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A Study on Efficacy of Movement with Mobilization Versus Graded Oscillatory Technique in the Management of Pain and Shoulder Function Among Shoulder Impingement Subjects

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Abstract

Many conditions affecting shoulder which includes rotator cuff tear, frozen shoulder, shoulder instability, bursitis and shoulder impingement. Impingement usually refers to compression and mechanical aberration of the rotator cuff tendon, subacromial bursa, or long head of biceps tendon beneath the anterior under surface of the acromion, coracoacromial ligament or under surface of the acromioclavicular joint during elevation of arm. Another possible mechanism of impinge can be attributed to intrinsic breakdown of the rotator cuff tendon as a result of tension overload. Study design consists of pre-test post-test experimental design, comparative in nature. This study was conducted at N.G. Multispeciality Hospital, Singanallur, Coimbatore, India. The study was conducted for a period of 7 days. 20 shoulder impingement subjects aged between 22 and 35 years who fulfilled inclusion and exclusion criteria were selected by purposive sampling method and randomly assigned to two groups of 10 subjects each. Group A was assigned for movement with mobilization and Group B for graded oscillatory technique. It is concluded that there is reduction of pain among shoulder impingement subjects treated with movement with mobilization. It is concluded that there is improvement in shoulder function among shoulder impingement subjects treated with movement with mobilization. It is concluded that there is reduction of pain among shoulder impingement subjects treated with graded oscillatory technique. It is concluded that there is improvement also in shoulder function among SHOULDER impingement subjects treated with graded oscillatory technique. It is concluded that movement with mobilization training group showed statistically significant improvement in shoulder function than the other group. It is concluded that movement with mobilization training group showed statistically significant reduction in pain than the other group.

Keywords: *Mobilization, graded oscillatory technique, pain, shoulder impingement subjects*

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INTRODUCTION

Shoulder pain and stiffness is common in the general community. It is the third most frequent site of musculoskeletal pain after back and neck. Not only does shoulder pain and stiffness impact on the physical functioning, it also contributes significantly to the emotional and psychological distress of the patients [1–5]. Furthermore, it imposes considerable financial burden on the affected individual and the society. Shoulder disorders are commonly encountered in community, but more prevalent in specific population such as elderly, workers involved with repetitive movement of shoulder, those who undertakes sports or recreation involving repetitive arm movements and those with specific medical problem.

Studies have reported on the severity and impact of shoulder pain, restriction of movements leads to functional limitation of daily activities. Such as personal care, dressing, house works and general activities. Shoulder impingement syndrome leads to pain and limitation of movements in which forward

flexion and internal rotation are limited more than other movements. Many condition affecting shoulder which includes rotator cuff tear, frozen shoulder, shoulder instability, bursitis and shoulder impingement. Shoulder impingement was described by Neer in 1972. Shoulder impingement is one of the most common conditions that affect the shoulder and accounts for 44–65% of all cases of shoulder pain. Impingement usually refers to compression and mechanical aberration of the rotator cuff tendon, subacromial bursae, or long head of biceps tendon beneath the anterior under surface of the acromion, coracoacromial ligament or under surface of the acromioclavicular joint during elevation of arm. Another possible mechanism of impinge can be attributed to intrinsic breakdown of the rotator cuff tendon as a result of tension overload [6–10].

Shoulder impingement disorders are currently classified as primary and secondary (Figure 1). Primary shoulder impingement occurs when the rotator cuff tendon, long head of biceps tendon, glenohumeral joint capsule are impinged between the humeral head acromion. Secondary impingement is defined as relative decrease in the subacromial space due to glenohumeral joint instability or abnormal scapulothoracic kinematics.

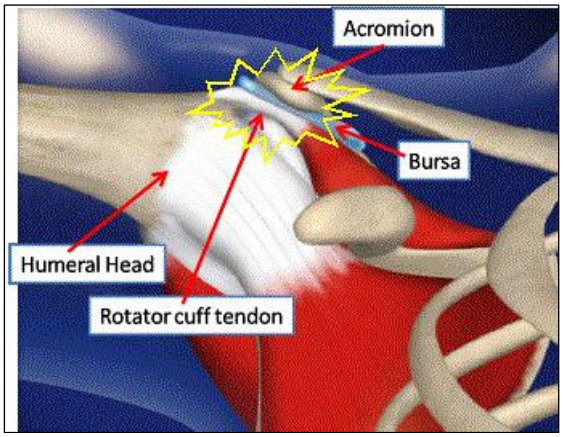


Fig. 1: *Shoulder Impingement.*

Pain, weakness and loss of motion are the most common symptoms reported. Pain is exacerbated by overhead or above-the-shoulder activities. A frequent complaint is night pain, often disturbing sleep, particularly when the patient lies on the affected shoulder. The onset of symptoms may be acute, following an injury, or insidious, particularly in older patients, where no specific injury occurs [11–13].

The key feature of the physical examination is an assessment for signs of impingement. All the impingement tests involve moving the shoulder passively (through forward flexion, internal and external rotation with the arm abducted 90 degrees, and adducted) with approximately 5–10 lb of force directed inferiorly on the acromion, thus narrowing the subacromial space. The examiner tests to see if pain appears with these maneuvers and disappears when the examiner removes the downward acromial push [14].

Treatment of impingement syndrome includes conservative and surgical conservative management includes injections-these are given into the subacromial space aiming for the bursa not the tendon itself. Physical Therapy management includes assessment of shoulder and from this, an individual programme of exercise given. These may include exercise to strengthen the muscle around shoulder blade, improve posture, stretching exercise and rotator cuff strengthening exercise. If unable to do any form of exercise because of pain, ultrasound (UST) and LASER, can be given. Manual therapy technique is also used to reduce pain and to improve Shoulder function and is includes movement with mobilization and graded oscillatory technique. Surgical management includes acromioplasty [15].

Mobilization with movement is the sustained repositioning of the articular surface on its partner with a movement or function. There will be no pain felt by the patient with sustained mobilization and there will be no pain with the movement taking place and there will be an immediate improvement in the function being undertaken. Graded oscillatory technique comprising a continuum of skilled passive movements to the joint complex that are applied at varying speeds and amplitudes, that may include a small amplitude/high velocity therapeutic movement with the intent to restore optimal motion, function, and reduce pain [16–19].

Grades
Grade 1: Small amplitude rhythmic oscillating mobilization in early of movement.
Grade 2: Large amplitude rhythmic oscillating mobilization in midrange of movement.
Grade 3: Large amplitude rhythmic oscillating mobilization at the point of limitation in the range of movement.
Grade 4: Small amplitude rhythmic oscillating mobilization at end range of movement.
Grade 5: Small amplitude, quick thrust at end range of movement.

STATEMENT OF PROBLEM

A study on efficacy of movement with mobilization versus graded oscillatory technique in the management of pain and shoulder function among shoulder impingement subjects.

SIGNIFICANCE OF STUDY

- To study the effect of movement with mobilization in the management of pain among shoulder impingement subjects.
- To study the effect of movement with mobilization in the management of shoulder function among shoulder impingement subjects.
- To study the effect of graded oscillatory technique in the management of pain among shoulder impingement subjects.
- To study the effect of graded oscillatory technique in the management of shoulder function among shoulder impingement subjects.
- To compare the effect of movement with mobilization and graded oscillatory technique in the management of pain among shoulder impingement subjects.
- To compare the effect of movement with mobilization and graded oscillatory technique in the management of shoulder function among shoulder impingement subjects.

HYPOTHESIS

It is hypothesized that there is no significant difference in pain and shoulder function following movement with mobilization among shoulder impingement subjects.
It is hypothesized that there is no significant difference in pain and shoulder function following graded oscillatory technique among shoulder impingement subjects.
It is hypothesized that there is no significant difference in between movements with mobilization and graded oscillatory technique in the management of pain among shoulder impingement subjects.
It is hypothesized that there is no significant difference between movements with mobilization versus graded oscillatory technique in the management of shoulder function among shoulder impingement subjects.

OPERATIONAL DEFINITION

Impingement syndrome is a clinical syndrome which is occurs when the tendon of rotator cuff muscles become irritated and inflamed as they passes through the subacromial space, the passage beneath the acromion, this can result in pain, weakness and loss of movement of shoulder. Pain is an unpleasant sensory and emotional experience association with actual or potential tissue damage or described in terms of such damage. Movement with mobilization is the simultaneous combination of accessory gliding technique and physiological movement. Shoulder function is associated with shoulder movements which is necessary to perform every activity in daily living. Graded oscillatory technique: it is a skilled passive movements to the joint complex that are applied at varying speeds and amplitudes, that may include a small amplitude/high velocity therapeutic movement with the intent to restore optimal motion, function, and reduce pain.

REVIEW OF RELATED LITERATURE

One of the very important early steps in a research project is performing the review of literature. This is also one of the most humbling experiences the authors are likely to have. It is because we are most likely to find out that any important idea the author have, has been thought of before, at least to some extent. A literature review is always performed to identify related studies, to set the current project within the conceptual and theoretical context. When looked at that way, almost no topic is so new or unique that you can't locate relevant and informative related studies.

In the literature review, the author can find the following things;

- First, the researcher can find a study that is quite similar to the one we are thinking of doing. Since, all authentic and credible research studies have to review the literature themselves, we can verify their literature review to get started on our own study (Figure 2).
- Second, prior research will help ensure that we include all of the important relevant constructs in our study. The author may find that other similar studies routinely look at an outcome that we might not have included. Our study would not be judged properly if it ignored a major construct.
- Third, the literature review will help us to find and select appropriate measurement instruments/tools. The author will readily see what measurement instruments/tools those researchers used themselves in contexts similar to ours.
- Finally, the literature review will help us to anticipate common problems in our study context. The author can use the prior experiences of others to avoid common traps and pitfalls.

METHODOLOGY

STUDY DESIGN

Pre-test Post-test Experimental Design, comparative in nature (Figure 2).

STUDY SETTING

This study was conducted at N.G. Multispeciality Hospital, Singanallur, Coimbatore, India.

STUDY DURATION

The study was conducted for a period of 7 days.

SELECTION OF SUBJECTS

20 shoulder impingement subjects aged between 22 and 35 years who fulfilled inclusion and exclusion criteria were selected by purposive sampling method and randomly assigned to two groups of 10 subjects each.

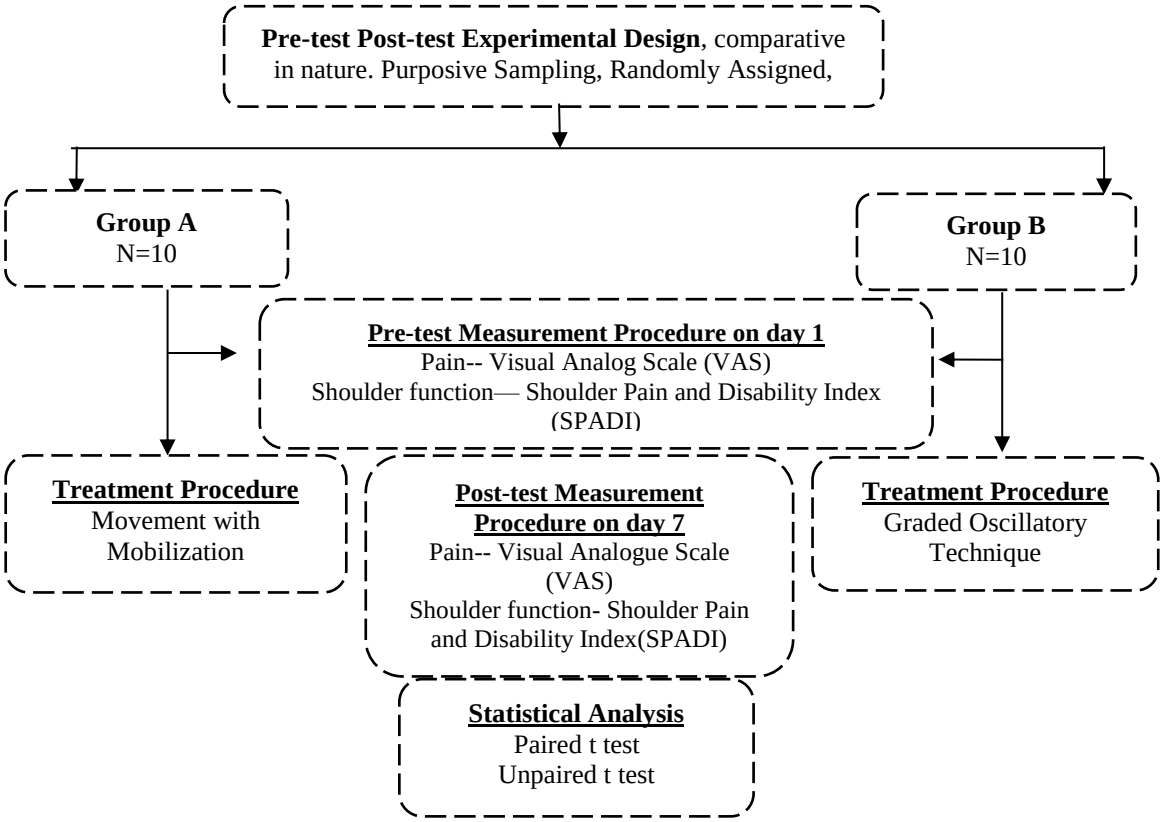


Fig. 2: *Pre-test and Post-test Experimental Design Set Up.*

Group A was assigned for movement with mobilization and Group B for graded oscillatory technique.

CRITERIA FOR SELECTION OF SUBJECTS

Inclusion Criteria

- Patient with impingement of shoulder.
- Hawkin's Kennedy test was positive.
- Neer's test was positive.

Exclusion Criteria

- Rotator cuff tear.
- Frozen shoulder.
- Shoulder instability.

VARIABLES

Independent Variable

- Movement with Mobilization
- Graded Oscillatory Technique

Dependent Variable

- Pain
- Shoulder function

MEASUREMENT TOOL

- Visual Analog Scale (VAS).
- Shoulder Pain and Disability Index (SPADI)

PROCEDURE

Measurement Procedure

Visual Analog Scale

- The visual analog scale is a measurement tool that measures a characteristic or attitude which ranges across a continuum of values and cannot easily be directly measured.
- Operationally VAS is an horizontal line, 10 cm in length, anchored by word descriptors at each end, as illustrated in Figure 1. The subject marks on the line a point that they feel represents their perception of their current state of pain. The VAS score is determined by measuring in millimetres from the left hand end of the line to the point that the subject marks (Figure 3).

Shoulder Pain and Disability Index

The shoulder pain and disability index (SPADI) is a self-administered questionnaire that consists of two dimensions, one for pain and the other for the functional activities. The pain dimension consists of five questions regarding the severity of an individual's pain. Functional activities are assessed with eight questions designed to measure the degree of difficulty an individual has with various activities of daily living that require upper-extremity use. The SPADI takes 5–10 minutes for a patient to complete and is the only reliable and valid region-specific measure for the shoulder.

SCORING INSTRUCTIONS

To answer the questions, patients place a mark on a 10 cm visual analogue scale for each question. Verbal anchors for the pain dimensions are 'no pain at all' and worst pain imaginable', and those for the functional activities are 'not difficulty' and 'so difficult it required help'. The score from both dimensions are averaged to derive a total score.

- Both Group A and Group B subjects were involved in pre-test and post-test assessment by visual analog scale and goniometric measurement.

Treatment Procedure

Volume of Training

- 15 repetition
- 3 session per day
- Total number of sessions 21

Treatment Procedure for Group A

- Movement with mobilization
- Manual Technique with elevation
- ***Indications:*** Painful arc, or painful and/or restricted flexion or abduction.
- ***Contact:*** Stabilize scapula, thenar eminence of other hand over the medial head of the humerus (avoid coracoid process).

Fig. 3: *The Visual Analog Scale –VAS (Not to Actual Scale)*

- ***Direction:*** Posterolateral, possibly slightly inferior glide.
- ***Movement:*** Perform repetitions with weight (e.g., punching) or overpressure.
- ***Variations:*** Spine for flexion and abduction.

Patient Position: Supine with arm in resting position. Support the forearm with therapist trunk and elbow.
Hand Placement: Place therapist hand in patient axilla to provide a grade-1 distraction. The web space of other hand is placed just distal to the acromion process.
Mobilizing Force: With the superiorly placed hand, glide the humerus in an inferior direction.

DATA ANALYSIS AND RESULTS

Data Analysis and Interpretation

The data collected from 20 subjects were evaluated statistically. Descriptive analytical study was done by using Paired 't' test and Unpaired 't' test.

a) Paired 't' Test $\bar{d} = \frac{\sum d}{n}$

$$s = \frac{\sqrt{\sum d^2 - \frac{\sum(d)^2}{n}}}{n-1}$$

$$t = \frac{\bar{d}\sqrt{n}}{s}$$

Where,
d – Difference between pre-test and post-test values

$\bar{d} = \frac{\sum d}{n}$ – Mean of difference between pre-test and post-test values
n – Total number of subjects
s – Standard deviation

b) Unpaired 'T' test

$$s = \sqrt{\frac{\sum(x_{1-} \bar{x}_2)^2 + \sum(x_{2-} \bar{x}_2)^2}{n_1 + n_2 - 2}}$$

$$T = \frac{\bar{x}_{1-} \bar{x}_2}{S} \sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

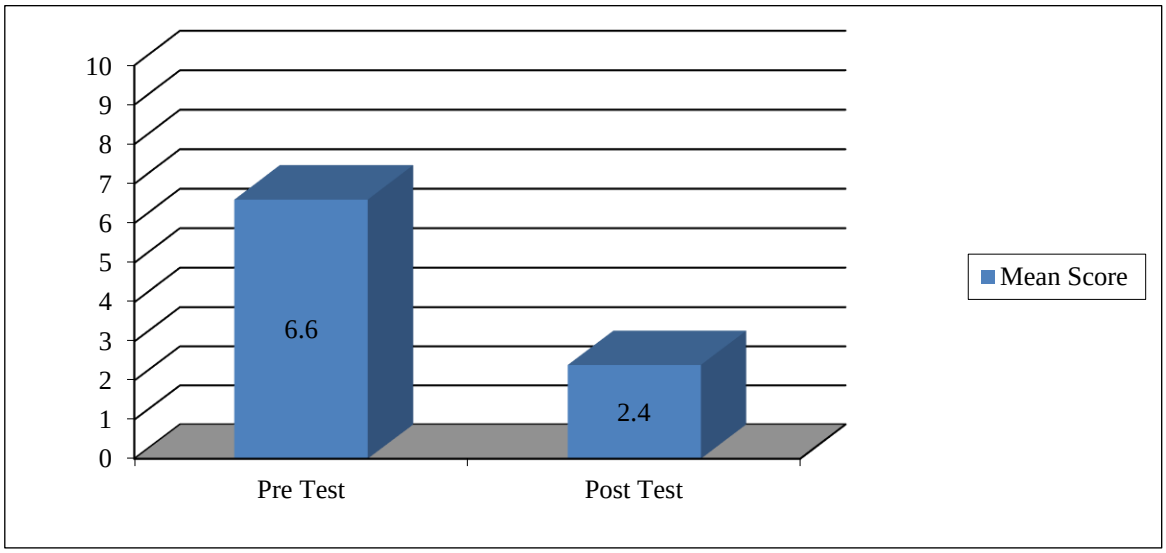
Where,
S = Standard deviation
n_1 = Number of subjects in Group A
n_2 = Number of subjects in Group B
$\bar{x}_1$ = Mean of the difference in values between pre-test and post-test in Group A
$\bar{x}_2$ = Mean of the difference in values between pre-test and post-test in Group B

Table 1 is showing the mean value, mean difference, standard deviation and paired 't' value between pre and post-test scores of pain among Group A.

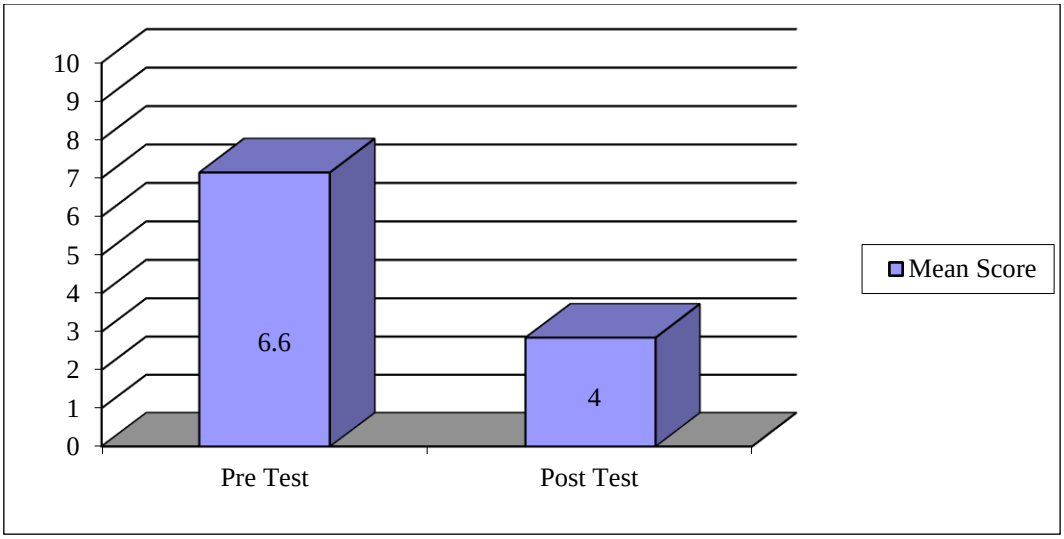
Table 1: *Pain in Group A.*

Measurement	Mean	Mean Difference	Standard Deviation	Paired 't' value
Pre-test Post-test	6.6 2.4	4.2	1.03	14.68

Pre and post-test mean values among Group A and B are depicted as graphical representations illustrated in (Graphs 1–12).



Graph 1: *Bar Diagram Showing the Pre and Post-test Mean Values of Pain on Visual Analog Scale among Group A.*



Graph 2: *Bar Diagram Showing the Pre and Post-test Mean Values of Pain on Visual Analog Scale among Group B.*

Table 2 showing mean value, mean difference, standard deviation and paired 't' value between pre and post-test scores of pain among Group B.

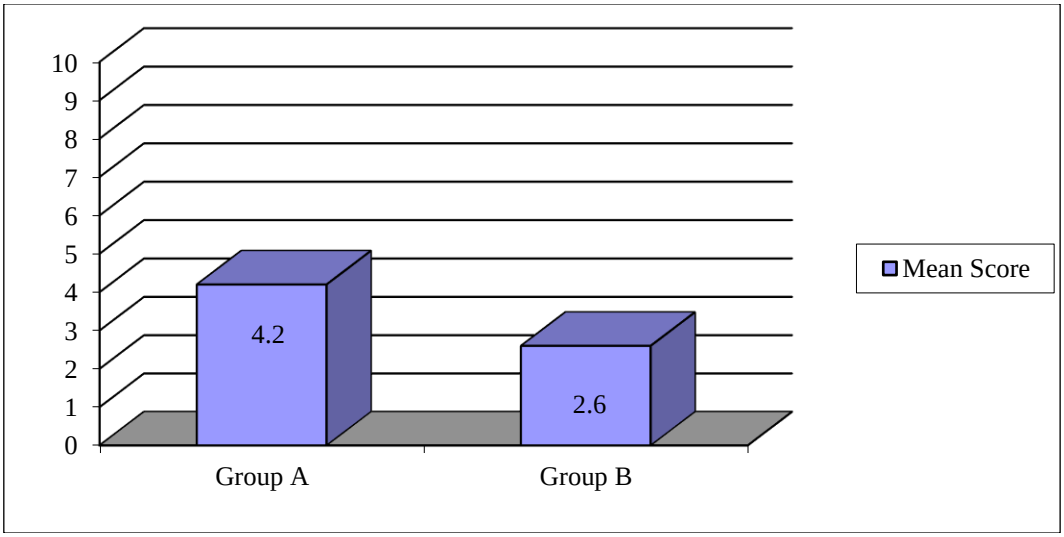
Table 2: *Pain in Group B.*

Measurement	Mean	Mean Difference	Standard Deviation	Paired 't' value
Pre-test **post-test**	**6.6** **4**	**2.6**	**3**	**7.02**

Table 3 is showing mean value, mean difference, standard deviation, and unpaired 't' Value scores between Group A and Group B.

Table 3: *Comparison of Pain between Group A and Group B.*

S.N.	Groups	Improvement		Standard deviation	Unpaired 'T' Test
1 **2**	Group A Group B	Mean	Mean Difference	1.45	1.1
		4.2 2.6	1.6		

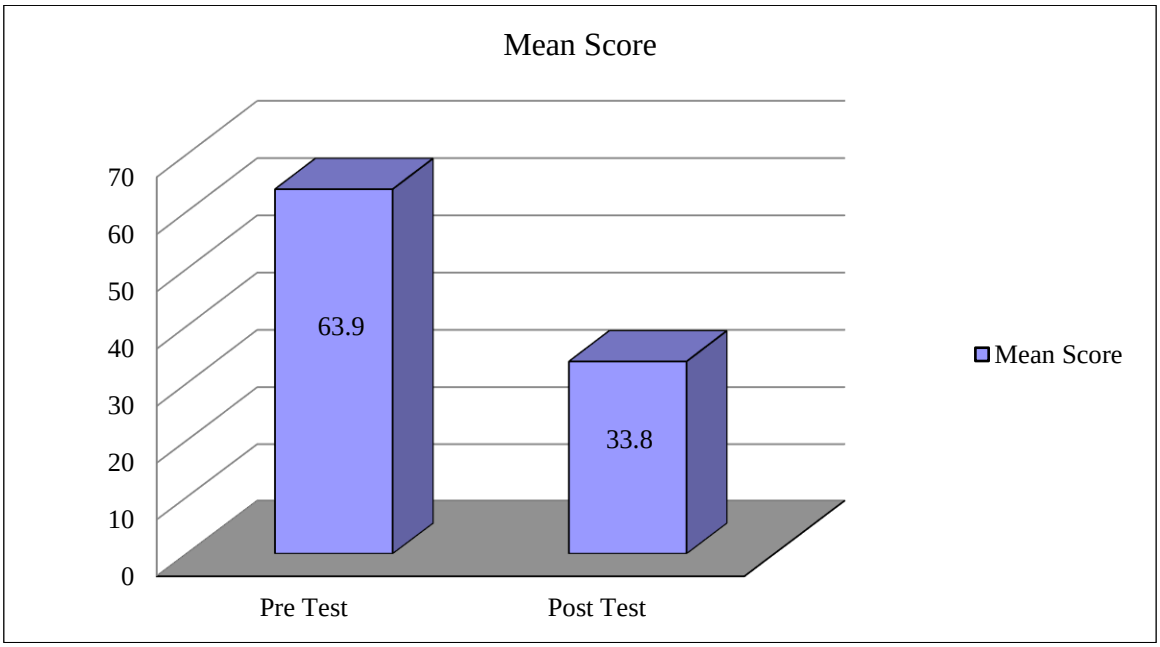


Graph 3: *Bar Diagram Showing Mean Values of Pain on Visual Analog Scale in Group A and Group B.*

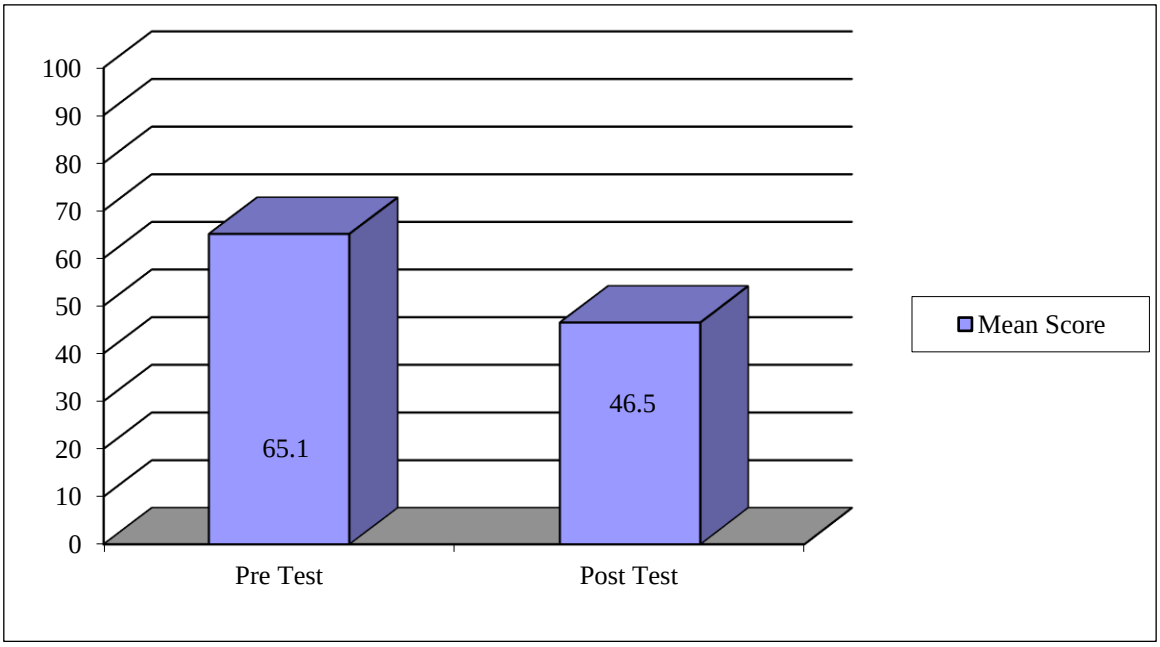
Table 4: *Shoulder Disability Group A.*

Measurement	Mean	Mean Difference	Standard Deviation	Paired 't' value
Pre-Test Post-test	63.9 33.8	30.1	1.29	72.3

Table 4 showing mean value, mean difference, standard deviation and paired 't' value between pre and post-test scores of shoulder disability among Group A (SPADI)



Graph 4: *Bar diagram showing the pre and post-test mean values of Shoulder Disability and Disability Index among group A.*



Graph 5: *Bar Diagram Showing the Pre and Post-test Mean Values of Shoulder Disability and Disability Index among Group B.*

Table 5 showing mean value, mean difference, standard deviation and paired't' value between pre and post-test scores of shoulder disability among Group B.(SPADI).

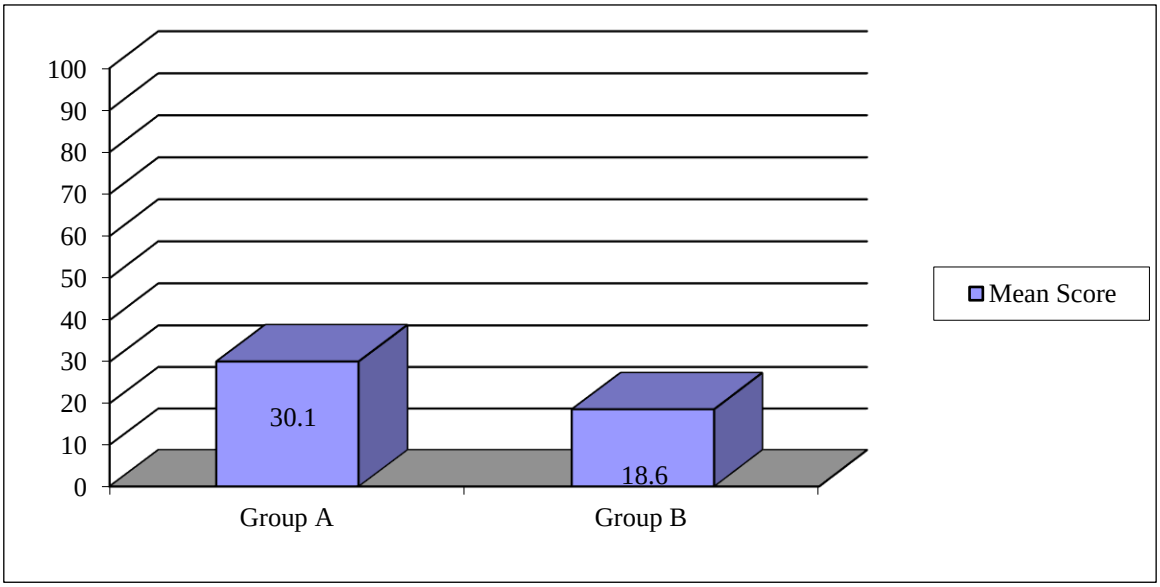
Table 5: *Shoulder Disability in Group B.*

Measurement	Mean	Mean Difference	Standard Deviation	Paired 't' value
Pre-test post-test	65.1 46.5	18.6	1.5	38.44

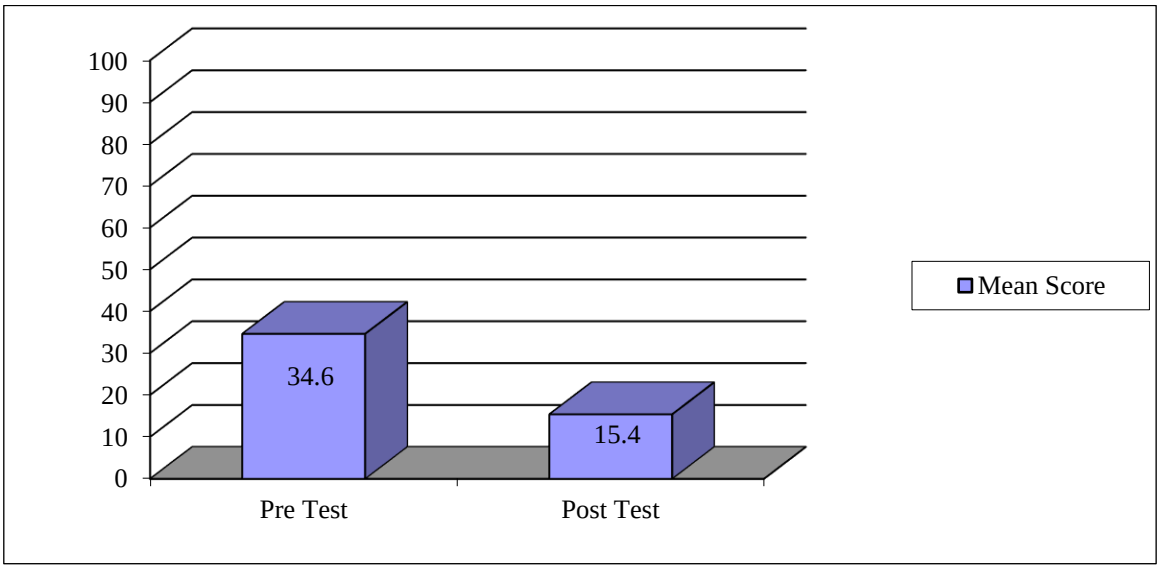
Table 6: *Comparison of disability between Group A and Group B.*

S.N.	Groups	Improvement		Standard Deviation	Unpaired 'T' Test
1 2	GROUP A GROUP B	Mean	Mean Difference	1.4	18.3
		30.1 18.6	11.5		

Table 6 showing mean value, mean difference, standard deviation, and unpaired 't' value scores between Group A and Group B.



Graph 6: *Bar Diagram Showing the Pre and Post-test Mean Values of Shoulder Pain and Disability Index among Group B.*



Graph 7: *Bar Diagram Showing the Pre and Post-test Mean Values of Shoulder Pain and Disability Index among Group B.*

Table 7: *Shoulder pain in Group A.*

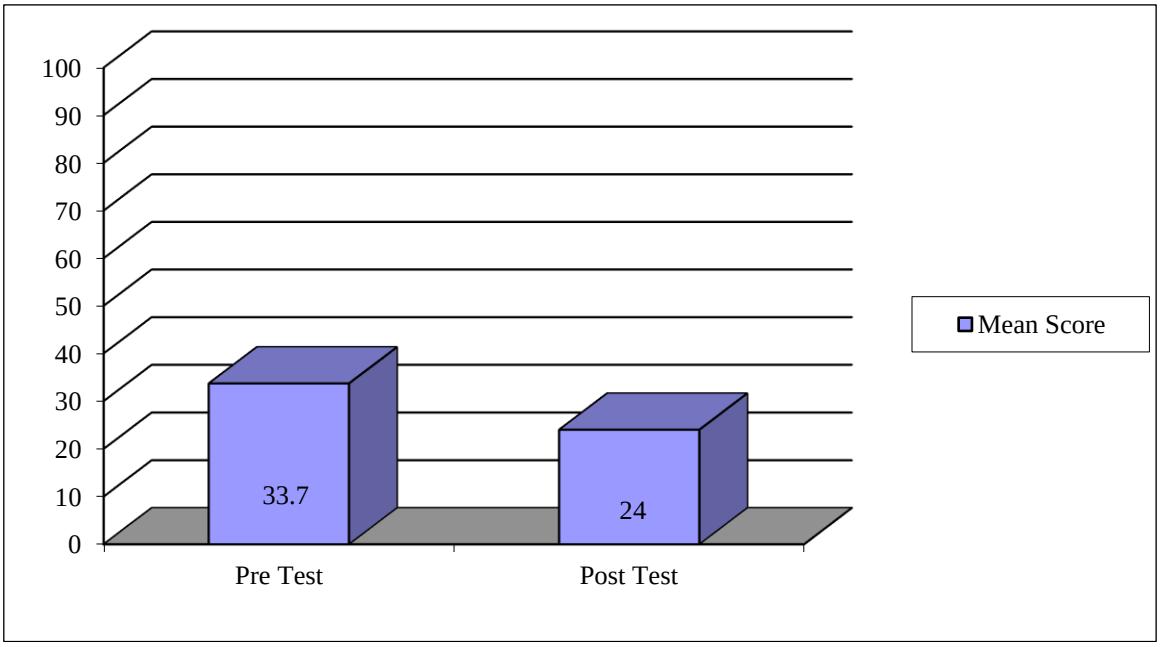
Measurement	Mean	Mean Difference	Standard Deviation	Paired 't' value
Pre-test post-test	34.6 15.4	19.2	1.98	30.6

Table 7 showing mean value, mean difference, standard deviation and paired 't' value between pre and post-test scores of shoulder pain among Group A (SPADI).

Table 8: *Shoulder Pain in Group A.*

Measurement	Mean	Mean Difference	Standard Deviation	Paired 't' value
Pre-test post-test	33.7 24.0	9.7	1.26	24.3

Table 8 showing mean value, mean difference, standard deviation and paired't' value between pre and post-test scores of shoulder pain among Group B (SPADI).

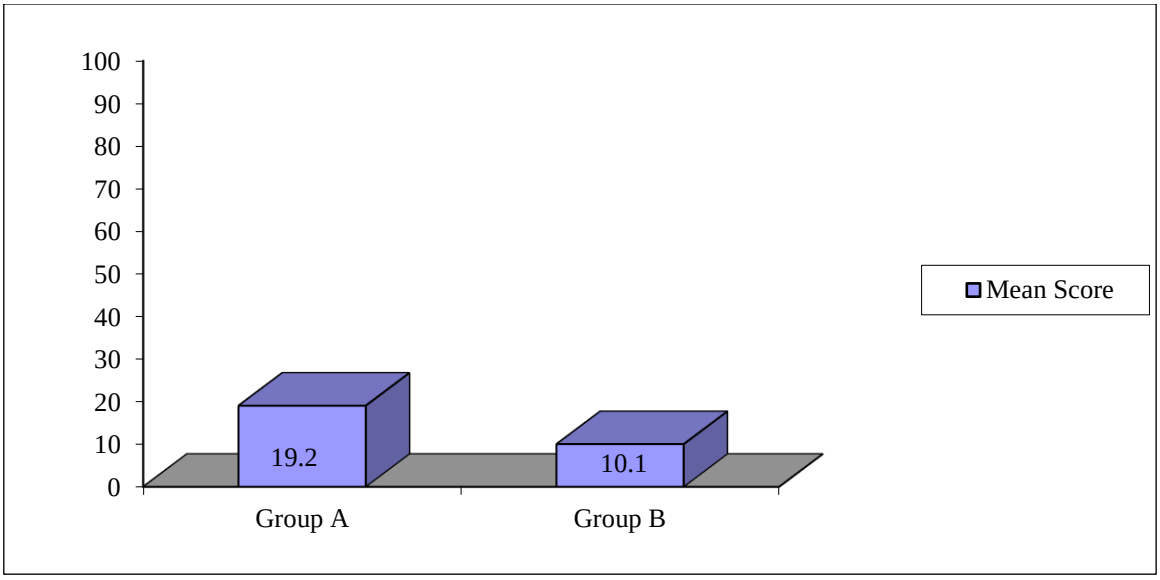


Graph 8: *Bar Diagram Showing the Pre and Post-test Mean Values of Shoulder Pain and Disability Index among Group B.*

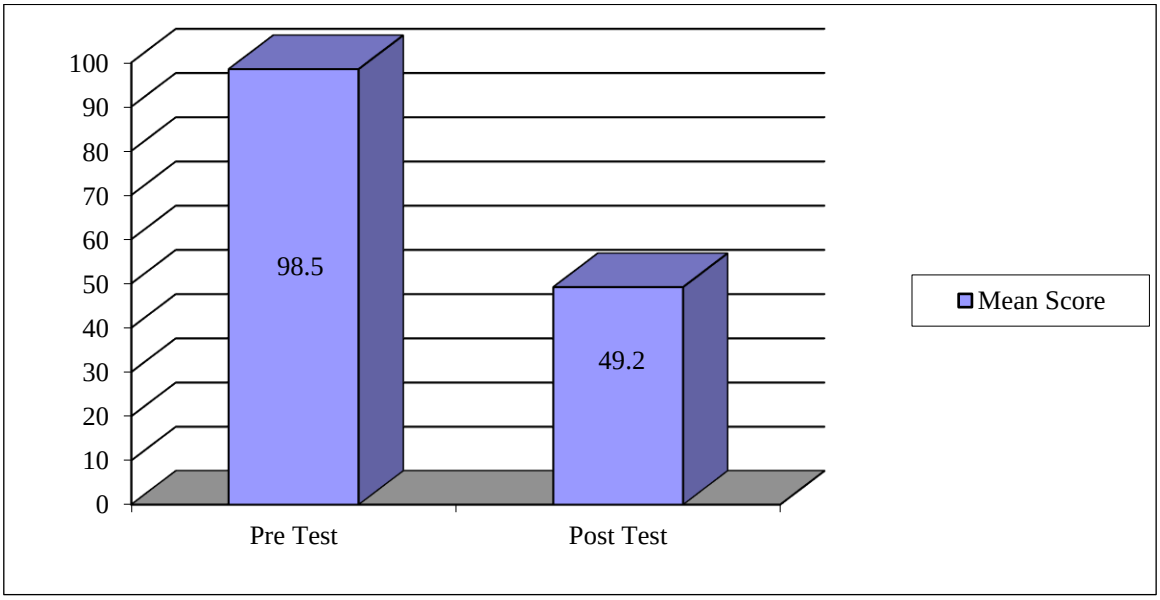
Table 9: *Comparison of Shoulder painbetween Group A and Group B.*

S.NO	GROUPS	IMPROVEMENT		STANDARD DEVIATION	UNPAIRED "T" TEST
1 2	GROUP A GROUP B	Mean	Mean Difference	1.64	12.1
		19.2 10.1	9.1		

Table 9 showing mean value, mean difference, standard deviation, and unpaired't' value scores between Group A and Group B.



Graph 9: *Bar Diagram Showing Mean Values of Shoulder pain and Disability Index in Group A and Group B.*



Graph 10: *Bar Diagram Showing Mean Values of Shoulder Pain on Shoulder Pain and Disability Index in Pre-test and Post-Test.*

Table 10: *Shoulder Pain and Disability in Group A and Group B.*

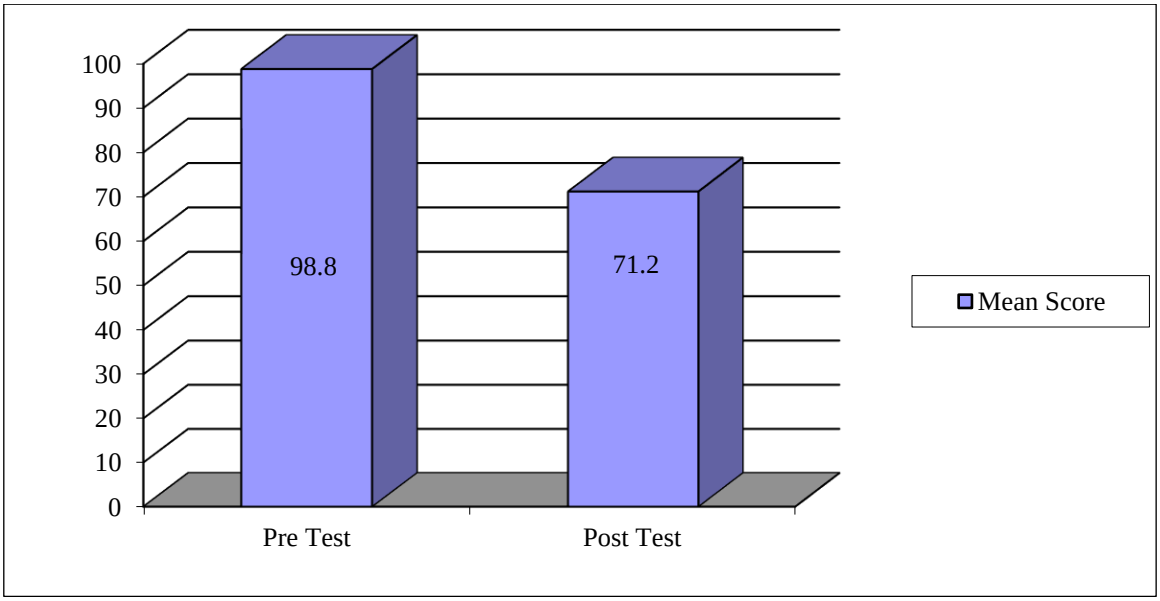
Measurement	Mean	Mean Difference	Standard Deviation	Paired 't' value
Pre-test post-test	98.5 49.2	49.3	2.4	64.9

Table 10 showing mean value, mean difference, standard deviation and paired 't' value between pre and post-test scores of shoulder pain and disability among Group A. (SPADI)

Table 11: *Shoulder Pain and Disability in Group B.*

Measurement	Mean	Mean Difference	Standard Deviation	Paired 't' value
Pre-test post-test	98.8 71.2	27.6	1.63	55.63

Table 11 showing mean value, mean difference, standard deviation and paired‘t’ value between pre and post-test scores of shoulder pain and disability among Group A (SPADI).

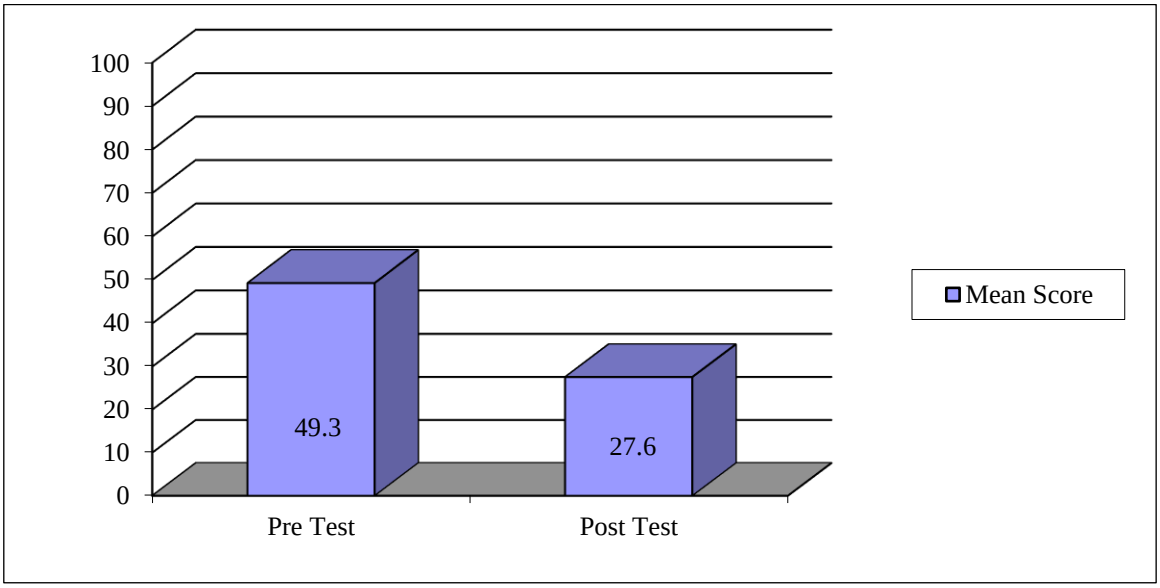


Graph 11: *Bar Diagram Showing the Pre and Post-test Mean Values of Shoulder Pain and disability Index among Group B.*

Table 12: *Comparison of Shoulder Pain and Disability between Group A and Group B.*

S.NO	GROUPS	IMPROVEMENT		STANDARD DEVIATION	UNPAIRED “T” TEST
1 2	GROUP-A GROUP-B	Mean 49.3 27.6	Mean Difference 21.7	2.76	17.5

Table 12 showing mean value, mean difference, standard deviation, and unpaired ‘t’ value scores between Group A and Group B.



Graph 12: *Bar diagram showing the pre and post-test mean values of Shoulder pain and disability on shoulder pain and disability index among Group A and group B.*

RESULTS

Group A was treated with movement with mobilization and Group B was treated with graded oscillatory technique (Tables 13–18).

Analysis of Dependent Variable Shoulder Pain in Group A: The Calculated Paired 't' value is 30.6 at 0.005 level of significance and the Paired Table 't' value is 3.25 at 0.005 level of significance. Hence, the calculated 't' value is greater than the Table 't' value.

Analysis of Dependent Variable Shoulder Pain in Group B: The Calculated Paired 't' value is 24.74 at 0.005 level of significance and the Paired Table 't' value is 24.74 at 0.005 level of significance. Hence, the calculated 't' value is greater than the Table 't' value.

Analysis of Dependent Variable Shoulder Pain between Group A and Group B: The calculated Unpaired 't' value is 12.1 at 0.005 level of significance and the Unpaired Table 't' value is 2.278 at 0.005 level of significance. Hence, the calculated 't' value is greater than Table 't' value.

Analysis of Dependent Variable Shoulder Function in Group A: The Calculated Paired 't' value is 72.3 at 0.005 level of significance and the Paired Table 't' value is 3.25 at 0.005 level of significance. Hence, the calculated 't' value is greater than the Table 't' value.

Analysis of Dependent Variable Shoulder Function in Group B: The Calculated Paired 't' value is 38.44 at 0.005 level of significance and the Paired Table 't' value is 3.25 at 0.05 level of significance. Hence, the calculated 't' value is greater than the Table 't' value.

Analysis of Dependent Variable Shoulder Function between Group A and Group B: The calculated Unpaired 't' value is 18.3 at 0.005 level of significance and the Unpaired Table 't' value is 2.278 at 0.005 level of significance. Hence, the calculated 't' value is lesser than Table 't' value.

Analysis of Dependent Variable Shoulder pain and Function in Group A: The Calculated Paired 't' value is 64.9 at 0.005 level of significance and the Paired Table 't' value is 3.25 at 0.005 level of significance. Hence, the calculated 't' value is greater than the Table 't' value.

Analysis of Dependent Variable Shoulder Pain and Function in Group B: The Calculated Paired 't' value is 55.63 at 0.005 level of significance and the Paired Table 't' value is 3.25 at 0.05 level of significance. Hence, the calculated 't' value is greater than the Table 't' value.

Table 13: *Pre and Post-test Visual Analog Scale values of Pain among Group A.*

Sl. No:	Pre-test	Post-test	Difference (d)	Difference Squared(d^2)
1	7	3	4	16
2	8	2	6	36
3	6	2	4	16
4	7	3	4	16
5	5	2	3	9
6	5	2	3	9
7	6	2	4	16
8	7	3	4	16
9	7	3	4	16
10	8	2	6	36

Table 14: *Pre and Post-Test Visual Analog Scale values of Pain among Group B.*

Sl. No:	Pre-test	Post-test	Difference (d)	Difference Squared(d^2)
1	6	4	2	4
2	8	6	2	4
3	7	5	2	4
4	5	2	3	9
5	5	4	1	1
6	7	3	4	16
7	7	4	3	9
8	8	4	4	16
9	6	5	1	1
10	7	3	4	16

Table 15: *Pre and Post-test Shoulder Pain And Disability Index Values of Shoulder Pain among Group A.*

Sl. No:	Pre-test	Post-test	Difference (d)	Difference Squared(d^2)
1	38	20	18	324
2	40	20	20	400
3	36	15	21	441
4	35	18	17	289
5	28	10	18	324
6	39	19	20	400
7	30	11	19	361
8	33	12	21	441
9	35	19	16	256
10	32	10	22	486

Analysis of Dependent Variable Shoulder Pain and Function between Group A and Group B: The calculated Unpaired 't' value is

17.5 at 0.005 level of significance and the Unpaired Table 't' value is 2.278 at 0.005 level of significance. Hence, the calculated 't' value is lesser than Table 't' value.

Table 16: *Pre and Post-test Shoulder Pain And Disability Index Values of Shoulder Pain among Group B.*

Sl. No:	Pre-test	Post-test	Difference (d)	Difference Squared(d^2)
1	40	30	10	100
2	39	28	11	121
3	28	19	9	81
4	35	24	11	121
5	33	21	12	144
6	30	21	9	81
7	36	28	12	144
8	32	23	9	81
9	35	26	9	81
10	29	20	9	81

Table 17: *Pre and Post-test Shoulder Pain And Disability Index Values of Shoulder Disability among Group A.*

Sl. No:	Pre-test	Post-test	Difference (d)	Difference Squared(d^2)
1	70	40	30	900
2	65	34	31	961
3	61	30	31	961
4	60	30	30	900
5	62	32	30	900
6	67	40	27	729
7	59	30	29	841
8	62	31	31	961
9	68	37	31	961
10	65	34	31	961

Table 18: *Pre and Post-test Shoulder Pain And Disability Index Values of Shoulder disability among Group B.*

Sl. No:	Pre-test	Post-test	Difference (d)	Difference Squared(d^2)
1	69	49	20	400
2	65	46	19	361
3	70	52	18	324
4	70	55	15	225
5	62	43	19	361
6	61	42	19	361
7	58	40	18	324
8	67	47	18	324
9	67	47	20	400
10	62	42	20	400

DISCUSSION

Shoulder impingement is common among sports peoples, workers involved with repetitive shoulder movements and those with specific medical problems. And is lead to pain, functional limitation and partial even complete thickness (Hawkins R J, *et al*. 1983).

Studies of Brain Mulligan (2003) shows movement with mobilization is more effective painful condition. Pamela Teys *et al.* (2006) concluded that the movement with mobilization is a useful technique to reduce pain and improve shoulder function. Aime F Kanchingue *et al.* concluded that physical therapy intervention of glenohumeral movement with mobilization shows high percentage of changes in reducing pain and improving function compared to pre-post treatment Micheal *et al.* (2000) concluded that the Graded oscillatory Technique and supervised exercises reduces pain and improve shoulder function. Douglas E. Corony *et al.* (1998) concluded that graded oscillatory technique reduces pain and improve mobility in shoulder impingement syndrome. Michener *et al.* (2004) concluded that graded oscillatory technique is effective in patients with shoulder impingement syndrome.

The purpose of this study is to validate and compare the effects of movement with mobilization versus graded oscillatory technique among shoulder impingement subjects. The results of the present study indicate that the movement with mobilization reduces the pain and improves shoulder function as well, thereby validating the study of Brain Mulligan (2003). Whereas the graded oscillatory technique also reduces and improves shoulder function, which is similar to the study of Michael *et al.* (2000) pain and has no significant effect on the neck function among computer professionals having non-specific neck pain, which is similar to the results in the study of Rupali Gupta, *et al.* (2011).

DISCUSSION ON HYPOTHESES

In Hypothesis 1 the researcher stated that **t**here is no significant difference following movement with mobilization in reducing pain and improving shoulder function among shoulder impingement subjects.

This study shows that there is significant difference in reducing pain and improving shoulder function following movement with

mobilization. Therefore, the hypothesis was rejected.

In Hypothesis 2, the researcher stated that there is no significant difference following graded oscillatory technique in reducing pain and improving shoulder function among shoulder impingement subjects

This study shows that there is significant difference in reducing pain and improving shoulder function following graded oscillatory technique. Therefore, the hypothesis was rejected.

In Hypothesis 3, the researcher stated that there is no significant difference between movement with mobilization and graded oscillatory technique in reducing pain among shoulder impingement subjects.

This study shows that there is significant difference between movement with mobilization and graded oscillatory technique in reducing pain among shoulder impingement subjects. Therefore the hypothesis was rejected.

In Hypothesis 4 the researcher stated that there is no significant difference between movement with mobilization and graded oscillatory technique in improving Shoulder Function among Shoulder impingement subjects.

This study shows that there is significant difference between movement with mobilization and graded oscillatory technique in improving shoulder function among shoulder impingement subjects. Therefore, the hypothesis was rejected.

SUMMARY AND CONCLUSION

Summary

A pre-test post-test experimental study was conducted to compare the effectiveness of movement with mobilization and graded oscillatory technique in reducing pain and improving shoulder function among shoulder impingement subjects. 20 subjects with shoulder impingement were included in this study by purposive sampling and randomly assigned to two Groups A and B with each group consisting of 10 subjects. Group A was treated with movement with mobilization and Group B was treated with graded oscillatory technique. Pain and shoulder function were assessed before and after the intervention by visual analog scale and shoulder pain and disability index. The statistical result shows that there is improvement in both the groups. But when comparing both it was found that movement with mobilization is more effective than graded oscillatory technique.

CONCLUSION

- It is concluded that there is reduction of pain among shoulder impingement subjects treated with movement with mobilization.
- It is concluded that there is improvement in shoulder function among shoulder impingement subjects treated with movement with mobilization.
- It is concluded that there is reduction of pain among shoulder impingement subjects treated with graded oscillatory technique.
- It is concluded that there is improvement also in shoulder function among shoulder impingement subjects treated with graded oscillatory technique.
- It is concluded that movement with mobilization training group showed statistically significant improvement in Shoulder function than the other group.
- It is concluded that movement with mobilization training group showed statistically significant reduction in pain than the other group.

LIMITATIONS

The study was conducted with a sample size of 20, the age group of the sample being 25–35 years with treatment duration of 7 days.

RECOMMENDATIONS

Future research can be conducted with a larger sample size, wider age group, different variables, more consistent outcome measures and different treatment durations.

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