

Effect of Muscle Energy Technique on Pain and Function in Adhesive Capsulitis -An Interventional Study

Manmitkaur A Gill¹, Bhavika P Gohel², Sandhya K Singal³

¹PhD Scholar, Gujarat University, M.P.T. Musculoskeletal Conditions, Senior Lecturer,
³I/C Lecturer, M.P.T. Sports,
Department of Physiotherapy, Government Spine Institute and Physiotherapy College, Civil Hospital Campus,
Ahmedabad-380016, Gujarat, India.

²M.P.T. Sports, Assistant Professor, C.U.Shah Physiotherapy College, Surendranagar.

Corresponding Author: Manmitkaur A Gill

ABSTRACT

Background: Frozen shoulder is defined as an idiopathic condition of the shoulder characterized by the spontaneous onset of pain in the shoulder with restriction of movement in every direction. Several studies have proved the effect of various electrotherapeutic modalities on adhesive capsulitis. Studies have also been done on effects of different manual techniques, but there are very few studies done on effect of muscle energy technique in adhesive capsulitis.

Aims and Objectives: To study the effect of Muscle Energy Technique on pain in adhesive capsulitis and to study the effect of Muscle Energy Technique on function in adhesive capsulitis.

Methodology: Ethical committee approval was taken prior to the study. Patients who were diagnosed with adhesive capsulitis and fulfilling inclusion and exclusion criteria were selected for the study after obtaining informed written consent. The patients were divided randomly in control group and interventional group. In control group patients received only conventional physiotherapy in the form of hot packs for 10 minutes, Codman's exercise, finger ladder exercises, wand exercises, active exercises and capsular stretching. In interventional group patients were treated with MET for shoulder flexion, abduction and external rotation along with conventional treatment. The protocol for MET includes 5 repetitions/set, 3 sets/session, 1 session/day for 15 days. Treatment was given once a day for 15 days except Sunday to both groups. VAS score, shoulder ROM and shoulder pain and disability index was taken before and after the treatment in both groups.

Results: Non-parametric tests were used to analyze the data. Within the Group data was analyzed with Wilcoxon Signed Ranks Test. Between the Group data was analyzed with Mann Whitney U Test. Result was found to be significant, p value <0.001 for within group and between group VAS and ROM. Between group analysis revealed that percentage of improvement in pain and ROM in group B was greater than group A. Within group and between group analysis of SPADI revealed that it is not statistically significant, although it is significant clinically.

Conclusion: Conventional physiotherapy and MET along with conventional physiotherapy, both are individually effective in relieving pain, improving range of motion and functional ability in patients with adhesive capsulitis, but among these two, the group which received MET along with conventional physiotherapy is found to be more effective in relieving pain, improving range of motion and functional ability in patients with adhesive capsulitis.

Keywords: Adhesive capsulitis, Muscle Energy Technique, Pain, Function.

INTRODUCTION

Idiopathic (primary) adhesive capsulitis occurs spontaneously without a specific precipitating event. Primary adhesive capsulitis results from a chronic inflammatory response with fibroelastic proliferation, which may actually be an abnormal response from the immune system. Secondary adhesive capsulitis occurs after a shoulder injury or surgery or may be associated with another condition such as diabetes, rotator cuff injury, cerebrovascular accident or cardiovascular disease, which may prolong recovery and limit outcomes. [1,2] Adhesive capsulitis has an incidence of 3-5% in the general population and up to 20% in those with diabetes. The typical patient that develops adhesive capsulitis is a female in her 5th to 7th decade of life. Adhesive capsulitis is commonly associated with other systemic and non-systemic conditions. By far the most common is the co-morbid condition of diabetes mellitus, with an incidence of 10-36%. [3-5] By applying appropriate treatment techniques in a creative and judicious manner, the physical therapist can do much to enhance the speed and degree of recovery from frozen shoulder. The rationale of using modalities in patients with adhesive capsulitis includes pain relief and affecting scar tissue (collagen). Muscle Energy Techniques (MET) are a form of soft tissue or joint, manipulations or mobilizations, deriving from osteopathic medicine, employed in the treatment of musculoskeletal dysfunction. [6] Muscle Energy Techniques (MET) can help to release and relax muscles, and promote the body's own healing mechanisms. MET is unique in its application as the client provides the initial effort while the practitioner facilitates the process. One of the main uses of this method is to normalize joint range, rather than increase flexibility, and techniques can be used on any joints with restricted range of motion (ROM) identified during the passive assessment. [7] So, the purpose of this study is to evaluate

the effect of muscle energy technique on pain and function in adhesive capsulitis.

MATERIALS AND METHODS

For the study 27 subjects who were referred from the Orthopedic Out Patient Department to Physiotherapy Department are taken after getting informed written consent giving due consideration to inclusion and exclusion criteria. Inclusion criteria for this study are patient diagnosed with adhesive capsulitis with age group between 40-70 years. Both male and female having limitation of passive ROM in glenohumeral joint compared with unaffected side and more than 30 degrees restriction for at least 2 of these 3 movements: flexion, abduction or external rotation were included. Exclusion criteria includes patient with rotator cuff tear and other shoulder ligament injuries, history of any arthritis related to shoulder, malignancy, fracture in and around shoulder, any neurological disorder, cervical spondylosis, cervical radiculopathy. Preparticipation evaluation form consisted of VAS, SPADI and upper extremity goniometry chart and musculoskeletal assessment which included chief complaint and history. Patients were divided randomly into two groups. Patients were treated for a period of 2 weeks, for 6 days a week, once a day. Group A (14) was given conventional physiotherapy. Hot packs for 10 minutes, Codman's exercise, finger ladder exercises, wand exercises, active exercises and capsular stretching. Group B (13) was given Muscle Energy Technique for shoulder flexion, abduction, internal and external rotation, along with conventional physiotherapy. The protocol for MET includes 5 repetitions/set, 3 sets/session, 1 session/day for 2 weeks. The words at the extreme ends of VAS, i.e. 'no pain' and 'pain that could not be tolerated' were explained in local language of Gujarati as patients were knowing only local language and same was done for SPADI as well. Post isometric relaxation (PIR followed by stretch, in a chronic context) method of

MET was used to increase joint mobility, where isometric contraction of agonist muscle was commenced from a more relaxed, mid-range position, rather than at the actual barrier. [8] A 5-7 second hold of an isometric contraction of agonist muscle, utilizing no more than 20% of the patient's available strength, was followed by a 30

second stretch of tissues to a point just beyond the previous barrier of resistance. MET was given as 5 repetitions/set, 3 sets/session, 1 session/day for 2 weeks for shoulder flexion, shoulder abduction, shoulder internal rotation and shoulder external rotation.



Fig 1: Wand exercise



Fig 2: Shoulder Ladder exercises



Fig 3: Pendular exercises



Fig 4: MET: Flexion



Fig 5: MET: Abduction



Fig 6: MET: Rotation

RESULTS

Total 27 patients were divided randomly into Group A and Group B. Data analysis was done using SPSS version 16.0 and Microsoft Excel. Since the data is not following normal distribution, Non-parametric tests were used to analyze the data. Within Group the data was analyzed with Wilcoxon Signed Ranks Test. Between Group the data was analyzed with Mann Whitney U Test. Confidence interval was set at 95% and $p < 0.05$ was considered significant. The Table 1 shows gender

distribution and Table 2 shows mean age of patients in Group A and Group B of 27 patients who participated in the study.

Table 1: Gender distribution of patients

GROUP	GROUP A	GROUP B
No. Of male patients	6	5
No. Of female patients	8	8
Total	14	13

Table 2: Age Distribution of patients

GROUP	N	MEAN	±SD
GROUP A	14	57.43	5.90
GROUP B	13	60.15	7.65

To analyze the effect on VAS, before and after intervention, Wilcoxon test was used. For Group A and B, P-value 0.001 was highly significant.

Table 3: Mean difference in VAS within Group A and B:
Mean difference in SPADI within Group A and B, P-value 0.001 was highly significant.

Group	Pre treatment		Post treatment		z value	p value
	Mean	±SD	Mean	±SD		
Group A	6.93	1.73	4	1.66	-3.324	0.001
Group B	6.46	1.89	2.15	1.34	-3.200	0.001

Table 4: Mean difference in SPADI within Group A and B:

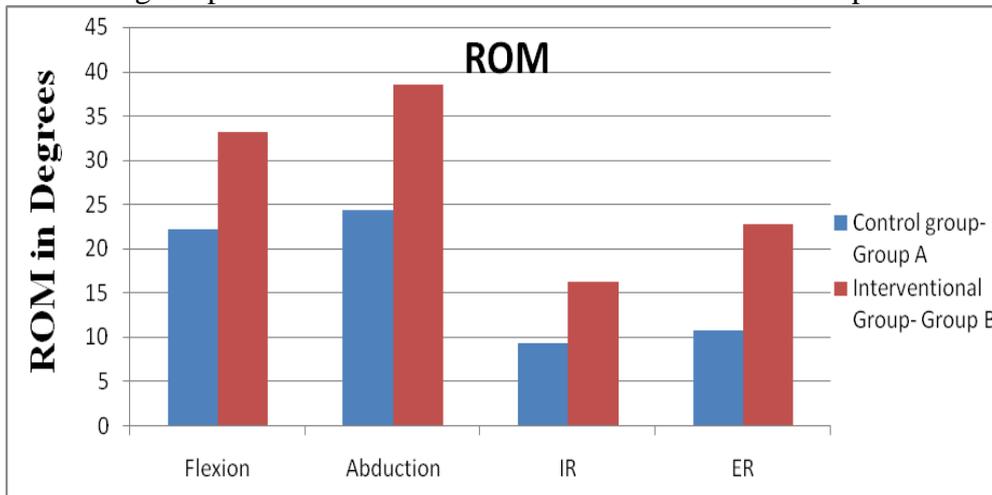
Mean changes in VAS and SPADI between Group A and B; Here, P-value 0.014 and 0.052 respectively and were found to be significant.

Group	Pre treatment		Post treatment		z value	p value
	Mean	±SD	Mean	±SD		
Group A	70.96	13.44	37.08	15.73	-3.306	0.001
Group B	64.21	18.26	21.31	13.01	-3.182	0.001

Table 5: Mean difference in VAS and SPADI between Group A and B:

Outcome	Group A	Group B	U value	p value
VAS	2.92 ± 1.14	4.30 ± 1.43	41.500	0.014
SPADI	33.87 ± 10.16	42.90 ± 13.66	51.000	0.052

Following Graph shows Mean difference in ROM between Group A and B:



The above findings suggest that there is significant difference within group and also between Group A (Conventional Physiotherapy) and Group B (MET along with conventional physiotherapy) for the outcomes - VAS and ROM. However, there is no statistically significant difference for the outcome measure SPADI, between group A and group B.

DISCUSSION

The purpose of this study was to evaluate the efficacy of MET over conventional physiotherapy on pain and function in patients with adhesive capsulitis. The data analysis and statistic inference have brought to check the effectiveness of MET and conventional physiotherapy on the variables of the study which are pain, ROM and functional ability. Results indicate that there is significant improvement in pain, ROM and functional status in patients with adhesive capsulitis after 2 weeks when

given conventional physiotherapy (Group A) and also in MET along with conventional physiotherapy (Group B). The MET has an effect in reducing pain, increase ROM and functional ability in patients with adhesive capsulitis. This is also supported by the study of Patil et al. They conducted a study to compare the effectiveness of MET on quadratus lumborum in acute low back using a randomized control trial. They studied a total number of 40 subjects (21 male and 19 female) and the result of the study concluded that MET on quadrates lumborum combined with interferential therapy is more effective in reduction of disability and increasing spinal range of motion than interferential therapy alone in patients with acute low back pain. [9] The study of Day et al also supports the results of the present study. [10] The increased ROM following MET may be due to various factors like neural and viscoelastic

properties. After application of MET, musculotendinous junction acts in a viscoelastic manner and leads to properties of creep and stress relaxation.

CONCLUSION

From the present study it has been concluded that conventional physiotherapy and MET along with conventional physiotherapy, both are individually effective in relieving pain, improving range of motion and functional ability in patients with adhesive capsulitis, but among these two, the group which received MET along with conventional physiotherapy is found to be more effective in relieving pain, improving range of motion and functional ability in patients with adhesive capsulitis.

Conflict of Interest: None declared.

Source of Funding: Nil.

Ethical Clearance: Ethical committee approval was taken prior to the study.

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