

Effectiveness of Gong's Mobilization Versus Scapular and Glenohumeral Mobilization in Subjects with Periarthritis of the Shoulder

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Abstract:-

Background & Objective: - Periarthritis of the shoulder is a painful condition with gradual restriction of the shoulder joint. The purpose of this study is to compare the effectiveness of Gong's mobilization and Scapular and Glenohumeral mobilization on pain, shoulder abduction, internal rotation range of motion and functional disability in patients with periarthritis of the shoulder.

Methods: An experimental study design, A total of 60 subjects with Periarthritis of the shoulder were selected and randomly assigned into 2 groups, 30 members in group A (Gong's mobilization), 30 members in group B (Scapular and Glenohumeral mobilization). Both groups received intervention as 5 treatment sessions per week for 4 weeks. The outcome measure of pain was measured using VAS, shoulder range of motions using Goniometer, and functional disability was measured using shoulder pain and disability index.

Results: The results showed a statistically significant difference in decreasing pain, increasing range of motion, and decreasing functional disability when compared between pre-test and post-test interventions within the group using paired "t" test. When compared between groups post interventions scores using independent "t" test, a statistically significant difference was found with Gong's mobilization when compared with Scapular and Glenohumeral mobilization.

Conclusion: - Gong's mobilization has shown to be more effective when compared to Scapular and Glenohumeral mobilization in decreasing pain, increasing range of motion, and decreasing functional disability in subjects with periarthritis of the shoulder.

Keywords:- Gong's mobilization, Scapular, Glenohumeral mobilization, Visual Analogue Scale, Range of Motion, Shoulder Pain and Disability Index, Conventional therapy.

I. INTRODUCTION

Periarthritis is the third most frequent musculoskeletal complaint; it affects 2-5% of the general population and 10-20% of people with diabetics. ^[1] Women are said to be more affected than men with more involvement of the dominant side shoulder. It usually develops between the ages of 40 to 60 years. Symptoms include deep dull aching pain around the shoulder and interactive night pain. Movement of the shoulder is severely restricted in all planes leading to progressive loss of active moments and passive movements. ^[2] Periarthritis is the leading cause of upper limb disability involving activities of daily living mainly overhead activities. Subjects frequently complain about the difficulty in putting on clothes. ^[3]

Manipulations, soft tissue mobilizations, and electrotherapy are proved to be effective in reducing pain, improving the range of motion of the shoulder and reducing the functional disability of the shoulder. ^[4] Joint mobilization is the technique that is performed to reduce pain and improve the joint range of motion. Different methods of mobilization are applied like distraction, compression, rolling, and spinning to increase range of motion which causes stretching soft tissues. Gliding technique such as anterior-posterior glide improves abduction and external rotation range of shoulder joint. Mobilization techniques can be performed both as physiological movements or accessory movements ^[5].

Gong's mobilization technique helps to decrease pain as well as distract the mind of the subject from stress caused due to pain. Gong's mobilization is an effective technique to improve shoulder abduction, internal and external rotation using anterior-posterior glide. This mobilization technique is applied in end range of available shoulder movement with a corrective glide from anterior to a posterior direction in a dynamic position. The technique is followed by a distraction force applied around the shoulder and performing the restricted movement. ^[2]

Scapular and Glenohumeral mobilization techniques are often used techniques to decrease pain and improve range of motion in frozen shoulder. These techniques create a mechanical force that may breaking up adhesions causing realigning collagen or may help to increase fiber glide in and around the joint structures. [1] This study is done to compare the effectiveness of Gong's mobilization and Scapular and Glenohumeral mobilization on pain, shoulder abduction, internal rotation range of motion ,and functional disability in patients with periarthritis of the shoulder.

II. SUBJECTS & METHODOLOGY

An experimental study was conducted during the period between July 2020 to June 2021 (1 Year). A total of 60 who met inclusion criteria were taken into the study and are divided through convenient sampling into 2 groups, 30 members in group A (Gong's mobilization), 30 members in group B (Scapular and Glenohumeral mobilization). In both groups, interventions are given 5 days in a week, 5 sets per day for 4 weeks. The outcomes of the interventions are measured using the Visual Analogue Scale (VAS) to measure pain, Goniometer to measure the range of motion, and functional disability was measured using Shoulder Pain and Disability Index (SPADI).

Procedure for interventions:

Group A: Gong's Mobilization

Gong's mobilization is done in a sitting position. All the participants are made to sit on a knee height stool with no backrest keeping the spine straight and arm comfortably extended at the side of the body. The therapist stands on the unaffected side of the subject and places one hand on the affected side head of humerus and the other hand on the affected side scapula of the subject's shoulder. The therapist then pushes the scapula of the affected side in a posterior to anterior direction with one hand and with the other hand pushes the humeral head in an anterior to a posterior direction parallel to the joint plain. Simultaneously the subject is asked to quickly and powerfully perform shoulder abduction with no external rotation and elbow flexed to 90 degrees in the coronal plane and also with the palm facing inwards and dorsum of the hand facing the outwards. During the above time, the therapist kept pressing the humerus head along the long axis of the humerus. The therapist follows the movement of the subject's shoulder when they were performing abduction. The speed of the movement is kept constant by the therapist from the beginning range until the end range maintaining little distraction throughout the movement. At the end range of movement, therapist accelerates the abduction movement. The technique is given as two sets of 15 repetitions in each set with 5 min of rest period between the sets followed by conventional physiotherapy. The technique was applied 5 days a week for 4 weeks.

Group B: Scapular and glenohumeral mobilization

Interventions in Scapular and glenohumeral mobilizations group consist of the following components:

1. Scapular superior glide:

The subject is made to lie on the unaffected side; the therapist stands by the side of the subject and places the index finger of one hand under the medial scapular border of the affected side scapula and the other hand grasping the superior border of the scapula. The scapula is moved superiorly for obtaining a Scapular superior glide.

2. Scapular inferior glide:

The subject is made to lie on the unaffected side; the therapist stands by the side of the subject and places the index finger of the hand at the medial scapular border of the affected side scapula and the other hand grasping the superior border of the scapula. The scapula is moved inferiorly to obtain a Scapular inferior glide.

3. Scapular upward rotation:

The subject is made to lie in a side-lying position on the unaffected side; the therapist places the index finger of one hand under the medial border of the scapula and the other hand grasping the superior border of the scapula. The scapula is then rotated upwardly to obtain Scapular upward rotation.

4. Scapula downward rotation:

The subject is made to lie in a side-lying position on the unaffected side; the therapist places the index finger of one hand under the medial border of the scapula and the other hand grasping the superior border of the scapula. The scapula is then rotated downwardly to obtain scapular downward rotation.

5. Scapula distraction:

The subject is made to lie in the prone position; the therapist places fingers under the medial scapular border and distract the scapula from the thorax (scapular tilt).

6. Glenohumeral distraction:

The subject is made to lie in a supine position; the therapist distract the humeral head with respect to the glenoid cavity by pulling the humeral head in the superior, lateral, and anterior directions with a firm grip of both hands close to the humeral head.

7. Glenohumeral caudal glide:

The subject is made to lie in a supine position; the therapist will hold the affected arm in 90 degrees of abduction and will push the head of the humerus in an inferior direction to obtain the caudal glide.

8. Glenohumeral anterior glide:

The subject is made to lie in a supine position; the therapist will hold around the head of the humerus of the affected side firmly with both hands and will apply upward pressure on the head of humerus to obtain glenohumeral anterior glide.

9. Glenohumeral posterior glide:

The subject is made to lie in a prone position; the therapist will hold around the head of the humerus on the affected side firmly with both hands and will apply upward

pressure on the head of the humerus to obtain glenohumeral posterior glide.

All the above 9 components were performed as Passive oscillatory movements. Each glide was performed at the rate of 2-3 glides per second for 30 seconds and every glide was given for 5 sets. The technique was applied 5 days a week for 4 weeks.

Conventional Physiotherapy Protocol Given for Two Groups:

Conventional physiotherapy was given as a common intervention for both groups. Conventional physiotherapy included pendular exercises, scapular stabilization exercises,

towel stretch, finger ladder, and active exercises involving outward rotation and inward rotation of the shoulder. [6,7]

III. DATA ANALYSIS & RESULTS

There was a significant difference in scores of VAS, Abduction ROM, Internal Rotation ROM, and SPADI when compared Pre-interventions and post-intervention within groups (p<0.05) (Table-1). However, post-intervention analysis after 4 weeks showed a significant difference in scores of VAS, Abduction ROM, Internal Rotation ROM, and SPADI in Gong’s Mobilization group when compared to Scapular and glenohumeral mobilization group (p<0.05) (Table-2).

Table1: Comparison of mean values of Pain, Abduction ROM, and Internal Rotation ROM, and SPADI scores pre and post interventions in both the groups.

	Gong’s Mobilization (N=30)			Scapular and glenohumeral mobilization (N=30)		
	Pre (Mean ± SD)	Post (Mean ± SD)	P-Value	Pre (Mean ± SD)	Post (Mean ± SD)	P-Value
Pain (VAS)	6±0.8	2.8±0.74	<0.001	6±0.7	3.3±1.1	<0.001
Abduction ROM (°)	90±8.3	158.3±6.3	<0.001	90.2±8.5	135±4.1	<0.001
Internal Rotation (°)	40.1±8.4	75±4.1	<0.001	40±8.3	64.8±4.2	<0.001
SPADI	50±8.3	105.3±4.1	<0.001	50±8.3	95±4.1	<0.001

Mean ± SD, VAS: Visual Analog Scale, SPADI (Shoulder pain & Disability Index), *p<0.05, pre-vs.-post Interventions

Table1: Comparison of mean values of Pain, Abduction ROM, and Internal Rotation ROM, and SPADI between Group A and Group B.

	Gong’s Mobilization (Group A) (Mean ± SD)	Scapular and glenohumeral Mobilization (Group B) (Mean ± SD)	P-Value
Pain (VAS)	2.8±0.74	3.3±1.1	<0.001
Abduction ROM (°)	158.3±6.3	135±4.1	<0.001
Internal Rotation (°)	75±4.1	64.8±4.2	<0.001
SPADI	105.3±4.1	95±4.1	0.0001

Ethical Clearance: - Ethical clearance taken from Ethical committee of Konaseema Institute of Medical Sciences (B.P.T &M.P.T), Amalapuram. Informed consent was taken from the study subjects before doing this study.

Conflict of interest: - No conflict of interest

Funding: - No external funding was done.

IV. DISCUSSION

This study is done to compare the effectiveness of Gong’s mobilization with Scapular and Glenohumeral mobilization on pain, shoulder abduction range of motion, shoulder internal rotation range of motions, and functional disability in periarthritis of the shoulder. Outcomes are measures using VAS, Goniometer, SPADI (Shoulder Pain and Disability Index) scores. Both the groups were given interventions 5 days a week for 4 weeks and both groups received a conventional physiotherapy treatment regime.

In this study, both groups showed a significant reduction in pain due to neurophysiological effects caused by stimulating type 2 mechanoreceptors such as Golgi tendon organs and muscle spindles while inhibiting type 4 nociceptors.[8]

Reduction in pain and improvement in range of motion in gongs mobilization group can be correlated to Wontae Gong study on gongs mobilization on shoulder abduction, which states that the shoulder abduction and internal rotation range of motion are restricted in periarthritis of the shoulder due to displacement of the humeral head in anterior and inferior direction during shoulder abduction and internal rotation. When posterior compression to the humeral head is given through gongs mobilization it puts the humeral head in a normal position thus normal rolling and sliding at the articular surface occurs and also tension in the posterior capsule is reduced. [9] This normalization of articular surface position and relaxation of posterior joint capsule help decrease pain and cause improvement of range of motion leading to an overall increase in functional activity which was proved by reduction in SPADI scores.

Impaired scapular movements can cause shoulder dysfunction leading to functional disability. Scapulohumeral rhythm is the kinematic interaction between the scapula and humerus and this interaction is important for optimal function of the shoulder.^[11] Linn JJ et.al in their study found that scapular kinematics in patients with shoulder dysfunction would be important to reflect functional disabilities.^[12] Scapular and glenohumeral mobilization can break adhesions causing the release of muscles thereby reducing pain, increases range of motion and improving shoulder function, and reducing shoulder disability.^[13]

Conventional exercises like the Codman's pendular exercise, Scapular Stabilization exercise, and active-assisted ROM exercises and Finger exercises were added to both the group as it is an effective strategy to stretch and strengthen the shoulder muscles affected by Capsulitis. Improvement in the outcome parameters also could be due to conventional exercises.^[14]

While it appears that both gong's mobilization and scapular and glenohumeral mobilization are effective interventions in reducing pain and improving shoulder range of motion and decreasing functional disability in periarthritis shoulder. But when compared between groups, Gong's mobilization showed statistically significant improvement over scapular and glenohumeral mobilization.

V. LIMITATIONS OF THE STUDY

Limitations of the study are small sample size and subjects with stage II periarthritis shoulder (also called as frozen shoulder) are only included. Further studies are recommended with a large sample size and other stages of frozen shoulder.

VI. CONCLUSION

Gong's mobilization technique as well as the scapular and glenohumeral mobilization technique is effective in reducing pain scores and improvements in range of motion and decrease in functional disability in subjects with periarthritis shoulder. However, Gong's mobilization showed better results when compared to scapular and glenohumeral mobilization on VAS, ROM, SPADI scores. Hence the study concludes that gong's mobilization is an effective intervention over scapular and glenohumeral mobilization in reducing pain, improving shoulder range of motion, and reduction of functional disability in subjects with periarthritis of the shoulder.

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