Osteopathic Amelioration of Upper Crossed Syndrome:

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Premise:

In Upper Crossed Syndrome (UCS), tight muscles in the trapezius and levator scapula in the upper back 'cross' with tight pectoral muscles of the chest, and weak deep neck flexor muscles in the neck 'cross' with weak scapular stabilizers, retractors and depressors in the mid-back. As a result in this syndrome the head is shifted forward, the upper trunk shifts rearward, shoulders round forward and the pelvis assumes a posterior tilt. The purpose of this paper is to provide better understanding of upper crossed syndrome by presenting a complete and concise clinical picture of the pathology and following through to establish an effective treatment guideline which incorporates manual osteopathic techniques to ameliorate the symptoms of UCS.

Etiology and Symptoms of Upper Crossed Syndrome:

Etiologically upper crossed syndrome has a number of predisposing factors. Although not overly specific to sex, women who have a very large chest size have a slightly higher prevalence due to the excess weight. Age, does play an important role in the normal aspect of the spine; as such older patients having a greater risk for dysfunction at the level of the cervical and thoracic vertebrae and general muscle weakness are also more susceptible to symptoms of UCS. The syndrome also has a predisposition for individuals with a sedentary lifestyle, which are most at risk for developing UCS as a result of chronic bad posture. Usually associated with sedentarism and occupational stress; long hours of sitting at a computer, watching television, or excessive use of a smartphone can contribute to and compound said bad posture. This prolonged poor posture can weaken the rhomboid and neck flexor muscles, while tightening and shortening the pectoral and upper trapezius muscles. [4] Therefore resulting in the typical 'cross' pattern where the condition gets its name. This imbalance causes the spine to pull forward, significantly increasing the amount of stress on the supporting muscles and aggravating symptoms either acutely of chronically. While poor posture and too much sitting is a leading cause of UCS, it is important to note that it is not uncommon to find UCS in athletes, especially swimmers and weightlifters; mainly due to overuse of the muscles in the area of the neck, shoulders, and upper back. Contrary to some musculaskeletal imbalances, upper cross syndrome often manifests in a very visible way, the usual characteristics of the condition present as:

- The head is consistently in a forward (anterior) position
- The spine curves inward near the neck (cervical lordosis) and outward in the upper back (thoracic kyphosis)
- The shoulders are elevated, protracted or rounded
- The Shoulder blades (scapulae) are misaligned
- There is decreased stability and/or range of motion in the shoulder joint

The muscular imbalance associated with upper crossed syndrome puts stress on the surrounding muscles, tendons, bones, and joints, causing most patients to develop a variety of common symptoms, including:

- Headaches
- Neck pain or stiffness in the back of the neck
- Chest pain and tightness
- Pain in the upper back, especially the shoulders
- Difficulty sitting, reading, watching television, or driving for long periods of time
- Restricted range of motion in the neck or shoulders
- Numbness, tingling, and pain in the upper arms

Affected Muscles in Upper Crossed Syndrome:

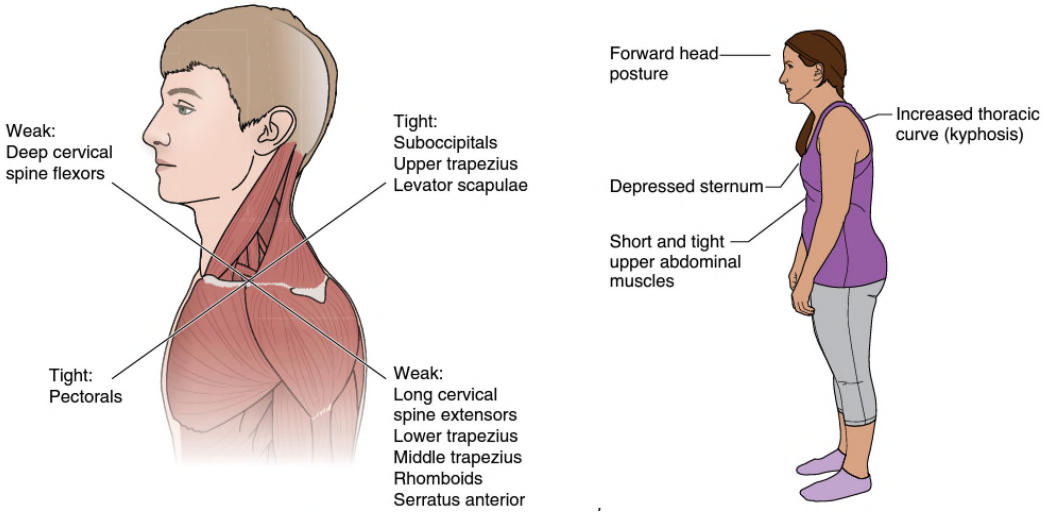
Through review of the etiology of UCS it is possible to identify the muscle groups that are affected and determine the cause of the stereotypic patterns formed. The syndrome is characterized by the specific 'cross' patterns generated by muscle weakness and tightness that cross between the dorsal and the ventral sides of the body. These imbalance patterns predominant in upper crossed syndrome lead to postural changes and joint dysfunction and degeneration which lead to musculoskeletal and neurologic pain. Often, weakness from muscle imbalance results from reciprocal inhibition of the tight antagonist. The degree of tightness and weakness varies between individuals, but the pattern rarely does. [2] These muscle groups include tight or facilitated ones and weak inhibited ones.

Tight, Facilitated Muscles

- Pectorals (Major & Minor)
- Upper Trapezius
- Levator Scapula
- Sternocleidomastoid
- Suboccipitals
- Subscapularis
- Latissimus Dorsi
- Arm Flexors

Weak, Inhibited Muscles:

- Longus Capitis
- Longus Colli
- Hyoids
- Serratus Anterior
- Rhomboids
- Lower Trapezius
- Posterior Rotator Cuff
- Arm Extensors



Typical Presentation of Upper Crossed Syndrome:

First described by Dr Vladimir Janda, upper crossed syndrome (UCS) is also referred to as proximal or shoulder girdle crossed syndrome specifies a distinctive postural stress resulting primarily from imbalances displayed in the muscles that bridge and connect the head, neck, shoulder girdle, and thorax; ultimately impeding function and causing physiologic restriction. [9] The 'facilitated' muscles in upper crossed syndrome present as short, tight, and inflexible and include the pectorals (pectoralis major and minor), upper trapezius, levator scapulae, and the suboccipitals (muscles at the base of the skull). [7] In addition, shortened internal rotators of the arm and upper segments of the rectus abdominis may also be noted. Painful trigger points can be palpated throughout the anterior and lateral muscles of the neck. Upper crossed syndrome may also cause shortness or tightening of the gluteals and hamstrings due to its adverse effect on pelvic tilt. With the shortening of these muscles other groups react complementarily and are prone to becoming lengthened and weakened; including the long cervical spine extensors, deep cervical spine flexors, lower and middle trapezius, rhomboids, and serratus anterior.

The physical presentations of a person with upper crossed syndrome as a result show specific postural changes which include anterior head carriage, increased cervical lordosis and thoracic kyphosis, with elevated and protracted shoulders, and rotation or abduction and winging of the scapulae. An increased thoracic curve, decreased lumbar and cervical curve presents a C-shaped curve of the spine, and as mentioned can have a detrimental effect on the pelvis be causing reduced or posterior pelvic tilt. [7] The C-curve posture also encourages shearing forces throughout the cervical and lumbar spine, potentially resulting in painful disc protrusion or degenerative disk and degenerative joint. Janda noted that these focal areas of stress within the spine correspond to transitional zones in which neighboring vertebrae change in morphology. [9]

In addition to increased kyphosis of the thoracic spine and lumbar lordosis there are numerous other effects caused by UCS imbalance. Frequently associated with paresthesia, decreased sensory motor awareness and loss of coordination are present when a joint is affected by the causative muscle groups; this occurs especially in the shoulder at the glenohumeral joint. Furthermore, one of the greatest effects of upper crossed syndrome is the weakening of the diaphragm, which alters optimal breathing patterns. UCS can also present with an aggravated torsional component, where by inflammation of the myofascia causes a unilateral lesion that skews the sagittal plane aspect of UCS and results in a multi-planar shift. [4] In these complicated cases patients will present with ipsilateral asymmetry, caused by the myofascial lesion, and will greatly benefit from targeted soft tissue therapy.

Osteopathic Assessment of Upper Crossed Syndrome:

When assessing a patient it is important to consider posture first; as with most clinical work-ups a lot of information can be gleaned from gait, range of motion testing, and postural analysis. Most commonly affected in upper cross syndrome; posture, balance and gait speak volumes about muscle imbalances created by the pathology as well as the underlying neurological cause of pain for patients. During history taking it is important to follow up on primary patient complaints and pain levels as well as presents of tingling or paresthesia; although subjective it helps to provide a baseline for later comparison on the effectiveness of treatment. The goal of osteopathic assessment should be to decide the extent of UCS symptoms; which muscle groups are most affected, the level of restriction on the associated joints, and the severity of dysfunction affecting the spine. The optimal course of manual osteopathic treatment should include decreasing muscle tension, strengthening weakened and elongated muscles, unlocking joint restrictions and thus allowing for normal posture to be restored. This ultimately will alleviate the muscle imbalance caused by upper cross syndrome and lend to efficiency of balance and gait, the conservation of energy, and improved fluid movement for the patient. [5]

As established, in upper crossed syndrome, tightness of the upper trapezius and levator scapula on the dorsal side crosses with tightness of the pectoralis major and minor. Weakness of the deep cervical flexors ventrally crosses with weakness of the middle and lower trapezius. [7] From an osteopathic perspective this pattern of imbalance creates joint dysfunction, particularly at the level of the cervical and thoracic spine; especially around the atlanto-occipital joint, C4-C5 segment, cervicothoracic junction, and T4-T5 segment. [10] Thus these changes caused by upper cross syndrome result in marked postural distortion with thoracic kyphosis and cervical lordosis, as well as functional issues that affect the thorax, especially the ribs, chest and shoulders. In addition, these postural changes also adversely affect the glenohumeral joint by decreasing glenohumeral stability. This happens because the glenoid fossa becomes more vertical due to serratus anterior weakness which leads to abduction, rotation, and winging of the scapulae. This loss of stability requires the levator scapula and upper trapezius to increase activation to maintain

glenohumeral centration [5] and results in progressive rounded shoulder posture and exacerbates anterior head carriage.

In order to determine the extent of dysfunction and to localise pain it is recommended to perform a number of orthopedic examinations as part of the osteopathic assessment. Furthermore, these tests help to rule out any concurrent pathology that could be affecting the patient, and allow to establish a baseline which can be revisited to monitor the effectiveness of treatment. The orthopedic testing is beneficial for determining pain, range of motion, muscle tone, the presence of somatic dysfunction, and the general structural dysfunction of the shoulder, cervical and thoracic spine. [6] Therefore it is recommended as part of a general osteopathic evaluation and diagnosis of upper cross syndrome to do orthopedic testing targeting the affected areas. These tests can include:

Range of motion testing using Goniometry:

- Cervical spine
  - Neck Flexion/Extention with a normal range of 50^{O} and 60^{O} respectively
  - Neck Lateral bending with a normal range of 45^{O}
  - Bilateral rotation Left/Right with a normal range of 80^{O}
- Shoulder
  - Bilateral Abduction/Adduction with a normal range of Abduction 150^{O} Adduction 30^{O}
  - Bilateral Flexion/Extension with a normal range of Extension 50^{O} Flexion 150^{O}

Cervical Spine: Testing should focus on ruling out existing issues with nerve root compression or upper motor neuron lesions, the irritation of the brachial plexus (median, radial, and ulnar nerves), and posterior outlet syndrome or other vascular issues. [3]

- Screening of Cervical Spine Rotation, Flexion, and Extension: determines restriction in range of motion of the cervical spine with left/right rotation, head tilt. The range of motion is determined by comparing both sides. The examiner also notes quality of the endpoint of motion, which is resilient in normal conditions but hard when functional impairment is present. Restricted mobility with pain is a sign of segmental dysfunction (arthritis, blockade, inflammation, or muscle shortening). Restricted rotation with a hard endpoint and pain at the end of the range of motion suggest degenerative changes, predominately in the middle cervical vertebrae (spondylosis, spondylarthritis, or uncovertebral arthritis). A soft endpoint is more probably attributable to shortening of the long extensors of the neck or the longus colli muscle. Compromised vascular supply or irritation of the vertebral artery should be considered where vertigo and nystagmus are present.
- O'Donoghue Test: Differentiates between ligamentous pain and muscular pain in the back of the neck. Occurrence of pain during this active head motion with isometric

tensing of the ipsilateral and contralateral paravertebral musculature suggests muscular dysfunction, whereas pain during passive lateral bending of the cervical spine suggests a functional impairment involving ligaments or articular, possibly degenerative processes.

- Soto-Hall Test: Pain in the back of the neck when pressure is applied during passive raising of the head suggests a bone or ligament disorder in the cervical spine. Pulling pain occurring when the patient actively raises the neck is primarily due to shortening of the posterior neck musculature.
- Spurling Test: Assesses facet joint pain and nerve root irritation. This test provides clinical evidence of both a facet syndrome and nerve root compression. Where facet joint irritation or nerve root compression is present, the examination will intensify the pain. Simultaneous extension of the cervical spine narrows the intervertebral foramina by 20–30%. Existing radicular pain will be increased by this movement.
- Cervical Spine Distraction Test: Differentiates between radicular pain in the back of the neck, shoulder and arm, and ligamentous or muscular pain in these regions. Distraction of the cervical spine reduces the load on the intervertebral disks and exiting nerve roots within the affected levels or segments while producing a gliding motion in the facet joints. Reduction of radicular symptoms, even in passive rotation, when the cervical spine is distracted is a sign of discogenic nerve root irritation. Increased pain during distraction and rotation suggests a functional impairment in the cervical spine due to muscular or ligamentous pathology or articular, possibly degenerative processes.
- Shoulder press test: provocation of radicular symptoms is a sign of adhesion of the dural sac and/or a nerve root. Circumscribed pain on the side of the stretched musculature indicates increased muscle tone in the sternocleidomastoid or trapezius. Decreased muscular pain in the side that is not stretched suggests a pulled muscle or a functional impairment involving shortening of the musculature.
- Intervertebral Foramina Compression, Flexion and Extension tests: rule out intervertebral disc dysfunction, and in the presence of diffuse symptoms that are not clearly specific to any one segment may be regarded as a sign of ligamentous or articular functional impairment (facet joint pathology)
- George Vertebral Artery Test (De Klyn Test): Tests for insuffciency of the vertebral artery. Abnormal auscultatory findings in the common carotid artery, vertigo, visual symptoms, nausea, fatigue, or nystagmus occurring during this maximum rotation and extension indicate stenosis of the vertebral artery or common carotid artery. The test is especially important in candidates for treatment (such as traction or manipulative therapy) of cervical spine symptoms associated with vertigo. The vertebral artery provocation test aids in the differential diagnosis because nausea, vertigo, and nystagmus initially increase but then rapidly decrease in intensity where a vertebral blockade is present. In the presence of vertebral artery insuffciency, the intensity of nausea and vertigo symptoms will rapidly increase within a few seconds.

Thoracic Spine: Testing should help determine the extent of dysfunction caused by UCS, impact of kyphosis, rule out spinal cord or nerve root impingement. [3]

- Ott Sign: Measures the range of motion of the thoracic spine.
- Adams Forward Bend Test: Assesses structural or functional scoliosis. In the case of UCS rules out underlying pathology.
- Kyphosis Test on Hands and Knees: This posture will correct a flexible kyphotic deformity of the thoracic spine. A kyphotic posture that remains unchanged is a fixed deformity.
- Test of Segmental Function in the Thoracic Spine in Extension: used to detect segmental functional impairments by palpating the individual segments while the examiner passively moves the patient's spine into flexion, extension, lateral bending, and rotation.

Shoulder: Testing should help determine the severity of restriction, presence of neurologic symptoms or paresthesia, rule out rotator cuff issues or pre-existing pathologies such as dislocation and subluxation with their various instability symptoms. [3]

- Allen Test: Assesses an arterial ischemic disorder in the upper extremities. Rapid, uniform reddening of the hand in the areas supplied by the respective arteries indicates normal arterial supply. If vascular supply to the hand and fingers is compromised, the ischemic changes in the hand will only slowly recede.
- Jobe Supraspinatus Test (empty can): When this test elicits severe pain and the patient is unable to hold his or her arm abducted 90° against gravity, this is called a positive drop arm sign. The superior portions of the rotator cuff (supraspinatus) are particularly assessed in internal rotation (with the thumb down), and the anterior portions in external rotation. A useful supplementary test is to have the patient hold the arm (palmup with the elbow extended, i.e., in maximum external rotation) at 90° elevation in the scapular plane.
- Infraspinatus Test: Comparative testing of both sides is best. Pain or weakness in external rotation indicates a disorder of the infraspinatus (external rotator). As infraspinatus tears are usually painless, weakness in rotation strongly suggests a tear in this muscle. This test can also be performed with the arm abducted 90° and flexed30° to eliminate involvement of the deltoid in this motion.
- Subscapularis Test: Assesses increased passive external rotation in comparison with the contralateral side suggests a rupture of the subscapularis (internal rotator). However, the tear may be small and may only involve the superior portion of the muscle. Usually increased external rotation is due to inactivity of the subscapularis and not a tear.
- Bursitis sign: Assesses and rules out underlying pathology to UCS. Localized tenderness to palpation in the subacromial space suggests irritation of the subacromial bursa but can also be a sign of a rotator cuff disorder.

Lumbar Spine and Sacrum: Testing should help rule out secondary dysfunction caused by UCS that could result in lumbar lordosis, facet irritation, or posterior pelvic tilt. [3]

- Schober Sign: Measures the range of motion of the lumbar spine.
- Spinous Process Tap Test: Indicates lumbar spine syndrome, using a reflex mallet, the examiner taps on the spinous processes of the lumbar spine and on the paraspinal musculature. Localized pain can indicate irritation of the involved spinal segments as a result of degenerative inflammatory changes. Radicular pain can be a sign of disk pathology.
- Psoas Sign: For diagnostic assessment of lumbar pain. Assesses reflexive contraction of the iliopsoas with traction on the transverse processes of the lumbar spine. Patients will report pain in the presence of changes in the lumbar spine (spondylarthritis, spondylitis, or disk herniation) or in the sacroiliac joint.
- Hoover Test: Tests for underlying pathology to UCS by simulation of lumbar spine complaints. Where sciatica is actually present, the patient will be unable to raise the leg and will press the heel of the other leg against the examiner's hand. A patient simulating sciatica will not press down with the contralateral heel. Often patients will report that they cannot raise the leg at all.

Osteopathic Approach to Treatment of Upper Crossed Syndrome:

The manual osteopathic approach to treating UCS should comprise all relevant techniques applicable to treating and ameliorating symptoms of said syndrome. The effectiveness of the techniques used should be targeted towards minimizing restrictions, joint dysfunction, muscle spasm, and symptomatic pain. Given the multifaceted approach offered by manual osteopathic treatment a variety of techniques are available for use. Depending on the level of dysfunction present in the patient, a good place to start therapy, in order to minimize pain would be with soft tissue and myofascial release (MFR) techniques in order to relax tight facilitated muscles. [8] Following sufficient relief of trigger points and muscle tension, joint mobilization (MOB's) of the cervical, thoracic, and lumbar spine, as well as bilateral shoulder, scapula, and clavicle can be used to reduce restrictions caused by the chronic pathologic postures assumed in upper crossed syndrome. Concluding treatment with muscle energy techniques (MET's) targeting weak elongated muscles in order to actively strengthen them and reduce muscle imbalance. [1] In addition to these techniques, visceral manipulation can be used to great effect if the patient in experiencing breathing issues associated with the thoracic kyphosis. Furthermore, depending on the level of restriction in the cervical spine and postural changes of the sacrum, craniosacral techniques can be used to scale down pressure on the base of the head and neck with suboccipital release, reduce sacral restriction with a sacral release, and to alleviate headaches the patient might be experiencing. An effective treatment plan can include the following:

Cervical Mobilization: Techniques should be focused on traction, stretching and relieving pressure on the intervertebral ligaments caused by the anterior head carriage common in upper cross syndrome.

- Supine Static Joint Play techniques for C1 to C7 (facet rub, lateral TVP, rotation)
- Global cervical long axis traction with contact on occipital bone
- Figure 8: Supine bilateral global multiaxial cervical osteoarticular mobilization
- Supine Upper Cervical Rotation Supine
- Supine Rotation with contact on ipsilateral of TVP
- Supine Traction with contact on Forehead

Thoracic Mobilization: Thoracic techniques should be used to break down restrictions at the level of the vertebrae caused by kyphosis, as well as act globally to relax the paraspinal muscles and stretch the tightened segments of the descending trapezius and rhomboids.

- Soft Tissue Palpation (bilateral)
- Deep tissue Palpation (bilateral)
- Spinal Process Posterior to Anterior and Medial to Lateral Static Joint Play
- Cat-Walk: Prone Bilateral Posterior to Anterior with pressure on TVP
- Prone Posterior to Anterior with Pelvis Pull
- Cross Hands: Prone PA on TVP with the PISI form in cross hand – rotational

Lumbar Mobilization: Techniques should be used to ease restrictions caused by UCS especially if lordosis is present. Focus should be on relaxing the Thoracolumbar (TL) junction and TL fascia adhesions.

- Lumbar Thermogenic Techniques
- Cat-Walk: Prone Bilateral Posterior to Anterior Lumbar Ostearticular Joint Mobilization
- Cupping: Prone Posterior to Anterior Lumbar Osteoarticular Joint Mobilization
- Double Edge: Prone Bilateral Posterior to Anterior Lumbar Osteoarticular Joint Mobilization
- Prone Posterior to Anterior lumbar osteoarticular joint mobilization with pelvis pull
- Prone Posterior to Anterior lumbar osteoarticular joint mobilization with leg lift
- Cross Hands: Prone PA on TVP with the PISI form in cross hand – rotational
- Prone caudal to cephalad (inferior to superior) lumbar osteoarticular joint mobilization traction

Shoulder Mobilization: Techniques serve to increase range of motion in glenohumeral joint which is limited in upper cross syndrome, as well as improve stability and reduce anterior roll.

- Supine Anterior to Posterior and Posterior to Anterior
- Supine Medial to Lateral with Arm Lift
- Supine Anterior to Posterior with Arm Lift

- Supine Long Axis Traction
- Supine Rocking Shoulder

Clavicle Mobilization: Working in conjunction with scapula and shoulder mobilizations, these techniques should focus on relieving restrictions present at the sternoclavicular and acromioclavicular joints while aiding to relax the pectorals and sternocleidomastoid muscle.

- Supine inferior to superior and superior to inferior mid-clavicle global mobilization
- Lateral recumbent sternoclavicular joint (SCJ) distraction
- Supine distraction of clavicle in the sternoclavicle joint (SCJ) in contralateral side
- Supine posterior glide of ipsilateral clavicle with thumb in SCJ
- Supine anterior glide of ipsilateral clavicle in SCJ with head bent to ipsilateral side
- Supine superior and inferior glide of clavicle in SCJ with thumb
- Supine distraction of clavicle in the acromioclavicular joint (ACJ) in contralateral side
- Lateral recumbent anterior to posterior ACJ mobilization with patient's hand on hip
- Seated anterior to posterior and posterior to anterior concaved ACJ mobilization

Scapula Mobilization: Global techniques can be used to great effect affecting the rotator cuff muscles. Mobilization of the joint can reduce pressure on the serratus, trapezius, and levators, and reduce scapular winging common in UCS.

- Lateral recumbent multi-axial Scapulothoracic joint (STJ) mobilization
- Lateral recumbent elevation (superior) & depression (inferior) STJ mobilization
- Lateral recumbent retraction (medial glide) & protraction (lateral glide) STJ mobilization.
- Lateral recumbent retraction with downward & upward rotation STJ mobilization
- Lateral recumbent distraction (winging) of the STJ

Muscle Energy Techniques: These techniques should be used to directly target muscles affected by upper cross syndrome as part of therapy to increase range of motion. [2] MET's are a gentle and controlled resistance exercise and thus very effective for strengthening and stretching and a key part of treatment. MET's should be used complementary to soft tissue techniques. By repeatedly activating and contracting the affected muscles over the duration of the therapy UCS symptoms should improve with muscle strengthening. [5] Some techniques specifically applicable to relieving symptoms of upper cross syndrome include:

- Supine Cervical Rotation MET working on the sternocleidomastoid and scalene muscles
- Supine Cervical Extension MET with primary muscles worked being the trapezius, neck extensors
- Supine Cervical Lateral Flexion MET with direct lateral flexion stretching the scalenes, splenius cervices, obliquus capitis superior, rectus capitis lateralis, longus colli, splenius capitis, & inter-transversarii muscles
- Seated Upper Thoracic MET working on erector spinae, abdominal complex

- Seated Mid Thoracic MET targeting the multifidis, rotatores, erector spinae, internal and external obliques
- Seated Lower Thoracic MET targeting the internal/external obliques, latissimus dorsi, erector spinae, multifidis, rotators
- Seated Lumbar Lateral Flexion MET working on the internal/external obliques, latissimus dorsi
- Seated Lumbar Rotation MET primarily working the erector spinae, miltifidis, rotatores
- Seated Shoulder Abduction MET focusing on the supraspinatus and deltoid muscles
- Seated Shoulder Internal and External Rotation MET targeting the teres minor, infraspinatus, and supraspinatus respectively
- Seated Shoulder Extension MET with muscles worked being the deltoids and pectoralis major
- Seated Shoulder Flexion MET muscles worked being latissimus dorsi, subscapularis, deltoids
- Supine Scapular elevation MET with ipsilateral shoulder shrug (resistance) and contralateral head rotated 45 degrees to contralateral side, laterally flexed and brought to forward flexion (stretching) targeting the upper trapezius and levator scapulae
- Supine Scapular retraction muscle energy technique, with ipsilateral upper limb flexed 90 degrees working the pectoral muscles
- Supine Rotator Cuff MET with internal and external rotation with arm abducted 90 degrees targeting the muscles of the rotator cuff
- Seated Breath Assist Inferior Clavicle MET with adduction of arm working on the scalene muscles

Soft Tissue Techniques: For maximum effect from manual osteopathic treatment in upper cross syndrome it is highly recommended to incorporate soft tissue therapy. [1] Due to the specific presentation and symptomatology of UCS, techniques which focus on relieving tension on affected muscles, releasing myofascial restriction and trigger points are very beneficial. These techniques should be targeted at tight facilitated muscle groups which are causative to anterior head carriage and shoulder roll. Furthermore soft tissue techniques can be used to relieve increased thoracic curve and scapular protraction associated the kyphosis caused by UCS. Global methods such as effleurage can be used on every affected joint and muscle group common in upper cross syndrome. Additionally various patrissage methods are also very effective on these tissues, when combined with general Myofascial Release Techniques where there is more muscular surface area to work with; it is very useful in treating the thoracic and lumbar spine, shoulders, and chest especially targeted at the pectorals and sternocleidomastoid. [8] Cross-friction and skin roll techniques can be used alongside mobilization techniques on the thoracic and lumbar spine to aid releasing restriction and relaxing the thoracolumbar fascia. Lastly advanced soft tissue techniques can also be essential in amelioration of upper cross symptoms. The targeted relief of trigger point therapy is very beneficial in treating muscles spasms common in UCS affecting the levator scapulae, upper trapezius, pectoralis minor, and

sternocleidomastoid. While the tapotement methods can also be used for the entire spine it should be used towards the end on treatment as it activates the central nervous system, waking the patient up after being relaxed by other soft tissue techniques.

Therapeutic Exercises: To aid the therapeutic process homecare should include effective stretching and strengthening exercises which improve range of motion. These exercises can help manage/prevent the return of symptoms of upper cross syndrome in the long term following manual osteopathic treatment. [2]

- Levator Scapulae Stretch: stretching the neck and levator scapula.
- Upper Trapezius Stretch: performed bilaterally for stretching the neck
- Pectoralis Door-way stretches: lengthening tight pectoral muscles
- Foam Roller Bridge: focused on reducing upper thoracic kyphosis and breaking down myofacial adhesions
- Scapular Retractions: by squeezing the scapula together the Rhomboids are activated and pectoral muscles lengthened
- Chin-tucks: activates the muscles required to maintain proper head position helping with the forward head carriage
- Brugger Posture: will relax your upper traps and allow the shoulder blades to slide down
- Middle and Lower Trapezius Strengthening
- Serratus Anterior Strengthening

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