

# Restorative dentistry III.

## Reconstruction of posterior teeth using adhesive materials

# **CLASS I.**

## **All pit and fissure restorations**

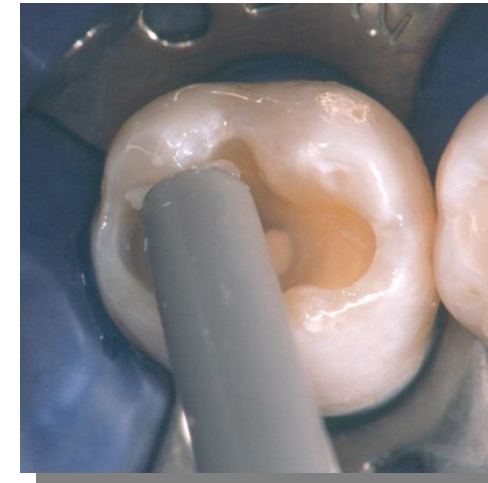
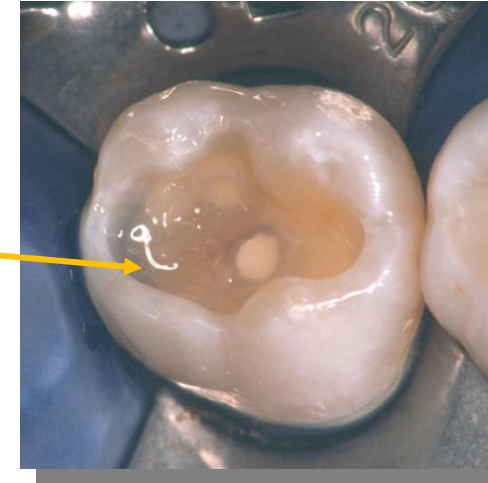
▪

R. on occlusal surface of premolars and molars

R. in foramina coeca – usually on occlusal two thirds of the facial and lingual surfaces of molars and on palatal surface of maxillary incisors

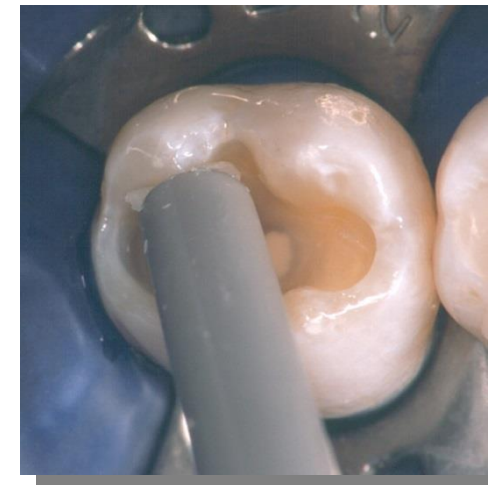
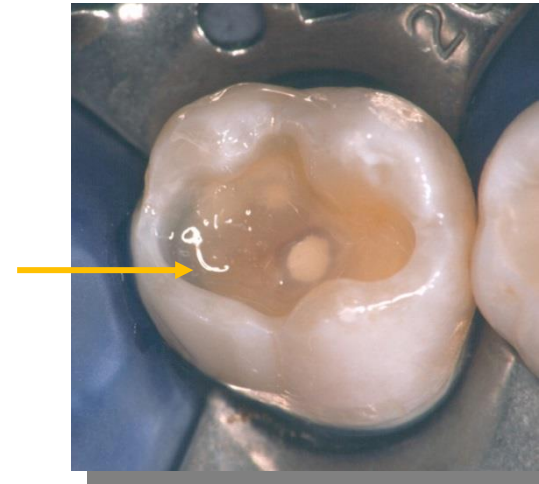
## Amalgam - disadvantages

- Infractures of marginal ridge
- Corrosion
- Bad aesthetics



# Amalgam - advantages

- Easier to place
- Good mechanical properties esp.
- Price



# Indications

- Moderate to large restorations
- If there is heavy occlusal loading (alternative onlay)
- Oral hygiene is not optimal (alternative dense glassionomer as middle term temporary)
- When the proper isolation is not possible
- Price

# Contraindications

- Aesthetically prominent areas of posterior teeth
- Small - moderate classes I. that can be well isolated

# Amalgam ?

**Pertinent material qualities and properties**

**Strength**

**Longevity**

**Ease of use**

**Clinically proven success**

**BUT!**

# GIC only?

- Primary dentition
- Resin modifies GIC preferable

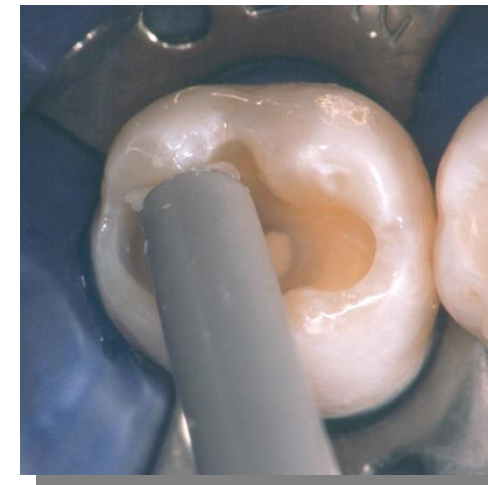
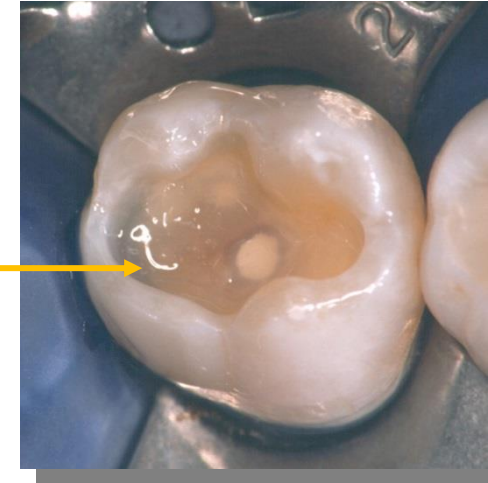


# Composite - benefits

- Non metallic material
- Adhesion – no gap
- Less amount of hard dental tissues that is necessary to remove
- Good resistency of the treated tooth
- Aesthetics

# Composite - disadvantages

- Good isolation is necessary
- Technique sensitive treatment
- Price



# Indications

- Aesthetically prominent areas of posterior teeth
- Small - moderate classes I. that can be well isolated
- Good level of oral hygiene is necessary

# Contraindications

- Moderate to large restorations
- Restorations that have heavy occlusal contacts
- Restorations that cannot be well isolated
- Restorations that extend onto the root surface
- Abutment teeth for removable partial dentures

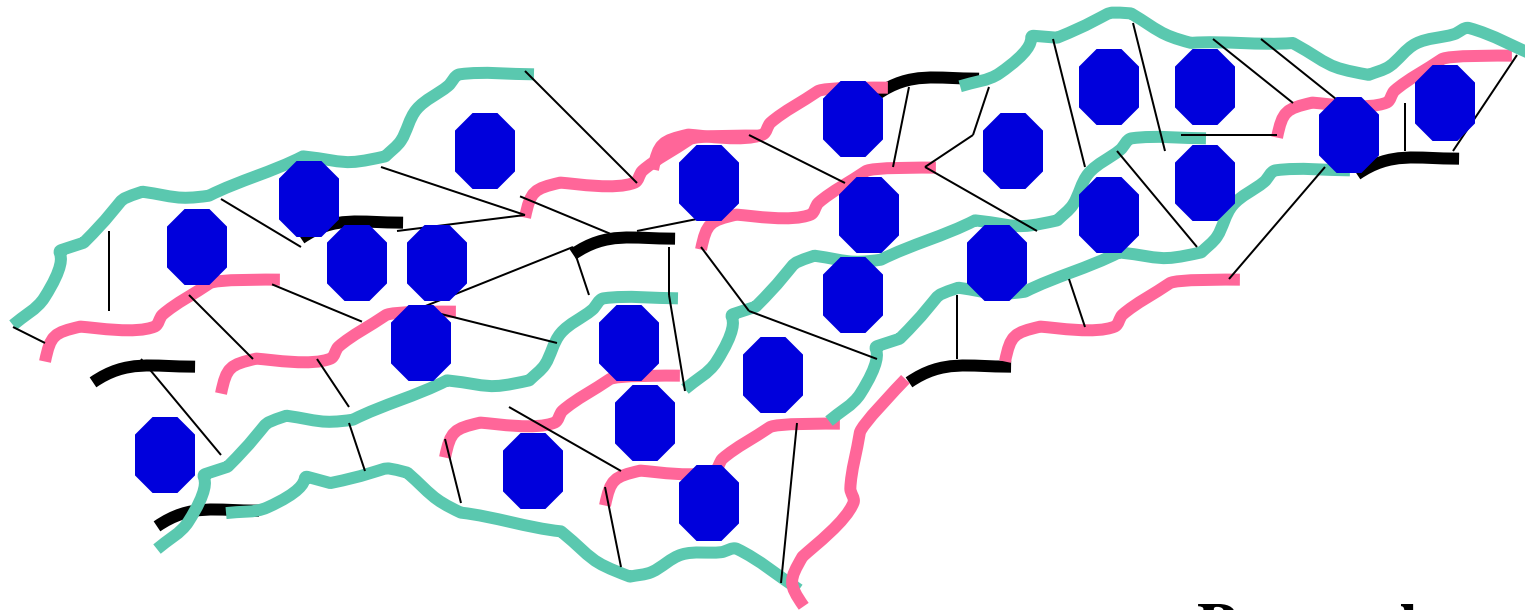
# Composite and cavosurface margin

- Outline includes the caries lesion only
- The fissures that go to the caries lesion should be opened

# Retention principles

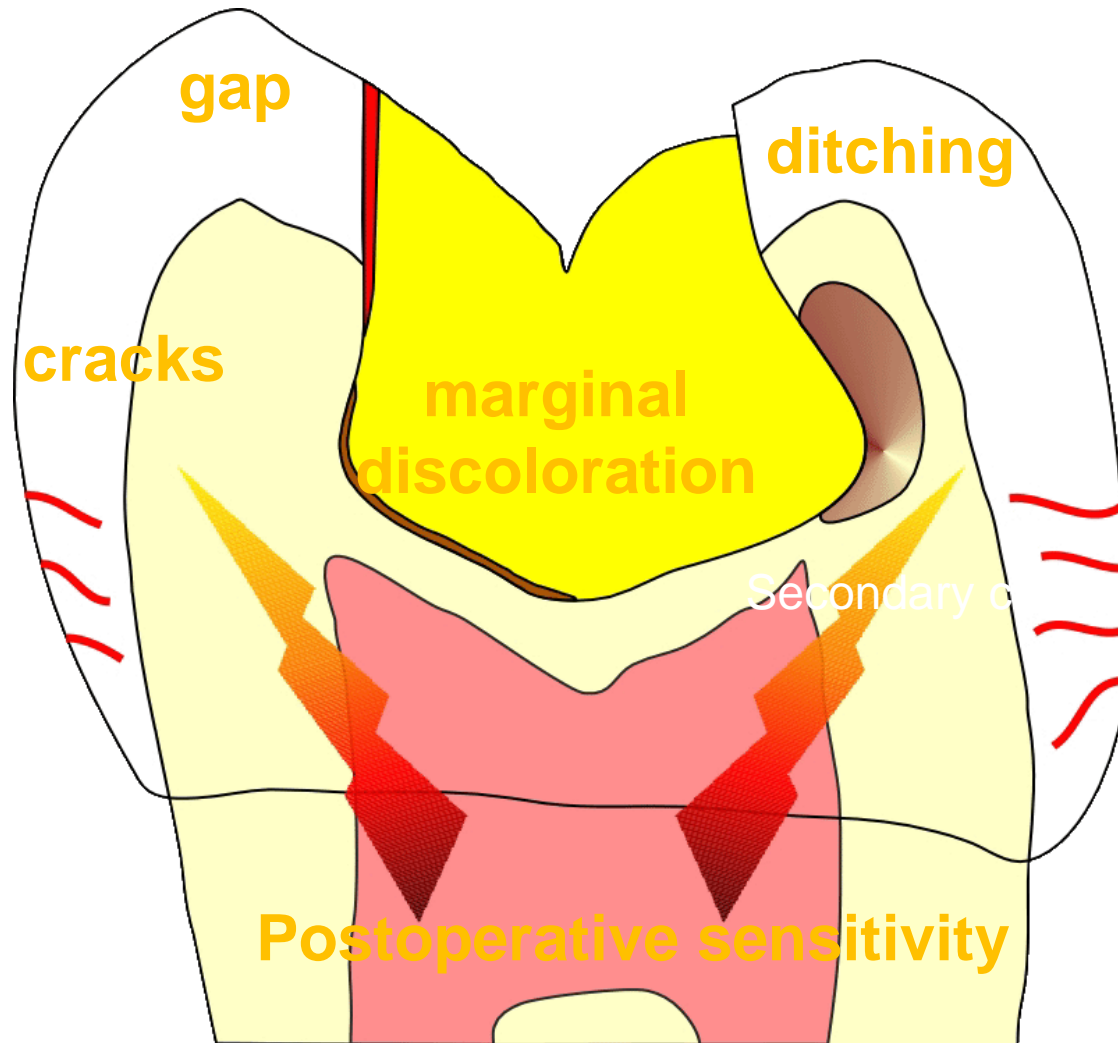
- Prepare the box or deep dish – the bottom is in dentin
- Do not prepare any undercuts!
- Do not bevel enamel, finish the border with the fine diamond bur only.

# Polymerization shrinkage and polymerization stress



Pre -gel  
Gel point  
Post -gel

# Risks – high C-factor



Versluis 2000

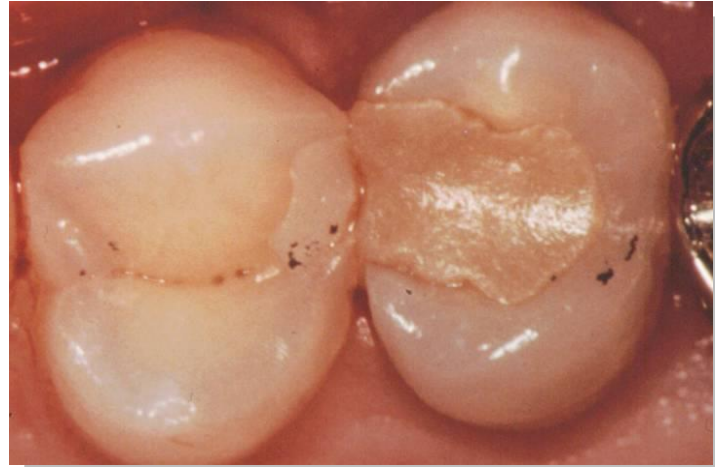


# Adhesives

- Acid etching technique
- Selfetching adhesive systems

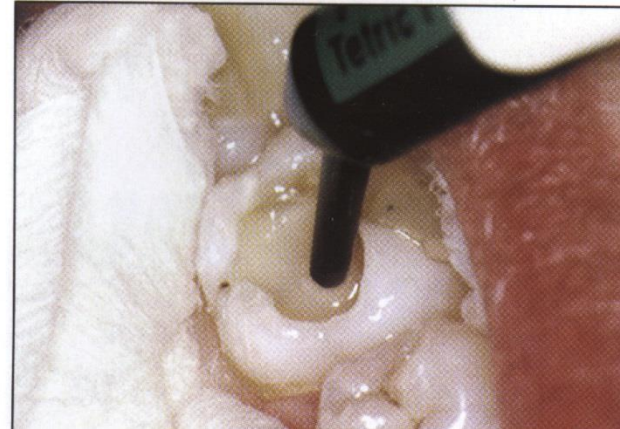
# Marginal adaptation depends on the

- mode of the placement of composite material
- dry operating field
- adhesive systems

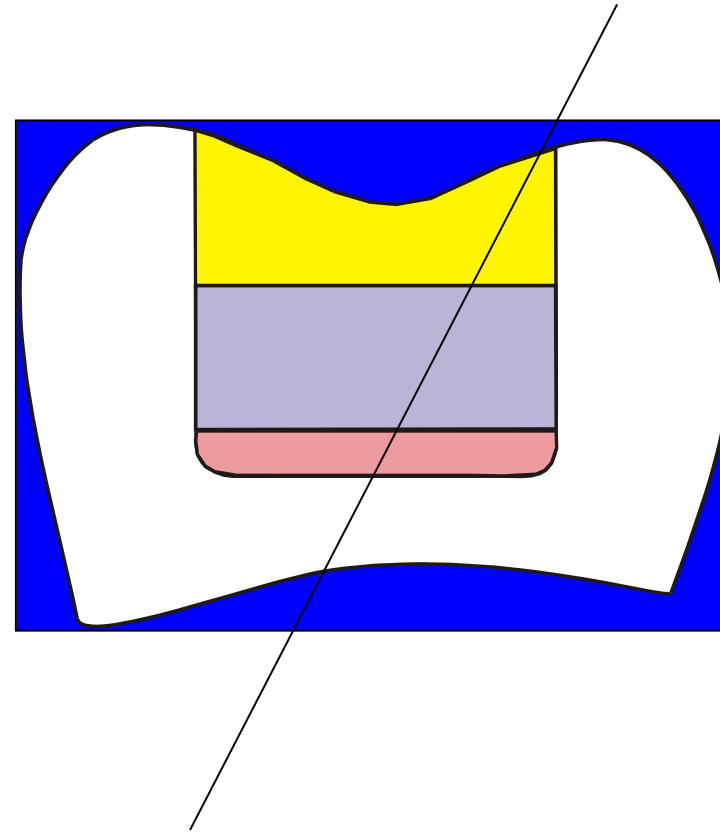
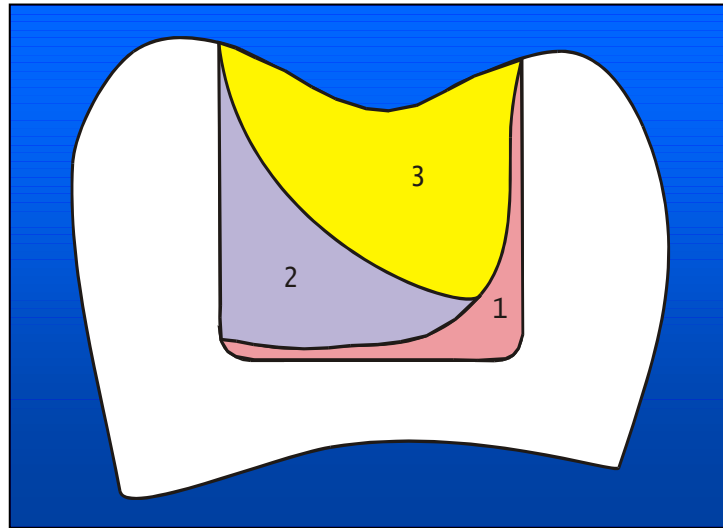


# Flowables - importance

1. **Excellent marginal adaptation**
2. **Protection of the adhesive**
3. **Elastic layer ?**



# Placement of the material



# Adhesives

– Acid etching technique

Etching

Washing

Priming Bonding

# Adhesives

– Selfetching adhesive systems

Priming

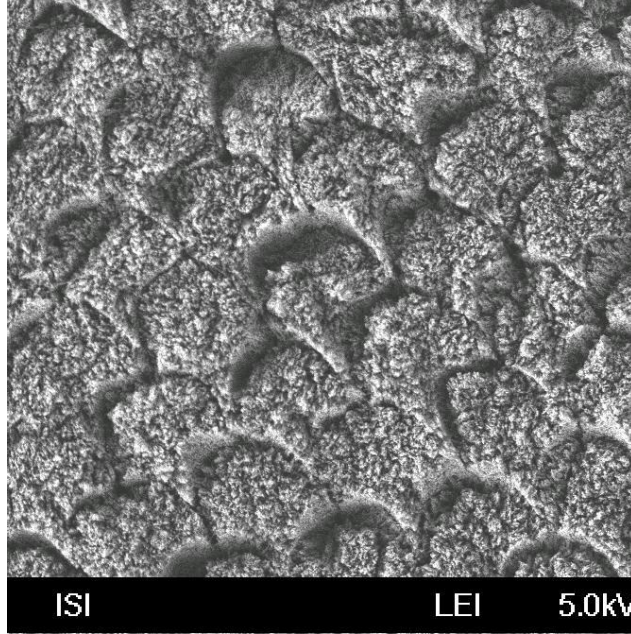
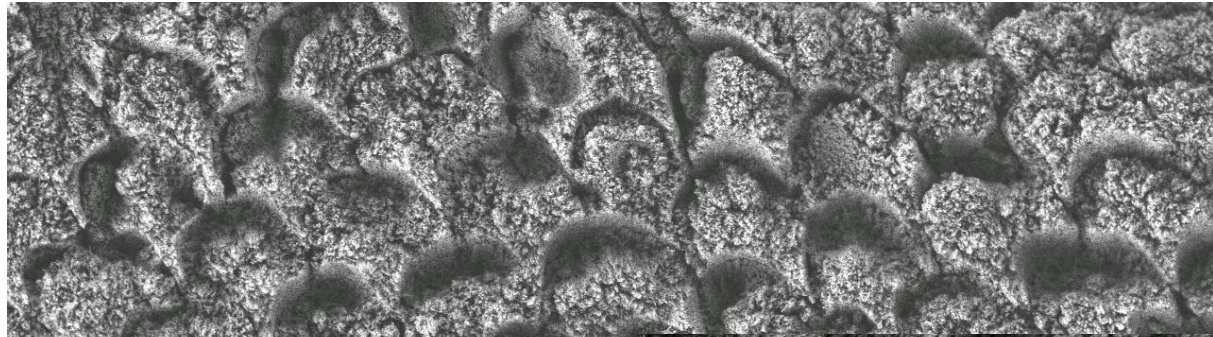
Bonding

# Adhesives

- Active and passive bonding

Active – rubbing with microbrush - selfetching

Passive – without any rubbing – acid etching

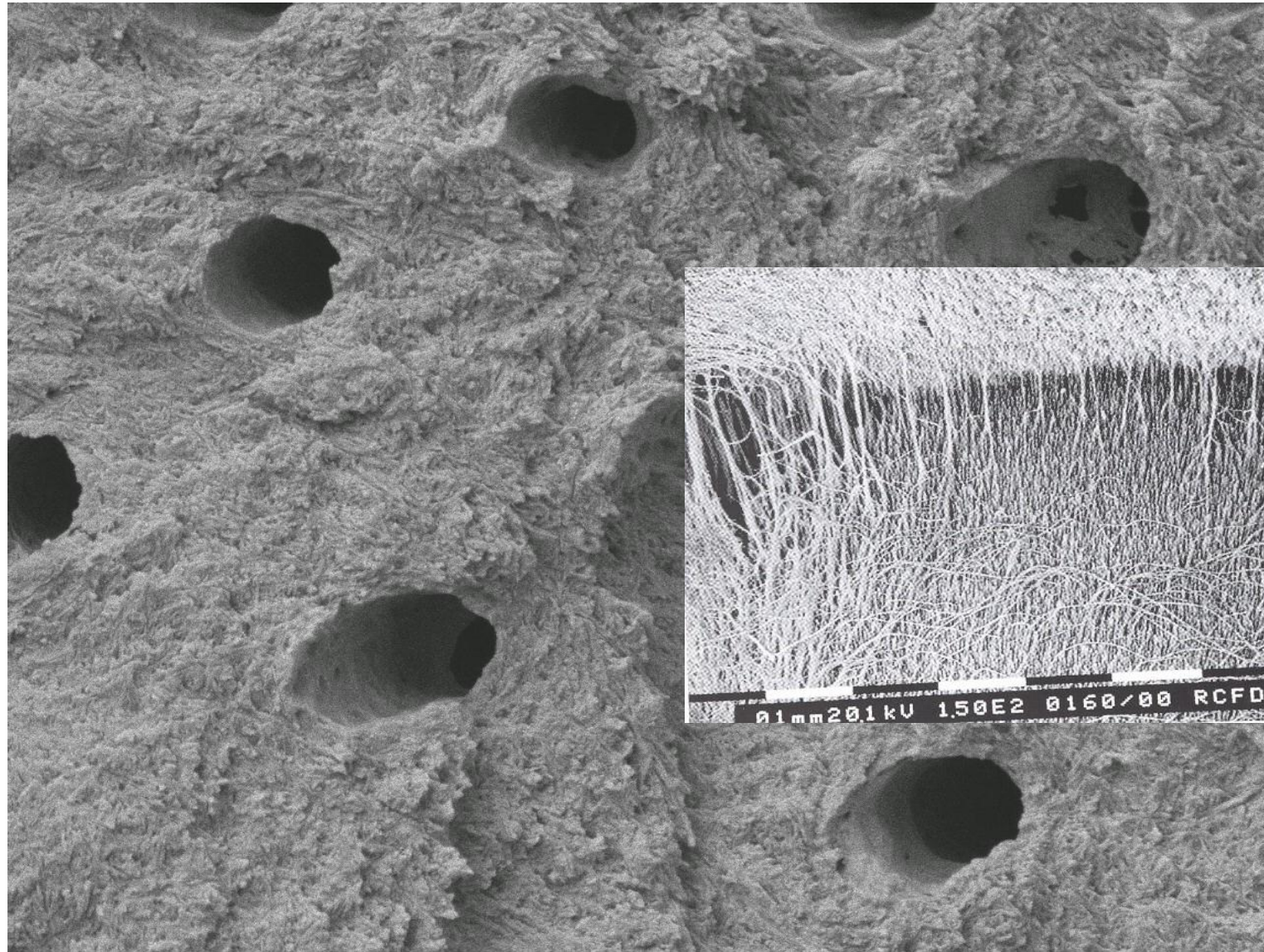


ISI LEI 5.0kV



ISI LEI 5.0kV X2,000 10μm WD 7.9mm





ISI

LEI

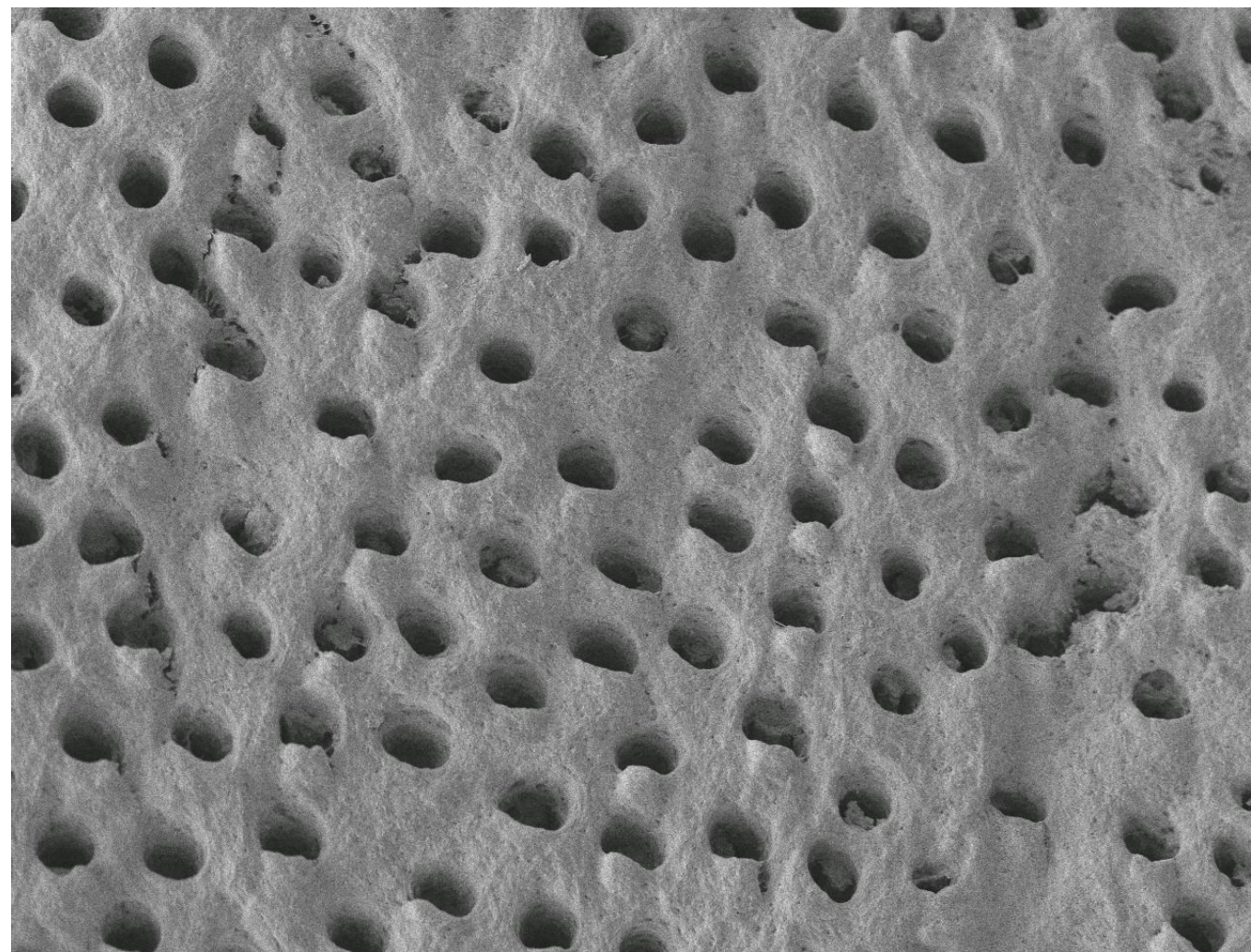
5.0kV

X6,000

1μm

WD 9.0mm

0.1mm 20.1kV 150E2 0160/00 RCFD---



ISI

LEI

5.0kV

X2,000

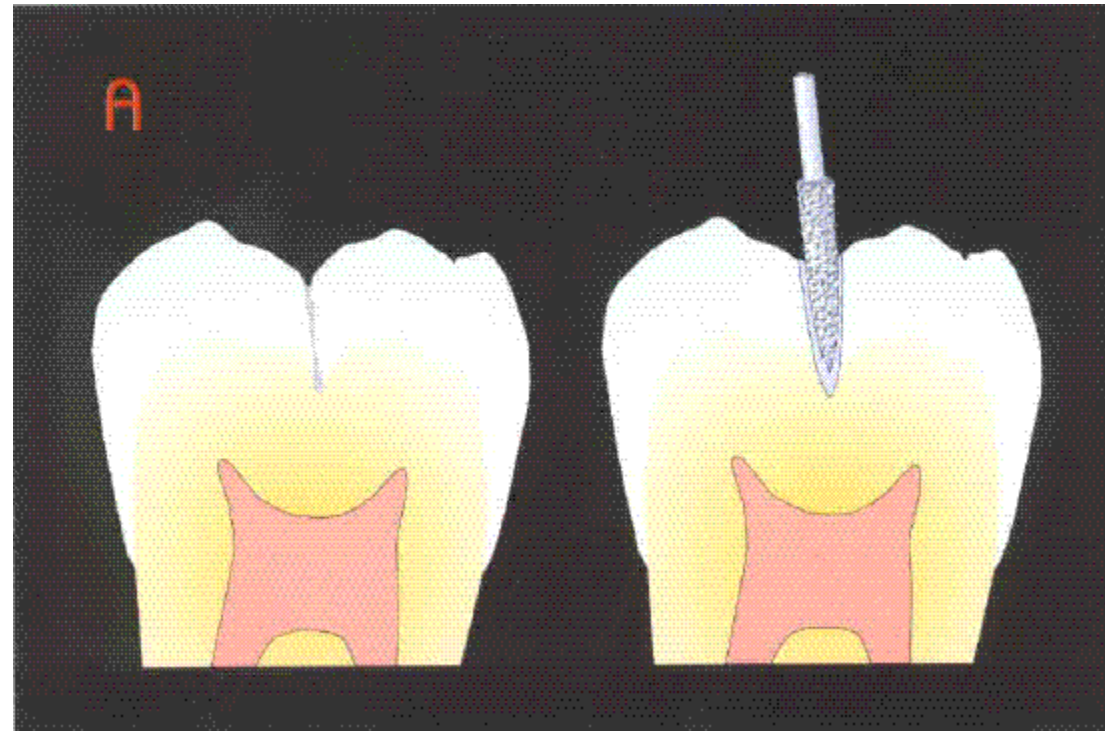
10 $\mu$ m

WD 8.6mm





# Adhesive preparation in a fissure



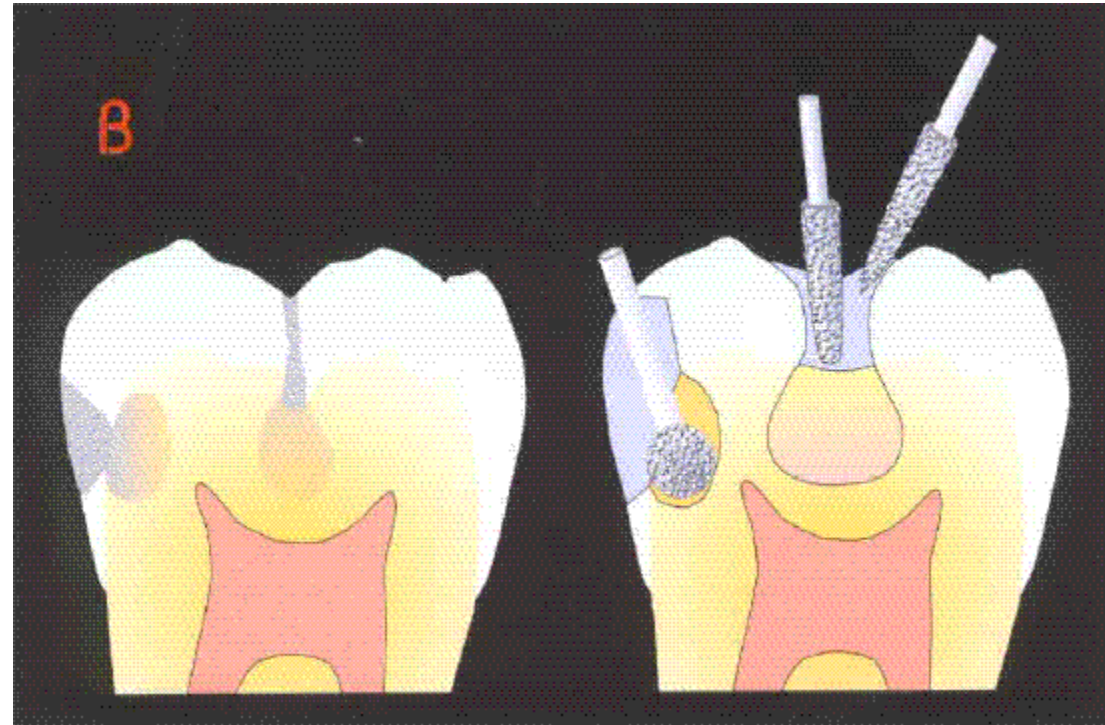
# Pit and fissure sealing indications

- Teeth soon after eruption with deep fissures
- Disabled patients
- Adults - hyposalivation

# Pit and fissure sealing - cointraindications

- Shallow fissures, good oral hygiene DMF = 0
- High caries risk (DMF high) – risk of proximal caries
- Proximal caries, occlusal caries (ICDS – 3 and more)

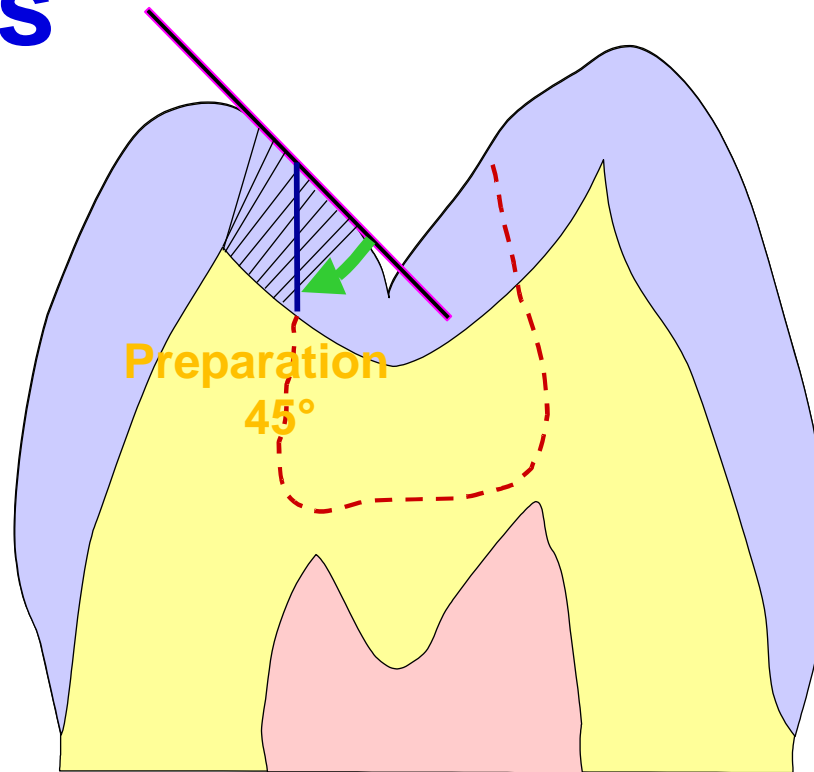
# Adhesive preparation

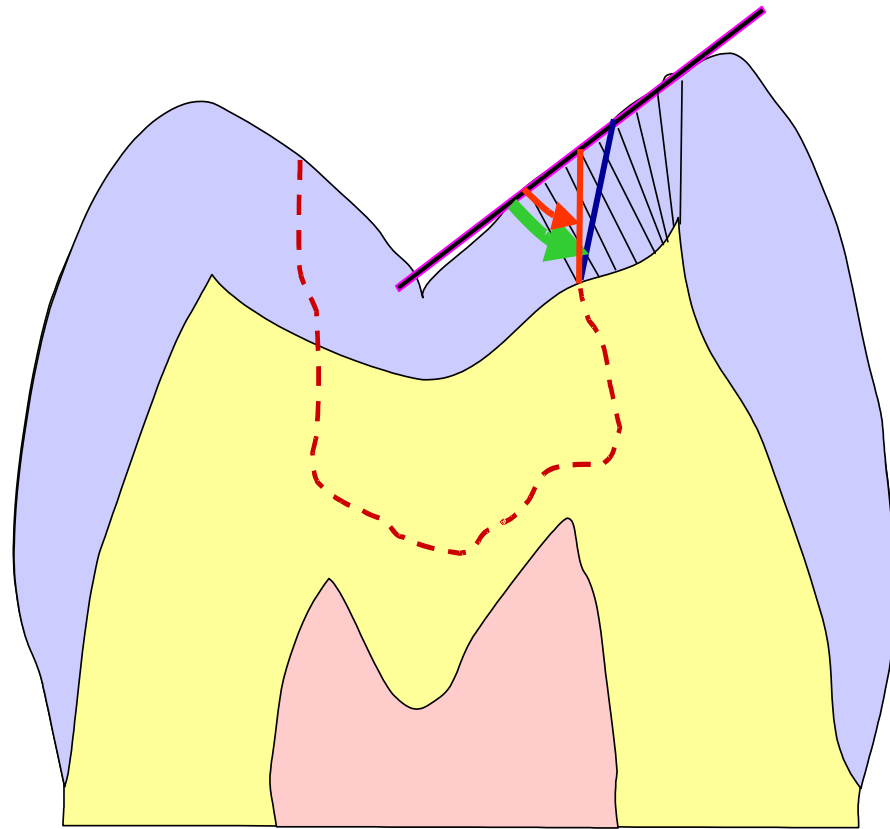




# Preparation of enamel borders

The beveling depends on the orientation of enamel rods





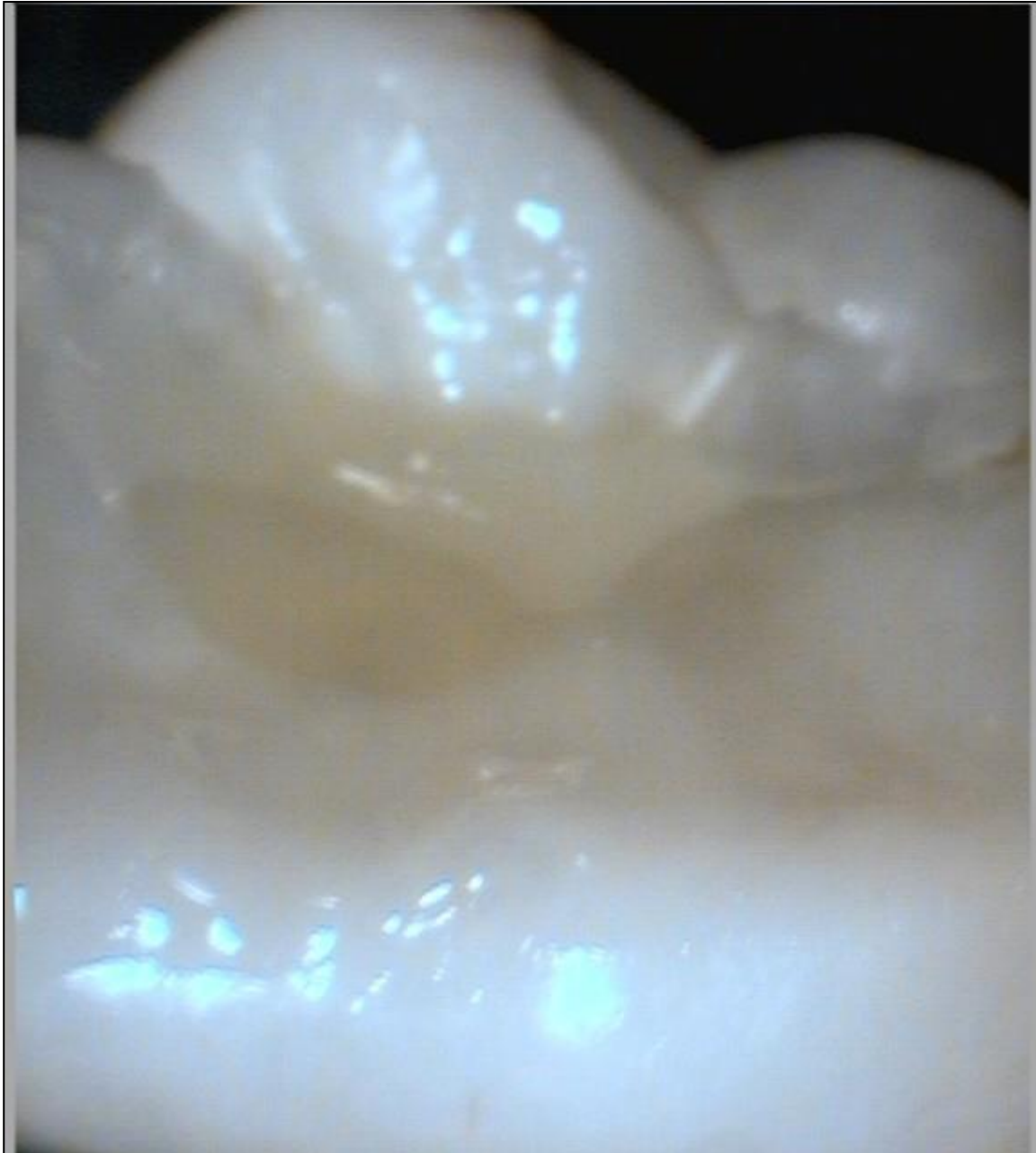
Next to cusp  
50-60°,

# Preventive filling - indications

- Primary molars
- Premolars
- Permanent molars (D3 and more)

# Preventive filling - contraindications

- High caries risk, DMF > 5
- Large dental caries (more than 1/3 intercuspidal distance, underminig chronic caries
- Proximal surfaces must be intact or max D1
- Proximal cavitated lesions

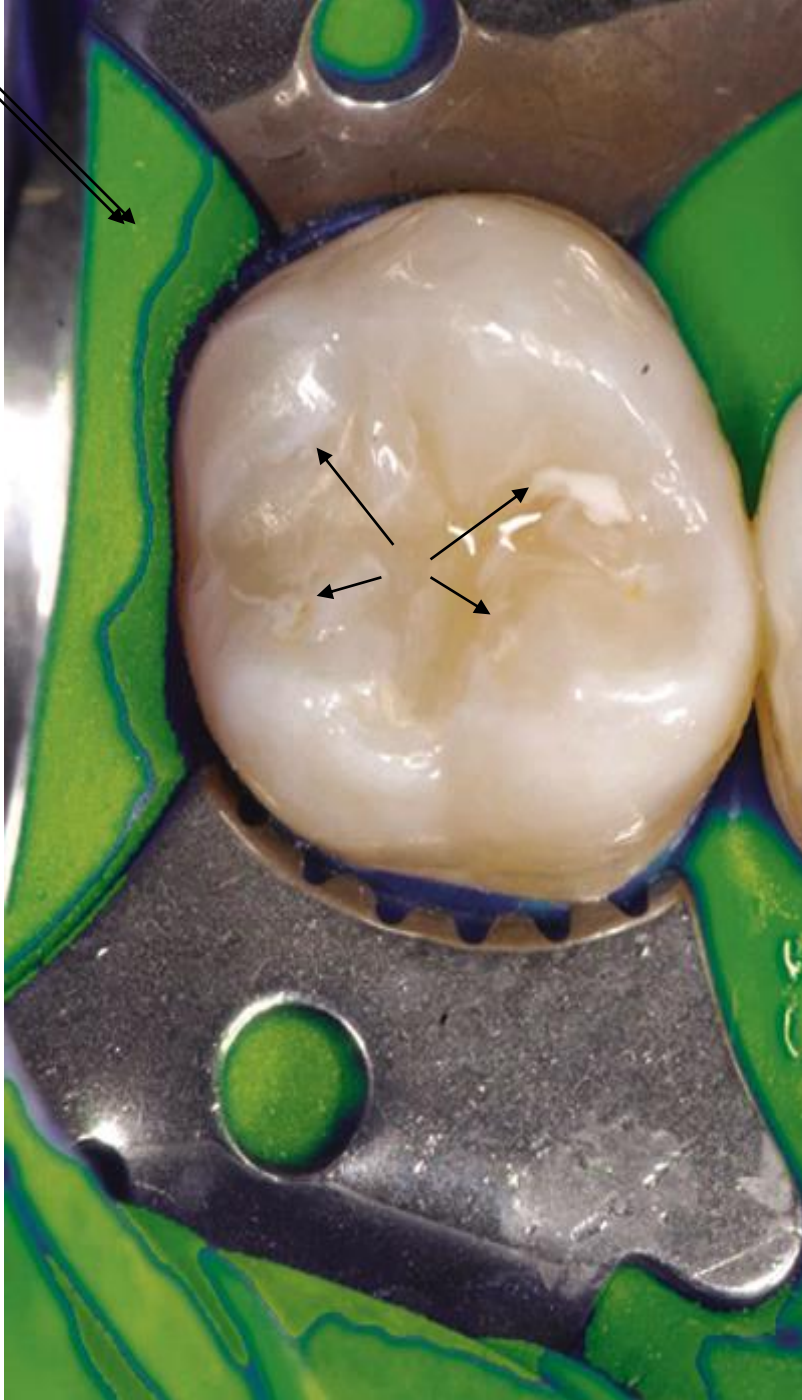


Preventive composite filling

Preventive glassionomer filling

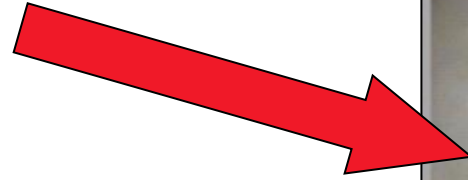
Sealant filling

Preventive filling –  
GIC + composite



The composite material  
is built cusp by cusp

**Isolated cavities**



**Preparation of fissural complex**



# CLASS II.

## Proximal caries in posterior teeth

Direct restorations

- Amalgam
- Composite
- Glassionomer
- Indirect restorations –inlays, onlays

Composite

Ceramics

40 Metal alloy



# Indications: Amalgam

- Moderate to large restorations
- If there is heavy occlusal loading (alternative onlay)
- Oral hygiene is not optimal (alternative dense glassionomer as middle term temporary)
- When the proper isolation is not possible
- Price

# Contraindications: Amalgam

- Aesthetically prominent areas of posterior teeth
- Small - moderate classes I. that can be well isolated

# Indications: Composite

- Aesthetically prominent areas of posterior teeth
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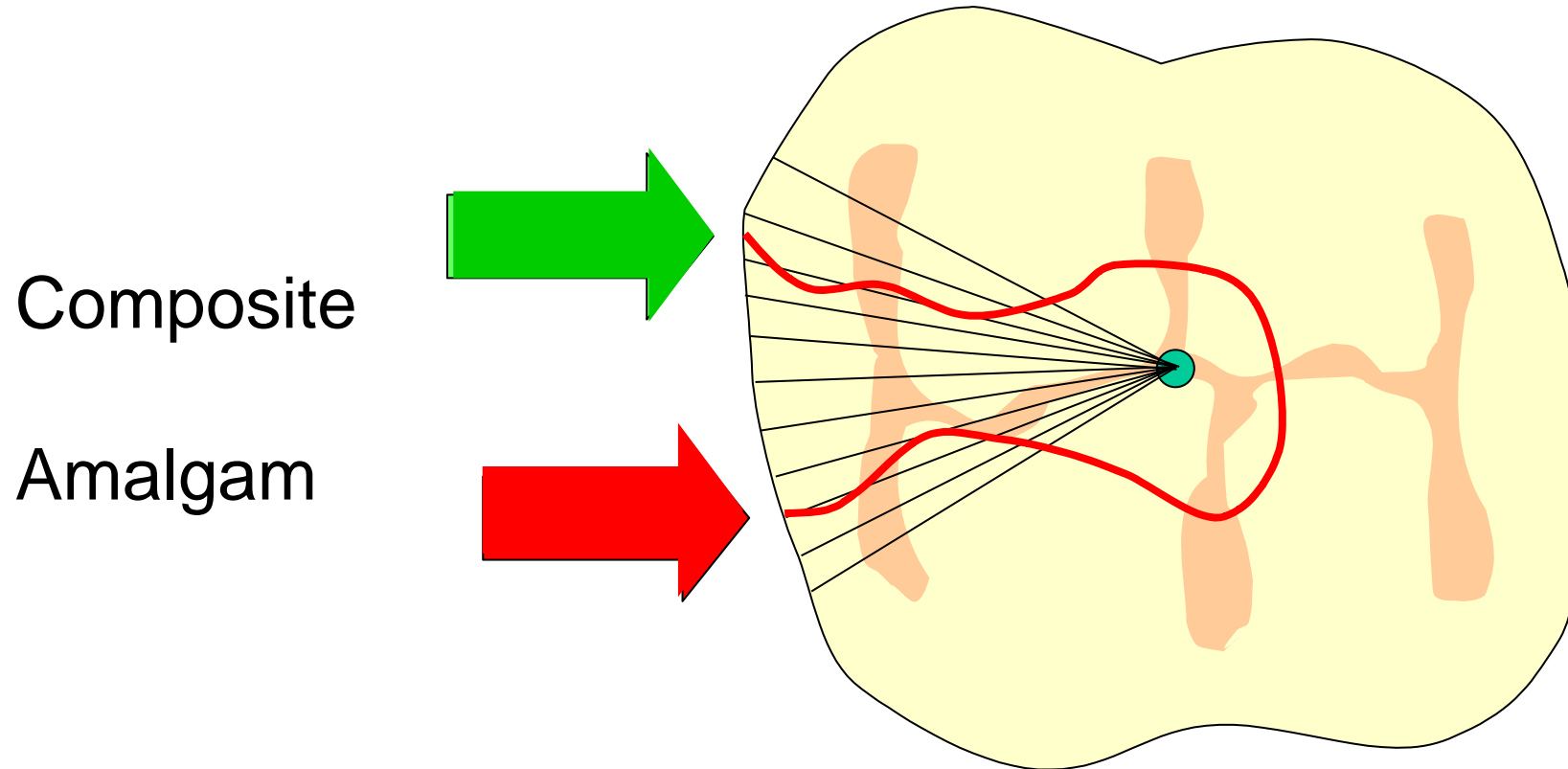
# Contraindications: Composite

- Moderate to large restorations
- Restorations that have heavy occlusal contacts
- Restorations that cannot be well isolated
- Restorations that extend onto the root surface (subgingival – margin relocation or lengthening of the crown is necessary)
- Abutment teeth for removable partial dentures

# Composite - possibilities

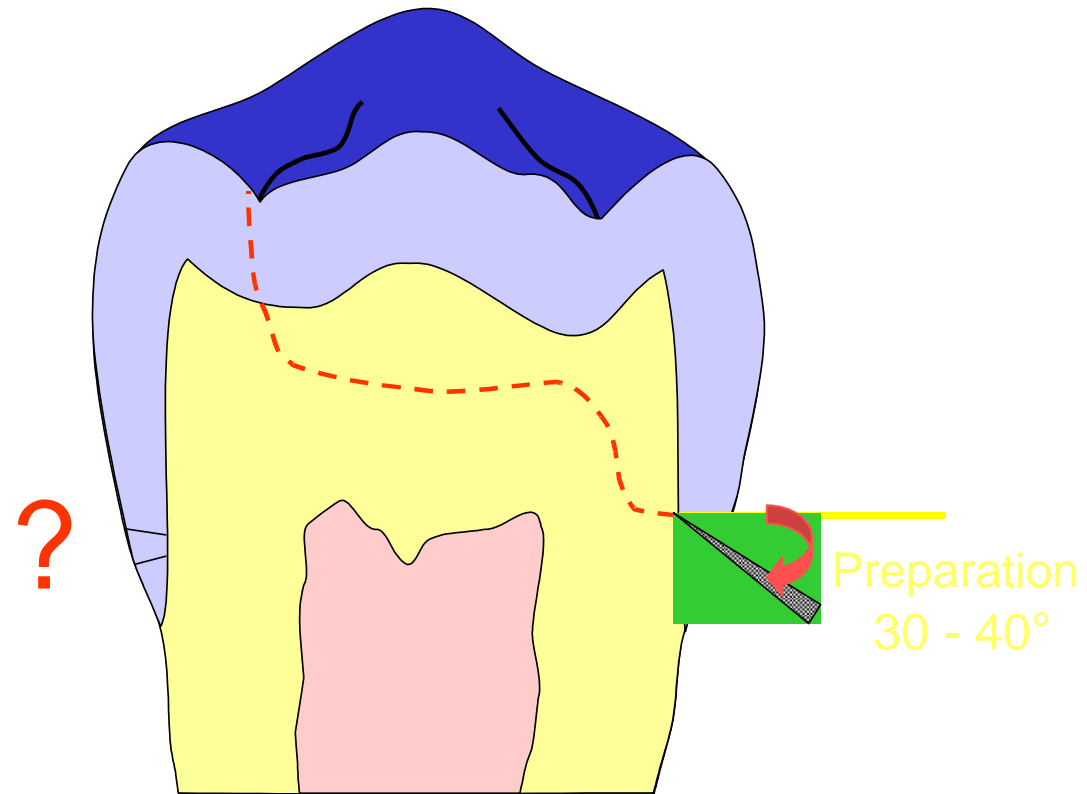
- Conventional cavity (occlusal and proximal cavity)
- Adhesive slot
- Tunnel preparation
- Cusp replacement – direct, indirect.

# Interproximal borders



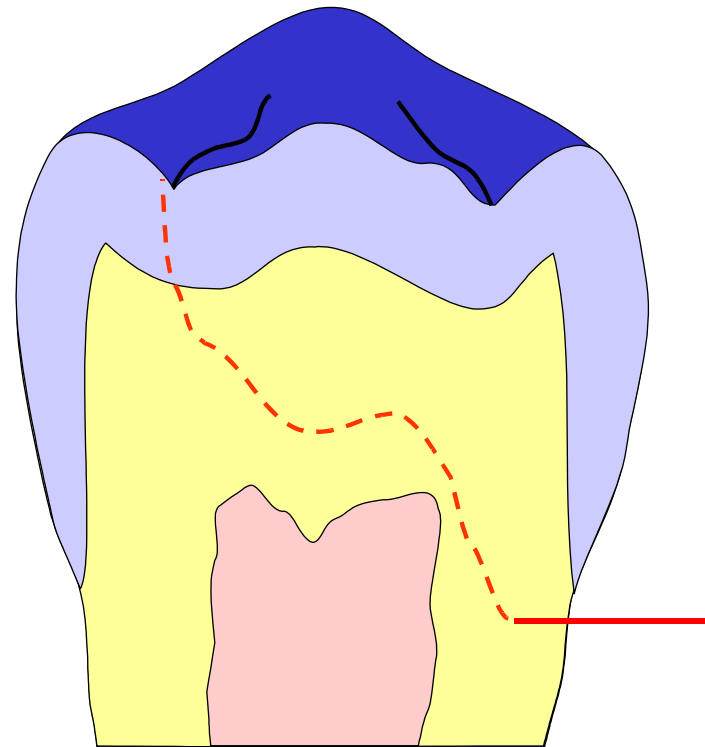
# Cervical borders

In enamel



# Cervical borders

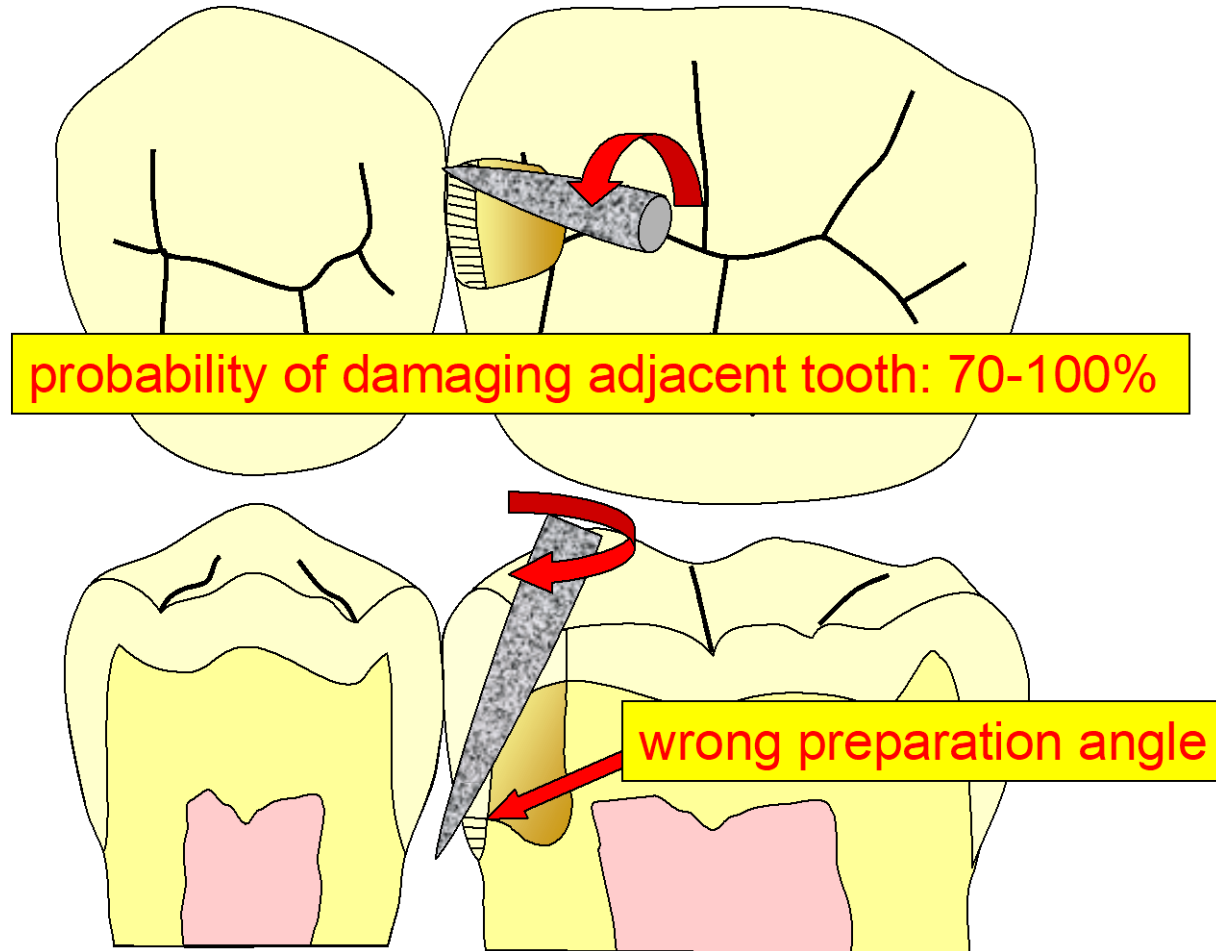
In dentin



No bevel



# Preparation technique



# Oscillating instruments



# **Class II. and contact point**

## **Importance of the correct restoration of the contact point:**

- Prevention of retention in the proximal space
- Prevention of secondary caries
- Prevention of irritation of interdental papilla and resorption of alveolar bone
- Prevention of changes in position of the teeth

# Class II. and contact point

- Matrix band + matrix retainer
  - Metal band (in primary teeth)

Without matrix retainer

Plastic band (polyester – e.g. Lucifix matrix)

Sectional matrices with separator



# Matrix band and matrix retainer

Contact point  
Contact area



# Sectional matrices

- Sectional matrices with separator
- Good adaptation
- Separation using wedge and separator



Sectional pre-contoured metal matrix system provided the highest contact tightness with the highest length of contact arc. Restorations with circumferential pre-contoured metal matrix system provided higher LCA than those with circumferential straight metal matrix with Tofflemire retainer and circumferential pre-contoured transparent matrix system“



*Kampouropoulos D, Paximada C, Loukidis M, Kakaboura A. The influence of matrix type on the proximal contact in class II resin composite restorations. Oper Dent 2010; 35; 454-462*

Use of the sectional matrix system in two-surface Class II cavities resulted in statistically significantly tighter proximal contacts than the use of the circumferential matrix system.

For the three-surface no statistically significant differences in contact tightness were found between the different matrix systems.“

*Wirsching E, Loomans B A, Klaiber B, Dörfer C E. Influence of matrix systems on proximal contact tightness of 2-and 3-surface posterior composite restorations in vivo. J Dent 2011; 39: 386–390*







# Step 1: Pre - wedging

The wedge is inserted before preparation:

Compression of gingiva

Separation of teeth

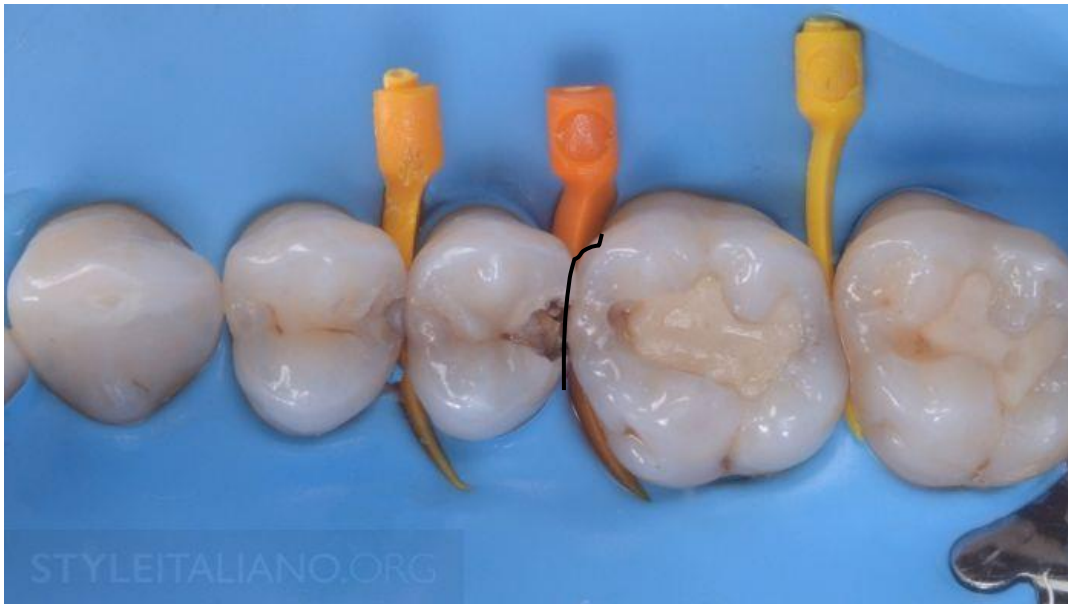
Together with the matrix protection of damage of neighbouring tooth

Matrix for the filling can be inserted easier.



## Step 2: preparation

- Preparation with the protection of neighbouring tooth using the metal strip or matrix.



## Step 3: adaptation of wedge, matrix and separator

- The wedge can be new or the same as previous, inserted from oral or vestibular side
- The matrix is 0,5 mm below the gingival wall
- Separator separates teeth

# Step 4 Making filling



# Custom ring technique

Historically, there were already similar techniques that can be confused with the “custom rings” technique, in 1981 from the book “textbook of Operative dentistry” by Baum/Phillips and Lund called “the non yielding matrix”, this technique had the objective of creating a super hard support for the matrix with acrylic in order to achieve extra contention for the amalgam condensation.

# Custom ring technique

- The group Styleitaliano developed the Custom Rings technique taking advantage of the simplest materials regarding wedges, rings and matrices in order to be able to personalize the ring embrasures to adapt the matrices in an anatomical and personalized way.



# Custom ring technique

- The technique consists then on taking an impression with a photo-curing material (any light curing gingival material, block-out resin or flow composite) of the proximal embrasures of the teeth to restore and integrate them into the ring in order to be able to shutter perfectly wedge, matrices with a ring that will seal perfectly taking into advantage the anatomy of the healthy structures.

# Custom ring technique indication

- Larger cavities with axial wall exceeding the proximal surface



# Liquid dam is placed into the proximal space, cured



# Sandblasted ring is placed and portion of liquid dam added, cured



# Customized ring



# Matrix with wedge and customized ring









# Kompozitní výplň II. třídy



# Kompozitní výplň II. třídy



## Kompozitní výplň II. třídy



























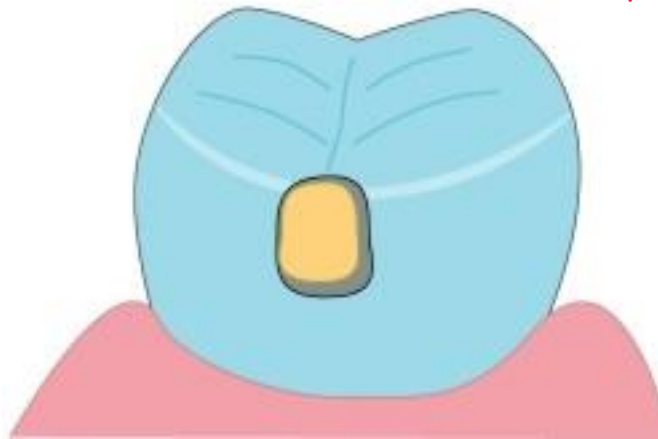


# Miniinvasive class II. cavities

## Adhesive slot

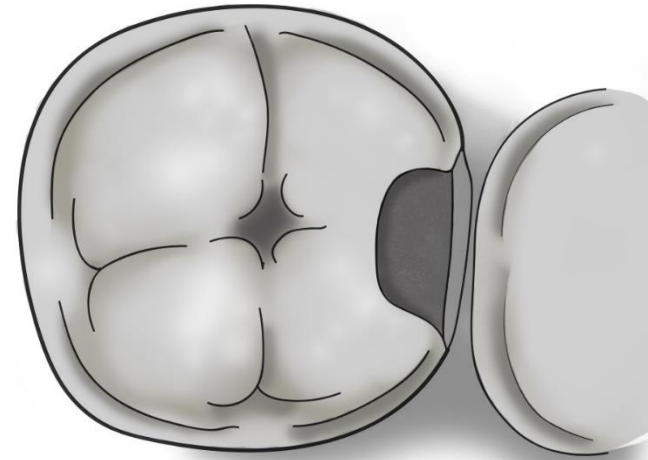
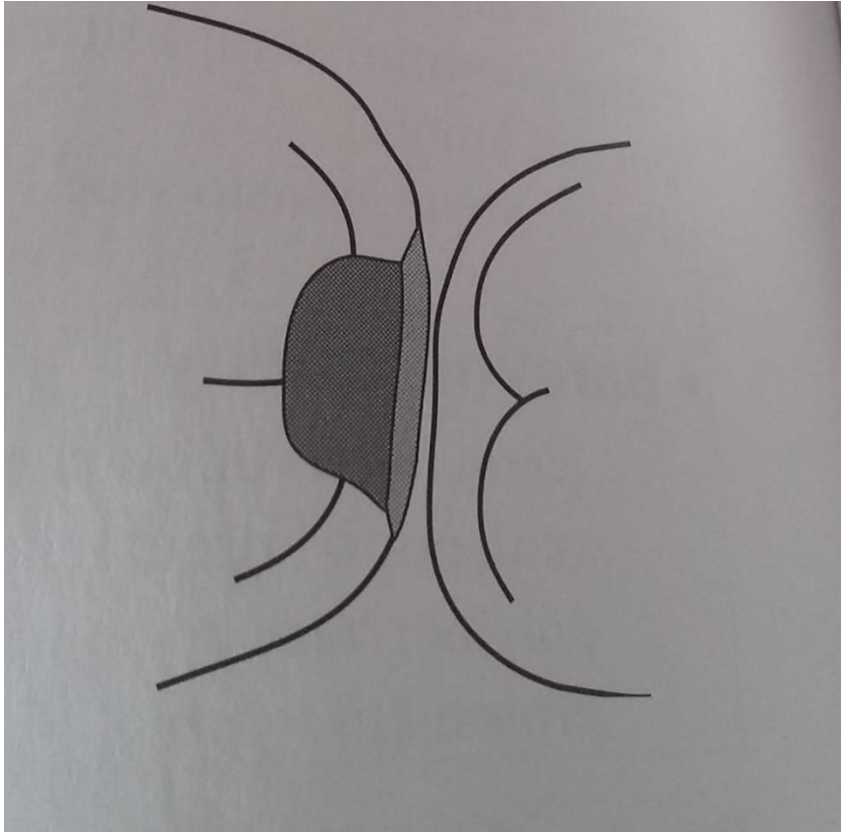
**Vertical**

**Horizontal**

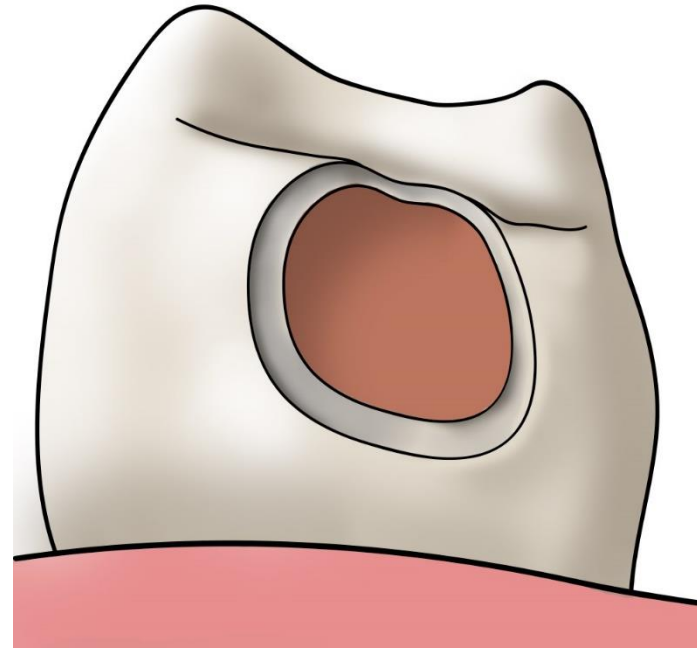
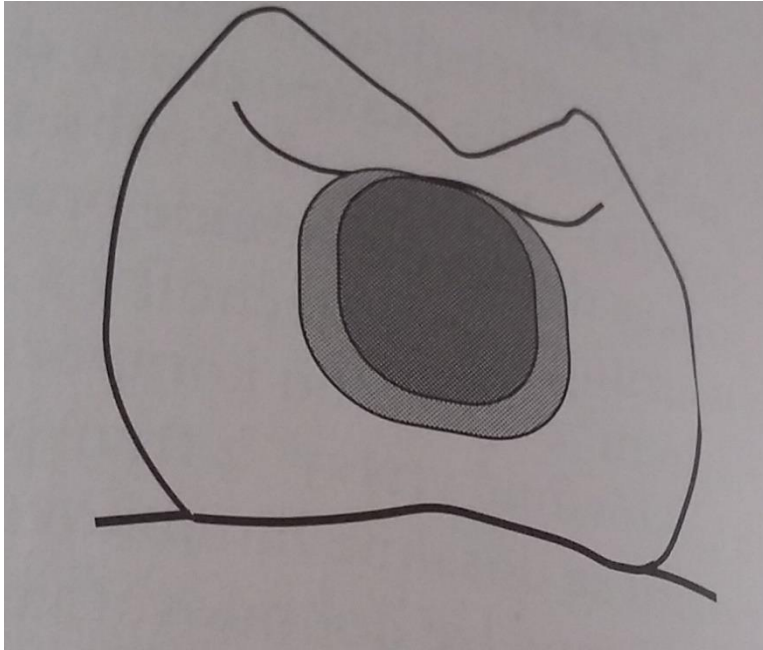




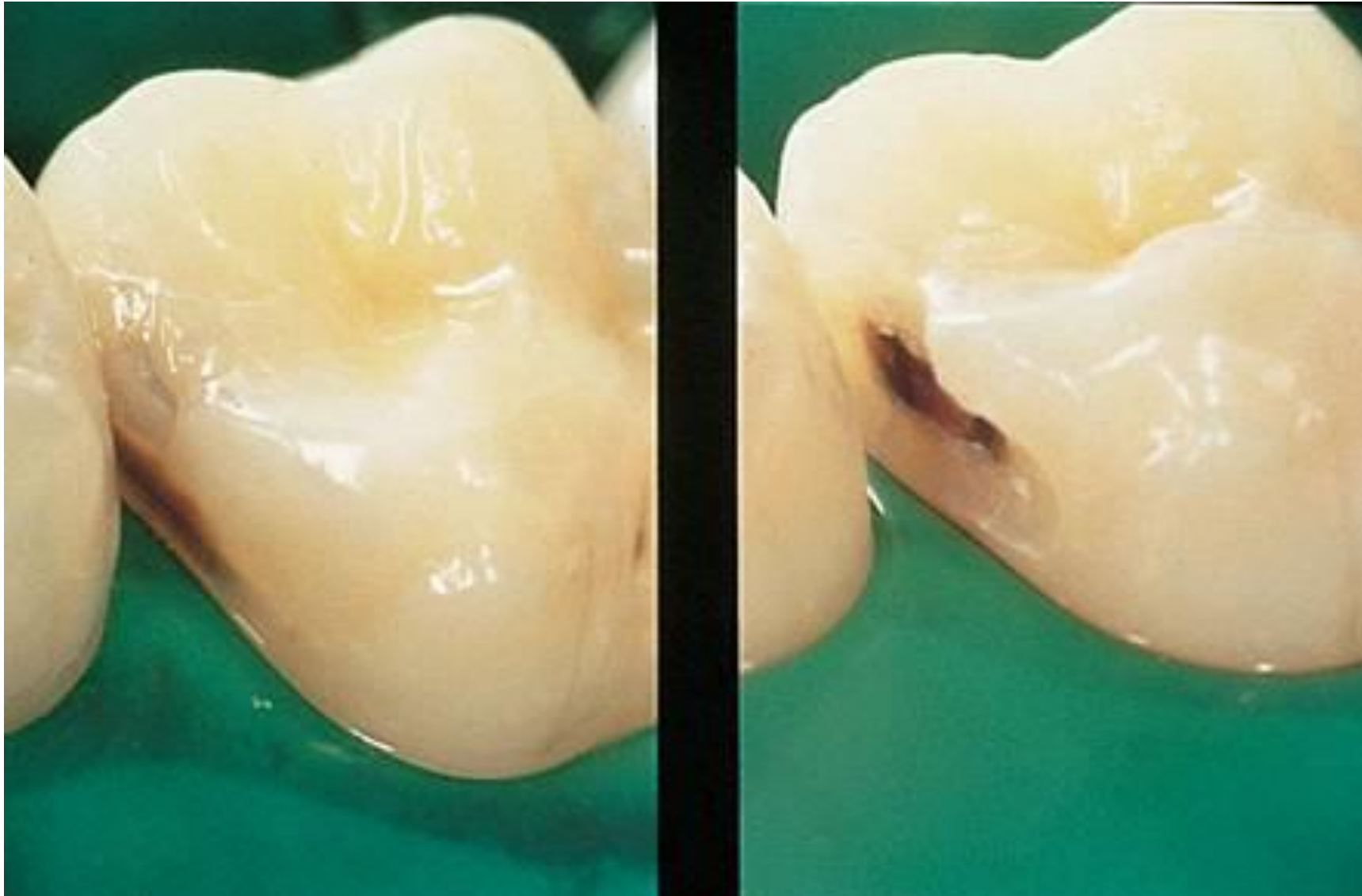
# Adhesive slot



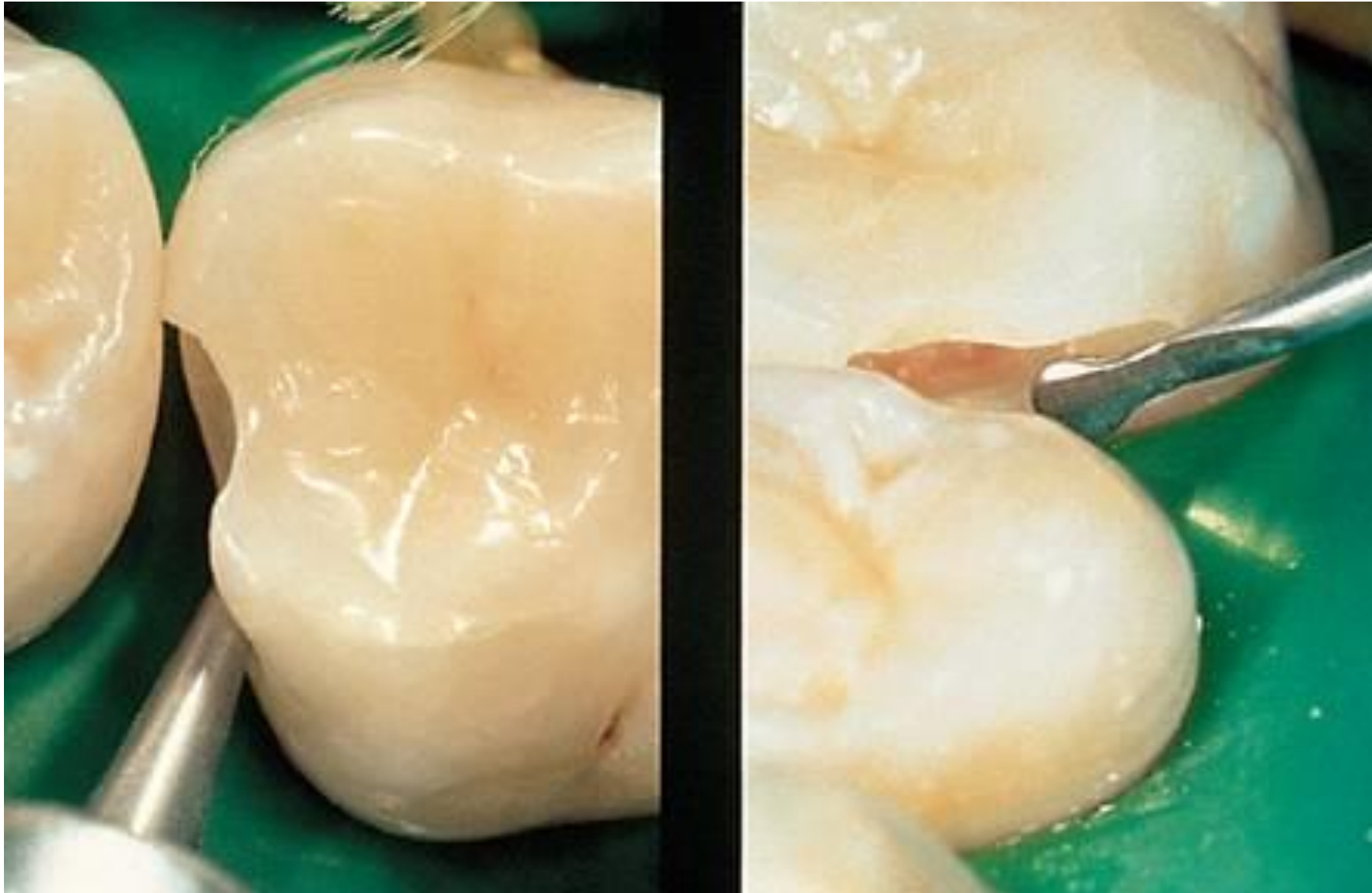
# Adhesive slot



# Approximal Caries



# Approximal Caries

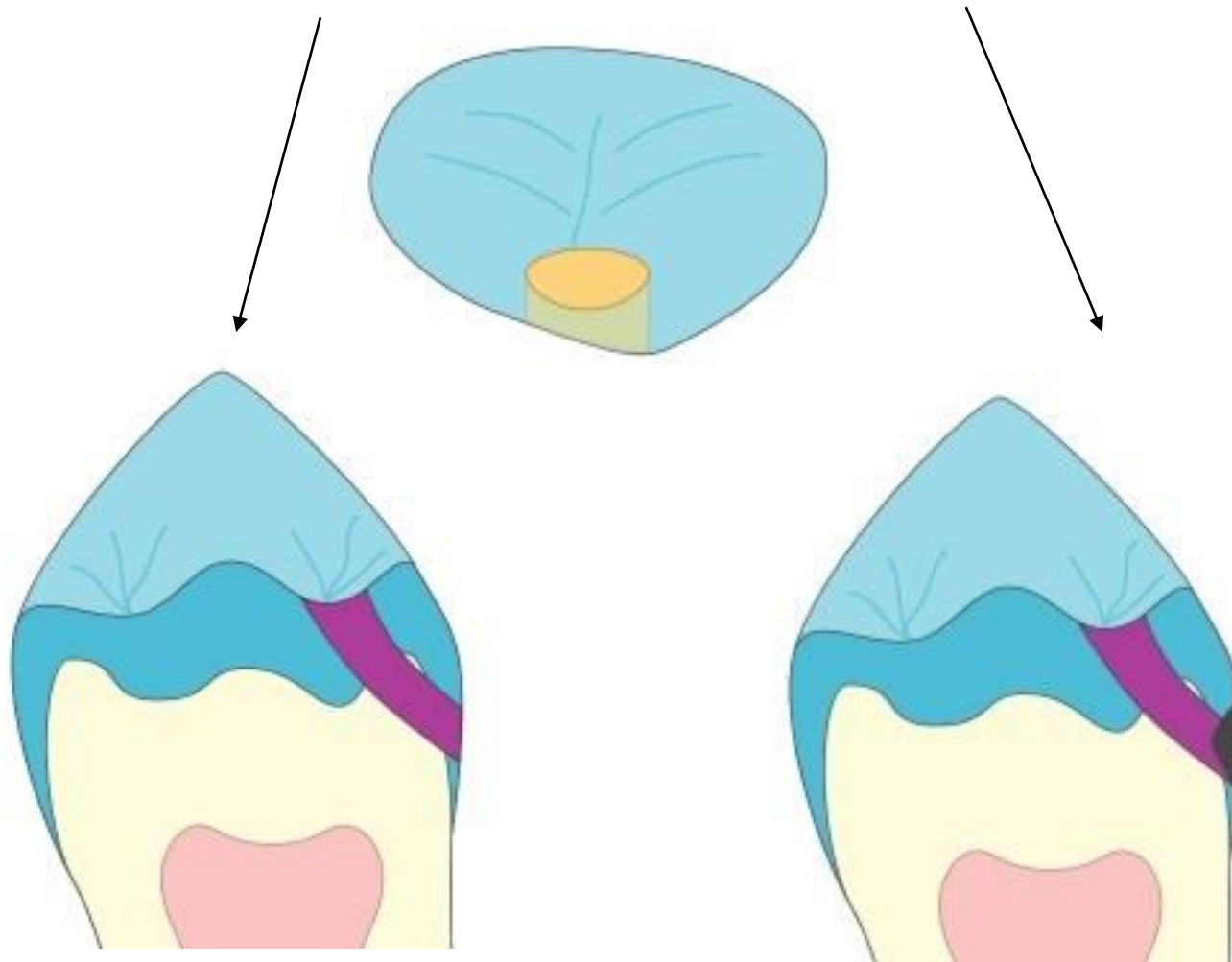


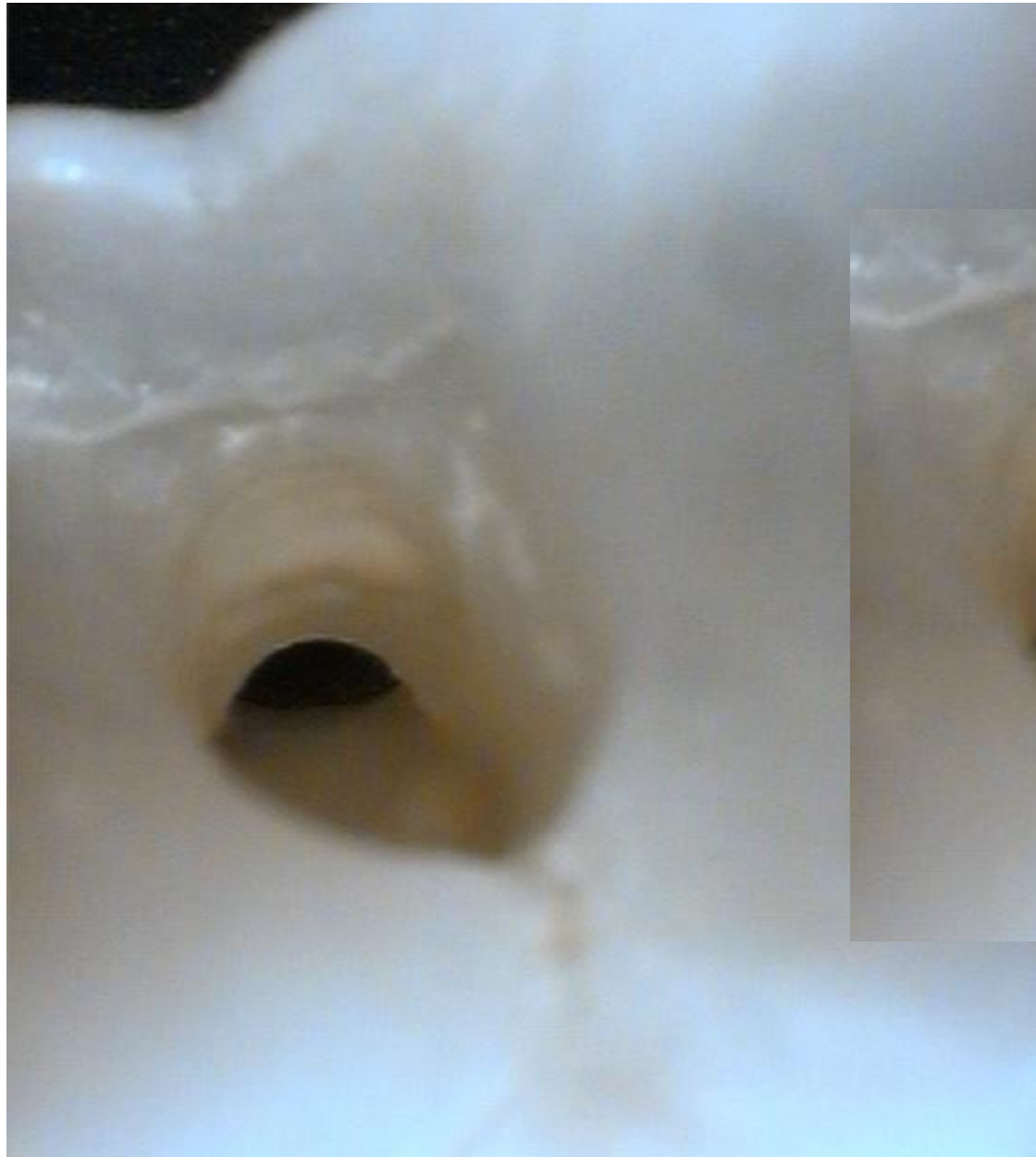


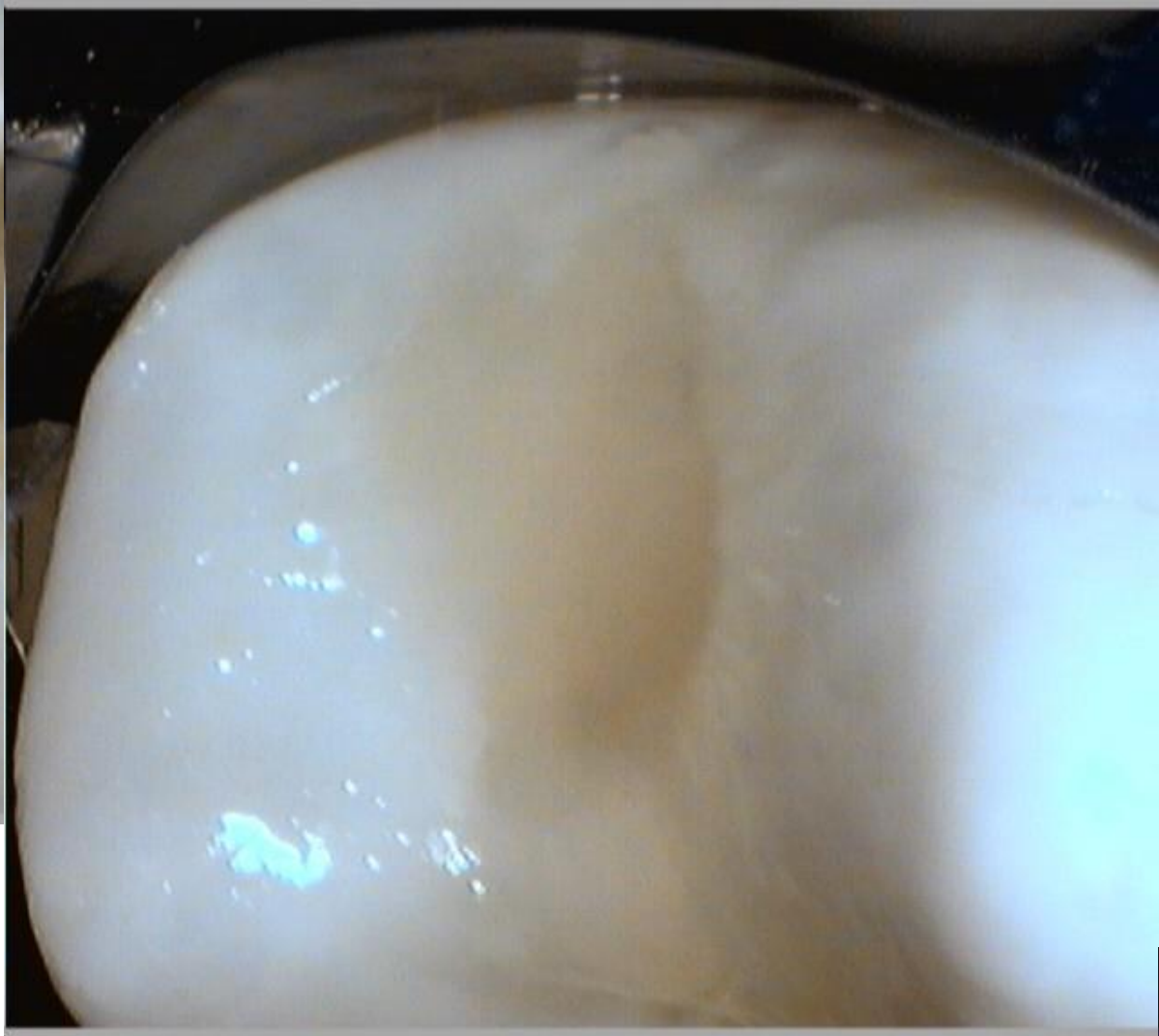
# Tunnel preparation

Open

Closed









Success?



Low caries risk  
Special small instruments  
Magnification  
BW post op  
Composite or GIC