]

Regardless of where the snapping occurs, the tautness of the large iliopsoas tendon bridging the anterior hip region is clinically evident. If one has ever had the misfortune of slipping a surgical finger behind the iliopsoas tendon and extending the hip, it is a painfully crushing experience.

Assessment

Characteristically, the patient will describe a painful clicking sensation emanating from deep within the anterior groin. Usually, this is audible and often prominent enough to be characterized as a clunk based on its sound.

Sometimes the snapping can be generated simply by going from flexion to extension, but the specific reproducible maneuver is with the patient lying supine, bringing the hip from a flexed, abducted, externally rotated position down into extension with internal rotation.[9] Sometimes this is more of a dynamic process that the patient can actively show better than the examiner can passively produce. Often, this is quite prominent but sometimes it is subtle, occurring more as a sensation experienced by the patient rather than what the examiner can objectively observe. Applying pressure over the anterior joint can block the tendon from snapping and assist in confirming the diagnosis.

Occasionally, the patient has to stand and dynamically produce the maneuver. A particular example is the patient that clicks with every step, especially as the hip goes into extension during the late stance phase of gait.

Passively placing the hip into forced flexion with internal rotation is a maneuver, which will characteristically be painful in association with hip joint pathology but should not provoke symptoms from the iliopsoas tendon.[10]

Although symptoms associated with the iliopsoas tendon are typically referred to the anterior groin, infrequently, some patients may also describe an element of aching arising from the flank, buttock, or sacroiliac region. Posterior symptoms are rarely attributed to the iliopsoas tendon, but the examiner must keep in mind that the psoas originates from the lumbar spine and the iliacus from the inner surface of the posterior pelvis.

Investigative Studies

Plain radiographs are an integral part of the assessment of any hip disorders and are helpful to rule out other processes. However, there is nothing about the radiographic findings that is typically indicative of symptoms referable to the iliopsoas tendon. Similarly, magnetic resonance imaging findings are rarely specific for involvement of the iliopsoas tendon but may reveal indirect evidence, characterized by inflammation of the surrounding iliopsoas bursa.

Iliopsoas bursography can be useful in substantiating the diagnosis of snapping iliopsoas tendon (Fig. 2).[7,16] With con-

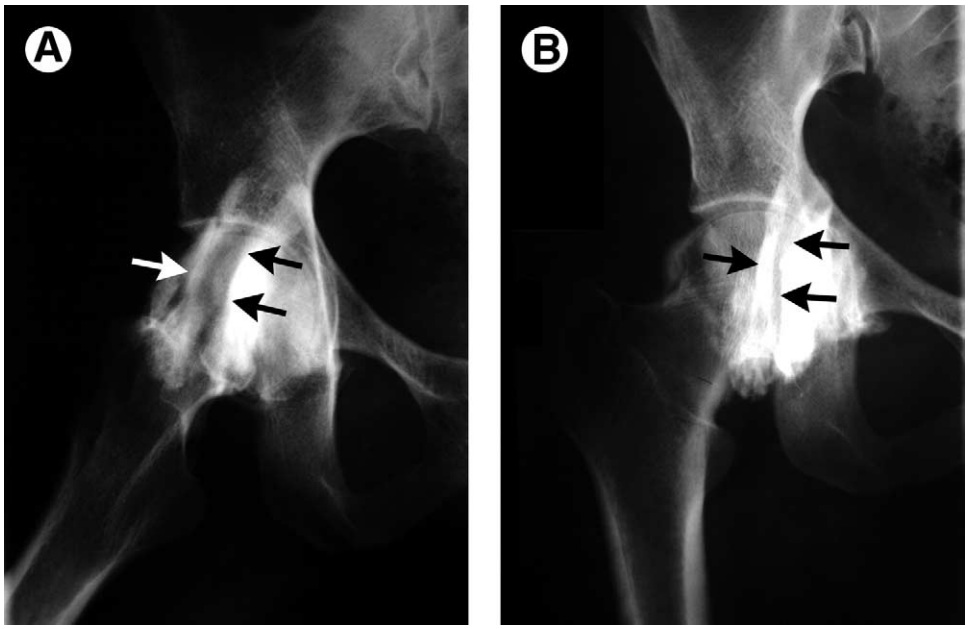

Figure 2 Iliopsoas bursography silhouettes the iliopsoas tendon (arrows) with contrast. (A) In flexion, the iliopsoas tendon lies lateral to the femoral head. (B) In extension, the iliopsoas tendon moves medial. (Figure © J.W. Thomas Byrd.)

trast silhouetting the tendon, under fluoroscopy, the tendon can be visualized flipping back and forth in concert with the patient's snapping sensation. A concomitant injection of bupivacaine may be of some diagnostic value if it temporarily alleviates the patient's symptoms and injecting corticosteroid may potentially be of some associated therapeutic value. The diagnostic efficacy of iliopsoas bursography has 2 caveats. First, the patient must be able to produce the snapping while lying supine on the fluoroscopy table. Second, with the fluoroscopy imaging unit positioned over the patient's hip, this may hinder the ability to create the snap or visualize it when the hip is in a flexed position.

More recently, these authors have come to rely on the diagnostic value of ultrasonography.[17] It can be quite good at visualizing the dynamic motion of the iliopsoas tendon. Its advantages are that it is noninvasive and can easily allow comparison with the uninvolved hip. It does require a high resolution ultrasound unit and an experienced ultrasonographer.

Conservative Treatment

The first step in the management of snapping iliopsoas tendon is establishing the diagnosis. For most patients, the treatment is then little more than assurance that this is a normal variant and that the snapping is not indicative of future problems.

For symptomatic cases, the emphasis is on conservative management using the standard methods used for other forms of tendinitis. An effort is made to identify and modify offending activities. This includes the concept of "active rest," resting the hip from activities that cause pain, while allowing the individual to continue with an alternative exercise program, staying below the threshold of symptoms. Stretching and flexibility to reduce the tension within the iliopsoas is emphasized in addition to gentle conditioning and incorporating a core stabilization program.

The period of recovery can range from weeks to months. The patient or athlete must be pain free with simple activities before attempting to return to the activities that had precipitated the symptoms. When a patient fails to respond, careful investigation is necessary to rule out other organic and nonorganic causes. This must especially include an evaluation of the patient's motivation and other emotional and environmental influences. Oral antiinflammatory medications are routinely used as an adjunct to help reduce symptoms. For recalcitrant cases, a corticosteroid injection in the iliopsoas bursa may be used as a final conservative step, although these authors have rarely found this to be curative.

Surgical Treatment

Surgery consists of relaxation of the iliopsoas to eliminate the snapping. This is accomplished by partial or complete release of its tendinous portion. Various open techniques have been described, mostly influenced by the authors' interpretation of the principal location of the snapping.

Surgery to address snapping of the iliopsoas tendon has been most influenced by Allen and coauthors.[6,8,9] They believed the tendon most commonly snapped across the anterior femoral head and capsule and described an anterior approach to address the tendon at this level. They initially used a vertical incision but then switched to a much more cosmetic transverse incision (Fig. 3). They release the posteromedial tendinous portion of the iliopsoas, leaving the anterior muscular portion intact, effectively producing a lengthening of the musculotendinous unit. Their cohort consisted of 20 hips in 18 patients.[8] Seventy percent had complete resolution of snapping, 25% had partial resolution and, overall, 85% were subjectively improved. Complications included 50% with reduced skin sensation, 15% with subjective weakness, and 10% underwent reoperation.

Gruen et al[14] hypothesized that the tendon was most taut over the pelvic brim and proposed fractional lengthening of

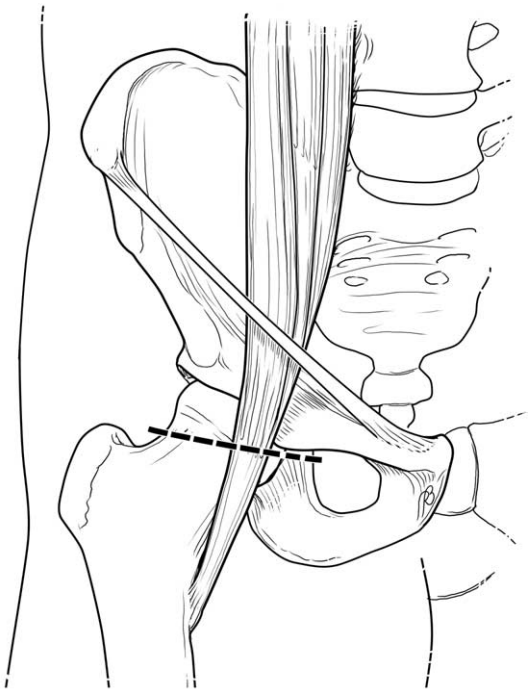

Figure 3 Anterior approach for iliopsoas release described by Allen and Cope[9] using a cosmetic transverse incision.

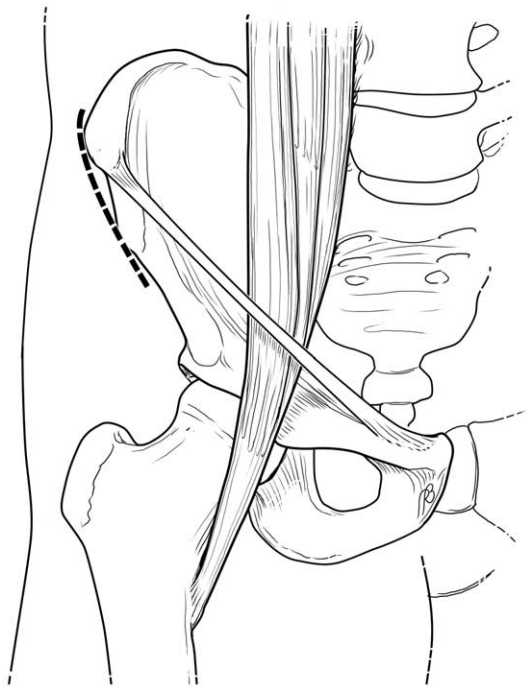

Figure 5 Modified iliofemoral approach for release of the iliopsoas over the iliopectineal eminence described by Dobbs et al.[15]

the iliopsoas tendon at this location. They described an ilioinguinal approach used in 11 patients (Fig. 4). They reported 100% resolution of snapping with overall 83% patient satisfaction. Complications included 45% subjective weakness and 1 patient who underwent multiple reoperations.

Dobbs et al[15] hypothesized that fractional lengthening of the tendon over the iliopectineal eminence might lead to less postoperative loss of hip flexion strength. They described a modified iliofemoral approach used in 11 hips of 9 adolescent children (Fig. 5). All were satisfied with the results of the procedure, and none had detectable loss of flexion strength; however, 1 patient developed recurrent snapping and 2 experienced an area of decreased skin sensation. They acknowledged that, although the approach was extensive, it did provide excellent visualization, which is important because they emphasized the extreme caution necessary to correctly identify the tendon from the femoral nerve, which lies in close proximity at this level.

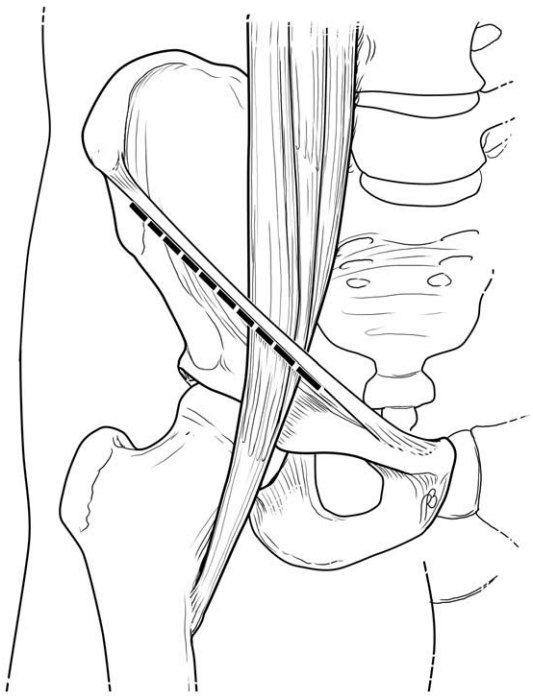

Figure 4 Ilioinguinal approach for release of the iliopsoas over the pelvic brim described by Groom et al.[14]

Taylor and Clark advocated a medial approach, citing cosmesis and avoidance of sensory deficits associated with the anterior approach as its principal advantages (Fig. 6).[18] They reported on 16 hips in 14 patients in whom the tendinous portion of the iliopsoas was released from the lesser trochanter, leaving its muscular portion in tact. All patients were subjectively improved with 57% experiencing complete resolution of the snapping and 36% partial resolution. Fourteen percent experienced persistent weakness of hip flexion above 90°.

Recently, these authors have gained experience with an endoscopic method of releasing the tendinous portion of the iliopsoas at the lesser trochanter.[19] Among the open techniques, this most closely simulates the method described by Taylor and Clark.[18] The hypothesis is that the solution to snapping of the iliopsoas tendon centers on relaxation of the musculotendinous structure. Successful results have been reported with relaxation at various levels. Thus, the principal feature is to develop a technique that reliably allows relaxation of the iliopsoas with the least amount of morbidity. In this regard, these authors have found the endoscopic method to satisfy this criterion. Also, it has been recognized that snapping of the iliopsoas tendon can occur in association

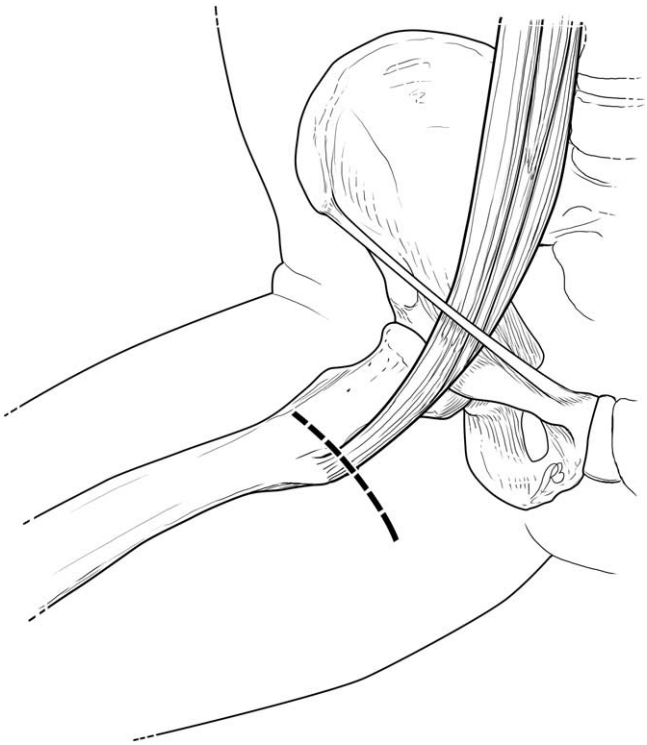

Figure 6 Medial approach for release of the iliopsoas from its insertion on the lesser trochanter described by Taylor and Clarke.[18]

with intra-articular pathology. Thus, the endoscopic method accommodates simultaneous arthroscopic assessment of the joint.

Endoscopic release of the iliopsoas tendon is a continuation of routine hip arthroscopy as previously described using a standard supine technique on a fracture table.[20,21] After completing arthroscopy of the hip, the instruments are removed and the traction released. The hip is flexed 15° to 20°, which slightly relaxes the iliopsoas tendon, and the hip is externally rotated. This brings the lesser trochanter more anterior for access to the endoscopic portals.

A portal is established distal to the standard anterolateral hip portal at the level of the lesser trochanter using fluoroscopic guidance. An ancillary portal is then established for instrumentation (Fig. 7A). The iliopsoas bursa is the largest bursa in the body. Adhesions within the bursa can be cleared, providing excellent visualization of the iliopsoas tendon. The tendinous portion of the iliopsoas is then transected directly adjacent to its insertion on the lesser trochanter, using either an arthroscopic bovie or other thermal device (Fig. 7B). As the tendon is released, it will retract 1 to 2 cm, exposing its muscular remnants, which are preserved.

Postoperatively, the patient is maintained on crutches for approximately 2 weeks until their gait pattern is normalized. Aggressive hip flexion strengthening is avoided for the first 6 weeks, but otherwise the patient follows a normal postarthroscopy protocol. Preliminary experience in 9 cases has been quite good. There was 100% resolution of the snapping and patient satisfaction, with no complications. No patient has experienced subjective weakness; however, these authors have been cautious to select only patients with severe recalcitrant symptoms and it is likely that their improved function because of pain relief may have overshadowed any residual strength deficit.

For recalcitrant cases, endoscopic release of the iliopsoas tendon seems to represent an excellent alternative to traditional open techniques. It is an outpatient procedure that allows concomitant assessment for hip joint pathology and excellent cosmesis. The results are at least comparable to those reported for open methods, with minimal morbidity. However, few patients require surgery for snapping of the iliopsoas tendon, regardless of whether it is performed open or endoscopic. When the surgeon is certain of the diagnosis, the patient must still show convincing evidence that they are an appropriate candidate for the procedure. They must acknowledge that they would not be deterred by the chance of residual weakness. This is especially important for athletes in whom weakness could be an inhibiting factor to resuming their competitive career.

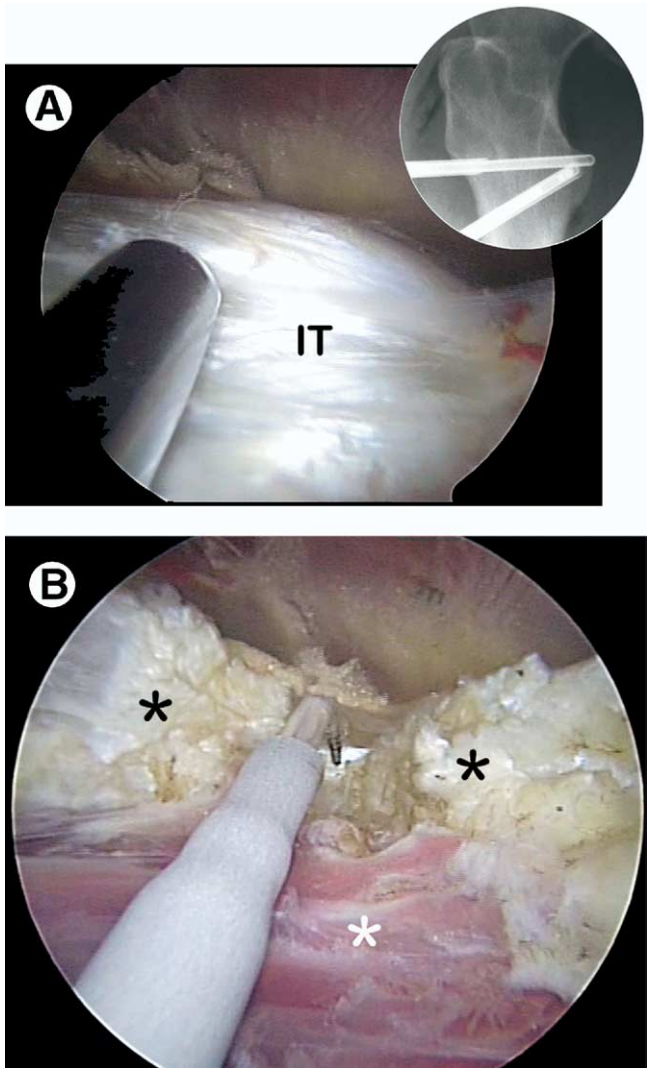

Figure 7 (A) The arthroscope and shaver are positioned within the iliopsoas bursa directly over the lesser trochanter, identifying the fibers of the iliopsoas tendon (IT) at its insertion. (B) An electrocautery device is used to transect the tendinous portion of the iliopsoas (black asterisks), revealing the underlying muscular portion (white asterisk), which is preserved. (Figure © J.W. Thomas Byrd.)

Iliotibial Band

Snapping of the iliotibial band, or external coxa saltans, is a more evident phenomenon, initially described in the scientific literature by Binnie in 1913.[1] Like snapping of the iliopsoas tendon, snapping of the iliotibial band may be an incidental finding in absence of any precipitating cause and in absence of symptoms.

Although snapping of the iliopsoas tendon can often be heard from across the room, snapping of the iliotibial band can be seen from across the room. Patients will describe a sense that the hip is subluxing or dislocating, which these authors have termed "pseudosubluxation." The visual appearance may indeed suggest that the hip is subluxing, but radiographs obtained with the hip in this apparently subluxed position will invariably show that it remains concentrically reduced.

Etiology

Although snapping may occur after trauma, most commonly symptomatic cases are associated with repetitive activities, especially sports or an active vocation. Classically, this has been described in the downside leg of runners training on a sloped surface such as a roadside.[22] It has also been reported as an iatrogenic process after surgical procedures that leave the greater trochanter more prominent, and these authors have observed this in patients who have had a portion of their iliotibial band used for reconstructive procedures around the knee.[23]

Pathomechanics

The snapping occurs from the iliotibial band flipping back and forth across the greater trochanter (Fig. 8). This is often attributed to a thickening of the posterior part of the iliotibial tract or anterior border of the gluteus maximus.[9,24] The snapping occurs as the thickened portion, which lies posterior to the trochanter in extension, then flips forward over the trochanter as the hip begins to flex. There may be a slight rotational component as the greater trochanter seems to slide from anterior to posterior underneath the abductor mechanism as the hip is rotated. Coxa vara has been proposed as a predisposing anatomic factor as has the reduced bi-iliac width.[11,25] Tightness of the iliotibial band may also be an exacerbating feature.

Assessment

The patient will always relate a snapping or subluxation type sensation. The symptoms are located laterally. Typically, they can readily illustrate this while standing. Like the iliopsoas, this is often a dynamic process, better demonstrated by the patient than can be produced by passive examination. Most likely, it would be detected with the patient lying on their side and then passively flexing and extending the hip. The snap can be palpated over the greater trochanter. Origin of the snapping is confirmed by applying pressure over the greater trochanter, which can block this from occurring. The Ober test evaluates for tightness of the iliotibial band which may accompany symptomatic snapping. The patient remains on their side, the knee is flexed 90°, and the thigh is lowered toward the table. This adducts the hip and allows the examiner to assess for contracture or tightness of the iliotibial band.

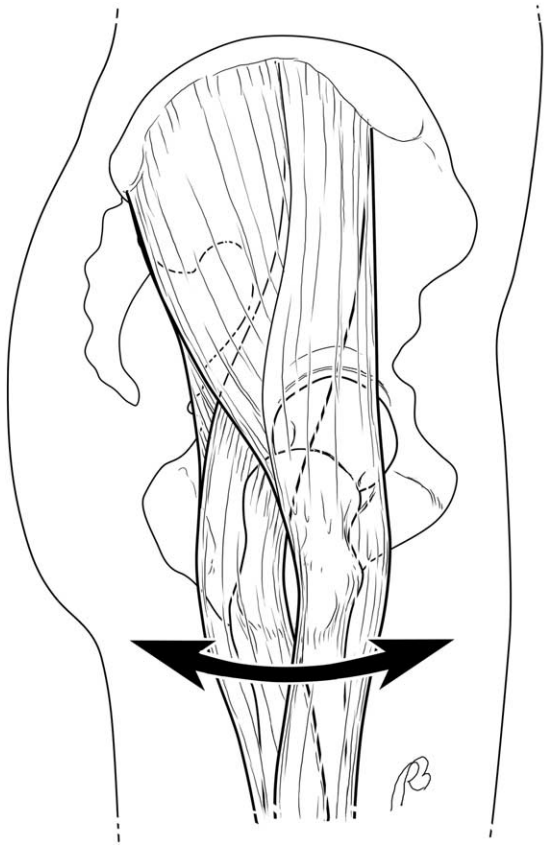

Figure 8 As the iliotibial band snaps back and forth across the greater trochanter, the tendinous portion may flip across the trochanter with flexion and extension or the trochanter may move back and forth underneath the stationary tendon with internal and external rotation.

Investigative Studies

Plain films are useful to rule out other radiographically evident disorders. More extensive investigative studies are not necessary to establish the diagnosis of a snapping iliotibial band because the clinical findings are evident. Ultrasonography may help to substantiate the diagnosis but is rarely necessary. Magnetic resonance imaging may show evidence of trochanteric bursitis or inflammation within the abductor mechanism. Although these studies may add little to the diagnosis of snapping iliotibial band, they may still be prudent in assessing for other associated pathology.

Conservative Treatment

Once the diagnosis is established, the patient is educated about the nature of this process and an effort is made to identify provoking factors. The patient's routine must be modified to avoid offending activities. They must first become asymptomatic before developing a strategy to resume the activities that created the problem.

Oral anti-inflammatory medication and therapeutic mo-

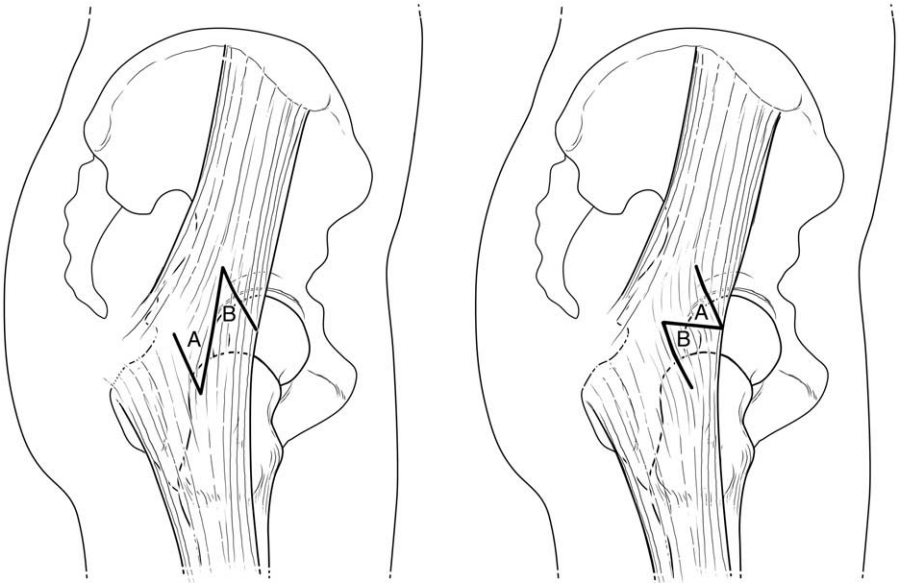

Figure 9 Illustration of the incision and transposition Z-plasty technique originally described by Brignall and Stainsby.[28]

dalities to reduce inflammation and symptoms can be helpful. A stretching program specific to the iliotibial band is implemented. Be aware that stretching the tendon may initially exacerbate underlying trochanteric bursitis because of repeated compression of this structure, but flexibility must be optimized to achieve a successful outcome. For recalcitrant cases, corticosteroid injections in the trochanteric bursa may provide temporary alleviation of symptoms. Although rarely a cure, this may be helpful in allowing the patient to progress with the rehabilitation efforts.

Surgical Treatment

The published results of surgical intervention for recalcitrant snapping of the iliotibial band range from poor to excellent. Various techniques have been described, but it is generally accepted that the common goal, regardless of the method, is to eliminate the snapping by some type of relaxing procedure of the iliotibial band. The success of the operation may be less dependent on the exact technique as much as careful patient selection. In fact, the published results of the same operation among 2 different military populations ranged from "less than optimal" to "excellent and predictable."[26,27]

It is important to remember that snapping of the iliotibial band is usually a dynamic process, better shown by the patient than observed by passive examination, and there may be a deliberate or voluntary component to this snapping phenomenon. Thus, the surgeon must carefully evaluate the patient's motivation and emotional stability. The patient is causing no harm by living with the condition but, if they have exhausted all efforts at conservative treatment, then surgical intervention is an appropriate final step for select recalcitrant cases. The patient must be aware that, although the results of surgery may be successful at eliminating the snapping, there is a risk that they may still experience similar or different pain or dysfunction. For correctly diagnosed cases that do not respond to surgical intervention, it is unlikely that there is a reliable subsequent salvage procedure.

Most recent published literature has been based on the z-plasty technique popularized by Brignall and Stainsby[28] in 1991 (Fig. 9). They reported 8 hips in 6 patients, mean age 19 years, all with resolution of the snapping and excellent pain relief. Three hips in 2 patients experienced occasional aching, and 1 patient underwent a second, more extensive z-plasty to achieve a successful outcome. Faraj et al,[29] in 2001, reported on 11 hips in 10 patients, mean age 17.3 years.[29] All experienced resolution of pain and snapping, although 3 patients developed painful scars requiring desensitization treatment for 2 to 6 months. In 2002, Kim et al[26] reported on 3 active duty soldiers with a successful result in only 1 case. Conversely, a report by Proventure et al[27] in 2004 included 8 hips in 7 active duty military personnel, with 6 of the 7 returning to full military duties. One underwent subsequent surgical intervention and was eventually medically discharged from the service. Of note, this study excluded an unknown num-

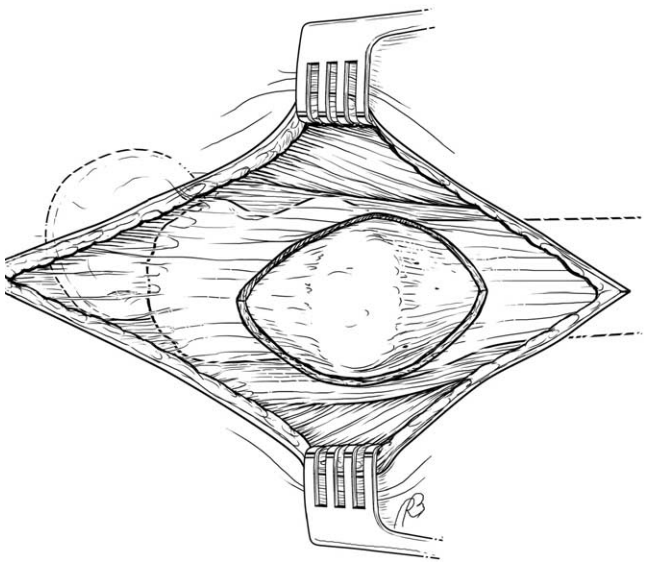

Figure 10 Ellipsoid-shaped segment excision of the iliotibial band over the greater trochanter described by Zoltan et al.[30]

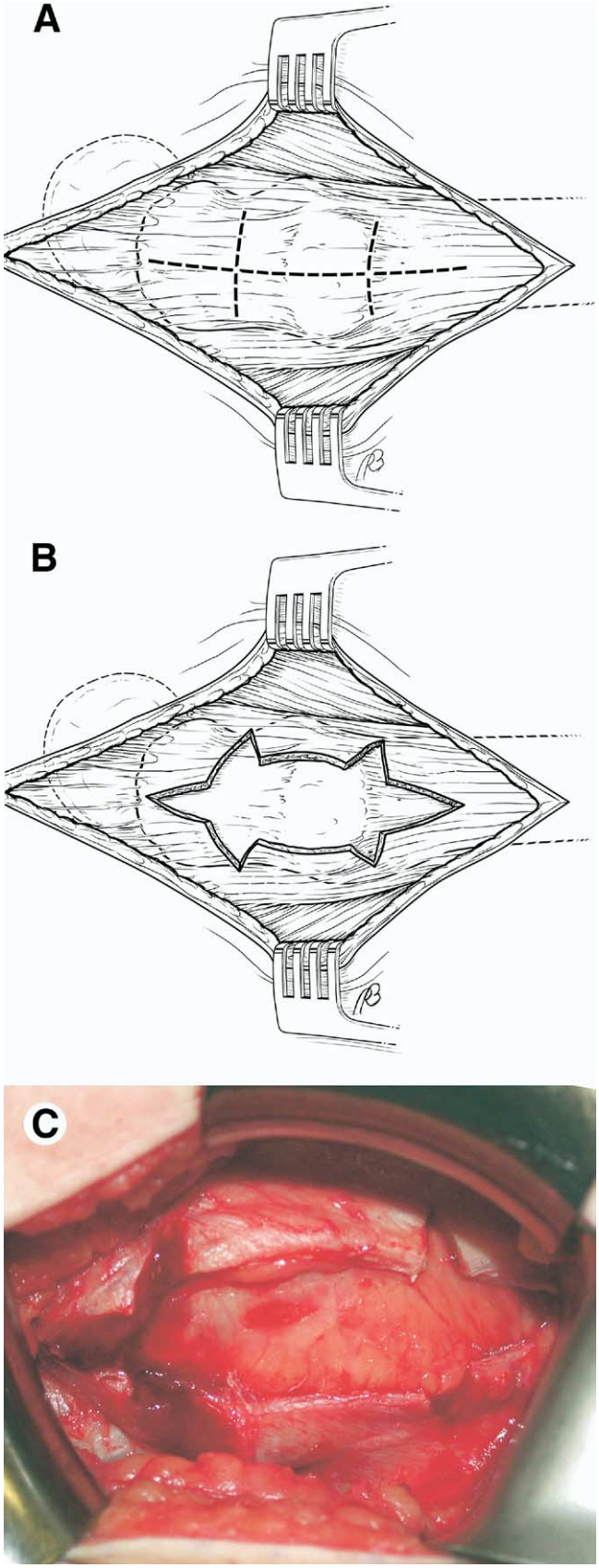

Figure 11 The approach used by this author includes an 8- to 10-cm longitudinal incision, posterior to the midpoint of the greater trochanter with 2 pairs of 1- to 1.5-cm transverse incisions. This relaxes the iliotibial band, eliminating the snapping, without creating any suture repair lines that would necessitate prolonged convalescence. (A) Illustration of incision pattern. (B) Illustration of relaxing response to incision. (C) Appearance at surgery. (Figure 11C © J.W. Thomas Byrd.)

ber of patients who had other concomitant diagnoses, prior fracture, childhood hip pathology, or had undergone previous surgical procedures.

In 1986, Zoltan et al[30] described 7 athletic individuals treated with excision of an ellipsoid-shaped segment of the iliotibial band over the greater trochanter (Fig. 10). All experienced resolution of the snapping, were able to return to sports activities, and considered themselves significantly improved, although only 3 were asymptomatic. One patient underwent a subsequent revision procedure with further excision of the iliotibial band to achieve a successful outcome.

The largest single series was published by Larsen and Johansen[25] in 1986 with 31 hips in 24 patients who underwent resection of the posterior half of the iliotibial tract at its insertion with the gluteus maximus. The details of this study were brief, but they reported that 22 (71%) were pain free, 6 (19%) had persistent snapping without pain, 3 (10%) had persistent snapping with pain, and there were no major complications. Two of the 3 with pain underwent revision surgery with good results.

In 1979, Brooker[31] described a cruciate incision of the iliotibial band over the greater trochanter as a successful method of management for severe trochanteric bursitis. William Allen from Missouri (personal communication) has proposed a modification of the cruciate incision in the management of the snapping iliotibial band. This is a method that these authors have used that includes an 8- to 10-cm longitudinal incision just posterior to the midpoint of the greater trochanter in the thickest portion of the iliotibial band along with 2 pairs of 1- to 1.5-cm transverse incisions (Fig. 11). Limited experience in 5 cases has resulted in complete resolution of the snapping, excellent patient satisfaction, and no complications. The advantage of this technique is that it is simple, it accomplishes the desired effect, it minimally violates the iliotibial band, and there are no repair lines that must be counted on to heal. This also facilitates a liberal, although structured, postoperative rehabilitation program. Crutches are used only for comfort as the gait pattern is normalized, typically 10 to 14 days. Gentle stretching and flexibility is emphasized, although aggressive stretching is not necessary.

Recent experience has begun to emerge on the role of trochanteric bursoscopy.[32,33] A natural progression of this may be toward endoscopic release of the iliotibial band. The concern is either inadequate or excessive resection. Currently, the open method still seems to be better suited for quantitating the extent of tendinous release.

Conclusions

Snapping hip, or coxa saltans, most clearly encompasses 2 distinct entities: the external type caused by the iliotibial band and the internal type caused by the iliopsoas tendon.[9] With an understanding of the anatomy, etiology, and pathomechanics, the characteristic history and examination findings will usually lead the clinician to the correct diagnosis. Further investigative studies may occasionally assist in substantiating this.

An intra-articular type of coxa saltans has also been pro-

posed.[9] This term is less clear because it encompasses numerous intra-articular lesions that can cause symptoms. It may be a challenge to distinguish whether the source of the patient's symptoms is entirely extra-articular or whether there may be an intra-articular component. It is not uncommon that patients may present with an element of both. The treatment strategy for hip joint pain may vary sharply from the symptomatic management used for extra-articular disorders.

The prevalence of asymptomatic snapping hips in the normal population is unknown. Similarly, the incidence of symptomatic cases is not well-defined. However, it is clear that, when treatment is necessary, most will respond to a properly constructed conservative strategy. It is rare that surgical intervention is necessary. Various techniques have been described with moderate success. The ultimate goal is the least invasive procedure with the lowest potential complications that accomplishes the desired effect of correcting the painful snapping. Certainly it is important to select an operation that adequately addresses the structural problem but perhaps more important to this success is selecting the appropriate patient. This is only partly determined by the anatomic lesion and perhaps moreso by the patient's motivation and expectations of what the procedure may accomplish.

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