



## Posterior dislocation of the hip and posterior cruciate ligament avulsion in an 8-year-old boy

*Sekiz yaşındaki bir erkek çocukta kalça posterior çıkığı ve arka çapraz bağ avulsiyonu*

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Traumatic hip dislocation is a relatively rare entity in children. Posterior cruciate ligament (PCL) avulsion is also very rare in children and only a few cases have been reported. Because of the mechanism of injury, coexistent PCL avulsion with posterior dislocation of the hip is frequently seen in adults. This coexistence, however, has not hitherto been reported in children. We present an eight-year-old boy with traumatic posterior dislocation of hip and PCL avulsion. He was brought to hospital after a car accident in which his knee hit to the front part of the car when he was driving a bicycle. He had limitation of motion in the left hip with adduction and flexion deformity and a mild swelling and ecchymosis on the popliteal fossa of the left knee. Pelvic X-ray showed posterior dislocation of the left hip. Closed reduction was performed under general anesthesia. Six weeks later, he presented again with a complaint of limitation of motion in the left knee. On a knee radiograph, an avulsed bony fragment was noted near the medial femoral condyle. Three-dimensional computed tomography with reconstruction showed avulsion of a 0.5-cm fragment from the medial femoral condyle. Because of delay, no surgical intervention was attempted and he received physical therapy for quadriceps strengthening and improvement in the range of motion of the knee. One month after physical therapy, he had 120 degrees of knee flexion with no flexion contracture. Twelve months after injury, the patient had a normal hip and near-full knee flexion. He had no rotary instability and was active in sport.

**Key words:** Accidents, traffic; hip dislocation; knee injuries; posterior cruciate ligament/injuries; rupture.

Travmatik kalça çıkığı çocuklarda nadir rastlanan bir durumdur. Arka çapraz bağ (AÇB) avulsiyonu da çocuklarda sadece birkaç olguda bildirilmiştir. Yaralanma mekanizmasına bağlı olarak, erişkinlerde posterior kalça çıkıklarıyla birlikte AÇB avulsiyonu sık görülmesine karşın, bu birliktelik çocuklarda bildirilmemiştir. Bu yazıda, travmatik posterior kalça çıkığı ve AÇB avulsiyonunun birarada görüldüğü sekiz yaşında bir erkek çocuk sunuldu. Hasta, bisiklet sürerken bir arabanın önden çarpması sonucu hastaneye getirildi. Sol kalçada adduksiyon ve fleksiyon deformitesiyle birlikte hareket kısıtlılığı ve sol dizde popliteal çukur üzerinde hafif şişlik ve ekimoz vardı. Pelvis grafisinde sol kalçada posterior çıkık görüldü. Hastaya genel anestezi altında kapalı redüksiyon uygulandı. Altı hafta sonra, sol dizindeki hareket kısıtlılığı nedeniyle tekrar başvuran hastanın diz grafisinde, medial femoral kondil kenarında avulsiyon görüldü. Üçboyutlu bilgisayarlı tomografi rekonstrüksiyonunda, medial femoral kondilden 0.5 cm'lik bir parçanın sıyrıldığı gözlemlendi. Tanıdaki gecikme nedeniyle hastaya cerrahi girişimde bulunulmadı ve kuadriseps güçlendirme ve diz hareket açıklığının iyileştirilmesi için fizik tedavi uygulandı. Bir aylık fizik tedavi sonunda, hastanın diz fleksiyonu 120 dereceye yükseldi ve fleksiyon kontraktürü görülmedi. Kazadan 12 ay sonra yapılan kontrollerde hastanın kalçası normal bulundu, diz fleksiyonu tama yakındı. Rotasyon instabilitesi olmaksızın spor etkinliklerine katılabiliyordu.

**Anahtar sözcükler:** Trafik kazası; kalça çıkığı; diz yaralanması; arka çapraz bağ/yaralanma; yırtılma.

Traumatic hip dislocation is a relatively rare entity in children. Posterior cruciate ligament (PCL) avulsion is also very rare in children and only a few cases have

been reported in the literature. Because of the mechanism of injury, PCL avulsion is frequently seen with posterior dislocation of hip in adults. This associa-

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tion has not been reported in children. We present an eight-year-old boy with traumatic posterior dislocation of hip accompanied by PCL avulsion.

### Case report

An 8-year-old boy had a car accident when he was driving a bicycle. His knee hit to the front part of the car and he was rushed to the hospital. On initial physical examination, he had limitation of motion in the left hip with adduction and flexion deformity. Pelvic X-ray showed posterior dislocation of the left hip (Fig. 1a). He had no neurovascular problem and he was conscious. He also had a mild swelling and ecchymosis on the popliteal fossa of the left knee. Admission X-ray of the knee was not obtained. Closed reduction was performed under general anesthesia and he was discharged from hospital after a-week skin traction. Six weeks later, the patient presented again with a complaint of limitation of motion in the left knee. On physical examination, he had positive sagging sign of the left tibia and positive posterior drawer test. The external rotation recurvatum test was negative and knee flexion was up to 70 degrees. On a lateral X-ray, an avulsed bony fragment was noted near the medial femoral condyle (Fig. 1b). Three-dimensional computed tomography with reconstruction showed avulsion of a 0.5-cm fragment from the medial femoral condyle (Fig. 1c). It was avulsed from the femoral side of the ligament and was tilted backward. Because of delay, no surgical intervention was attempted and he was sent to physiotherapy department for quadriceps strengthening and improvement in the range of motion of the knee. One month after physical therapy, he had 120 degrees of knee flexion with no flexion contracture. Twelve months after injury, the patient had a normal hip, two plus positive posterior drawer test, and near-full knee flexion. He had no rotary instability and was active in sport.

### Discussion

In adults, PCL avulsion accounts for only 3% of all ligamentous injuries of the knee. Pediatric avulsion injuries of the PCL are limited to case reports.<sup>[1-4]</sup> Mechanisms of injury to the PCL may vary, but two major mechanisms are hyperextension combined with rotation and direct blow to the knee in flexed position. In this mechanism of trauma, the posterolateral corner of the knee is usually preserved and functional outcome would be better. Posterior dislocation of the



**Fig. 1.** (a) Pelvic radiograph showing posterior dislocation of the left hip. (b) Six weeks after closed reduction of the left hip, knee X-ray showed a bony fragment. (c) Three-dimensional computed tomography reconstruction showed avulsion from the medial femoral condyle.

hip also occurs with this mechanism.<sup>[5]</sup> Our patient had no subjective problem with his knee one year after trauma.

Natural history of PCL avulsion in children is not clear, but most surgeons fix the avulsed fragment.<sup>[2,4,6]</sup> In our case, fixation of the fragment was not attempted because of delay in diagnosis. Yet, the patient was active in football one year later.

McDonald et al.<sup>[7]</sup> reported PCL injury (midsubstance) in a 6-year-old boy who did not receive any specific treatment. He was completely asymptomatic by three months postinjury, but he developed anterior knee pain at the age of 11 years. Frank and Strother also reported bony avulsion of the PCL from the femur in an 8-year-old boy. He was treated with excision of the fragment. Despite a positive posterior sagging sign at the end of a 2.5-year follow-up, he was active in karate and football.<sup>[8]</sup>

Considering lack of knowledge regarding the natural history of PCL injuries in children, the most logical strategy is to follow the protocol of adult PCL treatment, i.e., fixation of the bony fragment in acute stages and excision of the fragment in missed cases.

## References

1. Lobenhoffer P, Wünsch L, Bosch U, Krettek C. Arthroscopic repair of the posterior cruciate ligament in a 3-year-old child. *Arthroscopy* 1997;13:248-53.
2. Uğutmen E, Şener N, Eren A, Bektaş B, Altıntaş F. Avulsion fracture of the posterior cruciate ligament at the tibial insertion in a child: a case report. *Knee Surg Sports Traumatol Arthrosc* 2006;14:340-2.
3. Hesse E, Bastian L, Zeichen J, Pertschy S, Bosch U, Krettek C. Femoral avulsion fracture of the posterior cruciate ligament in association with a rupture of the popliteal artery in a 9-year-old boy: a case report. *Knee Surg Sports Traumatol Arthrosc* 2006;14:335-9.
4. Ross AC, Chesterman PJ. Isolated avulsion of the tibial attachment of the posterior cruciate ligament in childhood. *J Bone Joint Surg [Br]* 1986;68:747.
5. Reigstad A. Traumatic dislocation of the hip. *J Trauma* 1980;20:603-6.
6. Ringer JL, Fay MJ. Acute posterior cruciate ligament insufficiency in children. *Am J Knee Surg* 1990;3:192-203.
7. MacDonald PB, Black B, Old J, Dyck M, Davidson M. Posterior cruciate ligament injury and posterolateral instability in a 6-year-old child. A case report. *Am J Sports Med* 2003;31:135-6.
8. Frank C, Strother R. Isolated posterior cruciate ligament injury in a child: literature review and a case report. *Can J Surg* 1989;32:373-4.