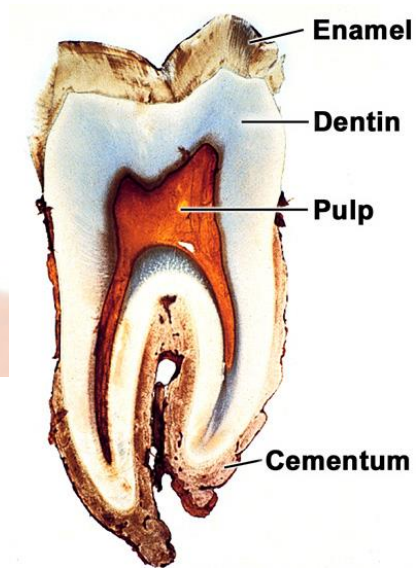


# Tandorganet

Introduktion af tandens væv

21. sep 2023

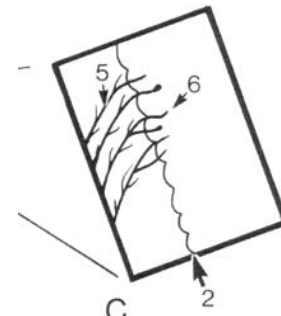
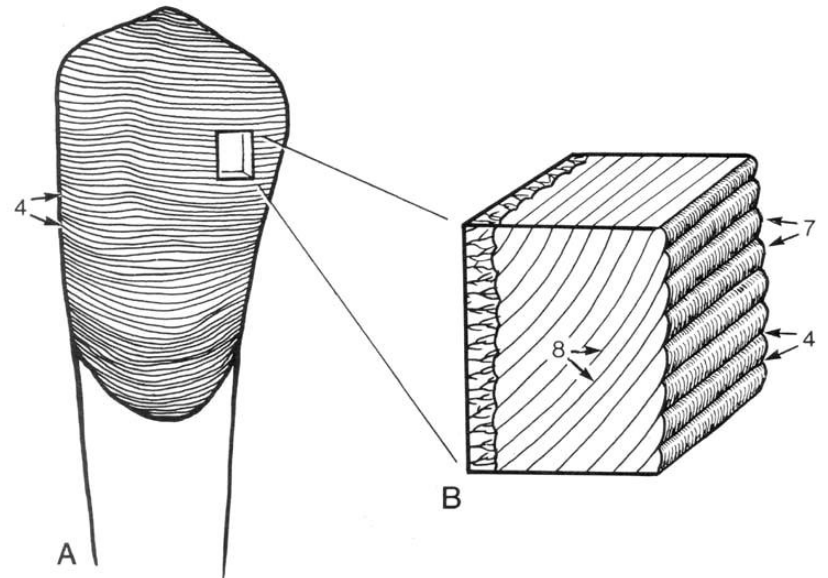
# TANDENS MIKROANATOMI



# EMALJENS OVERFLADER



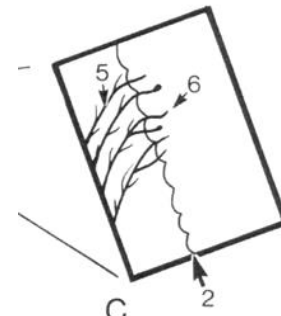
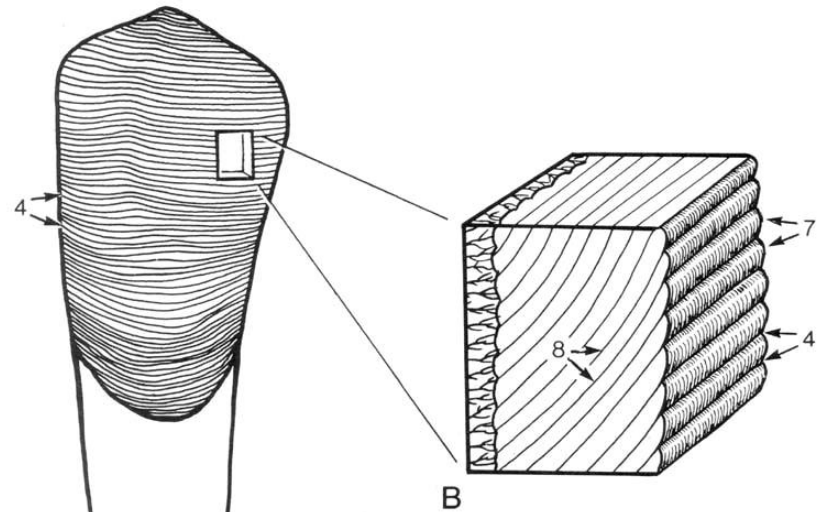
- YDRE
  - Emaljehinde
  - Emaljeoverflade
  - Perikymatier



# EMALJENS OVERFLADER



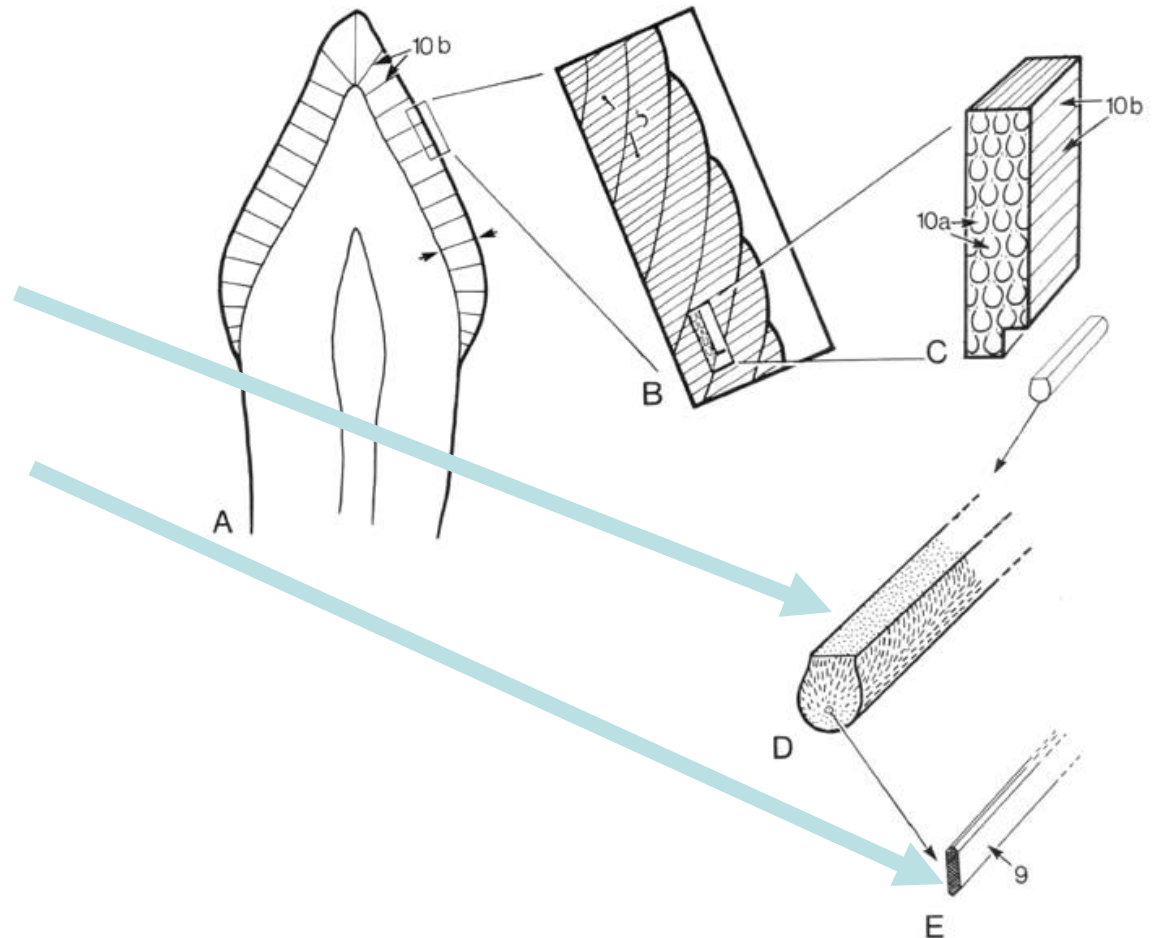
- YDRE
  - Emaljehinde
  - Emaljeoverflade
  - Perikymatier
- INDRE
  - Emaljedentingrænse
  - Odontoblastudløbere fra dentin (emaljetene)



# EMALJENS MINERALISERING



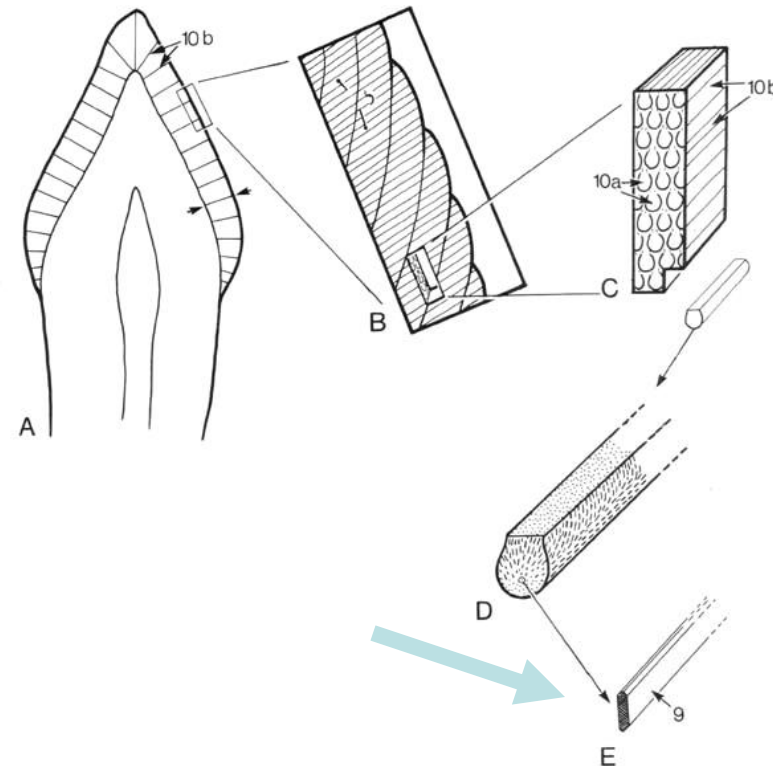
- Prismer
- Krystaller



# EMALJENS MINERALISERING



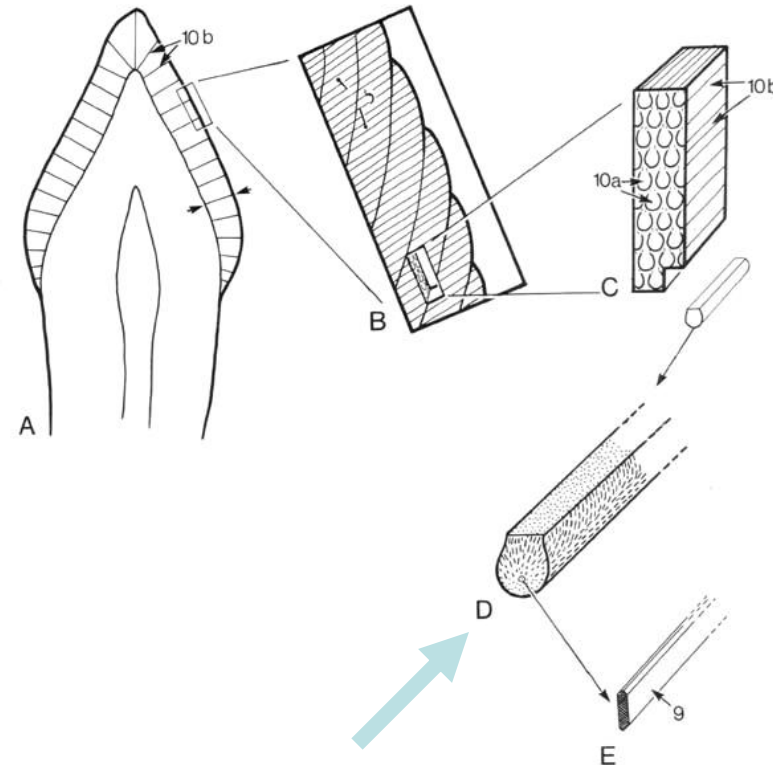
- Krystaller
  - Submikroskopiske (EM)
  - “Små krystalitter”



# EMALJENS MINERALISERING



- Krystaller
  - Submikroskopiske (EM)
  - “Små krystalitter”
- Prismer
  - “Større enheder”
  - Stavformede og afrundede i tværsnit
  - 3-6  $\mu\text{m}$  i tykkelse
  - Tykkest mod ydre emaljeoverflade
  - Næsten vinkelret på overflader



# SPECIELLE EMALJESTRUKTURER

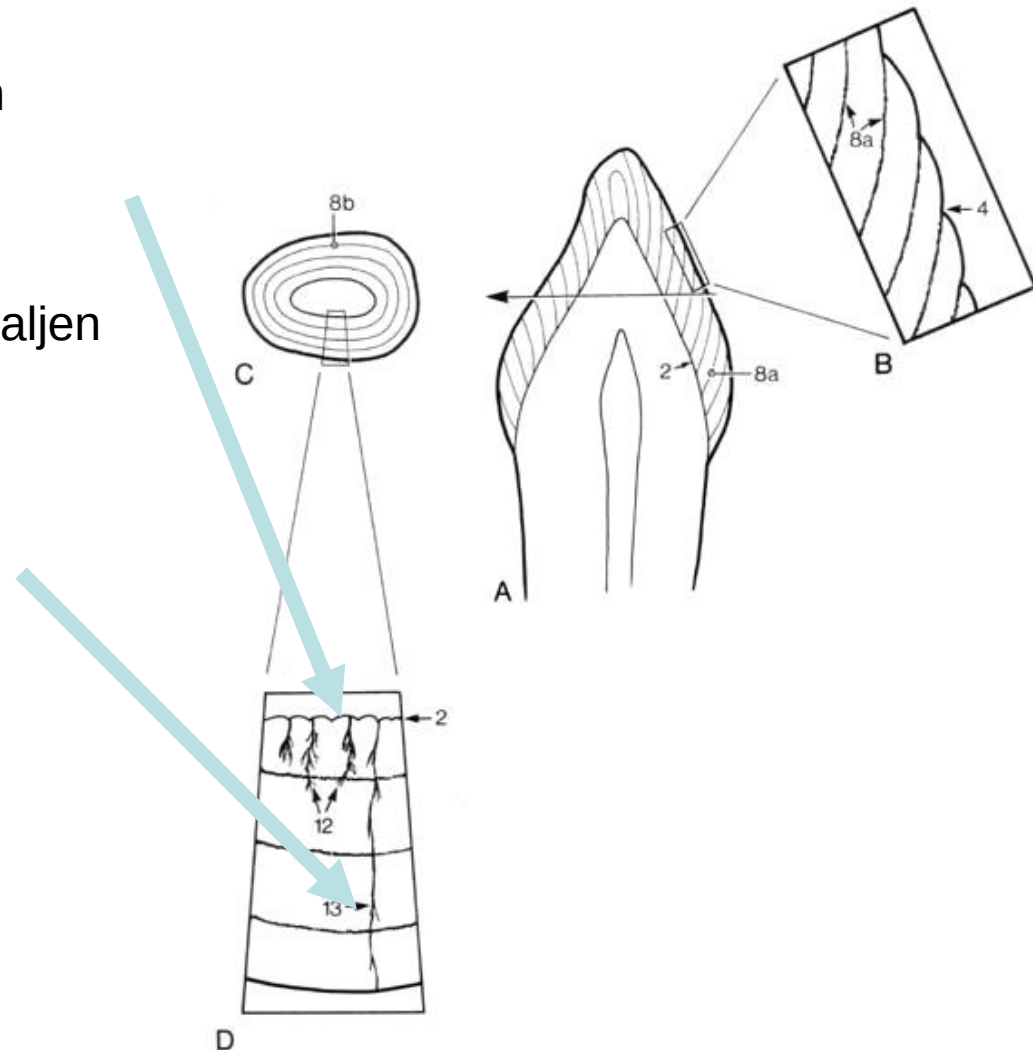


- Emaljebuske

- Kort stykke ud i emaljen
- proteinholdige

- Emaljelameller

- Hele vejen igennem emaljen
- proteinholdige

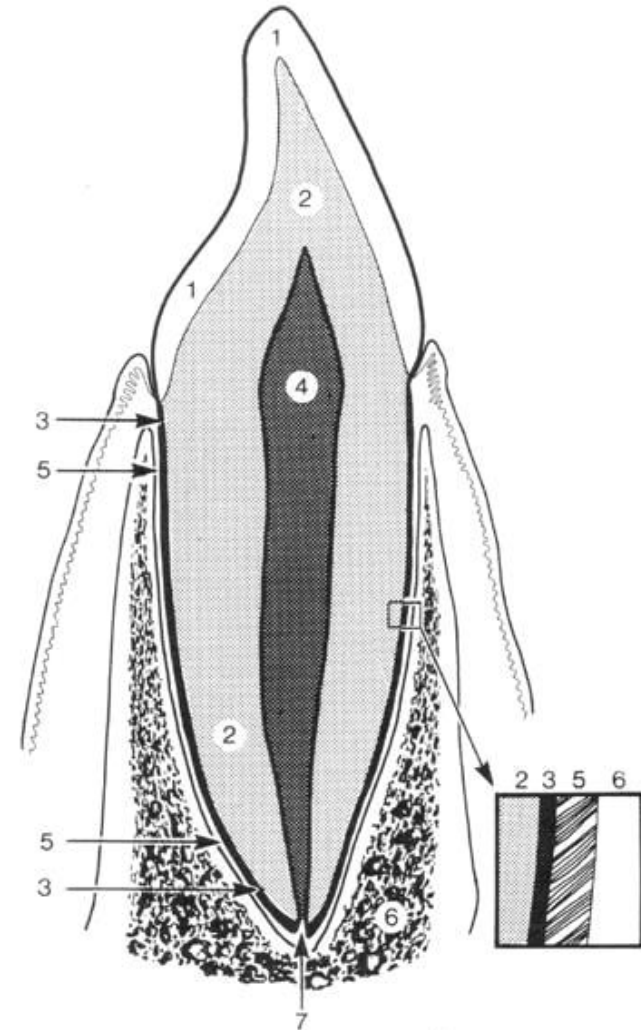




# DENTIN



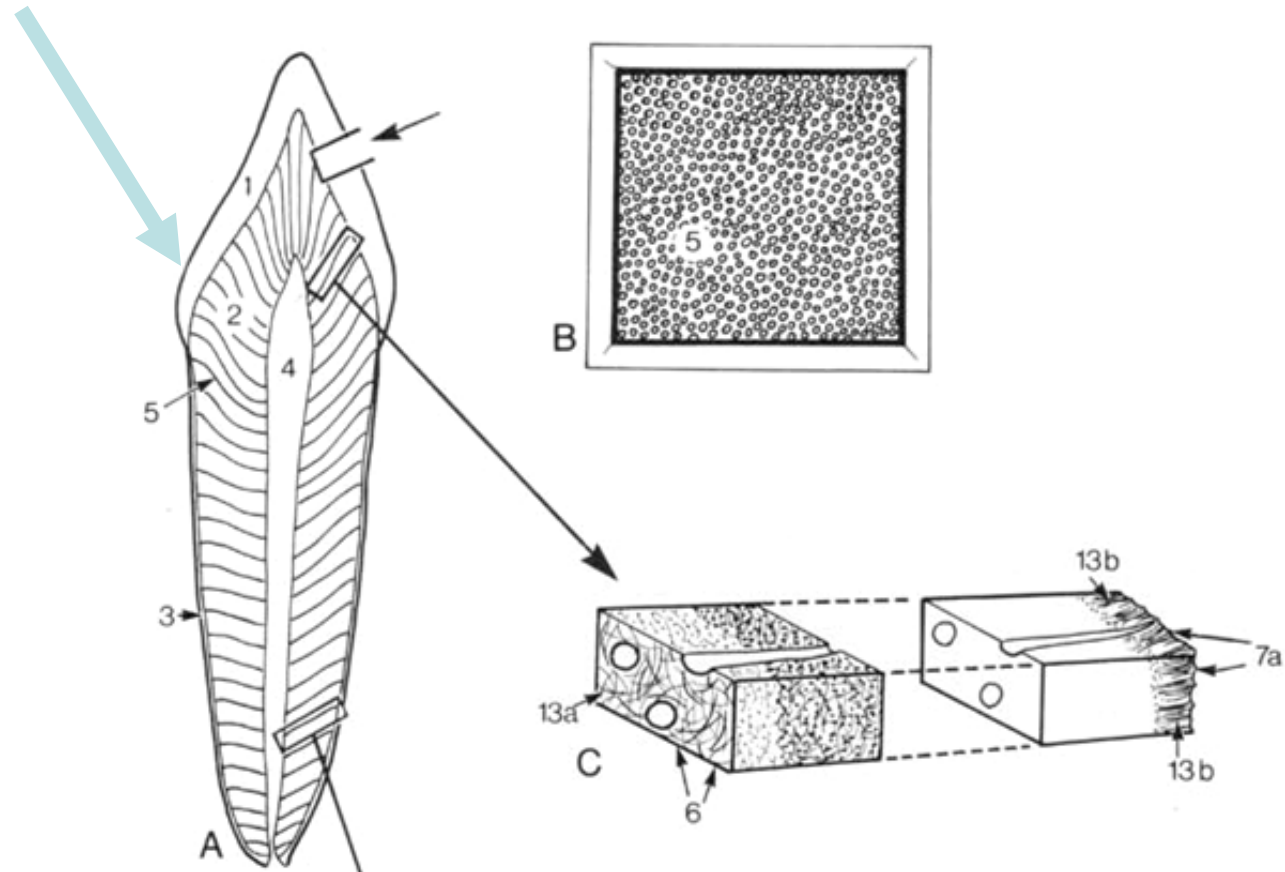
- Gullig, hård
- Støttevæv
  - kollagene fibriller
  - amorf grundsubstans
  - mineralsalte



# DENTINKANALER



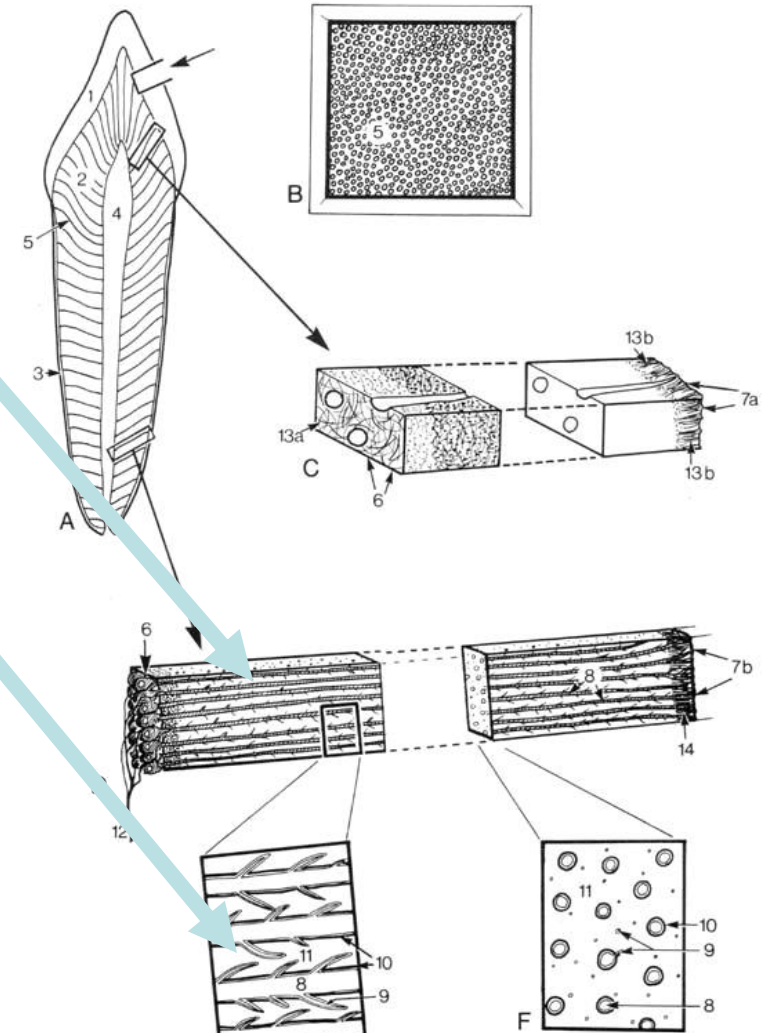
- S-formet forløb
- celleudløbere



# DENTINKANALER



- Indhold
  - odontoblastudløbere
  - ofte forgrenede
  - extracellulær væske
  - enkelte nervetråde

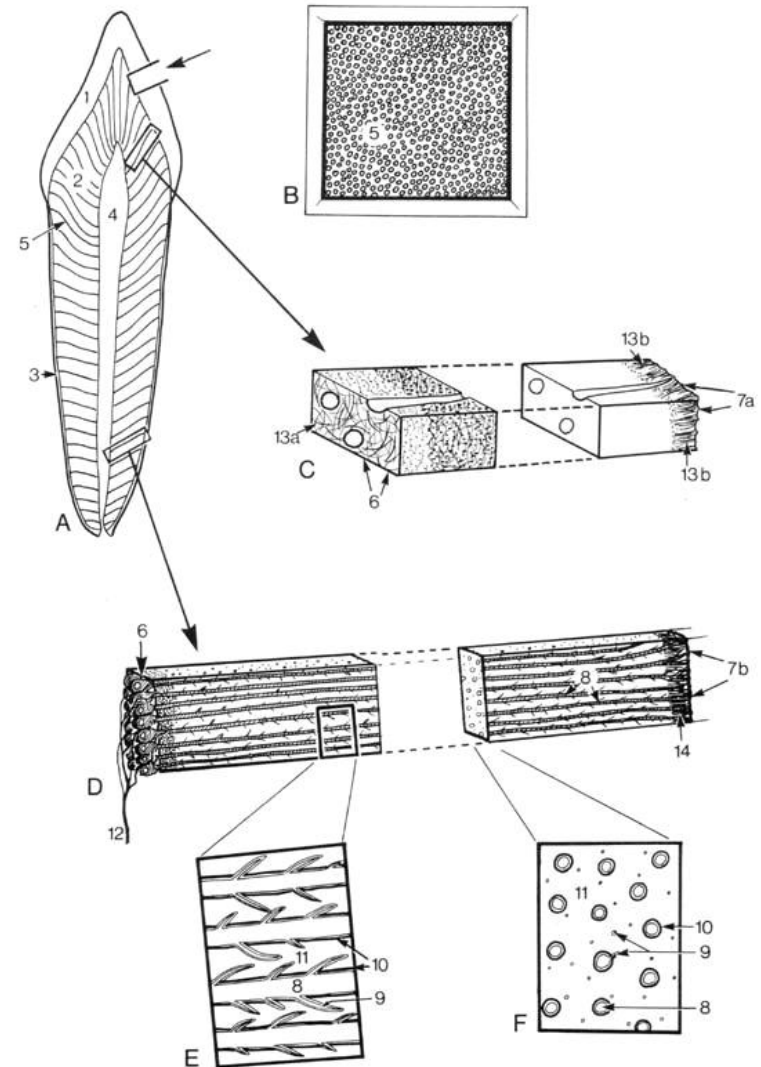


# DENTINKANALER

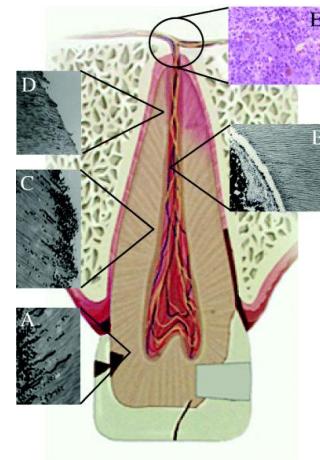


## Antal

- fra 12.500 / mm<sup>2</sup> (perifert)
- til 50.000 / mm<sup>2</sup> (centralt)
- mindre diameter i dentintubuli perifert



# //RISIKO FOR BAKTERIEL INVASION I DENTINKANALER



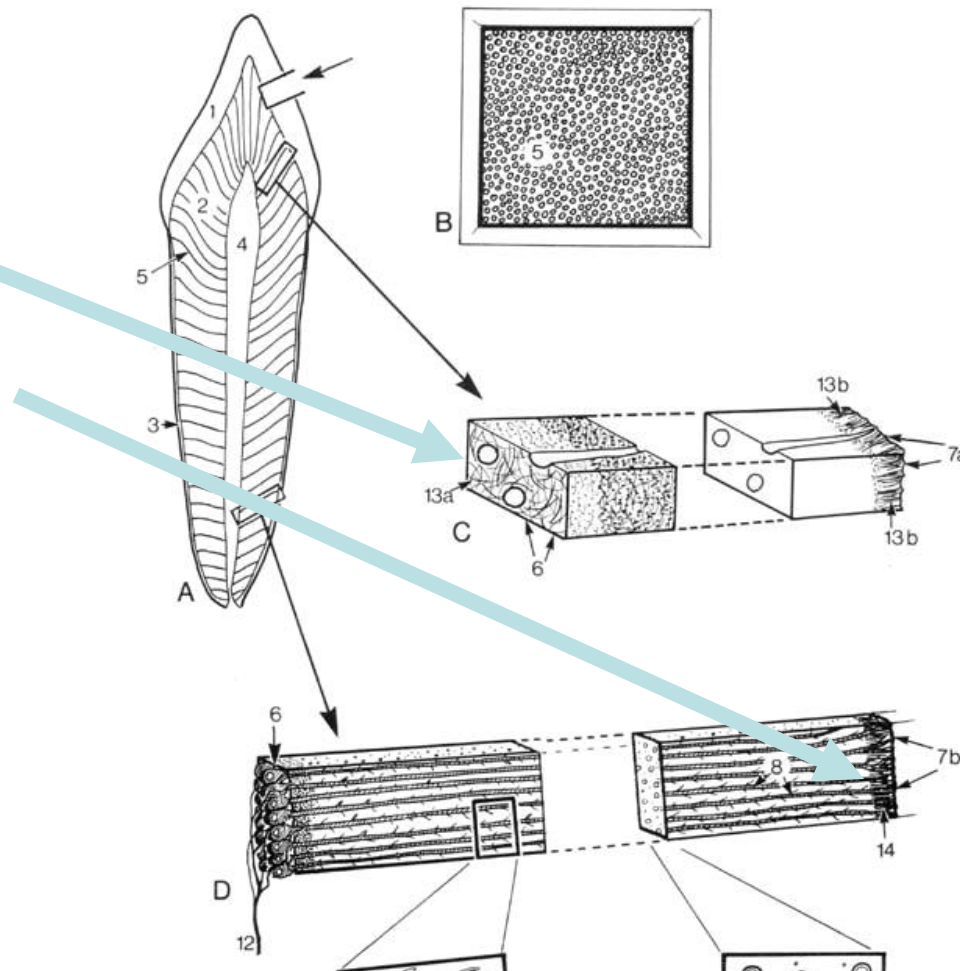
## Diameter

- størst nær pulpa ca 2-3  $\mu\text{m}$
- mindre perifert ca 1  $\mu\text{m}$
- bakteriestørrelse < 1  $\mu\text{m}$

# DENTIN



- Kollagen er uorganiseret
  - parallelt med overflade (for det meste)
  - ydre kappedentin vinkelret på overflade

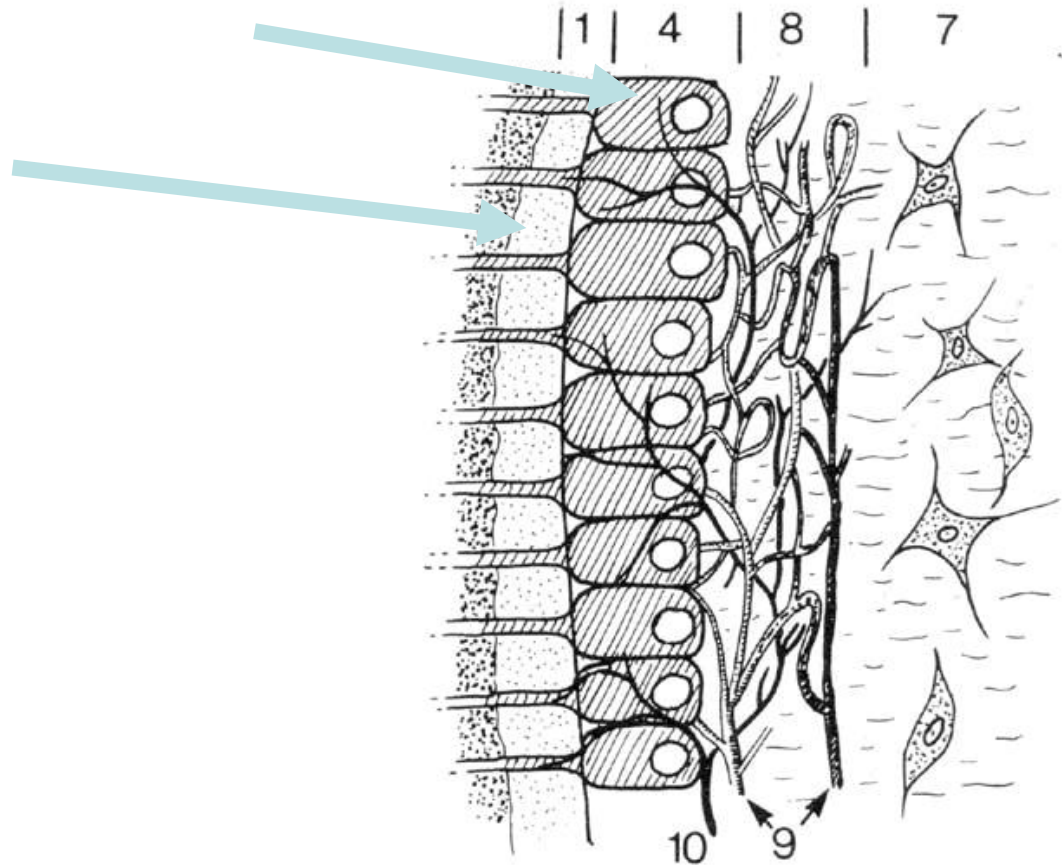




# DENTIN



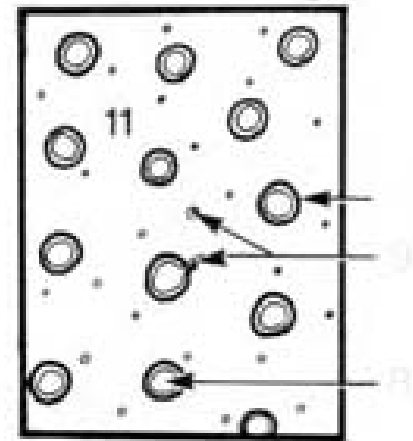
- lag af odontoblaster
- lag af prædentin
  - umineraliseret
  - tynd bræmme



# DENTIN



- peritubulær dentin
- intertubulær dentin

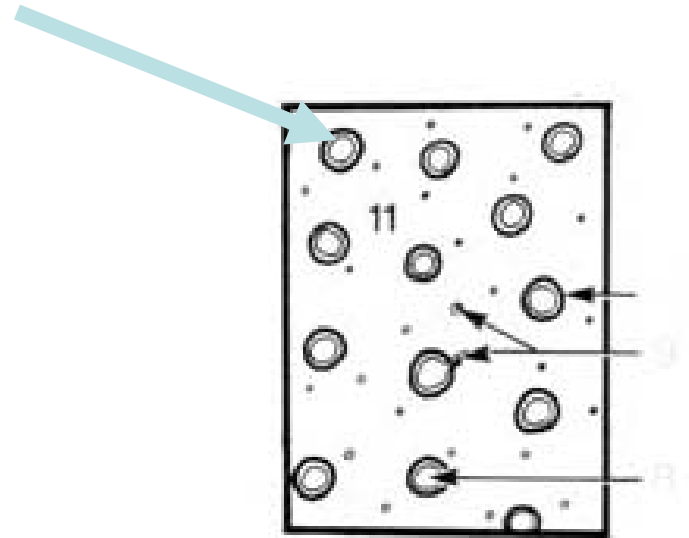




# DENTIN



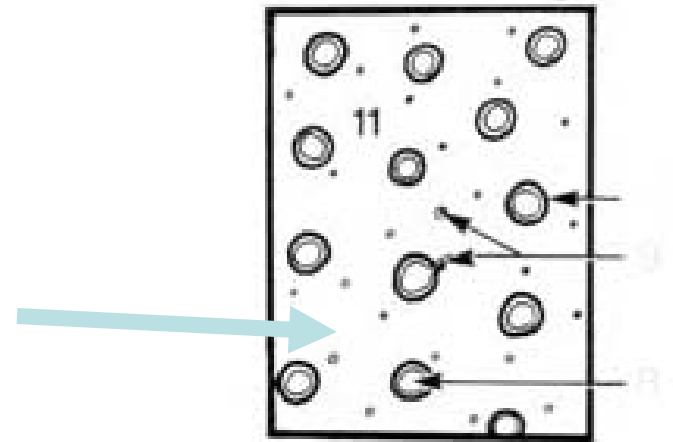
- peritubulær dentin
  - i væggen af tubuli
  - meget mineraliseret
- intertubulær dentin



# DENTIN



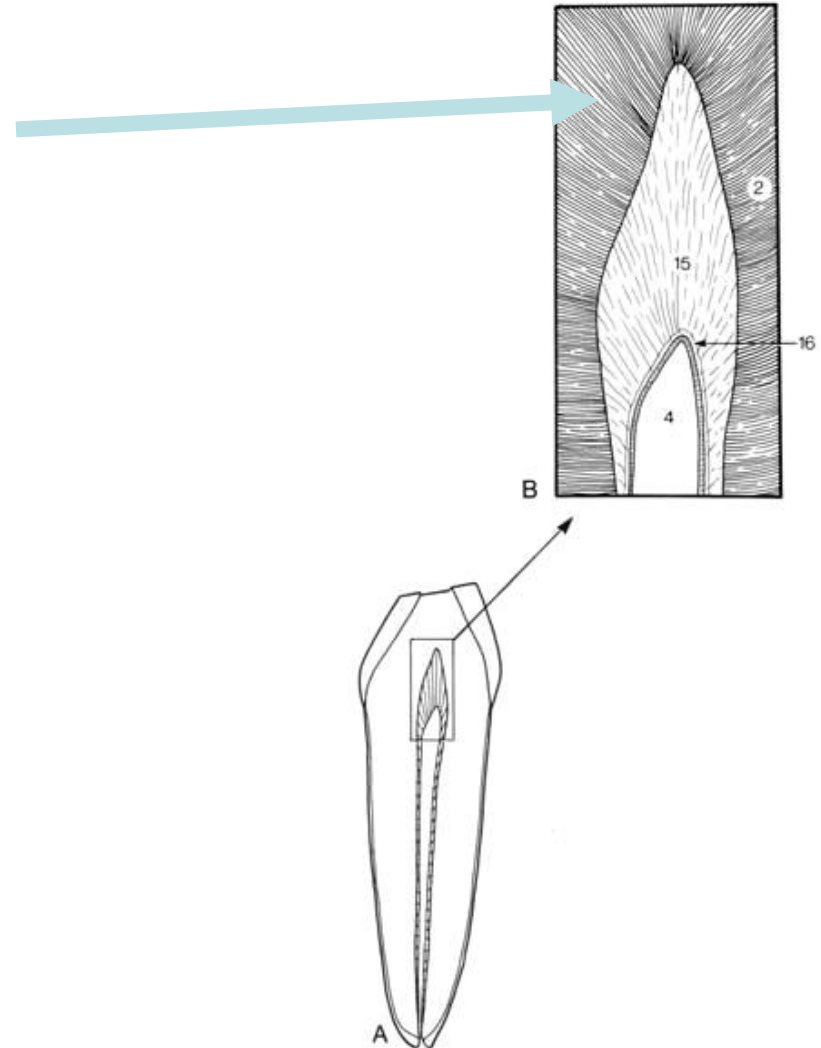
- peritubulær dentin
  - i væggen af tubuli
  - meget mineraliseret
- intertubulær dentin
  - mellem tubuli
  - flere kollagene fibriller
  - mindre mineraliseret



# DENTIN



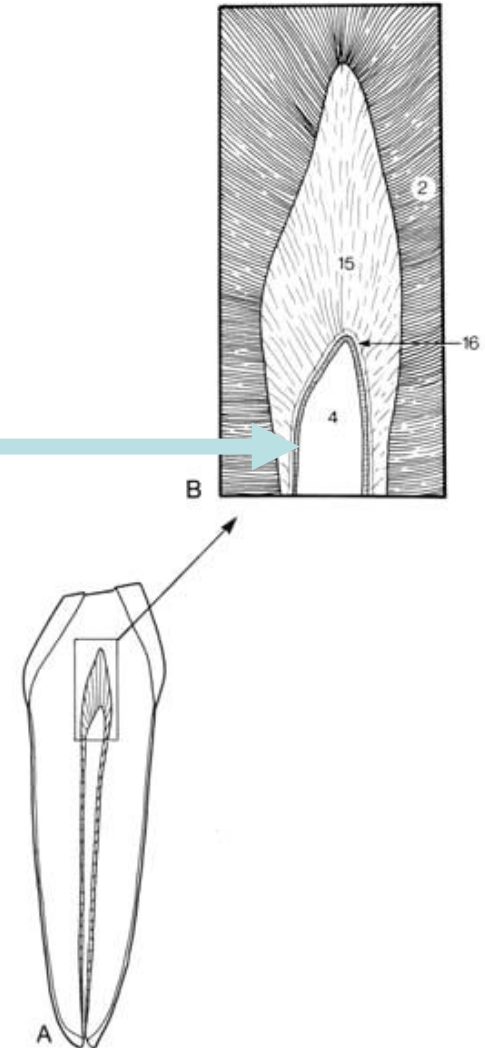
- primær dentin:
  - dannes indtil tand er færdigudviklet



# DENTIN



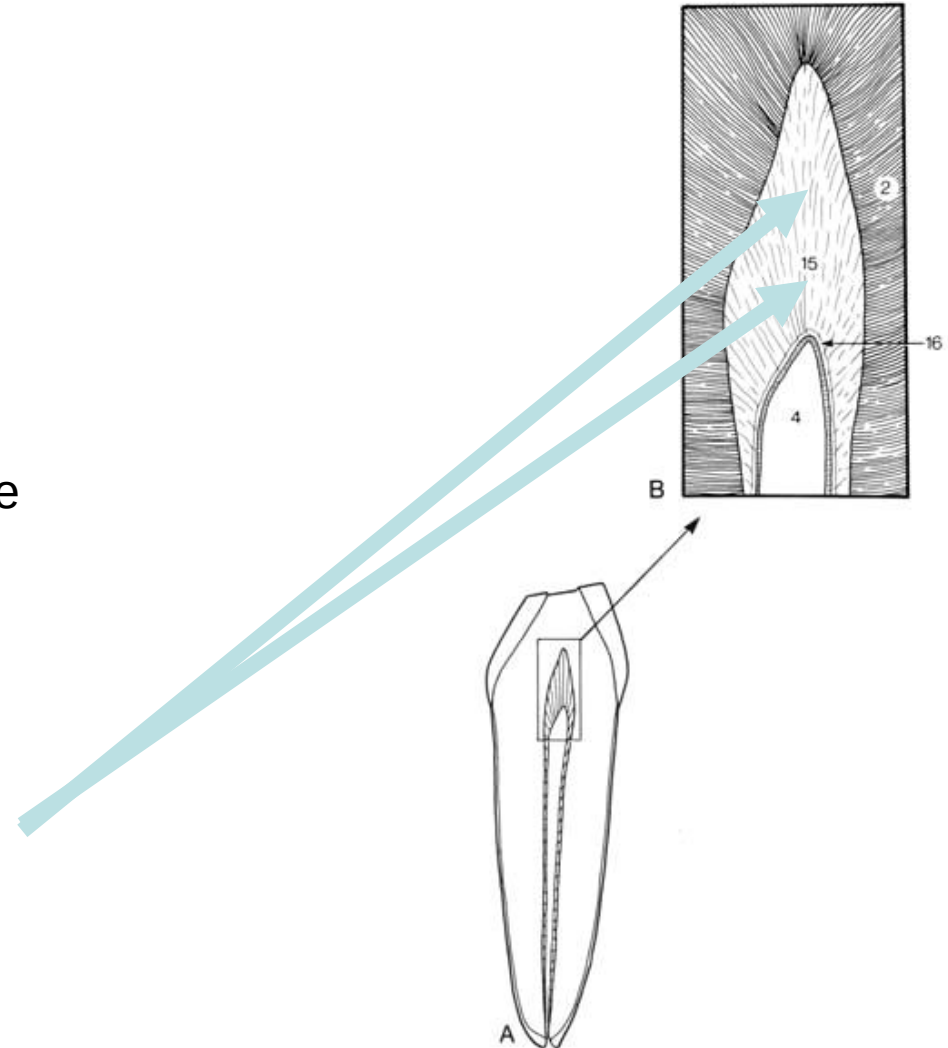
- primær dentin:
  - dannes indtil tand er færdigudviklet
- sekundær dentin
  - dannes fysiologisk hele livet igennem



# DENTIN



- primær dentin:
  - dannes indtil tand er færdigudviklet
- sekundær dentin
  - dannes fysiologisk hele livet igennem
- tertiær dentin
  - mere uregelmæssig



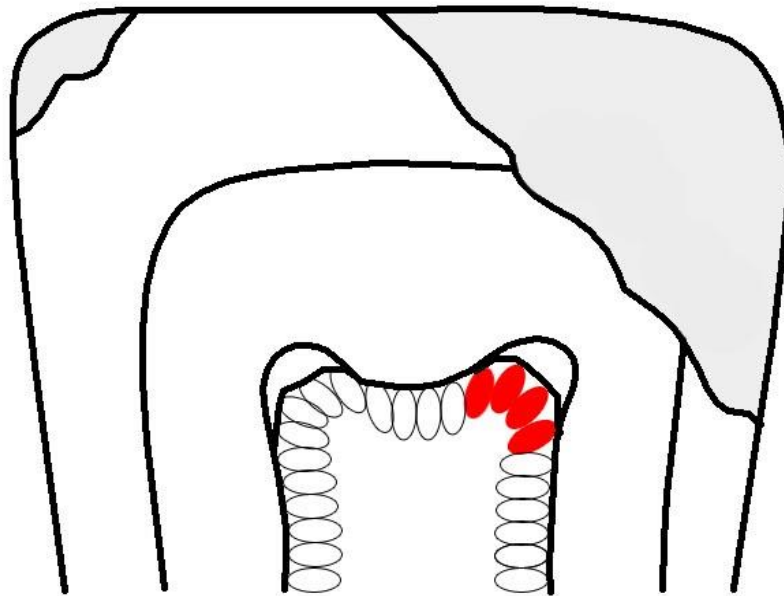
# Tertiær dentinogenese



Gode udtryk:

reaktionsdentin (samme celler)

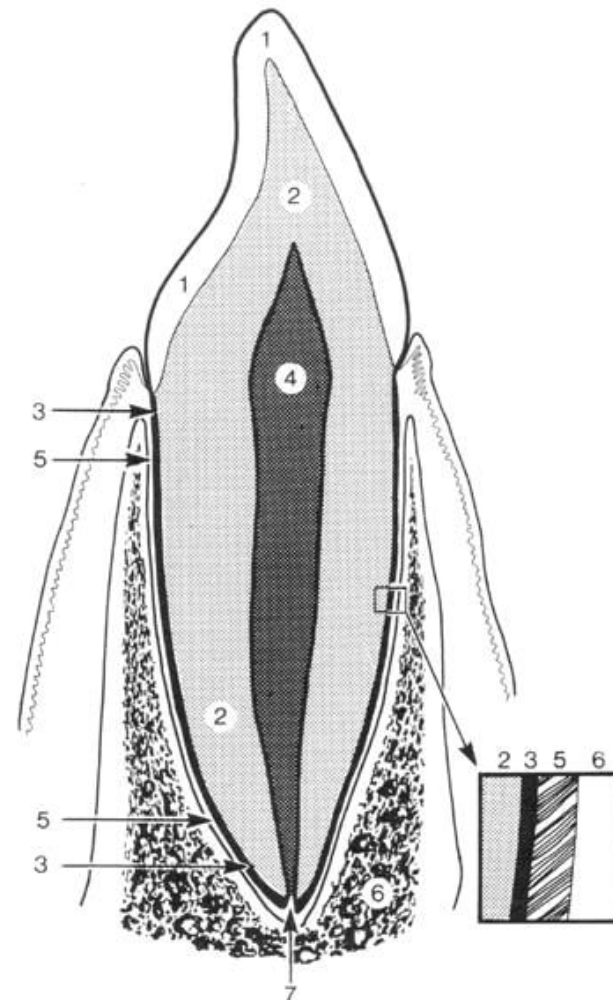
reparativ dentin (nye celler)



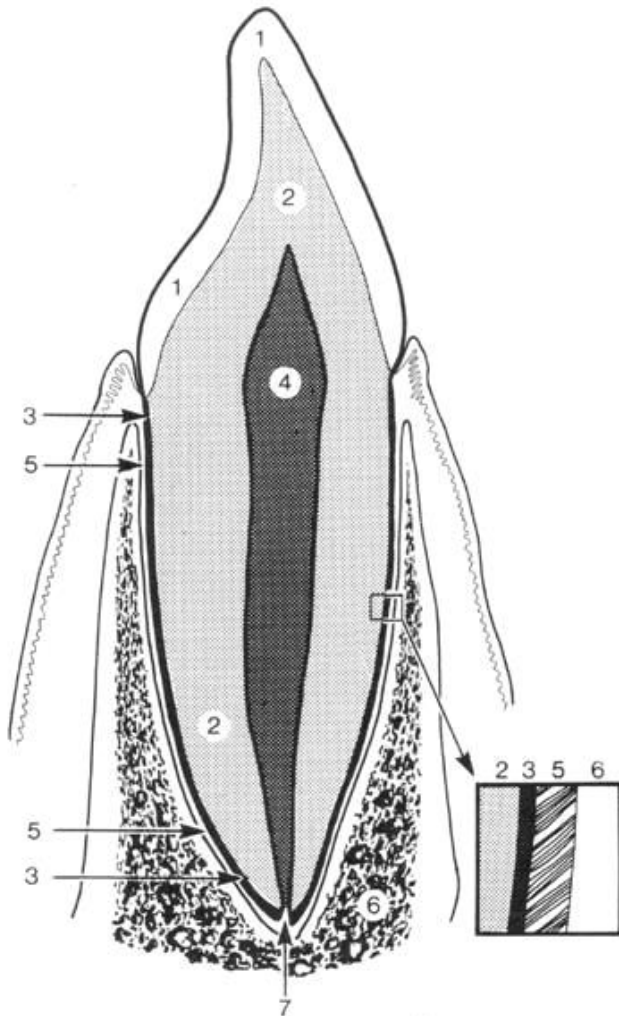


## Dentin:

- har ingen kar
- indeholder ikke cellelegemer
- bliver ikke remodeleret



# Tandens støtteapparat

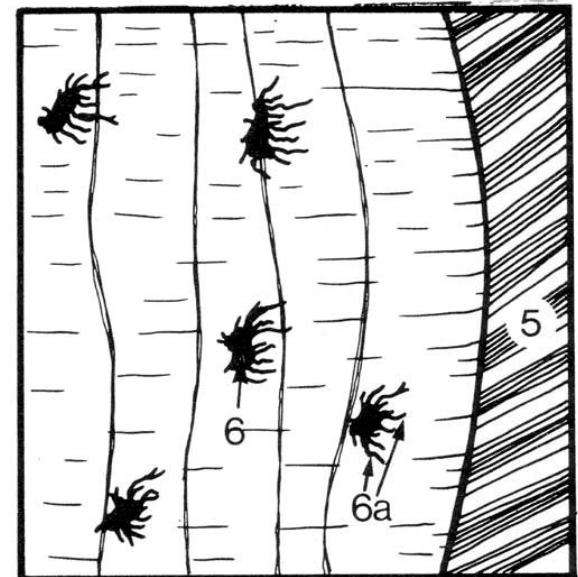


- Cement
- Rodhinde
- Alveoleknogle

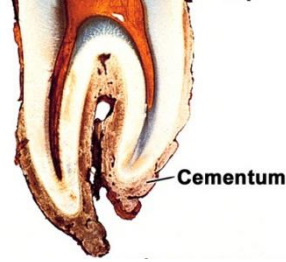


# CEMENT

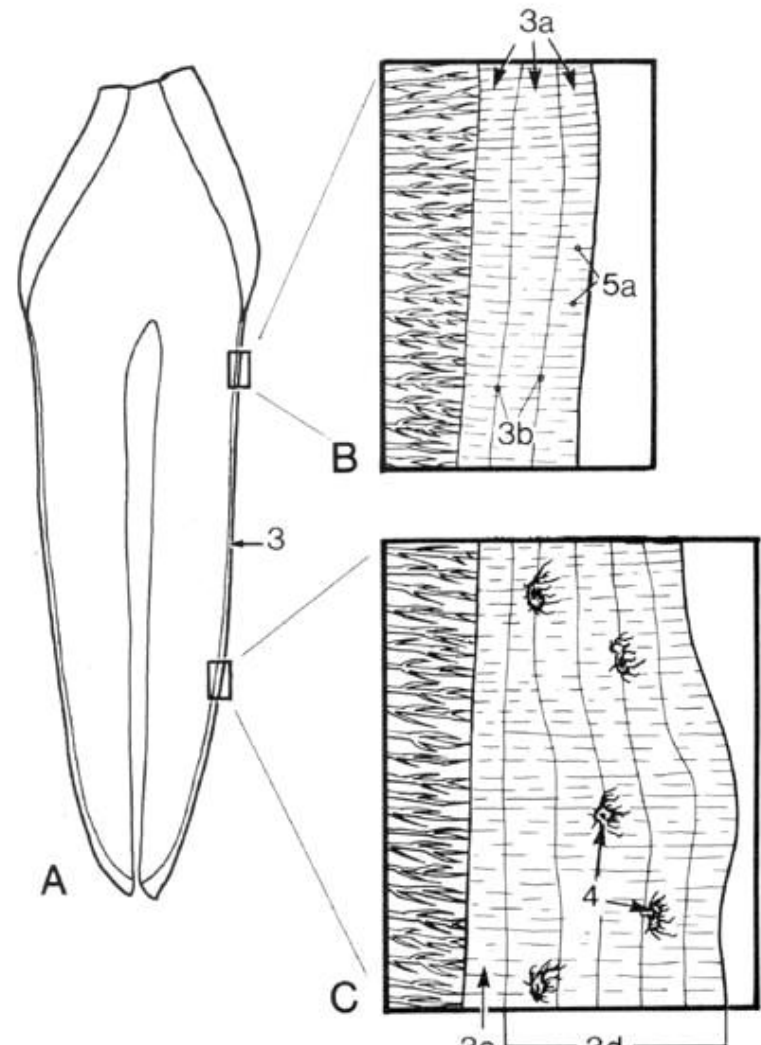
- gulligt, hårdt lag på roden
- fæster fibrilbundter fra rodhinde
- Sharpey's tråde (fibrilbundter)



# CEMENT

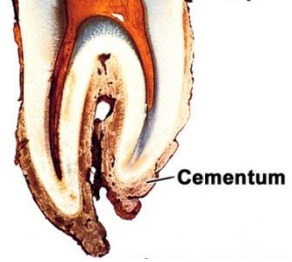
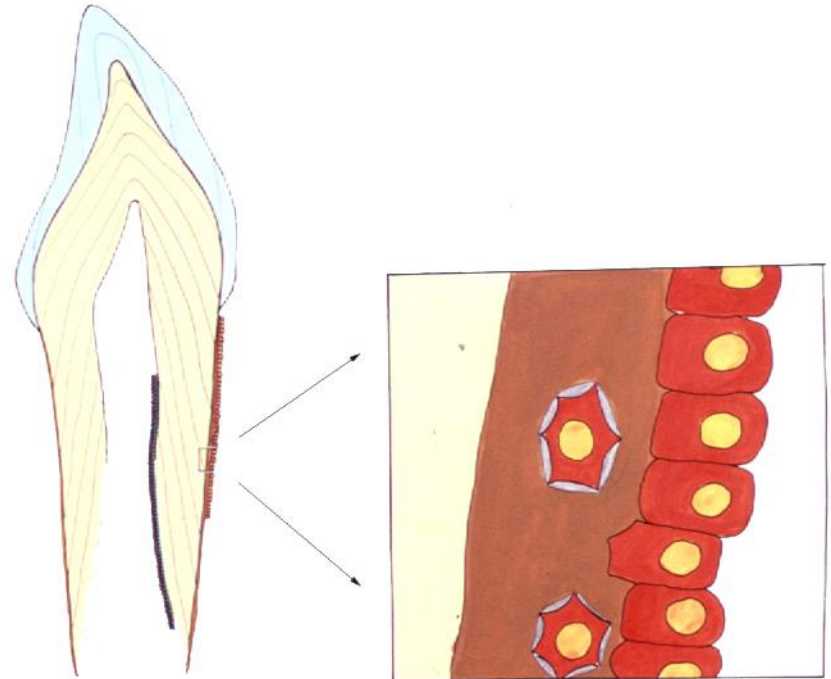


- cellefri cement
  - ind mod roddentinen
- celleholdig cement
  - udenpå flere steder
  - bl a i apikale 1/3
- cementlinier
  - er synlige vækstlinjer
  - sv t lameller i knogle



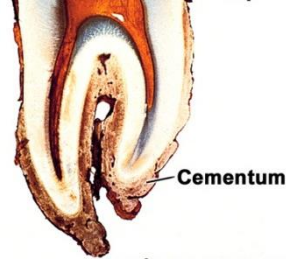
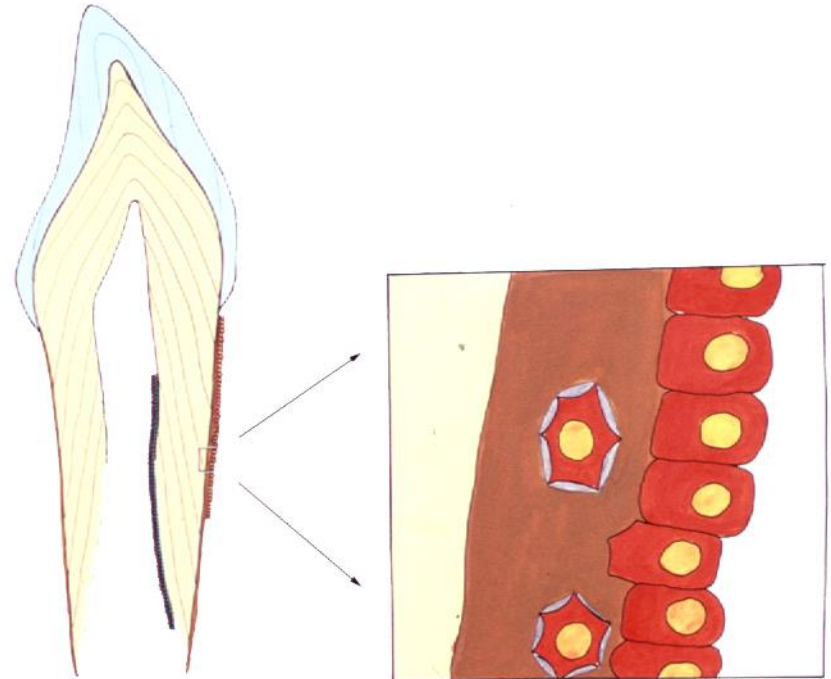
# CEMENT

- cementoblaster på overfladen

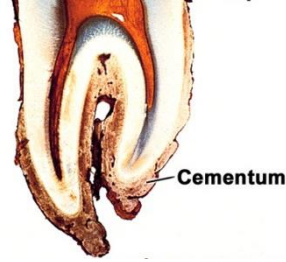


# CEMENT

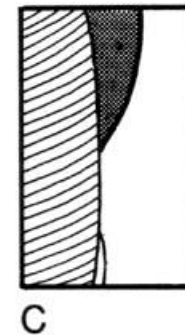
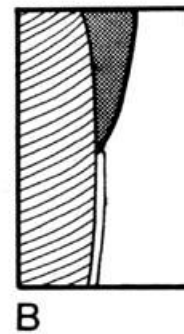
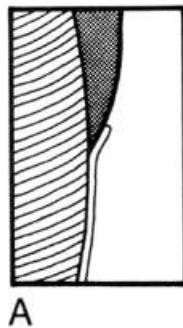
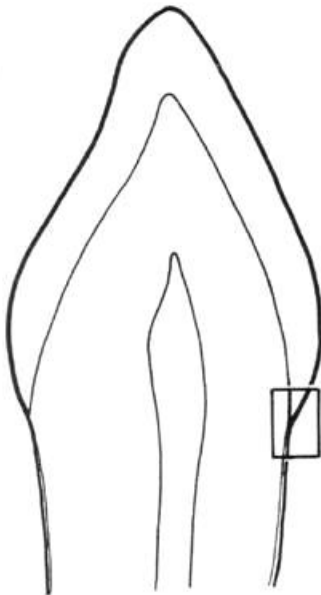
- cementoblaster på overfladen
- cementocyter indlejret i cement



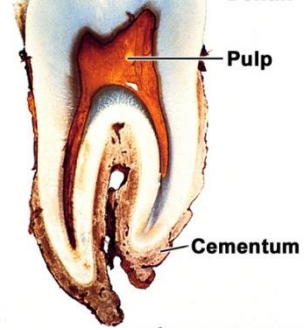
# CEMENT



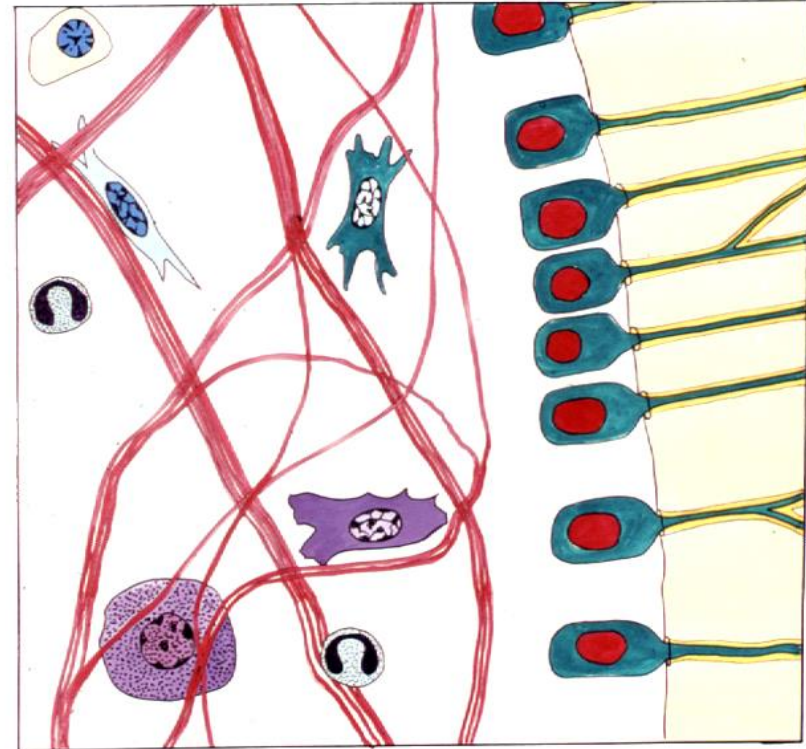
- undertiden mangler overlap mellem emalje og cement (er følsomt for patienter)
- det skyldes at Hertwig's rodepitel persisterer



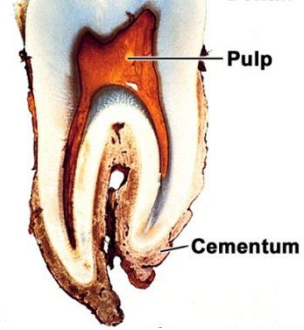
# PULPA



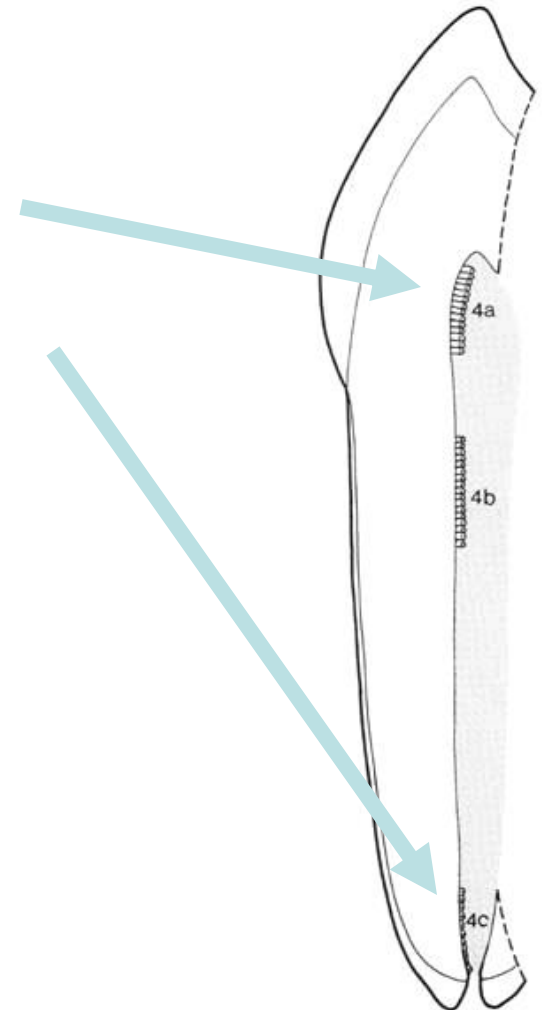
- Løst bindevæv
  - Celler
  - Kollagene fibriller
  - Amorf grundsubstans



# PULPA

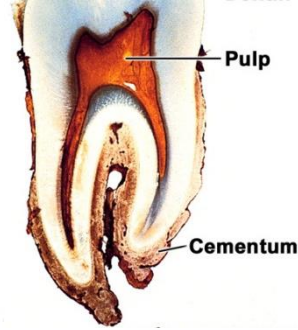


- Odontoblastlaget:
  - Prismatiske celler i kronen
  - Kubiske eller flade celler i roden

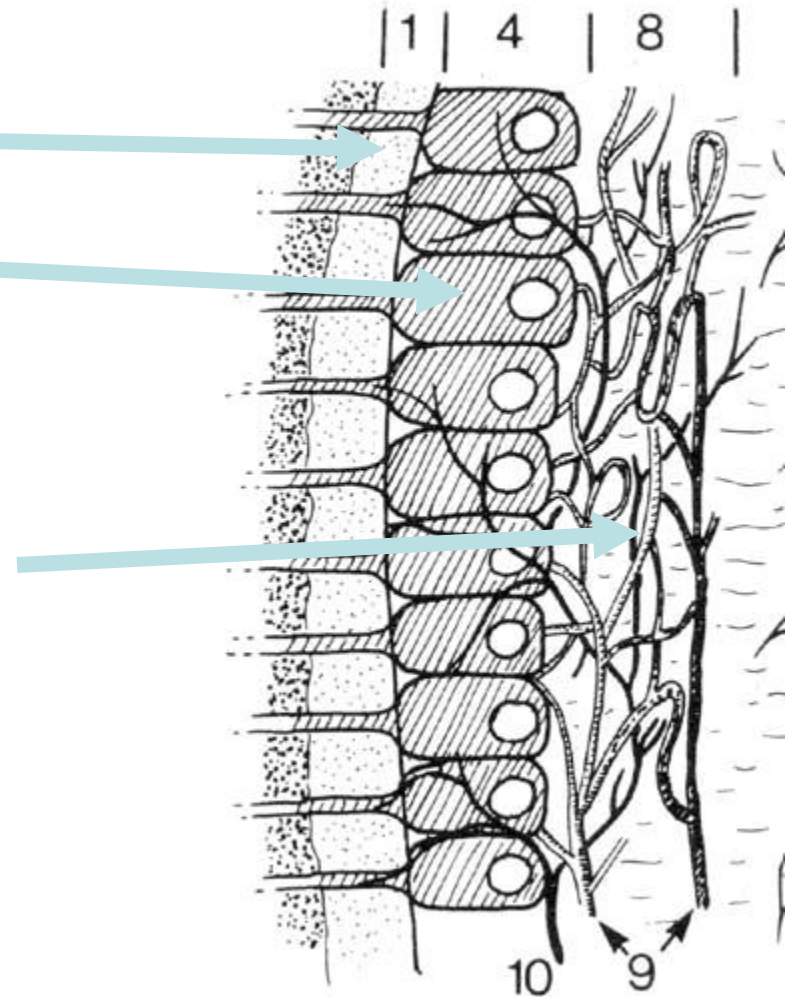




# PULPA

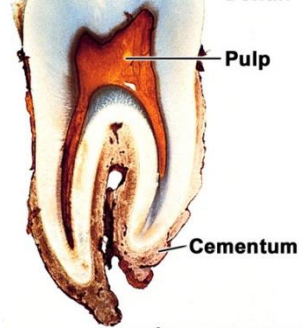


- Prædentin
- Odontoblastlaget
- Weil's zone (cellefattig)
  - subodontoblastiske kapillærslynger
  - subodontoblastiske nerveplexus



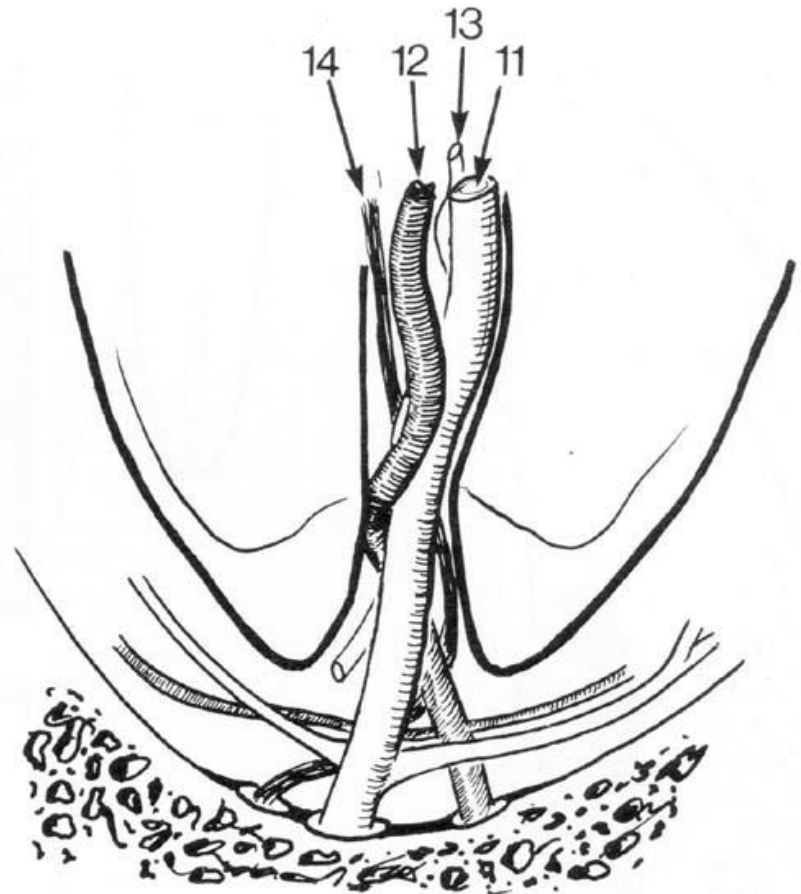


# PULPA

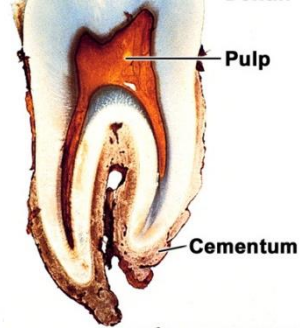


## Karforsyning:

- Arterie
- Vener
- Lymfekar

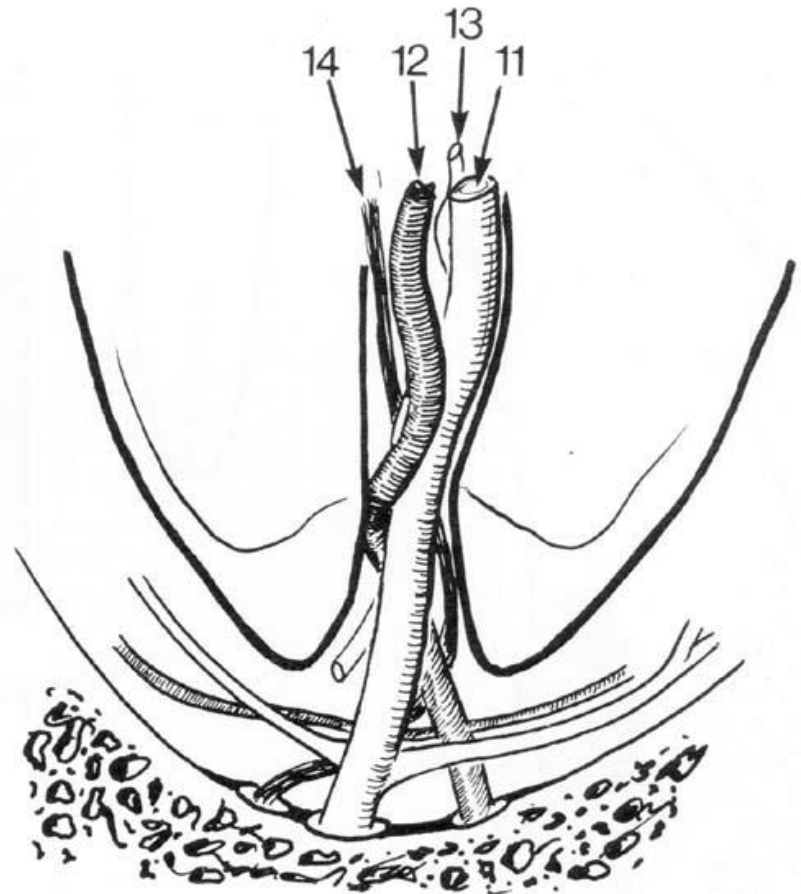


# PULPA

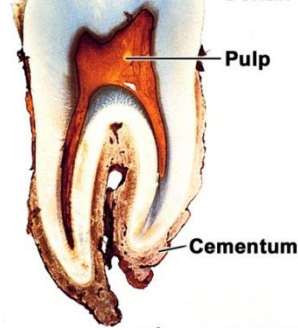


## Nervetråde:

- 5-10 tynde nervetrådsbundter

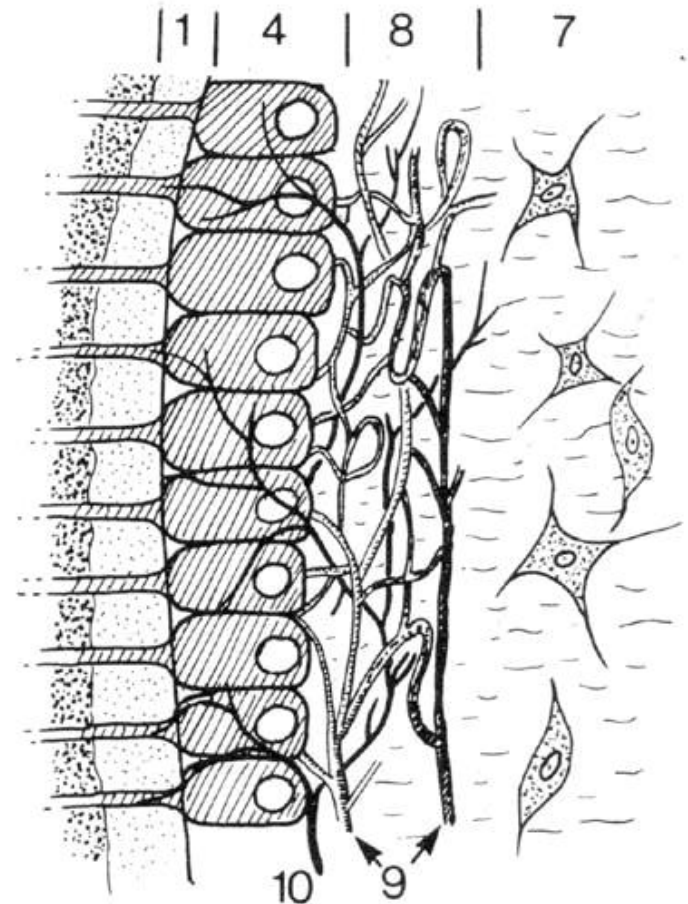


# PULPA

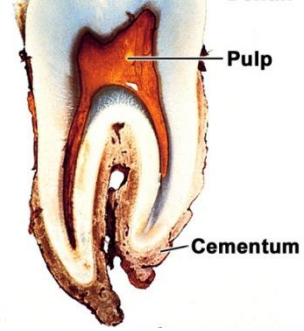


## Nervetråde:

- har alle frie nerveender
  - dvs ingen specialiserede receptorer
  - de fleste er sensitive (med/uden myelinisering)
  - resten er sympatiske tråde til kar (uden myelinisering)

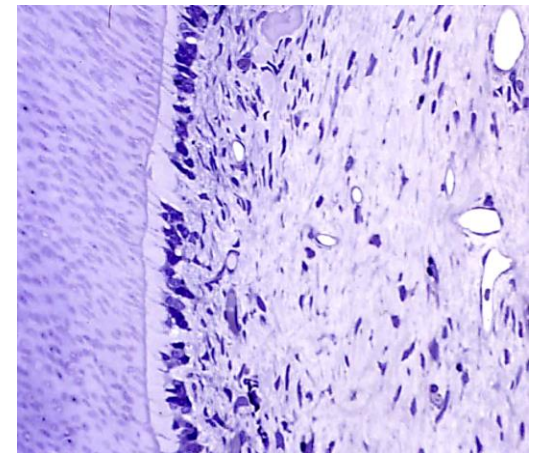


# PULPA



## Aldersforandringer:

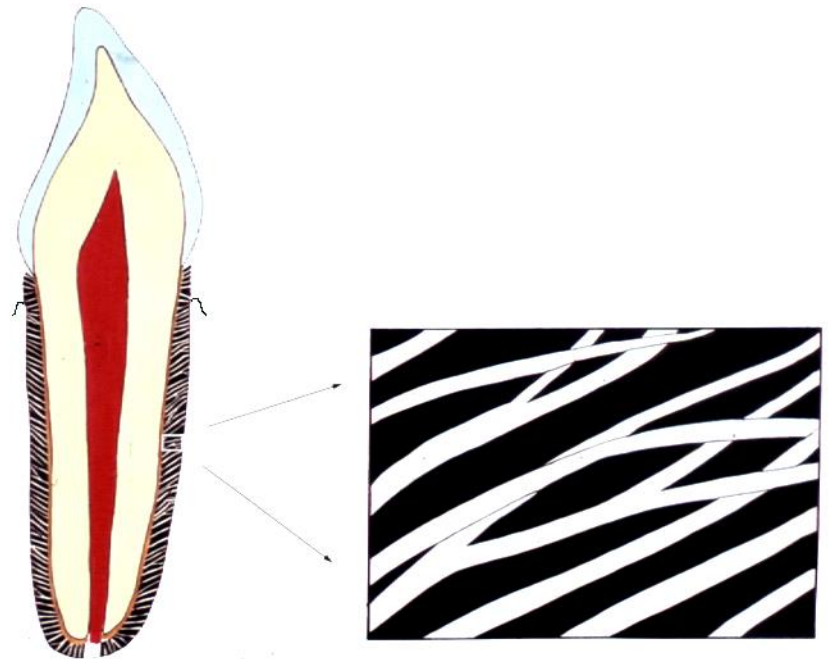
- Celletal falder
- Fibrilantal stiger
- Sekundær dentin  
mængde stiger



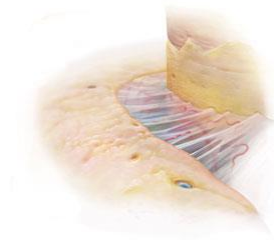
# RODHINDE



- Ligger i periodontalspalte
- Forbinder tandrod og knogle
- Er ca 0,25 mm tyk

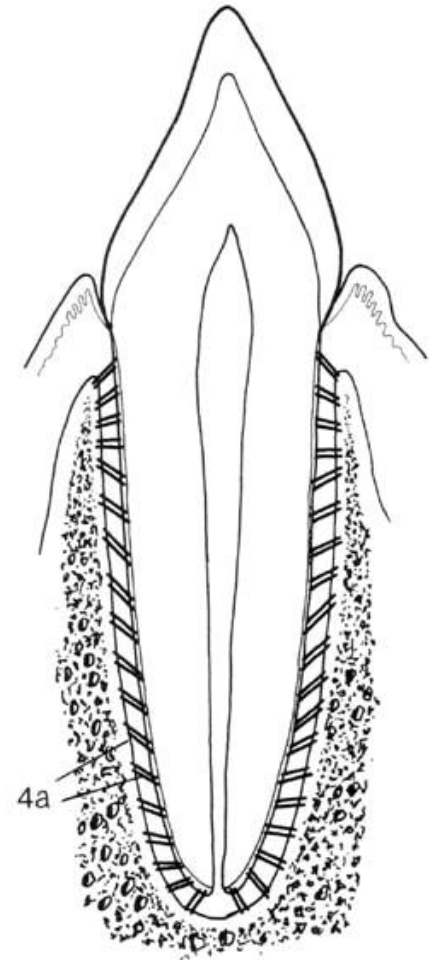


# RODHINDE



Nervetråde:

- Smerteførende
- Proprioceptive

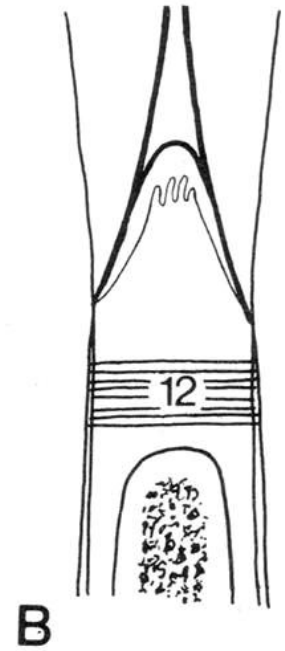
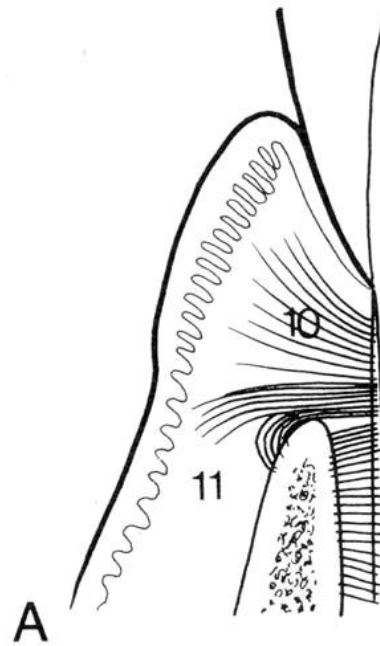


# RODHINDE



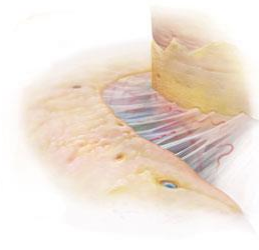
Fibre:

- Dentogingivale
- Dentoperiostale
- Dentoalveolære
- Transeptale

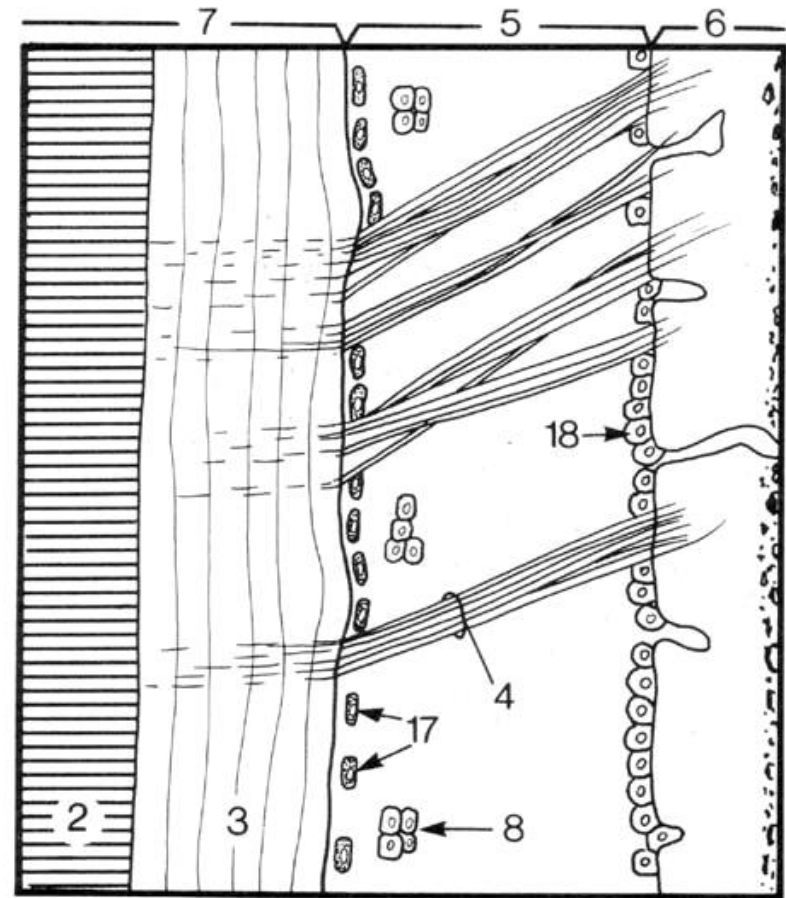
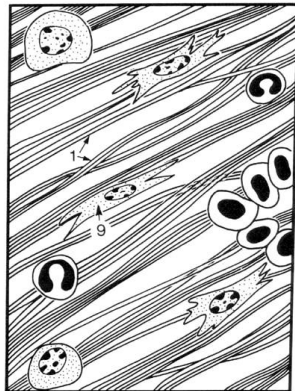




# RODHINDE



- stamceller i rodhinden kan differentiere til:
  - fibroblaster
  - osteoblaster
  - cementoblaster





# RODHINDE

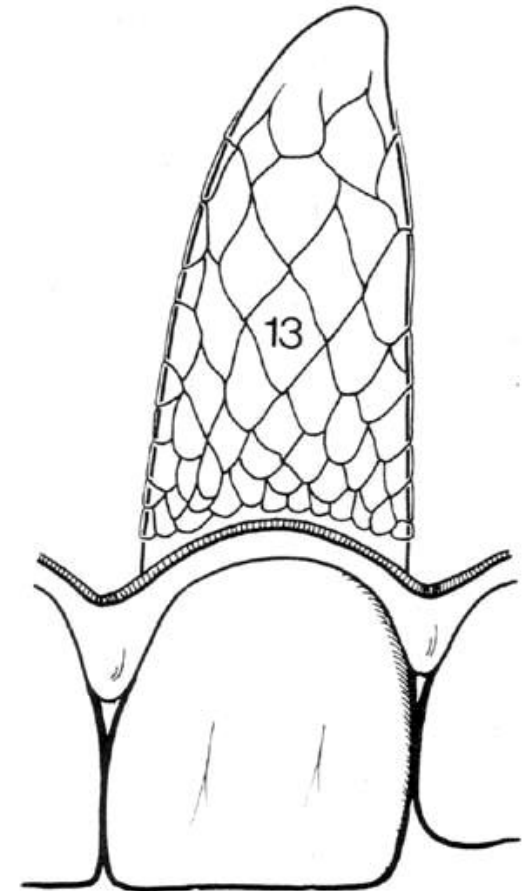


## Rester af Hertwig's rodskele:

- Malassez epiteløer
- i den inderste del af rodhinde
- danner et net
- kan udvikles til cyster
- hvis det går tabt bliver det gendannet



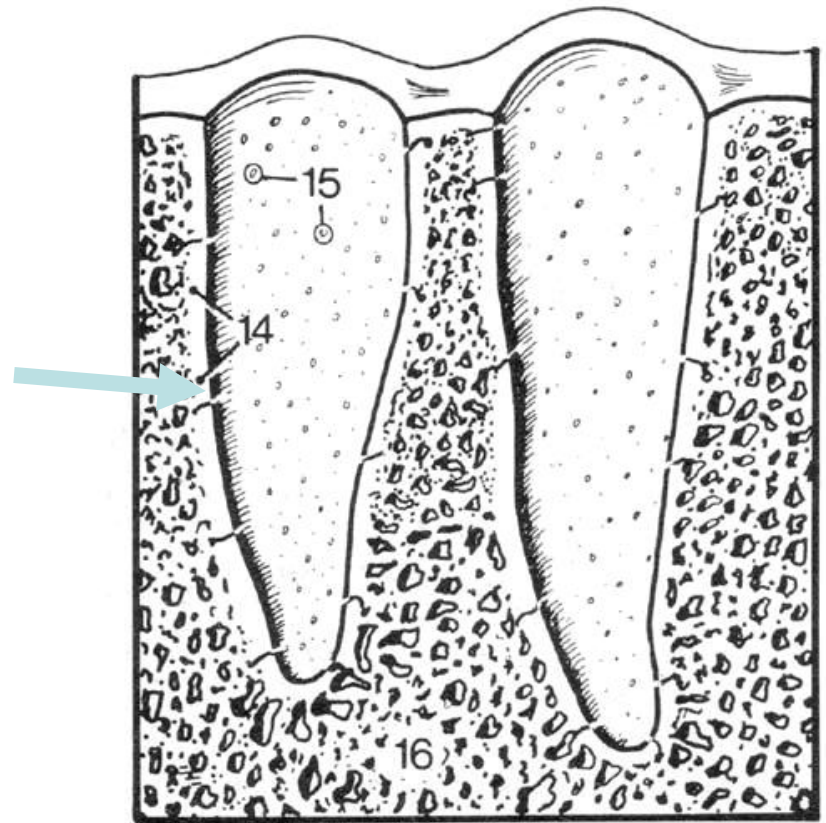
Rodhinde mellem tand og knogle



# ALVEOLEKNOGLE



- Substantia spongiosa
- Substantia compacta
  - har huller til mindre kar der forsyner rodhinden



# GINGIVA

- er rosa, mat, let nubret ("chagrineret")

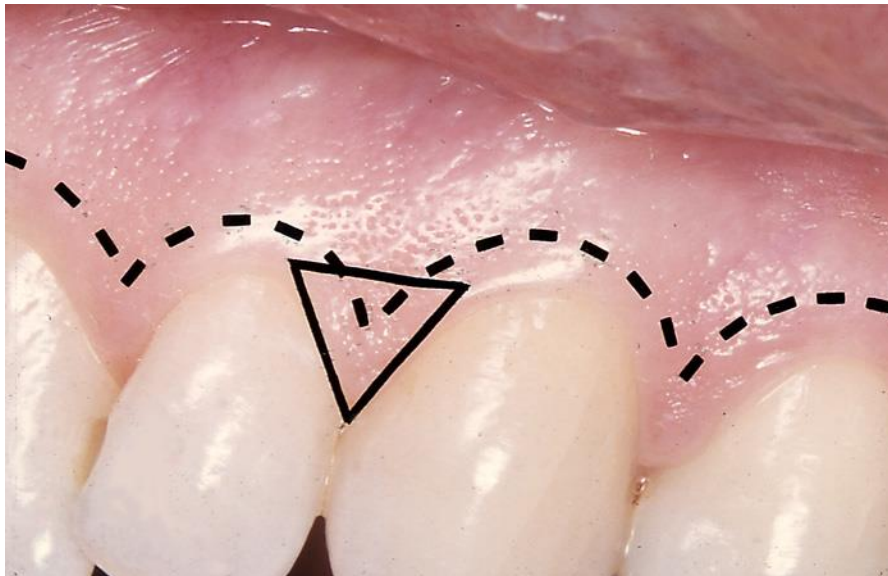


# GINGIVA



Stiplet linie afgrænser:

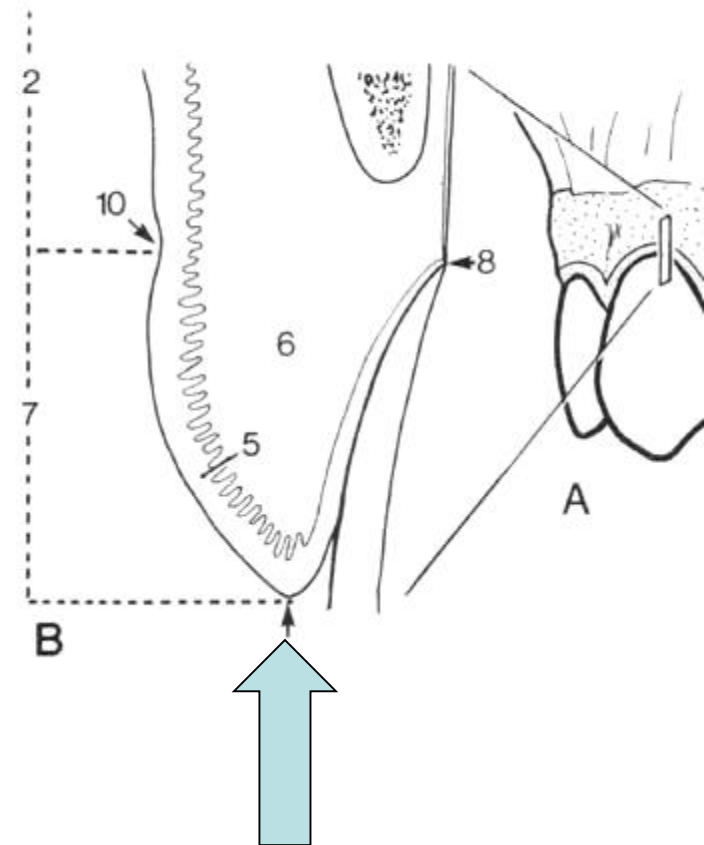
- Fast bundne gingiva
- Frie marginale gingiva



# GINGIVA



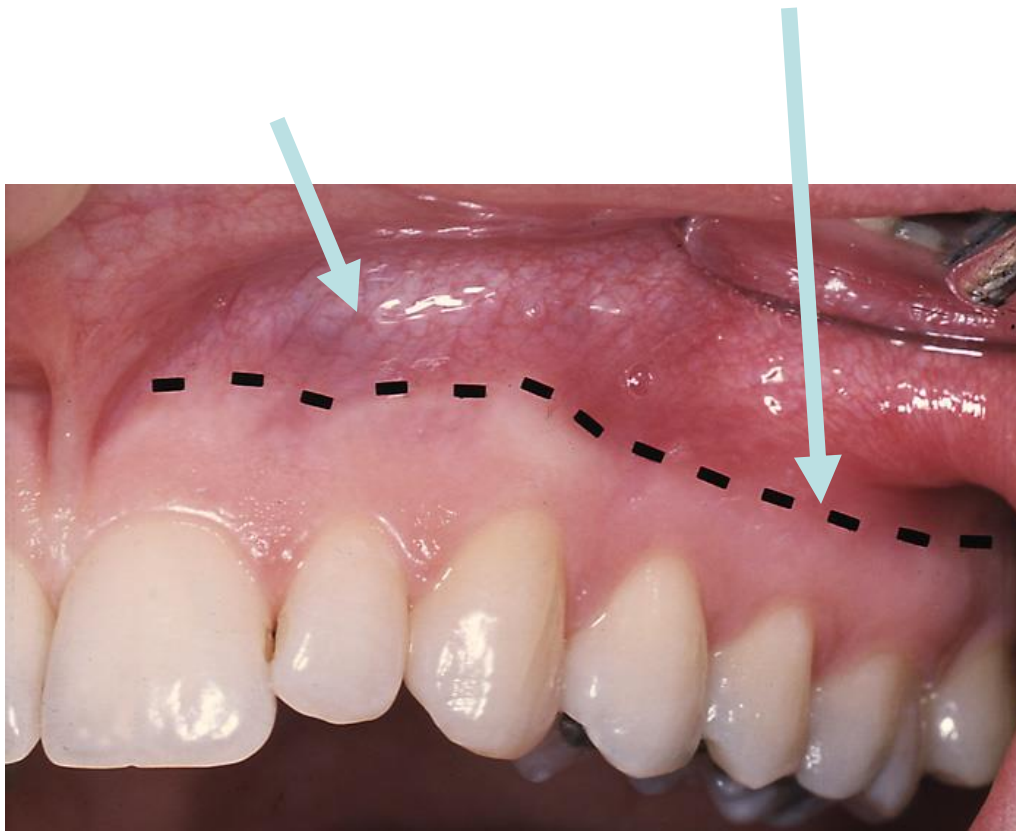
- Gingivalranden



# GINGIVA



- Mucogingivale grænse
- Alveolære mucosa

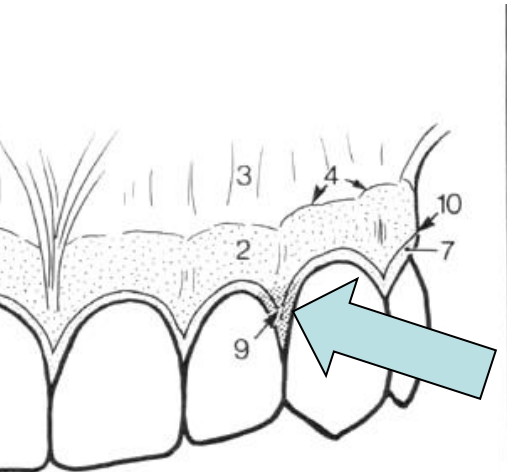




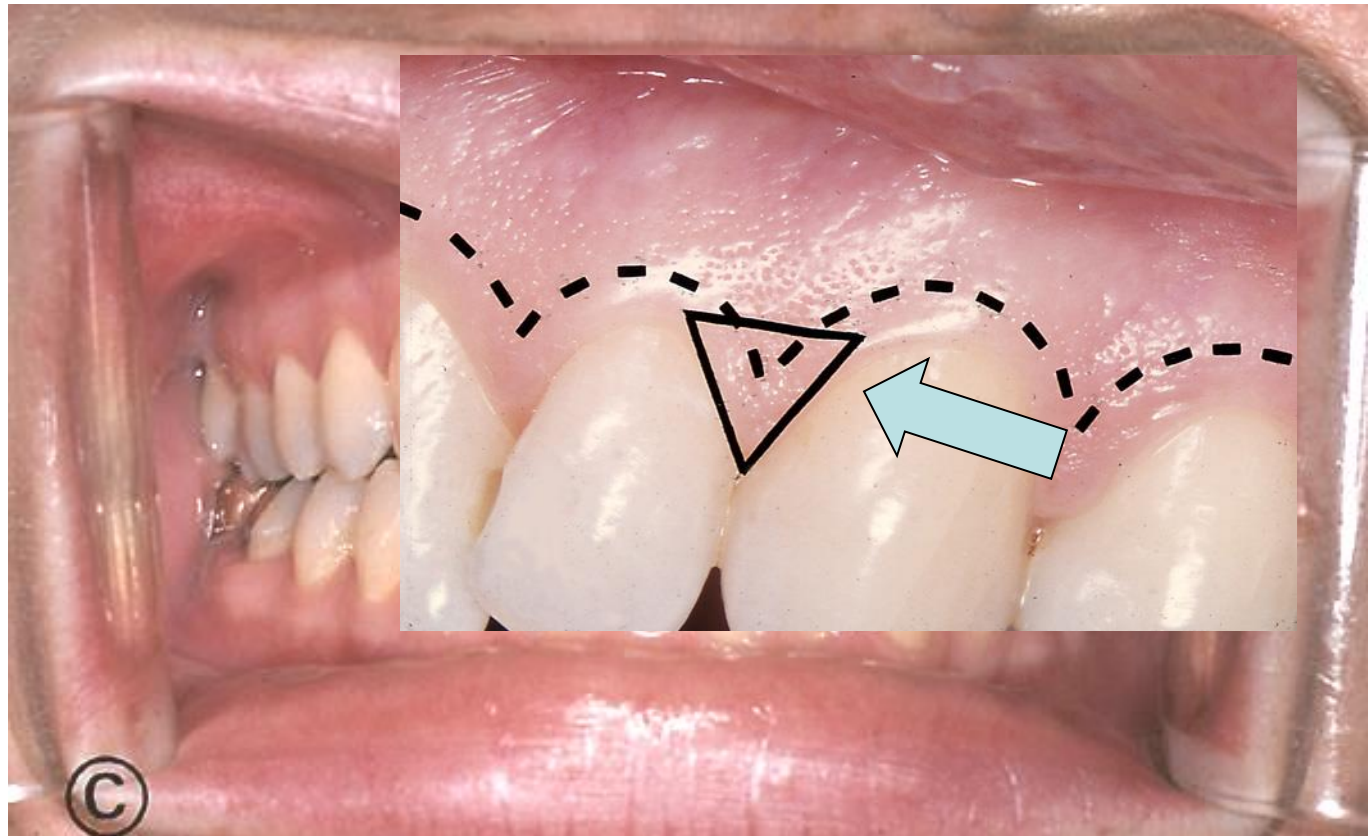
# GINGIVA



- Interdentalspapiller



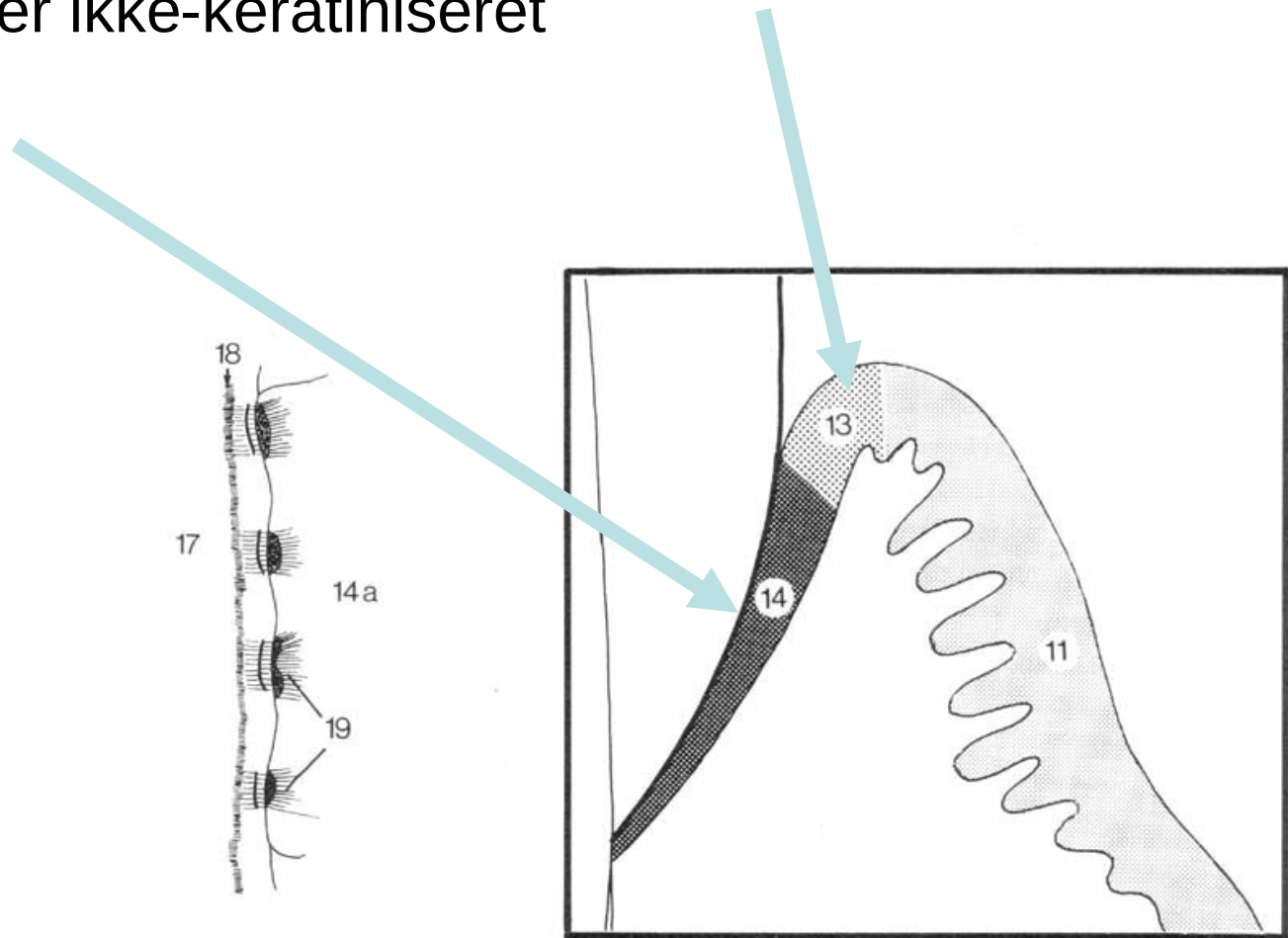
IOOS, AU





# GINGIVA

- Oralt sulcusepitel (ikke i tandkontakt)
- Kontaktepitel er ikke-keratiniseret



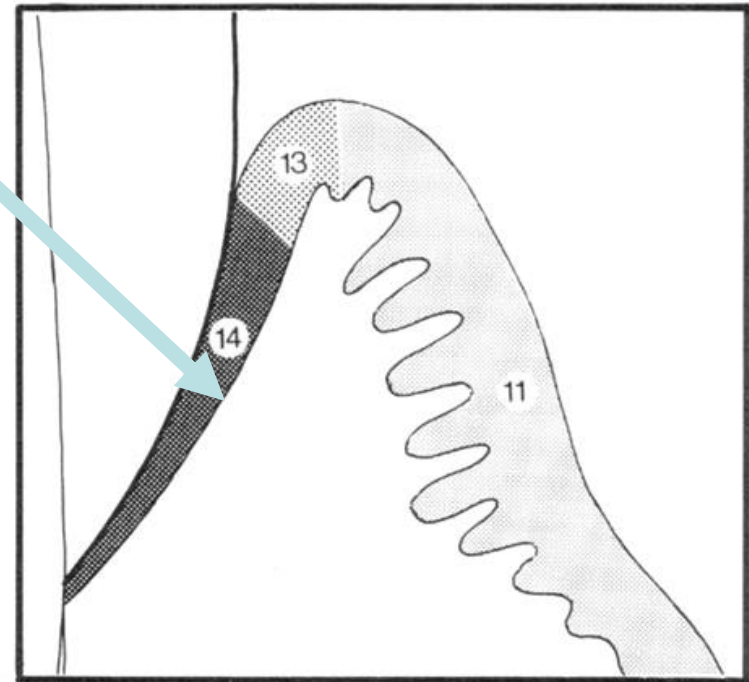




# GINGIVA

## Kontaktepitel

- har **ikke** lamina propria papiller
- få cellelag

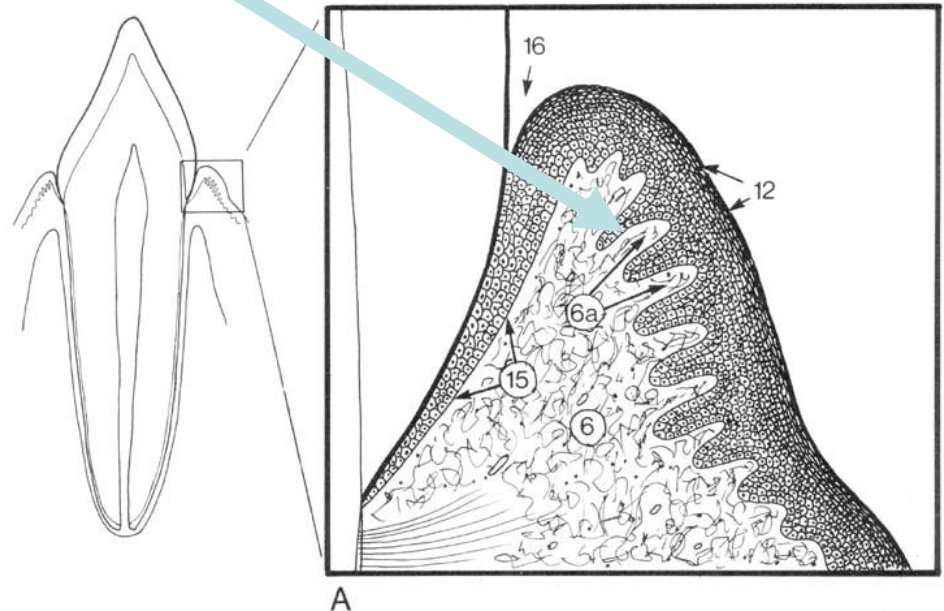


# GINGIVA



## Oralt epitel

- har lamina propriapapiller
- keratinisering:
  - orto-keratiniseret (uden kerner)
  - para-keratiniseret (med kondenserede pyknotiske kerner)

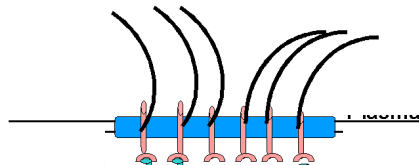
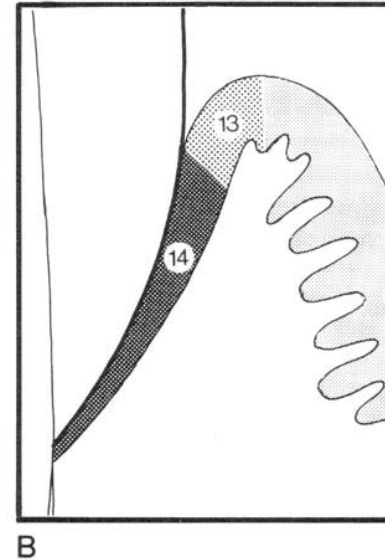
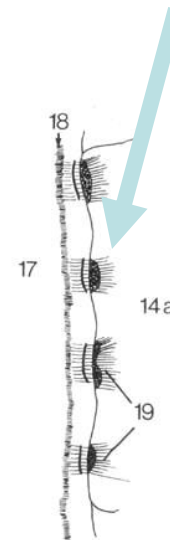


# GINGIVA



## Kontaktepitel:

- danner attachment
- hemi-desmosomer



# GINGIVA



## Lamina propria:

- fibrillært, kollagent, fast
- uorganiseret, bindevæv
- mange papiller

