

Clinical case

Traumatic hip dislocation in pediatric patients. Report of five cases

Salcedo JD,* Ortuño BN,**

Traumatología y Ortopedia Hospital Central Cruz Roja Mexicana, D.F. y Hospital General de Ecatepec Las Américas, Edo. Mex.

ABSTRACT. We present five cases of patients with traumatic hip dislocation diagnosed clinically, with X-rays and CT scan. Closed reduction was performed under IV sedation and fluoroscopic control. Patients wore a Dennis Brown brace at 45° of abduction and neutral rotation. Weight bearing was totally forbidden for three weeks. Later, with the brace in place, rehabilitation consisting of muscle strengthening was started; patients recovered the ranges of motion without any relapses of dislocation. No X-ray alterations occurred, nor alterations in the functional ranges of motion within the 12 months following. No neurovascular lesions occurred during this study.

Key words: dislocation, hip, wound and injuries, radiology, child.

RESUMEN. Se presenta el caso de cinco pacientes con luxación traumática de cadera, diagnosticada por clínica, estudios radiográficos y tomográficos. Se realizó reducción cerrada bajo sedación intravenosa y control fluoroscópico, continúan con aparato de Dennis Brown en abducción a 45° y rotación neutra. Se prohibió el apoyo absoluto por tres semanas. Después con el aparato se inició rehabilitación con fortalecimiento muscular, recuperando los arcos de movilidad sin reincidencia de luxación. No se presentaron alteraciones radiográficas, ni alteraciones en los rangos de movilidad funcional en 12 meses de evolución. No se presentaron lesiones neurovasculares en este estudio.

Palabras clave: dislocación, cadera, radiología, heridas, niños.

Introduction

Traumatic hip dislocation in childhood represents around 9% of all traumatic childhood dislocations. Occurrence is 0.8 cases per million children under 14 years of age. Fifty per cent of them occur in ages 12-15 years. Those in children under 5 years of age are reported in the literature as isolated cases.¹

This is a rare lesion that affects children with a frequency 25 fold lower than adults; posterior presentation occurs

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* Traumatology and Orthopedics, Mexican Red Cross Central Hospital, D.F.
** Staff physician, Orthopedics and Traumatology Service, Mexican Red Cross Central Hospital, D.F. and Ecatepec Las Americas General Hospital, State of Mexico

Please address all correspondence to:

Dr. Jesús Alejandro Salcedo Dueñas, jesus_saldue@hotmail.com
Lerdo de Tejada Núm. 107, Col. Valentín Gómez Farfás, C.P. 48320
Puerto Vallarta, Jalisco, México

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in 87%. Even though 13% of hip dislocations in children involve other associated injuries, this is not the case in low-energy injuries that, contrary to what is thought, represent the most frequent mechanism of injury (64%).

The causes of hip dislocation in children are falls in 50% of cases, traffic accidents in 30%, and sports and recreational activities in 15%.²

The anatomical characteristics of the hip vary with age; in children under 5 years of age the acetabulum is mainly soft, cartilage is flexible and with considerable joint laxity, so dislocation may occur due to negligible trauma; as the child grows up cartilage diminishes and there is less joint laxity, so dislocation only occurs with trauma of greater intensity, like traffic accidents and sports activities; as a result of this, acetabular injuries are most frequent at these ages.³

Males are more affected than females, with a 4:1 ratio; there is no preference for any side. Bilateral cases are rare.⁴

Dislocations in children are classified like in adults, i.e., anterior, central and posterior, with the latter ones being the most frequent ones⁵, their clinical picture is similar to that in adults and includes medial rotation of the pelvic limb, flexion, adduction and shortening (*Figure 1*). Central dislocations usually occur in adolescents and result from high energy trauma.

Ogden classifies hip dislocations into eight groups: Posterior-iliac, posterior-ischial, anterior-obturator, anterior-pubic, central, inferior, dislocation with a fragment remaining in the joint and dislocation with epiphysiolysis.

The diagnosis is a clinical one, based on the history of high energy trauma, strong pain, functional impotence, shortening of the involved limb and malposition of the thigh (Figure 2).

It is an emergency, so immediate treatment is necessary to avoid complications; the most frequent and severe one is aseptic necrosis which, in up to 15% of cases, results from tearing of the nutrient vessels of the femoral head.⁶

Associated nerve and vascular injuries and ipsilateral femur fractures should be identified before attempting reduction; it is known that, to do this, it is necessary to perform an appropriate clinical exam of the patient and use X-rays⁷ (Figure 3).

Osteonecrosis is a complication in approximately 10% of the cases of traumatic dislocations in children and is usually associated with high energy injuries and may occur as much as two years after the injury, thus the importance of following-up the patient for an appropriate period of time.⁸

Recurrent dislocations may also occur, they are usually posterior, are seen in children under 7 years of age and are associated with connective tissue disorders. It has been proposed that immobilization after dislocation has no effect on the chance of dislocation relapse; it has been observed that a posterior capsular defect is the usual cause and may warrant capsulorrhaphy but, on the other hand, it has also been stated that the rate of avascular necrosis increases with early weight bearing.⁹

The follow-up of child hip dislocations until the adult age shows that 36% of patients may have clinical or radiographic signs of degenerative coxarthrosis. This is very likely due to an articular surface trauma that is not preventable.¹⁰

The reviews performed have found that most authors report a higher incidence among males, which should be due to the fact that physical activity is usually more intense

among males than females. Hip dislocations may occur at any age, but there are two peak periods, 4-7 years and 11-15 years. Occurrence in the left or right side makes no difference and bilateral occurrence is very rare.

Generally speaking, it is essential to make a certain diagnosis and to perform reduction under anesthesia as soon as possible to achieve immediate pain relief and, above all, to reduce the risk of complications.^{11,12}

Material and methods

This is the report of 5 cases (3 males, 2 females) of traumatic hip dislocation (3 left sided and 2 right sided) in pediatric patients ages 4-6 years. All dislocations occurred with a posterior presentation and were due to low energy mechanisms; this study was conducted during a 31-month period (Table 1) at two referral hospitals. The patients did not have a history of hip dislocation or relevant conditions.



Figure 2. Clinical presentation of a pediatric patient with posterior hip dislocation.



Figura 1. Presentación clínica de un paciente con luxación traumática posterior de cadera.



Figure 3. Radiographic assessment prior to reduction.

Table 1. Specifications of the injuries and their evolution in each patient.

Sex	Age (years)	Mechanism of injury	Type	Hours of evolution	Evolution at 4 months	Rx at 4 months	Evolution at 8 months	Rx at 8 months	Evolution at 12 months	Rx at 12 months
Male	4	Fall from bed	Post.	4	Intact Roms	Normal	Intact Roms	Normal	Asympt.	Normal
Fem.	5	Squat	Post.	5	Pain Abduction	Normal	Asympt.	Normal	Asympt.	Normal
Fem.	4	Walking	Post.	3	Asymptomatic	Normal	Asympt.	Normal	Asympt.	Normal
Fem.	5	Going down the sidewalk	Post.	4	Pain Abduction	Normal	Asympt.	Normal	Asympt.	Normal
Male	6	Getting off the bed	Post.	6	Asymptomatic	Normal	Asympt.	Normal	Asympt.	Normal

Asympt. = Asymptomatic

**Figure 4.** CT images to rule out added injuries post-reduction.

Prior to the medical procedure X-rays were taken to determine the type of injury and the treatment plan. CT scans were performed (*Figure 4*) to rule out probable bone injuries.

Treatment consisted of closed reduction under sedation, in the shock room, in a mean of 10 minutes; some procedures were done under fluoroscopic control (*Figure 5*). Reductions were done within the first 8 hours of the traumatic event. Later a Dennis Brown Bar brace was put in place at 45° of abduction and neutral rotation. Weight bearing was totally forbidden for three weeks and each case was followed-up for a minimum of one year.

Results

Three weeks after reduction and using the abduction device, rehabilitation was started; it consisted of isotonic and isometric exercises for muscle strengthening; all cases recovered a full range of motion and there were no gait complications. Therapy was prescribed for 2 months. No dislocation relapses were reported. In no case were there any radiographic alterations at the 12-month follow-up after the reduction and treatment with the Dennis Brown Bar brace without weight bearing. No neurovascular injuries were reported. There were no alterations in the functional ranges of motion and in gait, and there was no pain.

Discussion

These injuries are infrequent and most of them result from trivial mechanisms. The use of the Dennis Brown Bar

**Figure 5.** Fluoroscopic control during the closed reduction procedure.

brace after closed reduction allows for the healing of the capsular defect thus preventing a new dislocation.¹³

Emergency hip reduction within 6 hours of the injury reduces the risk of osteonecrosis.¹⁴ However, closed reduction in infants should be done with precaution due to the risk of slipping the femoral head dislocation during manipulation. Open reduction is indicated when closed reduction fails or whenever there is interposition of the bone or soft tissues that prevents closed reduction. The latest complications include osteonecrosis, coxa magna and osteoarthritis.^{15,16}

Closed reduction under sedation within the first few hours of the traumatic event favors a good patient course as no radiographic alterations are seen after 12 months of follow-up.¹⁷

Starting an early rehabilitation program, at 3 weeks, based on muscle strengthening, reduces the risk of neurologic sequelae and muscle stiffness and maintains normal ranges of motion.^{18,19}

In our experience we obtained excellent outcomes in 5 patients treated with conservative management with a 31-month follow-up.

References

- Herrera JA, Price CT: Traumatic Hip Dislocations in Children and Adolescents: Pitfalls and Complications. *J Am Acad Ortho Surg* 2009; 17: 15-21.
- Haces F, Legorreta JG, Osuna G: Luxación traumática de cadera en niños. Reporte de 10 casos. *Rev Mex Ortop Ped* 1997; 1(1): 27-31.
- Ayadi K, Trigui M, Gdoura F, Elleuch B, Zribi M, Keskes H: Traumatic hip dislocations in children. *Rev Chir Orthop Reparatrice Appar Mot* 2008; 94(1): 19-25.
- Florián AM, López S, Ocampo F, Zabaleta RL, Yan R: Luxación traumática de cadera en un niño de un año. *Rev Diagnóstico* 2004; 43(1): 225-32.
- Estrada J, Garza JF: Luxación traumática de la cadera en niños. Reporte preliminar de 10 casos. *Rev Mex Ortop Traum* 1996; 10(1): 38-42.
- Zrig M, Mnif H, Koubaa M, Abid A: Traumatic hip dislocation in children. *Acta Orthop Belg* 2009; 75(3): 328-33.
- Gennari JM, Merrot T, Bergoin V, Turcat Y, Bergoin M: X-ray transparency interpositions after reduction of traumatic dislocations of the hip in children. *Eur J Pediatr Surg* 1996; 6(5): 288-93.
- Kumar JN, Hazra S, Yun HH: Redislocation after treatment of traumatic dislocation of hip in children: a report of two cases and literature review. *Arch Orthop Trauma Surg* 2009; 129(6): 823-6.
- Rockwood & Wilkins' Fracturas en el niño. 5ª ed. Marbán 2007 Vol. II: 929-39.
- Banskota AK, Spiegel DA, Shrestha S, Shrestha OP, Rajbhandary T: Open reduction for neglected traumatic hip dislocation in children and adolescents. *J Pediatr Orthop* 2007; 27(2): 187-91.
- García S, Hidalgo AM: Luxación traumática de cadera en niño de dos años. *Rev Esp de Cirugía Osteoarticular* 2000; 35(204): 444-7.
- Campbell WC: *Cirugía Ortopédica* 10ª Edic. Vol. II: 1480.
- Forde JC, Khan KS, Awan N: Traumatic posterior dislocation of the hip in a 3-year-old child. *Pediatr Emerg Care* 2009; 25(9): 584-5.
- Mirzatołooei F: Posterior dislocation of the hip and posterior cruciate ligament avulsion in an 8-year-old boy. *Acta Orthop Traumatol Turc* 2009; 43(6): 532-4.
- Banskota AK, Spiegel DA, Shrestha S, Shrestha OP, Rajbhandary T: Open reduction for neglected traumatic hip dislocation in children and adolescents. *J Pediatr Orthop* 2007; 27(2): 187-91.
- 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.
- Houben R, Londers J, Somville J, McKee A: Post-traumatic incongruent hip in a 12-year-old boy. *Acta Orthop Belg* 2007; 73(2): 255-7.
- Gurkan V, Dursun M, Orhun H, Sever GB, Kilickap C, Berkel T: Evaluation of pediatric patients with traumatic hip dislocation. *Acta Orthop Traumatol Turc* 2006; 40(5): 392-5.
- 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.