

The Effect of Proprioceptive Neuromuscular Facilitation Techniques and Shoulder Stabilization Exercise in Adults with Forward Head and Rounded Shoulder Posture

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Abstract: Background: The Forward and rounded shoulder posture appears to be the most common structural anomalies of the shoulder complex and involves the increased anterior tilt of cervical vertebra and posterior tilt of the upper thoracic vertebra which causes the shoulder to protrude, turn downwards, and tilt anteriorly. Long-term use of desk top and smart phones leads to wrong posture such as forward neck posture, rounded shoulders and slouched posture. Objectives: To find out the effects of Shoulder stabilization exercises and Proprioceptive Neuromuscular Facilitation Techniques in adults with forward head and rounded shoulder posture. Methods: A sample of 20 subjects with age group of 25 to 40 years was selected by convenient sampling method conducted over a period of 8 weeks treatment duration. The subjects were divided into two Groups. Group A received shoulder stabilization exercises and Group B received proprioceptive neuromuscular facilitation training. The outcome of Craniovertebral angle was measured by MB ruler software in adults with forward head posture and rounded shoulder. Results: There was a significant difference between the pre-test and posttest values of Group A and Group B for 8 weeks intervention by using MB ruler software for CV angle in adults with forward head and rounded shoulder posture. Group B showed significant improvement showed significant improvement in CV angle by using MB ruler software in subjects with forward head and rounded shoulder posture. Conclusion: The study concluded that there was a significant effect by using PNF technique than shoulder stabilization exercises in reducing CV angle in adults with forward head rounded shoulder posture.

Keywords: Forward head posture and rounded shoulder, CV angle, MB ruler software, PNF Technique, Shoulder stabilization exercise

1. Introduction

The Forward head and rounded shoulder postures are most common structural anomalies of the shoulder complex and involve the increased anterior tilt of cervical vertebra and

posterior tilt of the upper thoracic vertebra which causes the shoulder to protrude, turn downwards, and tilt anteriorly. Long-term use of computer and smart phones can leads to wrong posture such as forward neck posture, rounded shoulders and slouched posture.

The major cause for forward head and rounded shoulder is sitting in front of computer for long time and IT workers, using smartphones with incorrect posture and lack of physical activity forcing the body to adapt forward head posture and kyphosis. As a consequence of this the upper anterior muscles in the neck get shortened and the deep posterior muscles of the spine in the neck and lower posterior muscles of the scapulae get stretched and weakened causing early signs of upper cross syndrome. The craniovertebral angle (CV angle) measurement is a convenient and easy clinical method for the cervical posture assessment. "Markus Bader (MB) ruler software" assists to

measure angles and distances on the computer screen. The angle formed by the intersection of the horizontal line passing through C7 and a line extending from the tragus of the ear to C7 is known as the "CV angle (Craniovertebral angle).

Shoulder stabilization exercises are the most widely used form of treatment to correct Rounded shoulder posture. These exercises are redesigned to fix the shoulder to the chest cavity in a neutral position through interaction of the muscles that construct the shoulder. Proprioceptive Neuromuscular Facilitation techniques are simple, effective, more advanced form of flexibility training that involves both stretching and hold relax/contract relax. PNF used to treat pain, increase ROM, and reduce muscle stiffness. The stabilizing reversal technique is intended to improve the muscle strength of the trunk and shoulder girdle postural muscles.

2. Materials & Methodology

Study Design: A quasi-experimental study design was used among 20 subjects with forward head and rounded shoulder posture selected by convenient sampling conducted at Sree

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Abirami institutions, Coimbatore over a period of 2months.

Selection criteria:

Inclusive criteria: 20 subjects with the age group of between 25 -40 years were selected. Both male & female subjects were included with forward head & rounded shoulder, Subjects who used computer/ laptop for 4 hrs or more /day were included in this study, subjects with cervical and shoulder angles were less than < 50 .

Exclusion Criteria: Subjects who are having forward head & rounded shoulder with associated problems, Subjects with history of any surgery, injury or fracture, Subjects with any structural disorders related to spine with any neurological deficits were excluded.

Study methods: After obtaining informed consent form from the subjects, they were divided randomly into two experimental groups, Group-A (Shoulder stabilization exercise) and Group-B (PNF) with 10 subjects in each group. Pre-test and Post-test measurements were taken.

Procedure: Group- A (Shoulder stabilization exercise) 30 mins: Warm up: Neck, Shoulder, Wrist movements for 5 minutes.

Exercise 1: Stretching exercise on pectoralis minor

- 1) Both arms resting overhead on the floor with lower trunk rotated to the left in a spine position with the right knee flexed for 1 minute, repeat the other side for 1 minute, 5 repetitions daily for a total of 10 minutes.
- 2) Right arm resting overhead on the floor with lower trunk rotated and knees fallen to the left in a hook lying position with both knees flexed for 1 minutes, repeat the other side for 1 minutes, 5 repetitions daily for a total of 10 minutes.
- 3) Both arms and armpits resting close on the floor in quadruped position.

Exercise 2: Strengthening exercise with the Elastic band

- 1) Resisted shoulder external rotation with a band from 45 degrees to 60 degrees with elbows flexed in 90 degrees.
- 2) Resisted "rowing" shoulder extension with elbow flexion towards abdomen with a band fixed on feet in mini squat position for total of 10 min.
- 3) Resisted "rowing" shoulder extension with elbow flexion with a band fixed on feet in long sitting position. Cool down exercise for 5 mins.

Group – B (Shoulder stabilization exercise & Proprioceptive neuromuscular facilitation) 30 minutes: Warm up for 5 minutes.

Exercise 1: Stretching exercise on pectoralis minor

Exercise 2: Strengthening exercise with the Elastic band.

Exercise 3: Shoulder exercise and scapular muscle stabilizing exercises were given by isometric contraction using the hold relax technique of PNF for 10 seconds with 5 repetitions gradually increasing it week wise.

Week 1: Shoulder exercise and scapular muscle stabilizing exercises were given by isometric Contraction using the hold relax technique of PNF for 10 seconds with 5

repetitions.

Week 2: Same exercises were given for 10 seconds with 10 repetitions.

Week 3: Same exercises were given for 15 seconds with 15 repetitions.

Week 4: Same exercises were given for 15 seconds with 20 repetitions.

Week 5: Same exercises were given for 20 seconds with 25 repetitions.

Week 6: Same exercises were given for 20 seconds with 30 repetitions.

Week 7: Same exercises were given for 25 seconds with 35 repetitions.

Week 8: Same exercises were given for 25 seconds with 40 repetitions. Cool down: 5 minutes.

Data Analysis: The Collected data were tabulated and analysed using Student 't' test. Paired "t" test is used to analyse the significance between Pre-test and Post-test values of Group A and Group B and Unpaired 't' test was used to analyze significance between two groups. p value < 0.05 was considered as statistically significant improvement between the groups.

CV Angle: 47. 82 Degree

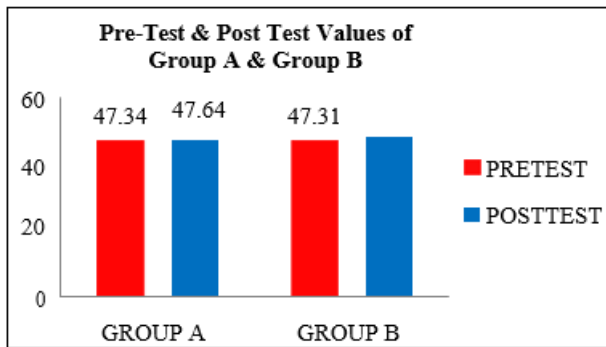


CV Angle: 49. 23 Degree



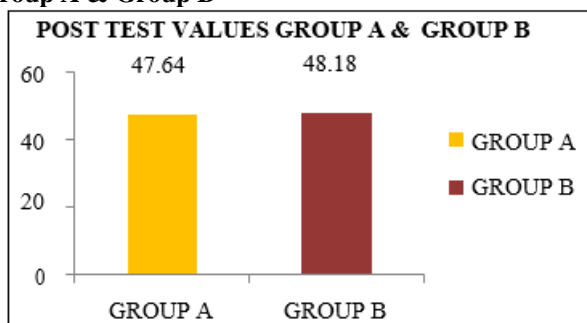
Paired 't' test – MB Ruler software,

Pre- test & Post test values of Group A & Group B



This test showed that there was significant difference between the Effects of PNF technique and shoulder stabilization exercise measured using Markus Bader ruler software in adults with Forward head and rounded shoulder posture.

Unpaired 't' Test -MB Ruler software, Post test values of Group A & Group B



Using Unpaired 't' test with 18 degree of freedom and 5% as level of significance, This test showed that there was a significant difference between both the groups.

3. Results

The Paired 't' test analysis for the pre-test and post-test values of MB ruler software for the group A and Group B showed there is a significant difference within groups. The Unpaired 't' test analysis for the post test values of MB ruler software for measuring CV angle for Group A and Group B showed there is a significant difference between the groups.

The statistical analysis showed that there was statistically significant improvement in the craniovertebral angle in Group B (Proprioceptive Neuromuscular Facilitation training) showed ($p < 0.05$) better result than group A (shoulder stabilization exercise).

4. Discussion

The aim of the study is to investigate the effects of shoulder stabilization exercises and PNF technique on postural correction in adults with forward head & rounded shoulder posture. 20 subjects with forward head and rounded shoulder posture were selected for this study according to inclusion and exclusion criteria they were divided into two groups. Group A received shoulder stabilization exercises and group B treated with PNF technique. The statistical analysis revealed that there is a significant improvement between

group A and group B.

CVA is a factor that significantly influences pain in subjects with Forward head posture. The decreased CVA causes flexing of the cervical vertebrae in a forward position, if it is maintained for a long period of time, increases the load in the extension muscles. In previous studies it has been reported that constant stress on the extension muscle and connective tissue in the craniocervical area leads to an imbalance in the neck that induces pain. Chiu et al reported that maintaining a FHP for long period of time increases the load on non-contractile structures, causing abnormal stress on the extension muscles in the posterior region which can lead to myofascial pain.

Various study showed that stabilization exercises and stretching exercises are helpful in improving rounded shoulder posture. According to the study by author Kim TW, An DI et al elastic band exercises are effective in improving the rounded shoulder posture. Many research on PNF have been conducted with positive results on the control of inappropriate muscle activity as well as the enhancement of physical balance and functions. Stretching therapy combined with PNF techniques as well as stabilization exercises that stimulate the proprioceptive myoreceptors of muscle and tendon are thought to have improved efficiency of the nerves muscle control, normalized muscle tone and increased blood and tissue fluid circulation. In this study PNF technique are found to be effective improving CV angle in adults with forward head and rounded shoulder posture (Group B).

5. Conclusion

The study concluded that there was significant improvement CV angle by using MB ruler software in adults with group B (PNF) than group A (Shoulder stabilization exercises). An early identification and intervention is necessary to prevent any subsequent deformities of spine and muscular weakness in the future. Stretching exercise has been proven to reduce forward head and rounded shoulder posture.

6. Limitation and Recommendations

Study was done with a small sample size with limited age group between 25 to 40 years. Craniovertebral angle is only included. This study recommended to conduct study with large samples size with treatment duration more than 8 weeks.

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