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ORIGINAL ARTICLE - 2

Title : A Study of Cervical Spine Posture In Medical Students.

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ABSTRACT -

Background : Ideal posture is believed to be the state of musculoskeletal balance. Students of medical college have to perform and teach numerous subjects which affect their posture and reposition it into a more strained and stressed improper, potentially unbalanced posture, with the addition of external force. Postural problems at cervical spine lead to Forward Head Posture (FHP), Neck pain, Cervicogenic headache, Rounded shoulders. This study was conducted to gather evidence about the actual deleterious change in posture being faced by the medical students. **Methods :** 60 males and females aged 18-25 years were conveniently selected from Medical, Dental and Physiotherapy College. Cervical posture was assessed in terms of Craniovertebral angle (CVA), and Anterior Head Alignment (AHA).Posture was assessed by sagittal plane and frontal plane photographs with the help of D-photo measurer software, version 3.4.0 **Study Design:** Observational study. **Results :** Results showed that CVA, AHA was found to be deviated from normal showing a tendency of FHP and left side lateral deviation. **Conclusion:** Cervical posture was significantly altered in medical students as an effect of their workload.

Keywords : Craniovertebral angle, Anterior Head Alignment.

Ideal posture is believed to be the state of musculoskeletal balance that involves a minimal amount of stress and strain on the body. Cervical spine is considered as the main functional center for the head, neck, and face. An ideal posture of cervical spine is considered to exist when the external auditory meatus is aligned with the vertical postural line [1]. Head Posture refers to the alignment of the head in relation to the rest of body. It is considered important, as deviations from 'normal' may have detrimental biomechanical and physiological implications and provide clues as to optimal intervention[2]. Postural disorders in cervical spine leads to Forward Head Posture, Neck Pain, Cervicogenic headache and Rounded shoulders. FHP afflicts a large percentage of population and can cause significant neck pain[3]. FHP is more pronounced in the working environment, where the various professional people tend to poke their chins down while reading, using computers and writing, especially with poor ergonomically designed work stations, sleeping with the head elevated too high, lack of developed back muscle strength and faulty postures which is acquired by most of the professionals due to awkward appearance of the skull caused when moving resulting in a chronic condition that puts increased stress on the posterior musculature of the cervical spine.[4,5] The incidence of FHP is 66% in healthy adults between the age group of 20 - 40 years due to decreased craniovertebral angle leading to a common problem of neck pain and lateral tilting in two-thirds of the population. It is more common in women (5.7%) than men (3.9%) and affects about 330 million people globally as of 2010 [6,7]. Adolescents acquire faulty posture while studying, reading and writing, performing practical works or due to working on laptops regularly, there may be decreased muscle strength, increased tightness of cervical muscles, eventually leading decreased craniovertebral angle. One currently acknowledged objective method of evaluating Forward Head Posture is through measuring the CVA[8,9]. Few Indian researchers have focused on the impact of incorrect postural alignment and the problems faced by the medical students during daily activities. Prolong downward movement of the head, decreased physical activities like stretching and strengthening results into FHP which further leads to neck pain and postural problems in later life. Priority to this topic about cervical spine was given as the incidences of cervical problems are frequently being reported amongst the medical students and very few studies have been conducted.This study will help to spread the awareness among the medical students and will help them take safety precautions during their work hours.

MATERIALS AND METHOD

Procedure of the study was explained to the students and informed written consent was obtained. A total 60 both males and females volunteered to participate who fulfilled the inclusion criteria.

Selection Criteria
Inclusion Criteria:

- Age 18 to 25 years.
- Both male and female students.
- Students with no history of neck pain.

Exclusion Criteria:

- Cervical surgery.
- Face or spinal abnormalities such as torticollis, scoliosis, kyphosis etc.
- A history of cervical fracture or trauma.
- TMJ surgery or dysfunction.
- Vestibular or Equilibrium problem.
- History of chronic neck pain.

Materials Used:

- Adjustable stool
- Pen marker
- Measuring tape
- Consent form
- Data collection sheet
- D- photo measurer software, version 3.4.0
- Digital camera- Sony Cyber Shot; 4.1 Megapixels; DSC- S80
- Pen and pencil
- Prior to data collection the subjects were suitably disrobed so that the neck was exposed. The subjects were sitting and adhesive markers were placed on four anatomical points comprising;
- External canthus of eye.
- Tragus of the ear.
- Spinous process of C7.
- Lower margins of both the ear lobes.

Subjects were asked to sit comfortable on an adjustable stool with feet placed flat on the floor and hands half way up your thighs with the palms up, sit like normal and relax, look straight ahead. The subjects looked directly ahead, camera was placed 1.5m from subject's right side. Camera was positioned perpendicular to the ground using a tripod stand. Two photographs were taken one from lateral view and

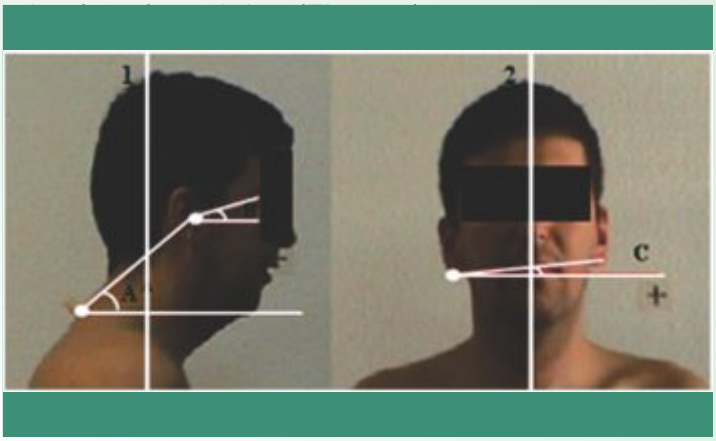

Figure 1: Representation of the reference lines used in the sagittal (1) and frontal (2)planes, and the anatomical angles used as surrogates of head posture: A) C7-tragushorizontalangle (used as surrogate of forward head posture); B) Tragus-eye-horizontalangle (used as surrogate of head extension); C) Right ear-left ear-horizontal angle (used as surrogate of side-flexion).

In order to evaluate the cervical spine posture, 2 angles of measurement reported by previous researchers were used as measures for cervical posture in this study. The angles were obtained as follows;

- Craniovertebral angle (CVA)
- Anterior Head Alignment (AHA)

Craniovertebral Angle : This angle was defined by Wickens and Kipath (1937). It is the angle termed at the intersection of a horizontal line through the spinous process of C7 and a line to the tragus of the ear. This is believed to provide an estimation of neck on upper trunk positioning .a small angle indicates more forward head posture.

Anterior Head Alignment : The angle formed by a horizontal line intersecting through the inferior margins of both the ears, was measured. Bielschowsky's said when a healthy individual tilts their head, the superior

oblique and superior rectus muscles of the eye closest to the shoulder keep the eye level. The inferior oblique and inferior rectus muscles keep the other eye level. AHA is believed to provide an estimation of both the eye levels & a side tilt indicates tightness of scalene muscle, trapezius muscles. The angles were measured by D-photo measurer software, version 3.4.0. It is a drafting program widely used by engineers, architectures, interior designers, land management graphics, even arts. It provides us an electronic drawing sheet. Inside the drawing area one vertical and horizontal line is present called Graphic cursor. On command these graphic cursor will join the anatomical markers. It will give us the degree of that angle.

RESULTS AND DISCUSSION : Statistical analysis was done by GraphPadInStat software (Trail Version 3.06) using various statistical measures such as mean, standard deviation (SD) and tests of significance such as one way ANOVA.The results were concluded to be statistically significant. The one way ANOVA was used to compare the deviation of the angle from the normal in both males and females. There is highly significant difference found in Craniovertebral angle (q=0.46, p>0.05) when compared to males vs. females. This angle provides an estimation of neck on upper trunk positioning and small angle indicates more forward head posture (Wickens and Kiputh 1937). There is highly significant difference found in Anterior Head Alignment (q=0.67, p>0.05) when compared tomales vs. females. This angle provides an estimation of both the eye levels and a side tilt indicates tightness of the muscles (Bielschowsky).This shows that there is a tendency of forward head posture and lateral deviation more in female medical students compared to male medical students.

Table 1: Distribution of Mean, Standard deviation and p - value of Craniovertebral angle and Anterior Head Alignment of male and female medical students

	Male Mean±SD	Female Mean±SD	"P" value	Result
Cranio-vertebral angle	46.13±6.26	45.76±5.58	P>0.05	Significant
Anterior Head Alignment	1.9±1.34	2.43±1.59	P>0.05	Significant

Discussion:

The aim of the study was to analyze the cervical spine posture in the medical students. It provides evidence that there is a tendency of forward head posture and lateral head tilting in medical students as an effect of their workload. Altered cervical posture can be explained as forward head posture and lateral head tilting. Forward head posture is a clinical entity that has been identified as a significant factor in a variety of musculoskeletal pain syndromes[10].The work tasks of medical students involves significant use of 'head down' posture, for reading and writing, working on laptops, poor ergonomically designed work stations, sleeping with the head elevated too high, and performing variety of tasks those that require sustained mechanical load and constant trunk flexion. Medical students tend to have a greater prevalence of neck, shoulder, arm, low back and musculoskeletal disorders due to activities which require sustained periods of working. These may cause adverse physical health issues to medical students due to the variety of job functions. A previous study revealed that there is a significant correlation between forward head posture and disability in patients with neck pain. So altered forward head posture and lateral head tilting in cervical spine posture can cause early musculoskeletal problems like neck pain in medical students. The prevalence of musculoskeletal disorders rate ranged from 20.9% to 57.0% for the neck and shoulder among the various body parts. Head and cervical posture evaluation has been a concern for many years not only because of the purported relationship that exists between head and cervical posture in the presence of temporomandibular disorders, neck pain, and headache, but also because of the biomechanical relationship between the head and cervical spine.

Conclusions : From the study it can be concluded that there is quite higher tendency of alteration in cervical

spine posture as there is significant change in Craniovertebral angle, anterior head alignment in medical students which can lead to forward head posture, neck pain and musculoskeletal dysfunction. Thus we can say that CVA and AHA is easy to understand and can be used to assess forward head posture & lateral tilting in normal individuals to prevent musculoskeletal dysfunction, neck pain, rounded shoulders.The main limitation of the study was the subjectivity of the angles in photograph. Both the angles and photograph were subjective so chances of personal and technical error are there.

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