

## Dissection 8: The Neck

### Dissection 1)

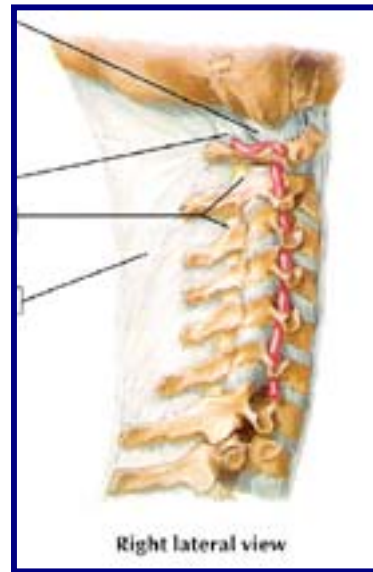
**Identify the cervical vertebrae, their articulations with one another, the ligaments connecting each, and the types of movements possible between different cervical vertebrae.**

Longitudinal bands: pass from transverse ligament of atlas to occipital bone superior and C2 inferior

- i. Alar ligament: extends from sides of dens to lateral margins of foramen magnum; short and round and attach cranium to C1 and prevent over rotations

\*Tectorial membrane: strong superior continuation of posterior longitudinal ligament across central atlantoaxial joint through foramen magnum to central floor of cranial cavity; runs from body of C2 to internal surf

- B. Typical cervical vertebrae: 7 vertebrae b/ the skull and the thoracic vertebrae.
  - i. Body: smaller and wider from side to side than anteroposteriorly with the superior surface concave and inferior surface convex.
  - ii. Vertebral foramens: large and triangular.
  - iii. Transverse processes: have foramina transversarium for passage of vertebral arteries, accompanying veins, and sympathetic plexuses.
  - iv. Articular facets: superior directed superolaterally; inferior directed inferoanteriorly
  - v. Spinous processes: C3-C5 are short and bifid, C6 is long, C7 is longest



- C. C1 (Atlas): no body, anterior and posterior tubercles, facet for dens, large vertebral foramen
- D. C2 (Axis): no disc b/ it and C1, has dens
- E. Articulations:
  - i. Intervertebral discs b/ all cervical vertebrae, except C1 and C2
  - ii. Zygapophysial joints between superior and inferior articular processes
  - iii. \*Uncovertebral "joints": b/ the unicate (hook-like) processes of C3 and C6 and the beveled surfaces of the vertebral bodies superior to them. These "joints" (fissures) are located at the lateral and posterolateral margins of the IV discs. Encapsulated, fluid-filled, and frequently form bone spurs causing neck pain.

- iv. Atlanto-occipital joint: b/ atlas and occipital condyles of occipital bone; synovial joint so the atlanto-occipital membrane from anterior and posterior arches of C1 to anterior and posterior margins of foramen magnum.
- v. Atlantoaxial joint: 2 lateral atlantoaxial joints b/ lateral masses of C1 and C2 and one medial atlantoaxial joint b/ the dens of C2 and anterior arch and transverse ligament of atlas.

F. Ligaments:

- i. \*Anterior and Posterior longitudinal ligaments
- ii. \*Ligamentum flavum
- iii. \*Intertransverse ligaments
- iv. \*Supraspinous and interspinous ligaments
- v. Nuchal ligament: strong median ligament of neck; from external occipital protuberance and posterior border of foramen magnum to spinous processes of cervical vertebrae
- vi. Cruciate ligament: cross-like ligament holding C1 and C2 in place and made of:
- vii. Transverse ligament of atlas: strong band extending b/ tubercles on medial aspects of lateral masses of C1 vertebrae; holds dens of C2 against anterior arch of C1 forming posterior wall of socket for dens.ace of occipital bone and covers alar and transverse ligaments

- G. Movements: Flexion and extension (nodding and due to atlanto-occipital joint), lateral bending, lateral rotation to both sides (atlantoaxial joint)

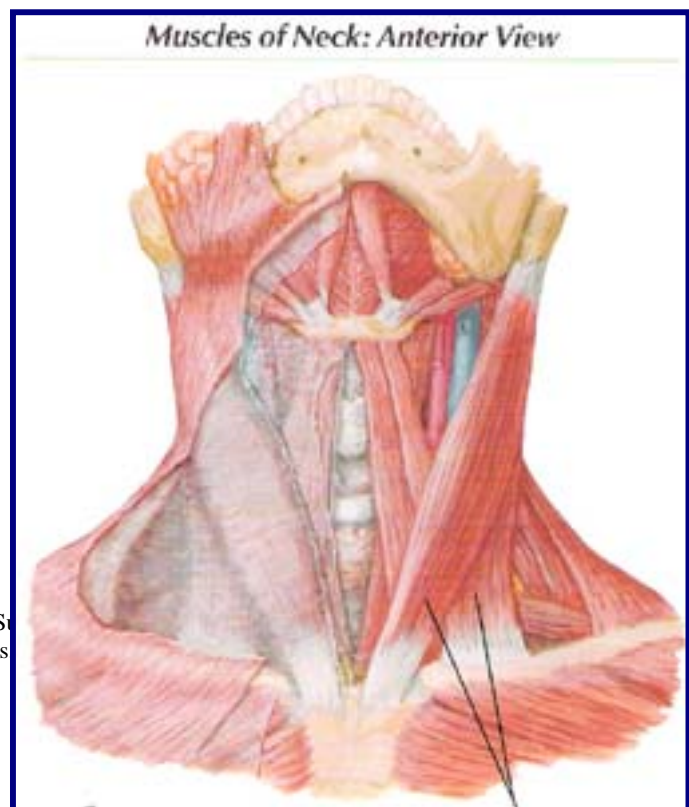
**Objective 2)**

**Identify the muscles of the neck and indicate their major actions and sources of innervation. Indicate the relationship of each of the muscle groups to the layers of deep fascia in the neck.**

- H. Superficial and lateral neck muscles: Located superficial to investing layer of deep fascia (platysma) or within to investing layer (sternocleidomastoid and trapezius).

i. Platysma:

1. From inferior border of mandible, skin, and subcutaneous tissues of lower face to fascia covering superior parts of pectoralis major and deltoid.
2. Innervated by cervical branch of facial nerve (CN VII)
3. Action: Draws corners of mouth inferiorly and widens it as in expressions of sadness and fright; draws skin of neck superiorly when



teeth are clenched

ii. Sternocleidomastoid (SCM):

1. From lateral surface of mastoid process of temporal bone and lateral half of superior nuchal line to anterior surface of manubrium (sterna head) and superior surface of medial 3<sup>rd</sup> of clavicle (clavicular head)
2. Innervated by spinal root of accessory nerve (CN XI), C2, and C3
3. Action: Tilts head to one side, flexes neck and rotates it so face is turned superiorly toward opposite side; acting together, flex neck so chin is thrust forward

iii. Trapezius:

1. From medial 3<sup>rd</sup> of superior nuchal line, external occipital protuberance, nuchal ligament, spinous processes of C7-T12, and lumbar and sacral spinous processes to lateral 3<sup>rd</sup> of clavicle, acromion, and spine of scapula
2. Innervated by spinal root of accessory nerve (CN XI), C3, and C4
3. Action: elevates, retracts, depresses, and rotates the scapula

I. Lateral prevertebral muscles (muscles of posterior triangle): Bordered by SCM, trapezius, and clavicle; deep to investing layer and prevertebral layers of deep fascia

i. \*Splenius capitis:

1. From inferior half of nuchal ligament and spinous processes of superior six thoracic vertebrae to lateral aspect of mastoid process and lateral 3<sup>rd</sup> of superior nuchal line
2. Innervated by posterior rami of middle cervical spinal nerves
3. Action: laterally flexes and rotates head and neck to same side; acting bilaterally, they extend head and neck

ii. Levator scapulae:

1. From transverse process of C1-C2, posterior tubercles of transverse processes of C3-C4 vertebrae to superior part of medial border of scapula
2. Innervated by dorsal scapular nerve
3. Action: elevates scapula and tilts its glenoid cavity inferiorly by rotating scapula

iii. Posterior scalene:

1. From posterior tubercles of transverse processes of C4-C6 to external border of 2<sup>nd</sup> rib
2. Innervated by anterior rami of cervical spinal nerves C7 and C8
3. Action: flexes neck laterally; elevates 2<sup>nd</sup> rib during forced inspiration

iv. Middle scalene:

1. From posterior tubercles of transverse processes of C3-C7 to superior border of 1<sup>st</sup> rib, posterior groove for subclavian artery
2. Innervated by anterior rami of cervical spinal nerves
3. Action: flexes neck laterally; elevates 1<sup>st</sup> rib during forced inspiration

v. Anterior scalene:

1. From anterior tubercles of transverse processes of C3-C7 to 1<sup>st</sup> rib
2. Innervated by cervical spinal nerves C4-C6
3. Action: flexes neck laterally and rotates it laterally; elevates 1<sup>st</sup>

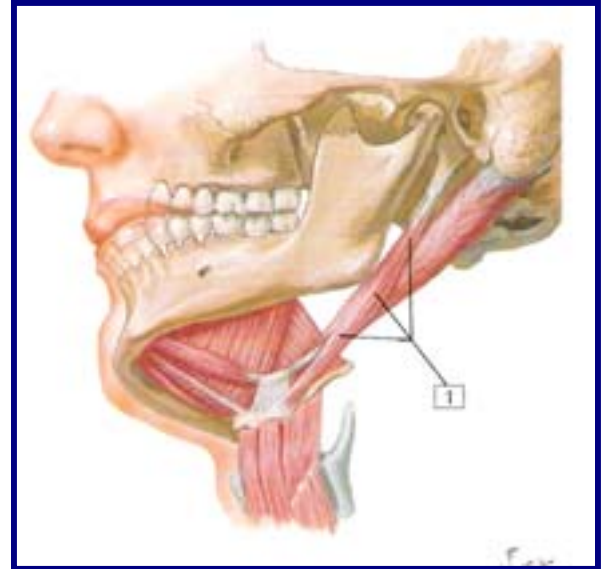
J. Muscles of anterior triangle: Bordered by median line of neck, SCM, and inferior border of mandible; deep to investing layer of deep fascia but superficial to

pretracheal layer of deep fascia (suprahyoids) or within the pretracheal layer (infrahyoids)

i. Suprahyoid:

1. Mylohyoid:

- a. From mylohyoid line of mandible to raphe and body of hyoid bone
- b. Innervated by mylohyoid nerve (branch of inferior alveolar nerve of CN V<sub>3</sub>)
- c. Action: elevates hyoid bone, floor of mouth, and tongue during swallowing and speaking



2. \*Geniohyoid:

- a. From inferior mental spine of mandible to body of hyoid bone
- b. Innervated by C1 via hypoglossal nerve
- c. Action: pulls hyoid bone anterosuperiorly, shortens floor of mouth, and widens pharynx

3. Stylohyoid:

- a. From styloid process of temporal bone to body of hyoid
- b. Innervated by cervical branch of facial nerve
- c. Action: elevates and retracts hyoid bone, thereby elongating floor of mouth

4. Digastric:

- a. From digastric fossa of mandible (anterior belly) and mastoid notch of temporal bone (posterior belly) to intermediate tendon to body and greater horn of hyoid bone
- b. Innervated by mylohyoid nerve (anterior belly) and facial nerve (posterior belly)
- c. Action: depresses mandible; raises hyoid bone and steadies it during swallowing and speaking

ii. Infrahyoid:

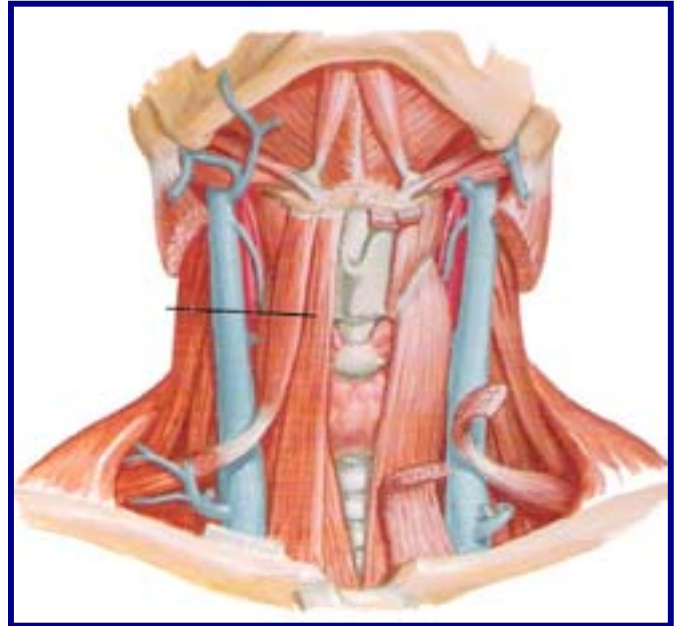
1. Sternohyoid:

- a. From manubrium and medial end of clavicle to body of hyoid
- b. Innervated by C1-C3 by branch of ansa cervicalis
- c. Action: depresses hyoid bone after it has been elevated during swallowing

2. Omoxyoid:

- a. From superior border of scapula near suprascapular notch to inferior border of hyoid
- b. Innervated by C1-C3 by branch of ansa cervicalis
- c. Action: Depresses, retracts, and steadies hyoid bone

3. Sternothyroid:
  - a. From posterior surface of manubrium to oblique line of thyroid cartilage
  - b. Innervated by C2-C3 by branch of ansa cervicalis
  - c. Action: Depresses hyoid bone and larynx
4. Thyrohyoid:
  - a. From oblique line of thyroid cartilage to inferior border of body and greater horn of hyoid
  - b. Innervated by C1 via hypoglossal nerve
  - c. Action: depresses hyoid bone and elevate larynx



- K. Anterior prevertebral muscles:  
posterior to trachea and esophagus  
and deep to investing and prevertebral layers of deep fascia
- i. Longus colli:
    1. From anterior tubercle of C1 vertebrae (atlas), bodies of C1-C3 and transverse processes of C3-C6 to bodies of C5-T3, transverse processes of C3-C5
    2. Innervated by anterior rami of C2-C6 spinal nerves
    3. Action: flexes neck with rotation (torsion) to opposite side if acting unilaterally
  - ii. Longus capitis:
    1. From basilar part of occipital bone to anterior tubercles of C3-C6 transverse processes
    2. Innervated by anterior rami of C1-C3 spinal nerves
    3. Action: flexes head
  - iii. \*Rectus capitis anterior:
    1. From base of skull, just anterior to occipital condyle to anterior surface of lateral mass of C1
    2. Innervated by branches from loop b/ C1 and C2 spinal nerves
    3. Action: flexes head
  - iv. \*Rectus capitis lateralis:
    1. From jugular process of occipital bone to transverse process of C1
    2. Innervated by branches from loop b/ C1 and C2 spinal nerves
    3. Action: flexes head and helps to stabilize it

### Objective 3)

**Trace the course of the portions of the brachial plexus, which are present in the neck region. Trace the course of the branches of the cranial nerves IX-XII seen in the neck. Predict the functional deficits, which would result from damage to any of these nerves or their branches in the neck region.**

L. Brachial plexus:

- i. Roots: anterior ventral rami of C5, C6, C7, C8, and T1
  1. Located @ posterior triangle of neck and pierce scalene hiatus, which is b/ the anterior and middle scalene muscles
- ii. Trunks: roots come together as they emerge from scalene hiatus
  1. Superior trunk: C5 and C6 roots combine
  2. Middle trunk: C7 root remain alone
  3. Inferior trunk: C8 and T1 roots combine
  4. Run from scalene hiatus to 1<sup>st</sup> rib; pass from neck to axilla through cervicoaxillary canal posteriorly
- iii. Divisions: each trunk splits into anterior and posterior divisions
  1. Anterior divisions innervate anterior aspects of limb
    - a. Anterior division of superior and middle trunks form lateral cord
    - b. Anterior division of inferior trunk forms medial cord
  2. Posterior divisions innervate posterior aspects of limb and form posterior cord
- iv. Branches from roots and trunks:
  1. Dorsal scapular nerve: from anterior ramus of C5; pierces scalenus medius and descends to levator scapulae and rhomboids to supply them
  2. Long thoracic nerve: formed from anterior rami of C5-C7; descends posteriorly to C8 and T1 anterior roots to external surface of serratus anterior to supply them
  3. Suprascapular nerve: off of superior trunk; passes laterally across posterior triangle of neck through suprascapular notch under superior transverse scapular ligament to innervate supraspinatus, infraspinatus, and glenohumeral joint
  4. \*Nerve to subclavius: off of superior trunk; descends posteriorly to clavicle and anterior to brachial plexus and subclavian artery to innervate subclavius and sternoclavicular joint
- v. Functional loss:
  1. Loss of the roots, trunks, or divisions would cause partial loss of function in the cords and branches in the axilla and arm.
    - a. Damage to the superior trunk causes Erb's palsy or "waiter's tip position" where the arm hangs down medially rotated with the palm of the hand facing posteriorly.
    - b. Damage to the inferior trunk causes claw hand due to atrophy of interosseous muscles, hyperextension of metacarpophalangeal joints, and flexion of interphalangeal joints.
  2. Damage to long thoracic nerve will cause winged scapula.
  3. Damage to suprascapular nerve will cause weakness in holding humerus to glenoid cavity, beginning abduction of the arm, and lateral rotation of the arm.

4. Damage to the dorsal scapular nerve will loosen the scapula against the thoracic wall and decrease retraction, elevation, and tilting of the scapula

M. Cranial nerves IX-XII:

- i. \*Glossopharyngeal nerve (CN IX): In the neck, the glossopharyngeal nerve runs in the carotid triangle (superior belly of omohyoid, posterior belly of digastric, and the anterior border of the SCM) to innervate the carotid sinus (dilation at bifurcation of common carotid arteries), which acts as a baroreceptor, through the carotid sinus nerve.
- ii. Vagus nerve (CN X): After leaving the jugular foramen it passes inferiorly in the neck w/in the posterior part of the carotid sheath in the angle b/ and posterior to the IJV and common carotid artery. The right vagus nerve passes anterior to the first part of the subclavian artery and posterior to the brachiocephalic vein and SC joint to enter the thorax. The left vagus nerve descends b/ the left common carotid and left subclavian artery and posterior to the SC joint to enter the thorax. Give off left and right recurrent laryngeal nerves, which loop around the right subclavian artery (right) and arch of the aorta (left) to enter the tracheoesophageal groove.
- iii. Spinal accessory nerve (CN XI): Spinal root splits from cranial root before exiting the jugular foramen of the cranium and enters the posterior triangle at or inferior to the junction of the superior and middle 3<sup>rd</sup>s of the posterior border of the SCM. It passes posteroinferiorly through the triangle, superficial to the investing layer of the deep fascia. It enters the sternocleidomastoid muscle and continues into the trapezius muscle, leaving the posterior triangle.
- iv. Hypoglossal nerve (CN XII): Runs under the mandible in the submandibular triangle deep to the posterior belly of the digastric between the internal carotid artery and internal jugular vein on its way to innervating the muscles of the tongue.
- v. Functional loss:
  1. Glossopharyngeal nerve (CN IX): Loss of taste in posterior 3<sup>rd</sup> of tongue and gag reflex.
  2. Vagus nerve (CN X): Loss of pharyngeal branches makes it difficult to swallow. Loss of superior laryngeal branches weakens voice. Lose parasympathetic innervation to heart, lungs, and GI tract to transverse colon.
  3. Accessory nerve (CN XI): Lose innervation to trapezius and weakness in shrugging the shoulders and impairment of rotary movements of the neck and chin to the opposite side as a result of weakness of the SCM
  4. Hypoglossal nerve (CN XII): Paralysis of the ipsilateral side of tongue, loss of innervation to geniohyoid and thyrohyoid.

**Objective 4)**

**Trace the course of the sensory and motor branches of the cervical plexus, their course and distribution in the neck and their relationship to major bony, muscular, or vascular landmarks in the region. Predict the functional deficits, which would result from their damage. Follow the extension of the upper part of the sympathetic trunk into the neck region.**

N. **Cervical plexus:** Located in the posterior triangle formed by the union of the adjacent anterior rami of the first four cervical nerves and it lies deep to the IJV and SCM. Cutaneous branches from the plexus emerge around the middle of the posterior border of the SCM and supply the skin of the neck and scalp. Branches usually come from superior cervical ganglion.

i. Sensory:

1. **Lesser occipital nerve:** Form C2 and innervates the skin of the neck and scalp posterosuperior to the auricle.

2. **Great auricular nerve:** From C2-C3 and ascends diagonally across the SCM onto the parotid gland where it divides and supplies the skin over the gland, posterior aspect of the auricle, and an area extending from the angle of the mandible to the mastoid process.

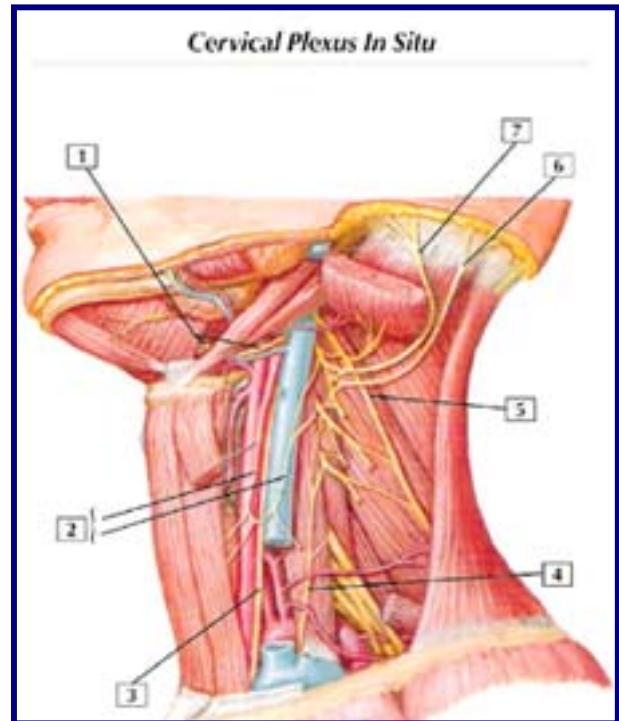
3. **Transverse cervical nerve:** From C2-C3 and innervates the skin covering the anterior triangle. The nerve curves around the middle border of the posterior border of the SCM and crosses it anteriorly and deep to the platysma.

4. **Supraclavicular nerve:** Emerge as a common trunk under cover of the SCM and send small branches to the skin of the neck. They then cross the clavicle and supply skin over the shoulder.

5. Damage to any of these nerves will cause loss of sensation of skin in the area they innervate.

ii. Motor/Sensory:

1. **Phrenic nerve:** Chiefly from C4 w/ some C3 and C5. The phrenic nerve is the sole motor supply to the diaphragm as well as sensation to its central part. In the neck, each phrenic nerve forms at the superior part of the lateral border of the anterior scalene muscle at the level of the superior border of the thyroid cartilage. Each phrenic nerve descends obliquely w/ the IJV across the anterior scalene muscle deep to the SCM, the prevertebral layer of the deep cervical fascia, and the transverse cervical and suprascapular arteries. The left phrenic nerve crosses the 1<sup>st</sup> part of the subclavian artery, and the right phrenic nerve crosses the 2<sup>nd</sup> part of the subclavian artery. Both pass posterior to subclavian veins and anterior to the internal thoracic artery as it enters the thorax.



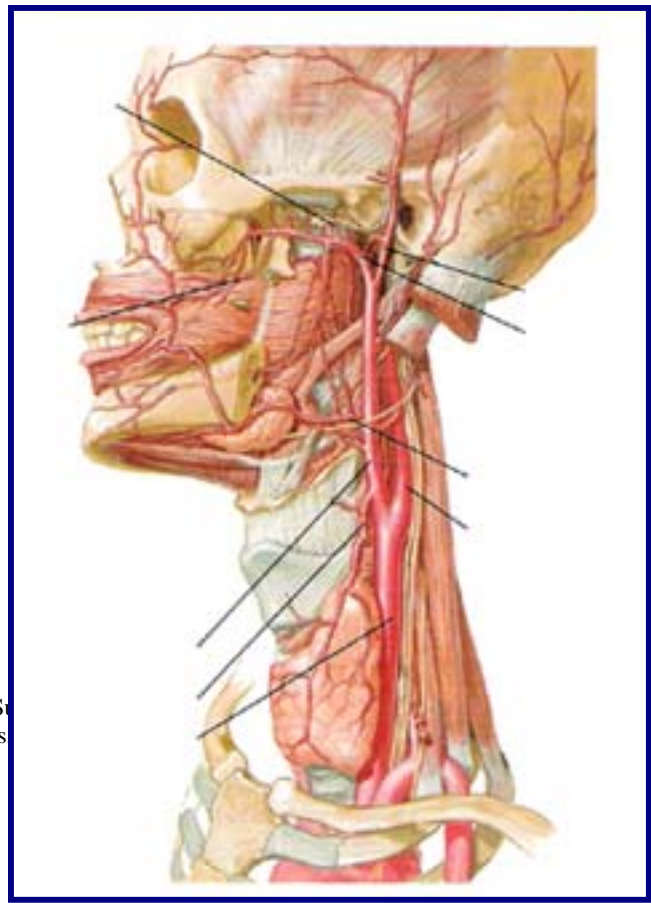
2. Damage to the phrenic nerve results in paralysis of the corresponding half of the diaphragm.
- iii. Motor:
1. Nerves to the geniohyoid and thyrohyoid muscles (C-1): Run near the hypoglossal nerve (CN XII).
  2. \*Contributing nerves to spinal accessory (CN XI) nerve (C2-C4): Innervate the sternocleidomastoid and trapezius muscles.
  3. Ansa cervicalis (C1-C3): Gives branches that innervate the omohyoid, sternohyoid and sternothyroid muscles (infrahyoid muscles, except for thyrohyoid); distinguishing characteristic is that it loops around in front of the carotid sheath.
  4. Damage to any of these nerves will cause in paralysis of the muscles they innervate.
- O. Sympathetic trunk in neck:
- i. Three sympathetic ganglia anterolateral to the cervical vertebrae and connect inferiorly to the thoracic sympathetic ganglia. Receive preganglionic sympathetic nerves from superior thoracic spinal nerves and have no white rami communicantes. Fibers can leave the ganglia via gray rami communicantes or directly by splanchnic nerves. Branches to head and viscera of the neck pass via cephalic arterial branches to run with arteries (periarterial plexus), especially the vertebral, internal carotid, and external carotid arteries.
    1. Inferior cervical ganglion: Usually fuses with 1<sup>st</sup> thoracic ganglion to form large cervicothoracic (stellate) ganglion. Lies anterior to C7 transverse process just superior to 1<sup>st</sup> rib. Some postsynaptic sympathetic fibers pass from gray rami to anterior rami of C7 and C8 and to the heart.
    2. Middle cervical ganglion: Occasionally absent, but lies on anterior aspect of the inferior thyroid artery at the level of the cricoid cartilage and the transverse process of C6 just anterior to the vertebral artery. Postsynaptic fibers pass from gray rami to C5, C6, thyroid gland, and the heart.
    3. Superior cervical ganglion: At level of C1 to C2. Large and good landmark. Postsynaptic fibers go to internal carotid sympathetic plexus to enter the cranial cavity. Sends arterial branches to external carotid artery and fibers from gray rami to superior 4 cervical spinal nerves. Other fibers pass to cardiac plexus of nerves.

### Objective 5)

**Trace the flow of arterial blood from the aorta through the neck including vessels that pass through the neck without branching and those that send branches to viscera and muscles of the neck.**

- P. Subclavian arteries: Left subclavian artery comes directly from the aortic arch, while the right subclavian artery comes from the brachiocephalic trunk off of the aortic arch. The brachiocephalic trunk is covered by the sternohyoid and sternothyroid muscles. Each subclavian artery is divided into 3 parts by the anterior scalene muscle: 1<sup>st</sup> = medial to muscle, 2<sup>nd</sup> = posterior to muscle, 3<sup>rd</sup> = lateral to muscle.
- i. 1<sup>st</sup> part:

1. Vertebral artery: Arises from the subclavian artery and passes through the foramina transversarium of C6-C1, but it may enter more superior than C6. Then passes through posterior arch of C1 into skull via foramen magnum.
  2. Internal thoracic artery: Arises from the anteroinferior aspect of the subclavian artery and descends inferomedially into the thorax. It has NO branches in neck.
  3. Thyrocervical trunk: Arises from anterosuperior aspect of the subclavian artery near the medial border of the anterior scalene.
    - a. Inferior thyroid artery: Largest branch and primary visceral artery of the neck. Runs superiorly and comes off of thyrocervical trunk where ascending cervical artery comes off.
    - b. Suprascapular artery: Passes inferiolaterally across the anterior scalene muscle and phrenic nerve. It then crosses the 3<sup>rd</sup> part of the subclavian artery and brachial plexus and passes posterior to the scapula. Supplies muscles of posterior scapula
    - c. Transverse cervical artery: Runs primarily posteriorly and initially runs superficially and laterally across phrenic nerve and anterior scalene to cross the superior trunk of the brachial plexus and pass under the trapezius. Sends branches to muscles in posterior triangle, the trapezius, and the medial scapular muscles.
    - d. Ascending cervical artery: Comes off of thyrocervical trunk and ascends up the neck
- ii. 2<sup>nd</sup> part:
1. Costocervical trunk: Arises posteriorly posterior to anterior scalene on right side and medial to it on left. Passes posterosuperiorly and divided into posterior intercostals artery and deep cervical arteries, which supply the first two intercostals spaces and the posterior deep cervical muscles, respectively.
- iii. 3<sup>rd</sup> part: Most superficial part and runs on top of first rib
1. Dorsal scapular artery: Its origin is inconstant because it can also come off of the transverse cervical artery or 2<sup>nd</sup> part of the subclavian artery.



- Q. **Common carotid arteries:** Come off aortic arch on left and brachiocephalic trunk on right. Runs in anterior triangle in carotid sheath parallel to descending IJV and vagus nerve. Ascend to level of thyroid cartilage.
- i. **Internal carotid artery:** Direct continuation of common carotid artery and has NO branches in the neck. Passes superiorly to skull and enters via carotid canal. Has sympathetic plexus with it. Lies anterior to longus capitis and sympathetic trunk and posterolateral to vagus nerve.
  - ii. **External carotid artery:** From common carotid artery and main part supplies structures of external cranium. Runs from neck along mandible to earlobe and imbeds in parotid gland.
    1. **\*Maxillary artery:** Terminal branch of external carotid artery.
    2. **\*Superficial temporal artery:** branch of external carotid artery.
    3. **Ascending pharyngeal artery:** Arises medially and ascends on the pharynx, prevertebral muscles, middle ear, and cranial meninges.
    4. **Superior thyroid artery:** Most inferior of the three anterior branches of the external carotid artery, runs anteroinferiorly deep to infrahyoid muscles to reach thyroid gland. Gives off branches to infrahyoid muscles and SCM. Also gives off **superior laryngeal artery** to larynx.
    5. **Lingual artery:** 2<sup>nd</sup> anterior branch off of external carotid artery to lie on middle constrictor muscle of pharynx. It arches superoanteriorly and passes deep to the hypoglossal nerve (CN XII), Stylohyoid muscle, and posterior belly of the digastric. Becomes the deep lingual and sublingual arteries.
    6. **Facial artery:** 3<sup>rd</sup> anterior branch of off external carotid artery next to or superior to lingual artery. Gives off tonsillar branch to palate and submandibular gland. Hooks around the middle of the inferior border of mandible and crosses face.
    7. **\*Occipital artery:** From posterior of external occipital artery superior to facial artery and passes parallel and deep to posterior belly of digastric to end in posterior scalp. Passes superficial to internal carotid artery and CN IX – CN XI.
    8. **\*Posterior auricular artery:** Small posterior branch from external carotid artery that ascends posteriorly b/ external acoustic meatus and mastoid process to contribute blood to adjacent muscles, parotid gland, facial nerve, temporal bone, and scalp.

### Objective 6)

**Trace the pathways for venous drainage from the neck into the brachial veins. Note the regions drained by tributaries of the internal and external jugular veins and subclavian veins. Trace the lymphatic drainage of the neck to the deep cervical lymph nodes (whether or not they are present in your cadaver) and indicate the drainage of these nodes to major lymph trunks or vasculature of the neck.**

R. Venous drainage:

- i. **External Jugular vein:** Begins at the angle of the mandible by union of the posterior division of the retromandibular vein and posterior auricular vein. The EJV crosses the superficial surface of the SCM, deep to the platysma, and then pierces the investing layer of the deep cervical fascia. It then descends to the inferior part of the posterior triangle and terminates into the

subclavian vein. It receives drainage from the transverse cervical vein, suprascapular vein, and anterior jugular vein.

- ii. Anterior Jugular vein: Typically arises near the hyoid bone from the confluences of submandibular veins. At the roof of the neck, it turns laterally, posterior to the SCM, and opens into the termination of the EJV or into the subclavian vein.
- iii. Internal Jugular vein: In anterior compartment and usually largest vein in the neck. The IJV drains blood from the brain, anterior face, cervical viscera, and deep muscles of the neck. Commences at the jugular foramen in the posterior cranial fossa as the direct continuation of the sigmoid sinus. It then runs inferiorly through the neck in the carotid sheath lateral to the internal carotid artery, common carotid artery, and vagus nerve (CN X). Unites with subclavian vein to form brachiocephalic vein. Receives blood from dural sinuses of cranium, occipital vein, common facial vein, anterior branch of retromandibular vein, pharyngeal veins, inferior petrosal sinus, lingual vein, superior thyroid vein, and middle thyroid vein.
- iv. Subclavian vein: Continuation of brachial vein after it crosses the first rib, and joins the IJV to make the brachiocephalic vein at a region called the venous angle. Right lymphatic trunk and thoracic duct dump lymph here.

S. Lymph drainage:

- i. Lymph from cranium drains into Occipital, Retroauricular, Parotid, Buccal, Submental, and Submandibular lymph nodes.
- ii. These lymph nodes drain into Superficial Cervical lymph nodes, which lie along the EJV.
- iii. The superficial cervical lymph nodes drain into the Deep Cervical lymph nodes that lie along the IJV mostly under the cover of the SCM.
- iv. Deep cervical lymph nodes send lymph to jugular lymphatic trunks that enter the thoracic duct on the left or right lymphatic duct on the right.
- v. The right lymphatic duct, which only receives lymph from right side of head and neck, dumps lymph into the right venous angle.
- vi. The thoracic duct, which receives lymph from whole body but right side of head and neck, dumps lymph into left venous angle.