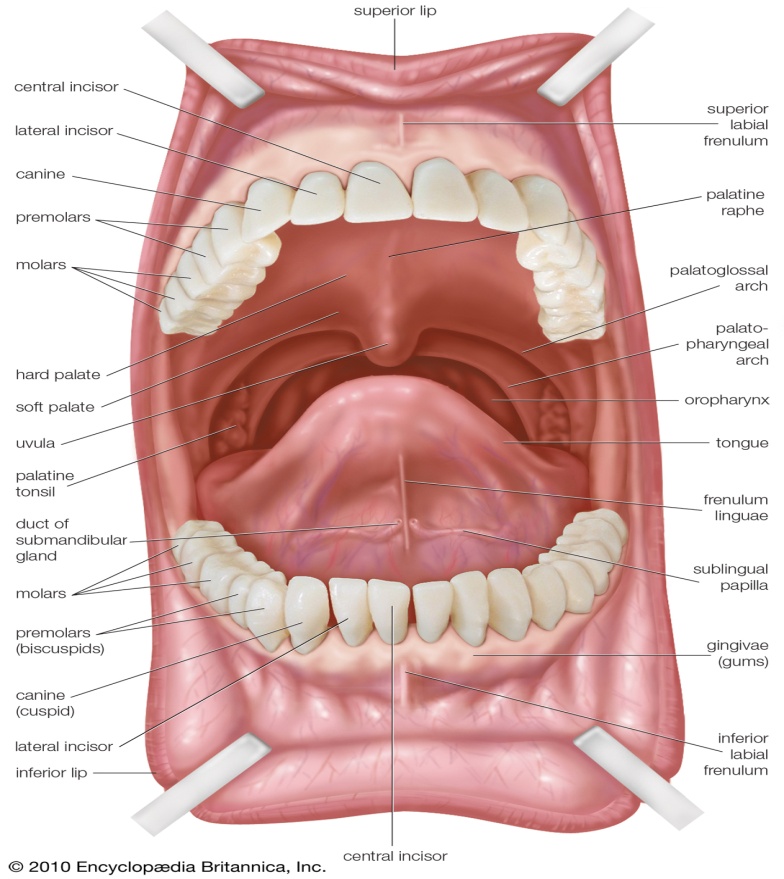
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1. *Discuss the anatomy of the tongue and comment on its applied anatomy.*

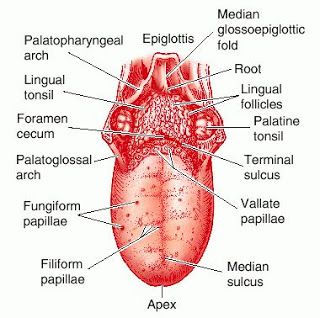
The tongue is a mobile muscular organ covered with mucous membrane. It is partly in the oral cavity and partly in the oropharynx. The tongues main functions are articulation and squeezing food in the oropharynx as part of deglutition. The tongue is also involved with mastication, taste and oral cleaning.



**PARTS AND SURFACES OF THE TONGUE**

The tongue has a root, body and apex. The root of the tongue is attached to the posterior portion, the body if the tongue is the anterior, approximately two thirds of the tongue between the root and apex. The apex of the tongue is the anterior end of the body, which rests against the incisor teeth. The body and apex of the tongue are extremely mobile.

The tongue features two surfaces: the more extensive superior and posterior surface is the dorsum of the tongue (top of the tongue) and the inferior surface of the tongue (underside of the tongue) which rests on the floor of the tongue. The dorsum of the tongue is characterized by a V-shaped groove, the terminal sulcus of the tongue, the angle of which points posteriorly to the foramen cecum. The terminal sulcus divides the dorsum of the tongue into the anterior part in the oral cavity and posterior part in the oropharynx.



The mucosa of the anterior part of the tongue is relatively thin and has numerous papillae:

-Vallate papillae: large and flat topped, directly anterior to the terminal sulcus and are arranged in a V shaped row.

-Foliate papillae: small lateral folds of lingual mucosa poorly developed in humans.

-Filiform papillae: long and numerous, contain numerous nerve endings that are sensitive to touch.

-Fungiform papillae: mushroom shaped pink or red spots scattered among the filiform papillae, but most numerous at the apex and margins of the tongue.

The mucosa of the posterior part of the tongue is thick and freely movable. It has no lingual papillae. The inferior surface of the tongue is covered with a thin, transparent mucous membrane. The surface of the tongue is connected to the floor of the mouth by the frenulum of the tongue.

**MUSCLES OF THE TONGUE**

The muscles of the tongue is divided into intrinsic and extrinsic muscles

1. **Extrinsic muscle of the tongue**
2. Genioglossus: fan shaped muscle, constitutes bulk of the tongue. Arises from the mandibular symphysis, inserts into the body of the hyoid bone and the entire length of the tongue.

Function: Inferior fibers protrude the tongue, middle fibers depress the tongue and superior fibers draw the tip back and down.

Innervations: motor innervations via the hypoglossal nerve (CNXII).

1. Hypoglossus: thin, quadrilateral muscle. Arises from the hyoid bone and inserts into the side of the tongue.

Function: depresses and retracts the tongue.

Innervations: motor innervaton via the hypoglossal nerve (CNXII).

1. Styloglossus: small, thin triangular muscle originates in the syloid process of the temporal bone and inserts into the side of the tongue.

Function: retracts and elevates the tongue.

Innervations: motor innervations via the hypoglossal nerve (CNXII).

1. Palatoglossus: narrow crescent shaped palatine muscle, arises from the palatine aponeurosis and inserts broadly into the tongue.

Function: elevates the posterior aspect of the tongue.

Innervations: motor innervations via the vagus nerve (CNX).

1. **Intrinsic muscle of the tongue**

The intrinsic muscle only attach to other structures in the tongue. There are four paired intrinsic muscles of the tongue and they are named by the direction in which they travel: the superior longitudinal, inferior longitudinal, transverse and vertical muscles of the tongue. These muscles affect the shape and size of the tongue- for example, in tongue rolling – and have a role in facilitating speech, eating and swallowing.

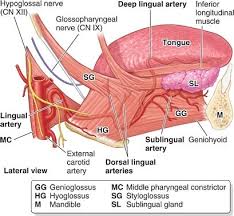
**INNERVATION OF THE TONGUE**

The tongue is divided into anterior 2/3rd and posterior 1/3rd in the anterior 2/3rd; general sensation is supplied by the trigeminal nerve (CNV). Specifically, the lingual nerve, a branch of the mandibular nerve (CNV3).

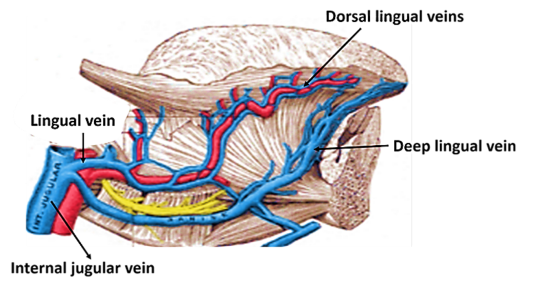
On the other hand, taste in the anterior 2/3is supplied by the facial nerve (CNVII). In the petrous part of the temporal bone, the facial nerve gives off three branches, one of which is chorda tympani. This travels through the middle ear, and continues on to the tongue.

The posterior 1/3rd of the tongue is slightly easier. Both touch and taste are supplied by the glossopharyngeal nerve (CNIX).

**VASCULATURE OF THE TONGUE**

The arteries of the tongue are derived from the lingual artery, which arises from the external carotid artery. On entering the tongue, the lingual artery passes deep to the Hypoglossus muscle. The dorsal lingual artery supplies the root of the tongue; the deep lingual artery supplies the body of the tongue. 

The veins of the tongue are the dorsal lingual veins, which accompany the lingual artery. The deep lingual veins, which begin at the apex of the tongue, run posteriorly beside the lingual frenulum to join the sublingual vein (often varicose in elderly people).



The lymphatic drainage of the tongue

1. Lymph from the root of the tongue drains bilaterally into the superior deep cervical lymph nodes.
2. Lymph from the medial part of the body drains bilaterally into and directly into the inferior deep cervical lymph nodes.
3. Lymph from the right and left lateral parts of the body drains into the submandibular lymph nodes on the ipsilateral sides.
4. The apex and frenulum drain into the submental lymph nodes, the medial portion draining bilaterally.

**CLINICAL ANATOMY**

1. Thrush (canddiasis): Yeast grows over the surface of the mouth and tongue. It can occur in almost anyone, but it occurs more in people taking steroids or with suppressed immune system.



1. Oral cancer: a growth occurs on the tongue and grows steadily. Oral cancer is common in people who smoke or drink heavily.



1. Macroglossia (big tongue): it could be as a result of congenital, inflammatory, traumatic, cancerous and metabolic causes.



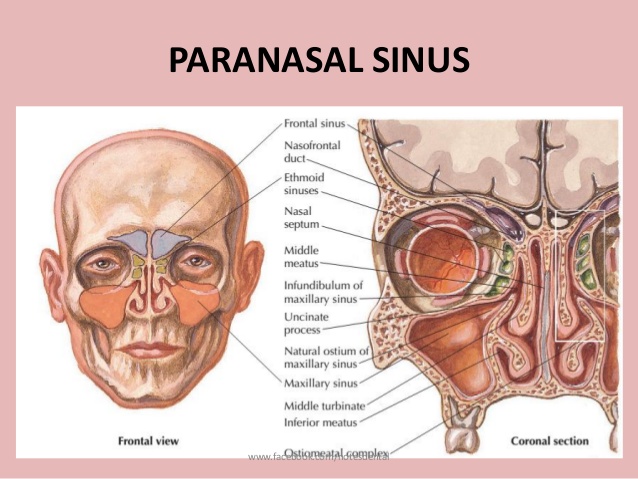
1. Atrophic glossitis (bald tongue): the tongue loses its bumpy texture, becoming smooth. Sometimes this is due to anaemia or a B vitamin deficiency. 
2. Oral leukoplakia: white patches appear on the tongue that can’t be scraped off. May be benign or may progress to oral cancer.



1. *Write an essay on the air sinuses.*

The paranasal sinuses are air-filled extensions of the respiratory part of the nasal cavity into the following cranial bones: frontal, ethmoid, sphenoid and maxilla. They are located according to the bones in which they are located. The sinuses continue to invade the surrounding bon, and marked extensions are common in the crania of older people.

Paranasal sinuses are a group of four paired air-filled spaces that surround the nasal cavity. The maxillary sinuses are located under the eyes; the frontal sinuses are above the eyes; the ethmoidal sinuses are between the eyes and the sphenoidal sinuses are behind the eyes.



**FRONTAL SINUSES**

The right and left sinuses are between the outer and inner tables of the frontal bone, posterior to the superciliary arches and the root of the nose. Frontal sinuses are usually detectable in children by the age of 7 years. The right and left sinuses each drain through a frontonasal duct into the ethmoidal infundibulum, which opens into the semilunar hiatus of the middle nasal meatus. The frontal sinuses are innervated by branches of the supraorbital nerves (CNV1).

The right and left frontal sinuses are rarely of equal size, and the septum between them is not usually situated entirely in the median plane. The frontal sinuses vary in size from approximately 5 mm to large spaces extending laterally into the greater wigs of the sphenoid. Often, a frontal sinus has two parts: a vertical part in the squamous part of the frontal bone, and a horizontal part in the orbital part of the frontal bone.

**ETHMOIDAL CELLS**

The ethmoidal sinuses 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. The ethmoidal cells usually are not visible in plain radiographs before 2 years of age; however, they are recognizable in CT scans. The anterior ethmoidal cells drain directly or indirectly into the middle nasal meatus through the ethmoidal infundibulum. The middle ethmoidal cells open directly into the middle meatus and are sometimes called “ bullar cells” because they form the ethmoidal bulla, a swelling on the superior border of the semilunar hiatus. The posterior ethmoidal cells open directly into the superior meatus. The ethmoidal cells are supplied by the anterior and posterior ethmoidal branches of the nasociliary nerves (CNV1).

**SPHENOIDAL SINUSES**

They are located in the body of the sphenoid, but they extend into the wings of this bone. They are unevenly divided and separated by a bony septum and because of this extensive pneumatization (formation of air cells), the body of the sphenoid is fragile. Only thin plates of bone separate the sinuses from several important structures: the optic nerves and the optic chiasm, the pituitary gland, the internal carotid arteries and the cavernous sinuses. The sphenoidal sinuses are derived from a posterior cell that begins to invade the sphenoid at approximately 2 years of age. In some people, several posterior ethmoidal cells invade the sphenoid, giving rise to multiple sphenoidal sinuses that open separately into the sphenoethmoidal recess. The posterior ethmoidal arteries and the posterior ethmoidal nerves that accompany the arteries that supply the sphenoidal sinuses.

**MAXILLARY SINUSES**

The maxillary sinuses are the largest of the paranasal sinuses. They occupy the bodies of the maxillae and communicate with the middle nasal meatus

-The apex of the maxillary sinus extends toward and often into the zygomatic bone.

-The base of the maxillary sinus forms the inferior part of the lateral wall of the nasal cavity.

-the roof of the maxillary sinus is formed by the floor of the orbit.

-The floor of the maxillary sinus is formed by the alveolar of the maxilla =. The roots of the maxillary teeth particularly the first two molars often produce conical elevations in the floor of the sinus.

Each maxillary sinus drains by one or more openings, the maxillary ostium, into the middle nasal meatus of the nasal cavity by way f the semilunar hiatus.

The arterial supply of the maxillary sinus is mainly from superior alveolar branches of the maxillary artery however, branches f the descending and greater palatine arteries supply the floor of the sinus. Innervaton of the maxillary sinus is from the anterior, middle and posterior alveolar nerves, which are branches of the maxillary nerves.

**Vascularization, innervations and lymphatics**

The anterior and middle ethmoid sinuses send their lymphatic drainage to the submandibular lymph nodes while the posterior ethmoid sinus sends its own to the retropharyngeal lymph nodes.

The anterior and posterior ethmoidal arteries, as well as the posterior lateral nasal branches provide an ample blood supply to this region. Meanwhile the anterior and posterior ethmoidal nerves and the posterior lateral superior and inferior nasal nerves help innervate it.

**CLINICAL ANATOMY**

## Sinusitis

Sinusitis is an extremely common outpatient case which presents as an inflammation of the **epithelia** of the sinuses. The causes can be either a viral or bacterial infection, or an allergic reaction. The inflammation can be **acute** or **chronic** and the **maxillary sinuses** are the most frequently affected. Antivirals, antibiotics and antihistamines are prescribed in persistent cases.