

**Sheet #2**

**Lecture title: The tongue and tonsil**

**Lecture Date: 1-4-2019**

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**Edited by: Ban Aladamat.**

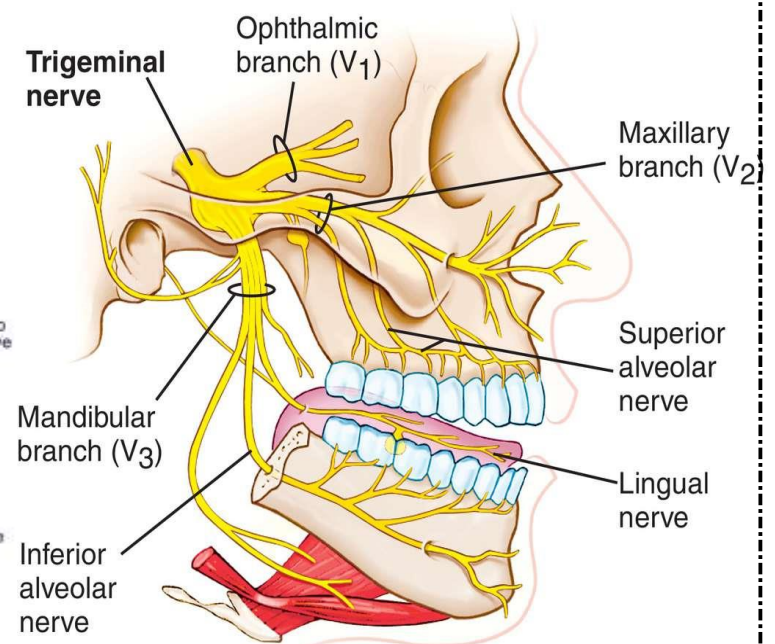
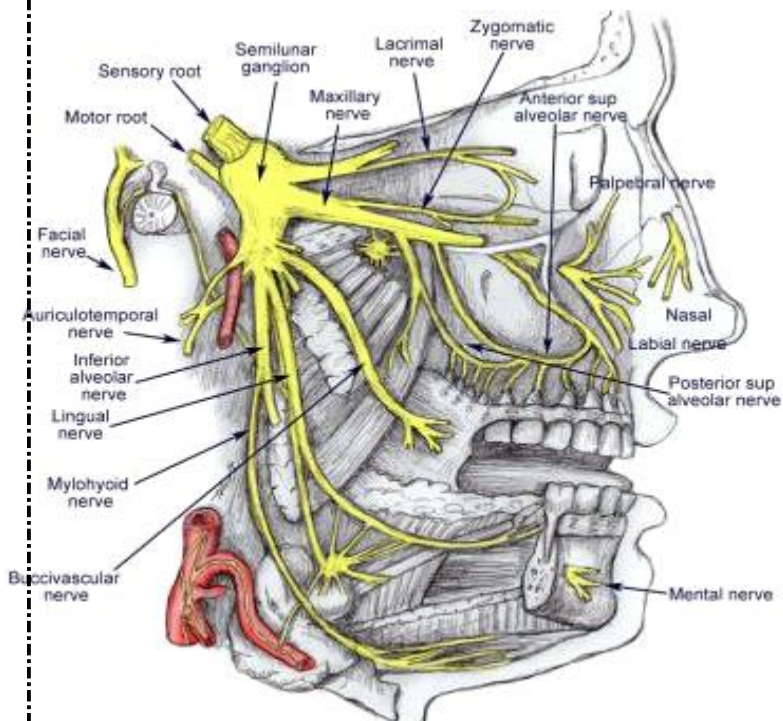
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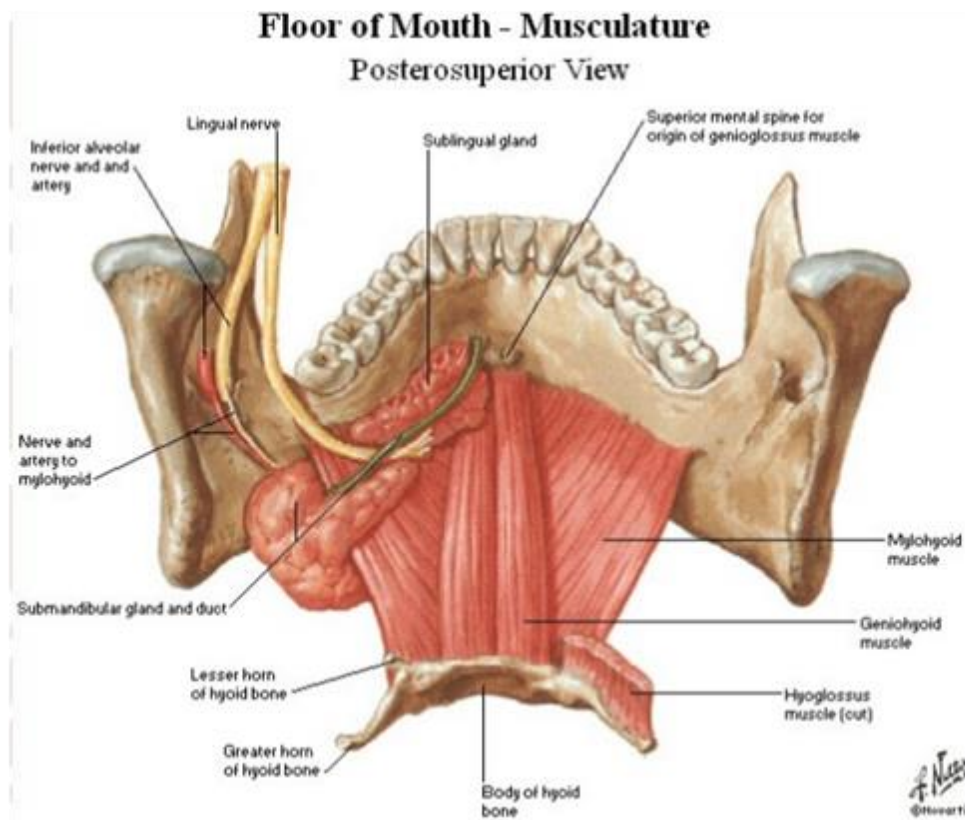
## Nerve supply of the gums:

	Outer Surface		Inner Surface	
	Anterior	Posterior	Anterior	Posterior
<b>Maxillary Gums</b>	Infra orbital nerve	Posterior superior alveolar nerve	Nasopalatine nerve	Greater and lesser palatine nerves
<b>Mandibular Gums</b>	Mental nerve	Buccal branch of mandibular nerve	Lingual nerve (both anterior and posterior)	



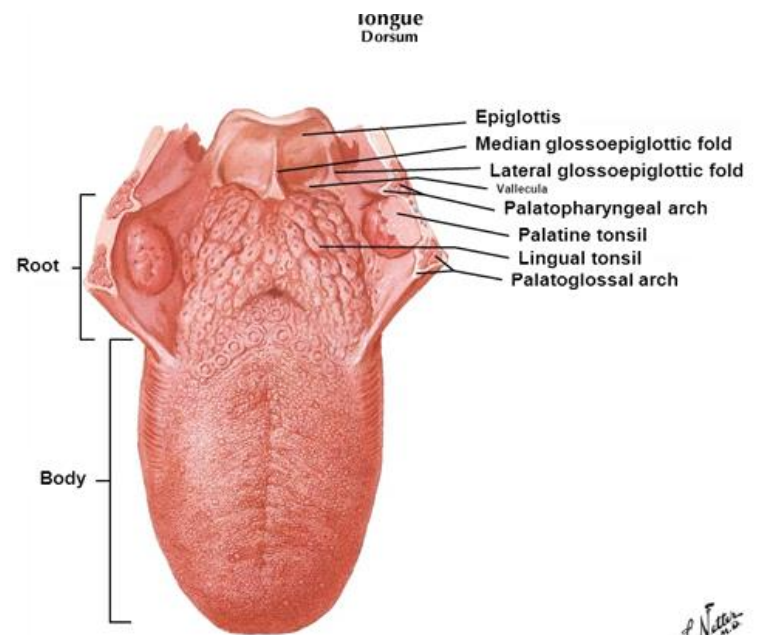
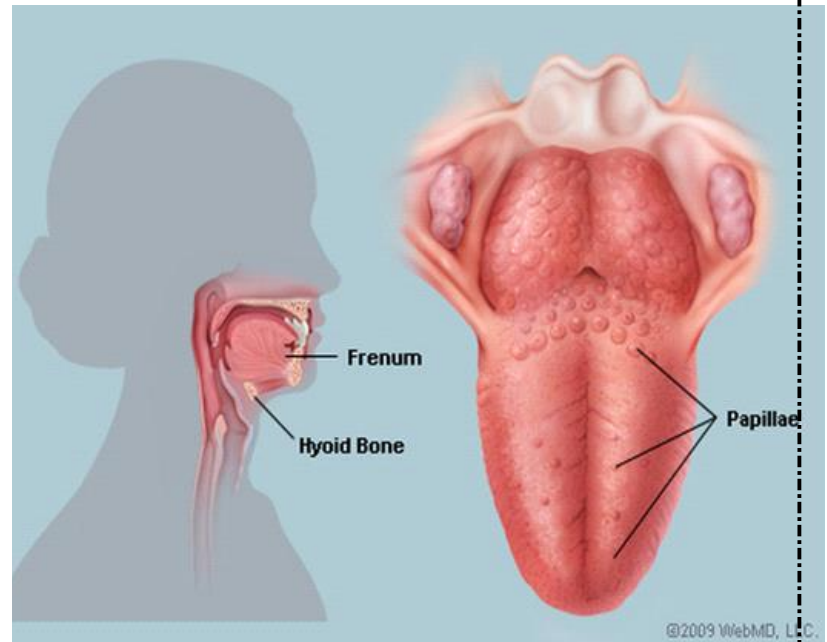
# Tongue and Tonsil

- The floor of the mouth is a diaphragm of muscles located under the tongue.
- This diaphragm is composed of:
  1. Mylohyoid muscle: (paired muscle) originates from mylohyoid line of the mandible and inserts in the body of the hyoid bone. It's innervated by the mylohyoid nerve (a branch of inferior alveolar branch of mandibular nerve). The two mylohyoid muscles unite in a midline raphe.
  2. Geniohyoid muscle: (paired muscle) located superiorly to the mylohyoid muscle. Originates from genial tubercle (inferior mental spine) of mandible and inserts in the hyoid bone. Innervated by the first cervical spinal nerve (C1) carried by hypoglossal nerve.

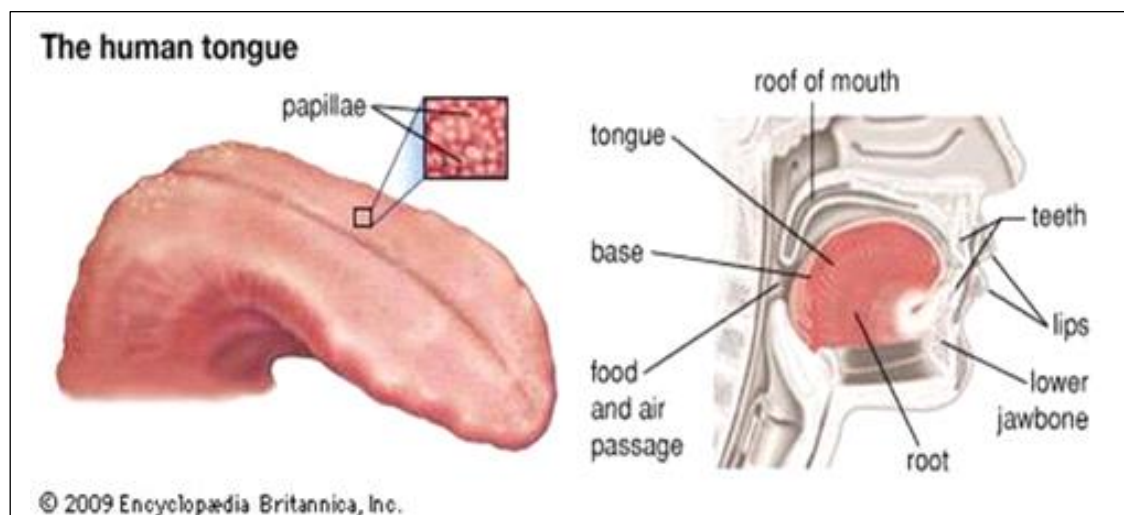


## Tongue:

- An inverted shoe-like organ. Freely mobile, fixed to hyoid and mandible bones. Covered by stratified squamous epithelium (only the dorsal surface is keratinized).
- It occupies partly the oral cavity proper and the oropharynx.
- Covered by mucous membrane that extends to the epiglottis (cartilage part of larynx) forming the median glossoepiglottic fold (ligament) and 2 fossae on both sides of the fold called vallecula {traps foreign bodies}.
- Its dorsal surface has a V-shaped sulcus called sulcus terminalis that divides it into anterior 2/3 and posterior 1/3 and a depression called foramen cecum.
- In front of the sulcus are 8-12 small rounded bodies (protrusions) called circumvallate papillae (taste buds).
- Under the mucous membrane of the posterior 1/3 is a lymphatic tissue called lingual tonsil (On the dorsal surface of the tongue)

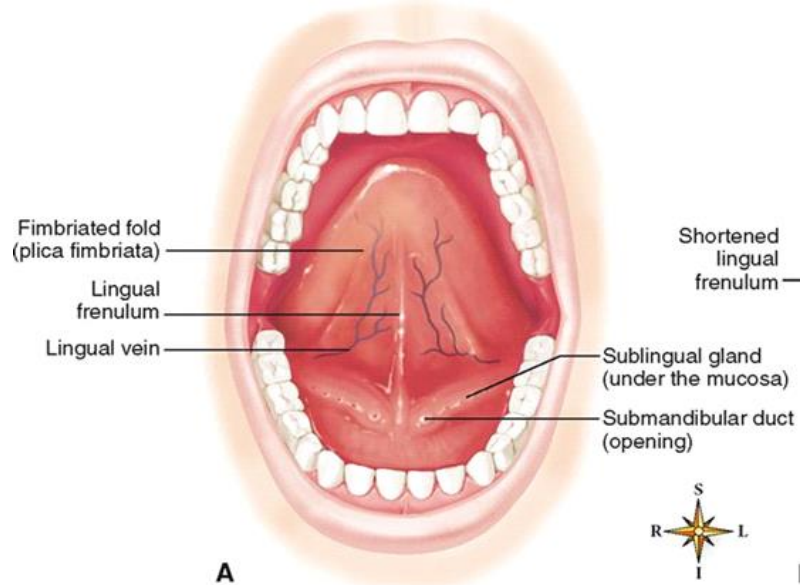


*A. Netter M.D.*



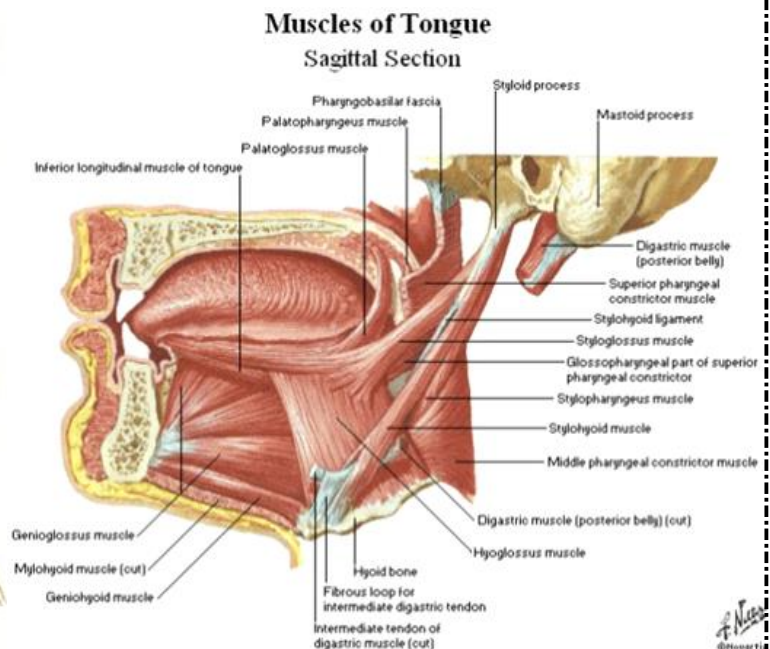
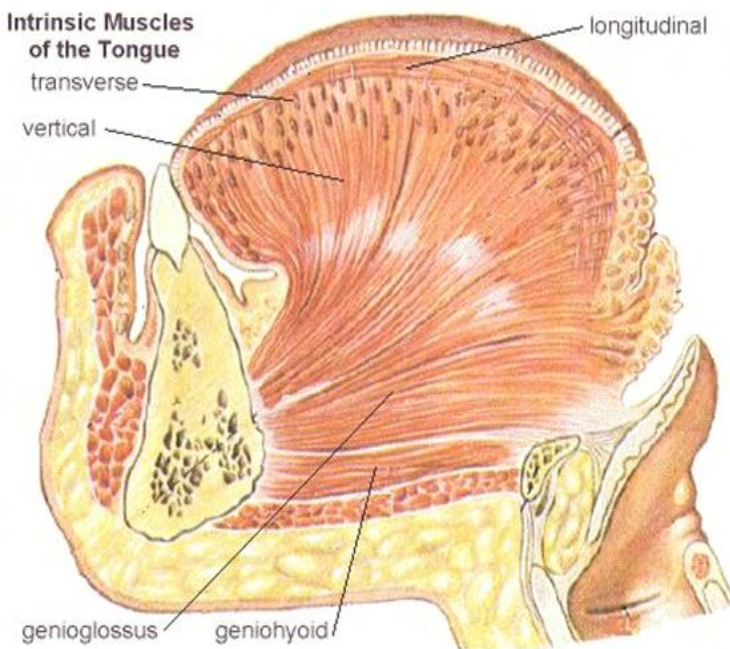


- Tongue is composed of two united halves (right and left). Each has its own muscle and innervations.
- In some congenital abnormalities, the halves do not unite and remain separated.
- If one half is paralyzed, the tongue will deviate to the paralyzed side.
- The mucous membrane underneath the tongue ties it to the floor of the mouth throughout the lingual frenulum.
- Sometimes, the frenulum restricts the tongues' movement by connecting it to the floor of the mouth. The patient is called tongue tied. It can be solved by cutting the frenulum.



## Muscles of the tongue:

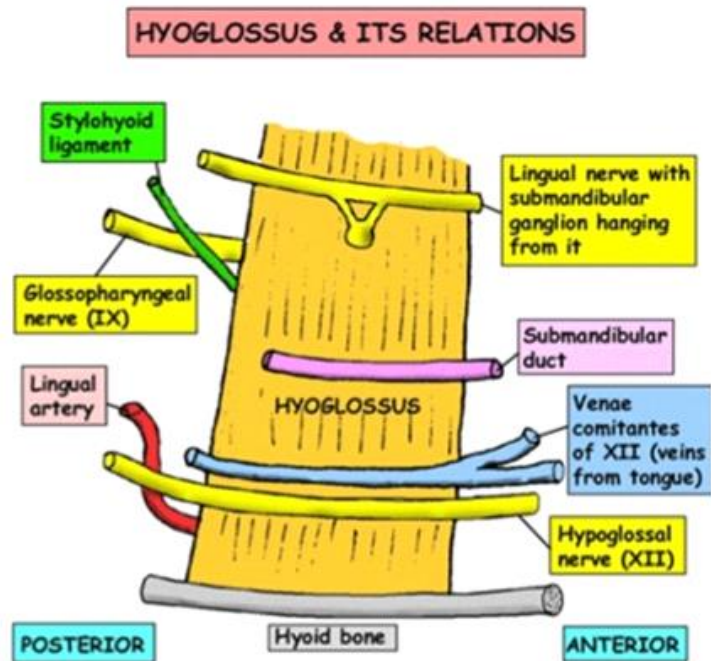
- **Intrinsic muscles:** located within the tongue and control the shape of the tongue
  - 1) Vertical
  - 2) Transverse
  - 3) Longitudinal
- **Extrinsic muscles:** control the position of the tongue.
  1. **Genioglossus muscle:** originates from the superior mental spine and fanning out in all directions. **Actions:** draws the tip back and down and protrudes the tongue.
  2. **Hyoglossus muscle:** originates from greater horn of hyoid bone and inserts in the side of the tongue. **Action:** depression of side of tongue.
  3. **Styloglossus muscle:** originates from styloid process of temporal bone and inserts in the posterior lateral sides of tongue. **Actions:** retraction and elevation of tongue.
  4. **Palatoglossus muscle:** originates from palatine aponeurosis and inserts in the tongue.





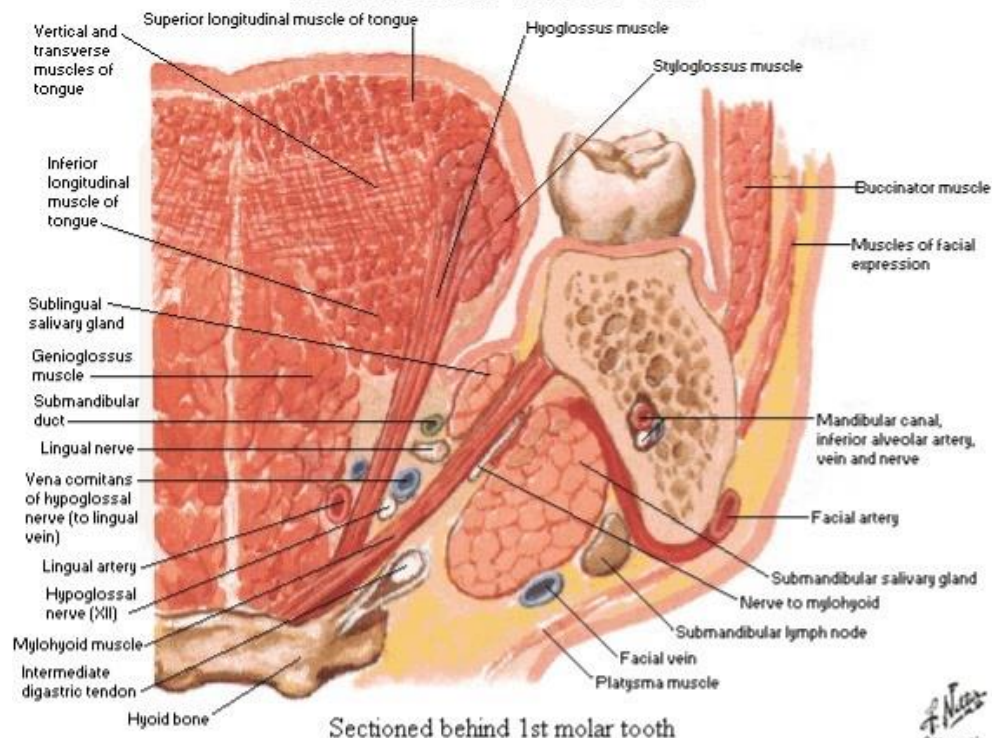
## Hyoglossus relations:

- Laterally: Lingual nerve (with submandibular parasympathetic ganglia), submandibular duct, venae comitantes of hypoglossal nerve and hypoglossal nerve.
- Medially: lingual artery, glossopharyngeal nerve, and styloid ligament.



## **Tongue and Mouth**

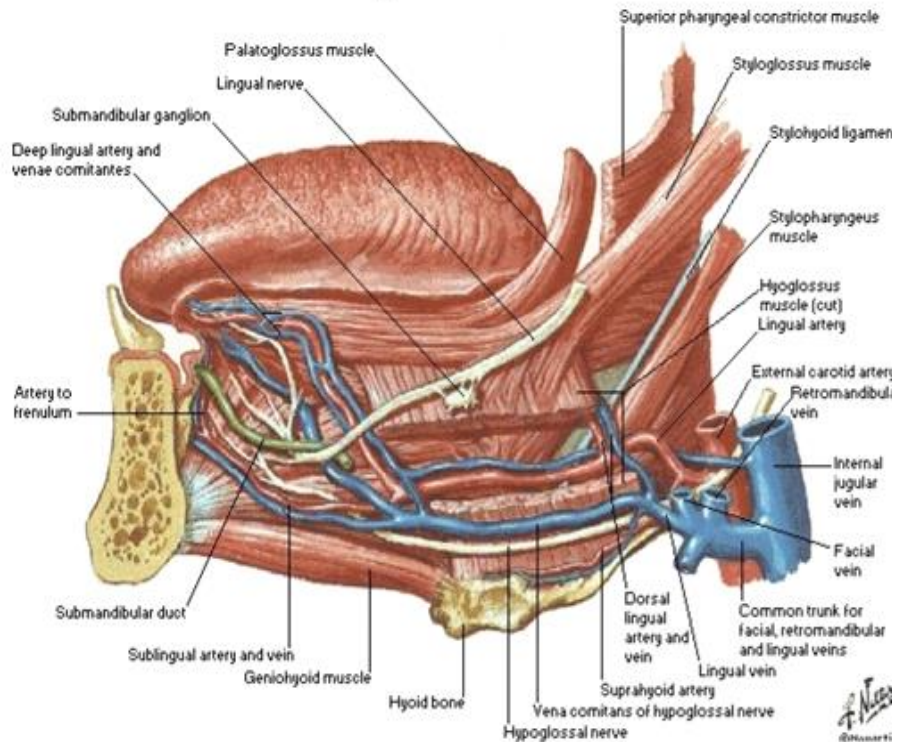
### **Frontal Section - Anterior View**



## Blood supply of the tongue:

- Arteries: Lingual artery and its branches:
  1. Deep lingual artery: supplies the anterior part
  2. Dorsal lingual artery: supplies the posterior part
- Veins: Deep and dorsal lingual veins unite to form lingual vein that joins the facial vein forming the common facial vein that drains into internal jugular vein.

## Tongue and Related Structures Sagittal Section



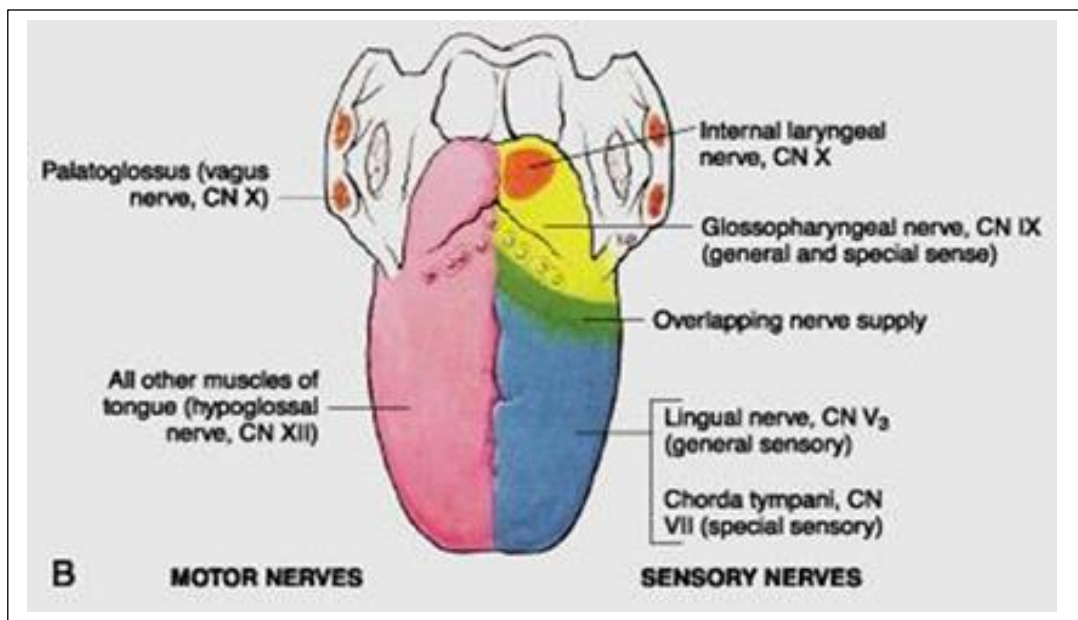
## Innervation:

1. General sensation
2. Taste sensation
3. Autonomic sensation
4. Motor sensation

	Anterior two thirds	Posterior one third
General sensation	By the lingual nerve	Glossopharyngeal nerve
Taste sensation	Chorda tympani "branch of the facial nerve"	Glossopharyngeal nerve

- Parasympathetic: by submandibular ganglia (stimulate secretion)
- Sympathetic: by superior cervical ganglia along lingual artery (inhibit secretion)
- Motor: All muscles of the tongue (both intrinsic and extrinsic) are supplied by the hypoglossal nerve with exception of the Palatoglossus muscle which is supplied by vagus nerve.



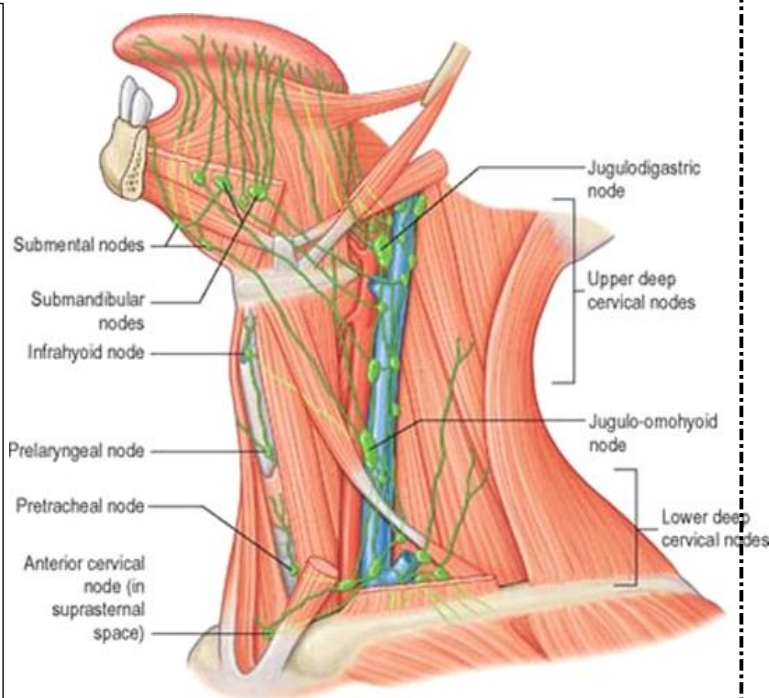


### Lymphatic drainage of the tongue:

1. The tip of the tongue: submental lymph node.
2. Side of the tongue go to the ipsilateral (the same side) submandibular lymph node
3. Midline: bilateral submandibular.
4. Posterior third: deep cervical lymph nodes

- What is the difference between the bilateral and ipsilateral? Ipsilateral means the same side. For example: if someone has a malignant tumor on a side (right or left), the tumor cells go to the lymph node that is located on the same side.
- If the tumor is in the midline of the tongue, where does the metastasis go? To the nodes on both sides (right and left), meaning it goes bilaterally

If tumor in the posterior third? it will go to the deep cervical lymph nodes, one of them called jugulodigastric node then it goes to the jugulo-omohyoid node then to the subclavian vein.



# Structure of the tongue

## Mucosa

- **stratified squamous** epithelium on both surfaces.
- The dorsal surface forms **papillae**

## Submucosa

- Has **minor salivary** glands that secrete both mucous and serous secretions.

## Muscles

- Core of **skeletal striated** muscles running in all directions

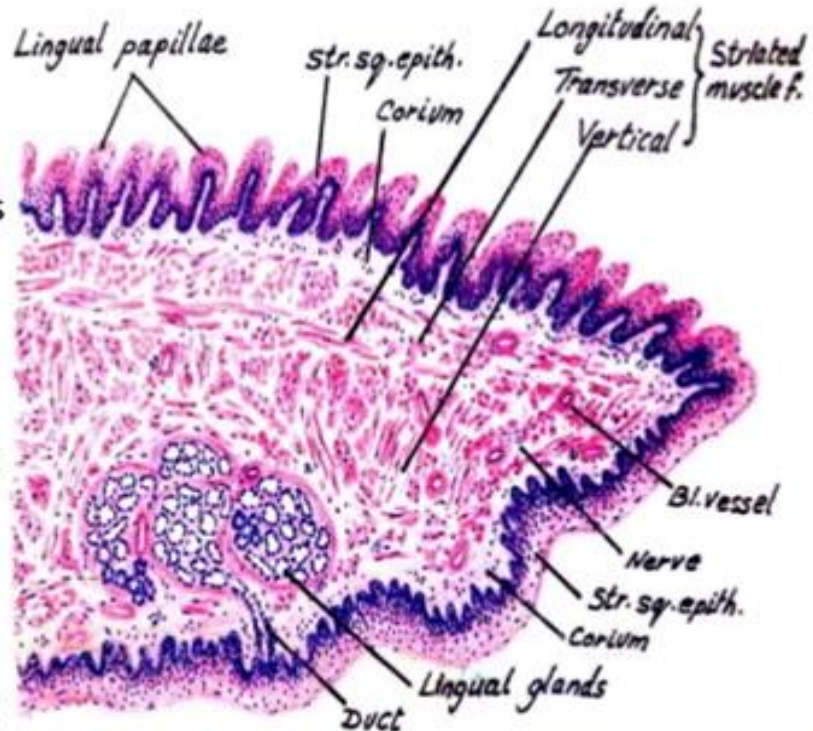
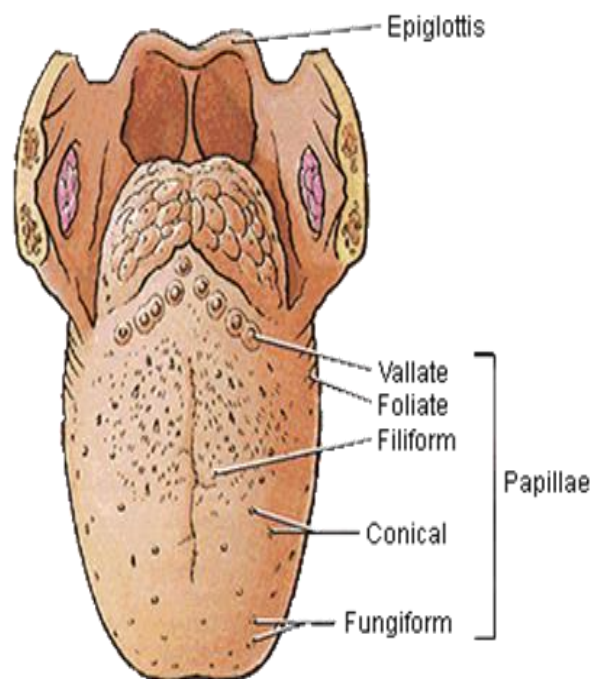


Fig. 3 Histology of the Tongue: Pearson Education 2013

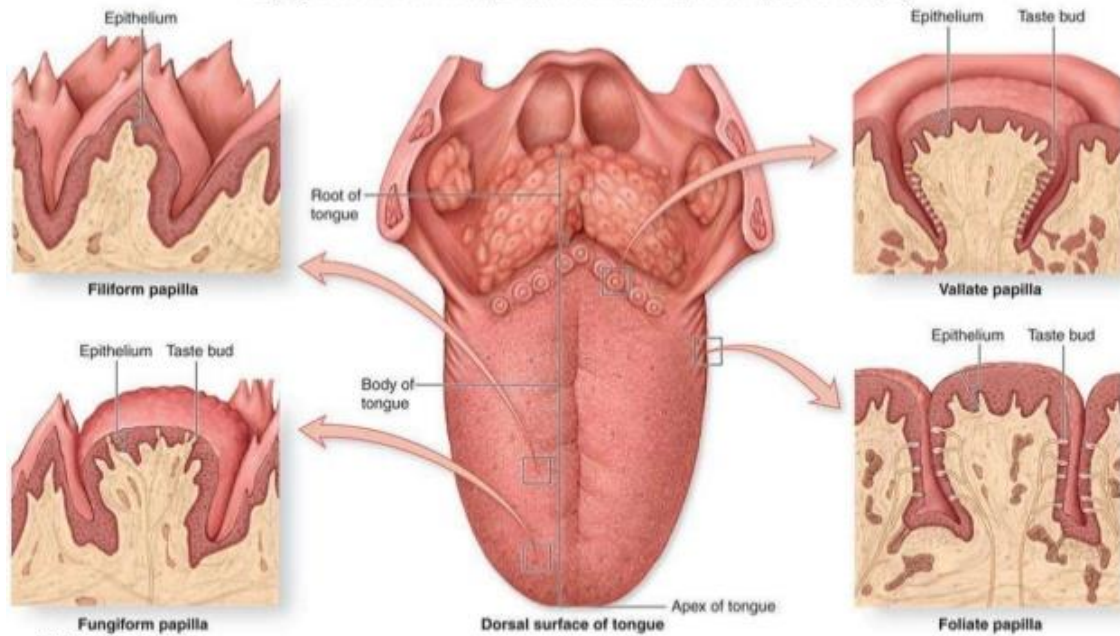
- The dorsal surface of the tongue is normally rough due to presence of papillae. If it ever becomes smooth, this indicates a deficiency of these papillae (atrophy) due to Vit.B12 deficiency. There are no papillae on the inferior surface.
- Papillae are more numerous in children than adults.
- Types of lingual papillae:
  1. Fungiform papillae: at the tip and sides of the tongue. Rounded structures with taste buds
  2. Filiform papillae: no taste buds
  3. Circumvallate papillae (vallate): in front of sulcus terminalis. Innervated by the glossopharyngeal nerve (C9).
  4. Foliate papillae: not common in humans





# Lingual Papillae

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Each consists of a connective tissue core covered by stratified squamous epithelium.

5

## Lingual Papillae

### Filiform papillae (Cone-shaped)

- Most numerous; all over the tongue.
- No taste Buds

### Fungiform papillae (Mushroom shaped)

- Less numerous; present on tip and sides of the tongue
- Has taste buds (Junqueira 2010).

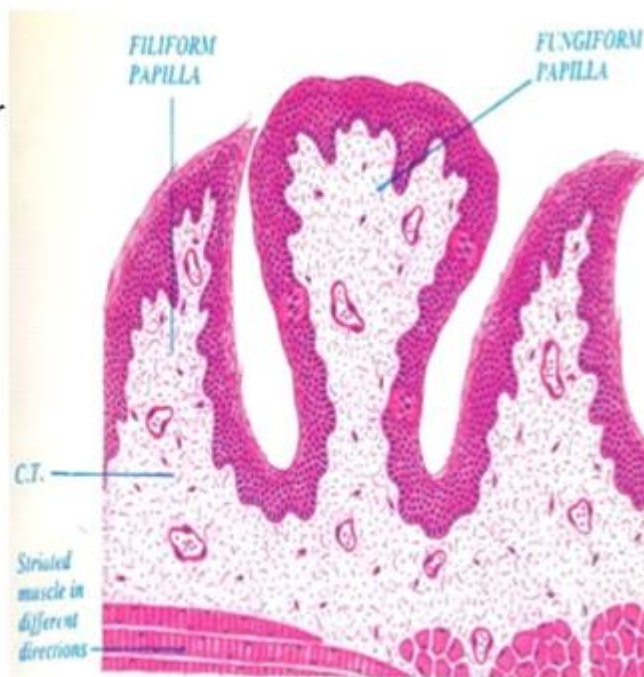


Fig. 5 Filiform papillae: Slideshare.com 2016

6



Note: taste buds not only found on the tongue, but also on soft palate, but also on soft palate and epiglottis and are found in numerous numbers.

## Lingual Papillae

**Circumvallate papillae**  
(surrounded by a wall,  
vall=wall)

8 - 12 papillae located just anterior to the sulcus terminalis.

- Large circular papillae, each is surrounded by a deep groove
- Has taste buds.

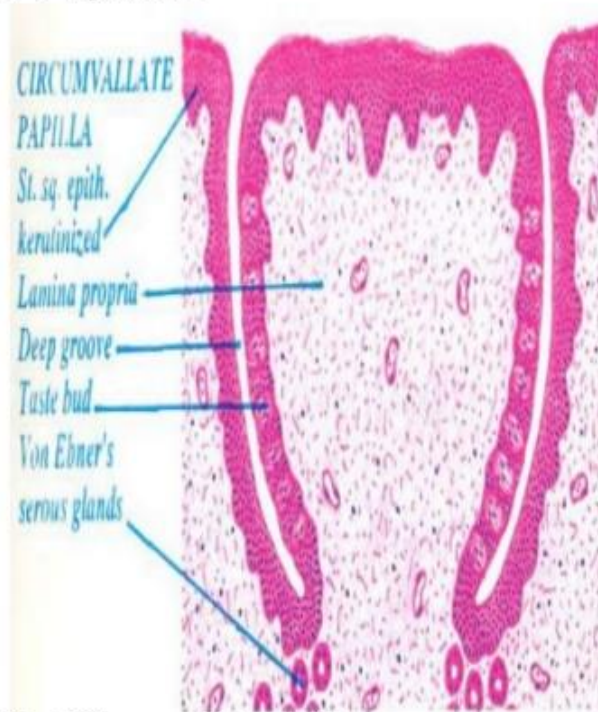


Fig. 6 Circumvallate papillae: Slideshare.com 20167

### Palatine Tonsil:

- Reminder of faucial fossa (isthmus) boundaries: anteriorly by palatoglossal arch, posteriorly by palatopharyngeal arch, superiorly by soft palate, and inferiorly by tongue.
- The palatine tonsil is found in this fossa between the two arches, has capsule
- The wall of the faucia separates the tonsil from superior constrictor muscle of the pharynx which is lateral to the tonsil. Deep to the superior constrictor muscle, there's a branch of facial artery and common carotid artery. These arteries are susceptible to be injured during a tonsillectomy leading to unstoppable bleeding. To stop the bleeding, the doctor gets the external carotid artery out and closes it. The facial artery is too deep to be reached
- Blood supply: branches of facial artery, lingual artery, and ascending pharyngeal artery (all are branches of external carotid artery)

