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Effectiveness Of Ultrasound With And Without Spencer Muscle Energy Technique In Subjects With Periarthritis Of The Shoulder - A Randomized Controlled Trial (Rct)

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Abstract: **Context:** The frozen shoulder is a common cause of shoulder pain and decrease in range of motion. Patients with Adhesive capsulitis have difficulties in everyday activities (dressing, grooming, and performing overhead reaching activities and so on for a period of several months to several years) and shoulder pain disturbing sleep at night on the affected side. Most patients slowly improve over 12 to 24 months. Some have prolonged loss of movement, pain, and associated disability. Various treatments options include physiotherapy, corticosteroid injections, and manipulation etc.… Clinical trials of these treatments have produced conflicting results. So, the aim of the study is to focus on ultrasound with and without spencer muscle energy technique on functional disability among peri-arthritis shoulder. Most of the study focused on the treatment duration of 3 to 4 months for peri-arthritis shoulder. The novelty of this study is to know the effectiveness of spencer muscle energy technique on ROM and Functional disability with the short duration of 4 weeks among patient with peri-arthritis shoulder.

Settings and Design: 80 patients were selected based on selection criteria and they were divided in to two group pre- test score were taken using SPADI and GONIOMETER and then Group A gets (Intervention) spencer muscle energy technique along with ultra sound and then group B gets (control) ultra sound for a period of 4 week and at the end of last session post - test of functional disability score using (SPADI) and range of motion score using (GONIOMETER) were taken.

Result: The results of this study show significant improvement in spencer muscle energy technique with ultrasound therapy Group A much better than the ultrasound therapy Group B among peri arthritis shoulder.

Keywords **- Ultrasound, Spencer Muscle Energy Technique, Peri Arthritis Shoulder.**

I. INTRODUCTION

The shoulder is considered to be the most mobile joint in the human body. It is better to call the shoulder complex because it takes a series of articulations to position the humerus in space. The main joints are glenohumeral joint, sternoclavicular joint, acromioclavicular joint and scapulothoracic articulations. The shoulder complex functions in a coordinated way to provide the upper limb with smoothest and widest range of motion. The motion available to the glenohumeral joint alone cannot account for complete elevation (abduction and flexion) available to the humerus. The scapula on the thorax contributes to the rest of the range through its sternoclavicular and acromioclavicular connections. Periarthritis shoulder is a common problem in the shoulder between 40 and 60 years. [1]

Adhesive capsulitis (AC) was first described as Periarthritis scapulohumeral in 1872 and subsequently as Frozen shoulder in 1934) It is categorized into primary or idiopathic. And secondary due to intrinsic or extrinsic causes. Adhesive capsulitis is further classified into 4 stages: pre-adhesive stage 1 with deltoid insertion and night pain; acute adhesive stage 2 with persistent night pain and stiffness; maturation stage 3; and chronic stage 4 with minimal pain and improved joint range. [2]

The shoulder capsule thickens and tightens as a result of lack of use, making the shoulder even more difficult to move-it is frozen in position. The prevalence of frozen shoulder is 2% in the general population, where 10% -29% of those with diabetes are prone to this problem. Frozen shoulder affects significantly more women than males, and it occurs more frequently in the non-dominant arm. [3]

The most common symptom of a frozen shoulder is night pain, resulting in sleep impediment that leads to one-sided sleep on the unaffected shoulder. Through each progressive day, frozen shoulder symptoms change. Concerning the physical findings, there is initially tenderness in the anterior and lateral glenohumeral joint line supervened by trigger points and muscle spasms in the pectoral muscle, scapula, trapezius and deltoid muscles resulting in pain in the neck area and over the shoulder girdle. various treatment option are there addition physiotherapy intervention such as thermotherapy, therapeutic modalities such as interferential therapy, ultrasound therapy, therapeutic exercises, graded mobilization, and manipulative techniques such as high thrust velocity, low amplitude end –range-mid-range mobilization. [4]

Spencer technique, also known as the seven stages of the Spencer, is an osteopathic manipulative treatment (OMT developed in 1915) It is a standardized series of treatments with broad application to diagnose, treat and establish prognosis for shoulder pain due to restricted mobility. It is a well-known multistep technique that combines Spencer's positioning, sequencing, slow stretching of the shoulder complex within pain-free limits while incorporating muscular energy with post-isometric contraction and relaxation. It serves to enhance mobility of glenohumeral and scapulothoracic joints by soft tissue stretching and fluid mobilization. It is sequenced to improve shoulder complex mobility by first treating most pain-free followed by most restricted motions. Spencer muscle energy technique (SMET) attempts to re-establish functional relationship between soft and articular tissues of the shoulder region, minimizes inflammatory and later developing fibrotic process, and restores arterial, venous and lymphatic flow. Numerous PT techniques have been found to be beneficial but there is no consensus on the best treatment approach for speeding up rehabilitation process and rejuvenating functional capacity in patient. So the aim of the study is to find out the effectiveness of ultrasound with and without spencer muscle energy technique in subject with peri arthritis shoulder. [5]

II. SUBJECTS AND METHODS

80 patients with peri arthritis shoulder who fulfilled the inclusion criteria which includes both genders, Patient aged between 40-60 years, Unilateral PA shoulder (at least 3 month duration) and exclusion criteria which includes Rotator cuff lesion, Osteoporosis, Malignancy, Neurological disorders, Hypermobility, Diabetes, Sensory loss patients, Rheumatoid arthritis, History of trauma, fracture around the shoulder complex, Pain or disorders of cervical spine, elbow, wrist or hand on affected side were selected and they are divided into two groups- Group A and Group B. Group A spencer muscle energy technique along with ultra sound therapy and Group B received ultra sound therapy for a period of 4 week.

III. TREATMENT TECHNIQUE

- **GROUP A:** Ultrasound Therapy with Spencer Muscle Energy Technique

Ultrasound Therapy

It has been given to 15 minutes for each session

Spencer Muscle Energy Technique

STEP 1: Shoulder Extension with Elbow Flexion

Patients elbow is maintained in a flexed position and the arm is extended until the restricted barrier

STEP 2: Shoulder Flexion with Elbow Extension

Patients flexed elbow is extended and moved anteriorly into shoulder flexion until the restricted barrier.

STEP 3: Circumduction with Compression

Therapist maintained the traction of the patient's shoulder in 90-degree abduction, moved the elbow in small clockwise and counter clockwise circles direction either compressive force

STEP 4: Circumduction and Distraction

Therapist maintained the traction of the patient shoulder joint in 90 degree of abduction and holding either elbow or wrist induced small clock wise and counter clock wise circles.

STEP 5: Shoulder Abduction and Internal Rotation with Elbow Flexion

Patient is asked to place his hand on therapist forearm for the support and then therapist performed abduction and internal rotation of patient arm. Internal rotation (90 degree)- Therapist placed the dorsum of the patient's hand behind his or her hip and moved the patients elbow anteriorly.

STEP 6: Shoulder Adduction and External Rotation with Elbow Flexion

Patient is asked to place his hand on therapists' forearm for the support and then the therapist takes patients arm into adduction and external rotation

STEP 7: Stretching Tissue and Pumping Fluids with the Arm Extended

Therapist interlocks his fingertips over the deltoid muscle, patient's hand is placed over the therapist shoulder, and the therapist slowly moved the arm away from the shoulder and released.

Repetitions: 3 sets each for 10 repetitions with 1 minute rest between sets, 3 times a week for 4 weeks

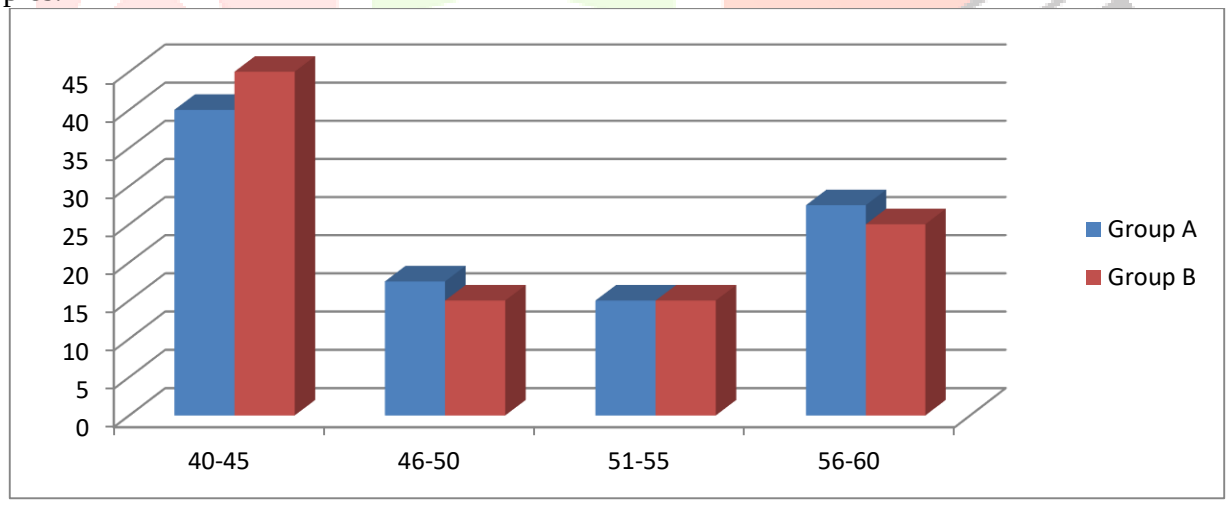
- **GROUP B**: Ultrasound Therapy without Spencer Muscle Energy Technique

IV. DATA ANALYSIS

Table 4.1: Age Distribution

Age	Group A		Group B	
	Numbers	Percentage	Number	Percentage
40-45	16	40	18	45
46-50	7	17.5	6	15
51-55	6	15	6	15
56-60	11	27.5	10	25
TOTAL	40	100	40	100

Between 40-45 years Group A consist of 40 % of peoples and Group B consist of 45 %, in 46-50 years. Group A consist of 17.5 % and Group B consist of 15 %, in 51-55 years Group A consist of 15 % and Group B consist of 15 % of peoples and in 55-60 years Group A consist of 27.5 % and Group B consist of 25 % of peoples.

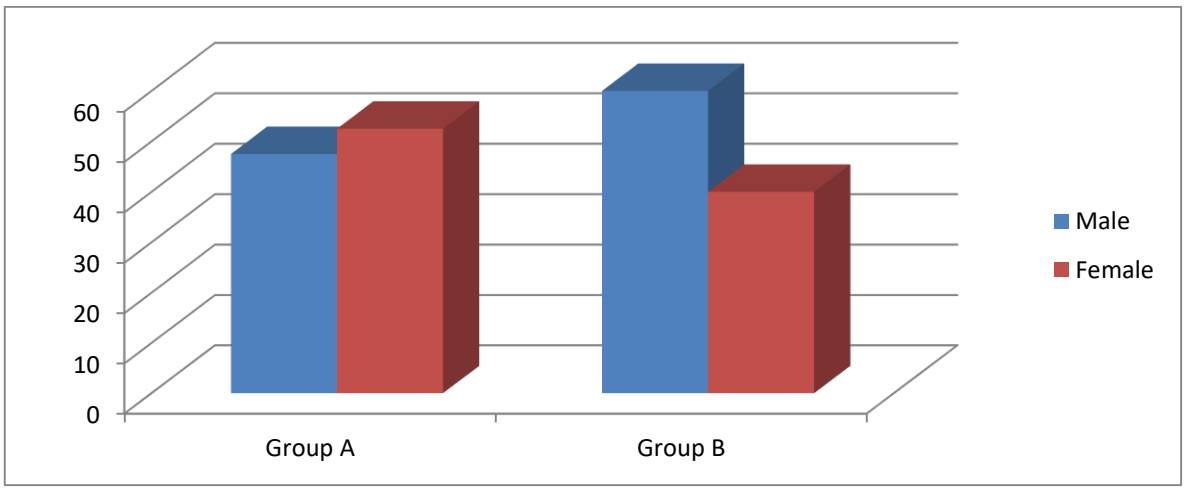


Graph 4.1: Representation Of Age Distribution Between Groups

Table 4.2: Gender Distribution

Gender	Group A		Group B	
	Numbers	Percentage	Number	Percentage
Male	19	47.5	24	60
Female	21	52.5	16	40
Total	40	100	40	100

In Group A 47.5 % male and 52.5 % were female whereas in Group B 60 % were male and 40 % were female

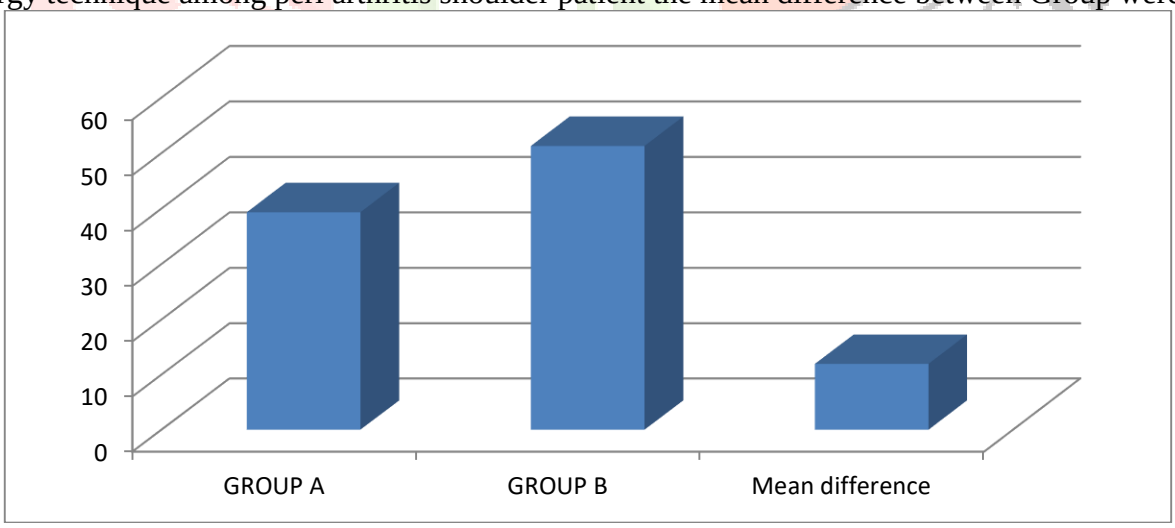


Graph 4.2: Representation Of Gender Distribution Between Groups.

Table 4.3: The Table Shows Post-Test Mean Value, Mean Difference, Standard Deviation And Unpaired 't' Value Of Shoulder Pain And Disability Scale For Group A and Group B

SI.NO	Groups	Improvement		Standard deviation	Unpaired t test	P Value
		Mean	Mean difference			
1.	A	39.33	11.95	14.17	4.1167	0.0001
2.	B	51.28		11.67		

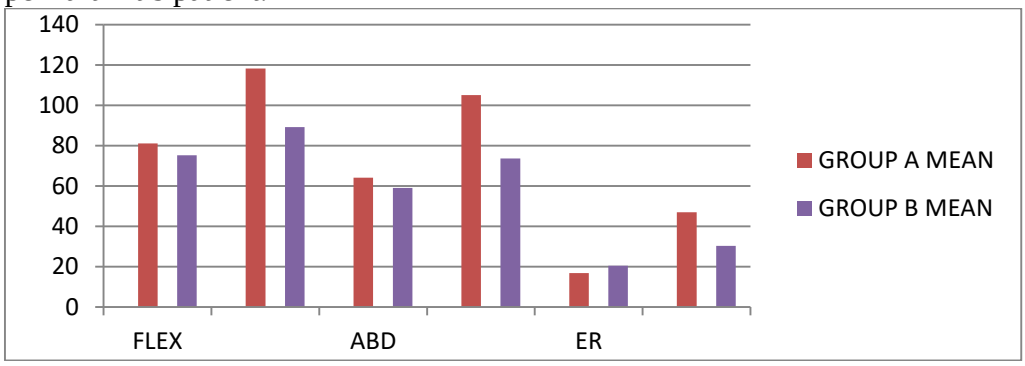
In Group A and B calculated un paired 't' value for functional disability is 4.1167. Above "p" value shows that there is significant difference between ultrasound therapy with and without spencer muscle energy technique among peri arthritis shoulder patient the mean difference between Group were 11.95



Graph 4.3: Shows The Graphical Representation Of Post-Test Mean Values Of SPADI For Group A and B

Table 4.4: The Table Shows Mean Value, Standard Deviation And 't' Value Of Shoulder Range Of Motion For Group A And Group B.

In group A and B calculated un paired 't' value of range of motion for flexion is 13.9527,16.9839, abduction is 13.2956,17.2652, external rotation is 18.1992,15.0193. Above value shows that there is significant difference between ultrasound therapy with and without spencer muscle energy technique among peri-arthritis patient.



Graph 4.4: Shows The Graphical Representation Of Range Of Motion For Group A And Group B.

V. RESULT

This study confirms that there was a significant improvement in spencer muscle energy technique with ultrasound therapy (Group A) is much better than the ultrasound therapy Group B. The statistical interpretation shows the improvement in the spencer muscle energy technique with ultrasound therapy is higher among peri arthritis shoulder patients.

VI. DISCUSSION

This study examined the Effectiveness of Ultrasound with And Without Spencer Muscle Energy Technique in Subject with Peri –Arthritis Shoulder. The 80-peri arthritis shoulder patient were included in this study they divided into 2 groups – Group A and Group B. Group A received spencer muscle energy technique with ultrasound and Group B received ultrasound for a period of 3 times a week for 4 weeks. After the intervention obtaining the results are spencer muscle energy is highly effective.

		Group-A				Group-B		
		Mean	**S. D**	**Unpaired 't' test**		**Mean**	**S. D**	**Unpaired 't' test**
FLEX	PRE	81.13	21.44	13.9527	PRE	75.13	13.89	16.9839
	POST	118.25	22.55		POST	89.13	15.06	
ABD	PRE	64.13	17.5	13.2956	PRE	59	20.01	17.2652
	POST	105	20.63		POST	73.63	20.32	
ER	PRE	16.75	13.57	18.1992	PRE	20.38	9.63	15.0193
	POST	46.88	11.47		POST	30.25	8.98	

In age distribution, Group A (40) and Group B (40) and in gender distribution In Group A 19 % male and 21 % were female whereas in Group B 24 % were male and 16 % were female

Iqbal M, et al., (2020) [6] showed the spencer muscle energy technique highly effective. This study supports my present study that the spencer muscle energy technique was used to correct the weakness of the scapulohumeral joint and improve the functional ability. Therefore, current study shows that statistically significant improvement in both the groups but spencer muscle energy technique with ultrasound therapy shows greater improvement in reduction in functional disability and improvement in range of motion. The Spencer technique reduces pain, the possible mechanism includes neurological and tissue variables such as stimulation of low-threshold mechanoreceptors on central pain inhibitory systems and neuronal populations

with possible gating effects in the dorsal horn. Low threshold mechanoreceptors from the joints and muscles project in the mid brain region to the periaqueductal gray. During isometric contraction, muscle and joint mechanoreceptors are activated. This results in sympathetic excitation evoked by the somatic efferent and localized activation of periaqueductal gray (PAG). Spencer muscle energy technique (Spencer muscle energy technique) attempts to re-establish functional relationship between soft and articular tissues of the shoulder region, minimizes inflammatory and later developing fibrotic process, and restores arterial, venous and lymphatic flow. Numerous PT techniques have been found to be beneficial but there is no consensus on the best treatment approach for speeding up rehabilitation process and rejuvenating functional capacity in patients

VII. CONCLUSION

The study concluded that the spencer muscle energy along with ultrasound is highly effective in improving the range of motion and functional disability in patients with peri arthritis shoulder

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