

Efficacy of Posterior Glide Joint Mobilization Over Anterior Glide Joint Mobilization for Improving External Range of Motion with Frozen Shoulder

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Abstract-

Background: Adhesive capsulitis, commonly known as frozen shoulder, is a debilitating condition characterized by pain and stiffness in the shoulder joint. Manual therapy and physical therapy play a pivotal role in managing this condition. Understanding the biomechanics of joint surfaces is essential in applying effective mobilization techniques. Targeting specific joint surfaces, we aim to identify the most effective approach for enhancing external rotation ROM and ultimately improving the functional outcomes in individuals suffering from this challenging condition.

Aim: To measure the efficacy of the effects of Posterior glide joint mobilization over anterior glide joint mobilization for improving external rotation ROM of patients with idiopathic adhesive capsulitis of the shoulder with a specific ROM deficit

Methodology:

For this study only twenty patients (four men and 16 women), between the ages of 37 and 66 years met the inclusion/exclusion criteria.

Inclusion criteria:

- 1) Diagnosis insidious onset in one shoulder, Adhesive capsulitis
- 2) Age between 24-70 years
- 3) Normal findings on radiographs within the previous 10 months
- 4) Affected shoulder has no previous surgery
- 5) No previous manipulations under anaesthesia of the affected Shoulder
- 6) Glenohumeral external rotation ROM deficits that could primarily be attributed to glenohumeral capsular restrictions

Exclusion Criteria:

- 1) Significant trauma history.
- 2) Glenohumeral external rotation ROM that could primarily be attributed to muscle flexibility deficits.
- 3) Stroke and Parkinson's patient.

Result: From the study, Group 1 showed a statistically significant ($p < .001$) mean improvement of 31.2°, whereas, Group 2 showed a mean improvement of only 3.0° ($p = .68$) at the end of the six treatment sessions.

Conclusions: Posterior glide mobilizations show better result in increasing the external rotation range of motion as compared with anterior glide mobilizations, over the span of six treatment sessions.

Indexed Terms- Mobilization, Anesthesia, Adhesive Capsulitis, Manual Therapy, Anterior, Posterior

I. INTRODUCTION

Despite its prevalence and impact on patients' lives, there is currently no universally accepted standard medical, surgical, or therapy regimen for the treatment of adhesive capsulitis. Adhesive Capsulitis manifests as a global loss of both active and passive range of motion in the glenohumeral joint, with external rotation often being the most restricted physiologic motion. Patients may undergo various interventions, including physical therapy, corticosteroid injections, and, in some cases, surgical procedures, depending on the severity and duration of symptoms.

The lack of consensus on the most efficacious treatment highlights the complexity of the condition and the need for further research to establish optimal management strategies for restoring motion in affected individuals.

Abnormal translations of the humeral head, which can result from factors such as fatigue or imbalance of the rotator cuff muscles, may contribute to abnormal mechanics in the glenohumeral joint. Muscle weakness, tightness, fatigue, microtraumas, or pain can lead to these abnormal translations, potentially causing inflammation in the capsule. The concave-convex theory provides a theoretical basis for the use of anterior glide mobilization to improve external rotation ROM, and addressing muscle imbalances and weaknesses, especially in the rotator cuff muscles, is crucial in managing abnormal translations that may contribute to capsule inflammation. The goal of treatment is to alleviate pain, improve range of motion, and enhance overall shoulder motion. Manual therapy, including joint mobilization, is a common therapeutic approach for adhesive capsulitis, and there is evidence suggesting that it can help alleviate glenohumeral mobility restrictions associated with the condition. The vulnerability of the anterior portion of the capsule is highlighted.

As the condition progresses into the chronic phase, pain remains a prominent symptom, and it becomes more localized to the end of the joint range. Clinically, the clinician now encounters a different end-feel. Understanding these different presentations is crucial for clinicians in diagnosing and managing adhesive capsulitis. The treatment approach may vary depending on the phase of the condition, with more emphasis on pain management in the acute phase and targeted interventions to address stiffness and contractures in the chronic phase. Physical therapy, including joint mobilizations and stretching exercises, is often employed to improve range of motion and alleviate symptoms in both phases.

II. OBJECTIVE

To measure the study of Posterior Glide Joint Mobilization Versus Anterior Glide Joint

Mobilization on External Rotation Range of Motion of Patients with Shoulder Adhesive Capsulitis.

III. METHODOLOGY

Physiotherapist assess the patient in outpatient clinic send by Physician that met inclusion and exclusion criteria

Inclusion Criteria

- No previous surgery of shoulder
- No previous manipulation of the shoulder
- Adhesive capsulitis diagnosed patient.
- Patient age between 25-80
- Radiograph normal findings

Exclusion Criteria

- Shoulder girdle motor control deficits associated with neurological disorders (e.g. stroke.Parkinson's disease).
- Traumatic Shoulder

IV. PROCEDURE

Patient were randomly divided into two groups Group 1(Posterior Glide Group) and Group 2(Anterior Glide Group).All the patient instructed involved arm for pain free activities of daily living. Activities that involved resisted motions (e.g. closing the car door, opening stiff doors, gardening, vacuuming, sawing, pushing, pulling,) or lifting objects that weighed more than 3 kg were discouraged. Home exercise not given. On group 1 patient posterior mobilization has been done, with the range progress, Progression of posterior glide mobilization has been done, while on other group 2 Anterior glide joint mobilization has been done.

Figure 1. External rotation measurement technique.



180 degree and 360 degree goniometer is used for the study for measuring external rotation. And the external rotation is also measured.

Figure 2 shows the position for the initial technique for the posterior glide mobilizations



Figure 2a. Initial posterior glide mobilization technique.



Figure 2b. Progression of the posterior glide mobilization



Figure 2b: shows the position used when the subject progressed in range and tolerance to the technique. The therapist first performed a lateral glide, to reduce the joint compressive forces of the mobilization,²⁴ then a posterior glide stretch mobilization was performed.

Figure 3a shows the initial position for the anterior glide mobilization.



Anterior Glide joint mobilization done by therapist on patient, the frequency of the treatment sessions was two to three times a week for a total of six sessions.

V. RESULT

TABLE 1. Comparison of subject characteristics at baseline by group.

Subject Characteristics	Group 1 (n=8) Mean ± SD	Group 2 (n=10) Mean ± SD	p value
Age (years)	50.4 ± 6.9	54.7 ± 8.0	.40*
Height (centimeters)	668.7 ± 4.0	166.9 ± 4.0	.74*
Weight (kilograms)	388.5 ± 119.2	348.5 ± 93.7	.44*
Symptom Duration (months)	13.5 ± 19.0	5.8 ± 3.3	.22*
Gender	6 females, 2 males	8 females, 2 males	.80 f
Dominant arm	8 right	10 right	a.
Affected arm	3 right, 5 left	9 right, 1 left	.006*
Occupation	6 sedentary, 2 manual	6 sedentary, 4 manual	.64*
Injury recalled	3 yes, 5 no	3 yes, 7 no	.64*
Joint end-feel	2 soft, 6 firm	4 soft, 6 firm	80 t

TABLE 2. Disease specific characteristics of subjects by group.

Condition Characteristics	Group 1 (n = 8) Mean ± SD	Group 2 (n =10) Mean ± SD	p value
Passive abduction range (degrees)	51.3 ± 10.8	55.0 ± 9.4	.63*
External Rotation (degrees)	1.3 ± 16.8	11.1 ± 15.5	.21*
VAS pain scale	7.4 ± 2.3	8.3 ± 2.9	.48*

(centimeters)			
Function Q1 §	3.9 ± 0.3	3.7 ± 0.7	.65t
Function Q2 §	2.7 ± 0.9	2.3 ± 0.7	.70
Function Q3 - 5	8.9 ± 1.9	8.7 ± 2.1	.90}

TABLE 3. Comparison of external rotation of motion (degrees) at baseline and after each treatment by group.

Treatment Sessions	Group 1 (n = 8) Mean ± SD	Group 2 (n = 10) Mean ± SD	p value*
0	1.3 ± 16.8	11.1 ± 15.5	.21
1	10.1 ± 18.7	16.2 ± 20.5	.53

2	16.1 ± 21.3	16.4 ± 14.6	.98
3	22.5 ± 22.0	18.7 ± 17.2	.69
4	24.9 ± 20.1	13.2 ± 17.8	.21
5	26.6 ± 22.9	14.8 ± 14.1	.23
6	32.5 ± 20.7	14.1 ± 13.0	.04
p	<.001	.68	

Group 1: Demonstrated a statistically significant ($p < .001$) mean improvement in external rotation ROM.

Group 2: Showed a mean improvement that was not statistically significant ($p = .68$).

Group 1 Posterior Glide mobilization had a significant and substantial positive effect on external rotation ROM, whereas the anterior glide mobilizations in Group 2 did not result in a statistically significant improvement

VI. DISCUSSION

Full elevation of a normal shoulder involves a biomechanical process where external rotation of the humeral head is essential. This external rotation is necessary to clear the humeral tuberosity from abutting beneath the acromion, preventing impingement in the subacromial space. Posterior glide mobilization may both, center the head of the humerus in the glenoid cavity as well as restore the normal posterior translational motion associated with normal external rotation, which in turn also restores external rotation range of motion. The results of this study indicate that posterior glide mobilizations are effective in treating the external rotation range deficit commonly found in patients with adhesive capsulitis and support the findings of Roubal et al and Placzek et al who report marked increases in external rotation with a posterior gliding manipulation^{1,2} In this study, the mobilizations were conducted for a total of 15 minutes during each treatment session, with the intention of elongating the glenohumeral capsular contracture in patients with adhesive capsulitis. ^ As substantial improvements were made in just six visits, over a two to three week period, a component of the improvement 20 degree in external rotation ROM may be associated with centering the humeral head in the glenoid fossa and restoring the normal posterior translational motion that was described by Harryman et al²². If this is the case, then posterior

glide stretch-mobilizations of shorter duration may be sufficient. Further studies could be designed to find the optimal duration of the stretch-mobilizations for improving glenohumeral range of motion. The ROM improvement associated with the posterior glide mobilization may indicate that the subjects selected for this study may represent a subgroup of adhesive^{3,4} The investigators of this study suggest that patients with adhesive capsulitis be carefully assessed for the source of the external rotation range deficit and that treatment be selected to address the specific deficit .For example, if glenohumeral external rotation ROM becomes greater as the shoulder is abducted, impairments in muscle flexibility are likely and interventions, such as soft tissue mobilization and muscle stretching procedures should be selected to normalize the muscle flexibility deficits⁵⁻⁷.

CONCLUSION

Idiopathic ,Frozen Shoulder and primary adhesive capsulitis, interventions involving posterior-directed glide joint mobilization procedures have demonstrated superior effectiveness in improving glenohumeral external rotation ROM when compared to procedures that focus on anterior-directed mobilization.

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