

# Comparison Between Traction-Counter Traction and Modified Scapular Manipulation for Reduction of Shoulder Dislocation in Terms of Reduction Time

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## Abstract

**Background:** To compare the mean reduction time in modified scapular manipulation and traction counter traction technique in the management of acute anterior shoulder dislocation.

**Methods:** Patients aged 16-60 years of age admitted through A&E department were included in the study. Patients were divided in two groups randomly on basis of lottery method. It was randomized controlled trial (RCT). In group A, patient were manipulated, with modified scapular manipulation technique without sedation and analgesia. In group B, patient were manipulated, with Traction-Counter Traction technique under I/V sedation and analgesia. Reduction time was recorded from start of manipulation technique till shoulder joint was reduced clinically.

**Results :** A total of 60 patients were included in the study, out of which 65% were male and 35% were female. The mean age of patients was  $35.52 \pm 13.31$  years. The mean reduction time was significantly less ( $p = 0.049$ ) in patients with modified scapular manipulation group then traction counter traction group.

**Conclusion:** Modified scapular manipulation is a effective way of reducing shoulder joint with less reduction time as compared to traditional traction counter traction method in accident and emergency department without the use of I.V sedation and analgesics.

**Key Words:** Traction-counter traction, Modified scapular manipulation, Shoulder dislocation

## Introduction

Shoulder joint moves in different directions and it is the most mobile joint of the body. It is this characteristic, which makes it more susceptible to dislocation than any other joint in human body.<sup>1</sup> Shoulder dislocation accounts for almost 50 percent of all dislocations presenting in emergency. Acute

anterior dislocation is the most common type of shoulder dislocation accounting for approximately 95% of all shoulder dislocations. Many reduction methods have been described in the literature which includes different reduction maneuvers.<sup>2</sup> Whichever technique is opted it should ideally be effective, less time consuming and as painless as possible with less iatrogenic complications.<sup>1,2</sup> It is common among young adults age 20-30 years and in elderly women with prevalence of 17 per 100000.<sup>3,4</sup> Shoulder dislocation accounts for almost 50 percent of all dislocations presenting in emergency.<sup>5,6</sup> Acute anterior dislocation is the most common type of shoulder dislocation accounting for approximately 95% of all shoulder dislocations.<sup>7-9</sup> Other uncommon presentations are posterior, inferior and very rare thoracic dislocations.<sup>10,11</sup> Anterior shoulder dislocation usually occurs following fall on out stretched hand with arm in abducted and externally rotated position.<sup>12,13</sup> Acute anterior dislocation presents as orthopedics emergency in which reduction should be performed as soon as possible because incidence of complications increases with time and reduction is most effective way for pain relief.<sup>14-21</sup>

Before attempting any reduction, a detailed history and physical examination are essential for any shoulder dislocation.<sup>22</sup> History should include mechanism of injury/trauma, time since trauma, previous dislocations. In physical examination comparison with other shoulder is very important along with active and passive range of motions in all directions. Examination of distal neurovascular status is mandatory in every case before and after reduction of shoulder. In emergency departments, intravenous sedatives and narcotics are usually used for reducing pain before attempting shoulder reduction.<sup>23</sup> These drugs have their own complications such as respiratory depression and central nervous system suppression, which require careful monitoring of vitals and pulse oximetry for oxygen saturation, and hence prolonged stay at hospital, which in turn burden the

hospital resources and time and use more valuable time of emergency doctor.<sup>24,25,26</sup> Different methods have been proposed to cut short this valuable time, one of these is scapular manipulation technique. In this technique, patient lies in prone position with shoulder joint in 90° degree flexion and externally rotated, a gentle traction is applied downwards and scapula is manipulated to complete the reduction. In modified scapular manipulation, head is tilted opposite to dislocated shoulder to allow more relaxation.

Reduction time significantly reduces between modified scapular manipulation and traditional traction counter traction technique. Dislocation of shoulder is very common problem in our society, and since our hospitals are over burdened, an effective reduction technique should be opted which reduces the reduction time.

### Patients and Methods

Patients (n=60) aged 16-60 years of age admitted through A&E department Benazir Bhutto Hospital Rawalpindi, were included in the study. Patients were divided in two groups randomly on basis of lottery method. In group A patient were manipulated, with modified scapular manipulation technique without sedation and analgesia. In this technique, patient lies in prone position with pillow under the affected shoulder and head tilted to the opposites side, assistant applied traction to the hanging arm while maintaining external rotation by flexing elbow at 90 degrees (Fig 2). Surgeon manipulates scapular tip medially to complete reduction. In-group B patient were manipulated by the senior orthopedic surgeon with Traction-Counter Traction technique in which traction is applied to the affected arm with shoulder in abduction and assistant applied counter traction with a sheet across the shoulder. Reduction time was recorded from start of manipulation technique till shoulder joint is reduced clinically. If reduction was not achieved clinically, shoulder was reduced under general anaesthesia and excluded from the study. Independent samples t-test were applied to compare the difference between reduction time in two groups. Effect modifiers like age, gender were controlled by stratification. Post stratification independent sample t-test was applied. A p-value < 0.05 was considered statistically significant.

### Results

Out of 60 patients 39 (65%) were male and 21 (35%) were female. The mean age of patients was (35.52±13.31) years. All the 60 patients included in

study had unilateral shoulder dislocation. The time to reduction was significantly different between two groups: (200.43±9.24) seconds for modified scapular manipulation (MSM) group and (232.63±13.04) seconds for Traction counter traction (TCT) group (P<0.049) (Table 1). Time to reduction was more significant in male patients (p<0.017) as compared to female patients (p<0.99) (Table 2&3). Similarly time to reduction was more significant in patient aged between 31-45 years (p<0.013) then patient aged between 16-30 years (p<0.385) and 46-60 years (p<0.641) (Table 4).

**Table 1 Comparison of Reduction Time (seconds) between MSM group and TCT group.**

	Treatment group	N	Mean	SD	p-value
Reduction Time (seconds)	MSM*	30	200.43	50.610	0.049
	TCT**	30	232.63	71.436	

\*MSM=Modified Scapular Manipulation;\*\*TCT=Traction-Counter-Traction

**Table 2 Comparison of Reduction Time (seconds) between male patients in MSM group and TCT group**

	Treatment group	N	Mean	Std. Deviation	P-value
Reduction Time (seconds)	MSM	20	187.15	48.973	0.017
	TCT	19	235.84	70.764	

**Table 3 Comparison of Reduction Time (in seconds) between female patients in MSM group and TCT group**

	Treatment group	N	Mean	SD	p-value
Reduction Time (seconds)	MSM	10	227.00	44.875	0.99
	TCT	11	227.09	75.709	

### Discussion

Shoulder dislocation is commonly encountered on daily basis in Accident and Emergency department in our setup. It is common among young adults aged between 31-45 years. Mostly trauma is the cause of shoulder dislocation and anterior type of shoulder dislocation being the most common. There are various

conservative options for reducing anterior dislocation of shoulder joint ranging from different maneuvers to reduce, intraarticular lignocaine injection, I.V. sedation, reduction under general anaesthesia and open reduction.

At our hospital, shoulder joint is usually reduced by traction counter traction technique with I.V analgesics and sedation, apply polysling after reduction with check x-rays, monitoring of sedation after shoulder joint is reduced and followed up in OPD after 3 weeks. However, in our study shoulder joint was also reduced by modified scapular manipulation in which no intravenous sedation and analgesics were used. Since there is no sedation used in Modified Scapular Manipulation, hence there is no need for post reduction monitoring, which lessened hospital stay and decreased hospital burden.<sup>2,5</sup>

The mean age of patients was  $35.52 \pm 13.31$  years. The mean reduction time was significantly less ( $P 0.049$ ) in patients with modified scapular manipulation group then traction counter traction group which is consistent with study conducted by Ghane MR et al.<sup>1</sup>In a study by Ghane MR et al<sup>1</sup>, a total of 97 patient with anterior shoulder dislocation were included in the study out of which 80 (81.6%) were male patients with mean age of  $34.15 \pm 13.48$  years, which is comparable with our population mean age ( $35.52 \pm 13.31$ ) in this study. <sup>1</sup> Comparison was done between reduction time in shoulder dislocation between two methods i.e. modified scapular manipulation and traction counter traction method. In their study the reduction time was highly significant ( $p < 0.001$ ) between the two groups. Which is consistent with our study ( $p < 0.049$ ) although with less significance level as compared to study done by Ghane MR et al<sup>1</sup>. This implies that although reduction time is less in modified scapular manipulation as compared to traditional traction counter traction, it is also dependent on skill level of the treating physician.

In a study by Pishbin et al, 41 patients with anterior shoulder dislocation were included in the study. <sup>6</sup> All patients underwent scapular manipulation technique for reduction of anterior shoulder dislocation. They had a success rate of 90.2% at first attempt with overall success rate of 100 percent, which is consistent with our study.

## Conclusion

1.Modified scapular manipulation is an effective way of reducing dislocated shoulder joint with less reduction time in accident and emergency department.

2.It has an added benefit that dislocated shoulder can be reduced without the use of I.V. analgesics and sedation, hence post reduction monitoring is not required.

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