

Original Research Article

Effect of Spencer Muscle Energy Technique on pain and functional disability in cases of adhesive capsulitis of shoulder joint

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Abstract

Background: 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 joint capsule. 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. Muscle energy technique helps in increasing shoulder range of motion. MET is unique in its application as the client provides the initial effort while the practitioner facilitates the process. One of the main uses of this method is to normalize joint range, rather than increase flexibility, and techniques can be used on any joints with restricted Range of Motion (ROM) identified during the passive assessment. So the study was done to evaluate the effect of MET on adhesive capsulitis.

Aim: This study was designed to evaluate the effect of Spencer MET on Pain and Functional Disability in Adhesive Capsulitis of Shoulder joint.

Materials and methods: An Interventional study was conducted at Out Patient Department of General Hospitals in Ahmedabad. The subjects were selected according to inclusion criteria. The Pre-training outcome of Pain (VAS) and SPADI was taken and then subjects were divided into two groups' one case and other control. Group A: was given conventional treatment along with MET for adhesive capsulitis. Group B: not getting any additional training for adhesive capsulitis other than

conventional treatment. The study was conducted for 6 months and treatment was given for 4 weeks 3 days a week and once a day. After 4 weeks post treatment outcome data were analysed for results.

Results: Data was analysed using SPSS software version 20 and Microsoft Excel 2007. In case and control both pain (VAS), SPADI showed significant improvement ($p < 0.05$). But there was more significant improvement in case as compared to control group in SPADI but not in VAS.

Conclusion: The Spencer MET is more effective increasing functional ability in patients with adhesive capsulitis as compared to conventional treatment.

Key words

Spencer Muscle Energy Technique, Adhesive Capsulitis, Pain, Shoulder Pain and Disability Index, Visual Analogue Scale, Short Wave Diathermy, Statistical Package for Social Sciences.

Introduction

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 joint capsule [1]. The term “frozen shoulder” was first introduced by Codman in 1934. He described frozen shoulder as a painful shoulder condition of insidious onset that was associated with stiffness and difficulty in sleeping on the affected side. Codman also identified the marked reduction in forward elevation and external rotation that are the hallmarks of the disease [2]. Duplay first describes the symptoms in 1872 using the term ‘periarthrite scapulohumerale’ [3]. Neviaser coined the term ‘adhesive capsulitis’ after open surgery in affected shoulders. He observed sound like adhesive tape being pulled off when he manipulated the adhesive capsule of the shoulder [4]. The incidence of FS is slightly higher in women than in men. This condition most frequently affects persons aged 40 to 60 years and rarely occurs in persons younger than 40 years of age. Frozen shoulder might affect both shoulders in up to 16% of patients; however, a relapse is uncommon. An increased incidence of FS has been noticed in patients with hyperthyroidism and hypertriglyceridemia [5]. Prevalence rate in the general population is 2-5% and 10–20% in diabetics [6]. Patients with FSS 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, which is a key diagnostic sign [7, 8]. Conservative treatment includes various exercise methods and physical therapy modalities such as hot-therapy, Transcutaneous electrical nerve stimulation (TENS), Ultrasound (US), Acupuncture and LASER (Light Amplification by Stimulated Emission of Radiations). Exercise programs consist of active and passive ROM exercises, stretching exercises guided by a physiotherapist, self stretching, manipulation and mobilization techniques, strengthening exercises, patient education and home exercises. MET is unique in its application as the client provides the initial effort while the practitioner facilitates the process. One of the main uses of this method is to normalize joint range, rather than increase flexibility, and techniques can be used on any joints with restricted Range of Motion (ROM) identified during the passive assessment. The main effects of MET can be explained by two distinct physiological processes: Post Isometric Relaxation (PIR) and Reciprocal Inhibition (RI) [9]. There is lack of studies which states the effectiveness Muscle Energy Technique in Adhesive Capsulitis of shoulder joint. Hence, the present study is being undertaken with the intention to evaluate the effectiveness of Muscle Energy Technique in Adhesive Capsulitis of shoulder joint.

Materials and methods

An Interventional study was conducted at Out Patient Department of General hospitals in Ahmedabad. The subjects were selected

according to inclusion criteria. The Pre-training outcome of Pain (VAS) and SPADI was taken. Subjects within age group 40-65 years, Both Gender, Subject having stiff painful shoulder for at least 3 month duration, Subjects with idiopathic frozen shoulder, Subject with DM, Adhesive Capsulitis subjects with limited Range of motion of shoulder abduction and external rotation, Subjects with bilateral/unilateral adhesive Capsulitis. Subjects with Rotator cuff tears, History of Rheumatoid arthritis, Malignancies in the shoulder region, Periarthritis shoulder secondary to fracture, Periarthritis shoulder secondary to dislocation, Periarthritis shoulder secondary to Reflex sympathetic dystrophy. Periarthritis shoulder secondary to neurological disorder; Thoracic outlet syndrome, Peripheral nerve injury and then subjects were divided into two groups' one case and other control. GROUP A: was given conventional treatment along with MET for adhesive capsulitis MET for shoulder join was given by Spencer Technique as shown in the figures. GROUP B: not getting any additional training for adhesive capsulitis other than conventional treatment. Conventional Treatment in the form of SWD 20 min with capacitor field method, Codman's Exercises, Rope and Pulley, Wall and Ladder Exercise, Shoulder Wheel Exercise, Self Stretching Exercise. The study was conducted for 6 months and treatment was given for 4 weeks 3 days a week and once a day. The pre treatment data were collected before the treatment and after 4 weeks post treatment outcome data were collected for analysis.

Statistical analysis

Level of significance was kept at 5% .Within group analysis was done using Wilcoxon test and paired t test and between group analysis was done using Mann Whitney U test and independent t test.

Results

Thirty patients who fulfilled all the inclusion criteria were divided into two groups, fifteen in control group and fifteen in case group. There no

drop outs in experimental group as well as in control group as the patients were dedicated to the study. Study was completed with 30 patients with 15 patients in each group.

Within group comparison of VAS in group A paired sample t test yielded p Value 0.0001 and in group B Wilcoxon signed Rank test yielded p value 0.001. And $t= 16.74$ in group A, $w= -3.397$ in group B indicative of significant difference. Both the groups improved significantly after intervention (**Table – 1**). The two-tailed Mann-Whitney U Test yielded p value 0.434 and $U= 95$, Suggesting that there was no statistical significant difference between group A receiving MET and group B receiving CONVENTIONAL in terms of VAS (**Table – 2**). For Group A and B, within group comparison of SPADI with paired sample t test yielded p Value 0.0001 for both the groups and $t= 22.75$ for group A and 30.07 for group B. Suggesting that both the groups improved significantly after intervention (**Table – 3**). An independent t test yielded p value is 0.0001 and $t=5.12$, indicative of significant difference. Group A receiving MET improved much better than Group B receiving CONVENTIONAL in terms of SPADI score (**Table – 4**).

Discussion

The current study was conducted to find out the effect of MET in patients with Adhesive Capsulitis on Pain, and Functional Disability. In this study both the techniques are equally effective in VAS but for SPADI Group A is more effective than Group B. Both the groups showed statistically significant improvement in VAS score.

Both the groups had received Short wave diathermy. The probable mechanism for pain relief is that the deep heating effect of SWD 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. The results of the present study are similar as found by May S. F. Leung, and Gladys L. Y. Cheing (2008) [10] conducted a study on Effects of deep and superficial heating in the management of frozen shoulder. Results shows the addition of deep heating (SWD) to stretching exercises produced a greater improvement in pain relief, and resulted in better performance in the activities of daily living and in range of motion than did superficial heating (Hot packs). 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 [11]. For Group A, pain is also reduced, the possible mechanism include 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 periaqueductal grey in the midbrain region. During isometric contraction, activation of muscle and joint mechanoreceptors 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 [12]. The finding of the present study are similar as found by Viswas Rajadurai (2011) [13] suggesting that MET is effective in reducing pain and improving Maximal Mouth Opening in patients with Temporo Mandibular Dysfunction. For Group A The 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 neurone. This stops the discharge of the efferent motor neurones 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. The finding of the present study are similar as found by Gupta S, Jaiswal P. (2008) [14] Suggesting that Post isometric relaxation is more effective in decreasing pain and disability and improving cervical range of motion as compared to isometric exercises over a period of three weeks in patients having non-specific neck pain.

Table - 1: Mean difference between Pre and Post VAS score in group A and B (Paired sample t test and Wilcoxon Signed Rank Test).

| Groups | Pre treatment | | Post treatment | | t and W value | p value |
|----------------|---------------|-------|----------------|------|---------------|---------|
| | Mean | SD | Mean | ±SD | | |
| Group A | 5.6 | 0.96 | 2.2 | 0.65 | t= 16.74 | 0.0001 |
| Group B | 5.4 | 1.008 | 1.8 | 0.80 | W= -3.397 | 0.001 |

Table - 2: Mean change in VAS score for both the group after intervention (Independent sample t test).

| Groups | Mean of post treatment score | ±SD | U value | p value |
|----------------|------------------------------|------|---------|---------|
| Group A | 2.2 | 0.65 | 95 | 0.434 |
| Group B | 1.9 | 0.80 | | |

Table - 3: Mean difference between Pre and Post SPADI score in group A and B (paired sample t test).

| Groups | Pre treatment | | Post treatment | | t value | p value |
|----------------|---------------|------|----------------|------|---------|---------|
| | Mean | SD | Mean | ±SD | | |
| Group A | 61.49 | 8.49 | 21.84 | 4.37 | 22.75 | 0.0001 |
| Group B | 61.96 | 8.79 | 32.93 | 6.60 | 30.07 | 0.0001 |

Table - 4: Mean change in SPADI score for both the group after intervention (independent sample t test).

| Groups | Mean of post treatment score | ±SD | t value | p value |
|----------------|------------------------------|------|---------|---------|
| Group A | 21.84 | 4.37 | 5.12 | 0.0001 |
| Group B | 32.93 | 6.60 | | |

Conclusion

Thus, it can be concluded that Spencer MET is more effective in reducing functional disability as indicated by significant difference in between group comparison of SPADI. Both the techniques are equally effective in reducing pain as indicated by no significant difference in between group comparison of VAS.

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