

## RESEARCH ARTICLE

## OPEN ACCESS

## Comparative Study of effectiveness of mobilization with movement (MWM) and End range mobilization (ERM) techniques in frozen shoulder

Jeyakumar S<sup>1</sup>, Jagatheesan Alagesan<sup>2</sup>, T.S.Muthukumar<sup>3</sup>

<sup>1</sup>PhD Scholar, Saveetha University, Kuthambakkam, Tamil Nadu, India,

<sup>2</sup>Assistant Professor, Physical Therapy College of Health Sciences, Gulf Medical University, Ajman, UAE

<sup>3</sup>Professor, College of Physiotherapy Sri Ramakrishna Institute of Para Medical Sciences, Coimbatore, TN, India

Received: 21 Oct,2018

Accepted: 24 Nov,2018

**\*Correspondence to:**

**Dr. Jeyakumar S**

PhD scholar, Saveetha University, Kuthambakkam, Tamil Nadu, India

Email:

[jeysubikshaa@gmail.com](mailto:jeysubikshaa@gmail.com)

**Copyright:** © the author(s), publisher and licensee Indian Academy of Pharmacists. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Published by: OZZIE Publishers



### Abstract

**Background:** Frozen shoulder is disorder of the connective tissue that limits the normal Range of motion of the shoulder in diabetes, frozen shoulder is thought to be caused by changes to the collagen in the shoulder joint as a result of long term Hypoglycemia. Mobilization is a therapeutic movement of the joint. The goal is to restore normal joint motion and rhythm. The use of mobilization with movement for peripheral joints was developed by mulligan. This technique combines a sustained application of manual technique “gliding” force to the joint with concurrent physiologic motion of joint, either actively or passively. This study aims to find out the effects of mobilization with movement and end range mobilization in frozen shoulder in Type I diabetics. **Materials and Methods:** 30 subjects both male and female, suffering with shoulder pain and clinically diagnosed with frozen shoulder was recruited for the study and divided into two groups with 15 patients each based on convenient sampling method. Group A patients received mobilization with movement and Group B patients received end range mobilization for three weeks. The outcome measurements were SPADI, Functional hand to back scale, abduction range of motion using goniometer and VAS. **Results:** The mean values of all parameters showed significant differences in group A as compared to group B in terms of decreased pain, increased abduction range and other outcome measures. **Conclusion:** Based on the results it has been concluded that treating the type 1 diabetic patient with frozen shoulder, mobilization with movement exercise shows better results than end range mobilization in reducing pain and increase functional activities and mobility in frozen shoulder.

**Key words:** Mobilization with movement, SPADI, VAS

## INTRODUCTION

Frozen shoulder was first termed by Codman in 1934, described a person presenting With painful loss of shoulder motion with normal radiology studies. Frozen shoulder, medically referred to as adhesive capsulate. Frozen shoulder is disorder of the connective tissue that limits the normal range of motion of the shoulder in diabetes, frozen shoulder is thought to be caused by changes to the collagen in the shoulder joint as a result of long term hypoglycemia. It usually in one shoulder only although it can occur in both<sup>1,2</sup>.

It is seen in 3% to 5% in the genera; population with a significantly increased incidence amongst diabetes on the order of 10% to 20%. It appears to be most common in adults between the ages of 40 to 70 years. Women appear to be at a slightly increased risk 4:1. Frozen shoulder is most strongly associated with insulin dependent diabetes. The list of developing adhesive capsulate may be as high as 36%. Diabetes also have a tendency to develop bilateral shoulder involvement<sup>3,4</sup>.

There are many therapeutic interventions which are used to treat the frozen shoulder: some of them are therapeutic modalities ultrasound, moist heat, ice, passive and stretching

exercises, mobilization techniques, anti-inflammatory non steroidal medications, corticosteroids, cortisone injections, or even surgery in severe cases. The classical treatment didn't show long term effect on this pathology. In order to get long term effect, advanced mobilization techniques stretch contracted periarticular structures<sup>5,6</sup>.

To regain the normal extensibility of shoulder capsule and tight soft tissue, passive stretching of the shoulder capsule and tissue by means of mobilizations techniques has been recommended. Mobilization is a therapeutic movement of the joint. It's a back and forth oscillating movement done within the available joint range of motion. The goal is to restore normal joint motion and rhythm<sup>7,8</sup>.

Intensive mobilization at varying the plane of elevation or varying the degree of rotation in end range position was applied in ERM. The intent of end range mobilization was not only to restore the joint play but also to stretch contracted periarticular structures<sup>9</sup>. The use of mobilization with movement for peripheral joints was developed by mulligan. This technique combines a sustained application of manual technique “gliding” force to the joint with concurrent

physiologic motion of joint, either actively or passively. The intent of MWM is to pain free motion at joint that have painful limitation of movement and to cause repositioning of bone positional faults<sup>10,11</sup>. Several authors conclude that End range mobilization (ERM) and mobilization with movement (MWM) techniques, both are significantly increasing the mobility and functional ability. By comparing both the groups, we conclude the exact method of ideal intervention in treating frozen shoulder. This also gives an idea whether the existing problem is due to positional fault in glenohumeral or lack of joint mobility.

The purpose of this study is to compare the effectiveness of the mobilization with movement and End range mobilization techniques in subjects with frozen shoulder to improve the functional ability, improve the mobility and to reduce the pain<sup>12,13</sup>.

**Objective:**

To compare the effectiveness of Mobilization with Movement and End Range Mobilization, the patient with frozen shoulder in type one diabetic must improve the functional activities of the shoulder.

**MATERIALS AND METHODS**

**Study Sample size:** 30 subjects both male and female, suffering with shoulder pain and clinically diagnosed with frozen shoulder.

**Study duration:** 3 weeks.

**Sampling Technique:** Convenient sampling technique is used to assign 15 subjects to each group. Group A : Mobilization with movement and exercises.

**Data collection procedure**

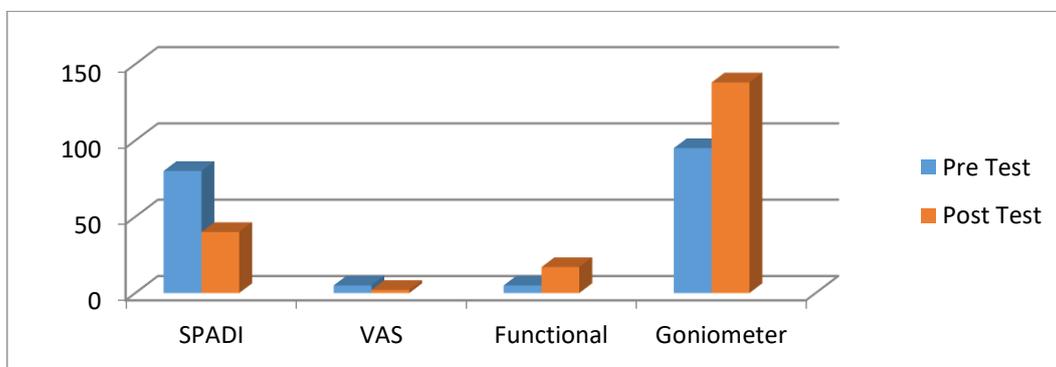
Information from and the consent form about this study were given to all the 30 patients. The procedure of the patients to think about their participation and all the complications, which may arise during the study and the procedure arranged for their safety is explained to them clearly. The patients were given freedom to ask clarify about their doubts regarding their participation in this study and the study procedure. Following informed consent obtained, these 30 patients were randomly grouped as GROUP A-MWM group (15 patients) and GROUP B – ERM group (15 patients). For both the GROUP A and GROUP B, pain and range of motion were measured before starting the treatment procedure.

**STATISTICAL ANALYSIS  
COMPARISON OF PRE TEST AND POST TEST IN GROUP A**

Outcome Measures	Mean Difference	SD Difference	Degree of Freedom	“t” value	“p” value
SPADI	38.67	6.46	14	23.17	0.000(S)
VAS	4.20	0.77	14	21.00	0.000(S)
Functional hand to back scale	11.33	4.32	14	10.16	0.000(S)
Goniometer abduction	44.07	7.67	14	22.26	0.000(S)

- S – Significance at  $p < 0.001$

**GROUP A**

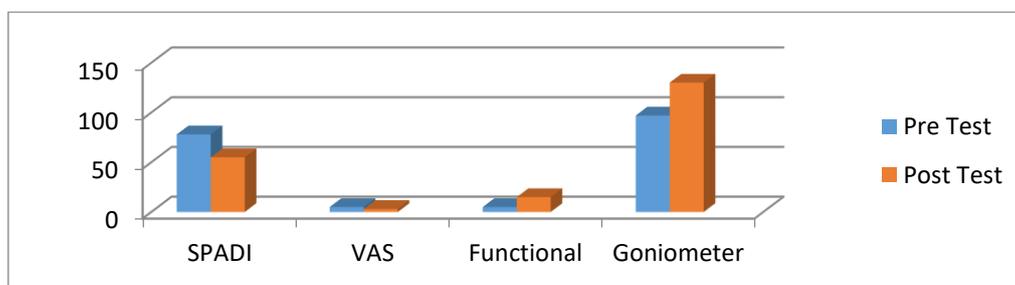


**COMPARISON OF THE PRE TEST AND POST TEST IN GROUP B**

Outcome Measures	Mean Difference	SD Difference	Degree of Freedom	“t” value	“p” value
SPADI	22.78	5.37	14	16.445	0.000(S)
VAS	3.67	0.72	14	19.621	0.000(S)
Functional hand to back scale	8.40	3.56	14	9.134	0.000(S)
Goniometer abduction	29.93	9.99	14	11.606	0.000(S)

- S – Significance at  $p < 0.001$

## GROUP B

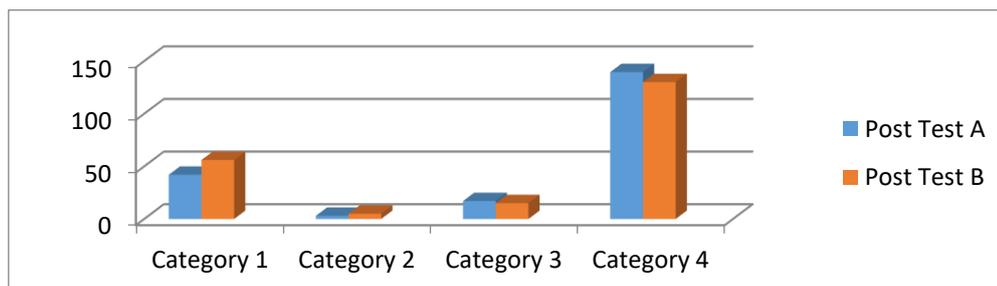


## POST TEST – GROUP A & B

Outcome measures	GROUP A		GROUP B		“t” value	“p” value
	Mean	SD	Mean	SD		
SPADI	43.28	11.30	57.37	7.66	-3.99	0.00**
VAS	2.93	0.80	3.67	0.62	-2.81	0.01*
Functional hand to back scale	18.40	3.31	15.20	4.06	2.31	0.03*
Goniometer abduction	139.60	9.30	129.80	9.46	2.86	0.01*

- \* Significance at  $p < 0.05$ .
- \*\* Significance at  $p < 0.01$ .

## COMPARISON OF GROUP A & B



## RESULTS

The mean value of pain and disability scores on GROUP A in pre test is 81.95. The mean value in post test is 43.28. The reduction in mean value shows a reduction in pain and disability level on SPADI. The mean value of pain and disability scores on GROUP B in pre test is 80.14. The mean value in post test is 57.36. The reduction in mean value shows a reduction in pain and disability level on SPADI. This shows pain and disability level in GROUP A (43.28) is more reduced than in B (57.36).

The mean value of pain scores on GROUP A in pre test is 7.13. The mean value in post test is 2.93. The reduction in mean value shows a reduction of pain level on VAS scale. The mean value of pain scores on GROUP B in pre test is 7.33. The mean value in post test is 3.67.

The reduction in mean value shows a reduction of pain level on VAS scale. This shows pain level in GROUP A (2.93) is more reduced than in GROUP B (3.67). The mean value of functional HAND TO BACK scale score on GROUP A in pre test is 7.07. The mean value in post test is 18.40. The change in mean value shows an increase in functional ability on functional HAND TO BACK scale. The mean value of functional HAND TO BACK scale score on GROUP B in pre test is 6.80. The mean value in post test is 15.20. The change

in mean value shows an increase in functional ability on functional HAND TO BACK scale. This shows functional ability in GROUP A (18.40) is more increased than in GROUP B (15.20).

The mean value of abduction range of motion on GROUP A in pre test is 95.53. The mean value in post test is 139.60. The change in mean value shows an increase in abduction range of motion on Goniometer. The mean value of abduction range of motion on GROUP B in pre test is 99.87. The mean value in post test is 129.80. The change in mean value shows an increase in abduction range of motion on Goniometer. This shows abduction range of motion in GROUP A (139.60) is more increased than in GROUP B (129.80). Comparisons of post test scores on both GROUP A as well as GROUP B were carried out. All the scores of GROUP A on post test showed significant difference at 0.005 compared to the post test scores of GROUP B.

## Findings

- The entire patients experienced reduction of pain and increase in functional ability and mobility after the treatment periods.
- By the statistical analysis, there is an improvement in both groups, but there is significant improvement in GROUP A when compared to GROUP B.
- There is a statistically significant reduction of pain and increase in functional ability and mobility on patients treated with mobilization with movement (GROUP A).

## Recommendation

- In future studies the shoulder movement like flexion and rotation can find the effectiveness of mobilization techniques on these conditions.
- The study can be done with larger samples and increased duration of the study.
- The follow-up after the treatment can be adequate.

## Conclusion

It is concluded that treating the type 1 diabetic patient with frozen shoulder, mobilization with movement exercise shows better results than end range mobilization in reducing pain and increasing functional activities and mobility in frozen shoulder.

## References

1. Andrew S. Neviasser, MD. Adhesive Capsulitis: A Review of current Treatment. 2010; 38(11):2346-56.
2. Bijur PE, Silver W, Gallagher EJ. Reliability of the visual analogue scale for measurement of acute pain. *Acad Emerg Med.* 2001; 8(12):1153-7.
3. Bill Vincenzo, Aatit Paungmali, Pamela. Mulligan mobilization with movement, positional faults and pain relief: current concepts from a critical review of literature. 2017;12(2):98-108.
4. Brain Mulligan. The painful dysfunctional shoulder. A new treatment approach using Mobilization with movement. *NZ Journal of Physiotherapy.* 2003;31(3):140-2.
5. Diercks RL, Stevens M. Gentle thawing of the frozen shoulder: a prospective study of supervised neglect versus intensive physical therapy in 77 patients with FSS followed up two years. *J Shoulder Elbow Surg.* 2004; 13(5):499-502.
6. Dogru H, Basaran S, Sarpel T. Effectiveness of therapeutic ultrasound in adhesive capsulitis. 2008;75(4):445-510.
7. Griggs SM, Ahn A, Green A. Idiopathic adhesive capsulitis: a prospective functional outcome study of nonoperative treatment. *J Bone Joint Surg Am.* 2000;82(10):1398-407.
8. Grubbs N. Frozen shoulder syndrome: a review of literature. *J Orthop Sports Phys Ther.* 1993;18(3):479-87.
9. Jelena Jurgel, Lauri Rannama, Helena Gapeyeva, Jaan Ereline, Ivo Kolts, Mati Paasuke. *Medicina.* Shoulder function in patients with frozen shoulder before and after 4 weeks rehabilitation. (Kaunas) 2005;41(1):30-8.
10. Jing-lan Yang, Chein-wei Chang, Shiau-ye Chen, Shwu-fen Wang and Jiujenq Lin, Mobilization Techniques in subjects with frozen shoulder syndrome: Randomized Multiple-Treatment Trial, *Phys Ther.* 2007;87(10):1307-15.
11. Lin HT, Hsu AT, An KN, Chang Chien JR. Reliability of stiffness measured in glenohumeral joint and its application to assess the effect of end-range mobilization in subjects with adhesive capsulitis. *Man Ther.* 2008;13(4):307-16.
12. Kazemi M. Adhesive capsulitis: a case report. *J Can Chiropr Assoc.* 2000;44(3):169-176.
13. Neviasser TJ. Adhesive capsulitis. *Orthop Clin North Am* 1987;18:439-43.
14. Tighe CB, Oakley WS Jr. The prevalence of a diabetic condition and adhesive capsulitis of the shoulder. *BMC Musculoskelet Disord.* 2008;9:103.
15. Warren R. Dunn. Adhesive Capsulitis-Correlating Clinical Disease State with Color Doppler Ultrasound. December 2008.

**Cite article as:** Jayakumar S, Alagesan J, Muthukumar TS. Comparative Study of effectiveness of mobilization with movement (MWM) and End range mobilization (ERM) techniques in frozen shoulder. *Res Pharm Health Sci.* 2018;4(4):519-522., doi: <https://doi.org/10.32463/rphs.2018.v04i04.22>