

OTUONYE GIFT CHARLES

17/MHS01/277

ANA 301 ASSIGNMENT

QUESTION 1: Discuss the Anatomy of the tongue and comment on its applied anatomy

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 posterolateral 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.

Anterior two thirds

The presulcal tongue includes the apex and body of the organ. It terminates at the sulcus terminalis; 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 terminalis 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.

Musculature

The tongue has 4 intrinsic and 4 extrinsic muscle, the muscles on each side of the tongue are separated by a fibrous lingual septum. Extrinsic muscles are so named because they originate outside the tongue and insert within it; intrinsic muscles are within the substance of the organ and do not insert on bone. Although the muscles do not act in isolation, intrinsic muscles generally alter the shape of the tongue, whereas extrinsic muscles alter its position.

Muscle	Type	Origin	Insertion	Action
Superior longitudinal	Intrinsic	Lingual septum and submucous fibrous layer	Margins of tongue	Elevates tip and sides of tongue; shortens tongue
Inferior longitudinal	Intrinsic	Body of hyoid and base of tongue	Apex of tongue	Curles tip inferiorly; shortens tongue
Transverse	Intrinsic	Lingual septum	Submucous fibrous layer	Narrows and lengthens tongue
Vertical	Intrinsic	Superior surface of tongue	Inferior surface of tongue	Flattens and broadens tongue
Genioglossus	Extrinsic	Mental spine of mandible	Lateral and inferior tongue	Depresses and protrudes tongue
Hyoglossus	Extrinsic	Body and greater horn of hyoid	Lateral and inferior tongue	Depresses and retracts tongue
Styloglossus	Extrinsic	Styloid and stylohyoid ligament	Lateral and inferior tongue	Retracts tongue
Palatoglossus	Extrinsic	Palatine aponeurosis	Lateral tongue	Elevates posterior tongue

Vasculature

Similar to most of the head and neck region, the tongue derives its arterial blood supply from the external carotid artery. The lingual artery branches off the external carotid artery deep to the stylohyoid muscle. At first, it travels superomedially; after a short distance, it changes direction and moves

anteroinferiorly. The hypoglossal nerve (cranial nerve XII) crosses over it laterally before it enters the tongue deep in the hyoglossus muscle.

Within the tongue, the lingual artery gives rise to its 3 main branches: the dorsal lingual, deep lingual and sublingual arteries. The dorsal lingual artery supplies the base of the tongue. The deep lingual artery travels on the lower surface of the tongue to the tip. A branch to the sublingual gland and the floor of the mouth is known as the sublingual artery.

The veins of the tongue parallel the lingual artery branches. The deep lingual vein begins at the tip of the tongue and travels posteriorly to join the sublingual vein. This drains into the dorsal lingual vein, which accompanies the lingual artery. Directly or indirectly, this vein empties into the internal jugular vein.

Nerve supply

Motor innervation for all of the muscles of the tongue comes from the hypoglossal nerve--with the exception of the palatoglossus, which is supplied by the pharyngeal plexus (fibers from the cranial root of the spinal accessory nerve carried by the vagus nerve).

General sensation of the anterior two thirds of the tongue is supplied by the lingual nerve, a terminal branch of the third division of the trigeminal nerve (V3). Taste sensation for this portion of the tongue is carried by the chorda tympani branch of the facial nerve. The posterior third of the tongue relays general and sensation via the lingual-tonsillar branch of the glossopharyngeal nerve. Some general and taste sensation from the base of tongue anterior to the epiglottis is carried by the internal laryngeal branch of the superior laryngeal nerve (CN X).

Lymphatic drainage

The lymphatic drainage of the tongue is complex. Lymphatics from the tip of the tongue travel to the submental lymph nodes. This can be ipsilateral or bilateral depending on the site of the lesion. Lymph from the medial anterior two thirds of the tongue travels to the deep cervical lymph nodes, and lymph from the lateral anterior tongue goes to the submandibular nodes. The tongue-base lymphatics drain bilaterally into the deep cervical lymph nodes.

Applied anatomy

1. A particular pharyngeal arch defect, known as Pierre Robin Syndrome, causes glossoptosis among other symptoms. This particular defect causes the tongue to be displaced posteriorly and may cause airway obstruction or apnea.
2. Ankyloglossia (tongue-tie) is caused by an abnormally short lingual frenulum, which can inhibit tongue movement.
3. Macroglossia is a congenital enlargement of the tongue. Microglossia is a small tongue, and aglossia an absent tongue, these are rare and are usually associated with other limb abnormalities.

QUESTION 2: write an essay on the air sinuses

The paranasal sinuses are air cavities that help circulate the air that is breathed in and out of the respiratory system. They are situated around the nasal cavity and they are all paired and sometimes symmetrical, while always being bilateral. There are four different pairs of sinuses and they are called the:

- maxillary sinuses
- frontal sinuses
- sphenoidal sinuses
- ethmoidal sinuses

The maxillary sinuses

The maxillary sinuses are the largest of the all the paranasal sinuses. They have thin walls which are often penetrated by the long roots of the posterior maxillary teeth. The superior border of this sinus is the bony orbit, the inferior is the maxillary alveolar bone and corresponding tooth roots, the medial border is made up of the nasal cavity and the lateral and anterior border are limited by the cheekbones. Posteriorly, two anatomical spaces known as the pterygopalatine fossa and the infratemporal fossa exist.

Vascularization, innervation and lymphatics

Submandibular the submandibular lymph nodes are the main destination during lymphatic drainage. The blood supply includes a contribution from the:

- anterior superior alveolar artery
- middle superior artery
- posterior superior alveolar artery

Innervation occurs through nerves of the same names as the arteries.

The frontal sinuses

Anteriorly, the frontal sinuses are contained by the forehead and the superciliary arches, superiorly and posteriorly by the anterior cranial fossa and inferiorly by the bony orbit, the anterior ethmoidal sinuses and the nasal cavity. Medially the sinuses face one another, separated by the midline. This pair of sinuses is irregular in shape when compared to one another and is underdeveloped at birth. They reach their full size and shape around seven to eight years of age.

Vascularization, innervation and lymphatics

They drain primarily into the ethmoidal infundibulum and the corresponding lymph drainage occurs via the submandibular lymph nodes. It is innervated by the ophthalmic nerve, including the supraorbital and supratrochlear branches.

The frontal sinuses are supplied by the:

- anterior ethmoidal artery
- supraorbital artery
- supratrochlear artery

The sphenoidal sinuses

The most posterior of all the sinuses in the head, the sphenoidal sinuses are large and irregular, just like their septum, which is made by the sphenoid bone. Laterally, a cavernous sinus exist which is part of the middle cranial fossa and also the carotid artery and cranial nerves III, IV, V/I, V/II and VI can be found. The anterior wall separates this pair of sinuses from the nasal cavity, as does the hypophyseal fossa, the pituitary gland and the optic chiasm superiorly and the nasopharynx and pterygoid canal inferiorly.

Vascularization, innervation and lymphatics

The lymphatic drainage occurs in the same way as the posterior ethmoid sinus. The posterior ethmoidal artery and the posterior lateral nasal branches supply the sphenoidal sinuses. The posterior ethmoidal nerve and the orbital branch of the pterygopalatine ganglion innervate them.

The ethmoidal sinuses

Superior to the ethmoidal sinus is the anterior cranial fossa and the frontal bone, laterally the orbit can be found, while the nasal cavity is situated medially. The ethmoid sinuses are unique because they are the only paranasal sinuses that are more complex than just a single cavity.

On each side of the midline, anywhere from three to eighteen ethmoidal air cells may be grouped together. These air cells are smaller individual sinuses grouped together to form one large one which encompass the anterior, middle and posterior nasal meatuses.

Vascularization, innervation 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 significance

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.