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"EVALUATION OF CORRELATION BETWEEN SCAPULAR POSITION, NECK PAIN AND HEAD POSTURE IN YOUNG ADULTS (18 – 26 years): A CORRELATIONAL STUDY"

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Abstract

Background: Nowadays due to change in postural habits, prolonged static load, working posture, involving neck and shoulder muscles are exposed to increase of shoulder and musculoskeletal disorders. Among young adults, complains concerning the musculoskeletal system are most frequently reported from neck, shoulder and back. Because of these changes there may be alteration in scapular positions. Thus this changes in scapular position causes many effects as body structure and functions, cervical pain, change in head posture. Thus there is need to be carried out to find out correlation of change in scapular positions with neck pain and head posture.

Method: 65 healthy young adults (age group 18-26yr) were selected for study on the basis of inclusion and exclusion criteria. The change in scapular positions was assessed using modified lateral scapular slide test. Neck pain was assessed using VAS scale. Head posture (craniovertebral angle) was assessed using MB ruler software.

Results: It was found that there exists a negative correlation between scapular positions and craniovertebral angle (r value= -0.074, p value= 0.569)

Conclusion: The study concluded that , there exists a significant correlation between scapular position and head posture and there is no correlation between scapular position and neck pain.

Key words: scapular position, neck pain, head posture, modified lateral scapular slide test, craniovertebral angle.

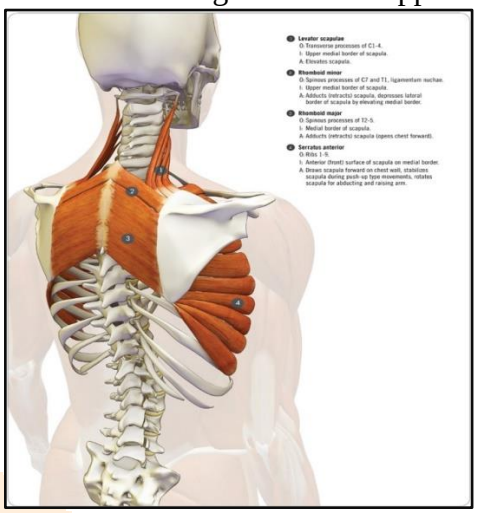
INTRODUCTION

Scapula normally, called as shoulder blade, it rests at a position on posterior thorax approximately 2 inches from midline, between second and seventh ribs. The scapula is internally rotated from vertical, and is upwardly rotated 10 to 20 degrees from vertical.[1]

Scapula plays a very important role in smooth mobility of glenohumeral joint.

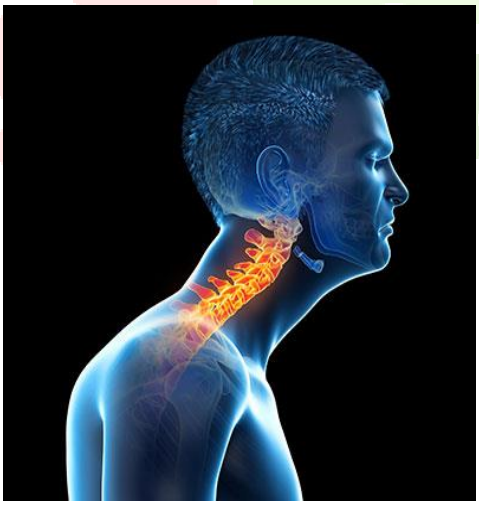
1. A primary role of the scapula is that it is integral to the glenohumeral articulation, which kinematically a ball and socket configuration
2. The second role of the scapula is to provide motion along the thoracic wall.
3. Final role that the scapula plays in shoulder function is as a link in proximal to distal sequencing of velocity, energy & forces of shoulder function [2]

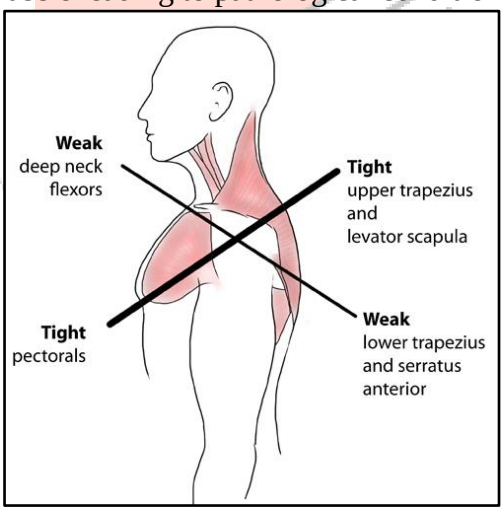
Scapular motion and arm motion are coupled in closed chain fashion that produces normal 'scapulohumeral rhythm. In overall ratio of 20 of glenohumeral to 10 of scapulothoracic motion during arm elevation is commonly described and this combination of concomitant glenohumeral and scapulothoracic motion is most commonly reffered to as scapulohumeral rhythm. According to the 2-to-1 ratio framework, flexion or abduction of 900 in relation to the thorax would be accomplished through approximately 600 of glenohumeral and 300 of scapulothoracic motion. Significance of th is rhythm lies in providing stability proximally at shoulder for efficient work of distal segment of the upper extremity. [3]



Now a days many people tend to maintain a position that causes fatigue in neck and shoulder. When the position is maintained for a long period, particularly muscles related to maintaining the position suffered from loading and fatigue. [4] In particular, scapula may be affected by abnormal alignment of surrounding body parts. Abnormal or altered scapular position is defined as an observable alteration in the position and the motion of the scapula relative to thoracic cage. [5]

Scapular asymmetry also has bad influence on alignment of cervical joint, causing neck pain. Mechanical neck pain is also reffered as non specific neck pain. It may defined as pain which aggrevated by movement, relived by rest and that is not associated with serious pathology. [4] Also the any deviation from the normal postural pattern adversely affects the adjacent joint and muscle leading to pathological condition.[3]





Forward head posture is the most common deviation from normal curvature in cervical spine.[1] Where the head protrudes forward from the saggital plane and appeared to be positioned in front of the body.

Forward head posture which is defined by Hertling et al. as follows " When the head is held anteriorly , the line of vision will extend downward if the normal angle at which the head and neck meets is maintained. Forward head posture, increases extension of atlanto occipital joint and upper cervical as well as flexion of lower cervical and upper thoracic vertebra. In FHP, center of gravity of the head shifts in antero-superior direction, increases the load on the neck which causes dysfunction of musculoskeletal system.

Upper cross syndrome is also reffered to as proximal or shoulder girdle syndrome. In this there is tightness of the upper trapezius and levator scapulae on the dorsal side crossed with tightness of pectoralis major and minor. Weakness of the deep cervical flexors ventrally crosses with weakness of middle and lower

trapezius. This pattern of imbalance creates joint dysfunction particularly at atlanto occipital joint, C4-C5 segment , cervicothoracic joint, glenohumeral joint, and T4-T5 segment.

METHODOLOGY

Sample size: 65
Study Design : Correlational study
Study setting : Dr Ulhas Patil Medical College, Jalgaon
Target Population : Young Adults between 18 to 26 years of age group
Sampling Method : Convenient sampling Technique

SELECTION CRITERIA:

Inclusion criteria:

- Young adults with age of 18 to25
- Both gender
- Subject with informed consent

Exclusion Criteria:

- Subjects with:
- Fracture or trauma of upper limb and cervical spine
- Young adults who exercises or attain exercise session daily,
- Neurological disorder related to upper limb.
- Idiopathic or congenital head, neck, and shoulder trauma.
- Obese subjects

Outcome Measures

1. MB ruler- to assess craniovertebral angle
2. Modified Lateral Scapular Slide Test
3. VAS – to assess neck pain

Materials required:

1. Mobile camera
2. MB ruler software
3. 1 and 2 kg dumbbells
4. Consent form
5. Measuring tape
6. Adhesive marker

PROCEDURE

To conduct the following study permission was taken from Dr.Ulhas Patil college of Physiotherapy, Jalgaon

1. Ethical clearance was obtained from the institutional ethical committee. The purpose & procedure of the study was explained to participant.
2. A written consent was obtained.
3. Subject were screened according to the inclusion and exclusion criteria
4. Total 65 subject were included in the study.
5. Selected participant were evaluated for the presence of change in scapular position using a valid & reliable method – modified lateral scapular slide test:
6. Selected participants head posture (craniovertebral angle) were assessed using a valid and reliable photogrammatic method – MB ruler software.
7. Selected participants also assessed for neck pain by using Visual Analouge Scale.

Assessment of change in scapular position by using modified lateral scapular slide test :

- Subject were assessed for change in scapular position using modified lateral scapular slide test.
- In this experiment 6 test positions were used as follows:

a) 1st position of test – upper limbs hanging beside the body & the examiner measure the least linear distance between T7 spinous process and inferior angle of scapula using vernier caliper.
b) 2nd position of test- upper limbs at 90˚ of with internal rotation of arms, then linear distance between them was measured .
c) 3rd position of test- subjects was asked to keep their upper limbs at 90˚ of scaption with internal rotation of shoulder.

d) 4th & 5th test position- subjects was asked to keep their upper limbs at 90˚ of scaption with internal rotation of shoulder with 1, 2 kg weights again examiner will measure the linear distance.

e) 6th test position – the subjects was asked to keep their trunk fixed and move up their arms upto 180 degree without having weight in hand.

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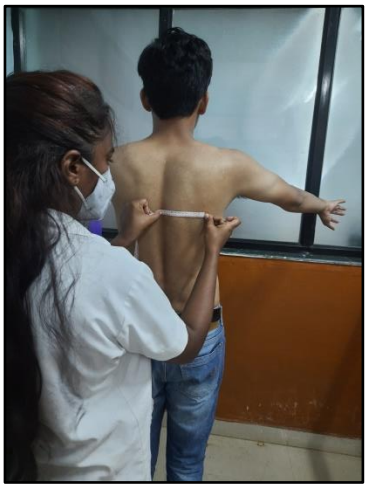
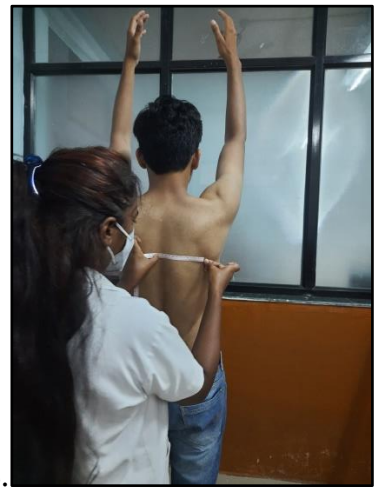
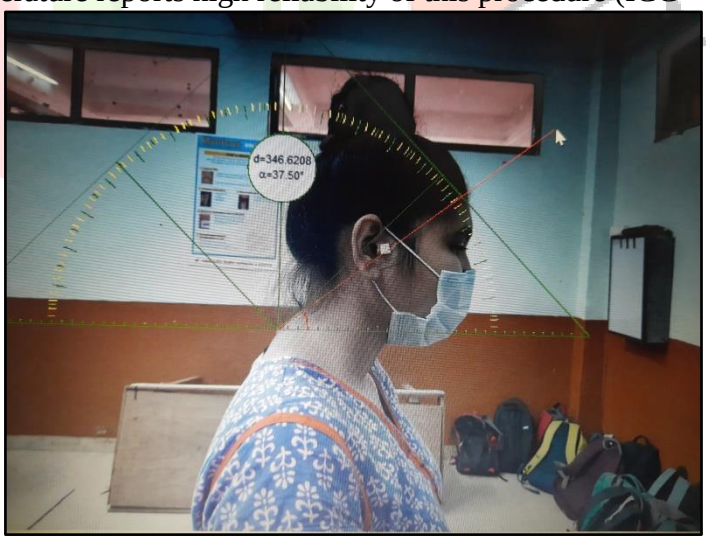
2. 
3. 

Assessment of forward head posture (measurement of craniovertebral angle) using MB ruler software

- Subjects were assessed for any deviation of head posture using valid & reliable computerized photogrammetry with emphasis on craniocervical segment.
- The photographic records was obtained from a mobile camera positioned 60cm from the subject, allowing the recording of the face and upper trunk in the sagittal plane (right and left views).
- The subject were sitting over stool and looking forward in relaxed posture. Skin over anatomical landmark was wiped with cotton soaked in spirit to remove skin secretions for proper fixation of adhesive markers. Adhesive markers were fixed over the anatomical landmarks. Anatomical landmarks were spinous process of C7, tragus of left or right ears.
- The subject was kept standing, looking forward in a relaxed posture.
- The photographs was analyzed using MB ruler software – the craniovertebral angle (CVA), that is the angle between the horizontal line passing through C7 and a line extending from the tragus of the ear to C7 was obtained. The literature reports high reliability of this procedure (ICC = 0.88).



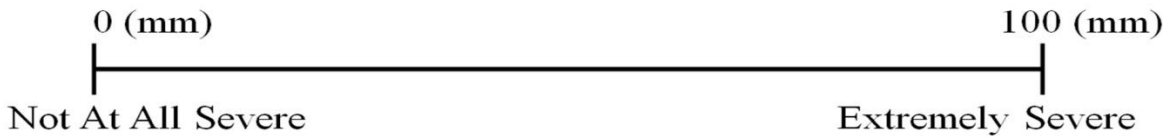
Assessment of neck pain using visual analogue scale :

- The subject were assessed for neck pain using a visual analogue scale.

The pain VAS is unidimentional measure of pain intensity, which has been widely used in diverse adult population.

The most simple VAS is a straight horizontal line of fixed length, usually 100 mm. the ends are defined as the extreme limits of parameter to be measured like pain oriented from the left(worst) to the right(best)

Note how severe you feel your disease state is with a mark (|) on the line below.



DATA ANALYSIS

STATISTICAL METHOD USE The entire data of the study was entered and cleaned in MS excel before it was statistically analysed in 'Graphpad instant version 3.05. All the result are shown in tubular as well as graphical format to visualize the data on qualitative characteristic was presented as n {% of case} The data on quantitative characteristic was presented as mean standard deviation. The statistical significance of correlation between scapular position with neck pain and forward head posture carried out using pearson's correlation coefficient test. The p value less than 0.05 are considered to be statistically significant.

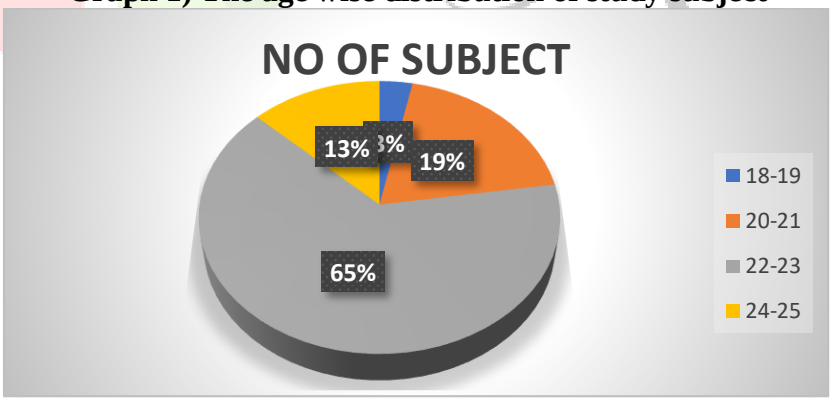
OBSERVATION AND TABLES

Table 1) The age wise distribution of study subjects

Age in years	No of subjects (n=65)
18-19	2
20-21	12
22-23	40
24-25	8

In study 2 subject were between 18-19 years of age, 12 subject were between 20-21 years of age, 40 subject were between 22-23 years of age, 8 subject were between 2425 year of age.

Graph 1) The age wise distribution of study subject



Comments – The graph shows age wise distribution of study

Table 2) Evaluation of scapular position using modified lateral scapular slide test

MLSST POSITION	RIGHT	LEFT
Position 1	79.97	76.85
Position 2	88.56	84.58
Position 3	97.83	93.32
Position 4	102.6	98.65
Position 5	107.84	103.44
Position 6	119.82	114.3

This table infers that mean value of scapular distance of 6 scapular position by using modified lateral scapular slide test.

Graph 2) Scapular positions of MLSST subject.

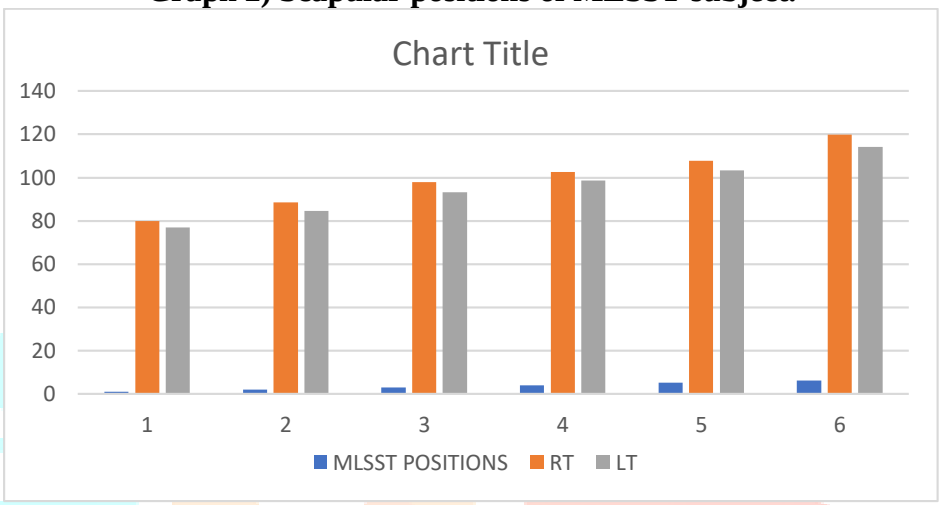


Table 3) Evaluation of neck pain on VAS in mm

VAS SCORE	
MEAN	8.06

This table infers that the mean value of neck pain among 65 subject.

Graph 3) evaluation of neck pain on VAS in mm

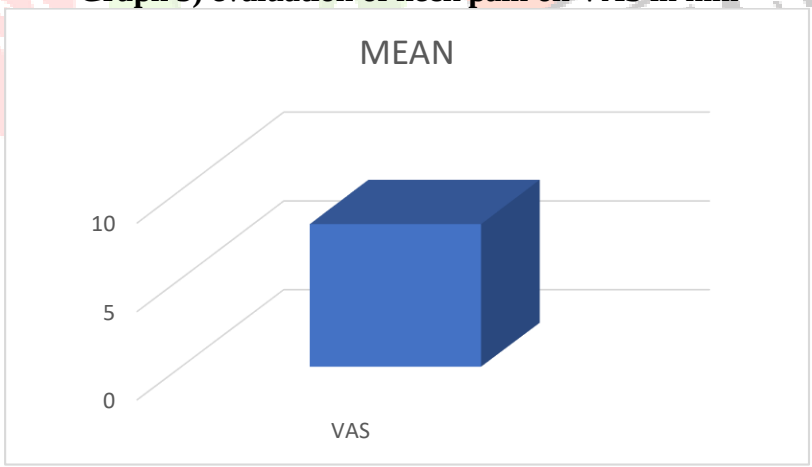


Table 4) Evaluation of forward head posture

Forward head posture	No of subject
Yes	44
no	21

This table infers that, among total 65 subject, 44 subject had forward head posture and 21 subject has normal posture.

Graph 4) Evaluation of forward head posture

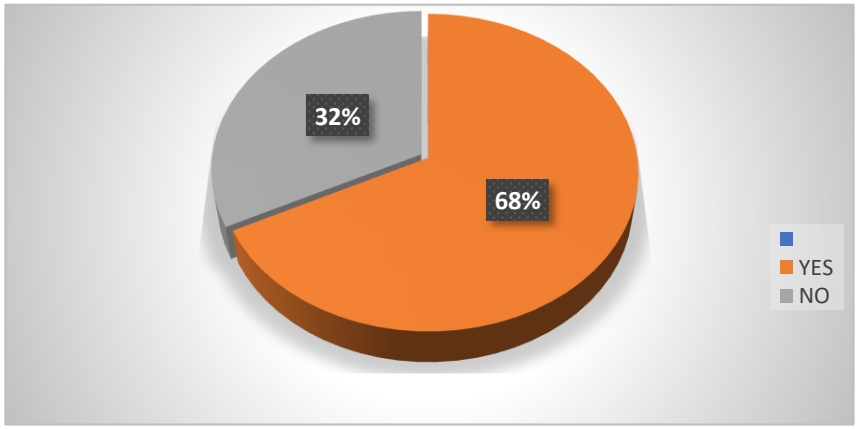
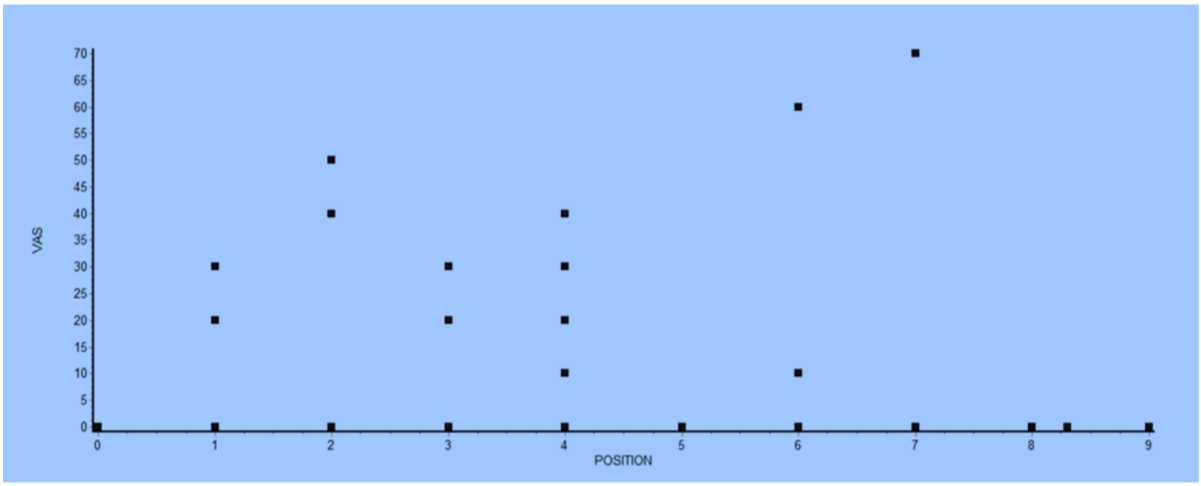


Table 5) Correlation of scapular position with neck pain

Scapular position	Neck pain	Pearson correlation coefficient	P value
4.03	8.06	**-0.074**	**0.569**

Values are mean standard deviation. P value and r correlation coefficient are obtained using pearsons correlation coefficient test, after confirming the underlying normality assumption.

Graph 5) correlation of scapular position with neck pain (vas)



Comments-

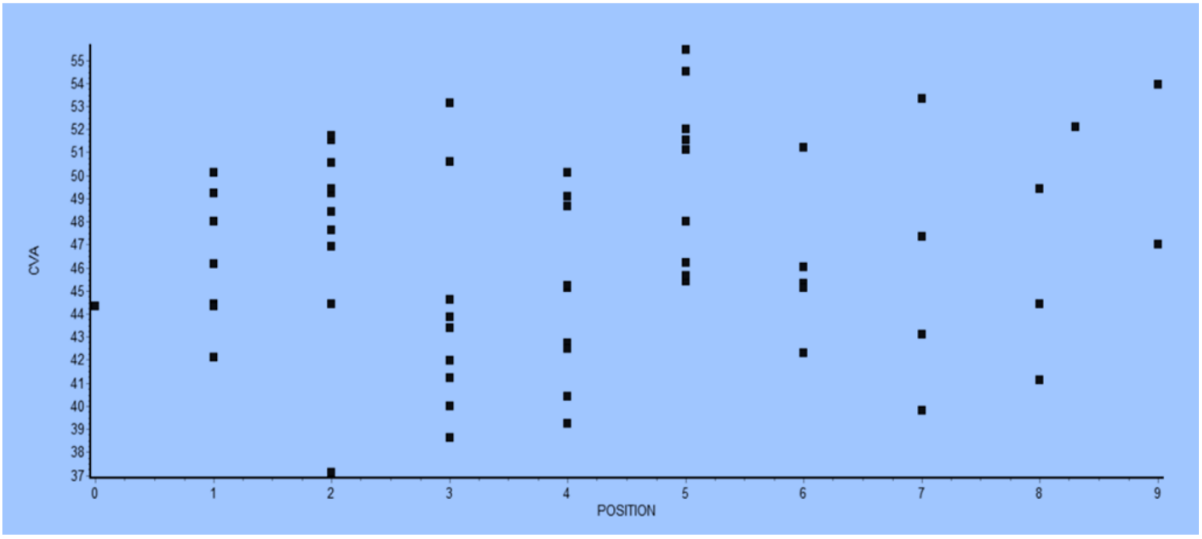
There were no significant correlation found between scapular position and neck pain.

Table 6) Correlation of scapular position with forward head posture

Scapular position	Forward head posture	Pearson correlation coefficient	P value
4.03	**46.64**	**-0.254**	**0.046**

Values are mean standard deviation. P value and r correlation coefficient are obtained using pearsons correlation coefficient test, after confirming the underlying normality assumption.

Graph 6) correlation of scapular position and craniovertebral angle



Comments-

There were moderate negative correlation (r= -0.254) found between scapular position and craniovertebral angle.

This means that as scapular position increases, craniovertebral angle decreases.

RESULT

1.There is no significant abnormality observed in all 6 scapular position of modified lateral scapular slide test.

2. There is minimal pain among young adult (vas).

3. From above all 65 subject , 44 subject had forward head posture.

4. There is significant negative correlation exist between scapular position and craniovertebral angle. r value= -0.254 and p value = 0.046.

5. There is not significant negative correlation exist between scapular position and neck pain. r value = -0.074 and p value = 0.569

DISCUSSION

The primary purpose of the study is to evaluate CORRELATION BETWEEN SCAPULAR POSITION, NECK PAIN AND HEAD POSTURE

The present study was carried out to see the correlation between scapular position with neck pain and forward head posture. In this particular study, total 65 physiotherapy students, of age group (22 ± 4) had participated.

This participants were evaluated as per the data collection sheet.

Outcome measure in the study shows the following result.

Variable 1: Scapular position

In our study there is no significant abnormality found in all 6 scapular position with modified lateral scapular slide test.

The result found in our study is accordance with study done by **Thomas Curtis & James Roush (2006)** on the lateral scapular slide test: a reliability study of males with and without shoulder pathology.

In this study, Kibler1,4 described a test to clinically measure static scapular positions called the lateral scapular slide test (LSST). This test involves measuring the distance from the inferior angle of the scapula to the nearest vertebral spinous process using a tape measure or goniometer in three positions: shoulder in neutral, shoulder at 40-45 degrees of coronal plane abduction with hands resting on hips, and the shoulder at 90 degrees abduction with the arms in full internal rotation.

Kibler1,4 contends that the injured or deficient side would exhibit a greater scapular distance than the uninjured or normal side and asserted that a bilateral difference of 1.5 cm (15 mm) should be the threshold for deciding whether scapular asymmetry is present.

The current study showed that there is no significant abnormality occur in scapular position due to sedentary lifestyle. There is minimal overhead repetitive task done by student which causes a scapular muscle fatigue,

imbalance or weakness, lack of muscular capsular flexibility & puts demands on scapulohumeral stabilizers, that could resulting in alteration in this normal scapulohumeral rhythm.

Variable 2: Forward head posture

in our study, among all 65 subjects there were 44 subject had forward head posture.

The result found in our study is accordance with the study done by **Arfaz Naz & Muhammad Salman Bashir (2018)** on prevelance of forward head posture among university students. This cross sectional study was carried out on 197 students from our different universities.

The current study showed that the prevelance of forward head posture was found to be 68% among young adults. Thus among total 65 subjects, 44 subject had forward head posture. This high prevelance may be related prolonged use of mobile phone, faulty posture or lack of awareness about proper posture in them.

Forward head posture is the anterior positioning of the cervical spine. Most people employed in economic activities complain neck,shoulder and lower back pain. In particular when uses a computer or smartphone in an inappropriate posture for a long time , the centerline of the head moves forward and upward , which causes an increase in the weight of the head supported by the neck, ultimately result in changes in the head , neck, shoulder. If the head is located anteriorly for long periods, the bending moment of the head increases, and compensatory excessive strenghtning of the upper neck joints and atlanto-occipital joints is required to fix the gaze to the front. This can cause shortening of the posterior head and the neck muscles and the upper neck bones can protrude relatively forward when the face is oriented upward.

Variable 3: Neck pain

In our study, there is minimal amount of neck pain found in young adults.

The result found in our study is accordance with the study done by **Su-Rim Kim, Mi-Hee Kang (2016)** on correlation among scapular asymmetry, neck pain and neck disability index in young adult women with slight neck pain. In this study scapular asymmetry showed moderate positive correlation with neck pain.

The current study showed that there was minimal pain found among young adults as there were no significant abnormalities found in scapular position.

The chief objective was to evaluate the correlation between change in scapular position with neck pain and head posture.

Variable 4: craniovertebral angle & scapular position

Correlation between craniovertebral angle and scapular position

Pearsons correlation coefficient test used for analysis on data (n=65). On correlating score with pearson correlation coefficient test the r value= -0.254 & p value obtained was <0.0001 which implies that there is moderate negative correlation exist between craniovertebral angle and scapular position (table 5). This suggest that as craniovertebral angle increases, change in scapular position decreases.

This findings are supported by a research done **by Ashiyat k. Akodu, Sunday R, Akinbo and Queen O (2018)** conducted a study on correlation among smartphone addiction, craniovertebral angle, scapular dyskinesia, and selected anthropometric variables in physiotherapy undergraduate which done on in 77 subject . in this study it was observed that there is no significant relationship between scapular dyskinesia and craniovertebral angle.

In our study, there is a negative correlation between forward head posture (CVA) and scapular position which implies that participants with abnormal craniovertebral angle (low) have low scapular dyskinesis, and this may be because an increase in craniovertebral angle cause weakness of the mid trapezius and serratus anterior muscle associated with scapular stability.

CONCLUSION

It was concluded that there was no significant abnormalities found in scapular position.It was found that there is moderate negative correlation exist between scapular position and forward head posture.There were no correlation exist between scapular position and neck pain.

LIMITATIONS

1. The age considered in study were 18-25.

SUGGESTION AND FUTURE SCOPE

1. Different age group population can be considered.
2. For measuring distance between 2 scapula digital vernier caliper can be used.
3. Can be done by comparing on symptomatic and asymptomatic subjects.

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