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1. SCALP

The scalp consists of skin and subcutaneous tissue that cover the neurocranium. It extends from the supraciliary arches anteriorly. It extends posteriorly to the external occipital protuberance and superior nuchal lines. Laterally it continues inferiorly to the zygomatic arch. The scalp is a multilayered structure with five layers. These layers can be defined by the word itself. The scalp is a multilayered structure with five layers that can be defined by the word itself:

1) S-skin
2) C-connective tissue (dense)
3) A-aponeurotic layer
4) L-loose connective tissue
5) P-pericranium

The epicranius muscle is formed by two muscles. They are occitofrontalis and temporoparietalis. The occipitofrontalis is a flat muscle with two heads. These are occipital and frontal heads (bellies). They share a common tendon. This tendon is called epicranial aponeurosis. A more common name for it is “Galea aponeurotica”. Galea aponeurotica is a wide aponeurosis. It connects the two heads.

The scalp has a rich blood supply. The arteries anastomose freely with adjacent arteries and across the midline with the contralateral artery. The arterial walls are firmly attached to the dense connective tissue in which they are embedded, limiting their ability to constrict when cut. Consequently, bleeding from scalp wounds is profuse. The arterial supply is from the external carotid arteries and internal carotid arteries.

Facial artery is a branch of external carotid artery. It provides the major arterial supply to the face. The other two arteries of the face are: superficial temporal artery (smaller terminal branch of the external carotid artery) and transverse facial artery (a branch of the superficial temporal artery).

Facial veins provide the primary superficial drainage of the face. The facial vein drains directly or indirectly into the internal jugular vein (IJV). The retromandibular vein is a deep vessel of the face formed by the union of the superficial temporal vein and the maxillary vein. The retromandibular vein divides into an anterior branch that unites with the facial vein and a posterior branch that joins the posterior auricular vein to form the external jugular vein. This vein empties into the subclavian vein in the neck.

CN VII, the facial nerve, has both a motor root and a sensory/parasympathetic root. The motor root of CN VII supplies the muscles of facial expression, including the superficial muscle of the neck (platysma), auricular muscles, scalp muscles.

The trigeminal nerve (CN V) originates as two roots: motor and sensory. The sensory root of CN V consists of the neurons located in a sensory ganglion (trigeminal ganglion; Gasserian ganglion, or semilunar
ganglion, or Gasser's ganglion). CN V is the sensory nerve for the face and the motor nerve for the muscles of mastication.

The peripheral processes of the neurons of the trigeminal ganglion constitute three divisions of the nerve: the ophthalmic nerve (CN V1), the maxillary nerve (CN V2), and the sensory component of the mandibular nerve (CN V3). These nerves are named according to their main areas of termination: the eye, maxilla, and mandible, respectively.

### 3. TEMPORAL REGION

The temporal region is the region of the head that includes the lateral area of the scalp and the deeper soft tissues overlying the temporal fossa of the cranium, superior to the zygomatic arch.
1) Temporal muscle
2) Temporal fascia (overlies the temporalis muscle)
3) Superficial temporal artery (br. of external carotid)
4) Superficial temporal vein (unites with the maxillary vein to form the retromandibular vein)
5) Auriculotemporal nerve (br. of mandibular nerve which is a branch of the trigeminal nerve)

TMJ movements are produced chiefly by the muscles of mastication. These four muscles (temporal, masseter, and medial and lateral pterygoid muscles) are all innervated by the, the (motor root of the) mandibular nerve (CN V3).

### 4. MUSCLES OF MASTICATION

TMJ movements are produced chiefly by the muscles of mastication. These four muscles (temporalis, masseter, and medial and lateral pterygoid muscles) are all innervated by the (motor root of the) mandibular nerve (CN V3).

Table 1. Muscles of mastication

<table>
<thead>
<tr>
<th>Muscle</th>
<th>Origin</th>
<th>Insertion</th>
<th>Innervation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masseter</td>
<td>Zygomatic bone &amp; Zygomatic arch</td>
<td>Lateral surface of ramus of mandible</td>
<td>Masseteric nerve - mandibular nerve [V₃]</td>
<td>Elevation of mandible (closes the mouth) and slight protraction</td>
</tr>
<tr>
<td>Temporalis</td>
<td>Temporal fossa &amp; temporal fascia</td>
<td>Coronoid process of mandible &amp; ramus of mandible</td>
<td>Deep temporal nerves - mandibular nerve [V₃]</td>
<td>Elevation of mandible (closes the mouth) and retraction of mandible</td>
</tr>
<tr>
<td>Medial pterygoid</td>
<td>Has two head: Deep &amp; Superficial heads</td>
<td>Medial surface of mandible near angle</td>
<td>Nerve to medial pterygoid from the mandibular nerve [V₃]. Nerve to lateral pterygoid directly from the anterior trunk of the mandibular nerve [V₂] or from the buccal branch</td>
<td>Elevation of mandible (closes the mouth) and slight protraction</td>
</tr>
<tr>
<td>Lateral pterygoid</td>
<td>Upper head: infratemporal fossa</td>
<td>Capsule of TMJ and to the pterygoid fovea on the neck of mandible</td>
<td>Masseteric nerve from the anterior trunk of the mandibular nerve [V₃]</td>
<td>Depression of mandible (opens the mouth) and protraction, side-to-side movement of the mandible</td>
</tr>
</tbody>
</table>

### 5. NECK

The neck is a transitional area between the base of the cranium superiorly and the clavicles inferiorly. Neck is a passageway for many important structures extending between the head and the trunk such as the larynx and the thyroid and parathyroid glands.

The neck joins the head to the trunk and limbs. It serves as a major conduit for structures passing between them. The neck extends anteriorly from the lower border of the mandible to the upper surface of the manubrium of sternum, and posteriorly from the superior nuchal line on the occipital bone of the skull to the intervertebral disc between the CVII and TI vertebrae.
The skeleton of the neck is formed by the cervical vertebrae, hyoid bone, manubrium of the sternum, and clavicles. These bones are parts of the axial skeleton except the clavicles, which are part of the appendicular skeleton.

The fascia of the neck has a number of unique features. Structures in the neck are surrounded by a layer of subcutaneous tissue (superficial fascia) and are compartmentalized by layers of deep cervical fascia. Between the fascial layers in the neck are spaces that may provide a conduit for the spread of infections from the neck to the mediastinum.

Three spaces could be involved in this process:
- pretracheal space
- retropharyngeal space
- the third space is within the prevertebral layer

The cervical viscera are disposed in three layers, named for their primary function. Superficial to deep, they are the:
- Endocrine layer: the thyroid and parathyroid glands.
- Respiratory layer: the larynx and trachea.
- Alimentary layer: the pharynx and esophagus

The neck is divided into four major regions based on the usually visible and/or palpable borders of the large and relatively superficial sternocleidomastoid (SCM) and trapezius muscles.

1. Sternocleidomastoid region: The sternocleidomastoid (SCM) muscle is a key muscular landmark in the neck, forming the sternocleidomastoid region.

2. Anterior & lateral cervical regions: The SCM visibly divides each side of the neck into anterior & lateral cervical regions (anterior and posterior triangles).

3. Posterior cervical region: The region posterior to the anterior borders of (i.e., corresponding to the area of) the trapezius.

The SCM is a key muscular landmark in the neck, forming the sternocleidomastoid region. The SCM visibly divides each side of the neck into the anterior and lateral cervical regions (anterior and posterior triangles). The region posterior to the anterior borders of (i.e., corresponding to the area of) the trapezius is the posterior cervical region.

The floor of the lateral cervical region is usually formed by the prevertebral fascia overlying four muscles: splenius capitis, levator scapulae, middle scalene (L. scalenus medius), and posterior scalene (L. scalenus posterior). The scalene muscles move the first or second rib up. They help inspiration.

The anterior cervical region is subdivided into four smaller triangles by the digastric and omohyoid muscles: the single submental triangle and 3 small paired triangles—submandibular, carotid, and muscular.

In the anterolateral part of the neck, the hyoid provides attachments for the suprathyoid muscles superior to it and the infrahyoid muscles inferior to it. These hyoid muscles steady or move the hyoid and larynx. They are divided into suprathyoid and infrahyoid muscles.

**SUPRAPHYOID MUSCLES**

1) stylohyoid
2) digastric
3) mylohyoid
4) geniohyoid

These muscles are important in moving the hyoid bone and larynx up when talking and swallowing.

**INFRAHYOID (STRAP) MUSCLES**

1) omohyoid (superficial plane)
2) sternohyoid (superficial plane)
3) thyrohyoid (deep plane)
4) sternothyroid (deep plane)

Table 2. Innervations, and functions of the suprathyoid muscles

<table>
<thead>
<tr>
<th>Muscle</th>
<th>Innervation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stylohyoid</td>
<td>Facial nerve [VII]</td>
<td>Pulls hyoid bone upward</td>
</tr>
<tr>
<td>Digastric</td>
<td>Mandibular nerve [V₃]</td>
<td>Opens mouth by lowering mandible; raises hyoid bone</td>
</tr>
<tr>
<td>-Anterior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-belly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Posterior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-belly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mylohyoid</td>
<td>Mandibular nerve [V₃]</td>
<td>Support and elevation of floor of mouth; elevation of hyoid</td>
</tr>
<tr>
<td>Geniohyoid</td>
<td>Branch from anterior ramus of C1 (carried along the hypoglossal nerve [XII])</td>
<td>Fixed mandible elevates and pulls hyoid bone forward; fixed hyoid bone pulls mandible downward and inward</td>
</tr>
</tbody>
</table>

Table 3. Innervations, and functions of the infrahyoid muscles.

<table>
<thead>
<tr>
<th>Muscle</th>
<th>Innervation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omohyoid</td>
<td>Ansa cervicalis</td>
<td>Depresses and fixes hyoid bone</td>
</tr>
<tr>
<td>Sternohyoid</td>
<td>Ansa cervicalis</td>
<td>Depresses hyoid bone after swallowing</td>
</tr>
<tr>
<td>Thyrohyoid</td>
<td>Fibers from anterior ramus of C1 carried along hypoglossal nerve [XII]</td>
<td>Depresses hyoid bone, but when hyoid bone is fixed raises larynx</td>
</tr>
<tr>
<td>Sternothyoid</td>
<td>Ansa cervicalis</td>
<td>Draws larynx (thyroid cartilage) downward</td>
</tr>
</tbody>
</table>

6. VESSELS IN THE NECK

ARTERIES IN THE ANTERIOR CERVICAL REGION

1) Common carotid artery
2) Internal carotid artery
3) External carotid artery

The common carotid artery arises from the brachiocephalic trunk on the right side and from the arch of aorta on the left side. Each common carotid artery ascends within the carotid sheath with the IJV and vagus nerve to the level of the superior border of the thyroid cartilage. Here, each common carotid artery terminates by dividing into the internal and external carotid arteries. The internal carotid artery has no branches in the neck; the external carotid has several.

**Internal carotid artery**

The internal carotid arteries are direct continuations of the common carotids superior to the origin of the external carotid artery, at the level of the superior border of the thyroid cartilage. The internal carotid arteries enter the cranium and become the main arteries of the brain and structures in the orbits. No named branches arise from the internal carotid arteries in the neck. The internal carotid artery supplies the brain together with the vertebral artery which is a branch of the subclavian artery.

**External carotid artery**

The external carotid arteries supply most structures external to the cranium; the orbit and the part of the forehead and scalp. The external carotid artery extends to the level of the parotid gland. Each external carotid artery terminates by dividing into two branches within the tissue of the parotid gland. These two terminal branches are the maxillary artery and the superficial temporal artery. Before these terminal branches, six arteries arise from the external carotid artery. Three of them are below: Superior thyroid artery: the most inferior of the three anterior branches of the external carotid artery.

Lingual artery: arises from the anterior aspect of the external carotid artery disappears deep to the hyoglossus muscle, giving branches to the posterior tongue. It then bifurcates into the deep lingual and sublingual arteries.

Facial artery: arises anteriorly from the external carotid artery, either in common with the lingual artery or immediately superior to it.
**Carotid Sheath**
The *carotid sheath* is a tubular fascial investment that extends from the cranial base to the root of the neck. The carotid sheath contains:
- Common and internal carotid arteries
- Internal jugular vein
- Vagus nerve (CN X)
- Some deep cervical lymph nodes
- Carotid sinus nerve
- Sympathetic nerve fibers (carotid periarterial plexuses)

**VEINS IN THE ANTERIOR CERVICAL REGION**
1) Internal jugular vein (IJV) & its tributaries: drain the structures in the cranial cavity and most of the neck.
2) Anterior jugular veins: are formed by the union of veins in the submental and submandibular regions. They lie down in the anterior region of the neck close to the midline. They drain into the external jugular veins or subclavian veins.

**ARTERIES IN THE ROOT OF THE NECK**
1) Brachiocephalic trunk
2) Subclavian artery

**VEINS IN THE ROOT OF THE NECK**
1) External jugular vein (EJV)
2) Anterior jugular vein (AJV)
3) Subclavian vein
4) Internal jugular vein (IJV)

**ARTERIES IN THE LATERAL CERVICAL REGION**
1) Lateral branches of the thyrocervical trunk
2) Third part of the subclavian artery
3) Part of the occipital artery (branch of external carotid artery)

**VEINS IN THE LATERAL CERVICAL REGION**
1) External jugular vein (EJV)
2) Subclavian vein

**7. NERVES THE NECK**

**NERVES IN THE ANTERIOR CERVICAL REGION**
Branches of glossopharyngeal (CN IX) & vagus (CN X) nerves
submandibular & carotid triangles
CN IX primarily related to the tongue and pharynx.
CN X pharyngeal, laryngeal, and cardiac branches in the neck

**NERVES IN THE LATERAL CERVICAL REGION**
Spinal accessory nerve (CN XI)
Enters to the region @ junction of sup. & middle 1/3 of post. border of SCM.
Roots of brachial plexus between anterior & middle scalene muscles
5 rami 3 TRUNKS descend inferolaterally in the region.
The spinal accessory nerve (CN XI) passes deep to the SCM, supplying it before entering the lateral cervical region at or inferior to the junction of the superior and middle thirds of the posterior border of the SCM.
The roots of the brachial plexus (anterior rami of C5-C8 and T1) appear between the anterior and the middle scalene muscles.

**NERVES IN THE ROOT OF THE NECK**

(1) vagus nerves
(2) phrenic nerves
(3) the sympathetic trunks.

**8. CERVICAL PLEXUS**

The **cervical plexus** lies anteromedial to the levator scapulae and middle scalene muscles and deep to the SCM. The anterior rami (branches) of C1-C4 spinal nerves form the roots of the cervical plexus. The cervical plexus supplies the skin and the muscles of the head, the neck, and the shoulders.  

**Ansai cervicalis** is embedded in the carotid sheath and lower part of the larynx  
**Superior root:** continuation of the descending branch of the hypoglossal nerve (derived from C1 root).  
**Inferior root:** derived from C2 and C3 spinal nerves