Original Research Article

To study correlation between neck pain and cranio-vertebral angle in young adults

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Abstract

Introduction: Neck pain is a common disorder. Poor posture might result in muscular imbalance that causes a faulty relationship among various body parts. Forward head posture is one of the most common cervical abnormalities that predispose individuals toward pathological conditions, such as headache, neck pain, and temporomandibular disorders.
Aim: The aim of the study was to find the relationship between CV angle and neck pain.
Materials and method: 50 patients were evaluated and included in the study. They were evaluated for pain using Numerical Pain Rating Scale (NPRS) and the forward head posture was assessed by measuring CV angle. The total duration of the study was 6 months. Analysis was done using SPSS Version 20. **Results:** Spearman's correlation test was used to find correlation between CV angle and neck pain and the r value was found to be -0.731 with the level of significance 0.01.
Conclusion: A moderate to good negative correlation was found between CV angle and neck pain.

Key words

Neck pain, CV angle, NPRS, Forward head posture.

Introduction

Neck pain is a common disorder characterized by pain, discomfort or soreness experienced in a region between the inferior margin of the occipital bone and T1 [1]. Prevalence of neck pain in employees is not the same all over the world. In western countries it has been reported to be between 34% and 54%, with Scandinavian countries having higher mean estimates than the rest of Europe and Asia [1, 2].

Proper posture maintains the musculoskeletal equilibrium. Poor posture might result in muscular imbalance that causes a faulty relationship among various body parts. Forward head posture (FHP) is an epidemic that has become more prevalent in modern times. It is described as carrying the head forward of the centre of the shoulder. As the head moves forward, the centre of gravity shifts. To compensate for this shift in the centre of gravity, upper body drifts backward and shoulders slump forward so that the head is placed anterior to the trunk [3, 4].

FHP is one of the most common cervical abnormalities that predisposes individuals toward pathological conditions, such as headache [5, 6], neck pain [7, 8], temporomandibular disorders [9], vertebral bodies disorders [10], soft-tissue length and strength alteration [11, 12], or even scapula and shoulder dyskinesis [13, 14]. Because of these associated problems, assessment of head posture has become increasingly important in clinical practices in evaluating and designing treatment regimens for patients with neck pain and the other conditions just listed [15]. As neck pain could become a chronic and disabling symptom, discovering and controlling risk factors seems to be a reasonable prevention strategy. Improper posture could be improved by education and proper reminders to decrease the prevalence of neck pain and increase the quality of life.

It is thought that adolescents or patients with neck pain (NP) have a more forward head posture, thus a smaller craniovertebral (CV) angle than age-matched pain-free participants.

There is no concrete information on the relationship between neck pain and disability and forward head posture. The objective of the study was to find the relationship between CV angle and neck pain.

Materials and methods

The study was approved by the ethical committee of Shree Swaminarayan Physiotherapy College. A cross-sectional observational study was conducted in out-patient department of Shree Swaminarayan Physiotherapy College, Ahmedabad. A written informed consent was obtained from all participants. Male and female patients with neck pain between the ages of 30 to 40 years were eligible to participate. Participants were excluded if they had visual deficits, diagnosed balance disorders, musculoskeletal pathologies (e.g. history of shoulder surgery, torticolis, bone cancer, cervical or thoracic fracture), were non-ambulatory, displayed functional or structural scoliosis, or had excessive thoracic kyphosis. Given these criteria, a total of 50 patients were evaluated and included in the study to determine the relationship between CV angle and neck pain. All the patients were evaluated for pain using Numerical Pain Rating Scale (NPRS) and the forward head posture was assessed by measuring CV angle with Electronic Head Posture Instrument (EHPI). The total duration of the study was 6 months.

Measuring Pain

Participants were asked to report their neck pain intensity on an 11-point NPRS, in which 0 is pain free and 10 is the most severe pain. This scale has been shown to be reliable and valid for measuring subjective pain [16, 17].

Measuring Cranio-vertebral Angle (CV angle)

Measurement of CV angle is a highly reliable method to assess the forward head position [18]. It is the angle formed at the intersection of a

horizontal line through the spinous process of C7 and a line through the tragus of the ear.CV angle was measured by the EHPI which was proved to be valid and reliable [19]. It was composed of an electronic angle finder, a transparent plastic base, and a camera stand. The electronic angle finder 'SmartTool,' made by M-D Building Products, was fixed on a transparent plastic base. The combined SmartTool Angle Finder and the plastic base were mounted on a tripod camera. Adhesive pin markers were used to locate the position of C7 spinous process and the tragus of the ear. The participant was then asked to stand with his/her left shoulder in front of the EPHI. The participant was instructed to stand comfortably with his/her weight distribution evenly on both feet and to keep the eyes looking straight forward. He/she was then instructed to flex and extend the head three times and then rest it in a comfortable position. The therapist adjusted the EHPI until the two indicator lines were aligned with the markers. Three readings were taken and average of it was taken as final reading (**Figure – 1, 2, 3**).

Figure - 1: Measurement of CV angle using pointers at C7 spinous process and tragus of ear.

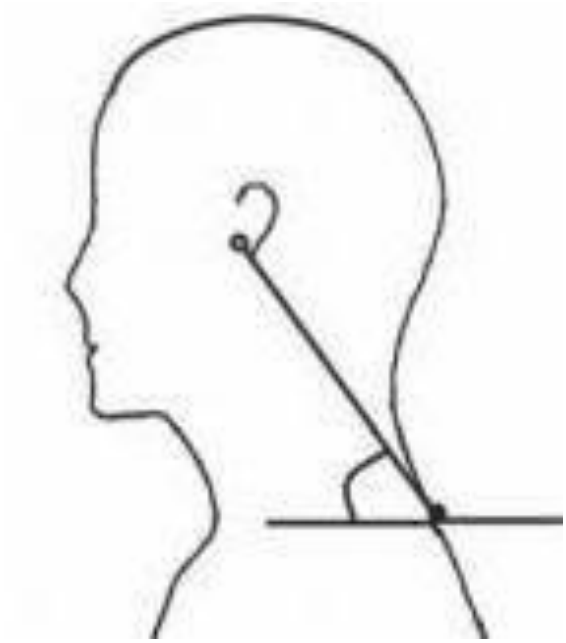


Figure - 2: Markers placed at tragus of ear and C7 spinous process.

Figure - 3: Measurement of CV angle using Electronic Head Posture Instrument (EHPI).

Statistical analysis

Analysis was done using SPSS (statistical package for social sciences) Version 20. Spearman's correlation test was used to find correlation between CV angle and neck pain.

Results

Mean values and standard deviation of CV angle and NPRS were calculated. Correlation between CV angle and NPRS was analysed.

Table - 1 shows the mean values and standard deviation of CV angle and NPRS of 50 subjects. The value of CV angle was 33.43 ±7.40 and that of NPRS was 5.54 ±1.85.

Table - 1: Mean values and standard deviation of CV angle and NPRS.

Outcome measures	Mean and Standard Deviation
CV angle	33.43 ±7.40
NPRS	5.54 ±1.85

Graph - 1 shows the mean values of CV angle and NPRS.

Graph - 1: Mean values of CV angle and NPRS.

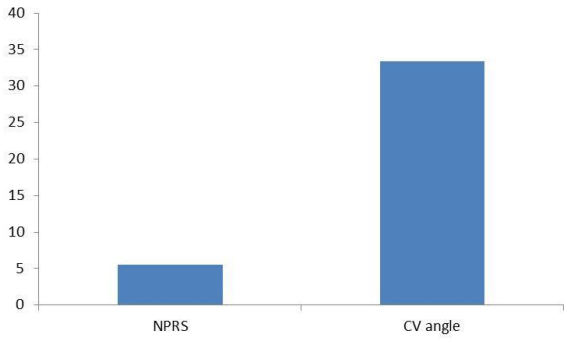


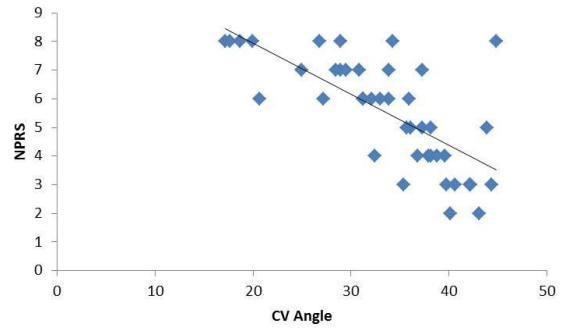
Table - 2 shows the correlation between CV angle and neck pain (NPRS). The r value was found to be -0.731.

Table - 2: Correlation between CV angle and NPRS.

Spearman r value	P value
-0.731	0.017

Graph - 2 shows correlation between CV angle and NPRS.

Graph - 2: Correlation between CV angle and NPRS.



Discussion

It was found that there was a moderate to good negative correlation between CV angle and neck pain (measured using NPRS). Neck Pain can be associated with musculoskeletal disorders, with several studies associating an excessive forward head position with neck pain [20]. Chiu, et al. [21] found that approximately 60% of individuals with neck pain had forward head posture. Johnson [22] suggested that prolonged forward head posture might increase loading to the non-contractile structures and put abnormal stress on the posterior cervical structures and cause myofascial pain. Headaches have also been investigated regarding their association with a forward head posture, including cervicogenic, post-concussional and chronic tension-type headaches.

Yip CH, Willford, et al. [23] further stated that poor head posture is generally accepted as one of the causes for neck pain because poor postural awareness and habitual poor postures may result in greater loading on the supporting structure and may cause sensitization and pain. Currently, upright posture evaluation is recommended as part of the comprehensive physical examination of the cervical spine.

Conclusion

There is a moderate to good negative correlation between CV angle and neck pain. Thus the results of present study showed that the subjects with neck pain had a more forward head posture. This study alerts physical therapist to address the correction of forward head posture along with conventional treatment in patients with neck pain.

Future studies can be done on larger sample size and the cause and effect relationship for head posture and pain and disability can be investigated, which is crucial for clinicians to assess and treat their patients and a comparison of CV angle in symptomatic patients and asymptomatic individuals can be done. Also future studies need to characterize the entire spine given the potential influence that the posture at lumbar spine has on head position.

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