

# Effect of Spencer Technique Combined with Conventional Physiotherapy on Pain and Functional Disability in Patient with Shoulder Impingement Syndrome: An Experimental Study

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DOI: <https://doi.org/10.52403/ijhsr.20230640>

## ABSTRACT

**BACKGROUND:** Shoulder impingement syndrome (SIS) resulting due to structural change that mechanically narrow sub-acromial space and functional disturbance of centering humeral head muscles imbalance leading to abnormal displace and soft tissue entrapment in SIS. Dull aching pain has developed with reduction of ROM, arm force & rotator cuff muscles strength, usually pain affects the activity of daily life.

**AIM:** The aim of the study is to find out effect of spencer technique combined with conventional physiotherapy on pain and functional disability patients with SIS.

**METHODOLOGY:** The interventional study was done on 30 patients with SIS. Basis on selection criteria patients were randomly divided into two groups. Group A: Experimental group consisted of 15 patients who received spencer technique combined conventional physiotherapy and Group B: Control group consisted of 15 patients who received conventional physiotherapy. Intervention for each group was given for 5 days per week for 2 weeks. NPRS and quick DASH were taken as outcome measure pre & post intervention.

**RESULTS:** Pair T Test and unpair T test were used for intergroup and intragroup data analysis respectively. Analysis showed that there was a significant difference in NPRS and quick DASH ( $P < 0.05$ ) respectively for Group A and group B. Between the group there was a significant difference in NPRS and quick DASH ( $P < 0.05$ ) respectively.

**CONCLUSION:** The result shows that spencer technique combined with conventional physiotherapy can be significantly effective in reduction of pain and functional disability in patients with SIS.

**KEY WORDS:** SIS, Spencer technique, pain, disability.

## INTRODUCTION

Shoulder pain is very common; it is the second most frequent musculoskeletal disorder.<sup>1</sup> The estimated prevalence of shoulder complaints is 7% to 34%, often with SIS as the underlying causes.<sup>2</sup> The annual incidence of shoulder disorder is estimated to be about 7% but an incidence of up to 14% has been found in working populations. Peak incidence is during the

sixth decade of life.<sup>3</sup> SIS was introduced in 1972 by Neer, who divided it into three stages: Stage I: Edema and hemorrhage, Stage II: Fibrosis and tendinitis, Stage III: Tears of the rotator cuff, biceps ruptures, and bone changes (Neer 1983). SIS was initially described as arising from the mechanical friction of the tendon under the acromion (Neer 1972). Two main classifications have been described to define

the etiology of SIS: the mechanical (extrinsic) and the degenerative (intrinsic) theory. They are sometimes also called the structural and functional theories. Extrinsic mechanisms can be arranged by dividing SIS into anatomical factors (the shape of the acromion and AC degeneration), and biomechanical factors (scapular kinematics, humeral kinematics, the influence of posture such as thoracic spine kyphosis, muscle deficit, and soft tissue tightness).<sup>4</sup> Intrinsic mechanisms include changes that contribute to the tendons themselves. These can arise from alterations in biology, degeneration, aging, diminished blood supply, and alterations in mechanical properties, tensile/shear overload, overuse, or trauma along the morphology.<sup>4</sup> Several risk factors are common in the age, gender, hand dominance, work, obesity, psychological & psychosocial factors, and other factors like DM, Parkinson disease and Stroke are also risk factors for shoulder pain.<sup>5</sup> Those tests specific to SIS include the Hawkins Kennedy test, Neer test, Jobe test, and a painful arc sign. Individually, these tests have low sensitivity and specificity, but when combined, they can help complete the picture of SIS.<sup>6</sup>

The spencer technique is particularly useful because of its broad application in diagnosis, treatment, and prognosis. It is developed by Spencer, D.O. in 1916. The evolution of this technique is traced from 1916 to date to try to identify factors in the development of manipulative methods. Spencer had first tried this technique in baseball players with shoulder pain due to trauma and had achieved great success. Spencer technique is an articular technique with seven different procedures used to treat shoulder restriction caused by shoulder pathologic conditions leading to pain and motion loss were bursitis, tendinitis, synovitis and capsulitis involving any of the shoulder soft tissue structures. In this technique passive, smooth, rhythmic motion is designed to stretch contracted muscles, ligaments, capsules and bursa. This technique improves shoulder mechanics,

improve joint range of motion, improve joint mobility, improve strength weak muscles, restoring normal muscles tone in hypertonic muscles, stretches local tissue, improving lymphatic flow, improving proprioceptive inputs, boosting local circulation flow, and improving musculoskeletal function.<sup>7</sup>

Shoulder impingement syndrome has severe effects on the patient's perception of their general health. The impingement begins gradually, after which it is commonly recurrent or chronic and it often affects people of working age. In industrial countries, impingement syndrome can be a tremendous burden. As a long-lasting condition, it brings significant economic consequence through treatment costs and productivity losses. It is clear need for the effectiveness and time management of the condition which will ensure recovery and avoid chronicity. Hence the purpose of current study is to evaluate the effect of spencer technique combined with conventional physiotherapy on pain and function disability in patient with SIS.

## METHODOLOGY

- **Study design:** Experimental study.
- **Study setting:** Shri K.K. Sheth Physiotherapy College, Rajkot.
- **Source of data collection:** Various physiotherapy centers in and around Rajkot city.
- **Method of data collection:** 30 patients with SIS with age group of 18 - 75 years were selected purposive sampling technique. The proposed title and procedure were approved by ethical committee members and written consent was taken from patient.
- **Sample size:** Total 30 Patients. (The sample size was calculated by  $n = 2 \frac{S^2 (Z_1 + Z_2)^2}{(M_1 - M_2)^2}$  ). **Treatment duration:** 5 days/week, for 2 weeks.
- **Eligibility criteria:**  
**Inclusion criteria:** (1) age between 18 to 75 years, (2) Male and female are both, (3)

Patients those who are clinically diagnosed as SIS, (4) Presence of one the following sign indicating SIS: Neer's impingement test, Hawkins-Kennedy impingement test, Painful arc sign during active flexion or abduction shoulder joint, (5) Shoulder pain during one of the following resistance tests: External rotation, internal rotation, abduction or flexion, (6) Shoulder pain for at least last four weeks.

**Exclusion criteria:** (1) Shoulder surgery in the last 1 years on the involved side, (2) Aggravating of symptom with active and passive cervical movement, (3) Neurological involvement with sensory and muscular deficit, (4) Complete tear of rotator cuff muscles, (5) Frozen shoulder, (6) Previous history of shoulder dislocation, (7) inflammatory joint disease (e.g., rheumatoid arthritis).

• **Measurement procedure:**

A pre-participation evaluation consisting of a basic musculoskeletal assessment chart was filled. NPRS and quick DASH was taken pre & post intervention. Patients were then explained about the test and procedure to be conducted.

• **Intervention**

**Group A (Experimental group):** 15 patients were given spencer technique combined conventional physiotherapy to find changes in pain and functional disability in patient with SIS.

**Spencer technique:** The patient lies in the lateral recumbent position with shoulder to be treated facing towards the ceiling. The patient's back is perpendicular to the table, with the lower knee and hip flexed to prevent any forward roll. and pillow is placed under the patient's head to keep it in midline position and therapist stands facing the patient. Resistance against the attempted extension, flexion, abduction, adduction, external rotation and internal rotation (Reciprocal inhibition) has been found to be helpful in augmenting the effect.

Stage 1: Shoulder extension with elbow flexion, Stage 2: Shoulder flexion with elbow extension, Stage 3: Circumduction with compression, Stage 4: Circumduction with distraction, Stage 5: Shoulder abduction and external rotation with elbow flexion: Stage A: Shoulder abduction and Stage B: Shoulder adduction and external rotation, Stage 6: Shoulder internal rotation with elbow flexion, Stage 7: Distraction in abduction.<sup>8</sup>



Stage 1



Stage 2



Stage 3



Stage 4



Stage 5(A)



Stage 5(B)



Stage 6



Stage 7

**Group B (Control group):** 15 patients were given conventional physiotherapy to find changes in pain and functional disability in patient with SIS.

#### **Conventional physiotherapy<sup>9</sup>**

Active assisted exercise shoulder joint: Shoulder wheel exercise, wall slider exercise, finger ladder exercise, stick exercise: Patients standing position (15 repetition), Rope and pulley exercise: Patients sitting position (15 repetition). Scapular stabilization exercise: Prone lying patient position - Y, T, I exercise (15

repetition).<sup>10</sup> Maitland mobilization for shoulder joint: Supine & Prone position of the patient (Grade 2 or 3: Anterior, Posterior and Inferior glides). Shoulder strengthening exercise: Flexion and Abduction (Sitting position), IR and ER (Side lying), Extension (Prone position) (15 Repetitions). TENS: Position of the patients: Sitting or high sitting position [Pulse duration: 50-200 $\mu$ s, Frequency: 80-120 Hz, Pulse duration: 50-200 $\mu$ s, Time: 15-20-minute, Intensity: 12-30 mA].<sup>11</sup>

- **Outcome measure:** Patients were again reevaluated after the period of two weeks of intervention on outcome measures NPRS, and quick DASH scale. The values of pre and post data were then evaluated to formulate the result.

## STATISTICAL ANALYSIS

All statistical analysis was done by Statistical Package of Social Science (SPSS) statistics version 26.0 for windows software.

## RESULT

**Table 1: Mean (in years) and SD of age Group A and Group B.**

	Group A	Group B
No. patients	15	15
Mean $\pm$ SD	40.73 $\pm$ 10.47	45.27 $\pm$ 11.26
Minimum	18	18
Maximum	60	60

**Table 2. Intra group comparison of NPRS and quick DASH for Group A.**

Parameters	Mean $\pm$ SD		T	P	Result
	Pre	Post			
NPRS	50.00 $\pm$ 11.33	13.66 $\pm$ 6.11	0.361	0.000	Significant
Quick DASH	45.61 $\pm$ 9.29	17.27 $\pm$ 4.38	0.864	0.000	Significant

**Table 3. Intra group comparison of NPRS and quick DASH for Group B.**

Parameters	Mean $\pm$ SD		T	P	Result
	Pre	Post			
NPRS	52.66 $\pm$ 15.79	26.00 $\pm$ 11.21	0.911	0.000	Significant
Quick DASH	51.10 $\pm$ 14.43	30.40 $\pm$ 9.51	0.941	0.000	Significant

**Table 4. Inter group comparison of NPRS and SPADI for Group A and Group B.**

Parameters	Mean $\pm$ SD		T	P	Result
	Pre	Post			
NPRS	51.33 $\pm$ 13.57	19.83 $\pm$ 10.86	-2.98	0.003	Significant
Quick DASH	48.28 $\pm$ 12.27	23.83 $\pm$ 9.87	-4.017	0.000	Significant

## DISCUSSION

The aim of the study was to determine if spencer technique combined conventional physiotherapy had showed an improvement in pain and functional activity of the patients having SIS. In that total patients selected included were 30, 15 were allotted in Group A (Experimental group) and 15 were allotted in Group B (Control group). Improvement in Group A (Experimental Group): The spencer technique combined with conventional physiotherapy has been given to the participant with for improving their functional activity and pain. These exercises shown significant improvement in pre and post treatment with the mean value in NPRS is 50.00 and quick DASH is 45.61 respective. The difference between pre and

Normality of data was checked by using Shapiro Wilk test which shows that data for NPRS & quick DASH of Group A and Group B is of parametric type. Intra-group pretreatment and posttreatment data of NPRS and quick DASH was analyzed by paired T test. Inter-group comparison of NPRS and quick DASH was analyzed by unpaired T test. Level of significance (P value) was set to 0.05 value.

post treatment was significant with the P value < 0.05; which concluded that there is significant difference present. Thus, spencer technique combined with conventional physiotherapy also showed significant improvement in the pain and functional activity of individuals having SIS. Pain was reduced after intervention, the possible mechanism includes neurological and tissue factors, such as stimulation of low threshold mechanoreceptors on centrally mediated pain inhibitory mechanism and on neuronal populations in the dorsal horn with possible gating effect. Low threshold mechanoreceptors from the joints and muscles project to the periaqueduct grey in the midbrain region. During isometric contraction, activation of

muscle and joint mechanoreceptors occur. This leads to sympatho-excitation evoked by somatic efferent and localized activation of PAG that plays a role in descending modulation of pain. Nociceptive inhibition then occurs at the dorsal horn of the spinal cord, as simultaneous gating takes place of nociceptive impulses in dorsal horn, due to mechanoreceptor stimulation. Possible mechanism behind increase in ROM by MET is that muscle contraction against equal counterforce triggers the Golgi tendon organ. The afferent nerve impulse from the Golgi tendon organ enters the dorsal root of the spinal cord and meets with an inhibitory motor neuron. This stops the discharge of the efferent motor neurons impulse and therefore prevents further contraction, the muscle tone decreases, which in turn results in the agonist relaxing and lengthening, so there is increase in the ROM. A study conducted by Raksha R. Jivani et al., (2021) on "Effect of Spencer Muscle Energy Technique Versus Maitland's Mobilization Technique on Pain, ROM and Disability in Patients with Frozen Shoulder: A Comparative Study." This study concluded Spencer Muscle Energy Technique and Maitland Mobilization are effective for improving pain, reducing disability and increasing ROM, when given along with conventional exercises.<sup>12</sup> However, spencer muscles energy technique is the more effective to improving pain, reducing disability and increasing ROM compared to Maitland Mobilization in patients with frozen shoulder.

Improvement in Group B (Control Group): Conventional therapy was given the treatment for the shoulder impingement included TENS, Maitland mobilization shoulder joint, Active assisted exercises shoulder joint, shoulder muscles strengthening exercises and posterior capsular stretch was given to improve the shoulder range of motion, pain and functional disability of the joint, mean score before the treatment of NPRS was 52.66 and quick DASH was 51.10 respectively. The improvement in pain and functional activity

after the conventional therapy is described by Paula R. Camargo et al., (2015) on a study done which states that "The findings of this study indicate that the addition of manual therapy to an exercise protocol does not provide added benefits to improving pain and function in individuals with SIS. Given the large improvement in pain and function and the absence of changes in scapular kinematics post-intervention, it appears that improvements in pain and function are not likely explained by changes in scapular motion. However, it is possible that some individuals may or may not benefit from the addition of manual therapy due to the wide CIs found for the scapular kinematic data." The study showed that exercise protocol i.e., conventional therapy had an effective improvement in pain and functional disability in SIS.<sup>13</sup>

Comparison between spencer technique combined conventional physiotherapy VS conventional physiotherapy in patients with shoulder impingement syndrome. Both the group shows significant improvement with the treatment. But when compared between both the Groups A showed significant improvement compared to group B. The results were calculated using unpair T test to compare the mean of the two groups, which was found to be significant in NPRS and quick DASH. The difference was significant which says that group A showed significantly more improvement compared to group B. According to the researches and findings spencer technique combined with conventional physiotherapy improved pain and functional disability of the patients having SIS. As a result, we reject the null hypothesis and accept the alternative hypothesis, which states that spencer technique combined with conventional physiotherapy significantly improved SIS, healthy individuals as measured by the NPRS and quick DASH.

Clinical implication: The Spencer technique can be added to the in the treatment protocol for SIS patient.

Limitation: Blinding was not done in the study.

Future scope: Spencer technique can be used in other shoulder conditions & Other outcome measure could be used.

## CONCLUSION

The result shows that spencer technique combined with conventional physiotherapy can be significantly effective in reduction of pain and functional disability in patients with SIS.

## Abbreviations:

SIS: Shoulder impingement syndrome

MET: Muscles energy technique

ROM: Range of motion

## Declaration by Authors

**Ethical Approval:** Approved

**Acknowledgement:** The author would like to thank shri K.K. Sheth physiotherapy center, Rajkot for providing the research facilities. Dr. Hardik Trivedi and Dr. Jayvant Gohil and Dr. Grishma Zalavadiya had same contributor for this research.

**Source of Funding:** None

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

## REFERENCES

1. Nyawose ZZ, Naidoo R. Prevalence of shoulder musculoskeletal disorders among school teachers: a systematic review. South African Journal Research Sport, Physical Education Recreation. 2019 Dec 11;41(3): 51–61.
2. Nazari G, McDermid JC, Bryant D. The effectiveness of surgical vs conservative interventional on pain and functional in patients with shoulder impingement syndrome. A systematic review and meta-analysis. PLoS One. 2019; 14(5).
3. Saara Ketola. SIS Arthroscopic acromioplasty offers no additional benefits compared to structured exercise treatment. Acta universitatis Tampensis 2146. Tampere University Press Tampere 2016. ISBN 1455-1616.
4. Philip W. McClure et al. Mechanisms of rotator cuff tendinopathy: intrinsic, Extrinsic, or both. Clinical Biomechanics. Volume 26, Issue 1, January 2011, Page 1-12.
5. Ahmad RG. Shoulder impingement: various risk factors for supraspinatus tendon tear: A case group study. Medicine (Baltimore). 2022 Jan 21;101(3).
6. Cools AM, Cambier D et al., Screening the athlete shoulder for impingement syndrome: a clinical reasoning algorithm for early detection of shoulder pathology. Br J Sports Med. 2008 Aug; 42(8): 628-35.
7. Patriquin D. The evolution of osteopathic manipulative technique: The Spencer technique. J Am Osteopath Assoc. 1992 Sep 1; 92:1134–6, 1139.
8. Alexander S. Nicholas Evan A. Nicholas. Atlas of osteopathic techniques 2nd edition. Ch 17. Page no: 532 to 540.
9. Brozman MD, S. Kevin E. Wilk clinical orthopedic Rehabilitation 2<sup>nd</sup> Edition. Chapter 3: Shoulder injury. Page no 154-155.
10. Ravichandran H, Janaki Raman B. Effect of scapular stabilization exercise program in patients with subacromial impingement syndrome: a systematic review. J Exerc Rehabil. 2020 Jun;16(3):216–26.
11. Val Robertson, Alex Ward, John Low and Ann Reed. Electrotherapy explained principles and practice Forth Edition. Ch 6. Page no 177-178.
12. Jivani RR et al. 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 Physiotherapy Res. 2021 Aug 11 ;9(4):3928–36.
13. Camargo PR. Effects of Stretching and Strengthening Exercises, With and Without Manual Therapy, on Scapular Kinematics, Function, and Pain in Individuals with Shoulder Impingement: A Randomized Controlled Trial. J Orthop Sports Phys Ther. 2015 Dec;45(12): 984–97.

How to cite this article: Jayvant Gohil, Grishma Zalavadiya, Hardik Trivedi. Effect of spencer technique combined with conventional physiotherapy on pain and functional disability in patient with shoulder impingement syndrome: an experimental study. *Int J Health Sci Res.* 2023; 13(6):248-254.  
DOI: <https://doi.org/10.52403/ijhsr.20230640>

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