Slipped Capital Femoral Epiphysis (SCFE)

Slipped capital femoral epiphysis, or SCFE, is characterized by the separation of the epiphysis from the metaphysis at the femoral neck due to disruption of the proximal femoral growth plate. Risk factors for this injury include obesity, male sex, Black race, adolescence and growth and sex hormone imbalances. Patients may present with mild or severe thigh, knee or groin pain with a limp as it often causes pain to bear weight on the affected side. Range of motion of the knee is often normal but there is often decreased internal rotation with obligate external rotation and flexion of the hip. Diagnosis is made with plain film radiographs demonstrating the deformity on a frog-leg lateral view. Treatment involves surgical pinning of the separated epiphysis. Avascular necrosis of the femoral head is a potential complication of this condition.



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Pathophysiology

Separation of Femoral Epiphysis from Femoral Neck

Femoral Epiphysis Separating from Femoral Neck

The femoral epiphysis, also known as the epiphyseal plate, physis, or simply growth plate, is the junction between the femoral head and neck, and is primarily composed of cartilage. During adolescence the femoral epiphysis is rapidly expanding and it poses as a weak point between the bones until the growth plate fuses and the femoral head and neck become one solid bone.

Through Growth Plate (Physeal Plate)

Slipping through Growth on Plate

Moving proximally to distally, bone anatomy consists of the epiphysis with underlying epiphyseal (growth) plate, the metaphysis, and then the diaphysis. SCFE occurs when there is separation along the epiphyseal plate at the femoral neck.

Obesity

Obese

Obese adolescents are at much greater risk for SCFE due to the greater mechanical stress placed on the hip joint.

Male Adolescents

Adolescents with Male Sex-symbol

Male to female ratio of SCFE cases is 1.5 to 1.

African American

African American

SCFE occurs more commonly in African Americans.

Growth and Sex Hormone Imbalances

Giant and Sex-symbols Unbalanced

Imbalances in growth hormone (or somatotropin) and sex hormones (progestogens, estrogens, and androgens [which includes testosterone]) can lead to abnormal growth patterns and bone ossification, which will predispose to the development of SCFE. Other endocrinopathies like hypothyroidism, growth hormone deficiency, diabetes, and Cushing syndrome may contribute to SCFE.

Signs & Symptoms

Thigh or Knee Pain

Thigh and Knee with Pain-bolt

Interestingly, these patients often present with thigh or knee pain (referred pain), not hip pain - when the problem is actually in the hip! Patients will report no history of direct trauma to the affected side. Pain is exacerbated by physical activity.

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Inability to Bear Weight

Bear cannot Bear Weight

Patients may be unable to bear weight due to pain on the affected side. As they attempt to compensate, they may begin to stress the contralateral side, and may eventually manifest with SCFE on that side.

Decreased Internal Rotation of Hip

Down-arrow with Internal Rotation

Patients will have very limited internal rotation and abduction of their hip and thus demonstrate obligate external rotation of their hip with flexion.

Obligate External Rotation of Hip with Flexion

External Rotation with Flexing

Patients will have very limited internal rotation and abduction of their hip and thus demonstrate obligate external rotation of their hip with flexion.

Diagnosis

Frog Leg Lateral X-ray

Frog Legs

This specific plain film radiograph view is used to evaluate the hip and surrounding structures. Diagnosis of SCFE can be made by observing the epiphyseal plate deformity on X-ray. Caution is warranted because moving the leg into this position can further exacerbate an unstable case of SCFE.

Treatment

Surgical Pinning

Surgeon with Pins

Use of surgical screws (pins) is the most widely used treatment to stabilize the epiphyseal plate and avoid complications. A solitary screw is drilled into the bone and prevents further slippage.

Complications

Avascular Necrosis of Femoral Head

Vascular Necrosis-crow killing Femoral Head

Osteonecrosis can occur due to compromise of the femoral head blood supply due to the slippage of the initial injury or as a complication of corrective surgery. Untreated avascular necrosis can lead to loss of function of the affected hip. Patients with this complication may complain of persistent hip pain despite prior repair. Other complications of SCFE include chondrolysis and osteoarthritis.

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