Introduction to Oral and Dental Tissues

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Oral Histology

- The science dealing with the Microscopic identification of cells and tissues in the oral cavity.
- The structure of organ tissues, including the composition of cells and their organization into various body tissues.

Why do we study oral histology ?

- To understand the structure and function of oral tissues .
- To understand the development of oral tissues .
- To understand the general oral physiology .
- To understand oral diseases .

Oral structures

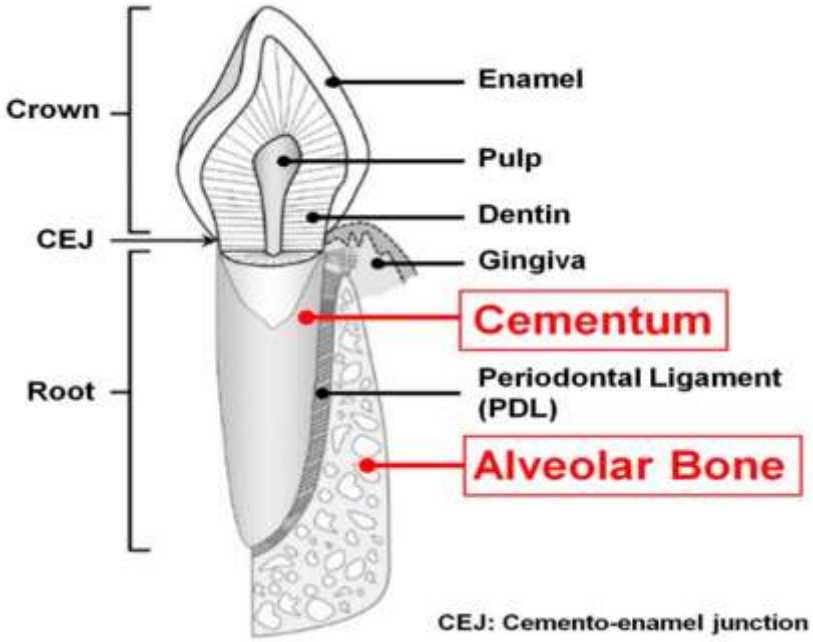
- Teeth : enamel , dentine , cementum and pulp
- Periodentum ; root cementum , peridontal ligament and aleveolar bone
- Oral mucosa

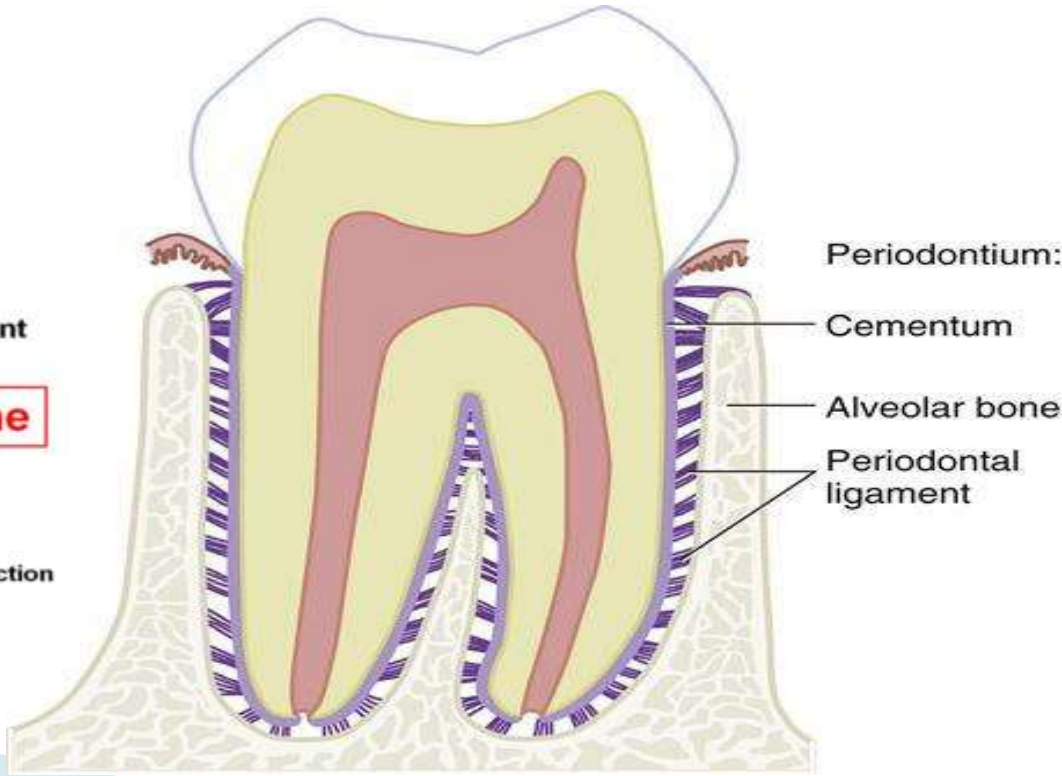
The tooth

- Approximately 20% of the surface area of the oral cavity is constituted by teeth. The tooth has two parts, crown and root, divided by a cervical line. Usually crown is visible in oral cavity and root remains inside the gums and jaw bone and is not visible

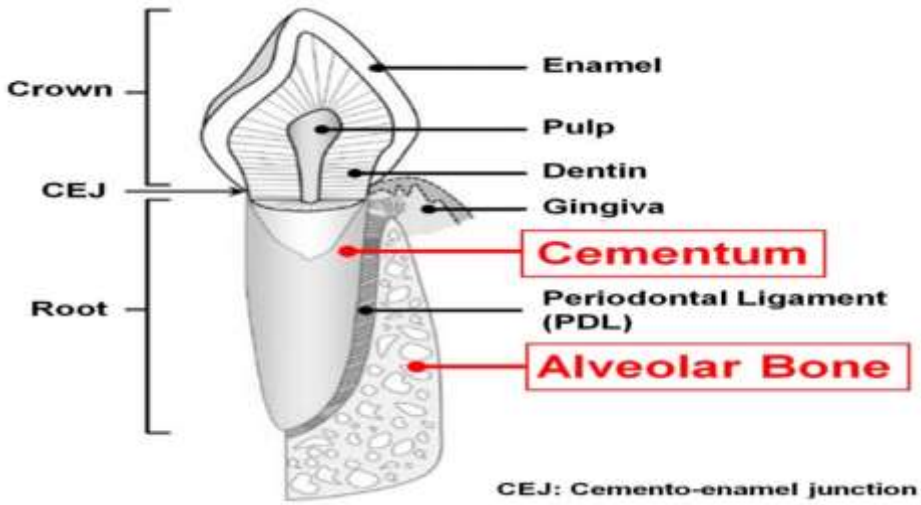


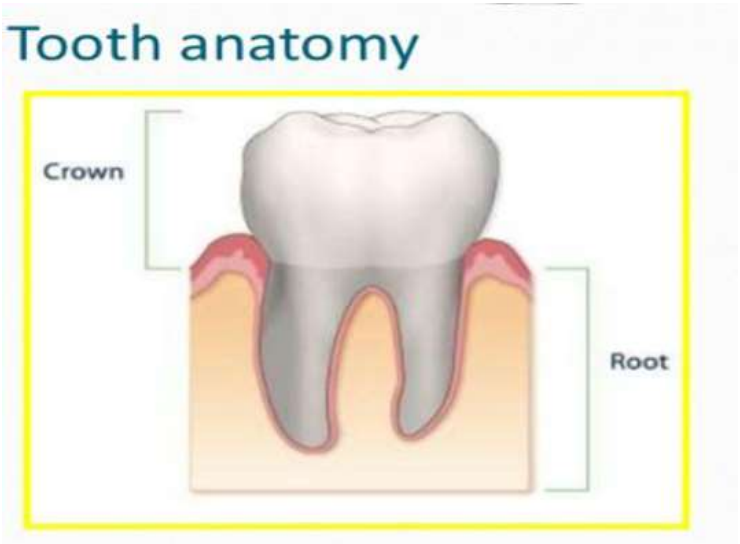
- The supporting tissues of the tooth which is consist of cementum, periodontal ligament and the alveolar bone.





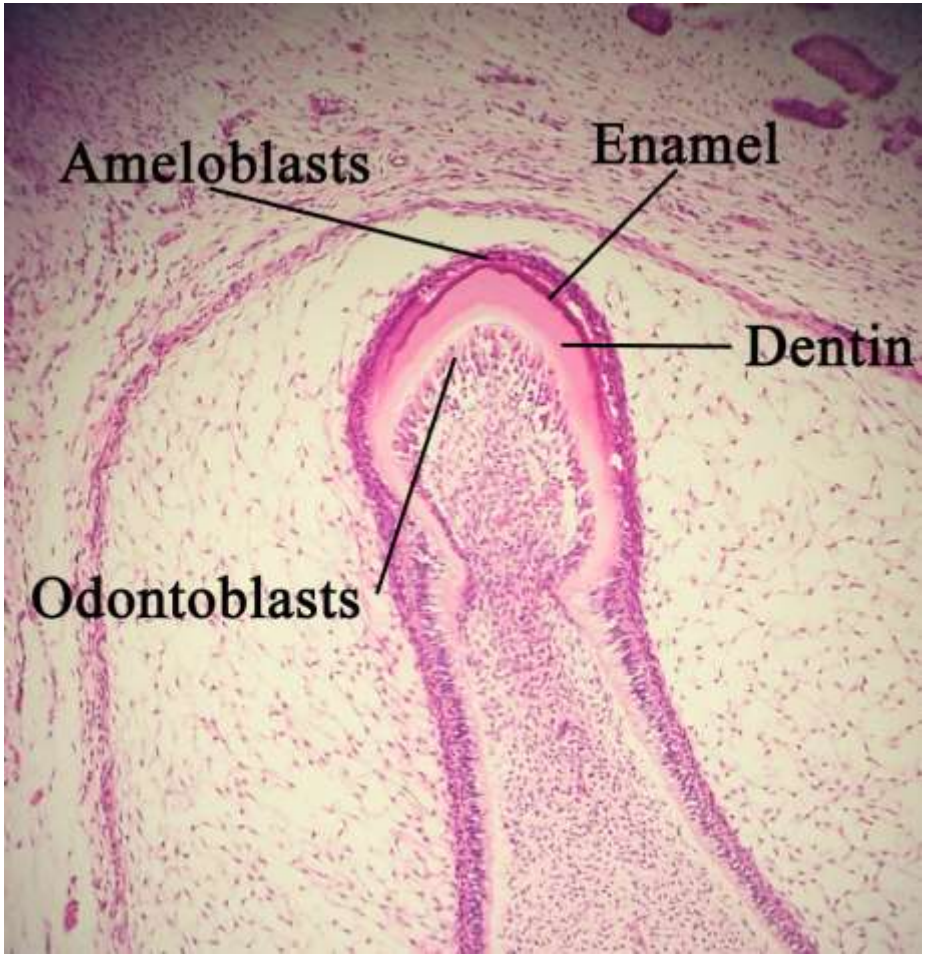
- The inner most part of the tooth in the crown and root is hollow and is called pulp.
- Pulp in crown and root is covered by the dentin.
- The dentin of the crown is covered by enamel and of the root is covered by cementum.

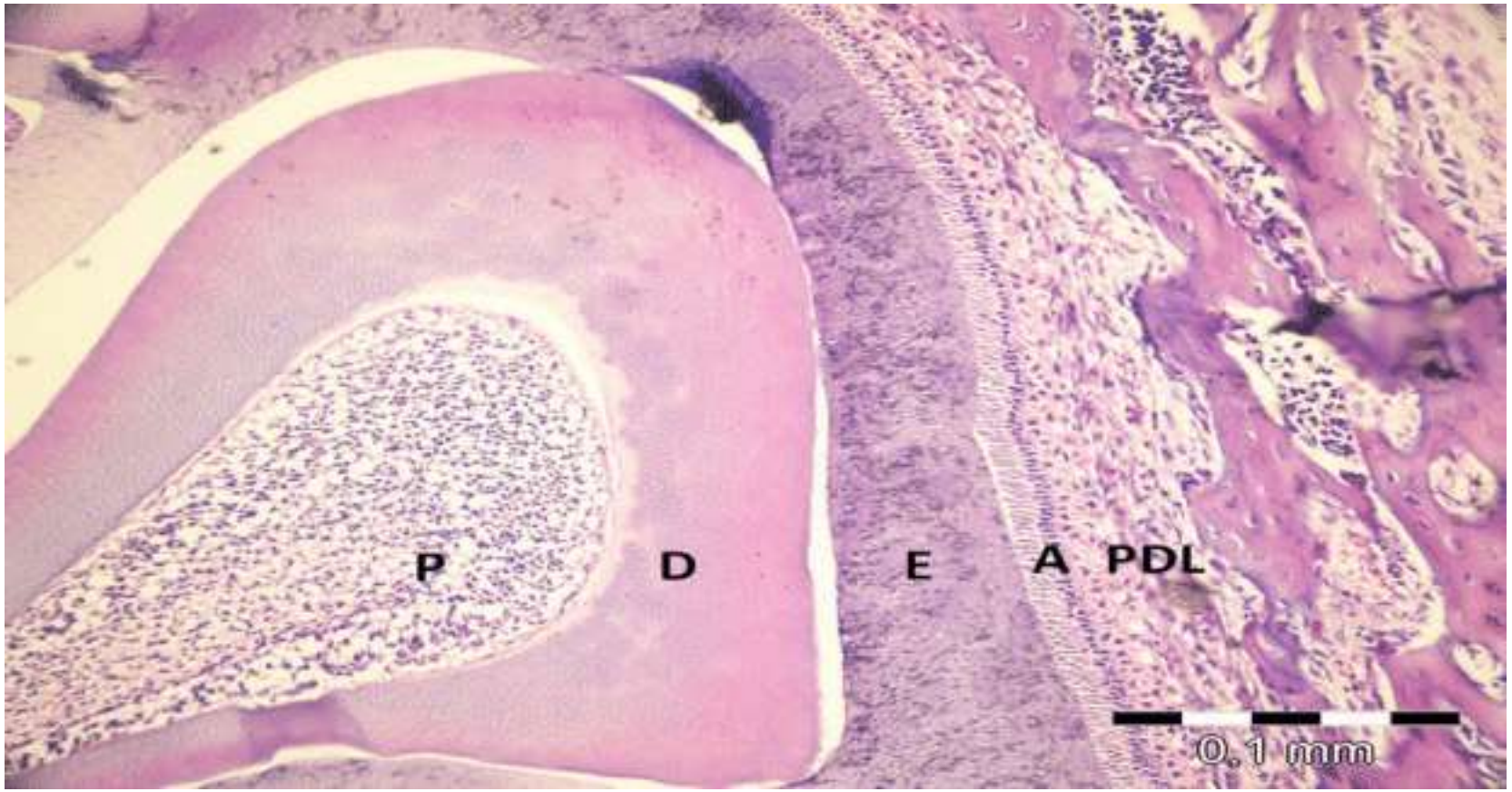


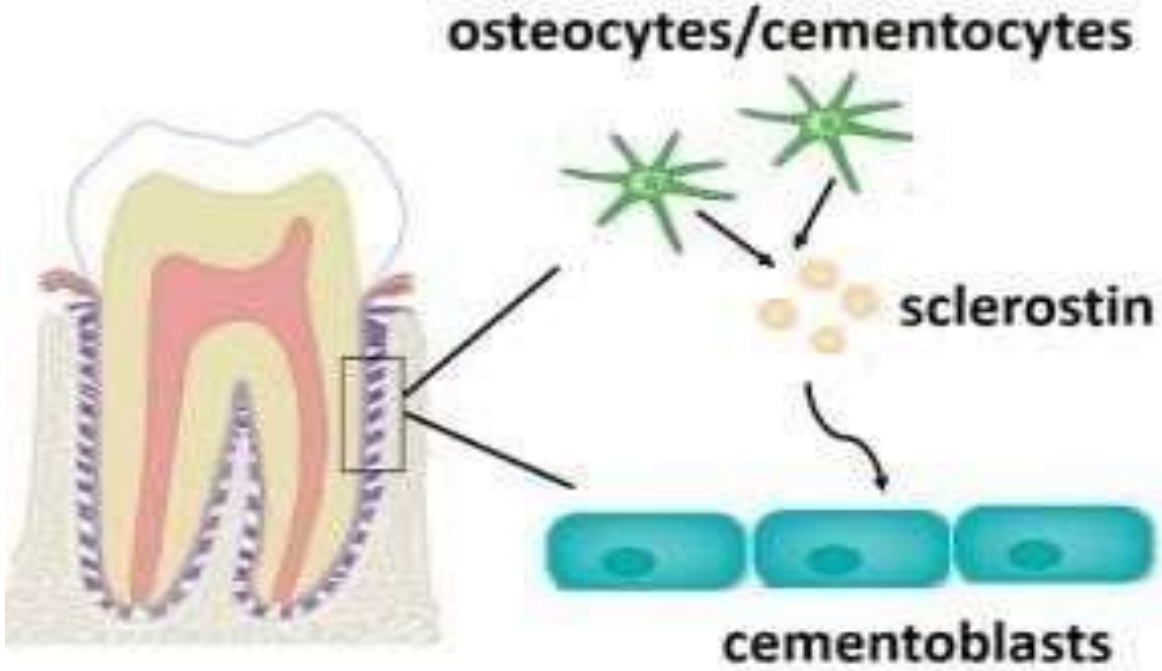


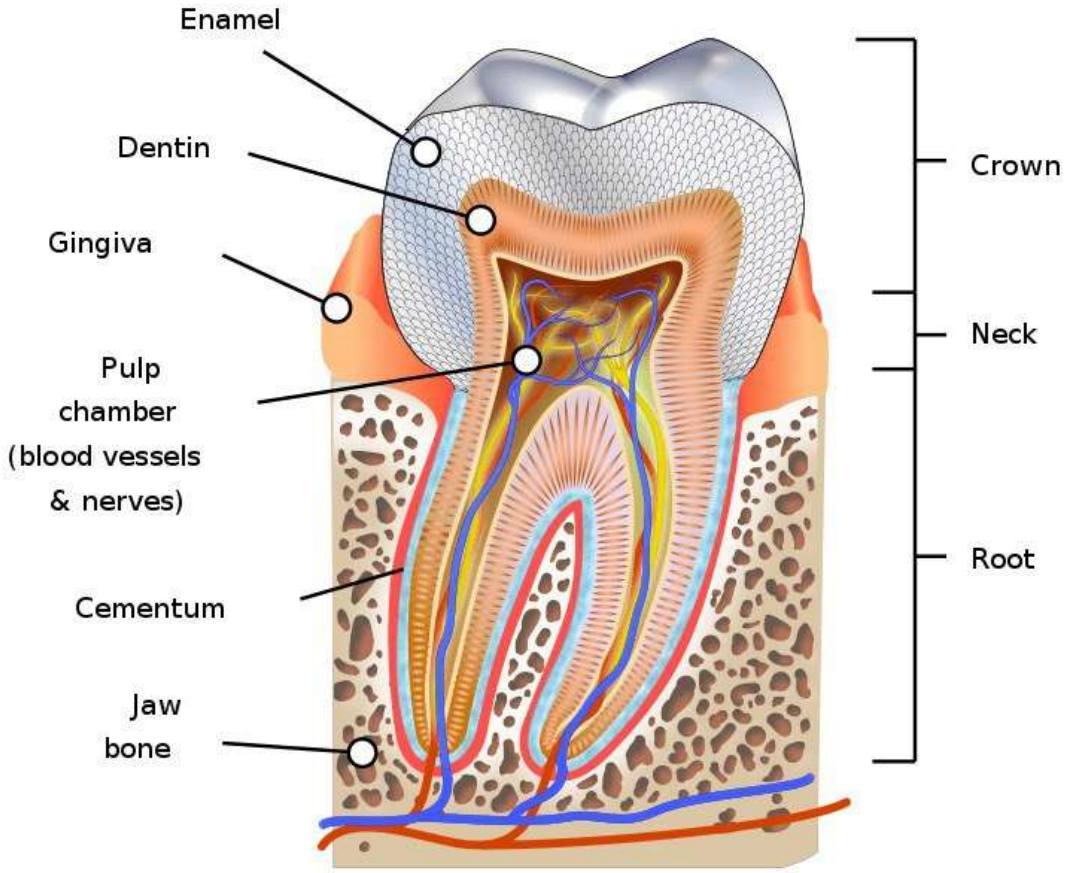
Cell types

- The name of the cells ending with blast do generate the tissues, like
- Ameloblast .....generate enamel
- Osteoblast..... generate bone
- Odontoblast .....generate dentin
- Cementoblast..... generate cementum
- Likewise the words ending with clast do resorb the tissue like osteoclast and odontoclast etc.


Ameloblasts
Enamel
Dentin
Odontoblasts


P
D
E
A
PDL
0,1 mm


osteocytes/cementocytes
sclerostin
cementoblasts


Enamel
Dentin
Gingiva
Pulp
chamber
(blood vessels
& nerves)
Cementum
Jaw
bone
Crown
Neck
Root

Enamel

- The enamel is brittle in nature and may fracture under masticatory load.
- Enamel is the only ectodermal derivative in the tooth. Enamel consist of 96 % of inorganic material in the form of apatite crystals.

Enamel

- Enamel is formed by the cells called Ameloblast which disappear once enamel is completely formed, hence when enamel is destroyed it cannot be regenerated.
- Enamel is insensitive, nonvital.

Dentin

- The bulk of the tooth is formed by dentin. Dentin is slightly resilient yellowish white, sensitive and avascular tissue which is less calcified than enamel.
- Dentin supports the enamel to prevent fracture of enamel under masticatory forces. The specialized cells which form and maintain the dentin are called odontoblasts.

Dentin

- The dentin is capable of repair as odontoblasts deposit rapidly more dentin when required and also slowly and regularly throughout the life.
- The dentin and pulp act as one unit. Dentin protects the pulp and the pulp nourishes the dentin.

Pulp

- The central hollow part of the tooth contains the soft and most vital and vascular part of the tooth which is called pulp.

Pulp

- Functions of the pulp are as follows.
- 1. Formative (produces dentin)
- 2. Nutritive (nourishes dentin)
- 3. Protective (protect dentin from damage by providing sensitivity to dentin)
- 4. Reparative (pulp produces dentin for repair as when required).

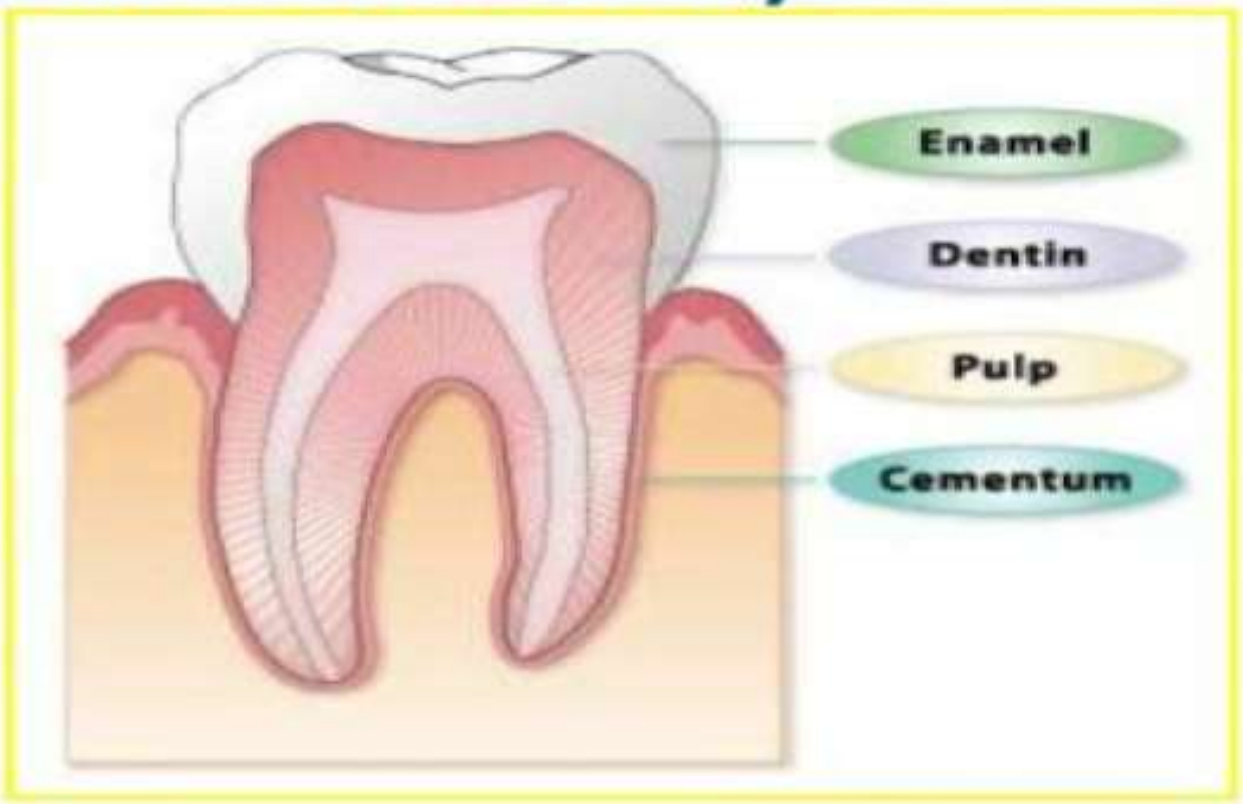
Cementum

- Cementum is a mineralized connective tissue. It is bonelike in structure covering the root of the teeth. Cementum is formed by cementoblasts.
- Cementum contains 50% inorganic material like apatite crystals and 50% is organic matrix mainly collagen.

Cementum

- The cementum is of following two types of cell :
- 1- Acellular (primary) :is covering the cervical portion of the root.
- 2- Cellular (secondary): is covering the apical portion of the root. It is called cellular because it's found of the cementoblasts.

Tooth anatomy

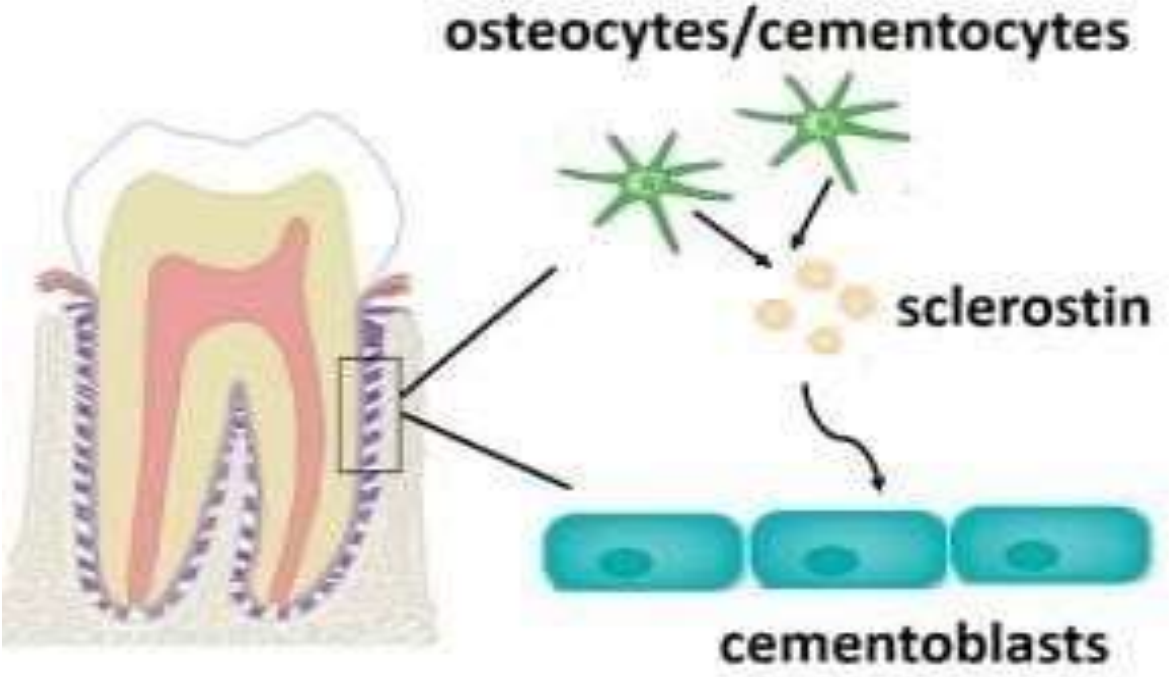


Periodontal ligament (PDL)

- The PDL is a very specialized connective tissue. It is made up of fibers which on one hand are embedded in the cementum and on the other hand are embedded in the alveolar bone

Periodontal ligament (PDL)

- . In this way they connect tooth to the bone. PDL fibers are made up of collagen and act as shock absorber.



Alveolar bone

- The teeth are attached to the alveolar processes of the jawbone by the PDL.
- When the teeth are lost the alveolar process are also gradually lost.

Oral mucous membrane

- The oral cavity is lined by a specialized mucosa.
- It consists of two layers, an epithelium and connective tissue .
- Functions of the oral mucosa are:
- (1) lining.
- (2)protecting.
- (3) taste.

Conclusion

- It is important to understand the normal structure , development and function of the oral structures in order to know the nature of pathologies faced in clinical practice

Thank you