

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.

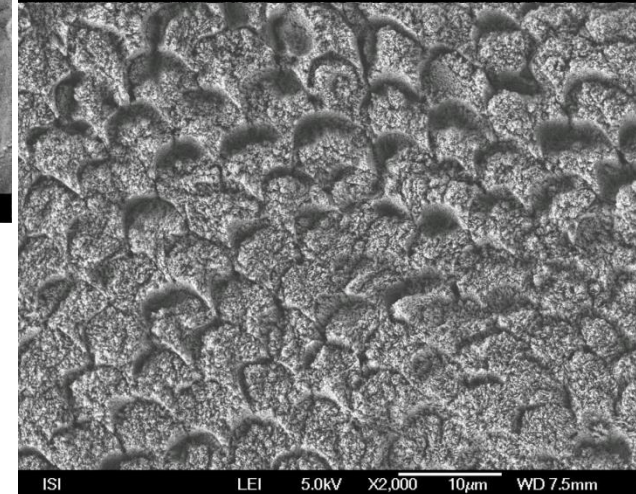
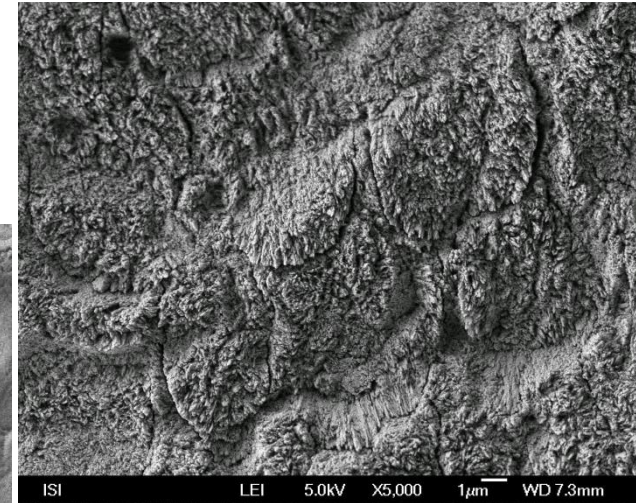
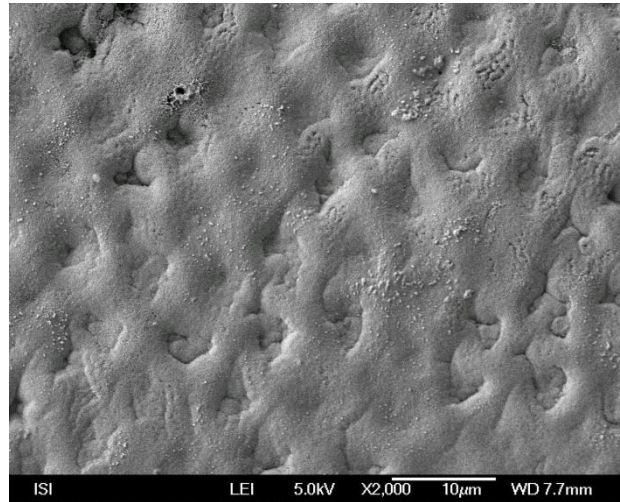


Enamel
Dentin
Cementum

Dental pulp
Periodontal tissues

Enamel

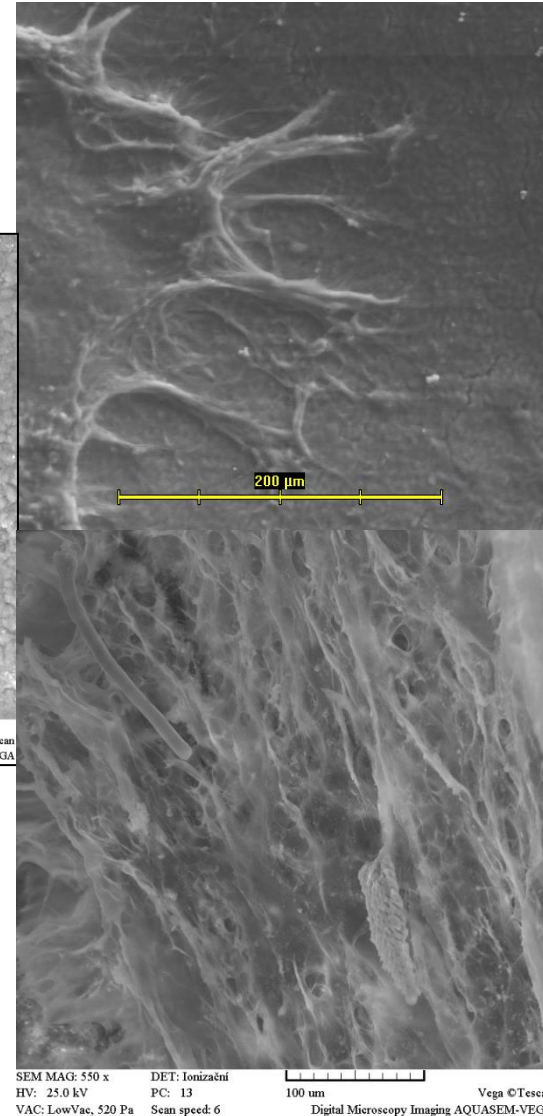
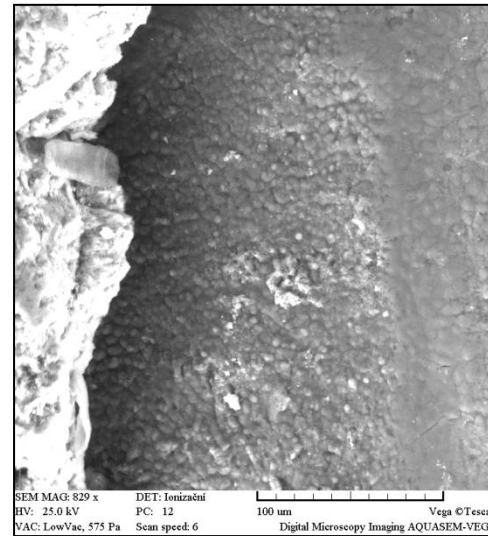
Covers the crown
98% inorganic subst.
Thin layer in cervical area



Cementum

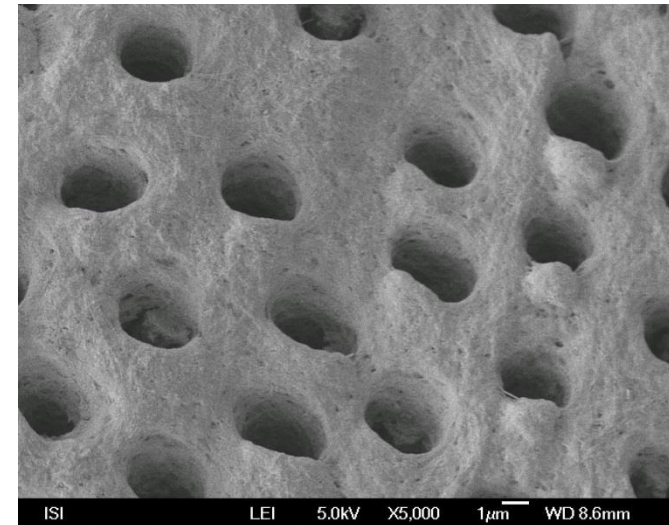
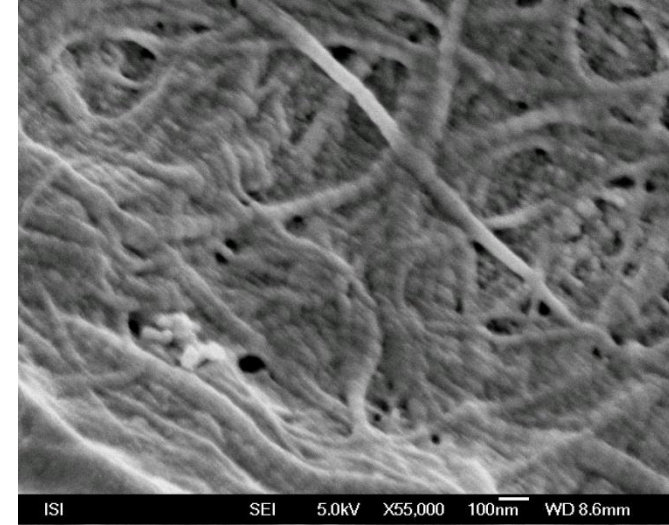
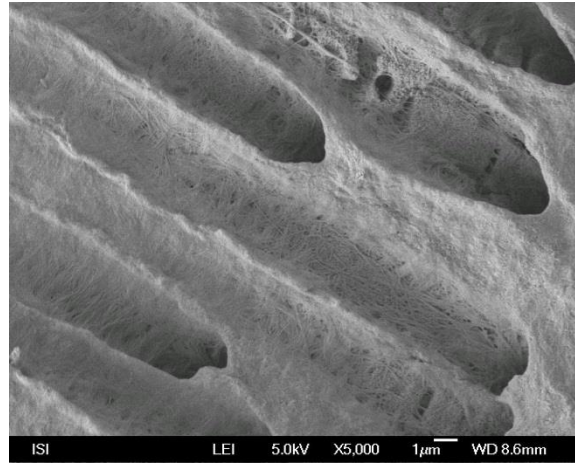
- Covers the root

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)

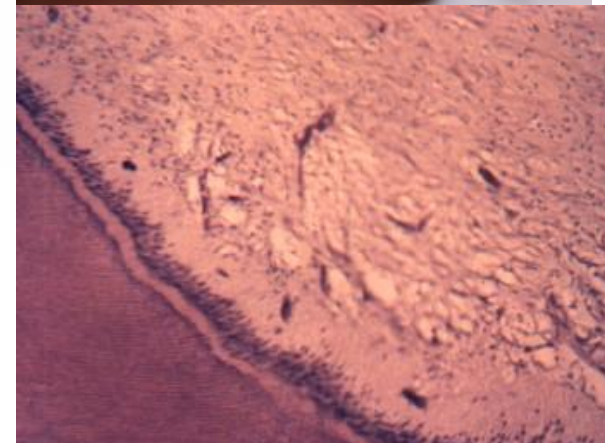
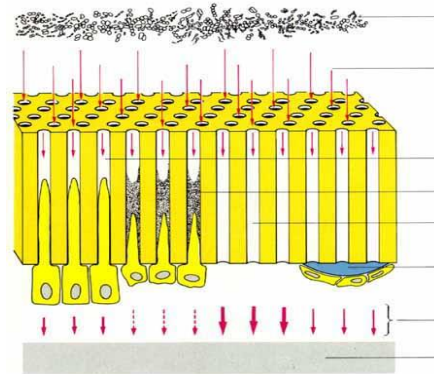


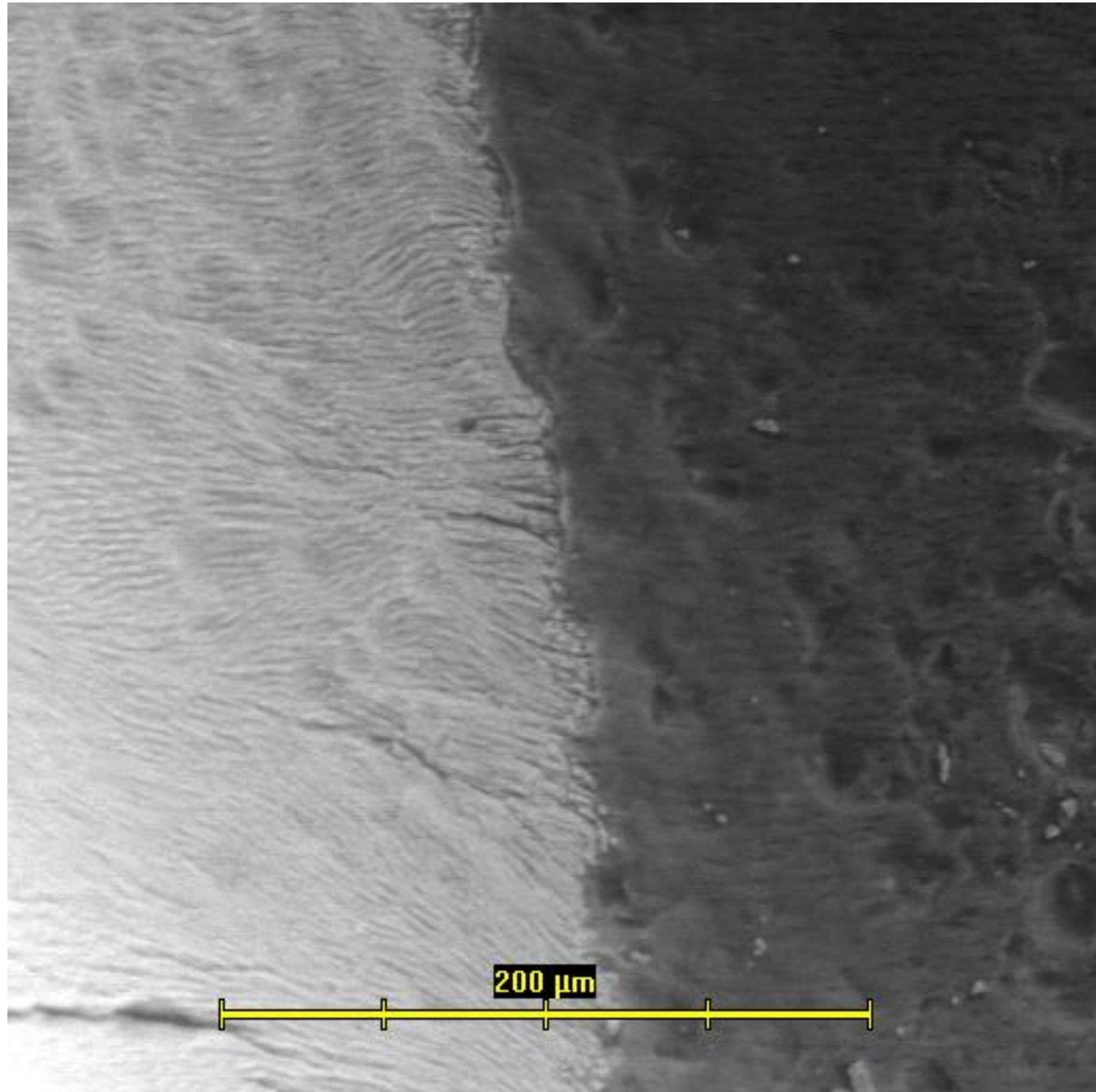
Dental pulp

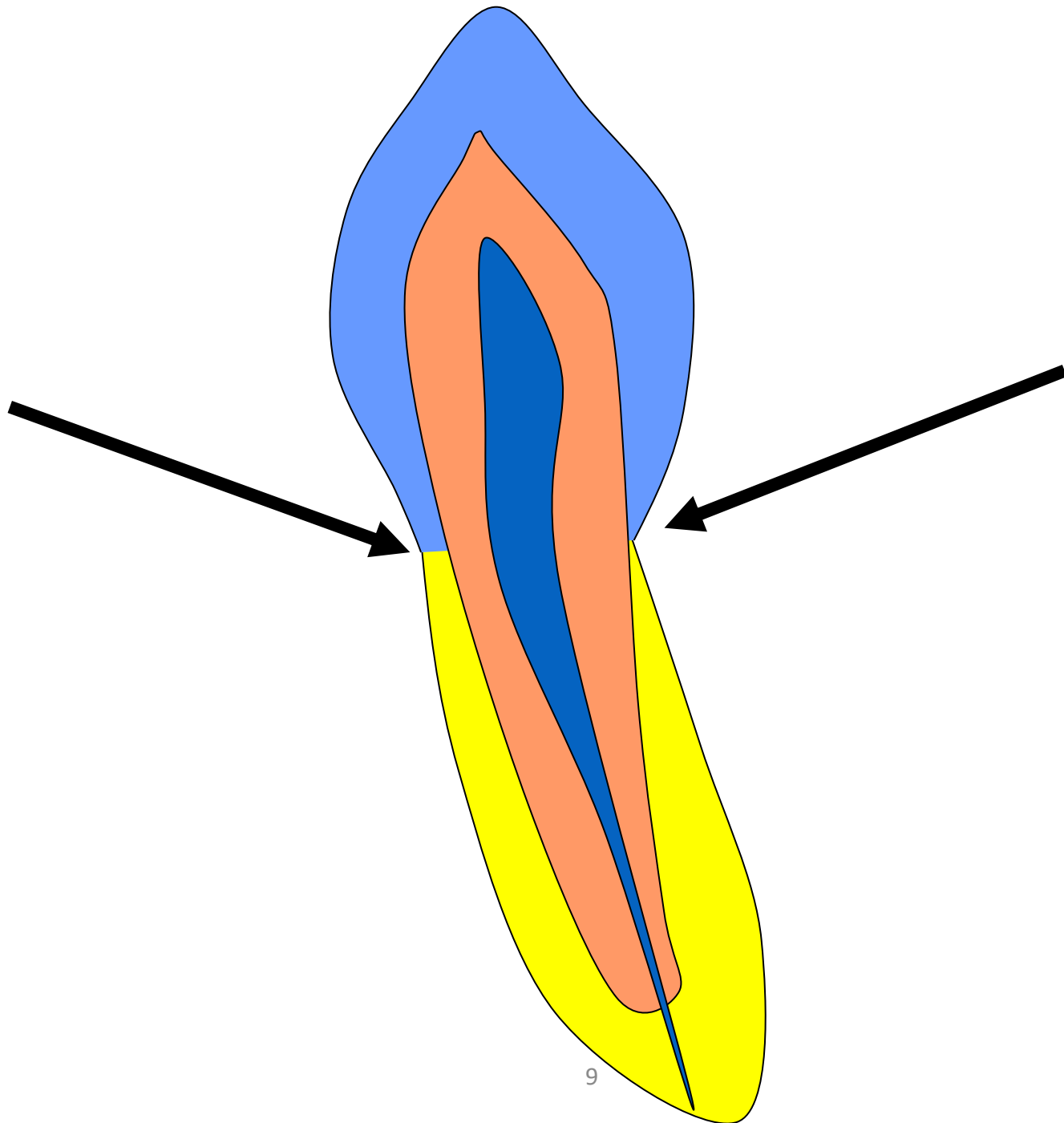
The tissue in the pulp chamber,
It contains cells, intercellular substance,
vessels and nerves.

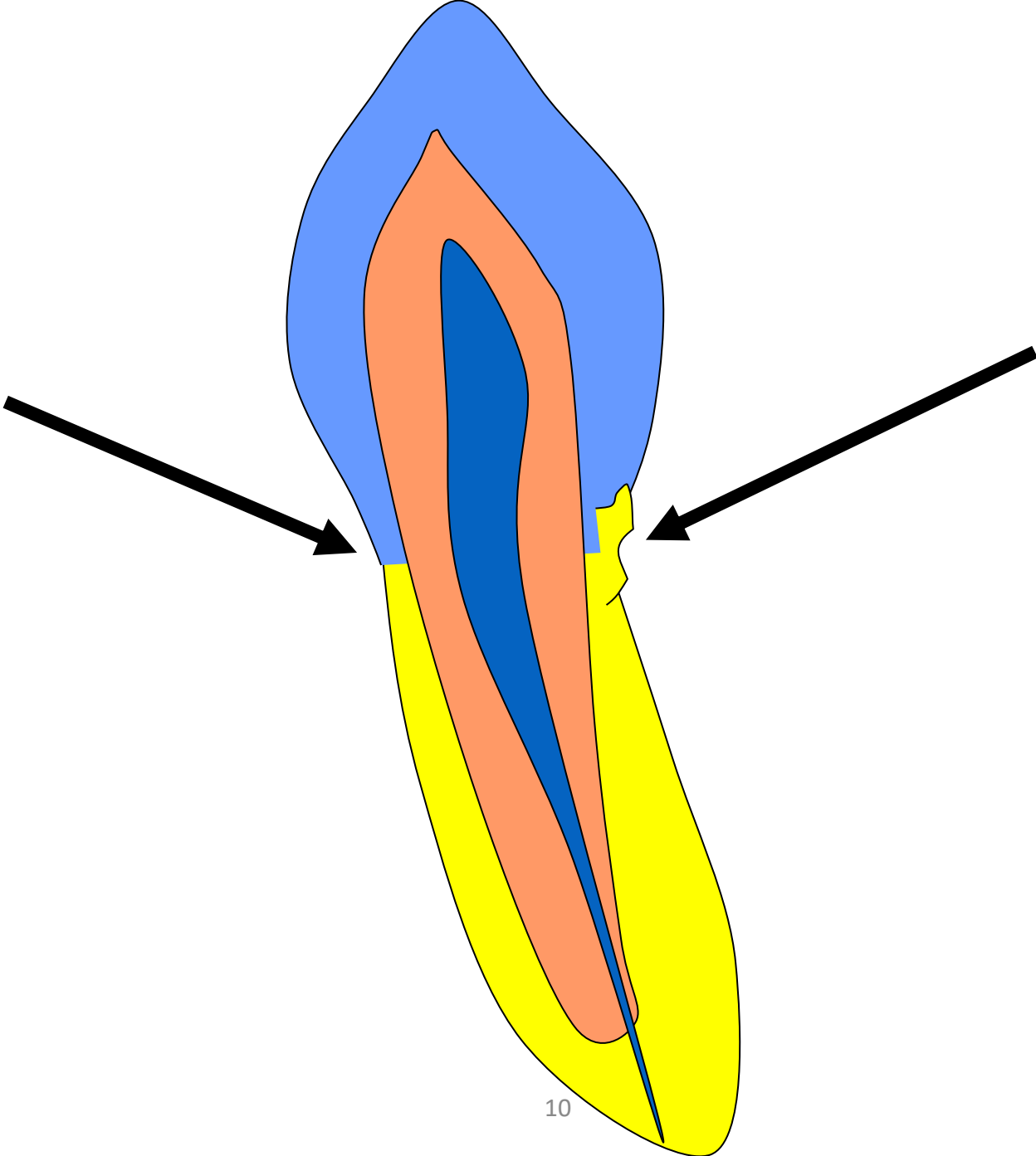
Odontoblasts at the periphery.

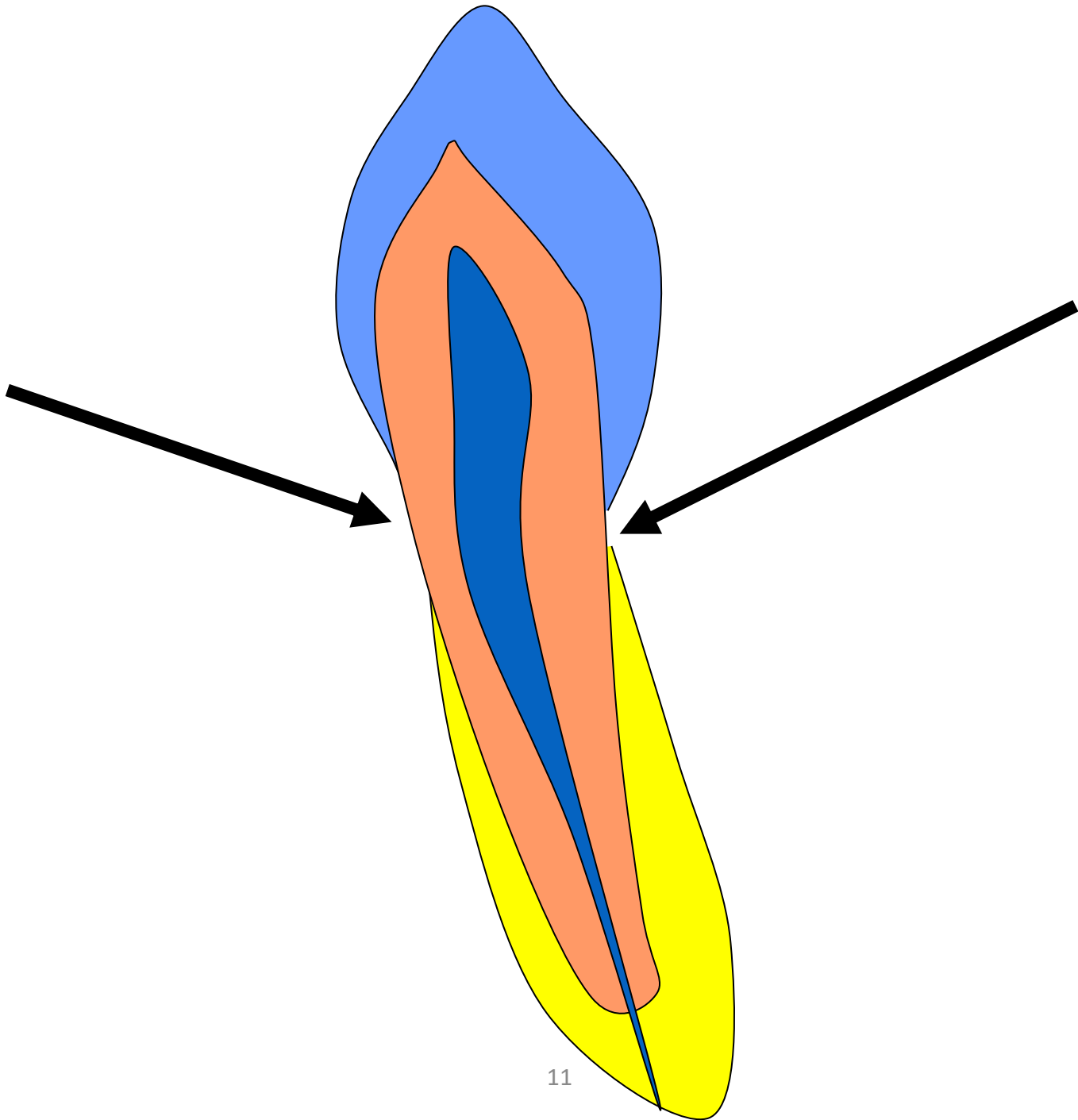
Primary, secondary, tertiary, sklerotic dentin.

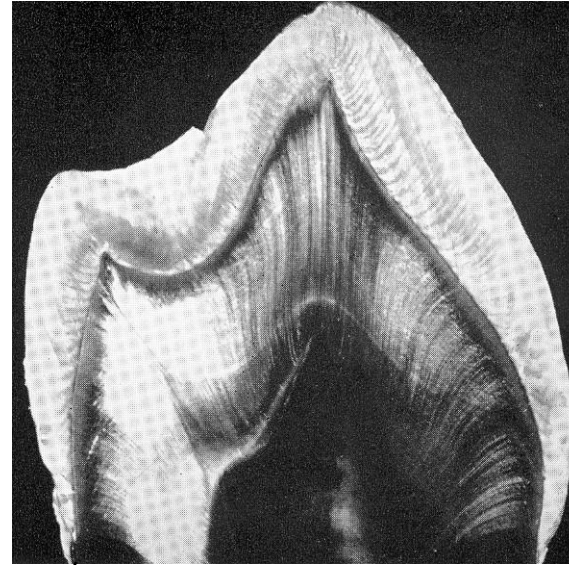
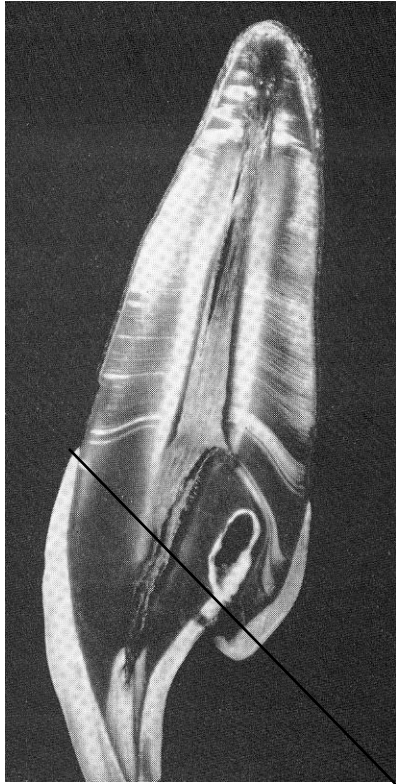




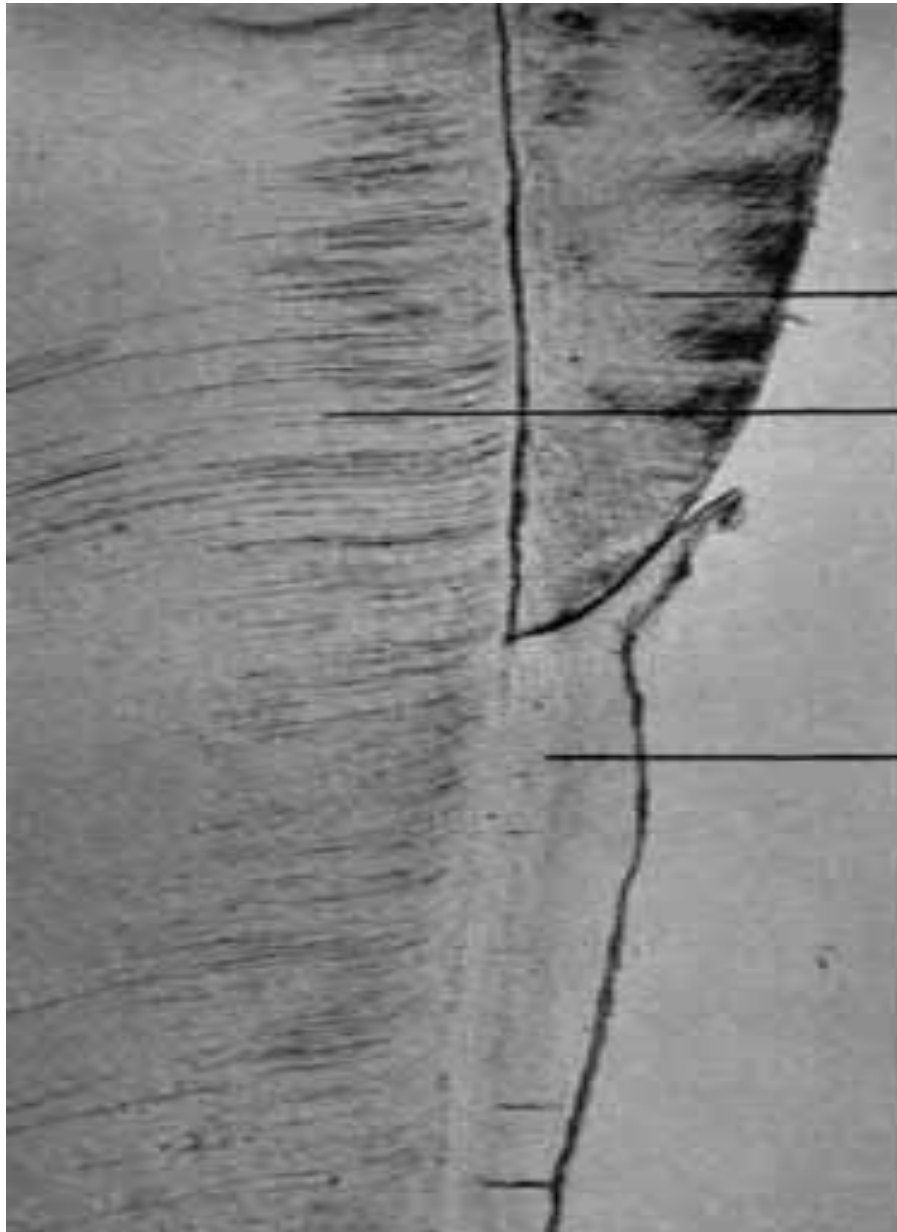








Sklovina v cervikální oblasti



Sklovina

Dentin

Cement

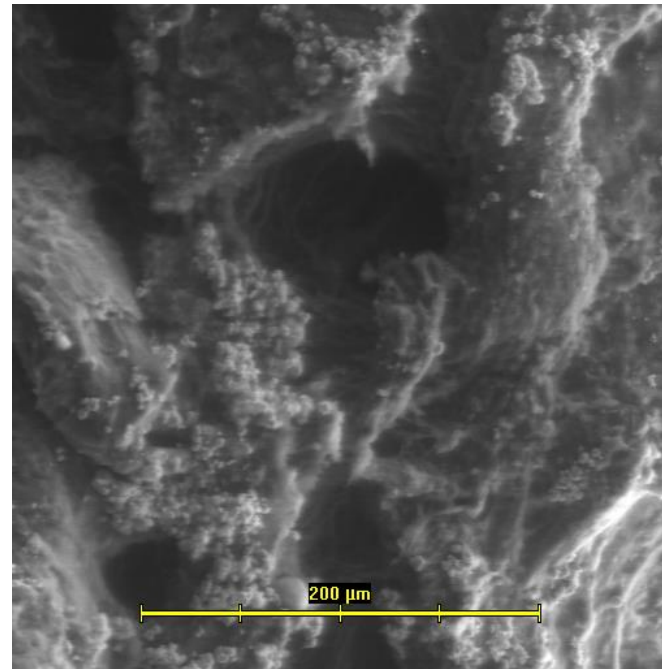
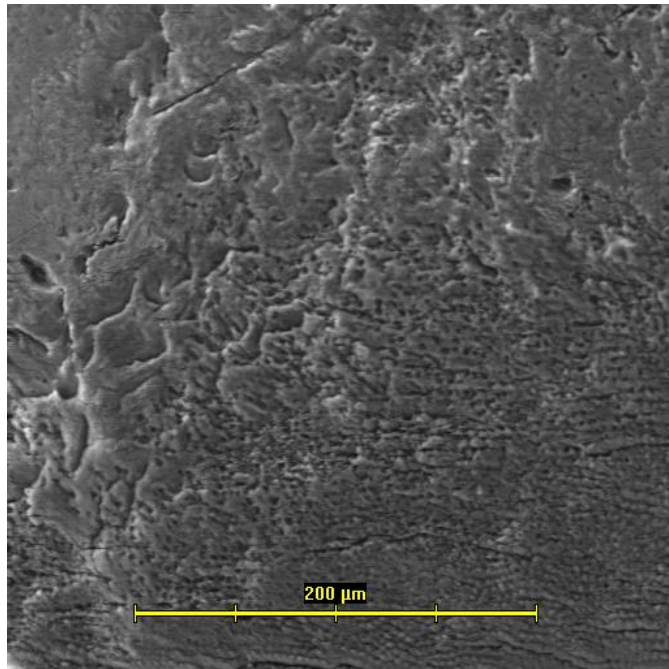
Anatomical and clinical crown



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.

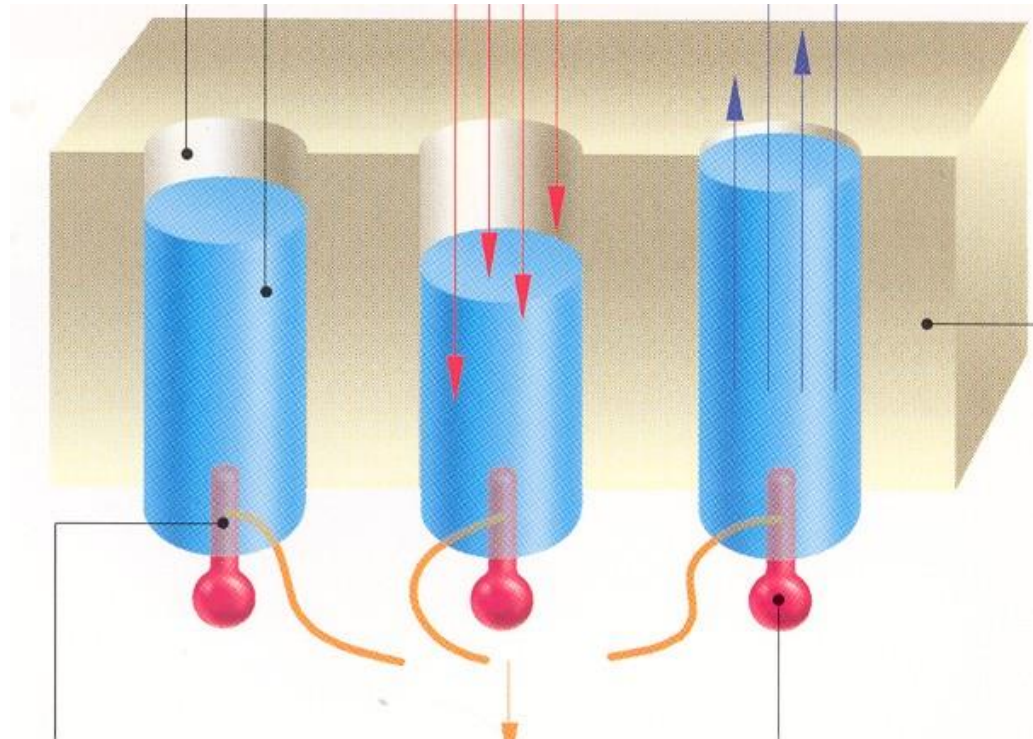
Exposure of dentine in cervical area



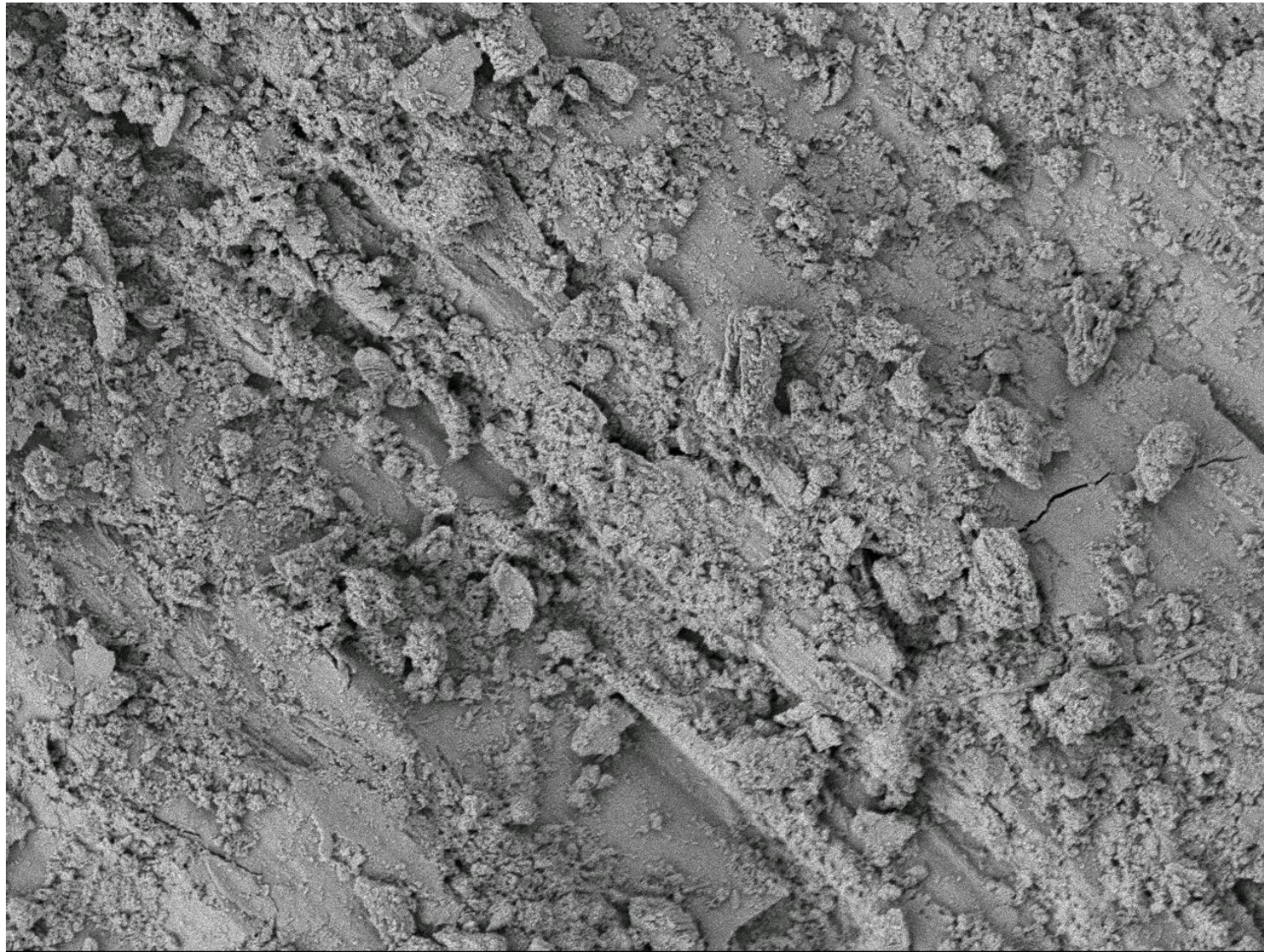
Tubular liquid
Odontoblast
Nerv

Hot

Cold
Dessication
Osmotic stimuli –hypertonic solution



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



ISI

LEI

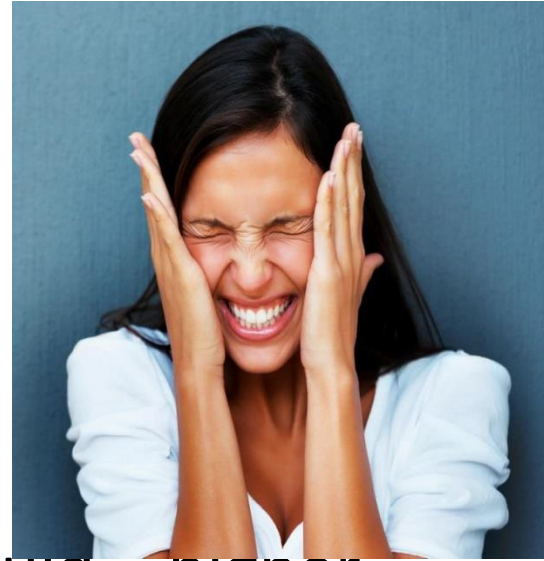
5.0kV

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

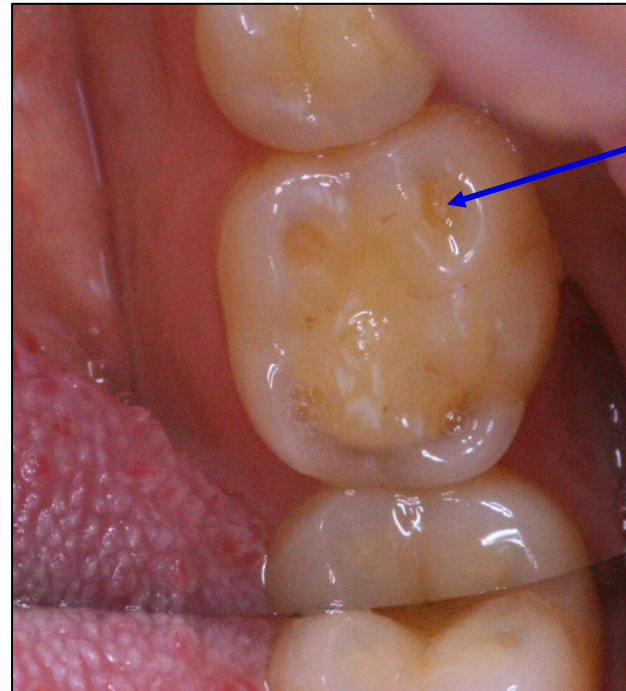
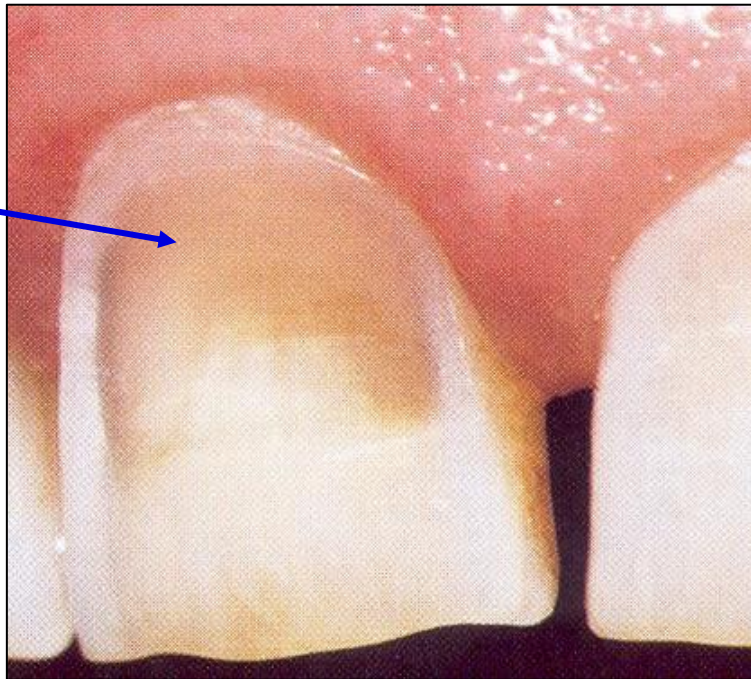
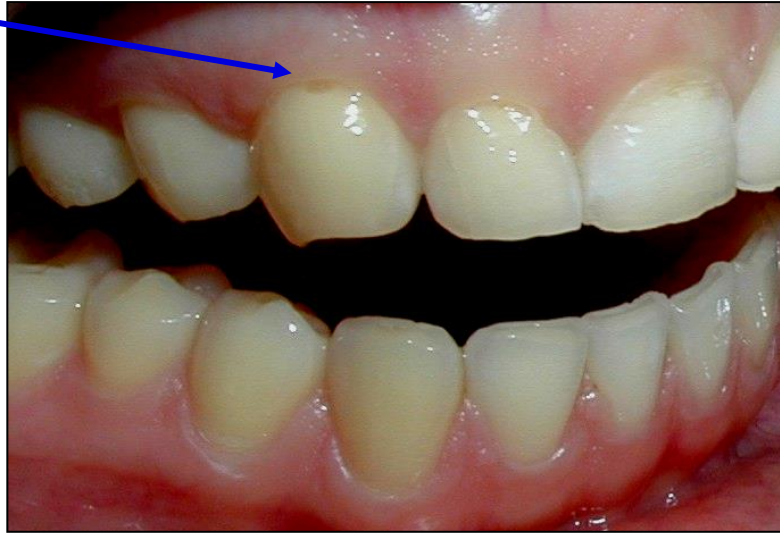
Fruit tea

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





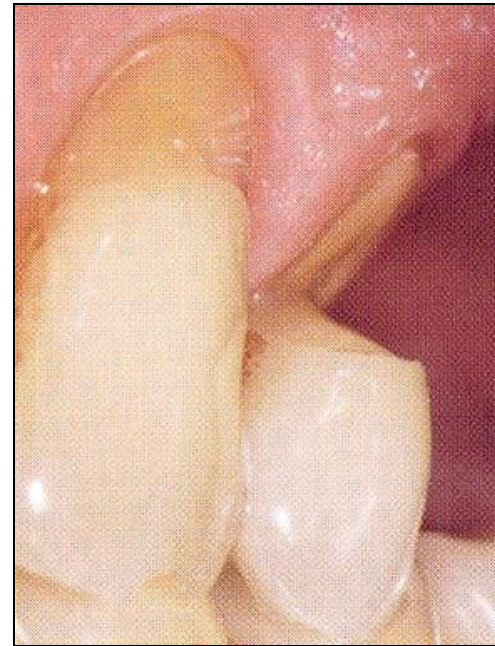
DR. BRUX[®]

Nuovo design



V-shaped defects

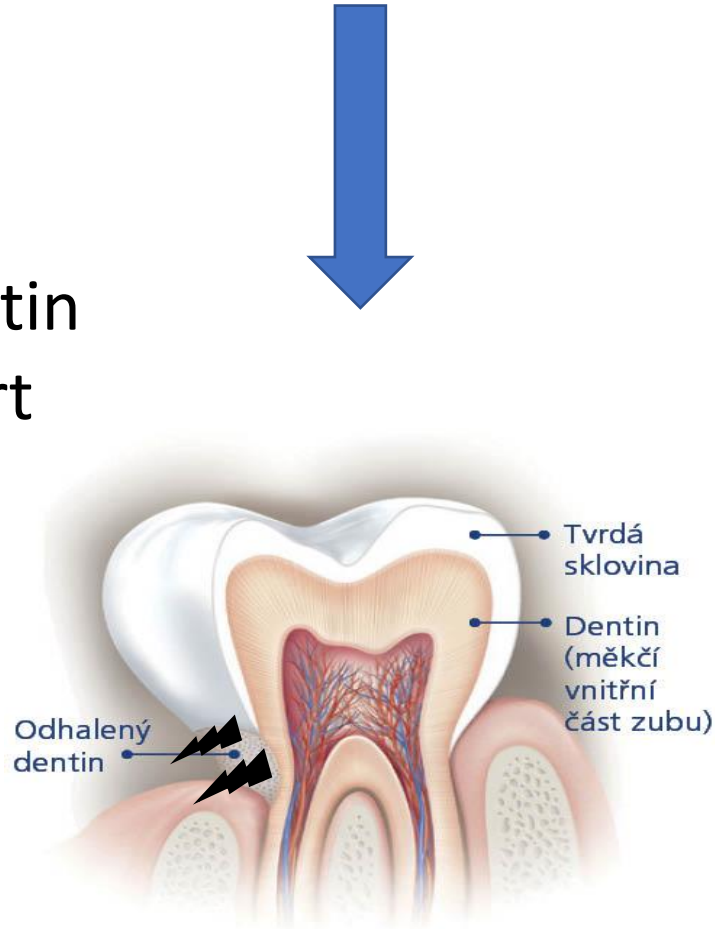
- Typical defects V – shaped in cervical area
Smooth bottom, no pain, teeth with atypical position
(rotation) or atypical loading,
sometimes without any reason.



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



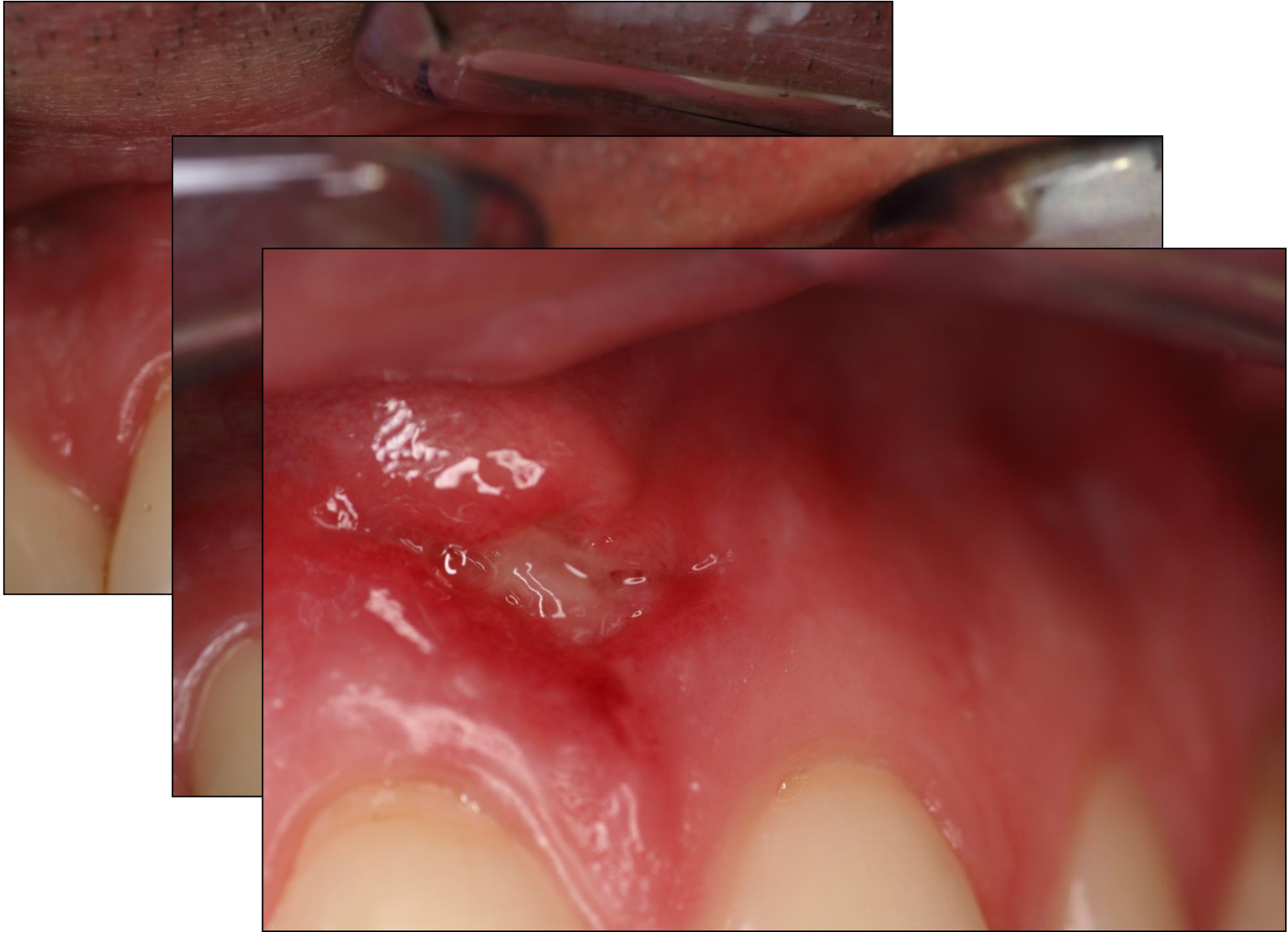
Cervical defects – erosion+abrasion



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

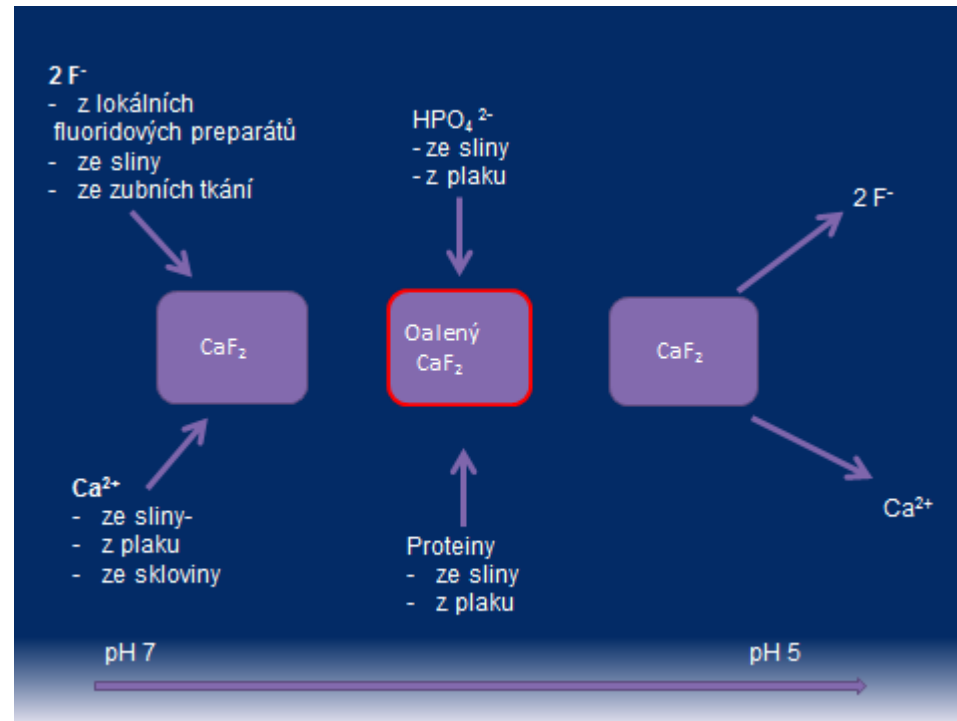
- Chemical

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



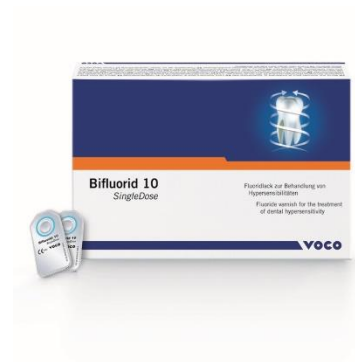
Varnishes with fluorides

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.

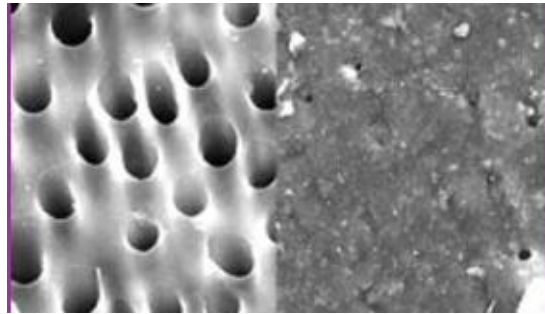


Pro - ArginTM

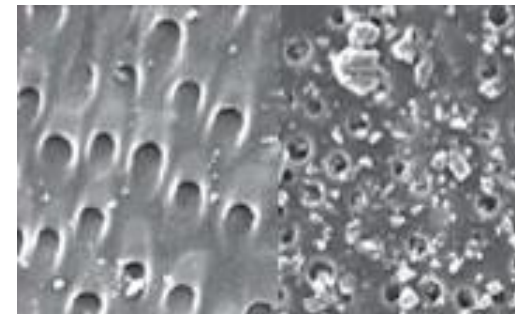
- Arginin bicarbonáe - complex of aminoacid and calciumcarbonate.
- Good adhesion and closure of dentin tubules.



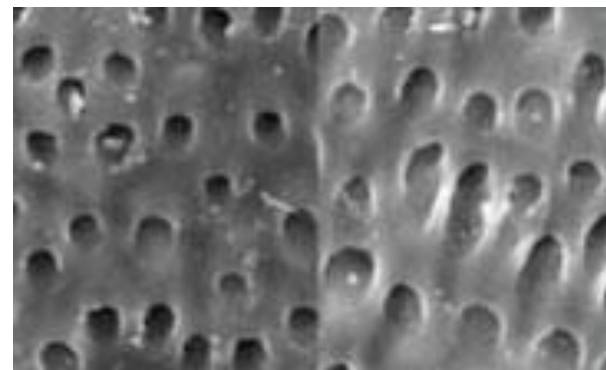
NovaMin



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

Hydroxyapatite

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

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



Hydroxyapatite and fluorides

- Remin Pro (VOCO)



Adhesive systems –sealing of dentin tubules

HEMA

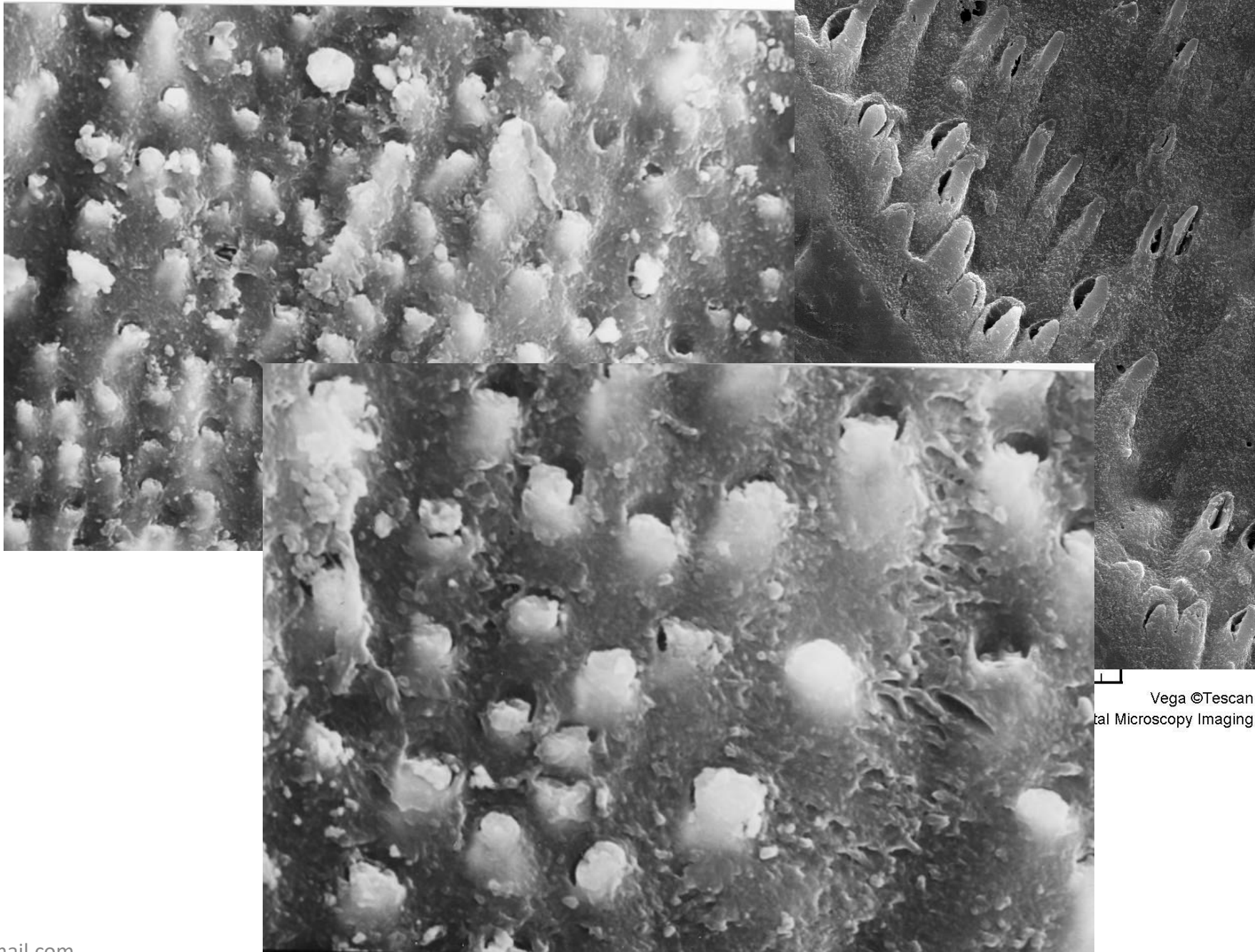
Glutaraldehyd

Triclosan

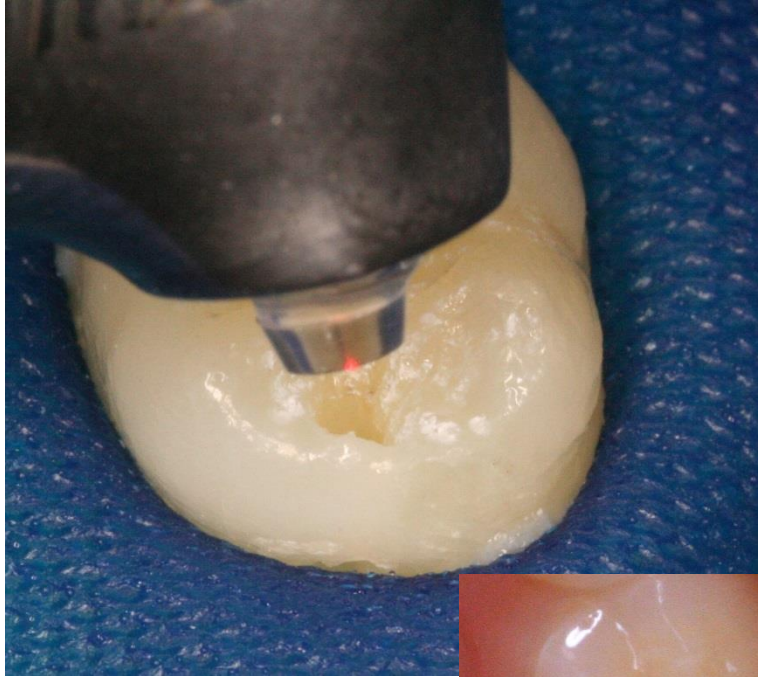
Also precipitation of proteins

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

