



## International Journal of Physiotherapy Research and Clinical Practice

### ORIGINAL ARTICLE

# A Clinical Perspective on the Therapeutic Impact of Mulligan's Dynamic Approach versus Kaltenborn's Static Posterior Mobilization in Enhancing Shoulder Joint Kinetics and Reducing Disability in Adhesive Capsulitis

Shakambari<sup>1</sup>, Raja<sup>1</sup>, Samuel Paul Isaac<sup>1</sup>

<sup>1</sup>Krupanidhi College of Physiotherapy, Bangalore, Karnataka, India

#### ARTICLE INFO

##### Article history:

Received 07.03.2024

Accepted 15.06.2024

Published 12.07.2024

<https://doi.org/10.54839/ijprcp.v3i2.shakambari>

#### ABSTRACT

A frequent ailment that usually affects people between the ages of 40 and 60, adhesive Capsulitis is marked by pain and limited shoulder movement. Physiotherapy, including joint mobilization techniques, is often used to alleviate symptoms. This study aimed to compare the effectiveness of two manual therapeutic techniques—Mulligan's Mobilization with Movement (MWM) and Kaltenborn's posterior mobilization—in helping Adhesive Capsulitis patients with shoulder function and pain reduction. The study was quasi-experimental with 40 participants (aged 35-70 years) diagnosed with adhesive capsulitis. Participants were randomly assigned to two groups: Mulligan's MWM was given to Group B, whereas Kaltenborn's posterior mobilization was given to Group A both combined with ultrasound therapy and conventional treatments over 3 weeks. The Visual Analog Scale (VAS) and the Shoulder Pain and Impairment Index (SPADI) were used to quantify pain and impairment before and after treatment. Both techniques resulted in significant reduction in pain and disability ( $p < 0.001$ ). However, Group B (Mulligan's MWM) showed more pronounced improvements, with greater reductions in both VAS and SPADI scores than Group A (Kaltenborn's mobilization), suggesting a more effective treatment approach. This study provides a direct comparison between Mulligan's MWM and Kaltenborn's posterior mobilization for managing adhesive capsulitis, highlighting the superior effectiveness of Mulligan's technique in improving pain relief and functional outcomes.

**Keywords:** Adhesive capsulitis; Mulligan's Mobilization with Movement; Kaltenborn's mobilization; Shoulder pain; Disability

### 1 INTRODUCTION

Adhesive capsulitis is a common shoulder condition that causes pain and gradually reduces shoulder movement.<sup>1</sup> It is estimated that between 2% and 5% of the general population develop adhesive capsulitis, a condition that affects both men and women equally. People between the ages of 40 and 60 account for the majority of instances. Adhesive capsulitis is idiopathic since its precise frequency and prevalence are unknown; nevertheless, diabetes mellitus and thyroid dysfunction are two disorders that are traditionally linked to it.<sup>2</sup> A range of treatments were used to help patients with adhesive capsulitis regain mobility and reduce pain. The goal was to reduce the long-term need for medication and surgery for adhesive capsulitis in the long run. Physiotherapy is the most extensively utilized treatment approach for

adhesive capsulitis, which involves heat therapy, physical exercises, and joint mobilization techniques.<sup>3</sup> The adhesive capsulitis are typically categorized into three distinct phases. The painful stage (Stage 1), marked by pain, typically persists for 2-9 months. In the adhesive stage (Stage 2) Pain gradually goes away, but there is noticeable stiffness, lasting for 4-12 months. In the recovery stage (stage 3), the range of motion (ROM) improves, and the pain subsides.

Pain associated with shoulder movement is commonly alleviated with standard anti-inflammatory medications; however, in more severe cases, corticosteroids may be required. Many patients with adhesive capsulitis experience difficulty sleeping and are unable to lie on the affected side because of pain. Limited range of motion (ROM) and weakened shoulder muscles are primary contributors to the physical disability experienced by these individuals.

Various treatment options have been explored to manage this debilitating condition, including physical therapy, corticosteroid injections, and manual therapy techniques.<sup>4,5</sup> Among these, Mulligan's Mobilization with Movement (MWM) and Kaltenborn posterior mobilization are two manual therapeutic approaches that have shown promise in reducing pain and improving shoulder mobility. Mulligan's MWM involves applying a mobilization technique combined with active movement to improve joint function and reduce pain. Conversely, Kaltenborn's posterior mobilization focuses on restoring joint mobility through sustained, passive mobilization of the shoulder joint. Despite their widespread use, few studies have directly compared the effectiveness of these two techniques in handling shoulder pain and disability in patients with adhesive capsulitis. This study aimed to evaluate and compare the effects of Mulligan's MWM and Kaltenborn posterior mobilization helps people with adhesive capsulitis with their shoulder discomfort and disability.

## 2 MATERIALS AND METHODS

The study involved 40 individuals, both men and women, ages 35 to 70, and was carried out using a quasi-experimental methodology, who had been diagnosed with adhesive capsulitis at the Krupanidhi Physiotherapy Centre, Bangalore. The ethical clearance was acquired from the Institutional Ethics Committee (IEC). All the participants provided informed consent. Participants were excluded if they had undergone previous anaesthesia-assisted manipulation, diabetes, neurological issues, shoulder fractures, skin conditions, shoulder lesions, sensory impairments, or had experienced recent shoulder dislocations or surgeries. Additionally, those with open wounds in the shoulder area or those unable to understand the Visual Analog Scale (VAS) and the Shoulder Pain and Disability Index (SPADI) were not included in the study.

The participants were randomly assigned to two groups, Group A and Group B, with 20 participants in each group. Group A received Kaltenborn's posterior mobilization, while Group B received Mulligan's mobilization with movement. Data were analyzed by comparing pre- and post-treatment scores using paired and independent 't' tests. For Group A, participants were positioned supine and relaxed, and then received Kaltenborn's posterior mobilization, which was combined with ultrasound therapy (3 MHz) and conventional treatments. For three weeks, this treatment was given in 10-minute sessions five days a week. In Group B, participants were instructed to sit comfortably, and Mulligan's mobilization technique, combined with ultrasound therapy (1 MHz) and conventional treatments, was applied. This involved three sets of 10 repetitions with 1-minute breaks between each set, five days a week, over three weeks. The effectiveness of the treatments was assessed using the VAS and SPADI scales, both at the beginning and end of

the 21-day treatment period.

## 3 RESULTS

The purpose of the current study was to evaluate how well Kaltenborn's posterior mobilization and Mulligan's mobilization with movement reduced pain and disability in patients suffering from adhesive capsulitis. Table 1 provides a within-group examination of pain and disability scores using the VAS and SPADI scales for both treatment groups. Group A, which received Kaltenborn's posterior mobilization, showed a significant reduction in both pain and disability scores. The pre-test scores were VAS =  $5.6 \pm 1.23$  and SPADI =  $66.3 \pm 9.91$ , while the post-test scores were VAS =  $3.6 \pm 0.87$ , and SPADI =  $43.3 \pm 10.12$ , with a p-value of  $< 0.001$ . Similarly, Group B, which received Mulligan's mobilization with movement, also exhibited a significant reduction in pain and disability. The pre-test scores for Group B were VAS =  $5.8 \pm 1.15$  and SPADI =  $66.5 \pm 11.14$ , and the post-test scores were VAS =  $2.05 \pm 1.09$  and SPADI =  $28.4 \pm 10.17$ , with a p-value  $< 0.001$ . These results show that in patients with adhesive capsulitis, both mobilization strategies were successful in lowering discomfort and enhancing shoulder function (Table 1).

Table 2 presents the between-group analysis of the VAS and SPADI index scores for both groups using an independent t-test. The mean VAS score for Group A was  $1.95 \pm 1.50$ , while for Group B it was  $3.75 \pm 1.44$ . Similarly, the mean SPADI index for Group A was  $22.9 \pm 11.7$ , and for Group B it was  $38.1 \pm 11.7$ . Both groups showed significant reductions in pain and shoulder disability, but Group B demonstrated a more pronounced improvement than Group A. These results suggest that while both treatment techniques were effective, Mulligan's mobilization with movement (Group B) led to a more substantial reduction in both pain and disability. In contrast to the values that are tabulated, the calculated 't' values were found to be significant, with a p-value of  $< 0.05$ . This indicates that the differences observed between the groups were statistically significant, further supporting the effectiveness of both treatment techniques in reducing pain and disability in individuals with adhesive capsulitis (Table 2).

## 4 DISCUSSION

In this study, the efficacy of Kaltenborn's posterior mobilization and Mulligan's mobilization with movement (MWM) in lowering pain and disability in patients with adhesive capsulitis was compared. The results showed that both therapeutic techniques were effective in reducing discomfort and improving shoulder function, consistent with the existing literature that supports the efficacy of mobilization methods in managing adhesive capsulitis. However, variations in the speed and extent of improvement have been noted across different studies, emphasizing the need for a more thorough

**Table 1: Analysis of the VAS and SPADI scales within groups A and B using a paired "t" test**

Groups	Treatment	Scale	Pre-test (Mean $\pm$ SD)	Post-test (Mean $\pm$ SD)	p-value
Group A	Kaltenborn's Posterior Mobilization	VAS	5.6 $\pm$ 1.23117	3.65 $\pm$ 0.87509	P<0.001*
		SPADI	66.3 $\pm$ 9.9159	43.3 $\pm$ 10.12176	P<0.001*
Group B	Movement with Mobilization	VAS	5.8 $\pm$ 1.15166	2.055 $\pm$ 1.09904	P<0.001*
		SPADI	66.5 $\pm$ 11.147	28.35 $\pm$ 10.16845	P<0.001*

\*Significant (p&lt;0.05)

**Table 2: Between-Group analysis of VAS scale and SPADI scale index for both Groups by independent 't' test**

Scale	Group	n	Mean $\pm$ SD	P value
VAS	Group A	20	1.95 $\pm$ 1.50	P<0.001*
	Group B	20	3.75 $\pm$ 1.44	
SPADI	Group A	20	22.9 $\pm$ 11.7	P<0.001*
	Group B	20	38.1 $\pm$ 11.7	

\*Significant (p&lt;0.05)

understanding of these treatments.

Kaltenborn's mobilization has been shown in multiple randomized controlled trials (RCTs) to significantly reduce pain and improve range of motion (ROM) within 2 to 6 weeks.<sup>6</sup> However, when compared to other techniques such as muscle energy techniques, Kaltenborn was found to be less effective in improving ROM.<sup>7</sup> Another study suggested that while Kaltenborn was effective, muscle energy techniques were superior in reducing pain and disability.<sup>5</sup> On the other hand, Mulligan's mobilization has demonstrated significant improvements in pain, ROM, and functional activity over 2 to 3 months, with some cases showing immediate relief.<sup>6</sup> A comparative study found Mulligan's mobilization more effective than positional release therapy in improving shoulder ROM and reducing functional disability.<sup>8</sup>

Both techniques in the present study were effective, but Mulligan's mobilization with movement seemed to offer quicker and more substantial improvements in ROM and functional activity when compared to Kaltenborn, as evidenced by the significant reduction in SPADI scores in the current study.<sup>8</sup> The choice of technique could depend on the specific goals of treatment and whether immediate pain relief or long-term functional improvement is prioritized. Recent studies have suggested that combining mobilization techniques with therapeutic exercises enhances outcomes, particularly in the earlier stages of adhesive capsulitis.<sup>8</sup> However, other methods, such as scapular mobilization and manual stretching, have shown similar effectiveness.<sup>9</sup>

The findings of the current study showed that Group A, which received Kaltenborn's posterior mobilization, had significantly lower pain and disability scores than Group B, which received Mulligan's mobilisation with movement (p < 0.05). This aligns with the existing literature that supports the efficacy of different mobilization methods in treating adhesive capsulitis. In particular, Mulligan's mobilization with movement provided greater improvements in pain relief

and functional capacity than Kaltenborn's mobilization, confirming the results of systematic reviews and integrative studies.<sup>10,11</sup>

Further comparative insights from the literature indicate that while Kaltenborn's mobilization is effective, Mulligan's technique has shown greater benefits in pain relief and functional improvement.<sup>12</sup> Combining mobilization techniques with therapeutic exercises has been found to enhance treatment outcomes, particularly in the earlier stages of adhesive capsulitis.<sup>9</sup> In addition, other studies comparing scapular mobilization and manual stretching techniques found no significant differences in effectiveness, suggesting that various mobilization methods can be beneficial in improving shoulder function.<sup>10</sup> Nonetheless, individual patient factors, such as the disease stage and comorbidities, remain crucial in determining the success of treatment.<sup>11</sup>

In patients with adhesive capsulitis, this study demonstrated that Mulligan's mobilization with movement, in conjunction with traditional therapy and ultrasound, resulted in statistically and clinically significant improvements in pain reduction and function.

These findings are consistent with other studies, such as those by Deepali Rathod et al., who found Mulligan's mobilization more efficient than Kaltenborn's in improving shoulder function in individuals with adhesive capsulitis.<sup>13</sup> Similarly, research by A. K. M. Rezwan et al. demonstrated that Kaltenborn mobilization was more effective than traditional physiotherapy treatments for adhesive capsulitis.<sup>3</sup> Studies by Ujwal et al. and Walling et al. also support the effectiveness of Mulligan's mobilization in enhancing ROM and alleviating pain in adhesive capsulitis patients.<sup>14,15</sup> The results of the present study align with these findings, confirming that Mulligan's mobilization, in conjunction with conventional therapy, led to greater improvements in shoulder function and pain reduction.

Both Kaltenborn's and Mulligan's mobilization techniques are effective for managing adhesive capsulitis; nevertheless, Mulligan's mobilization with movement demonstrated more significant improvements in pain reduction, ROM, and functional capacity. Despite the efficacy of both techniques, individual patient factors, including disease stage, symptom severity, and comorbidities, can significantly influence treatment outcomes.<sup>11</sup> Future research should include a larger sample size and extended treatment periods to explore long-term outcomes and determine whether combining these techniques could optimize treatment efficacy for patients with adhesive capsulitis.

## 5 CONCLUSION

To sum up, both Mulligan's mobilization with movement and Kaltenborn's posterior mobilization proved efficient in lowering disability and pain in individuals with adhesive capsulitis. However, Mulligan's technique has shown notable gains in functional ability, range of motion, and pain reduction. These findings suggest that Mulligan's mobilization may offer a more favourable approach for managing adhesive capsulitis, although patient-specific factors should be considered when selecting the most appropriate treatment.

## REFERENCES

1. Millar NL, Meakins A, Struyf F, Willmore E, Campbell AL, Kirwan PD. Adhesive capsulitis. *Nature Reviews Disease Primers*. 2022;8(1):59. Available from: <https://doi.org/10.1038/s41572-022-00386-2>.
2. Pandey V, Madi S. Clinical Guidelines in the Management of Frozen Shoulder: An Update! *Indian Journal of Orthopaedics*. 2021;55(2):299–309. Available from: <https://doi.org/10.1007/s43465-021-00351-3>.
3. Rezwan AKM, Shahriar TM, Rasal ANM, Rahman M, Haque T, Sharmin NA. Study on Effectiveness of Kaltenborn Mobilization Techniques Grade III in Patient with Frozen Stage of Adhesive Capsulitis of Shoulder Joint. *European Journal of Medical and Health Sciences*. 2021;3(5):50–53. Available from: <https://doi.org/10.24018/ejmed.2021.3.5.1050>.
4. Anwar M, Mughal MW, Izhar N, Rasheed M. Effectiveness of Maitland Mobilization Technique in Comparison with Mulligan Mobilization Technique in Management of Frozen Shoulder. *Pakistan Journal of Medical and Health Sciences*. 2023;17(5):57–60. Available from: <https://dx.doi.org/10.53350/pjmhs202317557>.
5. Afzal F. Effectiveness of Kaltenborn Joint Mobilization Technique Versus Muscle Energy Technique on Pain and Disability in Patients with Shoulder Adhesive Capsulitis. *Journal of Clinical and Nursing Research*. 2022;6(5):134–140. Available from: <https://doi.org/10.26689/jcnr.v6i5.4323>.
6. Husna I, Mizbah Z, Kandakurti PK, Arulsingh W. Does manual therapy techniques help in patients with adhesive capsulitis - A systematic review of literature. *Critical Reviews in Physical and Rehabilitation Medicine*. 2022;34(2):1–28. Available from: <https://doi.org/10.1615/critrevphysrehabilmed.2022043235>.
7. Muhammad U, Aqsa A, Nida K, Misbah M, Hiba R. Effectiveness of Kaltenborn mobilization versus muscle energy technique on shoulder range of motion in adhesive capsulitis. *Journal of Rawalpindi Medical College (Print)*. 2023;27(3):1959. Available from: <https://doi.org/10.37939/jrmc.v27i3.1959>.
8. Chandrasekaran K, Sundaram MS, Selvam PS, Reddy AV, Senthilkumar S, Rathnapandi V. A comparative study on the effectiveness of Mulligan mobilization versus Positional release therapy technique in patients with Adhesive capsulitis. *International Journal of Research in Pharmaceutical Sciences*. 2021;12(1):1–5. Available from: <https://doi.org/10.26452/IJRPS.V12I1.3904>.
9. Ibrahim OI, Abdel-Majid SF, Mohamed WR, Sarhan MA. Comparative Study of the Combined Effect of Therapeutic Exercises and Mobilization between Stage II and Stage III Frozen Shoulder. *The Medical Journal of Cairo University*. 2020;88(12):1531–1537. Available from: <https://dx.doi.org/10.21608/mjcu.2020.116244>.
10. Duzgun I, Turgut E, Eraslan L, Elbasan B, Oskay D, Atay OA. Which method for frozen shoulder mobilization: manual posterior capsule stretching or scapular mobilization? *Journal of Musculoskeletal & Neuronal Interactions*. 2019;19(3):311–316. Available from: <https://pubmed.ncbi.nlm.nih.gov/31475938/>.
11. Zhang J, Zhong S, Tan T, Li J, Liu S, Sun P. Comparisons of Non-Surgical Interventions for Frozen Shoulder: A Systematic Review and Network Meta-Analysis. *SSRN Preprint*. 2019;p. 1–33. Available from: <https://doi.org/10.2139/SSRN.3468379>.
12. de Oliveira SP, de Medeiros DB, de Lucena MMB, Fernandes SRT. Efeitos da mobilização no tratamento de paciente com capsulite adesiva: revisão integrativa. *Revista Interfaces: Saúde, Humanas e Tecnologia*. 2023;10(3):1585–1588. Available from: <https://dx.doi.org/10.16891/2317-434x.v10.e3.a2022.pp1585-1584>.
13. Rathod D, Priyanka G, Palkar A. Comparative Study of Kaltenborn Mobilisation versus Mulligan Mobilisation in Patients with Frozen Shoulder. *International Journal of Health Sciences and Research*. 2019;9(9):320–324. Available from: [https://www.ijhsr.org/IJHSR\\_Vol\\_9\\_Issue\\_9\\_Sep2019/49.pdf](https://www.ijhsr.org/IJHSR_Vol_9_Issue_9_Sep2019/49.pdf).
14. Yeole UL, Dighe PD, Gharote GM, Panse RS, Shweta A, Pawar PA. Effectiveness of movement with mobilization in adhesive capsulitis of shoulder: Randomized controlled trial. *Indian Journal of Medical Research and Pharmaceutical Sciences*. 2017;4(2):1–8. Available from: <https://doi.org/10.5281/zenodo.266638>.
15. Walling S, Kalita A, Dutta A. Effectiveness of Kaltenborn Posterior Glide and Coracohumeral Ligament Positional Stretching on External Rotation Range of Motion in Patients with Adhesive Capsulitis. *Indian Journal of Forensic Medicine & Toxicology*. 2021;15(2):1001–1009. Available from: <https://dx.doi.org/10.37506/ijfimt.v15i2.14445>.