Original Research Paper

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Orthopaedics

TO INVESTIGATE THE EFFECT OF MULLIGAN'S MWM IN THE TREATMENT OF PERIARTHRITIS SHOULDER AND TO COMPARE IT WITH MAITLAND'S GRADE III AND IV MOBILIZATION.

Dr. Sanket Bajpai	MPT (ORTHO) Professor,Ujjain college of physiotherapy, Ujjain (M.P).
Dr. Ruchi Mishra	MPT (OBS-GYNAE) Associate Professor, Ujjain college of physiotherapy, Ujjain (M.P).
Dr. Ananya Bhargava*	MDS (Orthodontics and dentofacial Orthopedics) Senior Resident (Department of Dentistry), Ruxmaniben Deepchand Gardi Medical College, Ujjain (M.P) India. *Corresponding Author

ABSTRACT **Aims and objectives-** 1. To measure the effect of Mulligan's MWM on the parameters of pain and range of motion in stage II and III of periarthritis shoulder.

2.To measure the effect of Maitland's Grade III and IV mobilization on the parameters of pain and range of motion in stage II and III of periarthritis shoulder.

3.To compare Mulligan's MWM and Maitland's grade III and IV mobilization on the parameters of pain and range of motion in stage II and III of periarthritis shoulder.

Material and methods- The active and passive range of motion of shoulder flexion and abduction was measured by using universal goniometer and the pain was noted on the VAS scale before treatment.. 30 patients were taken up for the study which were divided into two groups- Group A(Maitland Grade III and IV mobilization) and Group B(Mulligan's mobilization with movement). Immediately after the treatment their active and passive shoulder flexion and abduction range of motion as well as their pain on VAS was measured by the same co-investigator.

Results- The result showed no significant difference in shoulder flexion range of motion in both Mulligan's MWM and Maitland.flexion range of motion was not greatly improved in Mulligan's MWM. Although in Maitland, an anteroposterior glide improves the shoulder flexion R.O.M.

Conclusion- Mulligan's MWM is not a better technique than Maitland's grade III and IV mobilization to improve the shoulder range of motion and reduce pain in periarthritis shoulder.

KEYWORDS : Periarthritis,Mulligan MWN,Maitland.

INTRODUCTION-

Periarthritis shoulder is one of the commonest afflictions of shoulder joint affecting as much as 2% of the general population[1]. Periarthritis means inflammation of the tissues surrounding a joint and functional disturbance of periarticular tissues: tendons, ligaments and synovial bursae[2].Some of the common terms that are synonymous to periarthritis of the shoulder are adhesive capsulitis, frozen shoulder, stiff and painful shoulder, scapulohumeral periarthritis, tendonitis of short rotators and adhesive subacromial bursitis[3].

Periarthritis shoulder has been divided into four stages by Nevasier[3]. These are:

Stage1, symptoms present for less than 3 months with pain at rest..

Stage2, symptoms present for 3-9 months with progressive loss of range of motion and persistence of pain.

Stage3, patients will have loss of motion and it extends from 9-14 months.

Stage4 also called as thawing phase and it is characterized by the slow steady recovery in range of motion.

There are various types of mobilization techniques which have been used to reduce pain and improve the range of motion. Among these techniques are Maitland and Mulligan's mobilization with movement.

Maitland devised a technique which involves the application of passive and accessory oscillatory movements. The aim of this technique is to restore motion of spin, glide and roll between joint surfaces and it is graded according to their amplitude.

They are:

Grade1- small amplitude movement performed at the beginning of the available range.

Grade2 -large amplitude movement performed with in a resistance free part of the available range.

Grade3 - large amplitude movement performed into resistance or up to the limit of available range.

Grade4 -small amplitude movement performed into resistance or up to the limit of available range.

Grade 3 and 4 mobilization of Maitland is useful in stage 2 and 3 of periarthritis shoulder as this grade helps in reducing pain and breaking down adhesions within the joints. Grade 3 mobilization also helps to lessen the treatment soreness[4].

Mobilization with movement (MWM) is a technique given by Brian Mulligan. It applies movement along with physiological movement. The principle of Mulligan's MWM is to restore physiological tracking by the absence of pain. However both of these techniques are used to reduce pain and increase range of motion. Since Maitland follows the principle of convex-concave rule and Mulligan's MWM works on the principle of restoration of physiological tracking with active movement, it would be beneficial to compare both of these techniques for the reduction of pain and to increase range of motion in patients of periarthritis shoulder.

AIMS AND OBJECTIVES-

1. To measure the effect of Mulligan's MWM on the parameters of pain and range of motion in stage II and III of periarthritis shoulder.
2. To measure the effect of Maitland's Grade III and IV mobilization on the parameters of pain and range of motion in stage II and III of periarthritis shoulder.
3. To compare Mulligan's MWM and Maitland's grade III and IV mobilization on the parameters of pain and range of motion in stage II and III of periarthritis shoulder.

MATERIAL AND METHODS-

The study participants were examined in physiotherapy OPD of M.S.Ramaiah Teaching Hospital, bengaluru with periarthritis shoulder.

Sampling procedure: Convenience sampling
Type of study: Single blinded interventional study
Sample size: 30

Inclusion Criteria-

1. Patient between age of 40-70 years.
2. Having a limited range of motion of shoulder joint less than 25% compared with the non involved shoulder motions.
3. Patients suffering from periarthritis shoulder for last 3-14 months who are in stage II and III of Nevasier clasification.

Exclusion Criteria-

1. History of surgery in the involved shoulder.
2. Rotator cuff rupture.
3. History of fracture of shoulder complex.
4. Periarthritis secondary to neurological disorder.

5. Bilateral periarthritis shoulder.
6. History of arthropathy.
7. Stage I and IV of periarthritis shoulder.

Materials required-

A Standard goniometer, Mulligan belt, Stool , VAS , couch

Procedure of data collection-

A complete assessment of the patient was performed. The active and passive range of motion of shoulder flexion and abduction was measured by using universal goniometer and the pain was noted on the VAS scale before treatment. The range of motion was measured by a co investigator who is a physiotherapist and the primary investigator was blinded while performing the study. 30 patients were taken up for the study. 30 sealed envelopes were prepared. In 15 of these envelopes Group A was written and in another 15 Group B was written. The patients were asked to pick up those sealed envelopes and if it was found "Group A" written on that envelope then those patients were given Maitland Grade III and IV mobilization. If found "Group B" written on it then Mulligan's mobilization with movement was given. Immediately after the treatment their active and passive shoulder flexion and abduction range of motion as well as their pain on VAS was measured by the same co-investigator.

RESULTS-

The Statistical software namely SPSS 11.0 and Systat 8.0 were used for the analysis of the data and Microsoft word and Excel have been used to generate tables.

Table1-Comparison of Pre and Post VAS scores following Mulligan's MWM

The results shows a significant reduction in pain after the mobilization with Mulligan MWM ($p<0.001$)

Mobilization	Before mobilization		After mobilization		Effect size	z-value*	p-value
	Mean	SD	Mean	SD			
Mulligan	5.47	1.06	3.67	0.90	1.294	3.482	<0.001

* Z-value obtained using Wilcoxon signed rank test

Table 2-Comparison of pre and post mobilization ROM following Mulligan MWM.

The results shows a significant improvement in the shoulder AROM and PROM after mobilization with Mulligan MWM ($p<0.001$)

Mobilization	Before mobilization		After mobilization		Effect size	t-value	p-value
	Mean	SD	Mean	SD			
Shoulder flexion-AROM	90.20	9.97	100.60	7.01	0.853	11.184	<0.001
Shoulder flexion-PROM	96.13	10.28	109.60	7.30	1.068	10.015	<0.001
Shoulder abduction-AROM	74.93	10.14	92.07	12.34	1.073	19.286	<0.001
Shoulder abduction-PROM	79.80	10.30	98.40	12.12	1.169	23.047	<0.001

Table 3-Comparison of Pre and Post VAS scores following Maitland mobilization.

The results shows a significant reduction in pain after the mobilization with Maitland ($p<0.003$).

Mobilization	Before mobilization		After mobilization		Effect size	z-value*	p-value
	Mean	SD	Mean	SD			
Maitland	5.47	0.909	4.67	0.98	0.599	2.972	<0.003

Table 4-Comparison of pre and post mobilization ROM following Maitland group

The results shows a significant improvement in shoulder range of motion after Maitland mobilization ($p<0.001$)

Mobilization	Before mobilization		After mobilization		Effect size	t-value	p-value
	Mean	SD	Mean	SD			
Shoulder flexion-AROM	90.73	9.09	104.73	9.90	1.042	11.184	<0.001
Shoulder flexion-PROM	96.20	9.57	110.80	9.96	1.057	10.015	<0.001
Shoulder abduction-AROM	72.87	11.84	82.87	11.48	0.606	19.286	<0.001
Shoulder abduction-PROM	77.87	11.94	88.33	11.81	0.623	23.047	<0.001

Table 5-Comparison of VAS between the Mulligan's MWM and Maitland mobilization in Periarthritis shoulder .

The results suggests that there is a greater reduction in pain after Mulligan MWM when compared to Maitland.

Mobilization	Mulligan		Maitland		Effect size	z-value*	p-value
	Mean	SD	Mean	SD			
Before	5.47	1.06	5.47	0.99	0	0.043	>0996
After	3.67	0.90	4.67	0.98	0.75	2.637	<0.008

* Z-value obtained using Mann-Whitney test

Table 6-Comparison of ROM between the Mulligan'sMWM and Maitland group before mobilization in Periarthritis shoulder

The baseline parameter shows no significant changes in AROM and PROM of shoulder before mobilization

Mobilization	Mulligan		Maitland		Effect size	t-value	p-value
	Mean	SD	Mean	SD			
Shoulder flexion-AROM	90.20	9.97	90.73	9.09	0.039	0.153	>0.879
Shoulder flexion-PROM	96.13	10.28	96.20	9.57	0.005	0.018	>0.985
Shoulder abduction-AROM	74.93	10.14	72.87	11.8	0.132	0.514	>0.612
Shoulder abduction-PROM	79.80	10.30	77.87	11.94	0.122	0.475	>0.639

Table 7-Comparison of ROM between the Mulligan MWM and Maitland group after mobilization in Periarthritis shoulder

The result shows that there is an improvement in both shoulder abduction AROM and PROM following Muligan MWM when compared to Maitland. However, there is no significant change in shoulder flexion range of motion between the two groups.

Mobilization	Mulligan		Maitland		Effect size	t-value	p-value
	Mean	SD	Mean	SD			
Shoulder flexion-AROM	100.60	7.01	104.73	9.90	0.340	1.320	>0.198
Shoulder flexion-PROM	109.60	7.30	110.80	9.96	0.097	0.376	>0.709
Shoulder abduction-AROM	92.07	12.34	82.87	11.48	0.546	2.114	<0.044
Shoulder abduction-PROM	98.40	12.12	88.33	11.81	0.595	2.303	<0.029

DISCUSSION-

The baseline parameters of Mulligan's MWM and Maitland grade III and IV mobilization group are matched before the start of the study.On analyzing (Table 1), it was found that there is significant reduction in pain when Mulligan's MWM was given. Mulligan's MWM is guided towards restoration of correct physiological tracking by the absence of pain. On analyzing (Table 2), it was found that there is significant improvement in shoulder flexion and abduction range of motion in Mulligan MWM group. The reason for this may be that Mulligan has been found to correct the shoulder malalignment thus inhibiting pain and it increases the shoulder range of motion.[5]

On analyzing (Table 3), it was seen that there is a significant reduction in pain when Maitland technique was given. The reason for this may be that the oscillatory technique advocated by Maitland reduces pain by stimulating natural pain killing endorphins.

Shoulder flexion and abduction range of motion after Maitland (Table 4), was also found to be significantly improved. In Maitland, an anteroposterior glide is given to increase the shoulder flexion range while to increase abduction range of motion, inferior glide is given. Maitland advocates that the passive stretching along with the glide, further increase the range of motion.[6]

On analyzing (Table 5) the result showed that there was a reduction of pain following Mulligan's MWM mobilization more than that of Maitland.. The possible reason may be that Mulligan's MWM pushes the humeral head into its normal physiological tracking position. Besides, in Mulligan's MWM the patient does an active movement and so the movement is maintained in the pain-free range. However, in Maitland passive movement is given which may aggravate the pain[7].

Table 6 shows the baseline data between the two groups which suggest that all the parameters are matched and there was no significant difference between the two groups.

Comparison of Mulligan's MWM with Maitland technique in periarthritic shoulder (Table 7) showed a greater improvement in the shoulder abduction range of motion with Mulligan's MWM. In Mulligan's MWM, the posterior glide pushes the humeral head into its physiological position. This correction of the shoulder malalignment may inhibit the pain and increase the shoulder range of motion especially the shoulder abduction range of motion[8]. Contrary to this, Maitland inferior glide though increases the shoulder abduction range of motion but does not put the displaced humeral head back into its physiological tracking position. Also in Mulligan's MWM, sustained glide is given which may have a slight edge over Maitland[5].

The results showed no significant difference in shoulder flexion range of motion in both Mulligan's MWM and Maitland. The reason may be that in Mulligan's MWM, a sustained glide is Given along with active movement of the shoulder. Thus, to increase the shoulder flexion range of motion an anteroposterior glide was given but this could not be sustained with the active movement of the shoulder after a few degrees of shoulder flexion. Therefore, flexion range of motion was not greatly improved in Mulligan's MWM. Although in Maitland, an anteroposterior glide improves the shoulder flexion R.O.M., it does not correct the malalignment of the shoulder which inhibits range[9].

Our findings are consistent with the study done Haider et al[10] who found that mulligan's technique is more effective in treating frozen shoulder as compared to Maitland technique.

CONCLUSION-

Both the techniques had shown a reduction in pain and improvement of AROM and PROM of shoulder flexion and abduction. However, Mulligan's MWM showed a greater improvement in reducing pain and improvement of shoulder abduction range of motion. Thus it can be concluded Mulligan's MWM is not a better technique than Maitland's grade III and IV mobilization to improve the shoulder range of motion and reduce pain in periarthritis shoulder.

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