CHARLES UNIVERSITY IN PRAGUE

Faculty of Physical Education and Sport

UPPER CROSSED SYNDROME

Bachelor thesis

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Abstract

Title: Upper crossed syndrome

Author: Anastasios Magklaras

Thesis Aim: In this thesis I will discuss about the upper crossed syndrome as defined by Janda and show my results after five therapeutic sessions with one patient that I had most of the signs of the UCS.

Clinical findings: This patient is a 24 years old student. She has headaches with increased frequency last months and feels the stiffness of the neck after some hours of studying. According to the examination muscle imbalances were detected with the most important this one between the week deep neck flexors and the short suboccipital muscles. Also joint play restrictions existed in the cervical spine at the C/T junction. Trigger points in several muscles (e.g upper trapezius, levator scapulae etc) and muscle shortness (marked of suboccipital muscles) and ROM restriction of head movements were also detected.

Methods: The therapy included five meetings with the patient during two weeks. The patient was taught to sit correctly according to the Brugger sitting pattern to correct her incorrect sitting during studying. PIR techniques were performed at every session for the relaxation of hypertonic muscles, stretching techniques to elongate the shortened muscles, mobilization of restricted joints and strengthening exercises of the week muscles. Because of the incorrect breathing pattern the breathing exercises were performed and a therapy plan for the autotherapy was proposed to the patient.

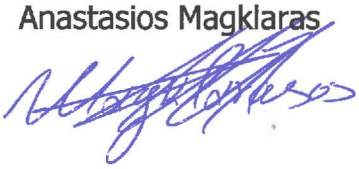
Results: After the five sessions improvements were detected in the final kinesiologic examination. Shortened muscles were elongated, hypertonic muscles were relaxed, restricted ROM of shoulder joint an head were increased, blockages of joint play in cervical spine and C/Th crossing were mobilized, strength of muscles around scapula and cervical spine was improved. Results of my treatment approach, discussions of the upper crossed syndrome and literature approaches for the examination and treatment of the upper crossed syndrome are discussed.

Key words: Upper crossed syndrome, muscle imbalances, headaches.

Declaration

I declare that this Bachelor Thesis has been based entirely on my own individual work
and on my own practice that took place in Vojenska Nemocnice in Prague from 21/1/2008 to 1/2/2008. All the information used for the development of this Bachelor
Thesis has been taken from the list of literature that exists in the end of this Thesis.

In Prague, 2008
Anastasios Magklaras



Dedication

To my family who is always there for me when it's needed.

To my supervisor Michaela Prokesova.

To all the great professors whom I had the luck to be taught from.

To the persons that helped me with my Bachelor thesis.

Acknowledgement

Until this moment of my life many peopled help me and I will always appreciate what they did for me.

First of all I would like to thank my family for all the times they have been there for me, helping me from the first moment or by pushing me to the limit for me to see how is the real life.

I want to thank all the professors that I had in Charles University of Prague. They do great work and they share their knowledge with pleasure with the students.

I want to thank the physiotherapist, my adviser in my 14 -days practice in Vojenska Nemocnice.

I want to thank the physiotherapist Mrs. Michaela Prokešová, my supervisor for my Bachelor Thesis. She is an incredible person and a great physiotherapist. Her cooperation with me in the preparation of my thesis was very effective and triggered me to think and finally to learn many thinks about physiotherapy.

Finally, I want to thank Prague, as place, for all that gave to me.

CONTENTS:

1. Preface

After my 3 years of studying here in Prague the university gave this knowledge to treat, injuries, variety of diseases, syndromes or problems.

In my thesis I will try to give you an example how I practically use all of these knowledge for a syndrome that is very often nowadays. I will show you a complete session of therapy units including evaluation, examination, inclusions that connect them to the therapeutic plan, and the execution of a therapy proposal with its effect on the patient's rehabilitation program.

It will be therefore analyzed the upper crossed syndrome as defined by Janda and show my results after five therapeutic sessions with one patient that I had most of the signs of the UCS.

2. General part

2.1 Anatomy

Vertebral column

Curves

Observing the body from a lateral view, we can see the curves of the spine.The cervical curve which is the less prominent, and it has a slight lordosis. The cervical curve, convex forward, begins at the apex of the odontoid (tooth-like) process, and ends at the middle of the second thoracic vertebra.; The thoracic curve which has a kyphotic curve - begins at the middle of the second and ends at the middle of the twelfth thoracic vertebra., the lumbar which has a lordotic curve. It begins at the middle of the last thoracic vertebra, and ends at the sacrovertebral angle. (1)

Kinesiology of the curves

The function of the spinal curves is for the absorption of the vibrations which are forced to the body. Spinal column works as a "suspensor".

Also the curves, bring the center of the gravity into a vertical line which this in turn, allows the body's weight to balance on the vertebral column in a way that expends the least amount of power – energy to keep upright bilateral stance. (2,5)

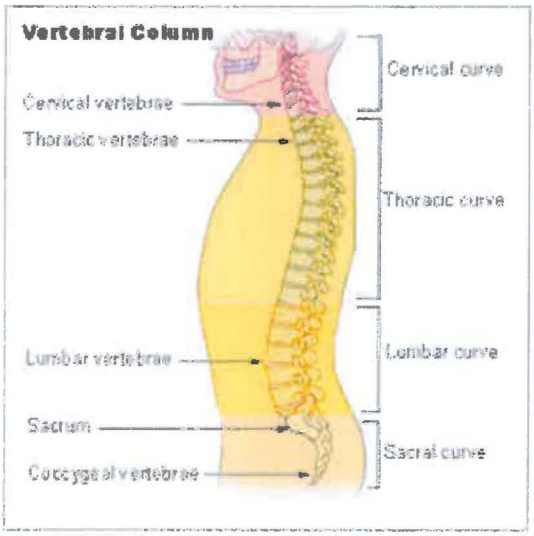


Figure 1. Vertebal column (lateral view)

General Characteristics of a Vertebra

A typical vertebra consists of two essential parts, an anterior segment, the body, and a posterior part, the vertebral or neural arch; these enclose a foramen, the vertebral foramen. The vertebral arch consists of a pair of pedicles and a pair of laminae, and supports seven processes, four articular, two transverse, and one spinous.

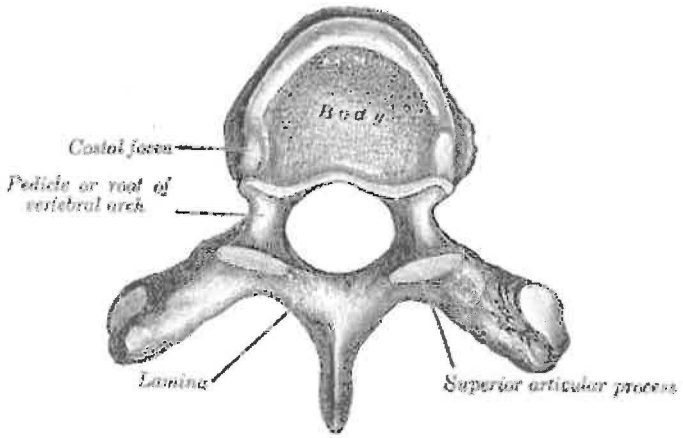


Figure 2. A typical thoracic vertebra, viewed from above

When the vertebrae are articulated with each other the bodies form a strong pillar for the support of the head and trunk, and the vertebral foramina constitute a canal for the protection of the medulla spinalis (*spinal cord*), while between every pair of vertebrae are two apertures, the intervertebral foramina, one on either side, for the transmission of the spinal nerves and vessels. (4)

Body (*corpus vertebrae*). The body is the largest part of a vertebra, and is more or less cylindrical in shape. Its upper and lower surfaces are flattened and rough, and give attachment to the intervertebral fibrocartilages, and each presents a rim around its circumference. In front, the body is convex from side to side and concave from above downward. Behind, it is flat from above downward and slightly concave from side to side. Its anterior surface presents a few small apertures, for the passage of nutrient vessels; on the posterior surface is a single large, irregular aperture, or occasionally more than one, for the exit of the basi-vertebral veins from the body of the vertebra. (4)

Pedicles (*radices arci vertebrae*). The pedicles are two short, thick processes, which project backward, one on either side, from the upper part of the body, at the junction of its posterior and lateral surfaces. The concavities above and below the pedicles are named the vertebral notches; and when the vertebrć are articulated, the notches of each contiguous pair of bones form the intervertebral foramina, already referred to. (7)

Laminae. The laminae are two broad plates directed backward and medialward from the pedicles. They fuse in the middle line posteriorly, and so complete the posterior boundary of the vertebral foramen. Their upper borders and the lower parts of their anterior surfaces are rough for the attachment of the ligamenta flava. (7)

Spinous Process (*processus spinosus*). The spinous process is directed backward and downward from the junction of the laminć, and serves for the attachment of muscles and ligaments. (4)

Articular Processes. The articular processes, two superior and two inferior, spring from the junctions of the pedicles and laminae. The superior project upward, and their articular surfaces are directed more or less backward; the inferior project downward, and their surfaces look more or less forward. The articular surfaces are coated with hyaline cartilage. (7)

Transverse Processes (*processus transversi*).—The transverse processes, two in number, project one at either side from the point where the lamina joins the pedicle, between the superior and inferior articular processes. They serve for the attachment of muscles and ligaments. (4)

Structure of a Vertebra. The body is composed of cancellous tissue, covered by a thin coating of compact bone; the latter is perforated by numerous orifices, some of large size for the passage of vessels; the interior of the bone is traversed by one or two large canals, for the reception of veins, which converge toward a single large, irregular aperture, or several small apertures, at the posterior part of the body. The thin bony lamellć of the cancellous tissue are more pronounced in lines perpendicular to the upper and lower surfaces and are developed in response to greater pressure in this direction. The arch and processes projecting from it have thick coverings of compact tissue. (4)

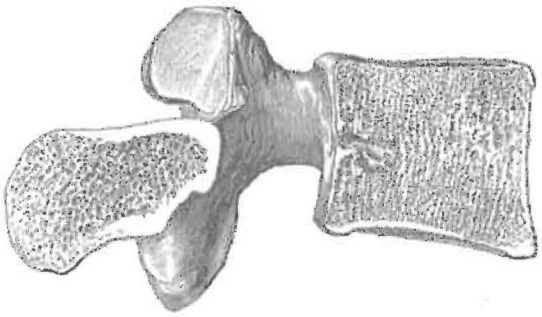


Figure 3. Sagittal section of a lumbar vertebra.

2.2 The Cervical Vertebrae

Cervical vertebrae are the smallest of the true vertebrae, and can be readily distinguished from those of the thoracic or lumbar regions by the presence of a foramen in each transverse process. The first, second, and seventh present exceptional features and must be separately described; the following characteristics are common to the remaining four.

The body is small, and broader from side to side than from before backward. The anterior and posterior surfaces are flattened and of equal depth; the former is placed on a lower level than the latter, and its inferior border is prolonged downward, so as to overlap the upper and forepart of the vertebra below. The upper surface is concave transversely, and presents a projecting lip on either side; the lower surface is concave from before backward, convex from side to side, and presents laterally shallow concavities which receive the corresponding projecting lips of the subjacent vertebra. The pedicles are directed lateralward and backward, and are attached to the body midway between its upper and lower borders, so that the superior vertebral notch is as deep as the inferior, but it is, at the same time, narrower. The laminae are narrow, and thinner above than below; the vertebral foramen is large, and of a triangular form. The spinous process is short and bifid, the two divisions being often of unequal size. The superior and inferior articular processes on either side are fused to form an articular pillar, which projects lateralward from the junction of the pedicle and lamina. The articular facets are flat and of an oval form: the superior look backward, upward, and slightly medialward: the inferior forward, downward, and slightly lateralward. The transverse processes are each pierced by the foramen transversarium, which, in the upper six vertebrae, gives passage to the vertebral artery and vein and a plexus of sympathetic nerves. Each process consists of an anterior and a posterior part. The anterior portion is the homologue of the rib in the thoracic region, and is therefore named the costal process or costal element: it arises from the side of

the body, is directed lateralward in front of the foramen, and ends in a tubercle, the anterior tubercle. The posterior part, the true transverse process, springs from the vertebral arch behind the foramen, and is directed forward and lateralward; it ends in a flattened vertical tubercle, the posterior tubercle. These two parts are joined, outside the foramen, by a bar of bone which exhibits a deep sulcus on its upper surface for the passage of the corresponding spinal nerve. (15,16,18)

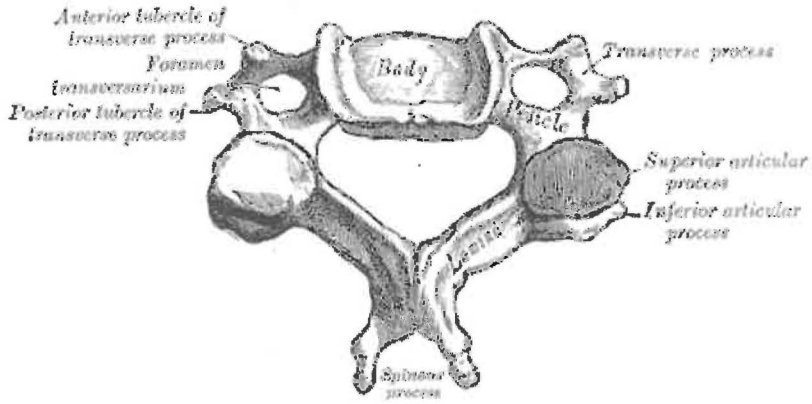


Figure 4. A cervical vertebra

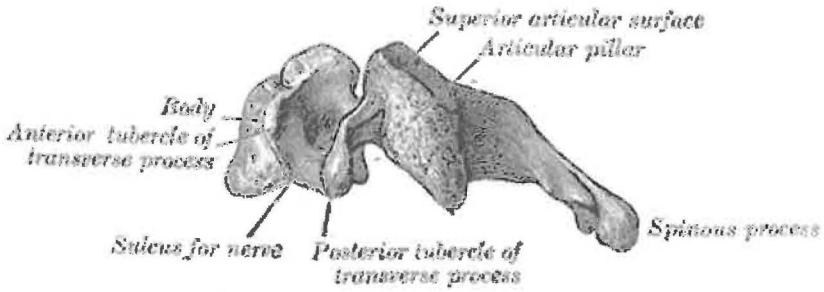


Figure 5. Side view of a typical cervical vertebra.

First Cervical Vertebra

The first cervical vertebra is named the atlas because it supports the globe of the head. Its chief peculiarity is that it has no body, and this is due to the fact that the body of the atlas has

fused with that of the next vertebra. Its other peculiarities are that it has no spinous process, is ring-like, and consists of an anterior and a posterior arch and two lateral masses. The anterior arch forms about one-fifth of the ring: its anterior surface is convex, and presents at its center the anterior tubercle for the attachment of the Longus colli muscles; posteriorly it is concave, and marked by a smooth, oval or circular facet (*fovea dentis*), for articulation with the odontoid process (*dens*) of the axis. The upper and lower borders respectively give attachment to the anterior atlantooccipital membrane and the anterior atlantoaxial ligament; the former connects it with the occipital bone above, and the latter with the axis below. The posterior arch forms about two-fifths of the circumference of the ring: it ends behind in the posterior tubercle, which is the rudiment of a spinous process and gives origin to the Recti capitis posteriores minores. The diminutive size of this process prevents any interference with the movements between the atlas and the skull. The posterior part of the arch presents above and behind a rounded edge for the attachment of the posterior atlantoöccipital membrane, while immediately behind each superior articular process is a groove (*sulcus arteriæ vertebralis*), sometimes converted into a foramen by a delicate bony spiculum which arches backward from the posterior end of the superior articular process. This groove represents the superior vertebral notch, and serves for the transmission of the vertebral artery, which, after ascending through the foramen in the transverse process, winds around the lateral mass in a direction backward and medialward; it also transmits the suboccipital (first spinal) nerve. On the under surface of the posterior arch, behind the articular facets, are two shallow grooves, the inferior vertebral notches. The lower border gives attachment to the posterior atlantoaxial ligament, which connects it with the axis. The lateral masses are the most bulky and solid parts of the atlas, in order to support the weight of the head. Each carries two articular facets, a superior and an inferior. The superior facets are of large size, oval, concave, and approach each other in front, but diverge behind: they are directed upward, medialward, and a little backward, each forming a cup for the corresponding condyle of the occipital bone, and are admirably adapted to the nodding movements of the head. Not infrequently they are partially subdivided by indentations which encroach upon their margins. The inferior articular facets are circular in form, flattened or slightly convex and directed downward and medialward, articulating with the axis, and permitting the rotatory movements of the head. Just below the medial margin of each superior facet is a small tubercle, for the attachment of the transverse atlantal ligament which stretches across the ring of the atlas and divides the vertebral foramen into two unequal parts—the anterior or smaller receiving the odontoid process of the axis, the posterior transmitting the medulla spinalis and its membranes. This part of the vertebral canal is of considerable size, much greater than is required for the accommodation of the medulla

spinalis, and hence lateral displacement of the atlas may occur without compression of this structure. The transverse processes are large; they project lateralward and downward from the lateral masses, and serve for the attachment of muscles which assist in rotating the head. They are long, and their anterior and posterior tubercles are fused into one mass; the foramen transversarium is directed from below, upward and backward. (15,18)

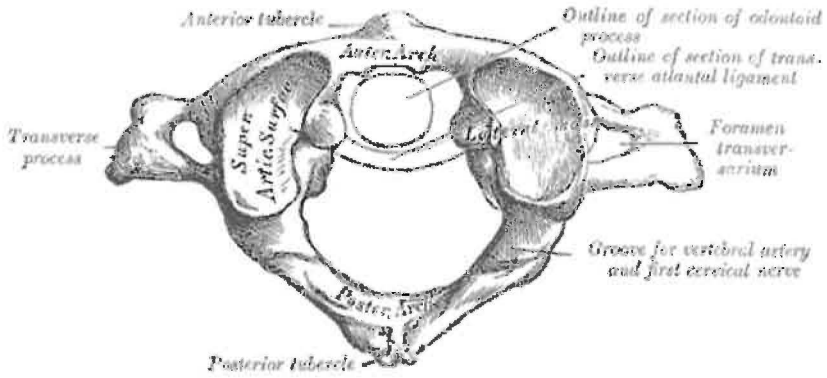


Figure 6: First cervical vertebra, or atlas.

Second Cervical Vertebra

The second cervical vertebra and is named the epistropheus or axis because it forms the pivot upon which the first vertebra, carrying the head, rotates. The most distinctive characteristic of this bone is the strong odontoid process which rises perpendicularly from the upper surface of the body. The body is deeper in front than behind, and prolonged downward anteriorly so as to overlap the upper and fore part of the third vertebra. It presents in front a median longitudinal ridge, separating two lateral depressions for the attachment of the Longus colli muscles. Its under surface is concave from before backward and covex from side to side. The dens or odontoid process exhibits a slight constriction or neck, where it joins the body. On its anterior surface is an oval or nearly circular facet for articulation with that on the anterior arch of the atlas. On the back of the neck, and frequently extending on to its lateral surfaces, is a shallow groove for the transverse atlantal ligament which retains the process in position. The apex is pointed, and gives attachment to the apical odontoid ligament; below the apex the process is somewhat enlarged, and presents on either side a rough impression for the attachment of the alar ligament; these ligaments connect the process to the occipital bone. The internal structure of the odontoid process is more compact than that of the body. The pedicles are broad and strong, especially in front, where they coalesce with the sides of the body and

the root of the odontoid process. They are covered above by the superior articular surfaces. The laminć are thick and strong, and the vertebral foramen large, but smaller than that of the atlas. The transverse processes are very small, and each ends in a single tubercle; each is perforated by the foramen transversarium, which is directed obliquely upward and lateralward. The superior articular surfaces are round, slightly convex, directed upward and lateralward, and are supported on the body, pedicles, and transverse processes. The inferior articular surfaces have the same direction as those of the other cervical vertebrć . The superior vertebral notches are very shallow, and lie behind the articular processes; the inferior lie in front of the articular processes, as in the other cervical vertebrć . The spinous process is large, very strong, deeply channelled on it's under surface, and presents a bifid, tuberculated extremity. (15,18)

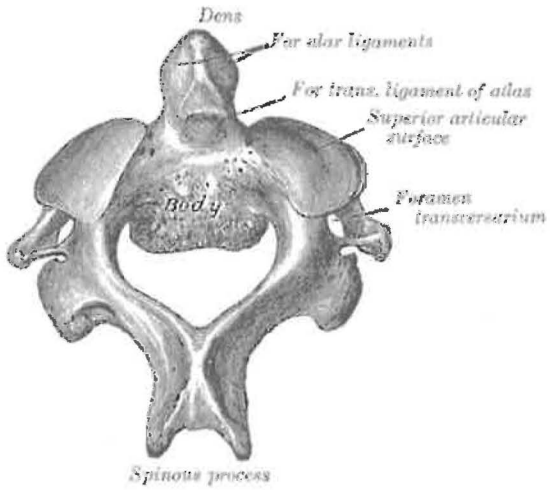


Figure 7: Second cervical vertebra, or epistropheus, from above.

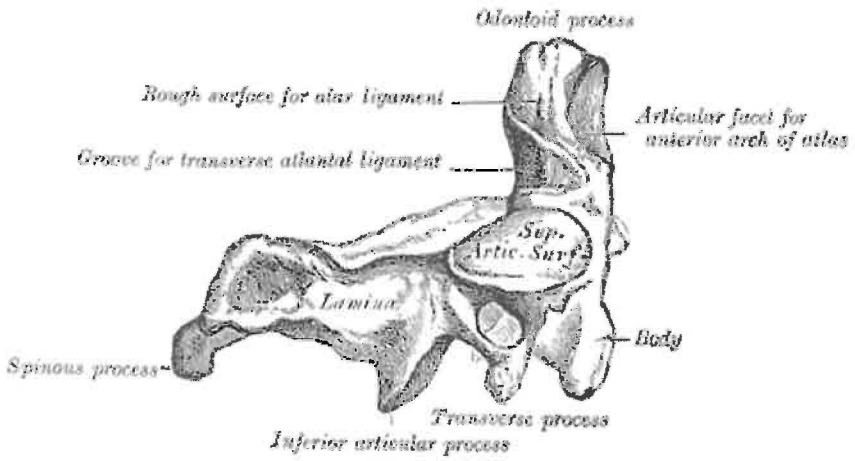


Figure 8: Second cervical vertebra, epistropheus, or axis, from the side.

The Seventh Cervical Vertebra

The most distinctive characteristic of this vertebra is the existence of a long and prominent spinous process, hence the name vertebra prominens. This process is thick, nearly horizontal in direction, not bifurcated, but terminating in a tubercle to which the lower end of the ligamentum nuchae is attached. The transverse processes are of considerable size, their posterior roots are large and prominent, while the anterior are small and faintly marked; the upper surface of each has usually a shallow sulcus for the eighth spinal nerve, and its extremity seldom presents more than a trace of bifurcation. The foramen transversarium may be as large as that in the other cervical vertebrae, but is generally smaller on one or both sides; occasionally it is double, sometimes it is absent. On the left side it occasionally gives passage to the vertebral artery; more frequently the vertebral vein traverses it on both sides; but the usual arrangement is for both artery and vein to pass in front of the transverse process, and not through the foramen. Sometimes the anterior root of the transverse process attains a large size and exists as a separate bone, which is known as a cervical rib. (15,18)

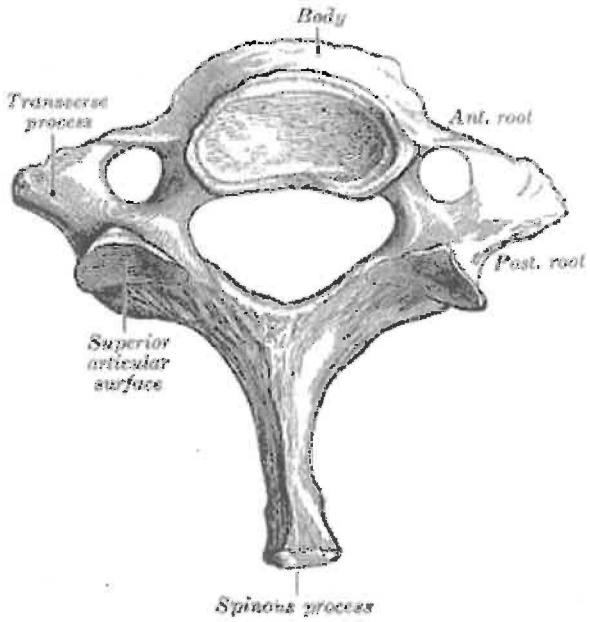


Figure 9. Seventh cervical vertebra.

2.3 Kinesiology of the cervical spine

Seven cervical vertebra and eight cervical nerve roots exist. C1-2, or the atlantoaxial joint, forms the upper cervical segment. This joint allows for 50% of all cervical rotation motion. The occipital atlantal joint is responsible for 50% of flexion and extension. Below the C2-C3 level, lateral bending of the cervical spine is coupled with rotation in the same direction. This is due to the 45° inclination of the cervical facet joints.

The vertebral bodies of C3-C7 are similar in appearance and function. They articulate via zygapophyseal or facet joints posteriorly. On the lateral aspect of the vertebral bodies are sharply defined margins, which articulate with the facet above. These articulations are called uncovertebral joints, or joints of Luschka. These joints can develop osteophytic spurs, which can narrow the intervertebral foramina.

Intervertebral discs are located between the vertebral bodies of C2-C7. The discs are composed of an outer annular fibrosis and an inner nucleus pulposus and serve as force dissipators, transmitting compressive loads throughout a range of motion (ROM). The intervertebral discs are thicker anteriorly and therefore contribute to normal cervical lordosis. The foramina are largest at C2-3 and progressively decrease in size to the C6-7 level.

The nerve root occupies 25-33% of the foraminal space. The neuroforamen is bordered anteromedially by the uncovertebral joints, posterolaterally by facet joints, superiorly by the

pedical of the vertebra above, and inferiorly by the pedical of the lower vertebra. Medially, the foramina are formed by the edge of the end plates and the intervertebral discs. The nerve roots exit above their correspondingly numbered vertebral body from C2-C7. C1 exits between the occiput and atlas and C8 exits below the C7 vertebral body. Degenerative changes of the structures that form the foramina can cause nerve root compression. This compression can occur from osteophyte formation, disc herniation, or a combination of the two. (1,18)

2.4 Thoracic vertebra

The thoracic vertebrae compose the middle segment of the vertebral column, between the cervical vertebrae and the lumbar vertebrae. They are intermediate in size between those of the cervical and lumbar regions; they increase in size as one proceeds down the spine, the upper vertebrae being much smaller than those in the lower part of the region. They are distinguished by the presence of facets on the sides of the bodies for articulation with the heads of the ribs, and facets on the transverse processes of all, except the eleventh and twelfth, for articulation with the tubercles of the ribs.

These are the general characteristics of the second through eighth thoracic vertebrae.

The first and ninth through twelfth vertebrae contain certain peculiarities, and are detailed below. The bodies in the middle of the thoracic region are heart-shaped, and as broad in the antero-posterior as in the transverse direction.

At the ends of the thoracic region they resemble respectively those of the cervical and lumbar vertebrae. They are slightly thicker behind than in front, flat above and below, convex from side to side in front, deeply concave behind, and slightly constricted laterally and in front. They present, on either side, two costal demi-facets, one above, near the root of the pedicle, the other below, in front of the inferior vertebral notch; these are covered with cartilage in the fresh state, and, when the vertebrae are articulated with one another, form, with the intervening intervertebral fibrocartilages, oval surfaces for the reception of the heads of the ribs. The pedicles are directed backward and slightly upward, and the inferior vertebral notches are of large size, and deeper than in any other region of the vertebral column. The laminae are broad, thick, and imbricated — that is to say, they overlap those of subjacent vertebrae like tiles on a roof. The vertebral foramen is small, and of a circular form. The spinous process is long, triangular on coronal section, directed obliquely downward, and ends in a tuberculated extremity. These processes overlap from the fifth to the eighth, but are less oblique in direction above and below. The superior articular processes are thin plates of bone projecting upward from the junctions of the pedicles and laminae; their articular facets are

practically flat, and are directed backward and a little lateralward and upward. The inferior articular processes are fused to a considerable extent with the laminae, and project but slightly beyond their lower borders; their facets are directed forward and a little medialward and downward. The transverse processes arise from the arch behind the superior articular processes and pedicles; they are thick, strong, and of considerable length, directed obliquely backward and lateralward, and each ends in a clubbed extremity, on the front of which is a small, concave surface, for articulation with the tubercle of a rib.

The first thoracic vertebra has, on either side of the body, an entire articular facet for the head of the first rib, and a demi-facet for the upper half of the head of the second rib. The body is like that of a cervical vertebra, being broad transversely; its upper surface is concave, and lipped on either side. The superior articular surfaces are directed upward and backward; the spinous process is thick, long, and almost horizontal. The transverse processes are long, and the upper vertebral notches are deeper than those of the other thoracic vertebrae.

The ninth thoracic vertebra may have no demi-facets below. In some subjects however, it has two demi-facets on either side; when this occurs the tenth has only demi-facets at the upper part.

The tenth thoracic vertebra has (except in the cases just mentioned) an entire articular facet on either side, which is placed partly on the lateral surface of the pedicle.

In the eleventh thoracic vertebra the body approaches in its form and size to that of the lumbar vertebrae. The articular facets for the heads of the ribs are of large size, and placed chiefly on the pedicles, which are thicker and stronger in this and the next vertebra than in any other part of the thoracic region. The spinous process is short, and nearly horizontal in direction. The transverse processes are very short, tuberculated at their extremities, and have no articular facets.

The twelfth thoracic vertebra has the same general characteristics as the eleventh, but may be distinguished from it by its inferior articular surfaces being convex and directed lateralward, like those of the lumbar vertebrae; by the general form of the body, laminae, and spinous process, in which it resembles the lumbar vertebrae; and by each transverse process being subdivided into three elevations, the superior, inferior, and lateral tubercles: the superior and inferior correspond to the mammillary and accessory processes of the lumbar vertebrae. Traces of similar elevations are found on the transverse processes of the tenth and eleventh thoracic vertebrae. (15,16)

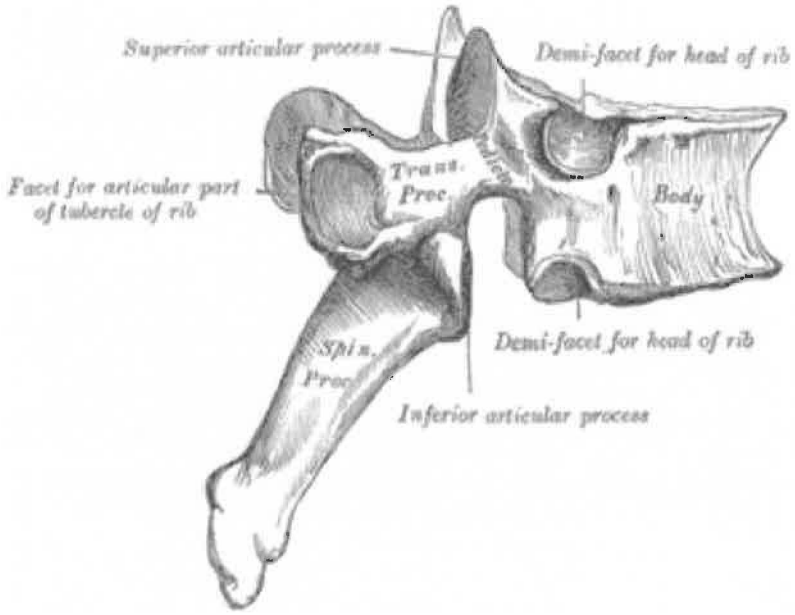


Figure 10. A thoracic vertebra (lateral view)

2.5 Muscles anatomy:

Important muscles around cervical and thoracic spine that appear lession in UCS.

Muscle:

- M.Trapezius; Upper – Middle - Lower fibers
- M.Levator scapulae
- M.Rhomboid major
- M.Rhomboid minor
- M.Subscapularis
- M.Supraspinatus
- M.infraspinatus
- M.teres minor
- M.Pectoralis Major
- M.Pectoralis minor
- M.Serratus anterior
- M.Sternocleidomastoid
- M.Rectus capitis posterior major
- M.Rectus capitis posterior minor
- M.Oblique capitis superior

- M.Oblique capitis inferior
- M.Longus colli
- M.Longus capitis
- M.Rectus capitis anterior
- M.Platysma
- M.scalenes
- Anterior
- Medius
- Posterior
- M.gluteus maximus
- M.iliopsoas
- Obliqus abdominis external - internal
- Transversus abdominis
- Rectus abdominis (13,13)

Respiratory muscles with reported lesions in UCS.

Muscle :

- Diaphragma
- M.External Intercostal
- M.Internal intercostals (13,15,16)

2.6 Upper crossed syndrome

History and Definition

Upper crossed syndrome was originated by Vladimir Janda. Dr Janda was known as the ''Father of Czech Rehabilitation.'' He graduated from Charles University in Prague in 1952, specializing in neurology and later in rehabilitation medicine. Janda was very interested in the functional role of muscles, and this led to testing his patients with surface electromyography. This information demonstrated patterns of muscle contraction in relationship to particular limb movements and the timing of recruit patterns of synergists. In 1979, he identified crossed syndromes of muscle imbalance for the upper and lower extremities based on research and clinical observations.

The upper crossed syndrome is defined as weak lower and middle trapezius, short upper trapezius and levator scapulae, weak deep neck flexors, and short subboccipital muscles and sterncleidomastoid, weak serratus anterior and short pectoralis major and minor.

Dr. Janda named this syndrome ''Upper Crossed'' because when the weakened and shortened muscles are connected in the upper body, they form a cross. (10,12,17)

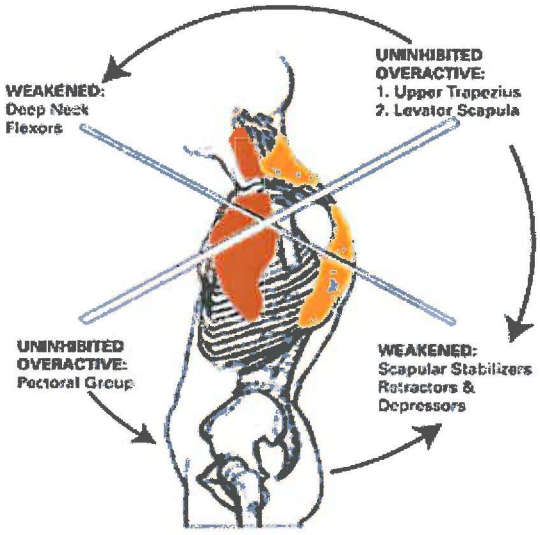


Figure 11. Upper crossed syndrome.

Diagnosis and types

The combined result of this posture is that the cervicocranial, glenohumeral, and tempomandibular joints are overstressed.

Joint dysfunction and TrP naturally result from these muscle imbalances associated with headache, neck pain, shoulder blade pain, and TMJ and shoulders disorders. Each of the three muscle imbalances that contribute to the UCS are discussed in the context of the key movement pattern that is affected:

scapulohumeral rhythm, neck flexion, and trunk lowering from a push up. Respiration, which is also affected, is discussed as well. (9,11)

A) Altered scapulothoracic and scapulohumeral rhythm:

The scapulohumeral rhythm is important for its relationship to prehension, reaching, grasping, and carrying activities

Week agonist: m.lower and m.middle trapezius

Overactive synergist: m.upper trapezius, m.levator scapulae, and m.rhomboids

Symptoms:

Patient can feel; intense neck pain, headaches, rotator cuff syndrome, shoulder blade pain.

Postural analysis:

Patient can have Gothic type of shoulders, upward rotation of scapulas.

Gait analysis:

Patient has altered arm swing, shoulder elevation with arm in (semi-) flexion.

Muscle length test:

Patient has shortened m.upper trapezius and m.levator scapulae.

Evaluation of key movement patterns:

a) Altered scapulohumeral rhythm (scapular fixation)

b) Upper thoracic breathing

TrP:

Can be found in the following muscles: M.Upper, middle and lower trapezius, M.Levator scapulae, M.Subscapularis.

Mobility (joint dysfunction):

Upper cervical spine, Cervicothoracic junction.

B) Altered head, neck flexion

Head/neck flexion is important for its relationship to standing or sitting posture and mastication.

Week agonist: deep neck flexors

Overactive antagonist: suboccipital muscles

Overactive synergist: m. SCM

Symptoms:

Patient can feel, headaches, neck and shoulder blade pain, TMJ.

Postural analysis:

We can notice the head's forward position, prominence of m.SCM

Muscle length test:

Muscles which will be found in shortened position; m.SCM, m.Suboccipitals

Evaluation of key movement patterns

Altered coordination during neck flexion.

TrP can be found in the following muscles:

M.SCM, m.Suboccipitals, m.Middle trapezius, Masticatory muscles, Mastoid process

Mobility (Joint dysfunctions)

C0-C1 and C/T junction

Lower cervical spine

TMJ

C) Altered scapula fixation during trunk lowering from a push-up

Scapular fixation is important for dally activities as; carrying, pushing and pulling.

Weak agonist: m.serratus anterior

Overactive antagonist: m.rhomboids

Overactive synergist: m.upper trapezius, m.levator scapulae, and m.pectoralis major, minor

Symptoms:

Patient can have neck and shoulder blade pain, round cuff syndrome, cervicobrachial syndrome

Postural analysis

Able to notice round shoulders, winged scapulae.

Gait analysis

During gait examination patient can have: winged scapulae with arm movement

Muscle length tests

Muscles which can be found in shortened position; M.pectoralis major, m.upper trapezius and m.levator scapulae.

Evaluation of key movement patterns

Altered scapula fixation during trunk lowering from a push-up

TrP can be found in the following muscles:

M.pectoralis major, m.upper trapezius, m.levator scapulae, m.pectoralis minor

Mobility (joint dysfunction):

Decreased upper thoracic extension

Discussion for respiration (abnormal respiration).

Agonist: Diaphragma.

Overactive synergist: m.scalenes, m.ntercostals, m.upper trapezius.

Symptoms:

Patient can have neck pain and headaches, chest wall pain, thoracic outlet syndrome.

Postural analysis

Patient has elevated shoulders, forward-drawn head, thoracic kyphosis,

Evaluation of key movement patterns:

Upper thoracic breathing

TrP can be found in the following muscles:

M.scalenes.

Mobility (joint dysfunction)

Decreased lateral bending and extension of cervical spine.

Decreased lateral excursion of the rib cage. (10,16)

2.7 Physical Examination

For this syndrome the following physical examinations should be completed by; Observation, palpation, motor and neurological examination.

Observation

The examination begins with observation of the patient during the history portion of the evaluation. This includes head and neck posture and movement during normal conversation. Typically the patient has the forward- drawn head position, with rounded and elevated shoulders and winging scapulas, and sometimes increase of lumbar lordosis.

Observation and evaluation of anterior, posterior and side view of the patient in erect standing position is necessary, in order to take information for patient's posture. Posture evaluation will give us information about the positions of the various joints and body segments, muscle balance or imbalance associated with static postural positions. (10,12)

Palpation

Palpation examination and barrier phenomenon of skin, connective tissue, muscle fascia, and muscle mass, will give us information for possible presence of hyperalgic skin zones (HAZ), tender points and trigger points, restriction of mobility of fascia, muscle spasm, hypertonicity or hypotonicity on muscles.

On palpation, tenderness of hyperactive muscles (e.g m.SCM, m.Upper trapezius) and several trigger points (e.g TMJ, mastoid process). (10,12)

Motor examination

We should examine active mobility, passive mobility and movement against resistance. Active mobility shows both muscular activity and joint mobility uninfluenced by the examiner. Any force applied by the examiner may be less than, equal to or greater than that used by patient; we then have concentric (resisted) movement, isometric resistance, or eccentric movement. Each technique examines muscular function (the strength of the muscle, reaction to pain provoked in the muscles, possible muscle imbalance, even coordination). Passive movement shows the degree of mobility of joints and may at the same time reveal muscular tension or spasm. Examination of a particular joint may disclose normal, increased, or restricted mobility. This may affect functional movement as well as joint play (is a passive movement, which cannot be carried out by the subject and comprises a translatory (sliding) movement of one joint surface against the other, or even rotation and also distraction).

Examination of the six basic moving patterns (hip extension, hip abduction, trunk curl up, head flexion, shoulder abduction, push up) is necessary in order to evaluate the coordinated activity between different muscle groups and the timing in which muscles are activated. The most important patterns to be observed are the head and neck flexion, shoulder abduction and push up which will show the altered movement patterns to diagnose upper crossed syndrome. Poor movement patterns have an adverse effect on both joint and muscle mechanics and will produce or perpetuate spinal blockage.

Muscle length tests are done for the purpose of determining whether the range of muscle length is normal, limited, or excessive. Muscles that are excessive in length are usually weak and allow adaptive shortening of opposing muscles; muscles that are too short are usually strong, and maintain opposing muscles in a lengthened position. Muscle length testing consists of movements that increase the distance between origin and insertion, elongating muscles in directions opposite to that of the muscle actions.

Mobility of joints (joint play) should also be examined to determine the joint dysfunction or blockages. In the upper crossed syndrome joint dysfunction and blockages of Co-C1, TMJ, upper cervical spine, lower cervical spine, C/T crossing, Upper thoracic spine, ribs can be detected. (11)

Range of motion (ROM) of joints can also be examined to show the joint dysfunction and restrictions coming from the shortness of the muscles. In upper crossed syndrome shortness of the muscles around neck result in decreased ROM with pain of all the motions of neck and neck. (10,12)

Neurological examination

On sensation examination, the sensation is usually normal with no changes. Deep tendon reflexes examination is also negative. The cervicogenic headache coming from the spinal stenosis of the upper cervical stenosis is the most usual neurologic sign. (8,12)

Imaging Studies

Plain radiographs

Radiographs of the cervical spine usually are the first diagnostic tests ordered in patients presenting with neck and limb symptoms. Radiographs are very helpful to detect degenerative changes of the cervical spine and possible spondylolisthesis. [11]

Disabilities of the articulations of the head and cervical spine can often be detected only by exact measurement of functional radiographs.

There are two radiographs;

one in flexion and one in extension, not only can the total mobility of the head be measured, but also the mobility of the individual articulations can be evaluated by taking exact measurements of the position of each vertebra. A method for semi-automatic measuring of such pairs of radiographs is presented. Edges and structures of the bones that are clearly visible in both radiographs are digitized on a graphics tablet. Then, by computer program, each vertebra of the first radiograph is shifted and rotated until it fits best to the respective vertebra of the second radiograph. Thus, for each articulation, the mobility angle and the location of the mobility axis relative to the adjacent vertebra, can be computed. First experiences with this method are presented. (14)

2.8 Treatment

Aim of the treatment according to different types of upper crossed syndrome:

Treatment for altered scapulohumeral rhythm:

1. Facilitate/strengthen m.lower and m.middle trapezius.
2. Relax/stretch m.upper trapezius, m.subscapularis.
3. Adjust/mobilize cervicothoraric junction and sternoclavicular joint.
4. Breathing correction and ergonomic advice. (12)

Treatment for altered neck flexion:

1. Relax/stretch m.SCM, suboccipital muscles.
2. Adjust/mobilize C0-C1 and cervicothoracic junction.
3. Facilitate/strengthen deep neck flexors (Hyoid, scalene, etc)
4. Correct poor sitting posture (12)

Treatment for altered trunk lowering from a push-up:

1. Facilitate/strengthen m.serratus anterior, m.pectoralis major and minor, m.upper trapezius.
2. Adjust/mobilize upper thoracic spine.

3. Postural re-education. (12)

Treatment for altered respiration:

1. Relax/stretch m.scalenes, m.upper trapezius.
2. Facilitate/train diaphragmatic breathing.
3. Adjust/mobilize cervical and thoracic spine.
4. Also postural re-education. (12)

Other:

Brugger's position is very important for the patient to be taught in order to know the correct way of sitting. Also the correct way of sitting - getting up from a chair, sofa, bed etc.

It also is important when dealing with the upper crossed syndrome not to ignore the lumbopelvic region. Lower body imbalances affect the overall posture and if left untreated would contribute to/or sustain an upper body postural disorder.

Dr.Lewit states the most important imbalance in the lumbopelvic region is between weak gluteal muscles with hyperactive hip flexors, and hyperactive lumbar erector spinal with weak abdominal muscles.

The patient must be taught pelvic tilt and pelvic bridge exercises to strengthen the abdominal and gluteal muscles (which in our case were not found weak). (11)

2.9 Differential consideration:

- Upper thoracic outlet syndrome.
- Stress and anxiety.
- Pseudoradicular syndrome – blockage of C5/6, C6/7, Th1/2
- Blockages – Acromioclavicular joint, 1^{st} – 2^{nd} ribs.
- Scalene syndrome.

Upper thoracic outlet syndrome

Thoracic outlet syndrome is a combination of pain, numbness, tingling, weakness, or coldness in the upper extremity caused by pressure on the nerves and/or blood vessels in the thoracic outlet.

Causes of Thoracic Outlet Syndrome

There are several causes of TOS. The common underlying cause of the syndrome is compression of the nerves and arteries of the arm in the Thoracic Outlet. In some cases the cause of compression is evident- an extra first rib or an old fracture of the clavicle, which reduces the space of the outlet. In other cases the cause is not clear. Compression may occur with repetitive activities that require the arms to be held overhead.

Symptoms

Symptoms of TOS include pain, numbness and tingling, (pressure on sensory nerves) weakness and fatigue (pressure on motor nerves) or swelling and coldness in the arm and hand (pressure on blood vessels). The symptoms can mimic many other conditions, such as a herniated disk in the neck, carpal tunnel syndrome, and even bursitis of the shoulder. Thus this syndrome can be very difficult to diagnose. (10)

Stress

Stress is simply a fact of nature—forces from the outside world affecting the individual. The individual responds to stress in ways that affect the individual as well as their environment.
In general, stress is related to both external and internal factors. External factors include the physical environment, including your job, your relationships with others. Internal factors which influence your ability to handle stress include your nutritional status, overall health and fitness levels, emotional well-being, and the amount of sleep and rest you get.

Physical symptoms

Headaches or backaches

Muscle tension and stiffness

Diarrhea or constipation

Nausea, dizziness

Insomnia

Chest pain, rapid heartbeat

Weight gain or loss

Skin breakouts (hives, eczema)

Loss of sex drive

Frequent colds (5)

Pseudoradicular syndrome – blockage of C5/6, C6/7, Th1/2

Causes of pseudoradicular syndrome

- Overloading posture
- Developmental mistake
- Injury, trauma
- General laxicity of joint and ligaments
- Can cause muscle imbalance

All the above cause functional abnormal position of a segment which may cause segmental instability and as a sequence muscle spasm, joint blockage, TrPs, myotendinosis and all the dysfunctions mentioned as functional disorders but we have always to be very careful as muscle spasm of joint blockage can never be the primary cause of a functional problem.(11)

Pseudoradicular syndrome:

- Does not respect dermatomes
- Diffused pain
- Normal muscle power
- Normal sensation
- Normal deep sensation
- Normal reflexes

Blockages – Acromioclavicular joint, 1st – 2nd ribs

Due to the tension and shortening of SCM muscle the 1st and 2nd ribs are being pulled upwards. They do not have the mobility as they should – blockage. (11)

Scalene syndrome

The anterior scalene syndrome is named after the compression it causes to the brachial plexus and to the subclavian artery between the anterior and medial scalene muscles and the first rib. Neurogenic symptoms include pain in the shoulder, arm, forearm, hand and fingers in a C8 and T1 distribution. Postural characteristic is the forward position of the head and shoulders.(10)

3. SPECIAL PART

Methodology: This thesis took place at the central Military hospital from 21/1/08 until 1/2/08. With my supervisor agreed to see the patient for a total of 5 meetings. During this period an initial kinesiologic examination was performed, goniometer, hummer. Then, a short and long term plan was suggested to the patient. The therapy's used is analyzed in the paragraph of treatment. After the treatments an evaluation of final kinesiology is presented and also a prognosis.

3.1 Anamnesis

Initials: E.P , female, 24 years old.

Occupation: Student

Height: 1,63

Weight:52

Family anamnesis

Father died because of cancer - when he was alive he had lots of headaches.

Mother is healthy.

Has one older sister – when she was 14-16 years old she had headaches aswell.

Personal anamnesis

Had headaches since she was 13-14 years old.

After that pain started to hurt her on the neck.

The X-Ray saw that she had flat cervical spine.

Operation anamnesis: N/A

Gynecolofical anamnesis: Stable period, Had a cyst 2 years ago at her ovaries.

Medication: she has gotten Mercilon and some injections for pain.

She got 1 injection for the cyst.

Allergic anamnesis: Allergy in dust and in pillows's feather.

Abuses: No smoker, drinks rarelly alcochol.

Working anamnesis: As a student she is sittinng and writting for many hours.

Social anamnesis: She is single and she lives alone.

Hobbies-ADL

She likes walking long distances and also sometimes she goes swimming(about towice a week).

Sometimes she goes running aswell.

Current disorders

Patient started feeling neck pain since she was 13-14 years old.

Last 2-3 years she has many headaches but she does not feel any vertigo.

When she feels headaches she takes painkillers and she feels better, but the last months the painkillers do not make any difference.

After school patient feels her neck stiff.

After studying for some hours, she feels stiffness on the upper back, neck area, and also neck pain.

She bought 3 weeks ago an orthopedic pillow.

Previous rehabilitation: Patient didn't have any treatment before. This is the first time she attends physiotherapeutic treatment.

Present status: Feels pain on the right and left side of the neck.

Has headaches – located on both sides of the head.

She is also very stressed because of her school (she had a lot of exams this period).

Differential consideration

- Stress
- Pseudoradicular syndrome – blockage of C5/6, C6/7, Th1/2
- Blockages – Acromioclavicular joint, 1^{st} – 2^{nd} ribs.
- Upper thoracic outlet syndrome.

3.2 Initial kiesiological examination:

3.2.1 Standing evaluation:

Table 1. Anterior view

Sole weight baring	Weight goes to the front part of soles.
Transversal sole Arch	Both of them aren't good especially the left. Do not have a good arch.
Longitudinal sole Arch	Not at all.
Calf side	Normal-same.
Patella	Look a bit medially.Both.
Thigh contour	Same
Anterior superior iliac spine	Same level.
Umbilicus	Pulled downward a bit.
Sternum	Normal.
Nipples	Same level.
Clavicles	Right is more prominant.
Shoulder position	Left is higher.
Trophy of SCM	A bit hypertrophy - billatreral
Head position	Looks down and has a small rotation to the left.

Table 2. Posterior view

Heel form	Rounded heels
Achille's tendon contour	Concave
Achille's tendon thickness	Same
Calf	Left more trophic than right
Popliteal lines	Same level
Thigh contour	Same
Subgluteal lines	Same level
Posterior superior illiac spine	Same level
Ilium crests	Same level
Trunk outlines	Same on both sides

Spinous processes	Same level
Inferior scapula angles	Prominant
Scapulas medial margin	Very prominant
Scapula alata	Yes she has – more on the right
Shoulder position	Right is higher

Table 3. Side view

Knee joint position	Straight
Position of pelvis	Anteriorly
Lumbar part of spine	Very small hyperlordosis
Thoracic part of spine	Kifosis
Shoulder position	Protracted
Cervical part of spine	Slight straightening.
Head position	Forward

Conclusion of postural evaluation:

According the anterior vew of the patient:

Looks downwards, and has a small rotation to the left, also the position of the left shoulder which is higher lead me to test the muscles, in case of shortness, hypertrophy, presense of a trigger point:

m.Trapezius(upper part), m.Levator scapulae.

The hypertrophy of the m.SCM and the prominance leaded me to test this muscle for the length of it.

According the posterior vew of the patient:

The prominance of the scapulas-scapula alata leaded me to test the muscle strength: m.Rhomboidei, m.Trapezius(middle-lower part), m.Serratus anterior. Also see if they have any trigger point.

According to the side vew:

The anteriorlly position of the pelvic leads me to test the muscle strength of the abdominal muscles ant the shorthness of the m.Quadratus lumborum.

The slight huperkifosis leads me to test the muscle stregnth of the m.Erector spinae, and the position of the shoulders must be tested for shortness m.Pectoralis major-minor. For strengthening test m.Rhomboidei, m.Trapezius(middle-lower part).

Head protrusion leads me to test the strength of m.SCM, m.Scaleni, and the deep neck flexors.

All of these postural problems are sings of classical postural problems which will need muscle stregnthening – lengthening and mobiliti of joints. Also some dynamics test so we can decide afterwards the main cause of them.

3.2.2 Distances of spine

Table 4.

Stibor's distance	9 Norm. 7-10cm
Shober's distance	3 Normal. 4-6cm
Forestier's distance	5 Norm. 0cm
Cepoj's distance	3 Norm.3-4cm
Otto's inclination dist.	3,5cm.
Thomayer's distance	Normal

Conclusion:

Measurements of cervical spine showed positive results which shows problem of the mobility of the cervical spine.

According Shober's test: Mobility of lumbar area of the patient is lower than normal which means that patient has a small restriction.

According Forester's test: According to the result of this test we can see that pateint's head is forward positioned which is due to muscle shortening of the nech flexors.

Otto's tes: Shows restriction in the mobility of thoracic spine.

General conclusion: We have to check the length of the muscles and give the correct treatment in order to fix the posture of the patient. This will dicrease the muscle tension,avoid possible trigger points, dicrease possible headaches.

3.2.3 Gait Examination

- The pelvis is positioned on the same transversal plane.
- Movement is symmetrical and fluent.
- The contralateral upper extremities are not moving normally.
- There is no synkinesis.
- In swinging phase: Extremity starts the movement with external rotation in hips.
- Hip extension is normal.
- Hip flexion is normal.

Gait evaluation

Step phase: normal

Stance phase: normal

Pelvis rotation: yes

Pelvis shift: yes

Trunk movement: No movement.

Arm synkinesis: Not at all, she is very stiff.

Heel walking.

Conclusion of Gait evaluation

Patient has a rythm while walking and she is steady enough. Steps between each other are normal, and so the stance phase. There is no arm synkinesis probably due to muscle disbalance-shortening of muscles(right shoulder has restriction). Also its caused by hypertonicity of the muscles.

3.2.4 Movement stereotypes

- *Hip extension*: one of the most importand phases of the gate.During the test which is done in prone position, Was performed normally.

- *Hip abduction*: is done in side lying position and shows information about the quality of the movement and of the stabilisators of the pelvis.She activated Quadratus lumborum first and then the abductors.

- *A curl up:* is done in supine position and with ankles in plantar flexion. It was very difficult for her to provide it. Very week neck flexors and very week abdominals.

- *A push up*: will inform us about the stabilisators of the scapula.When provided it there is hyperlordosis in the lumbar area. Scapulas are stabalized well, head goes forward.

- *Neck flexion*: Not well performed. She uses only the sternocleidomastoideus muscles.

- *Shoulder abduction*: The movement starts with m.supraspinatous, but elevation of shoulders begins at 25 degrees. This early elevation shows the overload of m.upper trapezius.

Conclusion of examination of the basic patterns movement:

According to the results, hip extensors are activating normally and movement is also performed normally. Hip abductors are not strong enough to perform the movement alone,so there is activation of m.Quadratus lumborum. The difficulties for providing curl up shows that abdominals are very weak for providind movement – might use in ADL m.Iliopsas- and also the neck flexors were weak which means that patient uses much m.SCM.
During push up the forward head position shows the weakness of the neck extensors for keeping it in the correct stable position. Shoulder abduction shows a muscle overloading.

3.2.5 Neurological examination

Upper extremities

Table 5. Superficial sensation better physiological or normal

Touch	Normal, same sensation in both sides
Tactile	Normal, same sensation in both sides
Dermatography	Normal, same sensation in both sides

Table 6. Deep sensation

Vibration	Normal, bilaterally same sensation
Sensation of position	Normal, bilaterally same position
Sensation of movement	Normal, bilaterally same position

Juster's phenomenon: Negative

Hoffman's phenomenon: Negative

Tromner's phenomenon: Negative

Rossolimmo's phenomenon: Negative

Zukovskj-Kornylov's phenomenon: Negative

Babinski's phenomenon: Negative

Openheim's phenomenon: Negative

Chaddock's phenomenon: Negative

Vitek-suma phenomenon: Negative

Mingazzini's sign: Negative

Barre's sign: Negative

Phenomenon of retardation: Negative

Megazzini's sign: Negative

Dufou'r sign: Negative

Rusecky's sign: Negative

Barre's sign: Negative

Reflexes

Biceps reflex: Right and left were both good – normal.

Triceps reflex: Left side wad good/normal. Right side was not the same, was not good.

Patellar reflex: Left was normal. Right was better.

Achille's tendon reflex: Left was good, but right was not.

Flexors of arm reflex: Left and right were both good – normal.

"S" reflex: Negative.

Conclusion of neurological examination:

All the neurological examinations were negative. This means that there is no radiculation from the cervical spine to the extremities.

3.2.6 Balance examination

Trendelenburg: Was performed very good.

Romberg: She was very good. Very good performance.

Valsalva's test: Negative.

3.2.7 Stability of cervival spine

Not very good stability.

Patient has very week muscles and she can't stabalize her neck well enough.

Conclusion of testing the stability of the cervical spine:

Patient has not a vary good stability of the cervical spine while holding head in the same position against a force. This leads me on testing the strength of the neck muscles and see how powerfull these muscles are.

All the following strength tests were done according to Kendal.

3.2.8 Muscle strentgh test for the neck

Extensions: 4

Flexion:3-

Rotation:3- (both sides)

Lateroflexion:3- (both sides)

Muscle strength test for abdominals

Rectus abdominis 3-

Internal – external oblique: 3-

Muscle strength test of upper back – both sides :

Rhomboids: 3

Middle trapezius: 3+

Serratus anterior: 3

Conclusion of muscle stregnth :

According to the results of the muscle strength test we can see that paitent has not the aquaired power into the muscles. Seratus anterior's weakness is a basic cause for the scapula winging. All group of muscles are weak which this causes the changes in the posture.

3.2.9 Reflex changes

Skin had HAZ especially on the upper part of trunk.

Fascia had a small restriction in laterolateral direction and in craniocaudal direction.

Cutaneus had a very small restriction in also laterolateral direction.

Subcutaneus had also very small restriction in the same directin as cutaneus.

Fascia of neck and upper trunk

Restricted fascia at all the upper part of trunk.

3.2.10 Palpation of muscles

Table 7. Palpation of muscles

Right		Left
Hypertonus,TrP Normal tonus local spasm Hypotonus	m.trapezius Upper part Middle Lower	Hypertonus, TrP Normal tonus with local spasm Hypotonus
Hypertonus, TrP	m.levator scapulae	Hypertonus, TrP
Hypertonus	m.Rhomboidei	Hypertonus
Normal tonus	m.subscapularis	Normal tonus
Hypertonus	m.supraspinatus	Normal tonus
Normal tonus	m.teres minor	Normal tonus
Normal tonus	m.infraspinatus	Normal tonus
Hypertonus	m.scalenes	Hypertonus
Hypertonus Spasm	m.SCM	Hypertonus Spasm
Hypertonus	m.pectoralis minor	Hypertonus
Hypertonus	m.pectoralis major	Hypertonus
Normal tonus	m.external oblique	Normal tonus
Normal tonus	m.internal oblique	Normal tonus
Spasm, painful Hypertonus	m.suboccipitals	Spasm, painful Hypertonus

Normal tonus	m.rectus abdominis	Normal tonus
Normal tonus	m.transverse abdominis	Normal tonus

Conclusion of fascia and palpation:

According to the results patient has not free movement in the fascia which this is influences the muscles, also hypertonicity of m.Trapezius, m.Levator scapulae, extensors of neck shows that patient cannot move freelly.

Found muscles associated with TrP such as upper part of m.Trapezius and m.Levator scapulae.

The deeper palpation in these hyperalgic zones shows the big spasm of suboccipital muscles.

3.2.11 Breathing examination

Inspiration: During inspiration the increase of transverse diameter is restricted. The lateral excursions of ribs are decreased. Also scalene muscles work more than they should be and diaphragm does not descent enough. From the sequence of the inspiration it is detected that the chest breathing predominates the abdominal breathing and the lateral expansion of ribs is impaired

Expiration: The controlled, forced and prolonged expiration were examined. The examination shows the overload of rectus abdominis and the decreased use of the transversal muscles.

Conclusion of breathing examination

The breathing examination shows a paradoxical breathing with the predomination of the chest breathing over the abdominal breathing. The lateral expansion of ribs is less during inspiration and the transverse abdominis is inhibited during expiration.

3.2.12 Joint play (Was done according to Lewit).

C0-C1: No restriction / blockage.

C1-C2: No restriction / blockage.

C-Th crossing: Restriction of Joint play in lateral direction which segment.

Acromio-clavicula jointr: No restriction(bilaterally)

Sterno-clavicular joint: No restriction bilaterally.

Shoulder joint : Left side was without restriction.
Right side had a small restriction in anterior and posterior direction.

Scapulothoracic Joint: No restriction bilaterally.

Ribs: No restriction bilaterally.

Scapula: Right side was a bit restricted.

Conclusion of Joint play.

There was a blockage-restriction on shoulder joint and C-Th crossing which will need to be released by mobilization or manipulation techniques.

3.2.13 ROM examination

Goniometry of active movement:

Table 8. Head ROM

Right	Head	**Left**
43 °	Lateroflexion	39 °
74°	Rotation	81°

Head flexion	33°

Table 9. Shoulder ROM

Right	Shoulder joint	**Left**
174 °	Flexion	170
43°	Extension	44 °

170°	Abduction	172
70°	Internal rotat.	70°
86°	External rotat.	80°

Conclusion of goniometry

The ROM of Head flexion is restricted as well as lateral flexion to left and rotation to right but only some degrees (table 9). The ROM of left shoulder is restricted in most directions but the right one has normal degrees because of dominance of right arm. The extension of head was not measured because it was painful. The muscle length test (passive ROM) will be needed to specify shortening of specific muscles.

3.2.14 Muscle length tests

Table 10. Muscle length tests

Right		**Left**
1	m. trapezius upper part	1
1	m. levator scapulae	1
1	m. pectoralis minor	1
1	m. pectoralis major	1
1	m. SCM	1

(b)

m. suboccipitals	2
m. erector spinae	1
m. scalenii	0

Conclusion of muscle length test

According to these tests shortening exists in m. trapezius upper part in both sides, m. levator scapulae in both sides, m pectoralis major in both sides, illiopsoas both sides, and SCM both sides. The greater shortening appeared at he suboccipitals muscles, and some shortening also to erector spinae. Pectoralis minor and m.scaleni had normal length.

The muscle length tests were provided according to *Janda*

Conclusion and discassion of initial kinesiologic examination:

Obtaining the history is important for the proper diagnosis.
Therapist should first determine the main complaint. In this case the main complaint is the pain and stiffness of the neck and also the headaches.
Positions of the head but also activities that increase or decrease symptoms are also helpful in making the diagnosis. This is a helpfull part for the treatment.

Questions that they should be asked:

When did the pain occur for the first time.
How was the pain.
What was done are all important inquiries for the patient.
The symptoms that the patient will give are important for the localization of the pain, and by this way the diagnosis and ultimate treatment will be decided.
In our case, patient declared that after some hours of studying a day feels worse in her neck. Her neck pain started aproximatelly at the age of 13-14 but last 2-3 years has many headaches every month and after taking some painkillers the pain was reduced.
Now the headaches happen many days per week but are not diminished after taking painkillers.
Assessment of family anamnesis it is always important. I this case, there is only the father who had headaches often, but unfortunatelly he is no longer alive.

The therapist should ask about previous treatments: Unfortunatelly, this patient didn't go during the past years for any kind of a therapy.
Another important information is medication that the patient might had liko for instance: aspirin, nonsteroidal anti-inflammatory drugs. She used painkillers for headaches, Mercilon, and some injections for the pain. She also got an injection for the cyst she had.

Questions on previous medical treatment should include:

physical therapy, traction, manipulation, previous injections, or surgical treatments.

A social history should include sport and position, occupation, and the use of nicotine and/or alcohol.

She did not have any previous rehabilitation.

She has no job. She is a student which automatically means that she is sitting a lot of time in front of the computer with a false pattern.

Patient drink very rarelly alcohol.

Janda identified an upper crossed syndrome with typical pairs of weak and tight muscles: The imbalance in the following pairs of muscles:

Weak m.lower and middle trapezius, m.rhomboids and short m.upper trapezius and m.levator scapulae.

Weak deep neck flexors and short suboccipitals and m.SCM

Weak m.serratus anterior and short m.pectoral major.

Table provides the signs related to varius dysfunctions associated with upper crossed syndrome.

Table 11. Signs of upper crossed syndrome(postural)

Findings in posture	Dysfunctions
Round shoulders	Shortened m.pectoralis
Forward-drawn head	Kyphotic upper thoracic spine
C0-C1 hyperextension	Shortened suboccipitals
Elevation of shoulders	Shortened m.upper trapezius and m.levator scapulae and weak lower and m.middle trapezius
Winging of scapulae	Weak m.serratus anterior

Patient's dynamic and postural examination has typical signs of upper crossed syndrome. We found weakness of deep neck flexors and shortness of suboccipital muscles. Weakness of m.serratus anterior with shortness of m.upper trapezius, m.levator scapulae, and m.pectoralis major.

Knowledge of this pattern is important for neck, shoulder, or upper back conditions related to abnormal sitting, respiration, mastication, and grasping activities.

Symptoms, such as changes in gait, postural abnormalities of the upper trunk should be obtained.

The comparison of all the separate conclusions associated with above discussion leads me in these results:

1. Most of the symptoms, postural signs, muscle weaknesses and tightnesses, joint dysfunctions, changes in gait and trigger points of certain muscles of the above defined UCS are detected after the initial kinèsiologic examination of the patient. The main cause is the bad posture during the job and sitting during classes in university. This false posture leads to overuse of certain muscles, weaknesses of others during the basic movement patterns, paradoxical breathing which also contributes to the falsie use during the every day activities.
2. Headaches which one of the most important subjective signs are provoked by the UCS signs and imbalances. It is a cervicogenic headache caused either by certain TrP of muscles (as defined above) around the cervical spine or by blockages of cervical joints.
3. Therapy must be planned according to all these imbalances and postural faults to reduce the pain and stiffness of neck and the headache firstly, to diminish the imbalances later.

3.3 Short term rehabilitation plan

Decrease the pain and tension from the neck so the patient will feel relief.

Decrease frequency of headaches

Decrease intensity of the headaches.

Relaxation of hypertonic muscles and also the TrP.

Increase the power of the weak muscles.

Increase ROM of the places which are restricted.

Correct sleeping posture.

Correct sitting posture.

Mobilize blockages from the joints such as:

- C-Th crossing

- Right shoulder
- right scapula

Instruct the patient how to provide the auto-therapy ecercises correctly.

Long term plan

Correct the posture during sleeping.

Correct the posture during sitting.

Increase the muscle power.

Increase the coordination of the muscles.

Increase the range of motion.

Correct the breathing.

Improving the activities of the daily living.

3.4 Therapy the 1st session 23/1/08

Subjective feeling of the patient

Patient is feeling the same as before she started therapies.

Full kinesiological evaluation.

Posture correction in sitting position according to Brugger.

Fascial techniques.

PIR for m. Levator scapulae, upper trapezius.

Mobilization of scapula – right side.

Breathing exercises.

Exercises for abdominals.

Autotherapy;

Instruction of patient an autotherapy program:

- Posture correction in sitting according Bruger.
- Self streching of m.Pectoralis major, m.Levator scapulae, m.Upper Trapezius.

Teaching exercise for home such as for the neck flexors and for m.Rhomboids and m.Trapezius middle part.

Second session 25/1/08

Subjective feeling of the patient

Patient feels a very small different around the area of the neck.

Fels more movable.

Control autotherapy program.

Posture correction in sitting according Brugger.

Soft tissue techniques for release of cervical-dorsal fascia.

PIR for m. Levator scapulae, upper trapezius, m. SCM.

PFS for m.Pectoralis major.

Breathing exercises for activation of m.Transverse abdominis, and also for facilitation of the diaphragmatic breathing.

Mobilization of right shoulder.

Traction of cervical spine-isometrically.

PNF for neck flexors and abdominal muscles.

Small foot exercises.

Third session 28/1/08

Subjective feeling of the patient

Patient said that she felt a lot better than before about the headaches.

They have not the same intencity as before.

Control autotherapy program.

Posture correction in sitting according Brugger.

Soft tissue techniques for release of cervical-dorsal fascia.

PIR for m. Levator scapulae, upper trapezius, m. SCM.

PFS for m.Pectoralis major.

Breathing exercises for activation of m.Transverse abdominis, and also for facilitation of the diaphragmatic breathing.

Mobilization of right shoulder.

Traction of cervical spine-isometrically.

PNF for neck flexors and abdominal muscles.

Active exercises of the head – all directions.

Small foot exercises.

Forth session 30/1/08

Subjective feeling of the patient

Didn't have that much pain.

She could study without feeling her neck stiff.

Headaches are better and better every day.

She feels more relief – free at the neck erea mostly.

Control autotherapy program.

Posture correction in sitting according Brugger.

Soft tissue techniques for release of cervical-dorsal fascia.

PIR for m. Levator scapulae, upper trapezius, m. SCM.

PFS for m.Pectoralis major.

Breathing exercises for activation of m.Transverse abdominis, and also for facilitation of the diaphragmatic breathing.

PNF for neck flexors and abdominal muscles.

Exercise by using the Thera-band in order to strength m.Rhomboidei, m.Trapezius(middle part and lower part). Also exersices for m. Serratus anterior.

Active exercises of the head – all directions.

Small foot exercises.

Fifth session 1/2/08

Subjective feeling of the patient

Patient feels much better with everything.

Headaches are not often, low intensity.

Her right shoulder was also better. Easyer to provide movements.

Full evaluation of the treatment.

Control autotherapy program.

Posture correction in sitting according Brugger.

Soft tissue techniques for release of cervical-dorsal fascia.

PIR for m. Levator scapulae, upper trapezius, m. SCM.

PFS for m.Pectoralis major.

Breathing exercises for activation of m.Transverse abdominis, and also for facilitation of the diaphragmatic breathing.

PNF for neck flexors and abdominal muscles.

Exercise by using the Thera-band in order to strength m.Rhomboidei, m.Trapezius(middle part and lower part). Also exersices for m. Serratus anterior.

Active exercises of the head – all directions.

Showed more exercises for autotherapy, and also ways for increasing the load of the exercises.

Repeated the most important things that patient should always remember.

3.5 Final kinesiological examination

Table 12. Anterior view

Sole weight baring	Weight goes to the front part of soles.
Transversal sole Arch	Both of them aren't good especially the left. Do not have a good arch.
Longitudinal sole Arch	Not at all.
Calf side	Normal-same.
Patella	Look a bit medially.Both.
Thigh contour	Same
Anterior superior iliac spine	Same level.
Umbilicus	Pulled downward but **less than before**.
Sternum	Normal.
Nipples	Same level.
Clavicles	Right is more prominant.
Shoulder position	Left is higher but **not as much as before**.
Trophy of SCM	**Prominance of this muscle has decreased a lot.**
Head position	**Much better, looks more less downward and, now is in th emiddle line.**

Table 13. Posterior view

Heel form	Rounded heels
Achille's tendon contour	Concave
Achille's tendon thickness	Same
Calf	Left more trophic than right

Popliteal lines	Same level
Thigh contour	Same
Subgluteal lines	Same level
Posterior superior illiac spine	Same level
Ilium crests	Same level
Trunk outlines	Same on both sides
Spinous processes	Same level
Inferior scapula angles	Prominant
Scapulas medial margin	**Not prominant as before. Less and are symmetrical.**
Scapula alata	**Right side has decreased very much. Left is almost without.**
Shoulder position	Right is higher

Table 14. Side view

Knee joint position	Straight
Position of pelvis	**Anteriorly position has decreased/improved.**
Lumbar part of spine	**Very small hyperlordosis after therapies**
Thoracic part of spine	**Slightly improved.**
Shoulder position	**Protracted is a lot decreased.**
Cervical part of spine	Slight straightening.
Head position	**Forward but not as much as before.**

Table 15. Distances of spine

Stibor's distance	9cm	Norm. 7-10cm
Shober's distance	3cm	Normal. 4-6cm
Forestier's distance	**2**	Norm. 0cm
Cepoje's distance	**Normal**	
Otto's inclination dist.	**4,5cm.**	
Thomayer's distance	**Normal**	

Gait Examination

- The pelvis is positioned on the same transversal plane.
- Movement is symmetrical and fluent.
- The contralateral upper extremities are moving almost normally.
- There is a **small** synkinesis.
- . In swinging phase: Extremity starts the movement with external rotation in hips.
- Hip extension is normal.
- Hip flexion is normal.

Gait evaluation

Step phase: normal

Stance phase: normal

Pelvis rotation: yes

Pelvis shift: yes

Trunk movement: **Small** movement.

Arm synkinesis: **Better than before**.

Heel walking.

Movement stereotypes:

- *Hip extension*: one of the most importand phases of the gate.During the test which is done in prone position, Was performed normally.

- *Hip abduction*: is done in side lying position and shows information about the quality of the movement and of the stabilisators of the pelvis.She activated Quadratus lumborum first and then the abductors.

- *A curl up:* is done in supine position and with ankles in plantar flexion. **It is still defficult for her to provide it normally. Neck flexors and abdominals have not the optimal power yet.**

- *A push up*: will inform us about the stabilisators of the scapula.When provided it there is hyperlordosis in the lumbar area **but not so much as the first time**. Scapulas are stabalized well, **head doesn't do so forward as before.**

- *Neck flexion*: **movement is good, but there is a small tremor which shows that the deep neck flexors do not have the optimal power yet.**

- *Shoulder abduction*: is performed in sitting position with the elbow flexed to avoid rotations on the girdle. **Activation of m.supraspinatus and m.deltoid at the beginning**
.

Balance examination:

Trendelemburg: Was performed very good.

Romber: Very good performance.

Valsalva test: Negative.

Stability of cervival spine

Stability of the head is **much better** than the beggining.

Patient is now able to hold the position of the head against a small force and be able to keep it there without changing angles.

All the following strength tests were done according to Kendal.

Muscle strentgh test for the neck

Extensions: 4+

Flexion:4-

Rotation:4- (both sides)

Lateroflexion:4 (both sides)

Muscle strength test for abdominals

Rectus abdominis 4-

Internal – external oblique: 4-

Muscle strength test of upper back – both sides :

Rhomboids: 4

Middle trapezius: 4

Serratus anterior: 4-

Reflex changes

Skin's HAZ on the upper part of trunk are redused. The redness is not so much as the beggining.

Fascia's restriction in laterolateral direction and in craniocaudal direction is decreased.

Cutaneus restriction in laterolateral direction is also decreased.

Subcutaneus restriction is less aswell as Cutaneus.

Fascia of neck and upper trunk examination

Decreased restriction of the fascia at all the upper part of trunk.

Better mobility.

Table 16. Palpation of muscles

Right		Left
Normal tonus, no TrP.	m.trapezius Upper part	Normal tonus, no TrP
Normal tonus, no spasm	Middle	Normal tonus, no spasm
Hypotonus	Lower	Hypotonus
Normal tonus, no TrP	m.levator scapulae	Normal tonus, no TrP
Normal tonus	m.Rhomboidei	Normal tonus
Normal tonus	m.subscapularis	Normal tonus

Normal tonus	m.supraspinatus	Normal tonus
Normal tonus	m.teres minor	Normal tonus
Normal tonus	m.infraspinatus	Normal tonus
Normal tonus	m.scalenes	Normal tonus
Normal tonus No spasms	m.SCM	Normal tonus No spasm
Hypertonus	m.pectoralis minor	Hypertonus
Hypertonus	m.pectoralis major	Hypertonus
Normal tonus	m.external oblique	Normal tonus
Normal tonus	m.internal oblique	Normal tonus
No spasm, less painful Decreased tonus	m.suboccipitals	No spasm, less painful Decreased tonus
Normal tonus	m.rectus abdominis	Normal tonus
Normal tonus	m.transverse abdominis	Normal tonus

Joint play: (Was done according to Lewit).

C0-C1: No restriction / blockage.

C1-C2: No restriction / blockage.

C-Th crossing: Restriction of Joint play in lateral direction which segment is now decreased.

Acromio-clavicula jointr: No restriction(bilaterally)

Sterno-clavicular joint: No restriction bilaterally.

Shoulder joint : Left side was without restriction.
Right side is much better. (patient felt big different)

Scapulothoracic Joint: No restriction bilaterally.

Ribs: No restriction bilaterally.

Scapula: Right side has improved a lot.

Table 17. Head ROM

Right	Head	Left
47°	Lateroflexion	42°
77°	Rotation	84°
	Head flexion	40°

Table 18. Shoulder ROM

Right	Shoulder joint	Left
177°	Flexion	178
45°	Extension	46°
177°	Abduction	172
70°	Internal rotat.	70°
90°	External rotat.	90°

Table 19. Muscle length tests

(a)

Right		Left
0	m. trapezius upper part	0
0	m. levator scapulae	0
0	m. pectoralis minor	0
1	m. pectoralis major	1
0	m. SCM	0

(b)

m. suboccipitals	1
m. erector spinae	0
m. scalenii	0

3.6 Therapy effect

Patient has many improvements after the five (5) rehabilitation sessions.
The head position aswell as the shoulders, scapulas, have improved a lot, but this doesn't mean that this is all the rehabilitation that our patient needs. The anthropometrical measurements show an increase of the flexibility of the cervical and thoracic spine.
Were not found any pathological signs on the patient's walking.
The SCM muscle is not so prominent as before on both sides
By palpation were found: TrP and also the tonus of the muscles in which, after the rehabilitation plan, the TrP were no more existed, and also the tonus of the muscles became normal again which was a very big improvement in muscles such as: m.Levator scapulae, m.Suboccipital, m.Rhomboidei, m.SCM, m.Trapezius upper part. Also the ROM of head was increased: Lateroflexion and also Rotation was an increasement 3-5cm. Head flexion increased by 7cm.
All the weak muscles like; m.Rhomboidei, m.Serratus anterior, m.Middle trapezius, deep neck flexors, increased their power but this doesn't mean that patient should stop exercising. She should keep exercise to reach the normal power that the muscles should have.

4. Prognosis

The upper crossed syndrome as a prognosis for this patient was very good.
Great improvement from the muscle imbalances were noticed and also discussed in the final kinesiologic examination.
I personaly believe that if the patient will follow the autotherapy program, she will see a great improvement. The stiffness from the neck area will dicrease a lot.
Because the time of the sessions was short, i did not deal with the lower trunk. I believe that after some sessions, exercises for the stabilizators of the lower trunk would be necessary for improvement of the posture. By helping this, patient would have less problems and the ADL would become easier.

5. Conclusion

During these two weeks of practise in the cantral Miliatary hospital of Prague, I was able to use the knowledge I was taught in the 3 years of my studies and have positive results in the therapies which I chose for the particular diagnose.
The improvement noted on the final kinesiologic examination, and it is significant to mention on the positive results contributed also the patient with her will to be healthy.

She performed the autotherapy plan everyday, and was correcting it session by session after my instructions. Without her effort I believe it would be not possible to see improvement in her situation for this particular period of our sessions.

6. List of Abbreviations

1) IV: Intervertebral
2) L5: fifth lumbar vertebra
3) T4: fourth thoracic vertebra
4) Co: occipital bone
5) C1: first cervical vertebra (atlas)
6) C2: second cervical vertebra (axis)
7) C3: third cervical vertebra
8) C6: sixth cervical vertebra
9) C7: seventh cervical vertebra
10) TH12: twelfth thoracic vertebra
11) UCS: Upper crossed syndrome
12) TMJ: Tempomandibular joint
13) SCM: Sternocleidomastoid muscle
14) HAZ: Hyperalgic zones
15) ROM: Range of motion
16) BMI: Body Mass Index
17) TrP: Trigger point
18) PIR: Post Isometric Relaxation
19) PFS: Post Facilitation Stretching
20) C/T: Cervicothoracic
21) m: muscle
22) M: muscle

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Figure

11

23. Nickleston Perry: DC Upper Crossed Syndrome and Shoulder Pain, 2007

10.Apendix

Muscle	Origin	Insertion	Function
M.Trapezius Upper fibers	External occipital protruberance, superior nuchal line, spinous processes of seventh cervical vertebrae	Lateral one third of clavicle and acromion process of scapula	With the origin fixed adduction of scapulas mainly performed by middle fibers. Lateral rotation of scapula by the upper and
Middle fibers	Spinous processes of first through fifth thoracic vertebrae	Medial margin of acromion and superior lip of spine of scapula	lower fibers with stabalization by the middle. Upper fibers also elevate scapula
Lower fibers	Spinous processes of sixth through twelfth thoracic verteabra	Tubercle at apex of spine of scapula	and lower depress it. With insertion fixed, acting unilaterally the upper fibers extend, laterally flex and rotate the head to the opposite side. Acting bilaterally upper trapezius extends the neck
M.Levator scapulae	Transverse processes of C1 to C6	Medial border of scapula between superior angle and root of spine	Elevates scapula. With the insertion fixed working unilaterally rotates the head to the same side, working bilaterally extends the head.
M.Rhomboid major	Spinous processes of T2 to T5	Medial border of scapula between spine and inferior	Adducts and elevates scapula and laterally rotate it

		angle	
M.Rhomboid minor	Lower portion of ligamentum nuchae, spinous processes of C7 and Th1	Medial border of scapula at the spine of scapula	Adducts and elevates scapula and laterally rotate it.
M.Subscapularis	Subscapular fossa of scapula	Lesser tubercle of humerus	Medially rotates the shoulder
M.Supraspinatus	Medial two thirds of supraspinous fossa of scapula	Superior facet of greater tubercle of humerous	Abducts the shoulder joint
M.infraspinatus	Medial two thirds of infraspinous fossa	Middle facet of greater tubercle of humerous	Laterally rotates the shoulder joint
M.teres minor	Upper two thirds, dorsal surface of lateral border of scapula	Lowest facet of greater tubercle	Laterally rotates the shoulder joint
M.Pectoralis Major	Medial half of clavicle and anterior surface of sternum, first seven costal cartilages, aponeurosis of m. external oblique	Proximal part of humerus (lateral lip of intertubecular groove)	Adduction, medial rotation of humerous with the origin fixed. With the insertion fixed, assist in elevating thorax as in forced inspiration. The upper part flexes and medially rotates the shoulder joint, and horizontally adduct humerous to the opposite shoulder
M.Pectoralis minor	Anterior surfaces of the third, fourth and fifth ribs, and deep	Coracoid process of scapula	Anteriorly tilts scapula. Assists in forced inspiration

	fascia overlying the related intercostals spaces		
M.Serratus anterior	Lateral surfaces of upper 8-9 ribs and and deep fascia overlying the related intercostals spaces	Costal surface of medial border of scapula	Keeps medial border and inferior angle of scapula apposed to thoracic wall, abducts and laterally rotates scapula when origin is fixed. With the insertion fixed may act in forced inspiration.
M.Sternocleidomastoid	Medial or sternal head: Cranial part of manubrium sterni Lateral or clavicular head : Median one third of clavicle	Lateral surface of mastoid process, lateral one half of superior nuchal line of occipital bone	Acting bilaterally flexes and extends the head, and acting unilaterally laterally flexes and rotates to opposite side the head
M.Rectus capitis posterior major	Spinous process of axis	Lateral portion of occipital bone below inferior nuchal line	Extension of head; rotation of face to same side
M.Rectus capitis posterior minor	Spinous process of atlas	Medial portion of occipital bone below inferior nuchal line	Extension of head
M.Oblique capitis superior	Transverse process of atlas	Occipital bone between superior and inferior nuchal lines	Extension of head and bends it to same side
M.Oblique capitis inferior	Spinous process of axis	Transverse process of atlas	Rotation of face to same side
M.Longus colli	Superior oblique portion: Transverse processes of third to	Tubercle on anterior arch of atlas	Flexes the head, laterally flexes and rotates it to the

	fifth cervical vertebrae Inferior oblique portion: Anterior surface of bodies of first two or three thoracic vertebrae Vertical portion Anterior surface of bodies of first three thoracic and last three cervical vertebrae	Anterior tubercles of transverse processes of fifth and sixth cervical vertebrae Anterior surface of bodies of second, third and cervical vertebrae	same side
M.Longus capitis	Anterior tubercles of transverse processes of third through sixth cervical vertebrae	Inferior surface of occipital bone	Acting bilaterally flexes the head Acting unilaterally rotates the head to the same side
M.Rectus capitis anterior	Root of transverse, and anterior surface of atlas	Inferior surface of occipital bone	Acting bilaterally flexes the head Acting unilaterally rotates the head to the same side
M.Platysma	Fascia covering superior parts of Pectoralis Major and Deltoid	Inferior margin of mandible, and skin of lower part of face and corner of mouth	Flexes the head
M.scalenes Anterior Medius	Anterior tubercles of transverse processes of third to sixth cervical vertebra Posterior tubercles of transverse processes	Scalene tubercle and cranial crest of first rib Cranial surface of	Acting bilaterally flexes the head. Acting unilaterally laterally flexes and rotates the head to the opposite side Acting unilaterally

Posterior	of second through seventh cervical vertebrae Posterior tubercles of transverse proceses of last two or three cervical vertebrae.	first rib between tubercle and subclavian groove Outer surface of second rib	laterally flexes and rotates the head to the opposite side Acting unilaterally laterally flexes and rotates the head to the opposite side
M.gluteus maximus	Posterior surface of lower part of sacrum, posterior gluteal line of ilium, side of coccyx, apeneurosis of erector spinae, sacrotuberous ligament, and gluteal aponeurosis	Larger proximal portion and superficial fibers of distal portion of muscle into iliotibial tract of fascia lata. Deep fibers of distal portion into gluteal tuberosity of femur.	Extends, laterally rotates, and lower fibers assist in abduction of the hip joint. The upper fibers assist in abduction.
M.iliopsoas	Transverse processes of all lumbar vertebrae, sides of bodies and intervertebral discs, superior two thirds of iliac fossa, iliac crest, iliolubar and vertral sacroiliac ligaments	Lesser trochanter of femur, lateral side of tendon of Psoas major, and just distal to the lesser trochanter	Flexes the hip joint, may assist in lateral rotation and abduction of the hip joint with the origin fixed. With the insertion fixed will increase the lumbar lordosis.

Table 2. Respiratory muscles with reported lesions in UCS[19][16]

Muscle	**Origin**	**Insertion**	**Function**
Diaphragma	The xiphoid process	To a central tendon	Separates the thoracic

	of sternum, the costal margin of the thoracic wall, the ends of ribs XI and XII, ligament that span across structures of the posterior abdorminal wall, vertebrae of the lumbar region	(thin strong aponeurosis with no bony attachment)	and abdorminal cavities. During inspiration contracts and descents. During expiration diaphragma relaxes and ascends decreasing the volume of thoracic cavity
M.External Intercostal	Inferior margin of rib above	Superior surface of rib below	Most active during inspiration; support intercostals space; move ribs superiorly
M.Internal intercostals	Lateral edge of costal groove of rib above	Superior surface of rib below deep to the attachment of the related external intercostal	Most active during expiration; support intercostals space; move ribs inferiorly

Photograph of the patient in lateral view.

Photograph of the patient in back view.

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Application for Opinion of UK FTVS Ethic Committee

On the project of Bachelor Thesis including human participants

Title: "Upper Crossed Syndrome"

Project form: Bachelor Thesis

Author: (crucial author) Magklaras Anastasios

Supervisor (in case of student project) Mgr. Michaela Prokešova

Project description

The case report of rehabilitation the patient with anamnesis .....elaborated with the vocational sight of physiotherapist in UVN PRAHA (Health care unit)

No one invasive procedure will be applied.

Proposal of Agreement (enclosed)

Prague 5.2.08 Author's signature .....

Statement UK FTVS Ethic Committee

Committee members: Ass. Prof. Staša Bartůňková, M.D., CSc.
Prof. Ing. Václav Bunc, CSc.
Prof. PhDr. Pavel Slepička, DrSc
Ass. Prof. Jan Heller, MD., CSc.

The project was authorized by Ethic Committee UK FTVS with reference number: 0104/2008

Date: 10.4.2008

Ethic Committee UK FTVS evaluated submitted project and found no discrepancy to valid principles, instructions and international guidelines for biomedical research, including human participants.

Author of project fulfilled necessary conditions for the agreement of Ethic Committee.

Faculty stamp

Signature of EC chairman

Univerzita Karlova v Praze Fakulta tělesné výchovy a sportu -5-

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