

Recurrent Posterior Hip Dislocations on a Cam-Type Femoroacetabular Impingement

A Case Report

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Hip joint dislocations usually occur in high-velocity traumas. In a nonpathological hip, the recurrence of dislocations in the absence of an osseous defect is rare.^{4,5,7} Low-velocity mechanisms have been described and recently associated with cam-type femoroacetabular impingement (FAI). FAI involves an abnormal contact between the femur and the acetabulum. Cam-type FAI implies a loss of the normal osseous concavity at the femoral head and neck junction, while pincer-type FAI reveals an excessive femoral head cover by the acetabulum.¹² This report discusses a recurrent dislocation of the hip presenting a cam-type FAI and a Bankart-like posterior capsular lesion.

CASE REPORT

A healthy 16-year-old female experienced her first hip dislocation after an alpine ski fall. A closed reduction was performed in the emergency department. Conservative treatment was initiated, with a nonweightbearing period of

2 weeks followed by a progressive return to normal activities. Follow-up was discontinued because she was not experiencing any residual pain or instability. Five years later, at the age of 21, she was quarreling with a friend when she sustained an atraumatic posterior hip dislocation resulting from an unclear mechanism of traction and torsion on her previously injured leg. Her neurovascular examination was normal, and radiographs revealed a posterior hip dislocation with no signs of fracture (Figure 1). Within 2 hours of the injury, a closed reduction using the Allis maneuver was performed in the emergency department with the patient under sedation.⁷

A postreduction computed tomography (CT) scan showed a concentric hip with a small nondisplaced subchondral fracture (<1 cm) around the footprint of the round ligament (Figure 2). Conservative treatment was initiated, with a nonweightbearing period of 4 weeks and progressive rehabilitation.

The patient was referred to us at 6 weeks postinjury complaining of instability during pivoting in sports and occasional pain. Physical examination revealed an asymmetric increased external rotation (70° with the hip flexed to 90°) and a unilateral excessive pistoning of the injured hip with an axial telescoping test of the hip in extension and neutral rotation. A posterior subluxation was reproduced by internal rotation of the leg in more than 30° of flexion. A 5-week trial of strengthening exercises in physical therapy did not improve her symptoms. A magnetic resonance arthrogram (MRA) at 5 months from the trauma showed a large posterior capsular tear and a cam-type morphology with an alpha angle of 58° (Figure 3). The acetabular index and the lateral center-edge angle were normal, with angles of 8.7° and 31.2°, respectively. An anterosuperior labral tear was also suspected. A 2-step surgical management was offered to address, in the same

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Figure 1. Second episode of right hip posterior dislocation.



Figure 2. Computed tomography scan of a concentric right hip after closed reduction showing no posterior wall fracture.

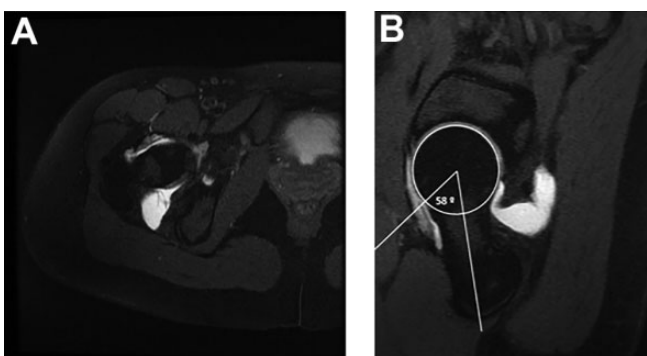


Figure 3. (A) Magnetic resonance arthrogram of the right hip showing the posterior contrast extrusion and absent posterior capsule. (B) Cam-type femoroacetabular impingement with an alpha angle of 58° on the sagittal oblique view.

surgical setting, both the posterior capsular avulsion and the cam-type FAI.

First, an osteoplasty of the femoral neck was performed by an anterior Smith-Petersen mini-approach.⁶ The patient

was supine with a 45° wedge under her right buttock. An anterior capsulotomy was performed and revealed engagement of the anterolateral portion of the femoral neck on the acetabulum in 80° of hip flexion causing a lever action on the femoral head, and this phenomenon occurred earlier in hip flexion with some internal rotation. The prominent osseous anterolateral femoral neck was removed with a 6.5-mm bur. No labral tear was observed when the femoral head was subluxated by applying axial traction to the leg.

Second, the patient was placed in the lateral decubitus position, and a limited Köcher-Langenbeck approach was performed. The short external rotators were found to be torn midsubstance, but the quadratus femoris muscle was intact. A large tear of the posteroinferior capsule was present. The quadratus femoris was reflected from the ischium to visualize adequately the ischial bone. Two double-loaded bone anchors with No. 2 nonabsorbable sutures (TwinLoop FLEX 3.5 mm; Stryker) were fixed to the ischial bone just posterior to the intact labrum in the inferior third of the posterior acetabular facet. A capsular repair was performed by use of horizontal mattress sutures to the residual capsule parallel with the fibers of the external obturator. The external rotators were then repaired with simple sutures (Polysorb 1; Medtronic). An intraoperative assessment showed improved stability, with a decrease in internal rotation and adduction in the hip flexed from 50° to 90° .

Postoperatively, partial weightbearing was immediately authorized and complete weightbearing started at 1 month. Hip flexion was limited to 90° , and no internal rotation was allowed for 4 months. A progressive return to normal activities was successful. At the first year of follow-up, the patient had no pain, instability, or limitation in activities. Final range of motion revealed some limitations in hip flexion (110°) and internal rotation (30°) at 90° of hip flexion. At 4 years, the patient's Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score was 98 out of 100, and she had no pain, recurrence of instability, or functional limitation. The WOMAC score is currently the only validated hip-specific score translated into French.

DISCUSSION

Recurrent hip dislocation in the absence of a preexisting hip injury is a relatively rare condition, with an incidence ranging from 0% to 2%.^{5,7} Upadhyay et al²⁴ first suggested that morphologic variations such as a reduced femoral antetorsion could increase the risk of native hip dislocations. In an arthroscopic study following hip dislocation in athletes, Philippon et al²⁰ observed FAI in 9 of 12 patients with posterior hip dislocation. Steppacher et al²³ confirmed these findings, showing that an increased alpha angle suggesting a cam-type FAI was more common in 53 traumatic hip dislocations. Acetabular retroversion was also significantly increased in the dislocation group, but this morphologic variation was not observed in our patient. Krych et al¹³ observed FAI in 18 of 22 patients with posterior hip subluxation, whereas Podeszwa et al²¹ showed an increased alpha angle ($>55^\circ$) in 6 of 11 children with hip dislocation.

Five other similar cases of recurrent or low-velocity hip dislocation with FAI morphology have been reported.^{2,14,17}

In our case, the patient experienced 2 episodes of hip dislocation: one during a ski fall at unknown velocity and the other with a low-velocity mechanism. Considering the ineffectiveness of the conservative treatment and the recurrent episodes of dislocation, an MRA was indicated. A 58° alpha angle measured on the sagittal oblique view of the MRA confirmed the cam-type FAI.¹¹ We found no acetabular dysplasia considering normal acetabular index and lateral center-edge angle. This presentation was consistent with the hypothesis recently suggested of a relationship between cam-type FAI and recurrent or low-velocity dislocation. As proposed by Steppacher et al,²³ the osseous prominence of the anterior femoral neck probably acts as a fulcrum on the acetabular rim in flexion and internal rotation and predisposes to hip dislocation even in minor trauma.

In an atraumatic situation, FAI is a concern considering the increased risk of eventual osteoarthritis.⁹ Surgical treatment is indicated for symptomatic FAI after 3 to 6 months of unsuccessful conservative management with physical therapy.^{1,12} A femoral neck osteochondroplasty is recommended, which entails an anterior arthrotomy, an arthroscopic technique, or the Ganz surgical hip dislocation approach.^{1,9,12,21} At this time, benefits of a surgical approach to FAI in terms of the risk of future dislocation have not been established. The few cases of osteochondroplasty in FAI with hip dislocation have showed no recurrence at short-term follow-up.²⁰

Considering the recurrence of dislocation, the low-velocity mechanism, and the residual instability of our patient, we decided to address this cam morphology surgically to potentially reduce symptoms and the long-term risk of redislocation and osteoarthritis. We preferred an anterior arthrotomy to allow complete visualization and access to the osseous convexity simultaneously as the capsular repair was performed and to allow evaluation of full range of motion during surgery. We believe that an arthroscopic approach would not have allowed effective evaluation of hip stability. Also, the large tear in the posteroinferior capsule would have caused an extravasation of the fluid. Furthermore, it would have required a form of capsulotomy to enter the arthroscope, thus adding to the existing large posterior capsular deficit. We also preferred anterior arthrotomy rather than the Ganz surgical hip dislocation approach because we planned to use posterior capsular repair and wanted the patient to have early postoperative mobilization to prevent ankylosis; the Ganz technique implies an extensive approach with potential limitations in posterior capsular repair as well as restrictions in postoperative mobilization to permit greater trochanter healing. The relatively long-term follow-up of 4 years showing no recurrence of dislocation and the patient's return to her full activity level without pain suggests the efficacy of an osteochondroplasty and posterior capsulolabral repair in that context.

The other interesting aspect of this case is the residual instability described by the patient even after conservative treatment. The MRA showed an important but rather unique posterior capsular tear that we assumed was the

principal factor in instability. The cam effect could also have contributed, considering that instability has been reported in patients with FAI.^{1,12} However, the patient had not experienced instability before her initial traumatic dislocation, when the cam morphology was already present, and she did not show hyperlaxity of other joints.

More than 20 cases of recurrent dislocations with residual instability are reported in the literature.^{3,8,10,15-19,22,23,25} Some of those patients presented a Bankart-like lesion of the hip that is described as a radial tear of the posteroinferior capsule, associated or not with a labral or acetabular rim lesion.^{3,10,15-17,22,23,25} Capsular plication with or without osseous block and capsulorrhaphy with sutures have been reported as successful surgical options to address these types of lesion. Birmingham et al³ described a capsular repair with 3 anchors to reattach the capsule to the ischium, with good results at 3-year follow-up. A similar approach was used in our case, where 2 anchors were used to affix the torn capsule to the ischial bone. We preferred using the bony anchor technique instead of a plication or a capsular repair with sutures, because the MRA suggested a capsular avulsion from the acetabulum without residual capsular tissue remaining on the posterior acetabular rim. An osseous block was not necessary considering the integrity of the acetabular rim. The instability was resolved, but there was a resulting asymptomatic, restricted hip flexion and internal rotation in flexion.

The tear seen in the short external rotator muscles could also have contributed to the residual instability, as these muscles act as dynamic stabilizers of the hip. Other authors have reported tearing or marked scarring of the short external rotator muscles seen in recurrent hip dislocations in addition to a posterior capsular tear.^{15,25} We believe that repair of the muscular tears improved stability by promoting anatomic healing of the muscles, which could not be achieved by arthroscopic treatment.

This patient had 2 possible reasons for her recurrent instability and continued symptoms: the cam lesion and the posterior capsule tear. It is unclear whether both contributed to symptoms or whether an isolated repair of the capsule would have been successful. We decided to treat both, but some could argue that the osteochondroplasty was not necessary.

In conclusion, a cam-type FAI should be suspected with recurrent dislocations of the hip, particularly in low-velocity mechanisms. To our knowledge, this is the first case report of low-velocity recurrent hip dislocation with a cam-type FAI and residual instability on a Bankart-like capsular lesion with both treated surgically. Femoral neck osteochondroplasty appears to be an effective option to reduce the risk of recurrence and should be considered to prevent further events. We successfully addressed the posterior capsular lesion of the hip with a posterior capsular repair with bony anchors to resolve the residual instability.

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