

DIAGNOSE THIS

A 12-year-old girl with right-sided hip pain

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A 12-year-old girl presents to her family physician with a 5-week history of right-sided hip pain. The pain is dull, focal, and aching in the hip and groin region. The patient has difficulty weight bearing on the affected side resulting in a limp when walking. The patient reports no recent history of physical trauma. She has a body mass index of 24 kg/m², placing her above the 90th percentile for her age and sex.

The patient is otherwise well with an unremarkable demeanor. Her hip is non-tender and there are no palpable abnormalities. Her physical examination reveals decreased range of motion at the hip through internal rotation, and abduction. Passive flexion of the hip causes abduction and external rotation of her right

limb. Her vital signs are: heart rate 95, respiratory rate 18, blood pressure 115/65, oxygen saturation 99% on room air. A plain film radiograph is obtained (Figure 1).

Choose the BEST answer:

- A. Juvenile idiopathic arthritis
- B. Avascular necrosis of the hip (Legg-Calve-Perthes disease)
- C. Slipped capital femoral epiphysis (SCFE)
- D. Developmental dysplasia of the hip



Figure 1. Plain pelvic radiograph (frog leg view) demonstrates widening of the proximal growth plate of the right femur with medial and inferior displacement of the proximal epiphysis of the femur.

Answer

The correct answer is "C".

Overview

Slipped capital femoral epiphysis (SCFE), also known as physiolyis of the hip joint, is one of the most common hip disorders of adolescence.¹ It is a Salter Harris Type 1 fracture meaning that it typically spares the metaphysis and epiphysis of the proximal femur. In this fracture, the femoral neck metaphysis is displaced anteriorly and superiorly to the capital femoral epiphysis.² It occurs when shearing forces applied to the femoral head exceed the strain value of the capital femoral physis (growth plate).³ The prototypical patient is an obese adolescent with no history of underlying risk factors. The majority of cases of SFCE present in the age range of 9-16 years with a mean presentation age of 12 years in girls and 13.5 years in boys.¹

Imaging studies

The best position to obtain an X-ray is in the 'frog leg' view, in which the knee of the affected limb is flexed approximately 40° and the hip is abducted approximately 45°. The diagnosis may be missed in the anterior-posterior view.⁴

Klein lines are drawn through the lateral aspect of the femur lying tangential to the neck of the femur to further aid in diagnosing the condition.⁵ Figure 2 shows the radiograph superimposed with Klein lines. In a

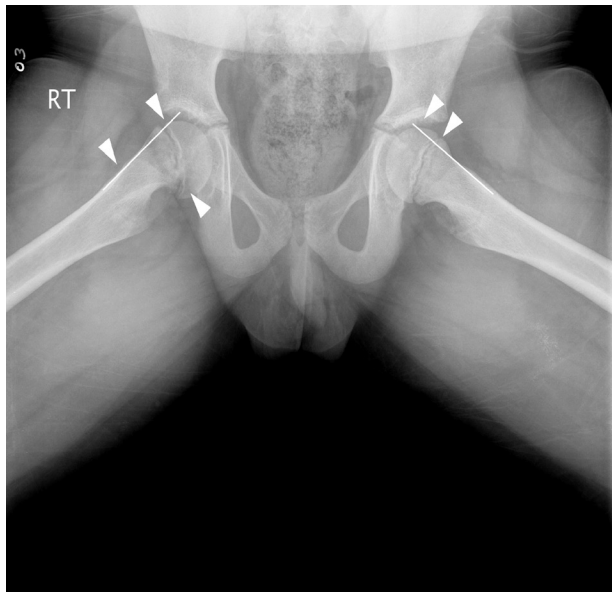


Figure 2. Radiograph with superimposed Klein lines.

normal femur (i.e., without slippage) the line should truncate at least one-tenth of the epiphysis. Compare the affected limb (right) to the unaffected limb.

Clinical features

The most common presentation is the chronic form of SCFE. However there may be acute cases involving trauma, or acute on chronic presentations, in which heightened activity or trauma causes a shift and results in sharp and sudden pain. The severity of the slip is determined by the degree of displacement and the slip itself is classified as 'stable' or 'unstable' based on whether the patient is able to weight bear.⁶

Management

All cases of SCFE require treatment. The gold standard of treatment for chronic or stable slips is surgical stabilization using a single cannulated screw placed through the center of the epiphysis without attempting to reduce the slip. The incidence of bilateral SCFE on primary presentation is reported between 8-27%, however, long term follow-up shows development of contralateral hip involvement in up to 63% of patients who had initially presented with single sided SCFE.^{7,8} These figures indicate that prophylactic pinning of the contralateral femoral epiphysis may be indicated in a subset of patients; however, this is controversial due to the introduction of potential perioperative complications and the risk of growth plate disruption in an otherwise healthy joint. Figure 3 illustrates bilaterally



Figure 3. Post-operative radiograph, from a different case, illustrates flattening sclerosis and irregularity of the right femoral head; signs characteristic of avascular necrosis.

pinned proximal femoral epiphysis in a post-operative hip radiograph.

Long-term complications

One possible and significant long-term complication of capital screw fixation is the development of avascular necrosis (AVN) at the treated limb(s). AVN is caused by disruption of blood flow to the femoral head due either to the slip itself or from surgical complications. The femoral head is particularly susceptible because it receives its blood supply mainly from the medial femoral circumflex artery and the inferior gluteal artery. The incidence of AVN is 13% in unstable SCFE cases that are pinned in-situ (i.e., without reduction).⁹ The risk of AVN leads some to suggest that preventative screw fixation should not be routinely performed in an unaffected leg. Figure 3 portrays an AVN complication that developed in a much older patient.

Other complications include chondrolysis, which is the loss of articular cartilage. As with any condition or intervention that puts abnormal stress on the joints, the

risk of developing osteoarthritis is increased in these patients.

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