

# Restorative dentistry I.

## 4 th lecture

**Dentin hypersensitivity and non carious lesions  
(defects)**



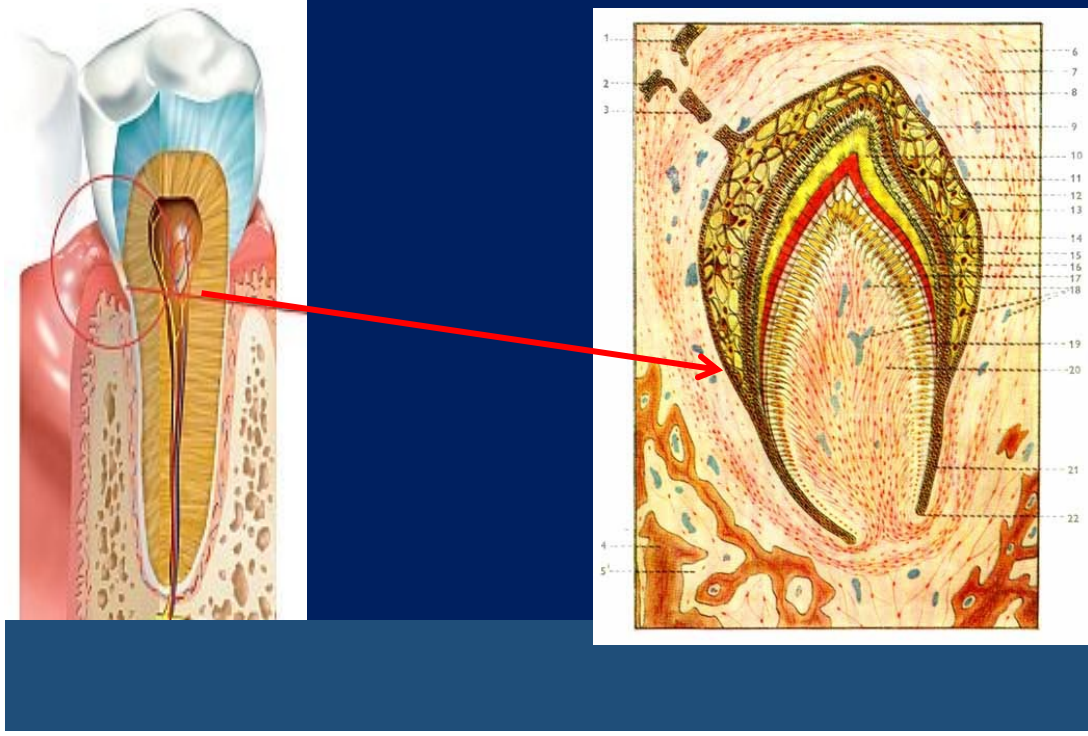
# DENTIN HYPERSENSITIVITY charakteristics

Sharp intensive pain in response to stimulus,  
decreasing and stopping immediately with the  
stimulus.

Dentin must be exposed, frequently in cervical area

Stimuli: thermal, chemical, osmotic, mechanical.





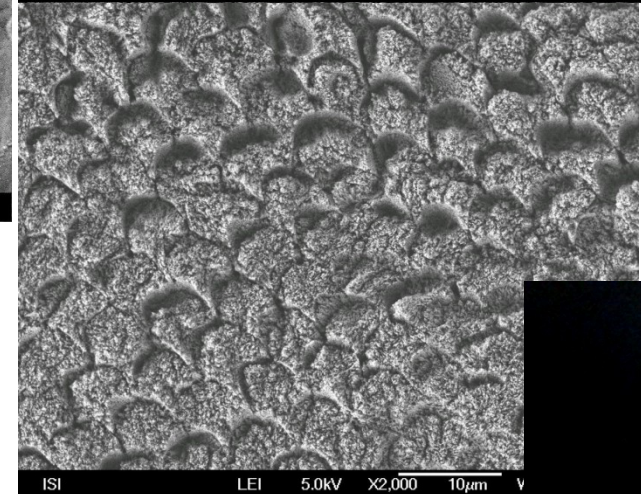
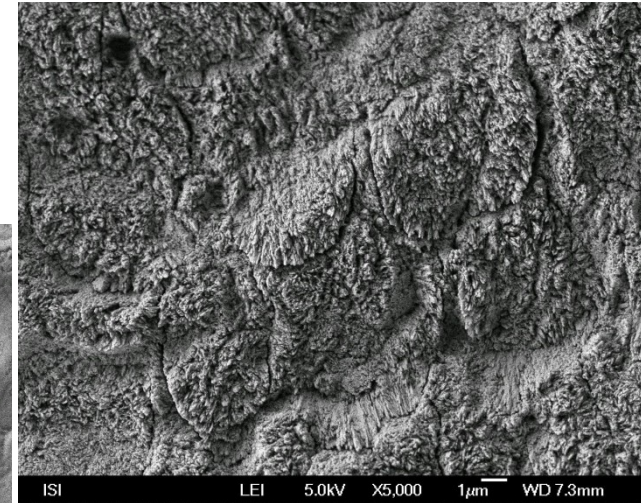
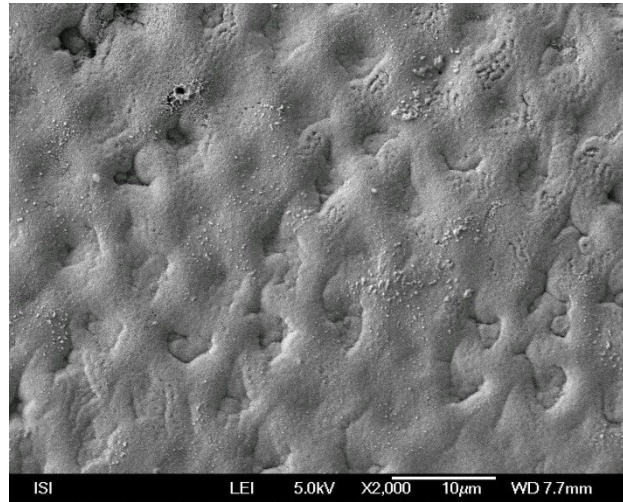
Enamel  
Dentin  
Cementum

Dental pulp  
Periodontal tissues



# Enamel

Covers the crown  
98% inorganic subst.  
Thin layer in cervical area

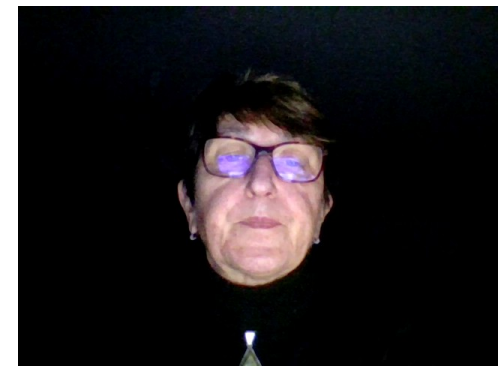
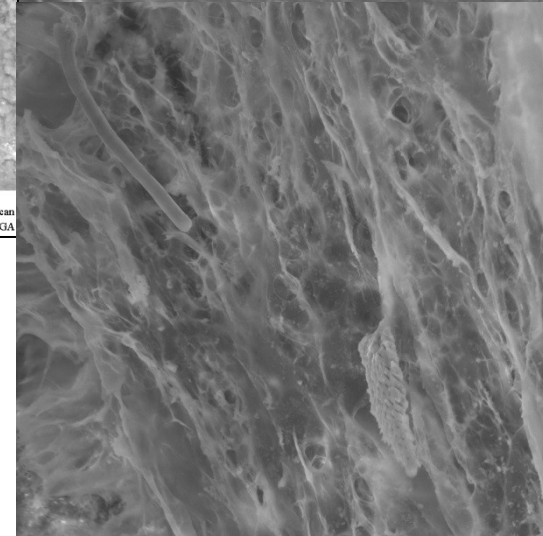
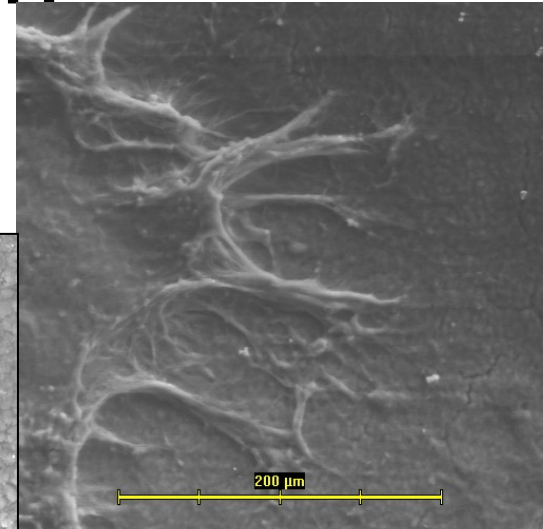
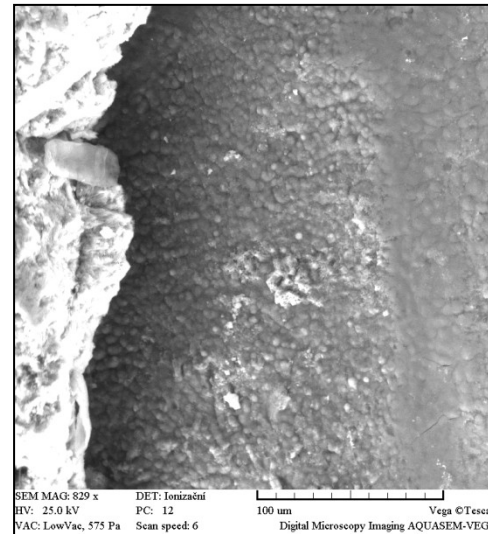




# Cementum

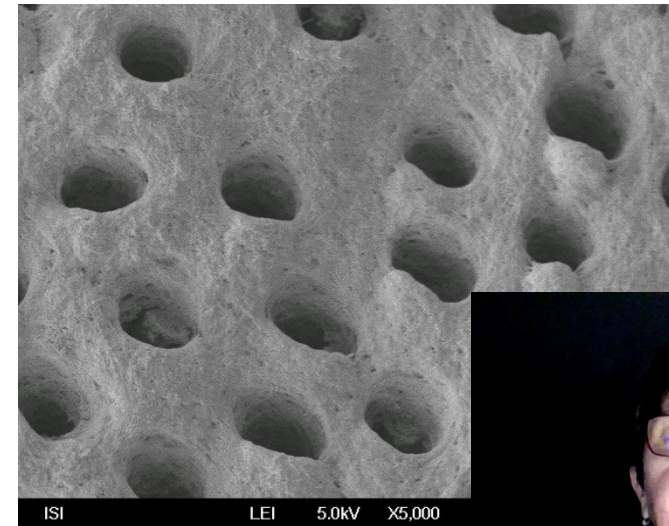
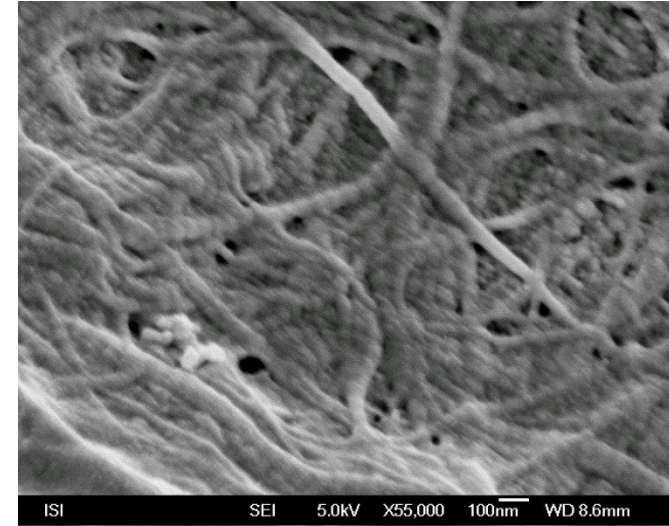
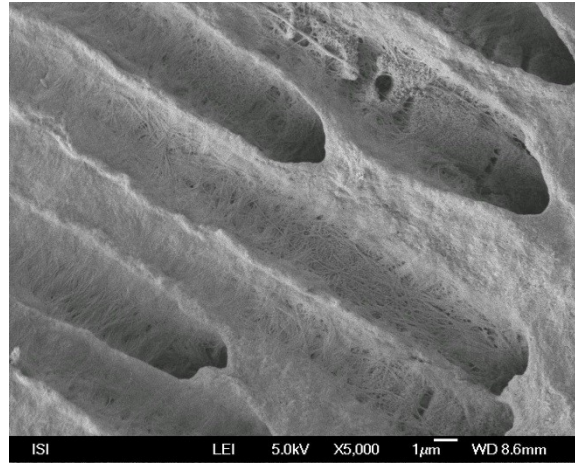
- Covers the root

50% inorganic substances  
Insertion of collagen fibers  
(Sharpey).  
Thin layer in cervical area



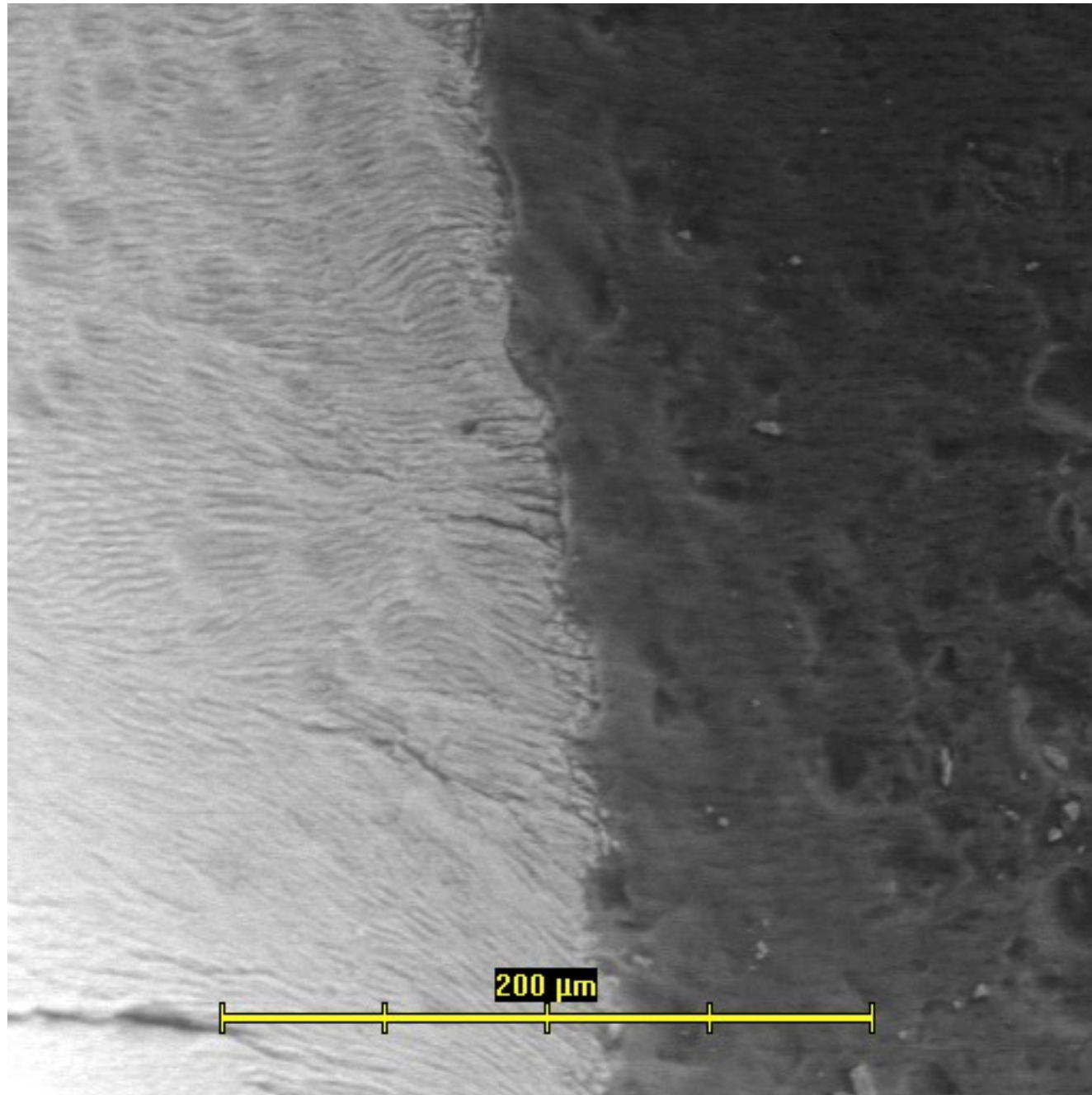
# Dentin

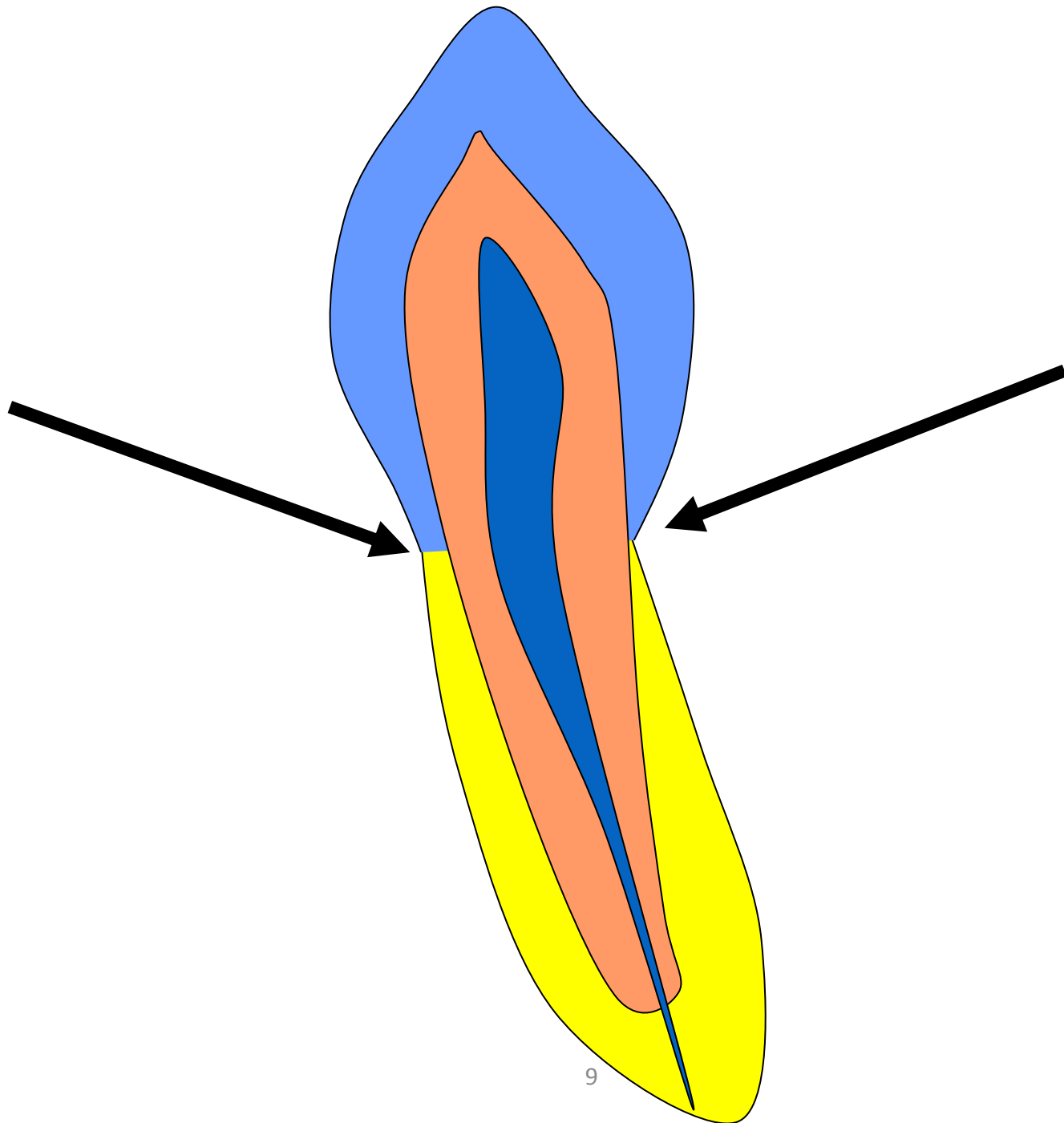
Core of the tooth  
75% inorganic substances  
Collagen fibers incrusted with hydroxyapatite crystals  
Dentin tubules – Tomes fibres (cytoplasmatic fibres of odontoblasts)



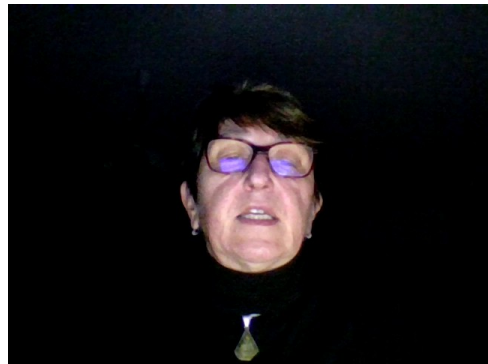
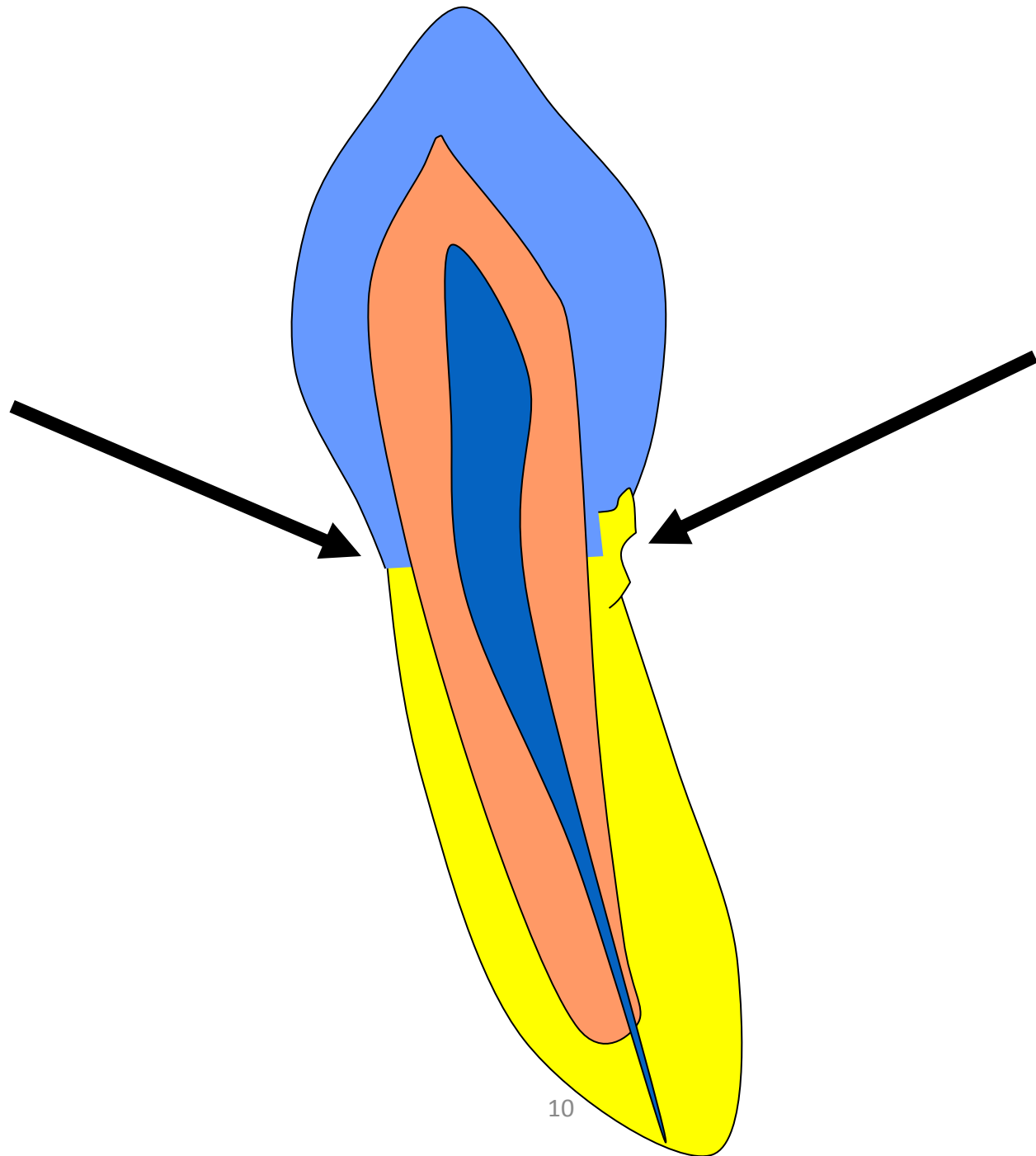


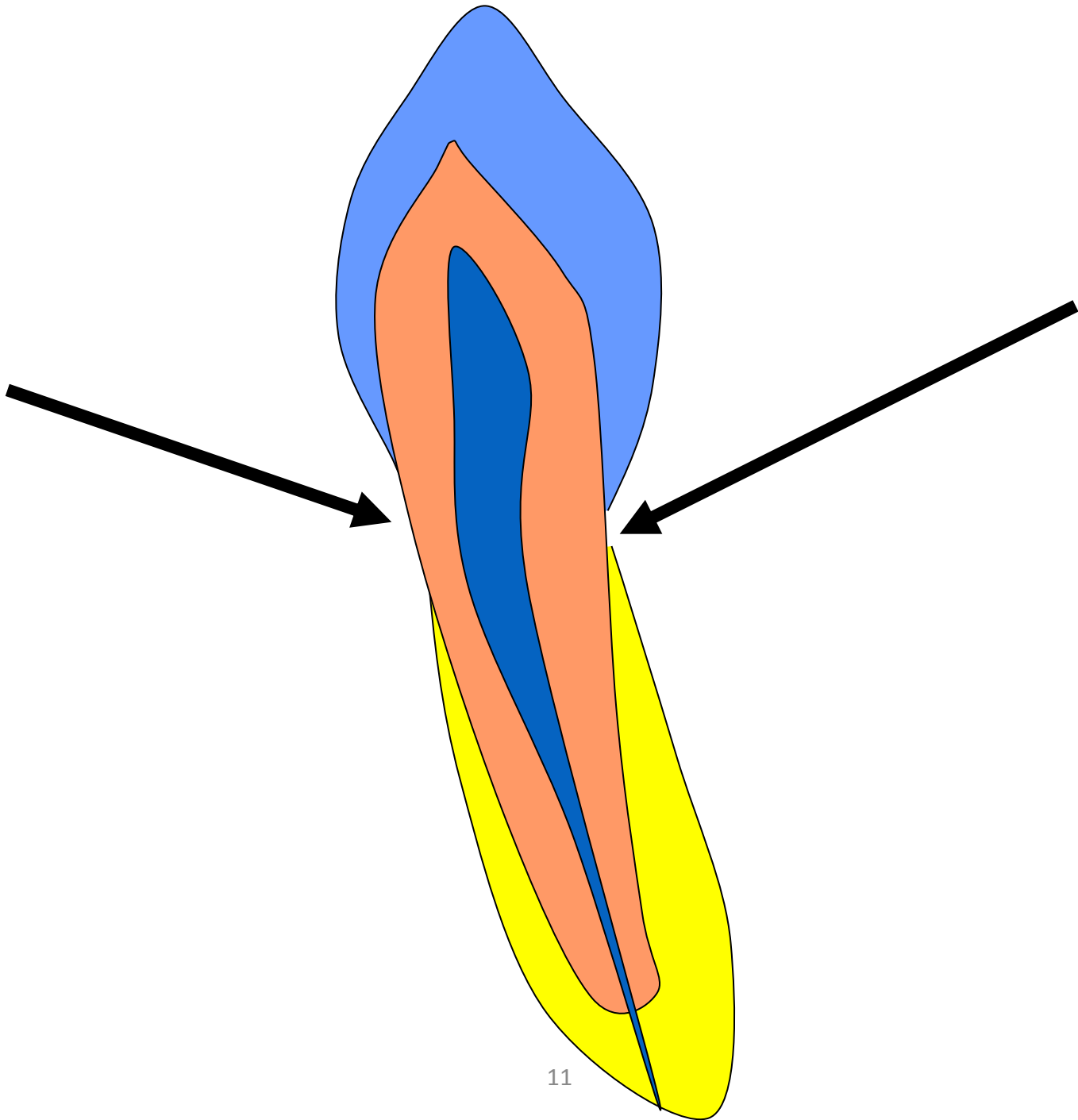


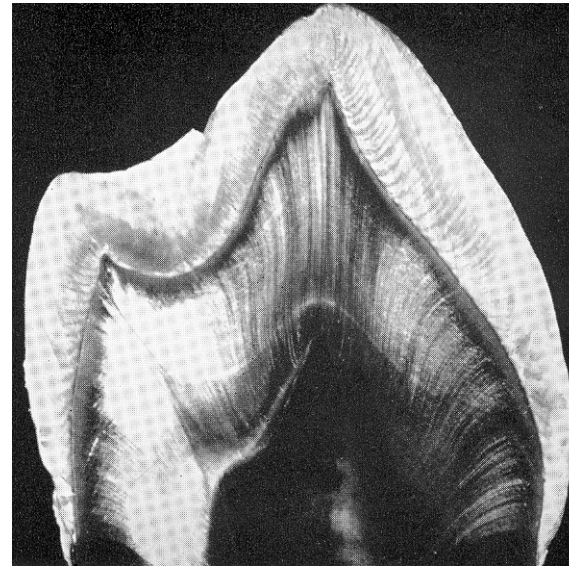
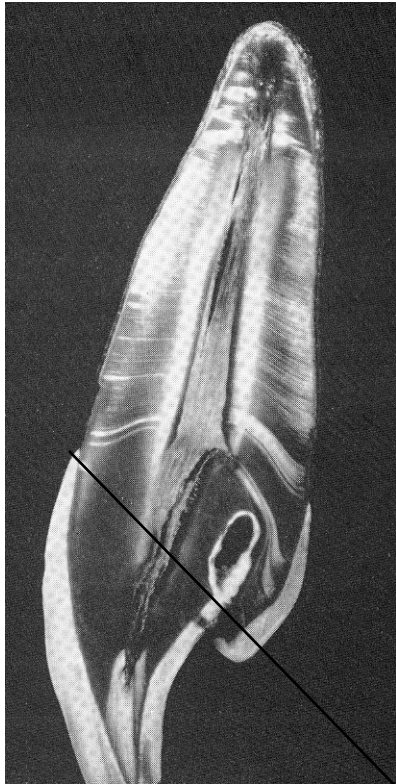




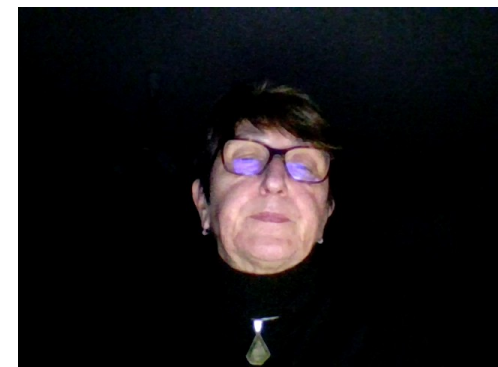


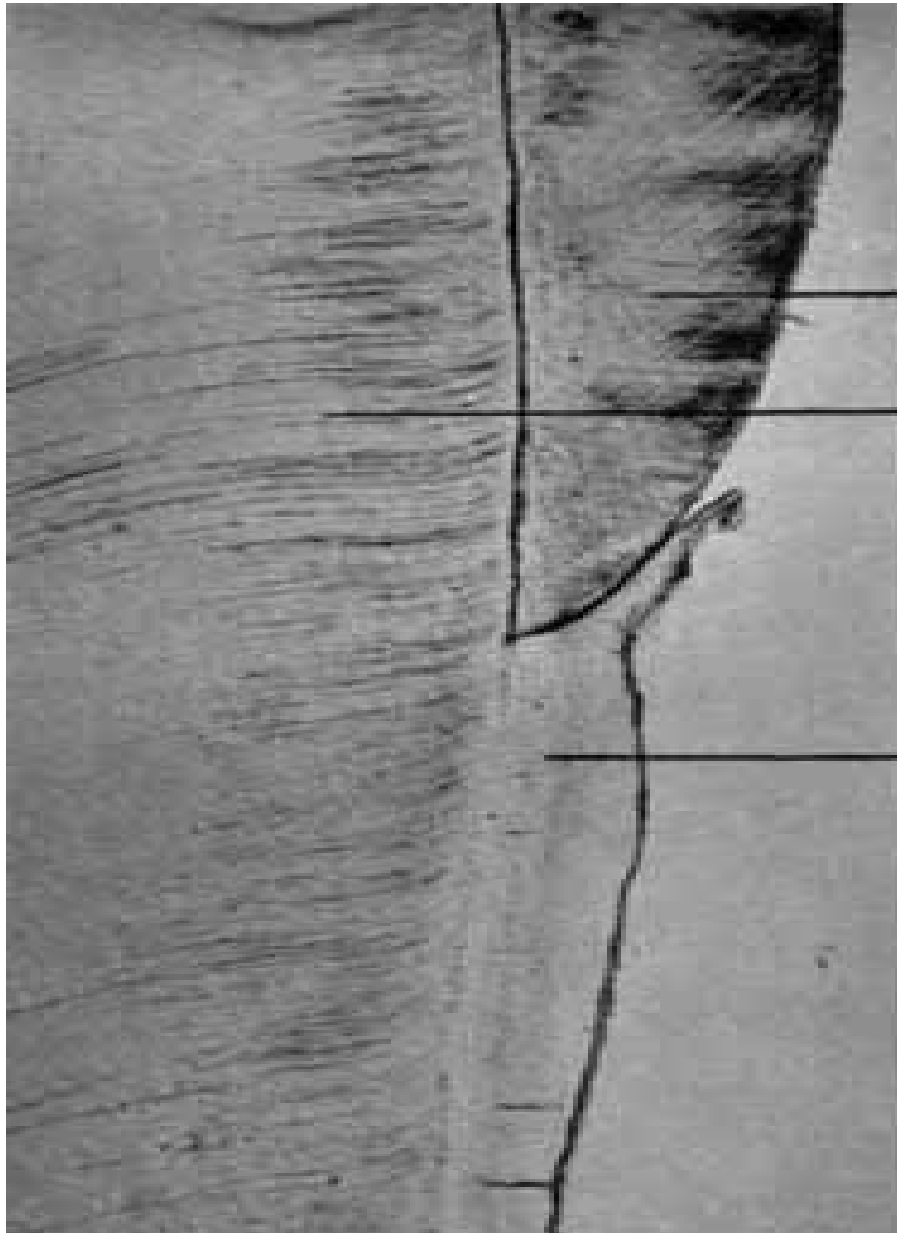






Sklovina v cervikální oblasti





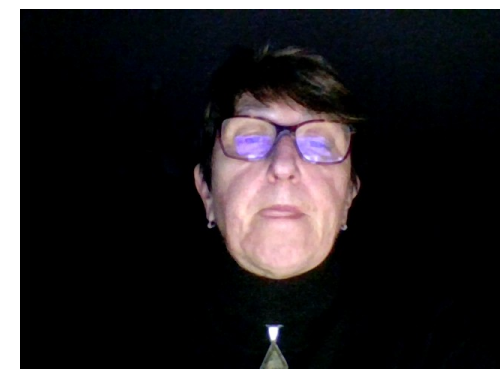
Sklovina

Dentin

Cement



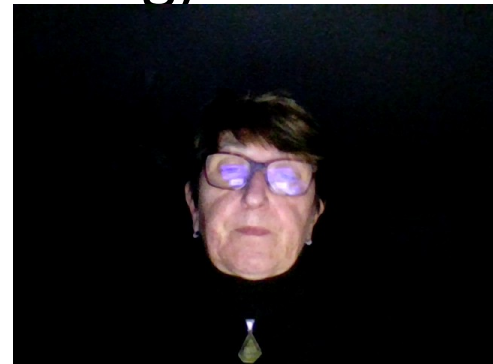
# Anatomical and clinical crown



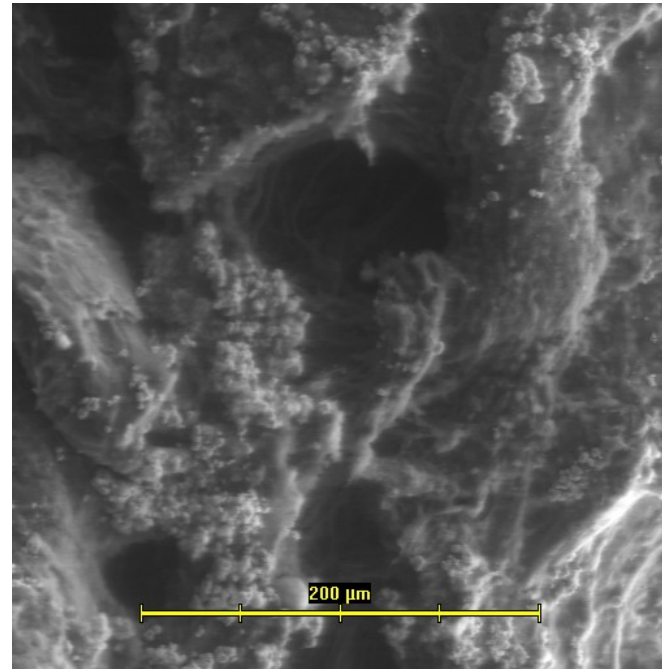
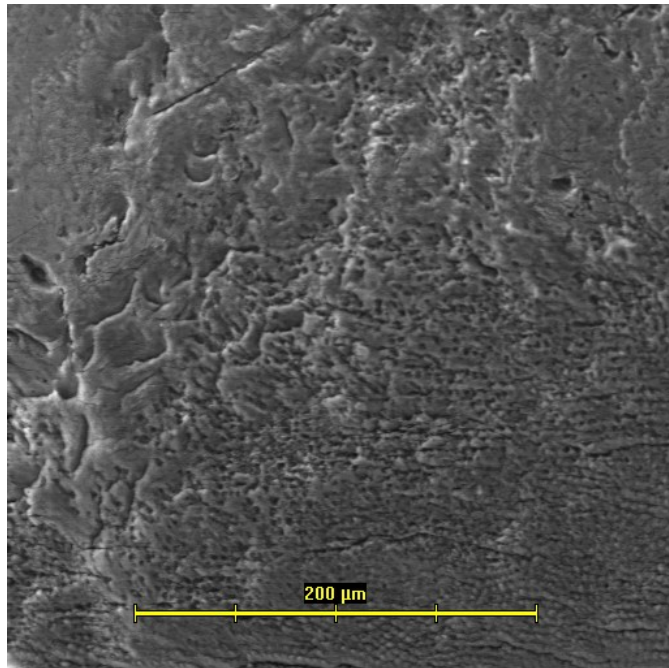


# Cervical area

- Special arrangement of hard dental tissues
- Caries danger area
- Gingiva in close proximity
- Special loading by elastic deformation of dental crown by occlusal loading.
- Isolation of the operation field is difficult (sulcular liquid, bleeding).



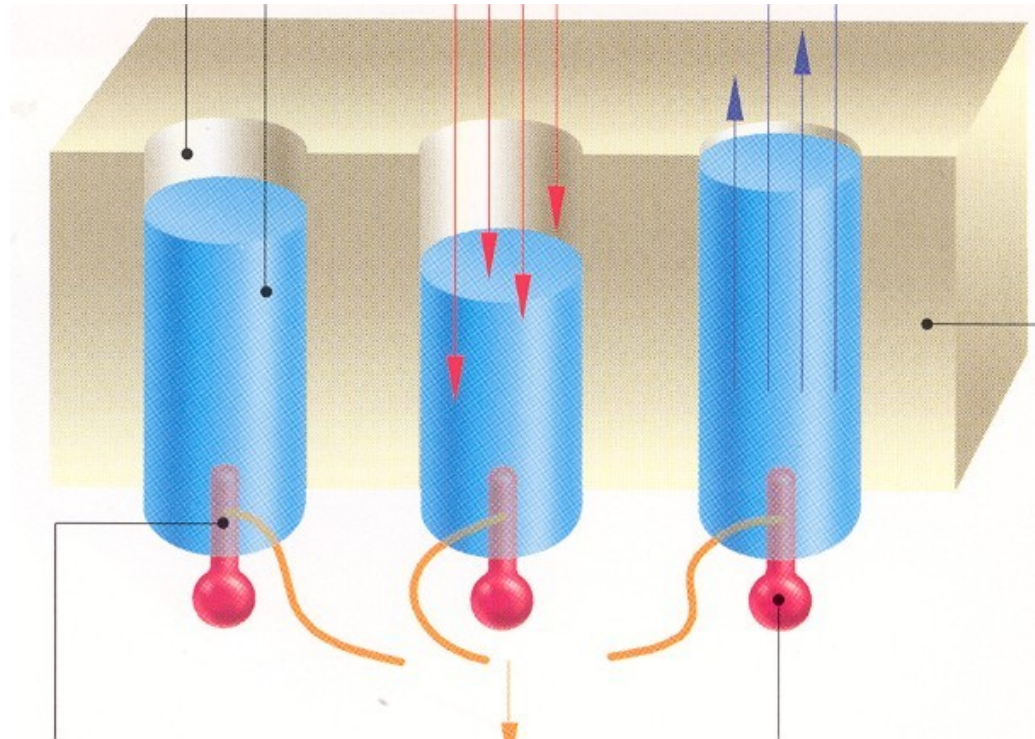
# Exposure of dentine in cervical area



Tubular liquid  
Odontoblast  
Nerv

Cold  
Dessication  
Osmotic stimuli –hypertonic solution

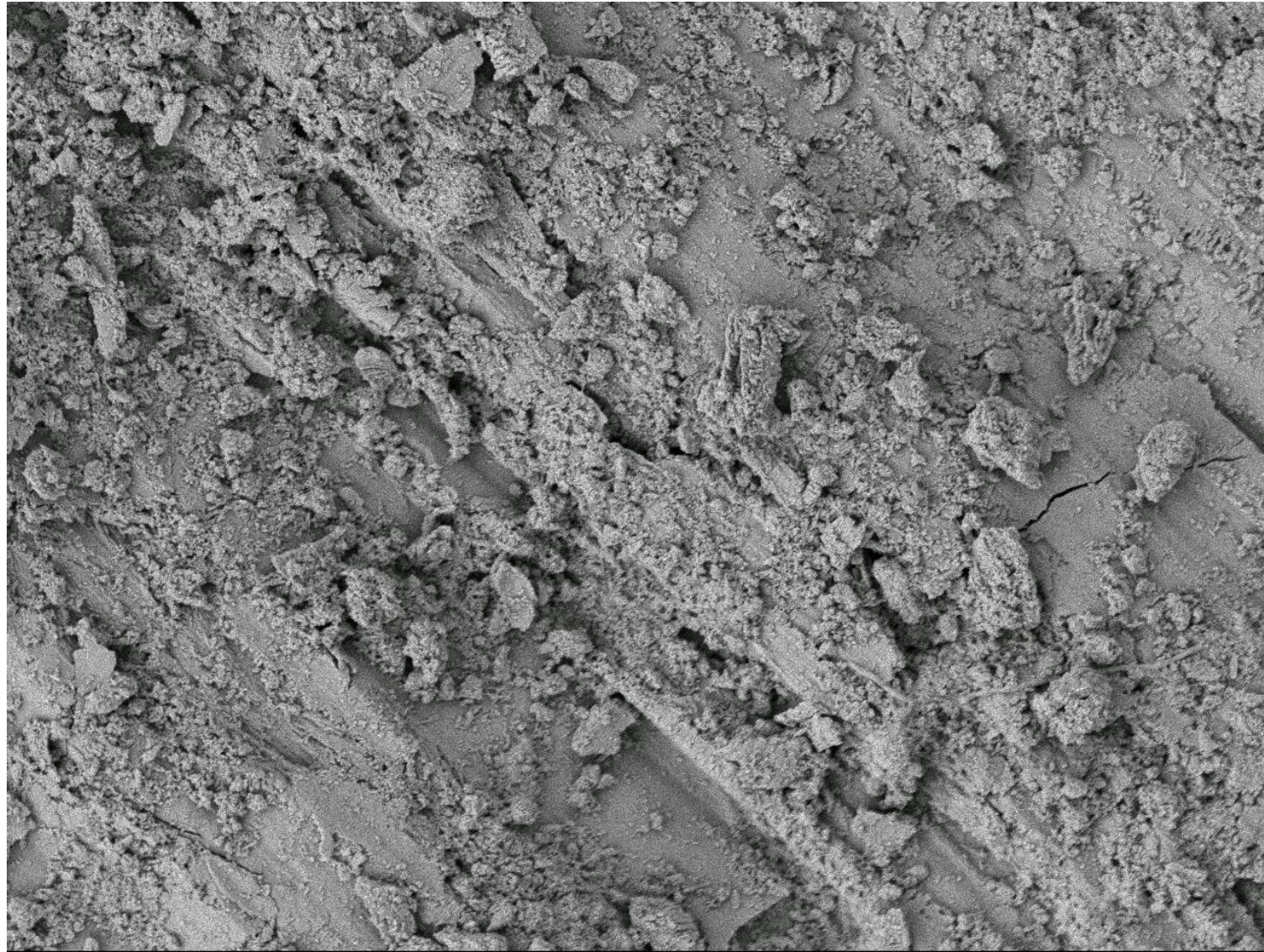
Hot



The movement of the tubular liquid – irritation of odontoblasts  
– transmission on the nerve fibres  
Hydrodynamic theory







ISI

LEI

5.0kV

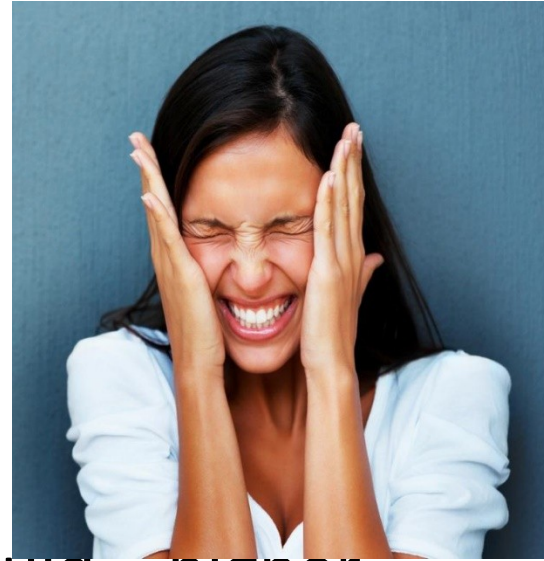
X2,000

10µm

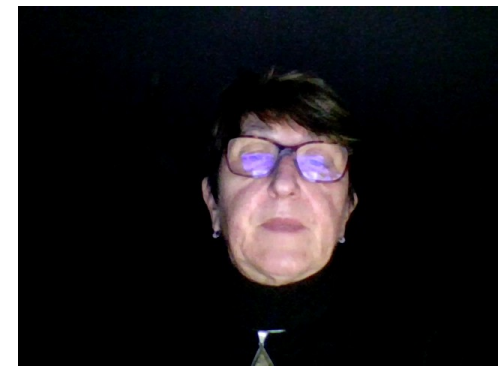
WD 9.8mm



# Sharp pain on cold



- Cold stimulus –shrinkage of the liquid – higher pressure extrusion- the liquid flows out – pain.
- Warm stimulus – expansion of the liquid expands – the liquid flows towards dental pulp – the pain is not so sharp.





# Dentin exposure

- Loss of enamel
- Gingival recession
- Combination



# Loss of enamel

- Eroze
- Abraze
- Atrice
- Abfrakce



# Erosion

- Irreversible loss of hard dental tissue as a consequence of demineralization without participation of microbes. Repeated contact with chemicals of low pH (1-3) is necessary.



# Acidic food and beverages alimentary source of acids

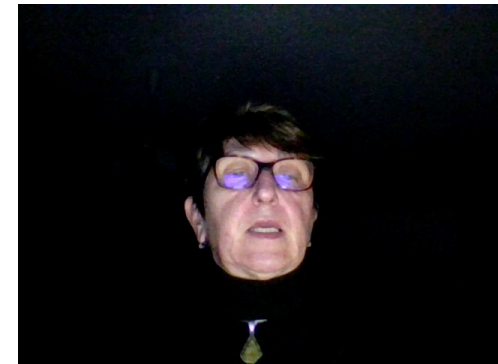
- Fresh fruit (citrus)
- Fresh vegetable
- Food with winegar, marinade – pickle
- Dressings with winegar
- Ketchup
- Fruit bonbons



# Acidic food and beverages

alimentary source of acids – external sources of acid.  
Erosion on the vestibular surface

Fruit juice (citrus)  
Vegetable juice  
Soft drinks  
Limonades  
Carbonated beverages  
Acidic mineral water  
Energetic beverages  
Isotonic beverages  
Vine, sect  
Fruit tea



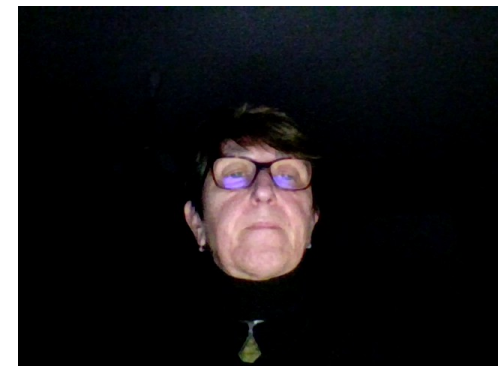


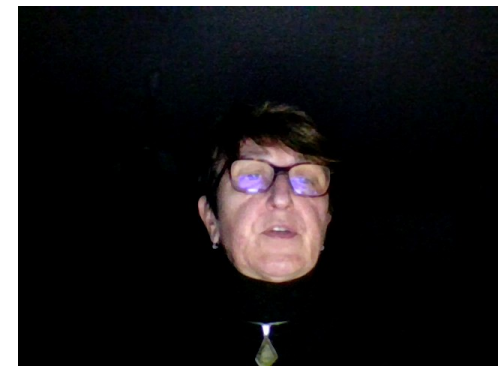
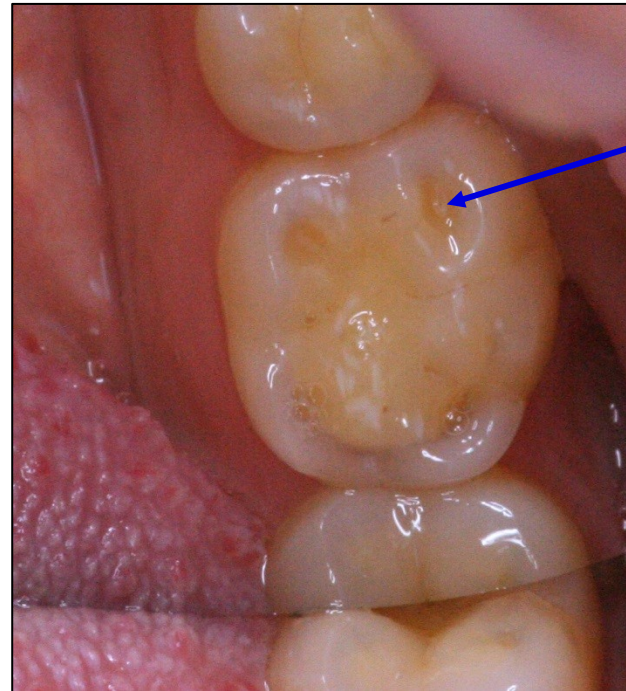
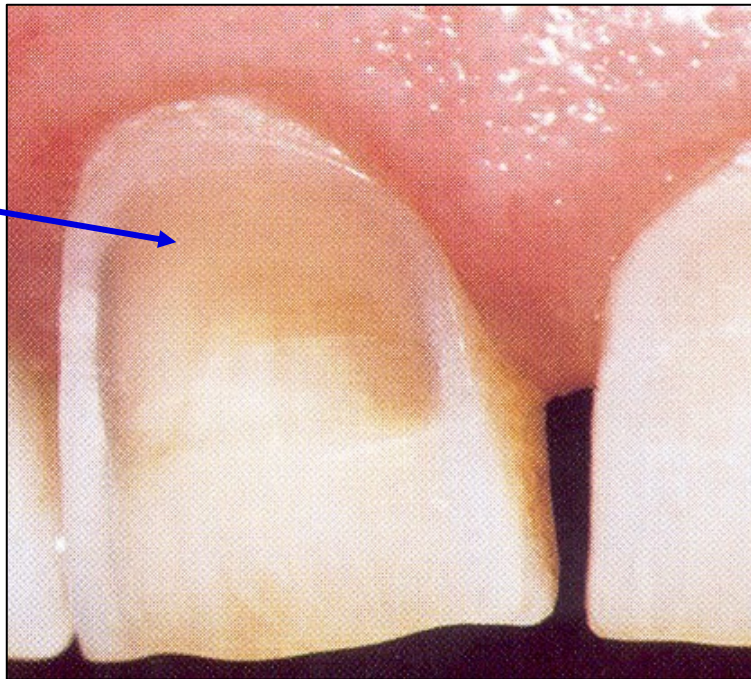
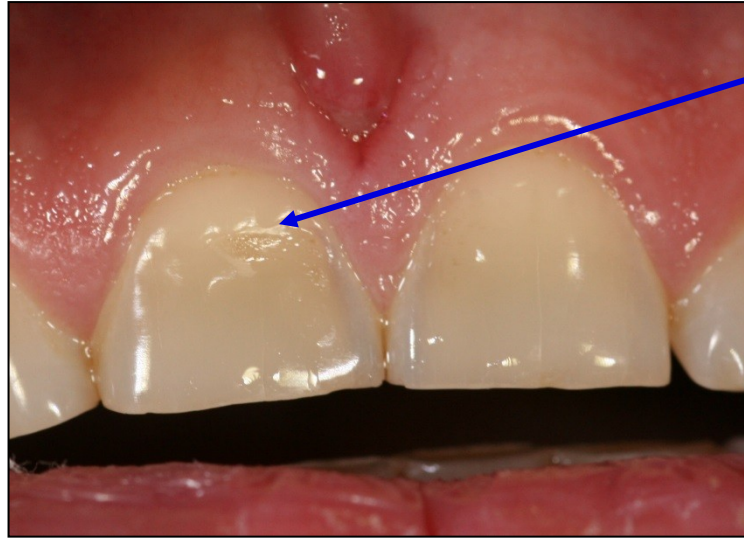
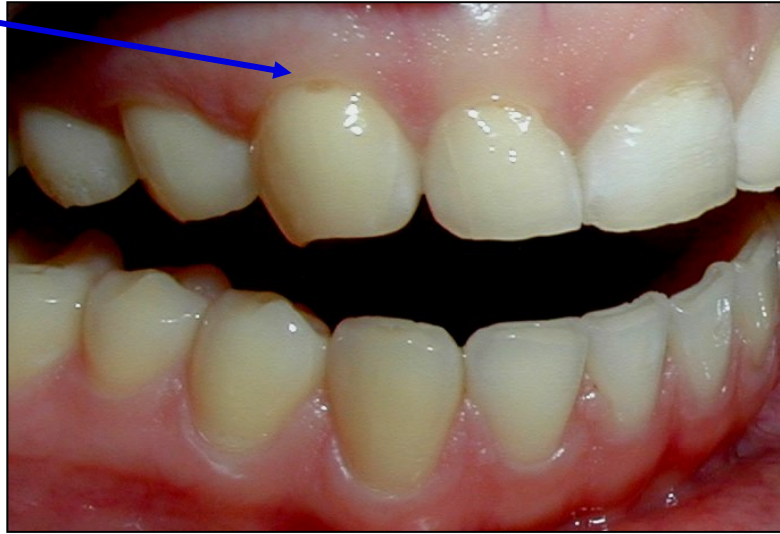
# Internal sources of acid – erosions on oral surface

Gastric acid

Vomitus, regurgitation, reflux

- Anatomic defects (hiat hernia, insufficient function of gastroesophag.sfincter, oesophageal diverticulosis)
- Gastrointestinal disorders (gastroesofageal reflux)
- Anorexia mentalis
- Bulimia nervosa
- Hyperemesis gravidarum
- Alcoholism
- Stress
- Diabetes mellitus
- Chemoterapy
- Peptic cicatrix
- Uraemia





# Abrasion

- Abrasion is a loss of hard dental tissues caused mechanically with some substance or objects. Abrasion is often combined with erosion. Typical location – cervical area of canines and premolars.

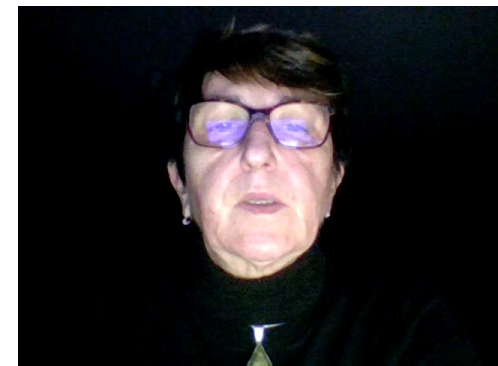






# Abrasion

- Demastication (food), parafunctions (biting of various objects e.g. pencil), toothbrushing (abrasive pastes, hard toothbrushes)



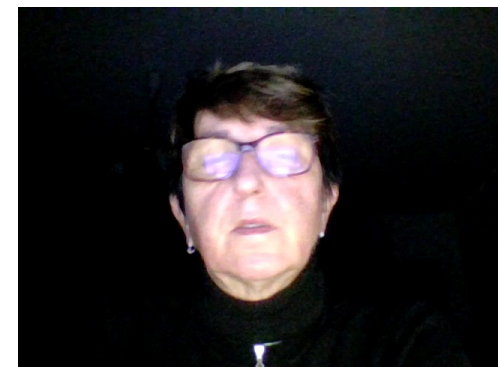


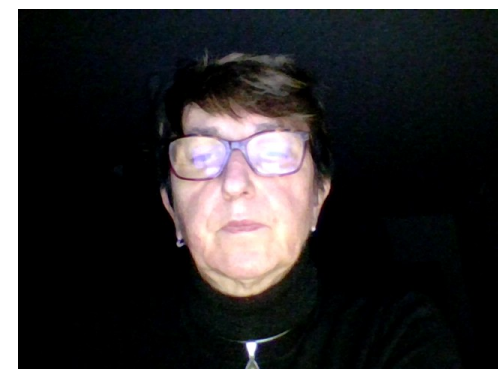
# Attrition

- Loss of hard dental tissues by direct contact of antagonists. Grinding, bruxism.

Reasons:

- Psychogenic factors (stress, anger)
- Physical effort
- Complicated intermaxillary relationships

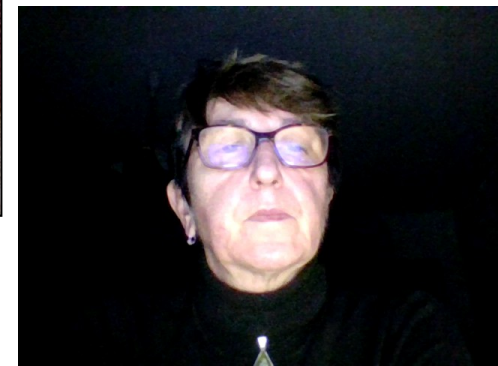
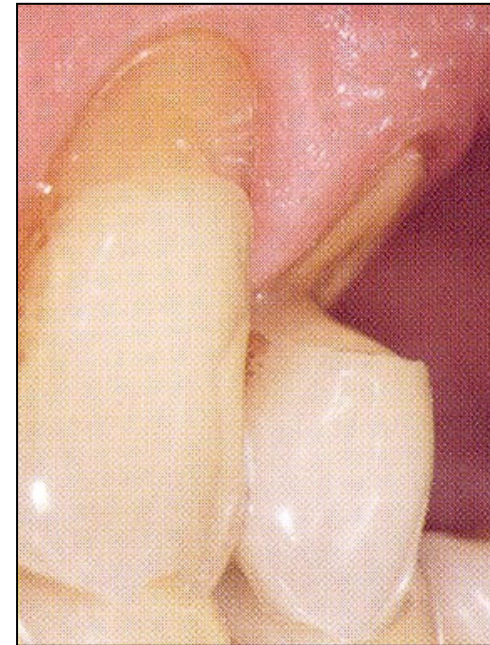






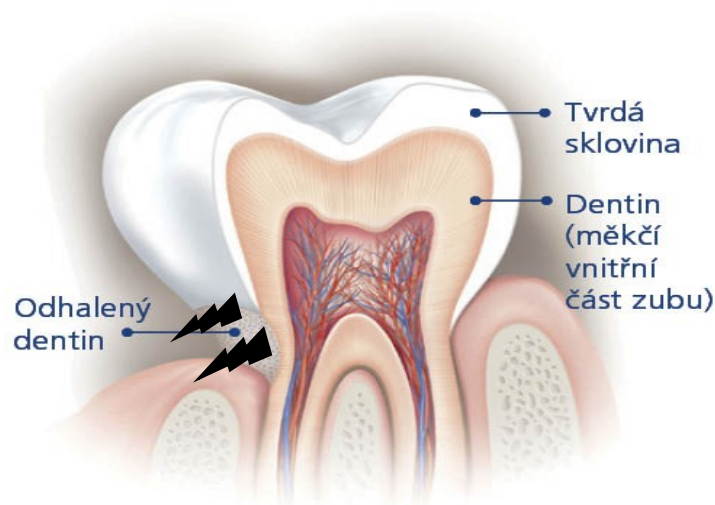
# V-shaped defects

- Typical defects V – shaped in cervical area  
Smooth bottom, no pain, teeth with atypical position  
(rotation) or atypical loading,  
sometimes without any reason.

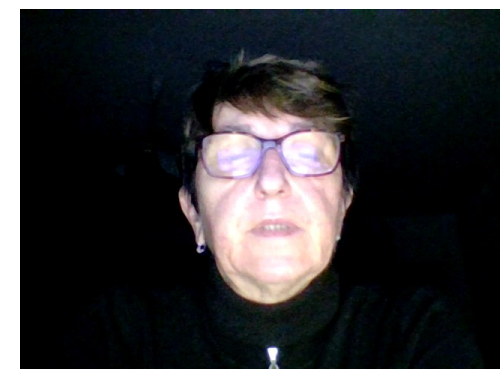


# Aethiology - abfraction

- During the occlusal loading
- elastic deformation of dentin
  - enamel loses the support
  - fracture of small pieces
  - **abfraction**



Hard enamel  
Elastic dentin

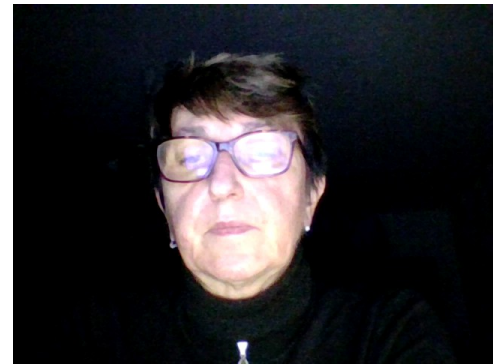


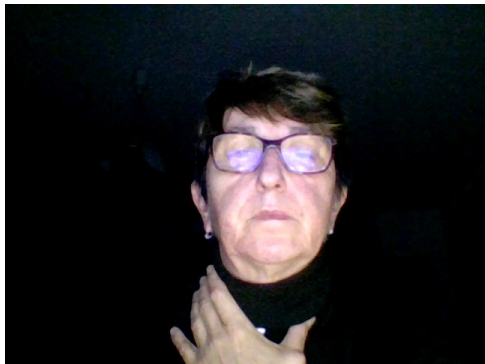


# Combination of factors

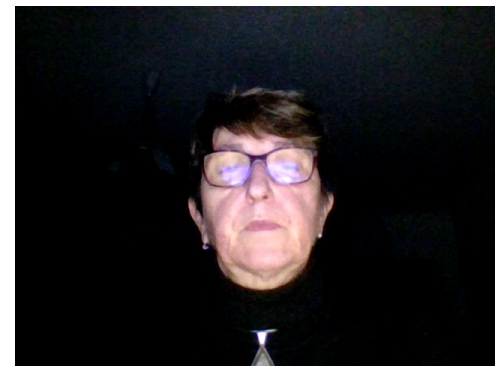
- Abrasive effect of tooth brushes and pastes

*It is not tlikely*





# Caries





# Cervical defects – erosion+abrasion



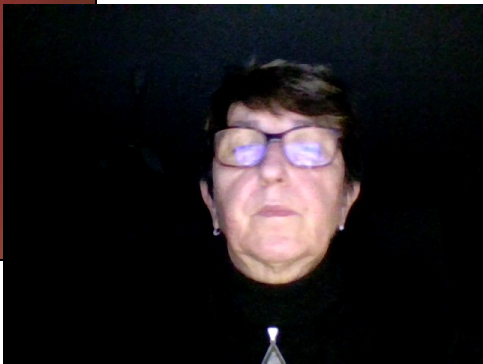
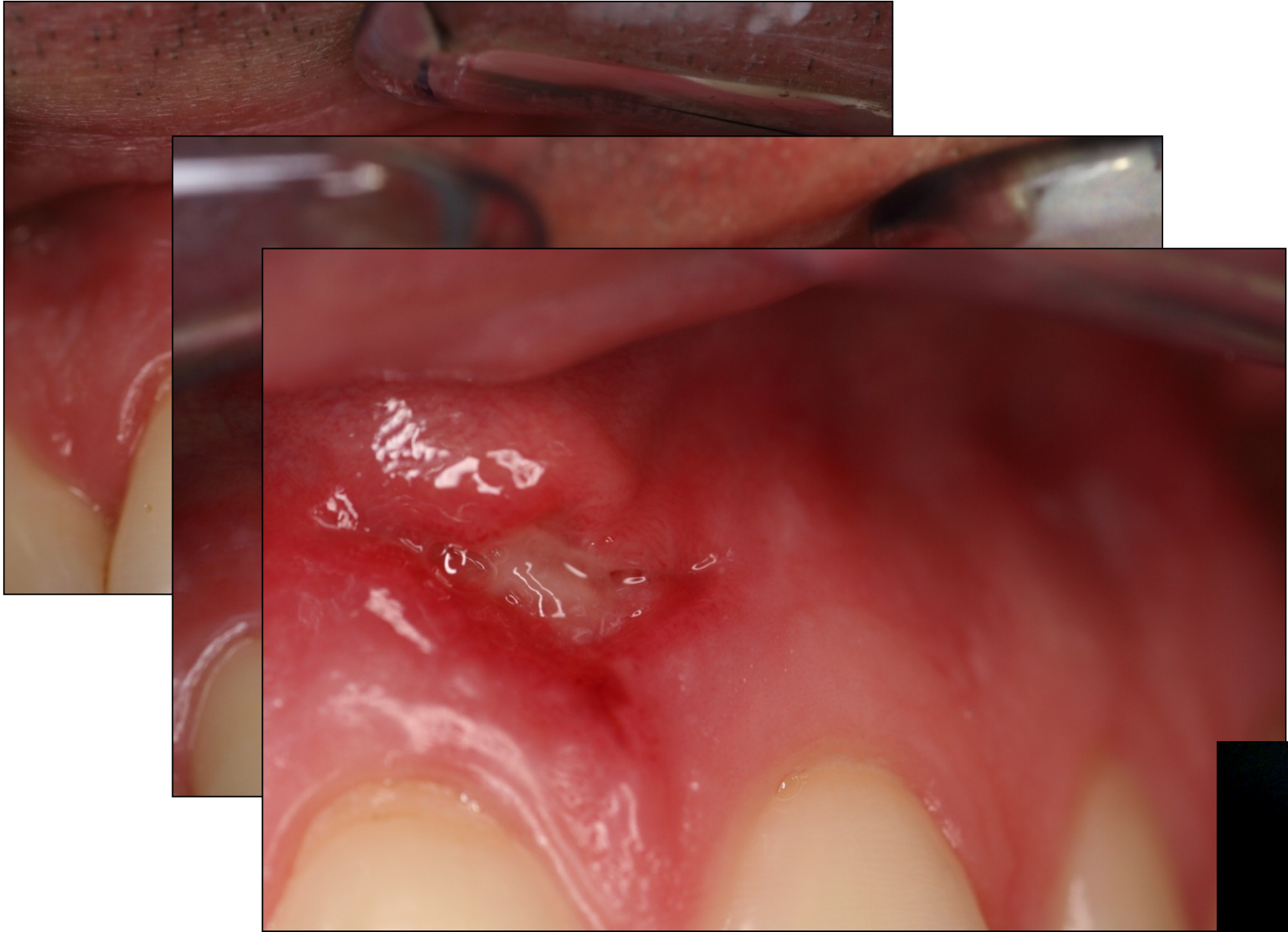
# Gingival recessions

- Hard toothbrush
- Horizontal technique
- Toothpaste with high RDA

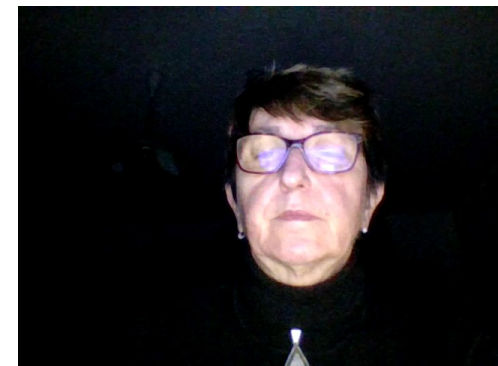








# Recessions



# Strategy of the therapy

- Find the reason
- Remove the reason
- Treatment





# Strategy of the therapy of dentin hypersensitivity

## Physical

- Closure of dentin tubules

- Chemical

Coagulation of proteins in dentin tubules, creation of non soluble complex of calcium, interference with the sensoric activity.

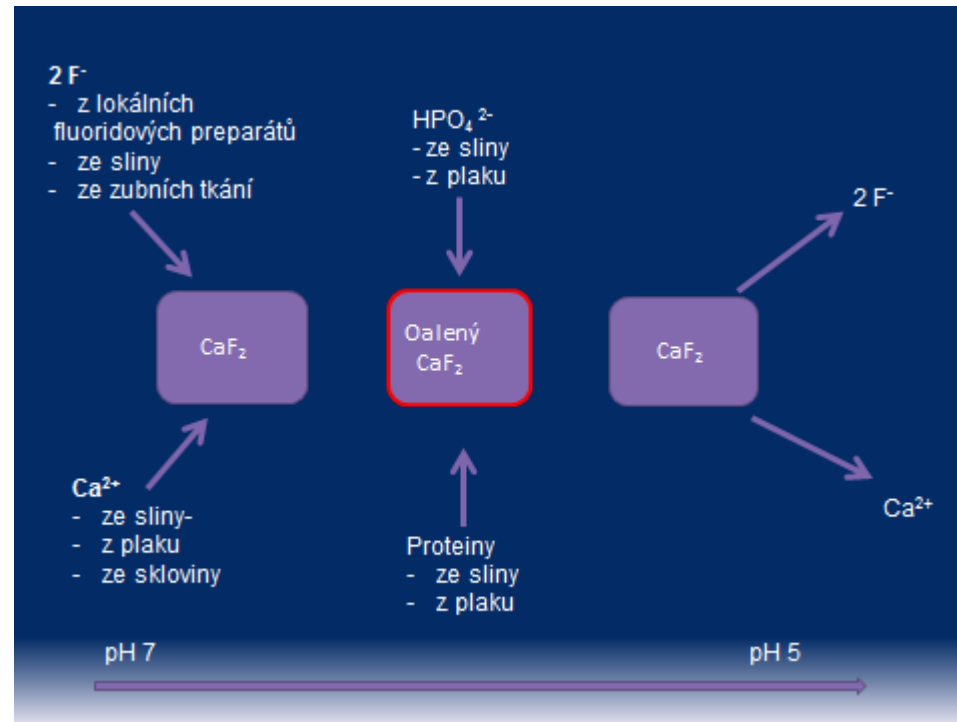




# Fluorides

Calcium fluoride  
Precipitates

Fluoride reacts  
with calcium ions  
in tubular liquid  
Reversible



# Fluoride gels

- 1 g Elmex Gelee obsahuje: aminfluorida mixta 33,19 mg (olaflurum 30,32 mg, dectafurum 2,87 mg), natrii fluoridum 22,10 mg (odpovídá 12,5 mg fluoridu).

1x týdně



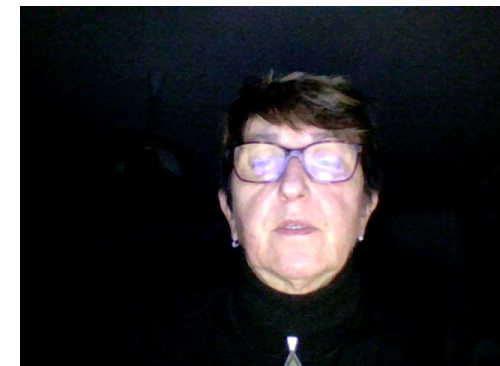
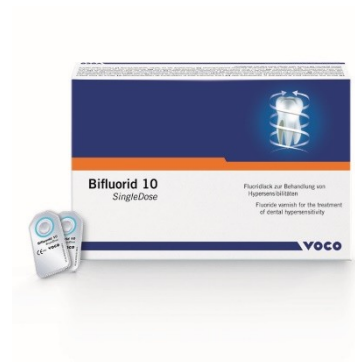
# Varnishes with fluorides

Duraphat® Colgate Oral Pharmaceuticals

Fluor - Protector® Ivoclar Vivadent n

Flor - Opal® Ultradent

Bifluorid 12® VOCO





# Other chemicals

- Potassium oxalate – closure of dentin tubules and depolarization of nerve fibres
- Strontium chloride - closure of dentin tubules
- Resins – chemicals similar to adhesives: hybrid layer formation.



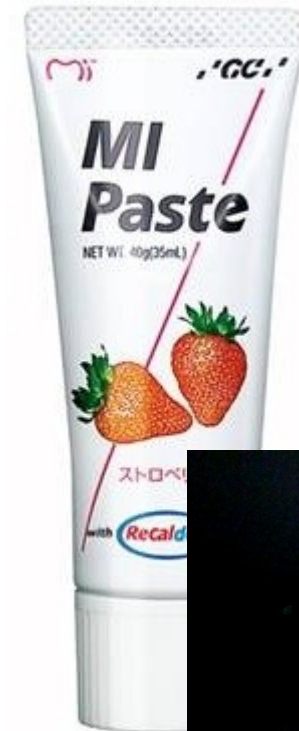


# Recaldent

- Casein phosphopeptid

Closure of dentin tubules

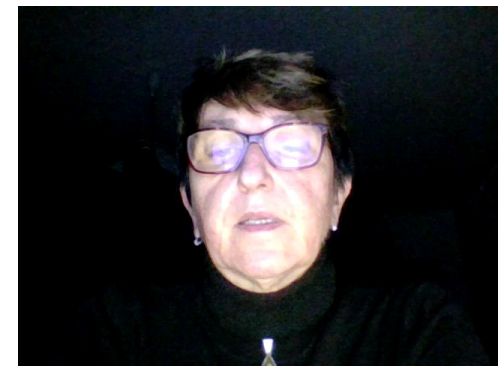
Tooth Mousse, MI Paste Plus (GC, Japan)



# NovaMin

Synthetic mineral containing sodium, calcium, phosphates, silica particles (sodium calcium phosphosilicate)

In contact with saliva calcium, sodium and phosphates are releasing. Good adhesion to the tooth surfaces and long term remineralization.

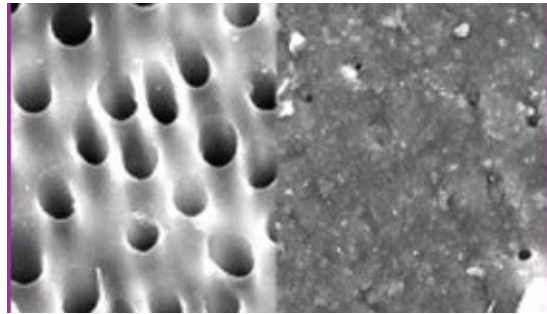


# Pro - Argin<sup>TM</sup>

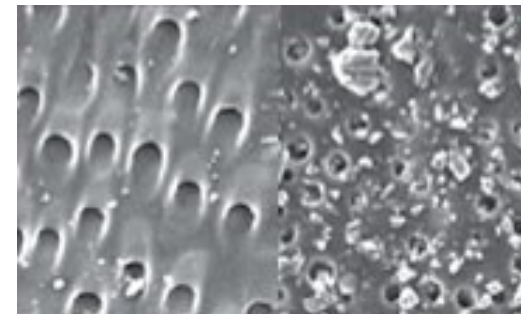
- Arginin bicarbonáe - complex of aminoacid and calciumcarbonate.
- Good adhesion and closure of dentin tubules.



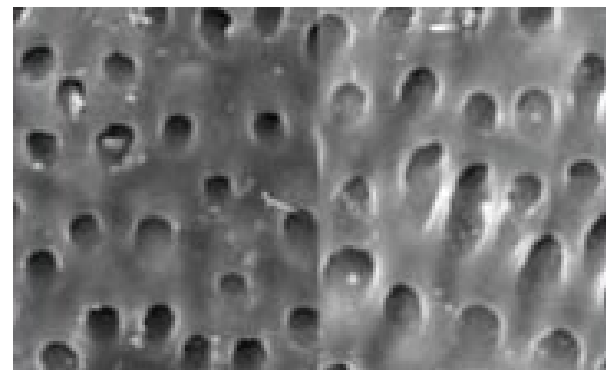
NovaMin



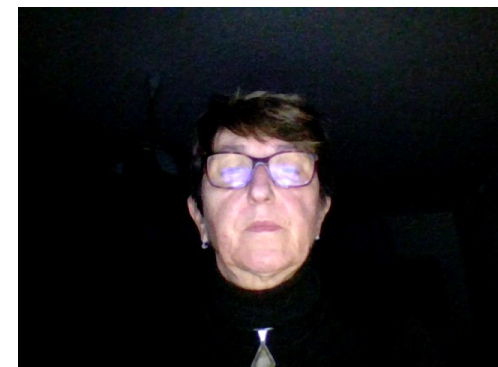
Pro-Argin



Recaldent

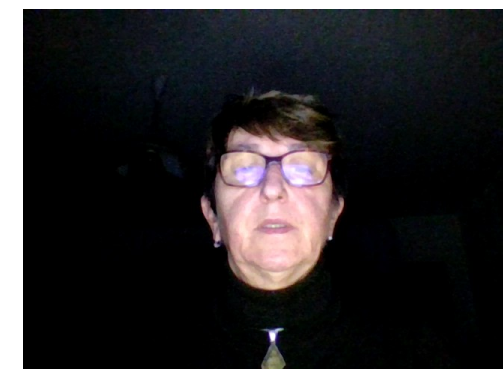


*Comparison of NovaMin and other Calcium Phosphate technologies, Dentist. Net*



# CHitoActive

- Chitosan, aminfluorid, stannum fluoride  
Protective film





# MICROREPAIR®

- Hydroxyapatite and zink ions



Zink ions:

Activation of hydroxyapatite

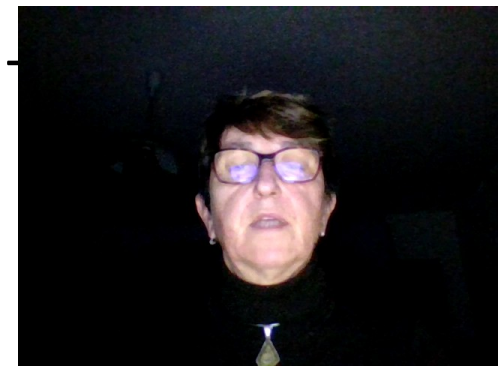
Antibacterial effect

Hydroxyapatit

- Support of hard dental tissues
- Effect against halitosis (absorbtion of sulphate compounds)
- Účinný proti halitóze.



- Biorepaire Plus Sensitivity, Biorepair Total Night Protection, Biorepaire Protection



# Hydroxyapatite and fluorides

- Remin Pro (VOCO)



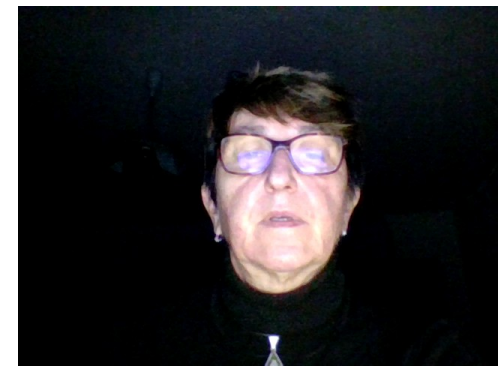
# Adhesive systems –sealing of dentin tubules

HEMA

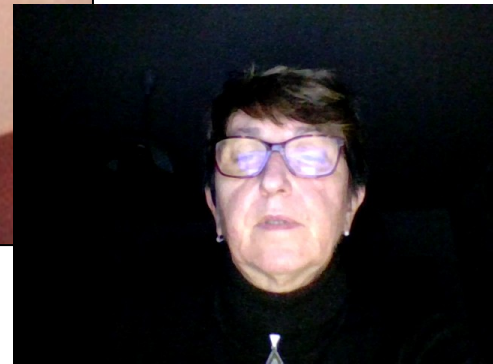
Glutaraldehyd

Triclosan

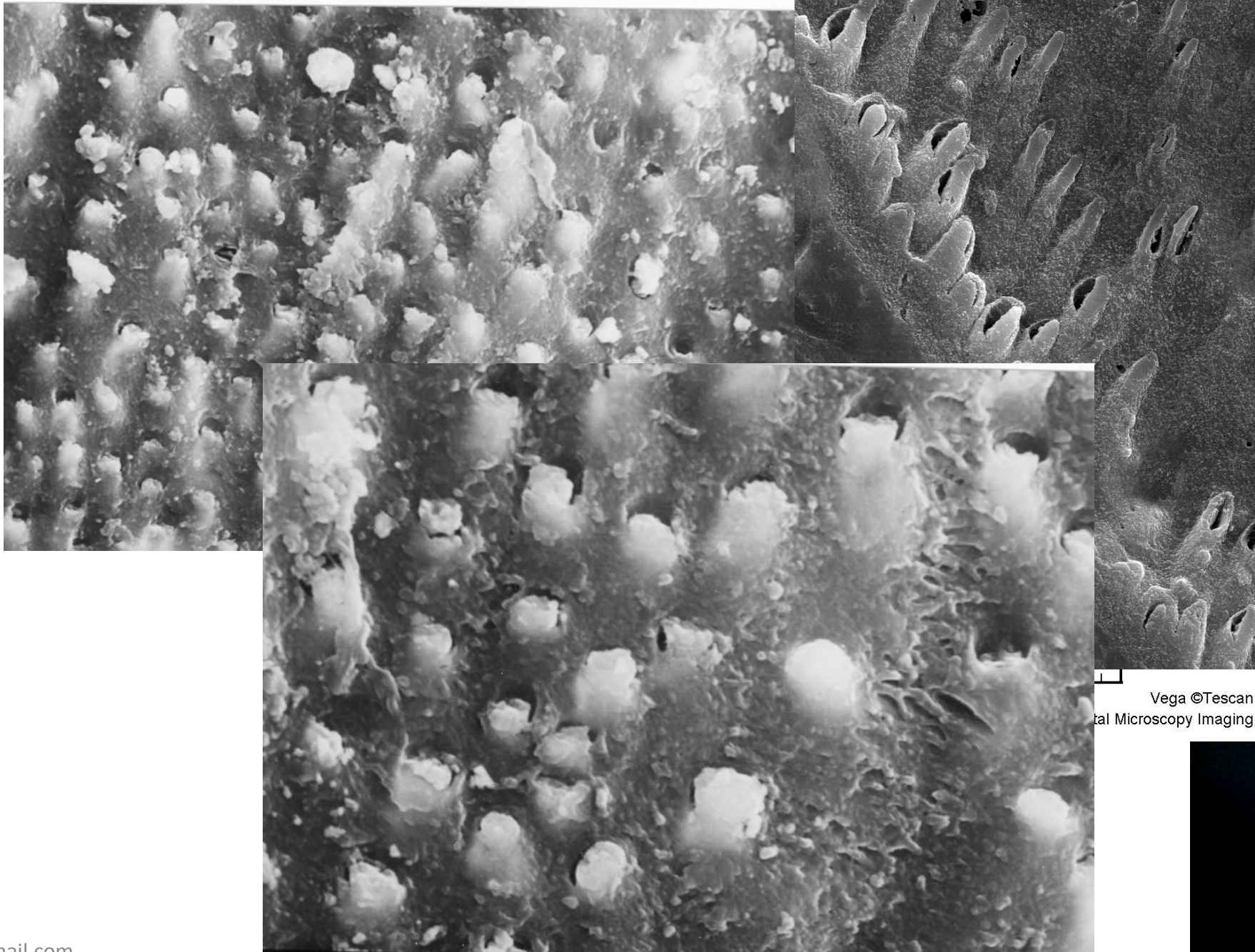
Also precipitation of proteins



# Filling therapy



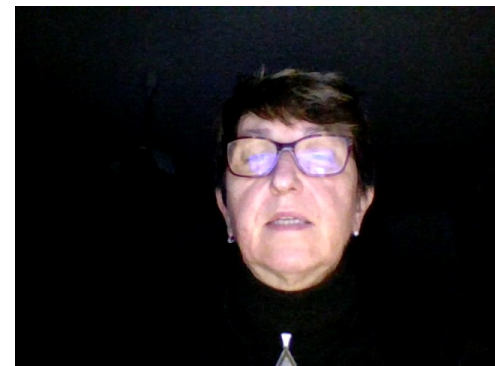
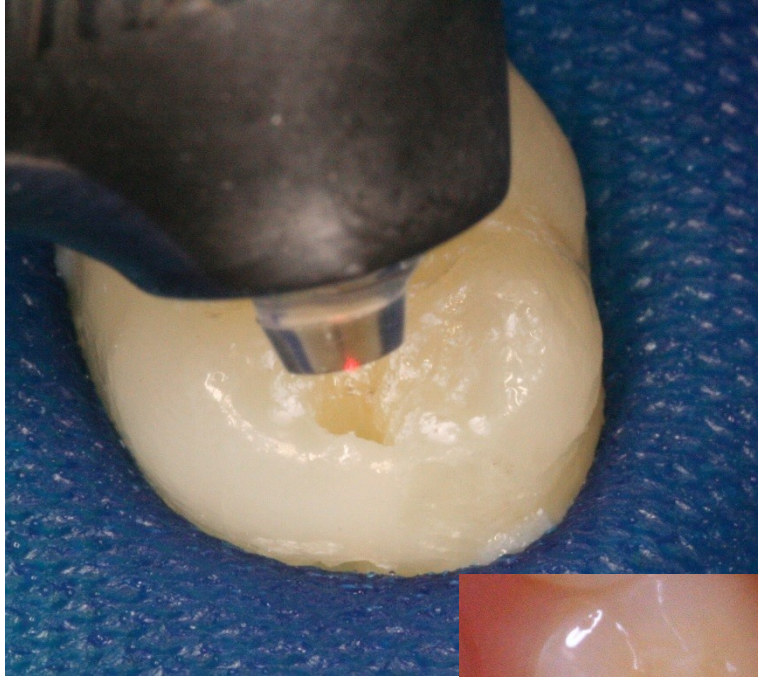




Vega ©Tescan  
Scanning Electron Microscopy Imaging







# Laser

Biostimulation a analgetic efekt, closure of dentine tubuls

- Nd:YAG
- Er:YAG
- Diodový laser



# Surgical therapy of exposed necks

