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MATRIC: 17/MHS01/132

LEVEL: 300L

1.TONGUE

OUTLINE

- **STRUCTURE**
- **MUSCLES OF THE TONGUE**
- **INNERVATION OF THE TONGUE**
- **VASCULATURE**
- **CLINICAL ANATOMY**

STRUCTURE OF THE TONGUE

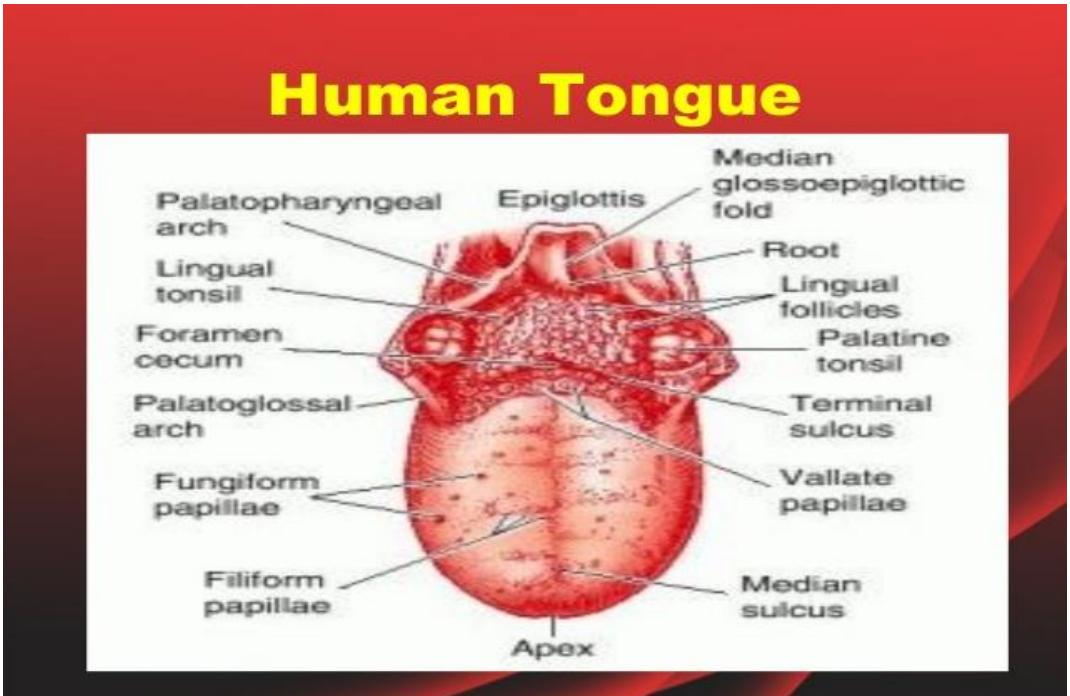
The tongue is a **mobile, boneless, muscular** organ that is covered with mucous membrane. It is located partly in the oral cavity and oropharynx. It functions in the following activities: speech and articulation, deglutition(swallowing), mastication, taste and oral cleansing.

PARTS AND SURFACES OF THE TONGUE

The tongue has 3 parts:

a. Root
b. Body; and
c. Apex.

a. The root is the attached posterior portion, extending between the mandible, hyoid and the nearly vertical posterior surface of the tongue. It is immobile compared to the remaining parts.
b. The body is the anterior 2/3 portion between the root and apex
c. The apex(tip) of the tongue is the anterior end of the body, which rests against the incisor teeth.

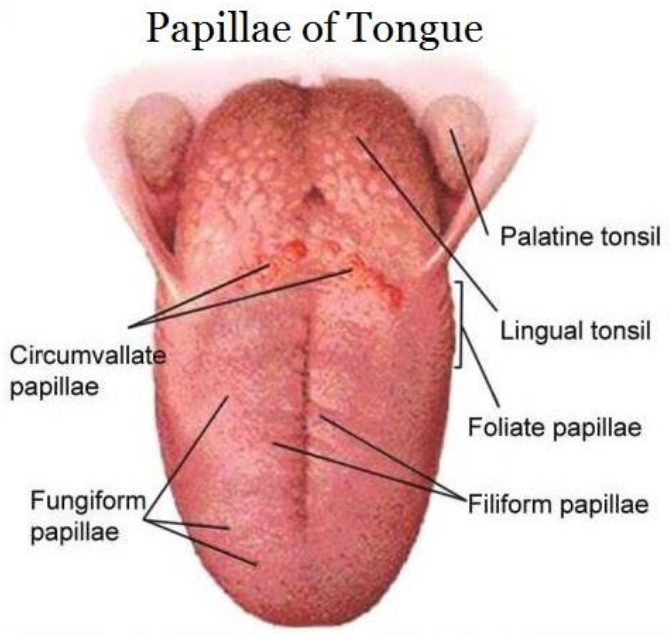


SURFACES

The tongue possesses two (2) surfaces:

1. The superior and posterior 'top' of the tongue, DORSUM OF THE TONGUE.
2. The INFERIOR SURFACE OF THE TONGUE which rests against the floor of the mouth

- The dorsum of the tongue is characterized by a "V-shaped" groove**, the terminal sulcus of the tongue**, which points posteriorly to the *foramen cecum.* The terminal sulcus divides the dorsum of the tongue transversely into:
  a. Presulcal, anterior part in the oral cavity
  b. Postsulcal, posterior part in the oropharynx.
- The mucosa of the anterior part is relatively thin and closely attached to the underlying muscle. It possesses a rough texture due to its numerous small lingual papillae**:**
  1.VALLATE PAPILLAE: They are large, V-shaped and flat-topped and lie anterior to the terminal sulcus. They are surrounded by deep circular trenches with taste buds on the walls.
  2. FOLIATE PAPILLAE: These are small lateral folds on the lingual mucosa. Poorly developed in humans.
  3. FILIFORM PAPILLAE: They are long, numerous scaly, conical projections that contain afferent nerve endings. They are arranged in V-shaped rows parallel to the terminal sulcus except at the apex where they are transversely arranged.
  4. FUNGIFORM PAPILLAE: They are mushroom-shaped, pink or red spots scattered among the filiform papillae, More numerous at the apex and margins of the tongue.
  NOTE: ***The vallate, foliate and most of the fungiform papillae contain taste receptors in the taste buds***



- The mucosa of the posterior part of the tongue is thick and mobile. Devoid of lingual papillae, it has an irregular cobblestone appearance due to the presence of **lymphoid nodules.** The lymphoid nodules are collectively called **LINGUAL TONSIL.**

- The inferior surface of the tongue is covered with a thin, transparent mucous membrane. The surface is connected to the floor of the mouth by a midline fold**, FRENULUM OF THE TONGUE.** The frenulum allows the anterior part of the tongue to move freely. There is a deep lingual vein found at each side of the of the frenulum. At the base of each side of the frenulum is also found the **SUBLINGUAL CARUNCLE** which has the opening of the submandibular duct from the submandibular salivary gland.

MUSCLES OF THE TONGUE

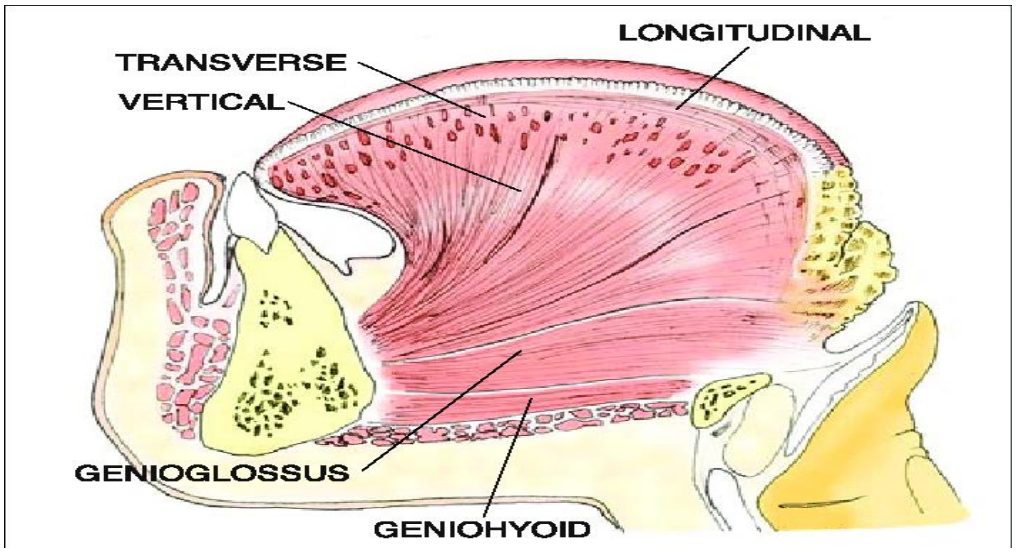
The tongue has 8 muscles in number which are classified in the following forms:

1. Intrinsic muscle
2. Extrinsic muscle
    - The intrinsic and extrinsic muscles are separated by a median fibrous **lingual septum.**

1. **INTRINSIC MUSCLE**: These muscles alter the shape and size of the tongue, e.g., in tongue rolling. They are four pairs in number:

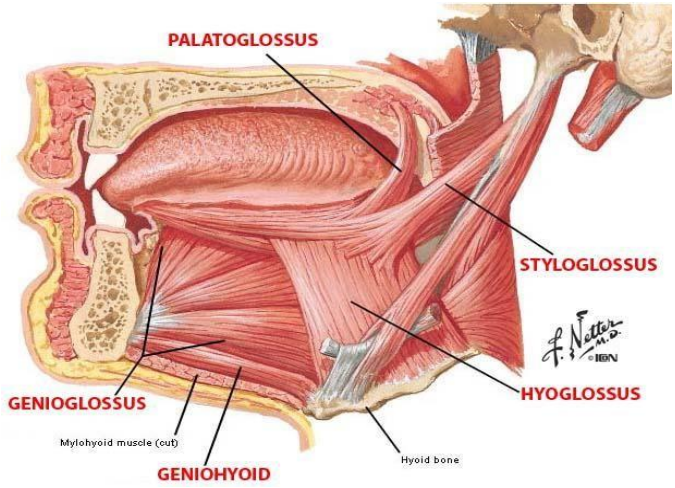
- Superior longitudinal
- Inferior longitudinal
- Transverse
- Vertical muscles of the tongue.

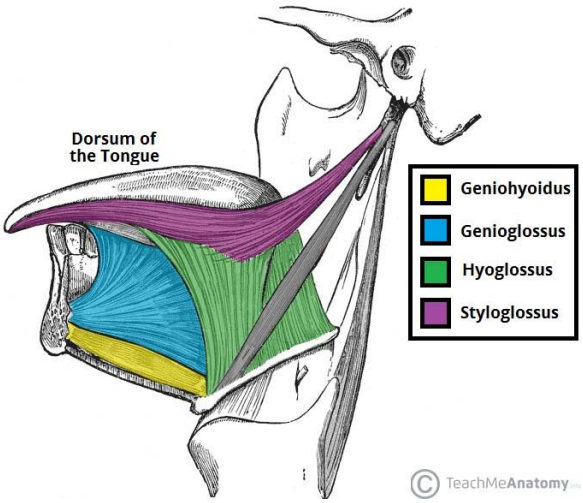
- Superior and inferior longitudinal make the tongue short and thick and retract the protruded tongue.
- Transverse and vertical muscles make the tongue long and narrow and help protrude the tongue from the open mouth.



- **EXTRINSIC MUSCLE**: They alter the position of the tongue. They originate outside the tongue and attach to it. They are:

- Genioglossus
- Styloglossus
- Hyoglossus
- Palatoglossus





INNERVATION

MUSCULAR INNERVATION

All of the intrinsic and extrinsic muscles of the tongue are innervated by the hypoglossal nerve (CNXII) except Palatoglossus, which has Vagus innervation (CN X). The palatoglossus is a palatine muscle that is supplied by the pharyngeal plexus.

MUCOSAL INNERVATION

- For general sensation in the anterior 2/3, the lingual branch of the trigeminal nerve (CN V3) is responsible.
- For taste sensations in anterior 2/3 excluding the vallate papillae, the chorda tympani branch of the facial nerve (CN VII) is responsible.
- For the posterior 1/3, touch and taste are supplied by the glossopharyngeal nerve (CN 1X).

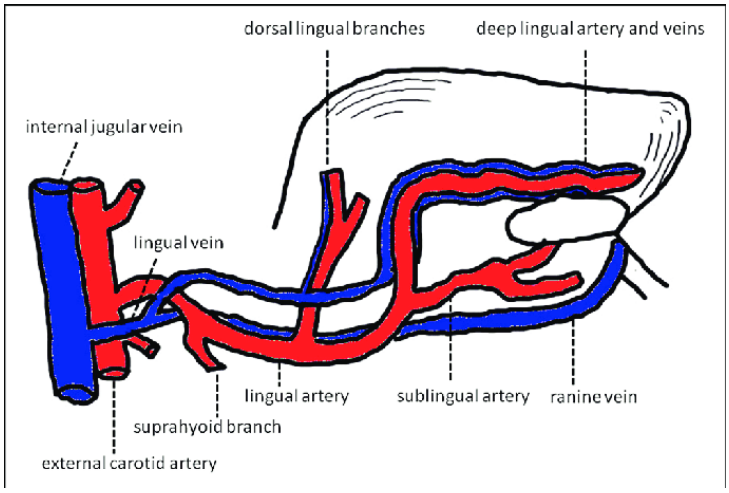
VASCULATURE

- ❖ The main artery of the tongue is the LINGUAL ARTERY, a branch of the external carotid artery. It gives off some smaller branches as it passes through the hyoglossus muscle:

a. Dorsal lingual artery, which supplies the root of the tongue
b. Deep lingual artery, which supplies the body of the tongue

- Another branch from the facial nerve, **TONSILLAR ARTERY**, gives some collateral circulation.
- Ascending pharyngeal artery, branch of the external carotid artery. These two branches supply the posterior part of the tongue.

- The venous drainage is through the LINGUAL VEIN, which gives off small branches:
  a. Dorsal lingual vein, which accompanies the lingual artery
  b. Deep lingual vein, which begins at the apex of the tongue, runs posteriorly beside the lingual frenulum to join the sublingual vein.



- The lymphatic drainage:
  1. Anterior two-thirds: Initially into submental and submandibular lymph nodes, which empties into deep cervical nodes.
  2. Posterior 2/3: Directly into the deep cervical lymph nodes.

CLINICAL ANATOMY

1. TONGUE TIE
   Here, there is excess piece of connective tissue, frenulum connecting the tongue to the floor of the mouth due to abnormal ***SCULPTING APOPTOSIS***. It restricts the movement of the tongue causing difficulties with breast-feeding and speech. It is common with varying degrees in children. A ***FRENECTOMY*** can be done to fix it.
2. ADMINISTERING DRUGS
   For drugs to be absorbed quickly, for example, nitroglycerin(vasodilator) for patients with angina pectoris, the pill or spray is put under the tongue where it will dissolve and enter the deep lingual vein in <1 minute.
3. PARALYSIS OF THE GENIOGLOSSUS MUSCLE
   When this muscle is paralyzed, it has the tendency to fall posteriorly, obstructing the airway, posing risk of suffocation.
4. MANDIBULAR FRACTURE

This can lead to hypoglossal nerve (CN XII) injury which would result in paralysis and eventual atrophy of one part of the tongue. The tongue would deviate to the paralyzed side during protrusion.

PARANASAL SINUSES (AIR SINUSES)

- These are air-filled extensions of the respiratory part of the nasal cavity. There are four paired sinuses according to the bone in which they are located:

a. Frontal sinus
b. Ethmoidal sinus
c. Maxillary sinus
d. Sphenoid sinus.

- These sinuses continue to erode into surrounding bones as marked extensions are seen in the crania of older people.
- They drain into openings found in the roof and lateral walls of the nasal cavity.

A. FRONTAL SINUS
They are the most superior in location, found under the forehead and posterior to the superciliary arches and root of the nose. It has two (2) parts; a vertical part in the squamous part of the frontal bone and a horizontal part in the orbital part of the frontal bone. They are variable in size but always triangular in shape. The two of them drain into the nasal cavity via the frontonasal duct, which opens into the hiatus semilunaris on the lateral wall. They are innervated by the branches of the supraorbital nerves (CN V1).

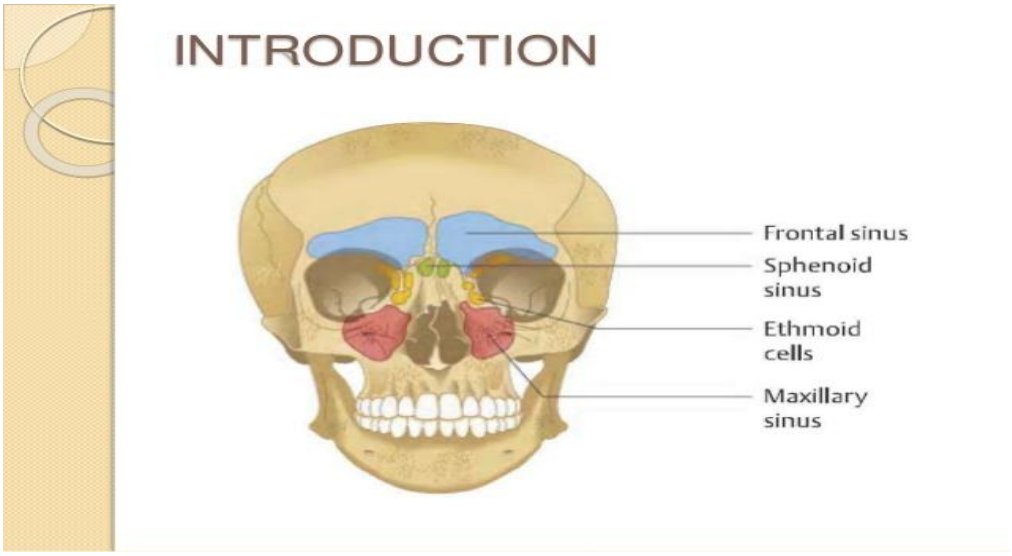
B. SPHENOIDAL SINUS
They are located in the body of the sphenoid at the level of the spheno-ethmoidal recess. They are found more posteriorly and are related superiorly and laterally to the cranial cavity. They drain into the roof of the nasal cavity. The posterior ethmoidal and posterior ethmoidal nerves supply this sinus.
NOTE: The pituitary gland can be surgically accessed via passing through the nasal roof into the sphenoid sinus and through the sphenoid bone.

C. ETHMOIDAL SINUS: They are small invaginations of the mucous membrane of the middle and superior nasal meatus into the ethmoid bone between the nasal cavity and the orbit. There are three of them:
1. Anterior ethmoidal sinus: Drains into the hiatus semilunaris
2. Middle ethmoidal sinus: Drains into the ethmoid bulla
3. Posterior ethmoidal sinus: Superior meatus

D. MAXILLARY SINUS
They are the largest of the paranasal sinuses. It occupies the body of the maxillae and communicate with the middle nasal meatus. It is divided into four parts:
1. APEX: Extends toward, sometimes into the zygomatic bone
2. BASE: Forms the inferior part of the lateral wall of the nasal cavity
3. ROOF: Formed by the floor of the orbit
4. FLOOR: Formed by the alveolar part of the maxilla.

- Each maxillary sinus drains into the middle nasal meatus by the maxillary ostium at the semilunar hiatus.

- **Potential pathway for the spread of infection- fluid draining from the frontal sinus can enter this sinus.**
- ARTERIAL SUPPLY: Superior alveolar branches of the maxillary artery
- INNERVATION: Anterior, middle and posterior superior alveolar nerves of the maxillary nerves.



CLINICALS

SINUSITIS: Since the sinuses are continuous with the nasal cavity, an upper respiratory infection can spread to the sinuses leading to inflammation of the mucosa.