

## Case Report

# Traumatic Posterior Hip Dislocation in a Child: When is an Anterior Open Reduction Indicated? A Case Report

Harikrishnan KT<sup>1</sup>, Jamil K<sup>2</sup> (✉), Abd Rasid AF<sup>2</sup>, Abdul Rashid AH<sup>2</sup>, Ibrahim S<sup>2</sup>

<sup>1</sup>Department of Orthopaedics, Hospital Melaka, Jalan Mufti Haji Khalil 75400 Melaka.

<sup>2</sup>Department of Orthopedics & Traumatology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Kuala Lumpur, Malaysia

### Abstract

Traumatic hip dislocations in children are uncommon, occurring in about 5% of all dislocations in children. Neglected hip dislocations are rarer and pose a serious threat to the normal development of the hip with complications of avascular necrosis and unstable gait. Open reduction is usually required, but the most appropriate surgical approach has not been clearly defined. We reported a child with a traumatic posterior hip dislocation who was successfully treated through an anterior approach after a previously failed posterior open reduction. An anterior open reduction of the hip following a previous failed posterior open reduction is a safe procedure and avoids the likelihood of an iatrogenic injury to the sciatic nerve. Pre-operative imaging with a CT scan or MRI is required in neglected cases to visualise intra-articular bone fragments, which can prevent a concentric reduction.

**Keywords:** Anterior hip approach; neglected hip dislocation; open reduction; shelf procedure; traumatic posterior hip dislocation

### Correspondence:

Kamal Jamil. Department of Orthopedics & Traumatology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Kuala Lumpur, Malaysia. Tel: +603-9145 5555 E-mail: [muhdkamal@ppukm.ukm.edu.my](mailto:muhdkamal@ppukm.ukm.edu.my)

### Introduction

Traumatic hip dislocations in children are rare. In developing countries, however, neglected hip dislocations are not uncommon, as reported by several case series (1-3). They are loosely defined as delay in treatment for more than four weeks after the injury (1). In children younger than 10, a trivial fall may result in a hip dislocation, mainly in a posterior direction. They can be missed initially due to the presence of other distracting injuries and the minimal precipitating trauma (1,3). The dreaded complication of a delay in reduction is avascular necrosis, which can be up to 15% of all hip dislocations (1). Treatment delays lead to soft tissue interposition, requiring an open reduction to locate the hip.

Due to the infrequent nature of the condition, previously reported cases are mainly from small case

series and retrospective studies (1-5). Therefore, the optimal approach for neglected cases is unclear. In open reduction of the hip, the recommended approach usually is in the same direction as the dislocation (4).

We reported a traumatic hip dislocation in a 2.5-year-old child who was treated with an anterior open reduction 14 months after the injury following a failed open reduction from a posterior approach.

### Case Report

A 2.5-year-old child sustained a traumatic hip dislocation when her older brother accidentally fell onto her left hip while playing together. The parents initially presented at another hospital but declined to the treatment and were discharged against medical advice. Four months after the injury, the child was readmitted to the same hospital because of persistent

limping and hip stiffness. A posterior open reduction was done after a period of traction, but the surgery was unsuccessful.

She was referred to our hospital 14 months after the initial injury. She had a painless limp with a reduced range of motion of the left hip. The plain radiograph showed a posteriorly dislocated left hip with intra and extra-articular bone fragments visible (Fig. 1a). We proceeded with magnetic resonance imaging, which showed an intra-articular bone fragment and a fracture of the posterior wall of the acetabulum (Fig. 1b).

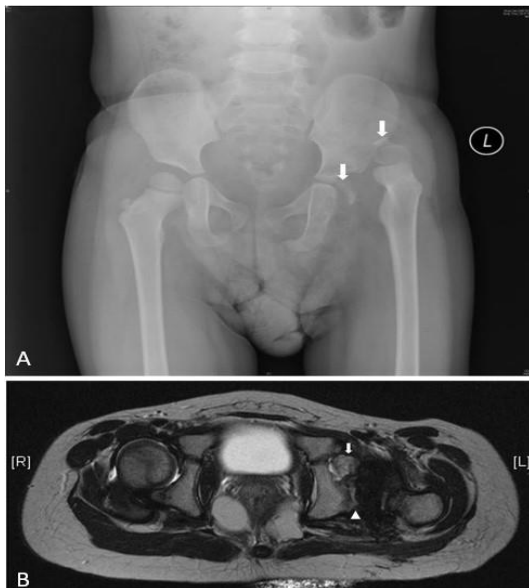


FIGURE 1: (A) Pelvic radiograph showed the left posterior hip dislocation. An extra-articular bone fragment (upper arrow) and an intra-articular bone fragment (lower arrow) were visible; (B) MRI of the left hip showed the posterior acetabular fracture (arrowhead) and an intra-articular bone fragment (arrow)

The child was treated with an adductor release followed by an anterior open reduction. Intraoperatively, we found that the hip joint was full of fibrous tissue. The fibrous tissue, intra, and extra-articular bone fragments were debrided. The bone fragments were most likely from the posterior wall of the acetabulum. The acetabulum and femoral head had areas with articular cartilage erosions. Left femoral shortening was done to facilitate reduction. To provide further stability to the reduction, an acetabular shelf was done by removing the bone segment followed with femoral shortening and fixed with 2 Kirchner (K) wires (Fig. 2a). A single trans-epiphyseal K wire was inserted to stabilise the hip, followed by spica immobilisation. The hip spica and K wires were

removed after eight weeks, and the child was allowed to mobilise.

The latest follow-up was six years after the injury, showing the child walked without pain. On examination, her hip flexion was 70°, abduction 30°, and adduction 15°, but minimal internal and external rotation. The limb length discrepancy was 1.5 cm. Although she had some restrictions on hip motion, she could do her normal activities of daily living. The radiograph of the left hip showed coxa magna. The acetabular shelf had remained in situ (Fig. 2b).

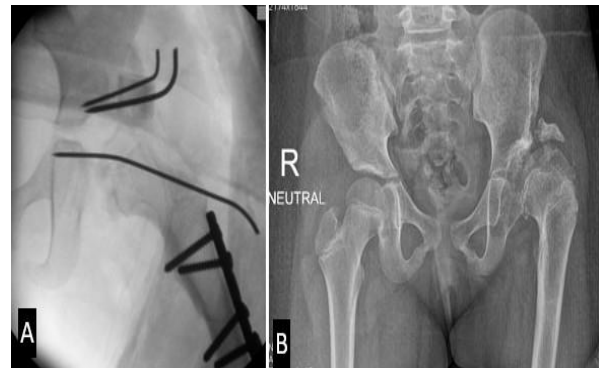


FIGURE 2: (A) Left hip fluoroscopic image after hip spica application. The femoral head and the acetabular shelf were stabilised with K-wires. The femur was fixed with a 4-hole plate after shortening; (B) Pelvic radiograph six years postoperatively. The left hip had developed coxa magna

## Discussion

Neglected hip dislocations in children are challenging to manage. While the best approach has yet to be established, many authors agreed that an open reduction should be attempted, and this may be accompanied by additional tendon releases and/or femoral shortening procedures (1,2,3,5). We searched the literature for studies describing children treated for neglected hip dislocations (Table 1). Studies included here have at least seven or more patients who had an open reduction for traumatic hip dislocations, which were not treated for more than 4 weeks.

All the authors described children with posterior hip dislocations following traumatic injury (Table 1). Pre-operative traction is a popular method used for 2 to 3 weeks. Rather than aiming for closed reduction, the purpose of traction is to stretch the contracted soft tissues and facilitate the open reduction (1-3). Generally, the direction of the hip dislocation dictates the approach to the hip. Therefore, a posterior or

TABLE 1: Literature on open reduction for neglected traumatic dislocations in children

Author/ Year	Number of patients	Mean age (years)	Mean follow-up (months)	Direction of dislocation	Surgical approach	Additional procedure	Outcome
Verma / 1975	28	<12	61.2	Posterior	Anterior (21) Posterior (3)	Traction (4)	Excellent/good in 67% (classification not reported)
Kumar & Jain/ 2005	18	7.4	25	Posterior	Lateral	Pre-op traction (18) K-wire through femoral head (18)	<u>Garrett's classification:</u> Excellent (17) Good (1)
Aguilar / 2006	14	6	48	Posterior	Posterior	Pre-op traction (14) Adductor/iliopsoas tenotomy (number not reported)	<u>Modified Stewart &amp; Milford criteria:</u> Excellent (9) Good (4) Fair (1) <u>Modified radiographic classification:</u> Excellent (4) Good (9) Fair (1)
Banskota et al./ 2007	8	7.5	91	Posterior	Posterior (5) Anterior (3)	Pre-op traction (8) Shortening osteotomy (1) Varus osteotomy (1)	<u>Garrett's classification:</u> Good (3) Fair (3) Poor (2) <u>Barquet's classification:</u> Type II (4) Type IV (2) Type V (2)
Gardner et al./ 2020	7	7.2	44	Posterior	Postero- lateral	Pre-op traction (7) Femoral shortening (5)	<u>Garrett's classification:</u> Excellent (6) Fair (1) <u>Barquet's classification:</u> Type I (2) Type II (1) Type III (3) Type V (1)

( ) = number of patients

posterolateral approach is chosen because it allows direct access to the dislocated femoral head and good exposure to the acetabulum (1,2). Any attenuated hip capsule can be released, and capsulorrhaphy can be performed posteriorly at the injury site. Some studies utilised other surgical approaches, such as anterior (5,6) or lateral (3), but no explanation was given regarding their choices.

Failure to achieve concentric reduction can occur due to osteochondral fragments associated with femoral head or acetabular fractures (7). These fractures can be subtle on plain radiographs; therefore, a CT scan or MRI is helpful. In our case, an MRI was able to show intra-articular bony fragments, which were likely the cause of failed reduction in the primary surgery. We opted for an anterior approach in our patient. Soft tissue scarring from the previous posterior approach

has distorted the anatomy and increased the risk of injury to the medial femoral circumflex vessels and sciatic nerve. Huo et al. (1992) reported on a case similar to ours. Their patient was a 2-year-old child with a traumatic fracture dislocation of the hip, which was missed initially. A posterior open reduction was done nine weeks after the injury, but concentric reduction was not achieved due to residual soft tissue interposition. A successful anterior open reduction was subsequently done 14 weeks after injury.

Some studies described additional procedures following an open reduction of a neglected hip dislocation. Kumar & Jain (2005) performed a lateral hip approach and inserted a trans-articular wire for all their patients. Meanwhile, Aguilar in 2006 believed that by performing a posterior approach, the presence of an intact hip capsule anterior and inferiorly

provided a stable reduction; hence, a trans-articular wire was not required in her case series. However, in selected cases, the adductor and iliopsoas tendons were released if the femoral head was still high riding following traction. On the other hand, Gardner et al. (2020) proposed a low threshold for performing femoral shortening in neglected cases to avoid excessive tension on the femoral head, which can lead to avascular necrosis. Our case was more complicated as it was a revision surgery. Therefore, additional soft tissue releases, femoral shortening and a shelf procedure were necessary to ensure a stable reduction.

Most authors reported their clinical outcome using Garrett's classification (9); an excellent outcome meant no pain, a full range of hip motion, and no limp. Good outcome indicated no pain, 75% of normal hip motion, and no more than a slight limp (9). The fair outcome meant some pain that was not disabling, some limitation of hip motion, but no abduction deformity or a moderate limp (9). Poor outcome was indicated by disabling pain, marked limitation of motion, or adduction deformity. Our patient had no pain but had some hip motion limitation and an adduction contracture. Arguably, this is classified as a poor outcome, although she had no pain. However, she was able to squat and perform her daily activities well.

Our patient had developed coxa magna at the latest six years follow-up after injury. The coxa magna deformity is likely a sequela of ischaemic episodes following the posterior and anterior open reductions. Barquet, in 1982, described that hip dislocations in younger children could disturb the hip blood supply and resemble Perthes disease. Hence, they can present with growth plate alteration and develop coxa magna.

### Conclusion

We have shown that an anterior open reduction of the hip following a failed posterior open reduction is a safe procedure and avoids the likelihood of an iatrogenic injury to the sciatic nerve. The long-term prognosis for this child remains guarded in the presence of coxa magna as she may develop secondary osteoarthritis of the hip. She remains on yearly follow-ups in our clinic.

### References

1. Aguilar JA. Treatment of neglected traumatic posterior hip dislocation in children. *Tech Orthop* 2006; 21: 143-9.
2. Gardner RO, Worku N, Nunn TR, Zerfu TT, Kassahun ME. Management of neglected traumatic hip dislocation in children. *J Pediatr Orthop* 2020; 40(7): e554-9.
3. Kumar S, Jain AK. Neglected traumatic hip dislocation in children. *Clin Orthop Relat Res* 2005; 431: 9-13.
4. Sulaiman AR, Munajat I, Mohd FE. Outcome of traumatic hip dislocation in children. *J Pediatr Orthop B* 2013; 22(6): 557-62.
5. Banskota AK, Spiegel DA, Shrestha S, Shrestha OP and Rajbhandary T. Open reduction for neglected traumatic hip dislocation in children and adolescents. *J Pediatr Orthop* 2007; 27(2): 187-91.
6. Verma B. Management of old unreduced traumatic hip dislocation: A study of 29 cases. *Indian J Orthop* 1975; 9: 69-80.
7. Vialle R, Odent T, Pannier S, Pauthier F, Laumonier F, Glorion C. Traumatic hip dislocation in childhood. *J Pediatr Orthop* 2005; 25(2): 138-44.
8. Huo MH, Root L, Buly RL, Mauri TM. Traumatic fracture-dislocation of the hip in a 2-year-old child. *Orthopedics*. 1992; 15(12): 1430-3.
9. Garrett JC, Epstein H, Harris W, Harvey JP Jr, Nickel VL. Treatment of unreduced traumatic posterior dislocations of the hip. *J Bone Joint Surg Am* 1979; 61(1): 2-6.
10. Barquet A. Natural history of avascular necrosis following traumatic hip dislocation in childhood: A review of 145 cases. *Acta Orthop Scand* 1982; 53(5): 815-20.