

# Screening for Upper Cross Syndrome in Asymptomatic Individuals

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## Abstract

**Background:** Upper cross syndrome has become prevalent in today's population. This syndrome 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 Upper cross syndrome is on the rise. This deviated posture and sedentary lifestyle continues, where it progresses more as the age progresses in adulthood. **Aims and objectives:** To screen, detect, early treat as well as prevent upper cross syndrome in young individuals. **Materials and methods:** Asymptomatic individual with 20-40 years of age group will be explained about the procedure before commencement of the study. Posture will be screened using Kinect Azure and REEDCO Posture Assessment Scale will be used for evaluation. Assessment of muscle tightness and weakness will be evaluated using muscle length tests and manual muscle testing.

**Results:** The expected results would include details about prevalence of UCS in asymptomatic individual. The parameters of outcome measures will be analyzed using the statistical test namely students paired T-test.

**Conclusion:** Based on previous data we assume it is essential to screen asymptomatic individual to look for signs of Upper Cross Syndrome for early detection, prevention and treatment.

**Key Words:** Upper Cross Syndrome, Kinect Azure, Muscle Length Testing.

## Introduction

There is a strong association of poor posture with imbalance created in musculoskeletal system and

is common condition to be reported as upper cross syndrome. Such posture creates muscle tension as well as limits the mobility.<sup>1</sup>

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In 1988 Dr. Janda put forth an interesting concept by dividing the muscles into two groups: Postural and Phasic. Postural or tonic muscles are important for maintaining upright posture, have tendency to become tight and hypertonic. Phasic muscles, which include almost all other muscles have tendency to become weak and hypotonic UCS is term coined by Janda use for this misalignment. He claimed that maintain a stooped

sitting posture for prolonged period of time is major contributing factor. Other words including proximal or shoulder girdle syndrome are also known.<sup>2</sup>

Upper cross syndrome (UCS) is the tightness, over-facilitation of the levator scapulae, pectoralis major and upper trapezius accompanied with weakened, inhibited serratus anterior, deep neck flexors especially scalene, middle trapezius, lower trapezius and rhomboids.<sup>3</sup> Hyperactive neck muscles on one side are counteracts the under active muscles on the opposite side, forming a 'X' pattern.<sup>1</sup>

The crossed in upper cross syndrome refers to the crossing pattern of overactive muscle with counter crossing of the under active muscle. When viewed from side an X pattern can be drawn for these two sets of muscles. The overactive muscles forms the diagonal pattern from the posterior neck with the upper trapezius and levator down and across neck to the anterior neck and shoulder with sternocleidomastoid (SCM) and pectoralis major. The other side of X now depicts the underactive muscles, with the deep cervical flexors down towards the mid/lower trapezius, rhomboids and serratus anterior. As we continually assume the seated, forward head posture driven by electronic devices or poor exercise selection and techniques, this X pattern of muscle imbalance will increase.<sup>4</sup>

It is commonly seen in people with forward head posture, desk job workers, dentist, beauticians etc. Different movement can cause upper cross syndrome, but most cases develop through poor posture, specifically sitting or standing for prolonged period of time with head forward. Activities promoting this postural position include use of computers and laptops, driving, watching TV, browsing cell phones, texting, use of apps or games, and reading. Alteration of this muscular imbalance occurs through prolonged periods of attaining a posture in the classroom, work place and also attaining a prolonged and sustained posture for other activities like cooking. Children are not as proactive today and the rate of the Upper cross syndrome is on the rise. This deviated posture and sedentary lifestyle continues, where it progresses more as the age progresses in adulthood.<sup>5</sup>

The resulting clinical presentation is a complaint of pain in the neck and shoulder, cervicogenic headache, hunched upper back and rounded shoulder.<sup>3</sup> The common

characteristics to diagnose upper cross syndrome include head constantly bent in forward position, increase cervical lordosis (cervical spine is too curved), increased thoracic kyphosis (the outward curvature of spine in the upper back, shoulder and chest is more), The shoulder are elevated, protracted and round and scapular winging (the shoulder blade sits out). Upper cross syndrome can cause many disorders in the body which includes headaches, degeneration of the cervical spine in early stages and the cervical curvature is also lost.<sup>5</sup>

This is often believed that constant maintenance of muscle contraction and fatigue due to weakness of muscle is known to cause chronic type of pain in cervical region. Therefore, neck muscles strength has vital role in stabilizing cervical region. In addition to the shoulder girdle muscle, the Deep Neck Flexors is an essential for controlling and stabilizing the spine and supporting the head's weight against gravity.<sup>6</sup>

There is need for this Study so as to screen asymptomatic individuals for UCS signs for early detection, prevention and treatment.

### Objective

To screen, detect and early treatment and prevention of upper cross syndrome in young individuals.

### Methods

This study will be 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.

**Study Design:** Cross sectional Study.

**Study Setting:** RNPC Musculoskeletal OPD.

**Participant:** All asymptomatic individuals between 20-40 years of age.

### Inclusion Criteria:

1. Asymptomatic individuals
2. Age group between 20-40 years.

### Exclusion Criteria

1. History of Neck pain, Cervical Trauma Or Surgery
2. Known Thoracic Scoliosis
3. Known Rotator Cuff Tear
4. Cervical Spondylosis.
5. Cervical Radiculopathy

## VARIABLES

### Outcome Measures

**1. Kinect Azure :** Karen Otte et al studied Accuracy and reliability of Kinect version 2 for clinical measurement of motor function the results showed most of clinical parameters showed good to excellent agreement with absolutes(30 parameters showed ICC(3,1) > 0.7 and consistency(38 parameters showed r > 0.7) and concluded that the Kinect version 2 will serve as a reliable and valid clinical measurement tool.<sup>7</sup>

**2. REEDCO Posture Assessment Scale:** Gunther, J.et al studied Reliability of two postural tests in postmenopausal women with osteoporosis test-retest and inter-rater. Results showed that in total RPS scores (Kruskal-WallisNonparametric ANOVA, H=6.96, p=.07) no significant Inter-rater difference was found. However, one item (head tiltPosition) was significantly different between therapists (H=8.049, P=.045). There was no significant test-retest difference in total RPS Scores. (Wilcoxon t, p=.5217). One of the 10 RPS items (lower back)was significantly different at post-test (Wilcoxon t, p=.0379).and concluded that inter rater differences in Total RPS scores approached significance, and several individual Scale items showed significant inter rater or test-retest differences. Further improvement of the reliability of the RPS should precede Clinical use as an outcome measure.<sup>8</sup>

### STUDY SIZE – 300

Sampling Technique is 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 will

be informed and explained about study procedure based on inclusion and exclusion criteria. Their consent will be taken, posture will be screened in using Kinect Azure and REEDCO Posture Assessment Scale will be used for evaluation. Assessment of muscle tightness and weakness will be evaluated using muscle length tests and manual muscle testing. Then the data will be collected and documentation will be done.

Aim is to screen asymptomatic individual for upper cross syndrome by

1. Evaluating Posture
2. Assessing Tight Muscles of head and shoulder.
3. Assessing Weak Muscle of head and shoulder.

### 1) Postural Assessment:

The posture will be screened in all views Using Kinect Azure and REEDCO Posture Assessment Scale will be used for evaluation.

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 equals good posture and a score of 59% or less is recorded as postural dysfunction.

### Procedure

Before evaluating posture, the participants will be asked to complete the personal data form including the consent form. Next, in order to assess the posture using REEDCO Posture Scale, the female participants will be asked to wear bodysuit, while male participants will be asked to take off their shirt. Markers will be made on anatomical landmarks on 7<sup>th</sup> cervical spine, bilateral acromion process, 5<sup>th</sup> lumbar spine and bilateral iliac crest. After that participant will be made to stand on the postural grid at provided spot with shoes off in three different direction: front (coronal view), back (coronal

view), and sideways (sagittal view). Then posture will be analyzed using Kinect Azure scoring will be done using REEDCO Posture Assessment Scale.

## 2) Assessment of Tight Muscles.

### 1. Pectoralis major

Test: Patient lies in supine lying and clasp the hand together behind the head. The arm is then lowered down until the elbow touches the examination table. Test is positive if elbow does not touch the table and indicate tight pectoralis major muscle.

### 2. Pectoralis minor

Pectoralis minor fuctions along with Rhomboids and levator scapulae to stabilize scapulae during arm extension Test: Patient is in supine lying. The examiner places the heel of hand over the coracoid process and pushes it toward the examination table. Normally posterior movement occurs with no discomfort to patient. Test is positive if there is [muscle tissue stretch] tightness over the muscle during posterior movement.

### 3. Latissimus dorsai

Test: Patient is placed in supine lying position and asked to fully elevate the arm through the forward flexion. If the muscle has normal length the arm will extend to rest against the examining table. The test is positive if scapulae does not lie flat against the table (scapulae remain protracted).

### 4. Biceps brachi (Arm flexor)

Test: Patient lies in supine lying with shoulder in extension over the edge of table with elbow flexed and forearm supinated. The examiner extend the elbow which would normally have bone to bone endfeel, if biceps is normal.

The test is positive if full elbow flexion would not occur and end feel will be a muscular tissue stretch.

## 3) Assessment of Weak Muscles

### 1. Deep Neck Flexors (Longus capitis and longus colli)

Patient position: supine lying with elbow bent and hand overhead resting on table

Fixation: anterior abdominals must be strong enough to stabilize to give anterior fixation of thorax to pelvis before head can be raised by neck flexors.

Test: Flexion of cervical spine by lifting the head from table with chin depressed and approximated towards the sternum.

Pressure against the forehead in posterior direction

Weakness: hyperextension of cervical spine resulting in forward head posture.

## 2. Triceps brachi (Arm Extensors)

Patient position supine lying

Fixation shoulder in 90° flexion with arm supported position perpendicular to table.

Test: extension of elbow

Pressure against the forearm in direction of flexion

Weakness: inability to extend the forearm against gravity.

## 3. Serratus Anterior

The patient is in standing position with arm flexed forward in 90° flexion

The examiner applies backward force to the arm

Test is positive: The medial border of scapula will wing. The patient also has difficulty abducting or forward flexing arm above 90° with weak serratus anterior.

## 4. Rhomboids

Patient in prone lying position. Test arm behind the body so hand is at opposite side back pocket. (Opposite back pocket). The examiner places the index finger along and under the medial border of scapula while asking the patient to push shoulder forward slightly against resistance to relax trapezius.

The patient is then asked to raise the forearm and hand away from the body. If rhomboids are normal the thumb is pushed away from the under scapula.

## 5. Middle Trapezius

Patient position in prone lying with arm abducted

to 90 and laterally rotated. The examiner resisting the horizontal extension of arm watching for scapular retraction to occur normally.

Test is positive if scapular protraction occurs and this indicates that the middle fibers of trapezius are weak.

### 6. Lower Trapezius

Patient in prone lying with arm abducted to 120 and shoulder laterally rotated.

The examiner applies resistance to diagonal extension and watches for scapular retraction which normally occurs. Test is positive if scapular protraction occurs, lower trapezius is weak.

### Discussion

To our knowledge this will be first study to screen asymptomatic individuals for UCS signs for early detection, prevention and treatment.

Practicing poor posture in daily routine for prolong period of time can lead to muscle imbalance resulting in UCS 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.

Moreover this study will employ well established and widely used methods with appropriate reliability and validity to assess muscle tightness and weakness as well as to analyze posture. Although we assume that after complete assessment of individuals they will have better understanding about importance of practicing proper posture in order to prevent early signs of UCS.

### Result

Upper cross syndrome has been evaluated in symptomatic individuals and has never been evaluated in asymptomatic individuals. The results would include details about prevalence of UCS in asymptomatic individuals. After completion of study result will be calculated by statistical analysis using paired T-test and

will be presented in the form of research paper.

### References

1. S Raja Rajeswari ,PremBlaisie Rajula<sup>1</sup>, Triveni M Gowda, Tarun AB Kumar, PL Ravi Shanka<sup>1</sup>, and Dhoom Singh Mehta. Upper Crossed Syndrome and Dentistry Why the Need for concern. Biomed Journal Science & Technology Research.2017; 1(7):1860-1862
2. David J. Magee. Orthopedic Physical Assessment (6<sup>th</sup> edition):382-386
3. Iqra Mubeen Salman Malik Kombh Waseem Akhtar Junaid Gondal Muneeb Iqbal Asif Wattoo Adil Arsha. Prevalence of upper cross syndrome among the medical students of university of Lahore. International Physiotherapy Journal.2016;3(3):381-384
4. Forouzan Rafie, Azadeh Zamani Jam, Arash Shahravan, Maryam Rao of, and Ali Eskandarizadeh. Prevalence of Upper Extremity Musculoskeletal Disorders in Dentists: Symptoms and Risk Factors. Journal of environment and public health.2015;1-6
5. Hardeep Oberoi Effect Of Cervicothoracic Taping Along With Stretching Strengthening Exercise Program For Upper Cross Syndrome(2015);1-68
6. Wontae Gong, Changsook Kim, msc, Yoonmi Lee. Correlations between Cervical Lordosis, Forward Head Posture, Cervical ROM and the Strength and Endurance of the Deep Neck Flexor Muscles in College Students. Journal of Physical Therapy science .2012; 3(8):275-277
7. Karen Otte, Bastin Kayser, Sebstein Mansow-model, Jullius Verri, Feridemann Paul, Alexander U. Brandit, Tanja Schmitz-Hubsch. Accuracy and reliability of Kinect version 2 for clinical measurement of motor function. Plus one/journal pone 2016:1-17
8. Gunther, J., Kolodziej, T., Bish, C., Tiberi, J., Physical Therapy, Daemen College, E. Amherst, NY. Test-retest and interrater reliability of two postural Measures in post-menopausal women with osteoporosis. Journal of Geriatric Physical Therapy 2005 28(3):122