

# PRACTICAL SESSION : DENTIN

## SLIDE DISCUSSION



DR SAJDA GAJDHAR

## Dentin

CLO	SLO	By the end of this Practical session, students should be able to:
1.1, 2.1	1	Illustrate the differences between the primary, secondary and tertiary dentin
	2	Demonstrate the different structures seen in dentin under microscope
	3	Demonstrate the differences in the course of dentinal tubules such as primary and secondary curvatures
	4	Demonstrate the dead tract, interglobular dentine and tome's granular layer

### Essential reading:

- Tencate's Oral histology ; pages 165 - 204
- James K Avery; pages 107-120

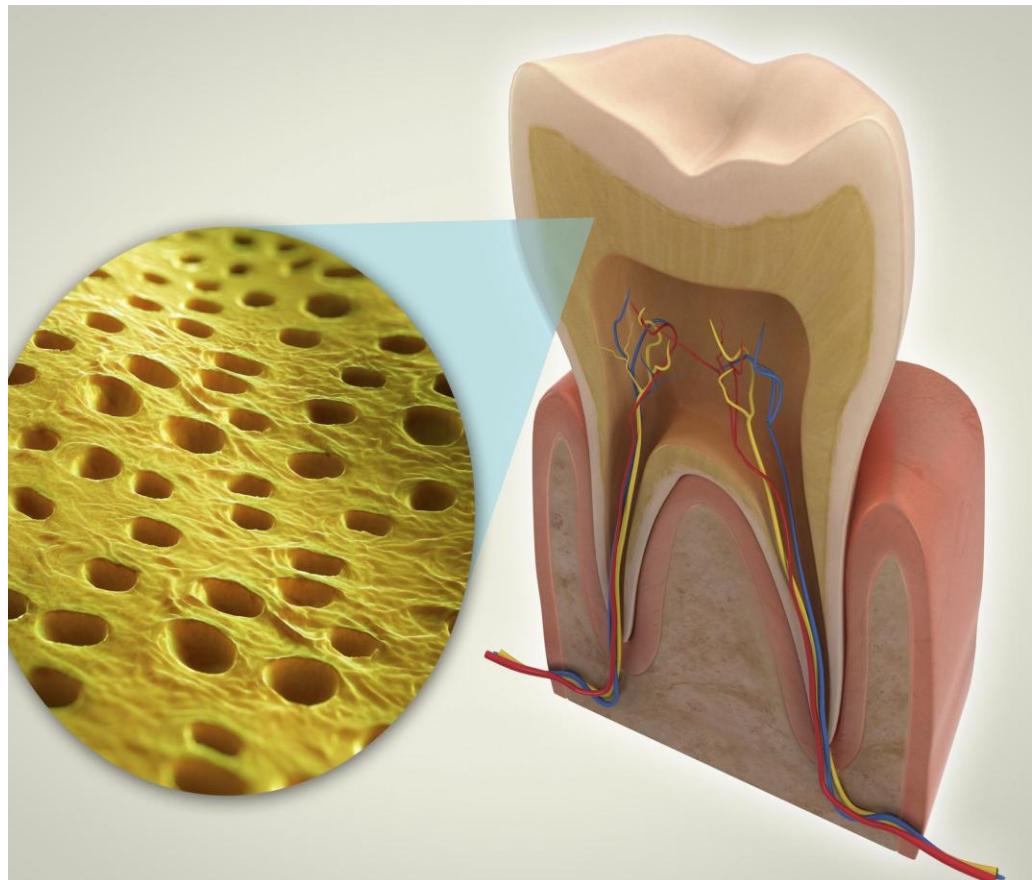
# CBL SCHEDULE FOR OCH

- 06-10-25 CBL and CPC –MAXILLARY SINUS AND TMJ
- 08-10-25 CBL and CPC-TOOTH DEVELOPMENT AND ENAMEL
- FORMATIVE ASSESSMENT SAME DAY SAME TOPIC
- GENERAL PATHOLOGY :
- 09-10-25-CBL ON CELL INJURY AND CELLULAR ADAPTATION AND FORMATIVE ASSESSMENT

# Tentative dates for exams

- OSPE-1 ORAL CAVITY IN HEALTH -13 OCTOBER
- OSPE-1 GENERAL PATHOLOGY -16<sup>TH</sup> OCTOBER

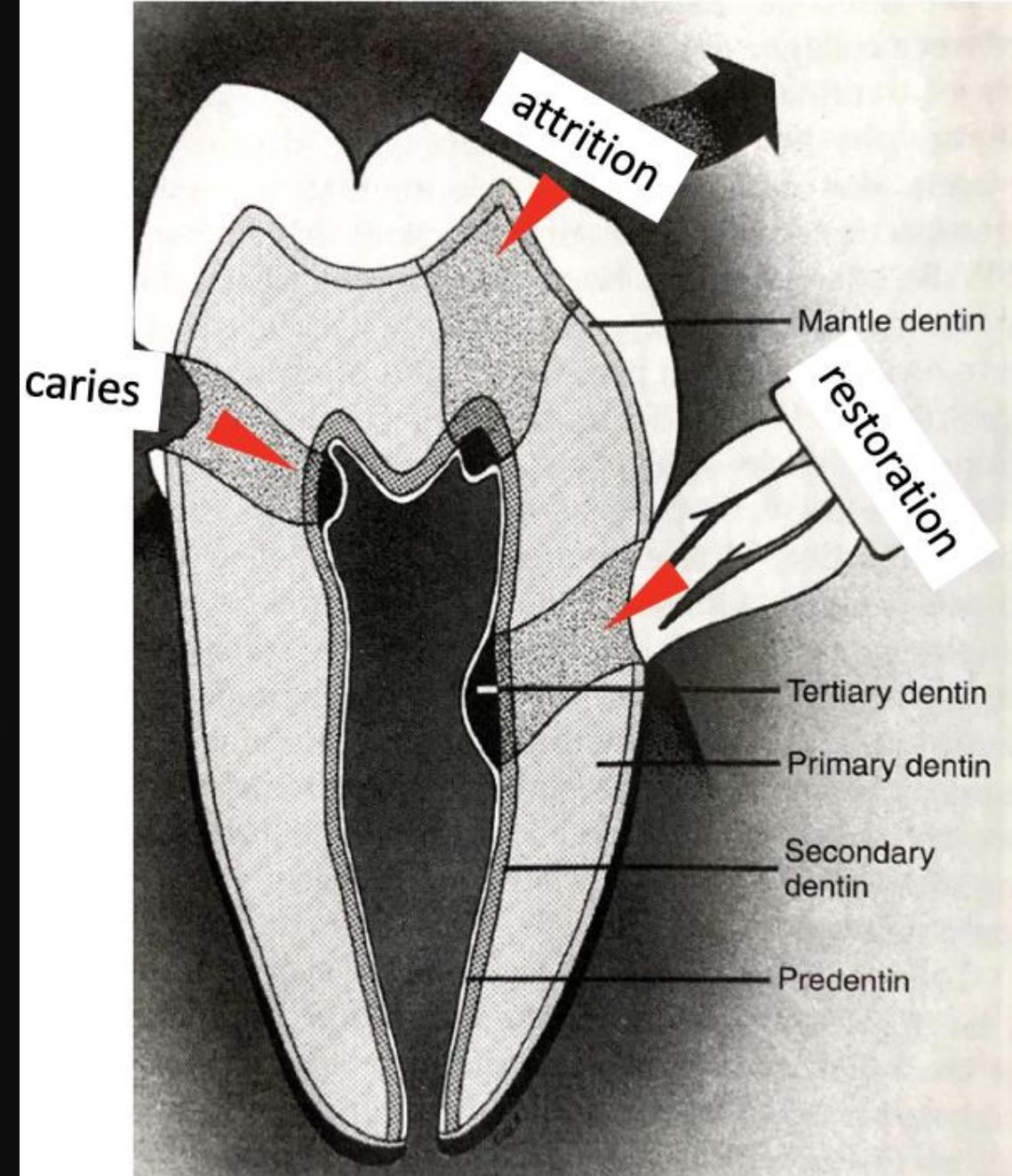
# DENTIN



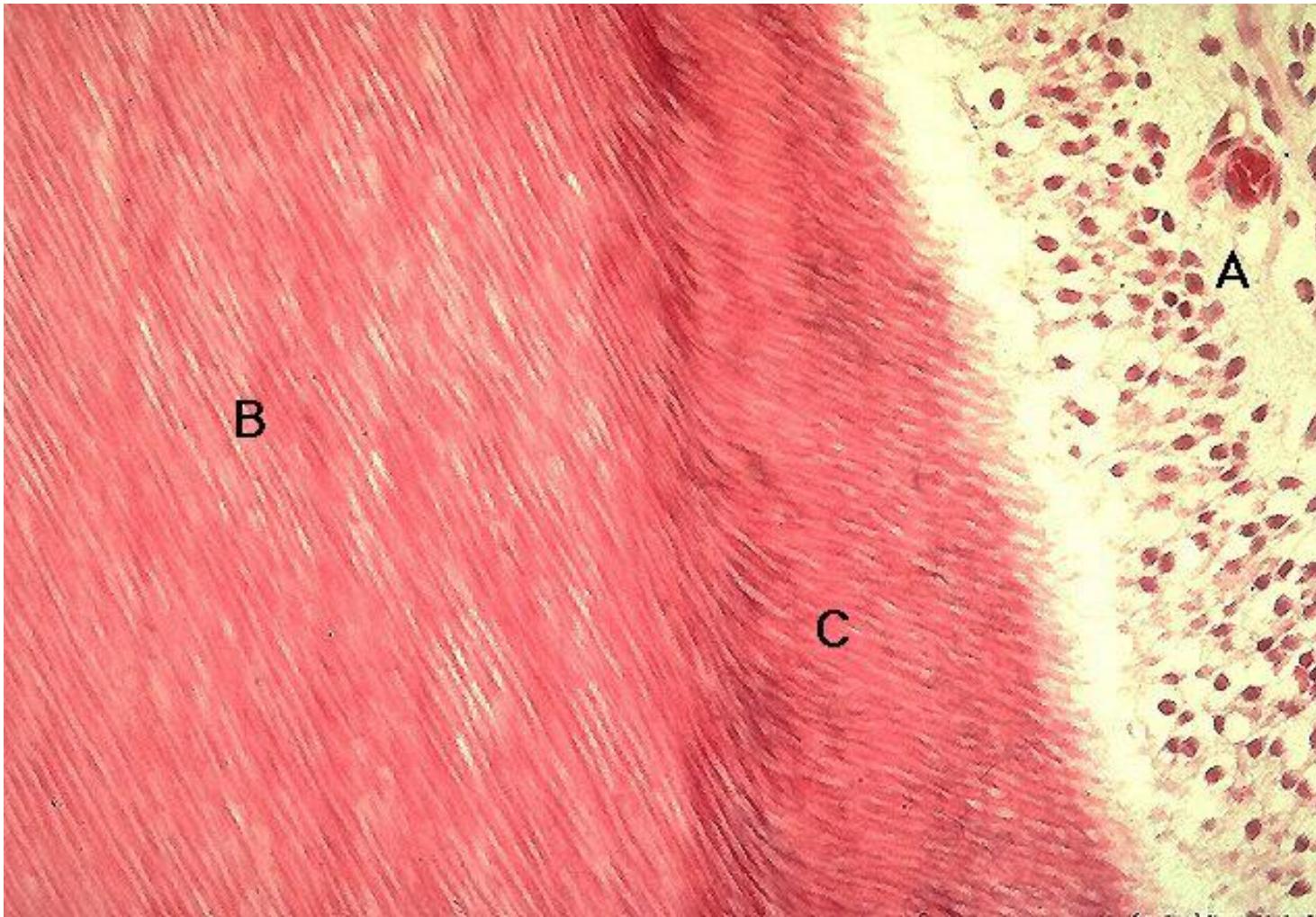
- Dentin is a **calcified mineralized tissue** like enamel but with a very different composition.
- Dentin is **produced by odontoblast cells** that reside at the periphery of dental pulp.
- The cell bodies of these cells are present in the pulp whereas their **processes** that is **odontoblastic processes**, extend into the dentinal tubules.
- Dentinal tubules contain **odontoblastic processes**, **dentinal fluid**, and **afferent nerve terminals**

# Types of Dentin

- ▶ - **Primary Dentin:**
  - all dentin formed prior to root formation or completion.
- ▶ - **Secondary Dentin:**
  - all dentin produced after root formation or completion.  
*(NOT due to trauma)*
- ▶ - **Tertiary Dentin:**
  - all reparative dentin (all regular and irregular)\*



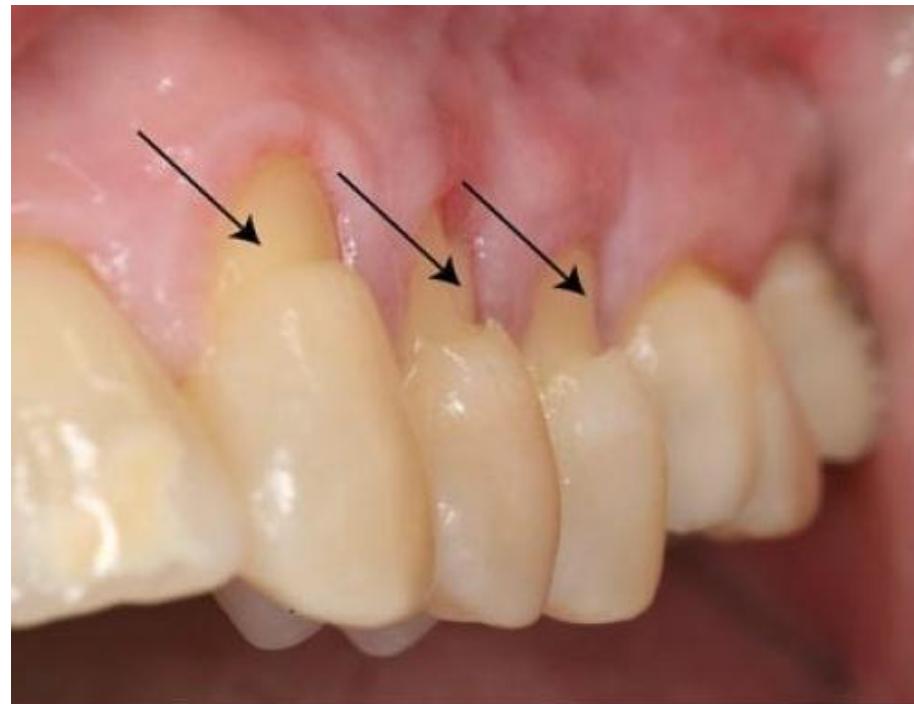
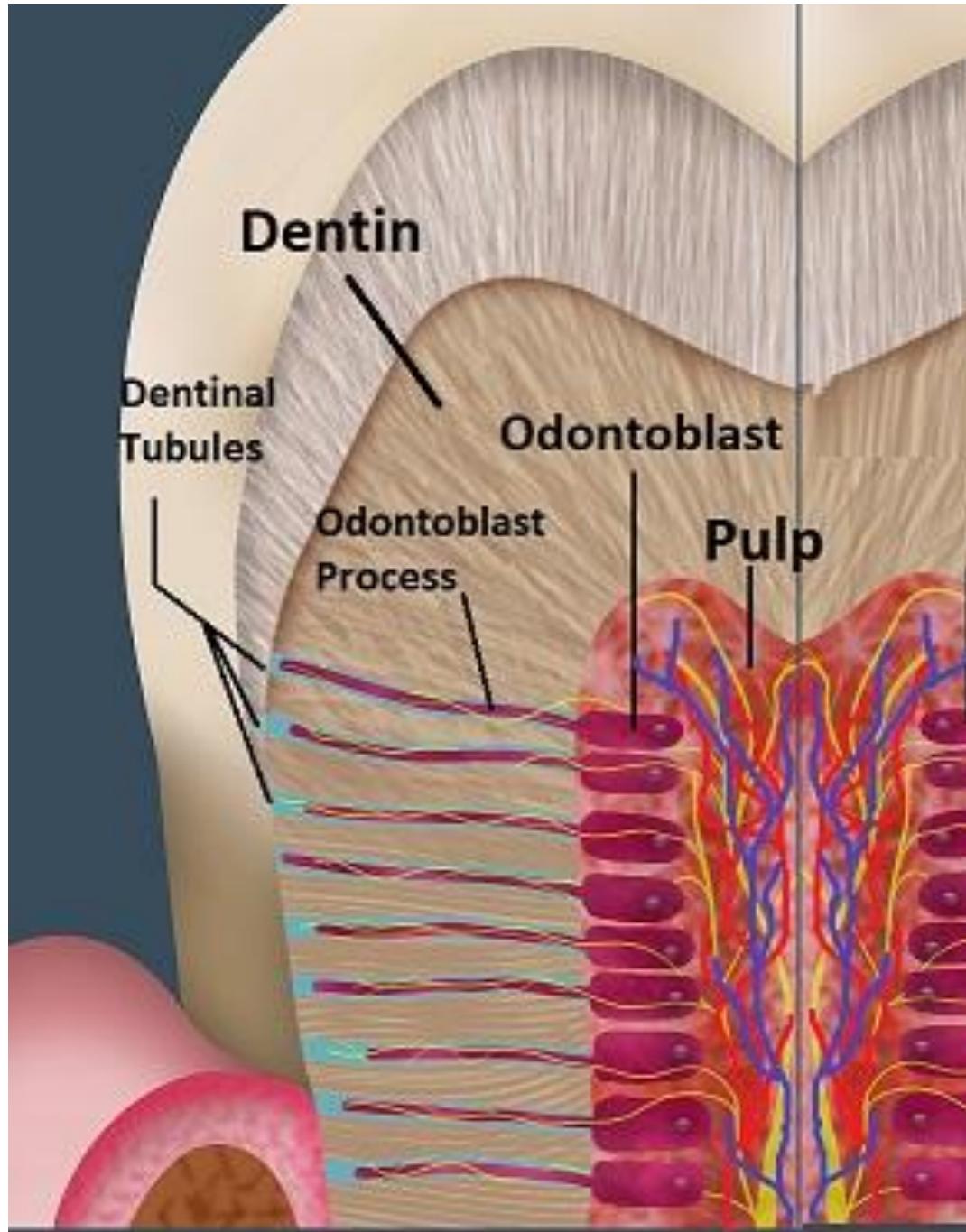
From "Ten Cate's Oral Histology"



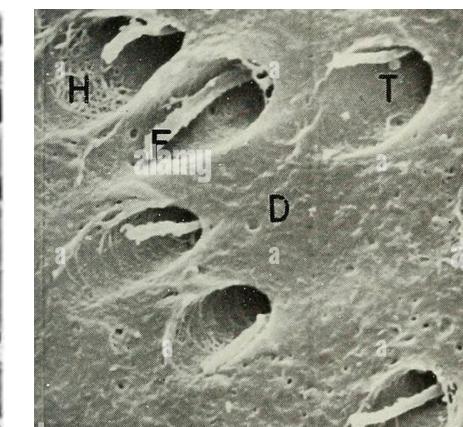
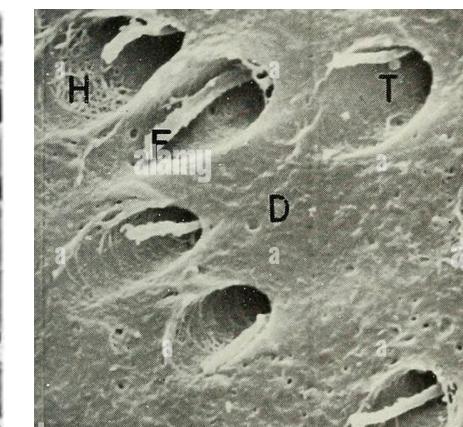
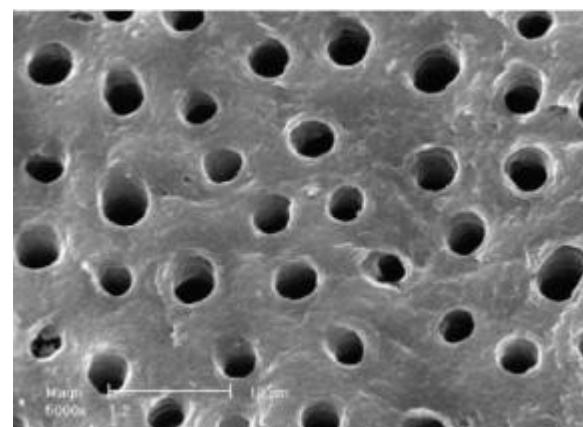
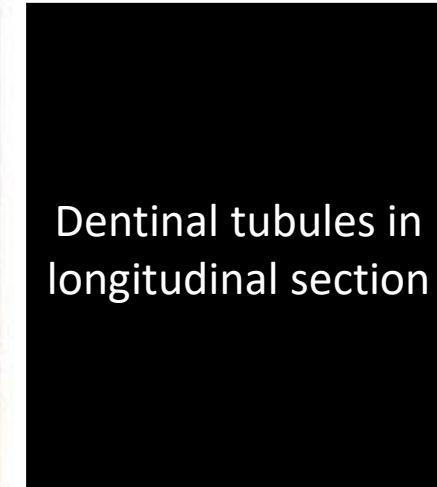
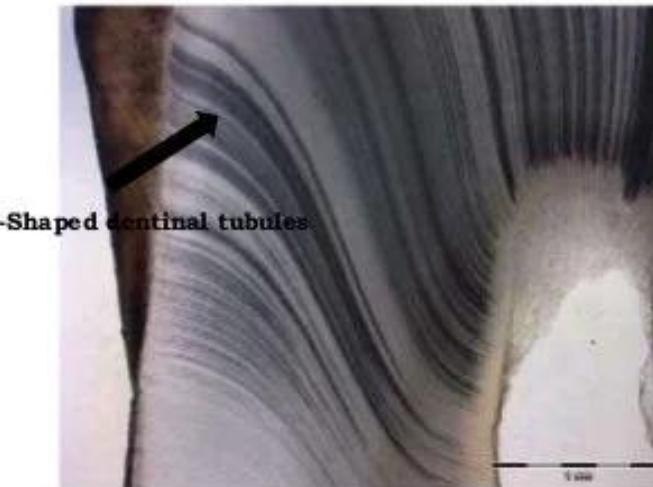
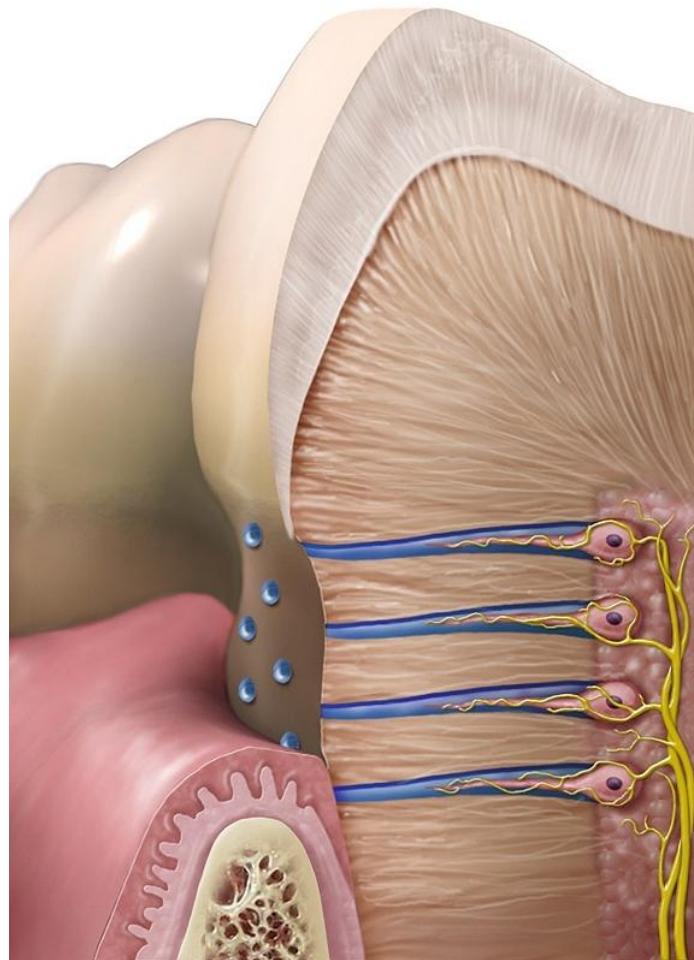
**A** - pulp

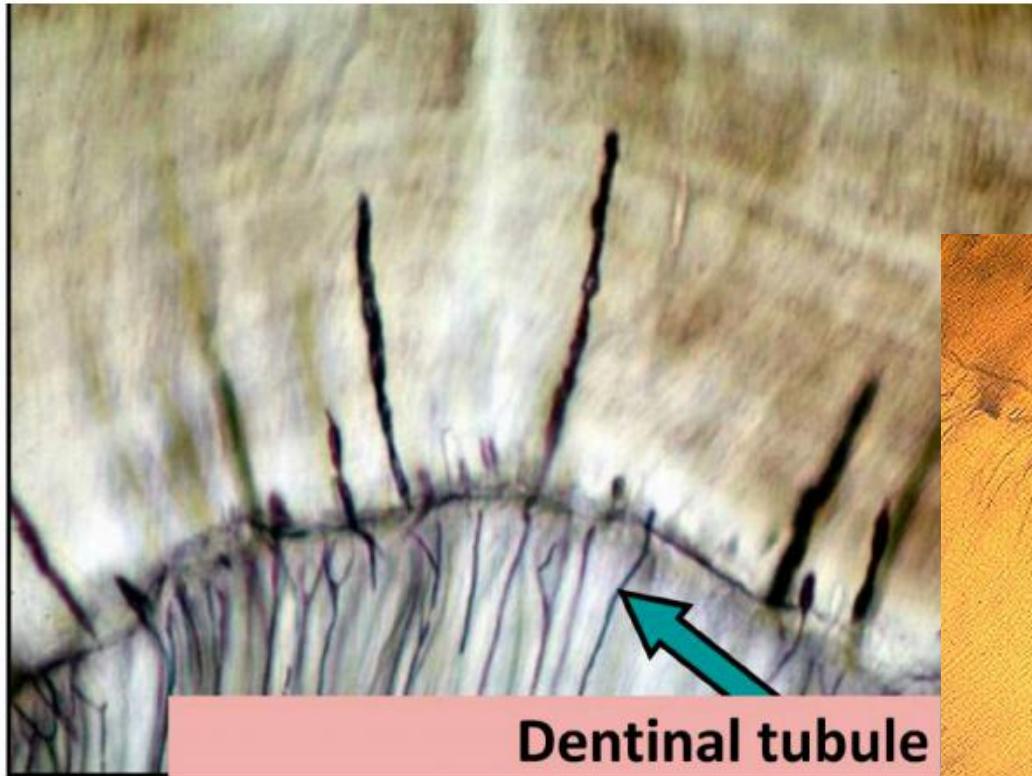
**B** - primary dentin

**C** - secondary dentin

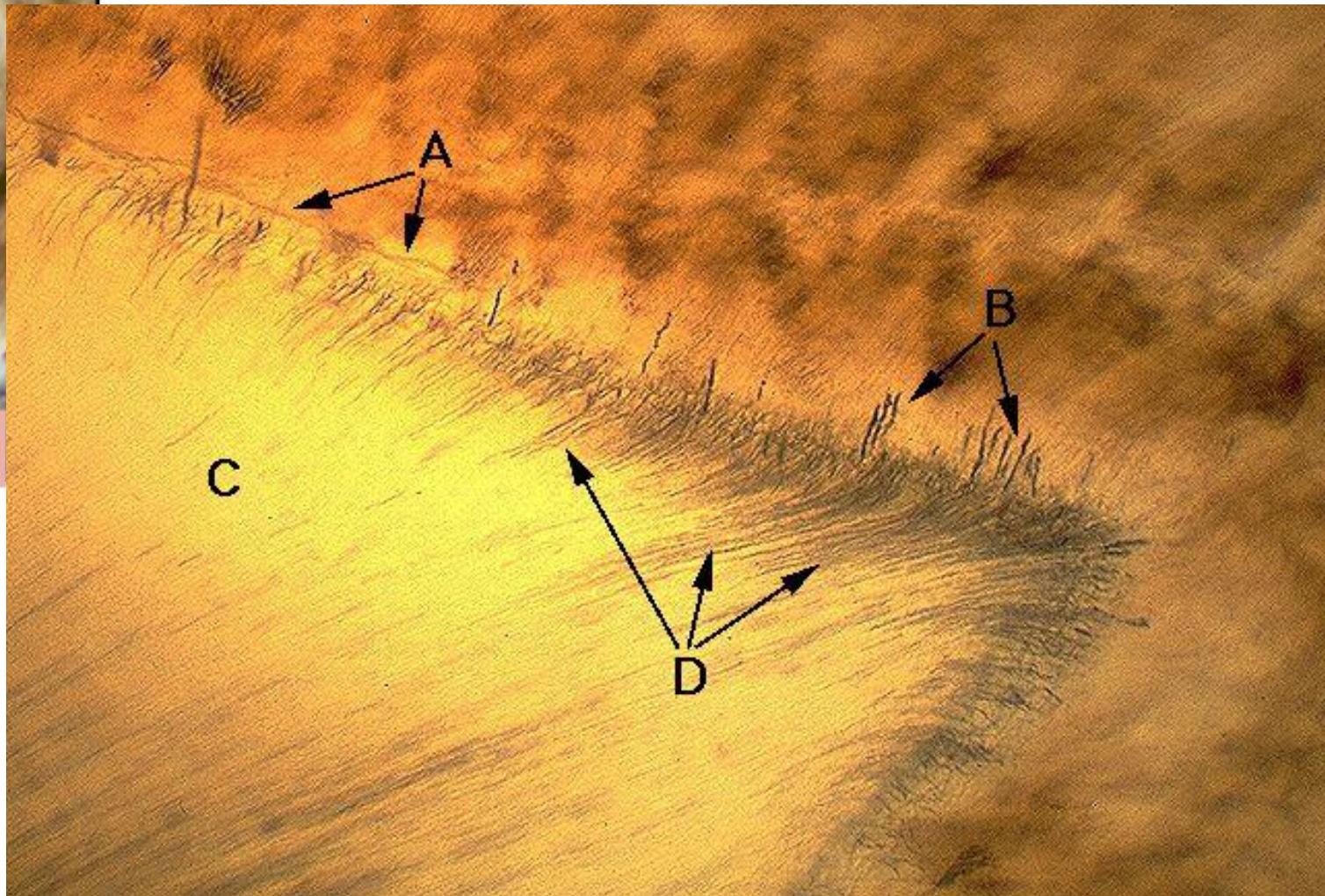


# DENTINAL TUBULES





Dentinal tubule

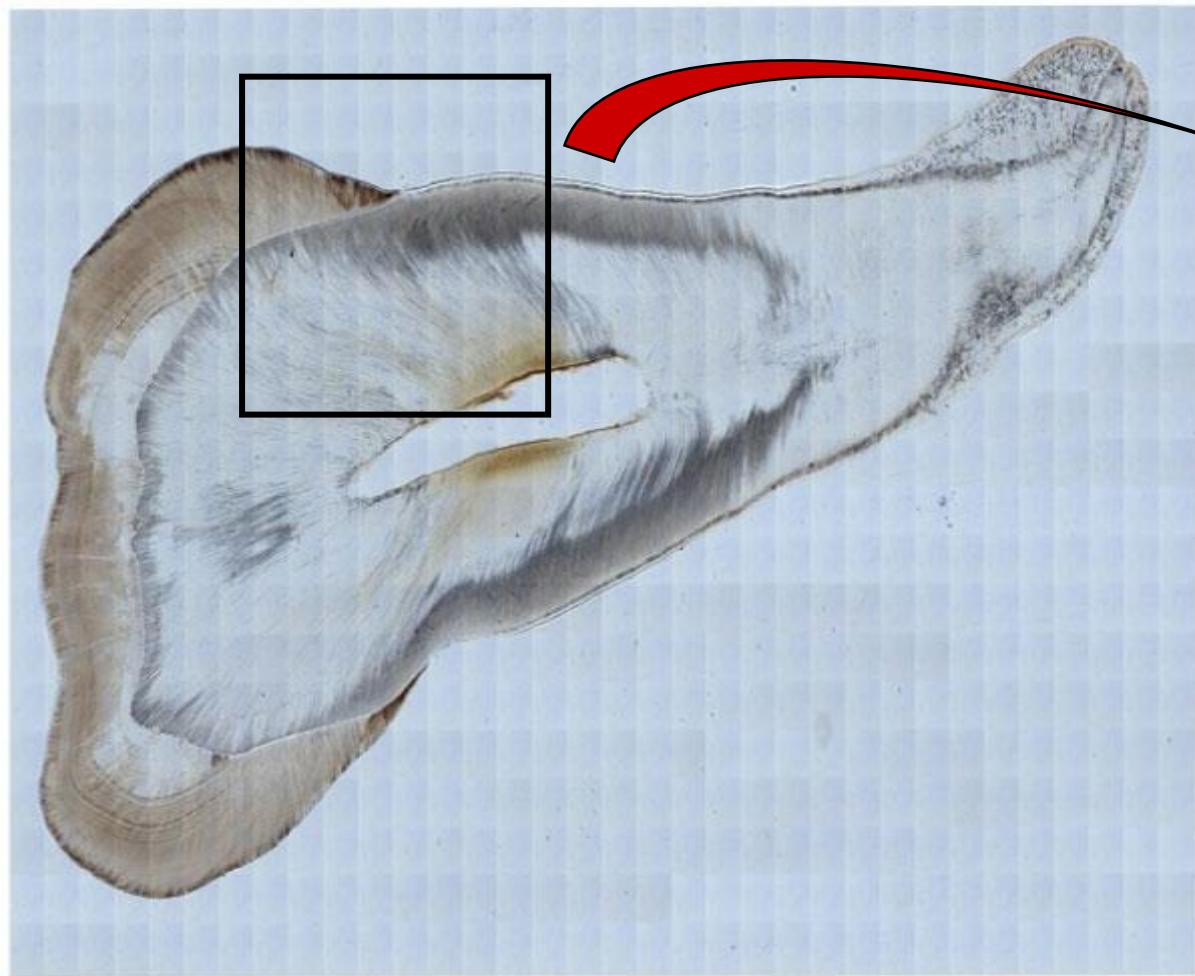


A - D-E junction

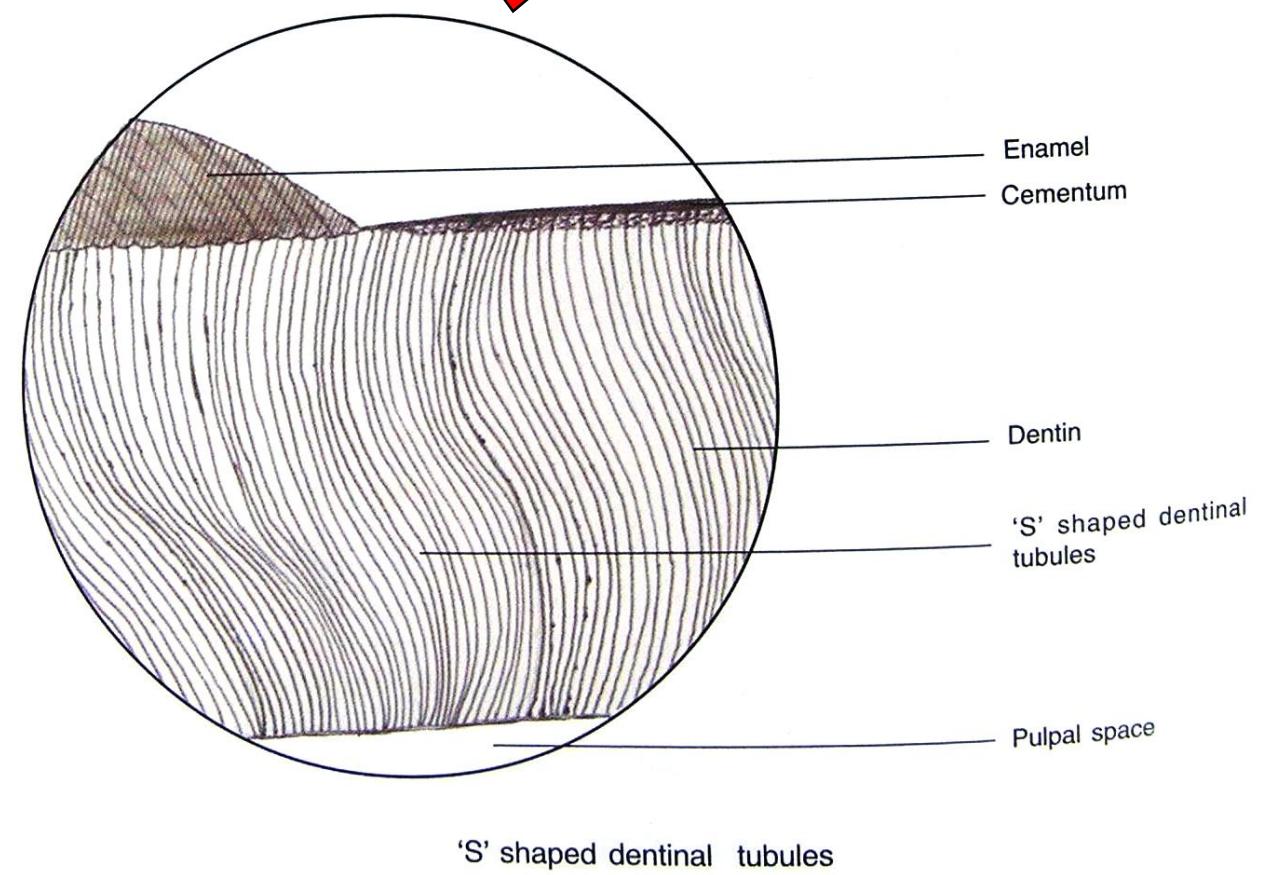
B - enamel spindles

C - dentin

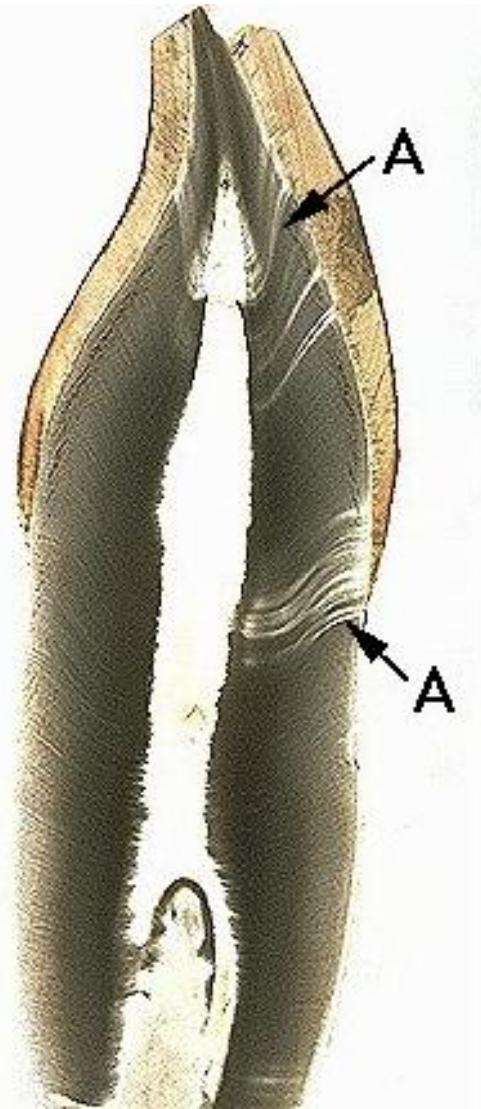
D - dentinal tubules



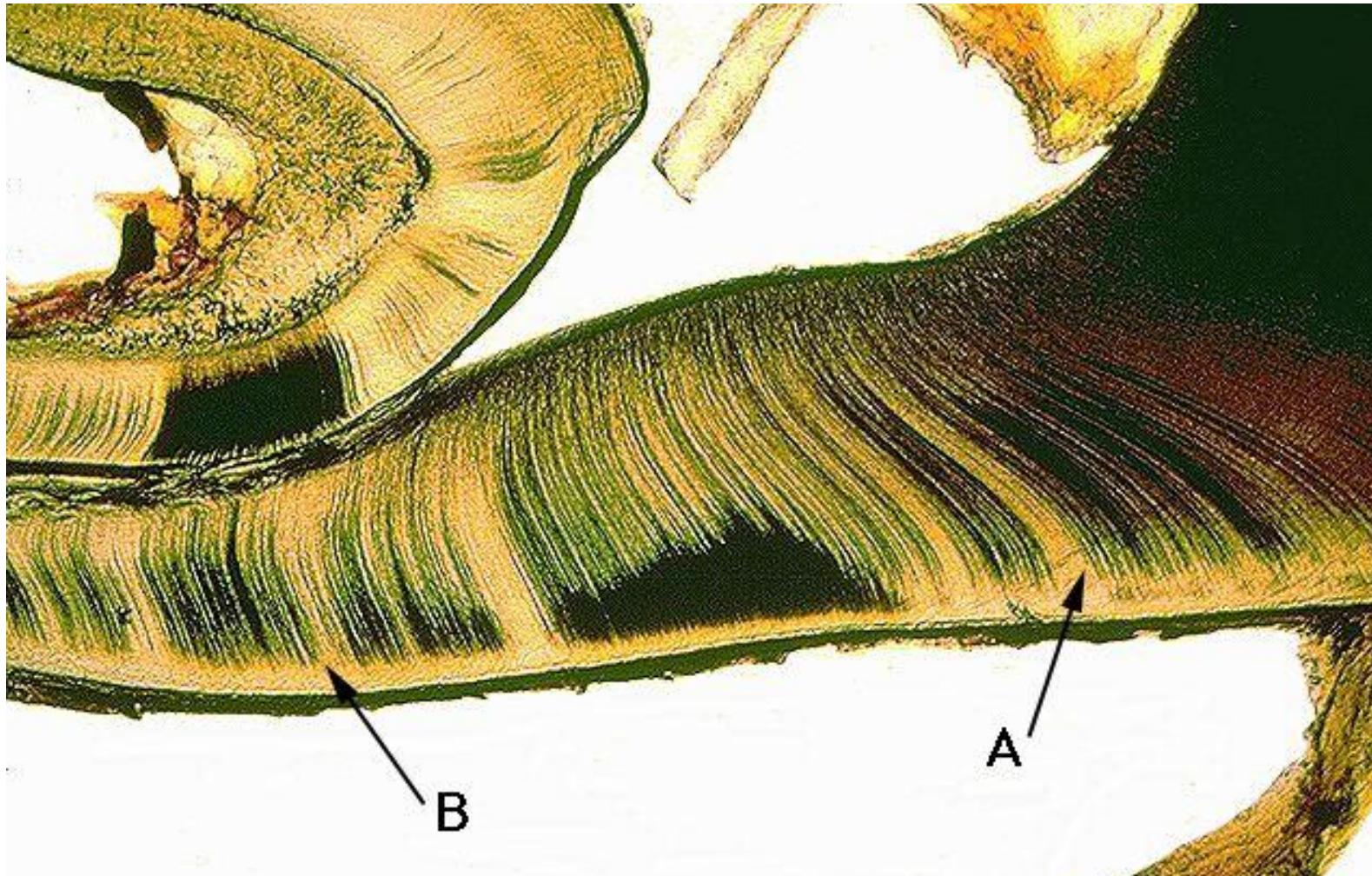
Shape of dentinal tubules in longitudinal ground section



This is a **longitudinal ground section of an incisor**. Note the **S-shaped pathways** (A) formed by the dentinal tubules as they pass through the dentin layer. This pathway is referred to as **the primary curvature**.



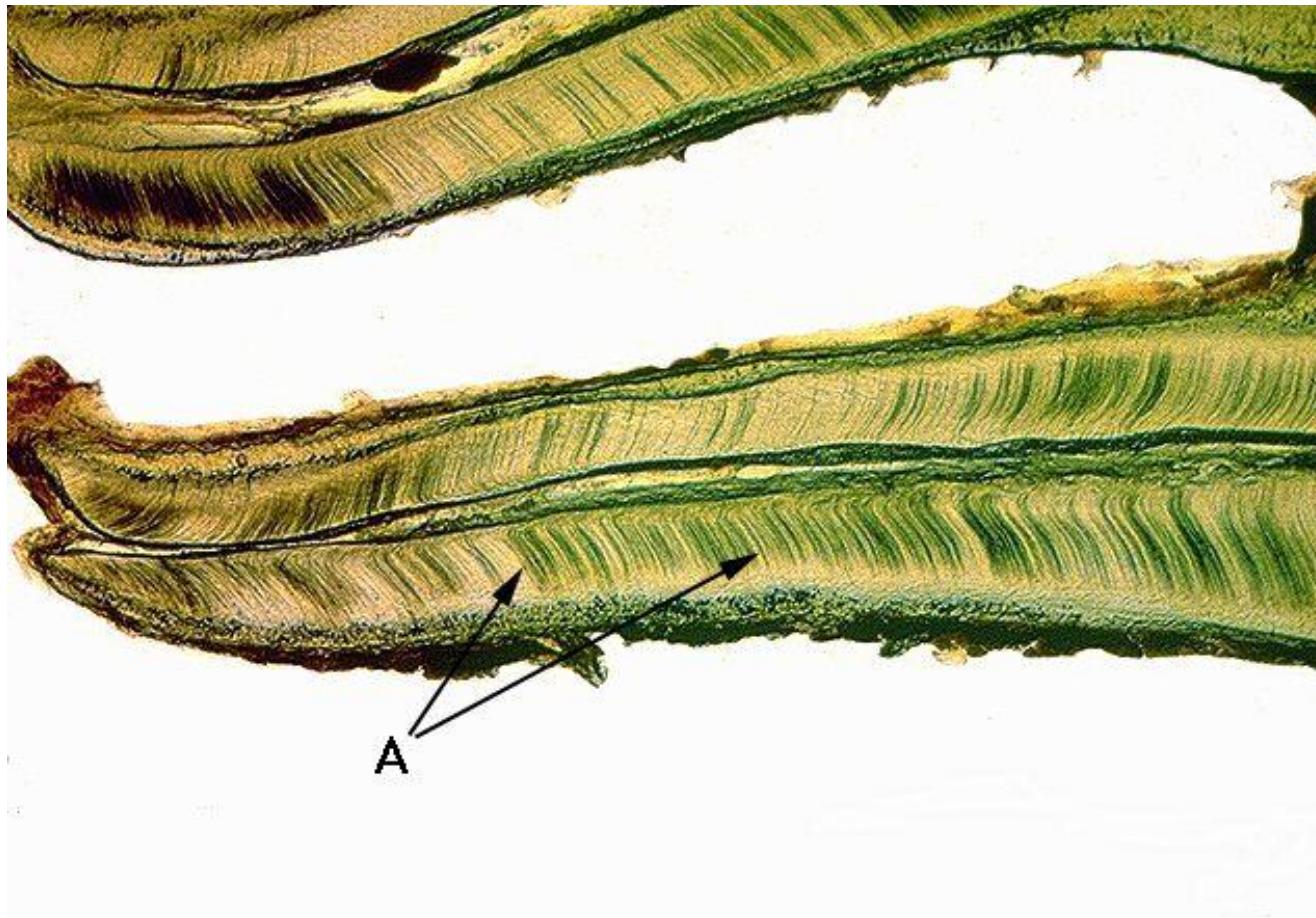
Note the difference in the shape of the primary curvature of dentinal tubules in the crown (A) compared to those in the root (B). As you pass down into the root, the S-shape of the dentinal tubules flattens out to a more linear shape.



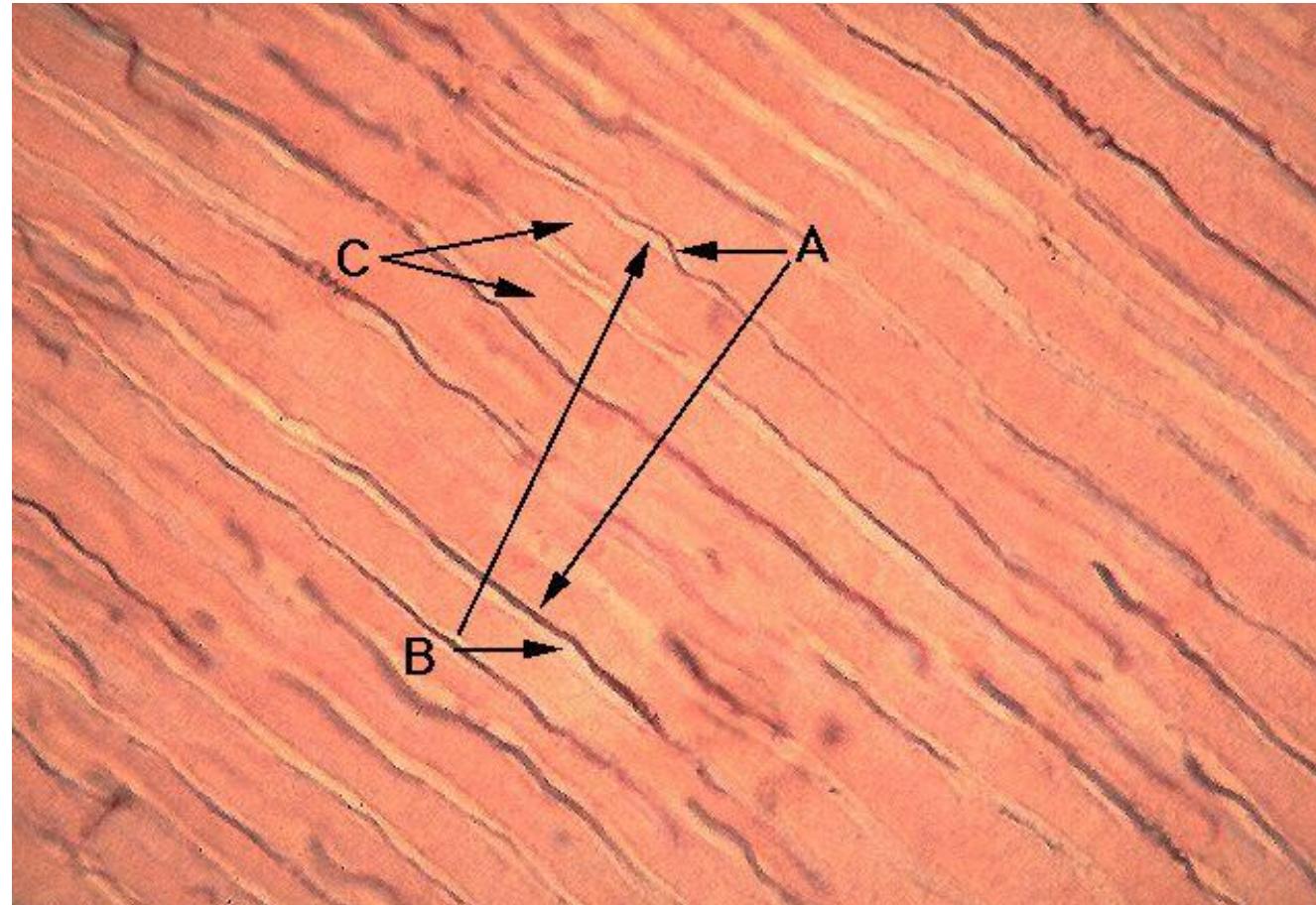
A - dentinal tubules in the crown

B - dentinal tubules in the root

# Dentinal tubules in root dentin



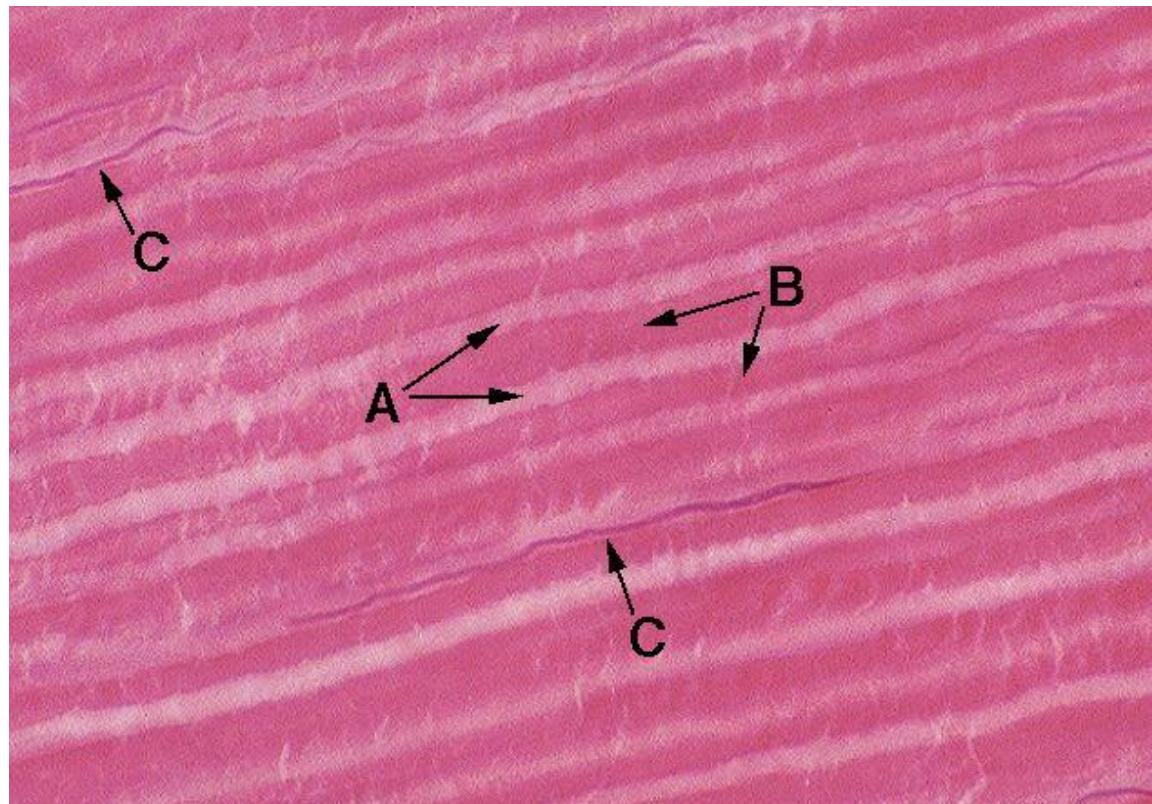
# Dentinial Tubules in Longitudinal Section (ground section)



A - odontoblast processes  
B - peritubular dentin

C - intertubular dentin

# Dentinial Tubules in Longitudinal Section (Decalcified section)



A - dentinal tubules  
B - intertubular dentin

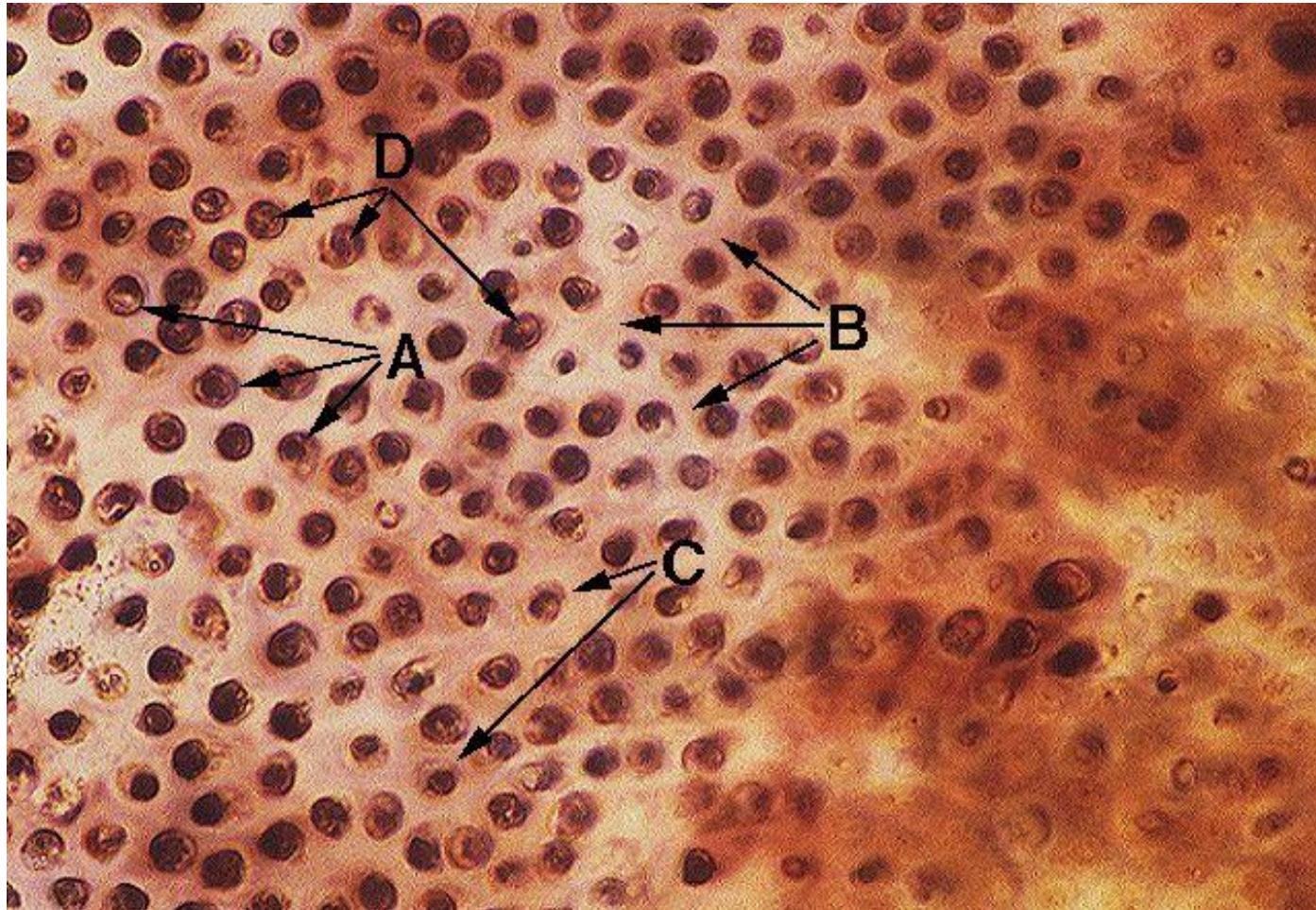
C - odontoblast processes

# Cross-Section/transverse section of Dentinal Tubules (ground section)



**A** - dentinal tubules

**B** - intertubular dentin

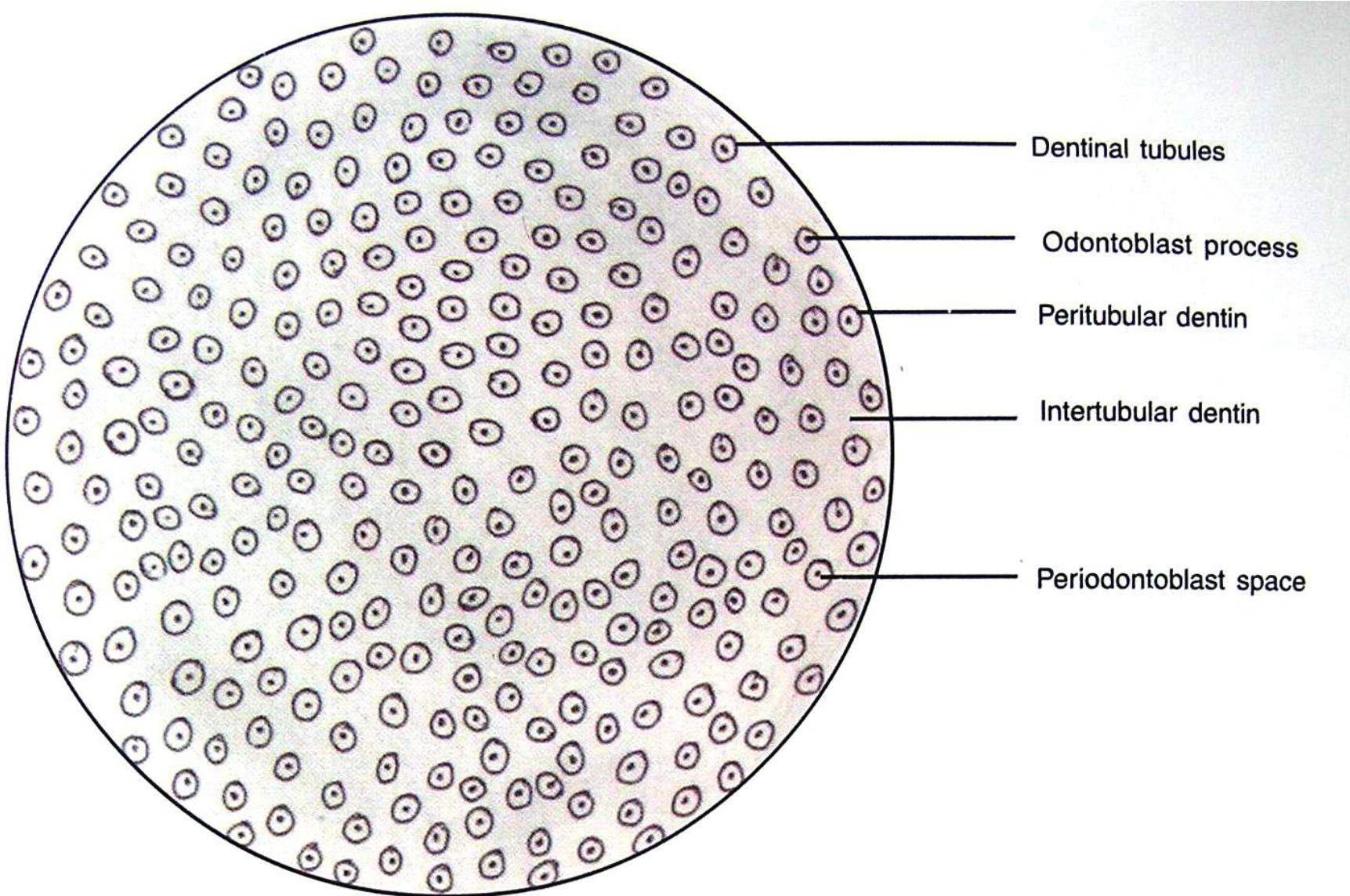


**A** - dentinal tubules

**B** - intertubular dentin

**C** - peritubular dentin

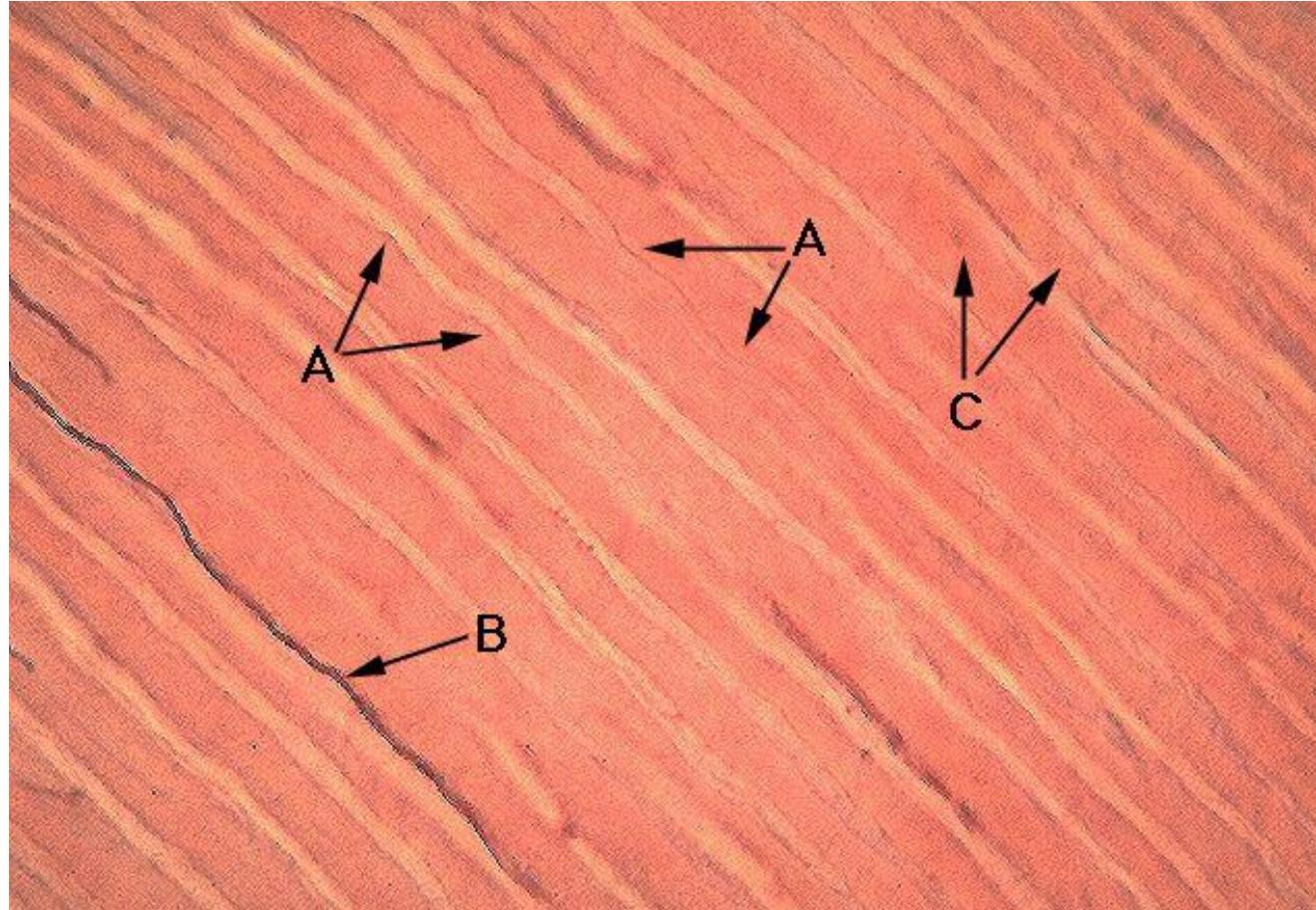
**D** - odontoblast process



Transverse section of dentin

## Secondary Curvature of Dentinal Tubules

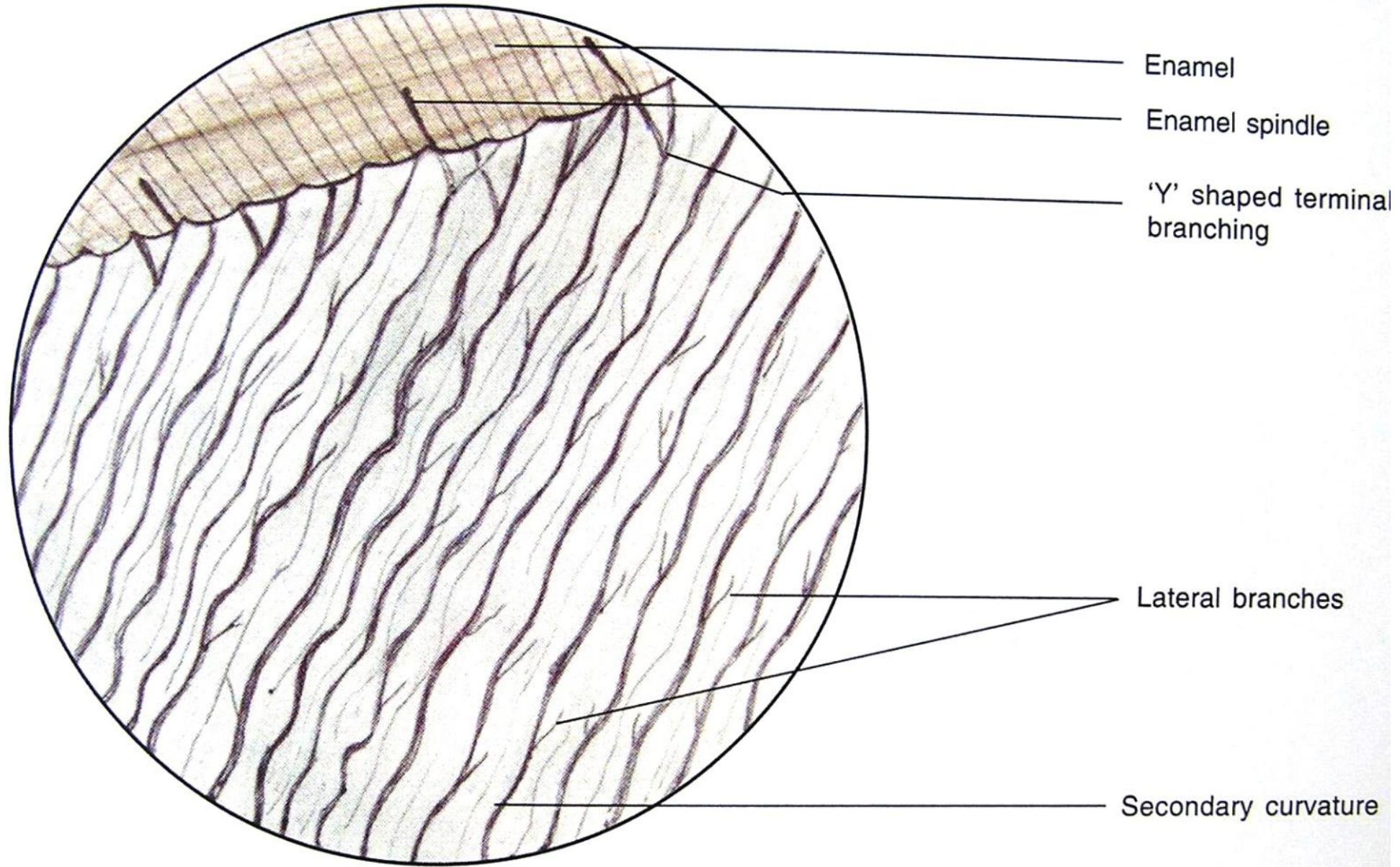
This section of demineralized dentin is taken along the mid region of their S-shaped primary curvature. Look carefully at the course of the tubules and note that they are not a straight, smooth structure. Instead, they exhibit minor spiral-like kinks or curvatures along the length of their primary curvature. These minor irregularities are referred to as **secondary curvatures (A)**



**A** - secondary curvatures

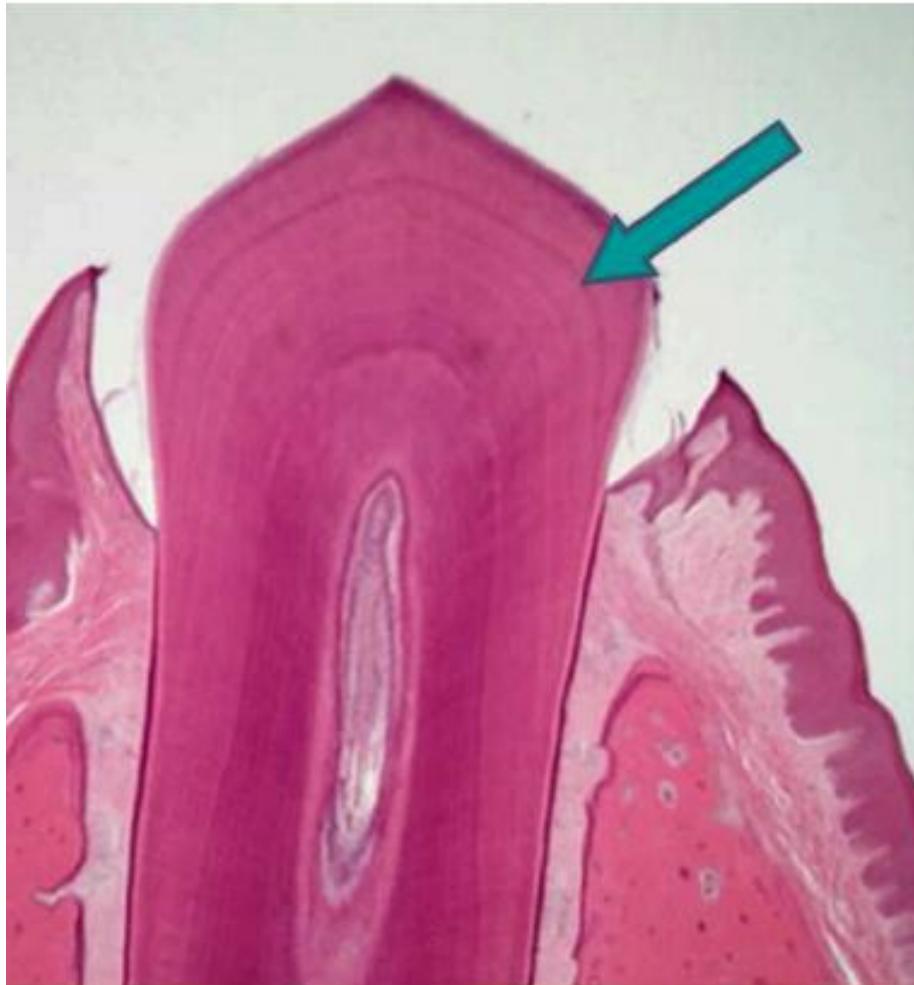
**B** - odontoblast process

**C** - intertubular dentin

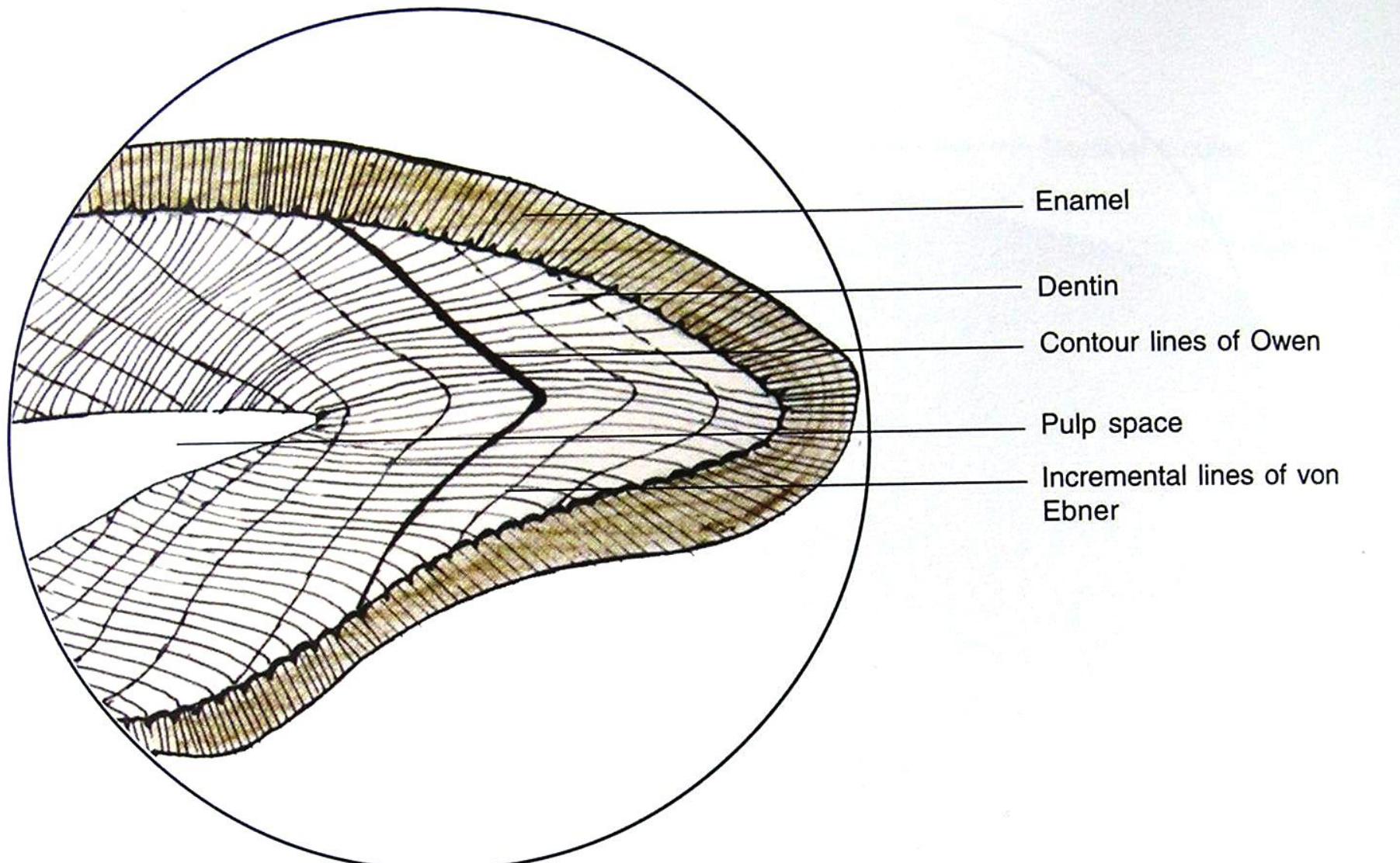


Terminal branches & lateral branches of dentinal tubules

# INCREMENTAL LINES OF VON EBNER

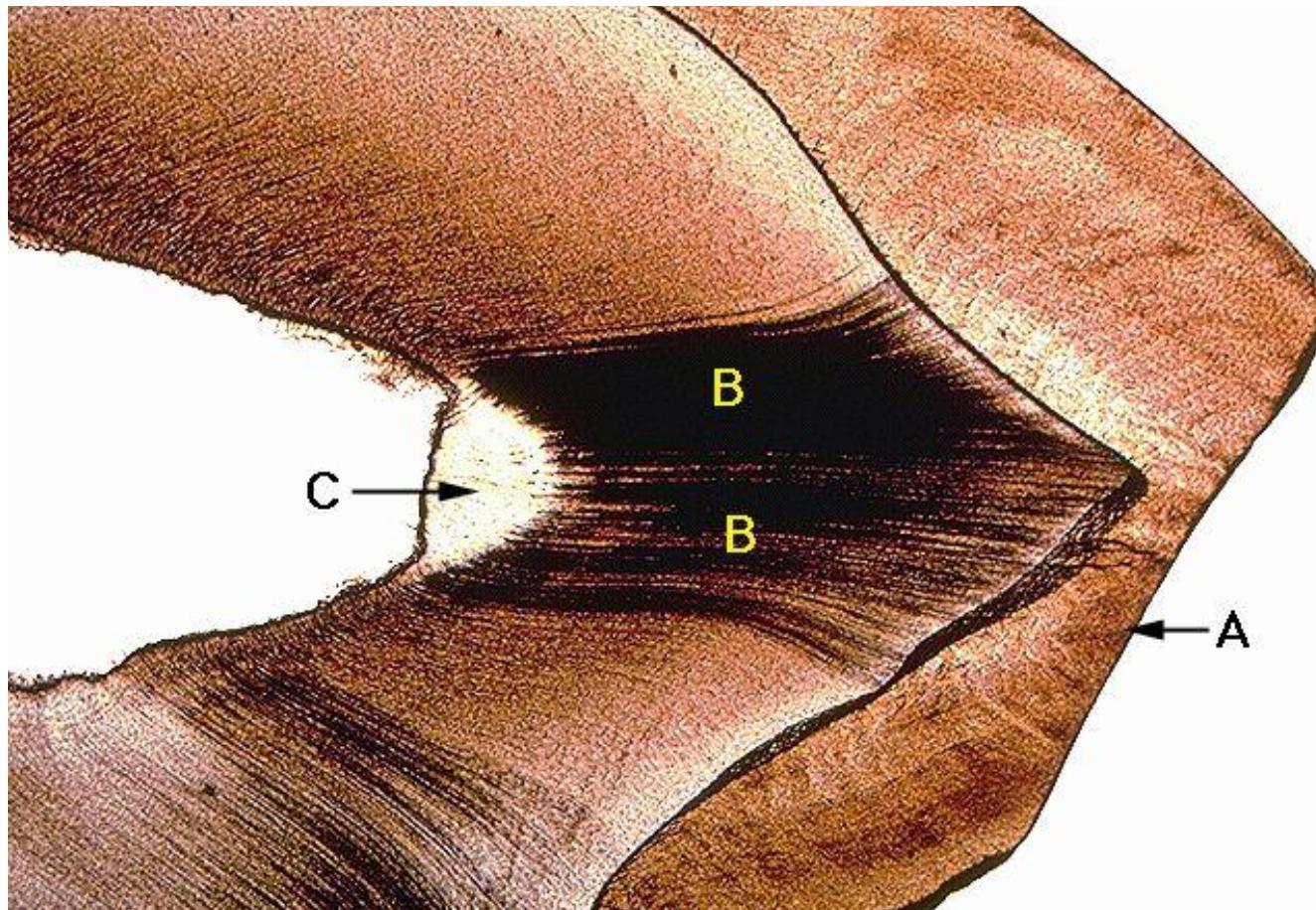


Incremental lines of von Ebner



Incremental lines of dentin

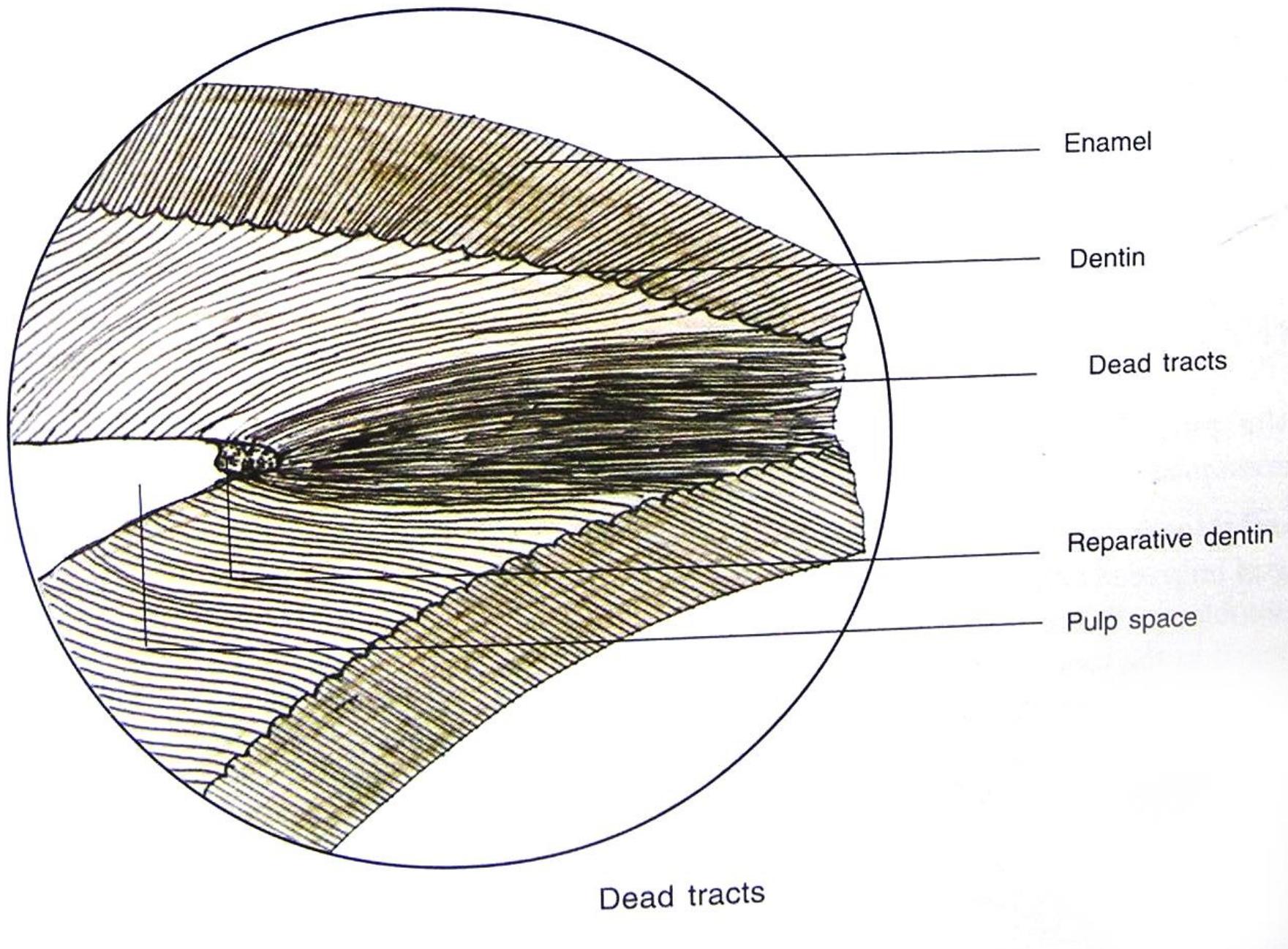
# DEAD TRACT



A - enamel

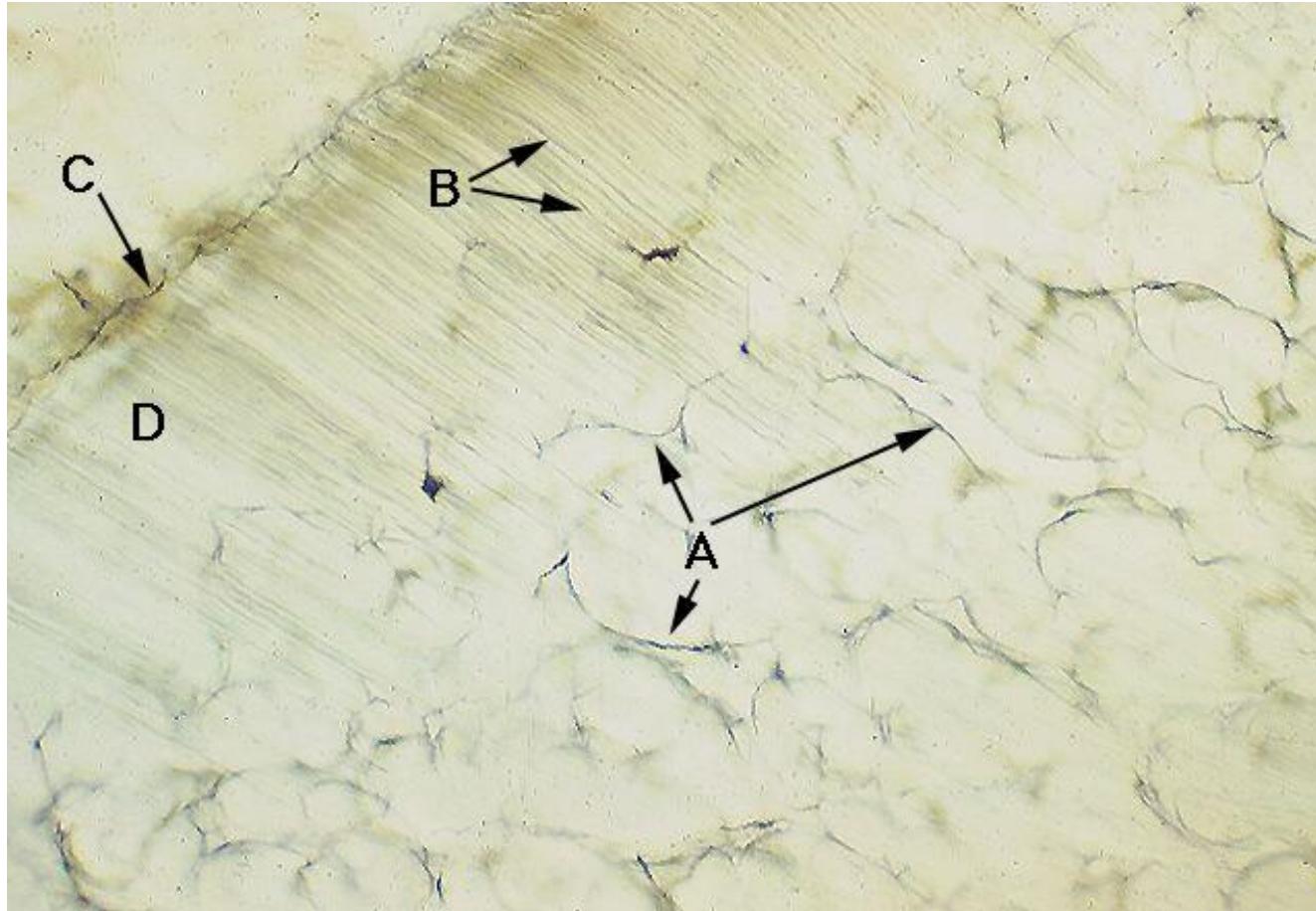
B - dead tracts of dentin

C - secondary dentin



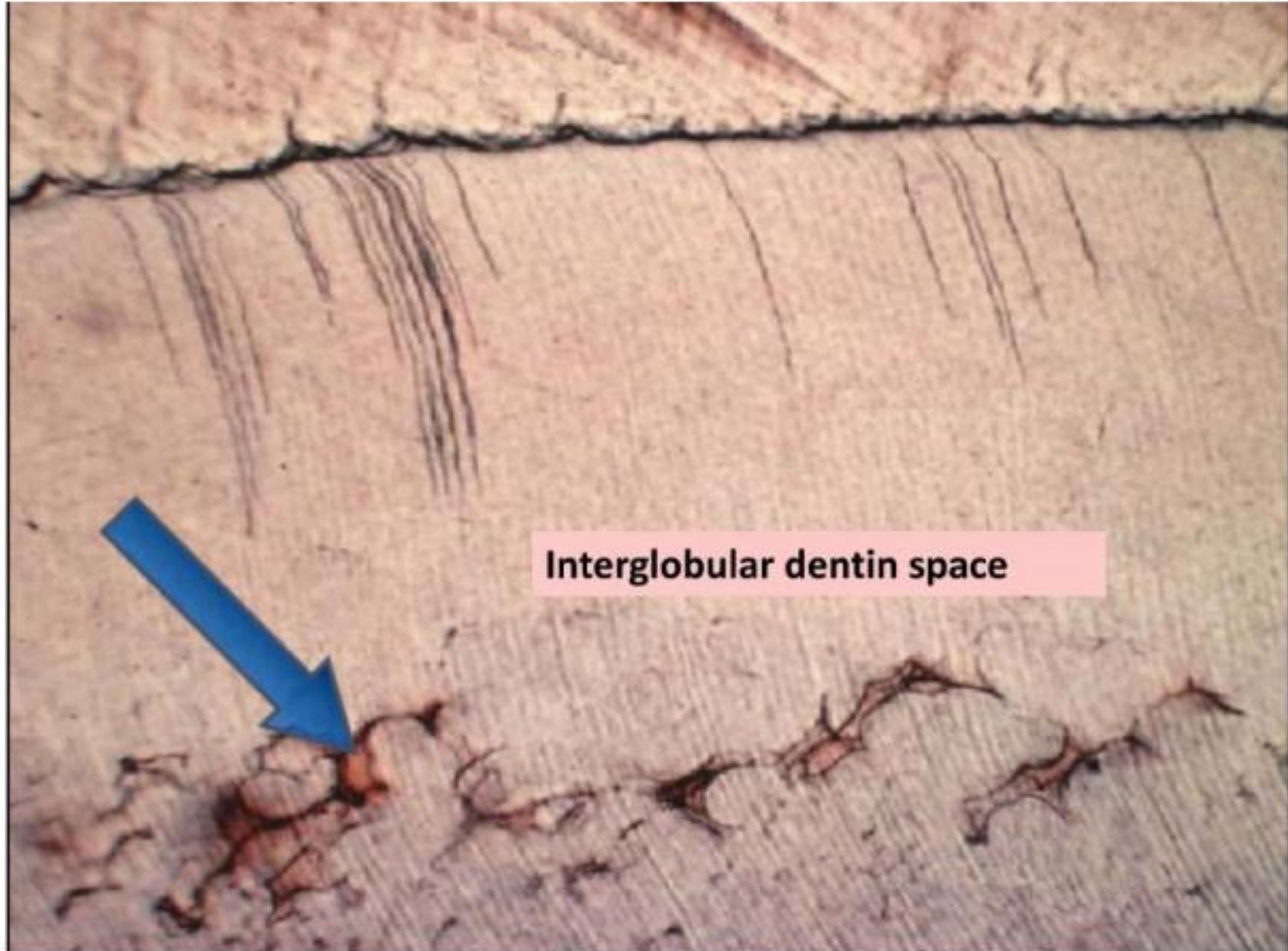
# INTERGLOBULAR DENTIN





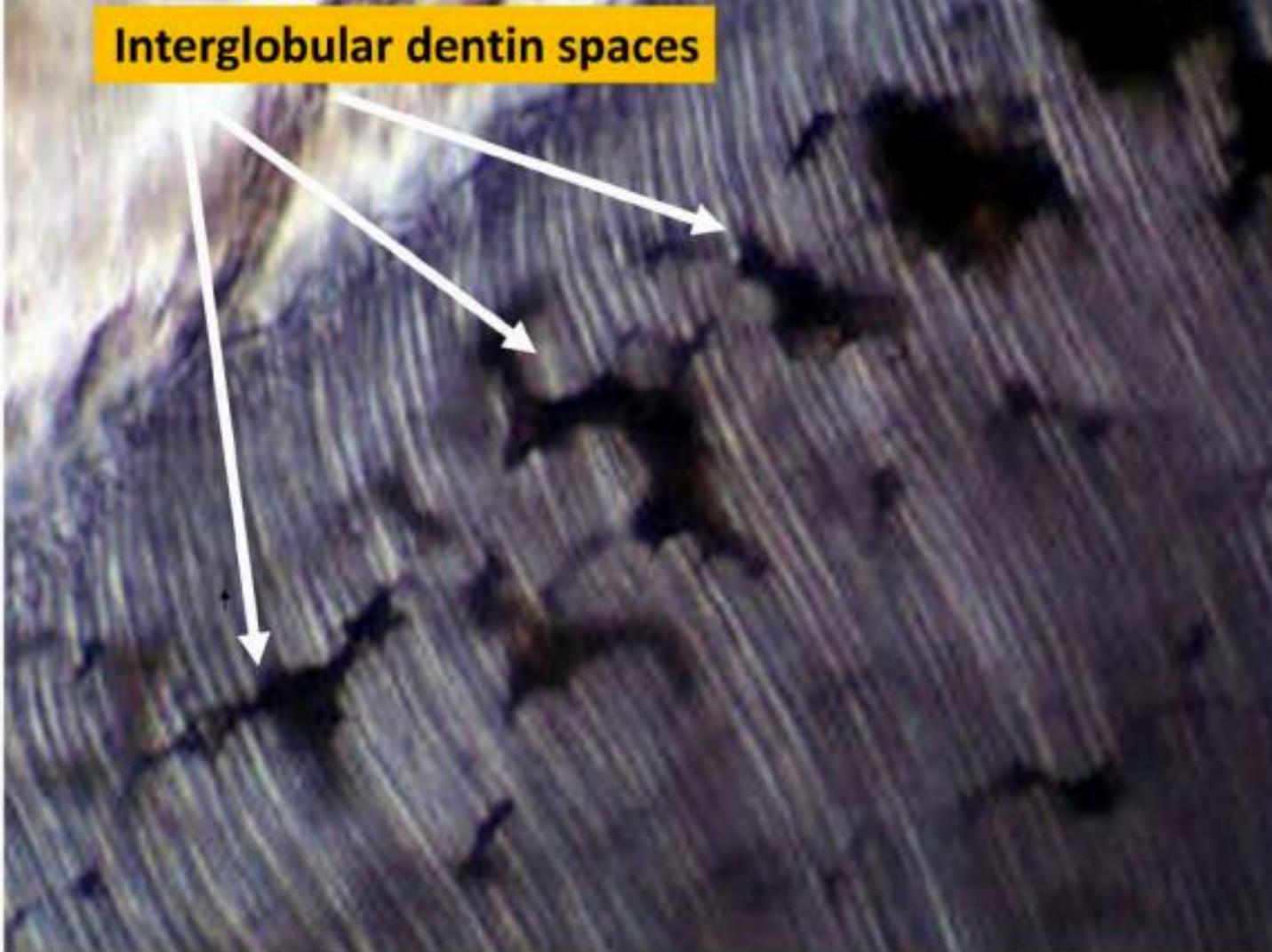
**A** - interglobular dentin  
**B** - dentinal tubules

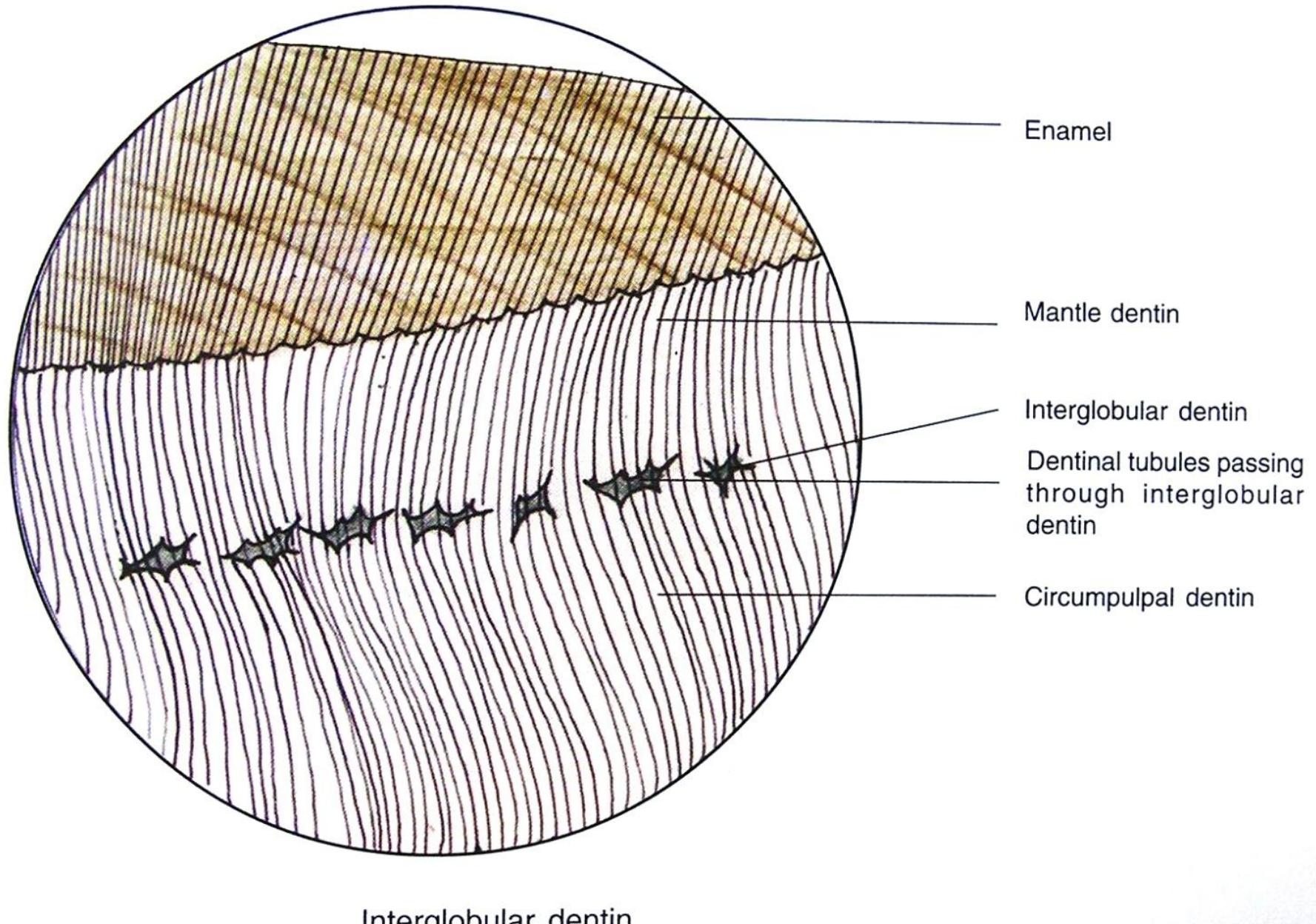
**C** - D-E junction  
**D** - mantle dentin



Interglobular dentin space

Interglobular dentin spaces

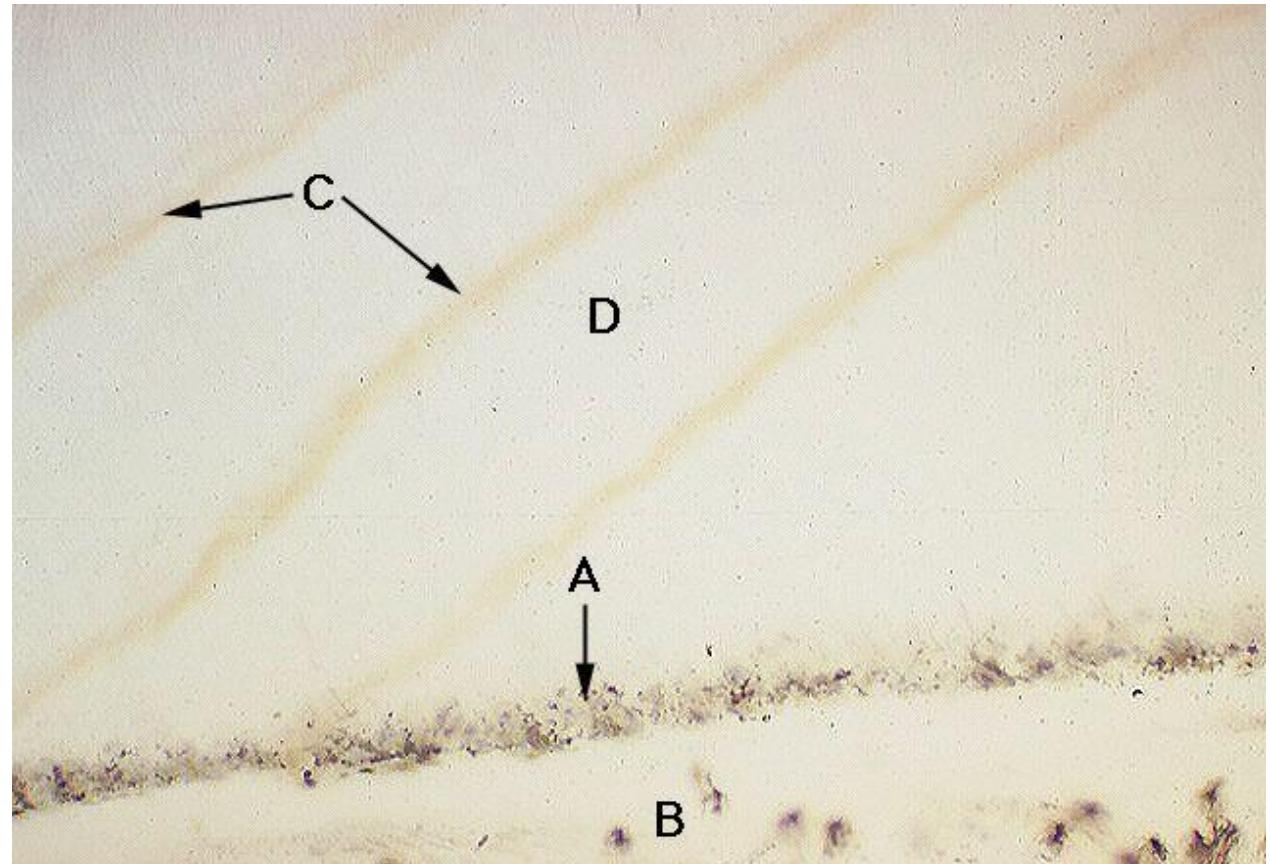




# Tomes' granular layer

## Tome's Granular Layer of Dentin

In the root, a layer of dark granules lie parallel to the outer surface of the dentin. This is called Tomes' granular layer (**A**). Cementum (**B**) lies along the lower margin of the field. Tomes' granular layer lies immediately adjacent to the cementum of the root in the region of the mantle dentin. Note the distinctly different colored lines (**C**) that traverse the dentin (**D**). These lines are not incremental lines of von Ebner, but rather **contour lines of Owen**. They reflect a major interruption in the deposition of dentin due to a metabolic disruption during odontogenesis.



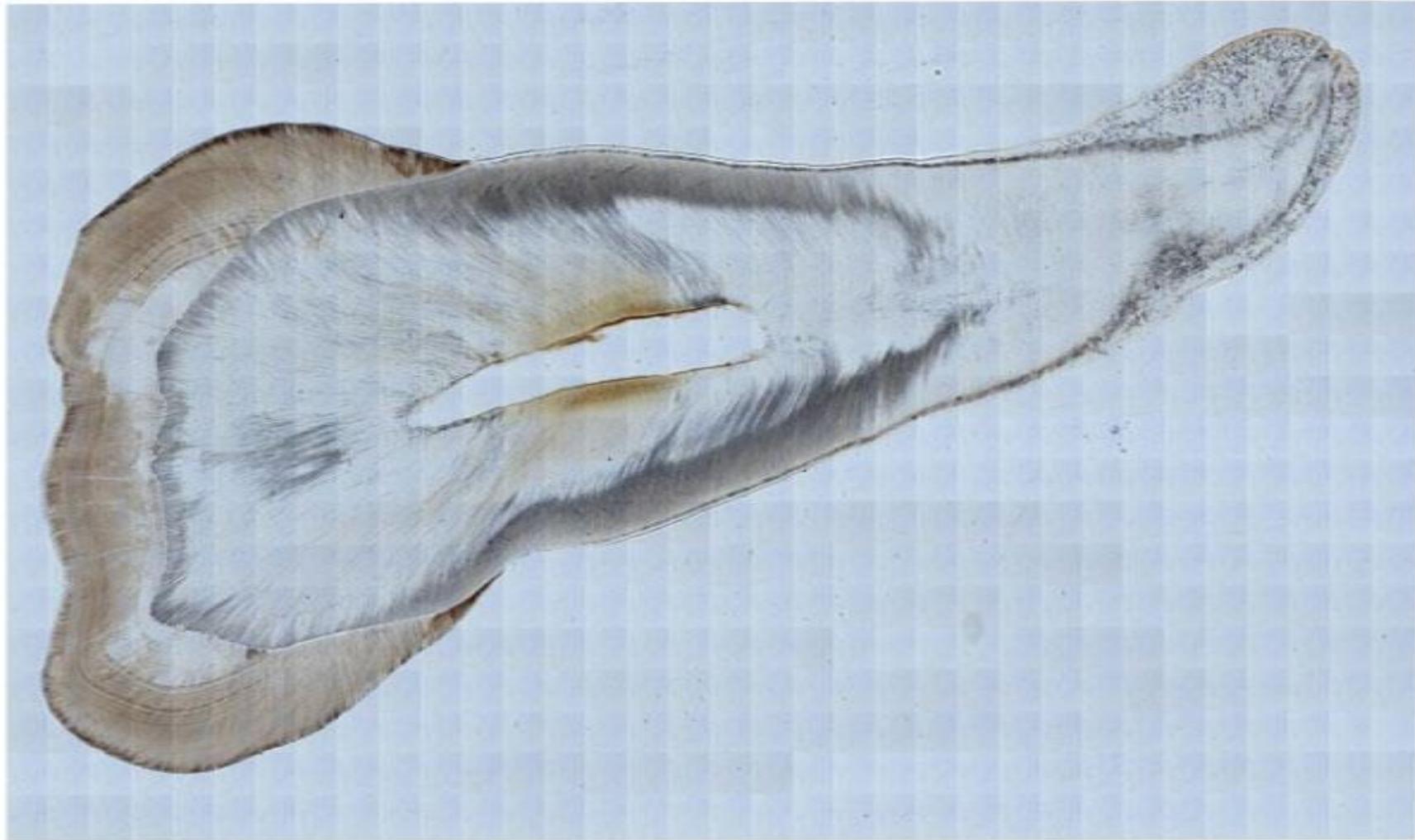
**A** - Tomes' granular layer

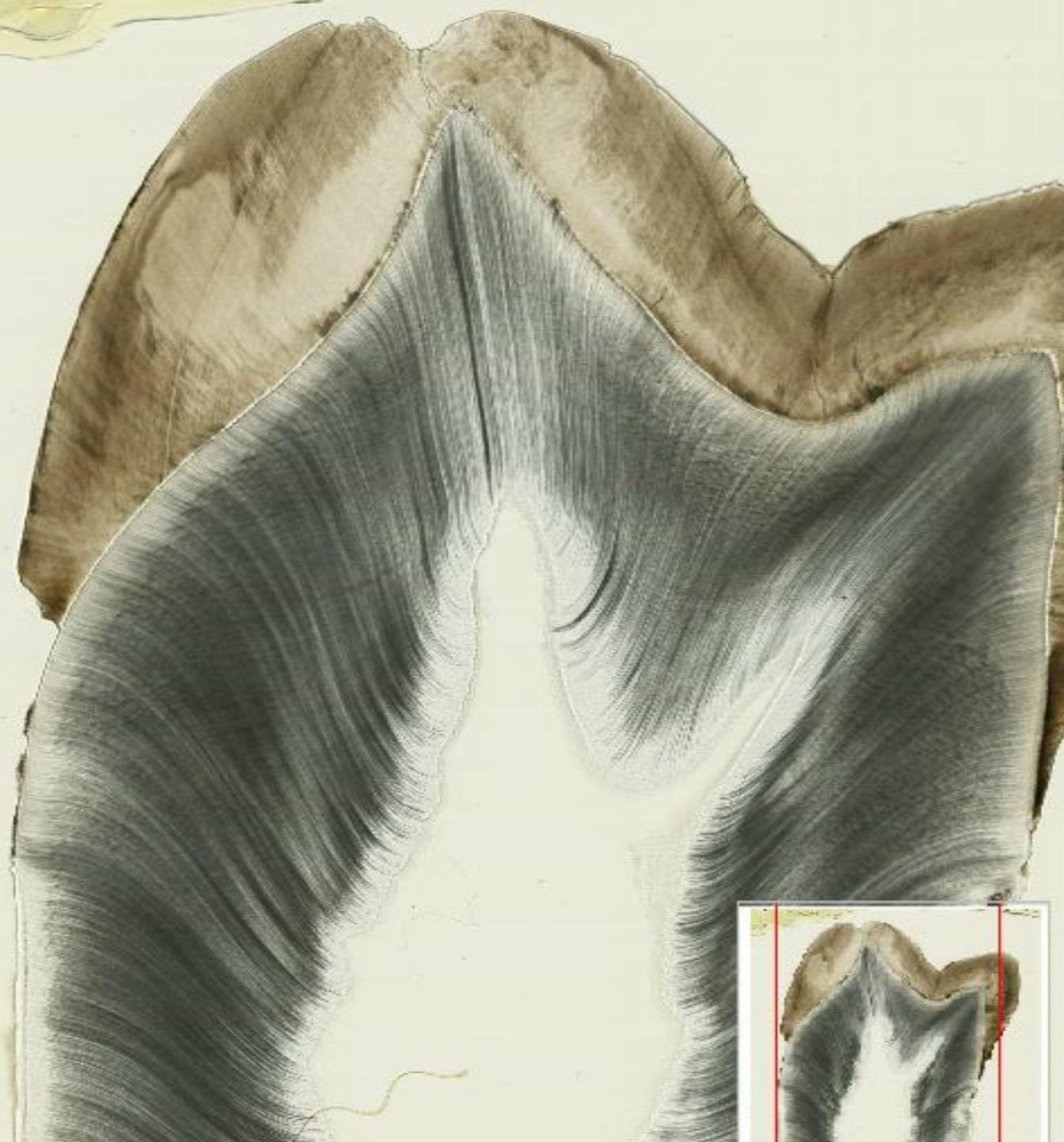
**B** - cementum

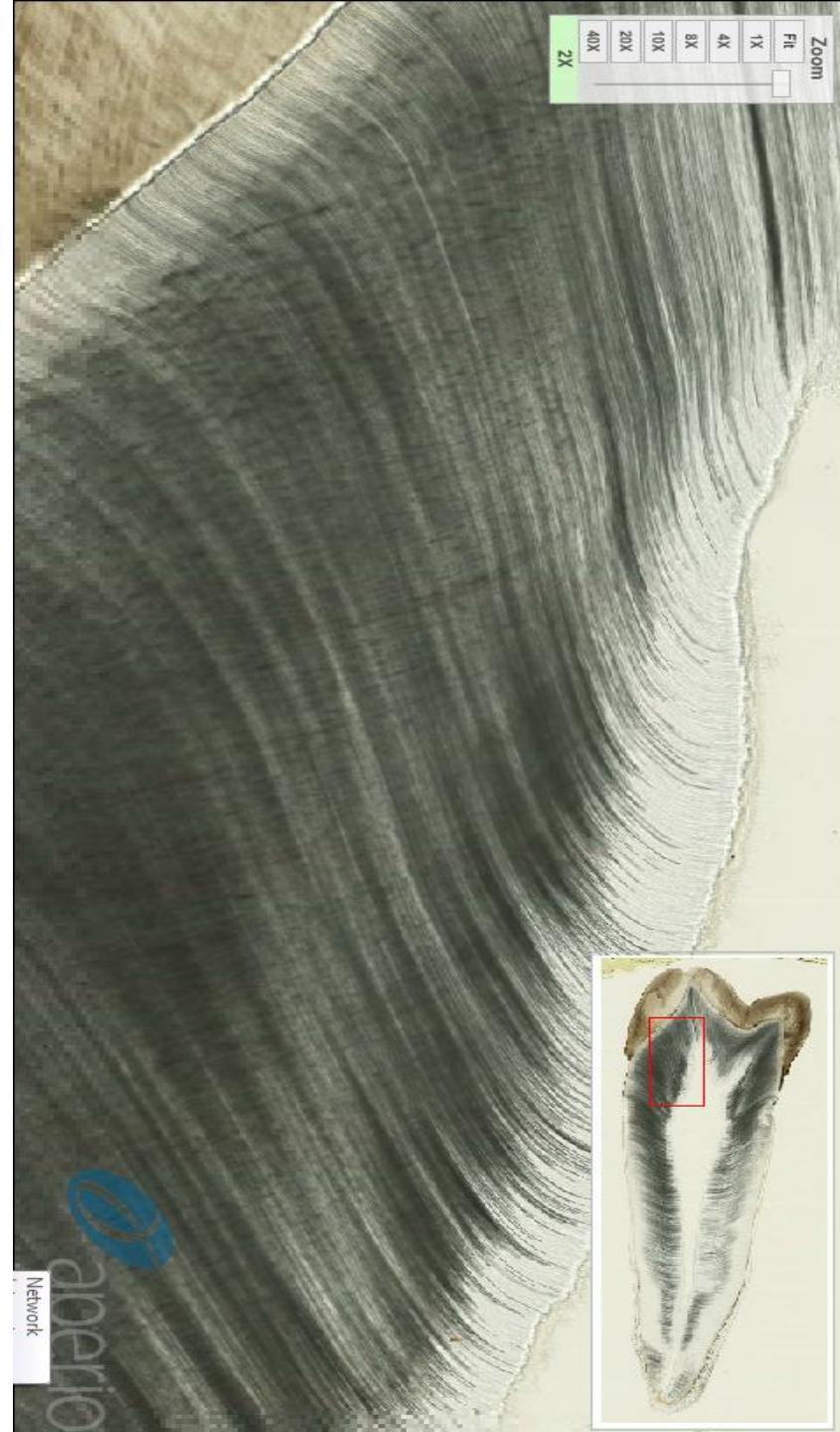
**C** - contour lines of Owen

**D** - dentin

# DIGITAL SLIDE DISCUSSION







Zoom  
Fit  
1X  
4X  
8X  
10X  
20X  
40X  
**2X**



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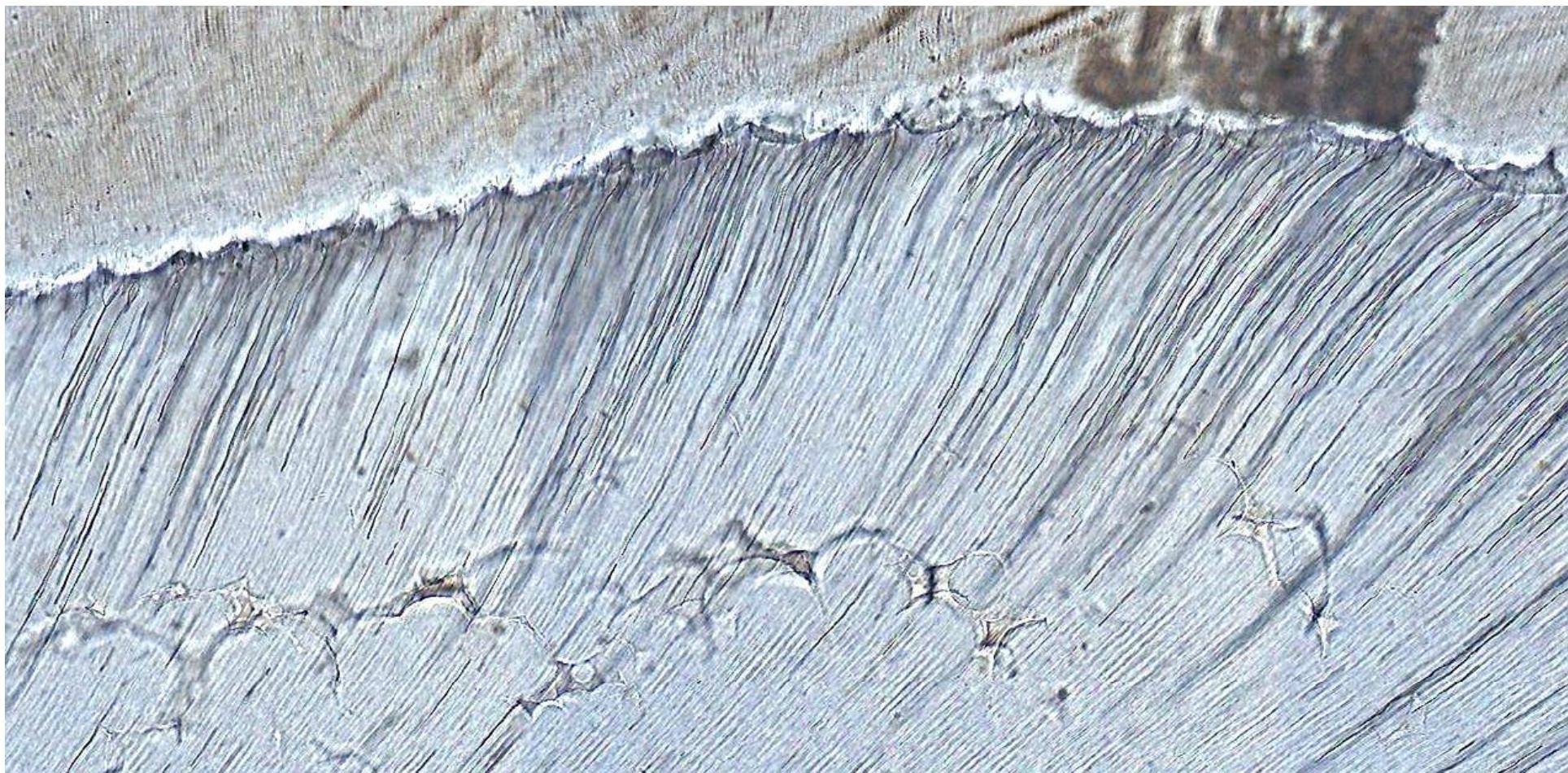


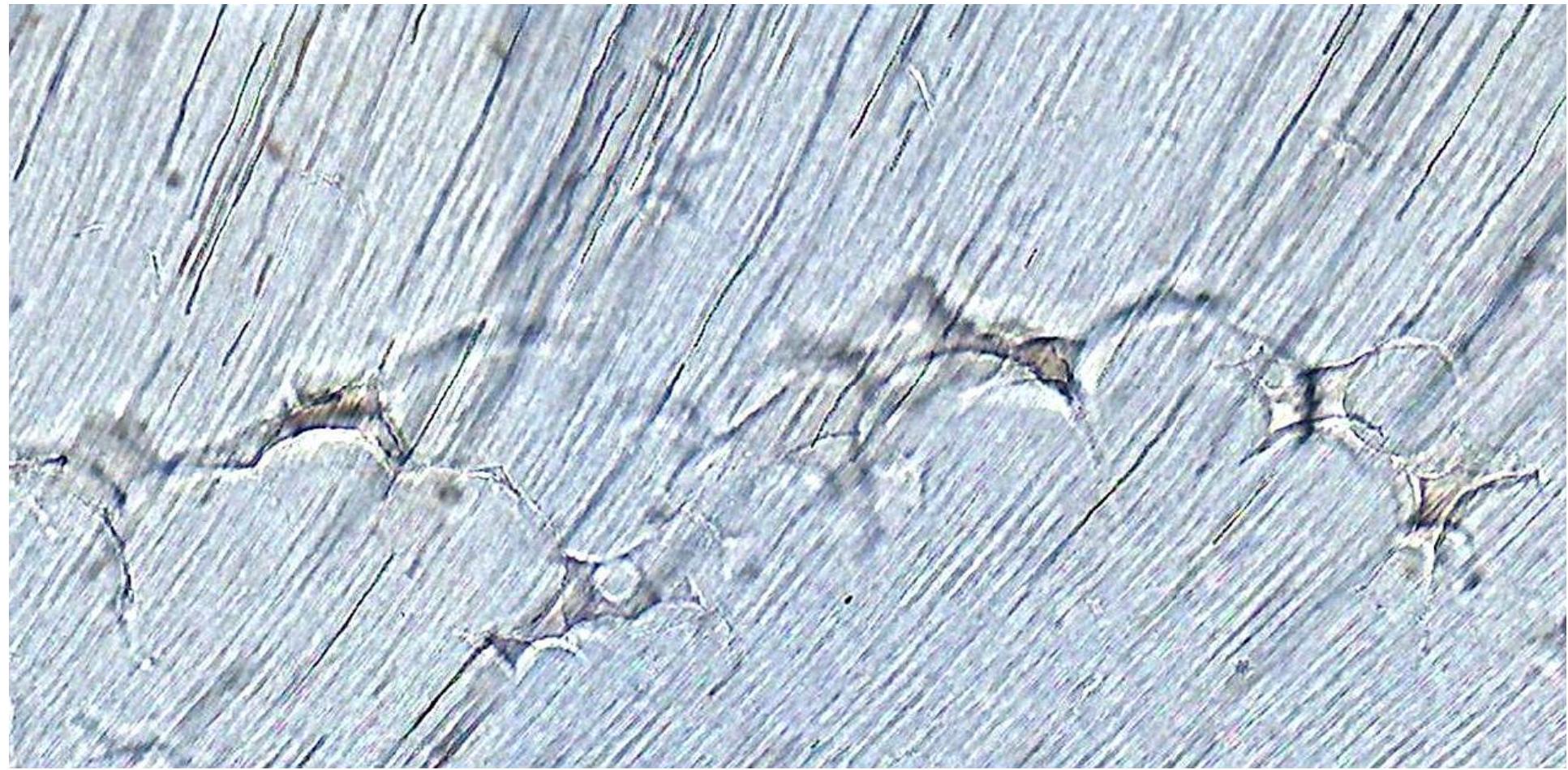
Zoom  
Fit  
1X  
4X  
8X  
10X  
20X  
40X



Open







- **Description:**

1. Scalloped structure
2. Light brown tissue above the scalloped structure
3. Tissue below the scalloped structure
4. Empty space in the center
5. Tubular structures in the tissue below the scalloped structure
6. Tubular structures are
  - a. Mostly dense and S-shaped in appearance
  - b. Less curved and lighter in appearance around the empty space in radicular portion

### Critical analysis:

- Dentino-enamel junction(1)
- Enamel (2)
- Dentin(3)
- Pulp space (4)
- Dentinal tubules (5)
- Primary dentin (a)
- Secondary dentin (b)



An 56 years old patient with deep carious tooth, during caries removal although a deep cavity was prepared but there wasn't any pulp exposure???





THANK YOU