



A PROSPECTIVE RANDOMIZED STUDY TO COMPARE THE EFFECT OF GONGS MOBILIZATION VERSUS PNF TECHNIQUES ON PAIN, ROM AND QOL IN SUBJECTS WITH GRADE 2 PERIARTHRITIS SHOULDER

Physiotherapy

Dr. P. Nikhitha* MPT in (Orthopaedics), College of Physiotherapy, SVIMS *Corresponding Author

Dr. S. Raghava Krishna MPT (Orthopaedics), Tutor, College of Physiotherapy, SVIMS

Dr. K. Senthil Kumar MPT (Orthopaedics), Ph.D., Assistant professor, College of Physiotherapy, SVIMS

Dr. C. Shanthy MPT (Orthopaedics), Ph.D., Assistant professor, College of Physiotherapy, SVIMS

Dr. K. Madhavi MPT(CT) Ph.D., Principal, College of Physiotherapy, SVIMS

ABSTRACT

Background: Periarthritis shoulder also called as Adhesive capsulitis, which is characterized by a progressive painful loss of passive and active shoulder range of motion. The purpose of this study is to compare the effectiveness of Gong's mobilization with PNF technique on pain, ROM and QOL in subjects with periarthritis shoulder. Aim and Objectives: To study the effect of Gong's mobilization with PNF techniques on pain, ROM and QOL in subjects with grade 2 periarthritis shoulder. This study evaluates the VAS score, Shoulder ROM and SPADI score in subjects with grade 2 periarthritis shoulder. **Methodology:** A total of 30 patients with Grade 2 periarthritis shoulder were selected and randomly divided in to 2 groups, 15 members in Group A (Gong's mobilization), 15 members in Group B (PNF technique) along with wax therapy and pendular exercises for both groups. Both groups received intervention as 6 treatment sessions per week for 2 weeks. The outcome measure of pain was measured by using VAS, shoulder ROM using Universal Goniometer, QOL was measured using shoulder pain and disability index. **Results:** The subjects in Group A effective in reduction of pain, increasing shoulder abduction and external rotation ROM than subjects in Group B. The subjects in Group B has shown more improvement in shoulder internal rotation and SPADI score than subjects in Group A. **Conclusion:** This study shows significant effect of Gong's mobilization on Pain, shoulder abduction and external rotation ROM than PNF technique and shows significant effect of PNF technique on shoulder internal rotation ROM, and SPADI than Gong's mobilization.

KEYWORDS

INTRODUCTION

Periarthritis shoulder also called as Adhesive capsulitis, which is characterized by a progressive painful loss of passive and active shoulder range of motion. Codman first used the term "Frozen shoulder" describing it as condition.^[1] The illness is brought on by persistent inflammation of the capsular sub synovial layer, which results in thickening, fibrosis contracture, and loss of the normal axillary recess.^[2] The axillary recess becomes adherent, the capsular extensibility decreases, and the humeral head to pass under the acromion during abduction is severely restricted. The main objective of adhesive capsulitis approaches is to restore this mechanism.^[3]

Incidence of Periarthritis shoulder ranges from 3-5% in the general population to 20 % in the general population. Adhesive capsulitis is classified into two categories (1) Primary, which is insidious and idiopathic (2) Secondary, which usually results from trauma or subsequent immobilization.^[4] Frozen shoulder can be divided in to three phases: the First stage is "Freezing stage" which lasts for 6 months to 9 months, the Second stage is "Frozen stage" stays for 4 months to 6 months, the Third stage is "Thawing stage" which might take anywhere from 6 months to 2 years.^[5] Systemic causes include diabetes mellitus, thyroid dysfunction and hypoadrenalism. Extrinsic causes include cardiopulmonary conditions, cervical spine diseases, stroke, Parkinson's disease and humerus fractures. Possible intrinsic causes include rotator cuff pathologies, biceps tendinitis, calcific tendinitis and acromioclavicular joint arthritis.^[6] Frozen shoulder is characterized by intense inflammatory changes in capsule indicating inflammatory mediators and disturbance in local collagen translation, which result in global fibroplasia.^[7]

The Non operative treatment of periarthritis shoulder includes anti-inflammatories or corticosteroids. NSAIDS may be used to relieve symptoms. Intra-articular corticosteroid injections, capsular distension injections are also used. Arthroscopy release and repair is an excellent additional tool for addressing the shoulder with adhesive capsulitis.^[8]

When a shoulder is in the dynamic posture and performing a restricted movement after being distracted, Gong's mobilization method, known as the end range mobilization, entails administering a corrective

antero-posterior glide. Next, oscillation with continuous stretching is administered at Maitland's grades 3 and 4. Thus it uses Maitland's approach in addition to distraction. This mobilization is a useful treatment in clinical setting because of its immediate effects. It aims to decrease pain and improve range of motion.^[9]

PNF technique is an important method used in manual therapy for rehabilitation. It is a stretching technique that can improve muscle flexibility and has been shown to positively affect active and passive range of motion in patients with frozen shoulder. In contrast to conventional manual therapy, the PNF technique can more effectively activate the body's proprioceptors, encourage neuromuscular responses and improve the related muscles capacity to contract.^[10]

Many conservative treatments are available for Periarthritis of shoulder, which includes wax therapy, ultrasound therapy, Short wave diathermy, Interferential therapy, mobilizations etc. Most of the studies done on PNF techniques and few studies were available on the Gong's mobilization on patients with periarthritis shoulder. Hence it become important to conduct a study to find out the effect of Gong's mobilization with PNF techniques on patients with periarthritis shoulder.

Need Of The Study

- Many conservative treatments are available for Periarthritis of shoulder, which includes wax therapy, ultrasound therapy, Short wave diathermy, Interferential therapy, mobilizations etc .
- Most of the studies done on PNF techniques and few studies were available on the Gong's mobilization on subjects with periarthritis shoulder.
- Hence it become important to conduct a study to find out the effect of Gong's mobilization with PNF techniques on subjects with periarthritis shoulder.

AIM OF THE STUDY

- To study the effect of Gong's mobilization with PNF techniques on pain, ROM and QOL in subjects with grade 2 periarthritis shoulder.

Objectives Of The Study

- To compare the effect of Gong's mobilization with PNF techniques on pain by using VAS score in subjects with Grade 2 periarthritis shoulder.
- To compare the effect of Gong's mobilization with PNF techniques on QOL by using SPADI questionnaire in subjects with Grade 2 periarthritis shoulder.
- To compare the effect of Gong's mobilization with PNF techniques by measuring ROM in subjects with Grade 2 periarthritis shoulder.

MATERIALS AND METHODOLOGY

Study design - Randomized prospective study design

Study setup - College of physiotherapy, SVIMS

Study duration - 11 months (January–November, 2023)

Sampling - Simple random sampling

Sample size - 30

Ethical Approval

- The present study was approved by Institution ethics committee (IEC) of SVIMS, wide reference number: 1543/2023 Tirupati.

Inclusion Criteria:

- Subjects with grade 2 periarthritis shoulder
- Age: 40-60 years
- Unilateral periarthritis
- Gender: Both males and females
- Dominant or nondominant side

Exclusion Criteria:

- Subjects with grade 1, 3 & 4 periarthritis shoulder
- Age below 40 years and above 60 years
- Patients with Bilateral periarthritis
- Patients with Diabetes mellitus
- Patients who undergone shoulder surgeries
- Patients who underwent Intraarticular injections
- Old history of fractures around shoulder joint

Outcome Measures

- Pain by using VAS scale
- Quality of life Questionnaire with SPADI
- ROM using Goniometer

Study Methodology

All the subjects who met the inclusion criteria and willing to participate in the study were recruited and informed consent is taken before starting the procedure. A total of 30 unilateral periarthritis shoulder subjects were taken. Subjects were randomly assigned into two groups GROUP-A and GROUP-B by the lottery method.

Each group divided into 15 subjects; Group A: Gong's mobilization, Group B: PNF technique. Both groups are given conventional physiotherapy (Wax therapy and pendular exercises). All the subjects received treatment for 45 minutes per session, 1 session per day, 6 days in a week for 2 weeks (12 sessions).

Procedure

Gongs Mobilization:

The position of patient is side lying posture. The patient had a 90° abduction of the shoulder to keep the humerus upstanding and the elbow was 90° flexed. The therapist now held one hand and maintained while applying pressure to the humeral head from anterior to posterior while maintaining the position of the patient's elbow at 90°. The therapist then raised their own body while softly pushing on the shoulder joints articular capsule.

To hold the humerus vertical axis the therapist did this while maintaining shoulder abduction and elbow flexion at 90°. The procedure took about 2 to 3 minutes and the articular capsule was gently squeezed for 10 to 15 seconds before being relaxed for 5 secs.

After slightly stretching the capsule the therapist gently applied gentle pressure on the shoulder joint from anterior to posterior with one hand. This prevented the articular capsule and somewhat enlarged humerus from being dragged vertically.

The therapist supported the elbow while using the other hand to complete the shoulder medial rotation. Maitland grades 3 and 4, then performed oscillation to increase ROM and grade 4 approach extended stretching for 7 secs. (Figure- 1)



Figure 1: Gong's mobilization

PNF Techniques

PNF techniques help in developing muscular strength and endurance, joint stability, mobility, neuromuscular control and coordination which all are aimed at improving the overall functional ability of the patients. It is stretching technique which is utilized to increase flexibility and ROM by increasing neuro muscular efficiency. The PNF training approach involves rotational, diagonal, multiplanar, and multijoint movements of the extremities. There are 2 diagonal patterns for the upper and lower extremities. Diagonal 1 (D1) and Diagonal 2 (D2). D1 has D1 Flexion and D1 Extension, D2 has D2 Flexion and D2 Extension.

Statistical Analysis:

The data is entered into Microsoft Excel for tabulation and analysis. Statistical analysis is carried out by using IBM SPSS 25.0 version software. The paired sample t-test is applied to compare the mean values of all the parameters in both the groups. A p-value of <0.01 will be considered as statistically significant.

RESULTS

DEMOGRAPHIC DATA

TABLE 1- Categorization of the subjects according to the Age wise in both groups

Age (years)	Group A		Group B		Total	
	No. of Subjects	%	No. of Subjects	%	No. of Subjects	%
< 45	2	13.3	1	6.7	3	10.0
46 - 50	3	20.0	3	20.0	6	20.0
51 - 55	4	26.7	8	53.3	12	40.0
56- 60	6	40.0	3	20.0	9	30.0
Total	15	100.0	15	100.0	30	100.0
Mean Age	52.47 ± 6.33		52.33 ± 5.23		52.40 ± 5.71	

Table 1 : Comparison of pretest and post test values of outcome measures of Group A and Group B

S. NO	Outcome measures	Pretest values Mean ± S.D		Post test values Mean ± S.D		Mean difference		P value
		Group A	Group B	Group A	Group B	Group A	Group B	
1.	VAS	7.20 ± 0.775	7.20 ± 0.775	4.33 ± 0.976	4.20 ± 0.775	2.867	3.000	P<0.01
2.	SPADI	81.40 ± 8.806	81.73 ± 7.392	54.13 ± 6.289	58.60 ± 5.767	27.267	23.133	P<0.01
3.	Shoulder abduction	90° ± 10.000	92° ± 8.837	138° ± 9.220	130° ± 8.121	-48° ± 00	-38° ± 00	P<0.01
4.	Shoulder external rotation	37° ± 7.020	36° ± 5.732	59° ± 7.037	55° ± 7.319	-22° ± 00	-19° ± 00	P<0.01
5.	Shoulder internal rotation	54° ± 6.325	57° ± 6.510	66° ± 6.325	72° ± 4.928	-12° ± 00	-14° ± 07	P<0.01

Comparison of mean & SD values of VAS, SPADI, Shoulder ROM before and after the treatment in the both groups

DISCUSSION

A painful condition that gradually restricts the shoulder joint is known as periarthritis of the shoulder. Movement of the shoulder is severely restricted in all planes leading to progressive loss of active movements

and passive movements. Patients with frozen shoulder primarily suffer pain and reduced mobility due to structural abnormalities in the soft tissues surrounding the shoulder joint. The goal of treating this problem has always been to increase shoulder joint range of motion and decrease pain.

Manish Shrestha, Diker Dev Josh, concluded that Gong's mobilization is useful in reducing a group of frozen shoulder patients pain, limited range of motion and disability. **Chennupati Ashok Chakravarthi et al.**, concluded that 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 shoulder. The study conducted by Wontae Gong on Gong's mobilization on shoulder abduction suggests that the range of motion for shoulder abduction and internal rotation is limited in periarthritis of the shoulder. This is because the humeral head moves in an anterior and inferior direction during these movements. This is consistent with the reduction in pain and improvement in range of motion observed in the Gong's mobilization.

The humeral head is placed in a normal position when posterior compression is applied through Gong's mobilization. This results in normal rolling and sliding at the articular surface as well as a decrease in posterior capsule tension. 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. **Manoj malik, Jaspreet kaur, Varun Singh, Sonu punia, Priyanka**, concluded based on findings of study, both groups (PNF and Joint mobilization) were equally significant in the lessening intensity of pain and increasing ROM in subjects of frozen shoulder.

This study is concluded the effectiveness of the Gong's mobilization and PNF technique along with conventional physiotherapy in periarthritis shoulder subjects with an expectation to reduce pain and Shoulder pain and disability scale and to increase Range of motion. Gong's mobilization technique helps to decrease pain and it is an effective technique to improve shoulder abduction, internal rotation, and external rotation. The PNF technique is an important technique used in rehabilitation manual therapy. This stretching method has been demonstrated to have a positive impact on patients with frozen shoulder's active and passive range of motion by increasing muscle flexibility.

CONCLUSION

The present study concluded that Gong's mobilization is effective in reduction of pain, increasing shoulder abduction and external rotation ROM than PNF technique. The present study also found that the PNF technique has shown more improvement in shoulder internal rotation and SPADI score than Gong's mobilization. This study accepted alternate hypothesis and disapproved null hypothesis.

Recommendations

- Long duration follow up may be require to find out the further advantageous effect of Gong's mobilization and PNF technique.
- More combination of other methods with the present study can be done.
- Study can be conducted on large group of population.
- This study may be conducted on individual side.

REFERENCES

1. Yuan, X., Zang, Z., & Li, J. (2017) Pathophysiology of adhesive capsulitis of shoulder and the physiological effects of hyaluronan. *European Journal Of Inflammation* 15(3).
2. Kingston K., Curry, E.J., Galvin, J. W., & Li, X. (2018). Shoulder adhesive capsulitis: epidemiology and predictors of surgery. *Journal Of Shoulder And Elbow Surgery*, 27(8),1437-1443.
3. Navjyot Trivedi, Monal Ladani (2021). Effectiveness of Therapeutic protocol for Physiotherapy management of Adhesive capsulitis. *Indian Journal Of Physiotherapy and Occupational Therapy -An International Journal* 15(1)
4. Manske, R. C., & Prohaska, D. (2008). Diagnosis and management of adhesive capsulitis *Current Reviews in Musculoskeletal Medicine*,1(3-4),180-189.
5. Prasanth, S., Sudhan Mohana M, A., Sreedharan, Sreejesh., Subbarayalu, A., & P, S. (2023) Comparative effect of Gong's mobilization and Spencer technique to manage Frozen shoulder *Physiotherapy Quarterly*, 31(3), 57-64.
6. Jason, J. I., Sundaram S, G., & Subramani M, V. (2015) Physiotherapy Interventions for Adhesive capsulitis of shoulder: A Systematic review. *International Journal Of Physiotherapy And Research*, 3(6), 1318-1325.
7. Pandey, V., & Madi, S. (2021) Clinical guidelines in the management of Frozen shoulder: An update! *Indian Journal Of Orthopaedics*, 55(2), 299-309.
8. Shrestha, M., & Joshi, D. D. (2020) Effect of Gong's mobilization on pain, range of motion and disability in Frozen shoulder: A pilot study. *International Journal Of Health Care Sciences*, 8(1).

9. Cassidy C, M., Sawyer E., Eovaldi, B, J., Varacallo, M. (2023). Anatomy, Shoulder and Upper limb, Shoulder muscles. *Statpearls*
10. Lin, P., Yang, M., Huang, D., Lin, H., Wang, J., Zhong, C., & Guan, L. (2022) Effective of proprioceptive neuromuscular facilitation technique on the treatment of frozen shoulder : A pilot randomized controlled trail. *BMC Musculoskeletal Disorders*, 23(1). Volume 23, 2022.