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# The Effect Of Anterior Versus Posterior Glide Joint Mobilization On External Rotation Range Of Motion In Patients With Shoulder Adhesive Capsulitis

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## Scientific Inquiry II

Fall 2014

### Critically Appraised Topic (CAT) Assignment

**Title:** The Effect of Anterior Versus Posterior Glide Joint Mobilization on External Rotation Range of Motion in Patients with Shoulder Adhesive Capsulitis.

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**Date CAT Completed:** 10/28/14

**Clinical Scenario:** The patient is a 62 year old female referred to physical therapy for adhesive capsulitis of her right shoulder. She presented with a history of adhesive capsulitis and went to physical therapy for previous episodes of the same condition. She had adhesive capsulitis of her left shoulder three years ago, which has resolved. As of April 2014, she presented with adhesive capsulitis of her right shoulder. She has received physical therapy on and off since April. The patient was referred to us a few days ago, with complaints of her condition worsening and a lack of progress at previous physical therapy clinics. Despite having prior physical therapy, she still has extremely limited range of motion. Upon initial examination, we found that she was limited in the motions of flexion, abduction, and external rotation. Her external rotation was the most limited, and when measured with a goniometer she had zero degrees of external rotation. After examination, I was curious what specific joint mobilizations would be the most beneficial, specifically for her limitation in external rotation. I instinctively thought of the “convex on concave” rule and consulted with my clinical instructor on doing anterior glide mobilizations. He warned me that there may be other optimal directions of force for increasing external rotation. This led to my clinical question; whether posterior glide mobilizations would be as effective as anterior glide mobilizations when trying to increase external rotation range of motion in patients with adhesive capsulitis.

**Clinical Question:** Is a posterior glide as effective as an anterior glide joint mobilization when trying to increasing external rotation range of motion in middle aged patients with primary adhesive capsulitis of the shoulder?

**Patient/Problem** – Middle aged patients with primary adhesive capsulitis of the shoulder

**Intervention** – Posterior glide joint mobilization

**Comparison** – Anterior glide joint mobilization

**Outcome** – Increase external rotation range of motion

**Clinical Bottom Line:** In subjects with primary adhesive capsulitis of the shoulder, posterior glide mobilizations were determined to be more effective than anterior glide mobilizations for improving shoulder external rotation range of motion. This supports my clinical question, that posterior glides are as effective as anterior. In fact, it supports that posterior glide mobilizations are more effective. This goes against the traditional view of “convex on concave relationship”, which says an anterior glide of the humeral head on glenoid should be performed to improve external rotation range of motion. Instead, a posterior glide is actually more effective and the

article attributes this to a “capsular constraint mechanism”<sup>1</sup>. Since both glide mobilizations help with pain relief, and posterior glide joint mobilizations are more effective, it seems that this intervention would be extremely useful for this patient. She accurately fits into the patient population of this study. She is suffering from primary adhesive capsulitis, her most limited motion is external rotation, and she is middle aged. In addition, it was determined that her restriction was capsular as opposed to muscular. This was a very important exclusion criteria for the study. By doing posterior joint mobilizations, it will allow for the treatment of external rotation and flexion at the same time. Also, passive range of motion of the shoulder can be performed in between posterior glide mobilizations. This can be done much easier and more effectively because the patient is supine for both interventions. Overall, it allows for less position changes of the patient and seems to be more clinically efficient. In the future, this research and ease of performing glides can guide my clinical decision making. It will help me choose the most effective direction of joint mobilization for limited external rotation in adhesive capsulitis patients. It will also remind me to search for evidence based research on future joint mobilizations, since sometimes the “convex on concave” relationship is not a steadfast rule.

**Search History:**

Databases/Sites Searched	Search Terms	Limits Used
I searched various databases before finding an article to fit my clinical question. I previously searched Cochrane Systematic Reviews and was unable to find results specific to my clinical question. Then, I searched the CINHALL database, in which I found the article I chose.	Search terms I used were adhesive capsulitis, joint mobilization, anterior, posterior, external rotation, and range of motion. I originally tried ‘frozen shoulder’, but had better results with the term ‘adhesive capsulitis’. I was also able to locate an article specific to external rotation limitations. My final search was “adhesive capsulitis AND joint mobilization AND external rotation”.	The limits I used were: English Language, Published Date (2000–2014), Peer Reviewed, Age Group: Middle Aged (45-64 years).

**Citations:** Johnson A, Godges J, Zimmerman G, Ounanian L. The effect of anterior versus posterior glide joint mobilization on external rotation range of motion in patients with shoulder adhesive capsulitis. *Journal Of Orthopaedic & Sports Physical Therapy* [serial online]. March 2007;37

**Summary of Study:**

*Study Design:* The study was a randomized clinical trial. Twenty patients fit the inclusion/exclusion criteria and were randomly assigned to 1 of 2 treatment groups. The two groups were anterior mobilization or posterior mobilization group. The randomization of the groups was predetermined using a random-numbers table.

*Setting:* All patients were referred to an outpatient physical therapy clinic for treatment. They were referred by the primary researcher, Andrea Johnson (DPTS). The study took place in Redlands, California through Beaver Medical Group and Loma Linda University.

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<sup>1</sup> Johnson A, Godges J, Zimmerman G, Ounanian L. 89

*Participants: The inclusion/exclusion criteria was: idiopathic or primary adhesive capsulitis (insidious onset with no history of major trauma), unilateral condition, age between 25 – 80 years, normal findings on radiographs within the previous 12 months, no previous shoulder surgeries to the affected shoulder, no previous manipulations under anesthesia of the affected shoulder, and external rotation range of motion restriction that worsened with shoulder abduction. Patients were also excluded if they had motor control deficits associated with neurological disorders or if their tightness was due to muscular tightness as opposed to capsular tightness. Twenty patients fit the inclusion/exclusion criteria and were randomly assigned to one of the treatment groups. As a group, there were twenty participants (four men and sixteen women) and all were between the ages of 37 and 66 years. The mean age was 54.7 for the anterior mobilization group and 50.4 for the posterior mobilization group. There were 8 women in the anterior mobilization group, and 2 men. In the posterior mobilization group there was 6 women, and 2 men included.<sup>2</sup>*

*Interventions: Interventions consisted of therapeutic ultrasound, joint mobilization, and upper-body ergometer exercise. These interventions were done for six treatment sessions, over a mean period of 18.5 days. All patients were warmed up with therapeutic thermal ultrasound. Joint mobilizations were then done, depending on which group the patient was in, it was either an anterior glide or posterior glide mobilization. The mobilization was a grade III stretch, held for at least 1 min and done for a total of 15 minutes. No oscillatory motions were performed. The patient then completed their session on the upper-body ergometer for three minutes in the forward direction only.*

*Outcome Measures: There were three outcome measures used in this study. The first outcome measure was a visual analogue scale (VAS) for pain. The patient marked on a vertical 10 cm line where they felt the “unpleasantness that their problem caused them”.<sup>3</sup> The second was a 5-item self-assessment function questionnaire. The five questions were taken from a 21-item questionnaire for shoulder disorders. They selected these five questions because they were related to common problems of adhesive capsulitis and focused on activities that require external rotation. The last and primary outcome measure was external rotation range of motion measurements. This was done at baseline and after each six treatment sessions using an adapted goniometer.*

*Data Analyses: An independent t test was done to determine similarity between participant characteristics at baseline. This was done for patient’s age, height, body mass, shoulder external rotation angles, and pain scale. The mean, median, minimum and maximum values were recorded and compared using the Mann-Whitney U test. In addition, the external rotation range of motion measurements at baseline and completion of each session were compared between the two groups using “a 2-by-7 mixed model analysis of variance (ANOVA), with group as the independent factor and measurement session as the repeated factor”<sup>4</sup>. Independent t tests were performed between groups for each time interval and paired t tests performed within groups to assess the difference in external rotation ROM compared to the baseline for the groups separately.*

**Summary of Evidence:** The study results determined that posterior glide mobilizations are more effective in increasing shoulder external rotation range of motion than anterior glide mobilizations. At the end of six treatment session, the anterior mobilization group had a mean

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<sup>2</sup> Johnson A, Godges J, Zimmerman G, Ounanian L. 89

<sup>3</sup> Johnson A, Godges J, Zimmerman G, Ounanian L. 90

<sup>4</sup> Johnson A, Godges J, Zimmerman G, Ounanian L. 93

improvement of  $3 \pm 10.8^\circ$  (95% CI,  $-4.8^\circ$  to  $10.8$ ;  $P = .40$ ). By the same time period, the posterior mobilization group had a mean improvement of  $31.3 \pm 7.4^\circ$  (95% CI,  $25.1^\circ$  to  $37.5^\circ$ ;  $P < .001$ ).<sup>5</sup> There was no significant difference in shoulder external rotation range of motion between the two groups at baseline. By 6 treatment sessions, the largest improvement in range of motion for anterior mobilizations ( $18^\circ$ ) was below the lowest gain in range of motion for the posterior mobilization group ( $22^\circ$ ). This evidence is valid and relevant when applied to a similar patient population. In addition, the validity of the results focuses on a short duration, 6 sessions. This helps contribute the results to the intervention, as opposed to changes from natural history of adhesive capsulitis. Lastly, this is extremely relevant since joint mobilizations are known to be an effective intervention for patients with adhesive capsulitis. The direction of the mobilization can help improve this intervention and make it even more effective.

TABLE 3		CHANGE IN EXTERNAL ROTATION RANGE OF MOTION BY GROUP*		
Sessions Compared	AM Group (n = 10)	PM Group (n = 8)	P Value <sup>†</sup>	
1-0	5.1 ± 7.8	8.9 ± 7.5	.32	
95% CI	(-0.5, 10.7)	(2.6, 15.2)		
Paired t test <sup>‡</sup>	P = .07	P = .01		
2-0	5.3 ± 10.2	14.9 ± 9.6	.06	
95% CI	(-2.0, 12.6)	(6.8, 22.9)		
Paired t test <sup>‡</sup>	P = .14	P = .003		
3-0	7.6 ± 4.6	21.3 ± 10.0	.001	
95% CI	(4.3, 10.9)	(12.9, 29.6)		
Paired t test <sup>‡</sup>	P = .001	P = .001		
4-0	2.1 ± 12.0	23.6 ± 9.2	.001	
95% CI	(-6.5, 10.7)	(15.9, 31.3)		
Paired t test <sup>‡</sup>	P = .59	P < .001		
5-0	3.7 ± 11.3	25.4 ± 6.8	<.001	
95% CI	(-4.4, 11.8)	(19.7, 31.1)		
Paired t test <sup>‡</sup>	P = .33	P < .001		
6-0	3.0 ± 10.8	31.3 ± 7.4	<.001	
95% CI	(-4.7, 10.7)	(25.0, 37.5)		
Paired t test <sup>‡</sup>	P = .40	P < .001		

Abbreviations: AM, anterior mobilization; CI, confidence interval; PM, posterior mobilization.  
 \*Values expressed as mean ± SD degrees of change between baseline and after each treatment session.  
 †All subjects attended all treatment sessions.  
 ‡Independent t test comparing AM group and PM group.  
 † Within-group difference (testing mean difference, 0).

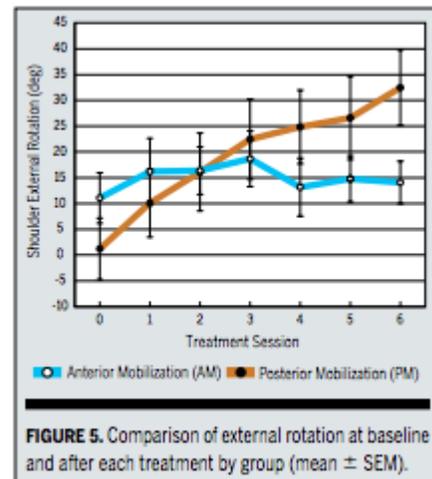


Chart and graph taken from article: Johnson A, Godes J, Zimmerman G, Ounanian L. The effect of anterior versus posterior glide joint mobilization on external rotation range of motion in patients with shoulder adhesive capsulitis. Chart. *Journal Of Orthopaedic & Sports Physical Therapy* [serial online]. March 2007;37 Available from: CINAHL Complete. Accessed October 30, 2014.

**Additional Comments:** Overall, the study rates high (Level 1b) according to the Centre of Evidence Based Practice. Despite being a randomized control trial, I believe that the study still has limitations. As mentioned before, the results of the study can only be applied to a similar patient population of this sample. In addition, the study was from a small sample size. If a larger sample with more diversity was taken, the results may have been different and the external validity would be increased. Another limitation is the fact that the study was done over the span of 6 treatment sessions. To make results more valid, the study could be spanned over a longer period of time. In addition, I think it would be beneficial to follow patients after they complete physical therapy. Finally, other interventions were included in this study. The patients received therapeutic ultrasound and exercises on the upper extremity ergometer in the same

<sup>5</sup> Johnson A, Godes J, Zimmerman G, Ounanian L. 94

treatment session. The benefits of both joint mobilizations would be considered more valid if it was the sole intervention administered.

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