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Medicine & Surgery

Gross Anatomy Assignment

***Questions***

1. ***Discuss the anatomy of the tongue and comment on its clinical anatomy.***
2. ***Write an essay on air sinuses.***



 THE TONGUE

1. The tongue is a mobile muscular organ. It is partly located in the oral cavity and partly in the oropharynx. The tongue is involved for mastication, taste, deglutition etc. the tongue functions mainly in forming words during speaking and squeezing food into the oropharynx during swallowing. The tongue has a root, a body, an apex, a curved dorsum and an inferior surface. The root is the part of the tongue that rests on the floor of the mouth its defined mostly as the posterior third of the tongue. The body is the anterior two third of the tongue, the apex is the anterior end of the body that rests on the incisor teeth. The dorsum of the tongue is the posterosuperior surface located partly in the oral cavity and partly in the oropharynx. The terminal sulcus (the angle of which points posteriorly to the foramen cecum) on the tongue divides the dorsum into an anterior/oral part and a posterior/pharyngeal part.

 The surface of the tongue is rough due to the presence of numerous small lingual papillae. The papillae present on the human tongue are

* ***Vallate papillae-*** They are large and flat topped, they lie directly anterior to the terminal sulcus and arranged in a V- shaped row.
* ***Filiform papillae-*** They are long and numerous, contain afferent nerve endings that are sensitive to touch. They are arranged in V- shaped rows parallel to the terminal sulcus
* ***Fungiform papillae-*** They are mushroom shaped pink or red spots. They are mostly found at the apex and margins of the tongue.

They all have taste receptors in their taste buds. The anterior part of the tongue has a mucous membrane that is thin and closely attached to the underlying muscle. The tongue is divided into right and left halves by a shallow midline groove. The posterior part of the tongue also has a mucous membrane that is thick and freely moveable, it has no lingual papillae but contains lymphoid nodules. The inferior surface of the tongue is covered by a thin, transparent mucous membrane from where we can see the underlying veins. At the inferior part, we can see the frenulum of the tongue. It connects the tongue to the floor of the oral cavity, it also allows the anterior tongue move freely.

***Muscles of the tongue.***

 There are the extrinsic muscles of the tongue and they function in altering the position of the tongue. The intrinsic muscles of the tongue function in altering the shape of the tongue. The intrinsic muscles have their attachments entirely within the tongue and are not attached to any bone unlike the extrinsic muscles

 The extrinsic muscles are:

1. **Geniglossus-** Fan shaped muscle
* *Proximally attached to the mental spine of the mandible*
* *Distally attached to the dorsum of the tongue, its inferior and posterior fiber attach to the body of hyoid bone*
* *It functions in depressing the tongue especially the central part, it pulls the tongue anteriorly for protrusion and retracts the apex of the protruded tongue*
1. **Hyoglossus-** Thin quadrilateral muscle
* *Proximally attached to the body and greater horn of hyoid bone*
* *Distally attached to the inferior aspects of lateral part of tongue*
* *It functions in depressing the tongue and shortening the tongue*
1. **Styloglossus**- Small, short triangular muscle
* *Proximally attached to the anterior border of distal styloid process and stylohyoid ligament*
* *Distally attached to the sides of the tongues posteriorly*
* *It shortens tongue and elevates its sides.*
1. **Palatoglossus-** Crescent shaped muscle
* *Proximally attached to the palatine aponeurosis of soft palate*
* *Distally attached to the posterolateral tongue blending with intrinsic transverse muscles*

 The intrinsic muscles are:

1. **Superior longitudinal muscle**
* *Proximally attached to the submucous fibrous layer and median fibrous septum*
* *Distally attached to the margins of the tongue and mucous membrane*
* *It curls tongue longitudinally upward, elevates apex and sides of tongue, shortens tongue*
1. **Inferior longitudinal muscle**
* *Proximally attached to the root of tongue and body of hyoid bone*
* *Distally attached to the apex of tongue*
* *It curls tongue longitudinally downward, depresses apex, shortens tongue*
1. **Transverse muscle**
* *Proximally attached to the median fibrous septum*
* *Fibrous tissue at lateral lingual margins*
* *It narrows and protrudes the tongue*
1. **Vertical muscle**
* *Proximally attached to the submucous fibrous layer of dorsum of tongue*
* *Distally attached to inferior surface of borders of tongue*
* *It flattens and broadens the tongue*

***Innervation of tongue***

* All muscles of the tongue aside palatoglossus receive motor innervation from hypoglossal nerve
* General sensation of anterior two third of tongue- lingual nerve, a branch of CN V3
* Special sensation of anterior two third of tongue- chorda tympani nerve, a branch of CN VII
* General and special sensation of posterior third of the tongue and the vallate papillae- lingual branch of glossopharyngeal nerve (CN IX)
* General and a little special sensation of the small area of the tongue anterior to the epiglottis- Internal laryngeal nerve, a branch of the vagus nerve.

***Arteries of the tongue***

 Mainly derived from the lingual artery, a branch of the external carotid artery. The dorsal lingual arteries supply the posterior part and the deep lingual arteries supply the anterior part

***Veins of the tongue***

 They are the deep lingual veins and the dorsal lingual veins they run alongside arteries. The deep lingual veins run alongside the frenulum to join the sublingual vein. These veins drain into the internal jugular vein.

***Lymphatic drainage***

* Lymph from posterior third – superior deep cervical lymph nodes
* Lymph from the medial part of the anterior two third- inferior deep cervical lymph nodes
* Lymph from the lateral parts of the anterior two third- submandibular lymph nodes
* Lymph from apex and frenulum- submental lymph nodes

***Clinical anatomy***

* Paralysis of geniglossus- paralysis of this muscle cause the tongue to fall posteriorly obstructing the airway and presenting the risk of suffocation
* Injury to hypoglossal nerve- Trauma such as a fractured mandible may injure the hypoglossal nerve resulting in paralysis and eventual atrophy of one side of the tongue. Upon examination the tongue deviates to the paralyzed side during protusion
* Frenectomy- cutting of the frenulum, it may occur due to an overly large lingual frenulum which can interfere with tongue movements and may affect speech.
1. ***Paranasal 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. The paranasal air sinuses are lined with respiratory epithelium (ciliated pseudostratified columnar epithelium).

 ***The maxillary sinuses***, the largest of the paranasal sinuses, are under the eyes, in the maxillary bones (open in the back of the semilunar hiatus of the nose). Its apex extends towards the zygomatic bone, the base forms the inferior part of the lateral wall of the nasal cavity, the roof is formed by the floor of the orbit and the floor is formed by the alveolar part of the maxilla. They are innervated by the anterior, middle and posterior superior alveolar nerves, a branch of the maxillary nerve. At birth the maxillary sinus is developed but not yet pneumatized; only by the age of seven is it fully aerated.

***The frontal sinuses***, superior to the eyes, in the frontal bone, which forms the hard part of the forehead. They are also innervated by branches of supraorbital nerve. The right and left sinuses are usually not of equal size. The size of the frontal sinus may be 5mm or more. It has a vertical part and a horizontal part. the frontal sinuses first appear between the age of six or seven, and fully develop during adulthood

***The ethmoidal sinuses*** are formed from several discrete air cells within the ethmoid bone between the nose and the eyes. They are innervated by the anterior and posterior ethmoidal branch of the nasociliary nerve of the trigeminal nerve (CN V1). This sinus has the anterior part that drains directly or indirectly into the middle nasal meatus through the ethmoidal infundibulum. The middle part opens directly into the middle nasal meatus, and the posterior part that opens directly into the superior meatus. At birth the ethmoid sinus is developed but not yet pneumatized; only by the age of seven is it fully aerated

***The sphenoidal sinuses***, are unevenly divided and separated by a bony septum. They are derived from a posterior ethmoidal sinus that begins to invade the sphenoid at approximately 2 years of age. The sphenoidal sinuses open separately into the sphenoethmoidal recess. They are innervated by the posterior ethmoidal arteries and nerve supply this sinus

***Clinical anatomy***

* **Sinusitis:** The paranasal 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 corticosteroids.
* **Cancer:** Malignancies of the paranasal 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. Tumors of the sphenoid and frontal sinuses are extremely rare.