

TOPIC OUT LINE 5 – CERVICAL SPINE, ANTERIOR THROAT AND OCCIPUT.

Introduction.

The cervical spine has three main functions.

The first, it allows stability and support for the head.

The second, its articulating vertebral facets allow for the head's range of movement.

Finally and most important, it provides housing and protection for the spinal cord and vertebral arteries.

A full understanding of cervical spine anatomy is essential in all clinical examinations as cervical spine pathology, while of concern in it self may be reflected to the upper and in some cases lower extremities to show up as muscle weakness, altered reflexes or sensation and pain.

Initial Regional Inspection.

On examination of the cervical spine and anterior throat the following observations must be considered.

- Attitude/ posture of the head, anterior/posterior, rotated or laterally flexed
- Cervical lordosis, increased/decreased
- Ease and quality of movement of the head/cervical spine
- Scars, surgical/traumatic
- Discolouration
- Swelling, Goitre
- Atrophy, Sternocleidomastoid/ Trapezius.

Ref. (Passor – Musculoskeletal Physical Examination Competencies Lists 2000 – 2001).

Once the initial regional inspection of the cervical spine and the anterior throat has been carried out, the palpation of both bony and soft tissue structures can be carried out.

Palpable Structures – Bony Structures.

For this examination the patient will lie supine with the practitioner sitting at the head of the patient. It is important that you communicate with your patient in regards to your intentions and receive verbal consent as some people are sensitive of being touched in this region, especially the anterior throat.

ANTERIOR STRUCTURES.

- Hyoid
- Thyroid
- Cricoid ring
- Trachea
- Carotid tubercles.

POSTERIOR STRUCTURES.

- External occipital protuberance (inion)
- Superior nuchal line
- Mastoid processes
- Cervical spinous processes
- Articular pillars (zygapophyseal joints).

Hyoid bone

The hyoid bone is a “horse shoe” shaped bone located high in the anterior throat, above the thyroid cartilage. In the vertical plane it is level with the body of C3.

Maintaining a gentle palpation, the inferior borders of the mandible is located. The palpation is continued inferiorly, into the soft tissue of the anterior throat, until the hyoid is identified.

As the hyoid is a difficult structure to identify, the palpation can be aided by asking the patient to swallow. This action moves the hyoid superiorly and inferiorly.

Thyroid

The palpation is continued inferiorly from the hyoid. A “groove” of soft tissue below the hyoid is palpated. Continue palpating inferiorly to the superior margin of the thyroid cartilage.

The superior margin is marked by a ‘V’ shaped notch which is approximately level with the body of C4. The anterior aspect of the thyroid is assessed for its smooth contours. The inferior margin is level with the body of C5.

As with the hyoid, swallowing may facilitate the palpation.

Cricoid Ring

From the inferior margin of the thyroid, palpate inferiorly over the thyrocricoid groove. Inferior to this region the cricoid cartilage should be palpated. The cricoid cartilage is approximately level with the body of C6.

Again swallowing may facilitate the palpation.

Trachea

Inferior to the cricoid below a soft tissue region the trachea is palpated.

The trachea is assessed for deviation. Common causes of tracheal deviation include pneumothorax, lung or bronchial carcinomas.

Carotid Tubercles

The carotid tubercles are difficult structures to palpate, and is assessed unilaterally, as bilateral palpation may impede the carotid arteries.

The sternocleidomastoid muscle is located. The posterior aspect of the muscle is contacted and controlled pressure is applied towards the cervical spine. A prominent tubercle is palpated on the anterior aspect of the TP of C6.

External Occipital Protuberance (Inion)

The occipital bone of the cranium is located. In a central position on the occiput a prominent protuberance is palpated. This is the external occipital protuberance. The inion is the attachment point of the trapezius muscle and the nuchal ligament. It also corresponds with the internal occipital protuberance on the internal aspect of the occiput, which carries the confluence of venous sinuses.

Superior Nuchal Line

From the external occipital protuberance, palpate laterally, along a marked ridge – the superior nuchal line.

The superior nuchal line is the attachment point of the sub occipital muscles.

Mastoid Processes

At the terminal ends of the superior nuchal line the mastoid processes are located.

Tenderness over the mastoid processes may indicate chronic infection of the mastoid air sinuses.

Cervical Spinous Processes.

The external occipital protuberance is re-located. Palpate inferiorly to assess the cervical spinous processes. C1 has no SP, therefore difficult to locate. The posterior arch of C1 is palpated as a “hardness” rather than a specific landmark.

The palpation is continued inferiorly, to assess the SP of C2, and then the bifid SP's of C3 to C5.

The SP's of C6 and C7 are also palpated. Assessments are made for lateral alignments and for the overall lordosis of the cervical spine.

Articular Pillars (Zygapophyseal Joints)

Palpate either side of the posterior arch of C1. Continue the palpation down to C2 assessing the zygapophyseal joints. This is repeated for all the cervical vertebrae assessing for hypertrophy and tenderness.

Palpable Landmarks – Soft Tissue.

This part of the routine is conducted with the patient sitting, and the practitioner positioned behind the patient.

Anterior Aspect

- Sternocleidomastoid muscle
- Lymph Node Chains
- Thyroid Glands
- Carotid Pulse
- Parotid Gland
- Supraclavicular Fossa

Posterior Aspect

- Trapezius Muscle
- Lymph Nodes
- Greater Occipital Nerves
- Nuchal Ligament

Anterior Palpation

Sternocleidomastoid

The palpation commences at the mastoid process. Palpate along the belly of the SCM assess for tenderness, symmetry and possible haematomas. End the palpation at the inferior attachment of the muscle.

Lymph Node Chain

Re-locate the mastoid process and palpate along the medial border of the SCM. The lymph nodes are palpated for enlargements suggestive of either an upper respiratory tract infection or organic pathology.

Thyroid Gland

The thyroid cartilage is re-located. Palpate either side of the cartilage for the thyroid gland. Assess for enlargement, nodular formation and symmetry. Any change from "normal" must be investigated by the patient's doctor.

Care must be taken when palpating this structure. Research suggests that over stimulation of this gland may stimulate thyroxine production which may result in adverse reactions such as palpitations. If the palpation is accurate and superficial then the gland should not be stimulated, and the patient will not suffer any adverse reactions.

Carotid Pulse

Palpate lateral to the thyroid cartilage and the carotid pulse is located.

This pulse is assessed unilaterally, as bilateral palpation may result in compromised blood flow to the head.

The pulse is assessed for rate, rhythm and amplitude.

Parotid Gland

This gland partly overlies the angle of the mandible. Its assessed for asymmetry, enlargement and possible stones.

Supraclavicular Fossa

This region is located on the anterior neck, above the clavicles. This area is palpated for any possible swelling, that could result from:-

- Clavicular fracture
- Lymph node enlargement
- Dome of the lung (enlarged due to pathology)
- Cervical rib

Posterior Palpation

Trapezius

Assess the muscle from its insertion at the skull to the shoulders and thoracic spine. It is commonly involved in cervical and thoracic pain as well as shoulder dysfunction. Palpate for symmetry, tenderness and fibrosity.

Lymph Nodes

These lymph nodes run along the anterolateral aspect of the trapezius muscle. They are assessed as described above.

Greater Occipital Nerves

The superior nuchal line is re-located. Using a superficial palpation, palpate along the nuchal line. These nerves are not normally palpable but, if inflamed may feel like a cord like structure. Inflammation of these nerves may result in headaches.

Nuchal Ligament

The nuchal ligament is an enlarged band of fascia extending from the external occipital protuberance to the spinous process of C7, attaching to each spinous process as it passes. It is not a palpable landmark, but tenderness may be reported following cervical spine dysfunction.

Once all the pain sensitive structures are palpated, active and passive movements are examined.

Orthopaedic Examination.

As with all spinal examinations, care must be taken to assess pure cervical spine movements for ease, quality and range of movements

Normal Range of Movement.

The cervical spine range of motion, is an approximation of the "normal" patient. It does not take into account for trauma, degenerative processes and in the healthy individual muscle bulk, which when well developed will limit range of movement.

- Flexion – 80° – limited by the chin touching the chest
- Extension – 50° – limited by trapezius muscle
- Total flexion/extension – 130°
- Side bending – 45°
- Rotation – 80°

Ref: The Physiology of the Joints I.A.Kapandji – Vol. 3 The trunk and Vertebral Column.

Active Movements.

As with all clinical examinations information is gathered from the case history in regards to which modality of movement/ symptoms the patient cannot carry out or presents with.

This information is essential when assessing the cervical spine, as certain movements will aggravate symptoms.

This examination can be carried out standing or sitting.

- Flexion
- Extension, note if the patient presents with symptoms of dizziness, nausea, vomiting, visual disturbances care must be taken in carrying out extension .
- Rotation
- Side bending.

Passive Movements.

This aspect of the examination is carried out sitting.

- Flexion
- Extension
- Rotation. Upper cervicals – the head in flexion and then rotation. Middle cervicals – the head in a neutral position and the rotation. Lower cervicals – the head in slight extension and the rotation.
- Side bending.

Special Tests.

Tests for the cervical spine include:-

NEUROLOGICAL DYSFUNCTION.

- Foraminal Compression
- Distraction Test.

VASCULAR DYSFUNCTION.

- VBI Test
- Sustained Rotation Test
- Extension Test.

Foraminal Compression Test.

This test is to help you confirm if there is a neurological deficit occurring. Classically it is to assess for a prolapsed intervertebral disc or osteophytic changes causing nerve root irritation. This test is conducted once all other neurological tests have been carried out.

The test is carried out in three stages. The patient is seated and the spine supported in a neutral position by the practitioner.

- Stage 1 – **Compression with the head in neutral.** A gradual compression is applied to the vertex of the patient's head in an inferior plane. Questions are asked on the level of discomfort/ reproduction of symptoms. The compression is held for 10 – 15 seconds and then gradually released.
- Stage 2 – **Compression with slight extension.** In order to further compress the foramen a slight extension is applied to the cervical spine. The amount of extension is determined by which vertebral level is affected. The lower the vertebra the more extension. (Application of

active/passive examination). A compression is gradually applied as described above.

- Stage 3 – **Compression with extension and rotation.** This last manoeuvre further compresses the foramen. As with stage 2, but with an added rotation to the affected side. Apply a gradual compression as described above.

The aim of the test is to assess for nerve root irritation. Classically the test will result in a sharp shooting pain radiating into the affected dermatome, and can be accompanied with altered sensation, again in the affected dermatome.

As with all orthopaedic testing if at any time the patient reports pain the test must be stopped. With the compression test we are assessing for reproduction of symptoms, BUT once the symptoms have been reported by the patient it is unsafe to continue with that specific test.

It is very unlikely in a clinical setting that the practitioner will have to test past Stage 1, as a “general” compression will reproduce symptoms if a nerve root irritation is present.

The test findings are recorded as to what is reported by the patient. i.e. Compression with the head in neutral:- pain radiating into C6 dermatome. Left side.

Distraction Test.

The distraction test should theoretically, increase the foraminal space. Therefore, in a nerve root irritation symptoms should be relieved. BUT if there is capsular irritation, ligamentous or muscular injury symptoms will increase. It is important to note that capsular irritation, ligamentous/muscular injury will not cause radiations into the affected dermatome.

This tests reliability is questionable, as in the acute patient with a nerve root irritation, the inflammatory process will lead to capsular irritation, so results may not be accurate. As with the compression test all other neurological tests must be carried out first in order to have an accurate diagnosis.

The patient’s position is identical to that during the compression test. With the head in a neutral position, a contact is made on the occiput with the hands curled over the ears. A traction is applied (making sure the occiput is not “lifted” off C1) to decompress the cervical spine. The traction is held for 10 seconds, and then gradually returned to normal.

The test finding are recorded as to what the patient reports. i.e. Traction:- relieved radiations in the C6 dermatome, Left side.

Vertebrobasilar Insufficiency Test. (VBI Test).

The vertebral arteries travel up the cervical spine to supply the basilar system of the brain. Any atherosclerotic changes with in these arteries will reduce

blood flow into the brain. The rotational, extension and side bending component of a cervical manipulation will compromise these arteries, therefore this test is essential BEFORE conducting any cervical manipulation.

The VBI test is the accepted pre-manipulative test; however the extension and sustained rotation tests are equally valid in assessing blood flow into the head.

The VBI test is only preformed just before a manipulation, and not to “ check the state of the arteries” however if a patient presents with signs and symptoms associated with vertebrobasilar insufficiency the test can be carried out as a safety precaution.

The test is preformed sitting, allowing gravity to add maximum resistance for the blood supply into the head. If the patient wears glasses allow them to keep them on, as the test requires the patient to have the best possible vision. With the head in the neutral position, slight SIDE BENDING AND ROTATION TO THE SAME SIDE with slight EXTENSION is carried out. i.e. with the head extended, right side bending and right rotation.

This position is held for 10 seconds, making sure the patient’s eyes are open. During the test, the practitioner assesses for Nystagmus, asks questions in relation to dizziness, nausea, vomiting, visual disturbance or any altered sensations the patient may be experiencing.

The test is then repeated, altering the rotation and side bending vectors to the other side, assessing the integrity of the both arteries.

The theory behind the test suggests that the side bending and rotational element stretches one artery allowing an assessment of the other. i.e. if the patients head is side bent right and rotated right, the left artery is stretched, therefore the right is being assessed.

The test findings are recorded as what symptoms the patient complains of. If the patient complains of any altered symptoms into the head it is considered a positive test.

Sustained Rotation Test.

Again this test assesses for blood flow into the head.

The patient is seated, with the head in a neutral position, pure rotation is introduced into the cervical spine. Rotation is taken to end of physiological motion, or as far as comfortable for the patient. This position is held for 10 seconds, and as the VBI test any altered sensations are noted.

This test is carried out bilaterally. Rotation of the head/cervical spine to the left will assess the right artery, and vice versa.

Extension Test.

The extension test assesses both arteries at the same time.

The patient's cervical spine is extended in the seated position, to end of physiological motion, or as far as comfortable for the patient, and held for 10 seconds. As with the above tests any alteration in sensation is noted.

If the patient is unable to carry out the tests because it is too painful for them, the test is invalid and a manipulation **MUST NOT** be carried out.

Every consultation a cervical manipulation is considered a VBI test must be carried out, no matter if this is the patient's first , tenth or twentieth treatment.

REFER TO HANDOUT :- GUIDANCE FOR PRE-MANIPULATIVE TESTING OF THE CERVICAL SPINE FOR VERTEBROBASILAR INSUFFICIENCY.
Society of Orthopaedic Medicine.

As with the VBI test, any alteration of symptoms is considered a positive test.