



Effect of Combining Stretching and Strengthening Exercises of Neck Muscles in Forward Head Posture among Desk Job Operators

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Objective: To find out the effect of combining stretching and strengthening exercises of neck muscles on CV Angle and neck pain in Forward Head Posture among desk job operators.

Method: A experimental study was done with 60 subjects of age between 25 to 35 years with chronic neck pain due to forward head posture. They were divided into 2 groups by simple random sampling method. Subjects in group A (n=30) were receive combining stretching and strengthening exercises of neck muscles along with application of inferential therapy (IFT) and hot packs and Subjects in group B (n= 30) were receive application of inferential therapy (IFT) and hot packs only for 4 weeks. The outcome was measured by Craniovertebral Angle (CVA) and Visual Analog Scale (VAS) Score.

Conclusion: The result of the study shows that combining stretching and strengthening exercises of neck muscles helps in improving forward head posture and reducing pain among desk job operators.

Keywords: Neck muscles; head posture; neck pain.

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1. INTRODUCTION

Body posture can be defined as a state of alignment of the body for a specific amount of time, while ideal posture describes a state of maintaining balance in the body using minimal musculoskeletal activity without causing pain or discomfort. The tendency to stay seated for long periods of time is increasing as is the percentage of the population that uses a personal computer or smartphone. This can cause changes in the alignment of the spine, leading to improper posture, such as a rounded shoulder or forward head posture (FHP) [1].

Forward head posture (FHP) is the anterior positioning of the cervical spine, this posture is called as text neck, scholar's neck. It is a postural problem that is caused by several factors including sleeping with the head elevated too high, extended use of computers, laptops & cell phones, lack of developed back muscle strength and lack of nutrients such as calcium [2].

Forward head posture (FHP) is a common neck disease in contemporary society, and it is caused by sitting at a desk for a long time. Maintaining a continuous posture leads to damage to the ligaments around the neck or lumbar. In addition, such a posture is caused by muscle fatigue and decreased physical activity. As a result, the weakness of the respiratory muscle decreases the lung capacity and increases pain and disease. Such disarrangement may cause homeostasis, which controls the blood supply and metabolites in the muscles and it can result in significant pain and a loss of function [3].

Forward head posture is identified by measuring craniovertebral angle. Measuring CVA is one of the common objective methods in assessing head posture. It is the angle formed by a horizontal line drawn through the spinous process of the seventh cervical (C7) vertebra and a line joining the spinous process of C7 vertebra with the tragus of the ear. The angle is a reliable indicator for identifying head and neck posture. We have developed an Electronic Head Posture Instrument (EHPI) to measure CVA [2].

In order to treat forward head posture, it is necessary to consider the correct posture, work environment, and exercise therapy. In order to improve this posture, heat, traction, and exercise have all been used. Various methods such as joint mobilization, stretching, isometric strengthening exercises, endurance exercises, and

proprioceptive exercises have also been applied depending on the method and theory utilized by the therapist or the patient's condition [3].

2. MATERIALS AND METHODS

60 Subjects were randomly assigned to each experimental Group A (receive combining stretching and strengthening exercises of neck muscles along with application of inferential therapy (IFT) and hot packs) and Group B (application of inferential therapy (IFT) and hot packs) using simple random sampling method. Consent of subjects was collected with prior permission. Inclusion criteria included age of 25 to 35 years (both males and females), subjects with forward head posture with chronic pain, desk job operators with 6-8 working hours. The subjects excluded on the basis of any history of cervical radiculopathy, cervical surgery, cervical injury, weakness of eyes, cervical and shoulder pathology, cervical traumatic cases. The subjects were assessed and demographic data such as CVA and VAS were assessed and noted. The subject in the Group A received an exercise program consisting of three stretching (Static Sternocleidomastoid stretch, One-sided unilateral self-stretch exercise, Static levator scapulae stretch) exercises and three strengthening (Side-lying external rotation, Scapular Retraction, Chin tuck) exercises. They were asked to perform three sets daily, 10 repetitions in each set as stretching exercises and strengthening exercises each held for 10 seconds and 10 seconds rest between each set. A 20-second rest was considered between successive exercises. The exercise protocol lasted for four weeks and was repeated four times per week. Every session of the intervention program took 41 minutes on average and application of inferential therapy (IFT) for 15 minutes and hot packs for 10 minutes. The subject in the Group B received application of inferential therapy (IFT) for 15 minutes and hot packs for 10 minutes only for 4 weeks. After 4 weeks, CVA with Electronic Head Posture Instrument (EHPI) and VAS with Visual analog scale were noted again.

3. RESULTS

Result was analyzed by using unpaired t test by using SPSS version 20.

The result of the unpaired t test, when we compared the values before treatment on score of Craniovertebral Angle(CV Angle), ($p=0.194$) as p value is more than 0.05 therefore it shows no significant difference between Groups A and

Group B, values of mean and S.D were 43.36 ± 1.77 and 44.00 ± 1.99 respectively whereas when we compared the values after treatment on score of Craniovertebral Angle (CV Angle), ($p < 0.005$) as p value is less than or equal to 0.05 therefore it shows significant difference between Group A and Group B, values of mean and S.D were 47.02 ± 2.06 and 44.15 ± 2.02 SD respectively.

The result of the unpaired t test, when we compared the values before treatment on score of Visual Analog Scale Score (VAS Score), ($p = 0.706$) which is more than 0.05 therefore it shows significant difference between Groups A and Group B, values of mean and S.D were 3.90 ± 1.32 and 44.00 ± 1.99 respectively whereas when we compared the values after treatment on score of Visual Analog Scale Score (VAS Score), ($p < 0.005$) which is less than or equal to 0.05 therefore it shows significant difference between Groups A and Group B, values of mean and S.D were 1.19 ± 1.43 and 2.20 ± 1.34 respectively.

Overall this result showed that Group A has higher mean value than Group B both for Craniovertebral Angle (CV Angle) and VAS Score as p value is less than 0.05.

This indicates that combining stretching and strengthening helps in improving forward head posture and reducing pain.

4. DISCUSSION

The present study was an attempt to find the effect of combining stretching and strengthening exercises of neck muscles along with inferential therapy (IFT) and hot packs in forward head posture among desk job operators. 60 subjects participated in the study that fulfilled the inclusion criteria. The study was conducted for duration of 4 weeks. Subjects were assessed by using VAS and CV Angle.

When compared the results within Group A and Group B on CV Angle and VAS, it shows that subjects of Group A treated with combining stretching and strengthening exercises of neck muscles along with inferential therapy (IFT) and hot packs and subjects of Group B treated with inferential therapy (IFT) and hot packs alone has significant improvement in CV Angle and pain among desk job operators with forward head posture.

But on comparison between the groups on CV Angle and VAS, the improvement was more

significant in subjects of Group A who were treated with combining stretching and strengthening exercises of neck muscles along with inferential therapy (IFT) and hot packs. Pain intensity significantly decreased in groups A. The reason for this reduction in pain was relaxation of the muscles (sternocleidomastoid, pectoralis minor, levator scapula, teres minor, Infraspinatus, rhomboids, middle trapezius, longus colli and longus capitis) due to stretching and strengthening.

In the present study, combining stretching and strengthening exercises involve muscle work at significant intensity level result in muscle strength improvement. Current study is supported by Zahra [3], they conducted a study to check the effect of 4-week postural corrective exercise in correcting forward head posture in college students. The finding suggest that 4 weeks posture corrective exercises were successful in improving the postural alignment related to forward head posture, the subjects showed significant improvement in CV Angle [4].

The results of the current study are also supported by Song Hee Cheon et al. [4], who conducted a study to check the changes in neck and upper trunk muscle activities according to the angle of movement of the neck in subjects with forward head posture in college students. The findings of the study suggests that activity of the sternocleidomastoid muscle showed significant differences between the flexed position and the full range of motion position, and between the neutral position and the full ROM position and the activity of the middle trapezius muscle showed a significant reduction in the extended position and the full ROM position as compared to the neutral position i.e., improvement in forward head posture [5].

The current study shows that stretching and strengthening have significant effect in improving CV angle in desk job operators with forward head posture. These assertions have gained support from findings of other studies in the literature [5], check the effect of Pectoralis Muscle Stretching on the Resting Position of the Scapula in Persons with Varying Degrees of Forward Head/Rounded Shoulder Posture in healthy participants. The finding suggest that in the persons with moderate forward head/rounded shoulder posture (FHRSP) stretching group demonstrate improved resting scapular position of forward head/rounded shoulder posture (FHRSP) patient as compared to mild and

moderate FHRSP stretching groups and control group following a two-week pectoralis stretching program. This concludes that stretching exercises has significant effect in improvement of forward head posture [6].

The current study is furthermore supported by Ruivo R.M [6], they conducted a study to check the Effects of a Resistance and Stretching Training Program on Forward Head and Protracted Shoulder Posture in Adolescents. The finding suggest that significant increase in cervical and shoulder angles was observed in the experimental group as compared to control group i.e., 16-week resistance and stretching training program decreased forward head and protracted shoulder postures in adolescents [7]

Present study relates to the previous findings that strengthening exercises helps in improving neck posture [7], conducted a study to check effects of deep flexor muscle-strengthening exercise on the neck– shoulder posture, and the strength and endurance of the deep flexor muscles on students. The finding shows that experimental group showed statistically significant changes in head tilt angle, neck flexion angle, forward shoulder angle after the strengthening exercise training as compared to control group i.e., strengthening cranio-cervical flexor muscles is important for the adjustment of neck posture, and maintaining their stability is required to improve neck-shoulder posture [8].

In present study we have seen that most of the subjects suffer from pain due to forward head posture, so we conclude that there is relationship between FHP and pain. This evidence is supported by a study done by Nasreen fawzy Mahmoud et al. [8], who has checked the relationship between forward head posture and neck pain. His study result shows that adults with neck pain shows increased forward head posture when compared to asymptomatic adults [9].

Therefore we can say that combining stretching and strengthening exercises of neck muscles helps in improving forward head posture among desk job operators.

5. CONCLUSION

The result of present study shows that combining stretching and strengthening exercises of neck muscles helps in improving forward head posture and reducing pain among desk job operators.

CONSENT

As per international standard or university standard written patient consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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