Comparative Study on the Effects of Mulligan Mobilization Technique and Muscle Energy Technique on Pain and Range of Motion in Adhesive Capsulitis

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Abstract: Objective: To compare the effects of mulligan mobilization technique and muscle energy technique on pain and range of motion in adhesive capsulitis

Methods: Randomized clinical trial was conducted on 22 patients of Adhesive Capsulitis. All were randomly allocated to group A and group B, by lottery method. Both were treated for 3 sessions in 3 weeks. NPRS and Shoulder Pain and Disability Index SPADI and Disabilities of the Arm, Shoulder and Hand (DASH) were used to measure the treatment effects at baseline and after the 6th week

Results: Statistical result was analyzed by SPSS Statistics. The result regarding the score of NPRS showed that Mean and Standard deviation, Pre-treatment, for group A and group B was 10.95±11.05 respectively, while after treatment these found to be 6.00±16.50. P-value before the treatment was non-significant i.e. 0.968 and P-value after the treatment was significant i.e. 0.00. Quick DASH, Mean and Standard deviation of the group A and B before the treatment was 9.23± 76.50 and after the treatment was 12.06 ±154.50 respectively. Results shows that group A was more significantly effective than group B but there was more variation in Mean and Standard deviation of Mulligan mobilization technique as compared to Post facilitation stretch technique.

Conclusion: The study results concluded that both treatment techniques i.e. Mulligan Mobilization and Muscle Energy Technique was effective and produce significant difference in NPRS and SPADI, DASH score to improve Pain and Range of motion in Adhesive capsulitis. But technique of study group A i.e. mulligan mobilization technique had shown more significant results in treating pain and range of motion as compared to MET treatment technique B in patients of Adhesive capsulitis

Key Words: Adhesive Capsulitis, Frozen Shoulder, Muscle energy technique, Post facilitation-stretch, Mulligan-mobilization.

I. INTRODUCTION

Frozen shoulder (FS), is a chronic progressive painful condition characterized by shoulder joint pain, capsular pattern restriction, and stiffness or loss of GH joint movement, also named as Adhesive capsulitis (AC), AC is a self-inflammatory condition(1). It's the third-most-common MSK condition. Adhesive Capsulitis can be idiopathic, which means it occurs for no apparent reason. (2, 3). It can occur without any obvious predisposing factors, or it can be linked to a variety of local or systemic disorders (4). AC can be classified as primary or secondary depending on the etiology. Idiopathic frozen shoulder (IAFS) occurs when there is no known cause and falls under the category of primary FS. Secondary frozen shoulder will be included if there is a known cause of frozen shoulder. (5). Women are more likely to be affected than men, but no familiar genetic or racial predisposition occurs(6). In comparison to the general population, the risk of developing AC have shown to be 1.22 times higher in hyperthyroid patients according to the study(7). The capsular pattern causes a proportional restriction in ROM during passive exercises due to tightness of the capsule of the joint. (8) External rotation is restricted more than abduction in adhesive capsulitis, and abduction is restricted more than medial rotation (9) (10). The management of AC include number of different ways, all helps to maintain and improve the functions and strength of the shoulder girdle muscles. One of the treatment of choice is Joint mobilization for restoring and improving the mobility of synovial shoulder joint. There are various levels of mobilization available, such as midrange mobilization(11). The muscle energy technique is another option for treating shoulder pain caused by frozen shoulder. Two distinct physiological processes can be used to explain the main effects of MET. Autogenic inhibition which includes the Post Isometric Relaxation technique (PIR) and Post Facilitation Stretch technique (PFS) and reciprocal inhibition are widely used in Osteopathy. Through a mechanism known as "increased tolerance to stretch," MET not only improves joint ROM, but it also improves muscle extensibility(12)(13). Mulligan's peripheral joint technique involves the repositioning of bone positional faults and applying a sustained manual "gliding" force applied to the joint. "Mobilization with movement" refers to the simultaneous application of mobilization and movement (MWM), followed by passive end-of-range overpressure, also known as stretching, without the use of pain as a barrier. According to additional research, MWMs are also effective in increasing joint (ROM), improving muscle function, treating specific pathologies(14). The propose of the study will help the clinicians provide an evidence-based approach for the application of Mulligan mobilization and post facilitation stretch, an application of MET on pain and ROM of AC. So, that it can be determined which treatment is superior in terms of achieving better results in the management regime.

II. METHODS

A Randomized clinical trial was conducted on 22 patients of Adhesive Capsulitis from March 2021 to Aug 2021 in Nishat Latif Hospital Sialkot. All were randomly allocated to group A and group B. Groups A was treated with Mulligan Mobilization and Group B was treated with Muscle Energy Technique, Post facilitation stretch. Both groups were treated for 3 sessions in 3 weeks. NPRS and Shoulder Pain and Disability Index SPADI and Disabilities of the Arm, Shoulder and Hand (DASH) were used to measure the treatment effects at baseline and after the 6th week. The NPRS (Numeric Pain Rating Scale) is a numeric rating scale with segments in which the subject have to selects any whole number (0–10 integers) that best describes the severity of his or her pain (15). SPADI is a subjective questionnaire including 13-item that assesses the pain intensity (5 items) and limitation in daily activities (8 items) that require upper-limb use. The higher the score (0-10) is, the more severe the disability (16). DASH is also called as shortened disabilities of the arm, shoulder and hand questionnaire. The original DASH has been shortened into the 11-item Quick DASH, a short, reliable, and valid measure of physical function and symptoms related to upper-limb musculoskeletal disorders (17). Time duration was 6 months after the approval of synopsis. Both male and female patients with age between 40-50 years, having pain in shoulder for at least 3 months, presenting with unilateral frozen shoulder of stage 3, 4 and Capsular pattern were included in the research. Patients with Secondary capsulitis, Shoulder injury i.e. proximal humerus fracture, Neurological deficit such as cervical stenosis, Shoulder surgical history and history of other pathological condition of shoulders i.e. Impingement syndrome, rotator cuff tear were excluded from research.

Table 2: Between group analysis after treatment by Independent t test: Post Test

Variables	Groups	No	Mean std. Deviation	P value
Post-pain	Group 1	11	25.09±1.64	.022
	Group 2	11	58.80±10.840	.030
Post-disability	Group 1	11	25.27±1.85	.000
	Group 2	11	54.50±14.74	.000
Post-SPADI	Group 1	11	25.24±1.49	.000
	Group 2	11	61.13±17.97	.000

Table 3: Within Group Analysis of Group A:

Variables	No	Pre Mean & Std. Deviation	Post Mean & Std. Deviation	Mean difference	P value
Pre-pain	11	82.18±4.68	25.09±1.64	16.87±3.04	.000
Pre-disability	11	83.11±4.86	25.27±1.85	57.84±3.01	.000
Pre-SPADI	11	83.58±3.36	25.24±1.49	58.34±1.87	.000

III. RESULTS

Statistical result was analyzed by SPSS Statistics. The result regarding the score of NPRS showed that Mean and Standard deviation, Pre-treatment, for group A and group B was 10.95±11.05 respectively, while after treatment these found to be 6.00±16.50. P-value before the treatment was non-significant i.e. 0.968 and P-value after the treatment was significant i.e. 0.00. Quick DASH, Mean and Standard deviation of the group A and B before the treatment was 9.23± 76.50 and after the treatment was 12.06 ±154.50 respectively. Results shows that group A was more significantly effective than group B but there was more variation in Mean and Standard deviation of Mulligan mobilization technique as compared to Post facilitation stretch technique. Between group analysis is checked by Independent t test.

Table 1: Between group analysis before treatment by Independent t test: Pre Test

Variables	Groups	No	Mean±Std. deviation	P value
Pre-pain	Group 1	11	82.18±0.68	.022
	Group 2	11	89.60±8.57	.030
Pre-disability	Group 1	11	83.11±4.86	.011
	Group 2	11	89.52±5.63	.012
Pre-SPADI	Group 1	11	83.58±3.36	.001
	Group 2	11	91.28±5.02	.001

Table 4: Within Group Analysis of Group B:

Variables	No	Pre Mean & Std. Deviation	Post Mean & Std. Deviation	Mean difference	P value
Pre-Pain	11	89.60±8.57	58.80±10.84	8.57±10.84	.000
Pre-disability	11	89.52±5.63	54.50±14.70	5.63±14.70	.000
Pre-SPADI	11	91.28±5.02	61.13±17.97	5.02±17.97	.000

IV. DISCUSSION

Manual therapy have been shown to be effective in the reduction of pain and restoration of function in patients with AC. Pain and dysfunction were reduced with Mulligan mobilization and PFS. Whereas, also increases the mobility of shoulder in all directions. Clinically significant differences in disability and range of motion related to shoulder pain, disability were observed in patients with adhesive capsulitis (excluding one drop-off patient) who were treated with mulligan mobilization and MET (Post facilitation stretch). In a study, researchers compared the effectiveness of Maitland Mobilization Technique and Muscle Energy Technique in the treatment of shoulder adhesive capsulitis. Pain and range of motion were significantly improved

in both groups compared to pre-treatment levels. In this study, the shoulder movements were measured using the NPRS, DASH, SPADI, and goniometry. Mulligan mobilization improved ROM, pain, and disability level(18). Between 2008 and 2018, Nikolaos Stathopoulos PT, MSc et al published Effectiveness of Mulligan's Mobilization With Movement Techniques on Range of Motion in Peripheral Joint Pathologies: A Systematic Review With Meta-analysis, which concluded by adding 18 studies with 753 participants in 10 separate meta-analyses. On comparison, sham, passive, other active, or no therapeutic approach, peripheral joint MWM appears to improve joint ROM in specific peripheral joint pathologies, constantly in all movement directions. The significant improvement of Mulligan's MWM on ROM is demonstrated in this meta-analysis(19). Positional Release Versus Muscle energy technique on Functional Ability of Shoulder in Chronic Adhesive capsulitis was studied DRRK Abd Elrazik. The results revealed that there was a significant difference in post-treatment values (P0.05) between groups A and B, with a t-value of 7.22 and a p-value of (0.0001) in favour of Group B. In Adhesive Capsulitis, both positional release and muscle energy techniques were found to be effective in improving functions of the shoulder, MET out-performed than positional release technique(20).

V. CONCLUSION

The study results concluded that both treatment techniques mulligan mobilization and muscle energy technique was effective and produce significant difference in NPRS, QuickDASH and SPADI score to improve pain and ROM in Adhesive Capsulitis. But technique of study group A i.e. Mulligan mobilization had shown more significant results in treating pain, ROM and disability as compared to Post Facilitation Stretch of muscle energy treatment technique B in patients of with Adhesive Capsulitis.

VI. CONFLICT OF INTEREST: There was no conflict of interest.

VII. FINANCIAL STATEMENT: No fundings were given by any authorities; it was a project thesis of Masters of Science in Orthopedic Manual Physical Therapy.

VI. DATA AVAILABILITY: Data will be provided on the demand by corresponding author

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