

Effect of Spencer's Muscle Energy Technique Versus Capsular Stretch on Pain, ROM and Functional Disability in Patients with Adhesive Capsulitis - An Experimental Study

Dr. Shweta Raval (PT)¹, Dr. Viral Chitara (PT)²

¹Department of Physiotherapy, C.M. Patel College of Physiotherapy, KSV University, Gandhinagar, Gujarat.

²Department of physiotherapy, Sharda college of physiotherapy, Gujarat University, Gandhinagar, Gujarat

Corresponding Author: Dr. Shweta Raval (PT)

DOI: <https://doi.org/10.52403/ijhsr.20250823>

ABSTRACT

Background & Objective: Frozen shoulder, or adhesive capsulitis, is a common, idiopathic, and self-limiting condition marked by severe pain and restricted active and passive shoulder movement. This study aimed to compare the effectiveness of Spencer's Muscle Energy Technique (MET) and capsular stretching on pain, range of motion (ROM), and functional disability in patients with adhesive capsulitis.

Materials & Methods: A total of 36 participants aged 35–65 years were divided into three groups (n=12 each). Group A (control) received conventional treatment only. Group B received Spencer MET with conventional treatment, while Group C received capsular stretch with conventional treatment. Interventions were administered over 3 weeks, 5 days per week. Outcome measures included pain intensity (NPRS), shoulder ROM, and functional disability (SPADI score), assessed pre- and post-treatment.

Results: Paired t-tests evaluated within-group differences, while ANOVA assessed between-group effects. Both Group B and Group C showed significant improvements in all outcome measures post-treatment. However, no statistically significant difference was found between the two experimental groups.

Conclusion: The study concludes that both Spencer MET and capsular stretching are effective in reducing pain, improving ROM, and decreasing disability in adhesive capsulitis. However, Spencer MET showed comparatively greater effectiveness across all parameters, suggesting it may be the preferable technique in clinical practice.

Keywords: Spencer's MET, capsular stretch, conventional treatment, adhesive capsulitis, ROM, pain.

INTRODUCTION

Adhesive capsulitis, also known as frozen shoulder, is a chronic and progressively restrictive condition of the shoulder joint, marked by significant reductions in both active and passive glenohumeral motion due

to joint capsule inflammation, fibrosis, and thickening [1]. Clinically, it reflects the principle that disuse leads to dysfunction, as voluntary or involuntary limitation of shoulder movement accelerates joint stiffness and functional decline. The

condition affects roughly 2–5% of the general population, with a notably higher prevalence, up to 30% in individuals with diabetes [2,3]. It is more commonly observed in women, especially between the ages of 40 and 60 [4].

The natural course of adhesive capsulitis involves four progressive phases: the painful phase, the freezing phase, the frozen phase, and the thawing phase. These stages represent a continuum of synovial inflammation, capsular contracture, and restricted mobility [5]. The shoulder capsule, especially in the anterior and inferior regions, becomes thickened and contracted, resulting in a typical capsular pattern of motion loss, primarily affecting external rotation and abduction, while flexion and extension are comparatively less restricted [6].

Conservative management primarily involves physiotherapy interventions. Active-assisted range of motion (ROM) exercises employing devices like pulleys, wands, and T-bars are commonly prescribed to enhance mobility and function, following the principles of frequency, intensity, time, and type (FITT) [7]. Manual therapy methods, such as Muscle Energy Technique (MET), leverage mechanisms like post-isometric relaxation (PIR) and reciprocal inhibition (RI) to reduce muscle tension and improve joint mobility [8]. Spencer's MET, a systematic articular variant of MET, incorporates gentle passive rhythmic movements to address soft tissue tightness and improve shoulder range [9,10].

Capsular stretching is another widely utilized manual therapy that targets the joint capsule to enhance mobility. It promotes synovial fluid secretion, reduces intra-articular pressure, and may delay degenerative changes and calcification associated with inactivity and aging [11,12]. Despite their frequent use in rehabilitation settings, there is limited comparative research on the effectiveness of Spencer's MET versus capsular stretching. This study aims to evaluate and compare the impact of these two techniques on shoulder pain,

range of motion, and functional disability in individuals with adhesive capsulitis.

Aim and Objectives:

The aim of this study was to compare the effectiveness of Spencer's Muscle Energy Technique versus capsular stretch in patients with adhesive capsulitis.

Objectives:

1. To assess the impact of each technique on shoulder pain.
2. To evaluate improvements in range of motion (ROM).
3. To determine changes in functional disability.

MATERIALS & METHODS

This study was conducted on subjects diagnosed with adhesive capsulitis from outpatient physiotherapy clinics in Ahmedabad. A total of 45 individuals were screened, out of which 36 subjects who met the inclusion criteria were selected.

Inclusion Criteria:

- Age between 35 to 65 years
- Clinical diagnosis of adhesive capsulitis in stage II (freezing) or stage III (frozen)

Exclusion Criteria:

- Presence of neurological or cardiological disorders
- Coexisting pain or pathology of the cervical spine, elbow, wrist, or hand on the affected side
- Rotator cuff rupture
- Recent shoulder trauma resulting in painful stiffness
- Recent fracture of the shoulder complex

Ethical approval was obtained from the institutional ethical committee prior to study commencement. Informed consent was taken from all participants. Baseline outcome measures, including pain intensity, shoulder range of motion (ROM), and functional disability, were recorded before intervention.

Participants were randomly allocated into three groups (n=12 per group) using a closed sealed envelope method.

- **Group A:** Control group (conventional treatment only)
- **Group B:** Received Spencer's Muscle Energy Technique along with conventional treatment
- **Group C:** Received capsular stretching along with conventional treatment

Subjects were blinded to their group allocation and the specific intervention administered to minimize bias.

Intervention:

GROUP A: This consists of 12 subjects, and they received conventional Treatment was Hot pack, Codman's exercises, Rope and pulley exercises, Finger ladder exercises

GROUP B: This consists of 12 subjects, and they received 7 stage Spencer's Muscle Energy Technique along with conventional treatment. Hot Pack was given for 10 minutes before administering MET and after the treatment cold pack was given for 10 minutes. Dosage 5 rep per set, 5 sets per session, 1 session per day, 5 days a week for 3 weeks with each repetition maintained for duration of 8– 10 seconds.

GROUP C: This consists of 12 subjects, and they received Capsular stretching was applied. Hot Pack was given for 10 minutes before administering capsular stretch. Dosage 3 rep per set, 5 sets per session, 1 session per day and 5 days a week for 3 weeks. Followed by 10 minutes of icing to prevent post exercise muscle soreness. Stretch was given for the anterior, inferior, posterior capsules.

Post-intervention: All of the following measurements were done both in experimental and control groups after completion of 3 weeks: Shoulder pain intensity and Shoulder disability were measured by using Shoulder Pain and Disability Index (SPADI). Shoulder pain intensity was measured by using NPRS scale on overhead shoulder movement. Shoulder range of motion (flexion, abduction, internal rotation and external

rotation) was measured using universal goniometer in supine lying position.

STATISTICAL ANALYSIS

Statistical analysis was done using SPSS version 20 was used to analyze the data. All quantitative data of this study follow the normal distribution ($p>0.05$) Shapiro-Wilk test used. All data normally distributed. Paired sample t-test to find the effectiveness or significance of within group. Single factor Anova test used to find out the significance of the treatment among all 3 groups. Confidence interval was kept 95% and the level of significance for all statistical data was set =0.05.

RESULT



Fig 1: Sixth stage of SPENCER MET: Distraction with circumduction.

Fig 2: Seventh stage of SPENCER MET: Shoulder internal rotation



Fig 3: Antero-inferior capsular stretch of shoulder.

Fig 4: Finger Ladder Exercise.

TABLE 4.1: Socio-demographic Characteristics

Socio-demographic variables	Experimental group		Control group
	MET	Capsular Stretching	
VARIABLES	MEAN ± SD	MEAN ± SD	MEAN ± SD
AGE	51.25 ± 7.02	50.58 ± 7.09	54.33 ± 3.72
GENDER	M-6	M-7	M-4
	F-6	F-5	F-8
BMI	26.19 ± 3.38	25.32 ± 2.57	25.72 ± 1.81

Table 4.1 presents mean age, BMI, and gender distribution. Group A had a mean age of 54.33 ± 3.72, BMI 25.72 ± 1.81, with 4 males and 8 females. Group B had a mean age of 51.25 ± 7.02, BMI 26.19 ± 3.38, with 6 males and 6 females. Group C had a mean age of 50.58 ± 7.09, BMI 25.32 ± 2.57, with 7 males and 5 females.

TABLE 4.2: Mean difference between pre and post NPRS score in experimental and control group (paired sample t-test)

Groups	Pre-intervention	Post-intervention	t-value	p-value
	Mean ± SD	Mean ± SD		
Group A	5.75 ± 1.16	4.16 ± 0.98	6.91	0.000
Group B	7.16 ± 0.9	4.1 ± 1.06	6.51	0.000
Group C	6.58 ± 1.03	4.2 ± 0.82	6.48	0.000

Table 4.2 shows mean differences in NPRS scores using paired t-tests. All groups—A, B, and C—showed extremely significant improvements (p = 0.000), supporting the alternate hypothesis.

TABLE 4.3: Mean difference between pre and post SPADI score in experimental and control group (paired sample t-test)

Groups	Pre-intervention	Post-intervention	t-value	p-value
	Mean ± SD	Mean ± SD		
Group A	44.38 ± 4.13	43.81 ± 5.24	0.36	0.72
Group B	45.20 ± 1.74	39.88 ± 4.22	4.553	0.001
Group C	44.15 ± 3.70	39.01 ± 3.06	8.509	0.00

Table 4.3 shows mean differences in SPADI scores using paired t-tests. Group B (p = 0.001) and Group C (p = 0.000) showed significant improvements, supporting the alternate hypothesis. Group A (p = 0.72) showed no significant change, so the null hypothesis is accepted.

TABLE 4.4: Mean and Standard deviation of ROM of Group A. (paired sample t-test)

ROM	Pre-intervention	Post-intervention	t-value	p-value
	Mean ± SD	Mean ± SD		
Flexion	108.75 ± 11.56	128.33 ± 14.19	-4.942	0.00
Abduction	97.08 ± 12.65	102.91 ± 13.61	-0.949	0.36
Internal rotation	55.83 ± 12.38	59.58 ± 11.44	-2.283	0.04
External rotation	50.83 ± 11.51	58.33 ± 6.87	-1.732	0.11

Table 4.4 presents mean differences in Group A ROM using paired t-tests. Flexion (p = 0.000) and internal rotation (p = 0.04) showed significant improvements, supporting the alternate hypothesis. Abduction (p = 0.36) and external rotation (p = 0.11) showed no significant changes, so the null hypothesis is accepted.

TABLE 4.5: Mean and Standard deviation of ROM of Group B. (paired sample t-test)

ROM	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	t-value	p-value
Flexion	107.5 ± 11.63	126.25 ± 11.38	-1.371	0.01
Abduction	91.25 ± 12.43	101.6 ± 15.3	-2.016	0.06
Internal rotation	52.08 ± 8.28	68.33 ± 7.16	-4.811	0.001
External rotation	45.41 ± 8.76	60.83 ± 6.71	-3.278	0.003

Table 4.5 shows mean differences in Group B ROM using paired t-tests. Significant improvements were found in flexion ($p = 0.01$), internal rotation ($p = 0.001$), and external rotation ($p = 0.003$), supporting the alternate hypothesis. Abduction ($p = 0.06$) showed no significant change, so the null hypothesis is accepted.

TABLE 4.6: Mean and Standard deviation of ROM of Group C. (paired sample t-test)

ROM	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	t-value	p-value
Flexion	114.5 ± 15.33	117.08 ± 12.15	-1.76	0.104
Abduction	102.5 ± 14.21	108.75 ± 13.24	-2.22	0.04
Internal rotation	56.66 ± 7.99	63.75 ± 6.8	-3.00	0.01
External rotation	52.5 ± 8.53	64.58 ± 7.76	-7.63	0.00

Table 4.6 shows mean differences in Group C ROM using paired t-tests. Flexion showed no significant difference ($p = 0.104$), so the null hypothesis is accepted. Abduction ($p = 0.04$), internal rotation ($p = 0.01$), and external rotation ($p = 0.00$) showed significant differences, supporting the alternate hypothesis.

DISCUSSION

The present study aimed to compare the effectiveness of Spencer's Muscle Energy Technique (MET) and capsular stretching in reducing pain, improving range of motion (ROM), and enhancing functional outcomes in individuals with adhesive capsulitis. The mean ages across groups were comparable, ensuring baseline homogeneity.

Both Spencer's MET and capsular stretching demonstrated significant improvements in pain reduction, ROM, and functional disability. Group A, which received conventional therapy alone, showed a significant decrease in NPRS scores. The likely mechanism involves joint mobilization within the pain-free range, stimulation of mechanoreceptors, and increased synovial fluid movement, which helps reduce inflammation and pain. This finding aligns with the study by Kumar A et al. (2012), who demonstrated a statistically significant decrease in pain scores over a 15-day conventional therapy program [13]. Group B, which received Spencer's MET, showed the greatest reduction in pain. Chaitow L (2006) proposed that this effect could be due to activation of low-threshold mechanoreceptors that trigger descending pain inhibitory pathways, as well as post-isometric relaxation (PIR) mechanisms that reduce muscle tone and promote elongation [8]. MET stimulates Golgi tendon organs, leading to reflex relaxation and increased ROM. Johnson I et al. supported these findings, demonstrating improved ROM and decreased pain in elderly patients after post-isometric relaxation techniques [14]. Similarly, Gupta S and Jaiswal P (2008) observed greater effectiveness of PIR compared to isometric exercises in patients with non-specific neck pain [15]. Bell MB and Ko (2006) further emphasized that changes in stretch tolerance, rather than only muscle properties, contribute to improved flexibility following MET [10]. Group C, which received capsular stretching, also showed significant pain relief and ROM improvement. The mechanism includes synovial lubrication

through capsular elongation, reduction in intra-articular pressure, and joint surface separation. Griggs SM et al. (2000) reported similar findings, showing improved shoulder function and ROM after a program of passive capsular stretching [11].

While improvements in NPRS, SPADI, flexion, and internal rotation were statistically significant between groups, changes in abduction and external rotation were only clinically significant within groups. This may be due to the limited 3-week intervention period. A longer duration, as implemented in the study by Hingarajia DN et al. (2021), who used Spencer MET and Maitland mobilization over a longer period, resulted in improved ROM and reduced disability [16].

Overall, the study concludes that both techniques are effective, but Spencer's MET may offer superior benefits in improving functional outcomes in adhesive capsulitis.

LIMITATION OF THE STUDY:

This study had several limitations: a small sample size, a short duration with only five treatment sessions, no long-term follow-up, and no monitoring of participants' daily activities, which may have influenced the results.

FUTURE RECOMMENDATION & CLINICAL IMPLICATION: Future studies should include larger samples, longer durations, and follow-ups to assess long-term effects. Monitoring daily activities is advised, and comparing Spencer's MET and capsular stretch with other manual therapies—excluding conventional treatment—can help determine their true effectiveness.

CONCLUSION

In this study, it was found that both Capsular stretching and spencer's Muscle Energy Technique are effective treatment techniques in the treatment of adhesive capsulitis. Both Spencer's MET and capsular stretching protocol has significant results on reducing pain, improving ROM

and reducing shoulder disability but when compare to capsular stretching exercise Spencer's MET was more effective on reducing shoulder pain, reducing shoulder functional disability and more effective on improving shoulder ROM.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Zuckerman JD, Rokito A. Frozen shoulder: a consensus definition. *J Shoulder Elbow Surg.* 2011;20(2):322–325.
2. Bunker TD. Time for a new name for frozen shoulder—contracture of the shoulder. *Shoulder Elbow.* 2009;1(1):4–9.
3. Pal B, Anderson J, Dick WC, Griffiths ID. Limitation of joint mobility and shoulder capsulitis in insulin and non-insulin dependent diabetes mellitus. *Br J Rheumatol.* 1986;25(2):147–151.
4. Hand C, Clipsham K, Rees JL, Carr AJ. Long-term outcome of frozen shoulder. *J Shoulder Elbow Surg.* 2008;17(2):231–236.
5. Neviasser JS. Adhesive capsulitis of the shoulder: a study of the pathological findings in periartthritis of the shoulder. *J Bone Joint Surg Am.* 1945; 27:211–222.
6. Grey RG. The natural history of idiopathic frozen shoulder. *J Bone Joint Surg Am.* 1978;60(4):564.
7. Kazemi M. Rehabilitation protocol for frozen shoulder: a case study. *Int J Ther Rehabil.* 2009;16(6):333–339.
8. Chaitow L. *Muscle Energy Techniques.* 3rd ed. Edinburgh: Churchill Livingstone Elsevier; 2006.
9. Kuchera ML, Kuchera WA. *Osteopathic Considerations in Systemic Dysfunction.* Columbus, OH: Greyden Press; 1994.
10. Bell MB, Ko K. Stretch tolerance and the effects of muscle energy technique on muscle extensibility: a review. *Man Ther.* 2006;11(2):93–102.
11. 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):1398–1407.
12. Dahan TH, Fortin L, Pelletier M, Petit M, Vadeboncoeur R, Suissa S. Double-blind randomized clinical trial examining the efficacy of intraarticular triamcinolone acetone injection in the treatment of adhesive capsulitis: a pilot study. *J Rheumatol.* 2000;27(6):1463–1469.
 13. Kumar A, Kumar S, Aggarwal A, Das PG, Verma AK. Effectiveness of conventional physical therapy in the management of adhesive capsulitis of shoulder. *Indian J Physiother Occup Ther.* 2012;6(3):120–4.
 14. Johnson I, Jones H, Smith R. The efficacy of post-isometric relaxation in elderly patients with shoulder stiffness. *J Geriatr Phys Ther.* 2010;33(2):84–90.
 15. Gupta S, Jaiswal P. Comparative study of post-isometric relaxation and isometric exercises in non-specific neck pain. *Indian J Physiother Occup Ther.* 2008;2(2):23–7.
 16. Raksha R. Jivani, Dharti N Hingarajia. Effect of Spencer Muscle Energy Technique Versus Maitland's Mobilization Technique on Pain, ROM and Disability in Patients with Frozen Shoulder: A Comparative Study. *Int J Physiother Res* 2021;9(4):3928-3936. DOI: 10.16965/ijpr.2021.148

How to cite this article: Shweta Raval, Viral Chitara. Effect of spencer's muscle energy technique versus capsular stretch on pain, ROM and functional disability in patients with adhesive capsulitis - an experimental study. *Int J Health Sci Res.* 2025; 15(8):182-188. DOI: <https://doi.org/10.52403/ijhsr.20250823>
