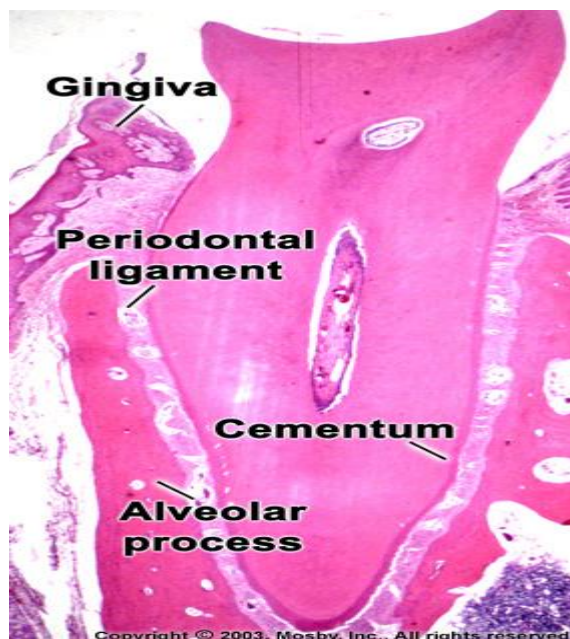
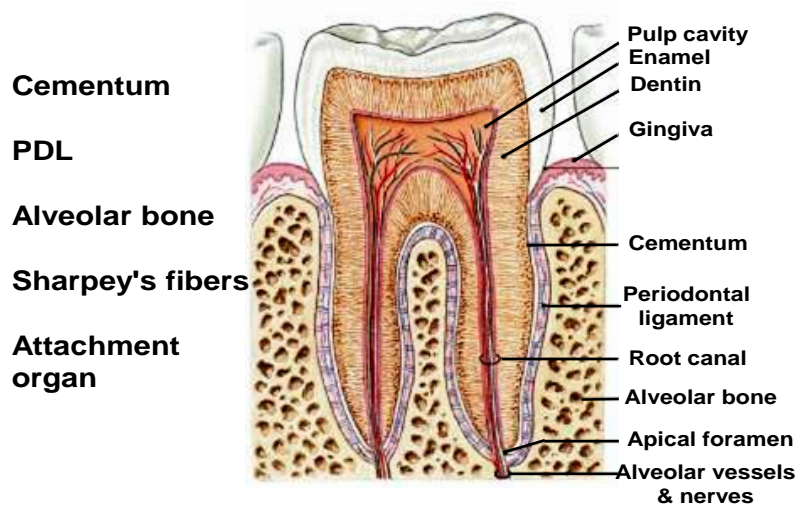


## Periodontium

- Gingiva(fibrous CT)
- Periodontal Ligament(fibrous CT)
- Alveolar bone(minerlaized CT)
- Cement(minerlaized CT)

### ***PERIODONTIUM***



# 1.Cementum

It is a **hard avascular mineralized connective tissue** that covers the roots of teeth.

**Physical properties:** Cementum is **pale yellow** with a dull surface.

- Cementum is **more permeable than other dental tissues**
- Relative softness and the **thinness at the cervical portion** means that **cementum is readily removed by the abrasion when gingival recession exposes the root surface to the oral environment**

## **Chemical Composition of Cementum**

**45% to 50% hydroxyapatite (inorganic)**

**50% to 55% collagenous and noncollagenous matrix proteins (organic)**

## **Role of Cementum**

- 1) It covers and protects the root dentin .
- 2) It provides attachment to the periodontal fibers
- 3) It compensates for tooth resorption

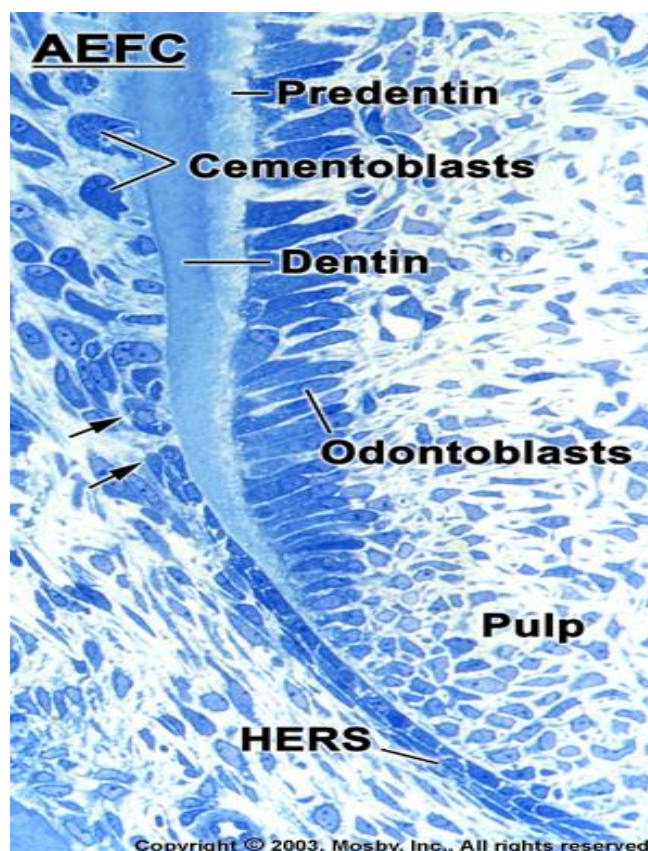
Varies in thickness: **thickest in the apex** and in the inter-radicular areas of multirrooted teeth, and **thinnest in the cervical area** 10 to 15  $\mu\text{m}$  in the cervical areas .

## **Differences between cementum and bone**

- **Not vascularized – a reason for it being resistant to resorption**
- **Minor ability to remodel**
- **More resistant to resorption compared to bone**
- **Lacks neural component – so no pain**
- **70% of bone is made by inorganic salts (cementum only 45-50%)**
- **Cementum is more resistant to resorption: Important in permitting orthodontic tooth movement**

## Development of Cementum

- Cementum formation occurs along the entire tooth **Hertwig's epithelial root sheath (HERS)** – Extension of the inner and outer enamel epithelium HERS sends inductive signal to ectomesenchymal pulp cells to secrete predentin by differentiating into odontoblasts HERS becomes interrupted Ectomesenchymal cells from the inner portion of the dental follicle come in with predentin will differentiating into cementoblasts .Cementoblasts form Cementoid: (Young matrix that becomes secondarily mineralized).



### Classification of Cementum (according to the followings)

1. Presence or absence of cells (Cellular and Acellular Cementum)
2. Origin of collagenous fibers of the matrix (Extrinsic fibers, intrinsic fiber, mixed fiber)

## Classification of cementum Based on the presence or absence of cell

### Acellular cementum:

1. Has No cells and has no structure
2. covers the root adjacent to dentin
3. Is primary cementum

### Cellular:

1. Has cells
2. found in apical area and overlying acellular cementum. Also common in interradicular areas
3. Is secondary cementum

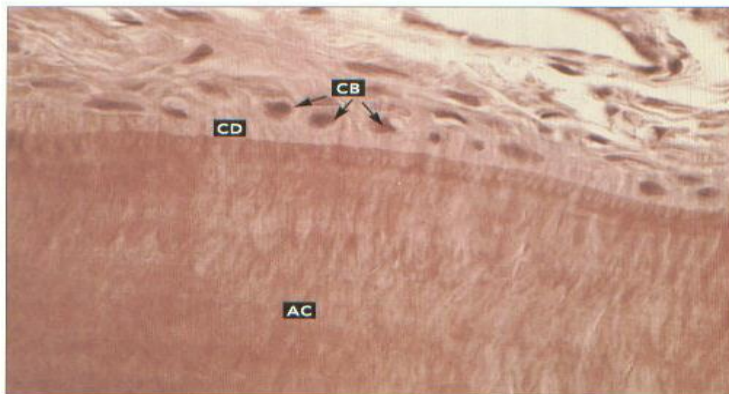
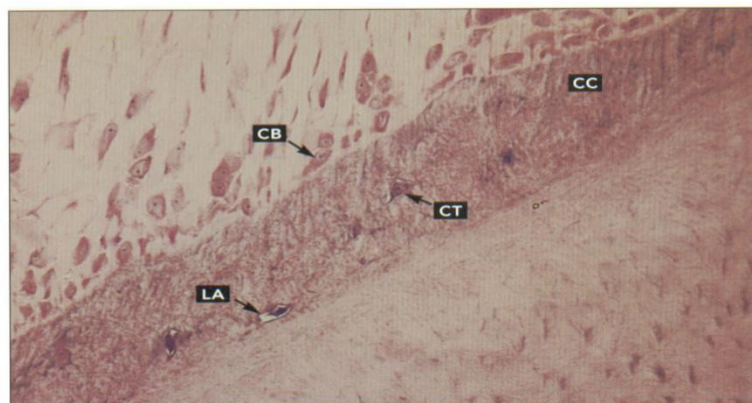
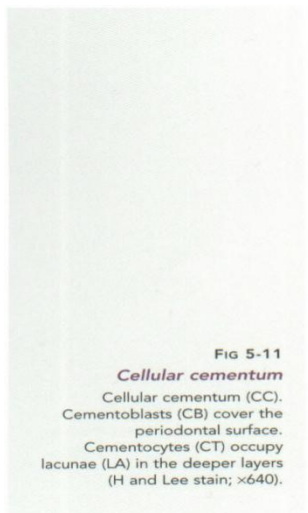
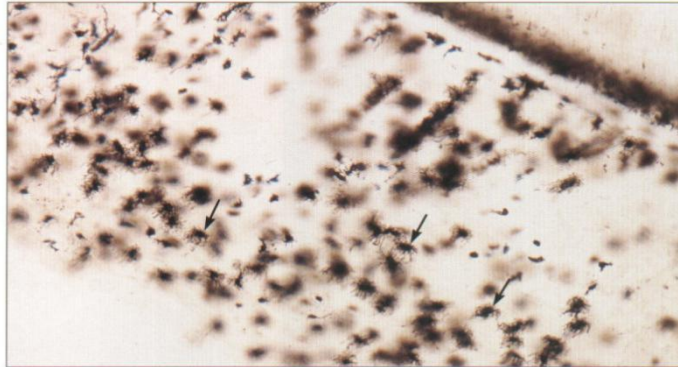
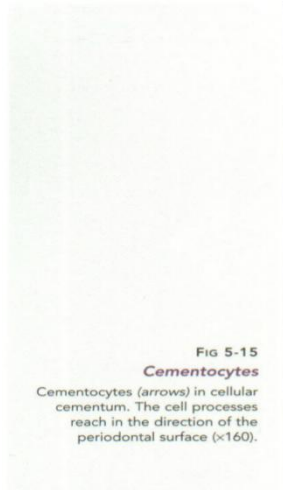


FIG 5-4  
**Acellular cementum**  
Cementoblasts (CB) and cementoid (CD) on the surface of acellular cementum (AC). (H and E stain;  $\times 640$ ).





### Classification of cementum Based on the Origin of Collagen Fibers

#### 1.Extrinsic fibers cementum

- 1.derived from(fibroblast cell in PDL).
- 2.These are in the same direction of the PDL principal fibers named as **sharpey's fiber**.

#### 2.Intrinsic fibers cementum

- 1.derived from cementoblasts.
- 2.Run parallel to the root surface and at right angles to the extrinsic fibers

#### 3.mixed fiber cementum

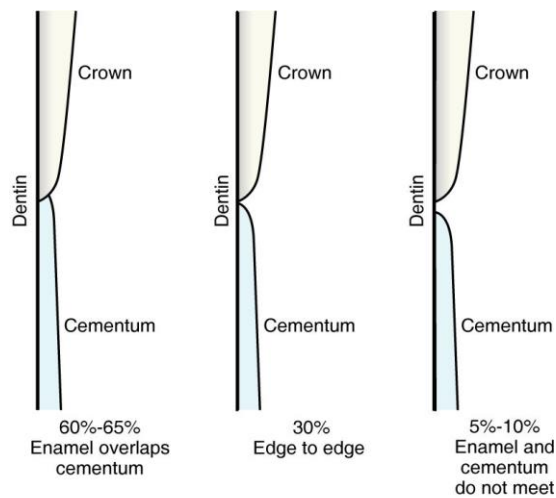
The area where both extrinsic and intrinsic fibers is mixed

### Distribution of Cementum on the Root

- Acellular afibrillar: cervical enamel
- Acellular extrinsic: Cervix to practically the whole root (incisors, canines) increasing in thickness towards the apical portion 50→200 $\mu$ m
- Cellular: Apical third, furcations

## Cemento-enamel junction(CEJ)

Cementum overlaps enamel	60%
Cementum just meets enamel	30%
Small gap between cementum and enamel	10%



(Not to scale)

(From Avery JK: Oral development and histology, ed 3, St. Louis, 2002, Thieme Medical.)

## **Aging of cementum**

1. **Smooth surface becomes irregular**
2. **Continues deposition of cementum** occurs with age in the apical area.  
[Good: maintains tooth length compensate the attrition in enamel; bad:  
obstructs the foramen]
3. **Cementum resorption.**
4. **Resorption of root dentin occurs with aging that is covered by cemental repair**
5. **Cementicle is Calcified ovoid or round nodule found in the PDL.**