

## **Comparison of Effectiveness of Mulligan’s Mobilization and Spencer Technique Along with Conventional Therapy for Frozen Shoulder. Randomized Controlled Trial RCT**

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**ABSTRACT:** *The purpose of this study is to compare the effectiveness between Mulligan's mobilization and spencer technique. The study's 36 patients who met the eligibility requirements were accepted. Before beginning any examinations, each participant in this study completed a written informed consent form. Three groups of frozen shoulder patients were randomly assigned. Mulligan's mobilization was used in Group A, Spencer technique was used in Group 2, and simply conventional treatment was used in Group 3. The computer-generated list used to divide the patients into the three groups remained consistent throughout the trial. In both groups, the course of treatment lasted four weeks. Shoulder pain is very common problem now a days. Shoulder pain leads to multiple dysfunctions depending upon severity of pain. It decreases the range of motion and leads to functional dependency. Physical therapy is important in the management of shoulder pain including heat therapy, infrared radiations, and manipulation exercises and in some cases traction. This study provided an opportunity to share my personal experience with community. This study was conducted purely in clinical setting of Physiotherapy Department Mayo Hospital, Lahore. The outcome of this study is of great value in treating frozen shoulder which is a great contribution to the health care system of Pakistan. As there are numerous treatment strategies to treat shoulder pain but there is not enough evidence about the efficacy of Spencer technique. Hence this study was done to compare the efficacy of these interventions. NPRS AND SPADI post treatment scores of group A show significant improvement in reducing pain and disability. It was concluded from the results of this study that Mulligan's mobilization are more effective than Spencer technique for treatment of frozen shoulder. It improves movements and posture of patients.*

**KEYWORDS:** Mulligan's mobilization, Spencer technique, conventional treatment, Randomized controlled trail.

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## INTRODUCTION

Frozen shoulder is also defined as slowly and continuous dropping of active and passive shoulder mobility probably due to capsular contracture(1).” Duplay originally provided a diagnosis for frozen shoulder in 1872, describing it as "peri-arthritis scapulohumeral." (2). Codman initially used the phrase "frozen shoulder" in 1934. Moreover, Codman demonstrated the significant decrease in external rotation and abduction. A large portion of the illness also affected structures outside of the joint capsule. These structures may include the sub acromial bursa, musculotendinous unit, and coracohumeral ligament. (3). Neviassire in 1945 narrated this term as adhesive capsulitis. However this term is not correct because this is not linked to adhesion of capsule, this is related to contracture of capsule(4).

Muscles are also involved in providing stability to shoulder joint. They stabilize shoulder and keep head of humerus into glenoid cavity and give maintenance to shoulder joint. Muscles involved in

shoulder joint are Supraspinatus, infraspinatus, teres minor and subscapularis. These four muscles form rotator cuff. Deltoid muscle is also involved in maintenance of shoulder joint.

Frozen shoulder can be due to hormonal imbalance, diabetes or weak immune system. It can also be due to long period of inactivity, due to injury or recent surgery of shoulder which leads to formation of adhesions (5).

Indications of frozen shoulder includes limited pain, pain on moving arm, pain during sleeping, restrictions on active range of motion and passive range of motion, but radiographical findings are normal (6).

Due to normal radiological findings, it is sometimes difficult to diagnose frozen shoulder. The diagnosis of frozen shoulder is problematic due to similar signs and symptoms with other pathological conditions such as rotator cuff tendinopathy or glenohumeral arthrosis (7, 8). With help of recent studies it is found that diagnosis of frozen shoulder is made on stiffening of coracohumeral ligament (9).

Many treatments are used for recovery of frozen shoulder. Aim of treatment is to recover patient's abilities even before natural recovery takes place. Along with interventions many other options are available for speedy recovery. It includes intra articular corticosteroid injection in shoulder joint. Intra articular sodium hyaluronate injection is also used for this purpose. Analgesics and NSAIDS are also frequently used. The improvement rate of sodium, hyaluronate injection is almost as equal to rate of steroid injection. Both of these treatments have improvements on patients and having less side effects (10). Hyaluronate injection seems to have better results. It helps in improving range of motion in patients who have limited ranges. It also decreases pain as pain decreases patient feels more comfortable in performing exercises. It also provides protection to chondrocytes and decreases spacing of joint space (11).

To improve situation of patients, many interventions are applied. Rehabilitation programs for frozen shoulder are not selected. It depends on the institute where rehabilitation is taking place. The application of physical therapy, frequency of exercises and timings of exercises have not yet properly described (12).

Mulligan mobilization is also called as mobilization with movement. In this case, the patient actively moves the joint while the therapist manually applies gliding force to the joint to restore the diminished accessory glide. The outcome should be pain-free movement.. The mobilization given to patient depends on his behavior. Direction of force, frequency, repetitions, amplitude change based on response of patient. On the patient comfort ability, therapist adjusts the treatment. Research data on mobilization is not very extensive because mobilization is always given along with other modalities like hot pack and exercises.

The spencer technique is developed by Spencer, D.O. in 1961. This approach is used to relieve pain and restriction at glenohumeral joint. Spencer technique is physical manipulation of muscles and joints and mobilization of glenohumeral joint and scapulothoracic joint is performed (13).

Frozen shoulder usually progress without any known cause. First patient experiences phase of pain, which progresses to freezing phase when glenohumeral motion is lost. Followed by thawing phase in which pain gradually lessens and most of the movement is restored (14).

There haven't been many research that contrast these two methods. Repositioning errors in bone position is made possible using the Mulligan technique. Spencer's method, however, promotes range of motion without experiencing any pain by stretching the tissues, enhancing lymphatic flow, and enhancing joint circulation.

Conservative method includes various exercise methods and physical therapy modalities. Physiotherapy exercises such as active exercises, active assisted exercises, passive exercises, self-stretching, mobilization techniques, wall exercises, pendulum exercises are also used for treatment of frozen shoulder. Modalities such as ultrasound, hot pack, LASER and short wave diathermy are also used. (15).

This study compares the efficacy of Mulligan's mobilization and Spencer's approach used in conjunction with conventional therapy to help patients with their pain and range of motion.

## **MATERIALS AND METHODS:**

**Study design:** The study design was Randomized Controlled Trial.

**Setting:** The study was conducted in physiotherapy department Mayo Hospital.

**Duration of study:** The duration of study will be of 4 months after approval of synopsis.

**Sample size:** A total of 36 Patients were included, which are divided into three groups (12 patients in group A, 12 patients in group B, 12 patients in group C).

**Sample technique:** The technique was Purposive non probability sampling:

<p><b>Inclusion criteria :</b></p> <ul style="list-style-type: none"> <li>• age 30-55</li> <li>• both male and females</li> <li>• diabetic patient</li> <li>• Symptoms present for more than 3 months.</li> <li>• Restricted movements in ADLs.</li> </ul>	<p><b>Exclusion criteria :</b></p> <ul style="list-style-type: none"> <li>• Cancer</li> <li>• Pregnancy</li> <li>• Systemic disease</li> <li>• Vertebral fracture</li> <li>• Nerve root irritation</li> <li>• Rotator cuff rupture</li> <li>• Open wound or skin infection</li> </ul>
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<p><b>Data Collection Procedure</b></p>	<p>This research was conducted on basis of inclusion and exclusion criteria for frozen shoulder pain. In this research there were three groups. Permission was assured from patients through consent form before starting treatment of patient. The examination included data that have both subjective and objective examination. The information related to patient having knowledge of age, sex, past medical history, social and economic interests, related to marriage, related to education, time span of pain, quality and location of symptoms.</p> <p>36 patients who complete selection criteria were included to this study. SPADI has two aspects, one aspect is of pain and second aspect is for functions. Pain aspect has 5 questions related to pain of patient and Functional aspect has 8 questions related to functional abilities of patient. It helped in assessment after that patient was randomly assigned to receive either mulligan mobilization or Spencer technique or only conventional treatment. Allocation of patients in three equal groups was randomly. On 0<sup>th</sup> day ROM will be assessed by using goniometer.</p> <p><b>Group A (Experimental group):</b>  <b>Mulligan’s mobilization</b></p> <p>As the patient actively moves the arm in the desired direction within a pain-free range, the therapist will use passive accessory glide.</p>
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**Dosage:** Repetitions are performed in sequence way. 3 sets of exercise with each 10 repetitions. And rest of 2 minutes between each set. Exercise is performed 3 times a week for 4 weeks. Conventional therapy.

**Group B (Experimental group):  
Spencer's technique.**

Patient positioned in side lying with the shoulder to be treated uppermost, the therapist stood in front of the patient stabilizing the superior aspect of the shoulder girdle. Following movements are performed passively in sequence.

**Dosage:** Repetitions are performed in sequence way. 3 sets of exercise with each 10 repetitions. And rest of 2 minutes between each set. Exercise is performed 3 times a week for 4 weeks. Conventional therapy

**Group C (Control group):  
Conventional therapy**

Patients will receive workout regimens and heated packs. The exercise therapy programme comprises wand, pulley, and finger ladder exercises, pectoral stretch, isometric exercises, active and active aided range of motion exercises, and Codman's pendulum exercises. Everyone will be told to follow the Home Exercise Program's (HEP) instructions at least twice each day.

**Codman's pendulum exercise:**

Bend forward at waist. Allow affected arm to hang down. Keep arm and shoulder relaxed. Move the arm in clockwise, anticlockwise circles.

**Repetitions:** Repetitions are performed in sequence way. 3 sets of exercise with each 10 repetitions. And rest of 2 minutes between each set.

**Wand pulley exercise:**

Ask the patient to stand comfortably. Hold a wand with both hands with elbows bent. Keep elbows close to body and move the wand across your body towards affected arm.

Hold for 10 seconds.

Repeat 2-4 times.

**RESULTS**

Table 1 shows the demographic data of the study. In group A; total patients were 12 having a mean of  $1.42 \pm 0.51$  while group B was  $1.92 \pm 0.29$  and in group C were  $1.67 \pm 0.49$ . the gender, occupation and marital status was also depicted.

Table 2 depicts pre and post treatment scores of NPRS and SPADI scales for pain and disability. Pretreatment and posttreatment values of NPRS of Group A, B & C were  $5.8 \pm 1.16$ ,  $7.91 \pm 1.14$ ,  $8.16 \pm 1.14$  and post scores were  $4.41 \pm 0.79$ ,  $5.16 \pm 1.02$ ,  $6.33 \pm 1.07$  with the p-value of 0.00. Pretreatment mean score of SPADI of these groups was 79.41, 9.69, 72.08, 12.01, 78.0, 8.52 and post treatment mean score  $43.0 \pm 8.05$ ,  $51.16 \pm 10.69$  and  $66.75 \pm 7.94$  respectively.

Table 3 shows the Post treatment scores of NPRS and ODI. Comparison Numeric pain rating scale score (NPRS) and SPADI with p value less than 0.05. showing improvement in group 2. Hence, Null hypothesis is rejected and there is significant difference in post treatment values of both groups.

**Table 1: Descriptive statistical analysis (N=36)**

	<b>Group A (n=12)</b>	<b>Group B (n=12)</b>	<b>Group C (n=12)</b>
Gender	7(F)/5(M)	5(M)/7(F)	7(F)/5(M)
Age	$1.42 \pm 0.51$	$1.92 \pm 0.29$	$1.67 \pm 0.49$
Occupational Status	58.3% (E), 47.1% (UnE)	33.3% (E), 66.7% (UnE)	16.7% (E), 83.3% (UnE)
Marital Status	41.7% (S), 58.3% (M)	100% (M)	58.3% (S), 41.7% (M)

**E(Employed), UnE(Unemployed), S(single), M(Married), M(Males), F( Females)**

**Table 2: Pre and post treatment scores of Group A,B & C**

**Group A (n=12)    Group B (n=12)    Group C (n =12)**

<b>NPRS Score</b>	Pre-value	8.5± 1.16	7.91 ±1.14	7.91 ±1.14
	Post-value	4.41± 0.79	516± 1.02	7.91 ±1.14
<b>SPADI Score</b>	p-value	0.000	0.000	0.000
	Pre-value	79.41± 9.69	72.08 ±12.01	78.0 ±8.52
	Post-value	43.0± 8.05	51.16± 10.69	66.75±17.94
	p-value	0.000	0.000	0.000



**Table 3 Post treatment scores of Group A,B & C**

		N	Mean (S.D)	p-value
Post_NPRS	Group A	12	4.41± 0.79	0.000
	Group B	12	5.16 ±1.02	
	Group C	12	6.33 ±1.07	
POST_SPAD I	Group A	12	43.08± 8.05	
	Group B	12	51.16 ±10.69	
	Group C	12	66.75 ±7.94	

**DISCUSSION**

The present examination was done to check the efficacy of mulligan mobilization and spencer technique for the treatment of frozen shoulder. We divided the 36 patients evenly among three different therapy modalities. Spencer method was used on Group B, Mulligan mobilization was used on Group A, and conventional therapy was used on Group 3. Likewise, 12 patients were divided between each group.

After one month's follow-up, patients who got Mulligan mobilization reported much less pain and impairment than those who received Spencer method. The Spencer method group and Mulligan mobilization group were shown to differ significantly. According to this viewpoint, therapists should explain these therapy alternatives to patients so they can decide which approach to utilise while taking into account the potential expense of each intervention as well as the patients' references. As a consequence of this study, it has been determined that Mulligan mobilization is significantly more successful than Spencer method in treating frozen shoulder

Another investigation looked at how patients with frozen shoulders responded to the Spencer Method, Kaltenborn, Mulligan, and Maitland mobilization in terms of discomfort, range of motion, and functional impairment. There will be four groups of 20 samples each, for a total of 80 samples. They will receive treatment five times per week for three weeks. The VAS, ROM, and SPADI scores from the post interventional evaluation will be evaluated again after the third week of treatment, and the follow-up and assessment of these outcomes will be evaluated again at the end of the second, third, and sixth months. After then, the data will be taken for analysis. Another investigation looked at how patients with frozen shoulders responded to the Spencer Method, Kaltenborn, Mulligan, and Maitland mobilization in terms of discomfort, range of motion, and functional impairment...(16) But in our study, only Mulligan and Spencer technique was used. NPRS and SPADI were likely the measuring outcomes in this study. Sample size was also changed.

. In another study, the effects of the high-grade Maitland mobilization technique and the post-isometric relaxation (PIR) muscle energy technique were examined with regard to the discomfort associated with frozen shoulder, glenohumeral joint abduction and external rotation, and functional activities. Both Group A and Group B received treatment for 4 weeks; Group A used the post-isometric relaxation (PIR) method, and Group B used Maitland grade (IV) mobilization. The shoulder function was evaluated using the Glenohumeral joint abduction, the shoulder pain and disability score, and the external range of motion with a goniometer.(17) But in our study functional outcome was not accessed. Muscle energy technique was not used for frozen shoulder in my study.

## **CONCLUSION**

All of three exercise groups resulted in improved reduction in pain and disability. Among all the groups the patients in Group A with mulligan mobilization showed the best results with pain reduction and disability as compared to Group B and Group C with spencer technique and conventional therapy respectively.

## **RECOMMENDATIONS**

Mulligan mobilization is very effective for treatment of frozen shoulder. It is highly recommended and effective and require fewer hospital visit for sufficient early response.

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