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Comparing Efficacy of Spencer Techinique Versus Proprioceptive Neuromuscular Facilitation on Pain, Rom, and Disability in Patients with Supraspinatus Tendinitis

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Abstract:
Supraspinatus tendinitis is marked by painful, gradual reduction in both active and passive shoulder of the joint. This condition has an unknown cause and is characterized by a slowly worsening, painful limitation of all joint movements, with spontaneous partial or complete recovery occurring over several months to years. It generally affects around 2-5% of adults, mainly those between the ages of 40 and 60. The Spencer technique is a methodical approach to shoulder treatment that has a wide range of applications for diagnosis and treatment. This technique is a well-recognized osteopathic manipulative approach that focuses on mobilizing glenohumeral and scapulothoracic joints. Its goal is to improve the functionality of restricted joints while also positively influencing various emotional, social, and cognitive dimensions. Proprioceptive neuromuscular facilitation (PNF) is a crucial technique utilized in rehabilitation as a primary intervention. This stretching method can enhance muscle performance and has been shown to positively affect both the active and passive range of motion in individuals with limited shoulder mobility. Rehabilitation therapists have employed PNF to aid in recovery. No study has compared Goods of Spencer ways and proprioception neuromuscular facilitation ways for subjects with supraspinatus tendinitis. Hence, the study has compared Goods of Spencer ways and proprioception neuromuscular facilitation ways for subjects with supraspinatus tendinitis.

Keywords: Spencer technique, proprioceptive neuromuscular facilitation, supraspinatus tendinitis.

Introduction:

The supraspinatus tendon unit receives the greatest load during shoulder abduction. This promotes compression of the humeral head during abduction and anteversion. This pressure keeps the humeral head centered in the glenoid fossa, preserving the mechanical advantage of the deltoid muscle and thus maintaining its strength. The tendon itself is attached to the top and front of the greater tuberosity. Tendinopathy is a general term used to describe conditions characterized by pain in and around the tendon associated with repetitive activity and dysfunction that occurs when the tendon does not regenerate properly during the healing process. For inflammation of the supraspinatus muscle. Lesions can be in one of four different locations and are easily distinguished by the presence or absence of painful arch pain or

complete elevation pain. Periosteal site of Teno: This lesion site is characterized by limited painful abduction with a painful arch and indicates that the lesion is located between the acromion and greater tuberosity. As a result, short-term pain occurs when the inflamed area is compressed under the acromial arch when raising the arm, the arch becomes more pronounced when raising the arm with the palm up, and the lesion is localized in front of the periosteal junction of the tendon. The pain is worse when I move my palm down, and I can see that the pain is behind the insertion of the tendon. Deep at the periosteal junction of the tendon: At this lesion site, there is aching pain on abduction with resistance to full passive elevation, indicating that the lesion is located deep at the periosteal junction of the tendon, with the rough tubercle and glenoid rim pinching the tendon. The first is prolonged necrosis of the tendon and subsequent formation of a fibrocartilage mass. Calcium salts (hydroxyapatite) are then deposited on the mass, forming calcifications. The lack of blood supply to the critical area, the distal supraspinatus, is caused by the constant pressure of the humeral head on the tendon during arm abduction. Traditional treatments for supraspinatus tendonitis include shoulder rotation, pain-free ROM exercises, active shoulder joint exercises, resistance exercises to improve muscle strength, and physical therapy to reduce pain. SPADI was developed to assess the degree of shoulder pain and discomfort in patients' daily activities without medical intervention. SPADI has been shown to have good interval reliability and consistency. Traditional treatments are only effective in reducing pain and disability. Between-group analysis showed that there was no significant difference in adduction motion with and without the Spencer maneuver. In summary, this study concluded that adduction exercises with or without the Spencer technique are equally effective in reducing pain, range of motion, and functional disability. Kabat and Noth developed the PNF method in the early 1950s.

Common movements are performed as normal physiological movements of joints in a plane, such as flexion (or) abduction (or) rotation. The hold-relaxation and contraction-relaxation techniques are based on the neurophysiology of reciprocal innervation, isometric post-relaxation (self-inhibition), and relaxation-tension. Rehabilitation therapists use PNF to restore functional range of activity and improve overall strength, balance, and coordination in patients with soft tissue injuries. All PNF techniques are performed according to a basic technique in which the execution of rotational movements is one of the main components. Various techniques can be used to improve muscle strength and flexibility, including rhythmic initiation, repetitive contractions, The techniques of rhythmic stabilization, isotonic combinations, dynamic inversions, hold-relaxation, and contraction-relaxation are employed. The Numerical Pain Rating Scale (NPRS) serves as a unidimensional assessment of pain intensity in adults, including those with chronic pain. Notable test-retest reliability has been found in both literate and illiterate individuals with rheumatoid arthritis before and after a doctor's consultation ($r = 0.96$ and 0.95, respectively). Regarding construct validity, the NPRS exhibits strong correlations with the Visual Analog Scale (VAS) among patients suffering from rheumatic and other types of chronic pain (pain lasting over 6 months), with correlation values between 0.86 to 0.95. Consequently, this study aims to assess the effectiveness of Spencer's technique in comparison to proprioceptive neuromuscular techniques for alleviating pain, increasing range of motion (ROM), and improving functional capacity in individuals with adhesive capsulitis.

METHODS AND PROCEDURE:

This study was an Experimental study design with pre and post comparative type. The study included 50 subjects based on inclusion criteria. This study included patients between age 40 to 60 years and excluded

those with recent surgery, open wounds, ligament tears and cardiac problems. Then they were divided into two groups by simple random sampling of lottery methods. The subjects were explained about the study and written consent form was collected. Group A treated with spencer technique and joint mobilization and Group B treated with proprioception neuromuscular facilitation for 8 weeks 5 sessions per week. Pre and post tests were conducted using VAS SCALE, SPADI and ACTIVE AND PASSIVE ROM using goniometer. GROUP A Spencer Muscle Energy Method: The therapist stood in front of the patient, stabilising the superior aspect of the shoulder girdle while the patient lay on their side with the shoulder to be treated uppermost. The arm was used as a long lever, and the fixed shoulder girdle served as a resistant structure against which to stretch the soft tissues surrounding the glenohumeral articulation. The patient's wrist and forearm are then supported by the therapist, who moves the arm passively, smoothly, and rhythmically while being carried as far as the patient's tensed muscles, ligaments, and shoulder capsule will allow.

GROUP B- proprioceptive neuromuscular technique. The patients were treated with D2 Pattern of proprioception neuromuscular facilitation techniques D2 proprioceptive neuromuscular facilitation flexion The subject should be in a supine position with their head and neck in a comfortable, almost neutral position. The affected upper extremity was in the following positions: elbow extension, forearm pronation, wrist and finger flexion, shoulder extension, adduction, and internal rotation, and forearm laying across the umbilicus. The therapist uses a lumbrical grip with one hand to hold the subject's hand's dorsum. The subject's forearm is grasped at the elbow by the other hand. The therapist places one foot forward and stands in a stride stance by the patient's shoulder. The therapist begins by placing his weight on his front foot and allows the subject's movement to drive his weight toward his back foot. The therapist uses his proximal grip to quickly traction and stretch the patient's affected shoulder.

Result:

The numerical pain rating scale, shoulder pain and disability index, and shoulder range of motion (flexion, abduction, internal rotation, and external rotation) showed significant differences in mean values at $P \leq 0.05$ between the pre-test and post-test for group A (Spencer Muscle Energy Technology) and group B (PNF). The findings demonstrated that for the pain, mobility problems, and impairment related to supraspinatus tendinitis, the Spencer muscle energy technique outperformed the proprioceptive neuromuscular facilitation technique. The Statistical Package for the Social Sciences (SPSS) version was used to estimate each parameter. The Shapiro-Wilk test in this investigation revealed that the dependent values had a normal distribution with $P > 0.05$. Consequently, a parametric test was used. We employed a paired t-test to ascertain significant differences between groups. Student t test used determine statistical difference between 2 groups.

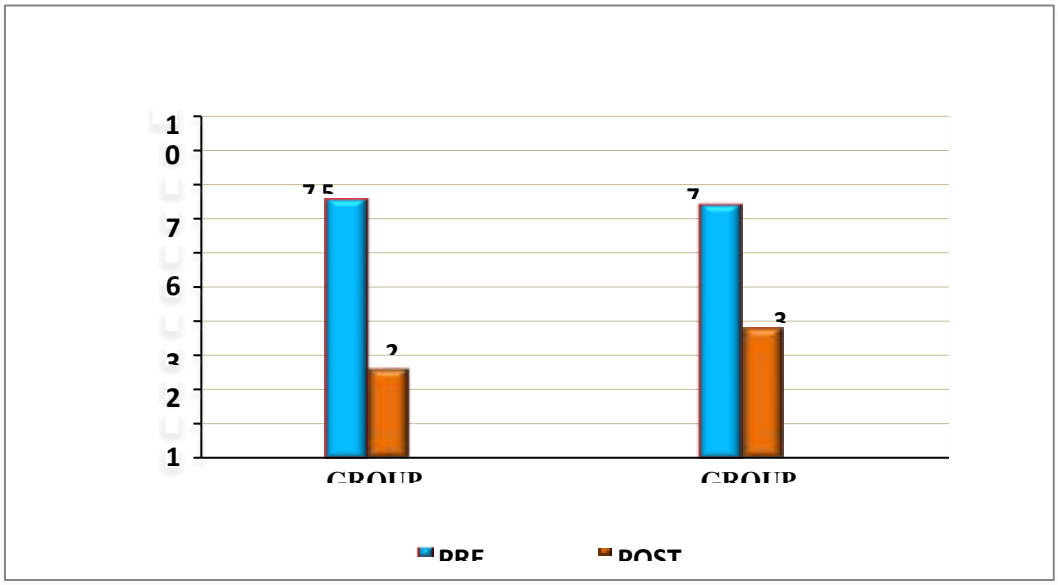
PRE TEST AND POST TEST B BETWEEN GROUP – A AND GROUP B (NPRS)

GROUP	PRE TEST		POST TEST		t - TEST	SIGNIFICANCE
	MEAN	S. D	MEAN	S. D		
GROUP- A	7.56	.506	2.60	.500	46.05	.000**

GROUP-B	7.40	.816	3.80	.816	27.88	.000**

(- P ≤ 0.05 - Significant)**

The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value between pre-test and post-test within Group – A & Group – B. There is a statistically significant difference between the pretest and posttest values within Group A and Group B at P ≤ 0.05.

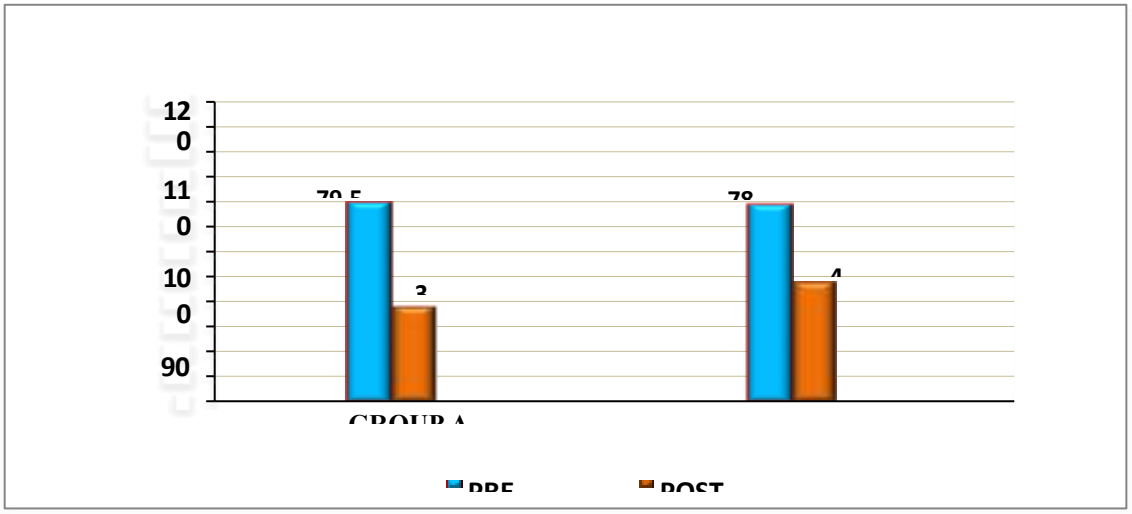


NPRS SCORE WITHIN GROUP – A AND GROUP – B BETWEEN PRE TEST AND POST TEST

COMPARISON OF SPADI SCORE WITHIN GROUP – A AND GROUP – B BETWEEN PRE TEST AND POST TEST

GROUP	PRE TEST		POST TEST		t - TEST	SIGNIFICANCE
	MEAN	S. D	MEAN	S. D		
GROUP-A	79.52	4.10	38.00	2.21	44.25	.000**
GROUP-B	78.60	2.78	48.00	3.42	40.41	.000**

(- P ≤ 0.05 - Significant)**



SPADI SCORE WITHIN GROUP – A AND GROUP – B BETWEEN PRE TEST AND POST TEST

SHOULDER JOINT ROM WITHIN GROUP – A BETWEEN PRE TEST AND POST TEST

GROUP A TEST	PRE TEST		POST TEST		t - TEST	SIGNIFICANCE
	MEAN	S. D	MEAN	S. D		
Flexion	103.60	8.60	136.40	7.97	-29.51	.000**
Abduction	98.60	7.97	126.00	9.12	-12.24	.000**
Internal Rotation	25.60	5.06	54.40	7.54	-18.76	.000**
External Rotation	22.60	6.63	44.80	8.83	-16.00	.000**

SHOULDER JOINT ROM WITHIN GROUP – A BETWEEN PRE TEST ANDPOST TEST

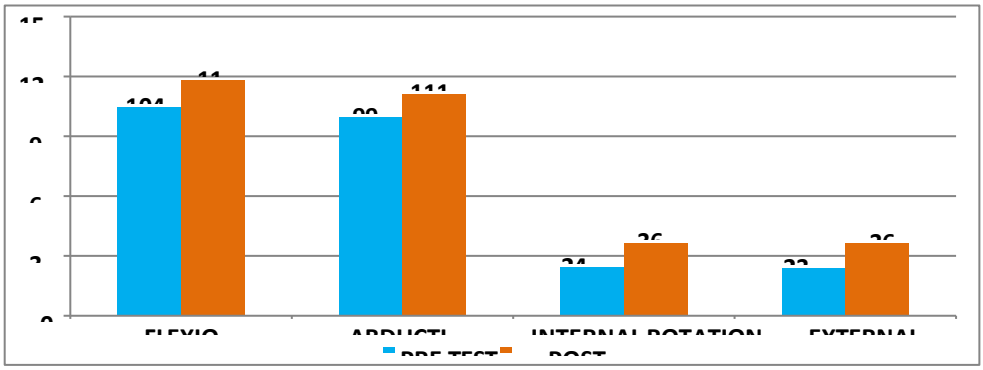
GROUP – B PRE TEST AND POST TEST (SHOULDER JOINT ROM)

GROUP B TEST	PRE TEST		POST TEST		t - TEST	SIGNIFICANCE
	MEAN	S. D	MEAN	S. D		
Flexion	104.40	7.11	118.00	8.16	-13.88	.000**
Abduction	99.60	9.78	111.20	8.32	-15.50	.000**
Internal						

Rotation	24.40	7.11	36.60	6.57	-14.86	.000**
External Rotation	23.60	6.37	36.40	7.43	-19.67	.000**

(- P ≤ 0.05 - Significant).** The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value between pre-test and post-test within Group – B. There is a statistically significant difference in between the pretest and posttest values within Group B at P ≤ 0.05.

SHOULDER JOINT ROM WITHIN GROUP – B BETWEEN PRE TEST AND POSTTEST



DISCUSSIONS:

This study was compare to the effects of Spencer Muscle Energy and Proprioceptive Neuromuscular Facilitation on pain, ROM, and disability in patients with supraspinatus tendonitis. The patient was treated using the Spencer Muscle Energy Method. Group A and PNF were assigned to group B. Over a period of 8 weeks, pain was assessed by VAS and SPADI in conjunction with ROM assessment using a goniometer. Improvements in the above parameters were observed in both groups. This study shows in Table 1 that the mean NPRS between the pre-test mean (7.56) and post-test mean (2.60) in group A showed a significant difference. Similarly, Table 2 showed a significant difference in the mean SPADI scores between the pre-test mean (79.52) and post-test mean (38.00) for Group A. Similarly, Table 3 shows the mean values of shoulder ROM and pre-test flexion (103.60), abduction (98.60), internal rotation (25.60), and external rotation (22.60) and the mean values of shoulder flexion (136.40), abduction (126.00), internal rotation (54.40), and post-test external rotation for Group A (44.80), which showed a significant difference. Similarly, there is no significant difference in the mean NPRS scores between Group A's pretest mean (7.56) and Group B's pretest mean (7.40). At the end of the treatment session, Group A's post-test mean (2.60) was significantly different from Group B's post-test mean (3.80). Similarly, the SPADI mean between Group A's pretest mean (79.52) and Group B's pretest mean (78.60) showed no significant difference. Group A's post-test mean (38.00) shows a significant difference from Group B's post-test mean (48.00). Similarly, the mean values of shoulder ROM for group A are between the mean values for shoulder flexion (103.60), abduction (98.60), internal rotation (25.60), and external rotation (22.60), and the mean values for post-test shoulder ROM for group A are the mean values for shoulder flexion (136.40), abduction (126.00), internal rotation (54.40), and external rotation. (44.80) indicates that there is a significant difference between the mean pre-test shoulder ROM values of shoulder flexion (104.40), abduction (99.60), internal rotation (24.40), and external rotation (23.60) in group B and the mean values of shoulder ROM after the test (shoulder flexion (118.00), abduction (111.20), internal rotation (24.40), and external rotation (23.60) in groupB).

LIMITATION OF THE STUDY

Only selected age groups were included.
Sample size may be small.
Shorter duration of treatment.
There is no long term follow up of the patient

RECOMMENDATION OF THE STUDY

Larger sample size can be used
Study period can be increased
More task specific exercises can be included
Along with mobilization modalities can be suggested for pain

CONCLUSION:

This study concluded that both groups of patients with supraspinatus tendonitis, ROM, and disability pain experienced improvement with Spencer muscle energy and proprioceptive neuromuscular facilitation techniques. Comparing the two groups, group A (Spencer muscle energy technique) showed better improvement than group B (proprioceptive neuromuscular facilitation technique) in patients with supraspinatus tendonitis. Group A (Spencer muscle energy technique) showed positive improvement in post-test performance compared to group B (proprioceptive neuromuscular facilitation technique).

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