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

**Anatomy of the tongue.**

Under normal circumstances, the tongue is a pink, muscular organ located within the oral cavity proper. It is kept moist by the products of the major and minor salivary glands, which aids the organ as it facilitates deglutition, speech, and gustatory perception. While there is significant variability in the length of the tongue among individuals, on average, the organ is roughly 10 cm long. It has three main parts:

* The tip or apex of the tongue is the most anterior, and most mobile aspect of the organ.
* The tip is followed by the body of the tongue. It has a rough dorsal (superior) surface that abuts the palate and is populated with taste buds and lingual papillae, and a smooth ventral (inferior) surface that is attached to the floor of the oral cavity by the lingual frenulum.
* The base of the tongue is the most posterior part of the organ. It is populated by numerous lymphoid aggregates known as the lingual tonsils along with foliate papillae along the poster lateral surface.

There are numerous important structures surrounding the tongue. It is limited anteriorly and laterally by the upper and lower rows of **teeth**. Superiorly, it is bordered by the **hard** (anterior part) and **soft** (posterior part) **palates**. Inferiorly, the root of the tongue is continuous with the **mucosa** of the floor of the oral cavity; with the **sublingual salivary glands** and vascular bundles being located below the mucosa of the floor of the oral cavity. The **palatoglossal** and **palatopharyngeal arches** (along with the palatine tonsils) have lateral relations to the posterior third of the tongue. Posterior to the base of the tongue is the dorsal surface of the **epiglottis** and **laryngeal inlet**, and the posterior wall of the oropharynx. As mentioned earlier, the presulcal and postsulcal parts of the tongue differ not only by anatomical location, but also based on embryological origin, innervation, and the type of mucosa found on its surface

**Antrior two-third.**

The presulcal tongue includes the **apex** and **body** of the organ. It terminates at the **sulcus terminals** which can be seen extending laterally in an oblique direction from the foramen cecum towards the palatoglossal arch. The mucosa of the dorsal surface of the oral tongue is made up of **circumvallate**, **filiform**, and **fungiform** **papillae**. There is also a **longitudinal** **midline** groove running in an anteroposterior direction from the tip of the tongue to the foramen cecum. This marks the embryological point of fusion of the lateral lingual swellings that formed the oral tongue. It also represents the location of the **median lingual (fibrous) septum** of the tongue that inserts in the body of the hyoid bone. On the lateral surface of the oral tongue are foliate papillae arranged as a series of vertical folds. The ventral mucosa of the oral tongue is comparatively unremarkable. It is smooth and continuous with the mucosa of the floor of the mouth and the inferior gingiva. The lingual veins are relatively superficial and can be appreciated on either side of the lingual frenulum. Lateral to the lingual veins are pleated folds of mucosa known as the plica fimbriata. They are angled anteromedially toward the apex of the tongue

**Posterior third.**

The remainder of the tongue that lies posterior to the sulcus terminals is made up by the base of the organ. It lies behind the palatoglossal folds and functions as the anterior wall of the oropharynx. Unlike the oral tongue, the pharyngeal tongue does not have any lingual papillae. Instead, its mucosa is populated by aggregates of lymphatic tissue known as the lingual tonsils. The mucosa is also continuous with the mucosa of the laterally located palatine tonsils, the lateral oropharyngeal walls, and the posterior epiglottis and glossoepiglottic folds

**Muscles**

The tongue is chiefly a muscular organ with some amount of fatty and fibrous tissue distributed throughout its substance. All the muscles of the tongue are paired structures, with each copy being found on either side of the median fibrous septum. There are muscles that extend outside of the organ to anchor it to surrounding bony structures, known as extrinsic muscles. The other set of muscles are confined to each half of the organ and contribute to altering the shape of the organ; these are the intrinsic muscles

**Intrinsic tongue muscles**

The intrinsic tongue muscles are responsible for adjusting the shape and orientation of the organ. It is made up of four paired muscles, which are discussed below in a dorsoventral manner

**Types:**

**Superior longitudinal**

**Origin** - submucosa of posterior tongue, lingual septum

**Insertion** - apex/anterolateral margins of tongue

**Innervation** - hypoglossal nerve (CN XII)

**Blood supply** - lingual branch of external carotid artery

**Action** - retracts and broadens tongue, elevates apex of tongue

**Inferior longitudinal**

**Origin** - root of tongue, body of hyoid bone

**Insertion** - apex of tongue

**Innervation** - hypoglossal nerve (CN XII)

**Blood supply** - lingual branch of external carotid artery

**Action** - retracts and broadens tongue, lowers apex of tongue

**Transverse muscle**

**Origin** - lingual septum

**Insertion** - lateral margin of tongue

**Innervation** - hypoglossal nerve (CN XII)

**Blood supply** - lingual branch of external carotid artery

**Action** - narrows and elongates tongue

**Vertical muscle**

**Origin** - root of tongue, genioglossus muscle

**Insertion** - lingual aponeurosis

**Innervation** - hypoglossal nerve (CN XII)

**Blood supply** - lingual branch of external carotid artery

**Action -** broadens and elongates tongue

**Extrinsic tongue muscles**

While the shape of the tongue is determined by the intrinsic muscles of the tongue, movement of the organ within (and out of) the oral cavity is dependent on the extrinsic tongue muscles. There are four pairs of extrinsic muscles, which can be viewed as those arising from above the tongue, and those that originate from below the tongue.

**Types:**

**Genioglossus**

**Origin** - Superior mental spine of mandible

**Insertion** - entire length of dorsum of tongue, lingual aponeurosis, body of hyoid bone

**Innervation** - hypoglossal nerve (CN XII)

**Blood supply** - sublingual branch of lingual artery, submental branch of facial artery

**Action** - depresses and protrudes tongue (bilateral contraction); deviates tongue contralaterally (unilateral contraction)

**Hyoglossus**

**Origin** - body and greater horn of hyoid bone

**Insertion** - inferior/ventral parts of lateral tongue

**Innervation** - hypoglossal nerve (CN XII)

**Blood supply** - sublingual branch of lingual artery, submental branch of facial artery

**Action** - depresses and retracts tongue

**Styloglossus**

**Origin** - anterolateral aspect of styloid process (of temporal bone), stylomandibular ligament

**Insertion** - blends with inferior longitudinal muscle (longitudinal part); blends with hyoglossus muscle (oblique part)

**Innervation** - hypoglossal nerve (CN XII)

**Blood supply** - sublingual branch of lingual artery

**Action** - retracts and elevates lateral aspects of tongue

**Palatoglossus**

**Origin** - palatine aponeurosis of soft palate

**Insertion** - lateral margins of tongue, blends with intrinsic muscles of tongue

**Innervation** - vagus nerve (CN X) (via branches of pharyngeal plexus)

**Blood supply** - ascending palatine branch of facial artery, ascending pharyngeal artery

**Action** - elevates root of tongue, constricts isthmus of fauces

**Applied anatomy of the tongue.**

**Agglosia**- partial development or complete absence of a tongue.

**Ankyloglossia**- also known as tongue-tie, is a congenital oral anomaly that may decrease mobility of the tongue tip and is caused by an unusually short, thick lingual frenulum, a membrane connecting the underside of the tongue to the floor of the mouth.

**Macroglossia-** unusually large tongue.

**Hyperglossia-**short incompletely developed tongue.

**Cleft tongue**- it’s a condition where the tongue has a cleft running right across it horizontally or vertically, although reported cases have had vertically.

**2. Write an essay on air sinuses.**

Air 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. The sinuses are named for the facial bones in which they are located.

**Structure**

Humans possess four paired air sinuses, divided into subgroups that are named according to the bones within which the sinuses lie:

* The maxillary sinuses, the largest of the air sinuses, are under the eyes, in the maxillary bones (open in the back of the semilunar hiatus of the nose). They are innervated by the trigeminal nerve (CN Vb).
* The frontal sinuses, superior to the eyes, in the frontal bone, which forms the hard part of the forehead. They are also innervated by the trigeminal nerve (CN Va).
* The ethmoidal sinuses, which are formed from several discrete air cells within the ethmoid bone between the nose and the eyes. They are innervated by the ethmoidal nerves, which branch from the nasociliary nerve of the trigeminal nerve (CN Va).
* The sphenoidal sinuses, in the sphenoid bone. They are innervated by the trigeminal nerve (CN Va & Vb).

The air air sinuses are lined with respiratory epithelium (ciliated pseudostratified columnar epithelium).

**Clinical significance.**

**Inflammation**

**Sinusitis**

The air sinuses are joined to the nasal cavity via small orifices called ostia. These become blocked easily by allergic inflammation, or by swelling in the nasal lining that occurs with a cold. If this happens, normal drainage of mucus within the sinuses is disrupted, and sinusitis may occur. Because the maxillary posterior teeth are close to the maxillary sinus, this can also cause clinical problems if any disease processes are present, such as an infection in any of these teeth. These clinical problems can include secondary sinusitis, the inflammation of the sinuses from another source such as an infection of the adjacent teeth.

These conditions may be treated with drugs such as decongestants, which cause vasoconstriction in the sinuses; reducing inflammation; by traditional techniques of nasal irrigation; or by corticosteroid.

**Cancer**

Malignancies of the air sinuses comprise approximately 0.2% of all malignancies. About 80% of these malignancies arise in the maxillary sinus. Men are much more often affected than women. They most often occur in the age group between 40 and 70 years. Carcinomas are more frequent than sarcomas. Metastases are rare. Tumours of the sphenoid and frontal sinuses are extremely rare.