Oral Cavity & Pharynx

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ORAL CAVITY
Introduction

- The **oral cavity**, known sometimes as “buccal cavity”, is the start of the alimentary canal.
- The content of the oral cavity determines its function.
- It houses the structures necessary for mastication and speech, which include teeth, tongue and associated structures such as salivary glands.
- Most of the oral cavity functions are related to the tongue, especially the tongue’s muscular and sensory abilities.
Functions

- **Digestion**: receives food, preparing it for digestion in the stomach and small intestine.

- **Communication**: modifies the sound produced in the larynx to create a range of sounds.

- **Breathing**: acts as an air inlet in addition to the nasal cavity.
Structure

- The mouth extends from lips to oropharyngeal isthmus that is the junction of the mouth with the pharynx.

- It is subdivided into:
  - The vestibule, which lies between the lips and cheeks externally and the gums and teeth internally.
  - The mouth cavity proper, which lies within the alveolar arches, gums, and teeth.

- Its boundaries include:
  - Anterior: Lips
  - Superior: Hard & Soft Palates
  - Posterior: Continuous with the Oropharynx
Vestibule

- The horseshoe shaped is situated anteriorly.
- It is the space between the lips/cheeks and the gums/teeth.
- The vestibule communicates with the mouth proper via the space behind the third molar tooth, and with the exterior through the oral fissure.
- The diameter of the oral fissure is controlled by the muscles of facial expression.
- Opposite the upper second molar tooth, the duct of the parotid gland opens out into the vestibule, secreting salivatory juices.
Mouth Proper

- Lies posteriorly to the vestibule.
- It is bordered by a roof, a floor, and the cheeks.
- The tongue fills a large proportion of the cavity of the mouth proper.
- The roof consists of the hard and soft palates.
- The floor consists of several structures:
  - **Muscular diaphragm** comprised of the bilateral mylohyoid muscles to provide structural support to the floor of the mouth.
  - **Geniohyoid muscles** to pull the larynx forward during swallowing.
  - **Tongue** that connected to the floor by the frenulum of the tongue, a fold of oral mucosa.
  - **Salivary glands** and ducts.
Cheeks

- The cheeks are formed by the buccinator muscle, which is lined internally by the oral mucous membrane.
- The buccinator muscle contracts to keep food between the teeth when chewing.
- It is innervated by the buccal branch of the facial nerve (CN VII).
Salivary Glands

- Salivary glands are exocrine glands that produce saliva.
- There are three large named pairs of salivary glands and multiple unnamed glands in the submucosa of the oral cavity (lips, palate & under surface of the tongue).
- **Parotid** produces a serous, watery secretion.
- **Submandibular** produces a mixed serous & mucous secretion.
- **Sublingual** secretes a saliva that is predominantly mucous.
Tongue

- The tongue is a muscular organ in the mouth covered with moist, pink tissue called mucosa.
- Tiny bumps called papillae give the tongue its rough texture.
- Thousands of taste buds cover the surfaces of the papillae.
- Taste buds are collections of nerve-like cells that connect to nerves running into the brain.
Intrinsic Muscles of Tongue

- Superior longitudinal
- Inferior longitudinal
- Transverse
- Vertical muscles
- All intrinsic and extrinsic muscles are innervated by the hypoglossal nerve
Extrinsic Muscles of Tongue

- **Genioglossus**
  - **Attachments:** Arises from the mandibular symphysis. Inserts into the body of the hyoid bone and the entire length of the tongue.
  - **Function:** Inferior fibres protrude the tongue, middle fibres depress the tongue, and superior fibres draw the tip back and down.
  - **Innervation:** Motor innervation via the hypoglossal nerve.

- **Hyoglossus**
  - **Attachments:** Arises from the hyoid bone and inserts into the side of the tongue.
  - **Function:** Depresses and retracts the tongue.
  - **Innervation:** Motor innervation via the hypoglossal nerve.
Extrinsic Muscles of Tongue

- **Styloglossus**
  - **Attachments**: Originates at the styloid process of the temporal bone and inserts into the side of the tongue.
  - **Function**: Retracts and elevates the tongue.
  - **Innervation**: Motor innervation via the hypoglossal nerve.

- **Palatoglossus**
  - **Attachments**: Arises from the palatine aponeurosis and inserts broadly across the tongue.
  - **Function**: Elevates the posterior aspect of the tongue.
  - **Innervation**: Motor innervation via the vagus nerve.
Blood Supply of Tongue

- The lingual artery (branch of the external carotid) provides most of the blood supply.
- Tonsillar artery (branch of the facial artery), has some contribution to provide blood supply to the tongue.
- Drainage of the tongue is by the lingual vein.
Innervation of Tongue

- **The Anterior 2/3**
  - General sensation is supplied by the *trigeminal nerve*, specifically the *lingual nerve* (branch of the mandibular nerve).
  - Taste in the anterior 2/3 is supplied from the *facial nerve*.
  - In the petrous part of the temporal bone, the facial nerve gives off three branches, one of which is chorda tympani, which travels through the middle ear, and continues on to the tongue.

- **The Posterior 1/3**
  - Both touch and taste are supplied by the *glossopharyngeal nerve* (CNIX).
Hard Palate

- Found anteriorly.
- It is a bony plate that separates the nasal cavity from the oral cavity.
- It is covered superiorly by respiratory mucosa (ciliated pseudostratified columnar epithelium) and inferiorly by oral mucosa (stratified squamous epithelium).
- It is important for feeding and speech.
- It also involved in mastication.
- The interaction between the tongue and the hard palate is essential in the formation of certain speech sounds.
Soft Palate

- A posterior continuation of the hard palate and it is a muscular structure.
- It acts as a valve that can lower to close the oropharyngeal isthmus and elevate to separate the nasopharynx from the oropharynx.
- The soft palate is distinguished from the hard palate at the front of the mouth in that it does not contain bone.
- It closing off the nasal passages during swallowing.
- A speech sound made with the middle part of the tongue (dorsum) touching the soft palate is known as a velar consonant.
Blood Supply

- Blood is supplied to the oral cavity via branches of the external carotid artery:
  - Facial
  - Maxillary
  - Submental
  - Lingual
  - Ascending palatine artery

- The venous drainage the oral cavity occurs via:
  - Greater and lesser palatine
  - Sphenopalatine
  - Submental
  - Lingual
Innervation

- Sensory innervation of the oral cavity is supplied by the branches of the **trigeminal nerve** (CN V).
- The roof of oral mouth is innervated by the greater palatine and nasopalatine nerves.
- They are both derived from the **maxillary division** (V2) of the trigeminal nerve.
- The floor of the oral cavity receives sensory innervation from the **lingual nerve**, a branch of the **mandibular division** (V3) of the trigeminal nerve.
- The cheeks are innervated by the **buccal nerve**. It is also a branch of the **mandibular division** of the trigeminal nerve.
- The tongue is also innervated by special sensory fibers for taste from the **chorda tympani**, a branch of the **facial nerve** (CN VII).
Mouth Ulcer

- Very common occurring in association with other diseases.
- The two most common causes of oral ulceration are local trauma and stomatitis.
- Mouth ulcers often cause pain and discomfort and may alter the person’s choice of food while healing occurs (e.g. avoiding acidic or spicy foods and beverages).
- The ulcer may be maintained by inflammation or secondary infection.
- Rarely, a mouth ulcer that does not heal may be a sign of oral cancer.
Stomatitis

- It is an inflammation of the mucous membrane lining of the mouth including the cheeks, gums, lips, tongue and palate.

- It can be caused by injury such as burns from hot food or drinks, poorly fitting oral appliances, cheek biting, mouth breathing and poor oral hygiene.
Parotitis

- It is an inflammation of one or both parotid glands.
- Acute bacterial parotitis results from a bacterial infection commonly occurring after radiation therapy or in immunocompromised patients.
- Chronic parotitis is recurrent bouts of infection in patients with a blocked or narrowed salivary duct.
- Viral parotitis, commonly called mumps, is caused by the paramyxovirus and causes a severe swelling of the parotid glands.
Cleft Palate

- In the birth defect called **cleft palate**, the left and right portions of this plate are not joined, forming a gap between the mouth and nasal passage.
- A related defect affecting the face is cleft lip.
- While cleft palate has a severe impact upon the ability to nurse and speak, it is now successfully treated through reconstructive surgical procedures at an early age, where such procedures are available.
PHARYNX
The human pharynx is the part of the throat situated immediately inferior to the oral and nasal cavities, and superior to the esophagus and larynx.
Introduction

- The pharynx is the part of the throat that lies directly behind the mouth.
- It is a muscular tube that connects the nasal and oral cavities to the larynx and esophagus.
- It is common to gastrointestinal and respiratory tracts.
- It begins at the base of the skull and ends inferiorly to the cricoid cartilage at C6.
- It is divided into three parts known as the nasopharynx, oropharynx and laryngopharynx.
- Its muscular wall formed of two layers:
  - Inner longitudinal
  - Outer Circular
Nasopharynx

- It extends from the base of the skull to the upper surface of the soft palate.
- The anterior aspect of the nasopharynx communicates with the nasal cavities through the choanae.
- This part of the pharynx is lined with respiratory epithelium: ciliated pseudo-stratified columnar epithelium with goblet cells.
- It performs a respiratory function by conditioning inspired air and propagating it to the larynx.
Oropharynx

- It is the middle part of the pharynx, located between the soft palate and the superior border of the epiglottis.

- It lies behind the oral cavity, extending from the uvula to the level of the hyoid bone.

- It contains the following structures:
  - Posterior 1/3 of the tongue.
  - The lingual tonsils – Located inferiorly to the tongue.
  - The palatine tonsils
  - Superior constrictor muscle

- It is involved in the voluntary and involuntary phases of swallowing.

- Because both food and air pass through the pharynx, a flap of connective tissue called the epiglottis closes over the glottis when food is swallowed to prevent aspiration.
Laryngopharynx

- The most distal part of the pharynx, located between the superior border of the epiglottis and inferior border of the cricoid cartilage (C6).
- It is found posterior to the larynx and communicates with it via the laryngeal inlet.
- It is the part of the throat that is connected to the esophagus.
- It lies inferior to the epiglottis and extends to the location where this common pathway diverges into the respiratory (larynx) and digestive (esophagus) pathways.
- At that point, the laryngopharynx is continuous with the esophagus posteriorly where it conducts food and fluids to the stomach.
- The laryngopharynx contains the middle and inferior pharyngeal constrictors.
Muscles

▪ There are two types of muscles that form the walls of the pharynx; longitudinal and circular.

▪ The circular muscles contract sequentially from superior to inferior to constrict the lumen and propel the bolus of food inferiorly into the esophagus.
  • Superior pharyngeal muscles constrictor is found in the oropharynx.
  • Middle pharyngeal muscles constrictor is found in the laryngopharynx.
  • Inferior pharyngeal muscles constrictor is found in the laryngopharynx.

▪ The longitudinal muscles shorten and widen the pharynx and elevate the larynx during swallowing.

▪ In addition to contributing to swallowing, it also opens the Eustachian tube to equalize the pressure in the middle ear with the atmosphere.
Blood Supply

- **Arterial Blood Supply**
  - The pharynx is supplied by branches of the external carotid artery:
    - Ascending pharyngeal artery
    - Lingual artery
    - Facial artery
    - Maxillary artery

- **Venous Blood Drainage**
  - The pharynx is drained by the pharyngeal venous plexus, which drains into the internal jugular vein.
Innervation

- Most of the pharynx is innervated by the **pharyngeal plexus**, which comprises of:
  - Branches of the glossopharyngeal nerve (CN IX)
  - Branches of the vagus nerve (CN X)
  - Sympathetic fibers of the superior cervical ganglion.

- **Sensory:** Each of the three sections of the pharynx have a different innervation:
  - The **nasopharynx** is innervated by the **maxillary nerve** (CN V2).
  - The **oropharynx** by the **glossopharyngeal nerve** (CN IX).
  - The **laryngopharynx** by the **vagus nerve** (CN X).

- **Motor:** All the muscles of the pharynx are innervated by the **vagus nerve** (CN X), except for the stylopharyngeus, which is innervated by the **glossopharyngeal nerve** (CN IX).
Tonsillitis

- The palatine tonsils can become inflamed due to a viral or bacterial infection.
- Usually they appear red and enlarged.
- Chronic infection of the palatine tonsils can be treated with their removal (tonsillectomy).
- When performing a tonsillectomy, there may be bleeding primarily from the external palatine vein and secondarily from the tonsilar branch of the facial artery.
- If an infection spreads to the peritonsillar tissue, it can cause abscess formation.
QUESTIONS?

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