Neck-1

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The Neck

The neck is the region of the body that lies between the lower margin of the mandible above and the suprasternal notch and the upper border of the clavicle below. Posteriorly, from superior nuchal line to intervertebral disc between C7 and T1.
Muscles of the neck

1- Sternocleidomastoid muscle
2- Scalene muscles
3- Infrahyoid muscles
4- Suprahyoid muscles
5- Platysma
**Sternocleidomastoid**

**Origin:** Manubrium sterni and medial third of clavicle (*two heads*)

**Insertion:** Mastoid process and superior nuchal line

**Nerve supply:** Spinal part of accessory nerve and C2 and 3

**Action:** Two muscles acting together extend head and flex neck; one muscle rotates head to opposite side
When **Sternocleidomastoid** contracts, it appears as an oblique band crossing the side of the neck from the sternoclavicular joint to the mastoid process of the skull.

You can feel and touch the left one when you turn your face to the right and vice versa.

**Ipsilateral flexion**

When you try to touch your shoulder with your ear

*Looking up into the sky*
Facts about sternocleidomastoid

- The carotid pulse can be easily felt in the middle third of the anterior border of sternocleidomastoid.
- Sensory cutaneous branches of cervical plexus merge at the posterior border of sternocleidomastoid (Erb’s point/ punctum nervosum).

Congenital torticollis

Excessive strain of sternocleidomastoid is caused by poor posture stances like when reading in bed, sleeping with more than one or two pillows, or even long periods of having your head turned to one side. Over time, this can cause sternocleidomastoid spasm.
The accessory nerve

- Leaves the skull through the **jugular foramen**
- Two roots:
  - **The cranial root**: joins the vagus nerve
  - **The spinal root**: runs downward and laterally and enters the deep surface of sternocleidomastoid, and crosses the posterior triangle of the neck to supply trapezius

**Supplies both sternocleidomastoid and trapezius**
The Accessory Nerves – XI – unique origin from spinal cord

- Foramen magnum
- Accessory nerve (XI)
- Sternocleidomastoid muscle (innervates)
- Rootlets of accessory nerve emerging from spinal cord (C₁–C₅)
- Trapezius muscle (innervates)
Scalene muscles

In Latin: the ladder

So you can memorize them by picturing them as a ladder between your ribs and cervical vertebrae.
**Scalenus anterior**

**Origin:** Transverse processes of C3-C6  
**Insertion:** First rib  
**Nerve supply:** Anterior rami of cervical nerves  
**Action:** Elevates first rib; laterally flexes the cervical spine
Unilateral contraction
Lateral flexion: Bending of cervical spine to the side

Bilateral contraction:
Ventral flexion: Bending of cervical spine to the front
Scalenus medius

**Origin:** Transverse processes of C2-C7

**Insertion:** First rib (dorsal to scalene anterior)

**Nerve supply:** Anterior rami of cervical nerves

**Action:** Elevates first rib; laterally flexes the cervical spine
Scalenus posterior

**Origin:** Transverse processes of C4-C6

**Insertion:** Second rib

**Nerve supply:** Anterior rami of cervical nerves

**Action:** Elevates second rib; laterally flexes the cervical spine
The scalenus anterior muscle is a key muscle in understanding the root of the neck. It is deeply placed and it descends almost vertically from the vertebral column to the first rib.
Scalenus medius
Scalenus posterior
Remember

- Brachial plexus lies between scalene anterior and scalene medius
- Scalene anterior divides the subclavian artery into three parts
The hyoid bone is a mobile single bone found in the midline of the neck below the mandible and abides the larynx.

- It does not articulate with any other bones.
- The hyoid bone is U shaped and consists of:
  1. Body
  2. Two greater horns
  3. Two lesser horns

- It is attached to the skull by the stylohyoid ligament.
- It is attached to the thyroid cartilage by the thyrohyoid membrane.
- The hyoid bone forms a base for the tongue.
Hyoid bone
Thyroid cartilage
Trachea
Larynx
Muscles superior to hyoid are classified as **suprahyoid muscles**

1. Stylohyoid
2. Digastric
3. Mylohyoid
4. Geniohyoid

Raise the hyoid (during swallowing)

Muscles inferior to hyoid are classified as **infrahyoid muscles** (strap muscles)

1. Omohyoid
2. Sternohyoid
3. Thyrohyoid
4. Sternothyroid

Depress the hyoid

Except sternothyroid

**Do not panic**
The names of these muscles offer clues from where these muscles are going to be attached.

Positioning of hyoid bone
All infrahyoid muscles are supplied by ansa cervicalis (C1, C2, C3) except thyrohyoid, supplied by C1.
**Sternohyoid**

**Origin:** Manubrium sterni (dorsal surface) and sternoclavicular joint

**Insertion:** Body of hyoid bone

**Nerve supply:** Ansa cervicalis (C1, 2, and 3)

**Action:** Depresses hyoid bone

Sternohyoid is the most superficial of infrahyoid muscles
**Superior belly Omohyoid**

**Origin:** Body of hyoid bone

**Insertion:** Intermediate tendon is held to clavicle and first rib by fascial sling

**Nerve supply:** Ansa cervicalis (C1, 2, and 3)

**Action:** Depresses hyoid bone

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**Inferior belly of Omohyoid**

**Origin:** Upper margin of scapula and suprascapular ligament
**Sternothyroid**

**Origin:** Manubrium sterni (dorsal surface)  
**Insertion:** Thyroid cartilage  
**Nerve supply:** Ansa cervicalis (C1, 2, and 3)  
**Action:** Depresses larynx

**Thyrohyoid**

**Origin:** Thyroid cartilage  
**Insertion:** Body of hyoid bone  
**Nerve supply:** First cervical nerve  
**Action:** Depresses hyoid bone or elevates larynx
Infrahyoid muscles

- Sternohyoid
- Thyrohyoid
- Omohyoid
- Sternothyroid
- Sternohyoid
Suprahyoid muscles

Involved in swallowing and movement of the larynx
**Stylohyoid**

**Origin:** Styloid process  
**Insertion:** Body of hyoid bone  
**Nerve supply:** Facial nerve  
**Action:** Elevates hyoid bone
**Anterior belly of digastric**

**Origin:** Digastric fossa of the mandible  
**Nerve supply:** Nerve to mylohyoid (mandibular nerve)

**Insertion:** Intermediate tendon is held to hyoid by fascial sling  
**Action:** Depresses mandible or elevates hyoid bone

**Posterior belly of digastric**

**Origin:** Mastoid notch  
**Nerve supply:** Facial nerve
The mylohyoid raphe is where both muscles meet. It inserts into body of hyoid.

**Origin:** Mylohyoid line of mandible

**Insertion:** Body of hyoid bone and fibrous raphe

**Nerve supply:** Nerve to mylohyoid (mandibular n)

**Action:** Elevates floor of mouth and hyoid bone or depresses mandible
Geniohyoid

**Origin:** Inferior mental spine of mandible

**Insertion:** Body of hyoid bone

**Nerve supply:** First cervical nerve (cervical plexus)

**Action:** Elevates hyoid bone or depresses mandible

Mentum
Genio
Chin
Superficial Fascia

It is a thin layer of fascia that contains:
1. Platysma muscle
2. Superficial veins
3. Cutaneous nerves
4. Superficial lymph nodes
Superficial Veins

1- External Jugular Vein
2- Anterior Jugular Vein

1- External Jugular Vein

✓ Begins just **behind the angle of mandible** by union of posterior auricular vein with posterior division of retromandibular vein
✓ Descends vertically across sternocleidomastoid
✓ Just above the clavicle in the posterior triangle, it pierces the deep fascia (investing layer) and drains into subclavian vein.
its course extends from the angle of the mandible to the middle of the clavicle
Superficial temporal vein

External jugular vein

Internal jugular vein

Posterior division of retromandibular vein

Posterior auricular vein

Retromandibular vein

Anterior division of retromandibular vein

Facial vein

External jugular vein

Internal jugular vein

Common facial vein
The external jugular vein begins by the union of the posterior auricular vein with the posterior division of the retromandibular vein.

The retromandibular vein is formed when superficial temporal and maxillary veins join in the substance of parotid gland.

On leaving the parotid gland, it divides into anterior and posterior divisions.

Facial Vein is joined by the anterior division of the retromandibular vein, and drains into the internal jugular vein.
2- Anterior Jugular Vein

✓ Begins just below the chin
✓ Runs down the neck close to the midline
✓ Just above the suprasternal notch, the veins of the two sides are united by a transverse trunk called the **jugular arch**
✓ Drains into external jugular vein
Cutaneous Nerves of the neck

**Back:** is supplied segmentally by posterior rami of cervical nerves 2 to 5

*Remember Greater occipital nerve (C2) supplies the back of the scalp*

**Front and sides:** is supplied by anterior rami of cervical nerves 2 to 4 through branches of cervical plexus

The first cervical nerve has no cutaneous branch
Cervical plexus

The **cervical plexus** is formed by the anterior rami of C1-C4

Branches:
1- **Cutaneous nerves** emerge from the posterior border of sternocleidomastoid and visible on posterior triangle
2- **Superior and inferior roots of ansa cervicalis** (C1-C3): innervates the infrahyoid muscles
3- **Phrenic nerve** (C3-C5)
Cutaneous branches of Cervical plexus

The lesser occipital nerve (C2): supply the skin over the lateral part of the occipital region and the medial surface of the auricle (upper half)

The great auricular nerve (C2 and 3): supply the skin over the angle of the mandible and on both surfaces of the auricle (lower half)

The transverse cervical nerve (C2 and 3): supply the skin on the anterior and lateral surfaces of the neck, from the body of the mandible to the sternum

The supraclavicular nerves (C3 and 4) descend across the side of the neck down to the level of the second rib. The medial supraclavicular nerve crosses the medial end of the clavicle and supplies the skin as far as the median plane. The intermediate supraclavicular nerve crosses the middle of the clavicle and supplies the skin of the chest wall. The lateral supraclavicular nerve crosses the lateral end of the clavicle and supplies the skin over the shoulder and the upper half of the deltoid muscle and the posterior aspect of the shoulder as far down as the spine of the scapula
Supraclavicular nerves are important clinically, because pain may be referred along them from the phrenic nerve (C3C4C5) (gallbladder disease).

Sensory cutaneous branches of cervical plexus emerge at the posterior border of sternocleidomastoid muscle (Erb's point)
Cutaneous branches of Cervical plexus

- Lesser occipital nerve (C2)
- Great auricular nerve (C2 and 3)
- Transverse cervical nerve (C2 and 3)
- Supraclavicular nerve (C3 and 4)
Transverse cervical nerve (C2 and 3)

Great auricular nerve (C2 and 3)

Lesser occipital nerve (C2)

Transverse cervical nerve (C2 and 3)
Ansa cervicalis

✓ A branch from C1 joins the hypoglossal nerve. Some of these C1 fibers later leave the hypoglossal as the **descending hypoglossi** which unites with the **descending cervicalis** nerve (C2 and 3) to form the **ansa cervicalis**.

✓ The first, second, and third cervical nerve fibers within the **ansa cervicalis** supply:
1. Omohyoid
2. Sternohyoid
3. Sternothyroid

✓ Other C1 fibers within the hypoglossal nerve leave it as the nerve to the thyrohyoid and geniohyoid.

Ansa cervicalis innervates the infrahyoid muscles except thyrohyoid (C1).
Phrenic nerve (C3C4C5) supplies the diaphragm
Muscular branches of Cervical plexus

- C1
- C2
- C3
- C4
- C5

- Hypoglossal nerve
- Geniohyoid
- Thyrohyoid
- Omohyoid
- Sternohyoid
- Sternothyroid

- Phrenic nerve
Deep cervical fascia is organized into several distinct layers:

1- Investing layer: surrounds all structures in the neck

2- Prevertebral layer: surrounds the vertebral column and the muscles around it

3- Pretracheal layer: encloses the viscera of the neck

4- Carotid sheaths: receive contribution from the other three layers
   Surround neurovascular bundles on the side of the neck
Neck compartments

**Visceral compartment**: contains parts of digestive and respiratory systems and several endocrine glands

**Vertebral compartment**: contains cervical vertebrae, spinal cord, cervical nerves and vertebral muscles

**Two vascular compartments**: contain major blood vessels and vagus nerve
Investing layer splits to enclose sternocleidomastoid and trapezius muscles
Encloses also infrahyoid muscles
Thyroid gland
Trachea
Thyroid cartilage
Thyroid gland
Trachea
Pretracheal layer surrounds trachea, esophagus and thyroid gland.
Pretracheal layer posterior to the pharynx is called **Buccopharyngeal fascia**

The retropharyngeal space is a potential space of the head and neck, bounded by the buccopharyngeal fascia
**Carotid sheath** is a column of fascia (from base of skull to thoracic cavity) that surrounds:
1. Common carotid artery
2. Internal carotid artery
3. Internal jugular vein
4. Vagus nerve
1: investing layer
2: trapezius
3: sternomastoid
4: prevertebral layer
5: pretracheal layer
6: carotid sheath
The fascial spaces:
- They are potential spaces filled with loose connective tissue.
- These spaces can provide a conduit for the spread of infections from the neck to the mediastinum.
Common Carotid Artery

- Right common carotid artery arises from brachiocephalic artery behind the right sternoclavicular joint
- Left common carotid artery arises from arch of aorta in superior mediastinum
- The common carotid artery runs upward through the neck under cover of sternocleidomastoid

At the upper border of the thyroid cartilage it divides into external and internal carotid arteries
External Carotid Artery

- Is one of the terminal branches of the common carotid artery
- Supplies structures in the neck, face, scalp, tongue and the maxilla
- It lies outside the carotid sheath
- Begins at the level of the upper border of the thyroid cartilage
- Terminates in the substance of the parotid gland behind the neck of the mandible by dividing into the superficial temporal and maxillary arteries
Branches of External Carotid Artery

1. Superior thyroid artery
2. Ascending pharyngeal artery
3. Lingual artery
4. Facial artery
5. Occipital artery
6. Posterior auricular artery
7. Maxillary artery
8. Superficial temporal artery

Some American Ladies Find Our Petra So Magnificent
1- Superior thyroid artery
2- Lingual artery
3- Facial artery
4- Ascending pharyngeal artery
5- Occipital artery
6- Posterior auricular artery
Branches of External Carotid Artery
Internal jugular vein

- Starts as a continuation of sigmoid sinus
- Leaves the skull through jugular foramen
- Descends through the neck **in carotid sheath**
- Ends by joining the subclavian vein behind the medial end of clavicle to form brachiocephalic vein
- Has a dilatation at its upper end called the superior bulb and another near its termination called the inferior bulb

**A central venous catheter** (central line) is a catheter placed into a large vein. Catheters can be placed in internal jugular vein.
The internal jugular vein is closely related to the deep cervical lymph nodes.