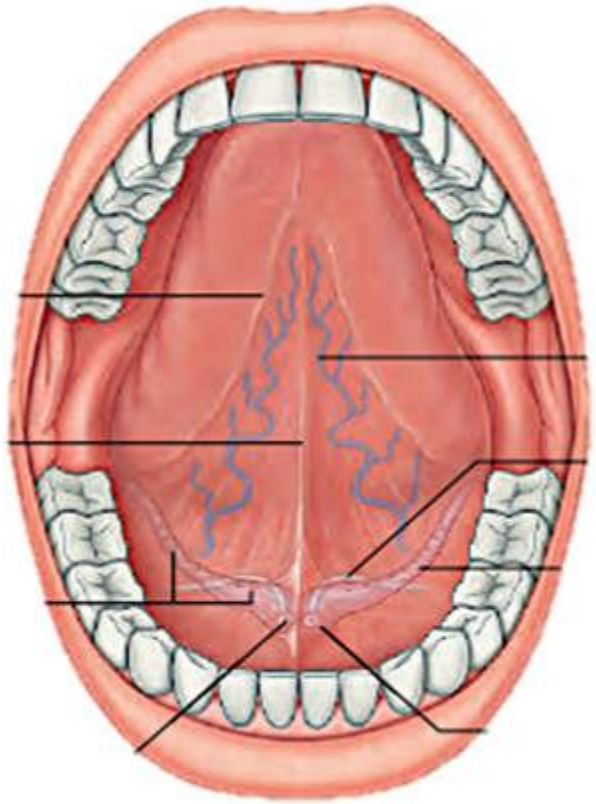
Oral cavity

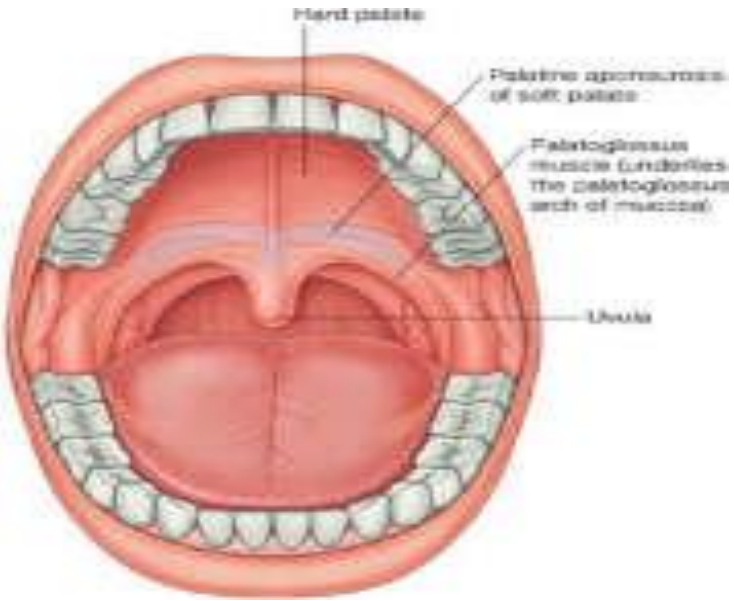
Oral cavity

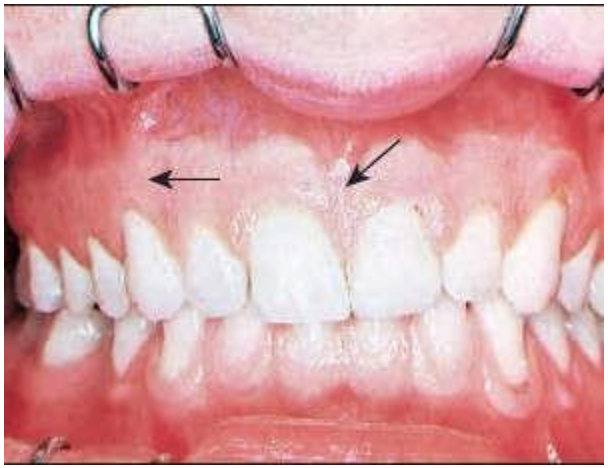
- 1st part of digestive tube.
- Extends anteroposteriorly from lips to the oropharyngeal isthmus.
- Used for ingestion of food and fluids.
- Divided into two parts:
  - **Vestibule** (slit-like space between lips/cheeks and teeth/gingivae(gums).
  - **Oral cavity proper**: larger space inside the teeth and gums.



Vestibule of the mouth

- Narrow space that lies outside the teeth and gums, and inside the lips and cheeks.
- Limited above and below by the reflection of mucus membrane from the lips and cheeks to the gums.
- When mouth is open, it freely communicates with the oral cavity proper.
- When it is closed i.e. when teeth are occluded, it communicates on each side with the oral cavity proper through a small gap called **retromolar region** (behind the third molar teeth and ramus of the mandible).
- Except teeth, entire vestibule line by mucus membrane.
- Anteriorly and laterally bounded by lips and cheek.





Vestibule of the mouth

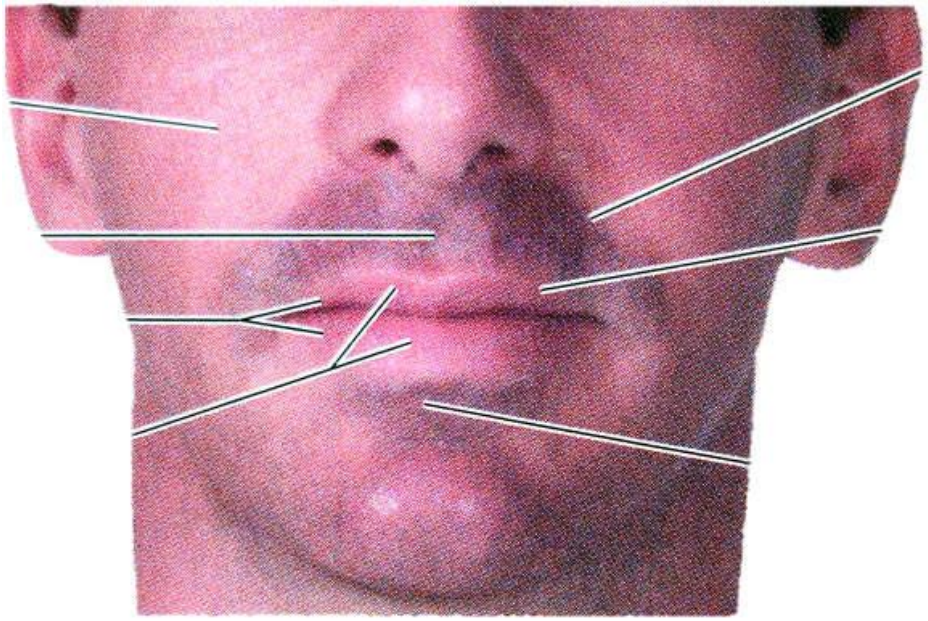
- Cheeks made up of buccinator muscle.
- Opening in the vestibule of the mouth:
  - Opening of the parotid duct.
  - Opening of labial and buccal mucus glands.
  - Opening of 4 or 5 molar glands (mucus) situated on the buccopharyngeal fascia.

Lips

- Anteriorly
- Two mobile musculofibrous folds.
- Upper and lower lips meet laterally at an angle of the mouth, usually present in front of first premolar tooth.
- Lips are internally line by mucus membrane and externally lined by skin.
- The mucocutaneous junction lines the edge of the lip.
- Red portion of lip is called **vermillion zone**.
- **Vermillion border**: skin and vermillion zone meet.
- **Frenulum of the lip**: internal aspect of each lip is connected to the corresponding gum by median fold of mucus membrane.

Structure of lips

- Superficial to deep:
  - Skin.
  - Superficial fascia.
  - Orbicularis oris muscle.
  - Submucosa containing mucus glands.
  - Mucus membrane.



Lips

- Blood supply:
  - Arterial supply: labial branches of facial artery.
  - Venous drainage: labial branches of facial vein.
- Lymphatic drainage:
  - Submental lymph node (central part of the lower lip).
  - Submandibular lymph node (lateral part of lower lip and upper lip).
- Nerve supply:
  - Sensory supply: trigeminal nerve.
  - Upper lip: labial branches of the infraorbital nerve (branch of maxillary division).
  - Lower lip: mental nerve (branch of mandibular division)

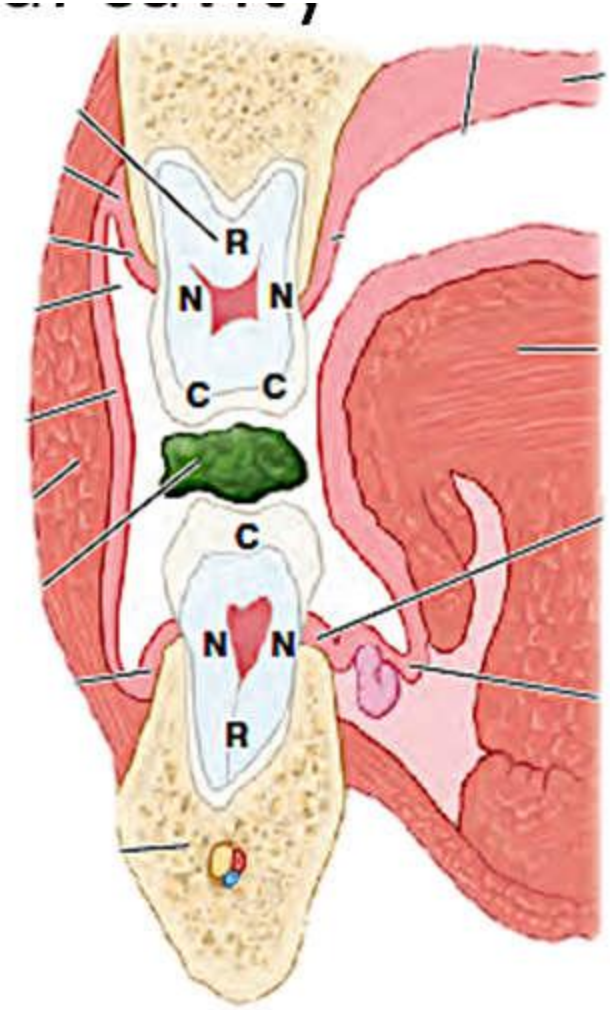
- Red portion of lips highly sensitive.

Cheeks

- fleshy flaps forming a large part of the face.
- Each cheek is continuous in front with the lip.
- Nasolabial sulcus or the nasolabial furrow: junction between the two.
- Extends from the side of the nose to the angle of the mouth.
- Cheeks is largely composed of buccinator muscle is covered by **buccopharyngeal fascia.**.
- Contains buccal glands, blood vessels, and nerves.

Layer of the cheek

- From superficial to deep,
  - Skin.
  - Superficial fascia containing some muscles of facial expression, *viz. zygomaticus major, risorius.*
  - Buccal pad of fat.
  - Buccopharyngeal fascia.
  - Buccinator muscle between the alveolar processes of both jaws.
  - Submucosa containing buccal (mucus) glands.
  - Mucus membrane.



Gums/gingiva

- Fibrous tissue covered with a smooth vascular mucous membrane.
- Envelop the alveolar processes of the jaws and the necks of the teeth.
- At the necks of the teeth, the fibrous tissue of gum becomes continuous with the periodontal membrane, which attaches the teeth to their sockets.

Gums/gingiva

- Parts of gum:
  - **Free part (free gingiva):** Surrounds the neck of tooth like a collar.
  - **Attached part (attached gingiva):** Firmly attached to the alveolar process.
  - **Interdental part (interdental gingiva):** Extension of the attached gingiva between the teeth.

Gums/gingiva

- Nerve supply:
  - **Upper gums on:**
    - the labial aspect are supplied by the posterior, middle, and anterior-superior alveolar nerves.
    - lingual aspect are supplied by the greater palatine and nasopalatine nerves.
  - **Lower gums on:**
    - labial aspect are supplied by buccal branch of mandibular nerve, and incisive branch of mental nerve.
    - lingual aspect are supplied by the lingual nerves.
- **Lymphatic Drainage:**
  - **Upper gums:** submandibular lymph nodes.
  - **Lower gums:** submental lymph nodes and submandibular lymph nodes.

Applied anatomy

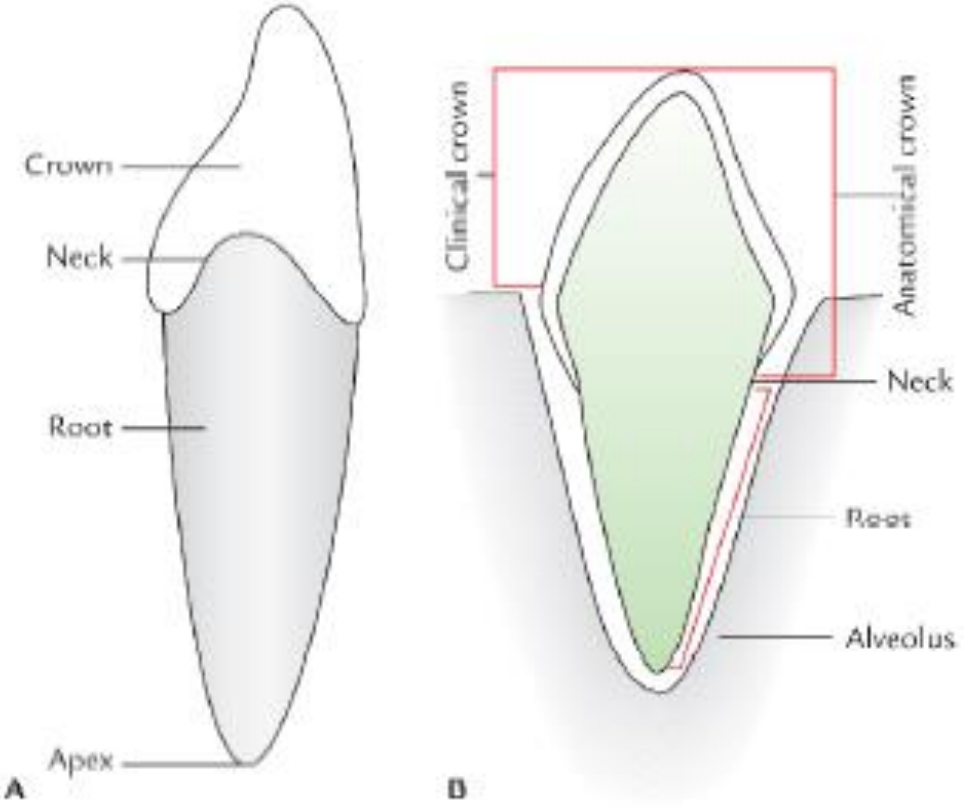
- **Gingivitis**
- **Scurvy**

Teeth

- Mineralized bone-like structures projecting from the alveolar processes of the jaws.
- **Functions of Teeth:**
  - Incise and grind the food material during mastication.
  - Perform the role of weapon for defense or attack.
  - Provide beauty to the face and means for facial expression.

Parts of a tooth

1. A crown:
   - Anatomical crown is the part of a tooth that is covered by enamel.
   - Clinical crown is the part that projects into the oral cavity.
2. Root:
   - Embedded within the socket of jaw beneath the gum.
3. Neck:
   - Constricted part of the tooth between the crown and root.
   - Encircled by the gum.



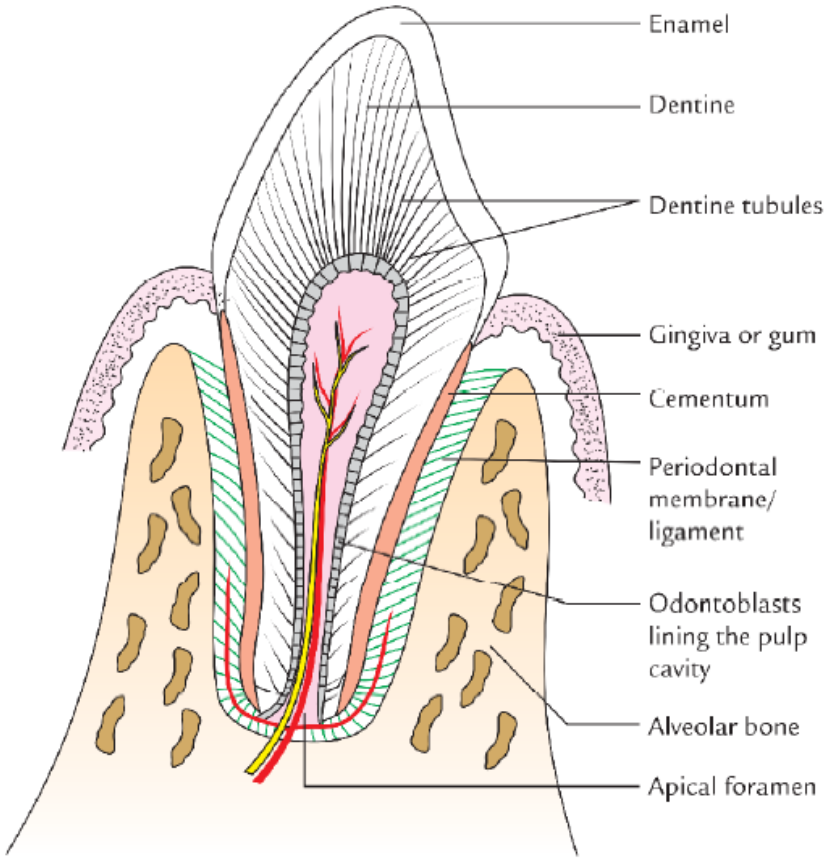
Structure of tooth

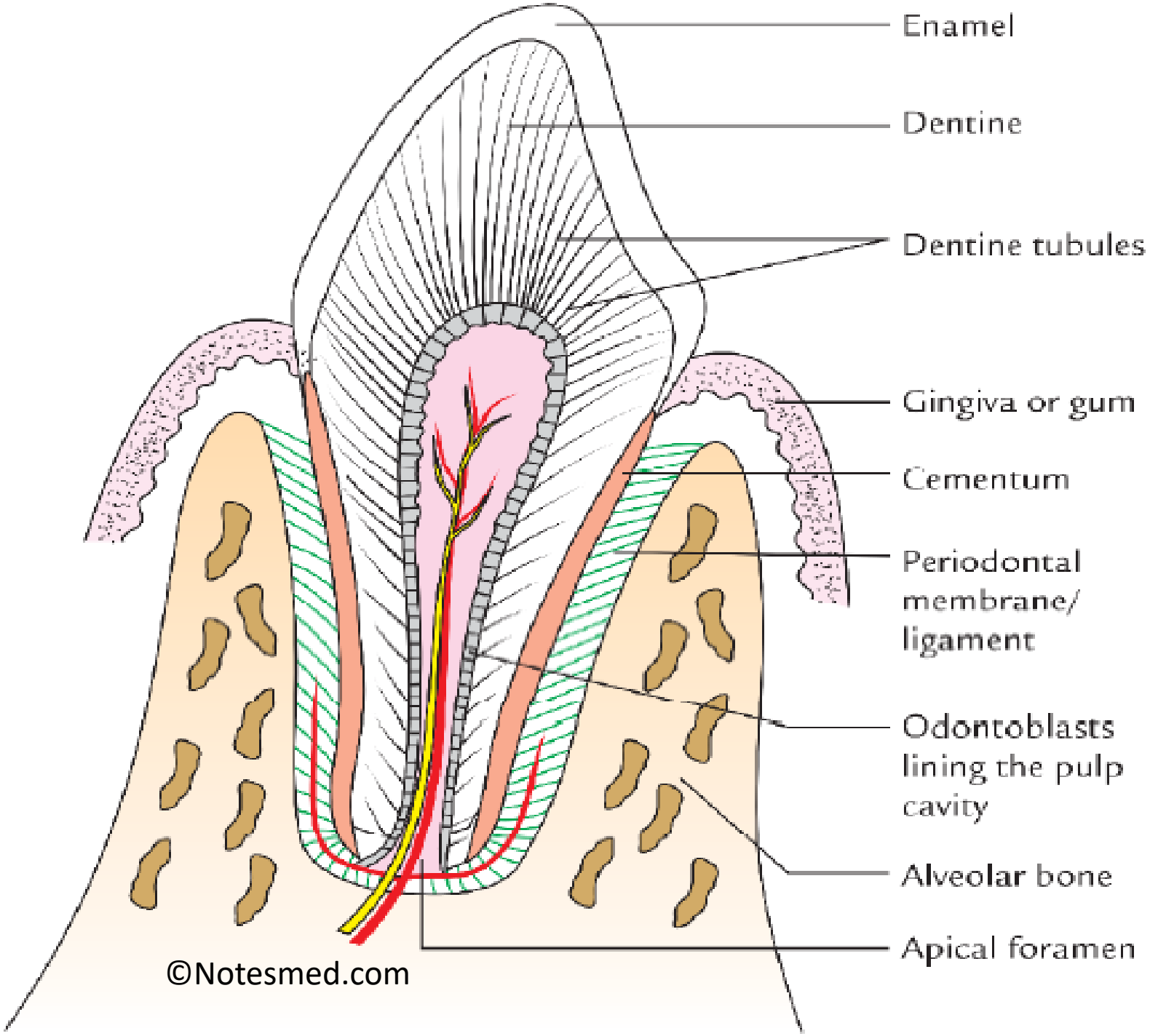
- Composed of a specialized connective tissue.
- Essentially consists of a pulp covered by three calcified tissues: dentine, enamel, and cementum.

1. **Pulp:**
   - Inner core containing soft tissue, blood vessels, nerve, and lymphatics.
   - Covered by layer of tall columnar cells called **odontoblasts.**
   - The space occupying the pulp is called **pulp cavity.**
2. **Dentine:**
   - **Calcified material** surrounding the pulp cavity.
   - Forms the basis of the tooth and contains **spiral tubules** radiating from the pulp cavity.
   - Each tubule is occupied by a protoplasmic process from the odontoblast.
   - In dentine the **calcium and organic matter** are in same proportion as the bone.

Structure of tooth

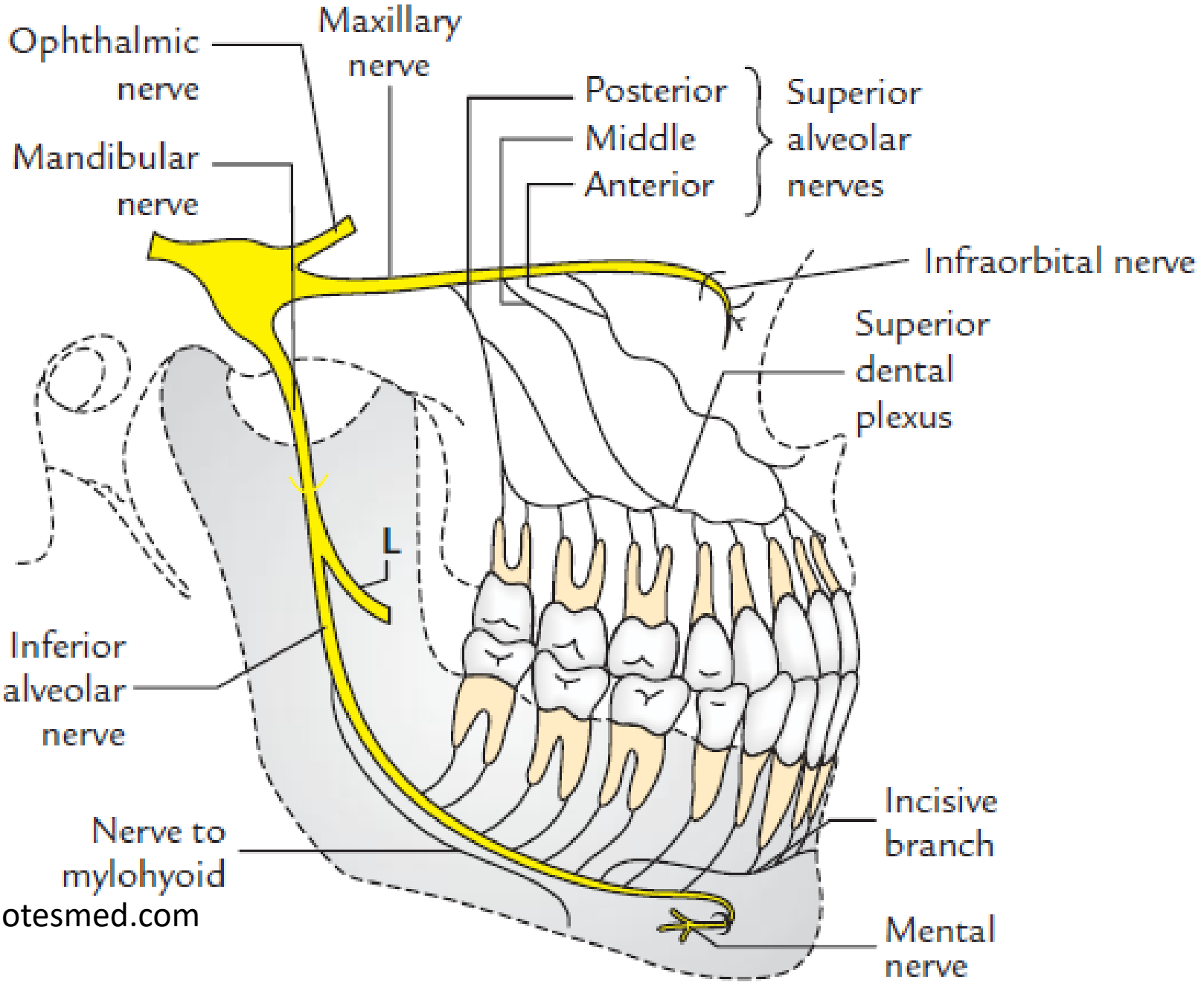
3. **Enamel:**
   - **Densely calcified white material covering** the crown of the tooth.
   - **hardest substance in the** body and is made up of **crystalline prisms.**
4. **Cement:**
   - **Bony covering over the neck and root** of the tooth.
   - Commonly overlaps the lower part of the enamel.
5. **Periodontal membrane:**
   - Present between the cementum and the socket, both of which act as periosteum.
   - Holds the tooth in the socket and therefore, often termed **periodontal ligament.**





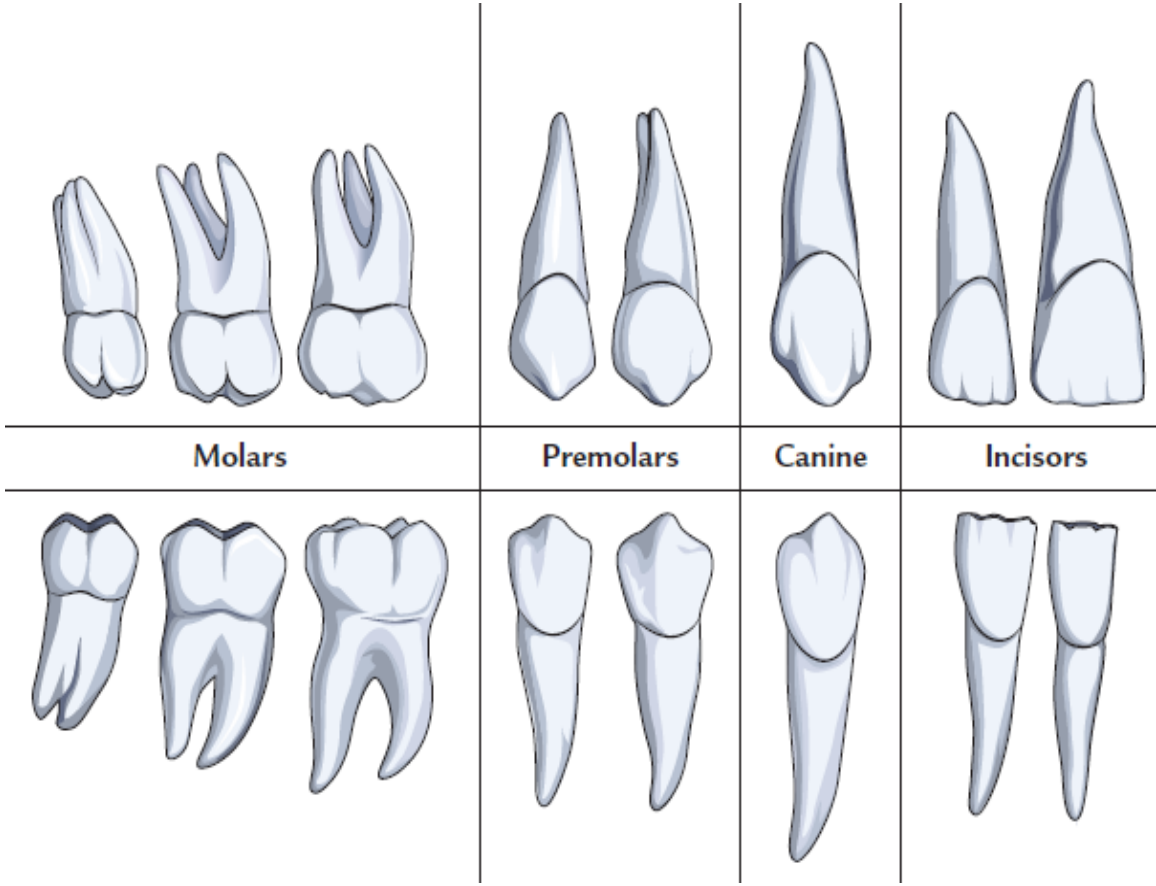
Tooth

- **Nerve Supply:**
  - **Upper teeth:** posterior, middle, and anterior-superior alveolar nerves:- form superior dental plexus.
  - Lower teeth: **inferior alveolar (dental) nerve.**
- **Arterial Supply:**
  - **Upepr teeth: Posterior, middle, and anterior-superior alveolar arteries** which are branches of the maxillary artery.
  - **lower teeth: inferior alveolar (dental) artery, a** branch of first part of maxillary artery.
- **Lymphatic Drainage:**
  - Ipsilateral submandibular lymph nodes.
  - submental lymph nodes.



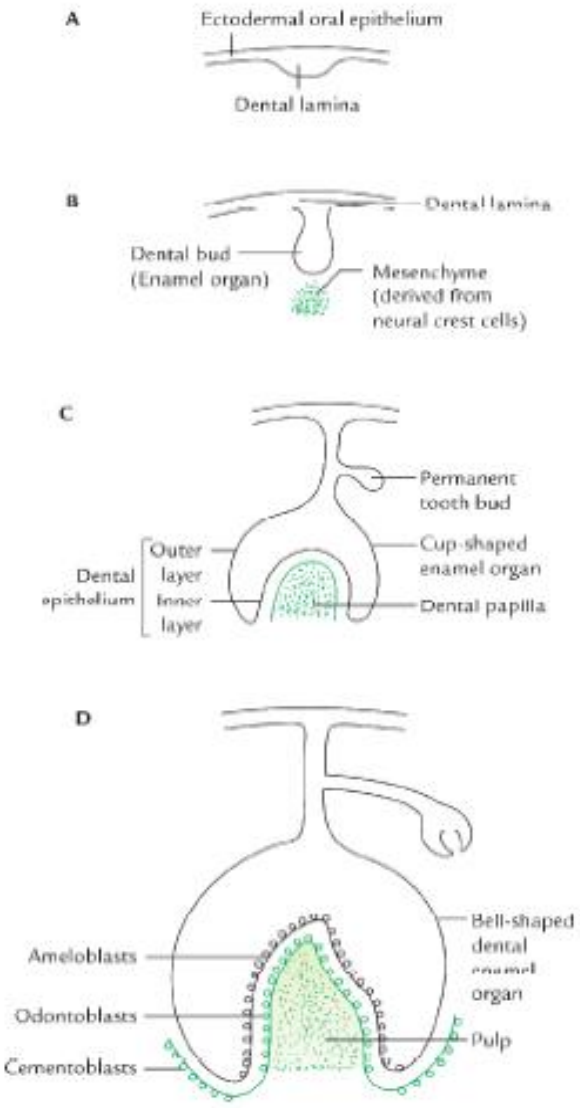
Number of teeth

- 16 permanent teeth in each jaw.
- **Diphyodont.**
- First set of teeth is **primary or deciduous teeth.**
- **Types of Teeth:**
  - **heterodont dentition.**
  - Incisors, canines, premolars, and molars.



Development of the Teeth

- **Ectoderm and an underlying layer of neural crest cells.**



Clinical correlation

- **Medicolegal importance of teeth.**
- **Eye tooth:**
  - Upper canine tooth is often referred to as *eye tooth because sometimes its long root may extend up* to the medial angle of the eye.

Oral cavity proper

- Has a roof and a floor.
- Posteriorly the oral cavity communicates with the oropharynx through **oropharyngeal isthmus (also called *isthmus of fauces).***
- **Boundaries:**
  - **Superiorly:** soft palate.
  - **Inferiorly: tongue.**
  - **Each side:** palatoglossal arches.

Floor of the mouth

- A small horseshoe-shaped region.
- Situated beneath the anterior two-third of the tongue and above the muscular diaphragm formed by **two mylohyoid muscles.**
- **Surface of the floor** is formed by mucus membrane, which connects the tongue to the mandible.
- **Laterally** the mucus membrane passes from the side of the tongue onto the mandible.
- Anteriorly the mucus membrane stretches from one half of the mandible to the other.
- The anterior part of the floor is called **sublingual region, which intervenes between the ventral** surface of the anterior two-third of the tongue and the floor of the mouth.

Sublingual region

- The lower surface of the tongue is connected to the floor of the mouth by a median fold of the mucus membrane called **frenulum linguae.**
- On each side of the lower end of frenulum, there is an elevation called **sublingual papilla, on the summit of** which opens the submandibular duct.
- The sublingual gland projects up into the floor of the mouth and produces an elevation in the mucus membrane on each side of the frenulum called **sublingual fold.**
- **Most of the sublingual ducts open on this fold.**

Roof of the mouth

- Formed by palate.
- Anterior two-third of palate, made up of bones is called **hard palate.**
- Posterior one-third made of soft issue is called **soft palate.**
- posterior-free margin of the soft palate a small conical projection called **uvula hangs down in the** median region.
- A poorly marked median raphe extends from uvula to the **incisive papilla—a slight elevation behind** the incisive fossa.
- Mucus membrane in the anterior part of the hard plate is thrown into 3 or 4 **transverse palatine folds but** posteriorly it is comparatively smooth.

Tongue

- A mobile muscular organ in the oral cavity.
- conical in shape being elongated posteroanteriorly and flattened dorsoventrally.
- Which bulges upwards from the floor of the mouth and its posterior part forms the anterior wall of the oropharynx.
- Skeletal muscle covered by mucus membrane.
- Muscle mass is separated into right and left halves by a midline fibrous septum.
- Tongue is separated from teeth by a deep **alveololingual sulcus, which is filled in** by palatoglossal fold/arch posterior to the last molar tooth.

Functions of tongue

- Taste.
- Speech.
- Mastication.
- Deglutition.

External Features

- A root.
- A tip.
- A body.
- **Root:**
  - Attached to the mandible and hyoid bone by muscles.
  - The nerve and vessels of the tongue enter through its root.
- **Tip:**
  - Anterior free end of the tongue, which comes into contact with the central incisors.
- **Body:**
  - Bulk of tongue between the root and tip.
  - Has dorsal and ventral surfaces and right and left lateral margins.

Tongue

- ***Dorsal surface:***
  - convex on all the sides.
  - divided by a V-shaped sulcus, the **sulcus terminalis into two parts, *viz.***
    - Anterior two-third or **oral part.**
    - Posterior one-third or **pharyngeal part.**

- The apex of the sulcus terminalis is marked by a blind foramen, the **foramen caecum, which indicates the point of** origin of the median thyroid diverticulum (thyroglossal duct) in the embryonic life.

Dorsal surface

- **Oral part presents the following features:**
  - A median furrow, representing the bilateral origin of the tongue.
  - Large number of papillae.
- **Pharyngeal part presents the following features:**
  - A large number of lymphoid follicles, which together constitute the **lingual tonsil.**
  - A large number of mucus and serous glands.

Oral part

- A shallow median furrow/groove: dorsum of oral part.
- mucus membrane is moist and pink and appears velvety due to the presence of numerous papillae.
- *Papillae of the tongue (Lingual papillae):*
  - *Projections* of lamina propria (corium) of mucus membrane covered with epithelium.
  - Four chief types of papillae are found:
    - **Vallate papillae.**
    - **Filiform papillae.**
    - **Fungiform papillae.**
    - **Foliate papillae**

Papillae

- **Vallate papillae:**
  - **Known formerly as** *circumvallate papillae.*
  - Largest (1-2 mm diameter).
  - Vary in number from 8–12 and are arranged in a V-shaped row in front of **sulcus terminalis.**
  - Each papilla is like a truncated cone surrounded by a circular sulcus, which is bounded on its periphery by a wall or **vallum.**
  - Duct of serous glands open into the sulcus (moat) and taste buds are found in the papilla and its vallum.

Filiform papillae

- Narrowest and most numerous.
- Minute conical projections with sharply pointed tips.
- Located abundantly on the dorsum of tongue.
- Largely responsible for its velvety appearance.

Fungiform papillae

- Red rounded head (about 1 mm in diameter) and a narrower base.
- At the apex and margins of the tongue, while some are scattered over the dorsum of the tongue.
- Visible as discrete pink pinheads.

Foliate papillae

- Inconstant vertical grooves and ridges near the margin in front of sulcus terminalis.
- Rudimentary in humans

Pharyngeal part:

- Posteriorly and forms the base of tongue.
- devoid of papillae.
- presence of numerous lymphatic follicles in the underlying submucosa.
- follicles are collectively termed **lingual tonsil.**
- mucus membrane is continuous with mucus membrane covering the palatine tonsils and the pharynx.
- Posteriorly, it is reflected onto the front of the epiglottis as the median **glossoepiglottic fold.**
- **lateral wall of** pharynx as **lateral glossoepiglottic folds.**
- Space on each side of the median glossoepiglottic fold is termed **epiglottic vallecula.**

Ventral (inferior) surface

- Situated in the oral cavity only.
- Mucus membrane lining this surface is thin, smooth, and purplish.
- Reflected onto the floor of the mouth.
- features:
  - Frenulum linguae: a median-fold of mucus membrane connecting the tongue to the floor of the mouth.
  - **Deep lingual veins**
  - **Plica fimbriata**

Muscles of the Tongue

- Consists of extrinsic and intrinsic muscles.
- Intrinsic muscles are within the tongue and have no attachment outside the tongue
- Extrinsic muscles take origin from structures outside the tongue and enter the tongue to be inserted in it.
- Intrinsic muscles change the shape of tongue.
- Extrinsic muscles move the tongue as well as alter its shape.

- **Intrinsic muscles:**
  - Superior longitudinal.
  - Inferior longitudinal.
  - Transverse.
  - Vertical.
- **Extrinsic muscles**
  - Genioglossus.
  - Hyoglossus.
  - Styloglossus.
  - Palatoglossus.

Intrinsic muscle	Location	Actions
Superior longitudinal	Beneath the mucous membrane	• Shortens the tongue • Makes the dorsum concave
Inferior longitudinal	Close to inferior surface between genioglossus and hyoglossus	• Shortens the tongue • Makes the dorsum convex
Transverse	Extends from median septum to the margin	Makes the tongue narrow and elongated
Vertical	At the border of the anterior part of the tongue	Makes the tongue broad and flattened

Muscle	Origin	Insertion	Actions
Genioglossus (a fan-shaped muscle)	Superior genial tubercle	• Whole of the tongue (fibres radiate from the tip to the base) • Hyoid bone (lowest fibres)	Protrudes the tongue when acting together with its counterpart of opposite side
Hyoglossus (a flat quadrilateral muscle)	Greater cornu and adjacent part of the body of hyoid	Side of tongue (posterior half) between styloglossus laterally and inferior longitudinal muscle medially	• Depresses the sides of the tongue • Makes the dorsal surface convex
Styloglossus (an elongated slip)	Tip of styloid process and adjacent part of the stylohyoid ligament	Side of tongue (whole length), interdigitating posteriorly with the fibres of hyoglossus	Draws the side of the tongue upwards and backwards
Palatoglossus (a slender slip)	Oral surface of palatine aponeurosis of palate	Side of tongue (at the junction of its oral and pharyngeal parts)	• Pulls up the root of the tongue • Approximates palatoglossal arches

Movements of tongue	Muscles
Protrusion (most important movement)	Genioglossus muscles (of both side acting together)
Retraction	Styloglossus muscles (of both sides acting together)
Depression	Hyoglossus muscles (of both sides acting together)
Elevation (of posterior one-third)	Palatoglossus muscles (of both sides acting together)
Changes in shape	Intrinsic muscles

Arterial Supply

- Branches of lingual artery.
- Tonsillar branch of the facial artery.
- Ascending pharyngeal artery.

Venous Drainage

- **Deep lingual vein is the *principal vein of the tongue.***
- **Venae comitantes** accompanying the lingual artery**.** They are joined by *dorsal lingual veins.*
- **Venae comitantes accompanying the hypoglossal nerve.**

Structures	Source of development	Nerve supply
Muscles	Occipital myotomes	Hypoglossal nerve
Mucous membrane (a) Anterior two-third of tongue	First arch	• Lingual nerve (post-trematic nerve of 1st arch) • Chorda tympani nerve (pre-trematic nerve of 1st arch)
(a) Posterior one-third of tongue	Third arch	Glossopharyngeal nerve (nerve of 3rd arch)
(c) Posteriormost part of tongue	Fourth arch	Internal laryngeal nerve (nerve of 4th arch)