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To study the effectiveness of Gong's mobilization versus conventional therapy on shoulder pain, abduction and medial rotation ROM in patients with stage II Frozen Shoulder

Dr. Juhi Ramteke and Dr. Jaywant Nagulkar

Abstract

Objectives:

- 1) To demonstrate the effectiveness of Gong's mobilization in improving pain in patients with stage II Frozen Shoulder.
- 2) To demonstrate the effectiveness of Gong's mobilization in improving abduction and medial rotation range in patients with stage II Frozen Shoulder.
- 3) To demonstrate the effectiveness of conventional therapy in improving pain in patients with stage II Frozen Shoulder.
- 4) To demonstrate the effectiveness of conventional therapy in improving abduction and medial rotation range in patients with stage II Frozen Shoulder.
- 5) To demonstrate the effectiveness of Gong's mobilization versus conventional therapy on shoulder pain, abduction and Medial rotation ROM in patients with stage II Frozen Shoulder.

Methodology: 60 subjects diagnosed with stage II frozen shoulder were taken. Participants were randomly divided into two interventional groups i.e Group A (30 patients) and Group B (30 patients). All the exercises were performed in 1 set with 15 repetitions for two weeks. Ethics committee clearance was obtained. Patient's in the control group were given moist pack for 20 minutes. conventional therapy was given including stretching and strengthening exercises. All exercises were performed in 1 set with 15 repetitions for two weeks. Patient's in the experimental group were given Moist pack for 20 minutes followed by Stretching and strengthening exercises and mobilization for increasing shoulder medial rotation and shoulder abduction range of motion. Outcome measures used were Intensity of pain on Visual Analogue Scale and Range of motion using Goniometer.

Conclusion: The result of the research supports the premise that Gongs mobilization along with conventional therapy is more effective in the treatment of frozen shoulder than the conventional therapy alone.

This study showed that there was a significant improvement in pain and ROM as a result of both Gongs mobilization with conventional therapy and conventional therapy laone, although there was more increase in ROM and decrease in pain with Gongs mobilization.

Also, the study infers that, clinically, Gongs mobilization with conventional therapy can be used in combination for the physiotherapy treatment protocol for patients with frozen shoulder.

Keywords: Gongs mobilization, conventional therapy, frozen shoulder, pain, abduction and medial rotation ROM

Introduction

- The shoulder joint is an elegant piece of machinery. It is a synovial joint of the ball and socket variety.
- Glenohumeral Stability relies on both static and dynamic stabilizers. static stabilizers consists of the capsule, glenohumeral ligaments, and glenoid labrum, whereas dynamic stability is largely provided through the rotator cuff muscles.
- Frozen shoulder or Adhesive capsulitis is characterized by painful, gradual loss of active and passive shoulder motion resulting from fibrosis and contracture of the joint capsule.

Stages of frozen shoulder

- 1) *Painful or Freezing Phase* typically lasts 10 to 36 weeks with spontaneous onset of shoulder pain, decreased movements, external rotation greatest followed by loss of

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abduction and then forward flexion which is often severe and disturbs sleep.

- 2) *Stiffening or Frozen Phase* may last 4 to 12 months with restricted ROM in a characteristic pattern of loss of external rotation, internal rotation, and abduction. In this stage pain gradually decreases and the patient complains of progressive stiff shoulder in a capsular form. Slight movements are present.
- 3) *stage of recovery or thawing phase* is characterized by the gradual recovery of ROM Which may last an average of 5 to 26 months and is reportedly directly related to the length of duration of the painful phase.
 - Joint mobilization techniques are assumed to induce various beneficial effects including biomechanical and mechanical effects. It controls the pain through neurophysiological affects this is because of stimulating type 2 mechanoreceptor and inhibiting type 4 nociceptos.
 - Conventional Therapy was given for the control group that included Codman's Pendulum exercise, Scapular stabilization exercise, Active-assisted ROM exercises, and Finger walk, base exercises and isometric activities. Heat application was used to promote soft tissue pliability and pain reduction.

Need for study

There are many studies done on frozen shoulder and effectiveness of various therapeutic techniques in its management. Various treatment techniques such as mulligan's and kaltenborn mobilization have proved to be beneficial in the management of frozen shoulder but there are very few literature available suggesting the effectiveness of Gong's mobilization or conventional therapy in treatment of stage II of Frozen Shoulder. Thus, the present study is done to evaluate the effectiveness of Gongs mobilization versus conventional therapy in the management of patients with stage II Frozen Shoulder.

Aims and objectives

Aim

To study the effectiveness of Gong's mobilization versus conventional therapy on shoulder pain, Abduction and Medial rotation ROM in patients with stage II Frozen Shoulder.

Objectives

1. To demonstrate the effectiveness of Gong's mobilization in improving pain in patients with stage II Frozen Shoulder.
2. To demonstrate the effectiveness of Gong's mobilization in improving abduction and medial rotation range in patients with stage II Frozen Shoulder.
3. To demonstrate the effectiveness of conventional therapy in improving pain in patients with stage II Frozen Shoulder.
4. To demonstrate the effectiveness of conventional therapy in improving abduction and medial rotation range in patients with stage II Frozen Shoulder.
5. To demonstrate the effectiveness of Gong's mobilization versus conventional therapy on shoulder pain, abduction and Medial rotation ROM in patients with stage II Frozen Shoulder.

Hypothesis

Null hypothesis

There is no significant difference between Gong's mobilization versus conventional therapy on pain, abduction and medial rotation ROM in patients with stage II Frozen Shoulder.

Alternate hypothesis

- There is significant difference between the Gong's mobilization versus conventional therapy in improving pain in patients with stage II Frozen Shoulder.
- There is significant difference between the Gong's mobilization versus conventional therapy in improving abduction and medial rotation range in patients with stage II Frozen Shoulder.

Methodology

- **Study design:** phase 3 of Randomized control trial.
- **Sampling size:** 60 Group A=30 Group B=30
- **Sampling technique:** Simple random technique.
- **Setting (location of study):** physiotherapy OPD in Tertiary care hospital.
- **Study duration:** 12 months.

Materials used

1. Consent form—A signed consent form from the patients to allow the patients to be included in the study
2. Data collection sheet.
3. VAS (visual analogue scale).
4. Goniometer.
5. Thera band.
6. Exercise ball.
7. Pillow.
8. Couch.
9. Table.

Sampling Criteria

Inclusion Criteria

1. The participants willing to participate in the study.
2. Diagnosed by a clinician as periarthritis of shoulder
3. Age between 40 – 70 years of both male and female
4. Diagnosed with diabetic frozen shoulder

Exclusion Criteria

1. The participants not willing to participate in the study.
2. Traumatic injury to the shoulder joint within 6 months of study or any type of arthritis
3. CNS/PNSDisorder

Statistical tool

- Visual Analogue Scale.
- Range Of Motion.

Independent Measures: Gong's mobilization, Conventional therapy.

Dependent measures: VAS, Range of motion.

Study procedure

Ethics committee clearance was obtained. Selection of subjects was done according to inclusion and exclusion

criteria was done and written consent was taken. Participant's demographic details were taken after signing the informed consent. Participants were randomly divided into two interventional groups i.e Group A (30 patients) and Group B (30 patients). All the exercises were performed in 1 set with 15 repetitions for two weeks. Outcome parameters were measured initially at the start of the treatment and lastly at the end of treatment period of 2 weeks.

Group A

Patient's in the experimental group were given Moist pack for 20 minutes followed by Stretching and strengthening exercises and mobilization for increasing shoulder medial rotation and shoulder abduction range of motion.

**Procedure for Gong's mobilization
For increasing shoulder Medial rotation**

Gong's mobilization was performed on subject in side-lying position with the involved shoulder joint upward and shoulder was abducted at 90 degrees. The therapist kept the subject's elbow joint at 90 degrees with one hand, placed his elbow below the subject's elbow joint, and pressed the humerus head from anterior to posterior with the other hand. Then, the therapist 1 held the vertical axis of the humerus steady by maintaining the shoulder abduction and the elbow at 90 degrees and raise therapist own body while slightly pulling on the articular capsule of the shoulder joint. This slight pulling of the articular capsule was maintained for 10–15 seconds then relaxed for 5 seconds. This technique was performed for about 2 to 3 minutes.

After extending the articular capsule by slightly pulling it, the therapist used one hand to press the shoulder joint from anterior to posterior in order to prevent vertical pulling of the slightly extended articular capsule and the humerus. The therapist supported the elbow with the other hand and perform shoulder medial rotation. Then, in order to increase ROM, oscillation at Maitland's grades 3 and 4 will be performed followed by sustained stretching at grade 4 for about 7 seconds.



For increasing shoulder abduction

The subject sat on knee-high chair with the spine in a neutral position and comfortably extend both their arms. Therapist stood on the side opposite to the affected side. The therapist pushed the scapula of the affected side in a posterior to anterior direction with one hand, and pushed the humeral head in an anterior to posterior direction parallel to joint plane with the other hand. Simultaneously, the subject were asked to quickly and powerfully perform shoulder abduction with elbow flexion and with palm facing inside and the back of the hand facing outside. During this time, the hands of the therapist kept facing the humeral head with long axis of the palm along with the long axis of the

humerus. The therapist followed the subject performing shoulder abduction, at the same speed while maintaining a little distraction, and adding acceleration in the end range. The glide was sustained during slow active shoulder movements to the end of the pain-free range and release after return to the starting position. The procedure will be performed in one set of 10 repetitions, with 1 minute rest between sets.



Group B

Patient's in the control group were given moist pack for 20 minutes. Conventional therapy was given including stretching and strengthening exercises. All exercises were performed in 1 set with 15 repetitions for two weeks.

**Conventional therapy
Strengthening exercises**



Pendularexercises



Isometric Scapular Retraction



Horizontal abduction exercises

Stretching exercises



Shoulder medial rotators



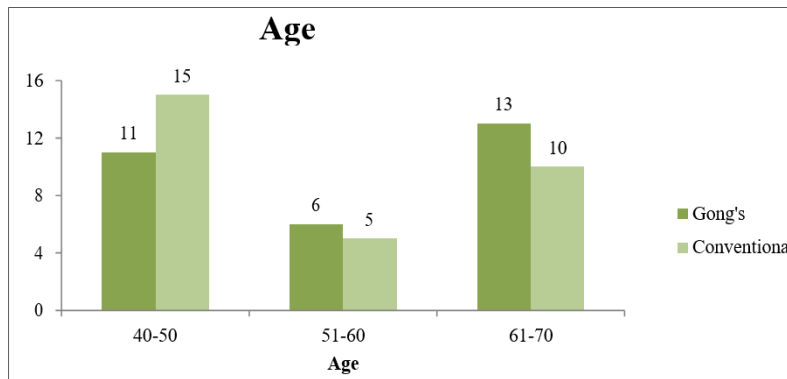
Shoulder lateral rotators

Data analysis and results

Descriptive statistical analysis was presented in the form of mean +/- Standard deviation and percentages. Paired and unpaired t test was performed to compare VAS, Abduction and medial rotation ROM values on 1st day and after 2 weeks of treatment. Significance is assessed at 5 % level of significance with p value was set at 0.05 less than this is considered as statistically significant difference. Out Come measurements are measured for pain using Visual analogue scale in centimeters and Active and passive shoulder abduction and Medial rotation ROM and presented as mean ± SD. Microsoft word and Excel have been used to generate graphs, tables etc.

1) Age wise distribution of participants

S. No.	Variable	Groups	Group A		Group B	
			Frequency	Percentage	Frequency	Percentage
1	Age	40-50	11	36.67	15	50.00
		51-60	6	20.00	5	16.67
		61-70	13	43.33	10	33.33



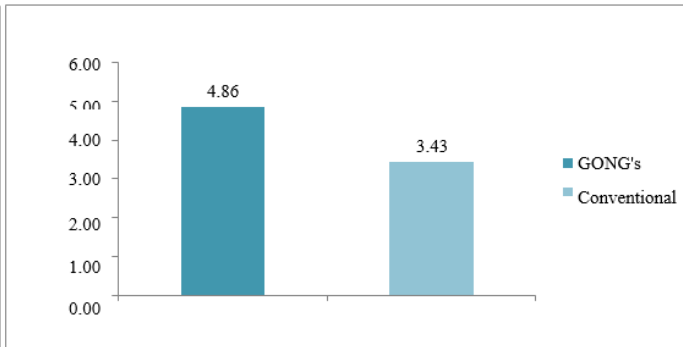
The above Bar Graph shows age wise distribution of the participants. Maximum number of participants i.e 26 are

seen in the age group of 40-50 years of age. 23 are in the age group of 61-70 and 11 are in the age group of 51-60.

2) Comparison of mean VAS of pre and post treatments of Gong's Mobilization and Conventional therapy

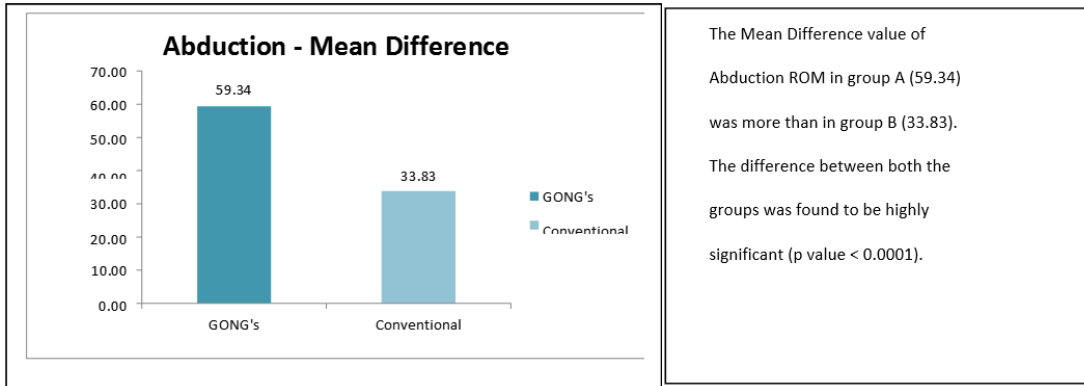
VAS	Group A Mean±SD	Group B Mean±SD
Pre -treatment	7.06±1.38	6.66±1.42
Post -treatment	2.20±1.06	3.23±0.72
P value	0.00	0.00
T value	17.74	15.38
Mean Difference	4.86	3.43

The Mean Difference value of VAS in group a (4.86) was more than than in group B (3.43). The difference between both the groups was found to be highly significant (p value < 0.0001).



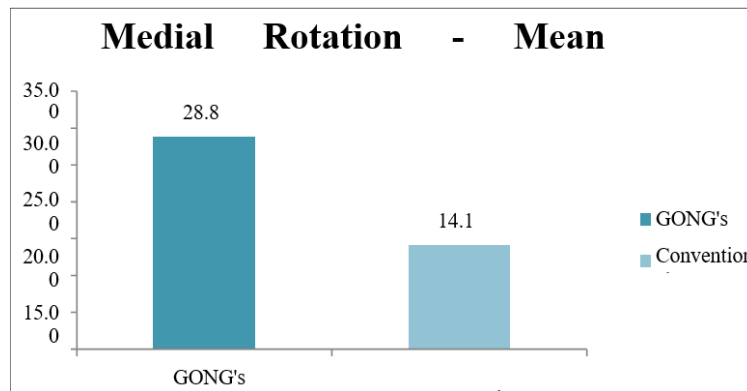
3) Comparison of mean abduction ROM of pre and post treatments of Gong’s Mobilization and Conventional therapy

Abduction ROM	Group A	Group A
	Mean±SD	Mean±SD
Pre -treatment	89.83±27.99	104.50±20.14
Post -treatment	149.17±16.51	138.33±21.02
P value	0.00	0.00
T value	15.48	10.33
Mean Difference	59.34	33.83



4) Comparison of mean Medial rotation ROM of pre and post treatments of Gong’s Mobilization and Conventional therapy.

Medial Rotation ROM	Group A	Group B
	Mean±SD	Mean±SD
Pre -treatment	35.33±11.96	30.33±9.82
Post -treatment	64.17±5.74	44.50±10.78
P value	0.00	0.00
T value	16.12	13.90
Mean Difference	28.84	14.17



The Mean Difference value of Medial Rotation in group A (28.84) was more than than in group B (14.17). The difference between both the groups was found to be highly significant (p value) < 0.0001.

less than 0.0001, which suggests that both the protocols were statistically significant. Assessment was done pre-treatment and at the second week i.e. post treatment.

Discussion

The Present study was undertaken to find the effectiveness of Gong’s mobilization versus conventional therapy on shoulder pain, abduction and medial rotation range of motion in patients with stage 2 frozen shoulder. In this study, unpaired t test was done of the values of VAS, Medial rotation and abduction Range of motion. When the paired t test was performed of the VAS values, there was significant difference between p-values. The p value was

1. Visual analogue scale

Group A: Using Paired t- test for analysis on data (n=30), results were found to be statistically significant at $p < 0.0001$ ($p < 0.05$). This suggests that VAS for pain significantly reduced after the 2 weeks of treatment. Similar results were found in the study done by Jyoti Rinku Dilip, Vinod Babu K *et al.* They conducted a study in which they mentioned regarding the improvement in the pain after the Gong’s Mobilization. They concluded that Pain was reduced because joint mobilization has both neurophysiologic and

mechanical effects, rhythmic oscillatory movements which stimulate the type-2 dynamic mechanoreceptors and inhibit the type-4 nociceptive receptors and also has an effect on circulatory perfusion, hence effectively used to treat reversible painful joint with low mobility and functionally fixed joint

Group B: Using Paired t- test for analysis on data (n=30), results were found to be statistically significant at $p < 0.0001$ ($p < 0.05$). This suggests that VAS for pain significantly reduced after the 2 weeks of treatment in Group B. The study done by Sean M. Griggs, Anthony Ahn *et al* on idiopathic frozen shoulder. There were significant improvements in the scores for pain at rest (from a mean of 1.57 points before treatment to a mean of 1.16 points at the final evaluation; ($p < 0.001$) and pain with activity (from a mean of 4.12 points before treatment to a mean of 1.33 points at the final evaluation; ($p < 0.0001$).

Comparison of VAS between Group A and Group B

The Mean Difference value of VAS in group A (4.86) was more than than in group B (3.43) which showed that VAS was significantly reduced in group A compared to group B. The difference between both the groups was found to be highly significant (p value < 0.0001).

2. Range of motion (medial rotation) and (abduction)

Group A

The mean value of Medial Rotation ROM pre treatment (35.33 ± 11.96) was increased post treatment (64.17 ± 5.74). The difference was highly significant (p value < 0.0001) following treatment with Gong's Mobilization. (Group A)

In this study, there was significant improvement In the Shoulder medial rotation ROM. According to the study done by Jyoti Rinku Dilip, Vinod Babu K *et al* to evaluate the effect of Gong's Mobilization versus Mulligan's Mobilization on Shoulder pain and Shoulder Medial Rotation mobility in subjects with Frozen shoulder, they concluded that the increase in shoulder medial rotation ROM was due to the fact that shoulder medial rotation was restricted by the humeral head's anterior displacement during shoulder medial rotation and now when posterior compression of the humeral head is given it puts the humeral head in a normal position.

Group B

The mean value of Abduction ROM pre treatment (104.50 ± 20.14) was increased post treatment (138.33 ± 21.02). The difference was highly significant (p value < 0.0001) following treatment with conventional therapy. (Group B)

The mean value of Medial rotation ROM pre treatment (30.33 ± 9.82) was increased post treatment (44.50 ± 10.78). The difference was highly significant (p value < 0.0001) following treatment with conventional therapy (Group B)

Abhay Kumar, Suraj Kumar in their study showed the Effectiveness of Maitland Techniques in Idiopathic Shoulder Adhesive Capsulitis. According to their study stretching exercises increases the extensibility of the soft tissue on the basis of creep response thus altering the viscoelastic properties and range of motion.

Comparison of ROM between Group A and Group B

Regarding Range of motion, the clinical difference detected in this study between the two training protocols suggest that

Gong's mobilization is slight more effective than the conventional therapy in improving ROM.

Conclusion

The result of this research supports the premise that Gong's mobilization along with conventional therapy is more effective in the treatment of Frozen Shoulder than the conventional therapy alone.

This Study showed that there was a significant improvement in pain and ROM as a result of both Gong's mobilization with conventional therapy and Conventional therapy alone, although there was more increase in ROM and Decrease in pain with Gong's Mobilization.

Also, the study infers that, clinically, Gong's mobilization with Conventional therapy can be used in combination for the physiotherapy treatment protocol for patients with Frozen Shoulder.

Limitations

- The duration of the treatment protocol was short i.e 2 weeks.
- Sample size is less.
- Follow-up was not done therefore long term effects were not known.
- Only Medial rotation and Abduction ROM and pain were measured.
- Subjects with primary frozen shoulder in the II stage were considered for the study.
- Subjects with small range group between 40 -70 years of age were considered for the study, thus results cannot be generalized for other age groups.

Further studies

- Further study should also be done to find the effect with other conventional exercise such as combined ultrasound therapy, pain, reliving methods with the mobilization technique.
- Study can be performed with a large number of population while the duration of the treatment protocol could be extended for a longer period of time.
- Further study should needed measuring effect on other outcome measurements.
- Further study is lacking with control group who received only conventional exercise.

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