



EFFECT OF MULLIGAN MOBILIZATION WITH MOVEMENT [MWM] VERSUS MUSCLE ENERGY TECHNIQUE [MET] ON PAIN, ROM AND DISABILITY IN SUBJECTS WITH GRADE 2 ADHESIVE CAPSULITIS - A COMPARATIVE STUDY

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ABSTRACT

Adhesive capsulitis, commonly known as frozen shoulder, is a prevalent musculoskeletal disorder marked by shoulder pain, stiffness, 'Mobilization with Movement (MWM) and Muscle Energy Technique (MET) are frequently used, though limited comparative evidence exists regarding their effectiveness. **Aim:** To compare the effects of Mulligan MWM and MET on pain, shoulder ROM, and functional disability in individuals with Grade 2 adhesive capsulitis. **Objectives:** The study aims to compare movement and Muscle Energy Techniques in improving shoulder ROM and reducing pain and disability in Grade 2 adhesive capsulitis patients. **Methodology:** A randomized experimental study was conducted with 40 participants aged 40–60 years diagnosed with Grade 2 adhesive capsulitis. Subjects were randomly assigned into two groups: Group A (n=20) received Mulligan MWM and Group B (n=20) received MET. Both groups also received conventional physiotherapy including hot packs and shoulder mobility exercises. Interventions were administered three times per week for four weeks. Outcome measures shoulder ROM (goniometry), and functional disability (Shoulder Pain and Disability Index - SPADI). Data were analysed using independent samples t-tests via SPSS. **Results:** Group A (Mulligan MWM) demonstrated significantly greater improvements compared to Group B (MET) in shoulder flexion ($p = 0.012$), extension ($p < 0.001$), and lateral rotation ROM ($p < 0.001$). SPADI scores also showed greater reduction in the Mulligan group ($p = 0.001$), indicating superior improvement in pain and disability. **Conclusion:** Mulligan Mobilization with Movement is more effective than Muscle Energy Technique in improving shoulder ROM, reducing pain, and decreasing disability in patients with Grade 2 adhesive capsulitis. It can be considered a beneficial adjunct in the clinical management of frozen shoulder.

KEYWORDS

Mulligan Mobilization with Movement, Muscle Energy Technique, Adhesive Capsulitis, Frozen Shoulder, Shoulder Pain, SPADI.

INTRODUCTION

Frozen shoulder, also known as adhesive capsulitis or peri-arthritis, is a condition involving inflammation, thickening of the joint capsule, and narrowing of the glenoid cavity, leading to progressive pain, stiffness, and marked restriction in both active and passive shoulder movements especially external rotation. It severely affects daily activities such as dressing, grooming, and overhead reaching. The condition, first described by Codman, is classified as primary (idiopathic) or secondary. Primary cases occur without a known cause, while secondary cases are linked to conditions like diabetes, thyroid disorders, stroke, trauma, surgery, or prolonged immobilization. It is more common in females aged 40–65, with a prevalence of 2–5.3%, and is often more severe in diabetic and hypothyroid individuals. Secondary frozen shoulder can result from disuse and joint inactivity, particularly after trauma, surgery, or stroke. The condition progresses through four stages: pre-freezing (2–9 months) with increasing pain; freezing (4–12 months) with worsening stiffness; frozen (12–43 months) with reduced pain but limited motion; and thawing, marked by gradual recovery. Symptoms typically begin with a dull ache in the deltoid or upper arm, worsen at night, and lead to significant functional disability due to joint stiffness and muscle guarding.

MATERIALS

Materials used for this study mulligan belt, couch, universal goniometer, HOT packs (hydro collateral packs)

METHODOLOGY

An experimental study design was employed and conducted over a period of four weeks at the College of Physiotherapy, with a sample size of 40 participants selected using a simple random sampling technique the participants were sourced from the College of Physiotherapy (SVIMS) and BIRRD Hospital.

Inclusion and Exclusion Criteria

Subjects who are included in this study are: (1) age 40-60 years (2) Gender: male and female (3) Subjects with stage -2 adhesive capsulitis

(4) Subjects with symptoms more than 3months.

Subjects who are excluded in this study are: (1) Subjects history of previous shoulder injury and surgery (2) Subjects with shoulder joint infections and bone tumors (3) Subjects with osteoporosis (4) Subjects with scoliosis, kyphosis deformities (5) Subjects with stroke, brachial plexus injuries, spinal accessory injuries (6) Subjects with dislocation, rheumatoid arthritis.

Treatment Procedure

The study was initiated after receiving ethical clearance on 25-02-2025 (IEC Code: 1781). A total of forty participants who met the inclusion and exclusion criteria were recruited after obtaining informed consent. These individuals were randomly divided into two equal groups—Group A and Group B—with 20 participants in each. During the course of the intervention, one participant from each group withdrew, resulting in 19 participants per group completing the study. The subjects included in the study were individuals diagnosed with shoulder periarthritis. Group A received Mulligan Mobilization with Movement (MWM) in combination with hot pack therapy, while Group B was treated using the Muscle Energy Technique (MET) along with hot packs. The interventions were administered three times a week over a period of four weeks. Range of motion (ROM) of the shoulder joint was assessed using a universal goniometer with the participant in a supine position. For measuring shoulder flexion, the fulcrum was placed on the lateral aspect of the greater tubercle, the stationary arm aligned with the mid-axillary line, and the moving arm along the lateral humerus, with the patient raising the arm overhead while keeping the elbow extended. Although shoulder extension is less commonly measured in supine, it was assessed using the same anatomical landmarks, allowing the arm to move backward off the table's edge. For evaluating external (lateral) rotation, the shoulder was abducted to 90 degrees with the elbow also flexed to 90 degrees, and a towel was placed beneath the humerus for support. The fulcrum of the goniometer was positioned at the olecranon, the stationary arm kept perpendicular to the floor, and the moving arm aligned along the ulna as the patient rotated the forearm backward. In addition to ROM

measurements, the Shoulder Pain and Disability Index (SPADI) was used as an outcome measure. SPADI is a self-reported questionnaire that assesses both pain and disability, with higher scores indicating greater levels of impairment. It is widely utilized in clinical settings for evaluating treatment effectiveness in shoulder conditions. During the MWM procedure, the patient lay supine with head support, while the therapist assessed shoulder mobility to detect painful or restricted movements. A Mulligan belt was used to apply a lateral glide to the joint, and the patient actively performed the restricted movement. If improvement was observed, the motion was repeated 6–10 times; otherwise, the glide direction was adjusted. Once pain-free movement was achieved, the patient practiced the movement independently.



Figure-1 MWM for GH Flexion



Figure-2 MWM for GH Extension



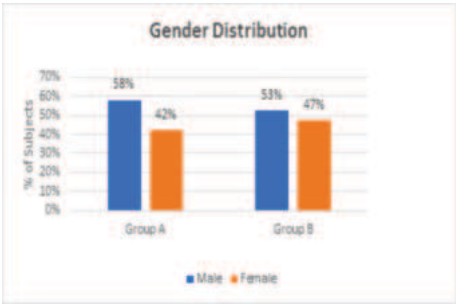
Figure-3 MWM for GH Lateral Rotation

(MET)The patient is positioned comfortably in a supine position with the shoulder relaxed. The therapist passively moves the shoulder into lateral rotation until the initial resistance is felt, typically caused by tight internal rotators or anterior shoulder structures. The patient is then instructed to perform a gentle, submaximal contraction of the internal rotators by attempting to internally rotate the shoulder against the therapist's resistance. This isometric contraction is held for about 5 to 10 seconds, followed by complete relaxation. The therapist then carefully moves the shoulder further into lateral rotation, taking up the new range without causing discomfort. This process is repeated 3 to 5 times, allowing progressive improvement in shoulder mobility

DATAANALYSIS& RESULTS:

Table 1: Shows the Mean Value of Subjects According to Gender in Both Group A and Group B

Gender	Group A	Group B
Male	11 (58%)	10 (53%)
Female	8 (42%)	9 (47%)
Total	19 (100%)	19 (100%)

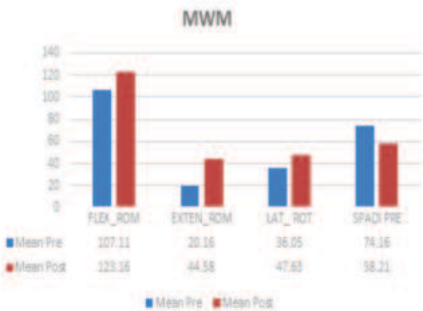


Graph 1: Gender Distribution in Both Groups

The study involved 38 participants with Grade 2 Adhesive Capsulitis, equally divided into two groups: Group A (Mulligan Mobilization) and Group B (Muscle Energy Technique). The mean age of participants was slightly higher in Group A (54.47 ± 5.31 years) compared to Group B (52.05 ± 4.95 years). Gender distribution was relatively similar between groups, with males constituting 58% in Group A and 53% in Group B. Regarding the side of the affected shoulder, the left side was more commonly affected in Group A (53%), while the right side was more affected in Group B (63%).

Table 2 and Graph 2 : Shows the Pre Value and Post Mean Values of Mulligan Mobilization with Movement

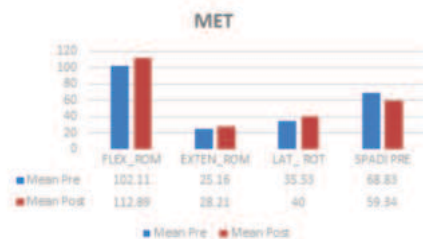
Paired Samples Statistics - Mulligan Mobilization						
Pair	Outcome Measure	Mean	SD	t	P-value	
Pair 1	FLEXION PRE VALUE	107.11	15.66	-12.91	0.000	
	FLEXION POST VALUE	123.16	18.12			
Pair 2	EXTENSION PRE VALUE	20.16	2.73	-91.00	0.000	
	EXTENSION POST VALUE	44.58	3.01			
Pair 3	LATERAL ROTATION PRE VALUE	36.05	9.66	-10.06	0.000	
	LATERAL ROTATION POST VALUE	47.63	10.85			
Pair 4	SPADI PRE VALUE	74.16	3.53	21.29	0.000	
	SPADI POST VALUE	58.21	2.67			



MWM Shoulder flexion increased notably from 107.11° to 123.16° ($t = -12.91$, $p < 0.05$), indicating enhanced range of motion. Shoulder extension showed a substantial gain, rising from 20.16° to 44.58° ($t = -91.00$, $p < 0.05$). Similarly, lateral rotation improved significantly from 36.05° to 47.63° ($t = -10.06$, $p < 0.05$), confirming greater joint mobility. In addition, SPADI scores decreased significantly from 74.16 to 58.21 ($t = 21.29$, $p < 0.05$), reflecting reduced shoulder pain and disability after the intervention.

Table 3 and Graph 3 Shows Pre and Post Value of Muscle Energy Technique

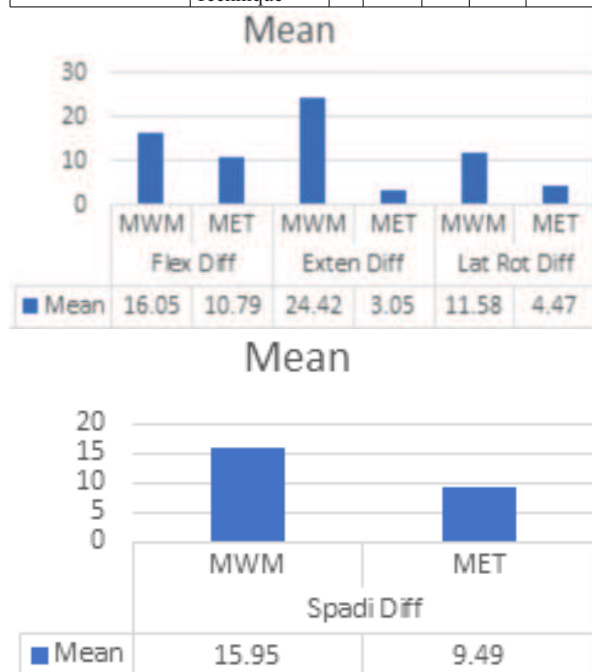
Paired Samples Statistics - Muscle Energy Technique						
Pair	Outcome Measure	Mean	SD	t	P-value	
Pair 1	FLEXION PRE VALUE	102.11	11.82	-7.00	0.000	
	FLEXION POST VALUE	112.89	12.05			
Pair 2	EXTION PRE VALUE	25.16	10.67	-10.88	0.000	
	EXTENSION POST VALUE	28.21	10.27			
Pair 3	LATERAL ROTATION PRE	35.53	10.79	-5.93	0.000	
	LATERAL ROTATION POST	40.00	11.30			
Pair 4	SPADI PRE VALUE	68.83	5.19	5.56	0.000	
	SPADI POST VALUE	59.34	6.58			



MET Shoulder flexion showed a significant increase in mean values from 102.11° to 112.89° ($t = -7.00$, $p = 0.000$), indicating enhanced range of motion. Shoulder extension also improved, with mean values rising from 25.16° to 28.21° ($t = -10.88$, $p = 0.000$), reflecting a meaningful gain. Lateral rotation demonstrated a moderate improvement, increasing from 35.53° to 40.00° ($t = -5.93$, $p = 0.000$). Additionally, SPADI scores significantly decreased from 68.83 to 59.34 ($t = 5.56$, $p = 0.000$), indicating a reduction in shoulder pain and disability.

Table 4 and Graph 4 Shows Mean Value Difference Between Mulligan Mobilization with Movement and Muscle Energy Technique

Independent Samples Test						
Difference Variable	Group	N	Mean	SD	t	P-value
FLEXION DIFF	Mulligan Mobilization	19	16.05	5.42	2.66	0.012
	Muscle Energy Technique	19	10.79	6.72		
EXTENSION DIFF	Mulligan Mobilization	19	24.42	1.17	55.02	0.000
	Muscle Energy Technique	19	3.05	1.22		
ROTATION DIFF	Mulligan Mobilization	19	11.58	5.01	5.16	0.000
	Muscle Energy Technique	19	4.47	3.29		
SPADI DIFF	Mulligan Mobilization	19	-15.95	3.27	-3.47	0.001
	Muscle Energy Technique	19	-9.49	7.44		



Mulligan Mobilization (Group A) was significantly more effective than Muscle Energy Technique (Group B) across all outcomes. In shoulder flexion, Group A improved by 16.05° vs. 10.79° in Group B ($t = 2.66$, $p = 0.012$). For shoulder extension, Group A showed a much greater gain of 24.42° compared to 3.05° in Group B ($t = 55.02$, $p = 0.000$). In lateral rotation, Group A improved by 11.58°, while Group B

improved by 4.47° ($t = 5.16$, $p = 0.000$). Finally, SPADI scores (pain and disability) decreased more in Group A (15.95) than in Group B (9.49) ($t = -3.47$, $p = 0.001$). These results indicate that Mulligan Mobilization was significantly more effective in improving shoulder mobility and reducing pain/disability.

DISCUSSION

The present study was conducted to find out the effect of mulligan mobilization with movement vs muscle energy technique on pain, Range of motion and disability in subjects with grade 2 adhesive capsulitis. With in each group significantly improvements shoulder range of motion and reduction in pain and disability in 4weeks of treatment. Group A Mulligan mobilization with movement had better results than the group B muscle energy technique in subjects. The present study is supported by the findings of previous studies which have found significant improvement in terms of shoulder flexion, extension, lateral rotation, SPADI in subjects with mulligan mobilization with movement

CONCLUSION

The study found that, which was treated with Mulligan Mobilization with Movement (MWM), had better results than muscle energy technique, which received Muscle Energy Technique (MET). Patients in mulligan mobilization with movement showed more improvement in shoulder movement and experienced less pain. In This study suggests that MWM may be a more effective treatment than MET for people with adhesive capsulitis, likely because MMT uses gentle, pain-free movements that help restore joint function and control.

Limitations of the Study

Participants under the age of 40 were not included, which may restrict the relevance of the findings for younger individuals.

The study lasted only four weeks, which might not be enough time to see long-term results.

The number of participants was small, which can make it harder to apply the results to a larger population.

Only two types of manual therapy were studied, so other helpful treatments were not included.

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