The major cause of hip dislocations is motor vehicle collisions. A great deal of force is required to dislocate a hip, and thus associated injuries are common. Up to 88% of hip dislocations will be accompanied by an associated fracture. Patients with hip dislocations have about a 25% risk for osteoarthritis and a 20% risk for avascular necrosis. In addition, sciatic nerve injuries occur in approximately 10% to 14% of patients with posterior hip dislocations. These risks may be decreased by prompt diagnosis and treatment in the emergency department (ED).

Osteonecrosis (also known as aseptic necrosis, ischemic necrosis, or avascular necrosis) may be caused by acute disruption of the blood supply to the femoral head as a result of a hip fracture or dislocation. Fractures of the femoral neck can also disrupt the blood supply and result in osteonecrosis. Other causes are sickle cell disease, barotrauma, radiation therapy, chemotherapy, atherosclerosis, and Gaucher disease. Associated conditions include steroid use, excessive alcohol consumption, smoking, connective tissue diseases, pancreatitis, and chronic liver and renal diseases. The incidence of osteonecrosis after hip dislocation depends on the degree of trauma involved and the duration of the dislocation. Some data suggest that reduction of the hip within 6 hours after dislocation decreases the incidence of osteonecrosis. Therefore, every effort must be made to relocate dislocated hips as soon as possible. Femoral neck fractures are also associated with a high incidence of osteonecrosis. It is thought that the synovial fluid around the fracture site interferes with normal bone healing. Intertrochanteric fractures and other more distal fractures of the femur are rarely complicated by osteonecrosis.
For the AP view, the patient is placed supine with about 15 degrees of internal rotation of the feet. For the lateral view, the patient is placed supine with the uninvolved hip flexed and abducted. The radiograph cassette is placed against the lateral aspect of the affected leg, and the x-ray beam is directed horizontally toward the groin with 20 degrees of cephalic tilt.

Frog-leg views of the pelvis should not be ordered if hip fracture or dislocation is a possibility.

### Hip Fractures

Hip fractures are classified as intracapsular or extracapsular. Intracapsular fractures include femoral head and femoral neck fractures (Fig. 83.1). These fractures are further categorized as either displaced or nondisplaced. Extracapsular fractures include intertrochanteric and subtrochanteric fractures, as well as the less common greater and lesser trochanteric fractures. These fractures can be further categorized by the degree of comminution.

### Presenting Signs and Symptoms

Pain is the most common complaint in patients with hip problems. The location and character of the pain are very helpful in making a diagnosis. Increased pain during and after weight bearing and improvement with rest suggest a structural joint problem such as osteoarthritis. Constant pain, unrelated to use, suggests an infectious, inflammatory, or neoplastic process.

Lateral hip pain, especially with tenderness over the greater trochanter, suggests trochanteric bursitis. Lateral hip pain with paresthesias suggests meralgia paresthetica—lateral femoral cutaneous nerve entrapment. This condition is characterized by a local area of pain (often burning or dysesthesia) that is not influenced by direct pressure on the hip or back movement.

Anterior hip or groin pain made worse by joint motion suggests a problem with the hip joint, such as osteonecrosis, occult fracture, synovitis, or a septic joint. Anterior hip pain that is not made worse by hip motion or weight bearing suggests an inguinal hernia, lower abdominal pathology, or referred lumbar nerve root pain. Posterior hip pain suggests sacroiliac joint inflammation, lumbar radiculopathy, or herpes zoster. Anterior thigh pain may be secondary to injury to the hip joint or femur, stress fracture of the femoral neck, or lumbar radiculopathy.

### Differential Diagnosis and Medical Decision Making

See Box 83.1.

### Diagnostic Testing

Anteroposterior (AP) and lateral radiographs of the hip are usually sufficient to diagnose hip dislocations and fractures.

### Box 83.1 Differential Diagnosis of Hip Pain

- Bursitis
- Osteoarthritis
- Hip dislocation
- Hip fracture
- Meralgia paresthetica
- Lumbar radiculopathy
- Osteonecrosis
- Acute synovitis
- Septic arthritis
- Herpes zoster
- Stress fracture of the femoral neck
- Aortoiliac occlusive disease
- Sacroiliac joint disease

**Fig. 83.1** Types of hip fractures.
FEMORAL HEAD FRACTURES
These relatively uncommon fractures usually occur in conjunction with hip dislocations in young people involved in motor vehicle collisions. Because these fractures may not be visualized on plain radiographs, computed tomography or magnetic resonance imaging may be necessary for diagnosis.

FEMORAL NECK FRACTURES
Fractures of the femoral neck, which is located between the femoral head and the trochanters, occur within the joint capsule and include subcapital fractures (fractures through the fused epiphyseal plate). These fractures are common and usually occur secondary to ground-level falls in older patients with osteoporosis and in young people involved in motor vehicle collisions.

This area of the femur has relatively little cancellous bone and very thin or absent periosteum; in addition, blood supply to the femoral head may be disrupted. As a result, degenerative changes involving the femoral head and frank avascular necrosis are common after these fractures.

Because patients may be able to bear weight with some of these fractures, radiologic examination is important even if the patient is able to walk. Most femoral neck fractures can be treated by open reduction and internal fixation. Early surgical correction, usually within 12 hours, reduces the incidence of aseptic necrosis.

INTERTROCHANTERIC FRACTURES
Intertrochanteric fractures are extracapsular injuries and are the most common type of hip fracture. The majority occur in elderly patients with osteoporosis as a result of ground-level falls. About 80% are comminuted fractures. Because patients cannot bear weight, the diagnosis is probably evident clinically and usually easily confirmed with an AP radiographic view of the hip.

Patients with intertrochanteric fractures may lose as much as 1 to 2 L of blood, and therefore intravenous crystalloid infusion or blood transfusion may be necessary. Affected patients are typically elderly and frail; ED evaluation includes determining the reason for the fall (e.g., syncope, near-syncope, transient ischemic attack), as well as evaluation for other significant medical problems. The treatment of choice is surgical repair; however, because avascular necrosis is uncommon, surgery does not have to be performed immediately. Medical and postoperative complications are common, and about one third of these patient die within 1 year of the injury.

GREATER TROCHANTERIC FRACTURES
Fractures of the greater trochanter are uncommon. In adults they are generally the result of direct trauma; in children they are usually secondary to muscle avulsion. These fractures may be difficult to visualize on radiographs. Fractures caused by direct trauma are generally comminuted but not displaced; those caused by avulsion are usually displaced but not comminuted.

If displacement is greater than 1 cm, open reduction with internal fixation is often recommended. However, most of these fractures are generally minimally displaced and do not need surgery. If plain radiographs are uninformative, computed tomography or magnetic resonance imaging may be needed to make the diagnosis.

LESSTER TROCHANTERIC FRACTURES
Fractures of the lesser trochanter typically occur in people younger than 20 years. If they occur in adults, a pathologic fracture should be suspected. The usual mechanism is forceful contraction of the iliopsoas muscle during strenuous activity. Patients are unable to lift the affected leg when in the sitting position. Treatment is usually bed rest.

SUBTROCHANTERIC FRACTURES
Subtrochanteric fractures are defined as fractures between the lesser trochanter and a point 5 cm distally. They are associated with severe trauma in young people or mild trauma in people with pathologic bone disease. Like intertrochanteric and midshaft femoral fractures, these fractures can be associated with significant blood loss. In addition, associated injury to the profunda femoris artery, branches of the lateral circumflex artery, the lateral femoral cutaneous nerve, and the femoral nerve is possible. If the patient has severe swelling in the proximal part of the thigh, angiography or duplex scanning should be performed to look for a vascular injury.

Treatment consists of open reduction and internal fixation. Because of the large stress forces in this area, nonunion is a relatively common complication.

FEMORAL SHAFT FRACTURES
The diagnosis of femoral shaft fractures is usually obvious on physical examination because of marked deformity and tenderness. These fractures most commonly occur after high-energy injuries such as motor vehicle collisions and falls, and thus associated injuries are common and must be carefully searched for.

If the fracture is associated with an open wound, the wound should be irrigated and covered with moist sterile dressings. Treatment of small, relatively clean wounds includes administration of a first-generation cephalosporin. An aminoglycoside should be given if more extensive soft tissue injury is present.

Because associated fractures in the hip and knee are common, radiographs should be obtained. Blood loss can be significant, but associated neurovascular injuries are rare. On average, these patients lose about 2 to 3 units of blood, and about 50% will require blood transfusions.

Traction devices should be removed when patients arrive at the ED, but limb immobilization should be maintained.

Treatment includes internal fixation with intramedullary rods. Severely comminuted fractures may be treated by closed reduction. In general, patients do better if the fractures are stabilized within 24 hours of injury. Early stabilization is associated with early patient mobilization and therefore less risk for the development of deep vein thrombosis, pressure ulcers, and pneumonia. Fat embolism syndrome is a possible complication. This condition is manifested by signs of pulmonary or central nervous system dysfunction, fever, and rash starting about 12 to 72 hours following the injury. In almost all cases, the fractures will have healed and the patients will be functional in 6 months. Nonunion is rare.

DISTAL FEMORAL FRACTURES
Fractures of the distal end of the femur tend to occur in older patients with severe osteoporosis or in young people with multiple trauma. Supracondylar and intercondylar fractures of the femur are difficult to treat. They are generally unstable and often comminuted. Most are treated operatively.
However, malunion, nonunion, and infections are relatively common.

**STRESS FRACTURES**

Stress fractures occur when normal bone is subjected to repeated stress. The bone fails because osteoblasts are unable to lay down new bone fast enough. Symptoms of a femoral neck stress fracture can be very mild pain only. Consequently, the injury may be mistaken for a muscle strain or arthritis. Pain is typically felt in the groin and medial aspect of the thigh, is worse with use, and may make weight bearing very painful or impossible.

Findings on physical examination are usually normal, except perhaps some pain at the extremes of hip flexion and internal rotation. Because plain films are generally unrevealing until 14 days after the injury, computed tomography or magnetic resonance imaging may be needed to make the diagnosis. This condition is often bilateral, so any pain in the other hip needs evaluation as well.

**HIP DISLOCATIONS**

In approximately 90% of hip dislocations, the femoral head is posterior to the acetabulum. Typically, posterior hip dislocations occur when the knee hits the dashboard during a motor vehicle collision. In posterior hip dislocations the limb is adducted, internally rotated, and shortened. In anterior dislocations the limb is abducted, externally rotated, and shortened.

**POSTERIOR HIP DISLOCATIONS**

Several techniques for reducing posterior hip dislocations have been described in the literature. All these methods require adequate sedation and analgesia. The Stimson method requires the patient to lie with the legs hanging over the edge of the bed. This position is seldom practical in a trauma patient, however.

The Allis technique involves keeping the patient supine on the bed. The hip is then flexed to 90 degrees and upward traction is applied with some gentle internal and external rotation. It is usually necessary to stand on the bed over the patient to perform this technique. An assistant stabilizes the pelvis and may apply some lateral force to the leg.

The Whistler technique involves lying the patient supine on the bed with the knees flexed about 130 degrees. An assistant stabilizes the pelvis while the operator stands on the side of the bed near the affected hip. The operator places an arm under the knee on the leg with the dislocation and then grips the top of the other knee. The other hand stabilizes the patient’s ankle. The operator then raises up the arm by using the patient’s knee as a lever in an attempt to relocate the hip. After reduction, the legs are immobilized in slight abduction with a pillow between the knees, and the patient should be sent for radiographs and hospital admission.

**ANTERIOR HIP DISLOCATIONS**

A modification of the Allis maneuver can be used to relocate anterior hip dislocations. The patient is placed supine and an assistant stabilizes the pelvis and applies lateral force to the affected thigh. Traction is then applied along the long axis of the femur with the hip slightly flexed. Gentle leg adduction and internal rotation may facilitate the reduction.

Postreduction care is the same as for posterior hip dislocations.

**PROSTHETIC HIP DISLOCATIONS**

A patient with a hip arthroplasty may dislocate the hip with minimal force. Frequently, a minor twisting motion is all that it takes. As with native hips, the majority of these dislocations are posterior. The reduction methods are the same as with a native hip. Orthopedic consultation should be considered. Because aseptic necrosis is not an issue, there is no urgency to reduce the hip. Unlike patients without artificial hips, these patients will often not require hospitalization after reduction.

**ULTRASOUND-GUIDED FEMORAL NERVE BLOCK**

Pain relief for hip fractures and femoral shaft fractures can be achieved with ultrasound-guided femoral nerve blocks. Contraindications to this procedure include hypersensitivity to the local anesthetic and infections near the injection site. In addition, patients with neurologic deficits in the affected leg or those at risk for compartment syndrome should not have a femoral nerve block performed because it may make it difficult to detect new or worsening neurologic changes. A femoral nerve block is also relatively contraindicated in patients taking anticoagulants or with a bleeding diathesis.

Because high energy is generally required to dislocate a hip, associated injuries are common. Ligamentous knee injuries, acetabular and femoral fractures, and sciatic nerve palsies should be considered. If an associated fracture is not clearly seen on plain films, a computed tomography scan should be ordered.

Posterior dislocations are likely to cause a fracture of the inferior aspect of the femoral head and may cause injury to the sciatic nerve. Anterior dislocations are associated with fractures of the anterior femoral head and also with vascular injuries.
Hip dislocations are orthopedic emergencies. Reduction should be performed as soon as possible because the incidence of avascular necrosis, traumatic arthritis, and joint instability increases with the length of time that the hip is dislocated. In addition, orthopedic consultation should be obtained.

Hip relocations require procedural sedation in the ED or general anesthesia in the operating room.

**SUGGESTED READINGS**


**REFERENCES**

References can be found on Expert Consult @ www.expertconsult.com.
REFERENCES