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ANA 301

QUESTION 1

The tongue (lingua) occupies the ventral aspect of the oral cavity and oropharynx. It is involved with grooming, lapping, prehension and manipulating food in the oral cavity. It is also involved in the deglutition reflex and vocalisation. The tongue is capable of vigorous and precise movements due to the apex being free of attachments to the oral cavity.

STRUCTURE AND FUNCTIONS

The tongue is skeletal muscle dorsally and structural fat surrounded by a cartilagenous sheath forming lyssa (canids only) ventrally. It has an attached root and body with a free apex. The frenulum (fold of mucosa) attaches the body of the tongue to the floor of the oral cavity. The root of tongue is attached to the hyoid bone. In the horse and dog, the tongue is 'u' shaped, becoming broader towards the tip. The furrow in the centre of the canid tongue is called the median sulcus. In the ox, sheep and pig the tongue is 'v' shaped with a pointed apex. The torus linguae is a swelling across the tongue laterally which pushes food against the hard palate.

PARTS OF THE TONGUE

It has several parts:

Root: This posterior one-third of the tongue is attached to the floor of the oral cavity.

Body: The mobile anterior two-thirds of the tongue is the body.

Apex: The apex is the tip of the tongue.

Dorsum: This part is the surface of the tongue. The terminal sulcus and the foramen cecum mark the area where the root and the body meet. It also has a midline groove that divides the tongue into left and right halves.

Inferior surface of the tongue: This part has a thin transparent membrane. A large fold of mucosa, called the frenulum, can be seen running down the midline. The ducts of the submandibular salivary glands are found at the base of the frenulum.

The anterior part of the tongue contains a large number of lingual papillae:

Vallate papillae: These papillae lie just anterior to the terminal sulcus and contain taste buds and lingual glands that secrete serous fluids.

Foliate papillae: These small folds along the sides of the tongue contain taste buds.

Filiform papillae: These papillae cover a large portion of the dorsum. They’re thread-like and sensitive to touch but do not contain taste buds.

Fungiform papillae: These mushroom-shaped papillae appear as red spots. They’re most concentrated on the apex and sides of the tongue. They also contain taste buds.

MUSCLES OF THE TONGUE

Following are the intrinsic muscles:

-Superior longitudinal muscle: This muscle originates on the submucosal fibrous layer and the septum and inserts into the margins of the tongue and mucous membrane. It curls the tongue upward and also shortens it.

-Inferior longitudinal muscle: Originating in the root of the tongue and on the hyoid bone, this muscle inserts into the apex. It curls the tongue downward and shortens it.

-Transverse muscle: This muscle originates on the septum and inserts on the lateral margins of the tongue. It narrows and protrudes the tongue.

-Vertical muscle: This muscle originates on the submucosal fibrous layer of the dorsum and inserts on the inferior surfaces of the borders of the tongue. It flattens and broadens the tongue.

the extrinsic muscles:

-Genioglossus: This fan-shaped muscle originates on the mandible and inserts onto the entire dorsum of the tongue and the hyoid bone. It protrudes the tongue and assists with other movements.

-Hyoglossus: This thin muscle originates on the hyoid bone and inserts onto the inferior and lateral parts of the tongue. It depresses and shortens the tongue.

-Styloglossus: This small, triangular muscle originates on the styloid process of the temporal bone and inserts onto the posterior parts of the tongue. It retrudes (pulls back) the tongue and curls its sides.

-Palatoglossus: This crescent-shaped muscle originates on the palatine aponeurosis and inserts onto the posterolateral part of the tongue. It elevates the posterior part of the tongue and depresses the soft palate.

Innervation

All muscles moving the tongue are innervated by the hypoglossal nerve (. The rostral 2/3 of the tongue is innervated by the sensory lingual branch of the trigeminal transmitting temperature, touch and pain sensation. The chorda tympani of the facial nerve transmits the taste. The caudal 1/3 of the tongue is innervated by the glossopharyngeal providing sensory function for taste.

QUESTION 2

The paranasal sinuses are air-filled **extensions** of the respiratory part of the nasal cavity. There are **four** paired sinuses, named according to the bone in which they are located; maxillary, frontal, sphenoid and ethmoid.

The function of the sinuses is not clear. It is thought that they may contribute to the **humidifying**of the inspired air. They also reduce the weight of the skull.

Sinuses are formed in childhood by the nasal cavity **eroding** into surrounding bone. As they are outgrowths of the nasal cavity, they all drain back into it **openings** to the paranasal sinuses are found on the **roof** and **lateral** walls of the nasal cavity. The inner surface is lined by a respiratory mucosa.

**Frontal Sinuses**: These are the most **superior** in location, found under the forehead. The frontal sinuses are variable in size, but always triangular-shaped. They drain into the nasal cavity via the **frontonasal duct**, which opens out at the hiatus semilunaris on the lateral wall.

**Sphenoid Sinuses**:  The sphenoid sinuses also lie relatively superiorly, at the level of the spheno-ethmodial recess.They are found more **posteriorly**, and are related superiorly and laterally to the **cranial cavity**. The sphenoid sinuses drain out onto the roof of the nasal cavity.  The relationships of this sinus are of clinical importance the **pituitary gland** can be surgically accessed via passing through the nasal roof, into the sphenoid sinus and through the sphenoid bone.

**Ethmoidal Sinuses**: There are three ethmoidal sinuses; anterior, middle and posterior. They empty into the nasal cavity at different places:

Anterior – Hiatus semilunaris

Middle – Ethmoid bulla

Posterior – Superior meatus

**Maxillary Sinuses:**The largest of the sinuses. It is located laterally and slightly **inferiorly** to the nasal cavities. It drains into the nasal cavity at the **hiatus semilunaris,** underneath the **frontal sinus** opening. This is a potential pathway for spread of infection fluid draining from the frontal sinus can enter the maxillary sinus.