

Original Contributions

REDUCTION OF ANTERIOR SHOULDER DISLOCATIONS BY SPASO TECHNIQUE: CLINICAL RESULTS

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□ **Abstract**—The Spaso technique consists of forward flexion, external rotation, and gentle traction for the reduction of anterior shoulder dislocations with the patient in the supine position. The aim of this prospective study was to assess clinical efficacy of the Spaso technique and to evaluate its complications. We prospectively evaluated 52 shoulder dislocations using the Spaso technique. All reductions were performed by residents in training. Rescue methods if initial reduction was unsuccessful were at the discretion of the treating physician. Fifty-two patients were enrolled and 39 (75%) dislocations were successfully reduced without anesthesia or assistance. The mean reduction time was 3.2 min, and 87% of successful reductions occurred in less than 5 min. If we exclude the first 20 cases as a learning period, the success rate increases up to 87.5%. There were no complications associated with using the Spaso technique in this series. Patients with concomitant greater tuberosity fractures and late presentation had a lower success rate, although this was not statistically significant. The Spaso method is effective in reducing anterior shoulder dislocations without anesthesia or assistance and may decrease reduction time and length of stay in the Emergency Department. © 2008 Published by Elsevier Inc.

□ **Keywords**—shoulder; glenohumeral; anterior; dislocation; reduction

INTRODUCTION

Shoulder dislocation is the most common among the large joint dislocations, with 85% presenting as anterior

dislocations (1). There are many different techniques described in the literature to reduce an anteriorly dislocated shoulder. Methods are mainly composed of traction, leverage, or a combination of both actions (2). The Spaso technique consists of gentle traction, external rotation, and minimal manipulation. This method was first described in 1998, but has not yet been well evaluated in the literature. It was reported to be simple, effective, and able to be performed by a single operator (3). The aim of this prospective study was to assess clinical efficacy of the Spaso technique and to evaluate its complications.

MATERIALS AND METHODS

Two training hospitals participated in this study. All shoulder dislocations that were referred to both hospitals between June 2005 and December 2005 were included in this study. Each hospital's patient group was restricted to 26 patients.

The Spaso technique was demonstrated to orthopedic residents in a classroom setting. They were asked to perform this method as their first choice in the treatment of acute anterior shoulder dislocations. Injuries classified as Neer's three- or four-part fractures were excluded from the study except for isolated greater tuberosity fractures. Those patients presenting 24 h after the dislocation, unconscious patients, and patients with severe glenoid fractures were also excluded from the study.

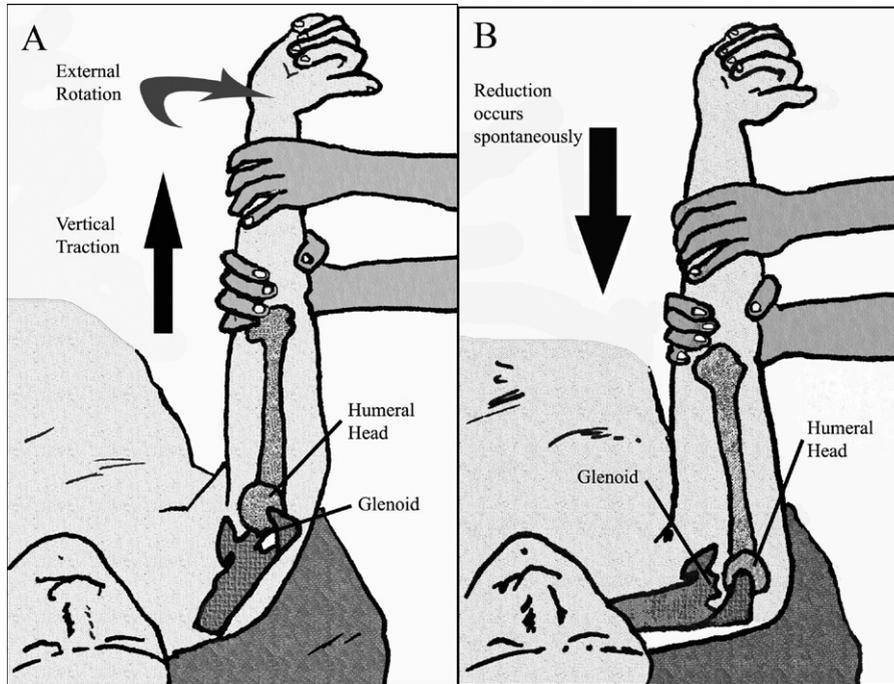


Figure 1. Gentle vertical traction and slight external rotation are applied. Note that the medial border of the patient's scapula remains in contact with the bed (A), after reduction (B).

Written informed consent was obtained from all patients. The gender, age, cause of injury, history of previous shoulder trauma, interval between injury and reduction, and previous attempts at reduction were recorded. Any accompanying fractures and neurovascular status of the extremity were documented.

True anteroposterior, true lateral and axillary projections of the shoulder were taken before and after the reduction (1). Duration of the reduction time was recorded. No premedication was administered to patients. If the Spaso technique failed to achieve reduction, the emergency physician was free to choose another method or to give anesthetic in the operating room.

Technique

The technique is performed in the supine position. The emergency physician stands at the patient's side and holds the patient's affected arm in forward flexion. Gentle vertical traction is applied and then slight external rotation is applied to the limb (Figure 1A). The patient must be kept relaxed so that the medial border of the scapula remains in contact with the bed. After a few minutes of traction, reduction will occur spontaneously (Figure 1B). If reduction does not then occur, the emergency physician may assist with his other hand to push the head of the humerus to the glenoid fossa (Figure 2).

In this study, after the reduction, the neurovascular status of the arm was reassessed and the shoulder was placed in a Velpau bandage. Complications were also noted. Three surgeons reviewed the patients' X-ray studies to determine the luxation type. An appropriate chi-square test was used to compare groups.



Figure 2. If the reduction does not occur spontaneously, it might be assisted by pushing the head of the humerus toward the glenoid fossa.

RESULTS

There were 42 male and 10 female patients. The average patient age was 33 years, with a range between 17 and 78 years. Most of the injuries were caused by a stress on the shoulder in abduction-external rotation (11 patients), after a simple fall (28 patients), or while playing contact sports (7 patients). The mechanism of injury was a fight in 3 patients; horse kick and epileptic seizure were the other reasons.

Twenty-four patients (46.2%) had primary dislocations. The average time between dislocation and reduction was 97.2 min. Thirty-five patients presented within 2 h.

The most frequent type of dislocation in our series was the subcoracoid anterior dislocation, which represented 69.2% (36 patients) of the injuries. The numbers of subglenoid and subclavicular dislocations were 8 patients (15.4%) each and these dislocations were associated with greater tuberosity fractures in 3 patients (37.5%) and in 2 patients (25%), respectively. One patient with subglenoid dislocation later received surgery for a greater tuberosity fracture displaced >5 mm. Two patients had axillary nerve paralysis and one patient had radial nerve paralysis. All patients recovered from paralysis after reduction. Of the 3 patients with associated fractures, one had a patella fracture, one had a distal radius fracture, and one had an acromioclavicular separation of the contralateral shoulder. Two patients were exposed to reduction maneuvers before being referred to our hospitals; Hippocratic method was tried on one patient and the other one tried to reduce his shoulder by himself.

Using the Spaso technique, we achieved closed reduction in 39 patients. The median reduction time was 2 min (range 1 to 15 min) and 34 patients' reductions (87.2% of successful reductions) were completed within 5 min. There were no complications associated with the Spaso technique. Successful reductions by this method were performed in 72.2% of subcoracoid dislocations, 75% of subclavicular dislocations, and 87.5% of subglenoid dislocations (Table 1).

The method was unsuccessful in 13 patients. The dislocations in 9 of these 13 patients were subsequently reduced with other methods. These methods included traction-counter traction, the Hippocratic method, and the external rotation method. Four patients' dislocations were reduced under general anesthesia. One of them was a 45-year-old man who was kicked by a horse and had a patella fracture and a greater tuberosity fracture as well. Three patients whose shoulders reduced under general anesthesia had associated greater tuberosity fractures and subclavicular or subglenoid type dislocations.

Table 1. Success of Reduction by Relevant Variables

	Number of Patients		Success Rate	<i>p</i> Value
	Total	Successful		
Age	37	28	75.6%	1.000
≤35 years				
>35 years	15	11	73.3%	
Sex				0.697
Male	42	32	76.1%	
Female	10	7	70.0%	
Presentation				0.309
Before 2 h	35	28	80.0%	
After 2 h	17	11	64.7%	
Dislocation				0.748
Primary	24	17	70.8%	
Recurrent	28	22	78.5%	
Greater tuberosity fracture				0.093
Present	5	2	40.0%	
None	47	37	78.7%	
Sequence				0.019
First 20 cases	20	11	55.0%	
Last 32 cases	32	28	87.5%	
Luxation type				N/A
Subcoracoid	36	26	72.2%	
Subclavicular	8	6	75.0%	
Subglenoid	8	7	87.5%	

Patient age did not significantly affect the method's success rate. The gender of patients did not statistically influence the success rate of the method nor was there any significant difference in the technique's effectiveness for primary or recurrent dislocations (Table 1).

The evaluation of our results regarding the time elapsed between initial injury and reduction maneuvers revealed no significant difference. The presence of associated greater tuberosity fractures likely decreased the success rate of the maneuver but this was not statistically significant (40% success rate in luxation with greater tuberosity fracture and 78.7% success rate in luxation without greater tuberosity fracture, $p = 0.093$) (Table 1).

We compared the first 20 dislocations' success rate with the last 32 dislocations' success rate and found them to be significantly different (55% and 87.5%, respectively, $p = 0.019$), suggesting learning over time.

DISCUSSION

The Spaso technique is a combination of three main maneuvers: forward flexion, gentle traction, and external rotation (3). In other humeral abduction maneuvers, such as the Milch technique or the Eskimo technique, forward flexion has been reported as a component of these approaches (4–7). Self reduction techniques and scapular manipulation maneuvers use forward flexion as well (7–11). In our opinion, forward elevation changes the

direction of the conjoint tendon, long head of the biceps humeri, and pectoralis major tendon, which increases the stress on the humeral head. When forward elevation or humeral abduction movement occurs, probably the cuff musculature shortens and the patient relaxes.

Hippocratic maneuvers require aggressive traction force that can cause complications, whereas self-reduction maneuvers do not (2,7,9,12). Instead, gentle traction force always increases a method's success rate, such as in the external rotation method, the scapular manipulation, and the Milch maneuver (5–7,10,11,13–15). The Stimson method uses gravity in place of gentle traction (7). All methods use some external rotation to facilitate reduction. If excessive external rotation force is applied, leverage may cause a humeral fracture (2). But unlike the Kocher method, the Spaso technique applies external rotation only, not leverage.

Using the Spaso technique, 75% of the 52 shoulders were reduced without anesthesia or assistance, and all patients were treated by residents. If we exclude the first 20 patients as a learning period, the success rate increases up to 87.5%. There were no complications attributable to the Spaso technique itself. Seventeen percent of patients were reduced with other techniques without anesthesia. But there was no one preferable method to be used. When the reduction with Spaso technique had failed, the resident simply used a technique with which he was familiar.

If we exclude traction or leverage maneuvers that could cause complications like fractures or neurological impairment, glenohumeral reduction techniques' success rates in the literature range from 60–95% (4–6,8–11,13,14,16–18). Without anesthesia, a success rate of up to 80% has been shown only in the Milch methods and external rotation methods in the literature (6,13,14). When we excluded the learning period, the Spaso technique's success rate was equal to the Milch and the external rotation methods.

When the luxation is not complicated by fractures or there is no major trauma present, the reduction will occur spontaneously with the Spaso technique, without anesthesia. But high energy trauma presenting with greater tuberosity fractures, subclavicular type or subglenoid type dislocations usually require anesthesia (1,9,14). Although not proven statistically, we believe that patients who had associated greater tuberosity fractures and presented later than 2 h probably had lower success rates. Late presentation probably increases a patient's pain and muscular spasm.

We do not routinely use anesthetics for glenohumeral luxation as a first choice. In fact, anesthetics relax the patient's muscular spasm and reduction becomes easier. Several studies have shown that shoulder dislocations could be successfully reduced without anesthesia. Thus,

the physician can discharge the patients within an hour and can reduce cost and time (9,13,17,18). The Spaso technique is easy to use and does not require assistance. The technique allows fast reduction in that most of our patients were reduced within 5 min.

LIMITATIONS

There were certain deficiencies in this series. First, this is not a randomized study to compare results with other techniques. Second, the study has a relatively limited patient group for statistical analysis. Finally, the entire investigation was completed with junior residents and it is not clear that similar success rates can be achieved in other settings.

CONCLUSIONS

In conclusion, the Spaso technique is a simple, rapid, and reliable technique for acute shoulder dislocation. It is a successful reduction maneuver and had no complications in this small series of patients. Even in inexperienced hands, the method could be performed sufficiently without anesthesia.

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