Hip arthroscopy is increasingly recognized as a treatment option for patients with hip pain and labral tears. When emphasis is placed on labral tears as a primary clinical finding in the peripheral compartment, a broader view of the pathophysiology of these tears may be missed. Therefore, it is imperative to gain arthroscopic surgical access to the central compartment and determine if its contents affect the congruency of the hip joint. Abnormal bone and fibro-fatty tissue in the cotyloid fossa decrease the space available for the ligamentum teres, leading to lateral subluxation of the femoral head and rim loading of the acetabulum at the chondrolabral junction. Rim loading of the acetabulum may induce articular-sided labral tears due to hip incongruency. Although these labral tears may require refixation, the congruency of the hip joint should be restored to the best extent possible. Arthroscopic intra-articular saucerization and debridement of space-occupying lesions in the cotyloid fossa increase the space available for the ligamentum teres, improve the congruency of the hip joint, and mitigate against acetabular rim loading. This article describes a case of arthroscopic intra-articular saucerization of the cotyloid fossa in a 25-year-old man with chronic hip pain.
The space available for the ligamentum teres in the cotyloid fossa allows the femoral head to remain congruent in the acetabulum as the ligamentum teres becomes taut or lax during external and internal rotation of the hip, respectively. Congruency of the hip joint may be compromised if the available space for the ligamentum teres is insufficient. This article describes a case of arthroscopic decompression of the cotyloid fossa to improve the space available for the ligamentum teres to promote congruency of the hip joint and to mitigate against articular-sided labral tears.

**CASE REPORT**

A 25-year-old man presented with a 3-year history of right hip pain that he described as a deep ache and rated as a 10/10 on the visual analog scale. He reported no mechanical symptoms or instability while walking. The patient located the pain deep posteriorly in the hip joint and in the sciatic nerve region. The pain frequently woke him at night, and he was unable to sleep comfortably, particularly when lying on the affected side. On occasion, the pain prevented him from ascending stairs and sitting for >30 minutes. He reported no history of trauma or prior hip treatment, and he did not participate in sports.

Physical examination demonstrated normal external rotation and extension, and the straight-leg raise test was negative. However, the patient had moderate to severe pain localized to the hip joint during internal rotation, with the hip in 0° of flexion while in a supine position. This pain was substantially exacerbated with direct axial impact loading of the foot while the hip remained internally rotated with 0° of flexion (cotyloid test). Flexion, adduction, and internal rotation, the test for femoracetabular impingement was negative. Flexion, abduction, and external rotation (FABER maneuver) relieved his symptoms.

The patient’s history and physical examination were not suggestive of infection, and plain radiographs revealed coxa valga with a thickened medial wall that appeared to be contiguous with the acetabular sourcil. At the superior margin of the cotyloid fossa on the anteroposterior view, mild osteopenia was observed, which suggested the presence of bone bruising due to abnormal weight bearing at the apex of the cotyloid fossa. A possible crossover sign was observed but considered insignificant in the absence of intraoperative labral findings (Figure 1). Magnetic resonance imaging (MRI) without contrast did not reveal a labral tear; however, heterotopic bone occupying the cotyloid fossa was in contact with the ligamentum teres, inducing a lateral translation force on the femoral head and causing rim loading of the acetabulum, which causes articular-sided labral tears at the chondral labral junction. If a labral tear is identified, disease within the central compartment should be evaluated (Figure 2). We did not offer the patient a diagnostic injection.

Due to the mechanical consequences of the heterotopic bone in the cotyloid fossa,
the patient underwent hip arthroscopy. The suction-seal typically provided by the labrum was not present during primary distraction of the hip joint. We used a 7.0-mm clear cannula and established the anterolateral portal. A 3.0-mm 30° scope with a 5-mm sheath was passed through the clear cannula into the hip joint. Through this portal, in-flow and out-flow was achieved. Through the anterolateral portal, we identified a hypertrophic ligamentum teres, heterotopic bone, and fibro-fatty tissue in the cotyloid fossa (Figure 3). Lesions in the cotyloid fossa impede a more normal medial position of the ligamentum teres and impart a lateral force on the femoral head during rotation of the acetabulum.

A visual perspective of the joint was obtained, extending from the cotyloid fossa in the central compartment to the labrum in the peripheral compartment (Figure 4). This maneuver allowed us to determine the presence of an articular-sided labral tear in relation to the heterotopic bone in the cotyloid fossa (ie, contrecoup lesion). We then examined the area of the cotyloid fossa that made contact with the femoral head. This area was contiguous with the medial margin of the articular surface of the acetabulum. In view of the location of this heterotopic bone, a posterolateral portal was established. An anterior portal was not required. Through the posterolateral portal, the cotyloid fossa was saucerized (ie, decompressed and reshaped) (Figure 5).

Saucerization of the cotyloid fossa relieved the abnormal area of contact with the femoral head and increased the space available for the ligamentum teres (Figure 6). The ligamentum teres demonstrated a tear that was probably due to abnormal contact with the superior apex of the floor of the cotyloid fossa, which was debrided as it entered the femoral head at the fovea (Figure 7). To successfully decompress and reshape the cotyloid fossa, we confirmed that the tips of our scope and shaver created a triangular apex deep in the central compartment, not the peripheral compartment as is normally achieved...
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during labral repairs. Placement of the second arthroscopic portal was based on the location of the visible disease observed through the single anterolateral portal. The hip joint was reduced and extensively ranged under direct arthroscopic visualization.

A small cystic adenomatoid malformation (CAM) lesion was also found intraoperatively on the anterolateral femoral neck that appeared to impinge against the superolateral rim of the acetabulum during flexion. Arthroscopic removal of the CAM lesion was performed through the posterolateral portal using an arthroscopic burr. A beaver blade was not used to perform an arthrotomy of the hip joint to avoid compromising the stability of the hip joint provided by the joint capsule.

At 6-week follow-up, the patient was fully ambulatory and demonstrated full range of motion, with the complete absence of hip pain during activities of daily living.

DISCUSSION

The indications for hip arthroscopy continue to expand. When an articular-sided labral tear is identified, its refixation after acetabular rim trimming is often performed. However, it is important to determine if pain in these hips is also due to disease in the central compartment. This concern may be more ominous when heterotopic bone in the cotyloid fossa causes abnormal weight bearing against the medial wall.

Our case demonstrated evidence of mild acetabular dysplasia, where a periacetabular osteotomy may have been considered as a treatment option.⁴ Although a thickened medial wall may be a common finding in acetabular dysplasia, developmental dysplasia of the hip (Legg-Calve-Perthes), the heterotopic bone seen on MRI in the cotyloid fossa, was a significant finding because this bone was contiguous with the medial margin of the acetabular sourcil. Figure 8 shows the normal relationship between the acetabular sourcil and the cotyloid fossa.

Hip arthroscopy and intra-articular saucerization of the cotyloid fossa (reshaping and decompression of the cotyloid fossa) was selected for this patient to eliminate abnormal weight bearing of the medial wall and increase the space available for the ligamentum teres. The absence of preoperative femoracetabular impingement symptoms and a labral tear allowed us to focus on the findings in the central compartment as a source of pain and to further contemplate these findings potentially being present in the nondysplastic hip with a labral tear.⁵

A positive cotyloid test does not exclude the presence of a labral tear; however, arthroscopic access to the central compartment provided a specific instrument trajectory that positioned potential peripheral compartment disease in the operative field of the arthroscopic triangle. It is important to understand the normal anatomic relationship of the acetabular sourcil to the medial wall. Abnormal findings must be correlated with the preoperative physical examination.

Our patient’s preoperative physical examination did not correlate with the small CAM lesion observed on MRI; however, clear impingement was present on arthroscopy, suggesting that in the absence of repetitive trauma to the labrum that may...
be observed in the young athlete, labral pathology and CAM and pincer lesions in nonathletes may be induced by or associated with disease in the central compartment. Consequently, CAM lesions may not contribute to preoperative pain, or may do so to varying degrees. Regardless, clinical findings attributable to CAM lesions should not exclude the diagnostic evaluation of the central compartment. When more advanced disease exists in the central compartment, patients may report instability and grinding sensations during ambulation, particularly if the ligamentum teres is torn. Figure 9 shows postoperative radiographs at 6-week follow-up.

Removal of the heterotopic bone in the cotyloid fossa eliminated the source of hip pain and a potential translation force imparted on the femoral head during gait. This translation force may induce lateral subluxation of the femoral head and is most likely to occur during midstance through toe-off (ie, internal rotation and axial loading of the hip joint). Furthermore, in the presence of a contained hip, lateral subluxation of the femoral head could cause articular-sided labral tears and blistering of the adjacent acetabular cartilage due to rim loading of the acetabulum.

Arthroscopic intra-articular saucerrization of the cotyloid fossa defines the true medial margin of the acetabulum and its floor. When combined with acetabular rim trimming, normal weight bearing of the acetabular articular cartilage is facilitated postoperatively. Although it is important to address peripheral compartment disease during hip arthroscopy, it is imperative to reshape and decompress the cotyloid fossa in areas of abnormal femoral head contact. Computed tomography may be useful in defining the extent of heterotopic bone. However, if the operative clinical criteria have been met, a single, well-placed anterolateral portal, alternating between a 30° and 70° scope, will allow a complete diagnostic evaluation of the central compartment. Preoperative radiographs and MRI should be used to fully characterize the relationship of the sourcil to the cotyloid fossa to improve surgical planning.

REFERENCES