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DEPARTMENT: MBBS

COURSE: GROSS ANATOMY OF THE HEAD AND NECK

COURSE CODE: ANA301

ASSIGNMENT TITLE: NOSE AND ORAL CAVITY

**ANSWER**

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

**TONGUE**

The tongue is a mass of muscle in most vertebrates almost completely covered by mucous membrane. It occupies most of the ORAL CAVITY & OROPHARYNX. Its average length from the oropharynx is about 10cm. Its average weight in males and females is about 70g and 60g respectively. Its upper surface (dorsum) is covered by taste buds which are housed in the numerous lingual papillae. It is sensitive and kept moist by saliva. It has a rich blood supply and innervation (which comes from five cranial nerves). It is known for its role in taste though it has some other important functions such as assisting in mastication, deglutition (swallowing), oral cleansing and articulation(speech).

**UPPER SURFACE OF THE TONGUE**

The upper surface of the tongue is divided into two parts by the TERMINAL SULCUS. They include:

* Oral part, which is located at the front and is innervated by the LINGUAL NERVE, which is a branch of mandibular division of trigeminal nerve (CNV3) for somatosensory perception and by the CHORDA TYMPANI, a branch of the facial nerve for taste perception.
* Pharyngeal part located posteriorly and is innervated by the GLOSSOPHARYNGEAL NERVE.

It is separated into the right and left side by a vertical section of fibrous tissue known as LINGUAL SEPTUM, that results in the groove, MEDIAN SULCUS on the tongue’s surface, dividing the tongue into two symmetrical halves. FORAMEN CECUM marks the end of this division (about 2.5cm from root of the tongue) and beginning of the TERMINAL SULCUS and it is also the site of attachment of THYROGLOSSAL DUCT.

**UNDERSURFACE OF THE TONGUE**

At the under surface of the tongue is the presence of a fold of mucous membrane known as FRENULUM, that tethers at the midline of the tongue to the floor of the mouth. On both sides of the frenulum is the presence of a small prominence known as the SUBLINGUAL CARUNCLE, into which major salivary SUBMANDIBULAR GLANDS drain into.

**MUSCLES OF THE TONGUE**

There are eight muscles of the tongue which are divided into two groups (4 each) and they include:

* INTRINSIC GROUP; responsible for the change in tongue shape, not attached to any bone and they are as follows; Superior longitudinal, Inferior longitudinal, Transverse and Vertical muscles.
* EXTRINSIC GROUP; responsible for change in tongue’s position and are attached to bone. They include; Genioglossus, Hyoglossus including the, Palatoglossus, Styloglossus.

**INTRINSIC GROUP OF MUSCLES**

SUPERIOR LONGITUDINAL MUSCLE

* ORIGIN: Lingual septum and Submucous fibrous layer.
* INSERTION: Margins of the tongue.
* FUNCTION: Elevates tip and sides of the tongue.

INFERIOR LONGITUDINAL MUSCLE: It is continuous with the styloglossus muscle.

* ORIGIN: Body of hyoid and base of tongue.
* INSERTION: Apex of the tongue.
* FUNCTION: Shortens the tongue.

TRANSVERSE MUSCLE: It joins the superior and inferior longitudinal muscle.

* ORIGIN: Lingual septum.
* INSERTION: Submucous fibrous layer.
* FUNCTION: Narrows and lengthens the tongue.

VERTICAL MUSCLE

* ORIGIN: Superior surface of the tongue.
* INSERTION: Inferior surface of the tongue.
* FUNCTION: Flattens and broadens the tongue

**EXTRINSIC GROUP OF MUSCLES**

GENIOGLOSSUS MUSCLE

* ORIGIN: Mental spine of the mandible.
* INSERTION: Lateral and inferior tongue.
* FUNCTION: Depresses and protrudes the tongue.

HYOGLOSSUS MUSCLE

* ORIGIN: Body and greater horn of the hyoid.
* INSERTION: Lateral and inferior tongue.
* FUNCTION: Depresses and retracts the tongue.

STYLOGLOSSUS MUSCLE

* ORIGIN: Styloid and stylohyloid ligament.
* INSERTION: Lateral and inferior tongue.
* FUNCTION: Retracts tongue.

PALATOGLOSSUS MUSCLE

* ORIGIN: Palatine aponeurosis.
* INSERTION: Lateral tongue.
* FUNCTION: Elevates posterior tongue.

**VASCULATURE OF THE TONGUE**

ARTERIAL SUPPLY: The tongue is primarily supplied by the LINGUAL ARTERY, branch of the EXTERNAL CAROTID ARTERY. Secondary supply to the root of the tongue is by TONSILLAR BRANCH of the facial artery and by the ASCENDING PHARYNGEAL ARTERY.

VENOUS DRAINAGE: Venous drainage is by the LINGUAL VEINS which drains into the INTERNAL JUGULAR VEINS

LYMPHATICS:

* The tip of the tongue is drained by the SUBMENTAL NODES
* The top right and left anterior two-third drains into SUBMANDIBULAR NODES
* Posterior one-third drains into the JUGULO-OMOHYOID NODES

**INNERVATION OF THE TONGUE**

Innervation here consists of motor fibers, general sensory fibers for sensation, special sensory fibers for taste.

* Motor nerve supply to all muscle of the tongue is from the efferent nerve fibers of the HYPOGLOSSAL NERVE (CNXII) except for the palatoglossus muscle which is supplied by the PHARYNGEAL PLEXUS associated with VAGUS NERVE (CNX).
* Innervation for the anterior two-third and posterior part are different due to derivations from two different pharyngeal arches.

For anterior two-thirds:

TASTE SENSATION: It is by the CHORDA TYMPANI, a branch of facial nerve (CNVII) via special visceral afferent fibers.

GENERAL SENSATION: It is by lingual nerve, a branch of the third division of trigeminal nerve (CNV3) via general visceral afferent fibers.

For the posterior one-third:

Both taste and general sensation is by GLOSSOPHARYNGEAL NERVE via a mixture of special and general visceral afferents.

For the base of the tongue:

Both taste and general sensation is by the INTERNAL BRANCH of the SUPERIOR LARYNGEAL ARTERY (a branch of the vagus nerve).

**CLINICAL ANATOMY**

- Injury to the hypoglossal nerve, could result in the deviation of the tongue towards the paralyzed side during protrusion. Over time, the tongue also atrophies on the paralyzed side.

- ANKYLOGLOSSIA: A congenital anomaly of the tongue also known as TONGUE TIE, which involves the tongue being tied to the floor as a result of short and thickened frenulum, affecting movement of tongue and thus ultimately affecting speech, eating and swallowing.

- GLOSSITIS: It is the inflammation and depapillation of the dorsal surface of the tongue leaving behind a smooth erythematous surface. This is usually as a result of NUTRITIONAL DEFICIENCY.

- TONGUE CANCER: A type of oral cancer that develops on the squamous cell (Squamous cell carcinoma) on the surface of the tongue. It can cause tumors or lesions. The most noticeable signs of tongue cancer are a sore tongue that doesn't heal and a painful tongue.

1. Write an essay on the air sinuses.

**AIR SINUSES**

It is also known as PARANASAL SINUS. It is a group of four paired air filled spaces that surround the nasal cavity. Each named after the facial bone they are located on. They include:

* Maxillary sinus
* Sphenoidal sinus
* Ethmoidal sinus
* Frontal sinus

MAXILLARY SINUSES: It is the largest of the four sinuses. It is the first sinus to develop and is filled with fluid at birth. It is located inferior to the eye, in the maxillary bone (Opens in the back of SEMILUNAR HIATUS of the nose). It is pyramidal in shape, with the base along the nasal wall and an apex pointing towards the ZYGOMA.

ARTERIAL SUPPLY: It is supplied by branches of INTERNAL MAXILLARY ARTERY which includes the infraorbital, alveolar, greater palatine and sphenopalatine arteries.

INNERVATION: It is innervated by the branches of trigeminal nerve (CNV2), infraorbital and greater palatine nerves.

FRONTAL SINUSES: It is superior to the eyes, in the frontal bone, which forms the hardest part of the forehead. It is funnel-shaped with their ostia located in the most dependent portion of the cavities. They first appear at about age 6 and fully develops at adulthood.

ARTERIAL SUPPLY: It is supplied by the supraorbital and supratrochlear branches of the ophthalmic artery.

INNERVATION: Supraorbital and supratrochlear nerves of the first division of trigeminal nerve (CNV1).

ETHMOIDAL SINUSES: It’s formed from discrete air cells within the ethmoid bone between the eyes and nose. Along with the maxillary sinus, it is fully developed at birth but not yet aerated. It only becomes aerated at ages 7-12.

ARTERIAL SUPPLY: Blood supply is from anterior and posterior ethmoidal arteries from ophthalmic artery (Internal carotid system) and sphenopalatine arteries from the terminal branches of internal maxillary artery (External carotid system).

INNERVATION: Ethmoidal nerves which branch from nasociliary nerves of the first division of trigeminal nerves (CNV1) innervates this sinus.

SPHENOIDAL SINUS: It is located in the sphenoid bone behind the eyes. It appears around age 3.

ARTERIAL SUPPLY: It is supplied by sphenopalatine artery except for the PLANUM SPHENOIDALE, which is supplied by POSTERIOR ETHMOIDAL ARTERY.

INNERVATION: Innervation of this sinus comes from the first and second division of the trigeminal nerve (CNV1 and CNV2).

GENERAL FUNCTIONS OF THE AIR SINUSES

* Lightening the weight of the head.
* Humidifying and heating air.
* Increasing speech resonance.
* Serves as CRUMPLE ZONES to protect vital structures in the event of facial trauma.

CLINICAL ANATOMY:

1. SINUSITIS: This is simply the inflammation of the sinus. Paranasal sinuses are joined to the nasal cavity by small orificies called OSTIA. This may become blocked as a result of allergic inflammation or nasal lining swelling that occurs with cold. This then disrupts normal drainage of mucus within the sinus resulting in SINUSITIS. Since the maxillary posterior teeth are in close proximity with the maxillary sinus, sinusitis in this case could be secondary, occurring as result of other clinical problems such as infection of the teeth.

TREATMENT:

1. By using DECONGESTANTS, which causes vasoconstriction reducing inflammation.
2. By using traditional techniques such as NASAL IRRIGATION.
3. By using CORTICOSTEROIDS.
4. CANCER: Paranasal sinus malignancies contribute about 0.2% of all malignancies. 80% of which are maxillary sinus. Tumor of frontal and sphenoidal sinus are extremely rare. Men are more affected than women. Carcinomas are more frequent than sarcomas. Mostly occurs between 40-70 years. Metastases are rare.