**NAME; NWOYE CHINONYELUM MATRIC NUMBER: 17/MHS01/212**

**HEAD AND NECK ASSIGNMENT BY DR. O.G**

**LEVEL; 300LVL**

1. **DISCUSS THE ANATOMY OF THE TONGUE AND APPLIED ANATOMY**

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The tongue is the muscular organ found in the vertebrate mouth. It is attached via muscles to the hyoid bone, mandible, styloid process, palate, and pharynx and divided into two parts by the V-shaped sulcus terminalis. These two parts, an anterior two thirds and a posterior one third, are structurally and developmentally distinct. The foramen cecum at the apex of the sulcus terminalis indicates the site of embryonic origin of the thyroglossal duct.

The following papillae cover the tongue and are used for taste perception:

1. **Vallate papillae**are arranged in a V-shape anterior to the sulcus terminalis and studded with numerous taste buds. Innervation is by the glossopharyngeal nerve (CN IX).
2. **Fungiform papillae** are mushroom-shaped papillae with erythematous domes, located on the lateral aspects and at the apex of the tongue.
3. **Filiform papillae** are slim, cone-shaped projections organized in rows parallel to the sulcus terminalis.
4. **Foliate papillae** are rarely found in humans (vestigial).

Another important part of the tongue is the lingual tonsil, a collection of nodular lymphatic tissue towards the posterior one-third of the dorsum of the tongue.

The functions of the tongue include taste, speech, and food manipulation in the oral cavity.

**Taste Functions**

Chemicals that interact with the taste buds in the tongue are referred to as "tastants." Taste buds themselves are found within the various papillae of the tongue. Tastants interact with gustatory cell receptors in the taste buds, resulting in transduction of a taste sensation. The five broad categories of taste receptors are :sweet salty, sour, bitter, and umami. The lingual papillae are divided into the vallate (or circumvallate), fungiform, filiform, and foliate papillae. More than half of the taste buds are located on the vallate papillae at the junction of the oral and oropharyngeal tongue or tongue base.

**Speech Functions**

Speech is produced in part by manipulation of the tongue in the mouth against the teeth and palate within the oral cavity. The intrinsic muscles of the tongue are involved primarily in shaping the tongue for speech.

**Food Manipulation Functions**

The tongue moves food around the mouth within the oral cavity by pressing it against the hard palate and out to the sides to enable mastication. It enables the formation of the food bolus in the oral preparatory phase of swallowing. It also takes part in the oral phase of swallowing by elevating and sweeping posteriorly to propel the food bolus past the anterior tonsillar pillar, triggering the swallowing reflex.

**Blood Supply and Lymphatics**

Blood supply to the tongue is predominantly from the lingual artery, a branch of the external carotid artery between the superior thyroid artery and the facial artery, which departs at the level of the greater horn of the hyoid bone within the carotid triangle. After branching from the external carotid artery, the lingual artery passes deep to the **hyoglossus** muscle and superficial to the middle pharyngeal constrictor muscle. It then gives rise to the following four arteries:

1. THE SUPRAHYOID ARTERYsupplies the omohyoid, sternothyroid, and thyrohyoid muscles. They anastomose with the corresponding vessels from the opposite side.
2. THE DORSAL LINGUAL ARTERY arises beneath the hyoglossus muscle and pass to the posterior part of the dorsum of the tongue. They supply the mucous membrane of this region as well as the **glossopalatine** arch, lingual tonsils, soft palate, and epiglottis. They anastomose with their corresponding vessels on the opposite side.
3. THE SUBLINGUAL ARTERY The branches at the anterior border of the hyoglossus muscle before passing between the genioglossus muscle and mylohyoid muscle to the sublingual gland. It supplies the sublingual gland before giving branches to the mylohyoid muscle. One branch from the sublingual artery passes posterior to the alveolar process of the mandible and anastomoses with the corresponding artery from the other side. A second branch of the sublingual artery pierces the mylohyoid muscle and anastomoses with the submental branch of the facial artery.
4. THE DEEP LINGUAL ARTERY, which is the termination of the lingual artery, passes between the genioglossus muscle and inferior longitudinal muscle.

**Nerves**

The hypoglossal nerve (CN XII) provides motor innervation to all of the intrinsic and extrinsic muscles of the tongue except for the palatoglossus muscle, which is innervated by the vagus nerve (CN X). It runs superficial to the hyoglossus muscle. Lesions of the hypoglossal nerve cause deviation of the tongue to the ipsilateral (i.e., damaged) side.

Taste to the anterior two-thirds of the tongue is achieved through innervation from the chorda tympani nerve, a branch of the facial nerve (CN VII). General sensation to the anterior two-thirds of the tongue is by innervation from the lingual nerve, a branch of the mandibular branch of the trigeminal nerve (CN V3). The lingual nerve is located deep and medial to the hyoglossus muscle and is associated with the submandibular ganglion.

On the other hand, taste to the posterior one-third of the tongue is accomplished through innervation from the glossopharyngeal nerve (CN IX), which also provides general sensation to the posterior one-third of the tongue.

Taste perception also is performed by both the epiglottis and the epiglottic region of the tongue, which receives taste and general sensation from innervation by the internal laryngeal branch of the vagus nerve (CN X). Damage to the vagus nerve (CN X) causes contralateral deviation (i.e., away from the injured side) of the uvula.

**Muscles**

The tongue's intrinsic muscles include the following:

1. The **superior longitudinal lingual** muscle, which shortens the tongue and curls it upward.
2. The **inferior longitudinal lingual** muscle, which shortens the tongue and curls it downward.
3. The **transverse lingual** muscle, which elongates and narrows the tongue.
4. The **vertical lingual** muscle, which flattens the tongue.

The tongue's extrinsic muscles include the following:

1. The **genioglossus** muscle, which protrudes the tongue, and is innervated by the hypoglossal nerve (CN XII).
2. The **styloglossus** muscle, which draws up the sides of the tongue to create a trough for swallowing following adequate mastication. The pair of styloglossus muscles works together on each side to retract the tongue. The styloglossus muscle is innervated by the hypoglossal nerve (CN XII).
3. The **hyoglossus** muscle, which depresses and retracts the tongue and is innervated by the hypoglossal nerve (CN XII).
4. The **palatoglossus** muscle, which elevates the posterior tongue, closes the oropharyngeal isthmus, aids in the initiation of swallowing, and prevents the spill of saliva from the vestibule into the oropharynx by maintaining the palatoglossal arch. It is the only extrinsic muscle of the tongue that is not innervated by the hypoglossal nerve; instead, it is innervated by the vagus nerve (CN X).

**APPLIED ANATOMY**

* **Ankyloglossia ("tongue-tie")** occurs due to an abnormal length of the frenulum linguae which causes limited manipulation of the tongue during speech and results in a speech impediment. In the most common form of ankyloglossia, the frenulum extends to the tip of the tongue. Ankyloglossia can be corrected by surgically severing the lingual frenulum.
	+ - * **Fissured tongue** occurs when several small furrows present on the dorsal surface of the tongue. It can be an oral manifestation of psoriasis. It is generally painless and benign, and is often associated with other syndromes (e.g., Down syndrome)
* **Geographic tongue** is a benign, asymptomatic condition characterized by the presence of large red patches with a greyish-white border covering the dorsum of an otherwise normal tongue. It is caused by inflammation of the mucous membrane of the tongue, which results in loss of lingual papillae. The tongue tends to fall posteriorly, thus obstructing the airway. Paralysis or total relaxation of the genioglossus muscle presents a risk of suffocation, which can occur during general anesthesia. An artificial airway is made using intubation, which prevents the tongue from falling backward and blocking the airway.
* Ludwig angina infection, once established, evolves to include the tongue. The tongue may enlarge to two or three times its usual size and tends to distend posteriorly into the hypopharynx, superiorly against the palate, and anteriorly out of the oral cavity. Any immediate posterior extension of this process will ultimately involve the epiglottis. The styloglossus muscle creates the connection between the submandibular parapharyngeal spaces, otherwise known as the buccopharyngeal gap, as it leaves the tongue and passes in between the middle and superior constrictor muscles before attaching to the styloid process. Cellulitis of the submandibular space may spread into the pharyngeal space and, from there, into the retropharyngeal space of the mediastinum.
* Dysgeusia, or a pure taste disorder, is rare and is usually associated with olfactory disorders.
1. **WRITE AN ESSAY ON AIR SINUSES**

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The paranasal sinuses are air-filled spaces located within the bones of the skull and facial bones. They are centered on the nasal cavity and have various functions, including lightening the weight of the head, humidifying and heating inhaled air, increasing the resonance of speech, and serving as a crumple zone to protect vital structures in the event of facial trauma.Four sets of paired sinuses are recognized: **maxillary, frontal, sphenoid, and ethmoid**

**MAXILLARY SINUS**

The maxillary sinus is the largest paranasal sinus and lies inferior to the eyes in the maxillary bone. It is the first sinus to develop and is filled with fluid at birth. It grows according to a biphasic pattern, in which the first phase occurs during years 0-3 and the second during years 6-12. The earliest phase of pneumatization is directed horizontally and posteriorly, whereas the later phase proceeds inferiorly toward the maxillary teeth. This development places the floor of the sinus well below the floor of the nasal cavity. The shape of the sinus is a pyramid, with the base along the nasal wall and the apex pointing laterally toward the zygoma. The natural ostium of the maxillary sinus is located in the superior portion of the medial wall. The anterior maxillary sinus wall houses the infraorbital nerve, which runs through the infraorbital canal along the roof of the sinus and sends branches to the soft tissues of the cheek. The thinnest portion of the anterior wall is above the canine tooth, called the canine fossa, which is an ideal entry site for addressing various disease processes of the maxillary sinus. The roof of the maxillary sinus is the floor of the orbit. Behind the posteromedial wall of the maxillary sinus lies the pterygopalatine fossa, a small inverted space that houses several important neurovascular structures and communicates with several skull base foramina. The infratemporal fossa lies behind the posterolateral wall of the maxillary sinus. The maxillary sinus is supplied by branches of the internal maxillary artery, which include the infraorbital, alveolar, greater palatine, sphenopalatine arteries. It is innervated by branches of the second division of the trigeminal nerve, the infraorbital nerve, and the greater palatine nerves.

**FRONTAL SINUS**

The frontal sinus is housed in the frontal bone superior to the eyes in the forehead. It is formed by the upward movement of anterior ethmoid cells after the age of 2. Developmentally, this is the last sinus to pneumatize. Growth increases at age 6 years and continues until the late teenage years.The frontal sinuses are funnel-shaped structures with their ostia located in the most dependent portion of the cavities. The posterior wall of the frontal sinus, which separates the sinus from the anterior cranial fossa, is much thinner than its anterior wall. The frontal sinus is supplied by the supraorbital and supratrochlear arteries of the ophthalmic artery. It is innervated by the supraorbital and supratrochlear nerves of the first division of the trigeminal nerve.

**SPHENOID SINUS**

The sphenoid sinus originates in the sphenoid bone at the center of the head. It arises not from an outpouching of the nasal cavity but from the nasal embryonic lining. The sinus reaches its full size by the late teenage years. The sphenoid sinus is variably pneumatized and may extend as far as the foramen magnum in some patients. The thickness of the walls of the sphenoid sinus is variable, with the anterosuperior wall and the roof of the sphenoid sinus (the planum sphenoidale) being the thinnest bones. The sphenoid sinus ostium is located on the anterosuperior surface of the sphenoid face, usually medial to the superior turbinate. The sphenoid sinus is supplied by the sphenopalatine artery, except for the planum sphenoidale, which is supplied by the posterior ethmoidal artery. Innervation of the sphenoid sinus comes from branches of the first and second divisions of the trigeminal nerve.

**ETHMOID SINUS**

The ethmoid sinuses arise in the ethmoid bone, forming several distinct air cells between the eyes. They are a collection of fluid-filled cells at birth that grow and pneumatize until the age of 12. The ethmoid cells are shaped like pyramids and are divided by thin septa. They are bordered by the middle turbinate medially and the medial orbital wall laterally. The ethmoid labyrinth may extend above the orbit, lateral and superior to the sphenoid, above the frontal sinus, and into the roof of the maxillary sinus. The ethmoid sinuses are supplied by the anterior and posterior ethmoidal arteries from the ophthalmic artery (internal carotid system), as well as by the sphenopalatine artery from the terminal branches of the internal maxillary artery (external carotid system).