

# A Study to Compare the Effect of Bruegger's Postural Exercise Versus Prone Trunk Exercise for Heavy Weight Lifting Workers with Kyphotic Posture and Shoulder Pain

Murugan D<sup>1</sup>; Nandhini. K<sup>2</sup>

<sup>1</sup>MPT [ortho] Assistant Professor, Sri Venkateshwaraa College of Physiotherapy,  
Affiliated to Pondicherry University, Puducherry

<sup>2</sup>MPT [ortho final year] Sri Venkateshwaraa College of Physiotherapy, Affiliated to Pondicherry  
University, Puducherry

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## Abstract:

### ➤ Background:

Regular carrying of heavy loads over a extended period of time could be an important causative factor in the development of kyphotic deformity. There is an evidence that exposure to combinations of physical workplace strains such as overhead related working, heavy weight lifting and forceful work , working in an uncomfortable posture increases the risk of shoulder pain. Bruegger's postural exercise promotes stability and relax tight muscles that tighten due to postural stress. Muscle tension is dramatically reduced in postural relief position. Prone trunk extension strengthening exercise are important in maintaining the good alignment of the posture. This exercise strengthens the thoracic extensor muscles against the gravity in a concentric and eccentric pattern hence this study is to compare the effect of Bruegger's postural exercise and prone trunk extension exercise for heavy lifting workers with kyphotic posture and shoulder pain.

### ➤ Methods:

The study design was a comparative study. 30 heavy weight lifting workers full filled inclusion and exclusion criteria were included in this study. They were allocated divided into two groups. Group A performed by Bruegger's postural exercise and Group B prone trunk extension exercise, 3 sessions per week for 4 weeks. The outcome measure, SPADI (Shoulder pain and disability index) and occiput wall distance test.

### ➤ Results:

Data analysis was completed by using unpaired "t" test and paired "t" test for the between group and within the group analysis respectively. The statistical analysis done with unpaired "t" test within the Group A & Group B analysis shows significance (p<0.05). It have been concluded that Group B shows improvement than Group A for correcting posture and reducing shoulder pain.

### ➤ conclusion:

The study conclude that (GROUP-A) Bruegger's postural exercise and (GROUP-B) prone trunk extension exercise and shows significant , when comparing both groups (GROUP-B) prone trunk extension exercise shows more improvement than Bruegger's postural exercise (GROUP-A) for heavy weight lifting workers with kyphotic posture and the shoulder pain.

**Keywords:** SPADI – Shoulder Pain and Disability Index (SPADI), Occiput Wall Distance Test, Bruegger's Postural Exercise, Prone Trunk Tension Exercise.

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## I. INTRODUCTION

Heavy weight lifting workers has been defined as work that has high energy demands or requires some measure of physical strength. There is an evidence that exposure to combinations of physical workplace strains such as overhead working, heavy lifting and forceful work as well as working in an awkward posture increases the risk of shoulder pain. Symptoms can be persistent and disabling in terms of an individual's ability to carry out daily activities both at home and workplace.<sup>17</sup> Prevalence of musculoskeletal disorders among the manual material handling workers of central market area Kolkata, India– the mean age was  $36.3 \pm 6.64$  years and with shoulder pain is about 41%.<sup>1</sup>

Regular carrying of heavy loads over a prolonged period of time could be an important etiological factor in the development of kyphosis deformity. Kyphosis is defined as an anteriorly tilted, downwardly rotated, and protracted shoulder.<sup>14</sup> Kyphosis increases tension in the shoulder muscles, includes pectoralis major, subclavius and pectoralis minor, excessive internal rotation seen in shoulder and the rotator cuff muscles are weakened. Shoulder pain is caused by the friction of muscles and tendon against the adjacent structures had been reported due to the poor working posture, manual handling and repetitive movements.<sup>5</sup> Bruegger's postural exercise promotes stability and relax tight muscles that tighten due to postural stress. Muscle tension is dramatically reduced upper back and shoulder in this postural relief position. Good posture and movement is achieved by stretching the tight tonic muscles and strengthening the antagonist muscles. There by this exercise activates the phasic muscles - Rhomboids, Serratus anterior, Deep neck flexors, Infraspinatus, Teres minor, Supraspinatus by these muscles through inhibition it force the tonic muscles – Upper Trapezius, Pectoral muscles, Sternocleidomastoid, Levator scapulae, Sub occipital muscles, Subscapularis, Scalene and Lattisimus dorsi to relax and further stretching occurs in the tonic group of muscles and it improve the posture, and strengthens the antagonistic muscles those that extend and externally rotate the shoulders and extend the wrist, fingers and thumb and scapular retractors. The studies proven that Bruegger's postural exercise is more effective for treating the patient with upper crossed syndrome.<sup>10,15</sup>

Prone trunk extension strengthening exercise are important in maintaining the good alignment of the posture. This exercise strengthens the thoracic extensor muscles against the gravity in a concentric and eccentric pattern. The muscle work concentrically, shortening when the trunk is lifted and then works eccentrically when the movement is reversed. The back extensors are undermined by poor posture habits. There by this exercise restore the muscle tone and improves the posture.<sup>18</sup> Studies proven that thoracic extension exercise improve shoulder function and reduce pain.

There is a validity and reliability for occiput – wall distance and its offer a clear cut – off point to determine the

presence of thoracic hyper kyphosis for clinical utility in various settings.<sup>25</sup> SPADI (Shoulder Pain And Disability Index) used for assessing the pain and disability of shoulder.<sup>25</sup>

In most of the study there is a prevalence of work related musculoskeletal disorder with shoulder pain and spine deformity in weight lifting workers. There are many exercise for correcting kyphotic posture and shoulder pain. Up to my knowledge there was no study about the effect of Bruegger's postural exercise versus prone trunk extension exercise for heavy weight lifting workers with kyphotic posture and shoulder pain. So, in this study I am going to compare the effect of Bruegger's postural exercise versus prone trunk extension exercise for heavy weight lifting workers with kyphotic posture and shoulder pain.

## II. MATERIALS AND METHODS

### A. Participants.

Age ranging from 30 – 45 years years, gender male, Weight lifting workers working for more than 10 years, Occiput wall distance 5.1 cm to 8.0 cm – that indicates moderate kyphotic posture. SPADI – score more than 35 points were included in this study. The condition such as Pain due to any fracture in shoulder and spine Shoulder dislocation, Other spinal conditions were excluded in this study. The materials used were Pen, Table, Inch, tape.

### B. Study Procedures.

The study was conducted in Industrial areas in Villianur and Thiruvandar Kovil, Puducherry. It was a Comparative study.<sup>30</sup> Heavy weight lifting worker with kyphotic posture and shoulder pain were taken as subjects for this study. Convenient sampling method was used. The patients signed consent forms after being divided into two groups (GROUP A and GROUP B) having 15 patients each. GROUP A received Bruegger's postural exercise and GROUP B was received Prone trunk extension exercise for 4 weeks. The outcome measures were occiput wall distance test, SPADI (Shoulder Pain and Disability Index)

### C. Intervention.

group A: Bruegger's Postural exercises GROUP B: Prone trunk extension exercise **BRUEGGER'S POSTURAL EXERCISES**

#### ➤ Group A Received Bruegger's Postural Exercises

Patient is Standing positioned with their back against a wall. Shoulder blades and buttocks should be in contact with the wall. Then instructed to retract their head and neck until the posterior occiput wall contacts the wall along with shoulder external rotation and abduction, retraction of scapulae. Duration: 10 secs holding, 10 – 15 times repetitions, 3 sets per day, 4 weeks.

#### ➤ Prone Trunk Extension Exercise

#### • Group B Received Prone Trunk Extension Exercise:

After placed in the prone position and the xiphoid process was placed at the edge of the table to support only the lower

trunk. To prevent the lumbar hyperextension a pillow was placed under the subject's abdomen. Then the subject was instructed to lift the upper trunk parallel to the ground.

Duration: 10 secs holding, 10 – 15 times repetitions, 3 sets per day, 4 weeks.

### III. DATA ANALYSIS

The significant differences between the two groups were statistically analyzed. The pre and post interventional differences within the two groups were analyzed by paired 't' test and between the two groups were analyzed using unpaired 't' test for each of the outcome measures to compare the effectiveness of bruegger's postural exercise versus prone trunk extension exercise for heavy weight lifting workers with kyphotic posture and the shoulder pain

Table 1 Showing pre and post values of group A: paired 't' test values

Group A	MEAN	SD	t – value	p – value
Pre Test	45.6	5.91	16.08	< 0.05
Post Test	24.26	5.52		

The 'p' value of SPADI (Shoulder Pain and Disability Index) in group A is < 0.05 considered significant. The 't' value of SPADI (Shoulder Pain and Disability Index) in group A is 16.080 with 14 degree of freedom.

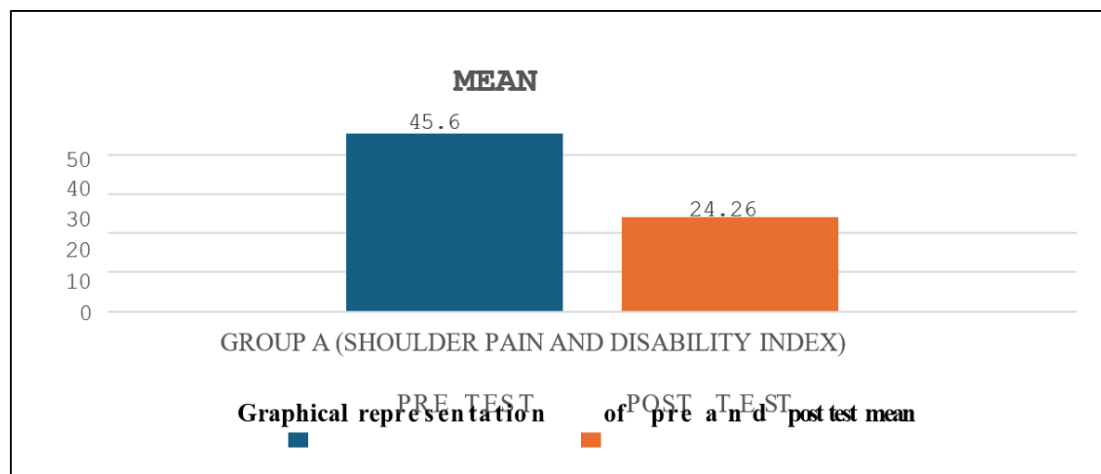


Fig 1 Graphical Representation of Pre and post test mean

Table 2 Showing pre and post values of SPADI group A: paired 't' test values

Group A	MEAN	SD	t - value	p – value
Pre Test	6.8267	0.2631	8.9405	< 0.05
Post Test	6.3933	0.3788		

The 'p' value of OCCIPUT WALL DISTANCE TEST in group A is < 0.05 considered significant. The 't' value of OCCIPUT WALL DISTANCE TEST in group A is 8.9405 with 14 degree of freedoms.

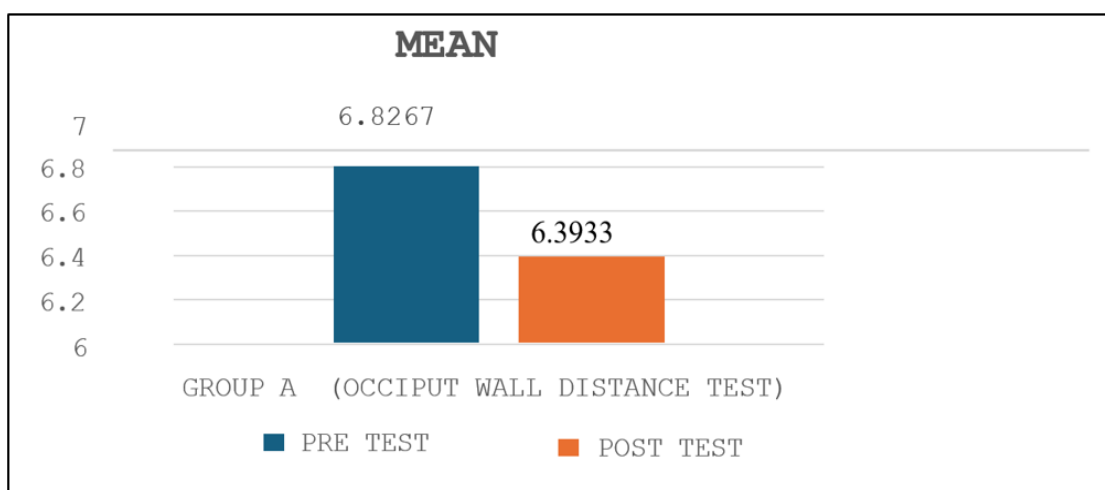


Fig 2 Group A Pre test

Graphical representation of pre and post test mean values of OCCIPUT WALL DISTANCE TEST group A.

Table 3 Showing pre and post values of group B: paired 't' test values

Group b	MEAN	SD	t - value	p – value
Pre test	45.73	7.5826	18.839	< 0.05
Post test	20.2	3.9497		

The 'p' value of SPADI (Shoulder Pain and Disability Index) in group B is < 0.05 considered significant. The 't' value of SPADI (Shoulder Pain and Disability Index) in group B is 18.839 with 14 degree of freedom.

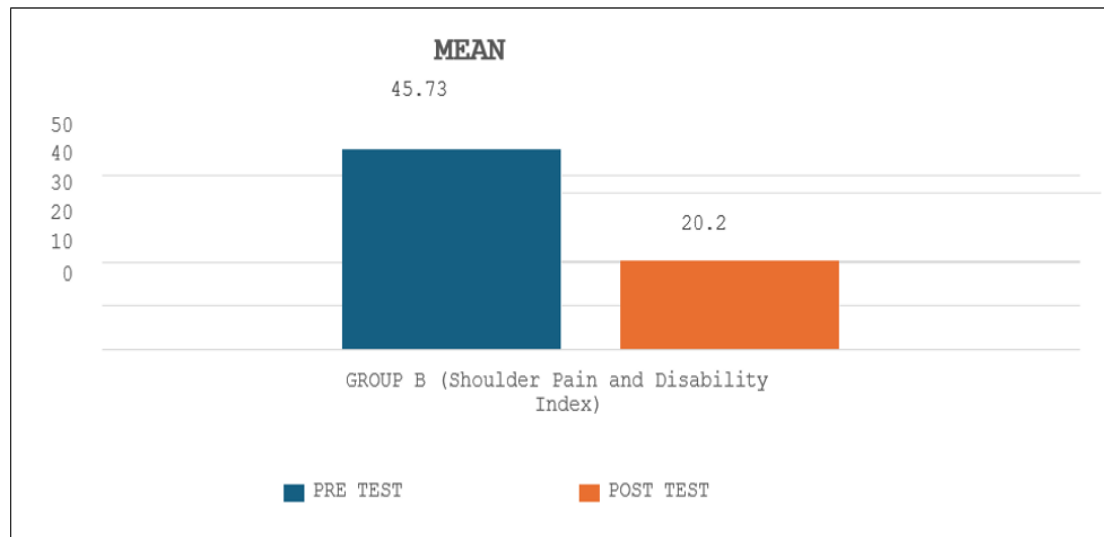


Fig 3 Graphical representation of pre post

Graphical representation of pre and post test mean values of (Shoulder Pain and Disability Index) group B.

Table 4 Showing pre and post values of group B: paired 't' test values

Group b	MEAN	SD	t - value	p – value
Pre test	6.7733	0.2658	10.8938	< 0.05
Post test	5.6933	0.4061		

The 'p' value of OCCIPUT WALL DISTANCE TEST in group B is < 0.05 considered significant. The 't' value of OCCIPUT WALL DISTANCE TEST in group B is 10.8938 with 14 degree of freedom.

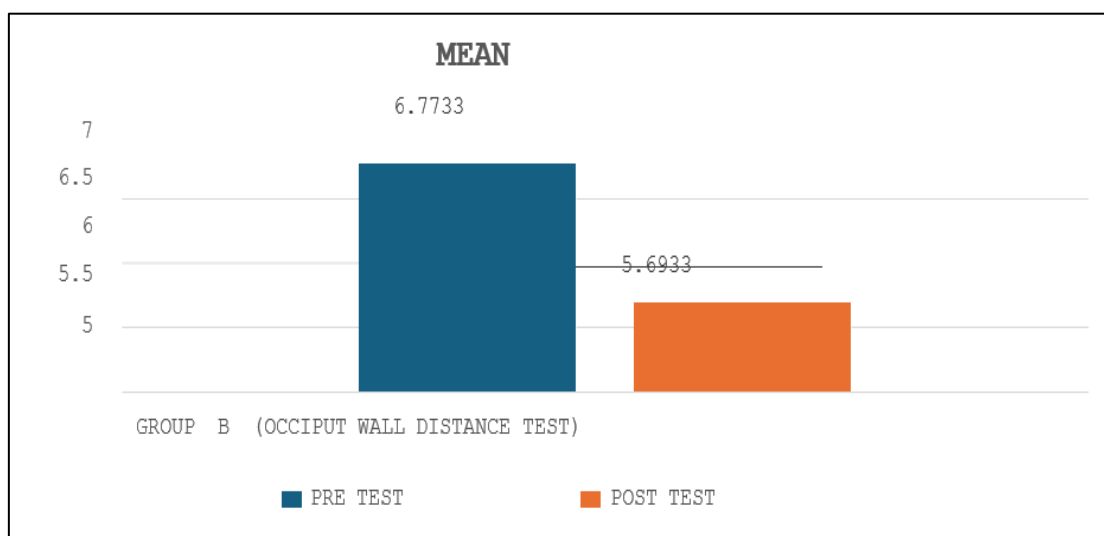


Fig 4 Representation of pre and post test mean values

Graphical representation of pre and post test mean values of OCCIPUT WALL DISTANCE TEST group B.

Table 5 Showing pre and post values of group A and B: Unpaired 't' test values

	MEAN	SD	t - value	p – value
Group a	20.66	5.665	1.9769	< 0.05
Group b	24.4	4.626		

The 'p' value of SPADI (SHOULDER PAIN AND DISABILITY INDEX) is <0.05 considered significant. The 't' value of SPADI (SHOULDER PAIN AND DISABILITY INDEX) is 2.3198

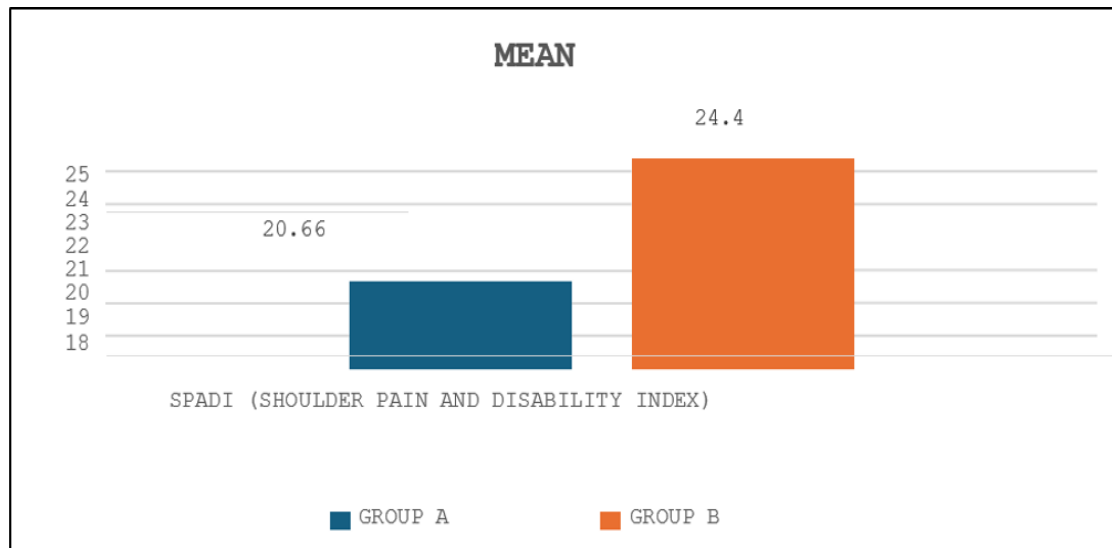


Fig 4 Representation of SPADI

Graphical representation of SPADI (shoulder pain and disability index) pre and post values of group A and B: unpaired 't' test mean values

Table 6 Showing pre and post values of group A and B: Unpaired 't' test values of OCCIPUT WALL DISTANCE TEST:

	MEAN	SD	t - value	p – value
Group a	0.43	0.1877	5.859	<0.05
Group b	1.08	0.384		

The 'p' value of OCCIPUT WALL DISTANCE TEST is < 0.05 considered significant. The 't' value of OCCIPUT WALL DISTANCE TEST is 5.859 with 28 degree of freedom measure is used to measure the pain and disability of shoulder, kyphosis level before and after the treatment.

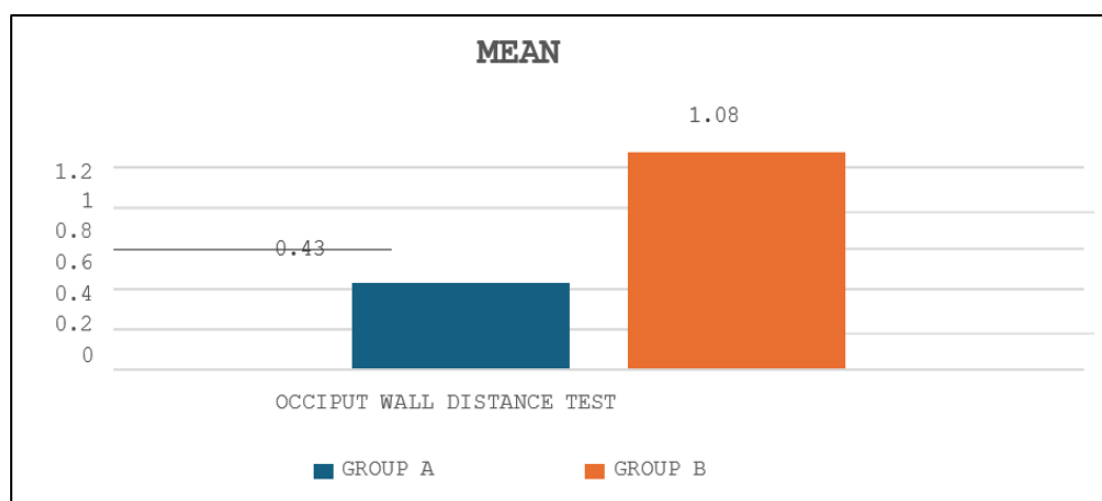


Fig 5 Graphical representation of occiput wall distance

Graphical representation of occiput wall distance test pre and post values of group A and B: unpaired 't' test mean values

#### IV. RESULT

The statistical analysis done by using paired and unpaired 't' test with the values of Group A and Group B shows significance of ( $p < 0.05$ ). Prone trunk extension exercise (Mean value: Occiput wall distance = 1.08, SPADI (Shoulder Pain And Disability Index = 24.4) is more effective than Bruegger's postural exercise (Mean value: Occiput wall distance = 0.43, SPADI (Shoulder Pain And Disability Index = 20.66) for heavy weight lifting workers correcting kyphotic posture and reducing shoulder pain.

#### V. DISCUSSION

The present study is a comparative study, conducted to find out the effect of Bruegger's postural exercise versus prone trunk extension exercise for heavy weight lifting workers with kyphotic posture and shoulder pain.

The participants in this study were selected on the basis of inclusion, exclusion criteria. In this study, 30 subjects who fulfilled the inclusion and exclusion criteria were taken with age group 40 years and above. They were randomly allocated to 2 groups: Group A and Group B, each containing 15 subjects. Bruegger's postural exercise was given to group A and Prone trunk extension exercise was given to group B. The outcome was assessed by using the Occiput wall distance test and the SPADI (Shoulder Pain And Disability Index). The outcome

During the 4 weeks of Bruegger's postural exercise activated the phasic muscles - Rhomboids, serratus anterior, deep neck flexors, infraspinatus, teres minor, supraspinatus by these muscles through inhibition it force the tonic muscles – upper trapezius, pectoral muscles, sternocleidomastoid, levator scapulae, sub occipital muscles, subscapularis, scalene and latissimus dorsi to relax and further stretching occurs in the tonic group of muscles and it improve the kyphotic posture, and strengthens the antagonistic muscles those that extend and externally rotate the shoulders, scapular retractors. Pain produced due to shoulder instability that leads to shoulder impingement in the kyphotic level was reduced by the position of external rotation and abduction of shoulder, retraction of scapulae by improving the muscle imbalance.

Prone trunk extension exercise strengthened the thoracic extensor muscles against the gravity in a concentric and eccentric pattern. The muscle work concentrically, shortening when the trunk is lifted and then works eccentrically when the movement is reversed. Pre and post values were assessed before and after 4 weeks of interventions, using the outcome measures such as SPADI and Occiput wall distance test. These values were statistically analyzed using repeated measure of paired 't' test.

A-REUM SHIN et al .., (2018): this study was about, whether the prone trunk extension will affect scapular and thoracic kinematics and muscle activities during scapular posterior tilting exercise in subjects with round shoulder and

flexed posture .15 subjects with round shoulder and flexed posture were included in this study and measured by using caliper and electromyography was performed to collect information about muscle activities. The study concluded that the scapular posterior tilting exercise and prone trunk extension exercise are the effective methods to reduce round shoulder posture and flexed posture. Based on this study, prone trunk extension exercise for correcting kyphotic posture and shoulder pain for heavy weight lifting workers.

KYLE TIEFEL (2012): The efficacy of treatment for upper crossed syndrome and the involvement of chiropractic: the subjects were treated with the muscular reeducation technique Bruegger's postural exercise in order to reduce the pain and improve the muscle imbalance with exercise and stretching, this designed to relax the hypertonic muscles and strengthen the weak hypotonic muscles. Study concluded that this muscular reeducation technique is more effective in treating patient with upper crossed syndrome. Based on this study, Bruegger's postural exercise for correcting kyphotic posture and shoulder pain for heavy weight lifting workers.

This study shows more improvement for reducing kyphosis posture and shoulder pain in heavy weight lifting workers in (GROUP -B) Prone trunk extension exercise than (GROUP A) Bruegger's postural exercise.

#### VI. CONCLUSION

The study conclude that (GROUP-A) Bruegger's postural exercise and (GROUP-B) Prone trunk extension exercise shows significant effect, when comparing both groups (GROUP -B) Prone trunk extension exercise shows more improvement than (GROUP A) Bruegger's postural exercise for reducing kyphosis posture and shoulder pain in heavy weight lifting workers for treatment duration of 6 weeks. Hence, the null hypothesis is rejected.

#### LIMITATIONS AND RECOMMENDATIONS

The study was conducted with small size, only two outcome tools are used. This study can be conducted for larger population and long-term effect has to be report and other outcome measure can be used and Further studies have to conducted to correct the posture and for other Musculoskeletal pain.

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