Short communication

Evaluation of forward neck posture among healthy individuals: A cross sectional study

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ABSTRACT

Introduction and Aim: Cervical neck pain is observed to be commonly associated with postural problems, affecting between 66% and 90% of the population. This study aims to evaluate the forward neck posture among healthy individuals.

Materials and Methods: 20 subjects of 20-35 years of age who were long term mobile users, software professionals and college students were recruited for this study. A digital, lateral-view image of the subjects in their regular standing posture was used to determine the cranial-vertebral angle. The seventh cervical (C7) vertebra, as well as the tragus and acromion, were marked with markers. A digital camera was placed 33 inches above ground level and 104 inches away from the subject. Each subject had their eyes gazed to a fixed point from a standing position. The subjects were halted in their most relaxed position, and a photograph shot.

Results: In this study, 20 students were evaluated consisting of 10 males and 10 females. From 10 males 5 were identified as having the angle of less than 50 degree and 5 females were identified as having the angle of less than 50 degree and they were identified with the forward neck posture.

Conclusion: The study identified the forward neck posture among normal healthy individuals. It was found that the age of the 10 affected subjects was between 20-35 years.

Keywords: Asymmetrical neck pain; neck posture; cervical exercise; craniovertebral angle; forward neck posture.

INTRODUCTION

Due to the change in occupational demands in the past decade there are various postural related changes that are taking place in human. The concept of seeing human as a biological unit rather than a mechanical unit is being advocated these days where alignment of the body parts in relation to one another doesn't really matters. Forward head posture (FHP) does not influence muscle stiffness, tone, and elasticity of neck muscles, nor does it influence the pressure sensitivity of the neck muscles particularly in the healthy, mildly symptomatic officers. Literature states that FHP combined with comorbid acute and chronic cervical pain among subjects who sit for long time contribute to changes in tone of the myofascial and tensegrity as well as aggravated pressure sensitivity of affected muscles (1). But there are certain changes that happen in the human body leaves them in a mechanical disadvantage position which alters the quality of functional performance. As these changes are happening very gradually it's tough for the clinicians to quantify them. Technology may be useful to carry out the process of quantifying FHP assessment (2). There is a software application that can measure linear distances and angulation in relation to the fixed reference points on a mere digital image thereby find the FHP (3). But the barrier for such process is time and cost factor. Adding to this the variation in the anatomical reference landmarks offers more challenge. So, angle-based FHP evaluation has been advocated to be a reliable and valid method (3). Going forward we identified many softwares that were found to be used in the analysis of (forward neck posture) FNP like "*Alcimage, software for posture assessment SAPO, digital image-based postural assessment, all body 3D scan, Biotonix, corporis pro, Fish matrix, Fisiometer Posturogram, physical physio, physio easy, posture print, and posture assessment based on digital imaging [APPID]"(4)* but the problem we faced using these software were that most of them were expensive, using non English language of operation and requiring professional training to use the same. Hence, we found a real need for finding a cost effective and hassle-free software or technique to determine FHP. We believed this can increase the number of research and analysis in FNP and its influence on many parameters that might be of clinical significance.

Fig. 1: Subjects 1-10 showing their FHP angle

Fig. 2: Subjects 11-20 showing their FHP angle

MATERIALS AND METHODS

This cross-sectional study was performed at the Sree Balaji College of Physiotherapy. The study was performed on 20 subjects with age of 20-35 years with an average age of 26.4 (2.6) years who were long term mobile users, software professionals and students. Subjects who had history of fracture, rheumatologic conditions, musculoskeletal injuries and previous history of neck or shoulder pain that required medical consultation were excluded from the study. We used Kinovea software to check the cranio-vertebral (CV) angle which is a measure of FHP (5). A digital, lateral-view image of the subjects in their regular standing posture was used to determine the cranial-vertebral angle The seventh cervical (C7) vertebra, as well as the tragus and acromion, were marked with markers. A digital camera was placed 33 inches above ground level and 104 inches away from the subject Each subject flexed and stretched their head three times in the standing position as much as they could, then gazed at their eyes reflected in the front mirror. When they came to a halt in their most relaxed position, a photograph was shot. The subjects were blinded about the study to prevent them from consciously correcting their neck posture. Using a digital camera, a photograph was taken from the side. To perceive the better CV angle through photogrammetry method, markers are placed on the patient in a few crucial areas, such as the tragus and the C7 spinous process. It has been calibrated with help of Kinovea software to measure the CV angle. The CV angle was measured using the following method. A horizontal line was drawn that goes through the C7 spinous process that runs anteriorly. A second line was drawn from the C7 spinous process to the tragus, which is the pointed area in front of the earhole. The CV angle is formed when these two lines meet at the C7 vertebra. Fig. 1 and 2 show the results of the measurements of all 20 participants

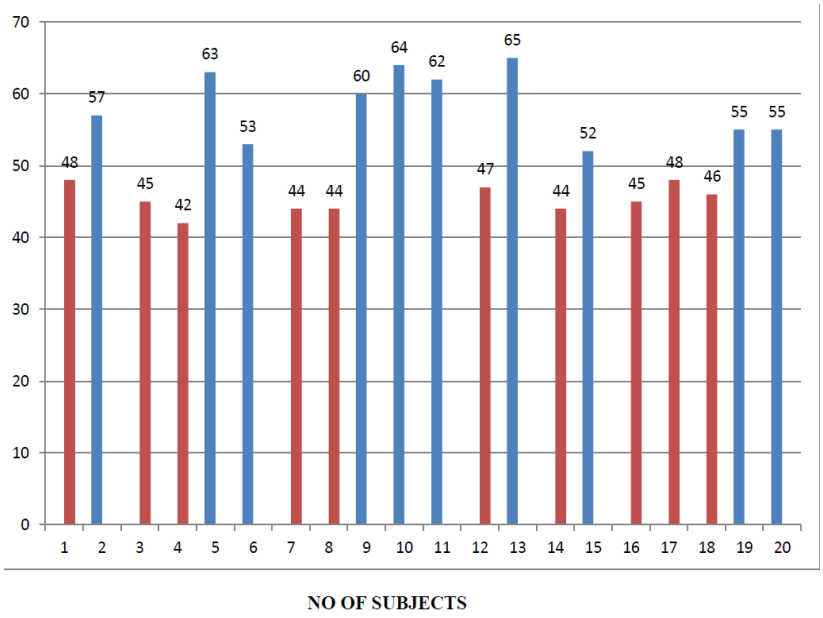

Fig.3: CV angles of all the 20 subjects (50 degrees being normal and less than 50 degrees is FNP)

RESULTS

This study included 20 students, 10 males and 10 females. The people who have more than 50 degrees were considered as the normal neck posture. Kinovean software greatly helped to find out the accurate angle of the subjects to find out the classification between the people with the angle of less than 50 degrees and more than 50 degrees. According to a medical literature review, a CV angle of less than 50% while standing is typically regarded forward head position (6). From 10 males 5 were identified as having the angle of less than 50 degrees and 5 females were identified as having the angle of less than 50 degrees and they were identified with the forward neck posture.

DISCUSSION

The photogrammetric method used in the current study has a high interrater (ICC=0.75-0.89) and interrater (ICC=0.91-0.99) reliability in finding FHP (7). It also has a good validity compared to analyzing the angle using a radiograph instead of photography. It has a strong correlation (R-values of at least 0.84) with the angles measured using Low Density X-ray images (LODOX) (8). Further in the past FHP was assessed using radiographs and photographs but there were no differences found between the two processes of assessing CV angle (9). Thus, in the current study photogrammetry has been considered as a method that is feasible clinically at the same time cost-effective, time-efficient, and lastly non-invasive with no exposure to x ray irradiation (8). From the current study the assumption that forward neck posture is genetically disorder need to be revisited because even 50% of normal individuals have FNP. In contrast, the CV angle in healthy participants in standing and sitting positions was consistent across both sides. As a result, we did not evaluate the FHP while sitting or bilaterally. The average CV angle among healthy older adults and patients with neck pain was 45 and 46°, respectively which showed that there was no difference among people aged 50 and above (10, 11). The same fact is proved among people of age group of 20-35 years through this study.

CONCLUSION

The study identified forward neck posture among normal healthy individual between the age of the (male and female) 20-35 years. People who had more than 50 degrees fell upon the classification of normal category. People who had less than 50 degrees forward neck posture fell upon the classification of forward neck posture. This study identified that 50% of the normal subject had forward neck posture, which was true in both the genders. Future studies should concentrate on progressive changes in the CV angle with occupational type and load and correlate it with occurrence of musculoskeletal issues and quality of life using prospective studies.

CONFLICT OF INTEREST

There is no conflict of interest involved among the authors of this study.

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