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Original Article

Comparison of Maitland Mobilization and Muscle Energy Technique on Pain, Range of Motion and Functions in Adhesive Capsulitis

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ABSTRACT

The adhesive capsulitis (frozen shoulder) a well-known musculoskeletal problem that affects more women and diabetic population. The restriction is in capsular pattern used to limit the daily activities of the population. **Objective:** To study the effectiveness of Muscle energy technique and Maitland mobilization technique on the pain, range of motion and disability index in the patients with adhesive capsulitis. **Methods:** This quasi-experimental study consists of 30 subjects including both males and females between 40-60 years, already diagnosed with adhesive capsulitis were selected. The sample was collected using a nonprobability convenient sampling method and was assigned groups (A or B) with 15 subjects each. Group A received a moist pack for 15 minutes, active ROM exercises, and Muscle Energy Technique (MET). Group B received a moist pack for 15 minutes, active ROM exercises, and Maitland mobilization. Both the groups were treated 2 times a week for 2 weeks and were told to continue the exercises at home. All the subjects were measured for pain and disability by SPADI, and ROM using a goniometer on 1st day on the 15th day after treatment. **Results:** There were 20 (66.6%) male and 10(33.4%) female participants. There was significant improvement at post-treatment levels in pain and ROM and SPADI in both groups. Although ROM improvement and pain reduction was improved in both groups but statistically significant ($p<0.05$) between group shown Maitland was superior to MET. **Conclusion:** Maitland Mobilization is more effective in reducing pain and increasing function and Disability among the patients having Adhesive Capsulitis as compared to MET for Pain, ROM and shoulder functions.

INTRODUCTION

The adhesions in the capsule of the shoulder joint is called the frozen shoulder. This tightening in a specific pattern first the lateral, involving abduction followed by medial rotation is limited [1]. The frozen shoulder is classified into 3 parts the first stage is called pre-freezing [2]. The onset takes much time some months patients feel all-time pain difficulty in the movement and pain increase at the night because of freezing [3]. Examination of capsule reveals that the hypertrophy of the synovial membrane and capsule take 9 to 10 months in 2nd stage, where articulations are less effective for normal joint play [4]. In 3rd stage hypertrophy in tissue, increase in the number of blood vessels and scar also formed, where it needs 10-13 months to develop. In this stage, movement is limited in all directions at the shoulder joint area of pain increase and it's also called the mature phase [5]. This need an interventional strategy including joint mobilization, an effective method to decrease pain and increase range of motion [6]. Through the muscle energy method the range of motion is restored by contracting the muscle and lengthening the muscle by relaxation method [7]. But it is derived through osteopathy in which isometric contraction is used to improve the musculoskeletal system performance that also decrease the pain [8]. The METS

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(Muscle Energy Technique) also affect biomechanics positively and the increasing length and improve functional performance [9]. This problem affects people between 40 to 60 years and more affected women compared to man. The prevalence rate is more in diabetic patients 10%to 20 %. The pain around the glenohumeral joint is diffuse and itching in nature. Sometimes also radiate in the upper side of the arm. Movement is not possible to easy and the limited in all types either motion active or either passive [10]. Its prevalence rate is more than 2 percent in 70 % of people especially in women after the age of fifty years much time frozen shoulders also affect the other side of the shoulder joint, mostly both sides affected after a long time of the problem [11]. The objective was to study the effectiveness of Muscle energy technique and Maitland mobilization method on the pain and the function in the patient of adhesive capsulitis. We hypothesized if there was a significant difference in the effectiveness of MET and Maitland mobilization on Pain, Range of motion, and functional performance among subjects with adhesive Capsulitis patients.

METHODS

This quasi-experimental study was conducted at Central park teaching hospital, Lahore from March 2019 to September 2019 after ethical approval from Riphah College of Rehabilitation Sciences (Ref. No: RCRS/19/1054) The sample size was taken 15 each group A sample size of 30 was calculated by assuming10% attrition rate with the power of 80%, 5% margin error and 95% confidence interval using G power software). The subjects in the age 45 to 65 years had Shoulder ROM restriction (lateral rotation ≥ 60o, abduction ≥30o, medial rotation ≥5o) [12], having pain in the glenohumeral joint for 3 months., 2nd stage, and tested frozen shoulder abduction test lateral rotation test positive were included (2) While the subjects having hyperglycemia, history of the shoulder joint injury and neurological disease or any other disability, recent cervical /shoulder area surgery or open wound, pain duration less than 1 month were excluded. Data were collected by using the convenient sampling technique. Written informed consent was taken. By taking into consideration, the said-mentioned inclusive & exclusive parameters, patients were recruited assigned to each group. At the time of the first visit of the patient in OPD of the physiotherapy department, a thorough case history was completed by a researcher. A baseline assessment and a complete physical assessment were carried out. The pain was measured Visual Analogue Scale from 0-10 which is one of the reliable tools to assess pain, reported ICC score was 0.97 (95% CI ranged from 0.96-0.98) [13]. Pain and disability were measured using SPADI(shoulder pain and disability index), having subscales one addressing pain (0-10) with 05 items and total pain score was calculated x/50.Similarly, the second section consists of disability with scores 0-10, having 08 items and the total disability score was calculated x/80. Responses are noted on the Likert scale, where 0= no pain n=and 10= worst pain, same with disability. It is a reliable tool which has test- retest reliability of 0.91 which is acceptable responsiveness [14]. And Range of motion was measured using a goniometer having an intraclass correlation coefficient (ICC) of more than 0.90, which can be used for Shoulder Range of Motion [15]. In group A (MET) Isometric contraction was given for affected Muscles at end range, the contraction was held for 7-10 sec followed by a relaxation phase of 2-3 sec, in which stretch was applied for 30 sec.(3 to 5 reps) (for 4 weeks; 3sessions/week) [16]. In Group (B) Maitland mobilization glides passively 2 to 3 per second 2 to 3 minutes. (Repeated 3 to 5 times)(for 4 weeks; 3sessions/week)[17]. The outcomes were measured using SPSS (Statistical Package for the Social Sciences) version 25. Statistical significance was set at P = 0.05. After assessing the normality by the Shapiro-Wilk test, as the p-value is greater than 0.05 then the data were distributed normally. Frequency tables, histograms, and bar charts were used to display the both group's descriptive statistics summary and independent-sample t-test (parametric test) and paired sample t-test (parametric test).

RESULTS

There were 20 (66.6%) male and 10(33.4%) female participants, where 14(42.4%) belongs to urban and 9(27.3%)were from areas. The occupation of 14(46.6%)was banking, 09(30%)were school teachers and 07(23.3% were from different occupations. There is no statistically significant difference between two groups at base line with p>.05(Table 1).

Study Groups		N	Mean± SD
Muscle energy technique (A)	Age of Participants	15	37.76±10.23
	Height in cm	15	163.44± 7.91
	Weight in kg	15	66.10±11.23
	BMI of Participants	15	24.67± 3.69
Maitland mobilization (B)	Age of Participants	15	37.85±10.71
	Height in cm	15	158.87± 8.38
	Weight in kg	15	63.25± 10.62
	BMI of Participants	15	25.02±3.80

Table 1: Demographic Profile of Participants

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Mean		N	Mean	SD	SE Mean	P Value
Pair 1	Pretreatment SPADI Pain	30	40.80	3.925	.71	0.00*
	Post treatment SPADI Pain	30	23.43	7.26	1.32	0.00*
Pair 2	Pretreatment SPADI Pain	30	69.80	4.62	.84	0.00*
	Post treatment SPADI Pain	30	35.20	10.93	1.99	0.00*

Table 2: Paired sample Statistics

The pretreatment status of participants was recorded by Shoulder pain and disability index (SPADI) The post treatment status was again recorded through same scales. For within group analysis paired sample t test was applied to compare the mean score of scales before and after treatment and p value, calculated through paired sample t test showed that the treatment in both groups was significant(p<0.05) in improving SPADI[Table 2].

Evaluation	Groups of the Patient	N	Mean	SD	SE Mean	P-values
Pretreatment Visual Analogue scale	METS(A)	15	6.80	1.01	0.082	0.88
	Maitland Mobilization (B)	15	6.75	1.20	0.79	
Post treatment Visual Analogue scale	METS(A)	15	3.50	0.94	0.08	0.00
	Maitland Mobilization (B)	15	2.70	0.65	0.87	
Pretreatment SPADI Pain	METS(A)	15	40.66	4.67	1.20	0.79
	Maitland Mobilization (B)	15	40.93	3.17	.81	
Post treatment SPADI Pain	METS(A)	15	28.80	5.64	1.45	0.00
	Maitland Mobilization (B)	15	18.06	3.97	1.02	
Pretreatment SPADI Disability	METS(A)	15	69.66	5.60	1.44	0.86
	Maitland Mobilization (B)	15	69.93	3.59	.928	
Post treatment SPADI Disability	METS(A)	15	44.60	4.77	1.233	0.00
	Maitland Mobilization (B)	15	25.80	5.97	1.543	
Pretreatment Disabilities of shoulder and range of motion	METS(A)	15	46.98	12.89	1.21	0.86
	Maitland Mobilization (B)	15	47.63	10.03	1.22	
Post treatment Disabilities of shoulder and range of motion	METS(A)	15	30.51	9.19	1.09	0.00
	Maitland Mobilization (B)	15	20.24	5.13	1.08	

Table: 3 Pre and Post Intervention group comparisons for Pain and SPADI, Pain score out of 50 and disability out of 80, P value significant ≤ 0.05*

The improvement of both groups was compared with independent sample t test. The improvement in SPADI Pain Score out of 50 was 28.80 ±5.64 in Group A was given METs 18.06±3.97 in Group B who was given Maitland. The p value calculated through independent sample t test (< 0.05) described that significant difference is present in the improvement level in both groups and treatment and improvement in Group B is significantly more than in Group A. Thus, rejected the null hypothesis and accepted the alternative hypothesis [Table 3]. A significant difference was observed between the Group A and B, Maitland Mobilization was found dominant over the Muscle Energy Technique with statistically significant difference at P <.05 [Table 4].

		Treatment group		P-value
		Muscle energy technique (A) (Mean±SD)	Maitland mobilization(B) (Mean±SD)	
Shoulder Flexion	Pre -treatment	89.95 ± 4.58	92.15 ± 8.16	0.301
	Post - treatment	107.40±8.14	142.75±9.66	0.000
Shoulder Extension	Pre -treatment	38.00 ± 6.16	39.00 ± 6.80	0.629
	Post - treatment	43.95±6.12	54.65±5.65	0.000
Shoulder abduction	Pre -treatment	91.65± 4.53	90.05±6.87	0.391
	Post - treatment	116.25±11.22	142.85±9.05	0.000
Shoulder internal rotation	Pre -treatment	49.00 ± 7.06	46.80± 7.74	0.353
	Post - treatment	55.20±7.00	71.60±8.74	0.000
Shoulder external rotation	Pre -treatment	72.00 ± 11.96	72.50 ± 11.64	0.894
	Post - treatment	74.50±10.99	83.50±5.87	0.003

Table 4: Pre and Post Intervention group comparisons -Range of Motion

DISCUSSION

This study shows that the Maitland technique is more effective than METS through the SPADI measuring scale. The improvement of both groups was compared with the independent sample-t-test. The outcomes of this research supported the hypothesis that both the Maitland method and MET are shown to affect pain reduction and in enhancing the shoulder ROM with improvement in functional Index in subjects with adhesive capsulitis. On further analysis, it also supported that there is a significant difference in the effectiveness of the PNF technique and MET and significant improvement in terms of pain relief, restoration of ROM, and early return to ADL were reported. The underlying mechanism could be the elongation of tissues, which could be the probable reason helping to improve ROM and function. Panjabi explains that all active movement all passive movement and neural system need for each movement, which stresses the diagonal pattern of movement in the PNF technique [18]. The current study shows that the Maitland mobilization technique is more effective than METS through the SPADI measuring scale. It is different from the above study because of the technique but both studies showed that METS is effective in the treatment of Adhesive capsulitis. The revision was directed by Abhay Kumar, the Effectiveness of Maitland Techniques in Idiopathic Shoulder Adhesive Capsulitis, both the sets have shown important improvement over time and statistical analysis of data in before and after the treatment [5].Shah Atika stated that MET is more effective in decreasing pain so when the pain of a severe or prolonged nature, marks tightening of complex muscles tough, the therapeutic use of the antagonists by MET can clearly be of value and as soon the pain decrease and further Maitland mobilization can be combined to increase the growth of muscle ROM [19]. The current study shows that the Maitland technique is more effective than METS through the SPADI measuring scale. It is different from the above study because of the technique but both studies showed that Maitland is effective in the management of the adhesion in the capsule. The improvement in SPADI showed a statistically significant difference between both techniques, in contrast to another

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Comparison of Maitland mobilization and METs was conducted in a study and concluded that the muscle energy technique is less effective than Maitland mobilization. Maitland mobilization is more effective on the pain and function in the adhesive capsulitis [20]. The Maitland mobilization group appeared in significant pain reduction as compared to muscle energy technique group as the minimum clinically important difference (MCID) of VAS is 1.37 comparing it with the study of an interventional approach using routine intervention with mobilization among cases of adhesive capsulitis was found effective regimen in increasing ROM and reduction of pain [22]. This research was delivered by Surabanhi Agarwal et al, which determined the difference between two methods of manipulation in frozen shoulder. The reverse distraction method and the Kaltenborn inferior glide and the in posterior direction by the grade of movement that use in mobilization for ten to fifteen times and other is baseline treatment for the 18 to 20 times for 20 days. It's concluded that inferior glide was found more effective. This research is very important for the manual therapist in terms of functional improvements in such cases [22]. In another study, Kulkarni et al. Allocated 30 people (16 men and 14 women) with a mean age of 56.3± 7.92 years underwent intervention The SPADI score improved from 91.7±6.90 to 35.26±3.45 in Group A ($p<0.005$) as compared to92.4 ±4.15 to 69.53±6.7in Group B ($p<0.005$. This is study proven that when moving with mobilization its get a better result in the pain and limitation in the frozen shoulder [23]. Further studies are recommended to track the long-term effects of treatments through the continuing follow-up sessions. In expansion further projects are required that determine whether a combination of treatments may have a cumulative effect to create considerably successful treatment regimens There were more female patients as compared to males, so it is not possible to generalize the outcome to the entire population. No long-term follow-up was conducted.

CONCLUSION

Maitland mobilization was clinically more effective than the muscle energy technique in reducing pain, enhancing shoulder range of motion, and functional mobility in patients with Adhesive capsulitis, and have statistically significant differences on between-group analyses.

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