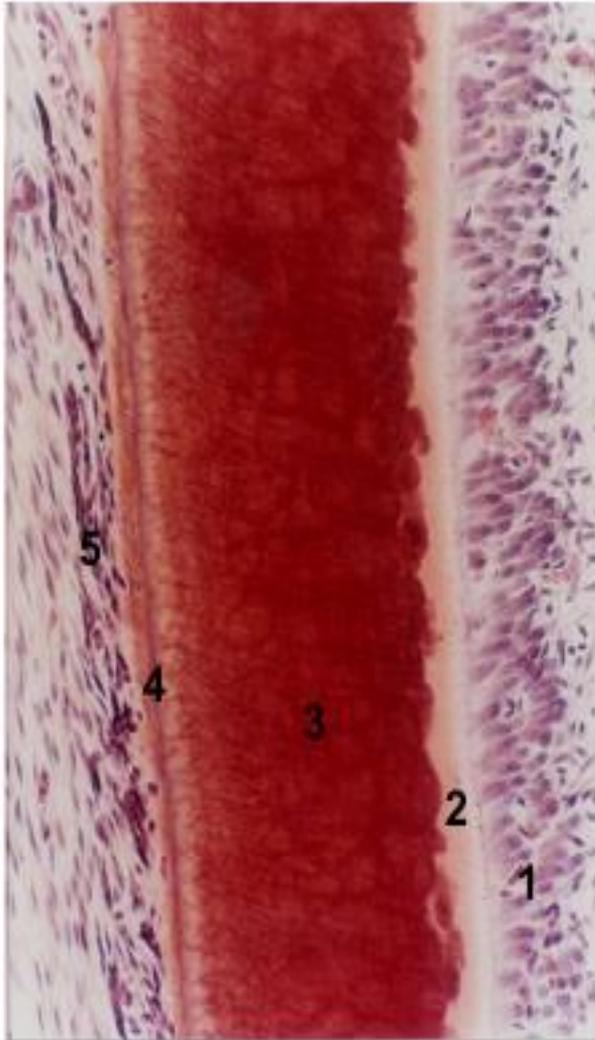


CEMENTUM

Prof.Dr.Athraa Y. Mohammed

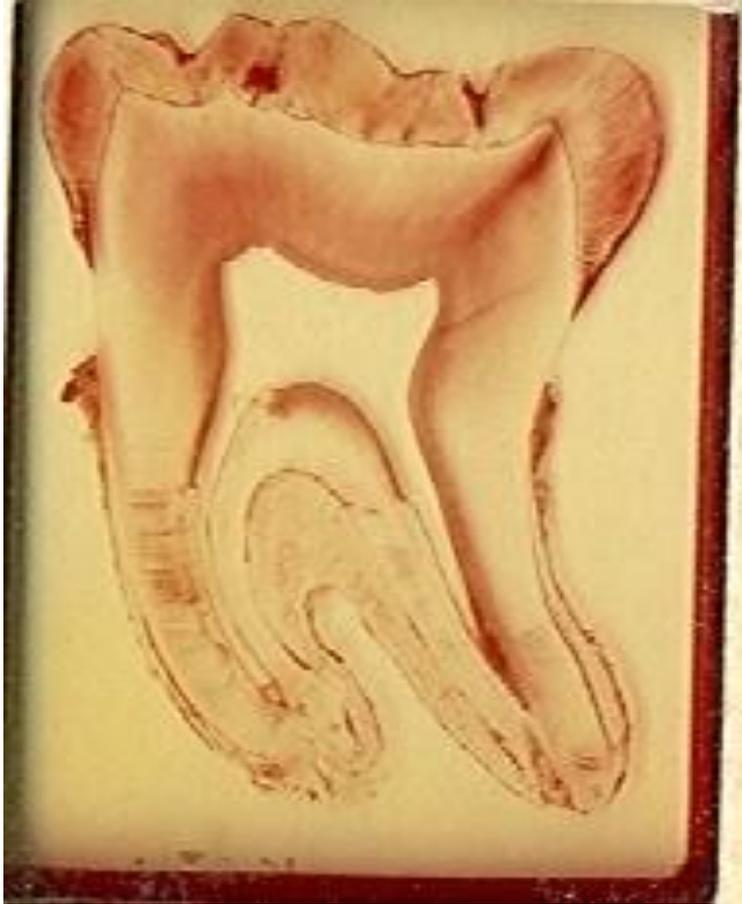
INTRODUCTION

- ✘ Is mineralized dental tissue covering the anatomic roots of human teeth.
- ✘ Begins at cervical portion of the tooth at the cementoenamel junction & continues to the apex.
- ✘ Furnishes a medium for the attachment of collagen fibers that bind the tooth to surrounding structures.
- ✘ Makes functional adaptation of the teeth possible.
- ✘ Unlike bone, human cementum is avascular.



1. Odontoblast.
2. Predentin.
3. Dentin.
4. cementum.
5. Epithelial rest of malasses.

THICK CEMENTUM ON ROOT APICES IN AN ELDERLY PERSON



PHYSICAL CHARACTERISTICS

- Hardness is less than that of dentin.
- Pale yellow in color.
- Can be distinguished from enamel by its lack of luster & dull surface
- Semi-permeable to a variety of materials.

CHEMICAL COMPOSITION

- Contains 45% to 50% inorganic substances & 50% to 55% organic material & water.
- Cementum has the highest fluoride content of all the mineralized tissues.
- Organic portion consists primarily of type I collagen & protein polysaccharides (proteoglycans).

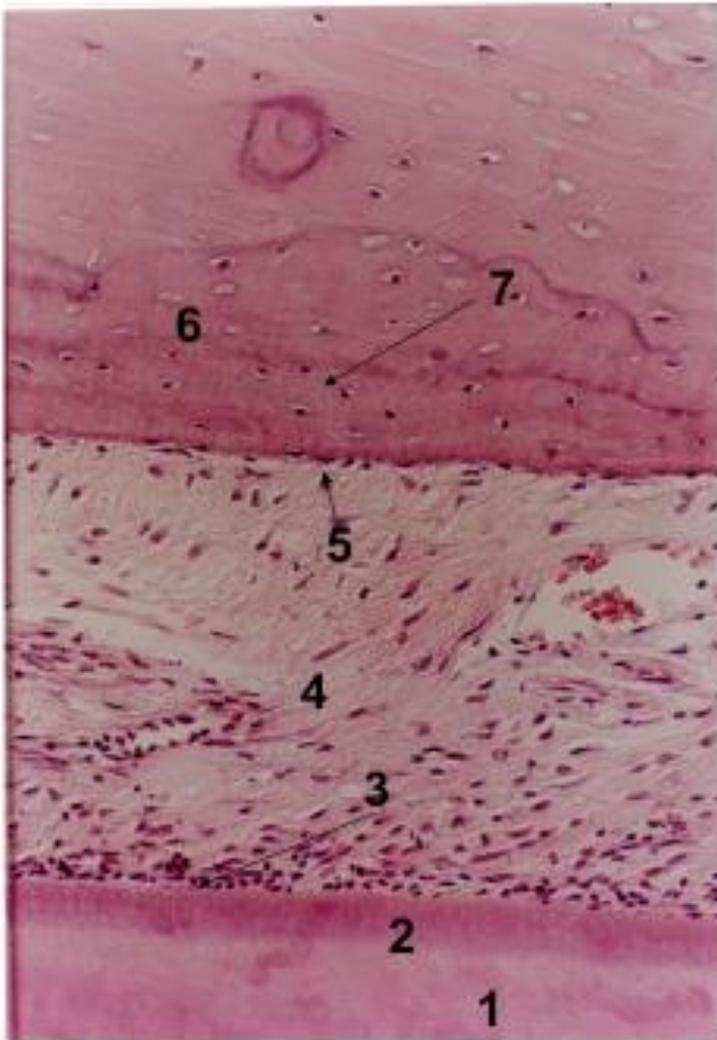
Roll of Cementum

- ▶ 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 mm in the cervical areas

Cellular components of cementum

CEMENTOBLASTS

- Soon after Hertwig's sheath breaks up, undifferentiated mesenchymal cells from adjacent connective tissue differentiate into cementoblasts.
- Synthesize collagen & protein polysaccharides which make up the organic matrix of cementum.
- Have numerous mitochondria, a well-formed golgi apparatus, & large amounts of granular endoplasmic reticulum.



1. Mental dentin.
2. Cementum.
3. Cementoblast
4. Periodontal ligament.
5. Osteoblast
6. Bundle bone.
7. Resting line..

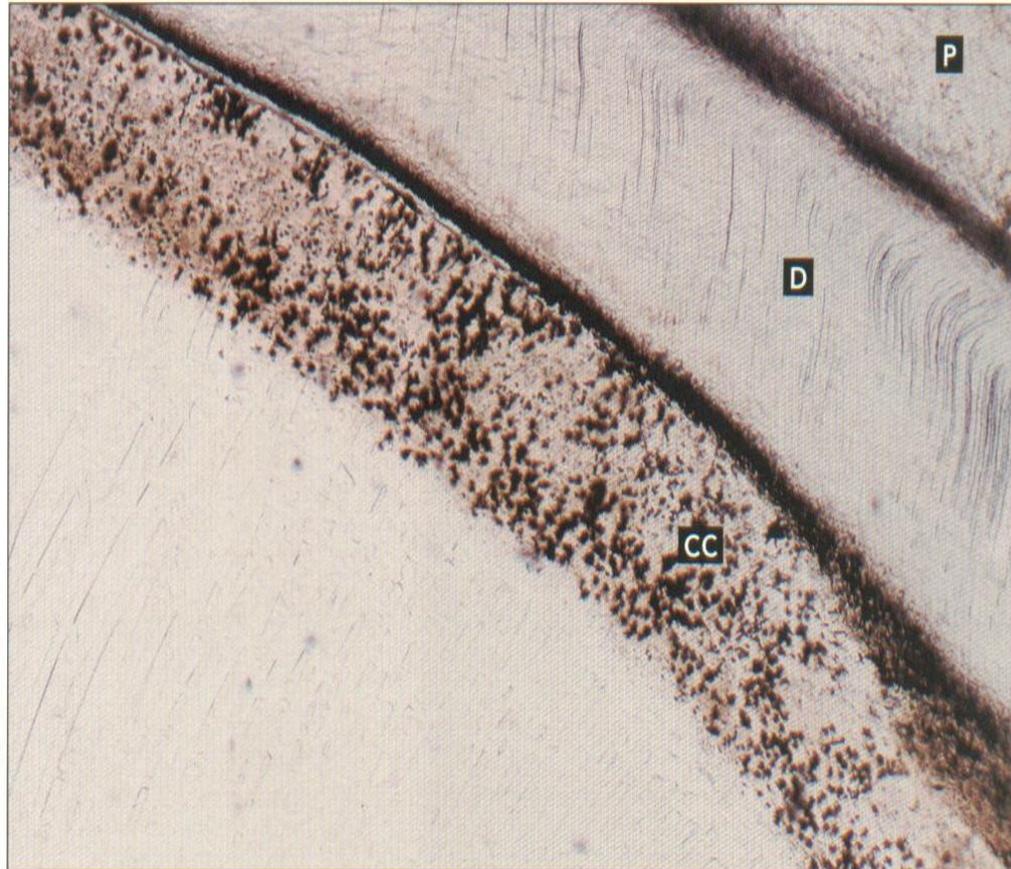
Cementocyte

- ▶ **Cementocyte is cementoblast that entrapped in cementum matrix during deposition. it is spiderlike located in lacunae with many canaliculi directed toward periodontal ligament.**

FIG 5-14

Root cellular cementum

Low-power view of cellular cementum (CC) on the root of a ground section of tooth. Root dentin (D) and the pulp cavity (P) are also shown (×40).

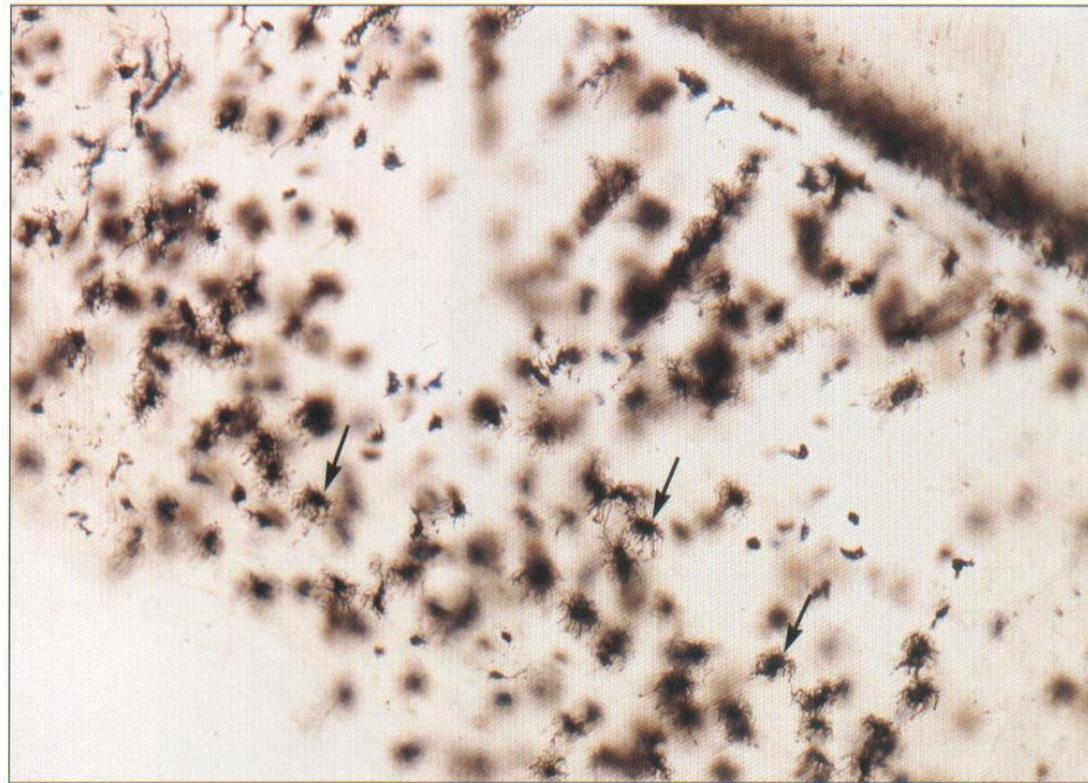


Cementocyte

FIG 5-15

Cementocytes

Cementocytes (arrows) in cellular cementum. The cell processes reach in the direction of the periodontal surface ($\times 160$).



ULTRASTRUCTURE OF CEMENTOCYTES DEEP CEMENTUM



CEMENTOID TISSUE

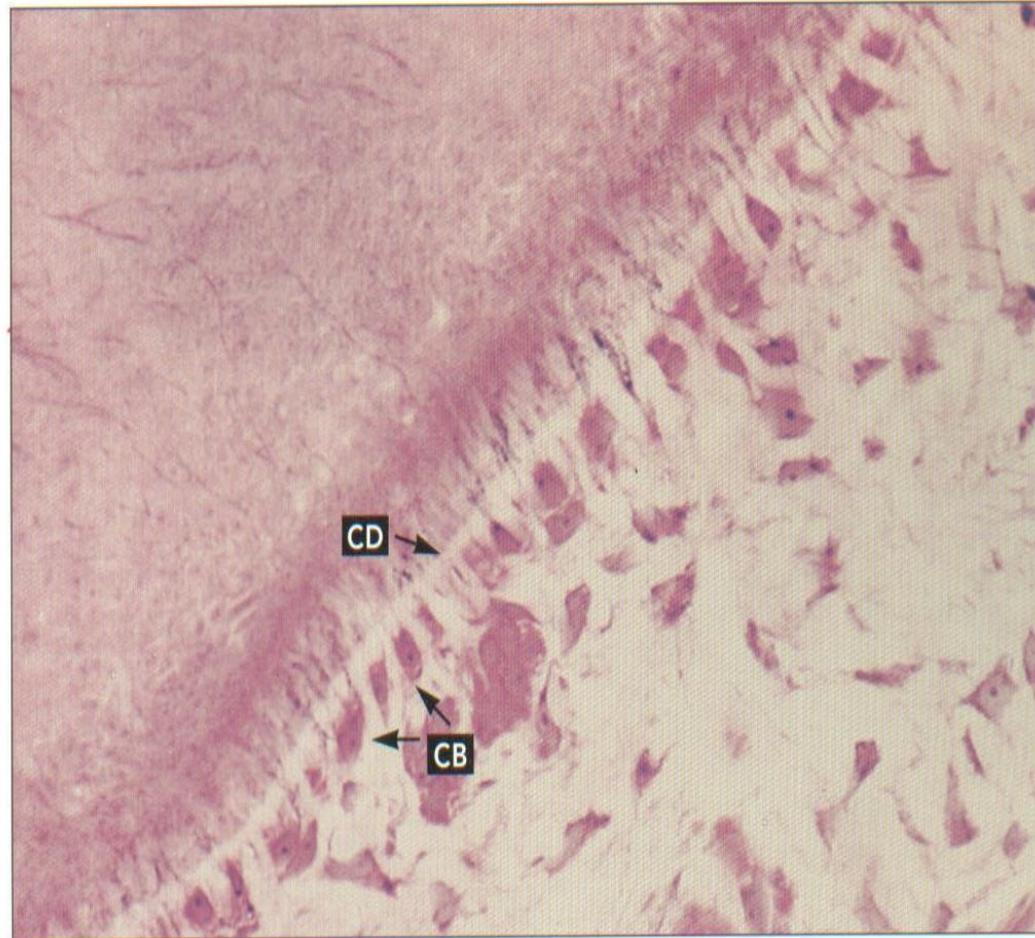
- The uncalcified matrix is called cementoid.
- Mineralization of cementoid is a highly ordered event & not the random precipitation of ions into an organic matrix.
- Fibers are embedded in the cementum & serve to attach the tooth to surrounding bone. Their embedded portions are known as **Sharpey's fibers**.

Cementoid

FIG 5-10

Cementoid

Cementoid (CD) produced by cementoblasts (CB) on the periodontal surface of acellular cementum on a tooth root (H and Lee stain; $\times 640$).



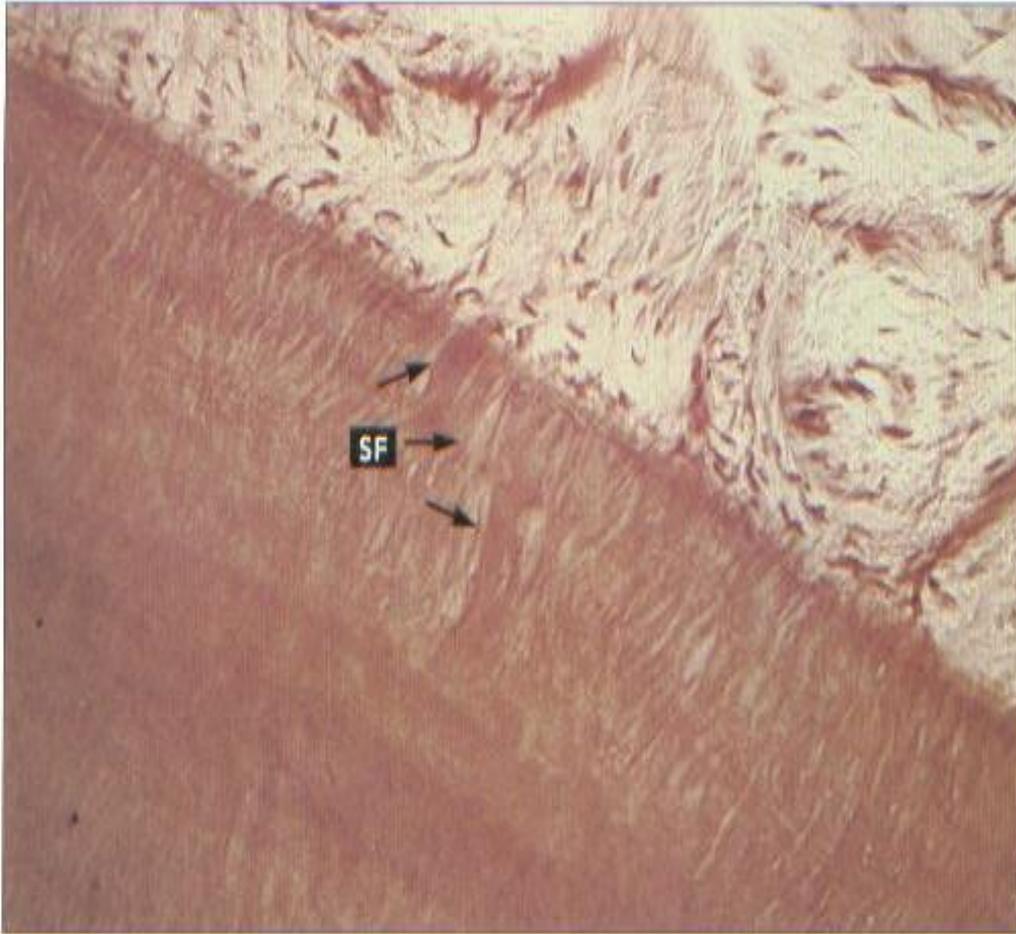


FIG 5-5

Sharpey's fibers

Sharpey's fibers (SF) in acellular cementum (H and E stain; $\times 400$).

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

Acellular cementum

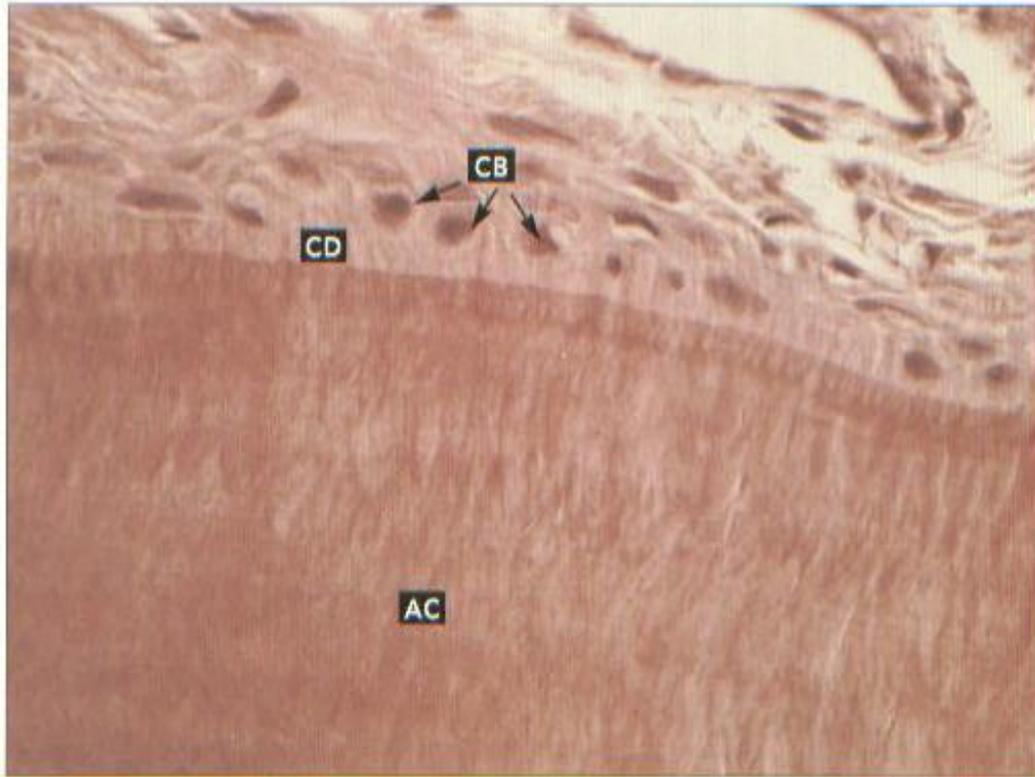


FIG 5-4

Acellular cementum

Cementoblasts (CB) and cementoid (CD) on the surface of acellular cementum (AC) (H and E stain; $\times 640$).

Cellular cementum

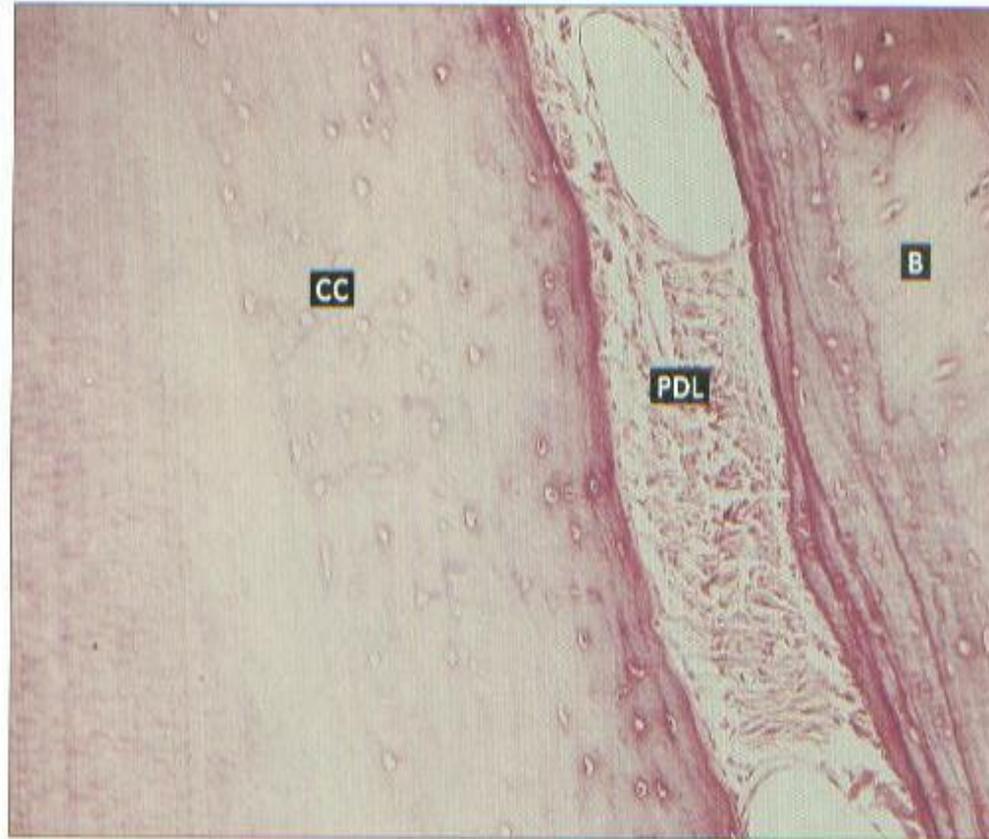
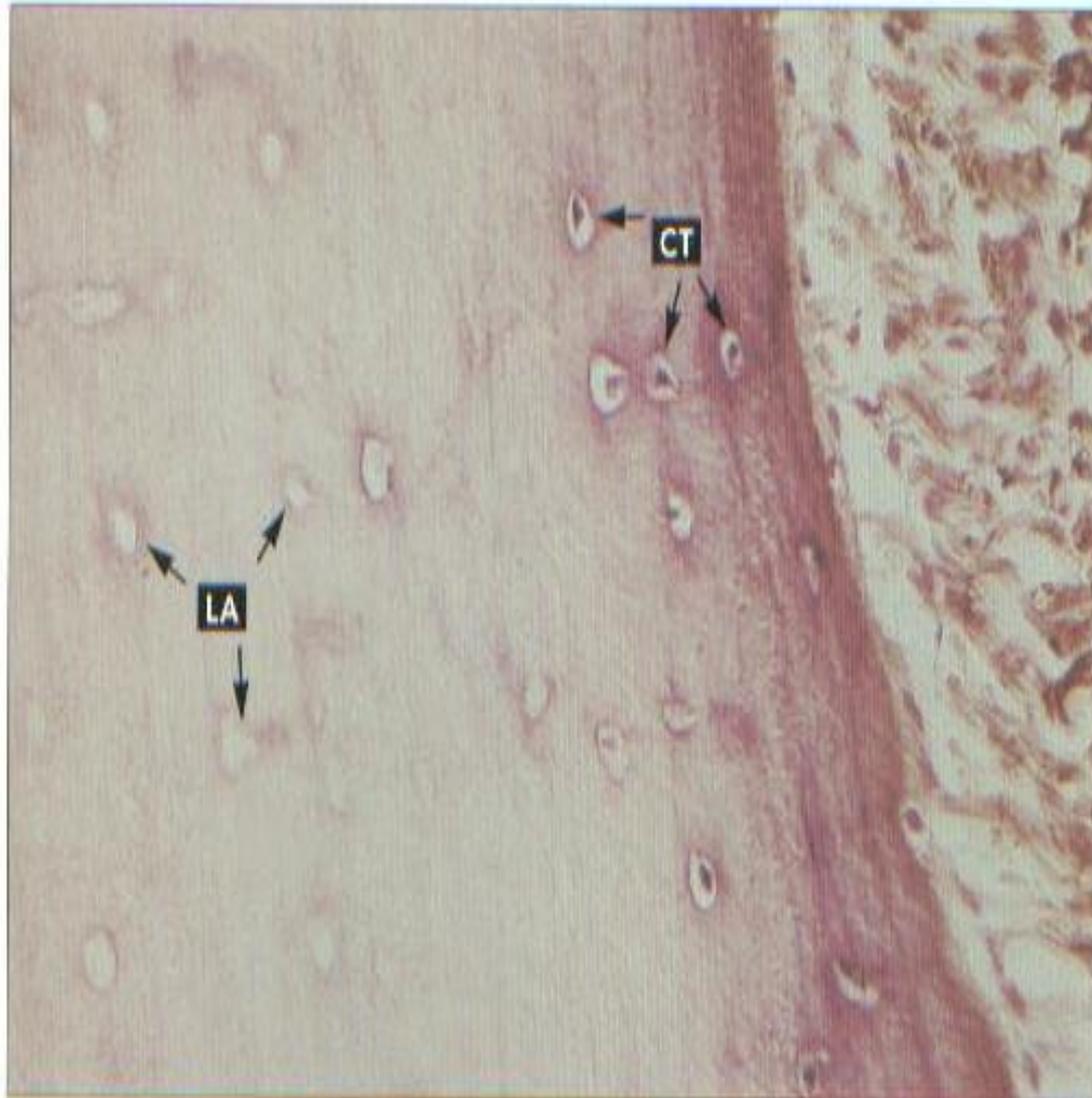


FIG 5-6

Cellular cementum

Cellular cementum (CC), periodontal ligament (PDL), and alveolar bone (B) in a transverse section of a tooth (H and E stain; $\times 160$).

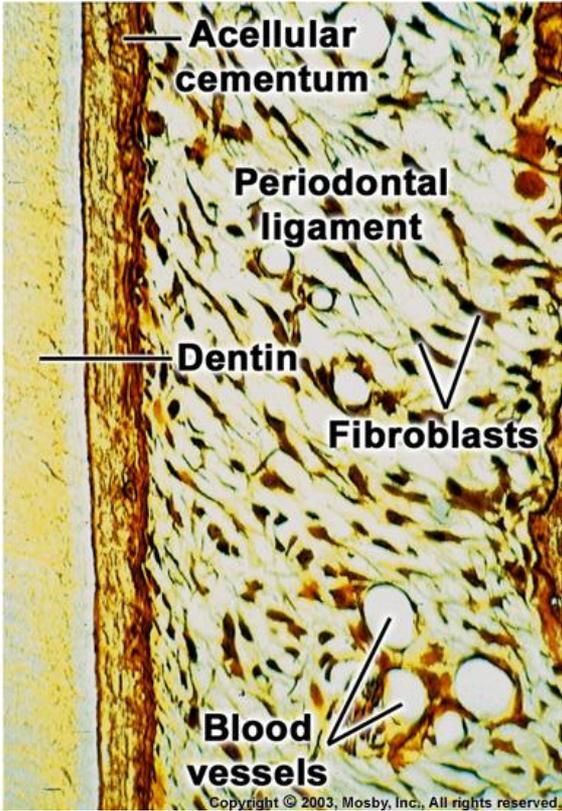
FIG 5-7
Cellular cementum
Cellular cementum with cementocytes (CT) near the periodontal surface, and empty lacunae (LA) deeper in the tissue (H and E stain; $\times 400$).



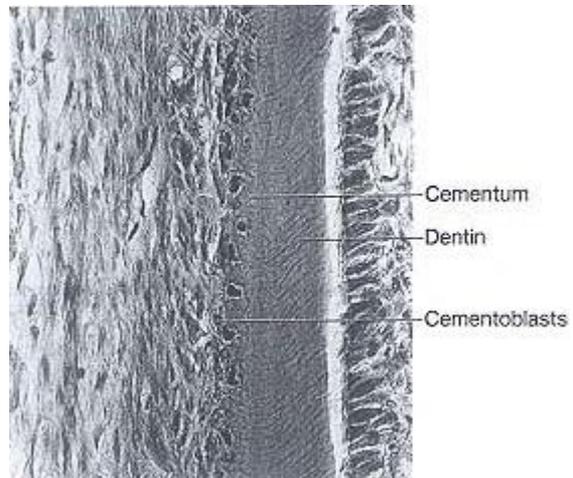
Classification based on origin of fibers in cementum

- ▶ **1.Extrinsic fibers cementum**
- ▶ **A.derived from(fibroblast cell in PDL).**
- ▶ **B.These are in the same direction of the PDL principal fibers named as sharpey's fiber.**
- ▶ **2.Intrinsic fibers cementum**
- ▶ **A.derived from cementoblasts.**
- ▶ **B.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**

Acellular cementum

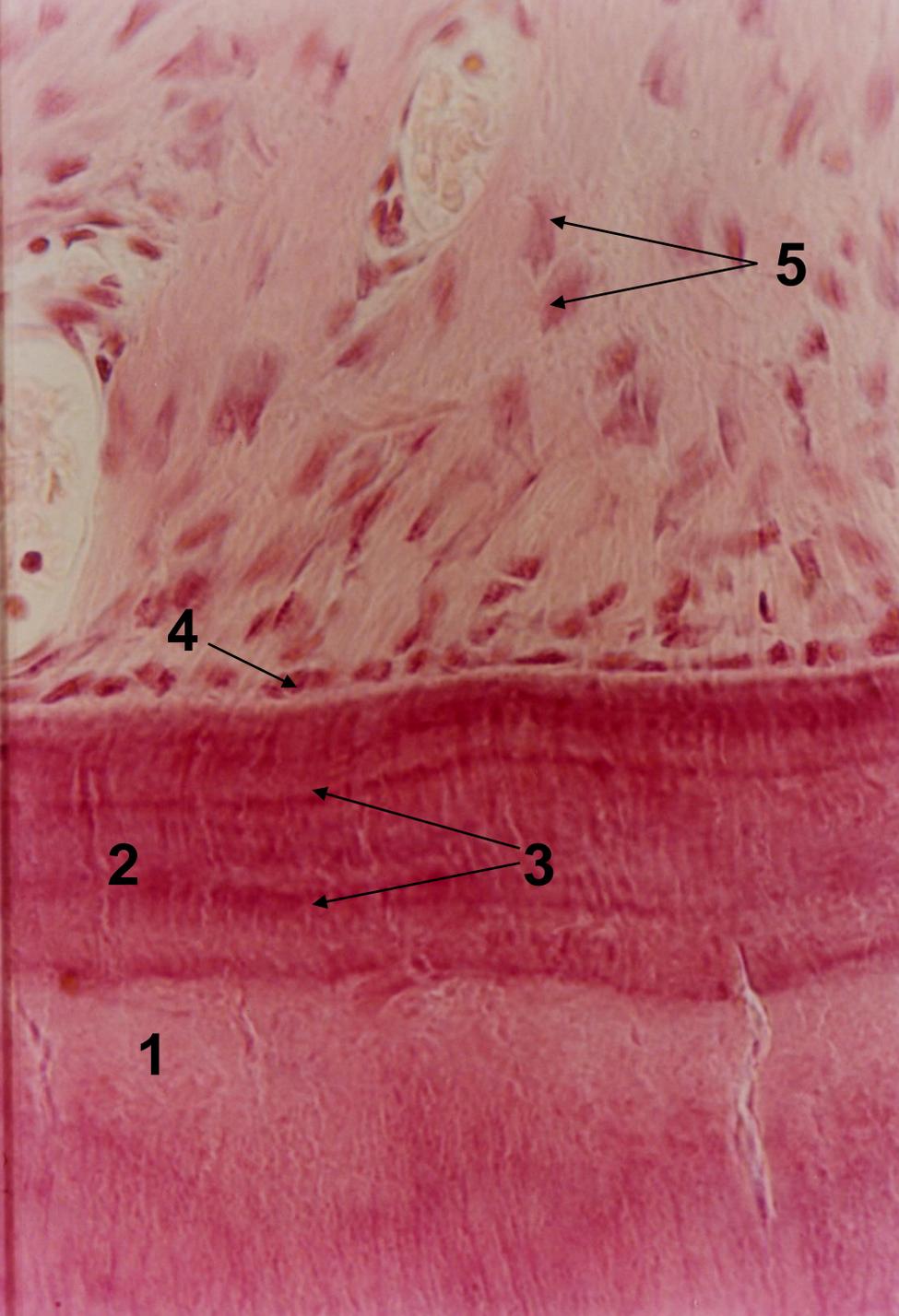


CELLULAR CEMENTUM



INCREMENTAL LINES

- ▶ Are highly mineralized areas with less collagen and more ground substance than other portions of the cementum.
- ▶ The thickness of cementum does not enhance functional efficiency by increasing the strength of attachment of the individual fibers.



- 1. Mental dentin.**
- 2. A cellular cementum.**
- 3. Incremental lines.**
- 4. Cementoblast.**
- 5. Fibroblast.**

Dentino-cemental Junction(DCJ)

- Smooth in permanent teeth.
- Scalloped in deciduous teeth.
- Dentin is separated from cementum by a zone known as the **intermediate cementum layer**.
- This layer is predominantly seen in apical two-thirds of roots of molars & premolars.

Dentino cemental junction(DCJ)

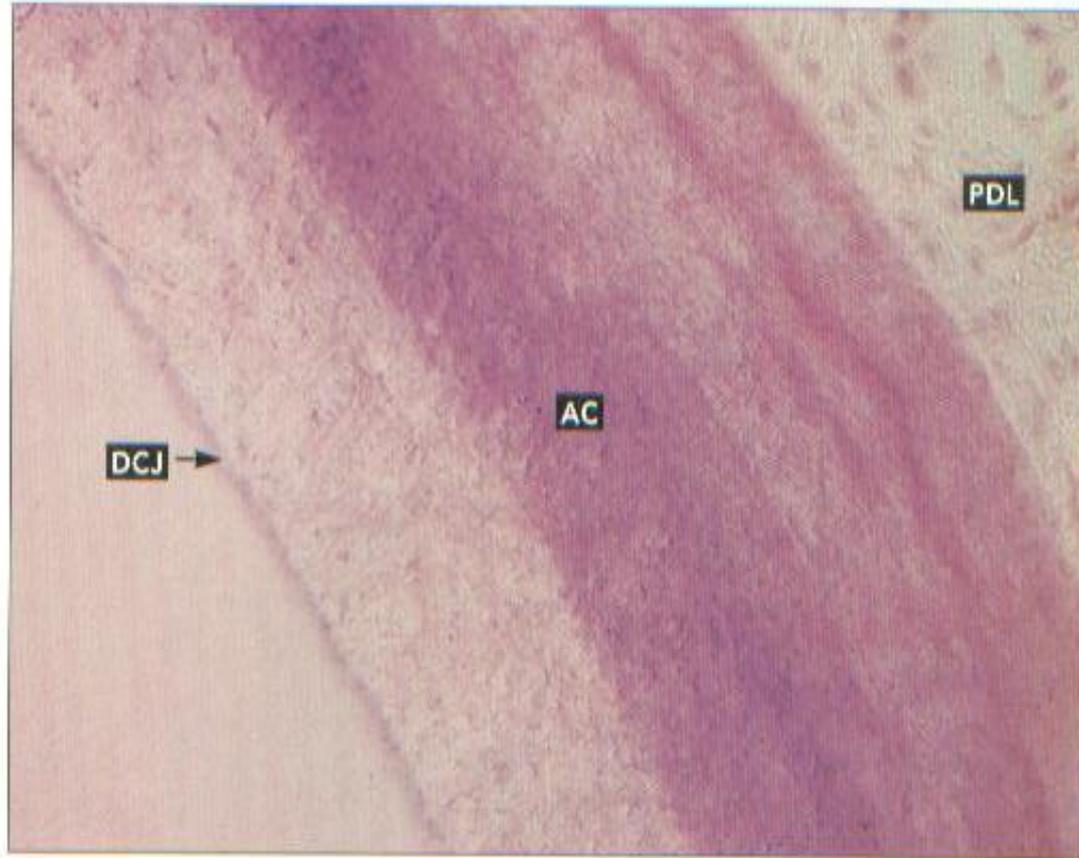


Fig 5-3

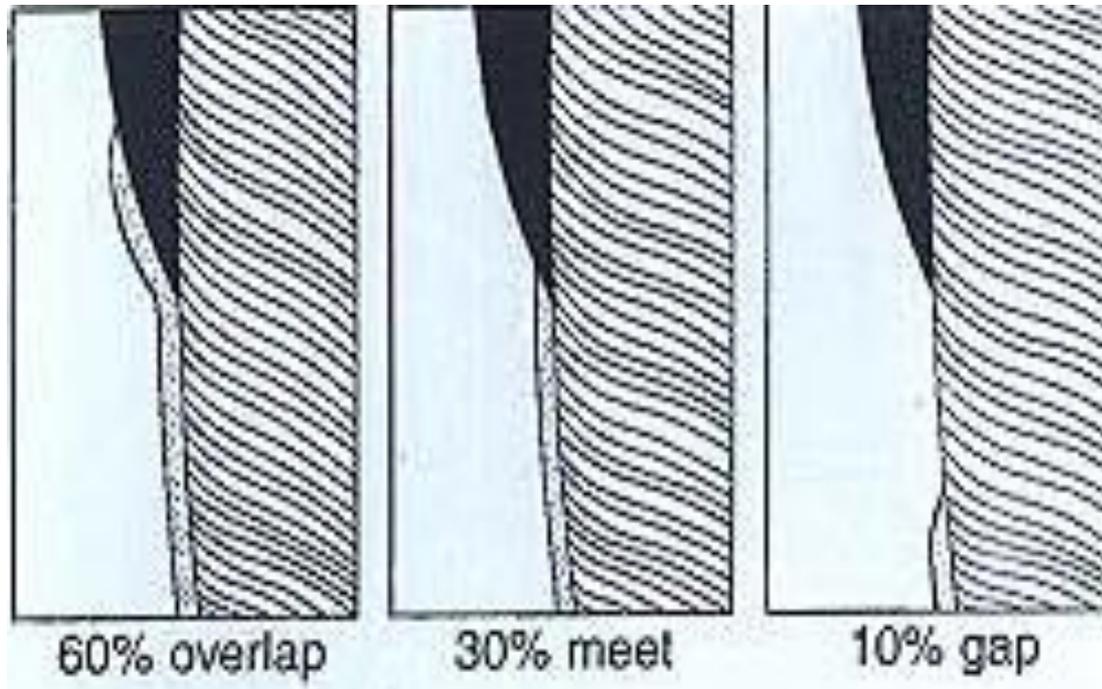
Dentino cemental junction

Higher magnification of the dentino cemental junction (DCJ), acellular cementum (AC), and periodontal ligament (PDL) shown in Fig 5-2 (x400).

CEMENTOENAMEL JUNCTION

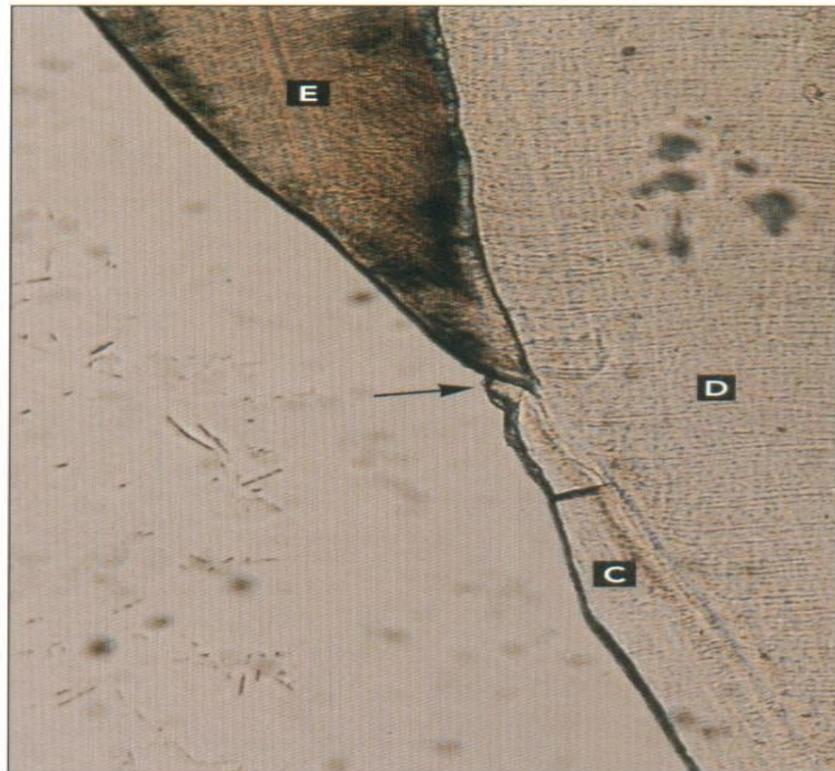
- In 60% of the teeth, cementum overlaps the cervical end of enamel for a short distance.
- In 30% of all teeth, cementum meets the cervical end of enamel in a relatively sharp line.
- In 10% of the teeth, enamel & cementum do not meet.

RELATION OF CEMENTUM TO ENAMEL AT THE CEMENTOENAMEL JUNCTION

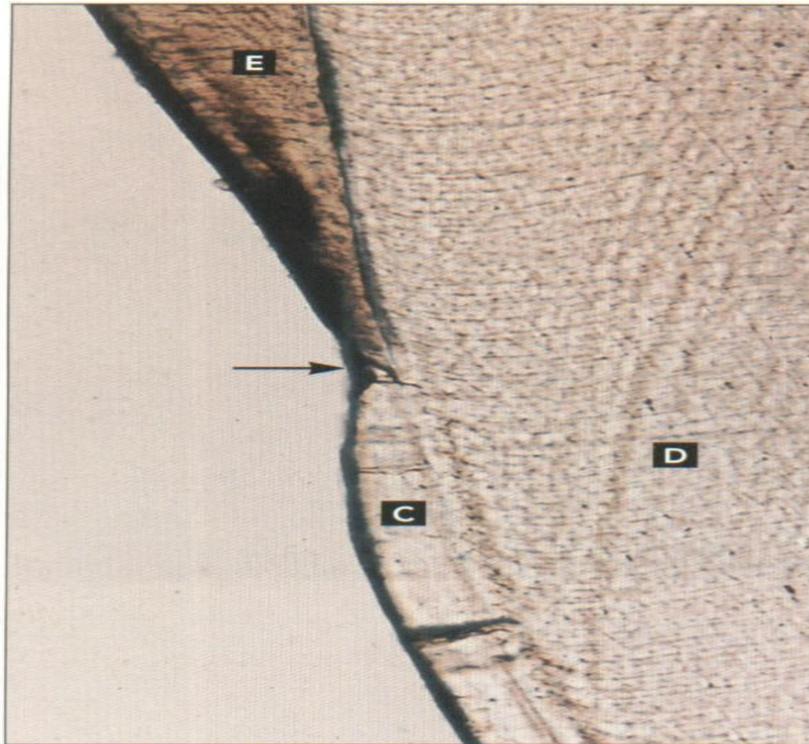


Cementum overlaps enamel 60%

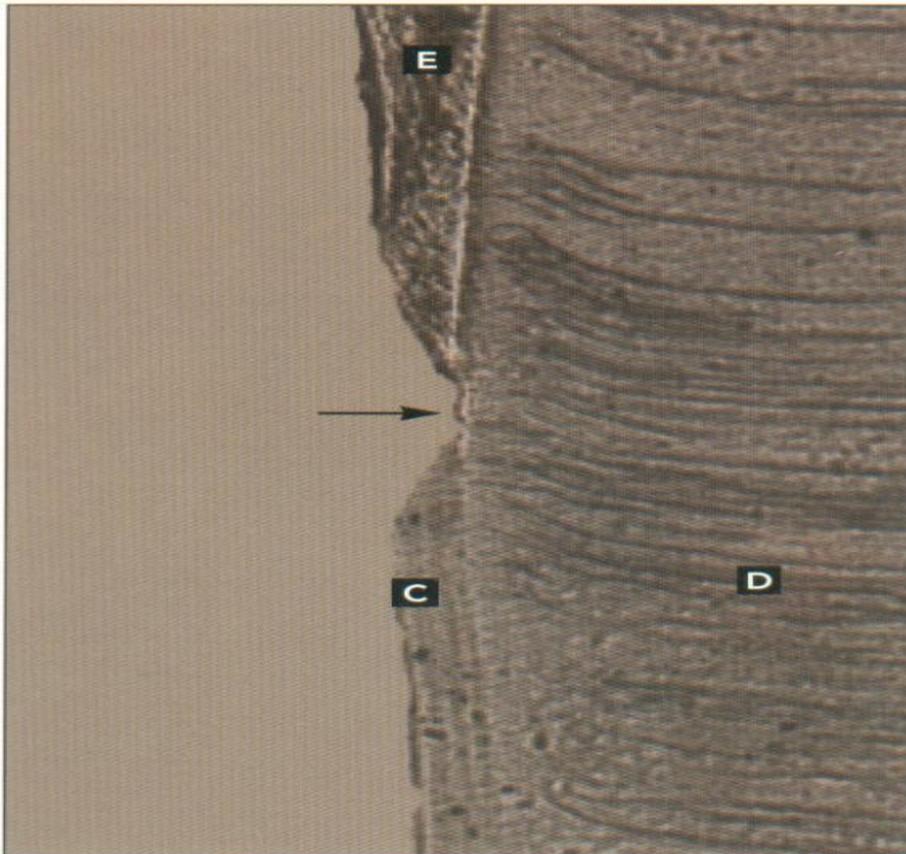
CEMENTUM



Cementum meet enamel edge to edge (30%)



Gap between Cementum and enamel (10%)

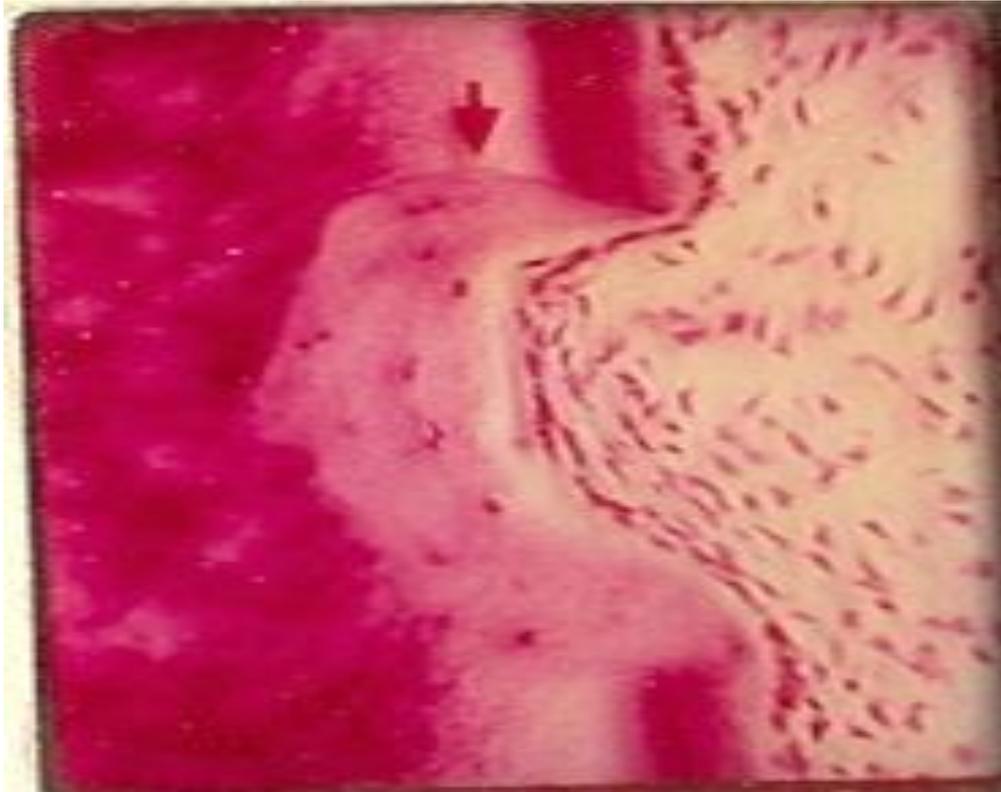


CLINICAL CONSIDERATIONS

- **Cementum is more resistant to resorption than is bone, & it is for this reason that orthodontic tooth movement is made possible.**
- **It is because bone is richly vascularized, whereas cementum is avascular.**
- **Cementum resorption can occur after trauma or excessive occlusal forces.**

- In most cases of repair, there is a tendency to re-establish the former outline of the root surface by **cementum**. This is called **anatomic repair**.
- However, if only a thin layer of cementum is deposited on the surface of a deep resorption, the root outline is not reconstructed, & a **bay like recess** remains.
- In such areas the **periodontal space is restored to its normal width** by formation of a bony projection, so that a proper functional relationship will result. the outline of the **alveolar bone** in these cases follows that of the root surface. This is called **functional repair**.

Resorption of Cementum



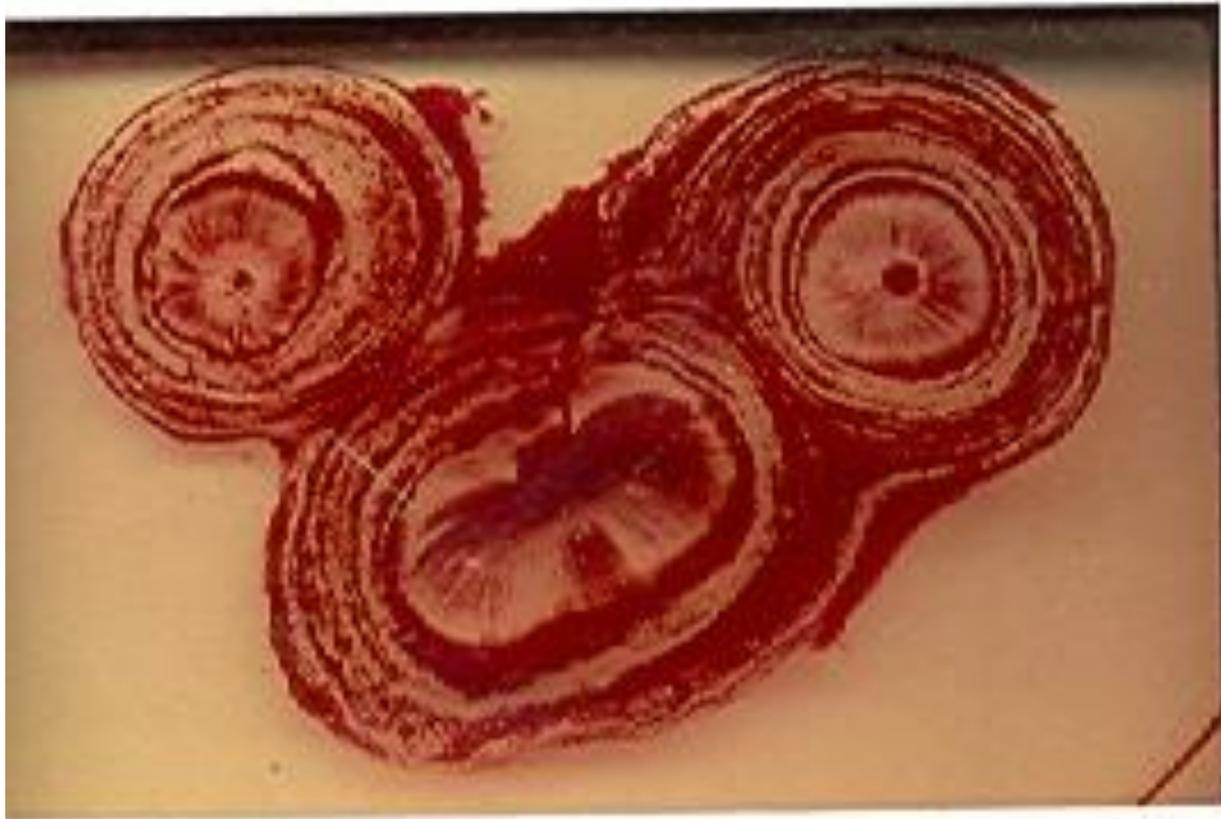
Resorption of cementum

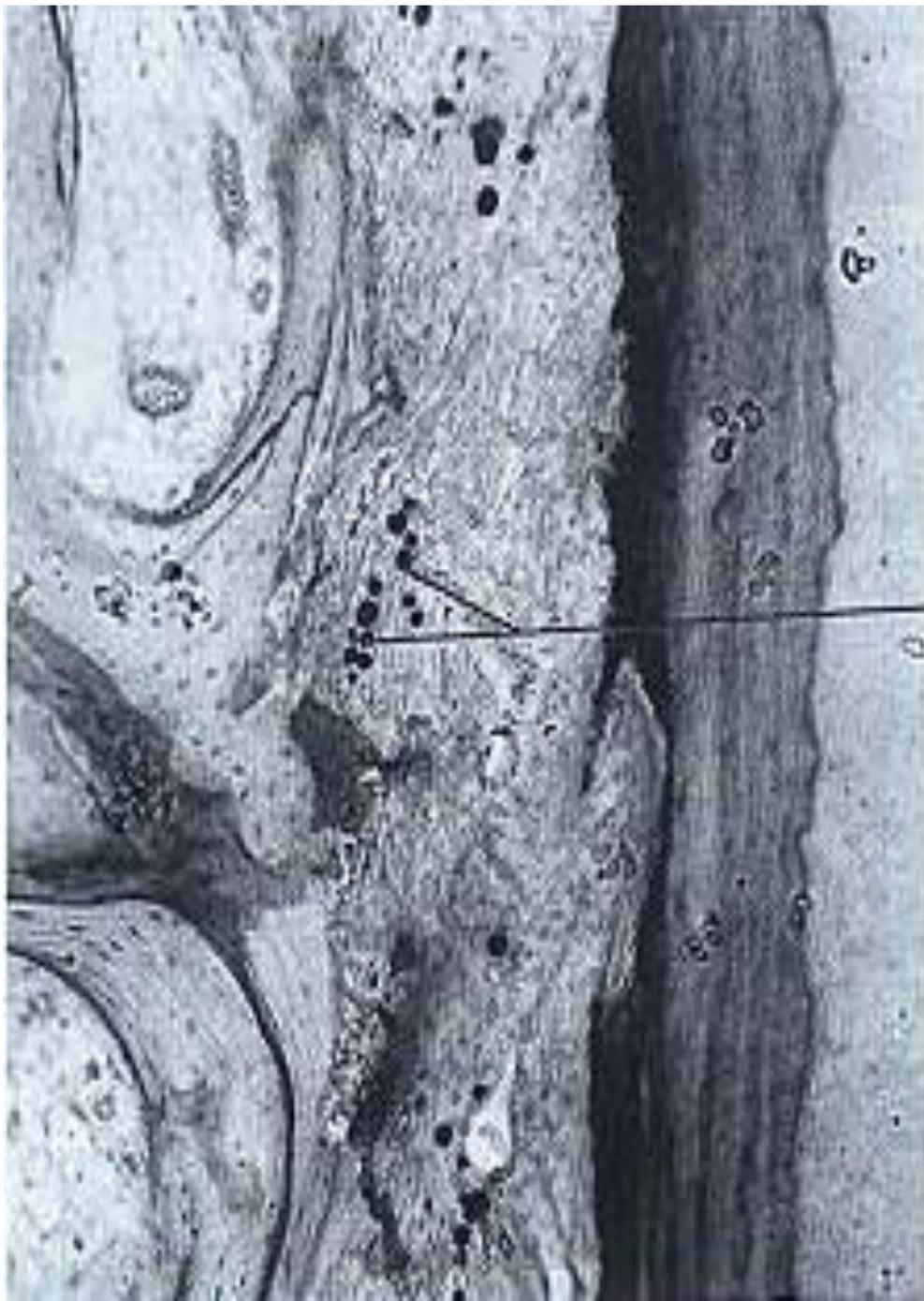


HYPERCEMENTOSIS

- Is an abnormal thickening of cementum.
- May be diffuse or circumscribed.
- May affect all teeth of the dentition, be confined to a single tooth, or even affect only parts of one tooth.
- If the overgrowth improves the functional qualities of the cementum, it is termed **cementum hypertrophy**.
- If the overgrowth occurs in non-functional teeth or if it is not correlated with increased function, its termed **hyperplasia**.

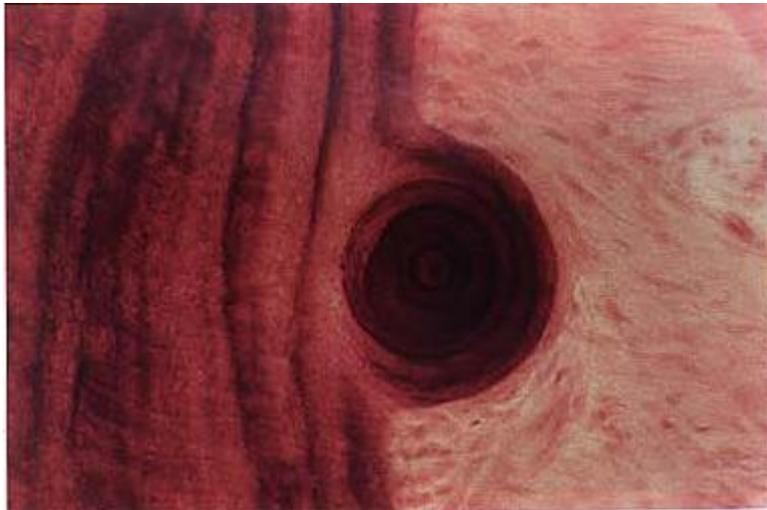
Hypercementosis





Free
cementicles

ATTACHED CEMENTICLES ON SURFACE OF CEMENTUM



THANK YOU

The slide features a white background with abstract, overlapping geometric shapes in various shades of pink and magenta on the right side. The shapes are layered, creating a sense of depth and movement. The text 'THANK YOU' is centered on the left side in a bold, dark grey font.