

The Oral Cavity

Oral Cavity:

The oral cavity extends from the lips to the pharynx. The paired palatoglossal folds form the oropharyngeal isthmus, which is the entrance into the pharynx.

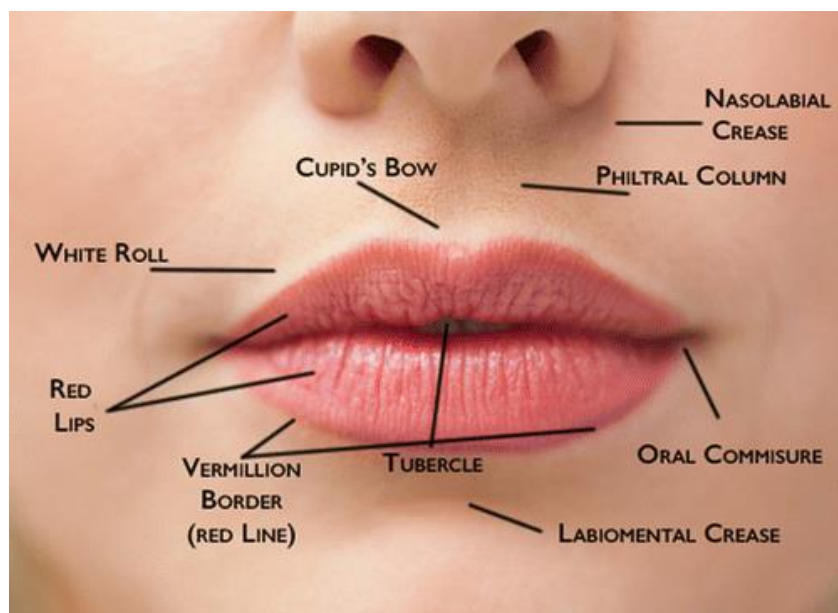
Lips:

Are two fleshy, mobile structures guarding the entrance to the mouth. They are covered externally with skin that overlies muscle (**orbicularis oris**), glands, and connective tissue. Internally they are lined with a mucous membrane.

The red portion of the lips, whose coloration is caused by a rich vascular bed visible through the thin epithelium, is termed the **vermilion zone**. The skin and vermilion zone join at the **vermilion border**.

A slight shallow, vertical depression in the midline from the nose to the vermilion border is the **philtrum**, and just inferior to this depression is the **labial tubercle**, a fleshy bump of varying size in the vermilion zone.

The two lips are connected laterally by the **labial commissures**, which are thin folds of tissue that are easily viewed when the mouth is slightly opened. The **oral fissure (rima of the mouth)** is the zone between the superior and inferior lips, which may be opened or, when the two lips are in contact with each other, closed.



The oral cavity has two components: the vestibule and the oral cavity proper.

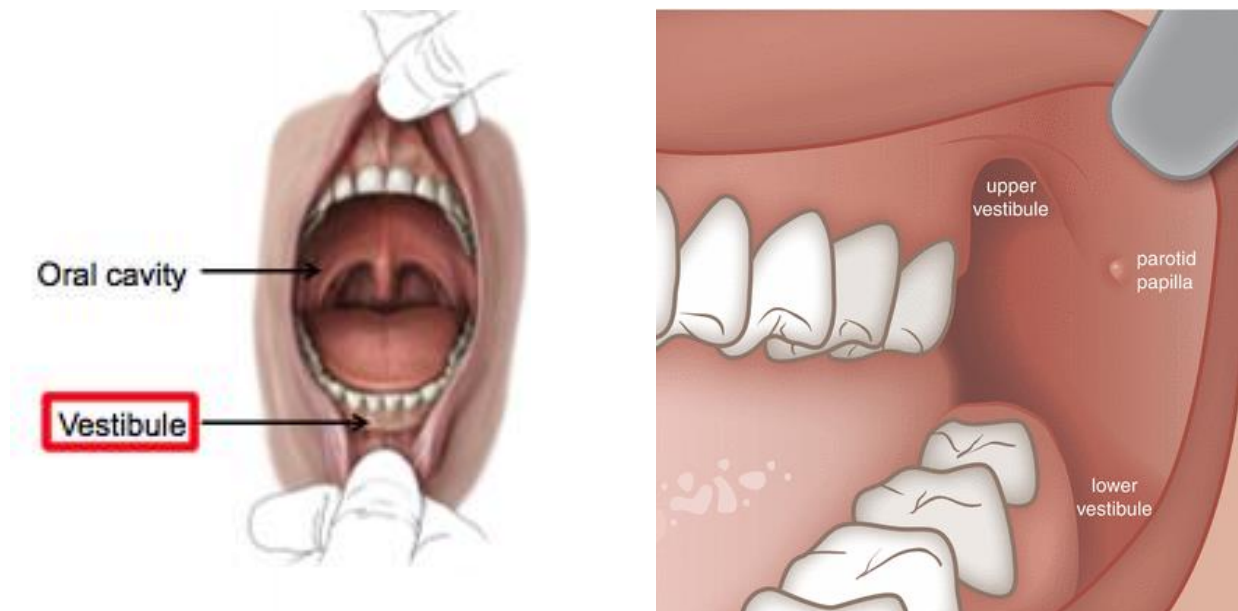
Vestibule:

The vestibule is a slit like space that lies between the lips and the cheeks externally and the gums and the teeth internally. It communicates with the exterior through the oral fissure between the lips. When the jaws are closed, it communicates with the oral cavity proper behind the third molar tooth on each side. The vestibule is limited above and below by the reflection of the mucous membrane from the lips and cheeks onto the gums.

The lateral wall of the vestibule is formed by the cheek, which is made up by the **buccinator muscle** and is lined with mucous membrane. **Labial Frenum** is a narrow midline fold of oral mucosa connecting each lip to the corresponding alveolar ridge; the upper frenulum is usually larger than the lower and both are variable in size.

The bulge extending into the labial vestibule from the alveolar ridge over the root of the maxillary canine tooth is the **canine eminence**, whereas the shallow depression just lateral to it is the **canine fossa**.

The duct of the parotid salivary gland opens on a small papilla into the vestibule opposite the upper second molar tooth.



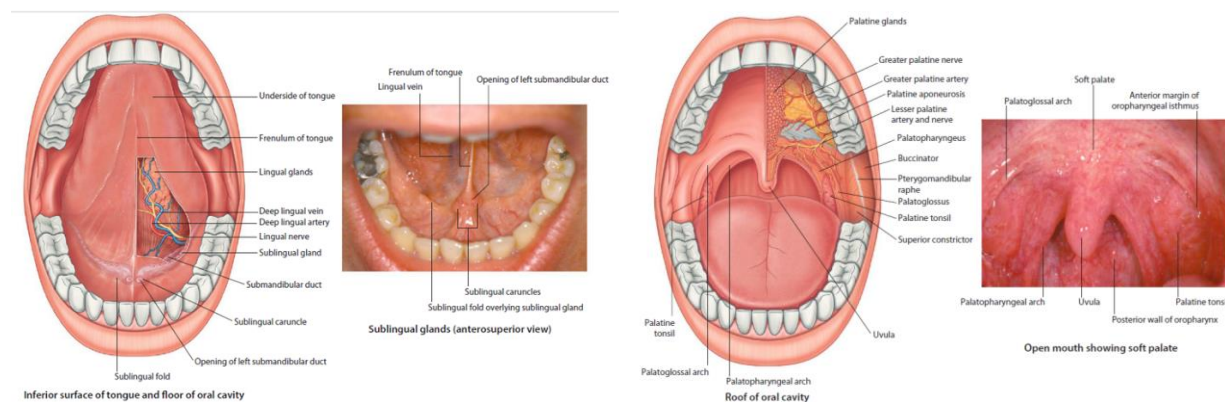
Oral Cavity Proper:

The oral cavity proper lies internal to the dental arches and their contained dentition and gingiva.

- It is bounded superiorly by the palate and inferiorly by the muscular tongue and reflections of the mucous membrane extending from the mandibular gingiva in the **sublingual sulcus (groove)** to the base of the tongue.
- Anterolaterally, it is bounded by the lingual surfaces of the teeth, lingual gingiva, and lingual alveolar mucosa.
- The posterior boundary of the oral cavity proper is formed by the vertical portion of the soft palate superiorly and by the **anterior pillar of the fauces (the palatoglossal arch)**.

A midline fold of mucous membrane, the **frenulum of the tongue**, connects the undersurface of the tongue to the floor of the mouth. On the lateral side of the frenulum, the **deep lingual vein** can be seen through the mucous membrane. Lateral to the lingual vein, the mucous membrane forms a fringed fold called the **plica fimbriata**.

The **submandibular duct** of the submandibular gland opens onto the floor of the mouth on the summit of a small papilla on either side of the frenulum of the tongue. The sublingual gland projects up into the mouth, producing a low fold of mucous membrane, **the sublingual fold**.



Oral Cavity Sensory Innervation

Roof: The greater palatine and nasopalatine nerves from the maxillary division of the trigeminal nerve.

Floor: The lingual nerve (general sensation), a branch of the mandibular division of the trigeminal nerve. The taste fibers travel in the chorda tympani nerve, a branch of the facial nerve.

Cheek: The buccal nerve, a branch of the mandibular division of the trigeminal nerve.

Teeth:

Teeth are arranged on the maxillary and mandibular arches. They articulate with their counterpart on the opposing arch and during occlusion, and when they do that they separate the oral cavity proper from the vestibule.

Nerve Supply:

- Maxillary teeth and the gingival tissue from the buccal and labial sides are innervated by the posterior, middle, and anterior-superior alveolar nerves, branches of the maxillary division of the trigeminal nerve.
 - Posterior superior alveolar nerve → distal root of 1st molar, 2nd molar, and 3rd molar.
 - Middle superior alveolar nerve → premolars and distal root of 1st molar.
 - Anterior superior alveolar nerve → incisor and canines.
- Palatal side of gingiva: [incisors, canines area supplied by nasopalatine nerve], [premolars, molars area supplied by greater palatine nerve].
- The mandibular teeth are innervated by the inferior alveolar (dental) nerve branch of mandibular nerve. The molars and premolars are supplied by the main trunk while canine and incisors by its incisive branch.

- The buccal gingiva of the mandibular teeth innervated by buccal nerve, the area anterior to the mental foramen supplied by the mental nerve. The lingual gingiva innervated by lingual nerve.
- Cross innervation occur at the mandibular incisors area between the right and left sides.

Arterial Supply:

- The upper teeth are supplied by posterior, middle, and anterior-superior alveolar arteries which are branches of the maxillary artery.
- The lower teeth are supplied by the inferior alveolar (dental) artery, a branch of first part of maxillary artery.

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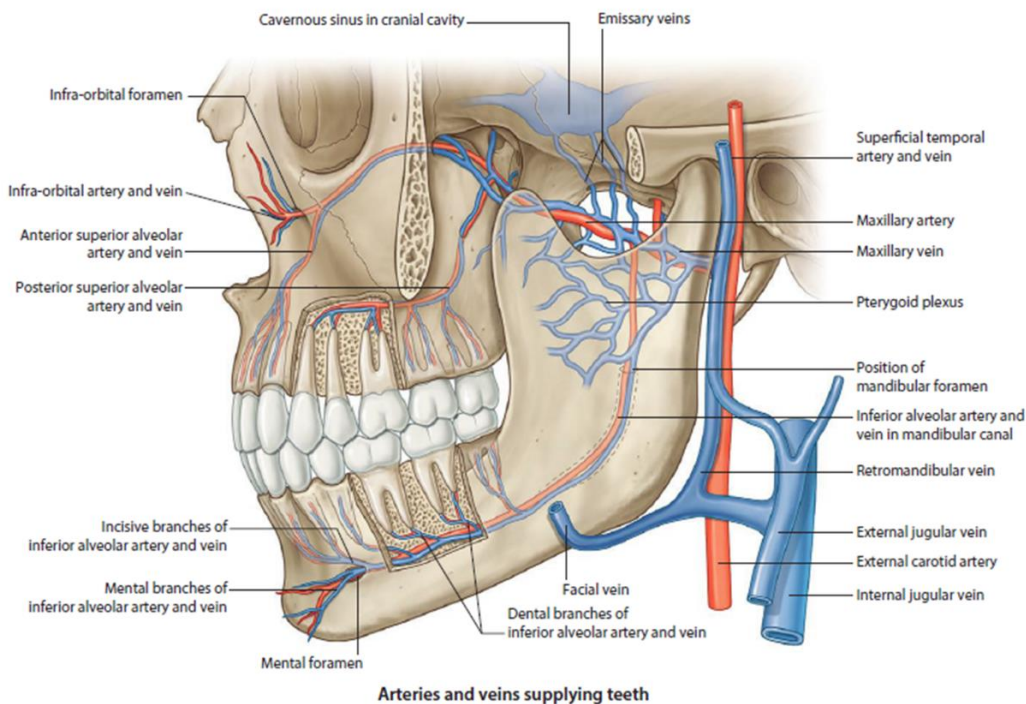
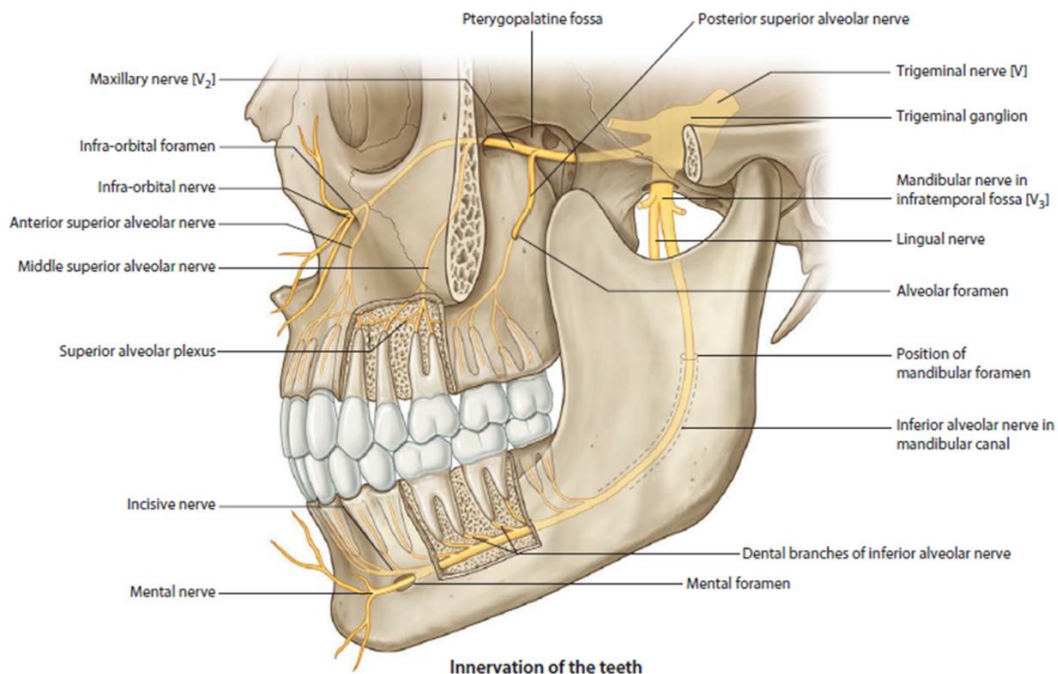
- The blood vessels and nerves enter the pulp cavity of the tooth through the apical foramen.
- The pulp and periodontal membrane have the same nerve supply but is different from that of the overlying gum.

Venous drainage:

- The posterior superior alveolar vein, the middle superior alveolar vein and the anterior superior alveolar vein drain the maxillary teeth into the pterygoid venous plexus.
- The inferior alveolar vein is the sole collector of the blood from the mandibular teeth pumped around the mandible and it drains into the pterygoid venous plexus.

Lymphatic Drainage:

The lymph from teeth is usually drained into ipsilateral **submandibular lymph nodes**. Lymph from the mandibular incisors, however, drains into **submental lymph nodes**.

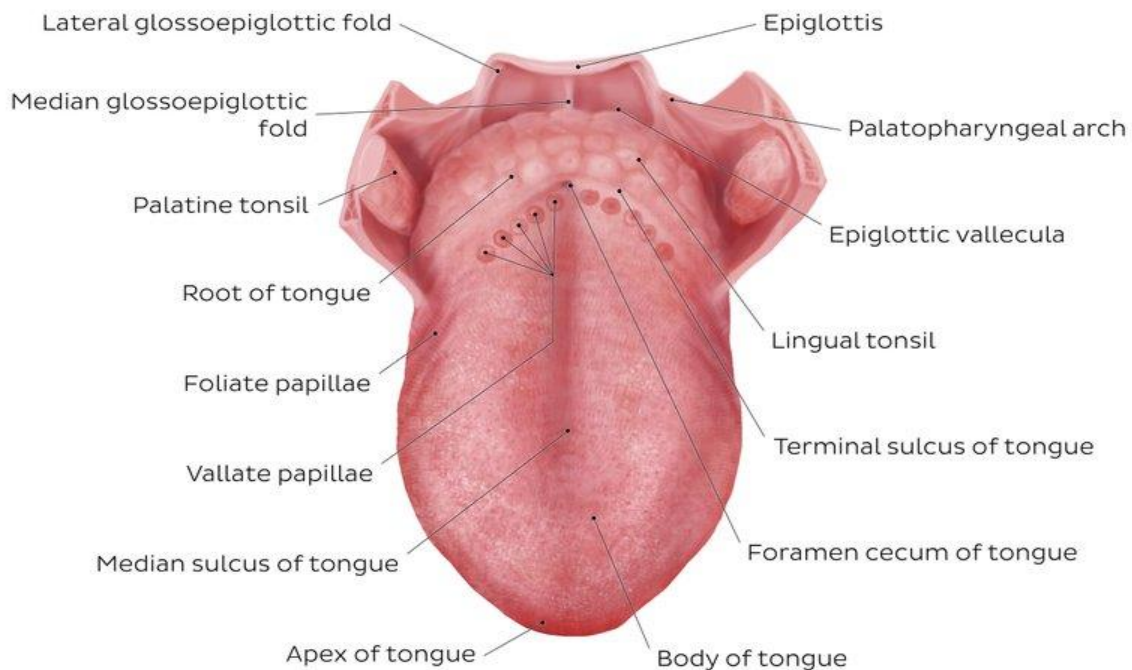


Tongue:

The tongue is a mass of striated muscle covered with mucous membrane. Muscles attach the tongue to the styloid process and the soft palate above and to the mandible and the hyoid bone below. A median fibrous septum (**median Sulcus**) divides the tongue into right and left halves.

A V-shaped sulcus, the **sulcus terminalis**, divides the mucous membrane of the upper surface of the tongue into anterior and posterior parts. The apex of the sulcus projects backward and is marked by a small pit, the **foramen cecum**. The sulcus divides the tongue into the anterior two thirds (oral part; body) and the posterior third (pharyngeal part; root). The foramen cecum is an embryologic remnant and marks the site of the upper end of the thyroglossal duct.

Three types of papillae are present on the upper surface of the anterior two thirds of the tongue: the **filiform papillae**, the **fungiform papillae**, and the **vallate papillae**. The large vallate papillae lie alongside the sulcus terminalis and help identify that structure.



Sensory Innervation

- Anterior two thirds: Lingual nerve branch of the mandibular division of trigeminal nerve (general sensation) and chorda tympani branch of the facial nerve (taste)
- Posterior third: Glossopharyngeal nerve (general sensation and taste)

Blood Supply

- The lingual artery, the tonsillar branch of the facial artery, and the ascending pharyngeal artery supply the tongue.
- The veins drain into the internal jugular vein.

Lymph Drainage

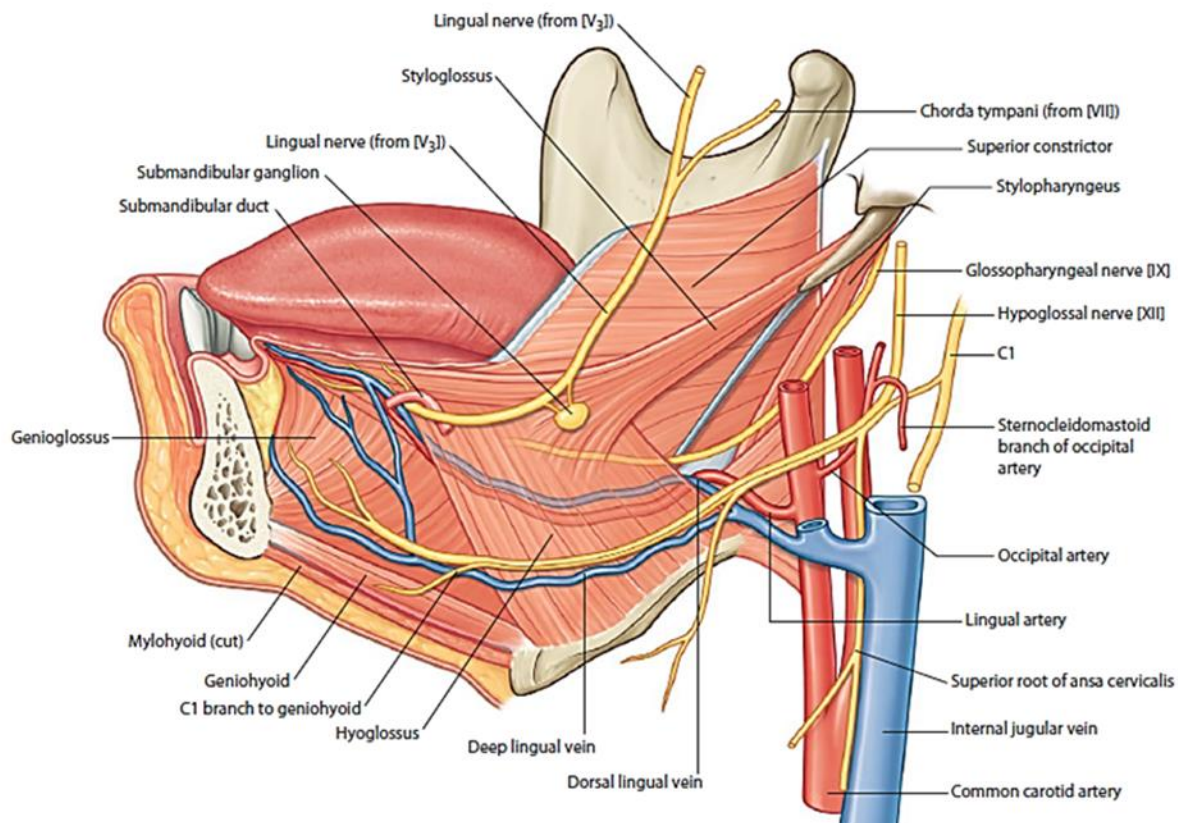
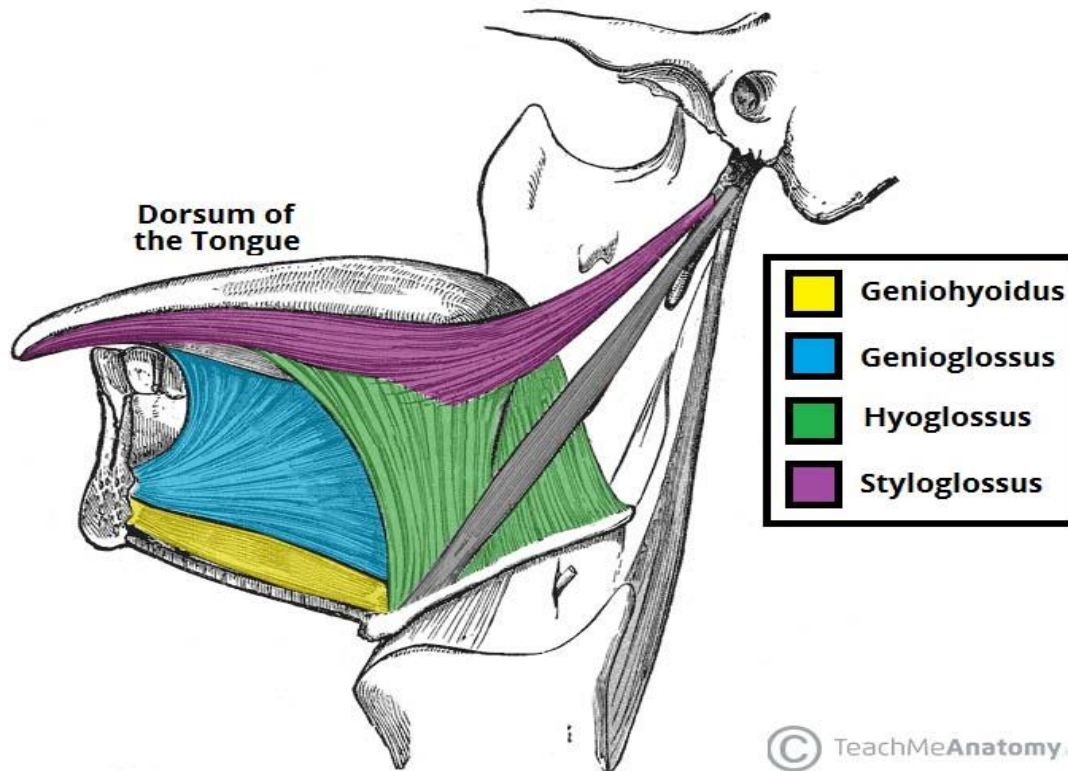
- Tip: Submental lymph nodes.
- Sides of the anterior two thirds: Submandibular and deep cervical lymph nodes
- Posterior third: Deep cervical lymph nodes

Tongue Muscles

The tongue possesses two groups of skeletal muscles: intrinsic and extrinsic. Intrinsic muscles are confined to the tongue and are not attached to bone. Extrinsic muscles originate outside the tongue; they attach to bones and the soft palate. The tongue muscles are summarized in *Table 1*.

Table 1: muscles of the tongue

MUSCLE	ORIGIN	INSERTION	NERVE SUPPLY	ACTION
Intrinsic Muscles				
Longitudinal	Median septum and submucosa	Mucous membrane	Hypoglossal nerve	Alters shape of the tongue
Transverse				
Vertical				
Extrinsic Muscles				
Genioglossus	Superior genial spine of the mandible	Blends with other muscles of the tongue	Hypoglossal nerve	Protrudes apex of the tongue through the mouth
Hyoglossus	Body and greater cornu of hyoid bone	Blends with other muscles of the tongue	Hypoglossal nerve	Depresses the tongue
Styloglossus	Styloid process of the temporal bone	Blends with other muscles of the tongue	Hypoglossal nerve	Draws the tongue upward and backward
Palatoglossus	Palatine aponeurosis	Side of the tongue	Vagus nerve (pharyngeal plexus)	Pulls roots of the tongue upward and backward, narrows oropharyngeal isthmus



Palate:

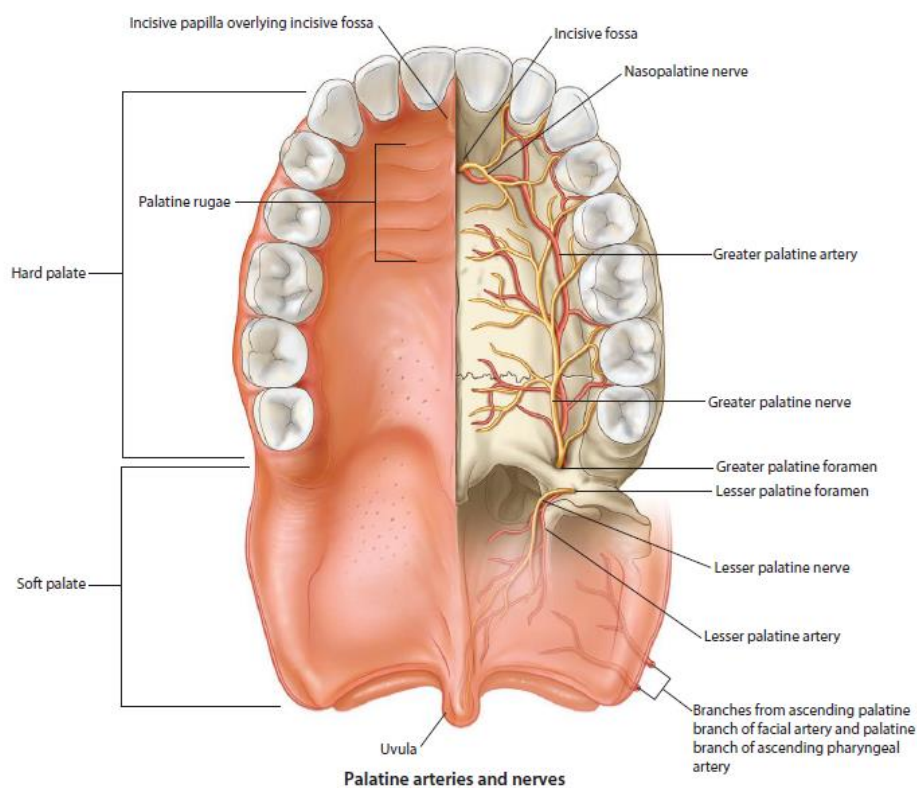
The palate forms the roof of the oral cavity and the floor of the nasal cavity. It has two parts: the hard palate in front and the soft palate behind.

The palatine processes of the maxillae and the horizontal plates of the palatine bones form the hard palate. It is continuous behind with the soft palate.

The soft palate is a mobile fold attached to the posterior border of the hard palate. Its free posterior border presents a conical projection in the midline called the uvula.

The soft palate is continuous at the sides with the lateral wall of the pharynx.

The soft palate is composed of mucous membrane, **palatine aponeurosis**, and muscles. The mucous membrane covers the upper and lower surfaces of the soft palate. The palatine aponeurosis is a fibrous sheet attached to the posterior border of the hard palate. It is the expanded tendon of the tensor veli palatini muscle.



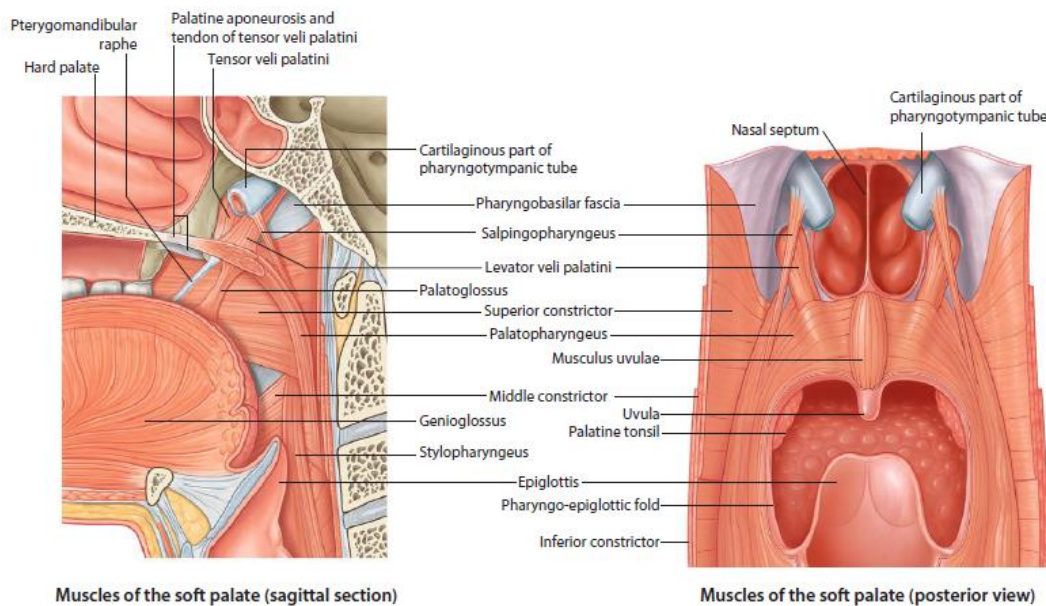
The muscles of the soft palate are summarized in *Table 2*.

Table 2: muscles of the palate

MUSCLE	ORIGIN	INSERTION	NERVE SUPPLY	ACTION
Tensor veli palatini	Spine of sphenoid, auditory tube	With muscle of other sides, forms palatine aponeurosis	Nerve to medial pterygoid from mandibular nerve	Tenses soft palate
Levator veli palatini	Petrous part of the temporal bone, auditory tube	Palatine aponeurosis	Pharyngeal plexus (vagus nerve)	Raises soft palate
Palatoglossus	Palatine aponeurosis	Side of the tongue	Pharyngeal plexus (vagus nerve)	Pulls root of the tongue upward and backward, narrows oropharyngeal isthmus
Palatopharyngeus	Palatine aponeurosis	Posterior border of thyroid cartilage	Pharyngeal plexus (vagus nerve)	Elevates wall of the pharynx, pulls palatopharyngeal folds medially
Musculus uvulae	Posterior border of the hard palate	Mucous membrane of the uvula	Pharyngeal plexus (vagus)	Elevates uvula

The muscle fibers of the tensor veli palatini converge as they descend from their origin to form a narrow tendon, which turns medially around the pterygoid hamulus. The tendon, together with the tendon of the opposite side, expands to form the **palatine aponeurosis**. When the muscles of the two sides contract, the soft palate tightens so that it may move upward or downward as a tense sheet.

The tensor and levator palatini muscles also act on the mucous membrane of the auditory tube and so affect function in the middle ear.



Two arches extend off each side of the soft palate. The palatoglossal arch is a fold of mucous membrane containing the palatoglossus muscle, which extends from the soft palate to the side of the tongue.

The **palatoglossal arch** marks where the oral cavity becomes the pharynx. The **palatopharyngeal arch** is a fold of mucous membrane behind the palatoglossal arch that runs downward and laterally to join the pharyngeal wall. This arch contains the palatopharyngeus muscle. The **palatine tonsils**, which are masses of lymphoid tissue, are located in the tonsillar fossa between the palatoglossal and palatopharyngeal arches.

Sensory Innervation

The **greater and lesser palatine nerves** from the maxillary division of the trigeminal nerve enter the palate through the greater and lesser palatine foramina. The greater palatine nerve runs forward and mainly supplies the hard palate. The lesser palatine nerve mainly passes posteriorly and supplies the soft palate. The **nasopalatine nerve**, also a branch of the maxillary nerve, enters the front of the hard palate through the incisive foramen. The **glossopharyngeal nerve** also supplies the soft palate.

Blood Supply

The **greater and lesser palatine** branches of the maxillary artery (descending palatine artery), the **ascending palatine branch** of the facial artery, and the **ascending pharyngeal artery** branch of the external carotid.

Palatal Lymph Drainage

Lymph drains to the deep cervical lymph nodes.