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INFLUENCE OF NECK PAIN ON PECTORALIS MINOR MUSCLE LENGTH AMONG YOUNG ADULTS

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ABSTRACT

BACKGROUND : Students are prone for posture and works related to neck pain due to their desk jobs. It leads to postural abnormality and muscle imbalance. Neck pain leads to alteration in the length of the pectoralis minor muscle length. Checking pectoralis minor muscle length helps in clinical discussion making in patients with neck pain.

OBJECTIVE: To find out the prevalance of pectoralis minor muscle tightness among students having neck pain.

METHODOLOGY: A convenient sample of 100 participants were categorized into symptomatic and asymptomatic group. Neck pain was assessed by NORTHWICK PARK neck pain questionnaire.

RESULTS: Neck pain has positive correlation with pectoralis minor muscle tightness in both right(r=0.887) and left(r=0.828) side.The pectoralis minor muscle tightness is more in symptomatic group than in asymptomatic group (p=0.00). **RESULT& CONCLUSION**: The

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study confirms that neck pain has influence on pectoralis minor muscle length

KEYWORDS: Neck pain, pectoralis minor, tightness, prolonged sittting, young adults

INTRODUCTION

Neck pain is becoming increasingly common throughout the world.Neck pain has a considerable input on all individuals and health care system.Neck pain accounts for 50% of all soft tissue problems seen in general practice and are a common reason for referral to PHYSIOTHERAPY

Prolonged sitting, improper posture of head using mobile phones/devices are major cause of neck pain in STUDENTS. Bad posture is certainly at top of list for most of the people.Pectoralis minor muscle attaches to the coracoid process of scapula and inserts on three, four,five ribs near the costosternal junction.The muscle orientation determines that it will produce scapular downward rotation,anterior tilt an internal rotation. Measuring the pectoralis minor muscle length is of clinical importance/interest as the short pectoralis minor length is identified as a part of pain and the muscle imbalance. In the upper extremity adaptive shortening of pectoralis minor may be repetitive use of the upper extremity and also due to VARIETY OF COMPENSATION PATTERNS.This shortening leads to postural abnormalities and upper body muscle imbalance.

In neck pain the neck muscles work extra hard and continuously contract to maintain the head posture.The neck pain that leads to forward shoulder causes the muscle of shoulder blade to lengthen and the chest muscles to shorten.Clinical test have been recommended to test shortening of the muscle. Measuring the pectoralis minor muscle length helps in CLINICAL DISSCUSSION MAKING and aidsin Determining the risk factors when treating patients with neck pain. This muscle contributed to the host of compensation patterns.This muscle has a significant role and should never be forget when treating neck pain.

Physiotherapy has become an independent practice among the health care profession has a vital role in making life better. Physiotherapist has the right to asses and plan a proper treatment legally

The prevalance of neck pain among college student are common due to the nature of the tasks such as writing and reading habits,the usage of computer and other electronic gadgets.The head and neck posture which assumed for a long period of time desk works and usage of electronic gadgets contributes to mechanical neck pain

The anatomical and kinematic relationship between cervical spine and thoracicSpine contributes to mechanical alignment changes in thorax and shoulder among mechanical neck pain students.The mechanical changes cause slouched shoulder and pectoralis minor muscle tightness

The tightness of the pectoralis minor muscle contributes to range of symptoms in shoulder,upper

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extremity and thorax. The screening of the pectoralis minor muscle tightness among neck pain subjects will be used as a prophylactic measure to prevent upper extremity and thorax symptoms and abnormalities in future

To know about the prevelance of the pectoralis minor muscle tightness in students with mechanical neck pain ,the pectoralis minor muscle length was measured in this study.

METHODOLOGY

A convenient sample of 100 participants age 18-25 were involved.50 volunteers with neck pain and 50 individuals were selected .The procedure of the study is explained and a consent form is obtained from the participants. The symptomatic individuals were given northwick park pain questionnaire and their pain was measured with visual analogue scale and score were calculated based on their response. Pectoralis minor muscle length was measured using a rigid standard transparent right angle (height of 12 cm and base of 8 cm) for both symptomatic and asymptomatic group. People with history of cervical pathology,shoulder gridle pathology, chestwall deformity, rib fracture, sternum injury, clavicle fracture, scapula fracture were excluded from the study. To find out the prevalence of the pectoralis minor muscle tightness among the subjects those who are having neck pain studies show that the muscle imbalance in upper quarter of body is common among the neck pain subjects this study emphasize on the significance of screening the pectoralis minor muscle tightness among neck pain subjects, will b used as a prophylactic measure tp prevent upper extremity and upper thorax symptoms due to it in future among the neck pain subjects

PROCEDURE:

Based on selection criteria 100 students were selected (50 subjects with neck pain- symptomatic and 50 subjects without neck pain asymptomatic) . the subjects were explained in details about the need of the study and those who are willing to participate are selected. The NORTHWICK PARK NECK PAIN QUESTIONNAIRE was given to the symptomatic group. The greater the score the greater the pain intensity. The pectoralis minoe muscle length was measured using a rigid standard transparent right angle (height of 12 cm and base of 8 cam) for both symptomatic ans asymptomatic group and were correlated with the neck pain score

STATISTICAL ANALYSIS:

The correlation between neck pain and pectoralis minor tightness was done by PEARSON CORRELATION and the comparison of pectoralis minor tightness between the symptomatic and asymptomatic group was done by INDEPENDENT SAMPLE t TEST

RESULTS:

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The results of the study reveal that neck pain is significantly associated with pectoralis tightness that there is positive correlation between neck pain and pectoralis minor muscle tightness in both right (r = 0.8878**) and left side (r = 0.828**).

The right side (dominant side) pectoralis minor tightness is more than the left side in both symptomatic and asymptomatic group.

The neck pain is one which causes more sick leave and decrease productivity and is prevalent among adults the study aims at finding the unoticed hidden factors of neck pain for planning better treatment regimen and prevent further complications.

DISCUSSION

The traumatic mechanical neck pain is common among college students due to forward head posture. The study reports revealing that Forward head posture is common postural problem seen among students with 85% of its prevalence[6].In forward head posture due to anterior head position with posterior rotation of the occiput and cervico-thoracic flexion,along with loss of cervical lordosis[1],results in hypomobility of C0,C1 and C2 joints and causes in tightness of sub-occipital muscles and causes sub-occipital neuralgia,due to hypomobility in upper cervical spine the middle cervical spine becomes hypermobile and prone for vertebral dysfunctions ,these dysfunctions causes facet capsule impingements, discherniations and radiculopathies[2].The causes tightness ofupper trapezius,sternocleidomastoid,scalene group of muscles and levatorscapulae,and weakness of deep neck flexor muscles,upper back muscles and serratus anterior,the sepatho-mechanical events in Forward head posture causes neck pain.

This indirectly causes problems in shoulder,upper extremity and thorax through rounded shoulder and its product pectoralis minor tightness.The tight pectoralis minor muscle due to rounded shoulder posture,pulls the scapula forward,downward,rotates internally and tips anteriorly and it induces malalignment of scapula,this causes disturbance in optimal resting position of scapula and restricts it kinematics in glenohumeral range of motion. The malaligned scapula which drawn forward,downward,internally rotated and anterior tipped will reduces the sub-acromial space and causes impingement syndromes and rotator cuff pathologies[5],the tight pectoralis minor reduces the sub pectoral space,entraps neuro-vascular structures and causes ThoracicOutletSyndrome(TOS)[2,9].The tightness of pectoralis minor causes anterior rib dysfunction,intercostal neuralgia,costochondritis and serratus anterior strain.Hence the dysfunctions and musculo-skeletal pathology of forward head posture is not confined tone ckalone,indirectly through rounded shoulder posture and pectoralis minor tightness,the dysfunctions and musculoskeletal pathology is also contributed in shoulder,upper extremity and thorax.

To know about how prevalent this pectoralis muscle tightness exist among neck pain subjects

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from the Forward head posture origin,the pectoralis muscle length is measured in the students those who had neck pain due to Forward head posture.

The 100 physiotherapy students both male and female,with the neck pain was selected, their pain was measured with Visual analogue scale and their neck disability is recorded with neck disability index,the subject those who are having pain more than 5points in Visual analogue scale was selected and their pectoralis muscle length was measured with the inch tape from the inferior edge of 4th rib to infero-medial aspect of corocoid process[7],thepectoralis minor tightness was more prevalent among the subjects those who had pain in neck 5points and above in Visual analogue scale,in this female subjects was pre-pondering

The neck pain and the habitual forward head posture is characterized as anterior head position with posterior rotation of occipit.The upper cervical spine will be in extension,the lower cervical spine and upper thoracic spine will be in flexion.There will be loss of cervical and excessive thoracic kyphosis flattening of lumbar spine tilting pelvis posteriorly while sitting will make loss of lumbar lordosis and through kinematic chain if contributes to neck pain through anterior head position of axial skeleton

Muscle imbalance and malalignments in the axial skeleton and pelvis cause stress of the muscles ofthe upper quarter and manifest head ache,neck pain and radiating pain.Neck pain indirectly causes problems in thorax through round shoulder or slumped posture that concomitantly occurs characterized by protraction of acromion in front of line of gravity,there will be protraction,downward rotation and anterior tapping of scapula.The malaligned scapula mechanically contributes to myofascial trigger points in pectoralis minor and it perpetuate the posture and causes adaptive shortening

CONCLUSION

The results of the study confirm that neck pain has a significant influence on pectoralis minor muscle length. The tight pectoralis minor cue for numerous injuries. Pectoralis minor has to be taken into consideration when treating patients with neck pain and if ignored leads to a potential cascade of problems. Screening the pectoralis minor tightness helps in CLINICAL DECISION MAKING and preparation of the treatment protocol.

The pectoralis minor tightness diminishes the arm strength and it is believed to cause respiratory difficuilty in individuals experience fatigue and might compromise the respiratory muscles

The tight pectoralis minor reduces the sub pectoral space, entraps the neuro vascular structures and cause thoracic outlet syndrome. The tight pectoralis minor also causes anterior rib dysfunction, intercostalneuralagia, costochortisis and serratus anterior strain ,upper cross syndrome and winging of scapula. It can again cause shoulder impingement, altered scapular kinematics and restricts-glenohumeral Range of motion. Pectoralis minor like a brother that not

like to be ignored, contribute to host compensation pattern .In future when treating patients with neck pain, Pectoralis minor has to be taken into consideration for planing effective therapeutic regimen

LIMITATIONS

The sample size is less.

The pectoralis minor length measurement was taken for only 100 subjects.Subjects aged 18 – 25 were only included in the study.

It can be done in other age groups also. Neck pain was assessed by self reported questionnaire and can have bias.

RECOMMENDATION

The respiratory rate, pattern, lung volumes and lung capacities of the subjects can also be measured in further studies.

The postural assessment of subjects with neck pain and pectoralis minor muscle tightness can also be done in further studies.Future studies must correlate the pectoralis minor length with the neck muscle endurance and strength

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CONFLICT OF INTEREST: There is no conflict of interest

SOURCE OF FUNDING: self funded

ETHICAL COMMITEE : Taken from Institutional Ethical Committee

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TABLE 1- CORRELATION BETWEEN PECTORALIS MINOR TIGHTNESS AND NECK PAIN

	RIGHT PECTORALIS MINOR TIGHTNESS	LEFT PECTORALIS MINOR TIGHTNESS
NECK PAIN	R= 0.887**	R= 0.828**

the values are the pearson correlation and R value. The results are statistically significant and shows that there is a positive correlation between the neck pain and the pectoralis minor length on right and left sides

TABLE 2. COMPARISON OF PECTORALIS TIGHTNESS BETWEEN BOTH THE GROUPS

		MEAN	SD	MEAN DIFFERENCE	T	DF	SIGNIFICANCE
Right pectoralis minor tightness	SYMPTOMATIC GROUP	6.34	0.78	2.93	22.58	98	0.000
	ASYMPTOMATIC GROUP	3.40	0.47				
Left pectoralis minor tightness	SYMPTOMATIC GROUP	5.60	1.02	2.51	15.87	66.88	0.000
	ASYMPTOMATIC GROUP	3.09	0.45				

Table 2 shows the values mean +/- standard deviation. The mean value of the right pectoralis minor tightness of neck pain group was 6.34 (SD 0.78) while that of the asymptomatic group was 3.40 (SD 0.478) and a stastically significant difference (p = 0.000**)

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TABLE 3 COMPARISON BETWEEN THE RIGHT AND LEFT SIDE PECTORALIS MINOR TIGHTNESS

		MEAN	SD	MEAN DIFFERENCE	T	DF	SIFNIFICANCE
OVERALL PARTICIPANTS	Right pectoralis minor tightness	4.87	1.60	0.52	10.36	99	0.000
	Left pectoralis minor tightness	4.34	1.49				

Table 3 The mean value of the right pectoralis minor tightness of neck pain group was 6.34 (SD 0.78) while that of the asymptomatic group was 3.40 (SD 0.478) and a stastically significant difference (p = 0.00***)

FIGURES

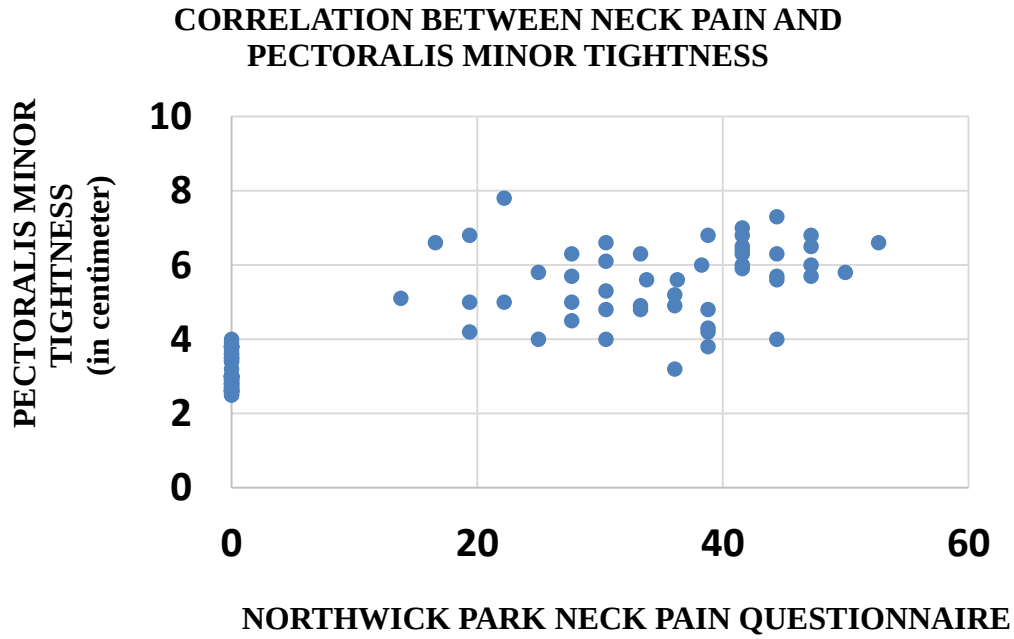

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Fig 1 shows the correlation of the Northwick park neck pain score and pectorlis minor tightness. The blue dots in the scatter plot represent the neck pain score. The right and the left pectoralis minor tightness is more in symptomatic group than in asymptomatic group (p = 0.00**)

REPRESENTS THE COMPARISON OF RIGHT PECTORALIS MINOR TIGHTNESS IN SYMPTOMATIC AND ASYMPTOMATIC INDIVIDUALS

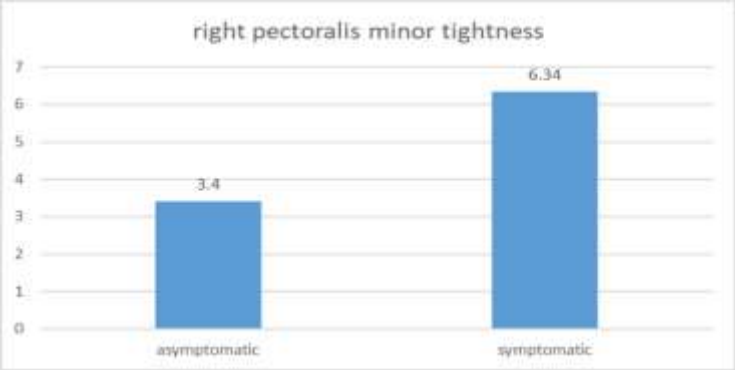

Fig 2 Pectoralis minor tightness in centimetres. The bar graph represents the tightness of the Right pectoralis minor muscle in both the groups. The pectoralis minor tightness is more on the right side (dominant side) than the left side in both the symptomatic and asymptomatic group (p = 0.00**)

REPRESENTS THE COMPARISON OF LEFT PECTORALIS MINOR TIGHTNESS IN SYMPTOMATIC AND ASYMPTOMATIC INDIVIDUALS

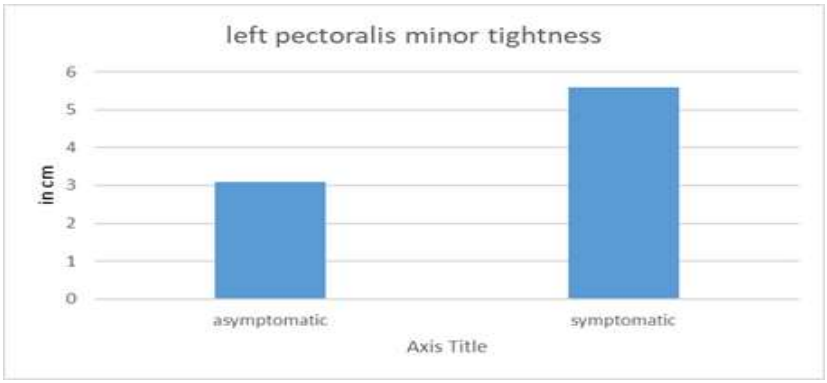

Fig 3 The bar graph represents the tightness of the pectoralis minor muscle. The mean value of left side pectoralis minor tightness of neck pain group was 5.60 (SD 1.03) while that of the

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asymptomatic group was 3.09 (SD 0.45) and had a difference that was statistically significant (p = 0.000**)

REPRESENTS THE COMPARISON OF RIGHT AND LEFT PECTORALIS MINOR TIGHTNESS OF OVERALL PARTICIPANTS

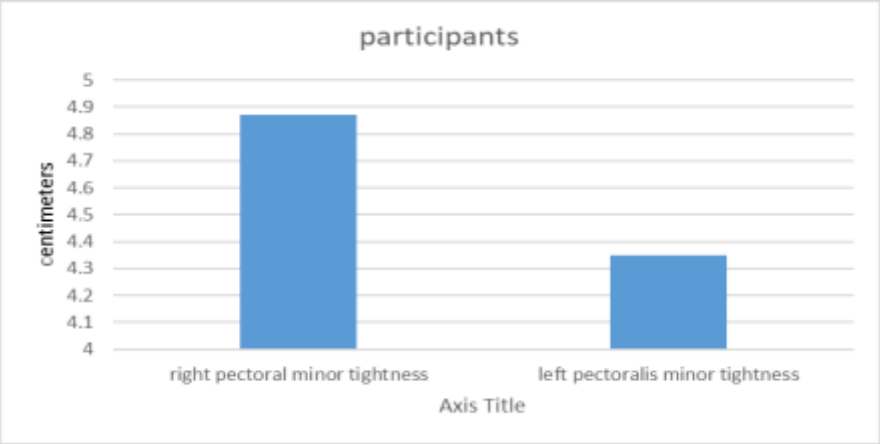

Fig 4: The bar graph represents the pectoralis minor tightness of the overall participants,The tightness is more right side (dominant side) thn the left side in both symptomatic and asymptomatic individuals.