



## Traumatic hip dislocation in children

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**Traumatic hip dislocation is rare in children. The purpose of this study was to investigate the epidemiological features, dislocation types, treatments, and clinical and radiological outcomes.**

**Seven cases of traumatic hip dislocation in children treated between 1996 and 2006 were included in this study. There were six boys and one girl with a mean age of 6.5 years. Six children had a low-energy injury. One child had a road traffic accident. All had a posterior dislocation of the hip without any associated fracture.**

**All children underwent closed reduction of their dislocation. The mean time interval between dislocation and reduction was 4 hours and 50 minutes. Following reduction, they were immobilised for six weeks: skin traction was applied for 3 weeks, followed in six children by a hip spica cast and in one child by non weight bearing mobilization.**

**The mean follow-up was 6.7 years. After clinical examination the hip was classified as normal in 6 children. One child had a stiff hip and a radiograph showed signs of avascular necrosis.**

**The severity of injury was related to the age at the time of injury. Factors predisposing to avascular necrosis were delayed reduction and severity of trauma.**

**Keywords:** traumatic hip dislocation ; children ; reduction ; avascular necrosis.

### INTRODUCTION

Traumatic hip dislocation in children is rare. This injury differs from injury in adults because it

requires a lesser trauma to produce dislocation and it has fewer associated injuries. The optimal management is prompt diagnosis and immediate reduction. Outcomes are usually satisfactory, although complications may occur, such as avascular necrosis, late post traumatic osteoarthritis, coxa magna and heterotopic ossification.

We retrospectively analyzed seven acute traumatic hip dislocations in skeletally immature patients. We specifically reviewed the types of dislocations, treatments, and clinical and radiologic outcomes.

### MATERIAL AND METHODS

Seven cases of traumatic hip dislocation treated between 1996 and 2006 were included in this study. Table I lists the main characteristics of the patients.

There were 6 boys and 1 girl with a mean age of 6.5 years (range, 3 to 14 years). The dislocations were all unilateral. The left hip was involved in 5 children and the

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**Fig. 1.** — Posterior dislocation of the right hip without fracture

right hip in two. Six children had a low-energy injury from a simple fall, one child had a road traffic accident. All had posterior dislocation of the hip without any associated fracture (fig 1).

All children underwent uncomplicated closed reduction under general anaesthesia. The mean time interval between dislocation and reduction was 4 hours and 50 minutes (range 3 to 6 hours).

After reduction, 6 patients aged less than 6 years, were kept in skin traction for 3 weeks, followed by a hip spica cast for another 3 weeks. The remaining child was kept for 3 weeks in skin traction, followed by non weight bearing mobilization for 3 weeks.

## RESULTS

The mean follow-up was 6.7 years (range, 2-12 years). After clinical examination the hip was classified as normal in 6 children. One child who had sustained a severe trauma, presented with a stiff hip, and radiographs showed avascular necrosis of the femoral head. In the other cases, radiographs were considered normal.

There were no redislocations.

### Illustrative cases

#### *Case n° 1 (patient n° 6) :*

A 14-year-old boy presented to our institution after a road traffic accident. He had severe pain in

his left hip and was unable to move or ambulate. Clinical examination showed the left hip to be flexed, adducted and internally rotated with apparent shortening of the left lower limb (fig 2a). Neurological examination revealed no sensory or motor deficits.

Radiographs showed posterior dislocation of the left hip without any associated fracture (fig 2b).

The hip dislocation was reduced without difficulty under general anaesthesia. After reduction the hip was stable with full range of motion. The time interval between dislocation and reduction was 5 hours. Post-reduction radiographs showed a concentrically reduced hip (fig 2c).

After reduction, the child was put in skin traction for 3 weeks, followed by non weight bearing mobilization for an additional 3 weeks.

At 2-year follow-up, he reported gradually worsening mechanical pain in the left groin. He walked with a limp. The left lower limb was 1 cm shorter than the right one. Pain and limitation of range of motion was noted: flexion was limited to 60°, internal rotation to 5° and abduction to 15°.

Radiographs showed typical signs of avascular necrosis of the femoral head (fig 2d).

#### *Case n° 2 (patient n° 1) :*

A 5-year-old boy sustained a posterior dislocation of the left hip after a fall (fig 3a). He had a closed reduction under general anaesthesia, four hours after injury. The reduction was concentric and stable.

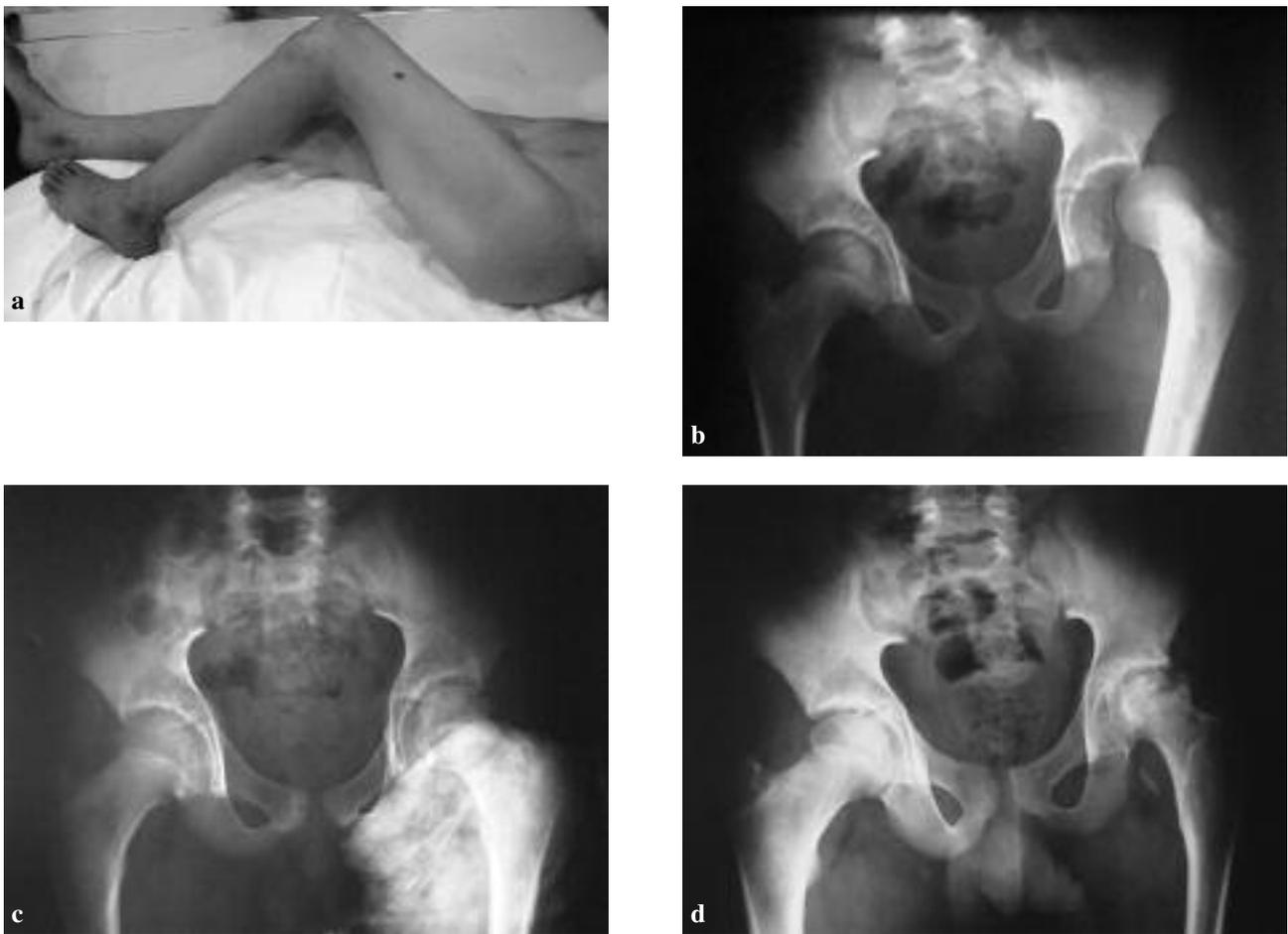
At 12-year follow-up he presented with a full range of pain-free motion. The radiograph was normal (fig 3b).

## DISCUSSION

### *Epidemiology*

Traumatic dislocation of the hip in children is rare, accounting for less than 5% of all traumatic hip dislocations (14,19,30). Bilateral dislocation is exceptional (6,8,21,31). In patients with bilateral dislocations, the direction of the dislocation of each hip may differ (21,31).

The femoral head in children may dislocate in any direction although, as in adults, posterior



**Fig. 2.** — Posterior left hip dislocation in a 14-year-old boy. a. Clinical presentation ; b. Initial radiograph ; c. Radiograph after reduction ; d. Radiograph 2 years after trauma showing avascular femoral head necrosis.



**Fig. 3.** — a. AP radiograph of the pelvis in a 5-year-old boy : posterior dislocation of the left hip ; b. AP radiograph of the pelvis 12 years after reduction : the hip appears normal.

Table I. — Characteristics of the seven patients

Patient n°	Age	Sex	Type of dislocation	Type of trauma	Side	Interval injury to reduction	Treatment	Complications	Follow-up	End result	
										ROM	Radio-graph
1	5	M	Posterior	Fall	Left	4 hours	Closed reduction Skin traction-hip spica	None	12 years	Normal	Normal
2	6	M	Posterior	Fall	Left	3 hours	Closed reduction Skin traction-hip spica	None	10 years	Normal	Normal
3	5	M	Posterior	Fall	Right	5 hours	Closed reduction Skin traction-hip spica	None	8 years	Normal	Normal
4	3	M	Posterior	Fall	Left	6 hours	Closed reduction Skin traction-hip spica	None	7 years	Normal	Normal
5	6	F	Posterior	Fall	Right	5 hours	Closed reduction Skin traction-hip spica	None	5 years	Normal	Normal
6	14	M	Posterior	Road traffic accident	Left	5 hours	Closed reduction Skin traction-non weight bearing	Avascular necrosis	3 years	Stiff	Avascular necrosis
7	7	M	Posterior	Fall	Left	6 hours	Closed reduction Skin traction-hip spica	None	2 years	Normal	Normal

dislocations occur more frequently (3,4,6,11,14,17, 27,28). Rarely the femoral head dislocates inferiorly (luxatio erecta femoris) (1,5). In our series, all children had a posterior dislocation.

There was a clear predominance of male individuals (6 of 7 children), as widely reported in literature (3,4,10,11,14,23,26,27,28, 32,34).

#### *Mechanism of injury*

Several authors (11,14,27,30) have classified traumatic hip dislocation into two groups according to the age at the time of injury. The first group includes children younger than ten years, in whom the injury is associated with relatively minor trauma, such as a simple fall. The second group includes children older than ten years in whom hip dislocation is associated with a more severe or forceful injury, such as may result from a road traffic accident. Barquet (4) and Schlonsky and Miller (32) also found that the magnitude of forces involved in the injury increased with patient age.

Joint laxity decreases with increasing age, and the cartilage to bone ratio also diminishes; hip dislocation in the older child must therefore be

associated with a greater force and a greater chance of concomitant fracture. Joint laxity also explains the absence of fractures of the acetabulum or the femoral head in the majority of cases in younger patients.

#### *Diagnosis*

Traumatic posterior hip dislocation in children often presents with the classic lower limb deformity. The hip is in flexion, adduction and internal rotation. The involved limb appears shorter than the contralateral limb and the femoral head can be palpated posteriorly (16).

Although the diagnosis is usually obvious, it is not uncommon to see a delayed or missed diagnosis. There are many reported cases of delayed diagnosis (6,7,11,12,13,15,22,28). The common causes for a delayed diagnosis are the presence of another fracture or injury that diverts attention from the hip injury (7,15,18,22,26,29), a minimal amount of trauma involved and the inaccessibility of medical facilities in developing countries (18).

Neurologic injuries are rarely reported. Sciatic nerve damage is the most common type of neuro-

logic injury and may occur in 5% to 20% of cases (4,7,14,15,17,27,32). It is usually a neurapraxia and symptoms are transitory.

### Treatment

The treatment of traumatic dislocation of the hip is prompt reduction by closed manipulation performed under general anaesthesia. This is usually easily achieved. Rieger *et al* (30) state that after a closed reduction, aspiration of the joint should be performed to drain the haemarthrosis, in an attempt to improve the vascular supply to the femoral head.

Rare cases of failed manipulation are either due to buttonholing of the femoral head through the hip capsule or infolding of the acetabular labrum (4,9,11,26), and in such cases open reduction is necessary.

Good quality radiographs obtained after reduction are essential to confirm a congruent reduction of the joint and to exclude the presence of fracture fragments. If interpretation of the plain radiographs is difficult or if there is any doubt whether the reduction is concentric, computed tomography is indicated.

There is no uniformity of opinion about the length of time required for immobilization after reduction, but the majority of authors suggest 6 weeks in traction or in a hip spica followed by immediate weight-bearing.

### Complications

The main complication of a dislocated hip in children is avascular necrosis of the femoral head. It has a significant effect on outcome. The overall incidence is between 0% and 15% (4,11,12,14,17,22,23,26,27,29). Most authors state that early reduction, a relatively minor degree of initial trauma and younger age are the main factors reducing this incidence. The case of avascular necrosis reported in our study appears to be related with the severity of the initial trauma.

Other uncommon complications of traumatic hip dislocation in children are late post traumatic osteoarthritis (4), coxa magna (3,4,12,22,26), heterotopic ossification (31,32) and recurrent dislocation (2,20,24,25,33).

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