INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD)
© 2026 IJNRD | Volume 11, Issue 2, February 2026 | ISSN: 2456-4184 | IJNRD.ORG

# OVERVIEW OF MOVEMENT WITH MOBILIZATION IN IMPROVING PAIN AND ROM ON ADHESIVE CAPSULITIS

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## ABSTRACT

Adhesive capsulitis is a common shoulder disorder characterized by pain, progressive stiffness, and significant restriction of both active and passive range of motion, particularly external rotation. It predominantly affects individuals between 40 and 60 years of age. Physiotherapy plays a vital role in the conservative management of adhesive capsulitis, with joint mobilization techniques gaining increasing attention. MWM combines sustained accessory joint glides with active movement to restore pain-free motion.

This review aims to evaluate the effectiveness of MWM in reducing pain and improving shoulder range of motion in patients with adhesive capsulitis. Evidence from randomized controlled trials and systematic reviews indicates that MWM is an effective and safe technique, showing superior or comparable outcomes to conventional physiotherapy and other mobilization methods. The findings support the clinical use of MWM as an effective intervention for adhesive capsulitis.

[Keywords: adhesive capsulitis, movement with mobilization, Mulligan mobilization, shoulder pain, range of motion (ROM)]

## INTRODUCTION

Adhesive capsulitis is a common, painful condition of the shoulder that is associated with loss of range of motion in the glenohumeral joint, especially in external rotation[1,2]. It results from the thickening and contraction of the glenohumeral joint capsule and synovium [1,6] Clinical manifestations are pain, stiffness, and shoulder dysfunction [2],Usually, the prevalence is reported to be 2-5 percent[3], [7,8],.The incidence of adhesive capsulitis is 3-5 percent [9,10].Most adhesive capsulitis patients are females between the ages of 40 and 60, and it is about 70 percent [2], [14].About 20–30% of cases of this condition are bilateral[15]. [9], [5]. In studies where pain was reported in several circumstances (e.g., at rest, at night, with exercise), only pain at rest was considered in the results[16].

It is predominantly an idiopathic condition that is more common in those with hypothyroidism and diabetes mellitus [2]. Secondary adhesive capsulitis may occur when there is a known intrinsic, extrinsic, or systemic cause[5].Both primary and secondary adhesive capsulitis are present. Alternatively, idiopathic adhesive capsulitis may develop on its own without a specific trauma or trigger[14].

According to Brian Mulligan, the idea of mobilization with movement is a logical extension of the development in manual therapy, which begins with active stretching exercises and progresses to passive physiological movement to passive accessory mobilization technique.[20] Mulligan mobilization is a type of manual therapy technique called mobilization with movement (MWM) that is frequently employed to treat musculoskeletal pain[21]. The Mulligan idea involves continuous active movement and continual gliding to mobilize the joint in a weight-bearing position[22]. The primary goals of manual treatment are to restore these pathological alterations and increase joint range[13]. Other beneficial effects of the Mulligan technique are improving the normal extensibility of the shoulder capsule, stretching the tight soft tissues, and normalization of scapulohumeral rhythm[23].

**METHODOLOGY**:

Articles were reviewed from the following databases: PubMed and Google Scholar. Only articles published in the English language were considered for review. Past 18 years articles are collected (2007-2025)

A comprehensive literature search yielded a limited number of studies, which included randomized controlled trials (RCTs), non-randomized controlled trials, and systematic reviews, and these were included in the analysis. Records identified from the databases (n=1090), records screened (n=54), records excluded (31), based on inclusion criteria 23 articles were included in this review

Inclusion Criteria:

Patients clinically diagnosed with adhesive capsulitis (frozen shoulder)

Age group between 40–70 years.

Both male and female participants.

Presence of shoulder pain and stiffness for more than 3 months

Restriction of both active and passive range of motion, especially external rotation and abduction.

**Figure no 1: Prisma study selection flowchart**

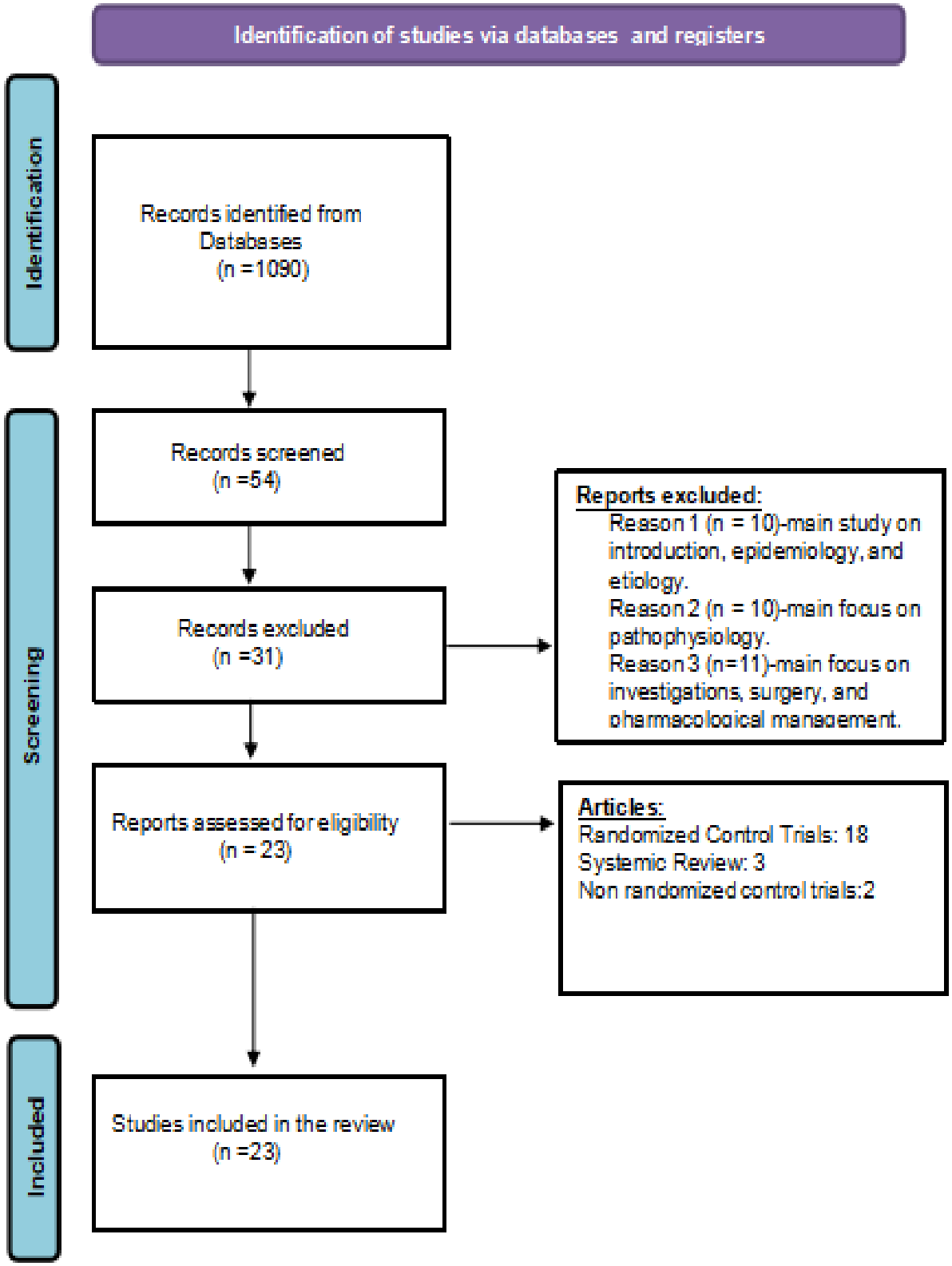


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**Table no 1: characteristics of studies included**

| Author & year | Study design | Subject | Age | Intervention | Study duration | Outcome measure | Result |
|---|---|---|---|---|---|---|---|
| Aqdas Shahzad, et., al (2024) | Systemic review | N=37 | | Group A received MWM, & Group B underwent therapies such as the METS, capsular stretching, & traditional therapy. | 6 months | VAS, NPRS, SPADI, Goniometer | MWM stands out as a beneficial & effective approach to addressing both pain and mobility challenges associated with a Frozen shoulder |
| Zainab Ijaz ur Rehman, et.al (2024) | RCT | N=28 | 18-70 | Group A received conventional physical therapy, Group B received the same therapy combined with FES and MWM | 6-12 Months | Goniometer | Combining FES with MWM improves shoulder mobility & reduces pain in AC patients compared to conventional therapy alone. |
| Mamoona Anwar, et al, (2023) | RCT | N=40 | | Group A: Treated with Maitland-graded oscillation techniques. Group B: Treated with MWM | 30 minutes with 6 months | SPADI | In both the treatments improvement of shoulder ROM'S were seen external rotation and abduction are more in MWM. |

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| Sharma. D, Prasad, et.al (2022) | Non trial randomized experimental design | ` | 30-60 | Group A received MWM, Group B received graded mobilizations. | 15 Days | VAS, Goniometer, SPADI | MWM is more effective than the Graded mobilization for improving sleep, ROM and reducing pain among AC patients. |
| Suman Malukani, Amit M. Patel (2022) | (NRCT) Non-Randomized control trial | N=40 | 40-70 | Group A was given MWM along with conventional therapy and Group B was given the PNF along with conventional therapy. | 1 Year | NPRS, SPADI, Universal goniometer | MWM is more effective in reducing pain and improving Shoulder function as compared to the PNF group. |
| Niraj Kumar, Siddhartha Sen, et., al (2022) | RCT | N=31 | 40-70 | Groups A and B were treated with Mulligan Therapy, Stabilization Exercise, and Moist Heat Therapy. | 5 days per week for 8weeks | NPRS | Group-A showed improvement in pain& ROM, Muscular strength &joint position sense compared with Group-B. |
| Ayesha Razzaq, et.al (2021) | RCT | N=70 | 30-70 | Group-I treated with MWM and Group-II with METS and Conventional treatment, including hot packs for 10 minutes and wand exercises, pulley rope, shoulder wheel exercises. | 2 sets per session 3 days a week for three weeks | NPRS, Goniometer, SPADI | Both MET'S and MWM techniques were effective in reducing pain, increasing ROM, but MWM was more effective compared to MET in managing patients with AC |
| Arif ali rana, et.al (2021) | RCT | N=40 | | Group A was given Maitland mobilization and Group B was treated with MWM. & | 6 weeks | SPADI | Improvements in the Range of motions and Reductions in the SPADI score are high |

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| | | | | both received conservative exercise plans as well. | | | in the Mulligan Group. So, it is more effective than the other technique. |
| Nithya, et.al (2021) | RCT | N=30 | 45-60 | Group A treated with MWM along with conventional management and group B was treated with post-isometric relaxation technique along with conventional. Management. | 3 times a week for 4 weeks | SPADI, NPRS | MWM is more effective in reducing pain and improving range of motion and functional outcome than post isometric relaxation technique of the Muscle Energy Technique. |
| Krisha A Shah, Ajay Kumar, et.al (2021) | RCT | N=30 | 40-60 | Group A received MWM and Group B received Kinesio taping for the shoulder joint. | | VAS, Universal goniometer | Increase in the ROM &reduction in pain in both groups, but Group A is much more effective than B |
| R. Chidambaram, et.al (2020) | RCT | N=50 | 40-70 | Group 'A' received MWM and Group 'B' received MWM along with sleeper's stretch. Both were given conventional treatments | 5 Days | SPADI<br>NPRS | \Both MWM and sleeper's stretch are effective in AC. Group B shows improvement in ROM and NPRS scores. |
| Alisha Fernandes, et.al (2020) | RCT | N=56 | | Group k: (n=28)<br>Treated with the Kaltenborn's mobilization and group M: was treated with the MWM. | 3 sessions/ week for 2 weeks | SPADI | Group K was more effective in improving shoulder ROM and reducing pain & disability. |

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| Sami S. Almureef, et.al (2020) | Systemic review | N=202 | 40-70 | Mobilization (mulligan, Maitland) Manipulation, different types of exercise irrespective of strength and durations. | | SPADI, VAS, Shoulder ROM, goniometry | Mobilization (mulligan, Maitland) with conventional therapy can be more effective in increasing shoulder ROM and reducing pain |
| Sharick Shamsi, et al (2019) | RCT | N=30 | | Group A: MWM along with exercises. Group B: Ultrasound therapy along with Exercises | 12 sessions for 4 weeks | VAS SPADI Goniometry | Both MWM and Ultrasound are effective. but group A is more effective than the group B. |
| Sumit Ragav and Anshika Singh, (2019) | RCT | N=30 | 40-60 | Group A and B were treated with a moist heat pack, MWM, and Kaltenborn's mobilization. Group C with hot water fomentation and a home-based ROM exercise. | 3 weeks | Goniometry & VAS | MWM shows significant difference in ROM and VAS score in order to decrease pain and improve ROM. |
| Jeyakumar, Jagatheesan, et.al (2018) | RCT | N=10 | 40-60 | Group A: hot pack application followed by Maitland and ROM, group B hot pack application followed by MWM & ROM | 4 weeks | VAS, Universal goniometer | Group A& B is effective in reducing the pain, improving the ROM significant changes in CHL thickness and HLA-B27 in AC of the shoulder joint. |
| Burak, Meneka, et.al (2018) | RCT | N=30 | 30-70 | Group A: MWM Group B: Traditional physiotherapy such as stretching's, cold packs, ultrasound, TENS, finger staircase, Codman | 6 Weeks, specifically once a day for 5 days a week | VAS score, ROM assessments, DASH score | MWM was much more effective than Traditional treatment methods in reducing pain, Improving ROM, DASH score. |

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| | | | | &wand exercises. | | | |
| Geetha Mounika Rayudu and Nityal Kumar Alagingi (2018) | Experimental study | N=60 | | Group-I treated with MWM & Conventional Exercises and Group-II with METS & Conventional Exercises | 3 sessions in a week for 3 weeks | SPADI | MWM &MET found clinically no significant difference in improvement of pain, shoulder ROM & functional ability. |
| Ankita Mehta, Nilima Bedekar, (2018) | RCT | N=40 | | Group 1 treated with a hot pack, TENS, and passive stretching's group 2 was treated with a hot pack, TENS, MWM | 15 days | SPADI | Passive Stretching showed more significant results than the MWM |
| Dr. B. Haveela, Dr. Praveen Dowle, et.al (2018) | RCT | N=90 | 35-65 | Group 1 received conventional therapy, Group 2 received MWM along with conventional therapy, and Group 3 received Spencer's technique along with conventional therapy. | 3 sets for 10 repetitions with 2 minutes rest between sets for 6 weeks. | SPADI, Goniometer | All three groups statistically showed improvement in pain, functional disability, and shoulder ROM. Mulligan's group was better than Spencer's and the control group. |
| Ujwal L Yeole, et.al (2017) | RCT | N=30 | 40-70 | Group A was given MWM and supervised exercises. Group B was given exercises without any mobilization. | Period of 1 week | SPADI NPRS | MWM proved to be a better technique for improving the ROM and pain in AC of the shoulder. |
| Minerva RK, Alagingi | Experimental | N=60 | 40-60 | Group I was treated with Maitland | 12 sessions | SPADI | MWM is more effective than Maitland |

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| NK, et al (2016) | study design | | | mobilization techniques and supervised exercises. Group 2 was treated with MWM. | for 4 weeks | | mobilization in reducing pain and improving shoulder functional ability. |
| Suzie Noten, Mira Meeus, et., al (2016) | Systemic review | N=12 | | Treated with Mulligan(n=1) Maitland(n=6), Angular(n=2), Cyrix(n=1), High intensity(n=1), Translational(n =1) | 1 week up to 90 days | VAS | Immediate long-term effects of the MWM (n=1) were found on both pain and ROM compared with conventional stretching exercises. |

## Discussion

Ankita Mehta et al. reported that passive stretching exercises and Mulligan mobilisation techniques both demonstrated a substantial reduction in pain and disability levels. In contrast, passive stretching yielded more pronounced results compared to the Mulligan mobilisation group. Suzie Noten et al. indicated that there is only a limited amount of preliminary evidence supporting the effect of the Mulligan technique on pain and range of motion. Aqdas Shahzad et al. (2013) identified Mulligan mobilisation as a beneficial and effective approach to addressing both pain and mobility challenges associated with frozen shoulder (FS) compared to stretching. The underlying mechanism is attributed to the neurophysiological effects of mobilisation, which activates mechanoreceptors and inhibits nociceptors, thereby providing pain relief.

Combining functional electrical stimulation (FES) with Mulligan's technique significantly improves shoulder mobility and reduces pain in adhesive capsulitis patients compared to conventional therapy alone. This suggests a synergistic effect when combining FES and Mulligan's technique, likely due to the simultaneous stimulation of muscles to activate motor neurons, resulting in restoring functional movements and improving their quality of life and correcting joint positional faults.

Mulligan's technique is more effective in treating frozen shoulder than the Maitland technique. Patients treated with Mulligan's technique experienced significantly more improvement in abduction and flexion due to neurophysiological effects on the stimulation of peripheral mechanoreceptors and the inhibition of nociceptors. Mechanical force during mobilisation may include breaking up adhesions, realigning collagen, but improvement in extension, lateral rotation, and medial rotation was statistically equivalent in both treatment group. Few studies suggest Mulligan mobilisation technique demonstrated superior results compared to graded mobilisation.

MWM is more effective in reducing pain and improving Shoulder function as compared to the PNF group, Kaltenborn's technique, conventional therapy. Mobilization reduces pain due to neurophysiologic effects on the stimulation of peripheral mechanoreceptors and the inhibition of nociceptors [41,4] Maitland technique and Mulligan technique may provide better improvement than the usual usage of physiotherapy modalities both techniques are effective in reducing the pain, improving the range of motion (ROM) and the joint mobility in relation to coracohumeral ligament (CHL) thickness and HLA-B27 in adhesive capsulitis of the shoulder [48] .Mulligan's mobilization was much more effective than traditional treatment methods for pain, the ROM, DASH scoring [22]. Mulligan's technique and MET found statistically and clinically no significant difference in improvement of pain, shoulder range and functional ability in subjects with adhesive capsulitis. But biomechanical effect of MWM is to correct this by repositioning the joint, causing it to track normally and mechanical benefits may include breaking up of adhesions, realigning collagen, or increasing fibre glide when specific movements stress the specific parts of the capsular tissue. Other beneficial effects of mulligan technique were improved the normal extensibility of the shoulder capsule and stretch the tightened soft tissue and normalization of scapulohumeralrhythm.[22]

Conventional therapy, mulligan along with conventional, spencer's technique along with conventional therapy statistically showed improvement in pain, functional disability and shoulder ROM. However, the functional improvement in mulligan's group was better than spencers and control group by correcting the positional faults and restoration of joint arthrokinematics, which in turn permits pain free range of motion. It is also found to be effective by neurophysiological mechanism and production of initial hypoalgesia based on stimulation of peripheral mechanoreceptors and the inhibition of nociceptors and altering sympathetic nervous system. [51]Movement with mobilization proved to be a better technique for improving range of motion and pain in adhesive capsulitis of shoulder, compared with supervised exercises without any mobilization. Joint mobilization techniques have various beneficial effects in neurophysiologic effect, it is based on the stimulation of peripheral mechanoreceptors and the inhibition of nociceptors mobilization techniques are supposed to increase or maintain joint mobility by inducing changes in synovial fluid, enhanced exchange between synovial fluid and cartilage matrix, and increased synovial fluid turnover.[21]

## RESULT:

The results of the reviewed studies demonstrate the efficacy of Mulligan Mobilisation in treating adhesive capsulitis, thereby enhancing pain management, range of motion, and functional ability. Mulligan Mobilisation stands out as a beneficial and effective approach to addressing both pain and increasing range of motion (ROM), encompassing abduction, flexion, extension, lateral rotation, and medial rotation. Additionally, it improves shoulder function, muscular strength, and joint position sense associated with frozen shoulder syndrome (FSS). Furthermore, it alleviates the difficulties faced by individuals in performing daily activities (ADLs) and reduces the scores of the SPADI, DASH, NPRS, and VAS, thereby decreasing disability. Notably, the Mulligan technique is more effective in treating frozen shoulders compared to other techniques and modalities such as the Maitland technique, graded mobilisation, functional electrical stimulation (FES), and proprioceptive neuromuscular facilitation (PNF). The Mulligan technique may provide superior improvements and significant changes in coracohumeral ligament (CHL) thickness in adhesive capsulitis of the shoulder.

## CONCLUSION:

In conclusion, the empirical evidence indicates that Mulligan mobilisation is a beneficial and effective approach for managing adhesive capsulitis. It exhibits positive effects on reducing pain and enhancing range of motion. The synergistic combination of Mulligan mobilisation with other therapeutic modalities, such as functional electrical stimulation and conventional physical therapy, may yield more pronounced improvements in shoulder mobility and pain management. Consequently, Mulligan mobilisation should be regarded as a valuable treatment option for patients afflicted with adhesive capsulitis.

## LIST OF ABBREVATIONS

MWM-Movement with mobilization

ROM-Range of motion

RCT-Randomised control trail

NRCT- non-randomised control trail

SPADI-Shoulder pain and disability index

NPRS-Numerical pain rating scale

DASH-Disability of the arm, shoulder and hand

FES-Functional electric stimulation

CHL-Coracohumeral ligament

ADLS-Active daily living

PNF-Proprioceptive neuromuscular facilitation

FES-frozen shoulder syndrome

FS-Frozen shoulder

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