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EFFECTIVENESS OF JOINT MOBILIZATION AND MUSCLE ENERGY TECHNIQUES ON PATIENTS OF FROZEN SHOULDER

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Abstract:
Background: *Frozen shoulder, also known as adhesive capsulitis, is a painful condition associated with fibrosis, progressive pain, decreased range of motion (ROMs) which leads towards severe shoulder pain, stiffness and infirmity. Most common in diabetic patients. Adhesive capsulitis is a clinical problem as well as a combination of psychological, physical and social factors that can lead to disability, may contribute to other conditions such as neck pain, chest pain. To deal with these complications Physical Therapy can play an important role.*
Aims and Objectives: *Therefore, this study is designed to see the effectiveness of these Physical Therapy Treatments (METs, Joint Mobilization, hot pack) for pain and decreased ROM in the patients of frozen shoulder.*
Methodology: *A sample size of 30 subjects was collected from four clinical settings of Faisalabad, divided into treatment and Control group through randomization. Outcomes of attentiveness are pain, ROM and disability. Universal Goniometer and NPRS was used for outcome measures. SPADI for shoulder disability. SPSS version 20 was used for statistical analysis and conclusion was made accordingly.*
Results: *Joint Mobilization showed significant results in frozen shoulder.*
Conclusion: *Joint mobilization with METs and hot pack are the potential treatment option for patients of frozen shoulder in all adult population regardless of harms and side effects. However a bigger sample size and a longer duration of the study are needed.*
The conclusion appeared as, the joint mobilization shows more significant effects when use with METs and hot pack.
Key Terms: *Frozen shoulder, Adhesive capsulitis, joint mobilization, METs, ROM, Hot pack.*

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INTRODUCTION:

Frozen shoulder is a painful musculoskeletal disorder characterized by fibrosis, mostly common in diabetic patients with severe pain and decreased ROM. Frozen shoulder is classified into three stages: the painful stage (painful and freezing stage, gradual onset of pain, lasts from one to two months), the frozen stage(lasts from four to twelve months or longer with decreased ROM), the thawing stage (final stage, progressive improvement of ROM within months to year) (Balcı, et al., 2016).

Frozen shoulder is a condition which limits the movements of shoulder joint. According to American Academy Of Orthopedic Surgeons Adhesive Capsulitis is defined as "a disability in which severity can differ, leads towards limitations in active and passive movements of shoulder in which radiographic findings except osteopenia are absent" (Matsen, et al., 1993).

Shoulder joint is a complex, ball and socket joint, consists of clavicle, scapula and proximal humerus. Four articulations: sternoclavicular, acromioclavicular, scapulothoracic and glenohumeral articulation. Muscles of shoulder: Trapezius, deltoid, levator scapulae, rhomboid major and minor, supraspinatus, infraspinatus and teres minor (Renjitha, 2013).

According to study frozen shoulder is uncommon in young population and most common in people age 40-60 (Inayat, et al., 2017).

Shoulder joint is one of the most common joint to be treated in a physiotherapy department among which the diagnosis of adhesive capsulitis also known as frozen shoulder is very often seen (Sharad, 2011).

According to a study conducted by Rees, et al. (2007) Muscle Energy Techniques are direct hand-on techniques that were developed by Dr. Fred Mitchel, Sr. Osteopathic Physician. MET is a technique that can be used for the purpose of lengthening and stretching of shortened muscles and fascia. Muscle Energy Techniques primarily focuses on soft tissues but generally these techniques also focuses on joint mobility.

METs not only improve the range of motion of joints but also lengthen the muscles.

MET is different from other techniques because initial effort is provided by patient while PT will just facilitate the techniques. Basically METS were used for a gain in ROMs and can be apply on any joint for improvement in ROMs (Contractor, et al., 2016).

An interventional study with a sample size of 30 patients was held in a private sector of Ahmadabad. Patients were allocated into two different groups. Group A was treated with conventional treatment along with muscle energy techniques and group B was treated with conventional therapy only. Duration of study was six months while duration of treatment was 1 month (4 weeks), 3 times per week. Pre and post treatment readings were taken and according to statistical analysis and graphical representation , patients treated with muscle energy techniques showed more improvements as compare to patients treated with conventional therapy (Contractor, et al., 2016).

According to studies joint mobilization and exercises were effective in treating the pain, ROM and stiffness of shoulders in patients of adhesive capsulitis. To reduce the stiffness of shoulder, particularly the external rotation, posterior directed joint mobilization technique show more effectiveness than anteriorly directed mobilization techniques (CHETIA, 2013).

A study was conducted to check the effectiveness of Maitland mobilization in patients with adhesive capsulitis. Sample size of 40 patients, subjects was divided into two groups. Experimental group (Maitland mobilization) and control group (common supervised exercises i.e. codman, self-stretch and shoulder wheel exercises). Mobilization techniques were applied three times a week. Duration of treatment was four weeks. 4 weeks treatment protocol showed improvements in both groups but Maitland techniques were found more effective (Kumar, et al., 2012).

A single case study was conducted on the patient of frozen shoulder in which three different regimens were applied in three different phases (A, B and C). Phase A was used as a base line treatment or comparison. In phase B frozen shoulder was treated with exercises only while in phase C both Maitland mobilization techniques and exercises were applied. All restricted movements were improved but the phase C was most promising and significant (Maricar, et al., 2009).

According to inclusion and exclusion criteria a sample size of 30 subjects including both male and female between age of 40 to 60 years was allocated into two different groups, A & B. group A was treated with Maitland, Active ROMs and moist heat for 15 minutes while group B received the treatment

including METs and moist heat pack. According to treatment plan patients received 6 sessions per week for two weeks of treatment. Home plan was also given to the patients. Readings were measured pre- and post-treatment. Pain score was decreased on VAS and ROMs were improved in both groups but ROMs were more improved in the group receiving Maitland and pain was more improved in the group which received METs (Narayan and Jagga, 2014).

A study was held to check out the effectiveness of Maitland Mobilization Techniques and muscle energy techniques (METs) on the patients of adhesive capsulitis for relieving pain and improving range of motion of shoulder joint. Patients were taken from private clinic with diagnosed adhesive capsulitis grade 02. A sample size of 30 patients between the age ranges from 40 to 60 years was selected for treatment. Patients were randomly divided into two groups. One group was treated with Maitland Mobilization Techniques and the other group was treated with muscle energy techniques. Patients were treated 6 days per week for 4 weeks with a home plan included Codman exercises and finger ladder exercises. Both range of motion and pain were measured before the treatment and after completing the duration of 4 weeks treatment. According to statistical analysis and calculations patients in group A showed more significant results as compare to group B both in pain and range of motion (Phukon, et al.).

MATERIALS AND METHODOLOGY:

Study design:

Quantitative study was conducted following RCT (Randomized control trial). Two groups from the selected sample were generated (1 treatment group and the other one was active control group). Both treatment (joint mobilization with muscle energy techniques) and active control (joint mobilization) groups followed combination of protocol.

GROUP A: METS + joint mobilization + hot pack
GROUP B: joint mobilization + hot pack

Study Settings:

Subjects were from:
Allied Hospital Faisalabad
Aziz Fatima Hospital Faisalabad
DHQ Faisalabad
MTH Faisalabad

Sample Size:

We selected an appropriate sample size of 30 individuals and divided into two groups in which each group was comprised of 15 participants.

According to (Phukon, et al.), the minimum sample size of 30 participants for experimental studies is required to see the effects of intervention and certain statistical tests.

Duration:

Collection and analysis of data was completed in almost 4 months. In first 2 months we prepared synopsis, reviewed literature and in next two months data was collected from participants, followed up and applied statistics to data and interpreted results.

Sampling Technique:

Convenient Sampling Technique
Lottery method was used to randomize the participants into two groups.
Only the individuals who met the inclusion criteria were enrolled in the study. Each client gave their informed consent for participation in research.

Inclusion criteria:

Age above 40
Patients who were willing to participate in the study
Both male and female subjects
Diagnosed Patients with stage-2 frozen shoulder
NPRS 3 to 7
Osteoarthritis
Diabetic patients

Exclusion criteria:

Cervical pain
Pregnancy
Refusal for consent
Patient with neurological disorders i.e. stroke, TOS.

Data Collection Procedure:

Before the collection of data, letter was given by The University of Faisalabad. The letter was signed by the setting incharge from where we collect the data. Signed consent was obtained from participants before including them in study. This form assured the participants to voluntarily participate into the study. The obtained data entered into the SPSS software version 20.

Data collection tools:

NPRS
Universal Goniometer
SPADI

Outcome measures:

Pain (NPRS)
Range of motion (universal goniometer)
Disability (SPADI)

RESULTS:

Data was analyzed by using Independent Sample T-Test. After analysis of data from SPSS version 20, we get following results.

- This study showed that the shoulder pain score was more before treatment (baseline) while pain was significantly reduced after treatment. Numeric Pain Rating Scale (NPRS) was used to measure shoulder pain.
- Mean value of treatment group (2.13±.990) and active control group (3.33±.900). P value (0.002) which was less than 0.05.
- Results revealed that both pain and disability score was improved after treatment, mean value of group A (29.27±5.700) and group B (38.07±8.964). P value for treatment group (0.003) which was <0.05.
- In this study Goniometer was used to measure shoulder range of motion in order to evaluate limited ranges of shoulder. Ranges were improved after treatment.
  - P value of external rotation 0.000 which was smaller than 0.05
  - P value for abduction 0.015 which was < 0.05
  - P value for flexion in treatment group 0.003 which was less than 0.05.

A significant improvement was found in range of motion of shoulder after applying Maitlan mobilization in group A an METs in group B. goniometry was performed to assess the ROMs of shoulder (Phukon, et al.).

Pre-treatment pain:

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean	Sig.(2-tailed)
NPRS pre treatment	METs with Mobilization	15	4.73	1.280	.330	1.000
	Mobilization	15	4.73	1.033	.267	

Post Treatment Pain:

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean	Sig.(2-tailed)
NPRS post treatment	METs with Mobilization	15	2.13	.990	.256	0.002
	Mobilization	15	3.33	.900	.232	

SPADI pre-treatment:

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean	Sig.(2-tailed)
SPADI pre treatment (in percentage)	METs with Mobilization	15	49.67	9.766	2.522	0.969
	Mobilization	15	49.53	8.667	2.238	

SPADI Post Treatment:

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean	Sig.(2-tailed)
SPADI post treatment	METs with Mobilization	15	29.27	5.700	1.472	0.003
	Mobilization	15	38.07	8.964	2.314	

Pre-treatment Shoulder Range of Motion:

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean	Sig.(2-tailed)
shoulder external rotation pre treatment	METs with Mobilization	15	36.27	4.217	1.089	0.205
	Mobilization	15	34.47	3.335	.861	
shoulder abduction pre treatment	METs with Mobilization	15	66.40	5.792	1.495	.342
	Mobilization	15	64.47	5.153	1.330	
shoulder flexion pre treatment	METs with Mobilization	15	68.93	4.920	1.270	0.231
	Mobilization	15	66.73	4.920	1.270	

Shoulder Range of Motion after Treatment:

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean	Sig.(2-tailed)
shoulder external rotation post treatment	METs with Mobilization	15	47.7333	3.61478	.93333	0.000
	Mobilization	15	41.8667	3.39888	.87759	
shoulder abduction post treatment	METs with Mobilization	15	77.4000	5.22084	1.34801	0.015
	Mobilization	15	72.6667	4.73085	1.22150	
shoulder flexion post treatment	METs with Mobilization	15	81.6667	4.79086	1.23700	0.003
	Mobilization	15	76.0667	4.49550	1.16073	

DISCUSSION:

The purpose of this study was to measure the efficacy of Muscle Energy Techniques and joint mobilization techniques to relieve pain and improve range of motion in patients of adhesive capsulitis.

Quantitative study was conducted following Randomized Control Trial (RCT) in which sample size of 30 participants were included from Allied Hospital Faisalabad, Aziz Fatimah Hospital Faisalabad, DHQ Faisalabad and Madina Teaching Hospital Faisalabad. Both male and female participants were included in study with age ranging from 40-60 years. Subjects were allocated into two different groups named as Group 1 (METs with Joint Mobilization) and Group 2 (Joint Mobilization). Group 1 received Muscle Energy Techniques with Joint Mobilization and Hot Pack while group 2 was treated with Joint Mobilization and Hot Pack only. According to study follow up was taken before and after treatment of 4 weeks (Contractor, et al., 2016).

Maitland techniques were used for the treatment of frozen shoulder. Different grades were used for

different purposes. Grade I and II for relieving pain and improving range of motion while grade III and IV were used as stretching purposes (Kumar, et al., 2012).

When the effects of two treatment options were compared, treatment given to the group 1 (METs with Mobilization) was more effective as compare to the treatment given to the group 2 (Mobilization Techniques) only. No harmful effects were observed with either of the treatments throughout study period. The results of this study supported the hypothesis that there was a significant difference between both treatments applied for pain, ROMs and Disability in the patients of adhesive capsulitis. There was no conflict of interest between studies.

CONCLUSION:

Joint mobilization with METs and hot pack was the potential treatment option for patients of frozen shoulder in all adult population regardless of harms and side effects.

The conclusion appeared as, the joint mobilization showed more significant effects when use with METs and hot pack as compared to joint mobilization when used with hot pack only. Because in this study there was a significant improvement in the treatment group in which patients were treated with METs and Joint Mobilization.

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