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# Effectiveness of Mulligan Mobilization in Frozen Shoulder

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***Abstract –***

***Objectives : Effectiveness of Mulligan Mobilization in Frozen Shoulder***

***Design: Randomized Control Trial***

***Methodology: According to predetermined inclusion and exclusion criteria, a total of 30 patients were enrolled. They were then randomly divided into two groups, each of which had 15 patients. While Group B received ultrasound treatment combined with exercises (stretching, strengthening, and ROM exercises) three times per week for four weeks, Group A had Mulligan mobilization in addition to these activities (12 sessions). The visual analog scale, the Shoulder Pain and Disability Index (SPADI), and goniometry for Shoulder Range of Motion were used to evaluate the patient's outcomes. Values from before and after the therapy were kept in order to compare the outcomes.***

***Results:***

***This research demonstrated that the patient's range of motion in external rotation, abduction, and flexion, as well as the degree of their pain, had significantly improved.***

***Conclusion: The study's findings imply that Mulligan and ultrasound may both help with frozen shoulder issues. Mulligan group had more improvement than Ultrasound group. Based on these findings, Mulligan mobilization with exercises, as opposed to ultrasound with exercises, should be the preferred method of therapy for frozen shoulder.***

***Keywords - Shoulder Pain, Mulligan, Ultrasound , Exercise.***

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## INTRODUCTION

Codman coined the term "frozen shoulder" in 1934. Frozen shoulder, he said, is a painful shoulder ailment with a slow onset, marked by a lack of forward shoulder flexion, external rotation, and sleeping on the afflicted side. The term "adhesive capsulitis" was first used by Naviesar in 19451. Frozen shoulder, adhesive capsulitis, and periarthritis are various names for the same painful, stiff condition affecting the glenohumeral joint2. To put it simply, adhesive capsulitis is the inflammation and subsequent contracture of the glenohumeral joint capsule, which causes shoulder discomfort and loss of motion3. Peak incidence is between the ages of 40 and 70, with a reported prevalence range of 2.5% to 5.3%.4-8. This is a self-limiting illness that typically goes away within 2–3 years, while up to 40% of individuals may have symptoms for more than 3 years9,10. Adhesive capsulitis, more often known as frozen shoulder, affects 3-5% of the general population and as many as 20% of those with diabetes, according to research published in 2014 by Smita Bhimrao. When Frozen Shoulder affects one shoulder, it raises the other shoulder's chance of being affected by 5-34%.11.

Females, particularly those between the ages of 40 and 60, including people from Northern England, Canada, Germany, and India (among others) participated in a cross-sectional research of frozen shoulder prevalence in 1951 and discovered that females had a higher incidence than men.12.

Two basic kinds of idiopathic frozen shoulder may be distinguished: In contrast to a secondary frozen shoulder, which is brought on by capsula injury or

the presence of another illness, a primary frozen shoulder is brought on by a lack of blood supply to the shoulder joint. 13.

The primary objectives of treating frozen shoulder are pain reduction, range preservation, and function recovery. Stretching and strengthening exercises, electrotherapy modalities, and mobilization are all components of physiotherapy treatment, which may be used in tandem.14 Passive movement within a large class of exercise, joint mobilization is used to alleviate discomfort and restore mobility to aching synovial joints. There are a number of different types of mobilization, and the language used to describe them differs depending on who you ask.

Mulligan's MWM approach for periphery joints combines positional fault correction with simultaneous (osteo-kinematics) joint mobility with a prolonged application of manual "gliding" force. MWMs combine an active, pain-free joint glide at the end of range with a passive correction. To overcome the impediment and restore proper alignment, It adds on top of the patient's active physiological movement.15,16.

The efficacy of Mulligan's MWM compared to conventional treatment in instances of advanced adhesive capsulitis is not well established, however past research has indicated that both Mulligan's method and passive stretching may help reduce shoulder discomfort and restore range of motion and function.17. Utilizing high-frequency sound waves, Ultrasound Therapy (UST)

In order to alleviate the symptoms of frozen shoulder, it is necessary to raise the temperature of the affected area by up to 5 centimeters. The speed at which nerve impulses travel and the strength with which skeletal muscles contract are both altered by UST.18. Therefore, therapy that reduces the severity and length of symptoms and impairment might have a substantial economic and public health impact by decreasing morbidity and disability. 19.

Thus, the purpose of this study is to evaluate the effectiveness of Mulligan's MWM in conjunction with exercise.

## MATERIAL AND METHODS:

Those who would be included in either of the two study groups were chosen at random.. Mulligan's mobilization and exercises (stretching, strengthening, and range of motion) were administered to Group A, whereas ultrasound and exercises were administered to Group B. (stretching, strengthening and ROM exercises).

**Inclusion criteria**[18,20,21]:

- Age 40- 60 yrs.
- Shoulder ROM restriction (external rotation $\geq 60^0$, abduction $\geq 30^0$, internal rotation$\geq 5^0$)
- Shoulder pain more than 3 months.
- A positive abduction test and external rotation test are indicative of adhesive capsulitis..

**Exclusion criteria**[22-25]

- Subjects with shoulder ligament problems, including rotator cuff tears.
- Shoulder-related arthritis history Accidental or trauma-related injury history.
- Malignancy.
- Shoulder fractures and dislocations may lead to periarthritis.,
- Reflex sympathetic dystrophy,
- Neurological involvement (stroke, Parkinsonism, radiating pain to arm).
- Shoulder-specific surgical history.

Thirty patients met the criteria and were enrolled. Fifteen patients in each of two groups (A and B) were selected at random. At the outset, we measured the pain, function, and shoulder range of motion (flexion, abduction, lateral rotation, and medial rotation) in both groups using a Visual Analog Scale, Shoulder Pain and Disability Index, and Goniometry. Three times a week for four weeks, treatment was administered (12 sessions)[18,26].

**Mulligan Mobilization procedure**[27]**:**

- The patient was instructed to place one arm at his side and keep his head tilted forward while seated on a stool.
- The right humeral head was given a graduated postero-lateral glide with the left hand while the right scapula was stabilized with the right.
- All the while I was going up and coming back down, I was gliding.
- The pressure and direction of the force vector were adjusted based on the sensation of discomfort to guarantee a pain-free glide.
- The participant was instructed to conduct a series of 10 elevation movements while maintaining the glide.

**Ultrasound Procedure**:

At a frequency of 1 MHz and an intensity of 1 W/cm2, the patient was subjected to pulsed ultrasound for 5 minutes. Physical therapists have been using a circular motion with the transducer head on the shoulder trigger points and the superior and anterior periarticular regions of the glenohumeral joint to treat shoulder pain.[28].

**Exercise therapy:**

- **Stretching exercises**:

Flexors and external rotators were stretched using the hand-behind-the-back technique. The patient was instructed to hold each stretch for 30 sec, with a 10-second break in between, and to repeat the sequence four times. They were instructed to regularly stretch at home. Abduction, flexion, external rotation, internal rotation, and horizontal adduction may all be strengthened with the help of some simple self-stretching exercises.[27].

- **Self-Stretching to Increase External (Lateral) Rotation:**

The patient is positioned such that his or her forearm is lying on the table and the elbow is bent at a right angle to the body. Get the patient to bend over at the waist until his or her head and shoulders are touching the table. [29].

- **Strengthening exercises:**

Resistance training using weights, therabands, springs, and push-ups got started. The rotator cuff muscles' mobility, strength, and coordination were all enhanced with the exercise routine and manual treatment, which helped to relieve stress on the subacromial bursa and relieve pain during overhead activities.[30].

**Range of Motion Exercises Program[18,26,29]:**

**Pulley Exercises:** A patient in a chair, gripping a skipping rope, crosses a metal beam. The alternating up-and-down motion of the rope helps the patient practice shoulder flexion and extension. Patients were instructed to do this on a daily basis for 5-10 minutes.

**Finger ladder Exercises:** The patient is oriented toward a wall-mounted ladder. A number of patients expressed a desire to rest their afflicted hands over a low staircase. Then, beginning at the bottom of the finger ladder, gently work your way up to the top, before descending down to the bottom.

**Circumduction Exercises:** Patients were instructed to dangle the afflicted shoulder over the side of the bed while lying in the prone position, and then gently rotate the shoulder in a circular motion in all directions. Depending on the patient's condition, this had to be done anywhere from 5-10 times daily.

**Pendulum Exercises:** Patients were instructed to lean forward, resting their sound forearm on a table or seat, with their shoulders relaxed, and then to gently swing their afflicted side arm forth and backward until they felt a mild to moderate stretch. This exercise should be performed 5-10 times, but only if the patient has no discomfort while doing it.

**DATA ANALYSIS**

SPSS 20 was used to analyze the data. Average and dispersion were used to compare outcomes, and paired and independent samples t-tests were used to determine statistical significance. P-values lower than 0.05 were considered significant. All individuals involved submitted an informed consent permission before they were included in the research to guarantee their agreement to participate, protect their privacy, and make sure they understood what would be expected of them.

**RESULTS**

In this study 30 patients participated with a mean age of 47.35±16.30 in group A and48.20±15.90 in Group B ranging from 40 to 60 years.

**Table 1: Age average and standard deviation for groups A and B**

| | | Group A (N=15) Mean ± SD | Group B (N=15) Mean ± SD |
|---|---|---|---|
| | Age ( Yrs) | 46.30±15.20 | 47.30±16.90 |

**Mean reduction in VAS**

Both groups had clinically significant difference in pre $R_x$ to Post $R_X$ values as p values for group A and B werep=0.004 and p=0.05 respectively.

**Table 2: VAS values between groups A and B were reduced on average. At before Rx and post Rx given p values, get the mean and standard deviation.**

| | Groups | Pre $R_X$ | Post $R_X$ | Pre $R_x$ to Post $R_X$ | |
|---|---|---|---|---|---|
| | | | | Mean ± SD | P value |
| 1 | Group A (N=15) Mean + SD | 6.35±1.5 | 1.05±0.8 | 3.85±1.15 | 0.000 |
| 2 | Group B (N=15) Mean ± SD | 6.55±1.5 | 1.95±0.6 | 2.10±0.70 | 0.00 |

### Shoulder pain and disability index

**Table 3: Index of shoulder pain and impairment**

| | Group | Pre $R_x$ | Post $R_x$ | P value |
|---|---|---|---|---|
| 1 | Group A(N=15) Mean ± SD | 75.20±3.25 | 33.25±5.20 | 0.0000 |
| 2 | Group B (N=15) Mean ± SD | 79.19±3.25 | 7.15±4.35 | 0.10 |

### Mean reduction in ROM

Both groups had significant difference in pre $R_x$ to Post $R_X$ p=0.000 respectively

| ROM | Group A (N=20) (Mean ± S.D) | | Group B (N=20) (Mean ± S.D) | | p-value (<0.05) |
|---|---|---|---|---|---|
| | Pre $R_x$ | Post $R_x$ | Pre $R_x$ | Post $R_x$ | |
| Flexion | 103.2±35.01 | 150.32±15.60 | 98.50±46.15 | 117.34±35.20 | 0.001 |
| Abduction | 91±32.95 | 162.4±8.43 | 83.52±47.15 | 113.62±36 | 0.000 |
| lateral rotation | 21.25±11.87 | 71.05±6.50 | 27±19.81 | 40.88±16.14 | 0.000 |
| Medial rotation | 41.50±9.25 | 65.66±9.15 | 41.27±13.25 | 50.15±11.4 | 0.001 |

### DISSCUSION

Finding out whether Mulligan methods are helpful for frozen shoulder was the motivation for this investigation. The Shoulder Pain and Disability Index (SPADI) is a combination of a numeric pain rating scale, a range of motion (ROM), and the SPADI to measure the severity o, this research assessed the efficacy of the Mulligan mobilization method vs ultrasound in frozen shoulder, in addition to stretching, strengthening, and ROM activities. Overall, respondents in both groups showed significant gains. From a clinical standpoint, there was a clear difference between the two groups. While both groups saw improvements in their VAS and SPADI ratings, a statistical comparison revealed that GroupA fared better than GroupB.

After 4 weeks of therapy, the VAS score for Group A (Mulligan Mobilization) was 4.11 points higher than Group B (Ultrasound; 2.41 points).

Frozen shoulder discomfort is lessened by therapeutic ultrasound, according to research published in 2017 by Farah shaheen.[30].

Evaluation of function at 7- and 12-week visits revealed the existence of considerable improvement, as reported by Hasan Kerem Alptekin in 2016. The treatment protocol consisted of 20 minutes of interferential current and hot pack application, 3 minutes of ultrasound therapy, regular range of motion (ROM) exercises, stretching exercises, strengthening with Theraband in all directions, and the application of post-exercise PNF techniques in all patients who did not have contraindications to deep or superficial heat application. The participants did 20 manual stretches, 5 in each direction.[31].

It was expected that the Mulligan method would much better alleviate shoulder discomfort and dysfunction than the Maitland approach, and this was supported by the research of Aliaa Rehan Youssef et al. in 2015. Patients treated with the Mulligan approach reported much less discomfort and better shoulder function than those treated with the Maitland technique, lending credence to this notion. Importantly, at the conclusion of therapy, patients in both groups had significantly improved.[32].

Mulligan's approach is used in Gaurav Mhaske's 2017 research because it increases range of motion and reduces pain simultaneously. The patient was given at-home therapy. For two weeks, twice a day, every day, you were intended to execute ten sets of the exercises.[27].

Goyal et al. (2013) following 3 weeks of treatment with end range mobilization, Mulligan, and combination mobilization, they compared pain, function, and active and passive ROM. At this time, the only discernable distinction between Mulligan and Maitland is in their exterior rotation range. However, the very short time period of the therapy (three weeks) may be to blame for the divergent opinions. Now that the Mulligan approach is being used, improvements in shoulder kinematics are beginning to show, and they are anticipated to remain even after the treatment has ended.[33].

Shrivastava et al. (2011), There was no discernible variation in pain levels, function, or shoulder mobility between the two mobilization methods when applied to 20 patients with idiopathic frozen shoulder. It is important to note that it is unclear whether individuals with diabetic frozen shoulder this study's scope included. Along with mobility, patients also received vigorous exercise like stretching and aerobics.[34].

Clinical applications of ultrasonic therapy (UST) in the rehabilitation of patients with frozen shoulder were described by Robertson VJ et al. in 2001. They found that UST's thermal and non-thermal effects were both beneficial in lowering inflammation, increasing tissue flexibility, and lessening discomfort. The thermal benefits of UST increase tissue flexibility and decrease inflammation, which aids in vigorous shoulder movement with little discomfort. UST's non-heat related effects have been demonstrated to shorten the time needed for in-house rehabilitation and lessen the likelihood that symptoms would return.[35].

In 2012, Shahbaz Nawaz Ansari published a research confirming that therapeutic ultrasound alleviated pain associated with frozen shoulder therapy. [18].

Our findings that Maitland mobilization, Ultrasound, and range-of-motion (ROM) exercise are all effective as a means of healing frozen shoulder are supported by a large body of research.

## CONCLUSION

The findings indicated that both treatments were helpful in treating frozen shoulder, but when comparing the maximum degree of success between them, the mulligan approach enforced a remarkable rate of recovery in restoring pain-free range of motion when compared to the Ultrasound and is superior.

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