

# Effect of Anterior Humeral Head Reposition Tape to Increase Shoulder Elevation in Subjects with Frozen Shoulder “A Quasi Experimental Trial”

Saima Zahid<sup>1</sup>, Wajida Perveen<sup>2</sup>, Atif Dustgir<sup>3</sup>

<sup>1</sup>Senior Lecturer, Riphah College of Rehabilitation Sciences, Riphah International University, Lahore Campus

<sup>2</sup>Assistant Professor/Vice Principal, Sialkot College of Physical Therapy, Amin Welfare & Teaching Hospital Sialkot

<sup>3</sup>Assistant Professor, Riphah College of Rehabilitation Sciences, Riphah International University, Lahore Campus

## Keywords

Anterior humeral head reposition tape, Mobilization with Movement, frozen shoulder, shoulder elevation.

## Author's Contribution

<sup>1</sup> Conception, synthesis, planning of research and manuscript writing

<sup>2</sup> Interpretation and discussion

<sup>3</sup> Data analysis, interpretation and manuscript writing

## Article Info.

Received: Jul 5, 2017

Revised: Aug 15, 2017

Accepted: Aug 18, 2017

Conflict of Interest: Nil

Funding Sources: Nil

## Address of Correspondence

Saima Zahid

saima.zahid.sz@gmail.com

## A B S T R A C T

**Background:** Frozen shoulder syndrome is characterized by pain and progressive loss of both active and passive shoulder movements due to uncertain etiology. About 2.0 to 5.0% of the general population and 40 to 60-year-old age group are affected by frozen shoulder as most common cause of shoulder disability. Mostly, in its idiopathic form, the condition is more common in women than in men.

**Objective:** To determine the evidence based treatment of choice for mid-range elevation limitation in subjects with frozen shoulder.

**Methodology:** A Quasi Experimental study of six months duration from September 2015 to February 2016. The study was conducted, at Amin Medical Complex Sialkot, Syed Medical Centre, Sialkot and Riphah Rehabilitation Centre. The study was completed in 6 months from September 2015 to February 2016 after the approval from research ethical committee of Riphah college of Rehabilitation Sciences (RCRS). Nonprobability convenient sampling technique was used to enroll the patients. A pre-defined inclusion and exclusion criteria was used to screen the patients. The sample size of 50 participants was included in the study. Patients were randomly divided into two groups (A & B). Each group was allocated with 25 patients. Group A was treated with Mobilization with movement (MWM) with anterior humeral taping while in group B only MWM Technique was used. Both groups were treated 4 times over 2 weeks. Data was collected before first treatment as baseline and was compared with Post-Treatment.

**Results:** The mean age of the subjects that participated in both treatment groups was  $47.34 \pm 6.49$  in group A and  $43.11 \pm 3.87$  in group B. The mean reduction in pain at the end of treatment was  $3.99 \pm 1.43$  in group A compared to  $1.49 \pm 0.78$  in group B ( $p < 0.05$ ). Similarly, there was mean improvement of  $23.34 \pm 10.34$ ,  $29.54 \pm 6.43$  in abduction and flexion respectively in group A ( $p < 0.05$ ). However, there was less improvement in abduction and flexion ( $15.45 \pm 4.99$  &  $11.32 \pm 6.47$  respectively) in Group B ( $p$  value  $< 0.05$ ).

**Conclusion:** The study concludes that anterior humeral head reposition tape in combination with MWM is an effective treatment when treating the patients with frozen shoulder to improve shoulder abduction, flexion and for pain relief.

**Cite This article as:** Zahid S, Parveen W, Dustgir A. Effect of Anterior Humeral Head Reposition Tape to Increase Shoulder Elevation in Subjects with Frozen Shoulder “A Quasi Experimental. JRCRS. 2017; 5(1):3-7.

## Introduction

Frozen shoulder syndrome is characterized by pain and progressive loss of both active and passive shoulder movements due to uncertain etiology.<sup>1</sup> About 2.0 to 5.0% of the general population and 40 to 60 year old age group are affected by frozen shoulder as most common cause of

shoulder disability. Mostly, in its idiopathic form, the condition is more common in women than in men.<sup>2</sup>

In 1934 Codman suggested the name “frozen shoulder”, characterized by normal radiological appearance but insidious feeling of pain at the insertion of

deltoid, incapability to sleep on the affected side, painful and constrained elevation and external rotation.<sup>3</sup> Later in 1945, Neviasser introduced the term “adhesive capsulitis” based on synovial changes. Frozen shoulder is thought to be a self-limiting disease, with complete remission occurring within two years.<sup>4</sup> However, Shaffer et al concluded that 50.0% of patients complained either stiffness or mild pain, or both, after an average of seven years of conservative treatment.<sup>5</sup>

Mobilization techniques have always been recommended for return of normal extensibility and passive stretching of the shoulder capsule and tightened soft tissues. Hambly K et.al concluded that to improve glenohumeral joint mobility and reduce disability, High Grade Mobilization Techniques appear to be more effective than low grade joint mobilization techniques, with minor overall differences between the 2 treatments<sup>6</sup> and gain in joint mobility was maintained in all subjects in 9-months follow-up.<sup>7</sup>

The results of a study suggest that either End Range mobilization (ERM) or MWM are equally effective interventions for patients with shoulder adhesive capsulitis to improve shoulder abduction ROM, while ERM was more effective to improve shoulder external rotation ROM.<sup>8</sup> Syed Shakil U Rehman et.al found that the Kaltenborn scapular mobilization technique is more effective as compared to the general scapular mobilization technique to increase restricted abduction above 90 degrees in adhesive capsulitis.<sup>9</sup> Another treatment alternative with immediate effects is Gong's Mobilization that can be done in the sitting position.<sup>10</sup>

It was concluded that ROM & Shoulder pain And Disability Index (SPADI) scores can be improved by the combination of manual therapy techniques (ERM+MWM) in frozen shoulder patients.<sup>11</sup> Although Mulligan's technique and passive stretching exercises are both effective in reducing pain, and restoring range of motion and function but pain, ROM, SPADI score, patient and Physiotherapist's satisfaction is better improved by Mulligan's technique.<sup>12</sup> Incorporating shoulder counter traction along with physiotherapy improves shoulder function better as compared to physiotherapy alone in frozen shoulder patients.<sup>13</sup>

Shoulder taping may be more useful than traditional immobilization methods in the treatment of frozen shoulder as it reduces pain considerably and comforts undue tension on involved structures.<sup>14</sup>

Current study addressed the effectiveness of MWM and anterior humeral head repositioning tape for the management of frozen shoulder. It will be beneficial for Physical Therapist in their clinical practice for better outcomes in frozen shoulder patients.

---

## Methodology

---

This uni-centric qualitative, cross sectional study was carried out on all undergraduate students enrolled from first to final year at ...by using convenience sampling. Ethical approval was obtained from the Institutional review board of Islamabad Dental Hospital. A verbal consent was taken from all the participants, and students unwilling to participate in the study were excluded.

A self-administered, anonymous questionnaire consisting of 19 questions, was distributed after lectures to students of each class in their lecture halls after taking due permission from the respective teachers. The questionnaire was made by reviewing the literature and then modifying it to fit local requirements. Pilot study was carried out and necessary changes were made accordingly. A brief introduction to the study was given and the questionnaire was explained to the students. Students were reassured that the data would be kept confidential. Each questionnaire approximately took 10 minutes to complete.

Data collected was entered and analyzed through SPSS version 22. Descriptive analysis was done and frequency and percentages were calculated for qualitative variables.

---

## Results

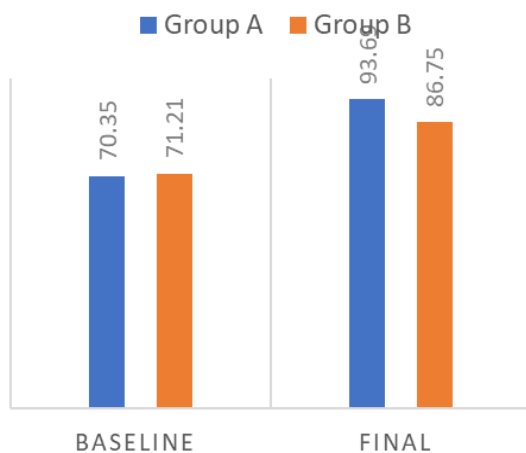
---

The mean age of the subjects that participated in both treatment groups was  $47.34 \pm 6.49$  in group A and  $43.11 \pm 3.87$  in group B. The mean reduction in pain at the end of treatment was  $3.99 \pm 1.43$  in group A compared to  $1.49 \pm 0.78$  in group B ( $p < 0.05$ ). Similarly, there was mean improvement of  $23.34 \pm 10.34$ ,  $29.54 \pm 6.43$  in abduction and flexion respectively in group A ( $p < 0.05$ ). However

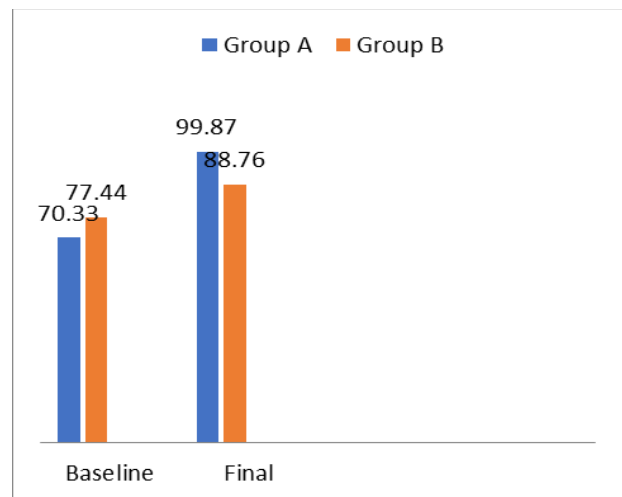
Analysis across the Groups					
	group	Pre-Treatment	P Value	Post- Treatment	P-Value
Mean NPRS Score (SD)	A	7.00(1.38)	0.156	3.01(1.02)	0.045
	B	7.30 (1.02)		5.81(1.22)	
Mean Shoulder Flexion ROM(SD)	A	70.33 (10.33)	0.111	99.87(10.11)	0.056
	B	77.44(9.98)		88.76 (12.56)	
Mean Shoulder Abduction ROM (SD)	A	70.35(8.52)	0.256	93.69(10.33)	0.01
	B	71.21(9.45)		86.75(11.33)	

Analysis within the Groups					
	group	Pre-Treatment	Post- Treatment	Change Score	P-Value
Mean NPRS Score (SD)	A	7.00(1.38)	3.01(1.02)	3.99 (1.43)	<0.05
	B	7.30 (1.02)	5.81(1.22)	1.49 (0.78)	<0.05
Mean Shoulder Flexion ROM(SD)	A	70.33 (10.33)	99.87(10.11)	29.54(5.55)	<0.05
	B	77.44(9.98)	88.76 (12.56)	11.32(3.11)	<0.05
Mean Shoulder Abduction ROM (SD)	A	70.35(8.52)	93.69(10.33)	23.34(6.45)	<0.05
	B	71.21(9.45)	86.75(11.33)	15.54(4.39)	<0.05

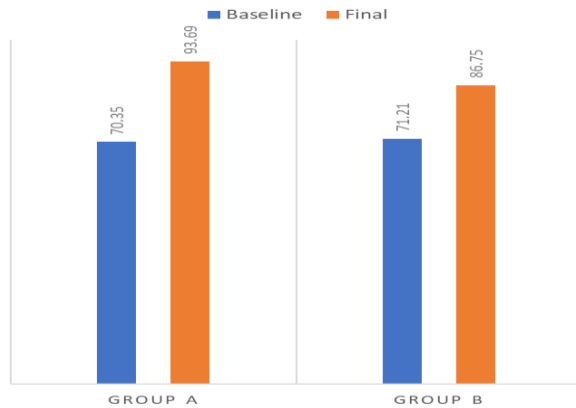
there was less improvement in abduction and flexion ( $15.45 \pm 4.99$  &  $11.32 \pm 6.47$  respectively) in Group B (p value < 0.05).



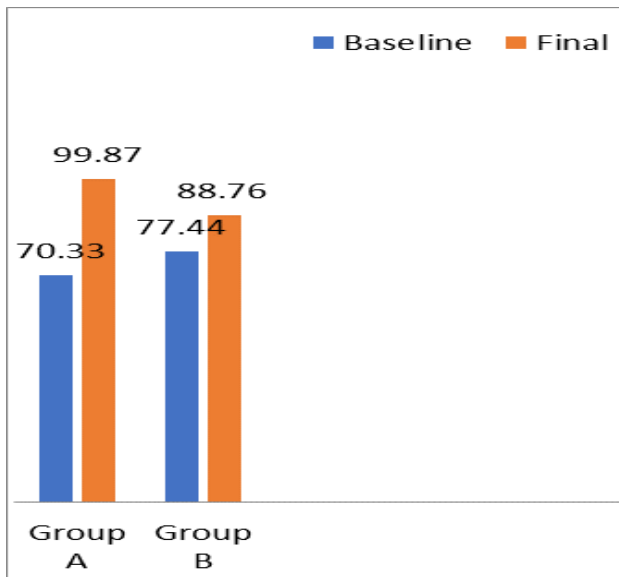
Pre & post treatment changes in abduction ROM



Pre & post treatment changes in Flexion ROM



**Pre & Post treatment Abduction ROM CHANGES across groups**



**Pre & Post Treatment Flexion Rom Changes Across Groups**

## Discussion

In clinical practice, frozen shoulder is one of the common conditions coming across the clinicians. Generally, the frozen shoulder presents with either pain dominant or stiffness dominant pattern. Depending on the stiffness dominant pattern, the patient may present with inner range, mid-range or the outer range limitation in ROM. There are number of commonly practiced manual therapy techniques to treat the stiffness, focusing more on the inner range and outer range. Evidence lacks for a specific type of treatment approach to resolve the mid-range limitation. The researcher worked on an effective

treatment approach with combination of anterior humeral head reposition taping and mulligan's mobilization with movement (MWM).

The study showed results in improvement in mid-range elevation (there was mean improvement of  $23.34 \pm 10.34$ ,  $29.54 \pm 6.43$  in abduction and flexion respectively in group A ( $p < 0.05$ ). However there was less improvement in abduction and flexion ( $15.45 \pm 4.99$  &  $11.32 \pm 6.47$  respectively) in Group B ( $p$  value  $< 0.05$ ), and the mean reduction in pain at the end of treatment was  $3.99 \pm 1.43$  in group A compared to  $1.49 \pm 0.78$  in group B ( $p < 0.05$ ) supporting the fact that combination of two treatment methods( MWM and Anterior humeral reposition taping) is effective to gain mid-range elevation and pain relief, because Shoulder taping may be more useful than traditional immobilization methods in the treatment of frozen shoulders as it reduces pain considerably and comforts undue tension on involved structures and enhances the effects of MWM.<sup>14</sup> Comparing the study by Vermeulen HM et al in 2000 that showed effectiveness of the 3 treatment methods in unilateral frozen shoulder, mobility and functional ability were more improved by ERM and MWM than Mid-Range Mobilization (MRM) alone.<sup>7</sup> In 2006 Vermeulen HM, Rozing PM, Obermann WR, Le Cessie S, Vliet Vlieland TP. conducted a study to Compare high-grade and low-grade mobilization techniques in the management of adhesive capsulitis of the shoulder.<sup>15</sup> So use of mobilization technique is not an uncommon method of treatment in frozen shoulder. According to the results obtained from the trial, both the techniques showed improvements through Numeric Pain Rating scale (NPRS) and shoulder ROM (flexion and abduction goniometry). There were better results of shoulder flexion and abduction ROM but little fall in NPRS for pain.

Mobilization techniques have been frequently used in clinical treatment of frozen shoulder patients and MWM with Anterior Humeral Head repositioning tape showed mid-range improvement in frozen shoulder patients comparing the study by Diercks RL, Stevens M, in which mobilization techniques were used for tightness of capsule and soft tissues in frozen shoulder patients.<sup>15</sup> Normal extensibility of the shoulder capsule and stretching of the tightened soft tissues is obtained as a result of treatment with mobilization techniques. The

results of this study support this and indicate that the most beneficial effects can be achieved with MWM, and anterior humeral repositioning taping. The researcher believes that the adhesive capsule and related constricted periarticular structures can be stretched by MWM and further enhanced by taping.

The researcher aimed to conduct a Quasi Experimental Trial to find out the efficacy of this treatment and to compare it with conventionally used treatment approaches. In order to bring out the clinical evidence or trials related to anterior humeral head repositioning tape in combination with MWM researcher came across various studies regarding frozen shoulder, but none of the study dealt with this combination of MWM and anterior humeral repositioning taping together. Researcher conducted the trial to compare different physiotherapy approaches, found them effective and concluded that repositioning taping (Rigid Tape) is another tool for the mid-range elevation in frozen shoulder and showed better results when combined with MWM.

Study is based on short term effects; no long-term effects were documented because of limited follow ups. Due to prolonged prognosis of frozen shoulder, the effects of repositioning tape were not studied in initial and end range restrictions.

There is need of studies on a larger scale to explore the best possible effective and evidence based treatment techniques for mid-range limitation of elevation ROM in patients of frozen shoulder.

---

## Conclusion

---

It is concluded that anterior humeral head repositioning tape in combination with Mulligan technique can be used as a treatment of choice in the treatment of mid-range limitation of elevation ROM in frozen shoulder.

---

## References

---

1. Yang J-I, Chang C-W, Chen S-y, Wang S-F, Lin J-j. Mobilization techniques in subjects with frozen shoulder syndrome:

randomized multiple-treatment trial. *Physical therapy*. 2007;87(10):1307-15.

2. Jayson M. Frozen shoulder: adhesive capsulitis. *British medical journal (Clinical research ed)*. 1981;283(6298):1005.

3. Bunker T, Anthony P. The pathology of frozen shoulder. A Dupuytren-like disease. *Bone & Joint Journal*. 1995;77(5):677-83.

4. Neviasser JS. Adhesive capsulitis of the shoulder: a study of the pathological findings in periartthritis of the shoulder. *JBJS*. 1945;27(2):211-22.

5. Shaffer B, Tibone J, Kerlan RK. Frozen shoulder. A long-term follow-up. *J Bone Joint Surg Am*. 1992;74(5):738-46.

6. Hambly K, Bobic V, Wondrasch B, Van Assche D, Marlovits S. Autologous Chondrocyte Implantation Postoperative Care and Rehabilitation Science and Practice. *The American journal of sports medicine*. 2006;34(6):1020-38.

7. Vermeulen HM, Obermann WR, Burger BJ, Kok GJ, Rozing PM, van den Ende CH. End-range mobilization techniques in adhesive capsulitis of the shoulder joint: a multiple-subject case report. *Physical therapy*. 2000;80(12):1204-13.

8. Zaky LA. End-range Mobilization (ERM) Versus Mobilization with Movement (MWM) in Treatment of Adhesive Capsulitis. *Bulletin of Faculty of Physical Therapy*. 2012;17(2).

9. Shakil-ur-Rehman S, Danish KF, Khan A, Sheikh SI, Sibtain F. Comparison between Kaltenborn and General Scapular Mobilization in Adhesive Capsulitis Patients. *Journal of Rawalpindi Medical College (JRMC)*. 2012;16(2):121-2.

10. Gong W, Lee H, Lee Y. Effects of Gong's Mobilization Applied to Shoulder Joint on Shoulder Abduction. *Journal of Physical Therapy Science*. 2011;23(3):391-3.

11. Goyal M, Bhattacharjee S, Goyal K. Combined Effect of End Range Mobilization (ERM) and Mobilization with Movement (MWM) Techniques on Range Of Motion and Disability in Frozen Shoulder Patients: A Randomized Clinical Trial. *Journal of Exercise Science and Physiotherapy*. 2013;9(2):74-82.

12. Doner G, Guven Z, Atalay A, Celiker R. Evaluation of Mulligan's Technique for Adhesive Capsulitis of the Shoulder. *Journal of Rehabilitation Medicine*. 2013;45(1):87-91.

13. Paul A, Rajkumar JS, Peter S, Lambert L. Effectiveness of sustained stretching of the inferior capsule in the management of a frozen shoulder. *Clinical Orthopaedics and Related Research*. 2014;472(7):2262-8.

14. Peters SB, Lee GP. Functional impact of shoulder taping in the hemiplegic upper extremity. *Occupational therapy in health care*. 2003;17(2):35-46.