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Comparison of Spencer's MET and Post-Facilitation Stretch in Patients with Adhesive Capsulitis

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ABSTRACT

Background of the study: Adhesive capsulitis causes progressive shoulder pain, stiffness, and functional limitation, significantly impacting daily activities in middle-aged individuals. This study compared the effectiveness of Spencer's Muscle Energy Technique (MET) versus Post-Facilitation Stretch on pain, range of motion, and disability in adhesive capsulitis patients.

Methodology: A randomized controlled trial was conducted at HBS General Hospital involving 38 participants with adhesive capsulitis. Participants were randomly allocated into two groups: Group A received Spencer's MET (n=19) and Group B received Post-Facilitation Stretch (n=19). Interventions were administered for 12 sessions over two weeks. Outcome measures included pain intensity, shoulder range of motion, and functional disability assessed daily during treatment, weekly throughout the intervention period, and at four-week follow-up. Data analysis employed repeated measures ANOVA for within-group comparisons and mixed-way ANOVA for between-group analysis.

Results: Within-group analysis revealed significant improvements in range of motion for both groups ($p<0.05$). Between-group analysis showed non-significant differences for pain and range of motion immediately post-treatment ($p>0.05$). However, overall treatment effects demonstrated significant improvements in pain, range of motion, and disability for both interventions ($p<0.001$).

Conclusion: Both Spencer's MET and Post-Facilitation Stretch effectively improved shoulder function in adhesive capsulitis, with Spencer's MET showing superior immediate pain reduction.

Keywords: *Physical therapy modalities, Pain Management, Range of motion, Rehabilitation, Shoulder joint.*

INTRODUCTION

Prevalence and persistence of adhesive capsulitis affect millions worldwide, often limiting daily activities and quality of life, affecting approximately 2-5% of the general population, poses a significant challenge in physical rehabilitation and pain management[1]. This study aims to assess and compare the effectiveness of Spencer's MET versus Post-Facilitation Stretch in restoring mobility and reducing discomfort in patients with this debilitating condition. Pain, limited mobility, and disability are the condition's hallmarks, and they may last anywhere from one to twenty-four month[1]. Due to primary adhesive capsulitis, the Glenohumeral joint's active and passive range-of-motion (ROM) gradually decreases in all planes, particularly external rotation. The gradual fibrosis and rigidity of the Glenohumeral joint capsule is the source of this loss[2].

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Although the exact cause of adhesive capsulitis is uncertain, it may result from post-traumatic stress disorder or other factors[3]. Thyroid dysfunction, diabetes mellitus, overuse syndrome, repetitive overhead activities, osteoarthritis of the shoulder joint, rotator cuff tear, calcific tendinitis, complex regional pain syndrome, breast cancer treatment, gout, fracture, dislocations, sprains, Dupuytren's contractures, and autoimmune disease are additional conditions that can result in the development of adhesive capsulitis[2]. Frozen shoulder is common among people with diabetes, both insulin-dependent and independent diabetic patients, as well as those with pre-diabetes. Collagen deposition in the shoulder's cartilage and tendons is one theory that has generated much debate over the pathophysiology of FS in diabetics, and inflammation has a significant impact on how diseases evolve. Males are more likely than females to get frozen shoulder, and risk factors include physical labor and mental health conditions[6]. It is believed to occur more frequently than 2% of the time in women and is more common in those in their fifth decade of life[7]. 2.4% to 26% of people have adhesive capsulitis, which affects just over 2% of the general population. Between 2% and 5.3% of people have primary adhesive capsulitis, and between 4.3% and 38% have secondary adhesive capsulitis. Every year, 3% to 5% of the general population suffers from frozen shoulder[8]. Younger patients and members of racial or ethnic minorities are more likely to experience it. Women are 70% more likely than men to be affected, and it is most prevalent in those between the ages of 40 and 60. About 20% of people with diabetes have adhesive capsulitis, which is 2–4 times more common in people with diabetes. Adhesive capsulitis is a modifiable patient variable because it is linked to both diabetes and obesity[9]. Glenohumeral joint adhesive capsulitis often affects non-dominant limbs, as using painful extremities is harder and the dominant extremity can perform the work. Although studies have highlighted a variety of treatments and methods for treating adhesive capsulitis, medical practitioners still face significant difficulties in treating this ailment. The primary goal of treatment is to restore shoulder mobility and function by dissolving joint capsule adhesions [10]. These methods include surgery, steroid injections, oral steroids, electrical acupuncture, soft tissue treatment, laser therapy, an aesthetic manipulation, placebos, and physical therapy. According to UK guidelines, adhesive capsulitis is classed as either pain-predominant or stiffness-predominant for diagnosis, treatment, and evaluation [11]. Once it happens, frozen shoulder is a highly costly issue. A variety of shoulder injuries result in longer sick leave compared to patients who do not develop post-traumatic or post-surgical stiff neck. Apart from the personal distress this condition causes, frozen shoulders cause costs of more than CHF 100 million, More than 100,000 sick days in 2018 – a heavy burden on the Swiss healthcare system[12]. One special articulatory method for treating adhesive capsulitis-related shoulder restrictions is Spencer MET. Spencer developed this systematic set of shoulder treatments in 1916, emphasizing scapulothoracic and Glenohumeral joint movement[13]. Stretching tight muscles, ligaments, and capsules in seven steps increases the range of motion without causing pain[14]. Despite its efficacy, rehabilitation procedures hardly ever use it. According to studies, SMET dramatically increases the range of motion, lessens shoulder dysfunction, and lessens shoulder pain. It reduces functional impairment more effectively than conventional treatment. SMET is also better at improving range of motion, reducing disability, and alleviating frozen shoulder pain, according to studies[13]. In order to lessen pain, increase shoulder range of motion, and stop additional shoulder impairment in adhesive capsulitis, SMET can be used in conjunction with other therapies like Myofascial Arm Pull[14]. The direct hands-on therapy (MET), a non-invasive treatment that mainly targets soft tissues and facilitates joint movement, was created by Dr. Fred Mitchell, Sr[15]. Joint Range of motion (ROM) and muscular extensibility are both increased by MET. Because the patient actively participates and the practitioner guides the process, it is unique in its application[16].

Two physiological processes that account for the main impacts of MET are Reciprocal Inhibition and Post Isometric Relaxation (PIR). Dr. Vladimir Janda developed a muscular energy technique called the "post-facilitation stretch (PFS)" to extend muscles that had been shortened for a long time[17]. Muscle spindles and the Golgi tendon organ (GTO) are triggered to prevent autogenic and

reciprocal contraction of specific muscles[17]. For patients with adhesive capsulitis, MET in conjunction with conventional physical therapy effectively reduces discomfort, improves range of motion, and restores function. In patients with adhesive capsulitis, techniques such as Mulligan mobilization and PFS have been demonstrated to alleviate pain and dysfunction, increase shoulder mobility, and lessen disability.

METHODOLOGY

This study was a randomized controlled trial conducted at HBS General Hospital, Islamabad. A total of 38 participants were recruited using a non-probability purposive sampling technique, with 19 participants assigned to each of the two groups. Ethical approval was obtained from the Riphah International University Ethical Committee and the higher authorities of the respective hospital. Written informed consent was taken from all participants after explaining the study objectives and procedures. Participants were assured that their data would remain confidential and that they could withdraw from the study at any point without any consequences. The inclusion criteria were individuals aged between 40 and 60 years, of either gender, with unilateral primary adhesive capsulitis in stage II or III. Participants were required to have a global reduction of at least 50% in active and passive shoulder range of motion in one or more directions compared to the non-affected side. Only diabetic patients with controlled blood sugar levels were included. Exclusion criteria included a previous history of shoulder fracture, cervical spine surgery or trauma, corticosteroid injection within the past 4 weeks, malignancy or avascular necrosis of the shoulder, post-traumatic stiffness, thoracic outlet syndrome, neurological disorders, or cervical radiculopathy. After initial screening and meeting the eligibility criteria, participants were randomly allocated into two groups. Group A received Spencer's Muscle Energy Technique (MET), and Group B received Post-Facilitation Stretch (PFS). Both groups also received conventional therapy, which consisted of hot pack application for 10 minutes, finger ladder exercises, Codman's exercises, wand exercises, and active shoulder range of motion exercises. The treatment was administered six days a week for two consecutive weeks, totaling 12 sessions. A follow-up assessment was conducted at the 4th week. Pain and shoulder range of motion were the primary outcome variables and were assessed at baseline, immediately after the first session to measure immediate effects, after the first week (6 sessions), after the second week (12 sessions), and at the 4th-week follow-up.

RESULTS

Data was analyzed using SPSS version 21. The normality of data determined through Shapiro-Wilk test. All the variables were used at baseline to assess the normality. The normality distribution of variables shoulder flexion, external rotation, shoulder internal rotation, shoulder extension, Shoulder abduction, shoulder adduction and NPRS were p0.05 fulfilling the parameters of parametric data. To compare the immediate effects of interventions on Pain and ROM Mann-Whitney U test was applied for between group comparison and Wilcoxon sign ranked test was used for within group comparison. The mean age of participants related to each group. Mean age of participants in Group A (Spencer's MET) was 50.53 $\pm$ 7.19 years whereas mean age of participants in Group B (Post-Facilitation Stretch) was 51.95$\pm$7.47 years. Out of 38 participants; in Group A (18%) were males and (32%) were females. In Group B (16%) were males and (34%) were females.

Table-1 Mann-Whitney U test

Variables	Treatment	MeanRank	Median(IQ)	Pvalue
Shoulder Flexion baseline	Spencer's MET	19.95	90(20)	0.80
	PFS	19.05		
Shoulder Flexionsession1	Spencer's MET	20.32	100(26.25)	0.65
	PFS	18.68		

Shoulder External Rotation baseline	Spencer's MET	18.63	5(6)	0.62
	PFS	20.37		
Shoulder external rotationsession1	Spencer's MET	20.76	9.5(6.75)	0.48
	PFS	18.24		
Shoulder Abduction baseline	Spencer's MET	17.87	82.50(40)	0.36
	PFS	21.13		
Shoulder abductionsession1	Spencer's MET	19.05	90(41.25)	0.80
	PFS	19.95		
Shoulder Internal Rotation baseline	Spencer's MET	19.16	5(5)	0.84
	PFS	19.84		
Shoulder internalrotationsession1	Spencer's MET	20.97	10(6)	0.41
	PFS	18.03		
Shoulder Extension baseline	Spancer'sMET	21.89	20(10)	0.17
	PFS	17.11		
Shoulder ExtensionSession1	Spancer'sMET	22.82	25(17)	0.64
	PFS	16.18		
Shoulder adductionbaseline	Spancer'sMET	20.47	12.50(15)	0.58
	PFS	18.53		
Shoulder adductionsession1	Spancer'sMET	20.29	19(15.5)	0.66
	PFS	18.71		
NPRSbaseline	Spancer'sMET	19.74	7(1.25)	0.89
	PFS	19.26		

The study found no significant difference between groups A and B in terms of shoulder flexion, shoulder external rotation, abduction, internal rotation, extension, adduction, or pain score. Both groups produced equal immediate effects on improving shoulder flexion, shoulder external rotation, abduction, internal rotation, extension, adduction, and pain score. The results suggest that both interventions effectively improve shoulder flexibility, external rotation, abduction, internal rotation, extension, and pain score.

Table-2 Wilcoxon Signed Rank Test

Variables	Spencer's MET Median IQ	P-value	PFS Median IQ	P-value
Shoulder Flexion baseline	90 (20)	<0.05	90 (20)	<0.05
Shoulder Flexionsession1	100 (25)		100 (30)	
Shoulder External Rotation baseline	5(7)	<0.05	5(5)	<0.05
Shoulder externalrotationsession1	10(8)		9(8)	
Shoulder Abduction Baseline	80(30)	<0.05	90(40)	<0.05
Shoulder abductionsession1	90(40)		94(45)	
Shoulder Internal	5(4)	<0.05	5(6)	<0.05

Rotation baseline				
Shoulder internalrotationsession1	10(6)		9(6)	
Shoulder Extension baseline	20(15)	<0.05	15(10)	<0.05
Shoulder ExtensionSession1	30(10)		20(17)	
Shoulder adduction baseline	15(15)	<0.05	10(10)	<0.05
Shoulder adductionsession1	23(15)		18(15)	
NPRS baseline	7(58)	<0.05	7(58)	0.90
NPRS session1	6(58)		7(58)	

The study compared shoulder flexion, shoulder external rotation, shoulder abduction, shoulder internal rotation, shoulder extension, shoulder adduction, shoulder NPRS, and pain reduction techniques. The results showed significant differences in shoulder flexion, external rotation, shoulder abduction, internal rotation, shoulder extension, shoulder adduction, shoulder NPRS, and pain reduction before and after the treatment. The treatment effectively improved shoulder flexion ROM, shoulder external rotation, shoulder abduction ROM, shoulder internal rotation, shoulder extension ROM, shoulder adduction ROM, and NPRS scores before and after the treatment. The median and IQR values for each technique were also significantly different at baseline and after the first session. However, the technique was less effective in reducing pain than other techniques. The results suggest that the treatment can be effective in improving shoulder flexibility, shoulder abduction, shoulder internal rotation, shoulder extension, shoulder adduction, and NPRS.

Table 3: Mixed ANOVA Time, Treatment group and Interaction effect

Variables		Group A (Spencer's MET)	Group B (PFS)	Time			Treatment			Interaction Effect		
		Mean ± S.D	Mean ± S.D	F - value	η2	P - valve	F – value	η2	P - valve	F - value	η2	P - valve
NPRS	**Baseline**	7.21±1.08	7.21±0.91	259.56	0.87	<0.001	183.19	0.94	<0.001	0.14	0.002	0.002
	1st week	3.84±1.50	5.21±1.08									
	2nd Week	1.58±1.01	3.05±0.97									
	4th week	1.53 ±0.61	3.00±0.94									
Shoulder flexion	**Baseline**	92.63±16.27	83.84±29.06	464.20	0.92	<0.001	258.72	0.95	<0.001	7.18	0.16	0.002
	1st week	160.15±15.98	129.57±28.74									
	2ndWeek	180.00±0.000	167.47±17.84									
	4th week	179.84±0.68	169.15±16.36									

Shoulder External rotation	**Baseline**	7.74 ±7.54	7.42±7.38	591.61	0.94	<0.001	320.39	0.96	<0.001	9.26	0.20	0.001
	1st week	43.26 ±43.26	33.21±13.32									
	2nd Week	82.42±11.99	64.68±17.56									
	4th week	83.47±10.25	66.58±17.46									
Shoulder Abduction	**Baseline**	74.21±24.84	80.00±24.94	412.41	0.92	<0.001	304.38	0.96	<0.001	5.51	0.13	0.01
	1st week	146.32±26.49	129.79±31.28									
	2ndWeek	179.47±2.29	165.05±21.03									
	4th week	179.63±1.60	165.95±20.35									
Shoulder Internal Rotation	**Baseline**	6.47±4.14	6.89±4.50	729.74	0.95	<0.001	436.30	0.97	<0.001	18.61	0.34	<0.001
	1st week	48.47±13.26	33.16±10.66									
	2nd Week	85.89±10.56	63.26±16.21									
	4th week	87.00±9.52	65.89±15.52									
Shoulder Extension	**Baseline**	18.95±8.09	15.05±7.96	588.86	0.94	<0.001	388.79	0.97	<0.001	6.99	0.15	0.002
	1stweek	59.68±1.37	50.16±11.61									
	2ndWeek	60.00±0.000	59.68±1.003									
	4th week	60.00±0.000	60.00±0.000									
Shoulder adduction	**Baseline**	14.47±8.80	12.58 ±6.76	510.92	0.93	<0.001	442.98	0.96	<0.001	2.701	0.07	0.076
	1stweek	49.37±2.75	43.89±9.26									

	2nd Week	50.00±0.000	50.00±0.000									
	4 thweek	50.00±0.000	50.00±0.000									
SPADI	**Baseline**	78.09±7.74	77.97±6.26	1709.82	0.97	<0.001	1557.40	0.99	<0.001	45.855	0.56	<0.001
	1st week	52.62±9.31	60.15±6.52									
	2nd Week	27.48±8.28	43.31±7.00									
	4th week	12.29±2.74	29.83±6.58									

Level of significance: $p<0.001^{***}$ and $p<0.05^{**}$

Table 4: Repeated measure ANOVA (within group analysis)

Variables		**Group A (Spencer's MET)**				**Group B (Post-Facilitation Stretch)**			
		Mean±S.D	**F value**	**P value**	**η2**	**Mean±S.D**	**F value**	**P value**	**η2**
NPRS	**Baseline**	7.21± 1.084	171.03	≤ 0.001	0.90	7.21 ±0. 918	95.27	≤ 0.001	0.84
	1 week	3.84 ±1.500				5.21 ± 1.084			
	2 Week	1.58 ±1.017				3.05 ±0. 970			
	4 week	1.53±0 .612				3.00 ± 0 .943			
Shoulder flexion	**Baseline**	92.63 ± 16.27	285.12	≤ 0.001	0.94	83.84 ± 29.06	199.19	≤ 0.001	0.91
	1 week	160.15 ±15.98				129.57 ± 28.74			
	2 Week	180 ±0.00				167.47 ± 17.84			
	4 week	179.84 ± 0.68				169.15 ± 16.36			
Shoulder External rotation	**Baseline**	7.74 ± 7.54	449.83	≤ 0.001	0.96	7.42 ± 7.38	194.22	≤ 0.001	0.91
	1 week	43.26 ± 13.79				33.21 ± 13.32			
	2 Week	82.42 ± 11.99				64.68 ±17.56			
	4 week	83.47 ± 10.25				66.58 ±17.46			
Shoulder Abduction	**Baseline**	74.21± 24.847	191.68	≤ 0.001	0.91	80.00 ± 24.944	241.78	≤ 0.001	0.93
	1 week	146.32 ± 26.493				129.79 ± 31.283			
	2 Week	179.47 ±2.294				165.05 ± 21.036			
	4 week	179.63 ± 1.606				165.95 ± 20.356			
	Baseline	6.47 ± 4.14	490.93	≤ 0.001	0.96	6.89 ± 4.50	259.04	≤ 0.001	0.93

Shoulder Internal Rotation	**1 week**	48.47 ± 13.26				33.16 ± 10.66			
	2 Week	85.89 ± 10.56				63.26 ± 16.21			
	4 week	87.00 ± 9.52				65.89 ± 15.52			
Shoulder Extension	**Baseline**	18.95 ± 8.09	463.48	≤ 0.001	0.96	15.05 ± 7.96	223.71	≤ 0.001	0.92
	1 week	59.68 ± 1.37				50.16 ± 11.61			
	2 Week	60.00 ± 0.000				59.68 ± 1.003			
	4 week	60.00 ± 0.000				60.00 ± 0.000			
Shoulder Adduction	**Baseline**	14.47 ± 8.803	293.16	≤ 0.001	0.94	12.58 ± 6.769	229.22	≤ 0.001	0.92
	1 week	49.37 ± 2.753				43.89 ±9.267			
	2 Week	50.00 ± 0.000				50.00 ± 0.000			
	4 week	50.00± 0.000				50.00 ±0.000			
SPADI	**Baseline**	78.0921 ± 7.74	881.43	≤ 0.001	0.98	77.9711 ± 6.26	871.01	≤ 0.001	0.98
	1 week	52.6274 ± 9.31				60.1563 ± 6.52			
	2 Week	27.4863 ± 8.28				43.3153 ± 7.00			
	4 week	12.2995 ± 2.74				29.8326 ± 6.58			

Level of significance: $p<0.001^{***}$ and $p<0.05^{**}$

Table 5: Pair wise comparison

Sr .no	Variables		Group A		Group B	
			Mean difference	**P value**	**Mean difference**	**P value**
1.	**NPRS**	**Baseline-1st week**	3.36	<0.001	2.00	<0.001
		1st week -2nd week	2.26	<0.001	2.15	<0.001
		2nd week – 4th week	0.053	1.000	0.053	1.000
		Base line – 4th week	-5.68	<0.001	-4.21	<0.001
2.	**Shoulder flexion**	**Baseline-1st week**	-67.52	<0.001	-45.73	<0.001
		1st week -2nd week	-19.84	<0.001	-37.89	<0.001
		2nd week – 4th week	0.158	1.000	-1.68	0.114
		Base line – 4th week	87.21	<0.001	85.31	<0.001
3.	**Shoulder External rotation**	**Baseline-1st week**	-35.52	<0.001	-25.78	<0.001
		1st week -2nd week	-39.15	<0.001	-31.47	<0.001
		2nd week – 4th week	-1.05	0.562	-1.89	<0.001
		Base line – 4th week	75.73	<0.001	59.15	<0.001
4.	**Shoulder Abduction**	**Baseline-1st week**	-72.10	<0.001	-49.78	<0.001
		1st week -2nd week	-33.15	<0.001	-35.26	<0.001

		2nd week – 4th week	-0.15	1.000	-0.89	0.608
		Base line – 4th week	105.42	<0.001	85.94	<0.001
5.	**Shoulder Internal Rotation**	**Baseline-1st week**	-44.0	<0.001	-26.26	<0.001
		1st week -2nd week	-37.42	<0.001	-30.10	<0.001
		2nd week – 4th week	-1.105	0.565	-2.63	<0.001
		Base line – 4th week	80.52	<0.001	59.00	<0.001
6.	**Shoulder Extension**	**Baseline-1stweek**	-40.73	<0.001	-35.10	<0.001
		1st week -2nd week	-0.31	<0.001	-9.52	0.009
		2nd week – 4th week	0.00	1.000	-0.31	1.000
		Base line – 4th week	44.94	<0.001	44.94	<0.001
7.	**Shoulder Adduction**	**Baseline-1st week**	-34.89	<0.001	-31.31	<0.001
		1st week -2nd week	-0.63	1.000	-6.10	0.061
		2nd week – 4th week	0.00	<0.001	0.00	<0.001
		Base line – 4th week	35.52	<0.001	37.42	<0.001
8.	**SPADI**	**Baseline-1st week**	25.46	<0.001	17.81	<0.001
		1st week -2nd week	24.14	<0.001	16.84	<0.001
		2nd week – 4th week	15.18	<0.001	13.48	<0.001
		Base line – 4th week	-65.79	<0.001	-48.13	<0.001

Level of significance: $p<0.001^{***}$ and $p<0.05^{**}$

DISCUSSION

The findings of this comparative study on Spencer's Muscle Energy Technique (MET) and Post-Facilitation Stretch reveal notable implications for clinical practice in managing adhesive capsulitis. The data indicate that both interventions yield measurable improvements in shoulder mobility and pain reduction; however, Spencer's MET demonstrated statistically significant advantages in promoting joint range and functional recovery in a shorter timeframe. These results corroborate previous literature[2,3], which underscores the efficacy of MET in enhancing musculoskeletal flexibility through neuromuscular re-education. Such mechanisms may contribute to the observed benefits, suggesting that Spencer's MET offers a synergistic approach that integrates active patient engagement and targeted mobilization techniques. Consequently, incorporating MET as a primary intervention could streamline treatment protocols and reduce rehabilitation duration, benefiting patients and healthcare providers. Moreover, the impact of Post-Facilitation Stretch in this study aligns with recent analyses highlighting the method's utility in addressing muscle stiffness and enhancing post-isometric relaxation[4]. However, its relative efficacy appeared diminished compared to MET, suggesting a possible advantage in utilizing Post-Facilitation Stretch as an adjunct rather than a standalone therapy for adhesive capsulitis.

The current study aimed to compare the immediate effect of Spencer‘s MET and Post-Facilitation Stretch on Pain and shoulder ROMs in patients with Adhesive Capsulitis. This study also compared the effects of Spencer‘s MET and Post-Facilitation Stretch on Pain, shoulder ROMs and Disability among Adhesive Capsulitis patients. Several studies support the results of current study. An RCT conducted by G. M. Rayudu et al. in 2018 investigated the effects of Muscles Energy technique

compared to Mulligan technique on functional ability in Adhesive capsulitis found significant difference of NPRS and ROM for within group analysis ($p < 0.05$)but between group analysis showed no significant outcome in terms of improving pain and reducing disability($p>0.05$). This study supports the results of immediate effect of present study in which ROMS and NPRS showed significant difference ($p<0.05$) for within group analysis but no significant difference ($p>0.05$)for between group analysis. Improvements in ROMS and pain in muscles energy techniques is due to stretching of tight muscles and fascia, mobilization of restricted joints and barrier engaging and isometric contraction causes GTO activation which causes inhibition of agonist muscles resulting relaxation of agonist and ROMs improvement. Within group outcomes of pain (NPRS) of present study revealed that Post-Facilitation Stretch was less effective in reducing pain immediately (P value>0.05). as compared to Spencer‘s MET .These results are against the outcomes of a study conducted by Suri et al. in 2013 that compared the effects of Maitland Mobilizations and Muscles Energy Techniques indicated that Muscle energy technique was more effective in reducing pain than Maitland Mobilizations[18]. There is stimulation of low-threshold mechanoreceptors in the muscles. SMET allows Sympathetic excitatory stimulation of somatic efferent nerves to help localize periaqueductal activation in the midbrain. Nociceptive impulses in the dorsal horn of the spinal cord block the pathway. Pain is controlled or modulated down this pathway by activating mechanoreceptors in muscles and joints.

The group statistical analysis of this research showed that both the techniques i.e. Spencer‘s MET and Post-Facilitation Stretch did not produce significant immediate outcomes in pain reduction and shoulder ROMs improvement i.e. $p>0.05$. these findings are consistent with a study conducted by Dr.B.Haveela et al in 2018[19] in which interventions were applied at three groups i.e.(Mulligan Mobilization, Spencer‘s MET and conventional protocol) which showed no significant results at 1st day however after 3rd and 6th week improvements in pain, ROMs and SPADI was observed.

An RCT conducted by G. Yuvarani et al. in 2021 that determined the Effect of Gong‘s Mobilization and Muscle Energy Technique on Pain and Functional Ability of Shoulder in Adhesive Capsulitis. The study's results revealed that MET is less effective than Gong‘s Mobilization for pain reduction, disability reduction and increasing ROMs20.These findings are against the findings of current study in which within group analysis found significant improvement in ROMs and pain with both the interventions. This is because MET causes active contraction of deep muscles whose line of pill causes accessory motions in the desired joints[19,21].

M.A carried out a randomized control trail. Gill et al. in 201822 on effects of MET in pain and disability reduction in Adhesive capsulitis patients which showed that muscles energy technique (Post Facilitation Stretch) in comparison to conventional therapy was more beneficial in reducing pain and improving ROMs and functional disability in Adhesive Capsulitis patients23. These results correlate the results of the present study in which significant reduction in pain (NPRS) was observed with time between group analysis and both techniques [24]. The neuronal mechanism in the dorsal horn is caused by neurological and tissue factors, such as stimulation of low threshold mechanoreceptors, which may result in gating effects, and the effect of rhythmic muscular contraction on interstitial and tissue fluid flow. The centrally mediated pain inhibitory mechanism was responsible for the pain reduction caused by MET[25].

CONCLUSION

This study concluded that both the techniques i.e. Spencer‘s MET and Post Facilitation Stretch are equally effective in ROMs improvement immediately in patients with Adhesive Capsulitis. However, Spencer‘s MET was more effective regarding immediate pain reduction than Post Facilitation Stretch. Both these techniques effectively reduced pain, ROMs improvement and disability reduction but Spencer‘s MET was more effective than Post- Facilitation Stretch.

AUTHORS’ CONTRIBUTION:

The following authors have made substantial contributions to the manuscript as under:

Conception or Design: Neelam Sajid

Acquisition, Analysis or Interpretation of Data: Neelam Sajid
Manuscript Writing & Approval: Neelam Sajid

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