Prevalence of an "Upper Crossed Syndrome in Physiotherapy College Students" – A Cross-Sectional Study

Dr. Pooja Dhage[1], Dr. Deepak Anap[2]

[1]Post Graduate Student, [2]Professor & Head, Department of Musculoskeletal Sciences, Dr. Vithalrao Vikhe Patil Foundation's College Of Physiotherapy, Ahmednagar - 414111

Corresponding Author : Dr. Pooja Dhage

Mail id : pooja8dhage@gmail.com

Mobile No.: 9503410744

Address : Department of Musculoskeletal Sciences, Dr. Vithalrao Vikhe Patil Foundation's College Of Physiotherapy, Ahmednagar-414111

Abstract :

Background : Neck pain can occur at any stage, due to muscular imbalance which can restrict daily activities of an individual, and can lead to an Upper Crossed Syndrome (UCS). Muscle balance can be defined as relative equality of muscle length or strength between an agonist and an antagonist. Very few studies are available in the literature on the prevalence of this condition. Hence, a study was undertaken to establish the prevalence of the UCS in physiotherapy students of College of Physiotherapy, Ahmednagar. **Objective :** To determine the prevalence of upper crossed syndrome in physiotherapy college students. **Methods :** In this cross-sectional study, 46 participants were selected for the study. They were assessed for cervical flexor strength by using pressure biofeedback, pectoralis minor tightness by using the measuring tape and craniovertebral angle by using ON Protractor mobile application. **Result :** Among 46 participants, the prevalence of an upper crossed syndrome was 30.43%. **Conclusion :** Upper crossed syndrome was highly prevalent in College students. Poor posture habit is found to be a risk factor.

Keywords: Upper Crossed Syndrome, Pectoralis Minor Tightness, Craniovertebral Angle.

Introduction : Upper Crossed Syndrome is defined as the tightness of the upper trapezius and levator scapulae on the dorsal side cross with tightness of pectoralis major and minor. The weakness of deep cervical flexors ventrally crosses with weakness of the middle and lower trapezius.[1]

Effects of UCS include increase in cervical lordosis, increased thoracic kyphosis, elevated, protracted or rounded shoulders and winging of scapula patient complain of neck pain, strain in upper back, chest pain, shoulder numbness and tingling.[2] Deformed muscles those are associated with UCS, creating stress on surrounding muscles, tendon, bones, and joints which produced altered biomechanics of posture in upper back.[3]

The estimated incidence of neck pain from available studies ranges between 10.4% and 21.3% with a higher incidence noted in office and computer workers.[4] Prevalence is generally higher in women, higher in high-income countries compared with low- and middle-income countries and higher in urban areas compared with rural areas.[4,5]

Methods : A cross-sectional study was conducted on physiotherapy students of college of Physiotherapy, Ahmednagar. Written informed consent was obtained from the study participants. Ethical clearance for the study was obtained from the Institute ethics committee. Using convenient sampling, 46 physiotherapy students with neck pain had been included, from the age group of 17-25 years, and were assessed on the basis of deep neck flexor strength, pectoralis minor tightness and craniovertebral angle.

For measurement of deep neck flexor strength, pressure biofeedback technique was used. Participant in a supine position with hip and knees flexed to 90 degrees to avoid lumber lordosis, no pillow under the head, pressure biofeedback kept under the cervical region pressure increased by 20mmHg and asked participants to pressed the neck and 3 readings were taken and an average of three noted.**(Fig 1)**[6]

Fig 1: Measurement of deep flexor strength by using pressure biofeedback

Pectoralis minor length (PML), measured by using measuring tape. Participants were asked to stand with their arms at their sides and look straight ahead in this resting position. To avoid conscious postural correction, the subjects had been asked to stand in the same position several times prior to data collection. Measuring tape placed on the fourth rib at the sternum and the inferomedial aspect of the coracoid process. Distance was calculated 3 readings were taken and an average of three noted.**(Fig 2)**[7]

Fig 2: Measurement of Pectoralis Minor Tightness

For measurement of Craniovertebral angle, smartphone application ON Protractor was used. Participant in sitting on a stool with an erect posture, hand by the side, they asked to focus on a particular point with the neck in a neutral position, hip and knee in 90 degrees of flexion and foot rest on the floor. Marker placed on C7 to tragus and a horizontal line extending from C7 to Marker and angle measured. **(Fig 3)**[8]

Fig 3: Measurement of a craniovertebral angle using ON Protractor mobile application
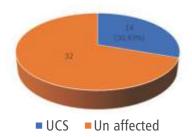

Result : The result was analyzed using SPSS version 24. A total of 46 participants were included in our study, 14 were positive for the Upper Crossed Syndrome (UCS). The Mean age of participants were 20.78 ± 2.00 years, and Mean BMI were 20.00 ± 1.52.**(Table 1)**

Table 1: Baseline - characteristics of the participants

	Mean ± SD
AGE	20.78 ± 2.00
HEIGHT	162.14 ± 6.19
WEIGHT	52.61 ± 5.50
BMI	20.00 ± 1.52

Chart 1 : Showing Subjects affected with the Upper Crossed Syndrome (UCS)
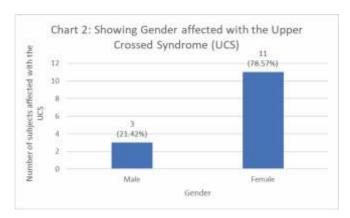

■ UCS   ■ Un affected

Chart 2: Showing Gender affected with the Upper Crossed Syndrome (UCS)

Table 2 : Mean and SD for Deep cervical flexor strength

Deep cervical flexor strength	26.4 ± 4.94

Mean and SD of Deep cervical flexor, was 26.4±4.94.**(Table 2)**

Table 3 : Mean and SD for Pectoralis Minor Tightness

Pectoralis Minor Length	Right Side	Left side
	6.92 ± 0.51	6.71 ± 0.48

Mean and SD of Pectoralis minor tightness on the right side was 13.17 ± 1.39, and on the left side it was 12.12 ± 1.12.**(Table 3)**

Table 4: Mean and SD for Craniovertebral angle

Craniovertebral Angle	54.08 ± 3.19

Mean and SD of craniovertebral angle was 54.08 ± 3.19, a normal range for craniovertebral angle less than 49°. Functionally Correctable range 49°- 59°.**(Table 4)**

Discussion : In the current study we found that the prevalence of upper crossed syndrome in physiotherapy college students is 30.43%. The prevalence of UCS in male was 21.42% and in female it was 78.58%. Mean and SD for deep cervical flexor strength was 26.4±4.94, Sue Hudswell et al studied in 2005 concluded that deep cervical flexors were more prone to develop weakness in neck pain symptoms.(9) Mean and SD for pectoralis minor tightness was 6.92±0.51 on the right side, and on the left side it was 6.71±1.76 pectoralis minor tightness index was calculated by pectoralis minor length divided by height of the participant and multiplied by 100, value less

than 7.44 indicated PML tightness.[10]

Mean and SD for Craniovertebral angle found 54.08±3.19 Various disorders of cervical region like-upper cross syndrome, cervical spondylosis, kyphotic posture, prolapsed intervertebral disc; scoliosis can affect the surrounding musculature leading to postural changes in the cervical region. Amongst these changes, forward head posture is most commonly seen which leads to muscle imbalance.[11] Weakness and tightness of upper crossed syndrome associated with prolonged use of visual display-terminal.[12]

Surendra Babu Darivemula et al, study on Work-related Neck Pain (WRNP) among desk job workers, where author noted WRNP prevalence was 43.3%. Workers working with closely placed keyboard and screen of the computers were at double the risk of suffering from WRNP.[13] Iqra Mubeen et al, did study on the "prevalence of upper cross syndrome among the medical students of University of Lahore", and they found the prevalence was 37.1%.[14]

Conclusion: The prevalence of Upper Crossed Syndrome in physiotherapy students in our study was 30.43 %. Bad postural habit is one of the common predisposing factor for the development of UCS in college students. Hence it's necessary to create postural awareness and ergonomic advice among the students.

References :

1. Janda MD (2007) Orthopedic physical assessment (5th edn) St. Louis: Sauders

2. Moore MK (2004) Upper crossed syndrome and its relationship to cervicogenic headache. J Manipulative Physiol Ther 27(6): 414-420

3. Pamela K. Levangie, Cynthia C. Norkin. The Ohio University. Joint Structure and Function: A Comprehensive Analysis 4th Edition 2005.

4. Hoy DG, Protani M, De R, Buchbinder R. The epidemiology of neck pain. Best Pract Res Clin Rheumatol. 2010 Dec; 24(6):783-92.

5. Maghsoud Eivazi GH, Amin Alilou, Solmaz Ghafurinia, Sara Fereudounnia. Prevalence of faulty posture in children and youth from a rural region in

Iran. Biomedical human kinetics. 2012 December; 4: 121-126.

6. Kisner c, Colby, LA Borstad,J. Therapeutic execise foundation and techniques. Fa Davis 2017

7. Kevin G. Laudner, Melissa Wenig, Noelle M. Selkow, Jeffrey Williams, Eric. Forward Shoulder Posture in Collegiate Swimmers: A Comparative Analysis of Muscle-Energy Techniques. Journal of Athletic Training 2015;50(11):1133–1139.

8. Sue Hudswell, Michael von Mengersen, Nicholas Lucas.The cranio-cervical flexion test using pressure biofeedback: A useful measure of cervical dysfunction in the clinical setting? International Journal of Osteopathic Medicine 8 2005 98-105.

9. Tae-Woon Kim, Da-In An, Hye-Yun Lee. Effects of elastic band exercise on subjects with rounded shoulder posture and forward head posture. J Phys Ther Sci. 2016 June; 28(6): 1733-7.

10. John D. Borstad, Paula M. LudewigThe Effect of Long versus Short Pectoralis Minor Resting Length on ScapularKinematics in Healthy Individuals. Journal of Orthopaedic & Sports Physical Therapy 2015.

11. Jinal a. Mamania deepak b. Anap dhanashree tanksale.Validity and reliability of 'on protractor' smartphone application for measurement of craniovertebral and cranio-horizontal angle. Int. j physiother, 2017.207-211.

12. Kevin G. Laudner, ; Melissa Wenig, Noelle M. Selkow, Jeffrey Williams, Eric .Forward Shoulder Posture in Collegiate Swimmers: A Comparative Analysis of Muscle-Energy Techniques. Journal of Athletic Training 2015;50(11):1133–1139.

13. Yoo, Won- gayu ,Yi chung-hwi,Kim min –hee. . Effects of a ball-backrest chair on the muscles associated with upper crossed syndrome when working at a VDT.2007,239-244.

14. Iqra Mubeen, Salman Malik, Waseem Akhtar Muneeb Iqbal Muhammad Asif Adil Arshad, Sobia Zia Saifullah Khalid. Prevalence of upper cross syndrome among the medical students of university of Lahore. Int J Physiother. 2016, 3(3), 381-384.