Research article

Screening for Upper Cross Syndrome in Asymptomatic Individuals

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ABSTRACT

Upper cross syndrome (UCS) refers to tightness of muscles such as pectoralis major, upper trapezius and levator scapulae and weakness of deep neck flexors, scalene, rhomboids, serratus anterior, middle and lower trapezius. Poor posture is associated with imbalance created in musculoskeletal system and common condition to be reported as upper cross syndrome. It is commonly seen in people with forward head posture, desk job workers, dentist, beauticians etc. The resulting clinical presentation is complaint of pain in neck and shoulder, cervicogenic headache, hunched upper-back and rounded shoulder. Children are not as proactive today and the rate of the UCS is on the rise. This deviated posture and sedentary lifestyle continues, where it progresses more as the age progresses in adulthood. To screen, detect, early treat as well as prevent upper cross syndrome in young individuals. Asymptomatic individual with 20-40 years of age group was explained about the procedure before commencement of the study.

Posture was screened using REEDCO Posture Assessment Scale was used for evaluation. Assessment of muscle tightness and weakness was evaluated using muscle length tests and manual muscle testing. From the current study we conclude that prevalence of UCS is significantly less in asymptomatic individuals as compared to symptomatic. Although it is very important to practice good posture in daily routine in order prevent early signs of UCS. The parameters of outcome measures were analyzed by descriptive statistics only. Based on previous data we conclude that it is essential to screen asymptomatic individual to looks for signs of UCS for early detection, prevention and treatment.

Keywords: Upper Cross Syndrome, Manual Muscle Testing, Muscle Length Testing.

INTRODUCTION

Musculoskeletal damage has been represented as the main problem among younger population. Mental, visual and postural problem can bring musculoskeletal issues, specifically affecting the thoracic and cervical region. Masculinity and physical activity are also associated with musculoskeletal distress [1][2].

In 1988 Dr. Janda put forth an interesting concept by dividing muscles in to two groups: Postural and Phasic. Postural or tonic muscles are responsible for maintaining upright posture, have tendency to become tight and hyper tonic. Phasic muscles, which include almost all other muscles, tend to become weak and hypotonic [3]. Upper cross syndrome is explained as pattern of muscle imbalance which is situated over head and shoulder region which is mainly due to bad posture. It is due to over activity and tightness of upper trapezius, levator scapulae, Sternocleidomastoid, pectoral muscles and reciprocal weakness with extensibility of deep lower trapezius, serratus anterior deep cervical flexors. Dr. Janda called this process Upper Cross Syndrome [2]. Today we might refer to it as ‘Text Neck’. Similar kind of pattern can continue or isolated in lower body called Lower Cross Syndrome. When found in upper body and lower body it is called Stratification or Layer Syndrome [4][5].

The series of imbalance produce joint abnormality specifically at Atlanta-occipital joint, C4-C5 segments, glenohumeral joint, cervico-thoracic joint and T4-T5 segment [2]. It is commonly seen in the people with forward head posture, desk job workers, dentist, beauticians etc. Clinical features include increase in cervical lordosis, thoracic kyphosis, hunching of thoracic spine (Rounded upper back), forward head posture and shoulder protraction, abduction or Rotation, winging of scapula and reduced motion of thoracic spine [6][7]. Common Symptoms include Chest pain, Migraine and tension headache, neck, shoulder or upper back pain, Sore shoulder blades, Pain in jaw Tiredness, Strain over back of neck which is accompanied with weakness in front, Neck stiffness, Mid back pain, pain, numbness and tingling in upper arm [8][9].

According to Karel Lewitt (1994), usually muscle imbalance occurs prior to functional imbalance. Janda also described the muscle dysfunction as a condition in which some muscles become weak and...
inhibited and others become shortened and stiff. Janda predicted that this pattern that encompasses the neck, upper part of the thoracic spine and shoulder joint, Upper Cross Syndrome\(^\text{[3]}\). He noticed that the most movements which were repetitive reinforce the postural system and neglect the phasic system which may lead to imbalance. He further noticed that imbalance in children begins in upper extremity as compared to the lower extremity, as seen in adults\(^\text{[10][11]}\).

Poor posture and its directions affect the physical activity and its direction leads to increased stress on supportive structures as well as repetitive bending. Therefore the optimum mechanical condition of body, the energy consumption in activities of daily living and exercise has particular importance\(^\text{[4]}\). Musculoskeletal disorder (MSD) is one of the major problems seen by ergonomist in various workplaces around the world. MSD is defined as injuries and disorders of soft tissue and nervous system. Some physical factors at workplace that were associated with the occurrence of MSD were awkward posture, repetitive movements, force of movement, vibration and temperature\(^\text{[5]}\). Different factors like hereditary, unsuitable posture and stress during work and lack of regular exercises can affect the occurrence of such disorder\(^\text{[6]}\). Cervical spine and soft tissue disorder e.g. Facet joint, muscles, ligaments and disc are important causes for neck pain caused by postural dysfunction.

The occurrence of neck pain in general population was 15 to 44% every year while in office workers its frequency is up to 50-60%\(^\text{[3]}\). The underlying cause of pain is bad posture, faulty positions, habits which can reduce flexibility and cause tension around muscles and soft tissues. Chronic cervical pain is caused by constantly maintained muscle contraction, fatigue and muscle weakness. Therefore, the muscle strength in the cervical region plays an important role in the cervical stabilization and its control\(^\text{[7]}\). Besides limitation in activities of daily living, neck pain affects working lives as well, which results in work loss leading the community to bear substantial and economical depletion.

Assessment methods for upper cross syndrome include postural examination, measurement range of motion for cervical spine, muscle length testing and evaluation of muscle strength. Various interventions include use of modalities, manual therapy techniques, Therapeutic exercises, Muscle Stretching, Instrument-Assisted soft tissue mobilization etc.

This study is important to undertake as the true burden particularly of upper back pain and forward head posture is in its recurrent and or persistent state. Various studies have been undertaken to assess upper cross syndrome in symptomatic population such as students, desk job workers, dentists, laundry workers etc which concluded that prolong static posture results in upper cross syndrome therefore need was felt to carry out the current study to find the prevalence of upper cross syndrome in asymptomatic individuals. The objective of the study was to screen, detect and early treatment and prevention of upper cross syndrome in young individuals.

### METHODOLOGY
This cross-sectional study was carried out in Ravi Nair Physiotherapy College, Musculoskeletal OPD, Sawangi (Meghe), Wardha, Maharashtra, India after approval from Institutional Ethics Committee of Datta Meghe Institute of Medical Sciences, deemed to be University. The inclusion criteria included asymptomatic individuals between age group between 20-40 years. The exclusion criteria included history of neck pain, cervical trauma or surgery, known thoracic scoliosis, known rotator cuff tear, cervical spondylosis, and cervical radiculopathy. The sample size was 300 and the sampling technique was simple random method.

#### Procedure
The institutional ethical committee clearance will be obtained before the start of study. 300 individuals, between the age group of 20-40 years asymptomatic population from Ravi Nair Physiotherapy College was informed and explained about study procedure based on inclusion and exclusion criteria. Their consent was taken. Posture was evaluated using REEDCO Posture Assessment Scale. Assessment of muscle tightness and weakness was done using muscle length tests and manual muscle testing. Then the data was collected and documentation was done. The aim was to screen asymptomatic individual for upper cross syndrome by evaluating posture, assessing tight muscles of head and shoulder and assessing weak muscle of head and shoulder.

#### Outcome Measures
The posture was evaluated using REEDCO Posture Assessment Scale. REEDCO Posture Score (RPS) is a standard posture assessment and is graded in coronal and sagittal view in head-to-foot and it is administered by visual inspection of 10 postural traits viewed laterally (sagittal view including neck, upper back, trunk, abdomen and lower back) or from behind (coronal view including head, shoulder, spine, hips and ankles. The scores are marked as follows: a value of 0 equals to poor posture or severe deviation, 5 equals fair posture or minimal to moderate deviation, and a value of 10 equal’s good posture and a score of 59% or less is recorded as postural dysfunction.

#### Data Measurement
Most of the time evaluation of postural function requires technological materials but simple test can also be used to identify postural dysfunction. A number of methods exist to evaluate posture. In this study REEDCO Posture Assessment Scale is used. Assessment of muscle tightness was done using Muscle Length Testing and Weakness was evaluated using Manual Muscle Testing.

### RESULT
The current study title “Screening of upper cross syndrome in asymptomatic individuals” included 300 participants between 18 to 40 age group, out of which 120 were males (40%) and 180 were female (60%). Body Mass Index (BMI) was < 18 in 4.67%, 18.1-24.4 in
80.33% and >25 in 15% of individuals. Individuals were found to have muscle tightness if the score for pectoralis major is <3, for pectoralis minor was <5 and Latissimus dorsiis <6. The current study concluded that individuals were not having tightness in pectoralis major and minor were as 32% population were having tightness in Latissimus dorsi.

Muscle weakness was assessed using Manual Muscle Testing grading system score 0 (None) indicates no visible or palpable contraction, 1 (Trace) visible or palpable muscle contraction with no motion, 2 (Poor) Full ROM gravity eliminated, 3 (Fair) full ROM against gravity, 4 (Good) full ROM against gravity with moderate resistance and 5 (Normal) full ROM against gravity with maximal resistance. For Deep neck flexors (80% fair and 20% good), serratus anterior (30% fair, 65% good and 5% normal), rhomboids (50% fair, 45% good and 5% normal), middle trapezius (10% fair, 50% good and 40% normal) and lower trapezius (55% good and 45% normal).

Posture was assessed using REED CO posture assessment scale, score of 59% or less is recorded as postural dysfunction. So, from this study the results showed that 9% of individuals were having poor posture and 91% had good posture. So, the present study conclude that prevalence of upper cross syndrome is less in asymptomatic individuals thus it is mostly found in symptomatic population.

Table 1: Distribution of patient according to muscle tightness score

| Muscle Tightness Score | No of patients | Percentage | Mean±SD |
|------------------------|----------------|------------|---------|
| Pectoralis Major        |                |            |         |
| <3                     | 0              | 0          | 7.68±1.29 |
| >3                     | 300            | 100        |         |
| Pectoralis Minor        |                |            |         |
| <5                     | 0              | 0          | 9.46±1.71 |
| >5                     | 300            | 100        |         |
| Latissimus Dorsi        |                |            |         |
| <6                     | 96             | 32         | 8.04±2.31 |
| >6                     | 204            | 66         |         |

Figure 1: BMI wise distribution of patients

Upper cross syndrome has been evaluated in symptomatic individuals and has never been evaluated in asymptomatic individuals. Statistical analysis was done by descriptive statistics only. According to age wise distribution of individuals mean is 21.66 and standard deviation is 2.38 (18-25 age group) and BMI wise distribution of individuals mean is 21.57 and standard deviation is 2.53 (16-30.80 kg/m²).

Distribution of participants according to muscle tightness score for pectoralis major mean is 7.68 and standard deviation is 1.29, pectoralis minor mean is 9.46 and standard deviation is 1.71 and for Latissimus dorsiis mean is 8.04 and standard deviation is 2.31. Distribution of participants according to muscle weakness score for Deep neck flexor mean is 3.20 and standard deviation is 0.40, for serratus anterior mean is 3.75 and standard deviation is 0.53, for rhomboids mean is 3.55 and standard deviation is 0.59, for middle trapezius mean is 4.30 and standard deviation is 0.64 and for lower trapezius mean is 4.45 and standard deviation is 0.49. Distribution of participants according to REED CO posture Score mean is 75.81 and standard deviation is 11.51 (45-95).

DISCUSSION

Several studies have found a high prevalence of upper cross syndrome in symptomatic population such as students, desk job workers, dentists, laundry workers etc. However upper cross syndrome occurs due to assuming static posture for prolong period of time can lead to symptoms such as chronic cervical pain, headache and in long term can also result in degenerative changes in cervical spine. Thus, is very important to look for signs of UCS.

To our knowledge this was the first study conducted to determine the prevalence of upper cross syndrome in asymptomatic individuals. Moreover, this study was employ well established and widely used methods with appropriate reliability and validity to assess muscle tightness and weakness as well as to analyze posture.

Among laundry workers a prevalence study was conducted. Random sampling method was used to select them. Various special tests were performed to assess the tightness and weakness of the muscles [12]. Population included was asked to fill Oswestry neck disability questionnaire. Data was obtained and analyze from 50 laundry workers out of them 14 patients had symptoms of upper cross syndrome.
syndrome. 4 patients had mild neck disability; 11 patients had moderate and 35 with no disability. Thus the study concludes that in laundry workers the prevalence of upper cross syndrome is significantly high [8][13].

Another cross-sectional overview comprising of 244 physiotherapy undergraduates was done for determining occurrence plus risk factor in the development of upper cross syndrome. There were 57 participants who were having pain at neck in passive range of motion during flexion and 187 were not having neck pain. There were 60 participants having thoracic pain during active range of motion during flexion and 184 had no thoracic pain in active range of motion during flexion [14]. In this study 30-40 participants presented with neck pain, rounded shoulder and flexion posture with consider amount of pain over thoracic area, thus are mainly prone to UCS [15][16].

**CONCLUSION**

From the current study we conclude that prevalence of upper cross syndrome is significantly less in asymptomatic individuals as compared to symptomatic. Although it is very important to practice good posture in daily routine in order prevent early signs of UCS.

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