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Efficacy between "Spencer Technique" and "Muscle Energy Technique" in Treatment of "Adhesive Capsulitis"

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Abstract

Background: Adhesive capsulitis is a painful and disabling condition of unknown etiology, in which the shoulder capsule, the connective tissue surrounding the glenohumeral joint become inflamed and causes chronic pain with restriction. Although there are multiple ways to treat the disorder, there is a lack of evidence in indicating a specific technique to treat the disorder. In this study, we intend to check the efficacy of two different techniques in improving the range and function of the shoulder joint.

Methodology: Thirty subjects were randomly allocated to two different groups. One group was administered with muscle energy technique (MET) and the other with Spencer technique. The pain intensity and disability of shoulder joint is evaluated with shoulder pain disability index. For range of motion for shoulder flexion, extension, abduction, adduction, internal rotation, and external rotation, Goniometry was used as an outcome measure.

Results: The results are tabulated in terms of mean, standard deviation, variance, *t*-test, and *P*-value. Student t-test shows that there were statistically significant values for groups ($P < 0.05$). Variance test has been found to be significant at $P < 0.05$, Spencer technique is found to be more effective compare to MET.

Conclusion: When applied to the patients, both MET and Spencer technique are found to be effective, in comparison using *t*-test, it is concluded that Spencer technique is more effective than MET.

Keywords: Adhesive capsulitis, Muscle energy technique, Range of motion, Shoulder pain disability index, Spencer technique

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Introduction

Adhesive capsulitis a chronic inflammatory disorder of the shoulder, where the exact cause is unknown. It is a disorder of the shoulder causing pain with disability. The disorder is characterized by involvement of the shoulder capsule and other soft tissues surrounding the shoulder. Pain is usually constant, worse at night.

The most commone problems encountered by the patients with adhesive capsulitis consists of difficulty to perform overhead activities, external rotation, internal rotation, and abduction. Peoples often complain of their inability to dress, to reach to the back pocket, or to sleep properly at night.

The attitude of the affected extremity is placed into adduction and internal rotation. The same side scapula is elevated and adducted. The entire glenohumeral joint is surrounded by a large and loose capsule that is taut superiorly and slack anteriorly and inferiorly in resting position.[1]

When the humerus is abducted and laterally rotated on glenoid fossa, the capsule twists on itself and tightens. There is a progressive limitation of both passive and active range of motion (ROM). Clinical syndromes include pain, limited ROM, and weakness from disuse. This is commonly seen in insulin-dependent diabetes patient.[2]

Hannafin *et al*. described four stages of adhesive capsulitis. Stage-1 is painful shoulder. Stage- 2 is "Freezing Stage" with chronic pain and limitation of active and passive ROM due to the inflammation. Stage-3 is "Frozen Stage" with Significant limitation of ROM with rigid "end feel," the primary goal is to increase ROM. Stage-4 is "Thawing Phase" with progressive improvement in ROM.[2] Restriction of shoulder abduction and external rotation ROM is usually affected in stage-2 and stage-3 frozen shoulder and the primary goal of the treatment in these stages is to minimize capsular restriction and improve ROM. These movements are important to perform daily activities.[2]

Spencer technique are seven gentle stretching maneuvers used to treat shoulder restrictions caused by adhesive capsulitis, hypertonic muscles, and many other traumatic or degenerative conditions, in which improved motion is needed.[3] Spencer technique is an articulatory technique used in osteopathic medicine to help relieve restriction and pain at the shoulder. These procedures are low velocity, moderate-to-high amplitude procedures, where the joint is moved through the complete available range. The initiating force is either springing motion or repetitive concentric movement of joint through the restrictive barrier.[3]

Muscle energy technique (MET) is a manual therapy procedure which involves the voluntary contraction of a muscle in a precisely

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controlled direction at varying levels of intensity against a distinct counterforce applied by the therapist. MET is a form of manual therapy which uses a muscle's own energy in the form of gentle isometric contraction to relax the muscles through autogenic and reciprocal inhibition and lengthen the muscle.

A wide variety of treatment protocol for adhesive capsulitis are available; however, the most effective management remains an area of debate. There is lack of evidence to allow conclusions to be drawn about the effectiveness of MET when compared with Spencer technique. Hence, need of doing this study is to compare the effectiveness between the two techniques, that is, Spencer technique and MET, along with conventional therapy for shoulder joint ROM and function in the treatment of Adhesive capsulitis.

Materials and Methods

It is a comparative study with pre-test and post-test design. The study involved subject of both the genders within the age group of 35–60 years. The data were collected from outpatient department of College of Physiotherapy and Medical Sciences and Physical Medical Rehabilitation Department, Guwahati Medical College and Hospital, Guwahati within a period of 6 months. A total number 30 subjects fulfilling the inclusion and exclusion criteria were included using Simple Random Sampling method. The total subjects diagnosed with Adhesive Capsulitis (Stage 2 and 3) were divided into 15 in Gr A who are treated with MET and conventional therapy. The rest 15 subjects to be treated with Spencer Technique and conventional therapy.

Procedure

MET applied to the patients of Group A, it is applied to Deltoid (3 fibers), Infraspinatus, Supraspinatus, Pectoralis major, and Subscapularis in different patient position of supine lying, side lying, and sitting. Dosage – 3 sets for ten repetitions with 2-min rest between sets, 3 times in a week for 6 weeks.

MET for Deltoids

For anterior fiber, the patient was in sitting position and the therapist was standing behind him. Therapist stabilized his shoulder by one hand and asked him to lift his arm and by the other hand therapist gave resistance toward the restricted barrier. For posterior fiber, the patient was in side-lying position and therapist was standing behind him. Then, therapist stabilized his shoulder with one hand and asked him to lift his arm up to his backside, and then, he gave the resistance toward the restricted barrier. For middle fiber, the patient was in sitting position and therapist was standing behind him. Then, therapist stabilized his arm and asked him to lift his arm up to the therapist side. Then, therapist gave resistance toward the restricted barrier.

MET Treatment of Supraspinatus

During this treatment, the patient position is in sitting. Therapist is standing at the back of the patient, left hand of the therapist is stabilizing the patients shoulder to be treated, and the right hand is supporting the patients arm and forearm. The patients arm is taken into adduction holding the elbow and then from this position, the arm is allowed to be taken to abduction with only 20% effort against therapists resistance. Following isometric contraction of the abductors, the arm is taken to a new adduction barrier.

MET Treatment of Subscapularis

During this treatment, the patient is in a supine position with the arm abducted to 90° and elbow flexed to 90° and forearm into external rotation. In this position, the arm is allowed to go for external rotation, while resistance is applied to internal rotation to reach a different barrier of resistance.

MET for Infraspinatus

For treatment of Infraspinatus, the patient is placed in supine position with both shoulder and elbow flexed to 90°. The patient is asked to perform internal rotation, and then, the therapist asks the patient to take the arm to external rotation while providing resistance isometrically. Following isometric contraction, the shoulder is taken into a new barrier into internal rotation.

MET for Pectoralis Major

Position of the patient is supine with the hands clasped behind the head, wherein the arm is abducted in a direction which produces the most marked evidence of pectoral shortness. The practioner gives resistance to the arm in a downward manner for few seconds, and then, a new barrier is attained. The patient is in supine lying position with the arm abducted. The more elevated the arm is the more impact that is on the costal and abdominal fibers. The lesser the abduction the focus is on clavicular fibers. The sternal fibers were influenced in a position with in between abduction and elevation.

Treatment Procedure for Group B – Spencer Technique was Performed in Six Different Positions

Extension – patient was inside-lying with affected shoulder uppermost. The shoulder is extended with elbow flexed. The patient elbow fixed in flexed position and arm extended until the restricted barrier.[3,4] Flexion – patient was inside-lying with affected shoulder uppermost extend patients elbow, flex shoulder until the restricted barrier.[3,4] Circumduction/compression – patient was in side-lying with affected shoulder uppermost. The patients elbow is flexed and shoulder abducted to 90 degree.Therapist holds the patients elbow to rotate the shoulder clockwise and anticlockwise. Gradual compressive forces are applied to the glenohumeral joint and humerus is rotated at bigger circles.[3] Circumduction/traction – patient was in side-lying with affected shoulder uppermost. Maintain arm in 90° abduction with elbow flexed. A gradual distraction is applied to the Glenohumeral joint while rotating the humerus in clockwise and anticlockwise position with larger circles.[3] Abduction internal rotation – shoulder abduction and internal rotation with elbow flexion and patient was asked to place his hand on therapist forearm for the support, and then, therapist performs the abduction and internal rotation of patient arm. Adduction with external rotation – patient was in side-lying with affected shoulder uppermost. Arm is sufficiently flexed, elbow flexed to 90°. The patient placed his hand on therapist forearm for the support. Then, therapist took patient arm into adduction and external rotation to end of restrictive barrier.[3] Distraction –In side lying position affected shoulder is placed superiorly. Extend elbow

and place over therapist shoulder. Therapist clasps his hands around patient shoulder. Slow gentle traction is applied by pulling humeral head . Return to neutral and add compression on Glenoid fossa. Repeat the technique 6–8 times.[3] Dosage – three sets for ten repetitions with 2-min rest between sets, 3 times a week for 6 weeks.

Conventional Therapy

Ultrasound therapy given for 10–18 session of 3MHz frequency with an intensity of 1.4 w/cm^2 for a period of 5–10-min duration.[5] Exercise therapy program includes Codman's pendular exercises, finger ladder exercise, capsular stretch, and scapular stabilization exercises for 10 min. All exercises will be directed to do same as home exercise program at least twice a day.[5]

Results

Student "*t*"-test has been used for the test for the significance of difference between the two groups. Statistical analysis was done using SPSS software version 20.0. Student *t*-test was performed to find effectiveness of MET and Spencer technique in improving the ROM, decreasing pain and disability.

Variance test was performed to compare the effectiveness of MET and Spencer technique. Statistical significance was set at $P < 0.05$ for all measurements, $P > 0.05$ was considered as non-significant, whereas $P < 0.05$ was considered significant, "Value of confidence interval was set at 95%." The study has been conducted on 30 subjects, in which each group included 15 individuals each. The statistical tool *t*-test was used to compare the pre-intervention and post-intervention scores of each variable for Group A (MET group) and Group B (Spencer group). Statistical significance is set at $P < 0.05$. Value of confidence interval was set at 95%.

- Shoulder pain disability index (SPADI) $t = 2.10$ which is significant ($P = 0.028$)
- SROM flexion $t = 1.82$ which is significant ($P = 0.038$)
- SROM extension $t = 2.17$ which is significant ($P = 0.047$)
- SROM abduction $t = 3.60$ which is significant ($P = 0.0038$)
- SROM adduction $t = 3.78$ which is significant ($P = 0.0023$)
- SROM external rotation $t = 4.06$ which is significant ($P = 0.0025$)
- SROM internal rotation $t = 3.47$ which is significant ($P = 0.0016$).

Discussion

Adhesive capsulitis is a painful and disabling condition of unknown etiology, in which the shoulder capsule, the connective tissue surrounding the glenohumeral joint become inflamed and greatly restricting motion and causing chronic pain. Pain is usually constant, worse at night. The most commonly affected movements are external rotation and abduction of the glenohumeral joint. Patients commonly complain of sharp pain while reaching for the back pocket or combing the hair. The arm does not swing while walking. At rest, the arm is often held in adduction and internal rotation, and the scapula of the affected side is usually elevated, laterally rotated, and abducted. Manual physical therapy is a part of conservative management and effective in managing pain, joint restrictions, and disability, while applied in combination with therapeutic exercises. For management of adhesive capsulitis, a strengthening and manipulation technique are frequently used and seems to be very productive. Gambler and Holland, in their study, concluded that although a definitive progression for treating adhesive capsulitis has not been developed, a general consensus exists within the literature that using manual therapy techniques in conjunction with therapeutic exercise is effective in regard to increasing function, as well as AROM, while decreasing levels of pain and disability. The aim of the study is to compare the effectiveness of Spencer technique versus MET along with conventional therapy in subjects with adhesive capsulitis. The data analysis of present study revealed that both the groups showed significant improvement in SPADI score within the group. The present finding shows that Group A (Spencer) was showed significant improvements in the SPADI score and Group A (MET) also showed significant improvements in the SPADI scores in the patients with adhesive capsulitis. Spencer technique showed a significant reduction in SPADI. This may be due to it increases overall ROM of shoulder with adhesive capsulitis and improving the function**.** Group A, that is, MET is mainly focused on the muscles which are tight, so it inhibits the muscles and increase the strength of the muscles. Hence, the pain was decreased but disability also decreased. However, in Group B, Spencer technique focused on the joint ROM and muscle activity. It manipulates the joint so that the joint space was increased and the function of the shoulder also increased.

In this study, it has been found that both groups are effective but MET increased the muscle power, so the pain was decreased and range was also increased. Reciprocal and autogenic inhibition were the techniques which increased the muscles strength of the weak and tight muscles. However, it was not affected in the joint articular surfaces. In Spencer technique, it helps the joint capsule to move freely, because it effects on the movement of the joint. Hence, as well as the muscles and the joint surfaces, both were getting response to the effect of the Spencer techniques as it was an osteopathic manipulative technique. Along with the muscle, the joint surface was also manipulated by this technique, so it has been found that SPADI score decreased after the treatment. In both the group, SPADI score and ROM of shoulder joint were increased, but in comparing both the group, Spencer technique was more effective than MET. Travell and Simons, in 2007, state that the modification of Spencer technique with adduction and lateral rotation articulatory technique is often applied to release tight subscapularis muscle trigger point tension often restricting shoulder ROM. A trigger point within subscapularis may spur other shoulder girdle muscles into developing secondary and satellite trigger points leading to major restriction in glenohumeral joint motion causing adhesive capsulitis.[6,7] Knebl *et al*., (2002) in their study of 29 elderly patients with preexisting shoulder problem, which was undertaken to determine the efficacy of osteopathic manipulation to increase functional independence, increase that ROM of the shoulder has demonstrated continued improvement in their ROM.[8] Whereas, in contradiction to the previous study, a study done by Sudarshan *et al*. found that there were improvements in shoulder joint ROM immediately after treatment with Spencer technique and that the improvements were maintained for 12 weeks when the participant was instructed to perform home exercises once daily for people with inferior capsule tightness, when the two manual therapy groups were compared, the Spencer therapy group had greater ROM improvement than the passive joint mobilization group in two directions post treatment; this indicates that this Spencer technique is clinically beneficial in treating reduced shoulder joint ROM in patients with inferior capsule tightness. The results of present study is well supported by the findings of previous studies.

Sudarshan *et al*. found that there were improvements in shoulder joint ROM after the treatment with Spencer technique. The data analysis of the present study reveals that both the group shows significant improvement in ROM of the shoulder joint. In Group A, MET is effective for increasing the ROM of shoulder joint by inhibits the muscles or by increasing the strength of the muscles.

In Group B, Spencer technique is also effective for increasing the ROM of the shoulder joint by manipulate the joint as per its motions. Hence, both muscles and the joint get the effects so it shows good improvement in shoulder ROM and function. Here after analysis using the *t*-test between the two groups, *P*-value of all the outcome measures shows significant difference, hereby concluding that Group b interventions are found to be more effective as compared to Group A. Hence, Spencer technique is found to be more effective in increasing ROM and function compared to MET in subjects with adhesive capsulitis.

Conclusion

Both the groups, MET and Spencer are found to be effective in increasing the ROM, decreasing pain and disability. Here, after analysis using the *t*-test between the two groups, *P*-value of all the outcome measures SPADI is 0.028, SROM flexion is 0.038, SROM extension is 0.047, SROM abduction is 0.0038, SROM adduction is 0.0023, SROM external rotation is 0.0025, and SROM internal rotation is 0.0016, showing significant difference, hereby concluding that Group B interventions are found to be more effective as compared to Group A. Following the study, Spencer technique has been found to be more effective in increasing ROM and function compared to MET in subjects with Adhesive capsulitis.

Ethical Approval

Ethical approval has been attained by the Institute Ethical Committee, College of Physiotherapy and Medical Sciences, Guwahati, Assam.

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References

1. Levangie PK, Norkin CC. The shoulder. In: Joint Structure and Function: A Comprehensive Analysis. 4th ed. Philadelphia, PA: FA Davis; 2006. Available from: https://digitalcommons.sacredheart.edu/pthms_fac/64
2. Neviaser JS. Adhesive capsulitis of the shoulder: a study of the pathological finding in periarthritis of the shoulder. J Bone Joint Surg 1945;28:211-22.
3. Cyriax J. Textbook of Orthopedic Medicine: Diagnosis of Soft Tissue Lesions. 8th ed., Vol. 1. Paris: Bailliere Tindall; 1982. Available from: http://www.orthopaedicmedicineonline.com/downloads/pdf/B9780702031458000041_web.pdf
4. Patriquin DA, Jones JM: Articulator techniques. In: Foundations of Osteopathic Medicine. Baltimore: Williams and Wilkins; 1997.
5. Neviaser AS, Haanafin JA. Adhesive capsulitis, a review of current treatment. Am J Sport Med 2010;38:2346-56.
6. Donatelli RA. Physical Therapy of the Shoulder. 4th ed. New York: Churchill Livingstone; 1997.
7. Travell J, Simons D. Myofascial Pain and Dysfunction: The Trigger Point Manual Volume 1: The Upper Body. 2nd ed. Baltimore, MD: Williams and Wilkins; 1999.
8. Knebl JA, Shores JH, Gamber RG, Gray WT, Herron KM. Improving functional ability in the elderly via the Spencer technique, an osteopathic manipulative treatment: A randomized controlled trial. J Am Osteopath Assoc 2002;102:387-96.