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Techniques and Procedures

HIP DISLOCATIONS IN THE EMERGENCY DEPARTMENT: A REVIEW OF REDUCTION TECHNIQUES

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☐ **Abstract—Background: Hip dislocations are a common presentation in the Emergency Department (ED) and require urgent reduction to reduce the risk of avascular necrosis. Over 90% of all dislocations can successfully be reduced in the ED and there is evidence that cases awaiting operative reduction result in significant delays. Discussion: While there is limited data comparing specific techniques, the individual success rates of most maneuvers range from 60-90%. Additionally, each technique has distinct advantages and limitations associated with its use. Conclusions: It is important for Emergency Physicians to be familiar with several different reduction techniques in case the initial reduction attempt is unsuccessful or patient characteristics limit the use of certain maneuvers. This article reviews a number of reduction techniques for hip dislocations, variations on these techniques, and advantages and disadvantages for each approach.** © **2017 Elsevier Inc. All rights reserved.**

☐ **Keywords—dislocation; hip; reduction; relocation**

INTRODUCTION

Hip dislocations are a common emergency department (ED) presentation, with studies suggesting an increasing incidence in North America (1–3). The hip joint is a ball-and-socket joint that is supported by multiple strong capsular ligaments (4–6). However, these ligaments may get disrupted when a strong force is applied to the femur, most commonly after motor vehicle collisions (4). In addition, reports have suggested that approximately 7% of all total hip replacements sustain a subsequent dislocation (7).

Reduction of a hip dislocation is often more challenging than dislocations of other locations, with most patients requiring procedural sedation to facilitate the reduction (8,9). Experts recommend up to 3 attempts at closed reduction before considering operative reduction (4). However, approximately 10% of all hip dislocations may be irreducible in the ED setting, requiring operative reduction under general anesthesia (10). Importantly, dislocated hips are at significant risk of avascular necrosis and operative delays may be substantial, with 1 study demonstrating a mean time delay of 10.9 hours among cases requiring general anesthesia (2,4,8,11). Therefore, it is essential for emergency physicians to be familiar with multiple techniques when performing reductions of hip dislocations, especially if the first technique is unsuccessful. This review is intended to describe several different reduction maneuvers, variations on these techniques, and advantages and disadvantages for each approach (Table 1).

DISCUSSION

Allis Technique

The Allis technique is a well-known approach that is still frequently performed in many EDs. This technique was

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Table 1. Review of Techniques for Hip Dislocation

Name	Technique	Advantages	Disadvantages
Allis	Provider grasps affected leg with both knee and hip flexed to 90° applying traction toward the ceiling	Well-established	Risk of falls and lower back injury to the provider
Bigelow	Provider grasps affected leg with both knee and hip flexed to 90°, applying in-line traction while abducting, externally rotating, and extending the leg	This technique is no longer recommended	Risk of falls and lower back injury to the provider. Increased risk of femoral neck fractures
East Baltimore lift	Two providers place their arms underneath the affected knee with their knees bent and their hands on each other's shoulders. Providers slowly stand up while countertraction is applied to the patient's ankle	Strong, controlled upward force and ability to internally and externally rotate the hip	Multiple providers are needed
Tulsa/Rochester/Whistler	Provider places the arm underneath the affected knee with the provider's palm on the flexed, unaffected knee. Using the forearm as a fulcrum, the provider applies downward pressure on the ankle, while internally and externally rotating the hip	Requires only 1 provider	Less upward force is possible. Potential injury to the provider's forearm
Flexion adduction	One provider flexes and maximally adducts the affected hip, while the second provider applies manual pressure on the femoral head	Allows for a controlled, steady reduction attempt	Limited data on efficacy
Foot fulcrum	Provider places patient's foot against his or her inner ankle and places provider's outer foot against the patient's femoral head. Provider grasps patient's flexed knee and leans backward	Requires only 1 provider and allows for a controlled, steady reduction attempt	Potential injury to provider's back and patient's sciatic nerve if incorrectly performed. Risk of fall injury
Howard	Provider grasps affected leg with both knee and hip flexed to 90°, applying in-line traction, while a second provider applies lateral traction	Allows for a slow, controlled reduction attempt	Multiple providers are needed. Limited data on efficacy
Lateral traction	Provider grasps affected leg in extension and applies in-line traction, while a second provider applies lateral traction	Valuable technique when the patient is unable to flex the affected hip	Multiple providers are needed. Limited data on efficacy
Lefkowitz	Provider places his or her knee underneath the affected leg with both knee and hip flexed to 90°. Provider applies a downward force on the patient's lower leg, using the knee as a fulcrum	Requires only one provider and allows for a controlled, steady reduction attempt	Potential to injure patient's knee ligaments. Difficult to provide significant force for the reduction
Captain Morgan	Provider places his or her knee underneath the affected leg with both knee and hip flexed to 90°. Provider plantarflexes ankle to facilitate the reduction	Requires only 1 provider and allows for a controlled, steady reduction attempt	May be more difficult in patients with longer legs
PGI	Provider gradually flexes knee to 120° of flexion, then abducts to 45°, and finally externally rotates until the hip reduces	Allows for a controlled, steady reduction attempt and does not require significant force	Limited data, but appears promising
Piggyback/rocket launcher	Provider places patient's flexed knee over his or her shoulder and rises to a standing position	Requires only 1 provider and allows for a controlled, steady reduction attempt	Excess pressure on the lower leg can injure the knee ligaments

(*Continued*)