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# Therapeutic Efficacy of Spencer Technique on Pain and Range of Motion in Frozen shoulder patients: A Randomized Study

**Neha Purbia[1], Dr. Renuka Pal[2], Dr. Jafar Khan[3], Dr. Sujay Gupta[4], Dr. Abid R Quershi[5], Dr. Dinesh Menaria[6]**

[1]MPT Scholar, Pacific College of Physiotherapy, Pacific Medical University, Udaipur, Rajasthan, India

[2]PT, Associate Professor, Pacific College of Physiotherapy, Pacific Medical University, Udaipur, Rajasthan, India

[3]PT, Dean and HOD, Pacific College of Physiotherapy, Pacific Medical University, Udaipur, Rajasthan, India

[4]Assistant Professor, Department of Orthopedics, Pacific Medical College & Hospital, Pacific Medical University, Udaipur, Rajasthan, India

[5]Assistant Professor, Pacific College of Physiotherapy, Pacific Medical University, Udaipur, Rajasthan, India

[6]Assistant Professor, MAA Gaytri College of Physiotherapy, Udaipur, Rajasthan, India

**Corresponding Author:**

Neha Purbia

Email ID: nehapurbia@gmail.com

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**ABSTRACT**

**Background:** Frozen shoulder is a musculoskeletal condition represented by painful and restricted shoulder movement which makes a person very weak. Different healing techniques can have varying effects in the management of this condition. This study focuses on exploring the therapeutic efficacy of spencer technique on pain and ROM in frozen shoulder patients.

**Aim:** This study aimed to evaluate the effect of Spencer technique in patients with frozen shoulder.

**Materials and Methods**: This was a randomized study, 20 participants were included for a treatment period of 6 weeks. This group received the Spencer technique. Outcome measures were SPADI (Shoulder Pain and Disability Index) , NPRS (Numeric Pain Rating Scale) and goniometric measurements. Data were analyzed using mean, standard deviation and t-test.

**Results**: The results displayed that the Spencer technique presented better outcomes in reducing the pain and range of motion restoration.

**Conclusion**: The Spencer technique yielded positive effects on functional outcomes, particularly in enhancing joint mobility and reducing disability, which proves to be a beneficial approach.

***Keywords:*** *Efficacy, frozen shoulder, spencer technique, scapular stabilization exercises, manual therapy.*

## 1. INTRODUCTION

Frozen shoulder is commonly known as adhesive capsulitis . It is a condition in which there is restriction in active as well as passive shoulder movement, particularly in external rotation, abduction, and flexion. (1,2) It also represents progressive pain. (3) Individuals aged 40-60 years more likely to be affected by frozen shoulder and is commonly seen in females. (4) It commonly progresses gradually and may influence the quality of life and daily activities of living such as grooming, dressing, or reaching overhead, mainly in middle-aged people.(5)

The pathophysiology of this condition is not entirely acknowledged, but it is assumed to include inflammation (chronic), resulting in fibrosis and contracture of the joint capsule. (6) Thyroid disorders, diabetes, extended immobility and prior trauma or surgery are the risk factors considered. (1) The focus of clinical management is on reduction of pain, improvement of function and restoration of mobility.

There is an existence of different conservative treatments like, stretching exercises, strengthening exercises, mobilization techniques and use of electrotherapy modalities and physical therapy remains the mainstay of non-surgical management. (7)

Out of all the mobilization techniques, the Spencer technique become noticeable for its capacity in restoring the joint movement and help in subsiding the restriction of soft tissue.

Spencer's approach is a seven-step mobilization method designed to help patients with frozen shoulder increase their range of motion and decrease joint stiffness. Spencer's approach reduces pain by altering the circulatory pain indicators, restores particular joint mobility, and enhances pain-free movement by expanding the shoulder capsule and restricted soft tissues. Passive, repetitive translation movements, traction, or gliding promote the nutrition of the joint structure, including the capsule, glenoid labrum, articular surfaces, circulation, and lubrication. (1,8)

As the osteokinematic GH rotation returns to normal biomechanics, increased accessory movement, including gliding, aids in the recovery of shoulder mobility. Muscle tension, muscle concentric activation, and periarticular tissue pain are all decreased by joint mobilization. (9)

[10,11] Other features of this approach are :

Joint Capsule Mobilisation- In this technique, the adequate stretching of the fibrotic joint capsule results in improvement of capsular elasticity.

Neurophysiological Effects-The movement and passive oscillations results in stimulation of mechanoreceptors and inhibition of pain pathways through gate control.

Circulation improvement- The pumping of lymphatic increases exchange of fluid produces reduction in inflammation and stiffness.

Comprehensive ROM Engagement- Spencer technique aims on all planes well orderly whereas there are exercise techniques that may miss the restriction of capsule.

This study gives deep analysis of complete insight into why the spencer technique is a better action taken for frozen shoulder.

## 2. MATERIALS AND METHODS

Twenty participants were selected from the sample population through randomised sampling. They were selected according to the inclusion and exclusion criteria. This group of 20 patients received Spencer approach.

The study was directed over a period of 6 weeks, with patients engaging in the intervention for five days per week. Three assessment tools were used before and after the treatment, SPADI used for pain and disability (12), NPRS for pain and goniometer used to evaluate all shoulder range of motion. All patients of the study were informed about the study steps, and the expected benefits were explained before initiating the intervention. Ethical approval was taken from the Human Resource and Ethical Committee of Pacific Medical College with the registration number – PMU/PMCH/IEC/2024/263.

## 3. PROCEDURE

A group of 20 participants who received Spencer technique consists of 7 stages. Each stage with gentle mobilization of the joint was repeated 5-7 times or until a particular movement was no longer improving in a pain-free range, typically performed with the patient in a side-lying position. During each stage, oscillatory gliding techniques and muscular energy techniques were applied.

Following is a seven-step series of the technique : Moist heat pack was given for 10 minutes before administering the technique.

1. Shoulder Extension – It was performed to increase the extension range of motion while elbow in flexion. The patient's flexed elbow was hold by the therapist's one hand and the other hand bridges the shoulder, then the patient's shoulder was extended to the edge of the restriction point. At the end range of motion, slow, oscillatory motions were applied (30-60 sec). The therapist then applied muscular energy technique (MET) in which the patient tried to bend their shoulder against the therapist's resistance. This was repeated for about 5-7 times or until the range was no longer improving.
2. Shoulder Flexion – It was performed to improve the flexion range of movement while elbow in extension. While the one hand of therapist bridges the shoulder, the therapist used the other hand to bring the patient's shoulder into its flexion motion to the edge of its restriction point. The goal was to cross the barrier by using gentle oscillatory movements at the end range (30-60 sec). Then, the patient was told to extend their shoulder against the therapist's resistance as part of the MET technique. This was repeated for 5-7 times.
3. Circumduction with Compression – It was performed to improve 3- dimensional mobility and stability of shoulder joint by inducing circumduction with slight compression movements. The elbow of the patient was kept flexed and position of the therapist's hand remained the same as stage 1. At this point, the patient's shoulder was abducted to the restricting barrier's edge. The therapist then pushed the humerus down into the glenoid cavity to create a minor compression movement alongwith rotation in both clockwise and anti-clockwise direction(30-60 sec) and repeated for

5-7 times.

4. Circumduction with Traction – It was performed to improve the mobility of shoulder joint by inducing traction movement. The therapist's one hand bridges the shoulder and the other hand holds the wrist with elbow in extension. Then, the patient's shoulder was abducted to the edge of the restricting barrier. To detach the humeral head from the glenoid cavity, the therapist's hand applied vertical traction alongwith tiny arc of clockwise and counterclockwise circumductory movements with emphasis on increasing range of motion.
5. Shoulder Abduction and Internal Rotation (IR) with elbow flexion – It was performed intended to improve the internal rotation range at the glenohumeral joint. The patient's shoulder was internally rotated about 90 degrees and abducted 45 degrees while the elbow was flexed. The patient's hand's dorsum was placed at the back side. The therapist's one hand was positioned over the elbow, while the other hand supports the patient's anterior shoulder. Then, the patient's elbow was gently moved forward (internally rotated) to the edge of restriction. At this point, oscillatory motions were applied and MET for 30-60 sec. and repeated 5-7 times.
6. Shoulder Abduction & Adduction and External Rotation (ER) with elbow flexion – It was performed to improve & increase the abduction, adduction and external rotation range of motion.

   For abduction - the position of one hand was in front of the glenohumeral joint and the other hand encircled the elbow joint. In order to increase the abduction range, the patient was told to grab the therapist's forearm with the hand of the arm being treated. Until a motion barrier was engaged, the patient's elbow was moved towards the head, abducting the shoulder. Gentle, oscillatory motions were applied (30-60 sec.) alongwith MET. For adduction and external rotation - the patient's hand was placed on the therapist's forearm after the therapist forces the patient to flex their shoulder joint till the elbow crosses the anterior chest wall. The patient's shoulder was then adducted to the restriction barrier and mild oscillatory motions and MET were utilized.
7. Joint pumping with the arm extended – It was performed to improve the accessory movements. The therapist interlaced both the fingers and wrapped the hands around the shoulder joint. Then, the therapist delivered inferior translatory movements (around half a minute) and next applied MET to further get the humeral head's inferior translation.

## 4. STATISTICAL ANALYSIS AND RESULTS

Data was statistically analyzed using paired t-test. All the results are displayed in tabular format and graphically represented to visualize the statistically significant difference more clearly.

**Table 1 : Analysis of Paired t-test in between pre and post intervention values of SPADI and NPRS scale within Group received Spencer technique**

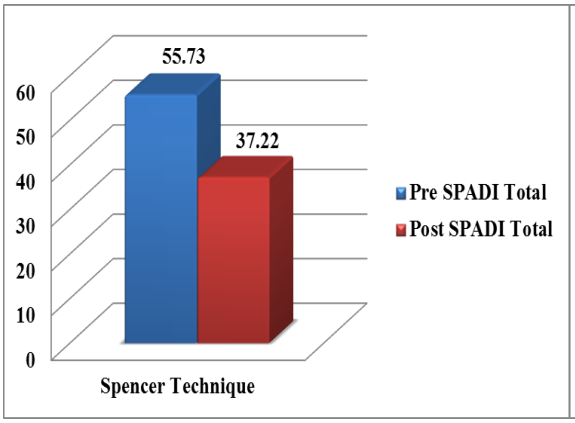
| Subscale Descriptive Data | **Paired t-test (Spencer Technique)** | | | |
|---|---|---|---|---|
| | **Mean & SD** | **Mean Diff** | **t-value** | **P-value** |
| Pre SPADI Total | 55.73 ± 4 | 18.51 | 58.906 | < 0.0001 |
| Post SPADI Total | 37.22 ± 4.06 | | | |
| Pre NPRS | 6.3 ± 0.73 | 2.85 | 26.045 | < 0.0001 |
| Post NPRS | 3.45 ± 0.51 | | | |

**Table 2 : Analysis of Paired t-test in between pre and post intervention values of Goniometer scale within Group received Spencer technique**

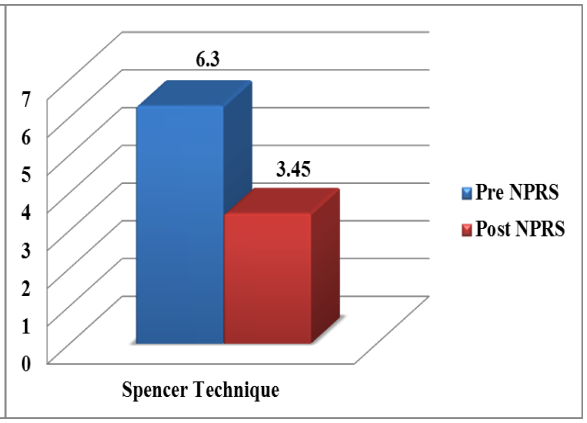
| **Subscale Descriptive Data** | **Paired t-test (Spencer technique)** | | | |
|---|---|---|---|---|
| | **Mean & SD** | **Mean Diff.** | **t-value** | **P-value** |
| Pre Flexion | 94.15 ± 7.66 | -22.5 | -44.533 | < 0.0001 |
| Post Flexion | 116.65 ± 8.71 | | | |

| | | | | |
|---|---|---|---|---|
| Pre Extension | 32.5 ± 6.23 | -11.8 | -25.526 | < 0.0001 |
| Post Extension | 44.3 ± 6.09 | | | |
| Pre Abduction | 86.65 ± 7.41 | -24 | -52.973 | < 0.0001 |
| Post Abduction | 110.65 ± 7.32 | | | |
| Pre Internal Rotation | 45.6 ± 5.91 | -18.35 | -38.901 | < 0.0001 |
| Post Internal Rotation | 63.95 ± 7.08 | | | |
| Pre External Rotation | 33.75 ± 5.38 | -21.3 | -67.18 | < 0.0001 |
| Post External Rotation | 55.05 ± 5.7 | | | |

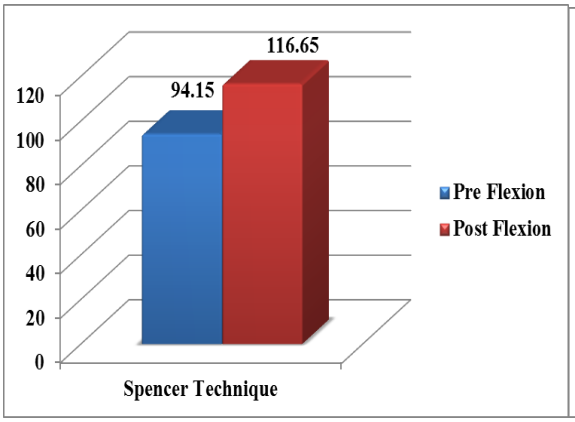
**Table 1 & 2 depicts paired t-test data of SPADI, NPRS and Goniometer scale in between pre and post intervention values within Group A, including mean, standard deviation, mean difference, t-value and p-value.**



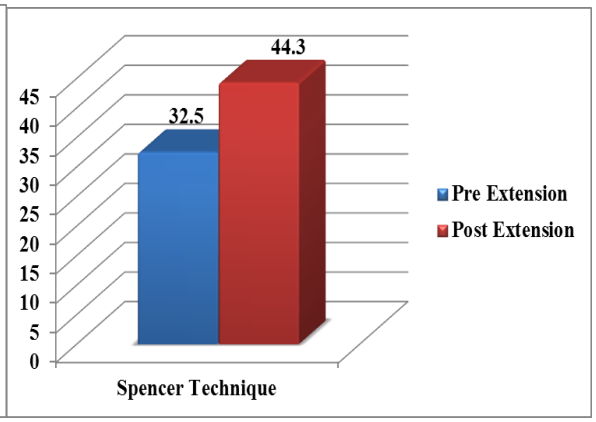

**Graph 1**



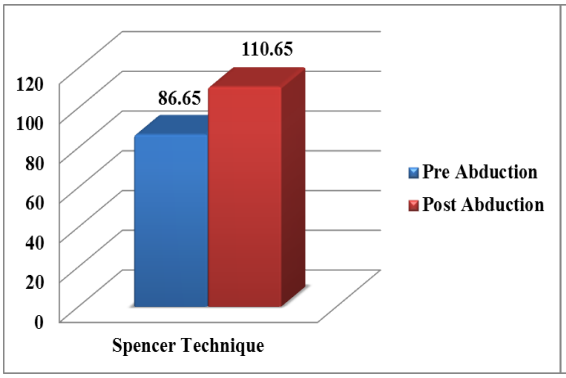

**Graph 2**



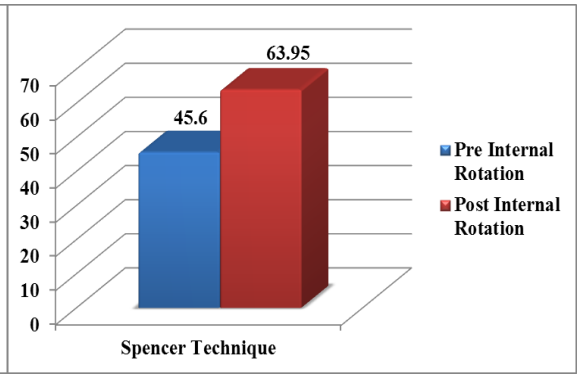

**Graph 3**



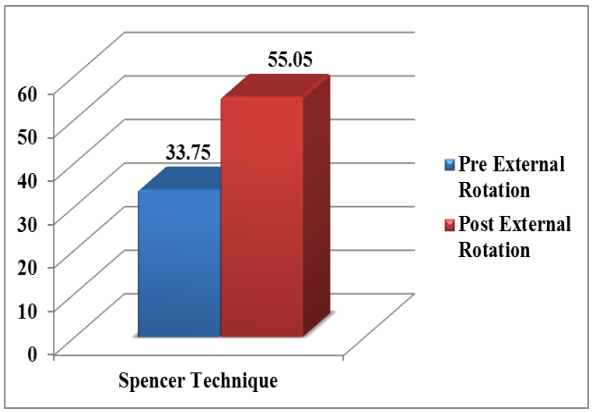

**Graph 4**




Graph 5




Graph 6




Graph 7

## 5. DISCUSSION

The purpose of this study was to evaluate the efficacy of Spencer technique in frozen shoulder patients. In this study, three outcome measures were taken in order to specify the results after the intervention of mobilization technique. Following a 6-week period, Spencer approach exhibited notable improvements in pain reduction, range of motion (ROM) and activity limitations. This greater efficacy may be due to its direct effect on joint structures and soft tissues.

The Spencer technique works on joint capsule, aims at joint play and adhesions by passive as well as active-assisted mobilisations. The seven steps of the technique gradually takes part in different planes of motion, directing to tissue release progressively, boosting the distribution of synovial fluid, and provoking the proprioceptors.

[13,14,15,16] Several of the physiological mechanisms can explain all of the observed benefits.

1. The shoulder joint is complex coupled with has a wide ROM because surrounding soft tissues are flexible along with integrity. The spencer technique uses passive mobilizations that systematically stretch the shoulder capsule, especially for areas affected by fibrosis and adhesion. The technique restores arthrokinematics as well as capsular compliance. Glenohumeral motion is improved on account of this restoration. (13)

The participants markedly improved as clear from post-treatment goniometric data in:

Flexion (↑ 22.5°), Extension (↑ 11.8°), Abduction (↑ 24°), Internal Rotation (↑ 18.35°), External Rotation (↑ 21.3°)

Important statistical improvements ($p < 0.0001$) showed the technique's ability to reverse capsular tightness and restore ROM.

2. Pain reduction is a likely result (mean NPRS drop from 6.3 to 3.45).

Mobilization is what stimulates mechanoreceptors, thereby inhibiting nociceptive transmission through gate control theory via neurophysiological modulation. (14,15)

Motion restoration equalizes the intra-articular pressure, thereby reducing the chemical irritants and also the inflammation, which in turn reduces the pressure on the joint.

Repeated mobilization is known to improve synovial fluid production, it also improves local circulation, easing tissue oxygenation, and even improving vascularity that leads to decreased stiffness as well as pain.

3. The SPADI scores, combining both pain and disability measurements – improved from 55.73 to 37.22 which revealed considerable reduction in functional outcomes.

These results were statistically significant, with p-values constantly < 0.0001 throughout pain, disability and total SPADI values.

These results are in line with previous study by Phansopkar et al. (2023) who found that the Spencer method significantly increased ROM and reduced pain and disability over multiple time points. (1) Also, study by Contractor et al. (2016) concluded that Spencer MET was more effective in reducing functional disability. (14) A comparative study by Ghaffar et al. (2023) also supported this study, it suggested that Spencer Mets has been more effective in reducing the pain of the patients as compared to PNF treatment. Healthcare professionals should consider the incorporation of Spencer as a viable option for pain management. (17)

Therefore, these findings suggest that incorporating this mobilization technique may lead to enhanced pain management and function.

## 6. CONCLUSION

This study concludes the more effectiveness of the spencer technique on frozen shoulder. It helps in more functional outcomes that includes pain relief and unrestricted range of motion.

The Spencer technique demonstrates to be a more all inclusive , rapid, and clinically effective technique which also addresses the main cause that is capsular adhesions. It gives relief through joint mobilization, neuromuscular relaxation and promoting movement of synovial fluid. For physiotherapists, involving the Spencer technique in the frozen shoulder treatment regime plan, which is also an evidence based strategy, should be of top consideration.

## LIMITATIONS

- Small sample size
- Short duration of study
- Absence of follow-up assessments.

## RECOMMENDATIONS

- Larger sample size should be included.
- The time duration can be increased
- Follow-up assessments could be incorporated

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