

Effect of Exercise Program on Forward Head Posture and Chest Expansion in Students of Adesh University

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ABSTRACT

Background: Forward head posture causes rounded shoulders which lead to decrease in chest expansion. So there is a strong need to find out the effect of exercises on FHP and chest expansion.

Research Methodology: An observational study on 40 subjects of age 18-30 years. The progressions for each strengthening exercise are indicated from left to right. Participants will perform each level for one week. The subjects were asked to perform group of strengthening and stretching exercises. Participants were instructed to complete 3 sets of 12 repetitions of the strengthening exercises and 3 stretching exercises hold for 30 seconds each. This program will be repeated 4 times per week. CV Angle and chest expansion were measured before and after the exercises.

Results: After analyzing the data with unpaired t test, it was seen that CV Angle was progressed after performing exercise program with mean difference of 2.92°, chest expansion was also increased with mean difference 0.810cm, 0.632cm, 0.285cm at axillary level, nipple level and xiphisternum level respectively. Although the values of chest expansion at axillary level and nipple are countable and significant but at xiphisternum level these values are lesser in comparison.

Conclusion: Hence from the result it is concluded that the CV Angle changes occurs with exercise program and chest expansion changes more at axillary level and nipple level and the least changes were seen at xiphisternum level.

Keywords: Forward Head Posture, Craniovertebral Angle, Chest Expansion, Stretching, Strengthening Exercise

INTRODUCTION

Good posture involves your body to stand sit walk and lie in position where the least strain is placed on supporting muscles and ligaments during these activities. Because of poor posture concomitant shortening and lengthening of muscle occur which ultimate leads to muscle imbalance and hence increases the strain on ligaments muscles and body parts.¹

Any deviation in normal posture pattern adversely affects the adjacent joints and muscles and leads to various pathological conditions. The FHP is the most common deviation from normal

curvature in cervical spine². Symptoms of FHP varies from chronic neck pain, shoulder pain, upper and middle back pain, Temporomandibular joint dysfunction, teeth clinching, fatigue, arthritis, nerve impingement, decreased Range of motion, myofascial pain syndrome, headache, migraine, tight chest and neck muscles etc³.

The FHP not only affects the functional movement of neck but also the act of breathing⁴. The damage in motor control of cervical spine associated with damage in respiratory muscles. Thus, in addition FHP has a negative effect on chest expansion⁵. The loss of strength in neck

muscles leads to instability of thoracic spine and alters the mechanics of chest expansion⁶. The excessive FHP can also affect the main respiratory muscles-diaphragm because of thoracic kyphosis and cervical lordosis⁷. The short exercise program can be demonstrated to improve the postural alignment of FHP. An exercise program would include deep cervical flexors and shoulder retractors strengthening cervical extensors and pectoral muscles stretching that address underlying muscular imbalance. Hence the current study was conducted to see the effect of exercise program on FHP and chest expansion in students of Adesh University.

MATERIALS AND METHODS

The study was conducted after the ethical approval from ethical committee of Adesh University. 40 subjects between 18-30 years of age were selected for the study that had craniovertebral angle less than 53°. The subjects who had other problems in upper extremity, any neurological problem, and respiratory problem were excluded from the study. The informed consent was taken from all the subjects for volunteer participation.

The subjects were screened for FHP with CV angle with less than 53° with knee registry application, after selection of subjects the pre interventional CV angle and CE were measure followed by interventional protocol of 4 weeks and the post interventional CV angle and CE were

measure for comparison. The CE was measured at 3 levels: Axillary level, nipple level and Xiphisternum level.

INTERVENTIONS:-

The exercise program included strengthening of deep flexor muscles and shoulder retractors while stretching of cervical extensors and pectoral muscles was also included in exercise program. The strengthening of deep cervical flexors was done with chin tuck exercise which was progressed with chin tuck with head lift from 2nd week onwards with progression in whole duration of 2 seconds each week up to 4th week i.e. 2,4,6 & 8 seconds hold. Chin drop exercise was one to stretch cervical extensor muscles and the pectoral stretch was given in standing position at the corner of wall.

Each exercise was progressed after every week for 4 weeks. The participants were instructed to complete 3 sets of 12 repetitions of strengthening exercises and 3 stretching exercises hold for 30 seconds each. The program was repeated 4 times per week for 4 weeks. In the end pre and post interventional CV angle & CE was compared to see the effect of the exercise program on FHP and CE.

RESULTS

The results of the study shows extremely significance increase in CV angle after the exercise program with mean difference of 2.92 with t value 4.7491 and p value < 0.0001.

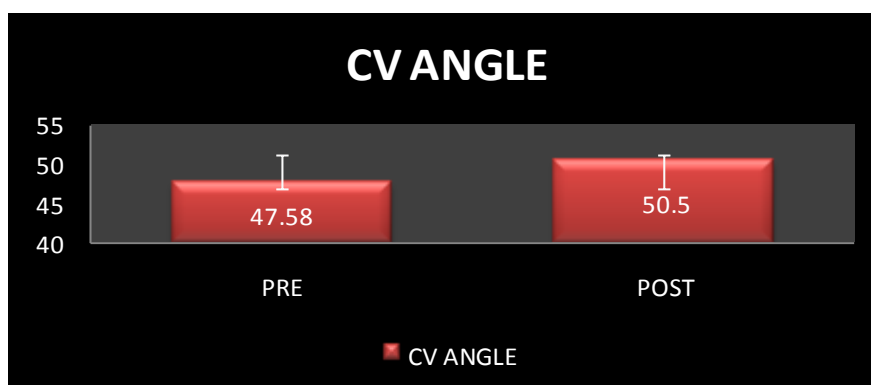


CHART 1: Showing pre and post comparison of Craniovertebral Angle following exercise program

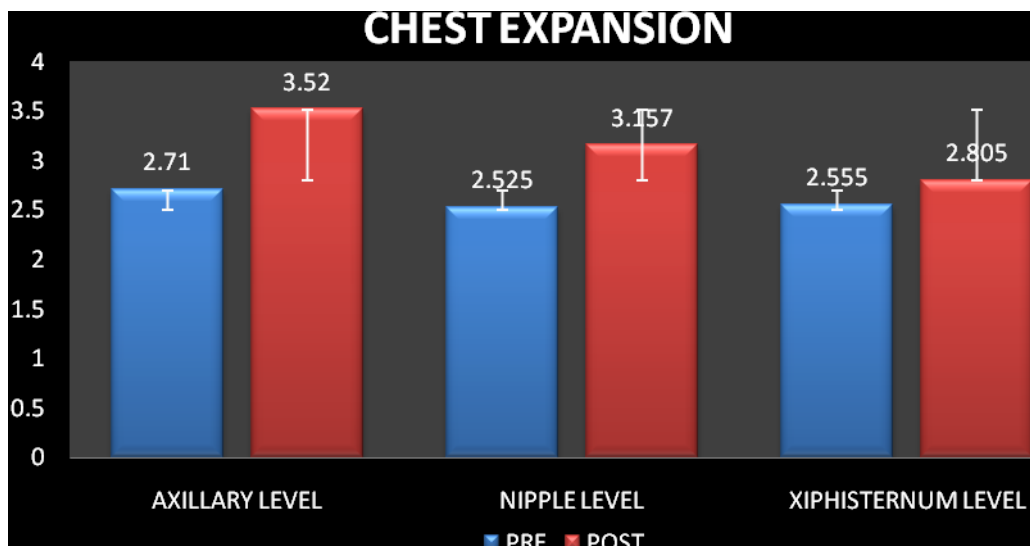


CHART 2: Showing Pre and Post comparison of Chest expansion at axillary level, nipple level and xiphisternum level following exercise program

The results of the study also shows the extremely significant increase in chest expansion at axillary level and nipple level with mean difference of 0.810 with t value 3.6602 and p value < 0.0005 , and mean difference 0.632, t value – 2.7650 and p value 0.0071 respectively but the results of the study shows non-significant improvement in chest expansion at xiphisternum level with exercise program with mean improvement 0.0285, t value-1.686 and p value 0.2461.

DISCUSSION

The prime objectives of the study were to evaluate the effect of exercise program on FHP & CE. The results of the study show that CV angle increases in all the subjects and the similar results found in CE following exercise program.

Before the exercise program the mean value of CV angle was 47.58° which rises to 50.50° after the exercise program. The mean value of chest expansion at axillary level was 2.710 cm and it moves to 3.520cm after the exercise program, the mean value at nipple was 2.525cm which moves to 3.157cm after the exercise program and that of xiphisternum level was 2.555cm and it rises to 2.805cm after exercise. It is observed in this study that at axillary level and nipple level there is more increase in CE with mean difference of

0.810cm and 0.632cm as compared to Xiphisternum level where mean difference was 0.285cm also the CV angle increase in all the subjects with mean difference 2.92° which is statistically significant

A study done by Taiichi Koseki et.al in 2019 shows that the forward head posture significantly affects the chest expansion and thus alter the respiratory function.⁸ A study done by Pulkit Walia⁹ in 2017 shows the relationship between FHP and CE and found the negative correlation between FHP and CE. Their study also suggested that there is decrease in CE at the Axillary level as compared to the other two levels which may due to the tight scalene and levator muscles due to the FHP. Hence, the results of their study are in favour of the results of current study.

CONCLUSION

It is concluded from the results of the study that the chest expansion increases by treating the Forward Head Posture following exercise program.

More significant increase was seen in chest expansion at axillary level and nipple level as compared to Xiphisternum level and also the significant improvement was seen in CV angle after the exercise program.

Conflict of interest - Nil

Source of Funding - Self
Ethical clearance - Ethical
Committee of Adesh University

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