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Age-appropriate Post-reduction Care of Anterior Shoulder Dislocation

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Age-appropriate Post-reduction Care of
Anterior Shoulder Dislocation

Hans Brannon Ayres

An evidence based scholarly paper submitted to the faculty of
Brigham Young University
In partial fulfillment of the requirements for the degree of
Master of Science

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ABSTRACT

Age-appropriate Post-reduction Care of Anterior Shoulder Dislocation

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Science

Background and Purpose: The shoulder is the most commonly dislocated joint in the body. This paper provides age-appropriate recommendations for post-reduction management of anterior shoulder dislocations. **Methods:** Literature was reviewed, limited to English language in the last five years. Appropriate articles were rated using the Levels of Evidence tool found in the Journal of Orthopaedic Trauma. **Conclusion:** We recommend aggressive treatment in younger patients, and increased screening for concomitant injuries in older patients. **Implications for Practice:** Age should be an important consideration when formulating a plan of care for the patient with shoulder dislocation.

Keywords: Anterior Shoulder Dislocation, Treatment, Adult, Child, Adolescent, Elderly

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Introduction

Anterior shoulder dislocation is a common presenting injury to emergency departments and urgent care centers throughout the United States. A 2010 epidemiological study of shoulder dislocations in the United States estimated the incidence rate to be 23.9 per 100,000 person years. The study shows that peak incidence rates are divided among two groups: males in their 20's, and females in their 80's (Zacchilli, M., Owens, B., 2010). These injuries are frequently managed by Nurse Practitioners working in the Emergency Department, Urgent Care, and Primary Care Clinics.

The purpose of this paper is to provide recommendations for the post-reduction management of anterior shoulder dislocations based on patient age, and the most up to date literature. The focus will be on immobilization position and duration, as well as indications for surgical referral. Reduction techniques will not be reviewed here.

Anatomy of the Shoulder

The glenohumeral, or shoulder joint consists of the ball-like proximal end of the humerus, which inserts into a socket formed by the glenoid cavity of the scapula. This ball and socket design affords the joint a large range of motion, but to the detriment of stability. Several muscles and ligaments provide stability to the joint. Two of the structures most commonly injured during dislocation are the glenoid labrum, a cartilaginous ring that provides a deeper socket by lining the glenoid fossa, and the group of muscles known as the rotator cuff, comprised of the subscapularis, supraspinatus,

infraspinatus and teres minor(McKinley, M., O'Loughlin, V. D., 2006). The glenoid fossa only articulates with about one third of the surface of the humeral head. The joint is most vulnerable when it is abducted and externally rotated. When force is added to the arm in this position, especially in extreme external rotation, the stabilizing tissues are overcome and the humeral head slips anteriorly out of the glenoid fossa, resulting in dislocation (McCance K.L., Huether, S. E., 2006).

History of Treatment Methods

Methods for treating the dislocated shoulder have changed over the years. For example, one of the first recorded treatments of shoulder dislocation dates back to ancient Greece, where Hippocrates described several methods of using traction and counter-traction to reduce a dislocated shoulder. One of these methods called for placing the arm of the affected shoulder over the rung of a ladder. The physician would then apply traction by pulling down on the arm until reduction was accomplished. (Mattick, A, Wyatt, J. P. 2000). The Hippocratic method is now rarely used in practice, as other methods have proved to be safer, easier, and more comfortable for the patient.

More than reduction methods have changed. In Hippocrates's method, the newly reduced shoulder would be strapped to the patient's trunk to provide immobilization. Today, there exist different types and methods of immobilization. Advances in orthopedic surgery have also provided shoulder dislocation patients with additional treatment options. A review of the literature has shown that optimal treatment often varies, based on the age of the patient.

Methods

A search was done of Medline, Cinahl, and Cochrane databases using the search terms “Shoulder Dislocation” AND “Treatment” OR “Therapy” OR “Rehab”. Included articles were published in 2010 or later, in the English language. This search yielded 677 articles. Of these articles, 21 were deemed relevant for this study. The articles were then assessed to determine rigor using an instrument found in the Journal of Orthopaedic Trauma, called the Levels of Evidence (Slobogean, G., Bhandari, M., 2012). Articles were assigned a score from I-V, with level I representing the highest level of evidence.

For the purposes of this literature review, patient populations were broken into three groups according to age: “Young” comprising patients up to age 30 years; “Middle,” comprising patients age 30-55 years; and “Older,” comprising patients age 55 years and older. Articles were then labeled according to age groups they contained. Please see Table one for a list of the reviewed articles with their assigned level of evidence ratings and age group classifications.

As many of the original authors were not researching age specific differences, many studies contained subjects from multiple age groups. Of the 21 originally selected articles, 9 fit in the Young category, zero in the Middle, and 2 in the Older. Eight additional articles overlapped Young and Middle, one overlapped Middle and Old, and one overlapped Young, Middle, and Old. Some articles were discarded according to the level of evidence and the availability of high-quality articles for each age group. Preference was given to level I and II articles.

Recent research in the Older population has been minimal. Therefore, only level IV articles were available in this category. This process of reduction left five articles for

the Young group, zero articles in the Middle group, two in the Older group, four in the Young/Middle overlap, one in the Middle/Older overlap, and zero in the Young/Middle/Older overlap, for a total of 12 articles.

A search of the National Guideline Clearinghouse was also conducted; using the search terms Shoulder Dislocation. The search yielded 19 guidelines, 3 of which were deemed relevant to this topic. These guidelines contain information on conservative management of shoulder dislocation, and indications for shoulder surgery. These guidelines served as a comparison for the reviewed literature.

Review of Literature

Young Patients

Because anterior shoulder dislocation (ASD) is most common in younger patients, most of the research done has focused on this age group. These studies often include patients older than 30 years of age. Few studies have been done on specific age groups.

Position of immobilization after reduction has been a topic of much research over the past several years. Despite the findings of Itoi et al. (2007) of increased benefit from external rotation, high-quality randomized controlled studies and systematic reviews have either not shown any benefit to external rotation over internal rotation (Hanchard, Goodchild, and Kottom, 2014; Liavaag et al., 2011; Whelan, Litchfield, Wambolt, and Dainty, 2014), or have shown an advantage that was not statistically significant (Paterson, Throckmorton, Koester, Azar, and Kuhn, 2010).

Few studies have been done to determine the optimum amount of time that should be spent in immobilization post reduction. Paterson et al. (2010) found that

immobilization for patients under 30 was no longer beneficial after 1 week's duration. Traditionally, more time has been spent in immobilization. For example, Whelan and associates' 2010 study of internal vs. external rotation had patients immobilized for 4 weeks.

Patients that are younger at the time of their first ASD have a higher rate of re-dislocation compared with older patients. For example, one study found that age less than 30 at time of first dislocation was predictive of repeat dislocation (Paterson, 2010). Another study reported that up to 92% of patients under the age of 30 at the time of first dislocation would have a repeat occurrence (Gigis, Heikenfeld, Kapinas, Listringhaus, and Godolias, 2014).

Surgical intervention becomes an important consideration in the Young population because of the high rate of repeat dislocation. Two of the reviewed studies recommended early surgical intervention instead of conservative management in young, active patients (Gigis et al., 2014, Handoll et al., 2010). Gigis et al. found that in patients 15-18 years of age, 70% of patients treated conservatively would have a recurrence, while that number was only 13% in patients that had a stabilizing surgery (2014). However, one prospective study of 225 patients age 12-40 found that 25 years after conservative therapy, about half of shoulders had become stable again without therapy (Hovelius et al., 2008).

In "skeletal immature" patients (age <16, or open growth plates) it was reported that surgery after a first time dislocation facilitated increased return to pre-dislocation activity level, but did not cause a significant difference in patient pain levels, functional scores, or level of shoulder stability (Khan, Samba, Pereira, and Canavese, 2014).

Another study used a Markov model to compare the cost effectiveness of surgical versus conservative management in different age groups. They found that surgery was more cost effective than conservative management in 15 year old boys and girls, and in 25 year old men (Crall et al., 2012).

Middle Patients

No studies containing a sample of patients exclusively between the ages 30-55 years were found. One study reported a strong association between concomitant greater tuberosity fracture shown on pre-reduction x-rays and iatrogenic humeral neck fracture during reduction in patients older than 40 years. The researchers recommended general anesthesia for reduction in this age group in order to prevent fractures by better relaxing the shoulder muscles (Atoun et al., 2013).

Older Patients

A study of patients older than 60 years demonstrated multiple differences in the care of the older adult. They found that older patients are more likely to have an associated injury with a dislocation (Shin et al., 2012). Rotator cuff tears and neurologic injuries are common in this age group. Vascular injuries are also more common with chronic dislocations (Paxton, Dodson, and Lazarus, 2014; Shin et al., 2012).

Both Paxton (2014) and Shin (2012) recommend a generally conservative approach. Non-operative treatment is preferred for first-time dislocations, providing there is either no fracture or one that is non-displaced, stability after reduction, intact subscapularis, and in patients without an acute rotator cuff tear. Paxton and colleagues

recommend 7-10 days of immobilization, followed by physical therapy (2014), while Shin and colleagues recommend 14 days of immobilization, followed by re-evaluation to determine if imaging or additional immobilization is necessary (2012).

National Guideline Clearinghouse

The National Guideline Clearinghouse has three guideline summaries that mention treatment options for acute shoulder dislocation. A review of these guidelines reflects current accepted practice. They recommend reduction be followed by a period of immobilization, though one guideline recommends immobilization for one to two weeks (Should cond dx/tx, 2013), while another recommends “three or more weeks” (Shoulder (acute & chronic) 2013). The same guideline summary that recommends a longer period of immobilization also recommends that the shoulder be immobilized with a sling and swathe, which generally refers to internal immobilization. A third guideline recommends immobilizing with an external rotation sling, but does not recommend a specific amount of time in immobilization (Shoulder disorders, 2011).

The guidelines recommend that immobilization be followed by physical therapy for six to eight weeks. At six weeks, an apprehension test should be conducted. If apprehension is present, then surgery should be considered. Other indications for surgery are two or more dislocations in less than three months, a large bony defect demonstrated on shoulder radiograph, or patient age of less than 35 years.

It is recommended that x-ray images be obtained initially to diagnose shoulder dislocation and look for bony defects. When surgery is indicated, an MRI of the shoulder should be obtained to look for any repairable defects, such as an anterior-inferior labral

tear (Bankhart lesion), a fracture of the posterolateral surface of the humeral head (Hill Sachs lesion), or a capsular tear.

The above recommendations are contradictory in certain cases, and do not take patient age into account. To optimize outcomes, patient age must be considered an important factor as a course of treatment is formulated.

Discussion

The goals for treatment of shoulder dislocation are to facilitate a timely return to full function, and to prevent instability of the shoulder that could lead to subluxation or repeat dislocation. Below we discuss our recommendations based on the review of current literature. The above National Guideline Clearinghouse recommendations are contradictory in certain cases, and do not take patient age into account. To optimize outcomes, patient age should be considered an important factor as a course of treatment is formulated. Please see table 2 for an overview of our following recommendations compared with the recommendations found on the National Guideline Clearinghouse.

Young Patients (age < 30)

The lack of both age-specific and high quality studies are a major barrier to making firm recommendations in the care of ASD. The two areas that have been well studied are timing of surgery in young active adults, and position of immobilization (internal vs external).

Level I and II evidence is available showing either no or insignificant benefit of external rotation immobilization over internal (Hanchard et al., 2014; Liavaag et al.,

2011; Paterson et al., 2010; Whelan et al., 2014). For this reason, we recommend a period of one week be spent in either a sling and swath or simple sling. This should be followed by physical therapy aimed at strengthening the muscles of the shoulder and supporting structures.

Because a high rate of re-dislocation has been shown in younger patients, we recommend that a referral to an orthopedic surgeon be seriously considered in any patient under 30 years that leads an active lifestyle. This is especially true for those that engage in frequent movements that put the shoulder in a vulnerable position of overhead extension and external rotation. Examples of these include painters, rock-climbers, volleyball and baseball players, etc.

If the patient's lifestyle does not put them at high risk, we recommend conservative management, consisting of one week of immobilization followed by physical therapy. Surgery should be considered if the patient develops symptoms of chronic instability, which could manifest as a feeling of apprehension when the shoulder is placed in a vulnerable position (an apprehension test), an episode of subluxation, or even a repeat dislocation.

Our recommendations are similar to those found in the National Guideline Clearinghouse, with the largest exceptions being that we recommend a shorter period of immobilization, as well as having a lower threshold for surgical referral in young, active adults.

Middle Patients (age 30-55)

Being that there are no studies focused specifically on patients 30-55 years old, it is difficult to make strong recommendations. Caring for patients in the middle population truly requires that the provider practice the “art” of medicine. An important concept to keep in mind is that as patients’ age, their labrum develops and strengthens, while in contrast, their rotator cuff becomes more easily injured. The bones also become softer. It is important to recognize that a wide range of activity levels exist in this age group. We recommend a conservative approach, similar to patients in the Young population, with surgery being warranted under certain circumstances. Please see the algorithm in Appendix 1 for a summary of our recommendations for the Young and Middle age groups.

Older Patients (age > 55)

Due to the lack of high quality studies focusing on this age group, we are unable to make any strong recommendations for their care. There is a great need for more studies to be done in this age group, considering that besides young active males, elderly women have the highest rates of dislocation. We believe that older patients should be approached differently than young patients.

Older patients are more likely to have associated injuries, including rotator cuff repairs, nerve injuries, and vascular injuries (Paxton et al., 2014). Shin and colleagues (2012) report that about 50% of the patients in their study of adults older than 60 had a concomitant rotator cuff tear, and that patients are more likely to have a tear as they grow older. The elderly must receive a thorough examination both at the time of injury and

reduction, and at regular intervals thereafter so that these associated injuries are not missed.

We find that Shin et al. (2012) provided a reasonable guideline for treatment and follow up of elderly patients. Please see Appendix 2 for an algorithm summarizing their recommendations. However, we must accept that these recommendations are based on a level IV study. We recommend that better designed studies be conducted focusing on elderly patients, specifically focusing on position and duration of immobilization, surgical indications, and ways to minimize associated injuries.

Conclusion

Anterior shoulder dislocations are commonly treated by nurse practitioners in a variety of settings. Though they are most common in young men and older women, the ideal treatment varies depending on a patient's age. Our above recommendations provide guidelines for treating the reduced shoulder, based on patient age. However, it is important to remember that few high quality studies have been conducted to verify the effectiveness of most of the methods discussed. There is a need for vigorous, high quality studies, especially in the older population.

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Clinical Orthopaedics and Related Research,

Figure 1

Young/Middle algorithm

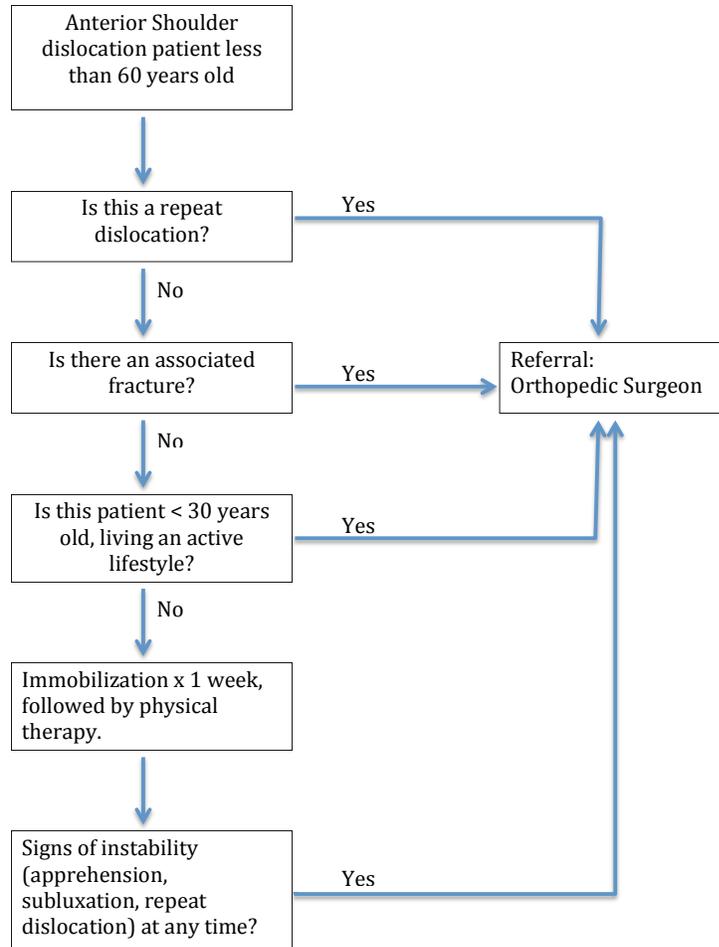


Figure 1. Treatment algorithm for Young and Middle patients.

Figure 2

Care Algorithm for ASD patients > 60 years old.

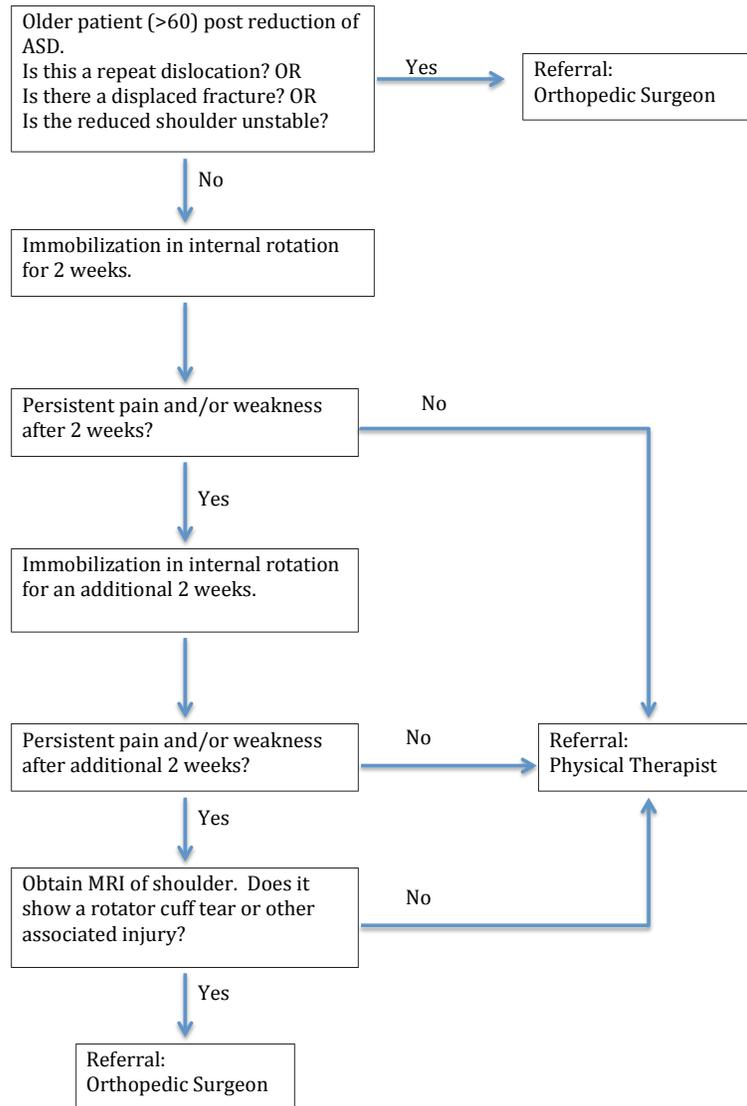


Figure 2. Treatment algorithm for Older patients.

Table 1

Summary of reviewed articles			
Author	Study type	Level of Evidence	Age group(s)
Atoun et al. 2013	Retrospective	Therapeutic level IV	Middle, Older
Crall et al. 2012	Markov model	Economic and Decision Analysis level III	Young
Gigis et al. 2014	Prospective comparative	Therapeutic level II	Young
Hanchard et al. 2014	Systematic review	Therapeutic level II	Young, Middle
Handoll et al. 2010	Systematic Review	Therapeutic level II	Young, Middle
Hovell et al. 2008	Prospective	Prognostic level I	Young, Middle
Khan et al. 2014	Retrospective	Therapeutic level III	Young
Liavaag et al. 2011	Randomized Controlled Trial	Therapeutic level I	Young, Middle
Paterson et al. 2010	Systematic Review	Therapeutic level II	Young, Middle
Paxton et al. 2014	Literature Review	Therapeutic level IV	Older
Shin et al. 2012	Case Series	Therapeutic level IV	Older
Whelan et al. 2014	Randomized Controlled Trial	Therapeutic level II	Young

Table 1. Summary of reviewed articles.

Table 2

Comparison of recommendations				
	National Guideline Clearinghouse	Authors' Recommendations		
		Young	Middle	Older
Immobilization Position	External	Internal	Internal	Internal
Immobilization Duration	1-3 weeks	1 week	1 week	2-4 weeks
Criteria for Surgical Referral	After third dislocation	After first dislocation	Repeat dislocation, Instability, Fracture, Labrum or Rotator cuff tear	Repeat dislocation, instability, displaced fracture, Rotator cuff tear or other surgical injury

Table 2. Authors' recommendations compared with those of the National Guideline Clearinghouse.