Treatment of Hip Dislocations and Associated Injuries

Current State of Care

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KEYWORDS

• Hip dislocation • Acetabular fracture • Femoral head fracture • Irreducible dislocation • Orthopedic emergency

KEY POINTS

- Time to initial hip relocation is considered an orthopedic emergency.
- Dislocations can be classified according to associated adjacent injuries, including acetabular, femoral head, and femoral neck fractures.
- Choice of open approach depends on visualization needed to treat associated hip injury.
- Complications include osteoarthritis, osteonecrosis, heterotopic ossification, and sciatic nerve palsy.
- Outcomes depend on the degree of initial trauma to the joint.

INTRODUCTION

Dislocations of the hip joint embody a wide range of injury patterns. However, all are similar in that they largely suggest a high-energy injury with considerable potential for both soft tissue and osseous injury. The hip is a stable, well-constrained ball-and-socket joint, requiring 40 to 60 kg (90–135 lb) of axial traction to simply distract and considerably more force to dislocate.[1] This high level of energy often results in associated injury to the labrum, femoral head, femoral neck, or acetabulum. These injuries may lead to protracted disability and dysfunction from complications such as osteoarthritis and avascular necrosis.

Hip dislocations have been reported in medical literature since the early nineteenth century[2]; however, the first considerable series of hip dislocations was published in 1938 by Funsten and colleagues[2] after the popularization of the ever-quickening automobile.[3] Subsequent series have revealed that most hip dislocations, 46% to 84%, occur secondary to traffic accidents, even with the advent of newer safety features.[3–9] The remaining minority most commonly occur because of falls, industrial accidents, or sporting injury.[4,6,10–12]

The treatment of hip dislocations, regardless of concomitant injury pattern, remains directed toward emergent reduction and attainment of a congruent joint through removal of imposing injured tissues and fixation of associated fractures. This article familiarizes readers with the classification, care, complications, and outcomes of hip dislocations and their associated injuries.

RELEVANT ANATOMY

Overall stability of the hip joint is reliant on the bony architecture and the joint's soft tissue

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constraints. As one of the most stable joints in the body, around 82% of the articular surface of the femoral head is enclosed by the bony acetabulum at neutral position.[13] This coverage is further extended by the labrum attached to the perimeter of the acetabulum. The labrum ensures that at least 50% of the femoral head is covered by the labral-acetabular complex in any position of hip motion.[14]

A thick capsule of longitudinally oriented fibers, save those circumferential fibers of the zona orbicularis, envelop the hip.[15] The longitudinal fibers thicken to form 3 distinct ligaments named for their origins and insertions.

- The iliofemoral ligament, also known as the Y ligament or ligament of Bigelow, arises in 2 distinct bands.[16] The medial band originates between the anterior-inferior iliac spine (AIIS) and the iliac portion of the acetabular rim and inserts on the distal intertrochanteric line. The lateral band originates superior to the medial band, closer to the AIIS, and runs oblique, downward, and lateral, to insert on the anterior greater trochanteric crest. Together, the 2 bands comprise the major static stabilizers of the hip in external rotation, whereas only the lateral band contributes significantly to stability in internal rotation.[16]
- The pubofemoral ligament originates from the anterior border of the superior pubic ramus and obturator crest with some fibers blending with the medial arm of the iliofemoral ligament and others wrapping inferiorly around the neck of the femur to insert on the posterior intertrochanteric crest. It controls external rotation in extension with contributions from the medial and lateral arms of the iliofemoral ligament.[16]
- Posteriorly, the ischiofemoral ligament is broad and less dense than the other two named ligaments, originating from the ischial portion of the acetabular rim and extending in an oblique and horizontal fashion to insert medial to the anterosuperior base of the greater trochanter and along the posterior intertrochanteric crest.[16]

In adults, the principal blood supply to the femoral head originates from the deep branch of the medial femoral circumflex artery. The chief division of the deep branch crosses posterior to the tendon of obturator externus and anterior to the superior gemellus, obturator internus, and inferior gemellus. It then perforates the hip capsule just cephalad to the insertion of the tendon of the superior gemellus and caudal to the tendon of piriformis before dividing into 2 to 4 superior retinacular arteries.[17] Lesser contributions arise through 2 central anastomoses (obturator and lateral femoral circumflex arteries [LFCA]) and 5 peripheral anastomoses (first perforating, LFCA, superior gluteal, inferior gluteal, and pudendal arteries).[17]

After confluence of nerves from nerve roots L4 to S3, the sciatic nerve exits the pelvis through the greater sciatic notch. Despite grossly appearing as a single nerve, the tibial and peroneal divisions have already formed before leaving the true pelvis. In around 83% of patients, the sciatic nerve courses anterior to the muscle body of the piriformis; however, in the remaining 17% the nerve varies from partially perforating the piriformis muscle body to coursing entirely posterior to the muscle body and any assortment in between.[18] This relationship may play a role in risk or protection of the nerve during dislocation, but is also an important consideration in surgical approach.

HISTORY, EXAMINATION, AND IMAGING

History

Patients with hip dislocations generally present after high-energy trauma. For this reason, patients often have distracting injuries or present in an obtunded state. It is imperative for physicians to recognize the signs and symptoms of a dislocation because delayed diagnosis in unconscious or obtunded patients can have serious results. Patients who are able to participate in an examination often complain of inability to move the lower extremity because of the semiconstrained position of the dislocated femoral head. They often endorse numbness or tingling in the affected extremity caused by neuropraxia of the sciatic nerve.

Examination

After appropriate Advanced Trauma Life Support (ATLS) management of a traumatized patient, examination of the lower extremity often reveals not only the presence of a dislocation but also the direction of dislocation.

- Patients with a posterior dislocation show hips that are flexed, adducted, and internally rotated.
- Patients with an anterior dislocation generally present with hips that are flexed, abducted, and strikingly externally rotated.