

# Adhesive cementation



# ADHESIVE cementation

- Fixed dentures can be fixed using adhesive cementation.
- Adhesive dentures: veneers, inlays, onlays, partial crowns, adhesive bridges, conventional crowns and bridges can be also cemented using adhesive cementation.

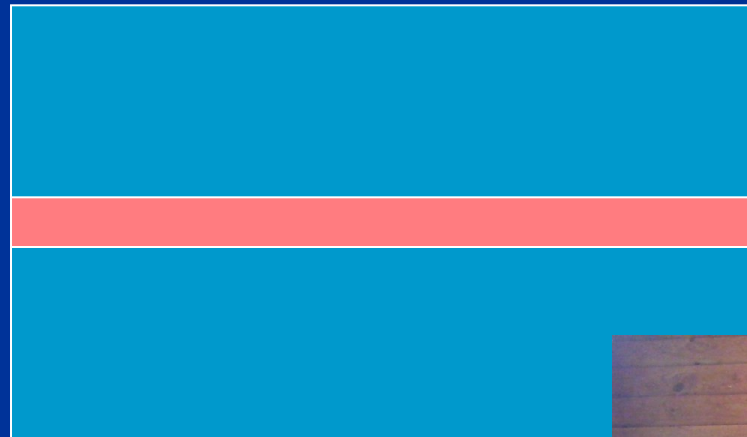
Material: Resin, ceramics, metal

# Adhesion

Ability of two materials to be connected  
(glue)

➤ Adhesive

➤ Adherend



# Adhesion

➤ Mechanic

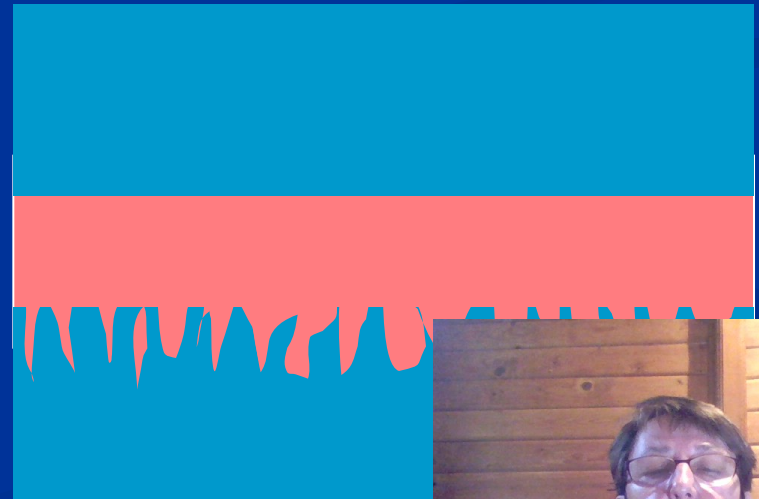
➤ Specific



# Adhesion

- Mechanic

*Is based on the roughness of the surface*



# Adhesion

➤ Specific

Physical

Chemical



# Adhesion

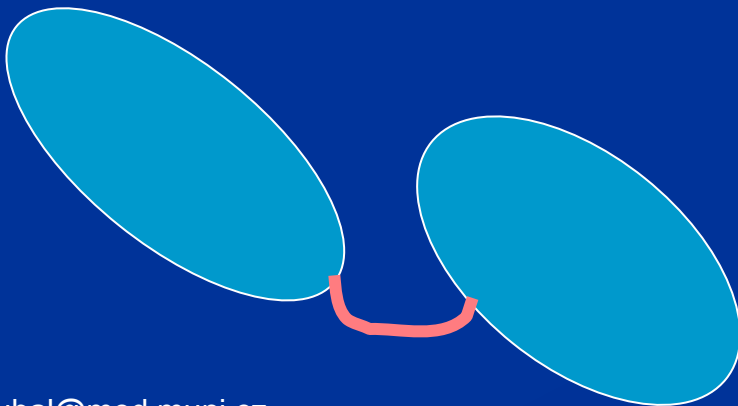
## ➤ Specific

Fysical – intermolecular forces

Van der Waals

H- bridges

Elektrostatic



# Adhesion

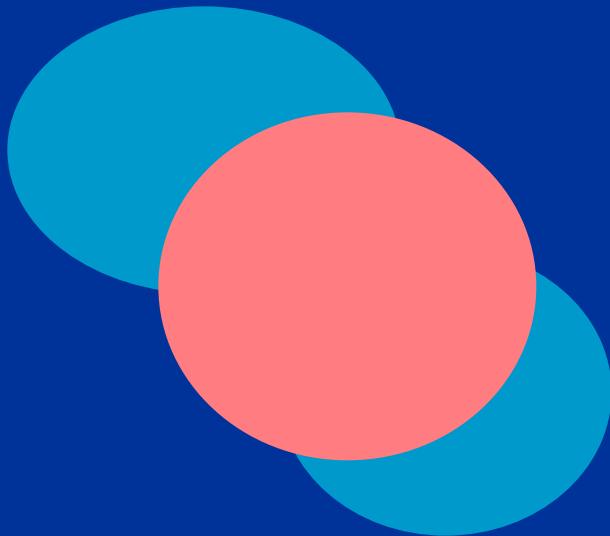
## ➤ Specific

Chemical binding

covalent

ion

metal





# Adhesive treatment in dentistry

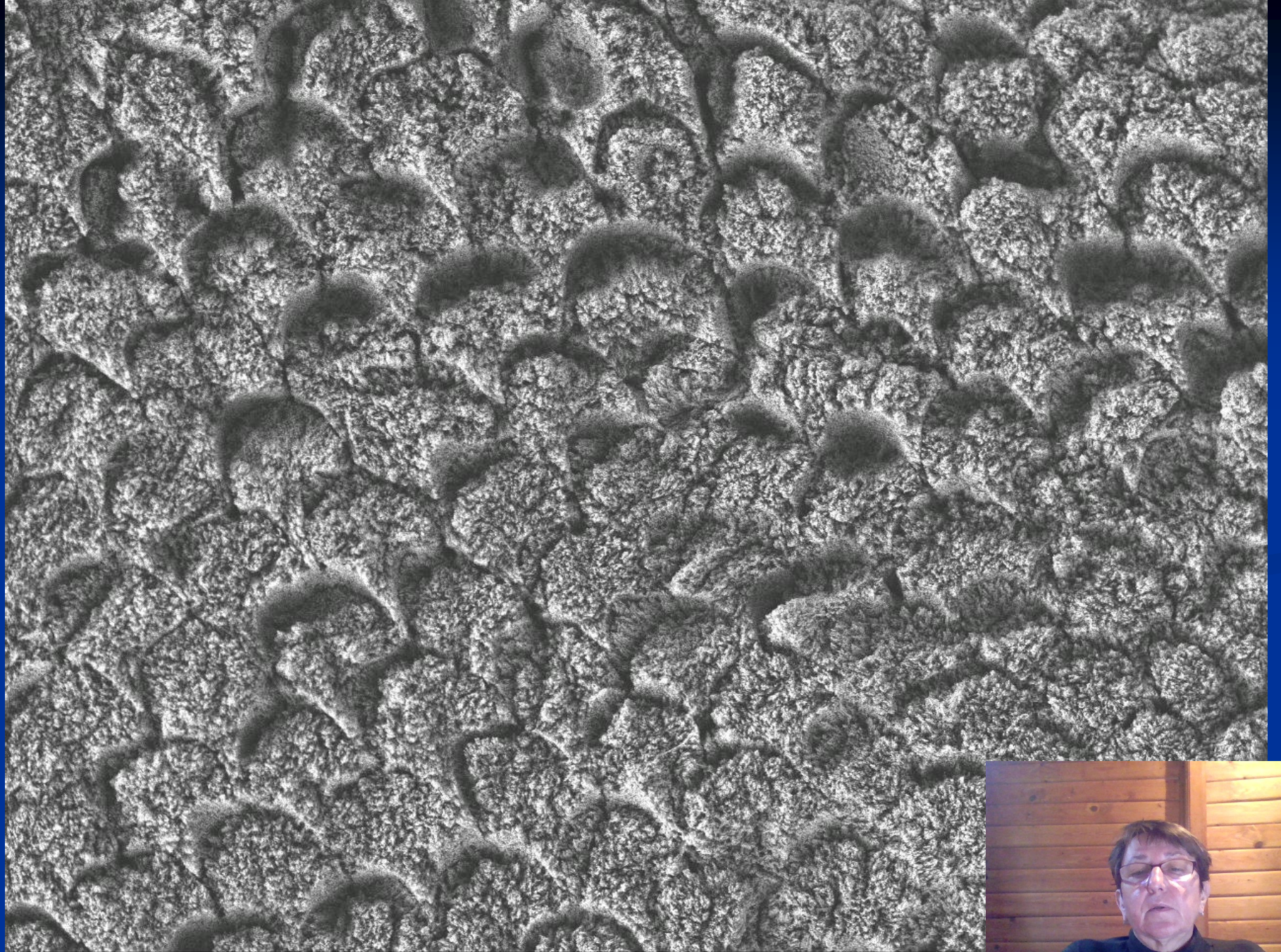
- Sandblasting
- Acid etching
- Elektrolytic treatment
- Laser
- Plasma coating
- Silanization



# Adhesive treatment of surfaces in dentistry

- Creates irregularities of the surface (roughness)
- Increases surface energy
- Increases wettability
- Combination





ISI

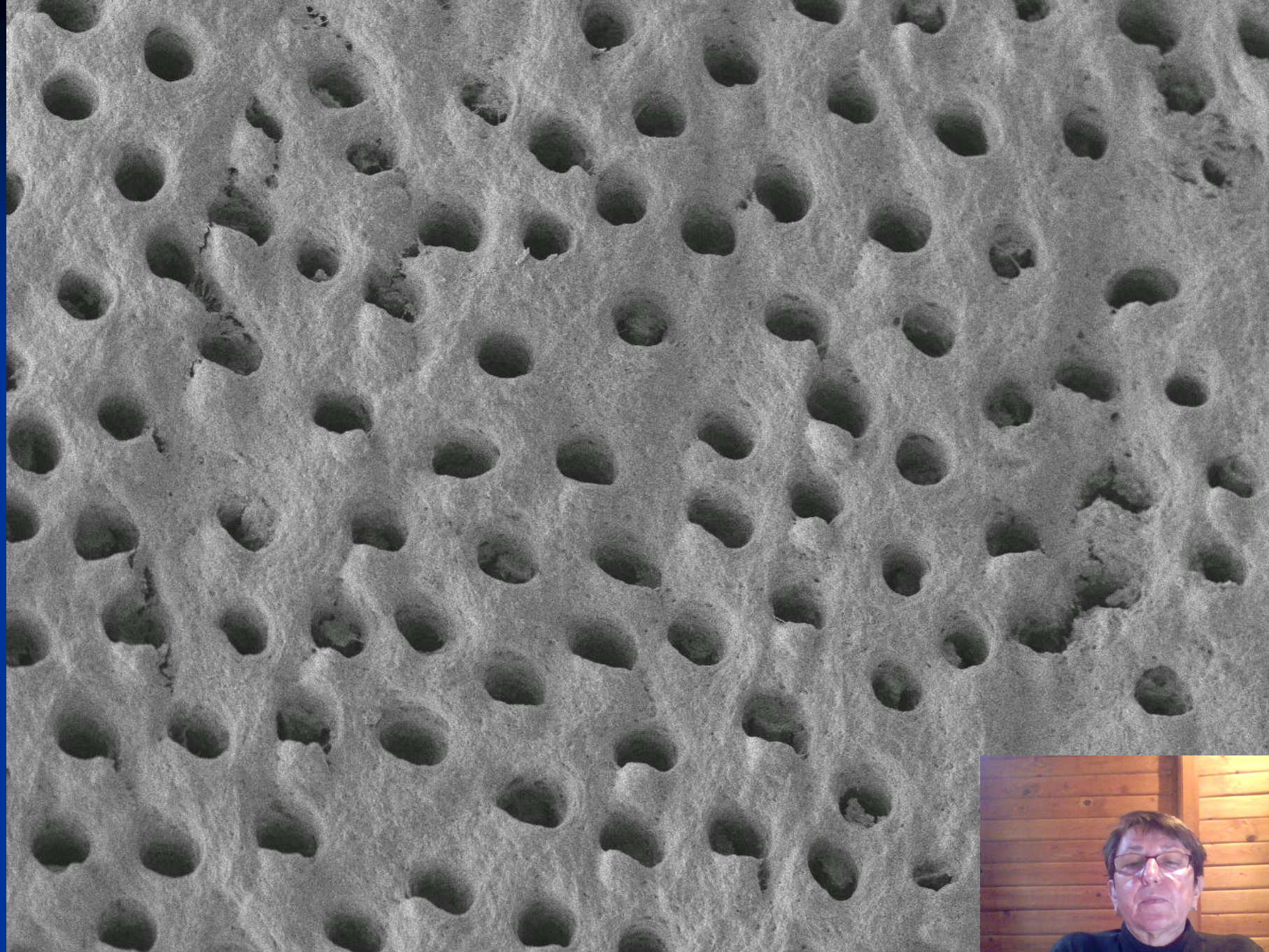
LEI

5.0kV

X2,000

10 $\mu$ m





ISI

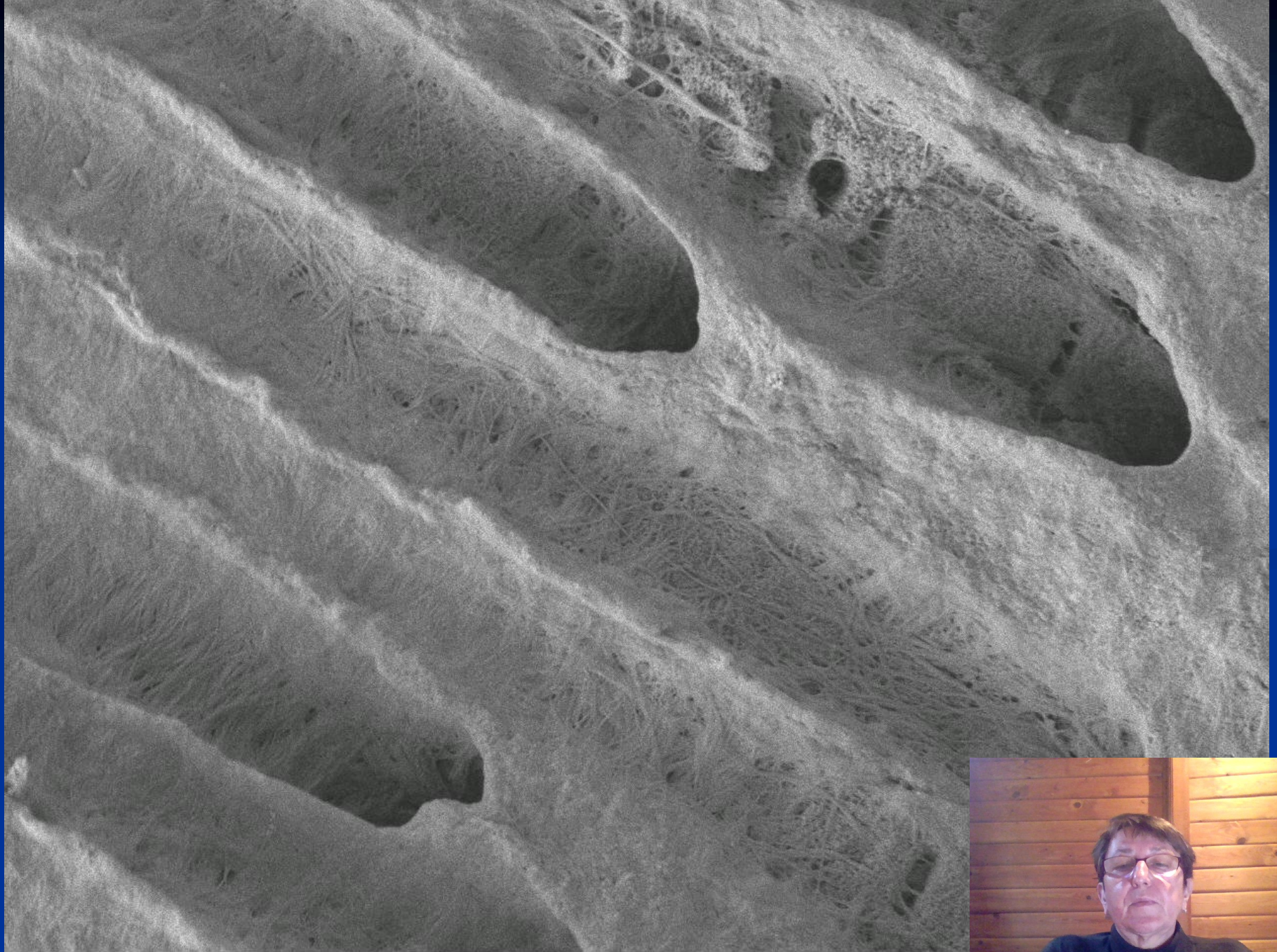
LEI

5.0kV

X2,000

10 $\mu$ m





ISI

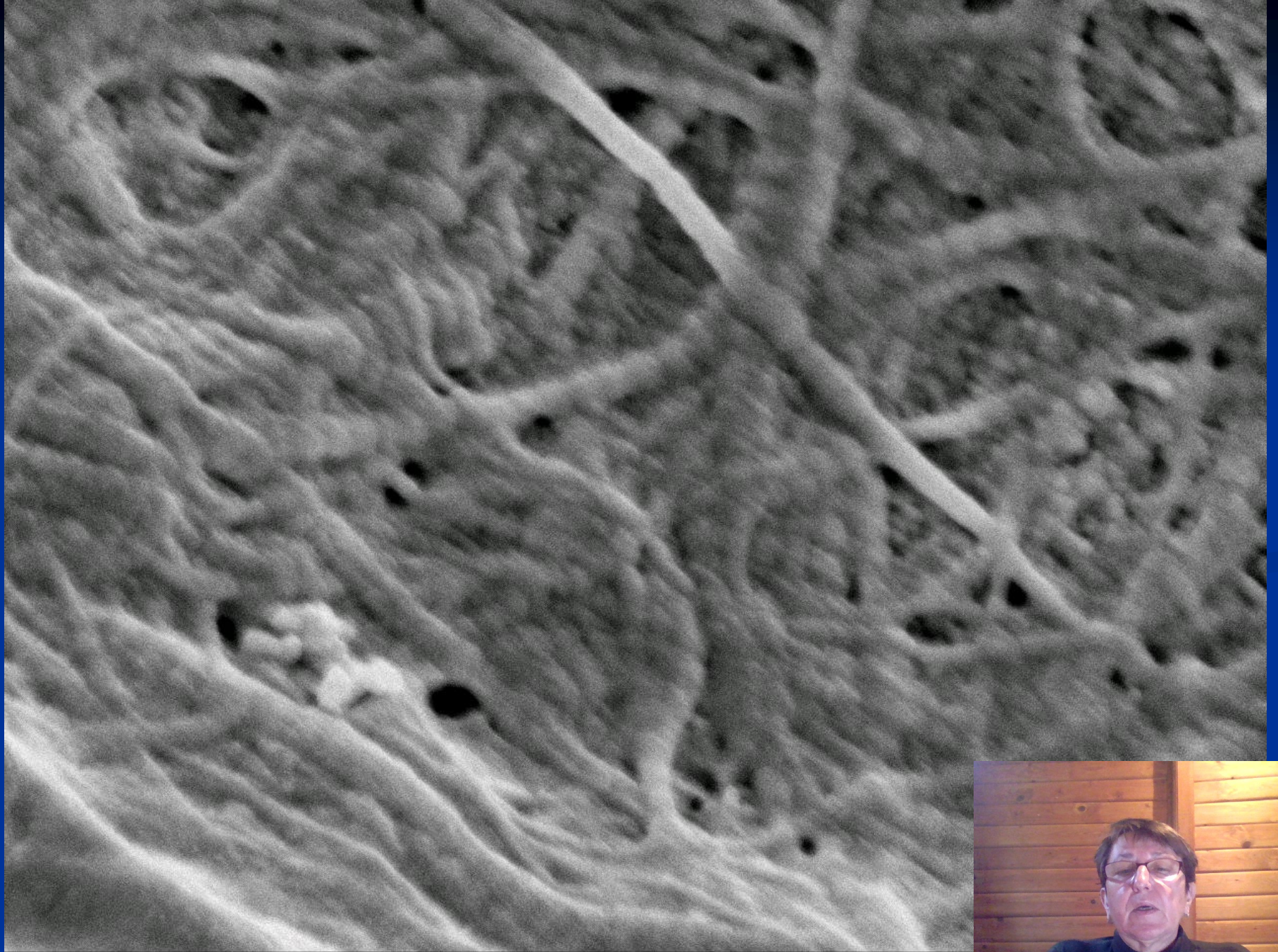
LEI

5.0kV

X5,000

1μm





ISI

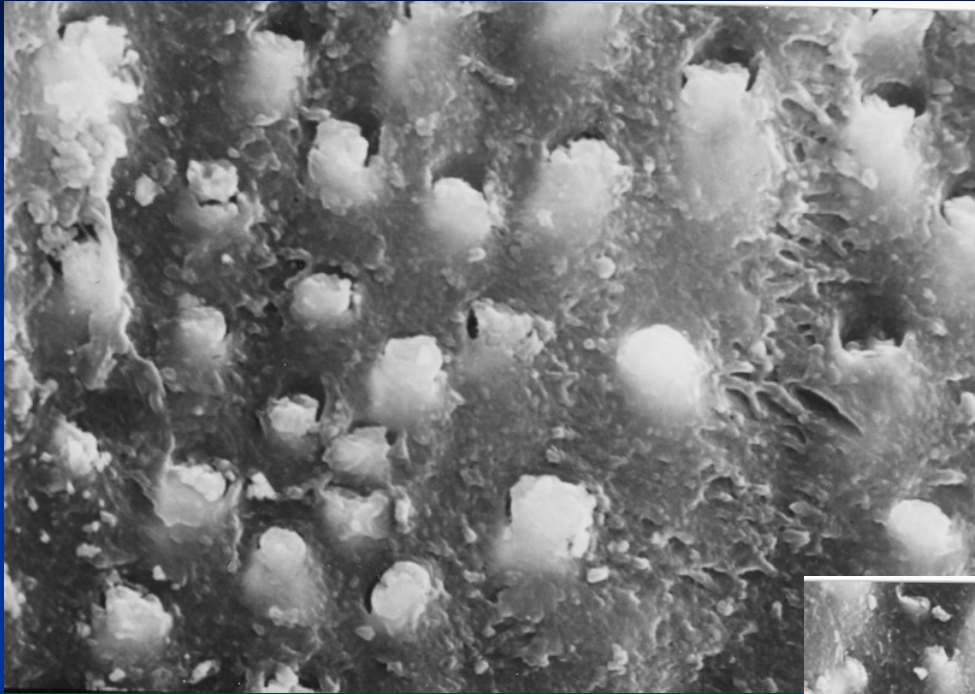
SEI

5.0kV

X55,000

100nm





# Adhesion - importance

- Making fillings
- Cementation
- Other (making dentures)





# Composite cements

- Composite materials
- Lower viscosity
- Selfcuring, dual curing. In special cases also light curing only.



# Bonding to hard dental tissues (enamel and dentin)

## ■ Miromechanically

- Acid etching
- Selfetching adhesive systems
- Selfetching (selfadhesive cements)



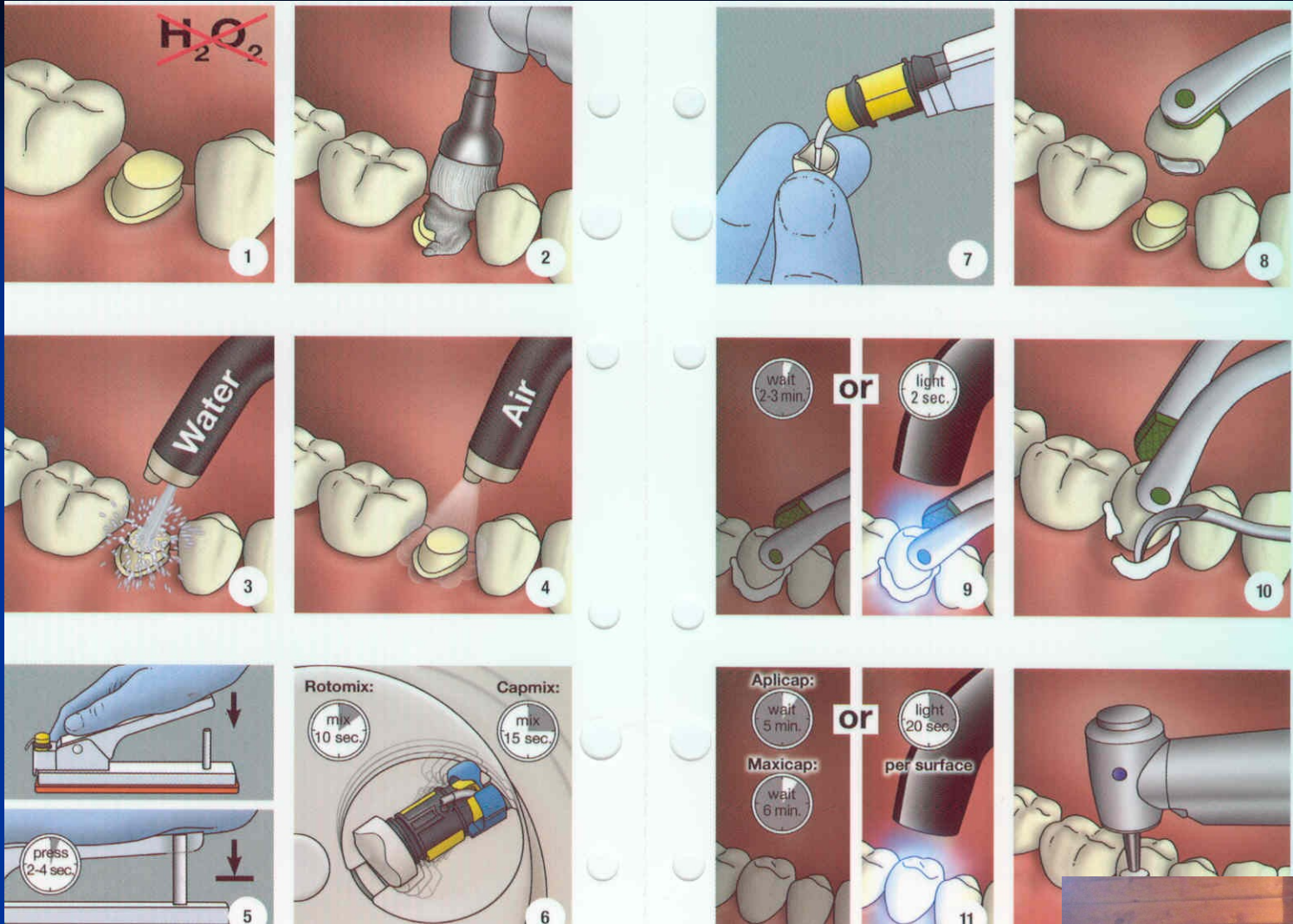




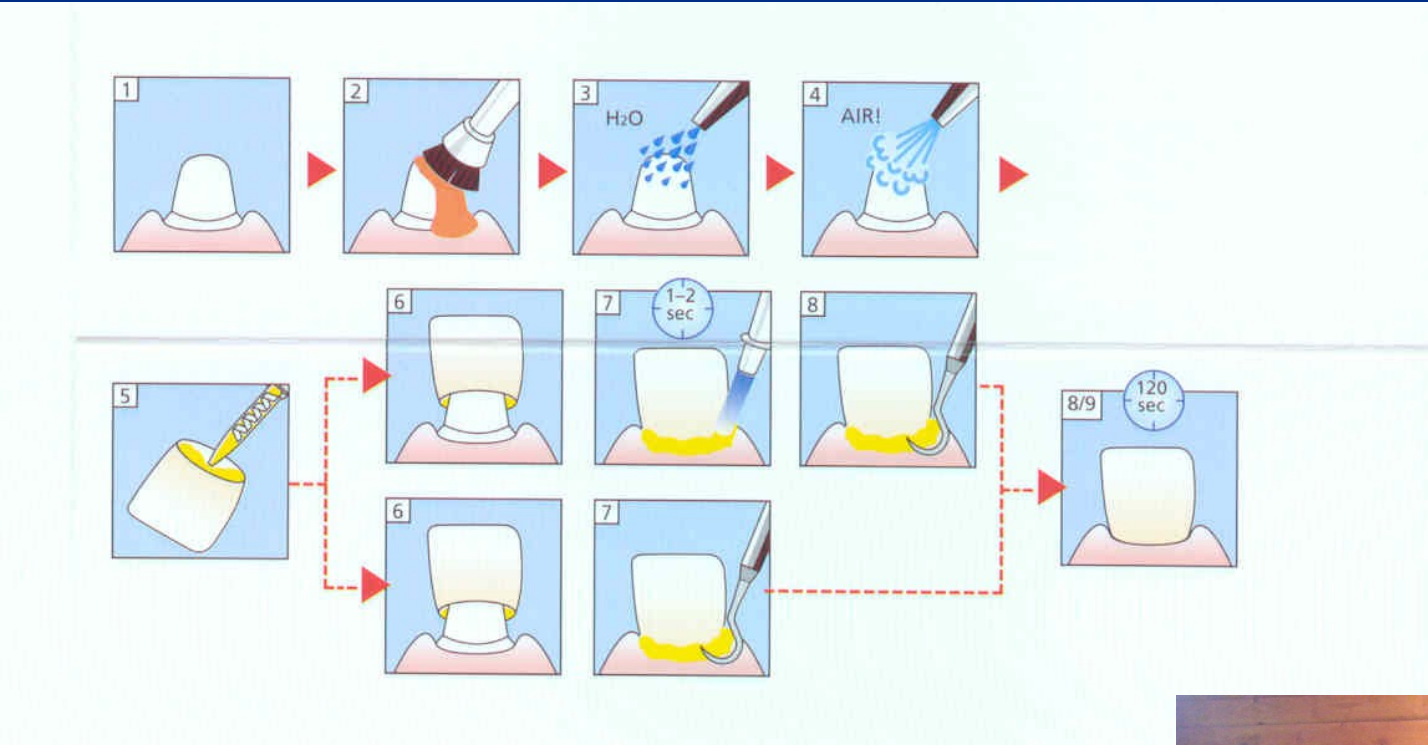


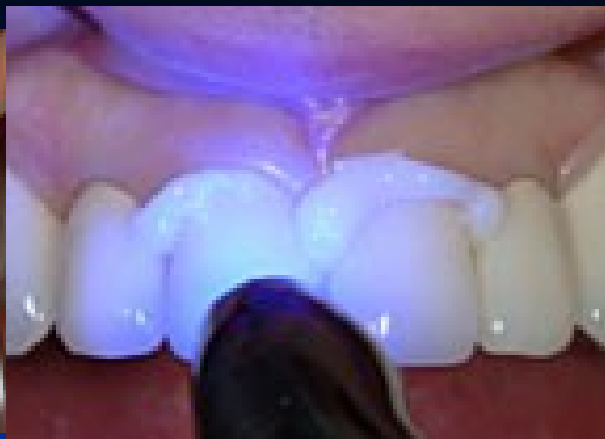
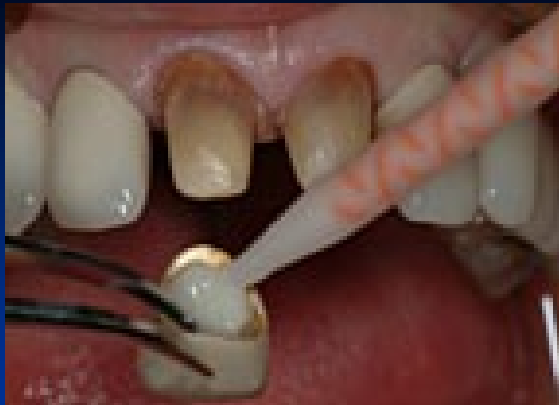


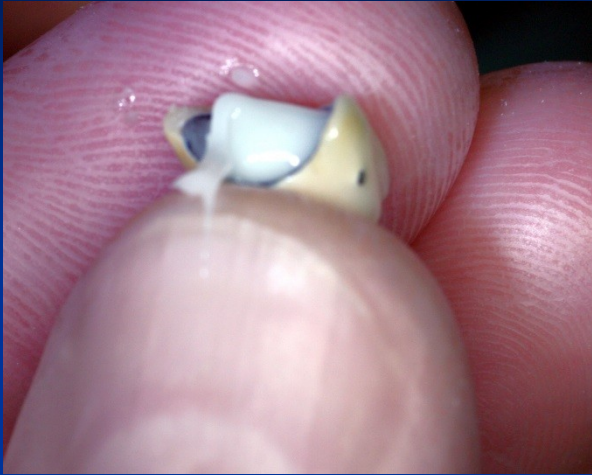












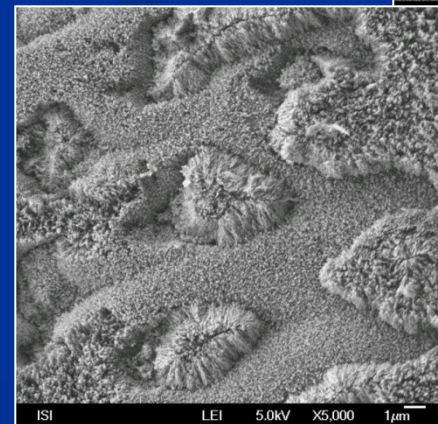
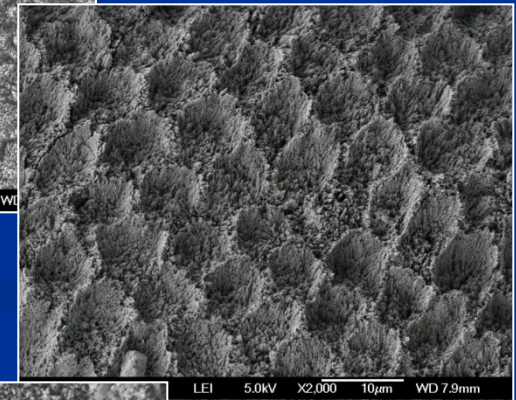
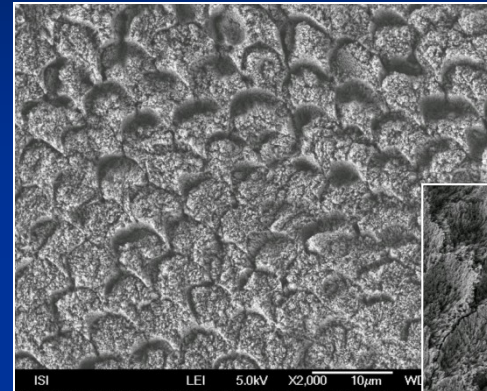
# Preparation of surfaces before adhesive cementation

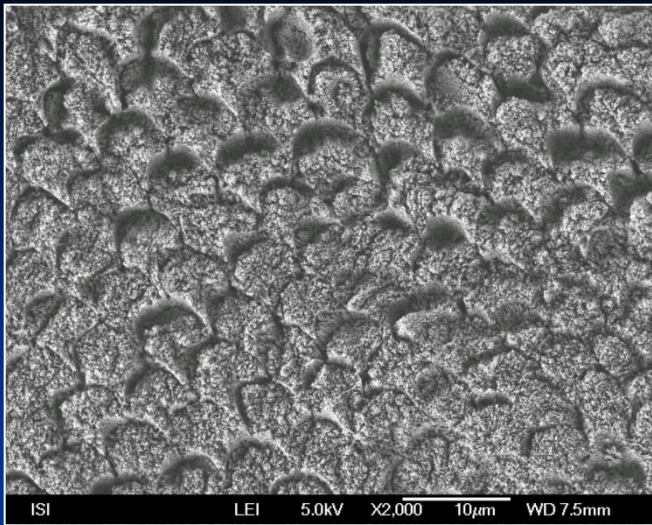
- Enamel
- Dentin
- Ceramic materials
- Composite materials
- Metal alloys



# Retentive pattern

- Periprismatic  
(Interprismatic)
- Intraprismatic
- Aprismatic





TE

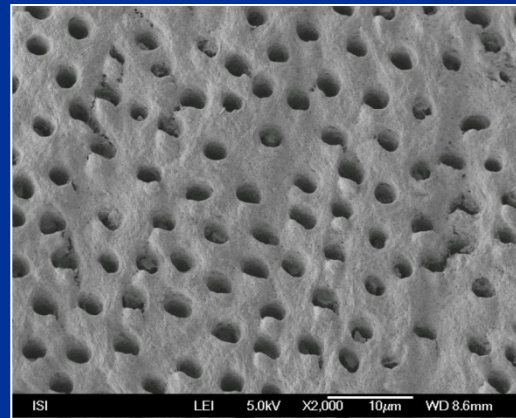
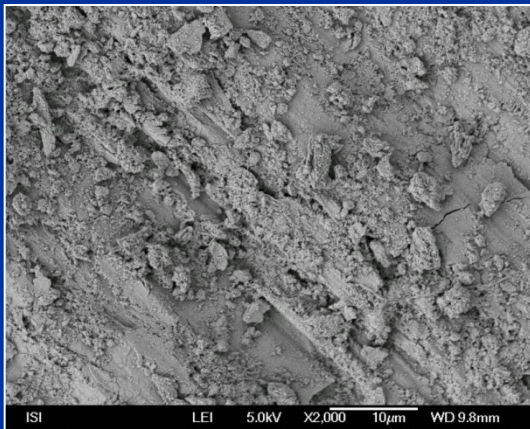


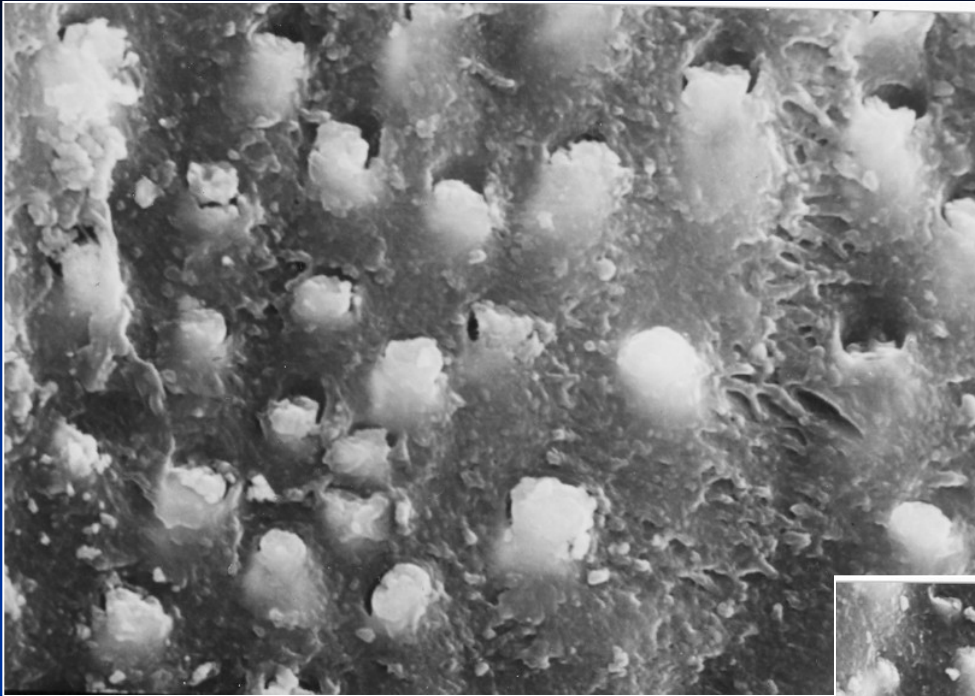
SE



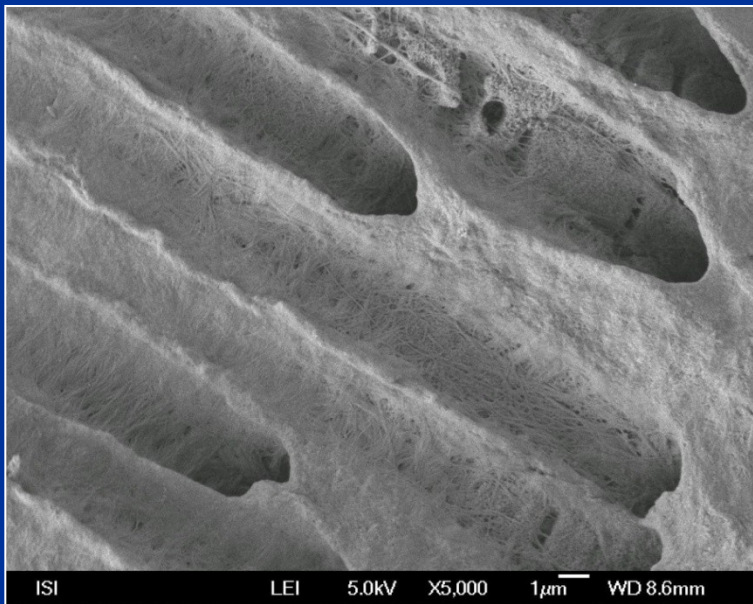
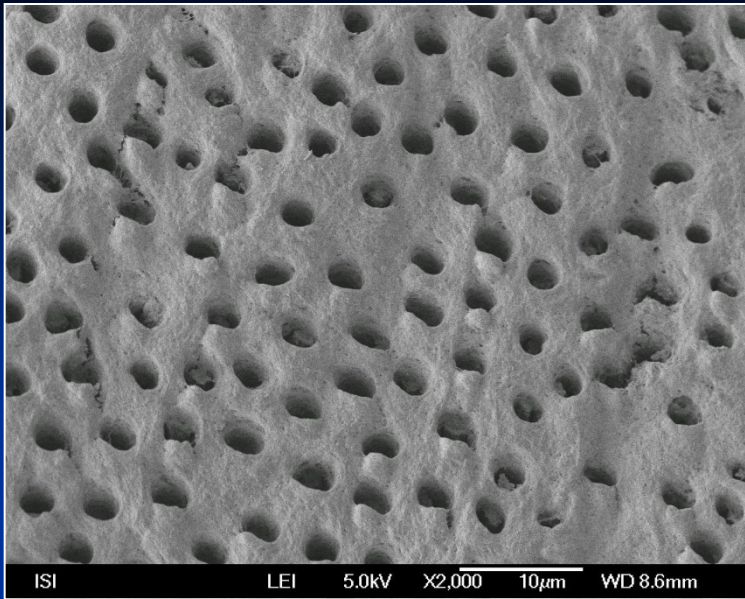
# Retentive surface of dentin

- Smear layer is removed (modified)
- Open dentin tubules
- Decalcified collagen network









# Ceramic materials

## Silicate ceramics - etchable

- Feldspatic
- Leucit
- Alumina
- Lithiumdisilicate

## Non silicate ceramics - non etchable

- Vysoce denzní alumina
- Zirkonosxde
- Highly dense zirkonia (yttrium stabilized)
- Pressed or layered

CAD/CAM ceramics

Less than 15% silicate matrix is not silicate ceramics



# Ceramic materials

## Silicate ceramics

- Crystals in glass matrix



- Etching HF

## Oxide ceramics

- Highly dense material



- Sandblasting Al



# Etching



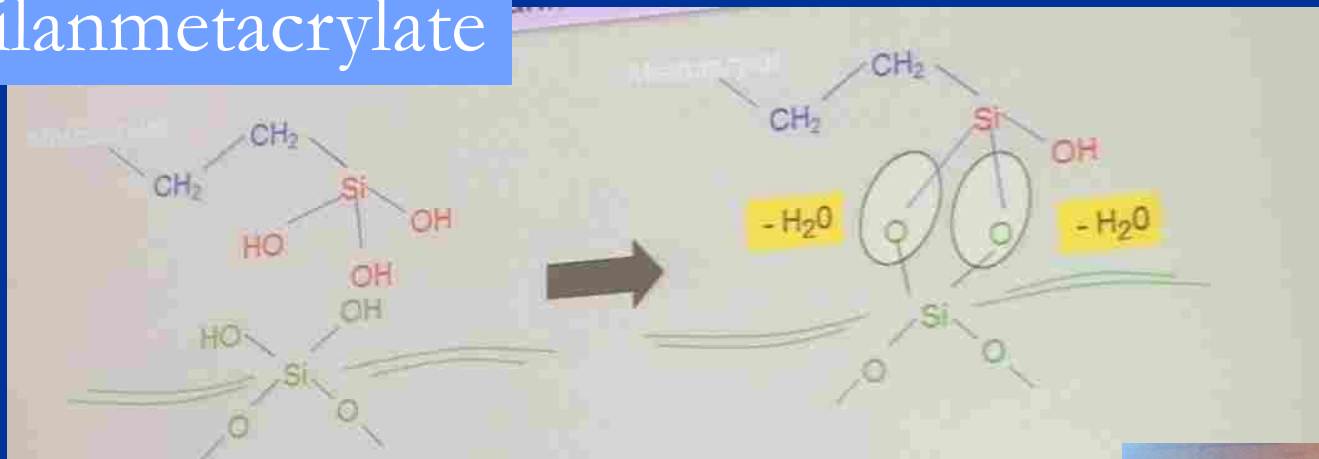
# Composite and metal surfaces

- Sandblasting



# Chemical adhesive treatment: ceramics, composite

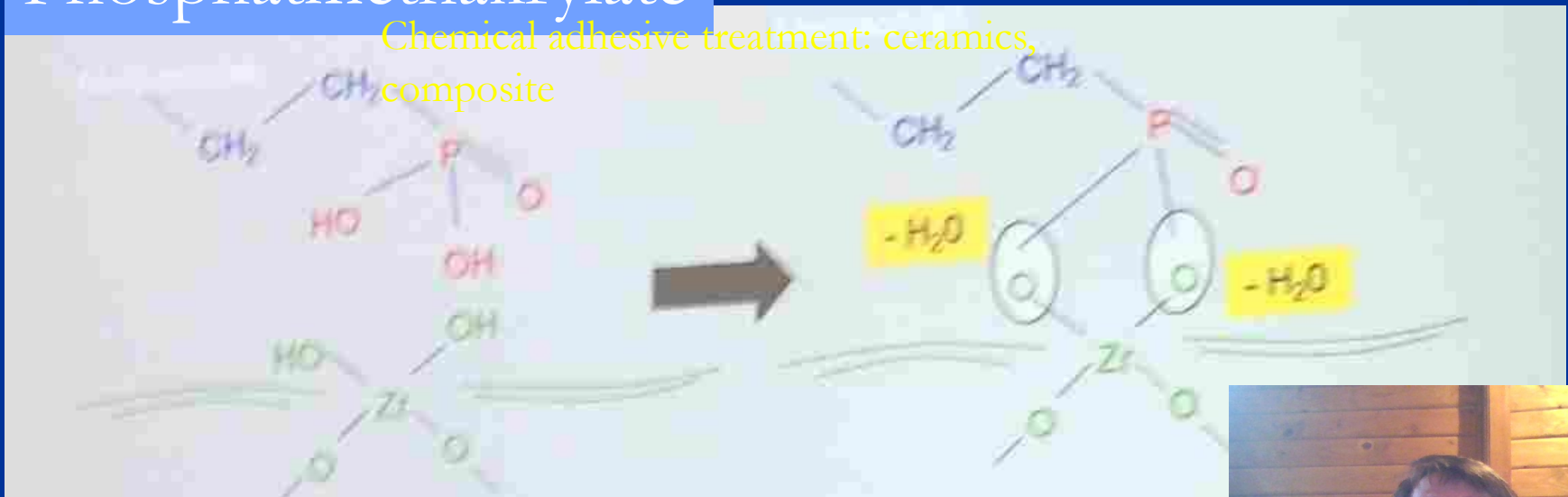
Silanmetacrylate



# Chemical adhesive treatment: metal zirconia

## Phosphatmethakrylate

Chemical adhesive treatment: ceramics,  
composite



# Chemical adhesive treatment: golden alloys

Sulfidmethacrylate



$Au\text{---}Au\text{---} Au\text{---}Au\text{---}Au$





# Comprehension

## Sandblasting plus silane

- Metal
- Metalceramic (metal)
- Zirconia
- Composite

## Etching plus silan

- Silicate ceramics



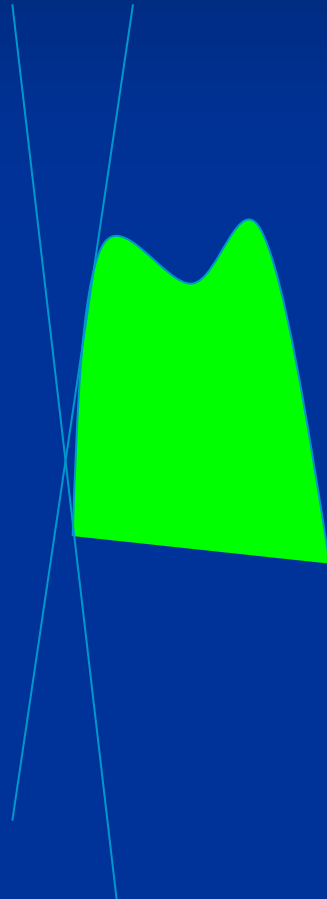
# When adhesive cementation

- Area of retention - size
- Geometry of preparation



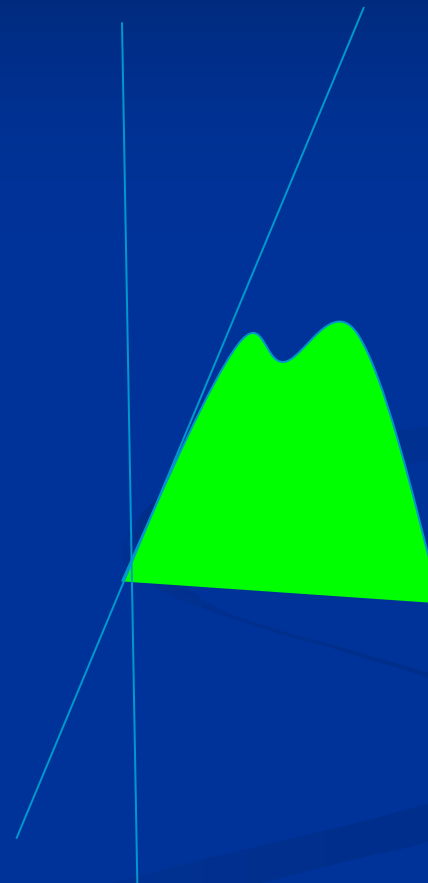
# Angle of convergency

6-15°



Conventional cementation

15-24°

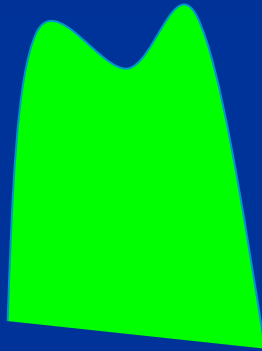


Adhesive



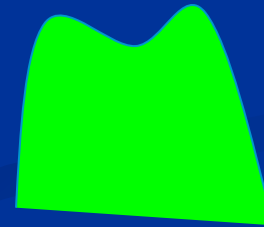
# Amount of hard dental tissue – how is the prepared tooth high

5 mm



Konvenčně

3mm



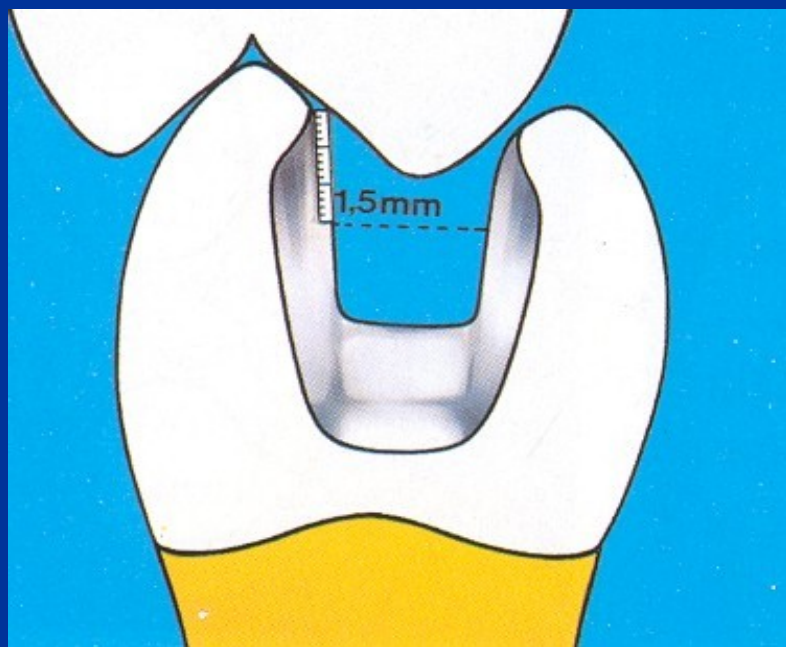
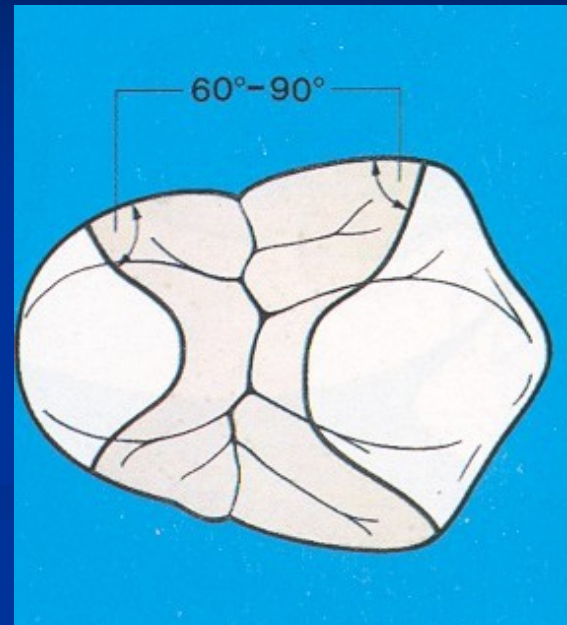
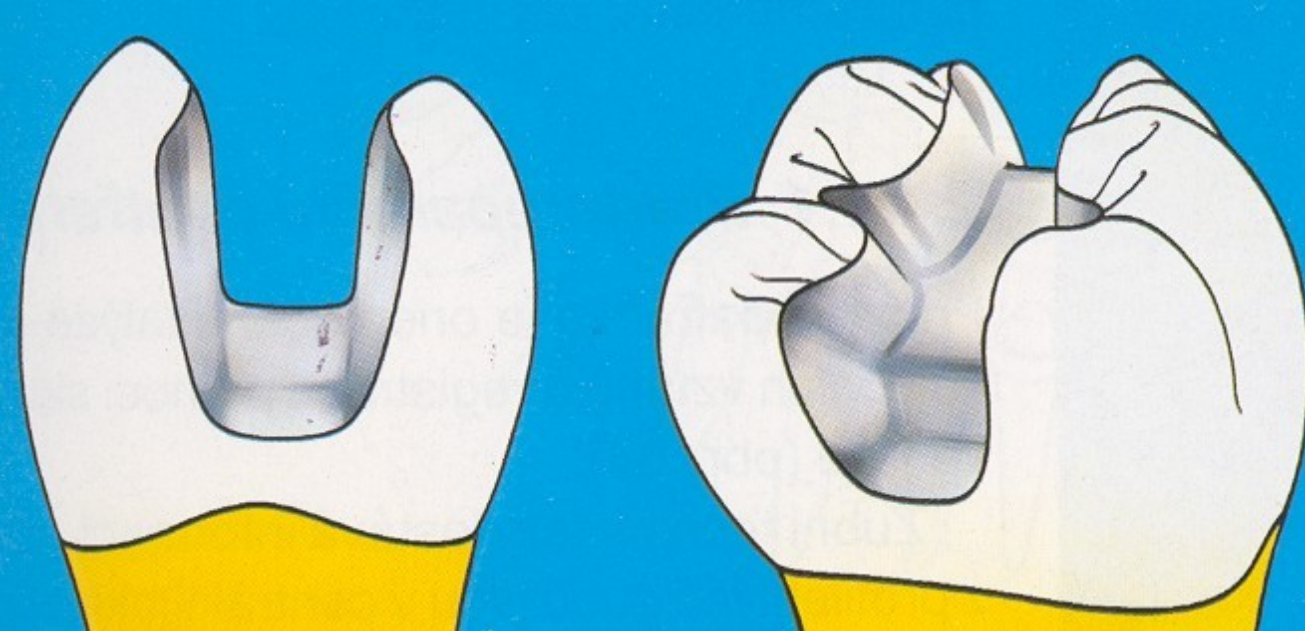
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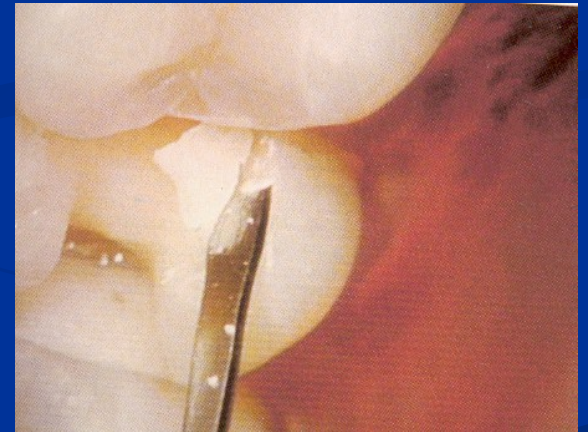
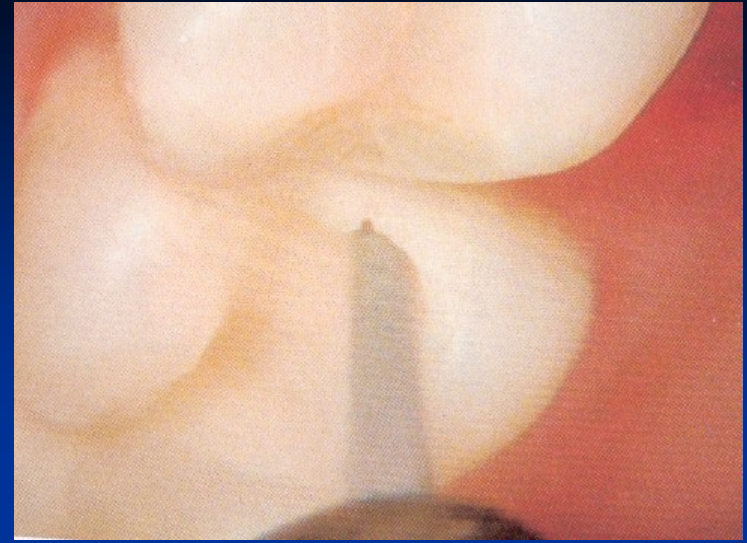


# Non metallic adhesive dentures

- Inlays, onlays
- Inlay bridges
- FRC posts





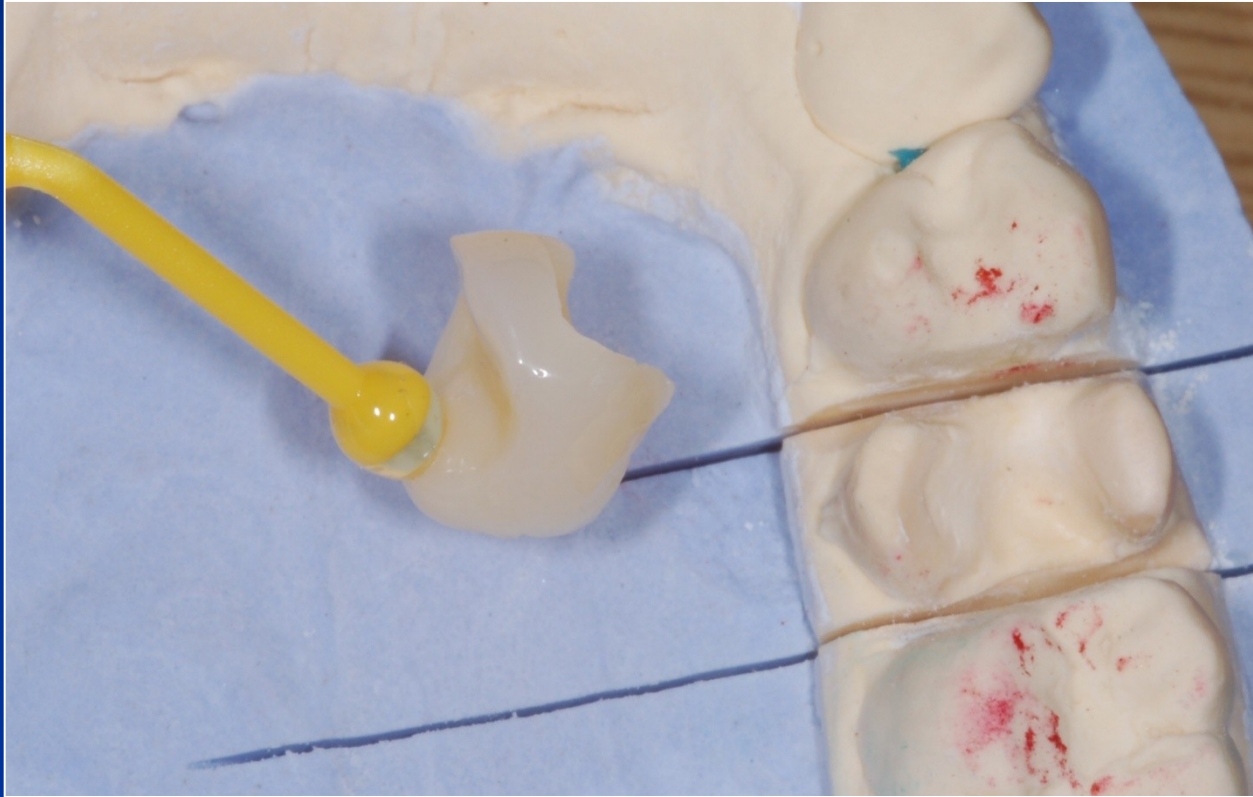








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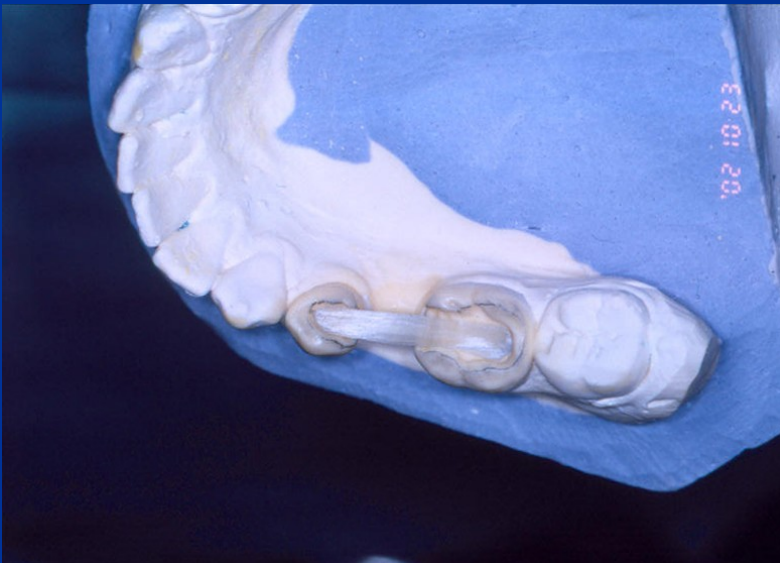
# One tooth replacement

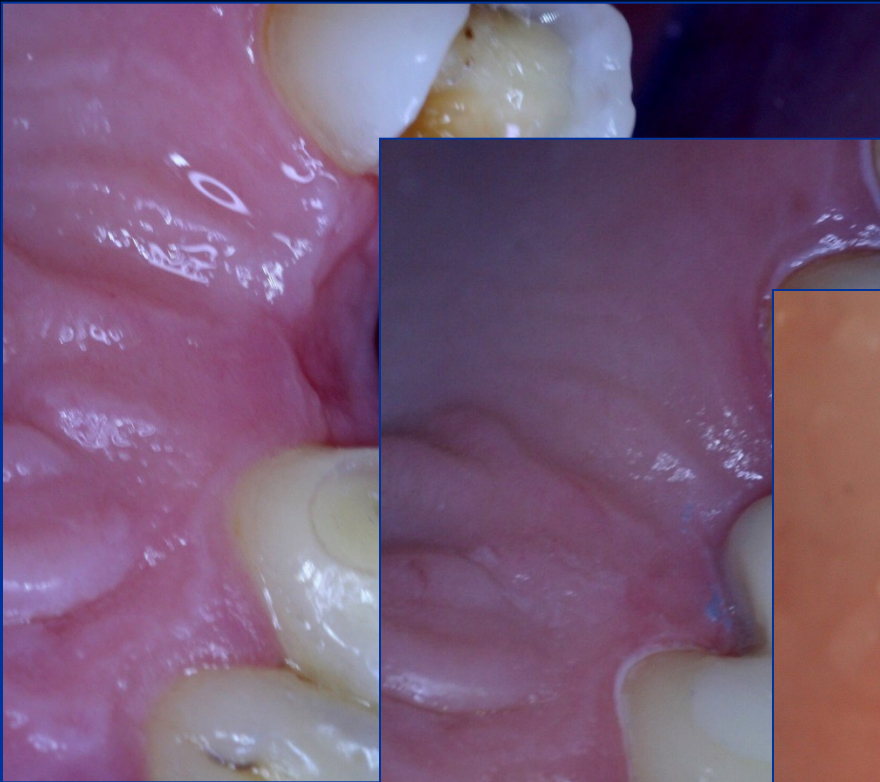




# Adhesive bridges







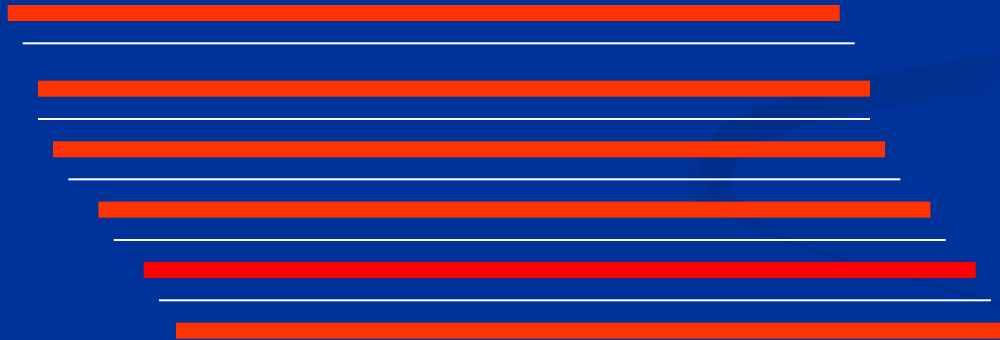


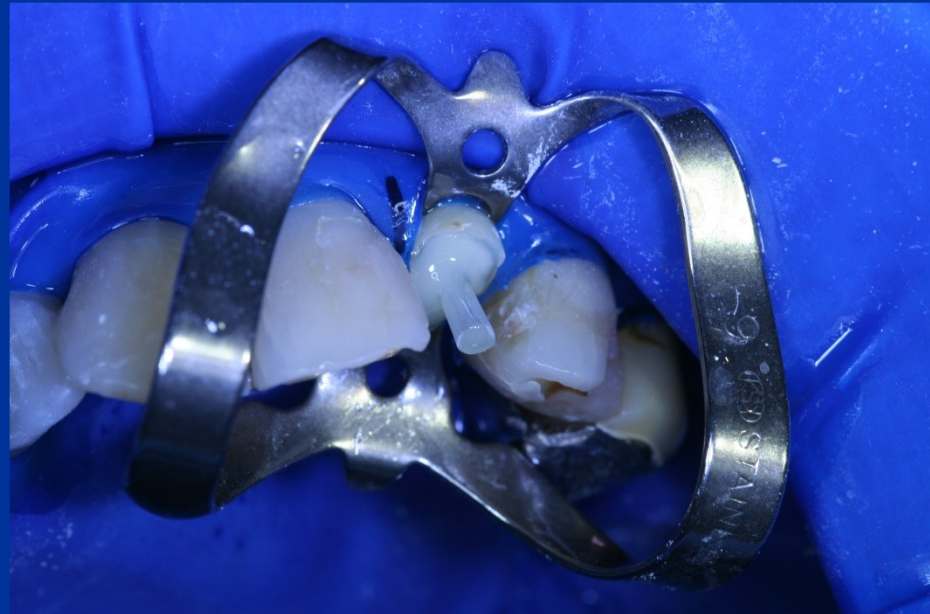





# FRC

## Filler - fibers





# FRC x PFC composites



Surface friction between  
matrix and filler –  
reinforcement  
Anisotropy



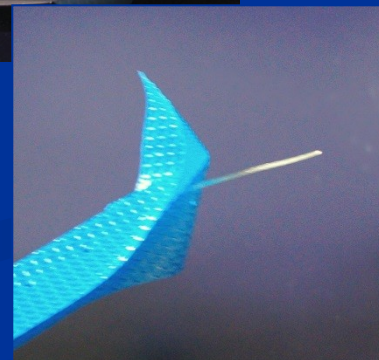
Surface friction is minima  
Isotropy



Always combination



# Products





# One tooth replacement

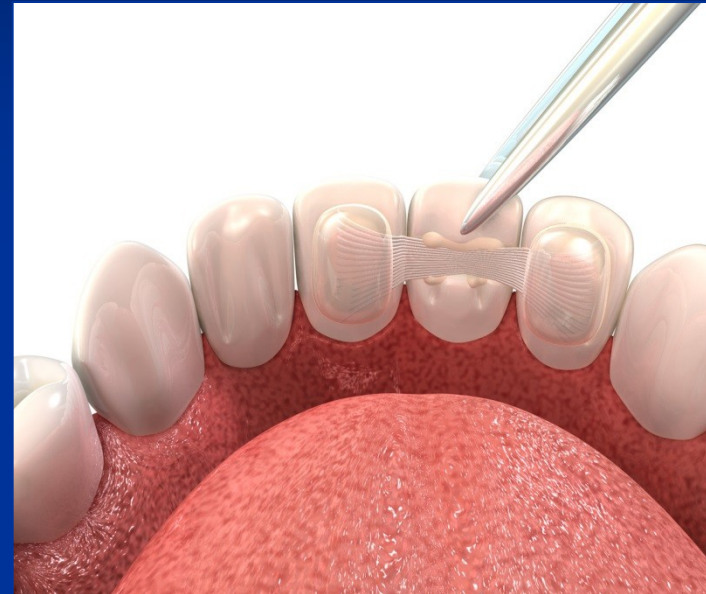
Location of FRC

Preparation

Adhesion

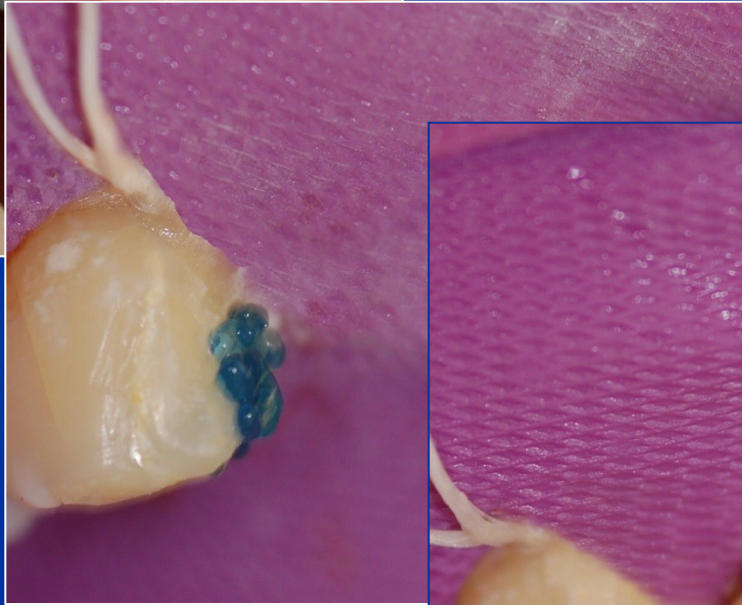
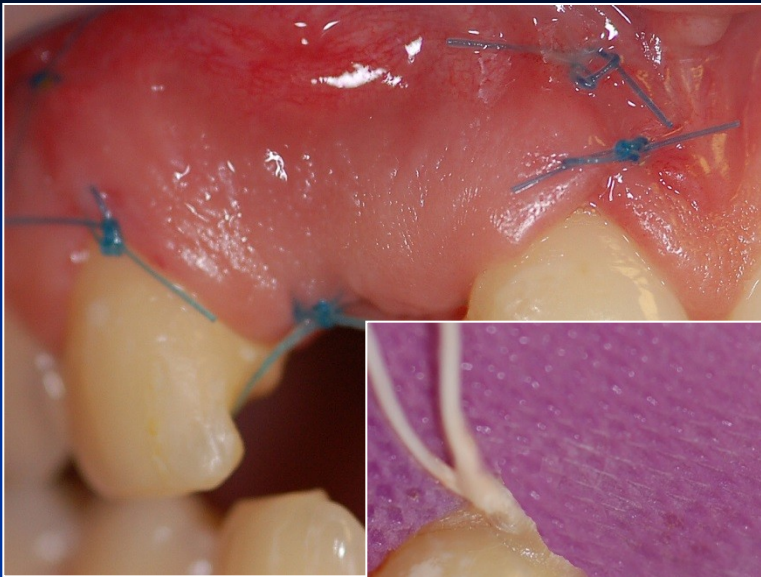
Placement of the arteficial tooth

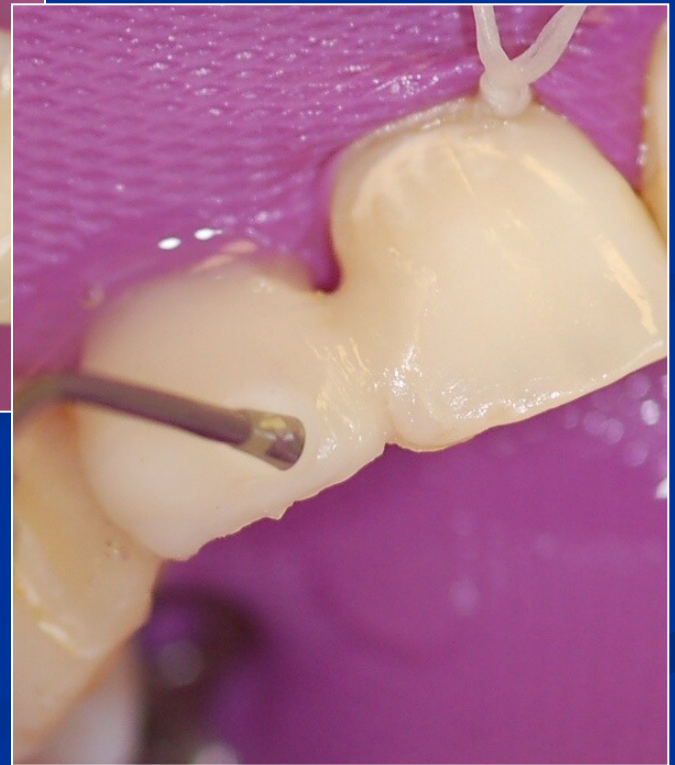
PFC composite on the top



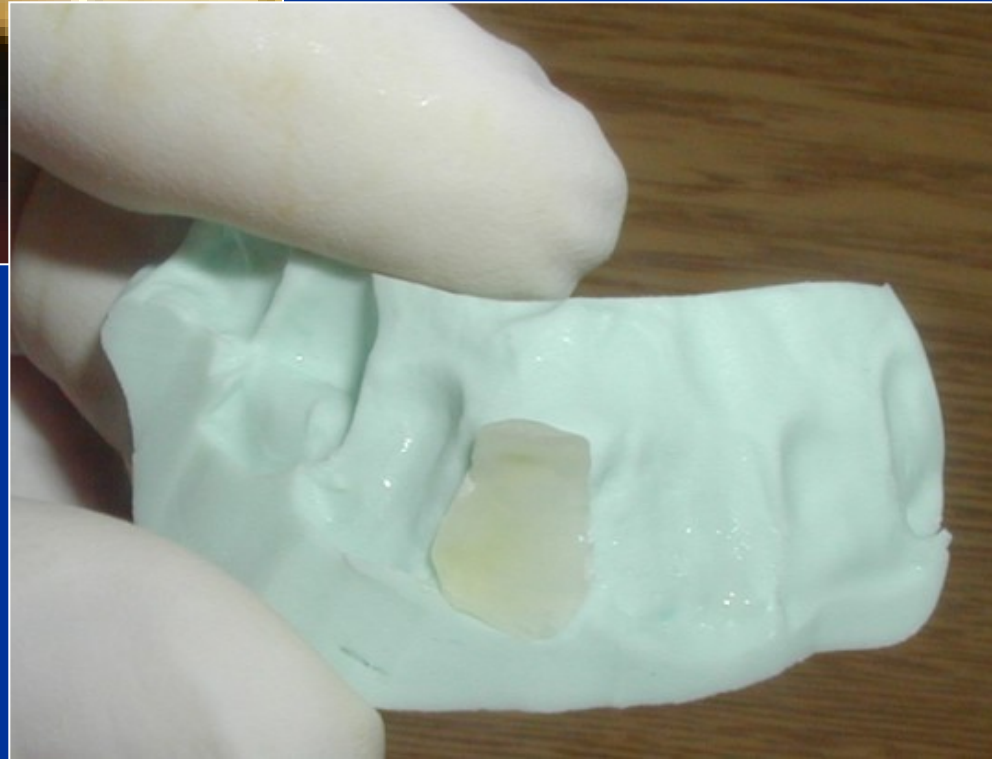














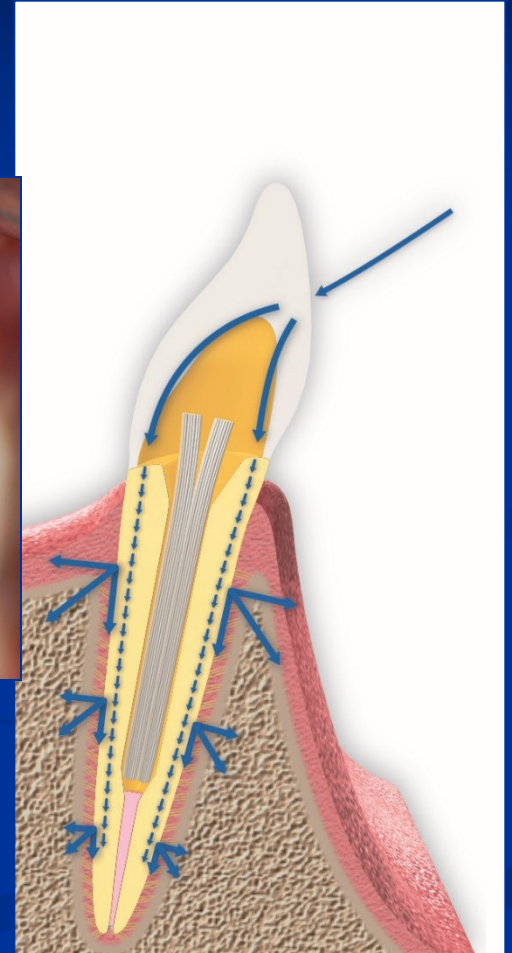
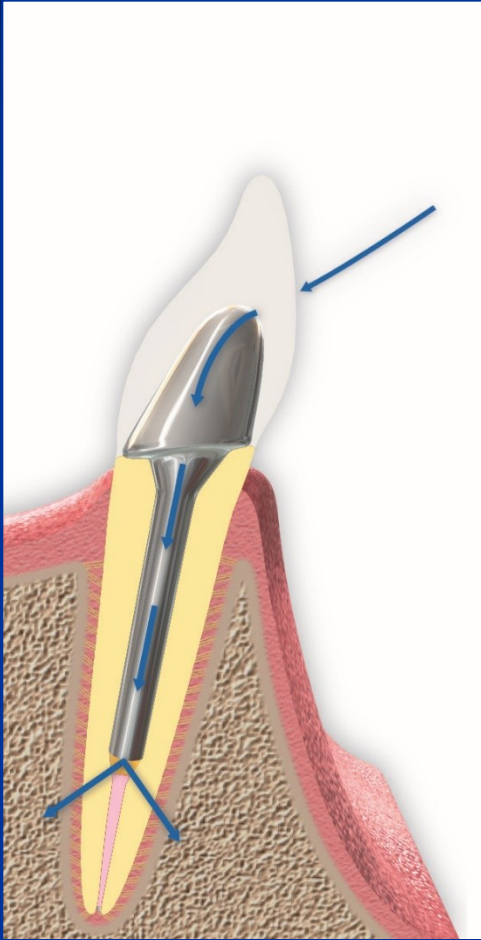


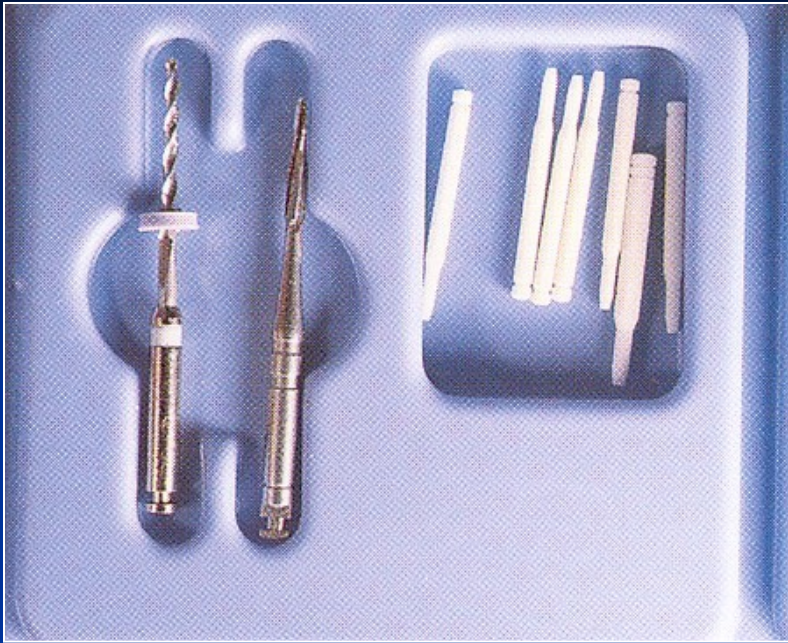




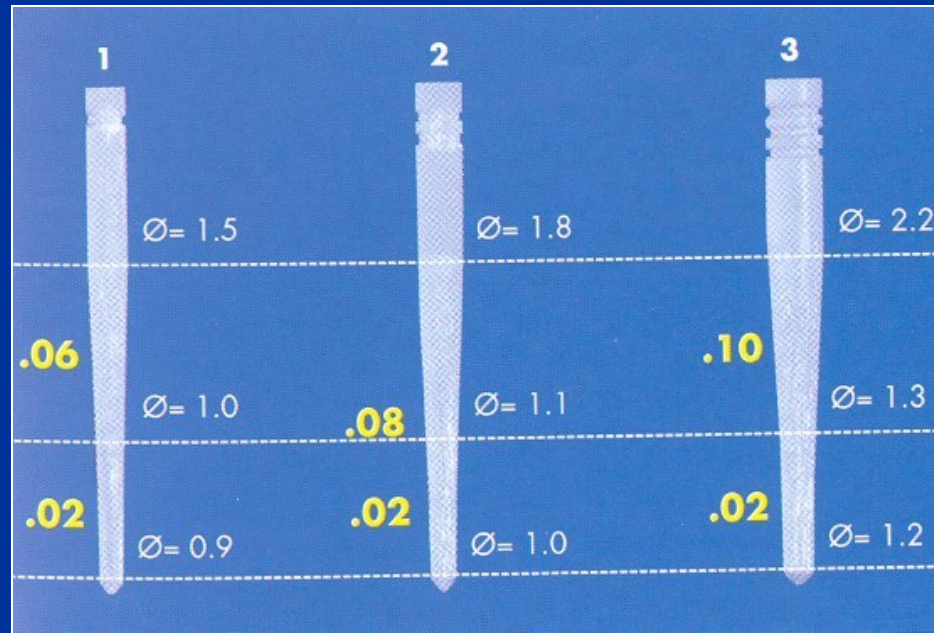


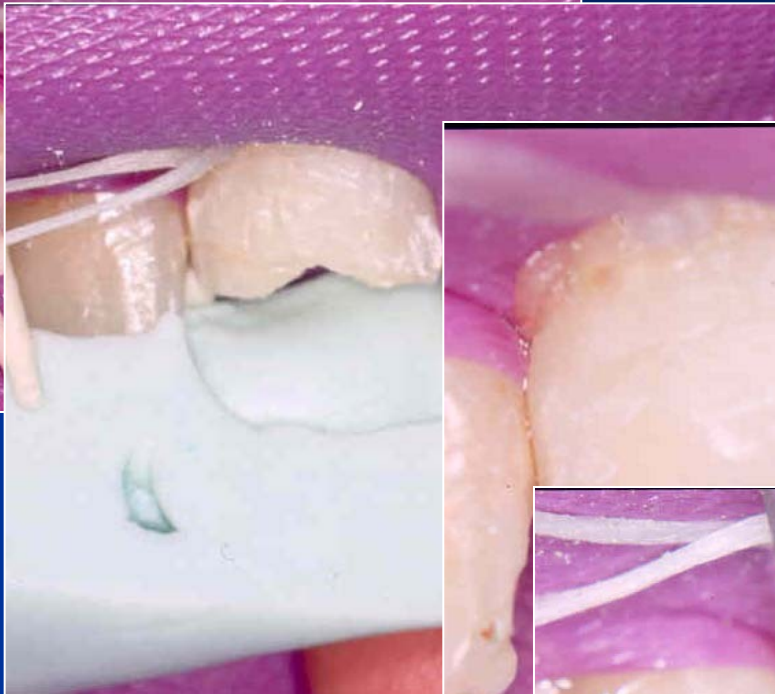
# FRC posts – postendo treatment





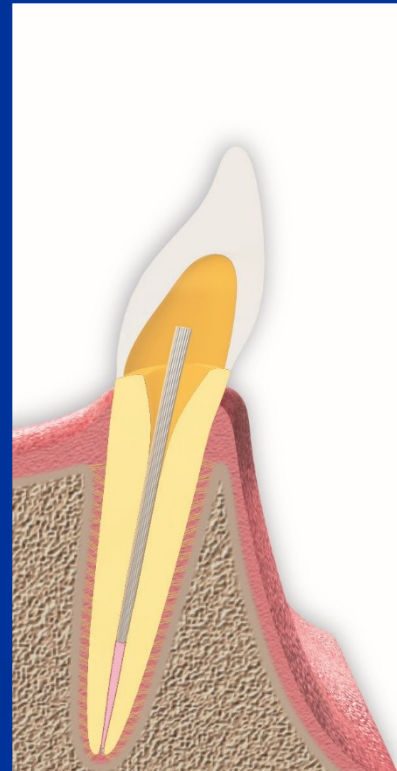
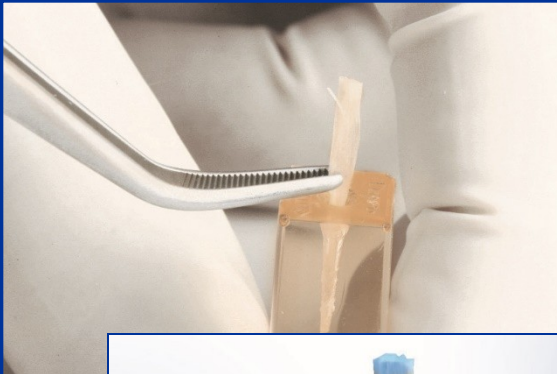
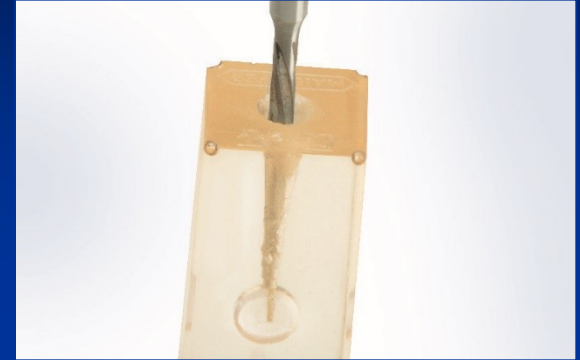
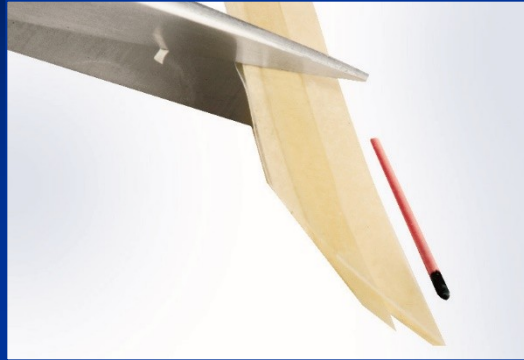
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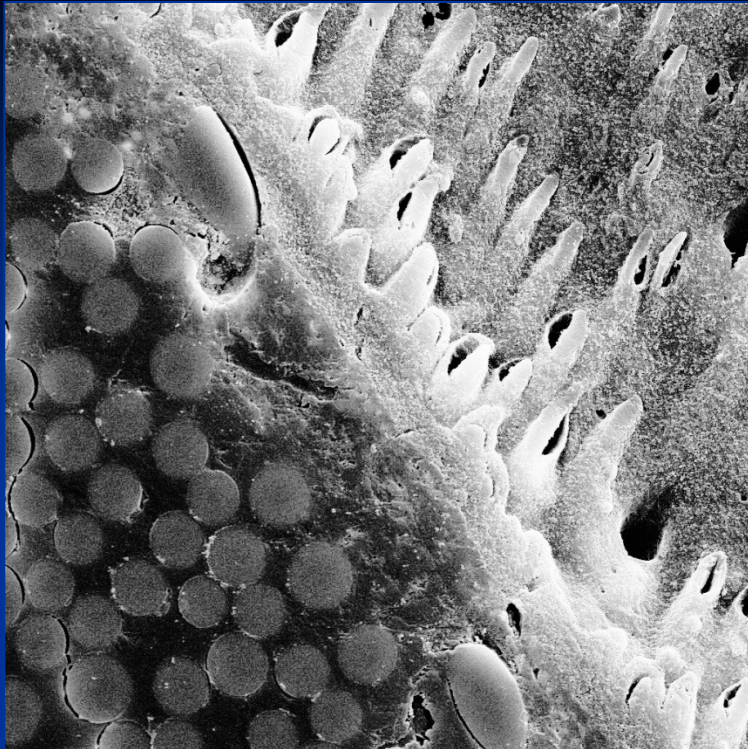




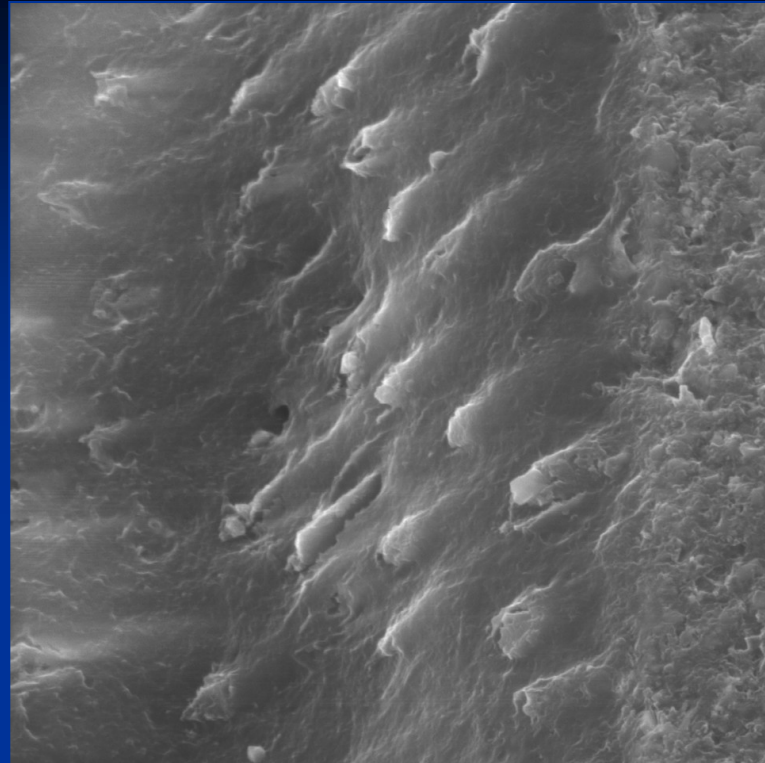


# Individually made FRC posts





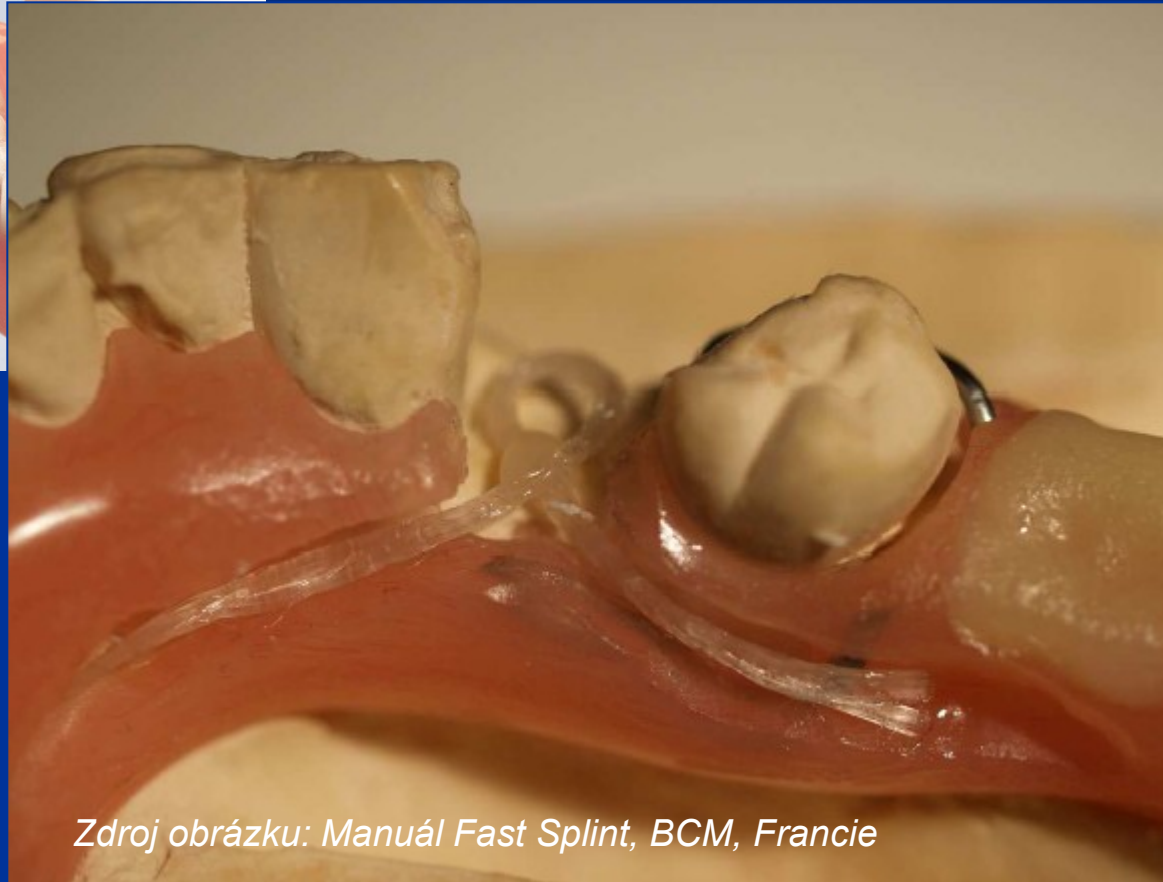
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HV: 20.0 kV    DATE: 06/19/07    Digital Microscopy Imaging  
VAC: HiVac    Device: TS5136XM



HV: 20.0 kV    DET: SE Detector    20 um    Satellite ©Tescan  
DATE: 05/22/06



# Repair od dentures



*Zdroj obrázku: Manuál Fast Splint, BCM, Francie*

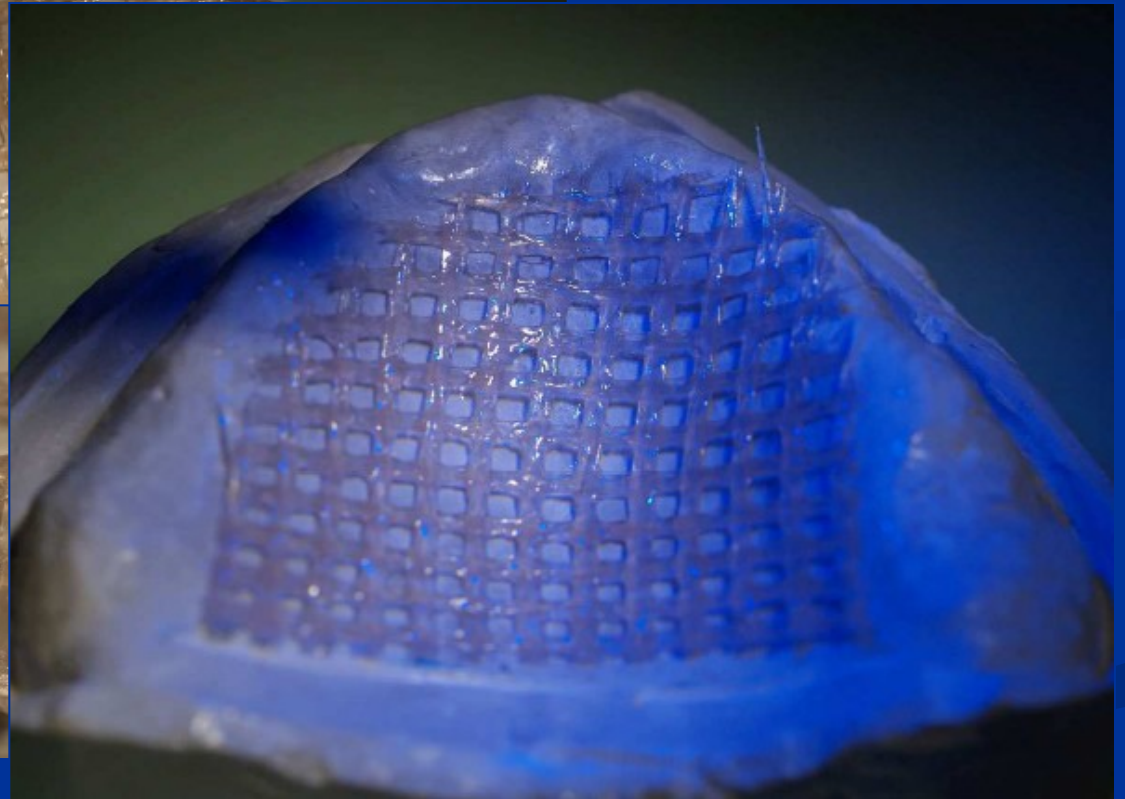
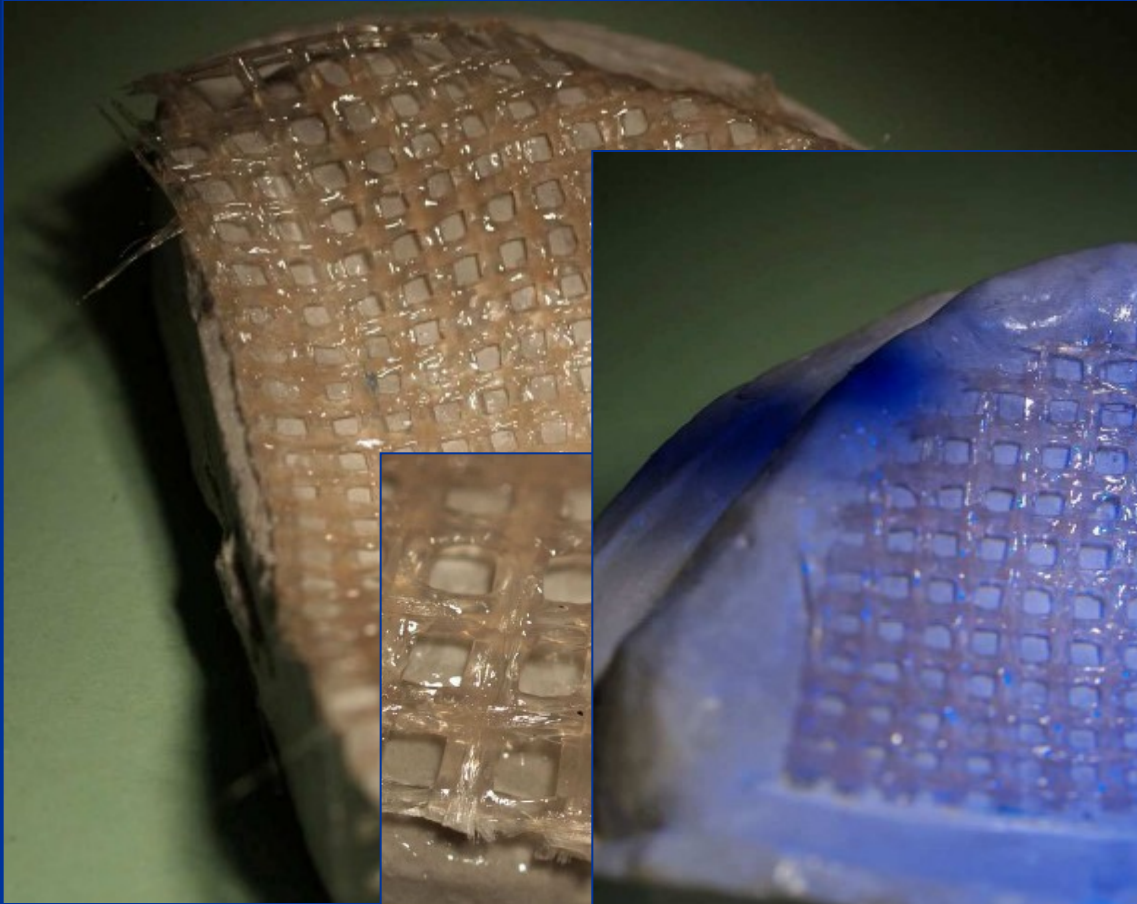


# Repair od dentures





# Reinforcement



# Products

