



Research Paper

Effectiveness of Spencer's Muscle Energy Technique Versus Theraband Exercises Along With Conventional Physiotherapy in Patients with Adhesive Capsulitis

DALAI BANU SARANYA
CH ASHOKCHAKRAVATHI principal
NALLURI SATYASRI Assistant professor

Corresponding Authors LVS Pravalika Professor
P sitaramacharyulu BIOSTATISTICIAN

ABSTRACT

Background & Objectives: Adhesive capsulitis is characterized by a painful gradual loss of both active and passive Glenohumeral motion resulting from progressive fibrosis and ultimate contracture of the Glenohumeral Periartthritis shoulder is characterized by a painful, gradual loss of active and passive Gleno-humeral movement. The Spencer Muscle Energy Technique and theraband techniques which are unique in its implementation as the client makes the initial effort while being facilitated by the practitioner. The main uses of this techniques are to normalize joint range, rather than increase flexibility.

Objective: To evaluate the effectiveness of the Spencer muscle energy technique and strengthening using Theraband on Pain, Shoulder ROM and Functional disability in patients with adhesive capsulitis of Shoulder.

Materials and Methods: In this study, 60 participants were chosen of them group A

{SPENCERS MET} And using a CONVINIENT sampling method based on selection criteria and informed consent was obtained from each participant. Subjects were assigned randomly into two groups. Group A (N=30) was treated with the Spencer muscle energy technique, ultrasound therapy and Codman's pendulum exercise. Group B (N=30) was treated with STRENGTHENING THERABAND exercises with ultrasound therapy and Codman's pendulum exercise. The initial evaluation of the pain and functional disability index by SPADI and , the shoulder ROM by the universal goniometer.

Results: Significant improvements observed in patients of Group A and Group B. When comparing the group A and B, SPADI(T=28.93, P=0.000), shoulder abduction (T=57.69, P=0.000), shoulder FLEXION (T=16.02, P=0.000), shoulder external rotation (T=17.84, P=0.000) are significantly increased in group A.

Conclusion: The study result concludes that in patients with ADHESIVE CAPSULITIS of shoulder, the Spencer muscle energy technique group is effective in decreasing pain, improving ROM, and functional disability.

KEYWORDS- Adhesive capsulitis, spacer's muscle energy technique, theraband exercises, flexion, abduction, external shoulder pain and disability index, conventional therapy

Received 02 Apr., 2024; Revised 11 Apr., 2024; Accepted 13 Apr., 2024 © The author(s) 2024.

Published with open access at www.questjournals.org

I. INTRODUCTION

FROZEN SHOULDER also known as ADHESIVE CAPSULITIS defined as chronic capsular inflammation along with fibrosis and thickening of joint capsule, thus leads to adhesion formation which is characterized by a painful , gradual loss of active and passive gleno - humeral movement.

Neviaser coined the term "Adhesive capsulitis" after open surgery in affected shoulders. the incidence of adhesive capsulitis of the shoulder is slightly higher in women than men This condition most frequently affects persons aged 40 to 60 years and rarely occurs in persons younger than 40 years of age. Fifty percent of the patients experience long term disability as a result of chronic loss of shoulder mobility In general population The prevalence rate of frozen shoulder is around 2% to 5% and it ranges from 11% to 30% in diabetic population[4]. The exact cause of frozen shoulder is still unknown. Many factors are considered to be associated with frozen shoulder such as female gender, age greater than 40 years, Diabetes mellitus, Trauma, prolonged immobilization, Thyroid disease, stroke or myocardial infarction, Presence of autoimmune disease and etc. As

the capsule is tight, thickened and adheres to bone, it results in painful limitation of both osteokinetic and arthrokinetic shoulder range of motion. Clinically frozen shoulder, characterized by gradual onset of shoulder pain and progressive stiffness of the shoulder joint, results in difficulty in upper limb activities, functional limitations, and significant disability. This condition is defined by thickening of the synovial capsule, contraction of soft tissue and biceps tendon adhesion, and/or axillary fold obliteration secondary to adhesion, resulting in an insidious and gradual loss of active and passive mobility in the glenohumeral joint owing to joint contracture. The first stage is the freezing phase, characterized by the onset of aching pain in the shoulder, the pain is usually more severe at night and may be associated with a sense of discomfort that radiates down the arm; this stage lasts up to 3 to 6 months. The second stage is the progressive stiffness or the frozen stage. The intensity of the pain decreases and shoulder movements are severely restricted, the patient's complaints of inability to reach into the back of the pocket, comb hair, etc. along with this there is atrophy of the muscles around the shoulder joint. This stage lasts up to 3 to 18 months. The final stage is the resolution or thawing stage, this stage is characterized by a slow recovery of movement. Treatment with aggressive physical therapy and surgical release may accelerate the recovery. Multiple procedures have been defined in the treatment of periarthritis of the shoulder such as cryotherapy, modalities, SWD, TENS, UST, moist heat, joint mobilization, stretching and strengthening exercises are given to restore function by decreasing inflammation and pain and thus enabling normal shoulder mechanics to be restored. In 1916 by Spencers, D.O. This technique evolved from 1916 to the present in an attempt to identify factors in the development of manipulative osteopathic technique focusing in mobilizing of the scapulothoracic and glenohumeral joints. Spencers muscle energy technique is an articular technique used in seven different processes to treat shoulder limitation caused by adhesive capsulitis. It enables the limited joints, enhances their function, and affects other emotional, social and cognitive regions positively. This technique improves pain-free movement by stretching soft tissues, improving lymphatic flow and stimulating enhanced joint circulation. Since the shoulder acts as both dynamic and static stabilizer, strengthening muscles around the shoulder is more important. Strengthening can be done by various means and one among that is Theraband. Its unique properties are that it allows muscles to be stretched and relaxed in a smooth and consistent manner. This also prevents the bounce at the end of a range of motion exercise that can cause muscle spasms. The other major advantage is that it is not dependent on gravity for providing resistance. Theraband was created in 1978 in Akron, USA. These bands are safe, inexpensive and portable. Its unique properties are that it allows muscles to be stretched and relaxed in a smooth and consistent manner. This also prevents the bounce at the end of a range of motion exercise that can cause muscle spasms. The other major advantage is that it is not dependent on gravity for providing resistance. Therabands are available in various thickness and strengths. Yellow band offers minimal resistance that offers 2.5 pounds of resistance, Red band offers medium resistance of 4.5 pounds and super heavy band being silver color with 15 pounds. Though these bands are endorsed even by American Physical Therapy Association (APTA), it is not commonly used for adhesive capsulitis. So, this study intends to analyze the effect of strengthening using Theraband with conventional exercises among subjects with adhesive capsulitis of the shoulder.

AIM OF THE STUDY

The study main AIM is to compare the effect of SPENCERS MUSCLE ENERGY TECHNIQUE with THERA BAND STRENGTHENING with conventional protocol in improving the shoulder Range of motion and decrease in pain and disability in subjects with adhesive capsulitis.

OBJECTIVES OF THE STUDY

SPECIFIC OBJECTIVE :

- To evaluate the effectiveness of SPENCERS muscle energy technique versus theraband exercises on pain and functional disability through SPADI in subjects with ADHESIVE CAPSULITIS
- To evaluate the effectiveness of SPENCERS muscle energy technique versus theraband exercises on ROM through goniometer in subjects with Adhesive capsulitis.
- To evaluate the effectiveness of SPENCERS MET AND THERA BAND training on pain, ROM and functional disability in subjects with Adhesive capsulitis.

HYPOTHESIS

ALTERNATIVE HYPOTHESIS : There is a significant difference between SPENCERS MUSCLE ENERGY TECHNIQUE and THERA BAND EXERCISES On PAIN, RANGE OF MOTION, FUNCTIONAL DISABILITY in subjects with adhesive capsulitis.

NULL HYPOTHESIS : THERE is no significant differences between SPENCERS MET and THERA BAND exercises on ROM, functional disability in subjects with adhesive capsulitis.

II. METHODOLOGY

STUDY SETTING : KIMS college of physiotherapy

STUDY DESIGN : comparative study

STUDY DURATION: 4weeks

STUDY PERIOD : 1year

SAMPLE SIZE : 60 subjects, two groups; group A and group B ,each group contains 30 subject

TYPE OF STUDY: Randomized clinical trial

SAMPLING SELECTION: sample of convenience

INCLUSION CRITERIA:

Age range varies from 40 to 60 years

Genders: both male and female

both right and left sides

Restriction in all planes

Pain and stiffness over the problematic shoulder region

EXCLUSION CRETERIA:

POST fracture FROZEN shoulder

Malignancies affecting the shoulder region

Osteoarthritis of shoulder joint and rheumatoid arthritis

Ligament injuries in shoulder joint

Neurological condition

Subjects with rotatory cuff tears

OUTCOME MEASURES:

PRIMARY OUTCOME MEASURES pain and function of the shoulder assessed using SPADI [shoulder pain and disability component] SECONDARY OUTCOME MEASURES active and passive ROM for shoulder external rotation, flexion, abduction was assessed using universal goniometre.

MEASURING TOOLS :

Shoulder pain intensity by NPRS SCALE, measuring units are 10cms line

Shoulder ROM and functional disability by SPADI

Shoulder range if motion by UNIVERSAL GONIOMETER

PROCEDURE

SPENCERS MUSCLE ENERGY TECHNIQUE :

The treatment procedure was given for 5 days a week. Frequency was one session a day, three sets of ten repetitions with one minute rest between sets. Before mobilization all patients were received Ultrasound treatment for 10 minutes and advised to perform CODMAN pendulum exercises as ahome program.

TECHNIQUE: Patient in the lateral lying in the shoulder to be handled away from the table.therapist should stand at the side of the table facing the patient at the level of the patients chest It has 7 stages such as:

[Stage 1]EXTENSION: Patient in side lying position with affected shoulder uppermost.Therapist one hand stabilize the acromioclavicular joint and other hand extend the patient shoulder in horizontal plane with elbow on flexed position until end range with barrier as felt

[stage 2] FLEXION: shoulder flexion with elbow extension, patient with flexed elbows were extended and moved anteriorly into shoulder flexion until restricted barrier was reached

[stage 3] CIRCUMDUCTION: with compression and elbow flexedin 90%abduction,grasping the patients elbow and shoulder, moved the elbow in small clockwiseand counter clockwise circles with compressive forces

[stage4] Circumduction with traction and elbow extension: the therapist maintained the traction of the patients with shoulder joint at 90degreeof abduction and holding their elbow or wrist induced small clockwise and counter clockwise circles

[stage 5] SHOULDER ABDUCTION AND INTERNAL ROTATION WITH

ELBOW FLEXION: The patient was asked to place his hand on therapist forearm for support and the therapist carried out the abduction and internal rotation of the patient arm internal rotation 90degrees.

[stage6] INTERNAL ROTATION WITH ARM ABDUCTED, HAND BEHIND

BACK: The therapist's hands on patient's shoulder to stabilize the clavicle and scapula and move the patient's hand to lumbosacral area. pull elbow anteriorly to internally rotate the shoulder into the restrictive barrier.

[stage7] DISTRACTION, STRETCHING TISSUE AND ENHANCING FLUID

DRIPANAGE WITH ARM EXTENDED: The therapist clamps his fingertips over the deltoid muscle, the patient's hand is placed over the therapist's shoulder and the therapist slowly shifts his arm away from the shoulder and releases it, repeating it 5-10 times if necessary.

Along with Spencer's met conventional treatment protocol was applied for 4 sessions and it includes:

- Ultrasound therapy: pulsed ultrasound was given over the shoulder joint and its surroundings

Intensity: 1w/cm²

Frequency: 1mhz

Duration: 10min

Sessions: 4 weeks/alternative days

- Capsular stretches on shoulder joint which includes anterior capsule, posterior capsule and inferior capsule and each stretching position was holding for 30sec and repeated for 3times.

- Self stretches and Pulley exercises for 5 minutes

Theraband Strengthening with Conventional Treatment:

- Conventional therapy and Theraband is given for strengthening of shoulder for a period of 4 weeks/alternative days.

Theraband Exercises:

- Patient will be standing in a comfortable position on floor where both feet firmly placed on the Theraband. Patient is asked to hold the end of the Theraband and asked them to gradually abducting, external rotation; flexion of shoulder will be encouraged from the starting position, followed by hold and back to the position without any bouncing movement. Initially for 1½ weeks all the subjects were given strengthening using yellow band followed by red

Theraband for another 1½ weeks

Treatment Protocol:

Yellow colour band and red colour band

Repetitions: 5reps

Hold Time: 25seconds

Frequency: 5times /week

Duration: 4 weeks

Conventional therapy also been advised

Along with theraband exercises treatment includes ultrasound therapy and shoulder girdle exercises .self stretching exercises for 4sessions/week

III. DISCUSSION

The current study was conducted to find out the effect of SPENCERS MET in patients with Adhesive Capsulitis on Pain, ROM and Functional Disability. In this study both the techniques are equally effective in PAIN but for SPADI Group A is more effective than Group B. Both the groups showed statistically significant improvement . Both the groups had received Conventional Exercises. The probable mechanism for pain relief is that Exercises within the pain free range of motion stimulates mechano receptors and decreases pain. Exercises within pain free range also move the synovial fluid, thus decrease inflammation and decreased pain Result of present study showed that in 4-week intervention both the groups showed statistically significant improvement in SPADI scores and ROM post intervention compared to pre intervention measures. When compared Spencer MET group showed more effectiveness in reducing pain, disability and increasing external rotation, abduction and flexion ROM than theraband strengthening exercise group. Improvement in Internal rotation and extension ROM showed no significant difference between both the groups. In Group A, pain was reduced after intervention, the possible mechanism include neurological and tissue factors, such as stimulation of low threshold mechano receptors on centrally mediated pain inhibitory mechanism and on neuronal populations in the dorsal horn with possible gating effect. Low threshold mechano receptors from the joints and muscles project to the peri-aqueductal gray in the midbrain region. During isometric contraction, activation of muscle and joint mechano receptors occur. This leads to sympatho-excitation evoked by somatic efferent's 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. Both the groups had received hot pack. The probable mechanism for pain relief is that the superficial heating effect of heat therapy increases the temperature of localized tissue, so vascular dilatation is promoted, and the pain threshold elevated. Such vascular improvement also accelerates the process of inflammation by increasing nutrition and oxygen supply, and by removing metabolites and waste products. This leads to a decrease in pain and swelling. Both the groups had received Conventional Exercises. The probable mechanism for pain relief is that Exercises within the pain free range of motion stimulates mechanoreceptors and decreases pain. Exercises within pain free range also move the synovial fluid, thus decrease inflammation and decreased pain [13]. Patients were not told to change their usual medication, which may have helped in reducing pain. However, 90% of the patients stopped their medication during treatment duration for both the groups. For Group A the mechanism behind increase in ROM by SPENCERS 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. Khyathi O ,et al says spencer's technique of stretching the shoulder capsule and the tight soft tissue improves pain free ROM, restoring the specific joint movement.when used this improves lymphatic flow from the treatment area,joint recovers normal ROM resets neural reflex. For group B THERABAND Hughes and McBride ,in his study he proved that theraband strengthening program is effective method of treating of adhesive capsulitis of the shoulder. exercises for adhesive capsulitis,use of elastic bands relies on the tensile properties of latex or other elastic polymers as a form of resistance.level of the elongation varies according to the rate and elongation of stretch of the material.the eccentric strength at slow speeds ,but not at fast speeds around shoulder whereas therapeutic ultrasound restored rom,functions and reduced pain compared to placebo sham ultrasound group for the physical therapy exercise and manual technique was found to be effective in treating adhesive capsulitis. Thus the combination of physical therapy and conventional therapy was found to be effective in treating adhesive capsulitis of the shoulder.universal goniometer and SPADI scale was used as a tools for the analysis.spadi scale and active range of motion showed significant improvement in group B Thus ,it can be concluded that SPENCERS MUSCLE ENERGY TECHNIQUE with conventional physiotherapy is more effective in reducing pain and functional disability and improving range of motion when compared to the THERABAND exercises of the shoulder.

IV. CONCLUSION

Hence, the study conclude that SPENCERS MUSCLE ENERGY

TECHNIQUE are effective in reducing pain and improving shoulder range of motion and functional ability in adhesive capsulitis of shoulder. However spencer MET (group A)protocol is more effective,as it reverses negative change in the joint,and normalize Arthrokinematic gliding and rolling movements and Osteokinematic rotation and allow the mobility of the shoulder to be restored as compared with Theraband strengthening exercises(group B) in Adhesive capsulitis of shoulder.

LIMITATIONS

Small sample size

Another limitation of the study considering both diabetic and non diabetic subjects which may effect the validity of the study.

The results cannot be generalized to individual age. We thus recommended future multi-centric studies with large sample size to further strengthen our study findings.

REFERENCES

- [1]. M Chokkalingam et al; Incidence and clinical profile of patients with frozen shoulder after cardiac surgery,DOI-10.4.103
- [2]. Vivek kumar et al frozen shoulder as a presentation of diabetes mellitus.
- [3]. CD Smith et al;Arthroscopic capsular release for idiopathic frozen shoulder with intra articular injection and a controlled manipulation,96(1) 55-60,2014
- [4]. Ujwal L yeole,pratiksha D dighe.et al;Effectiveness of movement with mobilization in adhesive capsulitis of shoulder-2017 ;4(2)
- [5]. Kazuya tamai et al (2014) Primary FS shows fibrosis of the joint capsule,associated with preceding synovitis. The initiator of synovitis, however, still remains unclear.
- [6]. Mohammad moin uddin et al No difference was found in level of pain and disability level between frozen shoulder patients with and without diabetes.
- [7]. M Chokkalingam et al (2017) Concluded that the present study shows that cardiac surgery increases the risk of developing frozen shoulder during the early postoperative period. Statistically significant correlation existed between positive LAM test and age of the patients, presence of diabetes mellitus and hypertension, type of cardiac surgery, and the regularity of physiotherapy follow-up.[8]
- [8]. Vivek et al (2017) Concluded that incidence of undiagnosed DM is high among frozen shoulder patients.
- [9]. Christopher D smith et al Concluded that arthroscopic capsular release is a safe procedure,with rapid improvement in pain and a marked improvement in range of motion.

- [10]. Ujwal I yeole et al (2017) Concluded that movement with mobilization proved to be a better technique for improving range of motion and pain in adhesive capsulitis of shoulder.
- [11]. Mohan kumar G et al (2016) Concluded that muscle energy techniques coupled with ultrasound therapy imparts more effective solution than the mobilization technique coupled with ultrasound.
- [12]. P. Khyathi, vinod Babu. K, Sai kumar. N (2015) Concluded that both mobilization with movement and spencer technique are shown to have short term effect on improving pain, shoulder mobility and functional disability-however, mobilization with movement was found clinically more effective with greater percentage of improvement on improving shoulder abduction, external rotation Rom and functional disability than spencer technique in subjects with frozen shoulder.
- [13]. Yatheendra kumar.G et al (2015) Scapular stabilization exercises in addition to HGMT is effective in decreasing pain and increasing ROM and functional ability by restoring scapula humeral rhythm in frozen shoulder.
- [14]. Sreenivasulu K et al (2016) Concluded that end range mobilization with scapular mobilization is more effective in improving range and functioning as compared to end range mobilization alone.