Central Compartment Release Versus Lesser Trochanter Release of the Iliopsoas Tendon for the Treatment of Internal Snapping Hip: A Comparative Study

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Purpose: To evaluate the results of 2 different techniques of endoscopic iliopsoas tendon release in the treatment of internal snapping hip syndrome. Methods: Between January 2008 and January 2012, a consecutive series of patients with the diagnosis of internal snapping hip syndrome were treated with endoscopic release of the iliopsoas tendon. The patients were divided into 2 groups according to the surgical technique used. Group 1 was treated with endoscopic iliopsoas tendon release at the lesser trochanter, and group 2 was treated with iliopsoas release from the central compartment. Hip arthroscopy of both the central and peripheral compartments was performed in both groups by the lateral approach. Associated injuries were identified and treated arthroscopically. The postoperative physical therapy protocol was the same for both groups. Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores were evaluated preoperatively and at last follow-up at a minimum of 24 months. Results: Twenty patients were included in the study: 6 in group 1 (4 male and 2 female patients; mean age, 35.6 years) and 14 in group 2 (5 male and 9 female patients; mean age, 32.7 years). Associated injuries were found and treated in 4 patients in group 1 and 10 patients in group 2. Every patient in both groups had an improvement in the WOMAC score. One patient in group 2 presented with recurrence of snapping that required surgical intervention. No complications were seen. Conclusions: Both central compartment release and release at the lesser trochanter produced favorable results, based on WOMAC scores, for the treatment of internal snapping hip syndrome.

International snapping hip syndrome was first described by Nunziata and Blumenfeld in 1951. It is characterized by an audible snap that occurs on the anterior part of the groin when the hip is moved from flexion to extension. The internal extra-articular snapping phenomenon is produced by the iliopsoas tendon slipping over the femoral head or the iliopsoas tendon. Internal snapping hip syndrome can occur without symptoms in up to 10% of the general population; there is no prevalence reported for symptomatic patients with snapping hip syndrome. When symptomatic, patients describe a snapping sensation and pain at the front of the groin while extending the hip, and they frequently are able to voluntarily reproduce the snapping phenomenon. With the patient supine, the hip is flexed to more than 19°, abducted, externally rotated, and then extended back to the neutral position. Plain radiographs are not useful in showing internal snapping hip syndrome; however, they are used to diagnose concomitant pathologies such as femoroacetabular impingement and developmental dysplasia of the hip. Ultrasonography has been used to visualize the dynamic motion of the iliopsoas tendon and document the snapping phenomenon. Its advantages are that it is noninvasive and can easily allow comparison with the uninvolved hip. Magnetic resonance arthrography is used to identify intra-articular lesions, such as labral tears or chondral lesions, which are present in more than 50% of the patients with this pathology. The treatment for internal snapping hip is initially nonoperative. Surgical treatment is reserved for patients who do not improve after conservative treatment has been attempted. Open and endoscopic surgical
techniques for the treatment of internal snapping hip syndrome by release or lengthening of the iliopsoas tendon have been described.\(^4\)

In a recent study Kelly and colleagues\(^{11}\) determined that patients with increased femoral anteversion (>25°) are at greater risk of inferior clinical outcomes after arthroscopic lengthening of a symptomatic, snapping psoas tendon; this is because the psoas tendon functions as a dynamic stabilizer in both dysplastic hips or femoral anteversion in these patients.

Endoscopic release of the iliopsoas tendon may be performed in a transcapsular manner in 2 different anatomic regions: (1) at the level of the labrum, from the central compartment,\(^{12}\) and (2) at the hip periphery. It can also be performed within the iliopsoas bursa on its insertion at the lesser trochanter.\(^5\) One disadvantage of transection at the iliopsoas bursa is that it requires the iliopsoas tendon to be accessed at the lesser trochanter under fluoroscopic control. In a systematic review, it was seen that complications were more frequent at the lesser trochanter in comparison with transcapsular release, especially hip flexor weakness, probably because when the release is performed in the central compartment, the muscular portion is preserved. The disadvantage of the central release is that the femoral nerve branches are directly over the iliopsoas muscle at this level and could have an increased risk of injury compared with the more distal release.\(^{13}\) There is no clinical information on the comparative results between the release at the central compartment and the release at the lesser trochanter.

The purpose of this study was to evaluate the results of the 2 different techniques of endoscopic iliopsoas tendon release mentioned earlier for the treatment of internal snapping hip syndrome. Our hypothesis was that the release of the iliopsoas tendon at the central compartment is an effective technique for the treatment of internal snapping hip syndrome, with similar results to those of the release at the lesser trochanter.

**Methods**

A consecutive series of patients with the diagnosis of internal snapping hip syndrome between January 2008 and January 2012 were treated by endoscopic release of the iliopsoas tendon. They were prospectively studied. Included patients were clinically diagnosed. The main symptoms were painful snapping phenomenon unresponsive to conservative therapy (all of the patients received physical therapy and anti-inflammatory steroids for 2 months). All the procedures were performed by the same surgeon (V.M.I.). Every patient who received endoscopic surgical treatment for internal snapping hip syndrome over the aforementioned period was included in the study. The patients were selected to undergo 1 of 2 different techniques of endoscopic iliopsoas release. Most commonly, central compartment release was selected because this procedure is performed through standard portals, through a medial extension of the capsulotomy. The surgeon performed lesser trochanter iliopsoas release in some patients for the purpose of demonstrating the technique to residents and fellows. Patients in group 1 were treated with an iliopsoas release at the lesser trochanter (Fig 1); patients in group 2 were treated with an iliopsoas release from the central compartment (Fig 2).

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**Fig 1.** Release of iliopsoas tendon at its insertion on lesser trochanter.

**Fig 2.** Release of iliopsoas tendon at central compartment.
Arthroscopy of the central and peripheral compartments of the hip was performed in both groups to treat concomitant pathology. Access to the central compartment was obtained by use of traction with the patient in the lateral position. For the patients in group 1, after arthroscopy of both hip compartments was complete, the iliopsoas bursa was accessed by use of accessory portals as the senior author previously described. The tendon was identified with direct arthroscopic vision at the level of the lesser trochanter and under fluoroscopic control with the hip without traction, flexion of 20°, neutral abduction–adduction and 10° of external rotation for exposure of the lesser trochanter on the image intensifier. The iliopsoas tendon was identified, dissected from the synovial tissue around it, and released by use of a radiofrequency hook probe in retrograde fashion. The surgeon completely cut the tendon. Only the tendinous fibers were released, and the muscle portion of the iliopsoas was not sectioned.

For group 2, the iliopsoas tendon release was performed with the hip joint in traction. The anterolateral portal was used as the viewing portal. With a 70° arthroscope, the anterior capsule was identified. From the direct anterior portal, a radiofrequency hook probe was introduced to create an anterior hip capsulotomy at the level of geographic zone I. The fibers of the iliopsoas tendon were visualized through the capsulotomy. The tendon was further exposed by use of a mechanical shaver. A radiofrequency hook probe was used to release the tendon in a retrograde fashion, leaving the iliacus muscle intact (Figs 3 and 4).

Postoperative management in both groups of patients was the same. Every patient was allowed free range of motion. Active hip flexion was restricted in the first 4 postoperative weeks. Weight bearing was indicated immediately except in cases in which it was delayed because of treatment of cartilage lesions with microfracture or in cases that underwent osteochondroplasty for cam-type femoroacetabular impingement. Every patient received 400 mg of celecoxib daily for 21 days. Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores in Spanish, with inverted polarity, were evaluated preoperatively and at last follow-up at a minimum of 24 months.

**Statistical Analysis**

Descriptive analyses were performed by use of SPSS software (version 20.0; SPSS, Chicago, IL).

**Results**

A total of 20 patients were diagnosed with internal snapping hip syndrome and treated with iliopsoas
endoscopic release (at the labrum or at the lesser trochanter) and were therefore included in the study. Demographic data and WOMAC results are shown in Table 1. Six patients were included in group 1 (4 male and 2 female patients; mean age, 35.6 years) and 14 patients in group 2 (5 male and 9 female patients; mean age, 32.7 years). Associated injuries were found and treated in 4 patients in group 1 (1 case of cam-type femoroacetabular impingement, 2 labral tears, and 2 chondral lesions) and in 10 patients in group 2 (10 cases of pincer-type femoroacetabular impingement, 8 cases of cam-type femoroacetabular impingement, and 8 labral tears). A successful outcome is considered the resolution of both pain and snapping, which is usually associated with improvement in the WOMAC score.5

The snapping phenomenon was successfully treated in every patient in group 1; 1 patient in group 2 required a second intervention consisting of peripheral compartment iliopsoas tendon release because of recurrence of painful snapping. This patient was treated for pincer and cam impingement associated with the internal snapping. The impingement required no further intervention. No patients were lost to follow-up at 24 months.

Group 1 averaged 50.1 points and group 2 averaged 57.2 points on the preoperative WOMAC score. Group 1 averaged 89.3 points and group 2 averaged 89.7 points on the WOMAC score at last follow-up. Every patient in both groups had an improvement in the WOMAC score. No complications were seen in any patient.

**Discussion**

The snapping phenomenon was successfully treated by the central transcapsular release (group 1), with similar results to those reported by Contreras et al.12

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**Table 1. Demographic Data and WOMAC Results**

<table>
<thead>
<tr>
<th></th>
<th>Central (Transcapsular) Release</th>
<th>Periphery (Lesser Trochanter) Release</th>
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</thead>
<tbody>
<tr>
<td>Age (yr)</td>
<td>30.93 ± 14.057 (range, 13-65)</td>
<td>35.67 ± 10.76 (range, 21-50)</td>
</tr>
<tr>
<td>Sex</td>
<td>5 M and 9 F</td>
<td>4 M and 2 F</td>
</tr>
<tr>
<td>WOMAC score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative</td>
<td>56 ± 13.21 (range, 31-74)</td>
<td>46.33 ± 21.83 (range, 23-83)</td>
</tr>
<tr>
<td>Postoperative</td>
<td>89.57 ± 3 (range, 80-92)</td>
<td>89.33 ± 1.36 (range, 87-91)</td>
</tr>
<tr>
<td>Surgical time (min)</td>
<td>84.64 ± 19.75 (range, 45-120)</td>
<td>81.67 ± 58.19 (range, 30-180)</td>
</tr>
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F, female; M, male.
The endoscopic release in the iliopsoas bursa also had similar results to those reported by the senior author previously.5

One patient in group 2 presented with recurrence of the snapping phenomenon that required surgical intervention. Because the central release is more proximal and preserves a greater volume of the iliacus muscle, it is considered a more partial release (Fig 5).14 This may explain why there is a greater possibility of recurrence. It has also been documented that a bifid iliopsoas tendon may be a reason for recurrence of snapping requiring revision surgery; a bifid tendon may be more difficult to identify from the central compartment.15 However, central compartment release is an attractive technique because fewer portals are required. The published results of endoscopic techniques for the treatment of internal snapping hip syndrome are comparable with or better than those of open releases, with less morbidity. At present, 3 endoscopic techniques to accomplish iliopsoas release have been described in the literature: transcapsular release from the central compartment, transcapsular release from the hip periphery, and endoscopic release in the iliopsoas bursa.5,11

Our results suggest that there are no differences in the use of any of the aforementioned techniques, but a proper randomized prospective study must be performed and the surgeon must be aware that recurrence of the snapping phenomenon could be a possibility when using a central compartment release. No other complications were observed in any patient in our series. It will be important in the future to study whether there is a relation between the higher rate of recurrence of symptoms and the central compartment release.

Limitations
The weaknesses of this study are that we evaluated cohorts that were not randomized and group 1 had fewer patients than group 2. Another limitation is the small number of patients in each group.

An additional study weakness is that no measurements of hip flexor strength were performed. One of the theoretical advantages of the central compartment release is that the flexor strength is less affected; this should be studied in the future.16

Conclusions
Both central compartment release and release at the lesser trochanter produced favorable results, based on WOMAC scores, for the treatment of internal snapping hip syndrome.

References

Fig 5. Anatomy of iliopsoas tendon and muscle complex in its trajectory at front of hip. At the level of the labrum, it has the highest volume and consists of 60% muscle and 40% tendon. At the hip periphery, it has roughly a 50%-50% relation between muscle and tendon. At its insertion on the lesser trochanter, it has the lowest volume and consists of 40% muscle and 60% tendon.


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