

HUMAN ANATOMY AND PHYSIOLOGY-II - BP201(T)

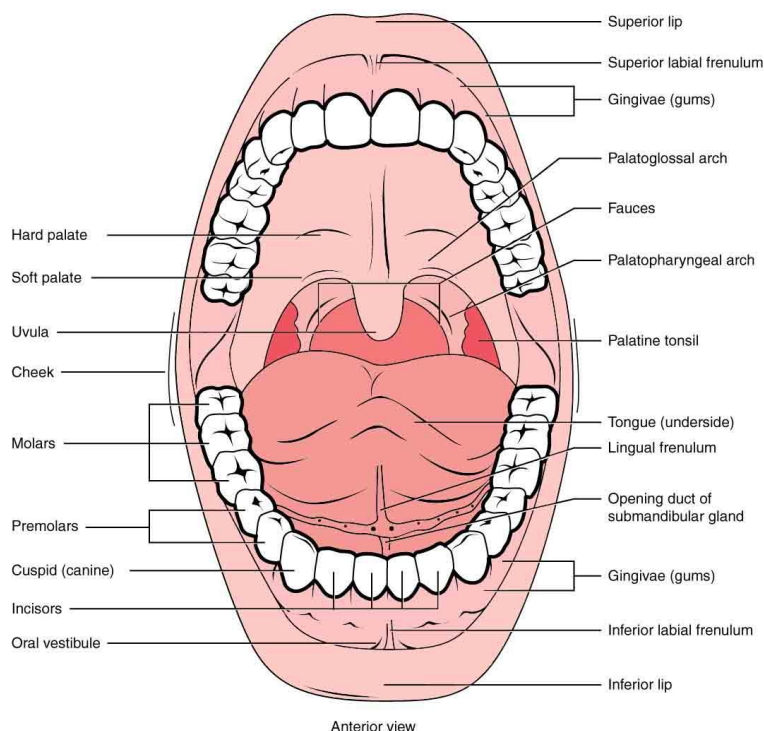
UNIT-II (Digestive System)

CLASS:2

TOPIC – Anatomy of GI Tract with special reference to anatomy and functions of stomach

STRUCTURE OF THE MOUTH

- The mouth or oral cavity is formed by muscles and bones:
 - Anteriorly – by the lips
 - Posteriorly- it is continuous with the oropharynx
 - Laterally – By the muscles of the Cheeks
 - Superiorly- by the bony hard palate and muscular soft palate
 - Inferiorly- by the muscular tongue & the soft tissues of the floor of mouth
- The oral cavity is lined throughout with mucous membrane, consisting of sturdy, stratified squamous epithelium containing small mucus-secreting glands.
- The part of the mouth between the gums and the cheeks is the **vestibule**, and the remainder of its interior is the oral cavity.
- The mucous membrane lining of the cheeks and the lips is reflected on to the gums or alveolar ridges and is continuous with the skin of the face.
- The palate forms the roof of the mouth and is divided into **anterior hard palate** and the **posterior soft palate**.
- The hard palate is formed by the maxilla and the palatine bones.
- The soft palate which is muscular, curves downward from the posterior end of the hard palate and blends with the walls of the pharynx at the sides.
- The **uvula** is curved fold of muscle covered with mucous membrane, hanging down from the middle of the free border of the soft palate.
- Originating from the upper end of the Uvula are **four folds of mucous membrane**, two passing downwards at each side to form **membranous arches**.
- The **posterior folds**, one on each side, are the **palatopharyngeal arches**, and the two **anterior folds** are the **palatoglossal arches**.
- On each side, between the arches, is a collection of lymphoid tissue called the **Palatine tonsil**.



Tongue

- It is composed of **Voluntary Muscle**. It is attached by its base to the hyoid bone and by a fold of its mucous membrane covering, called the **frenulum**, to the floor of the mouth.
- The superior surface consists of **stratified squamous epithelium, with numerous Papillae** (little projections).
- Many of these contain sensory receptors (specialised nerve endings) for the sense of taste in the taste buds.

Blood supply

- The main arterial blood supply to the tongue is by the lingual branch of the external carotid artery.
- Venous drainage is by the lingual vein, which joins the internal jugular vein.

Nerve Supply

The nerves involved are:

- The hypoglossal nerves (12th Cranial Nerves), which supply the Voluntary muscle.
- The lingual branch of the mandibular nerves, which arise from the 5th Cranial nerves, the nerves of somatic (ordinary) sensation, i.e. pain, temperature and touch.
- The facial and glossopharyngeal nerves (7th and 9th cranial nerves), the nerves of taste.

Functions

The tongue plays an important part in:

- Chewing (mastication)
- Swallowing (deglutition)
- Speech
- Taste

Nerve endings of the sense of taste are present in the papillae and widely distributed in the epithelium of the tongue.

Teeth

- The teeth are embedded in the alveoli, or sockets, of the alveolar ridges of the mandible and the maxilla.
- Babies are born with two sets, or dentitions: temporary or deciduous (baby) teeth and the permanent teeth.
- The teeth of both dentitions are present, in immature form, in the mandible and maxilla at birth.
- There are 20 temporary teeth, 10 in each jaw. They begin to erupt at about 6 months of age, and should all be present by 24 months.
- The permanent teeth begin to replace the deciduous teeth between the ages of 6 and 13 years.
- This dentition consisting of 32 teeth, is usually complete by the age of 20. The third molars (wisdom teeth) are the last to erupt.

Structure:

Although the shapes of the different teeth vary, the structure is the same and consists of:

The **crown**- the part that protrudes from the gum

The **root**- the part embedded in the bone

The **neck**- the slightly narrowed region where the crown merges with the root.

In the centre of the tooth is the **pulp cavity**, containing blood vessels, lymph vessels and nerves, and surrounding this is a **hard, ivory-like** substance called **dentine**.

The dentine of the crown is covered by a thin layer of a very hard substance, **enamel**.

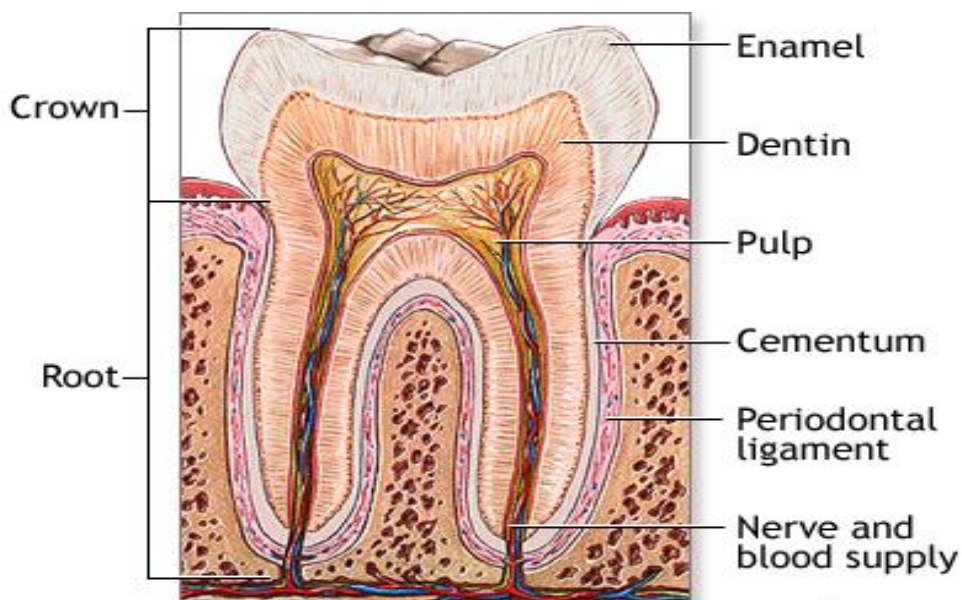
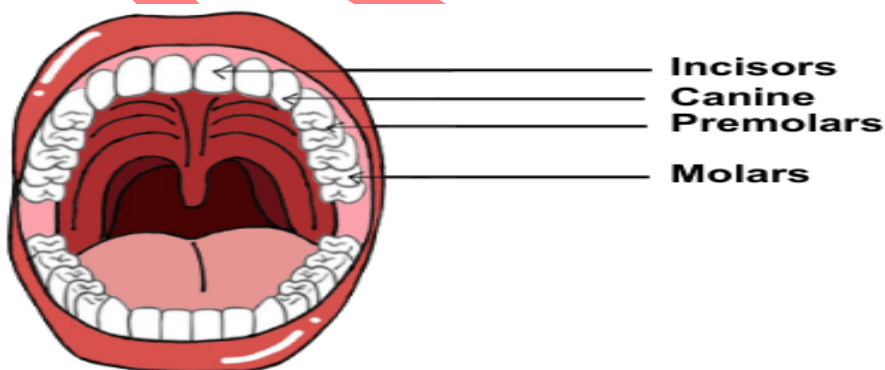
The root of the tooth, on the other hand, is covered with a substance resembling bone, called **cementum**, which secures the tooth in its socket. Blood vessels and nerves pass to the tooth through a small foramen (hole) at the apex of each root.

Blood Supply:

- Most of the arterial blood supply to the teeth is by branches of the maxillary arteries.
- The venous drainage is by a number of veins that empty into the internal jugular veins.

Nerve Supply:

- Nerve supply to the upper teeth is by branches of the maxillary nerves and that to the lower teeth by branches of the mandibular nerves. These are both branches of the trigeminal nerve (5th cranial nerves).

**STRUCTURE OF TOOTH****TYPES OF TEETH****Incisors****Canine****Premolars****Molars**

SALIVARY GLANDS

- The salivary glands release their secretions into ducts that lead into the mouth. There are three main pairs the parotid glands, the submandibular glands and the sublingual glands. There are also numerous smaller salivary glands scattered around the mouth.

Parotid glands:

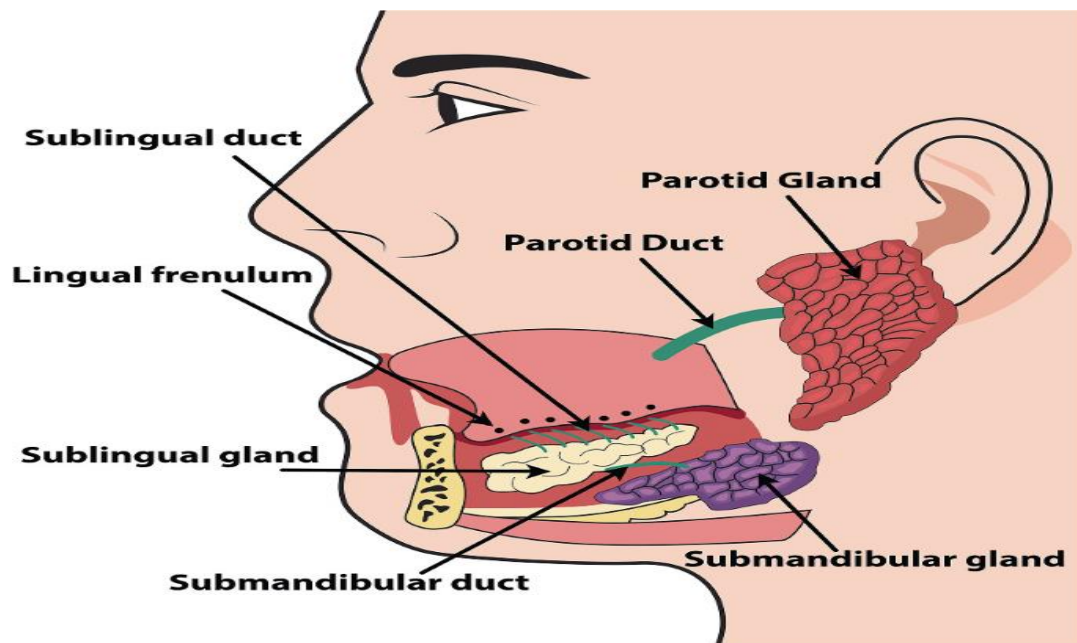
- These are situated one on each side of the face, just below the external acoustic meatus. Each gland has a parotid duct opening into the mouth at the level of its second upper molar tooth.

Submandibular glands:

- These lie one on each side of the face under the angle of the jaw. The two submandibular ducts open on the floor of the mouth, one on each side of the frenulum of the tongue.

Sublingual glands:

- These glands lie under the mucous membrane of the floor of the mouth in front of the submandibular glands. They have numerous small ducts that open into the floor of the mouth.



STRUCTURE:

- The glands are all surrounded by a fibrous capsule. They consist of a number of lobules made up of small acini lined with secretory cells. Saliva is released into ductules that join up to form larger ducts leading into the mouth.

Blood Supply

Arterial supply is by various branches from the external carotid arteries, and venous drainage is into the external jugular veins.

Composition of Saliva

Saliva is the combined secretions from the salivary glands and the small mucus-secreting glands of the oral mucosa. About 1.5 litres of Saliva is produced daily and it consists of

- Water
- Mineral salts
- Salivary amylase- a digestive enzyme
- Mucus
- Antimicrobial substances- immunoglobulins (antibodies) and the enzyme lysozyme.

Secretion of Saliva:

Saliva secretion is controlled by the autonomic nervous system. Parasympathetic stimulation Causes profuse secretion of watery saliva with a relatively low content of enzymes and other organic substances. Sympathetic stimulation results in secretion of small amounts of saliva rich in organic material, especially from the submandibular glands.

Functions of Saliva:

- 1. Chemical digestion of polysaccharides:** Saliva contains the enzyme amylase, which begins the breakdown of complex sugars, including starches, reducing them to the disaccharide maltose. The Optimum pH for the action of salivary amylase is 6.8 (slightly acid). Salivary pH ranges from 5.8 to 7.4, depending on the rate of flow; the higher the flow rate, the higher the pH. Enzyme action continues during swallowing until terminated by the strongly acidic gastric juices, which degrade the amylase.
- 2. Lubrication of Food:**
The high water content means that dry food entering the mouth is moistened and lubricated by saliva before it can be made into a bolus ready for swallowing.
- 3. Cleaning and lubrication of the mouth:**
An adequate flow of saliva is necessary to keep the mouth clean, moist and pliable. This also helps to prevent damage to the mucous membrane by rough or abrasive food.
- 4. Non-specific defence:**
Lysozyme and immunoglobulins (antibodies) present in saliva combat invading microbes.
- 5. Taste:**
The taste buds are stimulated only by chemical substances in solution and therefore dry foods stimulate the sense of taste only after thorough mixing with saliva. The senses of taste and smell are closely linked and involved in the enjoyment of food.

