

# Traumatic Recurrent Hip Dislocation Associated With Femoral Head Fracture Reconstructed With Iliac Crest Autograft

## Luxación recurrente de cadera asociada a fractura de cabeza femoral reconstruida con autoinjerto de cresta iliaca

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**Abstract:** Hip femoral head fractures are extremely uncommon, but likely associated with traumatic hip dislocations. Both lesions require emergent treatment to avoid further complications. 19-year-old male patient was received after a high-energy motor vehicle accident with severe brain and thoraco-abdominal trauma and a displaced femoral head fracture with posterior hip dislocation with no acetabular fracture. An emergent open reduction and internal fixation with 2 headless screws was performed, as well as posterior capsule repair. After 1 month as an inpatient in Intensive Care Unit, he sustained a new episode of posterior hip dislocation. Consequently, a second successful surgical reduction was obtained, and hip stability was achieved by posterior reconstruction with iliac crest autograft fixed with cannulated screw and posterior structure repair. Two years later, he was able to walk independently and he does not present any signs of degenerative joint disease nor avascular necrosis.

**Keywords:** femoral head fracture, recurrent native hip dislocation, iliac crest graft, posterior hip reconstruction, polytrauma.

**Resumen:** Las fracturas de la cabeza femoral son extremadamente raras y están asociadas comúnmente con una luxación de cadera traumática. Ambas lesiones requieren tratamiento urgente con el objetivo de evitar complicaciones posteriores. Un paciente varón de 19 años fue trasladado tras un accidente de tráfico de alta energía en el que sufrió un traumatismo craneoencefálico y toracoabdominal grave, además de una fractura de cabeza femoral desplazada junto a una luxación posterior de cadera sin afectación acetabular. De manera urgente, fue intervenido mediante una reducción abierta y fijación interna de la fractura con dos tornillos canulados sin cabeza y reparación de la cápsula articular posterior. Tras un mes de ingreso en la unidad de cuidados intensivos, sufrió un nuevo episodio de luxación posterior de cadera. Debido a ello, se realiza una segunda intervención quirúrgica con reducción abierta y en la que se obtiene una adecuada estabilidad de la cadera mediante reconstrucción posterior con la adición de autoinjerto tricortical

de cresta ilíaca y reparación capsular posterior. Después de dos años de seguimiento, el paciente deambula de manera independiente, sin dolor y sin signos degenerativos ni de necrosis avascular en las pruebas de imagen.

**Palabras clave:** fractura de la cabeza femoral, luxación recurrente de cadera nativa, injerto de cresta ilíaca, reconstrucción posterior de cadera, politrauma.

## INTRODUCTION

Traumatic hip fracture-dislocations are uncommon injuries usually caused by high-energy motor vehicle accidents (Giannoudis, et al., 2009, Marchetti, et al., 1996, Foulk & Mullis, 2010) and associated with poor prognosis (Marchetti, et al., 1996). It is well established that prompt treatment is required to prevent potential complications (Marchetti, et al., 1996, Foulk & Mullis, 2010), such as avascular necrosis (AVN), neurovascular injury, especially sciatic nerve palsy, degenerative joint disease (DJD) and heterotopic ossification (HO), all of them have been related to this condition (Marchetti, et al., 1996, Foulk & Mullis, 2010). In addition to that, the more severe the injury and the later the reduction, the worse the outcome (Giordano, et al., 2019). The most accepted scale for femoral head fractures is the Pipkin's classification (Scolaro, et al., 2017), which has been proved to be helpful in terms of preoperative plan and judging the prognosis, although other relevant factors, such as the time from injury or age, must be considered.

Furthermore, between 4 and 8 out of 10 have been associated with other associated injuries due to the fact of occurring in polytrauma patients (Foulk & Mullis, 2010). However, hip instability without acetabular involvement is an exceptional situation and there are scarce cases reported in literature (Foulk & Mullis, 2010).

The purpose of this case report is to illustrate an unusual appearance of a displaced head femoral fracture (type II of Pipkin classification) associated with posterior hip dislocation without acetabular fracture (type V of Epstein and Thompson or type IV of Stewart and Milford) (Foulk & Mullis, 2010) with a recurrent episode of hip instability 1 month after the procedure, despite proper urgent treatment, which was resolved with a posterior hip bone graft.

## CASE REPORT

A 19-year-old male patient was brought to our Emergency department after a traffic collision. He was intubated due to the presence of severe brain traumatic injury, diagnosed as subarachnoid hemorrhage in CT scan, and mild thoraco-abdominal trauma. He remained hemodynamically stable. Regarding limbs, he sustained a displaced right femoral head fracture, which consisted of over a third of the head circumference and located in the inferior half (type II of Pipkin classification), associated with posterior hip dislocation without acetabular fracture detected in body CT (Figure 1.A), type V of Epstein and Thompson or type IV of Stewart and Milford. Due to these findings, he underwent an emergent surgical procedure.

By posterior right hip approach without trochanteric osteotomy, a femoral head fracture in 2 fragments was found, which was fixed with two 2.0 mm headless screws (Figure 1.B). Then, an open hip reduction was performed, the posterior capsule was repaired by direct suture with reabsorbable thread, and finally

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## AUTHOR NOTES

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external rotators were inserted. The treatment success was confirmed by radiographic imaging (Figure 1.C). Postoperatively, he was admitted in Intensive Care Unit (ICU).



FIGURE 1.

Posterior hip right dislocation associated with displaced femoral head fracture. Axial and coronal slices CT scan in arrival (A). Intraoperative picture where it is observed the reduction of femoral head fragment and fixation with K-wires and screws (B). Intraoperative radiograph of right hip with adequate reduction of right hip and femoral fracture (C).

To complete the brain study, a magnetic resonance scan (MRI) was performed, which revealed a determined as grade-III diffuse axonal injury, therefore the patient was admitted to the ICU for a month. During that period, he developed moderate signs of cognitive and motor disability, as well as spastic symptoms which precluded prompt rehabilitation.

One month after the operation, in inspection limb shortening and internal rotation attitude were detected in his right lower limb, and radiographs showed a posterior hip dislocation without displacement of the femoral head fracture (figure 2.A). In addition, hip MRI illustrated a complete posterior capsular and external rotators tears as a consequence of joint injury, but without acetabular damage or a lack of blood supply to femoral head.

The surgical incision was made following the previous approach and the hip joint was accessed to proceed with joint repair using the following technique: a homolateral iliac crest graft was harvest and then carved to adapt it to the posterior acetabular shape. After that, the hip was reduced and the graft was posteriorly fixed by two partially threaded cannulated screws, akin to Latarjet's technique employed in treatment of shoulder instability (figure 2.B). Posterior capsule and external rotators were reinserted in place by transosseus stitches. Hip stability was tested by direct examination and by radiographic imaging intraoperatively (figure 2.C).

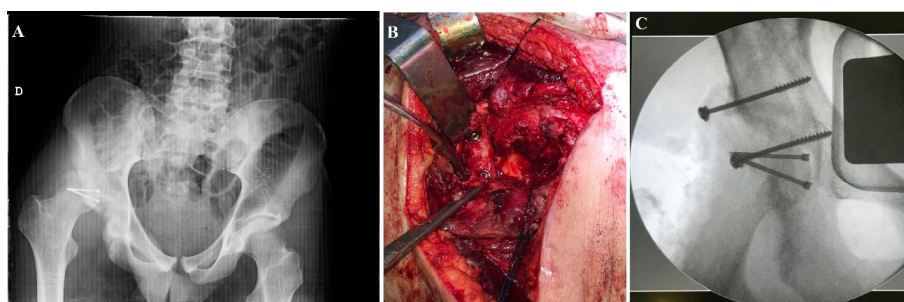


FIGURE 2.

Episode of recurrent right hip dislocation after 1 month of the procedure. Radiograph depicts posterior right hip dislocation without displacement of femoral head fracture (A). Intraoperative image that illustrates fixation of iliac crest strut as posterior bone block by 2 cannulated screws (B). Final intraoperative radiograph with the bone graft fixed in the proper place (C).

Non-weightbearing and the utilization of antiluxation orthosis were indicated for a six weeks period. The patient was admitted in a rehabilitation center for treatment of his neurological sequelae.

At 2-year follow-up, he was able to walk independently without assistance or limp. He did not claim any pain and he was able to perform sport activities. Regarding physical examination, he presented a complete range of motion with a mild limitation of 10 degrees in terms of hip internal rotation without clinical repercussion, with 18 points in Merle D'Aubigne and Postel functional score. A pelvic MRI and radiographs were performed 2 years after the last procedure (Figure 3) with no evidence of AVN or DJD.

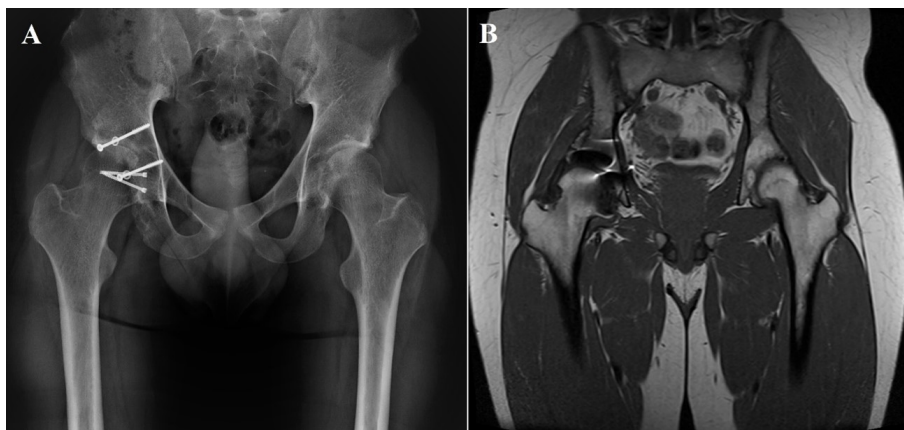


FIGURE 3.

Final result in 2-year follow-up visit. Pelvic AP radiograph represents the graft persists in place and there is no signs of degenerative hip joint or avascular necrosis (A). Coronal slice MRI that demonstrates absence of avascular necrosis (B).

## DISCUSSION

Hip fracture-dislocations are unusual injuries which has been attributed to high-energy trauma (Giannoudis, et al., 2009, Marchetti, et al., 1996, Foulk & Mullis, 2010, Giordano, et al., 2019). They require emergent treatment to prevent avascular necrosis of the hip and neurovascular diseases (Marchetti, et al., 1996, Foulk & Mullis, 2010, Giordano, et al., 2019).

According to Epstein and Thompson classification (Marchetti, et al., 1996), femoral head fractures associated with hip dislocation represent the last type (type V), which is correlated with the worst outcome. Rates has been reported in a range from 4 to 58% for avascular necrosis for hip dislocation itself, depending on whether the time until reduction was lower to 6 or 12 hours or not (Foulk & Mullis, 2010, Giordano, et al., 2019). AVN for femoral head fractures is variable among studies (Foulk & Mullis, 2010), with approximate results from 8,7% to 25% and it is higher regarding the more severe grade of the injury, although a remarkable number of studies reported minimum of 6-month follow-up and a mean of 12-month follow-up (Scolaro, et al., 2017). Theoretically, both combined conditions should increase AVN rate, as well as it has been reported more likely presence of DJD with that combination, up to 70% for DJD in fracture-dislocations (Foulk & Mullis, 2010).

Recurrence of hip dislocation is extremely uncommon, even if there is no acetabular fracture. In delayed-diagnosed dislocation, it has employed total hip arthroplasty (THA), with constrained implants (Kumar, et al., 2017) to prevent hip instability. Reconstruction with iliac crest graft for treating acetabular injuries is not a novel concept. Originally developed by Daum (1993), it had been used for posterior acetabular defects (Sen, et al., 2010), and neurologic hip dysplasia. Eaton et al., (1983) employed this kind of autograft for posterior wall acetabular reconstruction for a patient with spastic paraparesis, one of a 12-patient series where the rest needed THA and the graft was performed for posterior reconstructions.

In addition, Sen et al. (2010) reported an 8-patient series with comminuted posterior wall acetabular fractures reconstructed with this type of graft fixed by a reconstruction plate with good and fair results in the 87,5% at an average 3,3-year follow-up.

Recurrent posterior native hip instability is considered extremely uncommon. Carlson et al., (2018) compiled 9 cases of recurrent hip dislocations from 2 different institutions and advocated to seek for low femoral anteversion or acetabular retroversion and address them by treating the cause of the impingement or performing a periacetabular osteotomy. If that is not detected, then posterior capsular reconstruction should carry out.

Nonetheless, iliac crest graft as a “bone bumper” has not been reported before as a surgical technique for treatment of recurrence of hip dislocation in patients without acetabular defects, due to be the exceptionality of this case. We propose this intervention as a therapeutic alternative in this rare complication in patients with acute or subacute instability and with absence of avascular necrosis or DJD, as preserving-joint treatment.

#### DISCLOSURES:

The authors declare that there is no conflict of interest.

#### ETHICAL ASPECTS:

Written informed consent for patient information and images to be published was provided by the patient.

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