Managing Posterior Hip Dislocations

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0196-0644/$-see front matter
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https://doi.org/10.1016/j.annemergmed.2022.01.027

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[Ann Emerg Med. 2022;79:554-559.]

INTRODUCTION

Hip dislocations are an important condition presenting to the emergency department (ED), requiring rapid evaluation and management.[1] More than 90% of hip dislocations are posterior, and the most common mechanism for native hip dislocation is a motor vehicle collision causing a high-energy load on a flexed hip.[1,2] In contrast, prosthetic hips can become dislocated with minor activities, such as tying shoes or sitting in a low seat. Once dislocated, it is important to reduce the native hip as quickly as possible to reduce the risk of avascular necrosis. One study reported a 5% incidence among hips reduced within 6 hours of the injury versus 53% among hips reduced after 6 hours.[3] Indications for an open reduction in the operating room include open dislocations, ipsilateral femoral neck fracture, and failed reduction after several attempts at closed reduction. Many emergency medicine clinicians have developed significant experience in caring for these patients. This paper is not intended to be a comprehensive review of all the aspects of the evaluation and management of adult patients with hip dislocation; instead, this seeks to distill key facets of management based upon the current literature and years of practice.

ASSESSMENT AND IMAGING

Hip dislocation is often suspected clinically based on the mechanism and physical examination. On examination, the patient's lower extremity will usually be shortened, flexed, adducted, and internally rotated. The femoral head may also be palpated in the gluteal area. It is important to assess for any other associated injuries and perform a neurovascular assessment both before and after the reduction. The most common complication is sciatic nerve injury, which has been reported in approximately 20% of cases.[2]

Despite the classic appearance, imaging is important before reduction to confirm the diagnosis and assess for associated injuries. This often includes an anteroposterior view of the pelvis with a cross-table lateral radiograph, although ultrasound has been proposed as an alternate modality.[4] An oblique radiograph view of the pelvis (also known as the Judet view) may also be considered to better evaluate the acetabulum. However, all patients with dislocations resulting from significant trauma (eg, a motor vehicle collision, fall from height) should receive a computed tomogram of the pelvis with 3 mm cuts either pre- or postreduction to evaluate for occult fractures and loose bodies in the joint space, thereby limiting the role of the Judet view in current practice.

ANALGESIA AND ANESTHESIA

Hip dislocations can produce significant pain and muscle spasms. While intravenous opioids can help reduce the pain, this is often insufficient to allow reduction. Traditionally, procedural sedation has been used to facilitate the reduction attempt. The advantages of procedural sedation include enhanced muscle relaxation and pain control. While the choice of sedation medication is often based on a combination of factors, one retrospective study of hip reductions found that propofol had a greater likelihood of successful reduction with fewer sedative complications and shorter time to reduction compared with etomidate or an opioid combined with a benzodiazepine.[5] Additionally, it is crucial to ensure adequate sedation, as undersedation has also been associated with a reduced likelihood of reduction success.[6] However, not all patients are good candidates for procedural sedation, and it can make some techniques (eg, Stimson) more difficult. Regional anesthesia provides an alternate approach with several case reports describing the femoral nerve block,[7] fascia iliaca compartment block,[8-10] and pericapsular nerve group block[11] with good success rates. A short-acting agent (eg, lidocaine) is typically used, given the duration of the procedure. Regardless of the approach selected, it is essential to obtain adequate analgesia early in these patients.

REDUCTION TECHNIQUES

There have been dozens of hip reduction techniques described within the literature and countless published and

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unpublished modifications.[12] Herein, I will highlight 6 different hip reduction techniques featuring unique benefits and limitations, which I believe every emergency medicine clinician should be aware of (Table). Before discussing techniques, it is important to highlight 2 key pearls. First, reductions should be performed with slow, controlled, and steady application of traction. Sudden, rapid movements are more likely to create muscle spasm and injure the clinician or patient. As native hip dislocations often require a greater force to relocate, consider using techniques that can generate more force (eg, Rocket Launcher, East Baltimore Lift) for these reductions compared with prosthetic joints. Second, consider the direction of forces. While there are differences between the various techniques, they typically involve a combination of axial traction (in-line with the direction of the femur) on the flexed hip joint while maintaining the knee in flexion. The primary direction of force needs to remain at the hip joint, as opposed to the knee, to avoid injury to the knee ligaments. To avoid patient movement or injury during the reduction, the patient's pelvis should be stabilized to the bed by an assistant (eg, ED tech, nurse) or using a sheet tied around the bed for the techniques described below.

Modified Allis

The Allis technique was first described in 1895 and is still commonly performed in many EDs.[13] Traditionally, this has been performed with the clinician standing on the bed and grasping the patient's leg with the patient's knee and hip flexed at 90°. The clinician then applies axial traction while an assistant holds the patient on the bed. However, this technique places both the patient and clinician at risk of injury, including back strain and falling. To avoid this, I recommend using the modified version of this technique, wherein the clinician stands on the side of the bed and elevates the patient's leg by placing it on their shoulder and slowly standing up, thereby using the much stronger leg muscles (Figure 1).[12] If the hip is significantly adducted or rotated, it may be necessary to rotate the patient 20°-30° on the bed to allow the clinician sufficient room to get beneath the patient's leg.

Table. Hip reduction techniques.

Reduction Technique	Advantages	Disadvantages
Modified Allis	-Reduced risk of injury compared with the traditional Allis technique -Greater force generated using the stronger leg muscles	-Patient positioning can be challenging
Piggyback/Rocket Launcher	-Greater force generated using the stronger leg muscles -Enhanced control of patient hip position	-Patient positioning can be challenging
East Baltimore Lift	-Generates the most force using the stronger leg muscles of 2 clinicians	-Requires more people
Tulsa/Rochester/Whistler	-Can be performed by a single clinician	-Risk of injury to the clinician's arm if not careful -May not get sufficient force as some of the other techniques -Contraindicated in patients with contralateral lower extremity fractures or dislocations
Captain Morgan	-Backboard stabilizes patient and provides better countertraction than a patient bed	-May be difficult for clinicians with shorter legs to gain sufficient leverage -May not get as sufficient force as some of the other techniques
Stimson/Modified Stimson	-More ergonomic -Uses gravity to supplement the force needed	-Can be difficult to position the patient and needs multiple assistants so the patient does not fall off the bed -Less ideal for procedural sedation -More challenging in patients with larger abdominal girth -Contraindicated in patients with cervical spine injury

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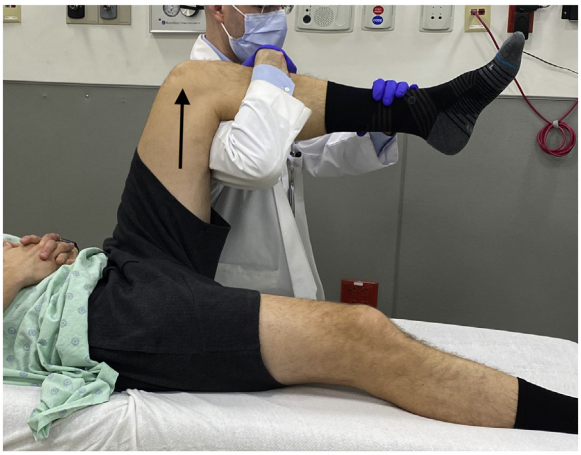

Figure 1. Modified Allis technique.

Piggyback/Rocket Launcher. This technique carries some overlap with the modified Allis but differs by allowing greater control of the hip position. For the piggyback technique, the patient is supine at the end of the bed with their hip and knee flexed at 90° (Figure 2).[14] The clinician places the patient's knee over their shoulder and slowly leans forward and stands up while guiding the thigh into adduction. The rocket launcher technique is a modification wherein the clinician begins by adducting and internally rotating the hip to exaggerate the deformity before standing up.[15] Authors reported a successful reduction in 5 out of 6 cases in the original description.[15] Advantages of this technique include the ability to use the much stronger gluteal and quadriceps muscles.

East Baltimore Lift

With this technique, the patient lies supine on the bed with 2 clinicians on each side of the patient (Figure 3).[16]

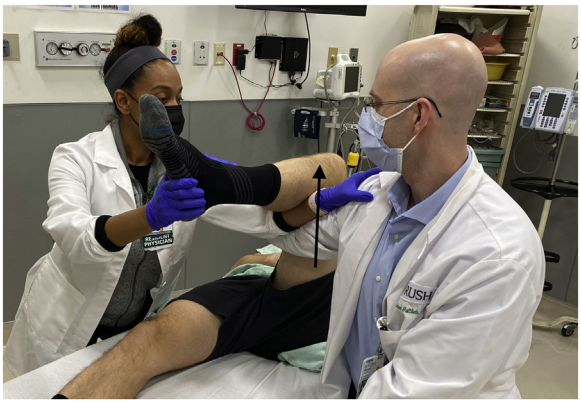

Figure 3. East Baltimore Lift technique.

The hip and knee are flexed at approximately 90°, with the clinicians locking arms underneath the patient's knee, while stabilizing the knee at the ankle joint. The bed should be sufficiently low such that both clinicians' backs are straight and their knees are bent at approximately 45°. A third person or sheet should stabilize the patient's pelvis. Both clinicians then stand up slowly, applying axial traction to the femur while gently internally and externally rotating the hip via the ankle. This offers the advantage of providing a stronger and more controlled upward force (by using the strong quadriceps and gluteal muscles of 2 people) but has the distinct disadvantage of requiring multiple clinicians or assistants to be present.

Tulsa/Rochester/Whistler

The Tulsa/Rochester/Whistler technique (separately described by 3 groups) is a variation of the East Baltimore lift, wherein the patient flexes both hips and knees on the

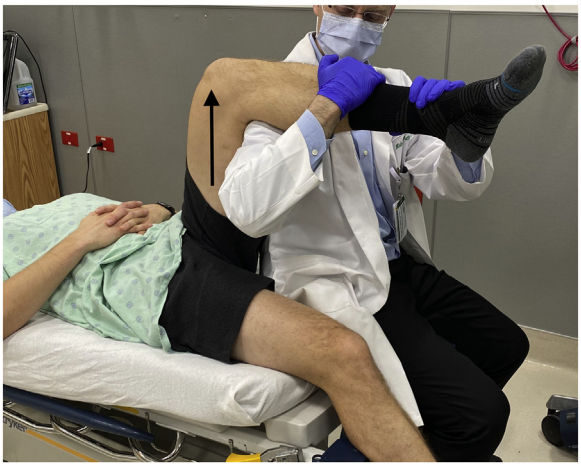

Figure 2. Piggyback and Rocket Launcher technique.

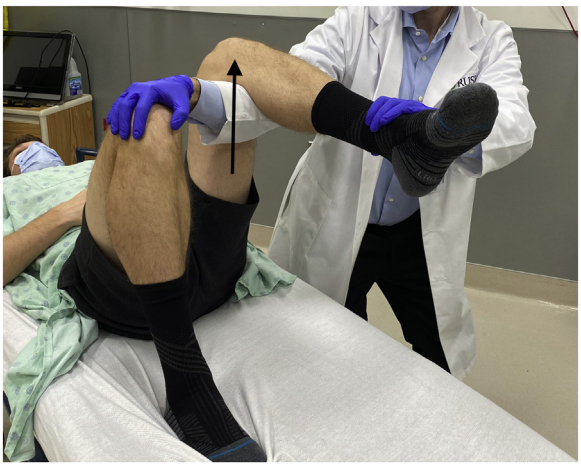

Figure 4. Tulsa/Rochester/Whistler technique.

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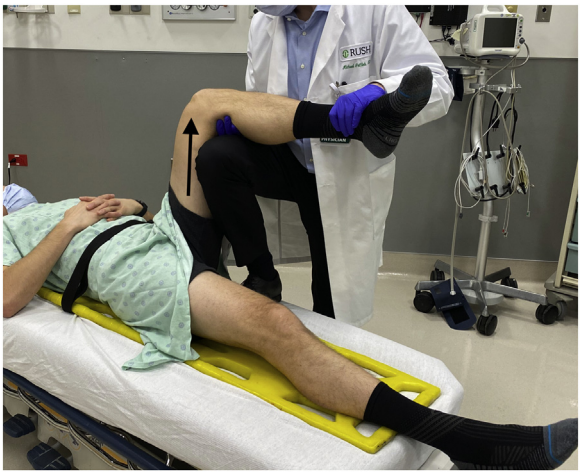

Figure 5. Captain Morgan technique.

bed (Figure 4).[17-20] Then, the clinician places their arm underneath the knee on the affected side and their palm on the contralateral knee. Like the East Baltimore lift, the bed should be sufficiently low such that the clinician's back is straight and their knees are bent at approximately 45°. The clinician then slowly stands up, using their arm to provide axial traction on the hip, while their other arm gently internally and externally rotates the leg. This technique was reported to have a 73.3% success rate compared with 62.5% for the Allis or modified Allis technique.[18] The advantage of this technique is that only 1 clinician is needed (since the patient's knee serves as a countertraction force). However, due to the rotational effect around the pelvis, an assistant may be needed to apply pressure to the patient's ipsilateral anterior superior iliac spine in select cases.

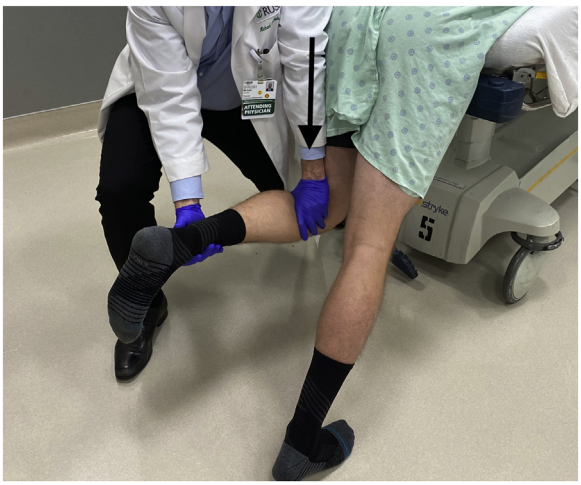

Figure 6. Stimson technique.

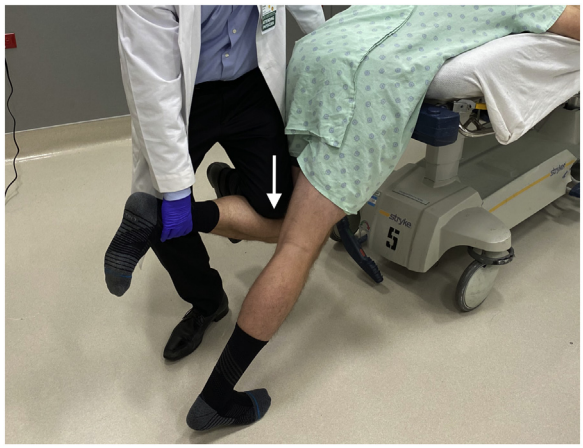

Figure 7. Modified Stimson technique.

Captain Morgan

The Captain Morgan technique begins by placing the patient supine on a backboard with the hip and knee flexed at 90° (Figure 5).[21] The clinician places their hand under the patient's knee and their knee under the proximal aspect of the patient's lower leg while using their contralateral hand to stabilize the patient's knee in flexion. The clinician then plantarflexes at their ankle while using their arm to lift upward, applying axial traction at the patient's hip. It is important not to push down on the patient's ankle, as this may cause ligamentous injury to the patient's knee.[22] The authors reported a 92% success rate among 13 cases.[21] The advantages of this technique include the use of a backboard to stabilize the patient and provide better countertraction for the clinician's foot, and the use of combined calf and upper extremity strength for the reduction.

Stimson/Modified Stimson

This is one of the oldest described techniques, first published in 1883.[23,24] This technique differs from the others in that the patient is prone on the bed with the affected leg flexed to 90° and hanging off the end of the bed. The patient's hip and knee are flexed to 90°, while the clinician applies a downward force to the lower leg with one arm while internally and externally rotating the patient's hip with their other hand (Figure 6). A modification of this technique has been described, where the clinician places their knee on the proximal calf near the popliteal fossa and slowly transfers their weight to the bent knee (Figure 7).[25,26] This offers the advantage of using gravity to facilitate the reduction but does require the patient to be prone, which can make procedural sedation more challenging. However, it is an excellent option for those having received a nerve block.

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DISPOSITION AND AFTERCARE

After reduction, the hip should be assessed for stability while the patient remains sedated or the nerve remains blocked. The hip should be flexed to 90° in a neutral position, abduction, and adduction.[1] This should be followed by applying a mild posteriorly directed force while the hip is in the neutral position.[1] The patient should be monitored postprocedure until they are clinically alert or the local anesthetic has worn off. If not already obtained, a computed tomography of the hip should be performed in those with significant trauma as the presence of loose bodies within the joint may prompt subsequent hip arthroscopy.[1]

Orthopedic surgery consultation should be considered depending on institutional protocols. Most patients with successful reduction of a prosthetic hip can be discharged with outpatient orthopedic surgeon follow-up. Due to the significant force involved in a native hip dislocation, it is important to ensure that there are no other major injuries before discharge. One study found that 71% of patients with traumatic hip dislocations had significant associated injuries.[27] Strict immobilization is not recommended, and experts generally recommend early active and passive range of motion exercises with either no weight-bearing or toe-touch weight-bearing (5-10 pounds) for the first several weeks.[1] While commonly used, abduction braces remain controversial and have not been demonstrated to reduce the risk of recurrent dislocations in patients with prosthetic hips.[28-31] However, patients should be advised to avoid flexing their hip beyond 90°, avoid any twisting motions, and avoid crossing their leg past midline.

The author would like to thank Dainis Berzins, MD, Devon Buddan, MD, and Evelyn Schraft, MD.

Supervising editor: Steven M. Green, MD. Specific detailed information about possible conflict of interest for individual editors is available at https://www.annemergmed.com/editors.

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Authorship: All authors attest to meeting the four ICMJE.org authorship criteria:(1) Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND (2) Drafting the work or revising it critically for important intellectual content; AND (3) Final approval of the version to be published; AND (4) Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Funding and support: By *Annals* policy, all authors are required to disclose any and all commercial, financial, and other relationships in any way related to the subject of this article as per ICMJE conflict of interest guidelines (seewww.icmje.org). The author has stated that no such relationships exist.

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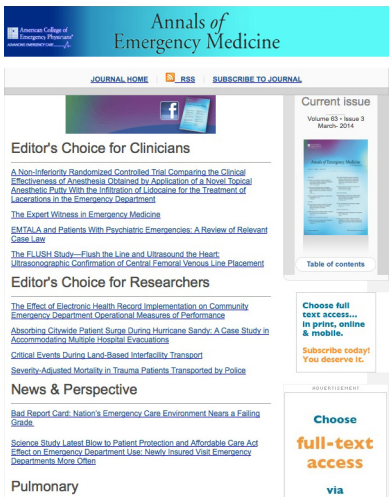

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