ijlpr 2022; doi 10.22376/ijpbs/lpr.2022.12.3.L66-72

International Journal of Life science and Pharma Research

ISSN 2250-0480

Research article

Physiotherapy

Clinical Implication of Cervical Pain on Posture among Teaching Professionals Aged Between 25-35 Years- A Cross Sectional Study

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Abstract: Cervical pain is amongst the incessant musculoskeletal disorders having a prevalence of 30% up to 60 % among teaching professionals. Cervical pain also known as neck pain; have consequences which are very severe among several working populations. Primary objective of study was to find out consequences of cervical neck pain on scapula position. Present study will embrace us about clinical implications of cervical pain on static scapular position further significant positive result lead to formation of specific scapular rehabilitation program for teaching professionals keeping all risk factors and their work ergonomics. Cross-sectional Comparative study design was used to identify the effect of cervical pain over resting position of scapula position with respect to scapula protraction and scapula upward rotation among 107 school teachers further to mention it is an extension of research work of primary author on school teachers. Scapula protraction was assessed at three different positions i.e at rest, 45-degree shoulder flexion and 90-degree glenohumeral abduction and scapula upward rotation was examined with the help of baseline digital inclinometer at four different positions. Results exhibit changes in scapula protraction and upward rotation among school teachers keeping p value < 0.001. Since school teachers primarily work on computer screen for teaching and preparation of lesson plans, this executes enormous load on teachers as they have to work continuously in static cervical posture for long hours continuously which executes significant load on neck and scapulothoracic musculature and alters the mechanics cervical pain results in statistically significant changes in scapula position i.e., scapula protraction, and scapula upward rotation in primary school teachers in all examined positions.

Keywords- Neck Pain, Scapula Posture, Protraction, Musculoskeletal Disorder, And Upward Rotation

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Received On 16 November, 2021
Revised On 19 March, 2022
Accepted On 10 March, 2022
Published On 1 May, 2022

Funding This research did not receive any specific grant from any funding agencies in the public, commercial or not for profit sectors.

Citation Jyoti Kataria,Dr. Bijender Sindhu,Dr. Sonia Pawaria , Clinical implication of cervical pain on scapula protraction and upward rotation among primary school teacher aged between 25-35 years- A cross sectional Study.(2022).Int. J. Life Sci. Pharma Res.12(3), L66-72 http://dx.doi.org/10.22376/ijpbs/lpr.2022.12.3.L66-72

I. INTRODUCTION

Cervical pain is sought to be very predominant disorder among school teachers having prevalence of 30% till 60%[1]. Musculoskeletal problems/ disorders comprise one of the most exorbitant and serious health hazards presently among school teachers. Chronic neck pain brings about serious musculoskeletal changes and may execute permanent changes in orientation of cervical spine if left untreated.[2] Cervical pain develops under unfavourable conditions which includes working in awkward posture for prolonged hours, any history of fracture/ trauma, development of degenerative changes, upper cross syndrome, muscular imbalance, and prolonged stress.[3] Teaching in any form is a formidable job, hence teachers generally while working are invariably subjected to enormous loads which influence their physical health significantly. Prevalence studies among teachers exhibits that majority were suffering from serious health issues especially regions like shoulder (73%), cervical (68%), and lumbar (59%) being most prevalent as compared to rest of the human body.[4] Black board/ white board teaching necessitate overhead activity and needed functioning in head extension along with arm elevation position, this has put noteworthy load on dominant upper limb as well as resting scapula position.[4] Teachers occasionally readjust in to several postures voluntarily and once in a while involuntarily in to infelicitous posture which further executes lot of stress on supporting structures of cervical spine. Hence it may put significant and prominent changes in functioning of neck and upper limb normal movements.[5,6]. Teachers mostly work in forward head posture, flexed neck posture, and to be precise in the present situation owing to the pandemic, most of the teaching involves working in front of computer/ laptops and screen. This long hours leads to escalation of screen time as well as sitting hours in awkward posture, hence prevalence of musculoskeletal disorders has exponentially enhanced.[7] Scapula is bone which clears the way for smooth functioning of glenohumeral joint as well as cervical spine, hence smooth static and dynamic balance is imperative for error free motion at cervical spine and glenohumeral joint.[8,9]. Irrespective of high incidence of cervical pain several variations still persist which differentiate the cervical pain with respect to its causative factor.[10,11]. Cervical pain is a musculoskeletal condition which encompass its own variable clinical course; however, it is mostly represented as continuous, or episodic, this fact may be elucidated as because of presence of coalition of the problem with various physical as well as psychosocial factors.[12,13] . As school teachers have a high prevalence of musculoskeletal disorder it is necessary to identify the risk factors and other associated factors which may execute a significant role in development of musculoskeletal disorder. Hence the intent of the study was to assess the resting position of scapula among school teachers who are suffering from cervical pain, as school teachers are under enormous load and they tend to work continuously in head down posture which may affect the resting positioning of scapula, so to identify its role in cervical pain present study was performed on school teachers' population. As cervical pain is a serious occupational hazard and being a Physiotherapist by profession, results of present research may embrace the opportunity to counsel them and assess them for their holistic wellbeing in future. Present study will explain the role of scapula with cervical pain however if results from present study observed to be significantly positive it may assist in formation of specific scapular rehabilitation program which is specially designed for school teachers keeping all risk factors in knowledge.

2. MATERIALS AND METHODS

2.1 *Study Design and Setting*

Cross-sectional Comparative study design was used to identify the effect of cervical pain over resting position of scapula position with respect to scapula protraction and scapula upward rotation. Study was performed among school teachers working in schools situated at New Delhi, Haryana, and Uttar Pradesh. All procedures performed in the present study involving human participants were in accordance with the ethical standards of the SGT university institute review board Ref no. SGTU/FOP/2019/45. Written consent was taken from the patients/ individuals for participating in the study. While performing study, confidentiality and obscurity of the participants were maintained as their personal details like name and contact were not included and asked by the examiner. ***Sample Size*** (n) Assuming that 45% of the subjects in the population have the factor of interest, the study would require a minimum of 41 sample size for estimating the expected proportion with 5% absolute precision and 95% confidence.[14] Sample size $N= Z^2 p(1-p)/ d^2$ (N- Sample Size, Z- Confidence level, p- population size/proportion, d- margin of error). Although data was collected form 100 school teachers.

2.2 *Study Sample*

School teachers who were working on a regular basis in both government and private aided schools were included in the study. All school teachers aged between 25-35 years of age, working seven hours per day or more were selected. Teachers having cervical pain as per numeric pain rating scale score value between 4- 10 were selected. Teachers who had surgical history of vertebral columns, working as guest faculty, having cardiorespiratory, neurological, psychiatric disorders and any malignancy were excluded from the study.

2.3 *Data Collection Procedure*

Convenience sampling technique adapted for data collection. Purpose & intention of the study was well delineated to all subjects and post their due written consent subjects were assessed and examined. Variables studied are age, gender, span of cervical pain, teaching experience, working hour / day and type of school (government aided or private aided).

2.4 *Examination Of Static Scapula Protraction- Lateral Scapular Slide Test (LSST)*

Lateral scapular slide test devised by Kibler was utilised for examination of scapula protraction at three varied orientations of upper limb. LSST is used to investigate any kind of unevenness of static scapula position under assorted loads.[15,16] Primarily lateral scapular slide test is employed to assess scapula position in arms abducted position.[17] Subjects were asked to take up first position of scapula protraction assessment where physical therapist palpated inferior border of scapula and marked it and identified the corresponding spinous process of thoracic spine further with the help of vernier calliper distance between inferior border of scapula and spinous process was measured and noted. Similarly for the second position, subjects were asked to place

their hands on their hip joint where the thumb placed posteriorly which is 45^0 of glenohumeral abduction[18,19]. Lastly assessment of the third position of scapula required subjects to place their glenohumeral joint in 90^0 abduction while maintaining glenohumeral joint in internal rotation. The difference between right and left side of scapular measurements should not vary more than 1 to 1.5cm..[22].examiner by manual palpation identified inferior angle of scapula and marked it with the help of marker. After palpation of inferior angle of scapula the examiner palpated and marked the corresponding spinous process of vertebra in the horizontal plane and measured the distance between these two reference points.[22]

2.5 *Measurement Of Scapular Upward Rotation*

Scapula Upward rotation was recorded with the help of 'Baseline digital inclinometer' where subjects were asked to stand in relaxed position followed by placement inclinometer over the spine of scapula. Hold button placed in inclinometer was pressed to record the scapula upward rotation. Measurements were taken at four positions i.e "At resting position, At sixy degree glenohumeral abduction, At ninety-degree glenohumeral abduction and at one hundred twenty-degree glenohumeral abduction.[23] Cervical pain was recorded by utilising numeric pain rating scale. It is self-reported scale for assessment of pain intensity zero states no pain and ten states most severe pain.[24]

3. STATISTICAL ANALYSIS

The data obtained were analysed using SPSS software version 23. Students' 't' test was used for analysis of comparison. The data were presented as mean and Standard deviation SD. Probability value (p) of less than 0.05 was considered statistically significant.

4. RESULTS AND DISCUSSION

Demographic characteristics i.e., gender, surgical history, and type of school among primary school teachers N-107 were summarised in Table 1. There was 10 males (10%) and 90 females (90%), suggesting homogeneity was not maintained in gender distribution due to availability of sample in study population. 15 (15%) teachers reported surgical history and 85 (85%) reported having no surgical history. Majority of school teachers 65 (65%) were from government schools if compared with private school 35 (35%).

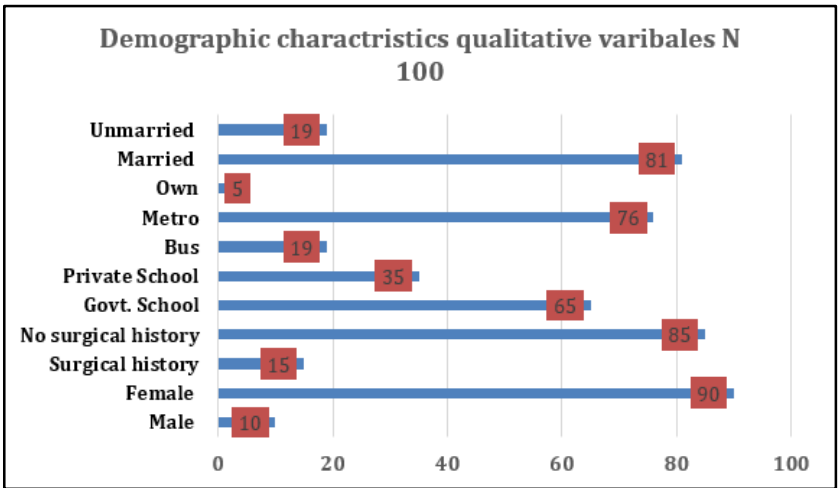
Table 1: Demographic features of teaching professionals in New Delhi, (N -100)

Variable	Frequency (N)	Percent %
Gender		
Male	10	10%
Female	90	90%
Surgical History		
Yes	15	15%
No	85	85%
Type of School		
Government	65	65%
Private	35	35%

Table 2. Majority of teachers travel daily by metro 76 (76%) and 19(19%) utilise bus as mode of travel and very few uses their own mode of travel. Marital status of teachers represents majority are married 81(81%) and unmarried were 19(19%) . Further results exhibits majority of schools of Delhi NCR lacks digital mode of teaching and utilise conventional mode of school teaching which involves black/white board primarily although there were few schools where digital mode 18(18%) of teaching facility is available whereas school teachers prefers to utilise conventional mode of school teaching due to several issues. School teachers reported major reason was technical issues faced during classes, they also mentioned that limited classrooms have access of digital mode of teaching and since they are more comfortable in white board teaching they prefers to continue with it however they further add digital mode assist in many ways where they want to explain and discuss some concept as it gives better insight about the topic/concept and boost the interest of the students.

Table 2- Demographic features of school teachers (N -100)

	Frequency (N)	Percent %
Daily Commute mode		
Bus	19	19%
Metro	76	76%
Own	5	5%
Marital status of teachers		
Not Married	19	19%
Married	81	81%
Teaching mode available/ present in schools		
Black/ white Board only	82	82%
Board & Power Point	18	18%
Most Comfortable Mode of teaching		
Black/ white Board	87	87%
Power Point	13	13%

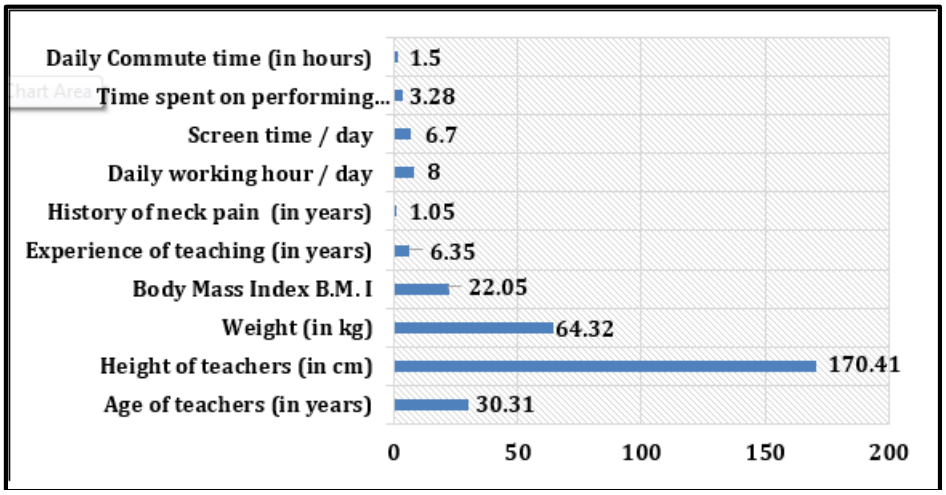


Graph 1- Demographics characteristics of school teachers

Tabel 3 exhibits descriptive statistics of quantitative variables which shows mean (S.D) age of 30.31(1.41), BMI ranged in normal healthy group with mean (S.D) 22.05 (0.41), teaching experience mean (S.D) 6.35(1.70), history of neck pain in years with mean (S.D) 1.05(1.00), daily hours of working mean (S.D) 8.00(0.15), screen time per day mean (S.D) 6.70(0.30), teachers also spend hours in performing administrative duties as well with mean (S.D) 3.28(0.53), and no. of hours spent daily in travelling include mean (S.D) 1.50(1.06).

Table 3: Descriptive statistics (95% CI)

Study Variable	Mean (N-100)	S.D 95% CI
Age of teachers (in years)	30.31	1.14
Height of teachers (in cm)	170.41	4.50
Weight (in kg)	64.32	2.36
Body Mass Index B.M. I	22.05	0.41
Experience of teaching (in years)	6.35	1.70
History of neck pain (in years)	1.05	1.00
Daily working hour / day	8.00	0.15
Screen time / day	6.70	0.30
Time spent on performing administrative work	3.28	0.53
Daily Commute time (in hours)	1.50	1.06



Graph 2- Demographics characteristics of quantitative variables of school teachers

Tabel 4: The Scapular Protraction recorded in three categories and further comparisons were made with Numeric pain rating scale scores NPRS Score**.** Results exhibits significant difference between scapula position with NPRS score among all three categories (Category 4to 5, category 6 to 7 and category 8 to 9) having p value < 0.001

Table: 4 Comparison of scapula position with NPRS Score				
Scapular Protraction	NPRS Score			P-Value*
	4 to 5 (n=18)	6 to 7 (n=67)	8 to 9 (n=15)	
Scapular Protraction at rest				
Mean	1.23	2.66	3.16	<0.001
SD	1.01	0.32	0.78	
Scapular Protraction at Hands on Hip				
Mean	0.19	1.76	2.34	<0.001
SD	0.70	1.35	1.23	
Scapular Protraction at 90 Degree Abduction				
Mean	0.32	2.89	2.90	<0.001
SDsss	0.88	1.64	1.20	

Scapular upward rotation UR was examined under four different positions which includes assessment at rest, at 60^0, 90^0 and 120^0 glenohumeral abduction which was compared with NPRS scores under three different categories .Results exhibits significant difference among all tested positions (Table-5)

Table 5: Comparison of NPRS score with Scapula UR				
Scapular upward rotation	NPRS Score			P-Value*
	4 to 5 (n=18)	6 to 7 (n=67)	8 to 9 (n=15)	
Scapular upward rotation at rest				
Mean	0.11	2.01	2.77	<0.001
Std. Deviation	0.23	1.89	2.01	
Scapular upward rotation at 60 degrees				
Mean	0.67	2.14	2.16	<0.001
Std. Deviation	0.89	1.55	0.55	
Scapular upward rotation at 90 degrees				
Mean	1.21	2.12	2.90	<0.001
Std. Deviation	0.91	0.78	0.87	
Scapular upward rotation at 120 degrees				
Mean	1.50	3.10	3.21	<0.001
Std. Deviation	0.87	1.01	1.09	

p value < 0.001

Present research was extension of previous work of author intended to find out effect of cervical pain/ neck pain on static position of scapula (scapula protraction and upward rotation among primary school teachers N-100 in New Delhi. Results exhibit statistically significant changes in scapular protraction (p value < 0.001) (table 4) and scapular upward rotation (p value < 0.001) (table 5). Wegner S et al (2010) has shown that reduced activity of scapulothoracic musculature especially upper, middle and lower trapezius fibres along with serratus anterior in consequence leads to alteration in force couple motion required to maintain correct posture. Further it is observed that neck pain leads to development of forward head posture which consequently results in alteration of force couple of scapulothoracic muscles which has significant effect in scapular movements [20,21.] Barbara Cagnie et al (2014), exhibits office workers who are having cervical pain tend to develop rounded shoulder / forward head position which alters the scapular orientation and static positioning among computer professionals. Since school teachers in present scenario are working on laptops and computers for teaching because of transition of teaching methods from conventional to modern, this produces enormous load on teachers as they have to work continuously in same cervical posture for long hours continuously which executes significant load on neck and scapulothoracic musculature and alters the mechanics.22 Rahman, N, & Warikoo D (2013) studied the effects of neck pain among school teachers where similar observations were made having positive relationship between musculoskeletal disorder primarily shoulder and neck pain with whiteboard teaching among school teachers.[23] Results suggest that poor work posture of school teachers lead to development of alterations in the biomechanics of shoulder and thoracic spine which further effects the static orientation of scapula.[23] Bhagyashri Badve and Shubhangi P.Patil (2021) studied the relationship between scapula position and cervical pain among school teachers where it was observed that there is presence of strong relationship between Scapular position and cervical spine pain among secondary school teachers 90-degree of shoulder abduction and internal rotation.[24]. Temesgen MH, Belay GJ et al (2018) studied that neck pain has significant effect on resting scapular position which includes altered scapular protraction and upward rotation in primary school teachers who identified to have several biomechanical alterations in scapula position.[25] Aldukhayel A, Almeathem F K (2021) studied the risk factors and associated factors responsible for neck pain and most ommon factors observed were work experience, poor posture, physiological pathologies, and height of teaching board. Further Geraldo Fabiano et al (2012) also observed altered function of scapula after functional analysis among professors under varying angles of measurement hence it supports our findings where alterations were observed in scapular position due to difference in rotational behaviour of scapula under varying circumstances of loading. Similarly in our study

teachers adapt different work posture which may further lead to adaptation of altered position of scapula during working[27]. A study by Lee at al (2020) on effect of scapular correction exercise over improvement in neck pain also suggested that corrective exercises of scapula help in reduction of neck pain and hence improves neck function and overall quality of life[28].Helgadottir H et al (2010,2011) observed after their research findings that computer professionals who are having neck pain their scapula position at rest is altered and as compared to those who are not having any symptoms similarly in present research since school teachers also tend to work on screen in flexed position hence our results also shows scapula position of school teachers is altered at rest as well as in other examined position which is further supported by the fact that school teachers scapula position is altered due to excessive work on computers in awkward position.[29,30] Engaging in regular physical exercise has a protective effect against the shoulder and/or neck pain. Hence, advisory for importance of physical activity may be provided to teachers along with adjustable chair, white board/ black board.[26]

5. CONCLUSSION

Observations from present study suggest that neck pain, cervical pain and mechanical neck pain are producing excessive loading on the upper thoracic and cervical posture which further results in biomechanical alterations in the posture of primary school teachers. Hence it can be concluded that present research exhibits statistically significant effect on scapula protraction and scapula upward rotation among primary school teachers and in future special emphasis must be given on work posture and ergonomics of school teachers as ergonomics exhibits significant effect on development of musculoskeletal disorders.

6. AUTHOR CONTRIBUTIONS

Ms. Jyoti Kataria conceptualised and designed the study and Dr. Bijender and D. Sonia contributed in formulation of methodology and data analysis. Further all authors have contributed in preparation of results and discussion followed by preparation of Manuscript. All the authors read and approved the final version of the manuscript.

7. CONFLICT OF INTEREST

Conflict of interest declared none.

8. REFERENCES

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1. Cross KM, Kuenze C, Grindstaff TL, Hertel J. Thoracic spine thrust manipulation improves pain, range of motion, and self-reported function in patients with mechanical neck pain: a systematic review. J Orthop Sports Phys Ther. 2011 Sep;41(9):633-42. doi: 10.2519/jospt.2011.3670. Epub 2011 Aug 31. PMID: 21885904
2. Erick PN, Smith DR. A systematic review of musculoskeletal disorders among school teachers. BMC Musculoskelet Disord. 2011 Nov 17;12:260. doi: 10.1186/1471-2474-12-260. PMID: 22087739; PMCID: PMC3250950.
3. Rachana Jani1, Krupa Tank2, Immediate Effect of Dynamic Cupping on Pain in Teachers with Mechanical Neck Pain: An Experimental Study. Indian Journal of Physiotherapy and Occupational Therapy, April-June 2020, Vol. 14, No. 02 154-159
4. Rahman, N. and D. Warikoo. "Association of blackboard teaching with scapular positioning and shoulder pain and disability among school teachers in dehradun." (2013). IJPBS Volume 3 Issue 2 ,475-485
5. Kothawala Batul et al.2017, Scapular Dyskinesis on Dominant Side Among Primary School Teachers. Int J Recent Sci Res. 2017, Vol- 8(11), pp. 21295-21298. DOI: http://dx.doi.org/10.24327/ijrsr.2017.0811.1045
6. Chaiklieng S, Suggaravetsiri P: Risk factors for repetitive strain injuries among school teachers in Thailand. Work: A J Prev, Assess Rehabil 2012; 41:2510-2515.
7. Roche SJ, Funk L, Sciascia A, Kibler WB. Scapular dyskinesis: the surgeon's perspective. Shoulder Elbow. 2015 Oct;7(4):289-97. doi: 10.1177/1758573215595949. Epub 2015 Jul 16. PMID: 27582990; PMCID: PMC4935127.
8. Kibler WB, Sciascia A and Wilkes T. Scapular dyskinesis and its relation to shoulder injury. J Am Acad Orthop Surg 2012; 20: 364–372
9. Kibler WB and Sciascia A. Current concepts: scapular dyskinesis. Br J Sports Med 2010; 44: 300–305.
10. Cohen SP. Epidemiology, diagnosis, and treatment of neck pain. Mayo Clin Proc 2015;90:284-99. 11.Blanpied PR, Gross AR, Elliott JM, et al. Neck pain: revision 2017. J Orthop Sports Phys Ther 2017;47:A1-83.
11. Takasaki H, May S. Mechanical diagnosis and therapy has similar effects on pain and disability as 'wait and see' and other approaches in people with neck pain: a systematic review. J Physiother 2014;60:78-84.
12. Lau KT, Cheung KY, Chan KB, Chan MH, Lo KY, Chiu TT. Relationships between sagittal postures of thoracic and cervical spine, presence of neck pain, neck pain severity and disability. Man Ther 2010;15:457-62.
13. Peterson DH, Bergman TF. Chiropractic technique: principles and procedures. 2nd ed. St. Louis (MO): Mosby; 2002.
14. Elaine Y.L.Chong et al. Subjective Health Complaints Of Teachers From Primary And Secondary Schools In Hong Kong.International Journal Of Occupational Safety And Ergonomics (JOSE) 2010;16(1):23-39
15. Curtis, Thomas, and James R Roush. "The Lateral Scapular Slide Test: A Reliability Study of Males with and without Shoulder Pathology." North American journal of sports physical therapy : NAJSPT 2006 vol. 1,3 140-6.
16. Kibler WB. The role of the scapula in athletic function. Am J Sports Med. 1998;26:325–337 [PubMed] [Google Scholar]
17. Ludewig PM, Cook TM. Contribution of selected scapulothoracic muscles to the control of accessory scapular motions. J Orthop Sports Phys Ther. 1997;25:77 [Google Scholar]
18. Allegrucci M, Whitney SL, Irrgang JJ. Clinical implications of secondary impingement of the

shoulder in freestyle swimmers. J Orthop Sports Phys Ther. 1994;20:307–318 [PubMed] [Google Scholar]

19. Kibler WB. Shoulder rehabilitation: Principles and practice. Med Sci Sports Exerc. 1998;30:S40–S50 [PubMed] [Google Scholar]
20. Wegner S, Jull G, O'Leary S, et al.: The effect of a scapular postural correction strategy on trapezius activity in patients with neck pain. Man Ther, 2010, 15: 562–566
21. Lindstrøm R, Schomacher J, Farina D, et al.: Association between neck muscle coactivation, pain, and strength in women with neck pain. Man Ther, 2011, 16: 80–86.
22. Barbara Cagnie, Filip Struyf P et al, The Relevance of Scapular Dysfunction in Neck Pain: A Brief Commentary J Orthop Sports Phys Ther 2014;44(6):435-439.
23. Rahman, N, & Warikoo D. Association of blackboard teaching with scapular positioning and shoulder pain and disability among school teachers in Dehradun, 2013,3(2), 60-69.
24. Bhagyashri Badve and Shubhangi P.Patil, Correlation of scapular position with neck pain in secondary school teachers, International Journal of Scientific Research,2021, 10 (09),66-68.
25. Temesgen MH, Belay GJ, Gelaw AY, Janakiraman B, Animut Y. Burden of shoulder and/neck pain among school teachers in Ethiopia. BMC Musculoskelet Disord. 2019 Jan 10;20(1):18. doi: 10.1186/s12891-019-2397-3. PMID: 30630454; PMCID: PMC6329165.
26. Aldukhayel A, Almeathem F K, Aldughayyim A A, et al. Musculoskeletal Pain Among School Teachers in Qassim, Saudi Arabia: Prevalence, Pattern, and Its Risk Factors. Cureus, 2021 13(8): e17510. DOI 10.7759/cureus.17