

Nonaccidental Traumatic Dislocation of the Hip in a 3-Year-Old Child: A Report of a Rare Pediatric Injury

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Abstract

Traumatic hip dislocations are rare in children, and reports of these injuries focus primarily on the risk of osteonecrosis of the femoral head as well as the long-term efficacy of treatment. Anatomical characteristics of the hip in young children, such as ligamentous laxity and a pliable acetabulum, can allow hip dislocation with low-energy trauma, but these injuries occur primarily in school-aged children during play activities.

We report a hip dislocation in a 3-year-old child with no clear explanation of the mechanism of injury and with multiple unexplained bruises at different stages of healing that led to the diagnosis of nonaccidental trauma (NAT). This case highlights the need to consider NAT in young patients with a traumatic hip dislocation.

Hip dislocations as a result of trauma are rare in children¹⁻⁸ and can be associated with serious complications, such as osteonecrosis (ON) of the femoral head.⁴ While there are reports of traumatic hip dislocations in children,¹⁻⁸ the focus has been primarily on risk factors for the development of ON as well as the long-term efficacy of treatment. Aside from one report that suggests that nonaccidental trauma (NAT) should not necessarily be suspected following a hip dislocation in a young child, no other reports consider this possibility.⁶

In this 3-year-old child, a hip dislocation and multiple unexplained bruises at different stages of healing led to the diagnosis of NAT. To our knowledge, this case is the first report of a hip dislocation as the result of NAT and highlights the need to consider NAT in young patients with a traumatic hip dislocation.

The patient's guardian provided written informed consent for print and electronic publication of this case report.

Case Report

One week before admission to the pediatric hospital, a 3-year-old boy was taken by his mother to his pediatrician because of a persistent fever. At that time, he had no musculoskeletal complaints such as hip pain. His gait was age-appropriate. During that evaluation, it was noted that the patient had multiple bruises, and he was admitted to the hospital for evaluation of a possible blood clotting disorder. Hematologic testing showed only mild elevation of his liver enzymes, and he was discharged.

At a follow-up visit 7 days later, the child was noted to have right hip pain and to be unable to bear weight, which were not present previously, so he was referred to the pediatric emergency department for further evaluation. The parents were unable to give a reliable history as to the onset and cause of his hip pain. The child was otherwise healthy with no significant medical history. He had been treated for dysplasia of the left (contralateral) hip with a Pavlik harness. The patient had not been previously referred to the Department of Child Services (DCS).

Figure 1. Anteroposterior radiograph demonstrating right posterior hip dislocation.



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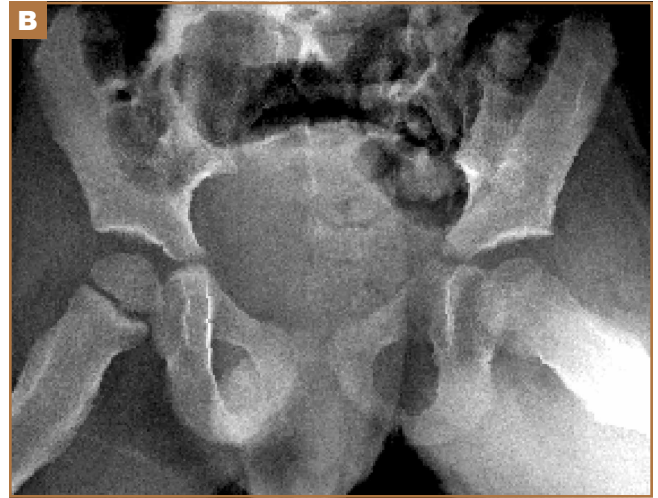
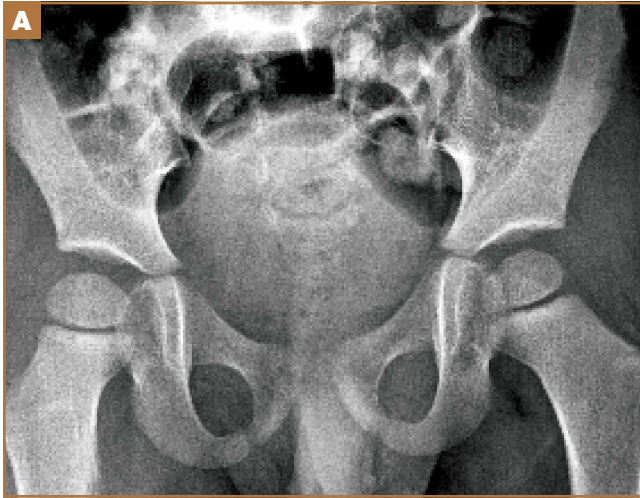


Figure 2. Postreduction (A) anteroposterior and (B) frog-leg lateral radiographs.



Figure 3. (A) Anteroposterior and (B) frog-leg lateral radiographs at 10-month follow-up with no evidence of osteonecrosis.

On physical examination, the child was awake, alert, and cooperative. He had a fading bruise on his left chest and multiple bruises on the anterior surfaces of both legs, but no explanation for the injuries could be obtained from the parents or the child. He had shortening of his right leg and was unable to bear full weight on it because of pain. His range of motion could not be tested because of pain and difficulty with cooperation. His neurovascular examination was normal.

Radiographs of the pelvis and hip showed a right posterior hip dislocation (**Figure 1**); no acute fracture or evidence of preexisting hip dysplasia was found. His skeletal survey was negative. The patient was sedated, and the hip was reduced on the first attempt in the emergency department. Reduction was confirmed initially with radiographs (**Figures 2A, 2B**), followed by magnetic resonance imaging (MRI) of his hip

that showed concentric reduction without associated fractures, articular pathology, or ON. Because of the presence of multiple bruises in different stages of healing and a hip dislocation, both with unknown mechanisms, the diagnosis of NAT was made. This diagnosis was also based in part on the parents' responses to questioning and inconsistencies in their reports. The patient was placed on protected weight-bearing and was discharged in the custody of his grandfather after DCS clearance. At 10-month follow-up, there was no evidence of osteonecrosis, and the patient had a full painless range of motion of the hip and a normal gait (**Figures 3A, 3B**).

Discussion

Traumatic posterior dislocation of the hip accounts for fewer than 10% of all dislocations in the pediatric population.^{4,7-9}

In young children, hip dislocations can be caused by low-energy trauma, which is believed to be secondary to peri-acetabular ligamentous laxity as well as a soft pliable acetabulum.¹⁰ Mehlman and colleagues¹¹ in a study of 42 traumatic hip dislocations in children found that 64% were caused by low-energy trauma. The average age of the 27 children with low-energy dislocations was 7.7 years and the youngest was 2.8 years old. Overall, Mehlman and colleagues¹¹ noted that the children in their study were predominantly boys (average age, 9 years 10 months) who had posterior hip dislocations that were low-energy injuries sustained during play activities. Our patient was much younger than this cohort, and no play-related mechanism of injury could be obtained from either the parents or the child, making an accidental dislocation less likely.

The infrequency of these injuries in very young children may be due to the fact that many reduce spontaneously and are not diagnosed. In addition, nontraumatic hip dislocation without hip dysplasia can occur in patients with Down syndrome, because of ligamentous laxity, or cerebral palsy, because of abnormal muscle forces across the hip.¹²⁻¹⁵ Song and colleagues¹⁶ described 8 patients with habitual hip dislocation as a result of one or more triggering factors: generalized ligamentous laxity, excessive anteversion of the femur and acetabulum, osteocartilaginous defect of acetabulum, coxa valga, and psychiatric immaturity. None of these predisposing factors were present in this child. Although Jones and colleagues¹⁷ reported 2 patients in whom NAT resulted in proximal physeal growth arrest, a hip dislocation as a result of NAT, to the best of our knowledge, has not been reported in the literature.

The rate of ON has been reported to be as high as 12% in children who sustain a hip dislocation, and timely reduction has been shown to reduce the risk of ON.¹¹ Mehlman and colleagues¹¹ found that a 6-hour delay in the reduction of a traumatic hip dislocation led to a 20-fold higher risk of ON in children. Although it is impossible to know how long the hip was dislocated in this child, it is likely that it was longer than 6 hours given the fact that the patient was initially seen on the day of admission at his pediatrician's office prior to transfer to the emergency department. This case highlights that good radiologic and functional outcomes can be achieved even with hips that have been dislocated longer than 6 hours or when the duration of dislocation is unknown. Despite his normal MRI and good clinical and radiologic evaluations, the patient will continue to be followed up for the development of ON.

Conclusion

Although certain injuries, such as corner fractures, fractures and/or bruises at different stages of healing, and long-bone fractures, are highly suggestive of NAT,¹⁸ a high index of suspicion for NAT must be maintained with all injuries, especially in young children. This case highlights that NAT must be con-

sidered even in children with rare injuries such as traumatic hip dislocations. It is our hope that increased awareness of this will lead to better diagnosis and protection for children who sustain NAT.

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