

# **Restorative dentistry III.**

## **3rd lecture – inlays, veneers**

### **Indirect reconstructions**

# Rigid fillings – inlays, onlays

- The material is rigid (already cured)

Metal alloy, composite, ceramics.

# Inlays made of the metal alloy (precious alloys)

- Manufactured in a dental lab
- Direct or indirect method    **Inlays made of metall alloys are over**
  - Direct method rarely (class I. only)
  - Indirect method (most cases)
- .

# Inlay

## Advantages

- Better anatomic shape
- Better polished
- Higher degree of conversion (composite inlays)

# Inlay

## Disadvantages

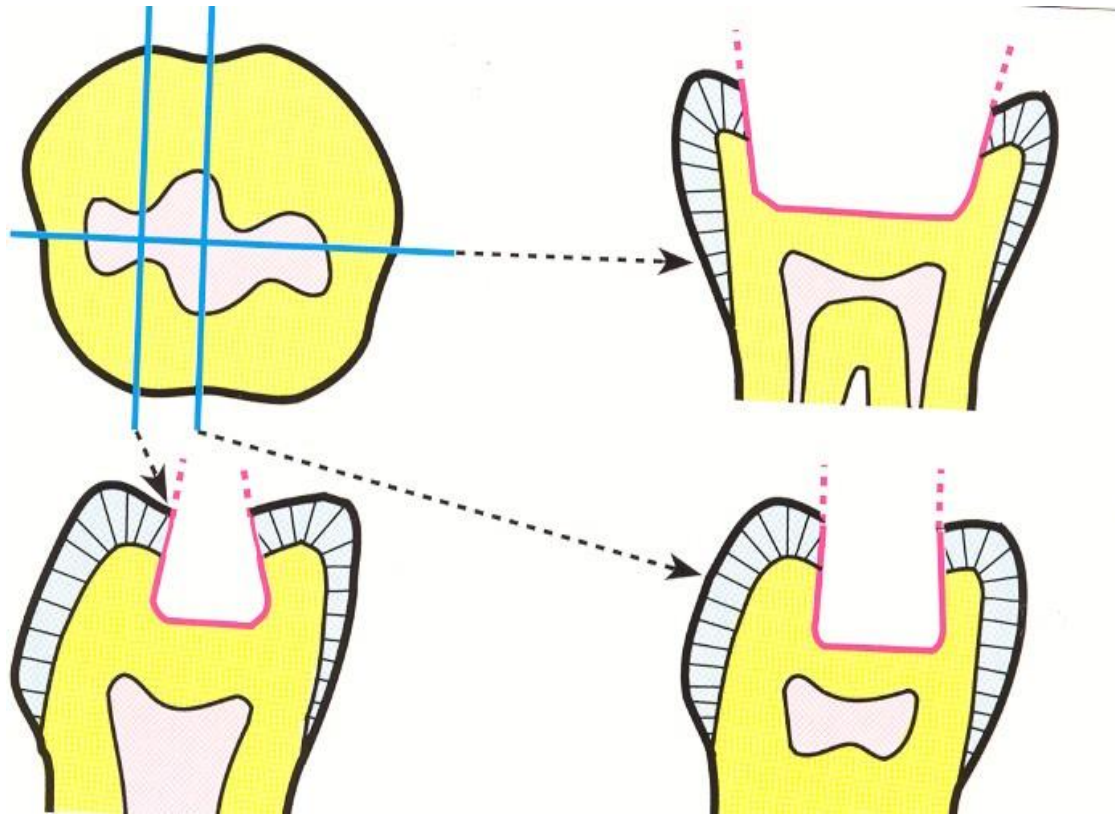
- The technology is not easy
- More time consuming
- Expensive

# Basic rules of preparation

➤ Box

➤ No undercuts

➤ Light divergence of the walls (facilitating shape). Angle of divergency 6 – 15°



## Box

No undercuts

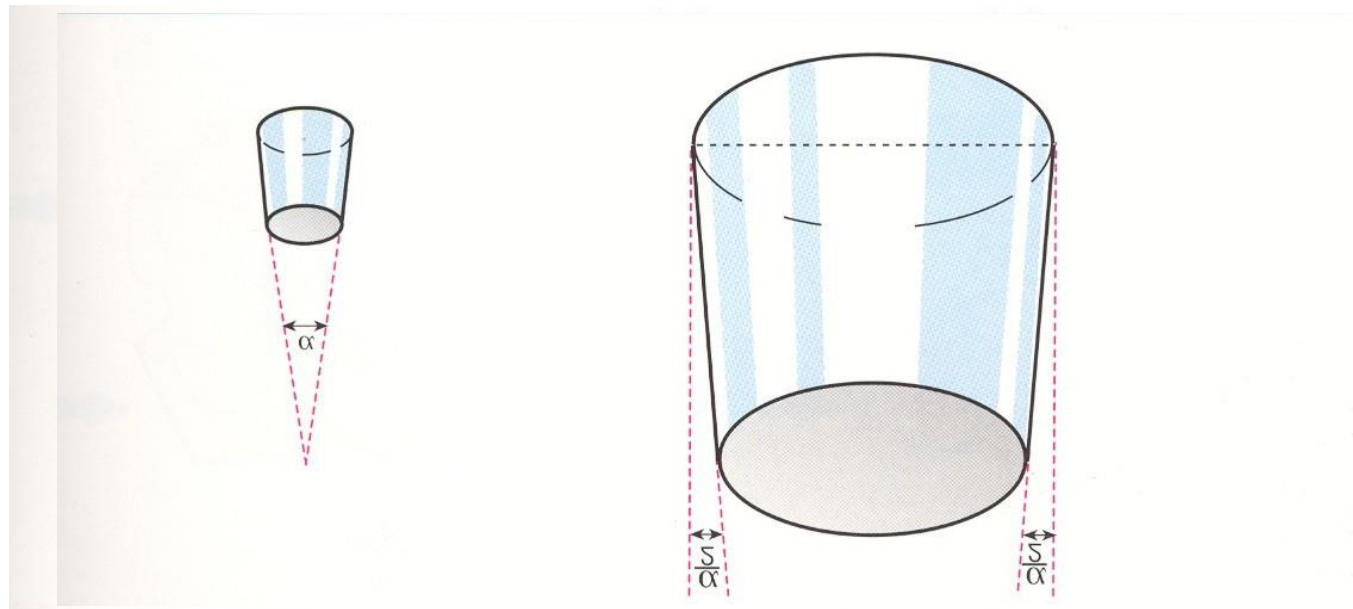
Simple box

Facilitating shape

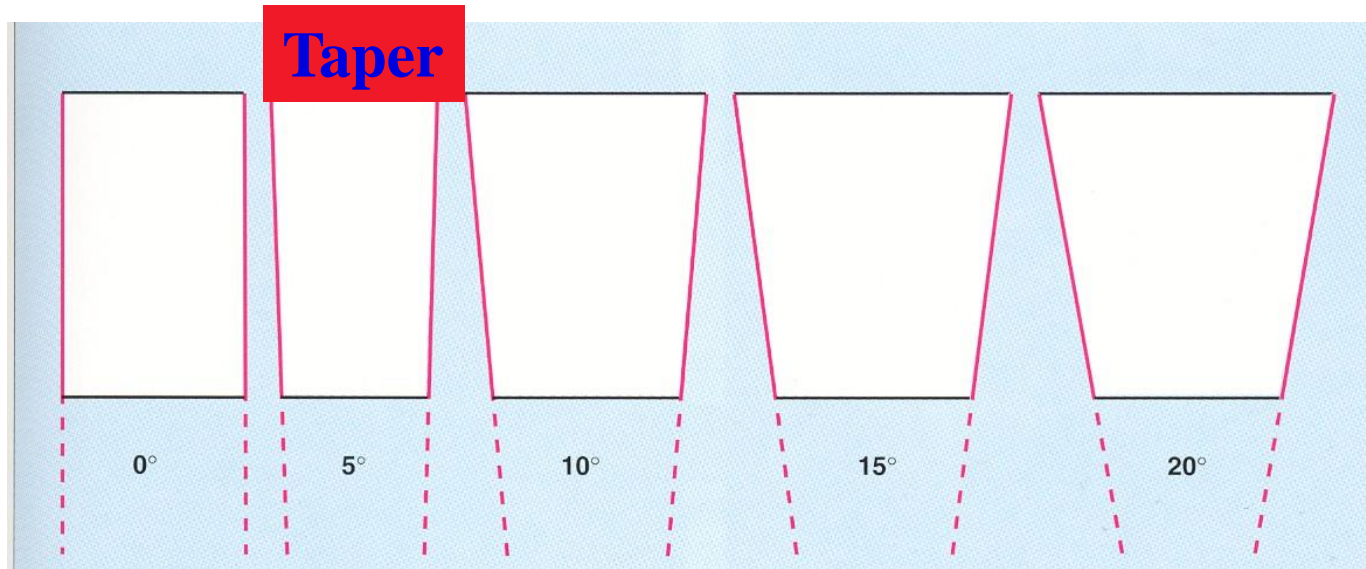
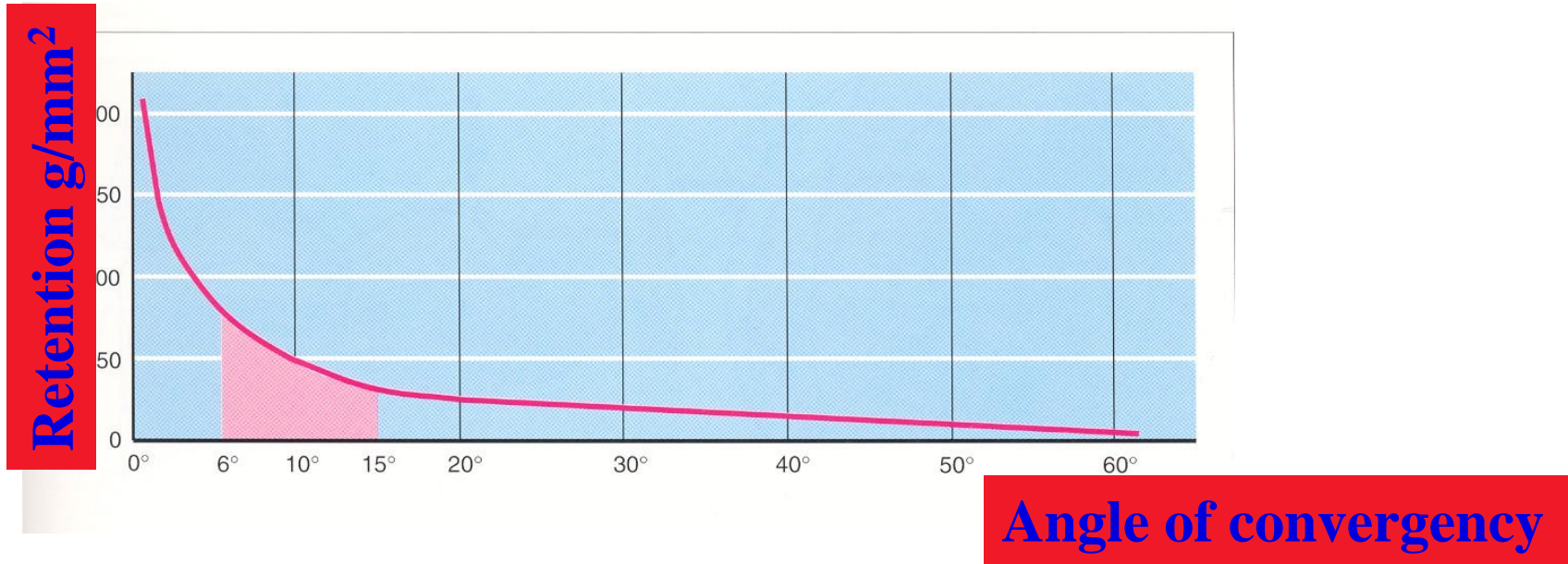
# Retention of rigid fillings

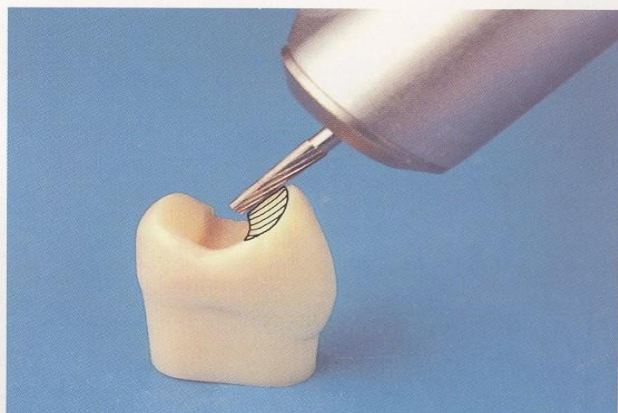
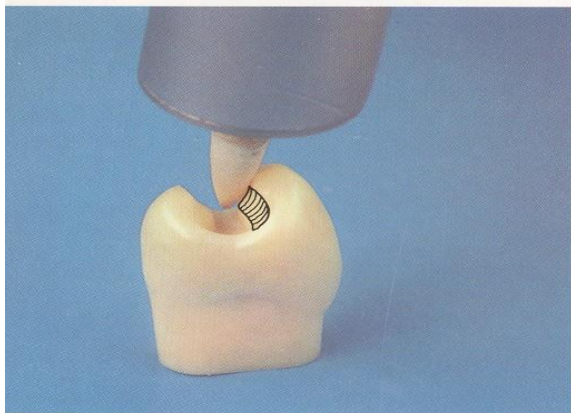
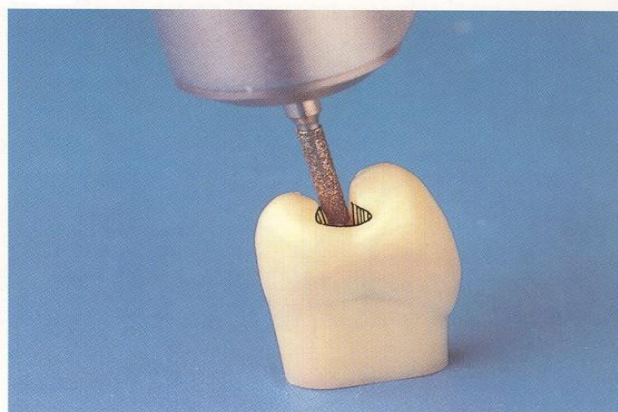
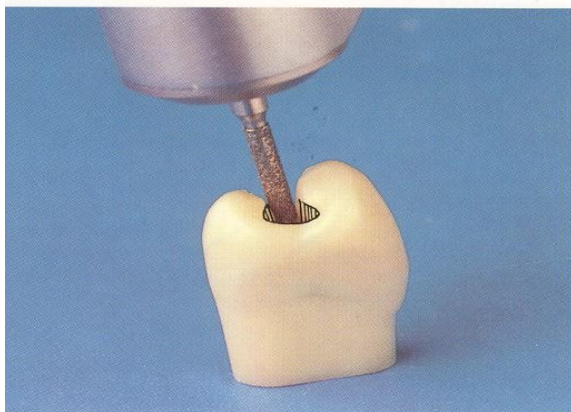
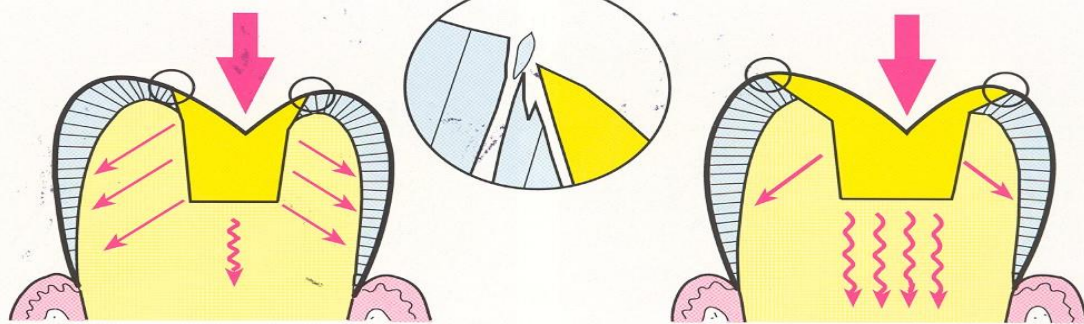
Against axial forces, depends on

1. Geometry of the preparation
2. Quality of the luting material (cement)

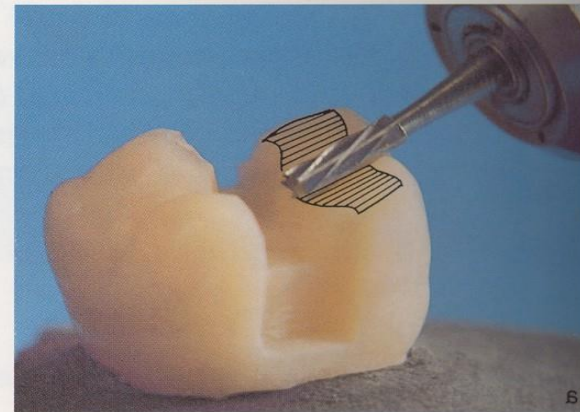
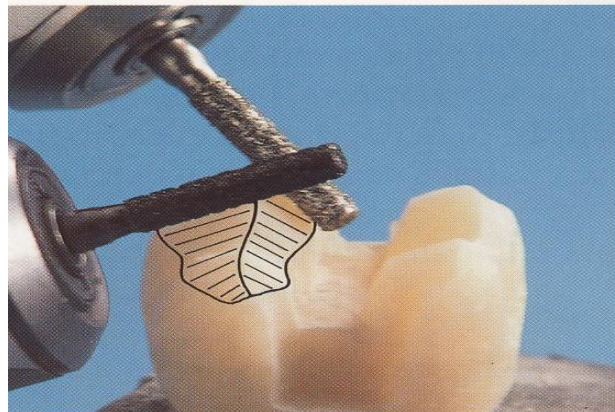
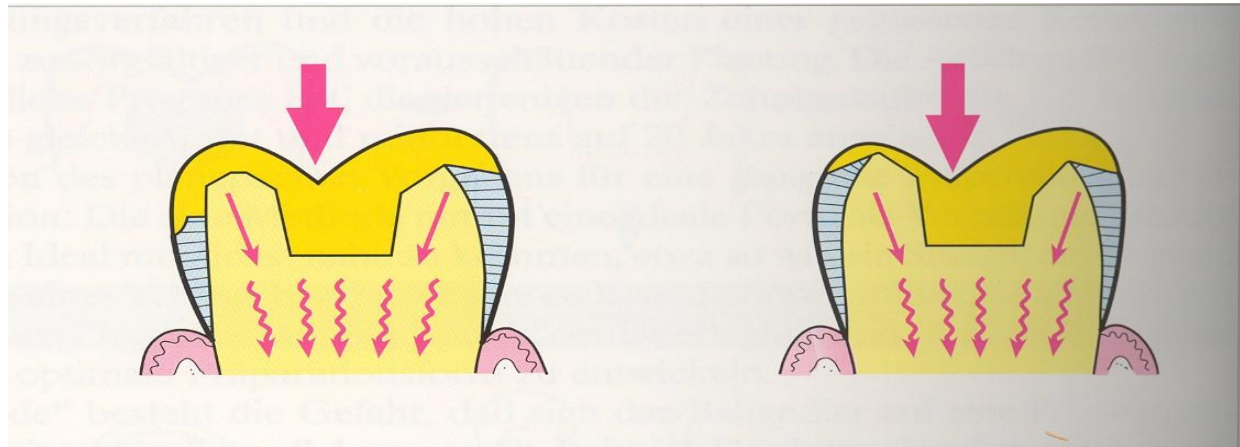




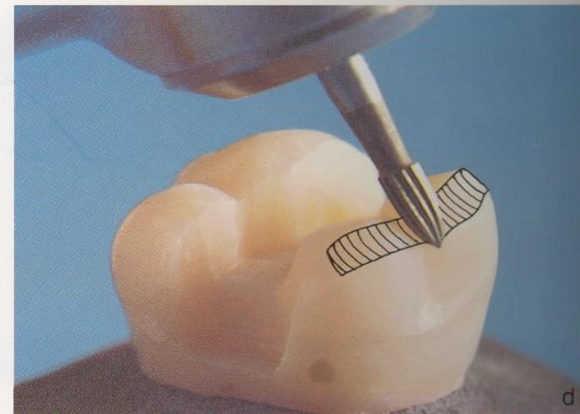
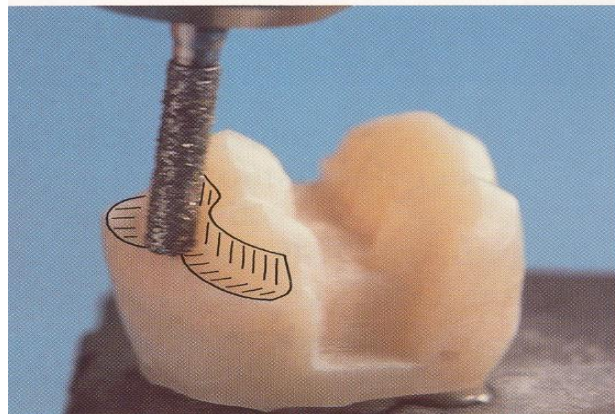


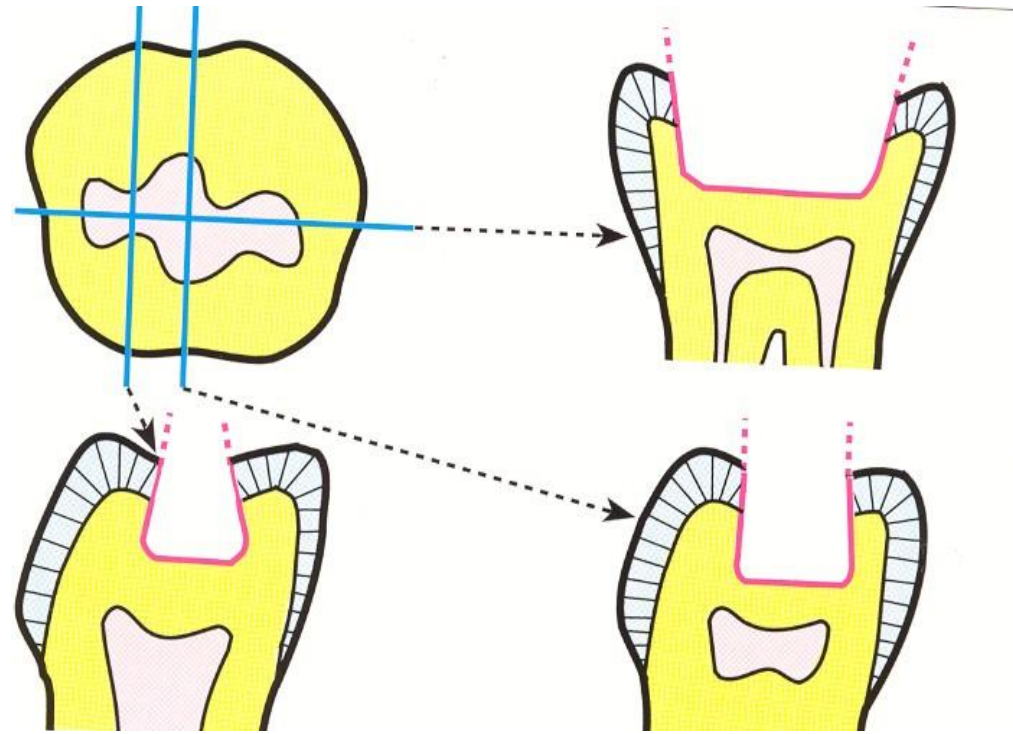
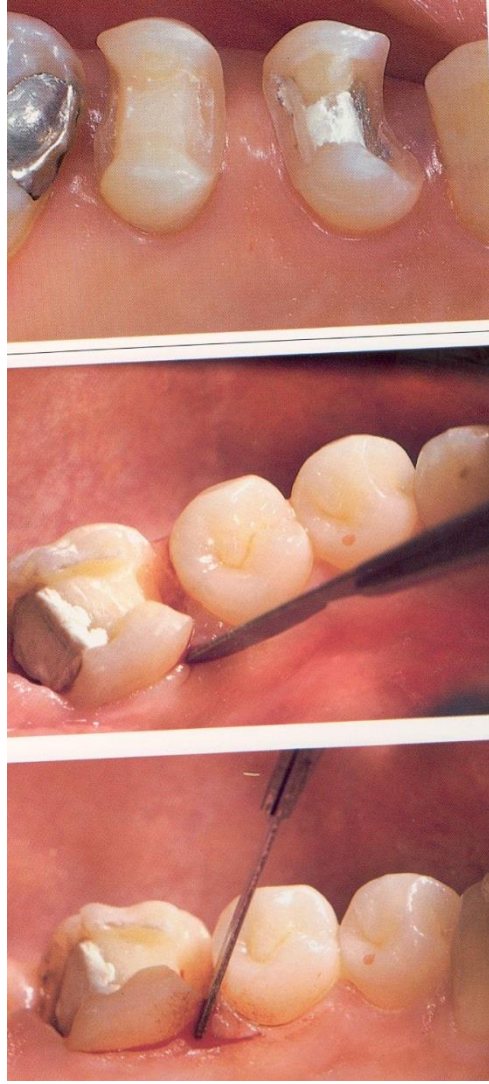




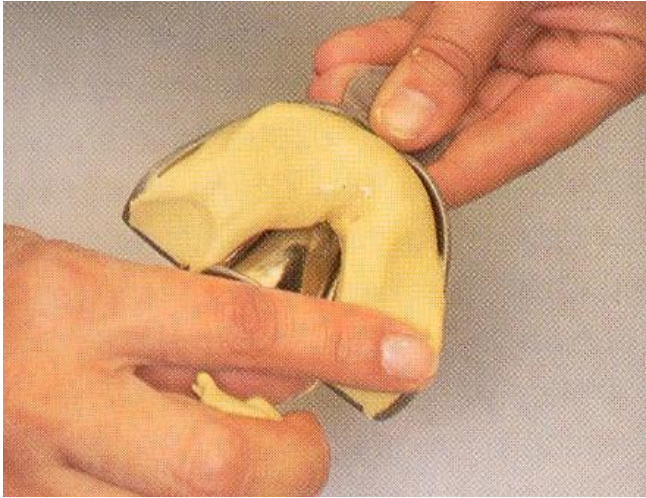


– Erhalten Zahnstruktur  
– Retention Kippstabilität





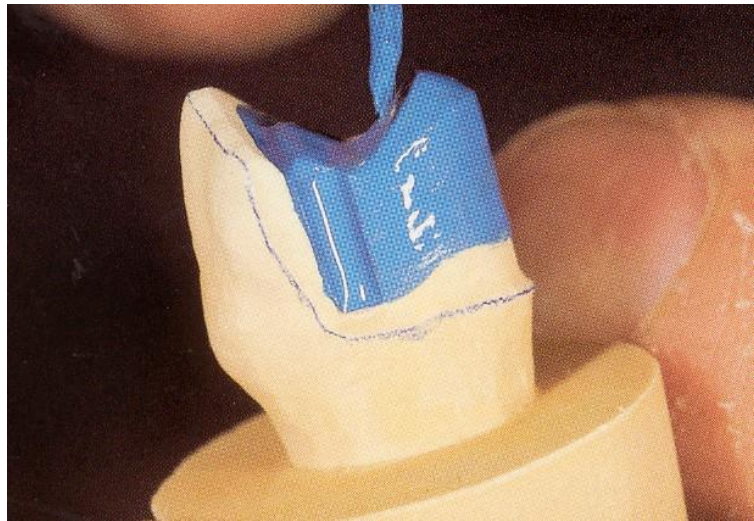
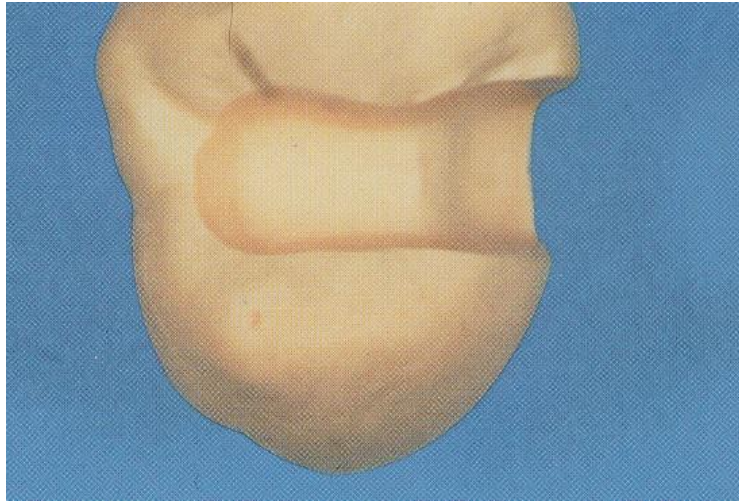












# Non metallic inlays

- Composite

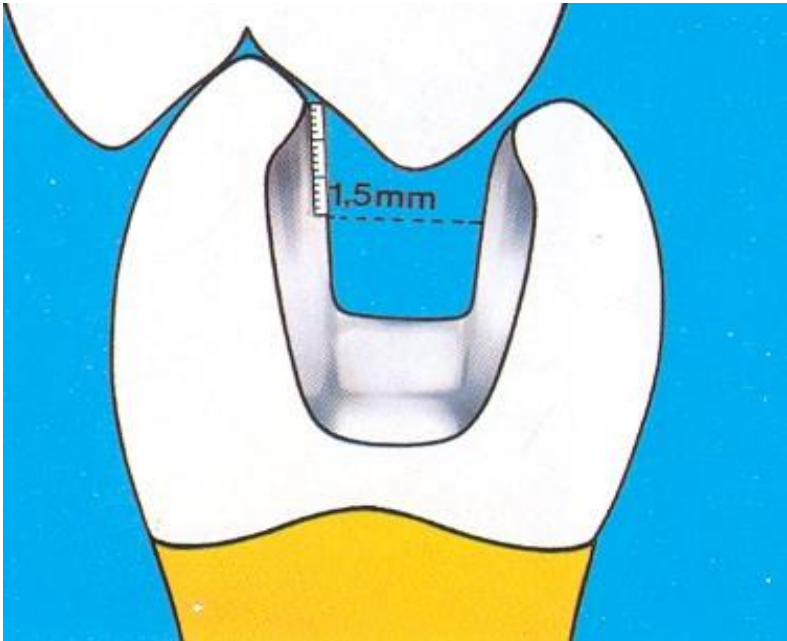
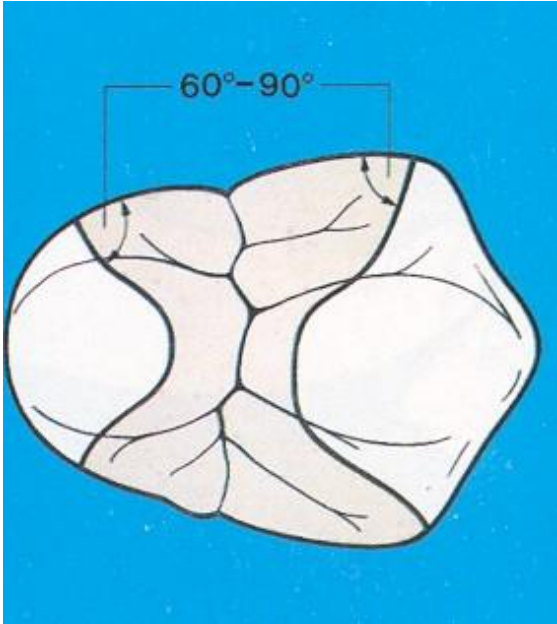
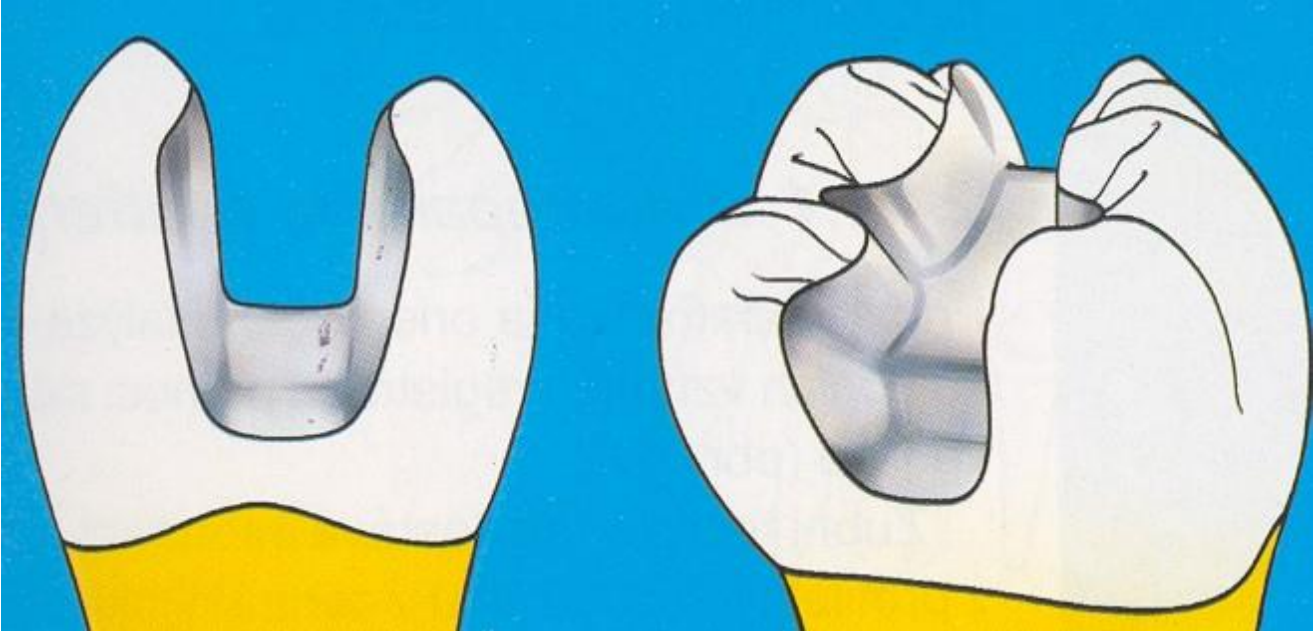
- Ceramics

Indirect method

CAD CAM



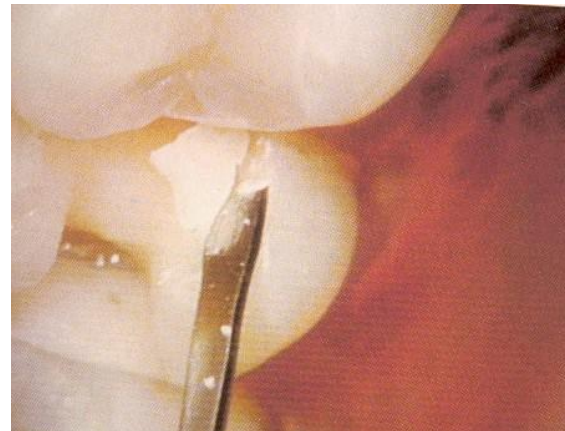




# Preparation

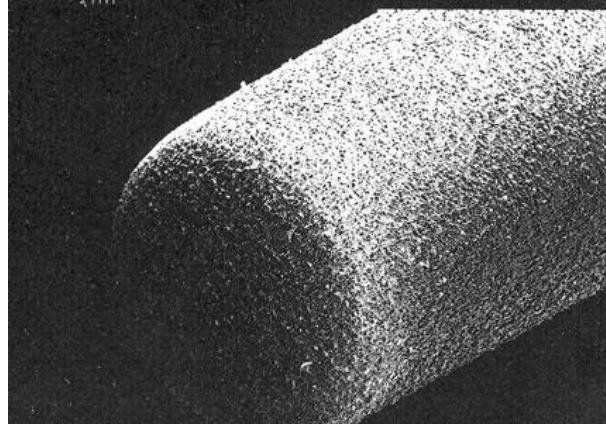
- Box
- No undercuts
- Facilitating shape – divergence of the walls appr.  $6^\circ$
- No bevel
- Thickness of the material 1,5 – 2 mm

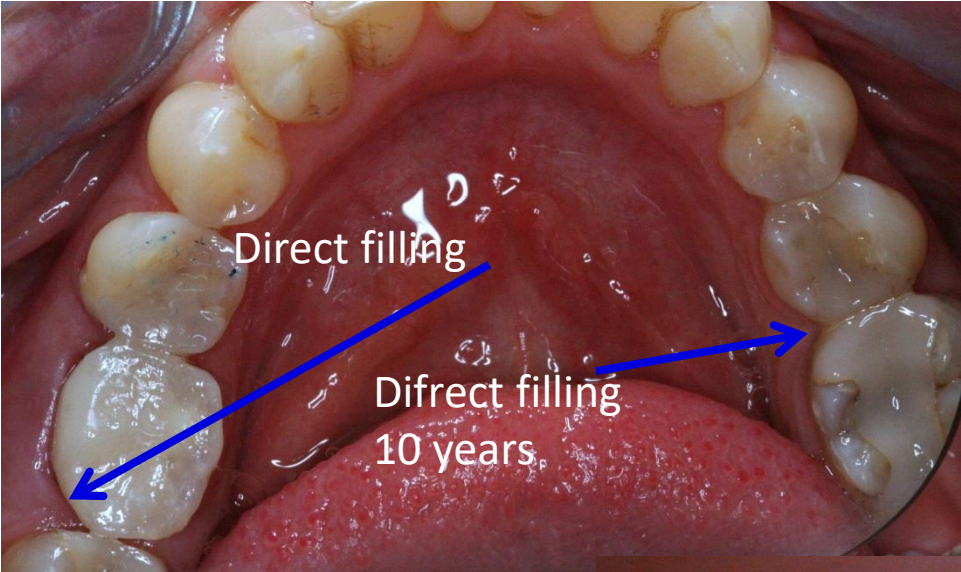
Preparation  
Standard  
diamond bur  
Finishing with  
Fine diamond bur  
And hand instruments





Special diamonds  
for preparation





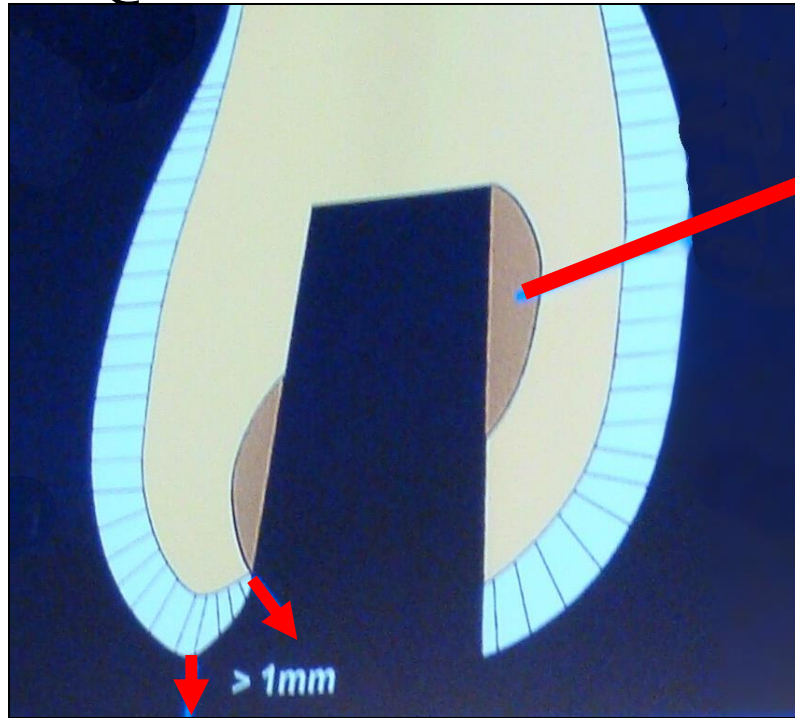
# Inley or onlay, overlay

Marginals ridges (sre present or not)

Dentine core

Supragingival tissues

Occlusal forces



Enamel supported with dentin  
Sklovina podložena  
Undercuts are blocked

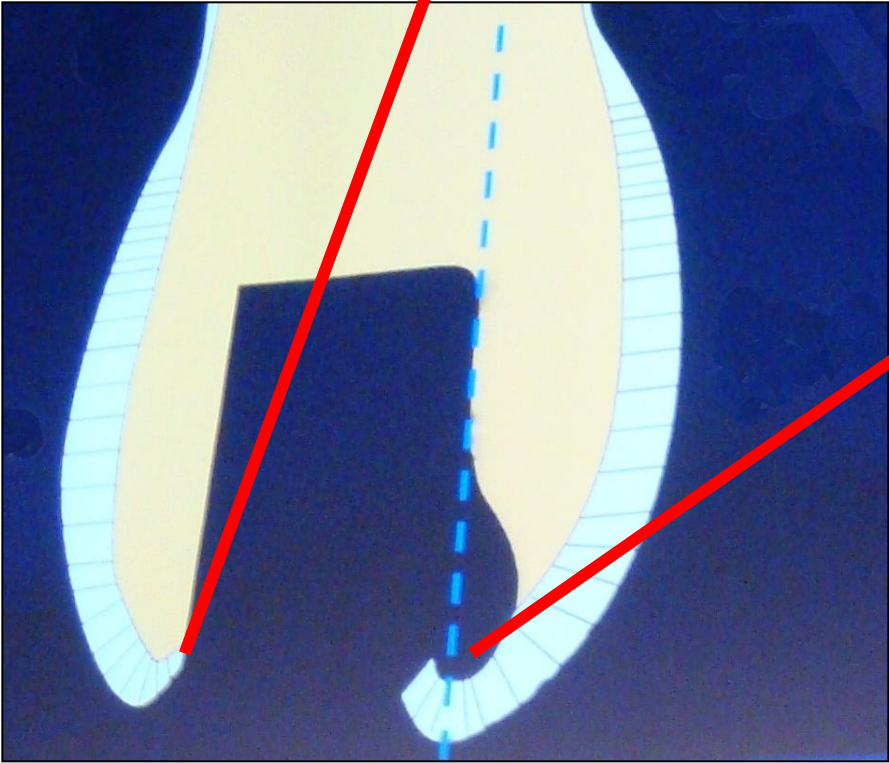
Distance of the cavosurface margin and cusp is more than 1 mm

**Inlay**



Distance of the cavosurface margin and the cusp is less than 1 mm

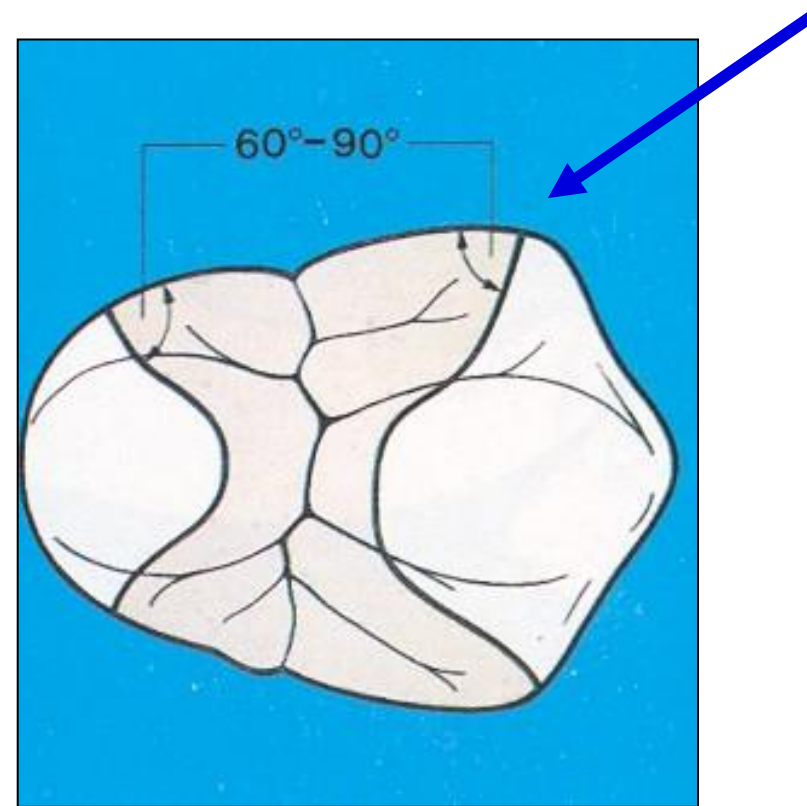
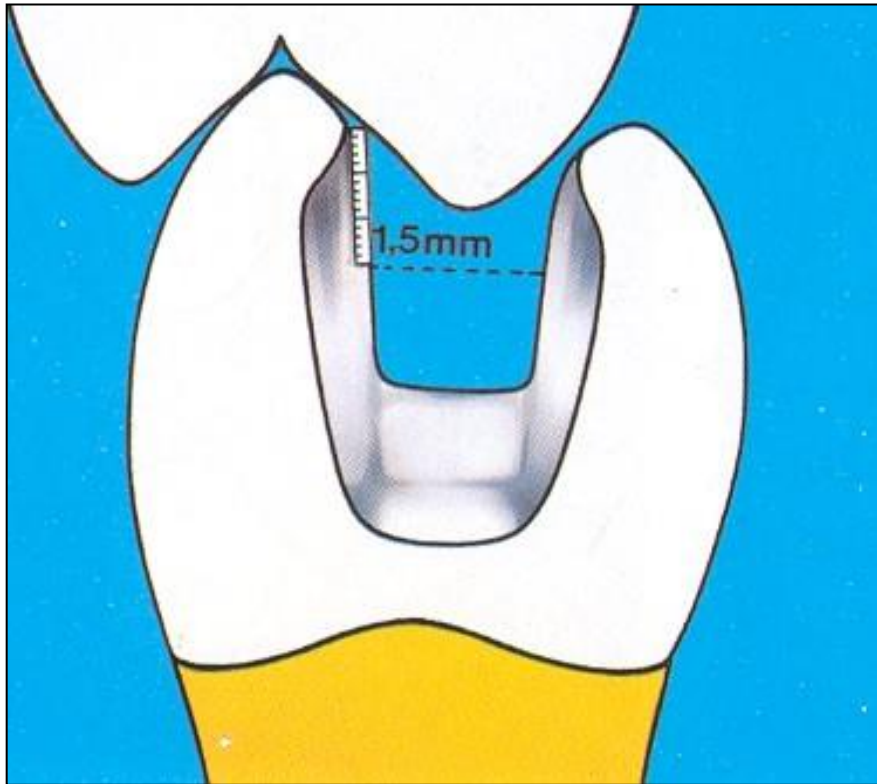
Enamel is not supported with dentin



Onlay

# Preparation rules

Thickness of the material 1,5mm - 2 mm Cavosurface angle



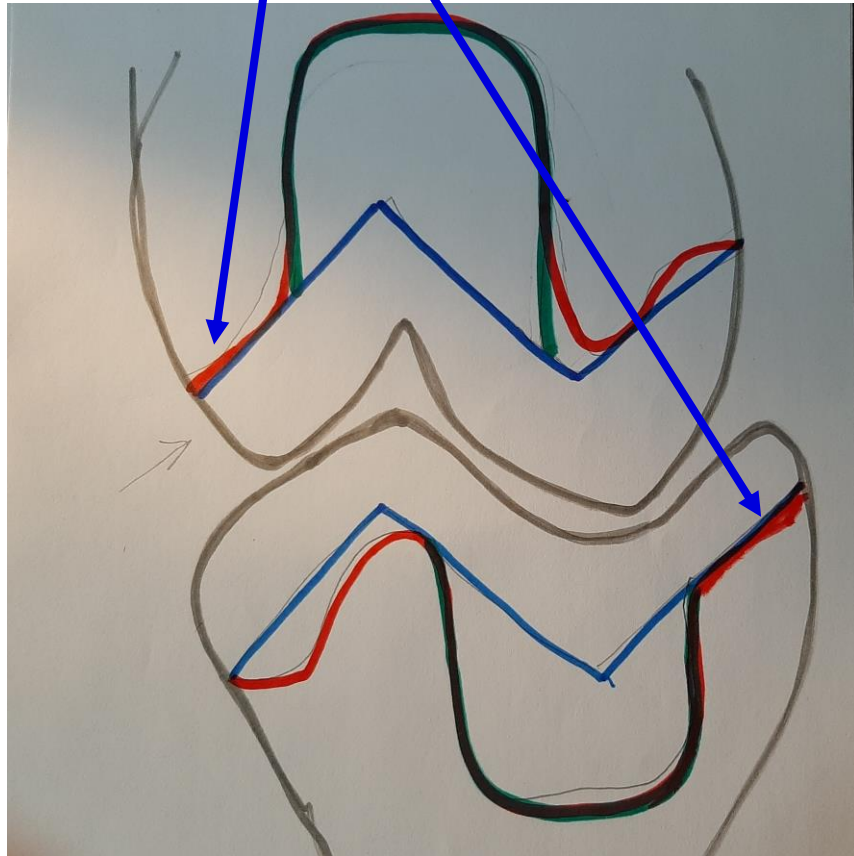




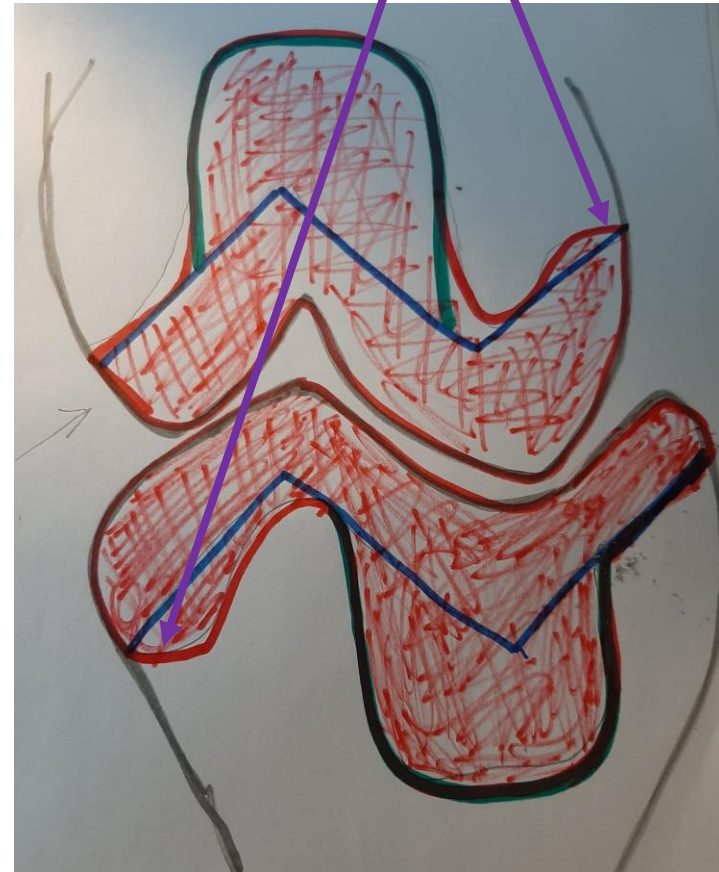




Nefunkční strana



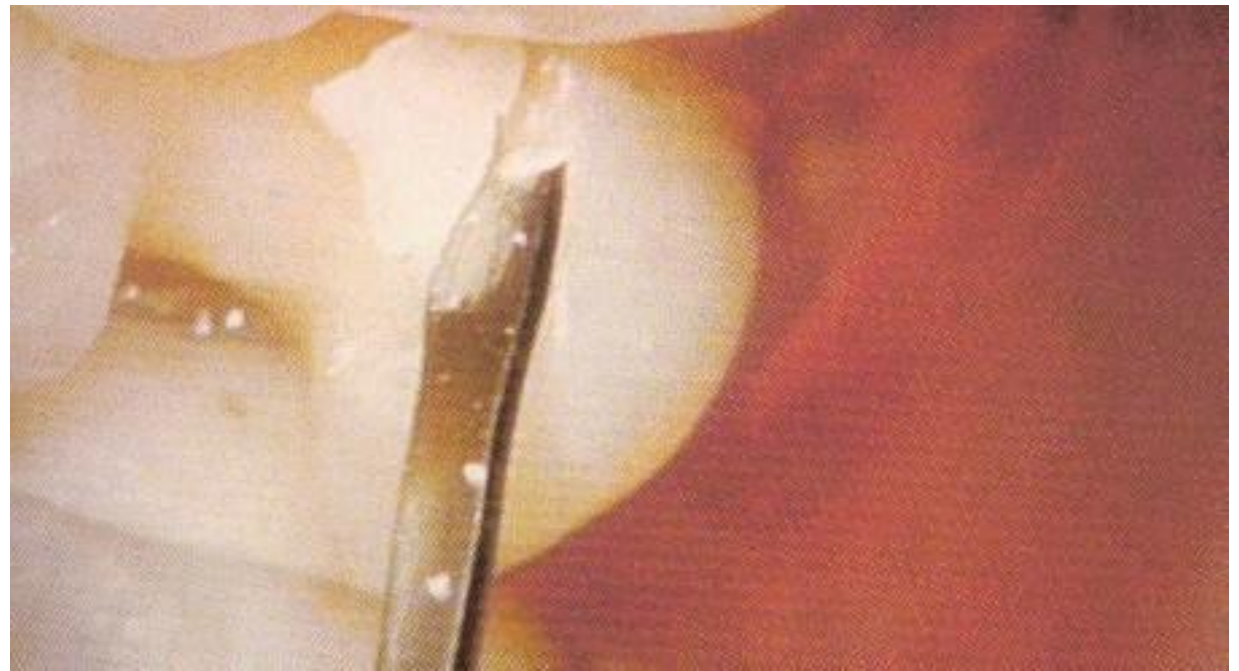
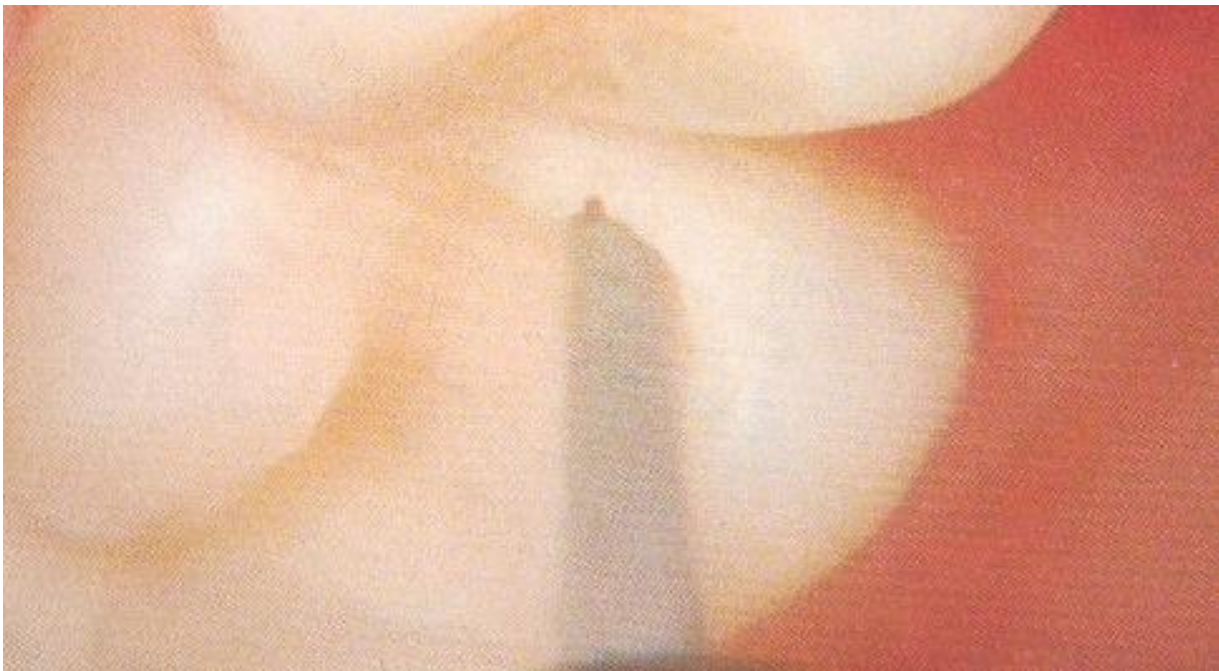
Funkční strana



# Rules of the preparation

- Cavity is 2 mm wide, no isthmus, simple lines
- 1,5 – 2 mm depth
- Gingival wall 1 mm
- Ostré margines, round edges inside the cavity
- Simple lines
- Smooth bottom







**Sealing dentin**

**Closure of dentine tubules**

**Significantly higher retention, protection of dental pulp**

**Bonding agent, flowable removal inhibition layer**

**Finishing with diamodn or /and glycerin gel**

**SEALING DENTIN**

Technique	Bond Strength	Fit	Temp	Impressioning	Risk of contamination	Post op sensitivity
IDS	HIGH	GOOD	DIFFICULT	TECH SENS	LOW	LOW
DDS	HIGH	FAIR	DIFFICULT	EASY	LOW	LOW
PDS	MOD	FAIR	EASY	EASY	HIGH	MOD
SDS	MOD	V. GOOD	EASY	EASY	HIGH	MOD

**THE FOUR OPTIONS FOR SEALING DENTIN**

1. IDS (immediate dentin sealing)
2. DDS (delayed dentin sealing)
3. PDS (pre-cementation dentin sealing)
4. SDS (simultaneous dentin sealing)

AT PREP  
AT SEAT





## INTERACTIONS BETWEEN IMPRESSION MATERIALS AND IMMEDIATE DENTIN SEALING

Pascal Magne, DMD, PhD,<sup>a</sup> and Brik Nielsen, BS<sup>b</sup>  
University of Southern California School of Dentistry,  
Los Angeles, Calif

NOVEMBER 2009

### CLINICAL IMPLICATIONS

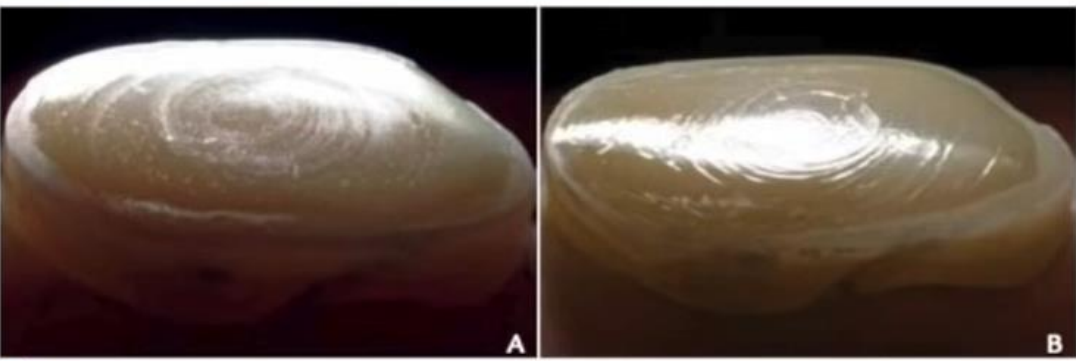
The results of this qualitative evaluation indicate that clinicians must be cautious when using immediate dentin sealing. The incompletely polymerized resin coating can inhibit the polymerization reaction of impression materials. Successful Extrude impressions of resin-coated surfaces can be obtained by air blocking and pumicing before making an impression. With Impregum, air blocking/pumicing results in impression defects due to adhesion and subsequent tearing of impression material.

Immediate Dentin Sealing before the impression requires complete removal of the oxygen inhibited layer.

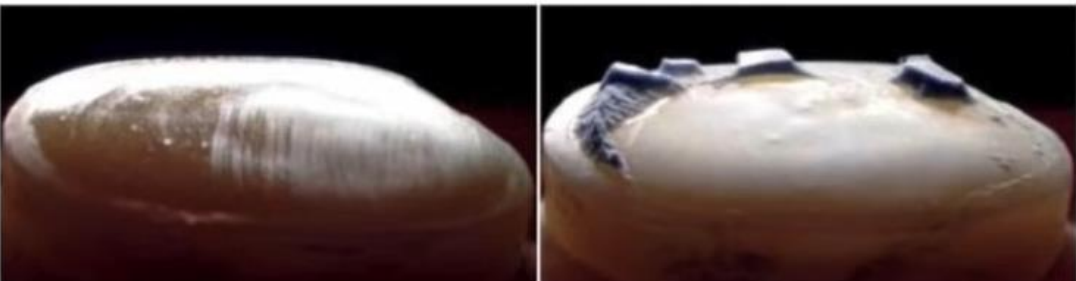
Failure to do so, will result in unset impression material (for PVS) and if removed causes polyether to be bonded to the tooth.

Removal by alcohol swab or air-blocking + pumice.

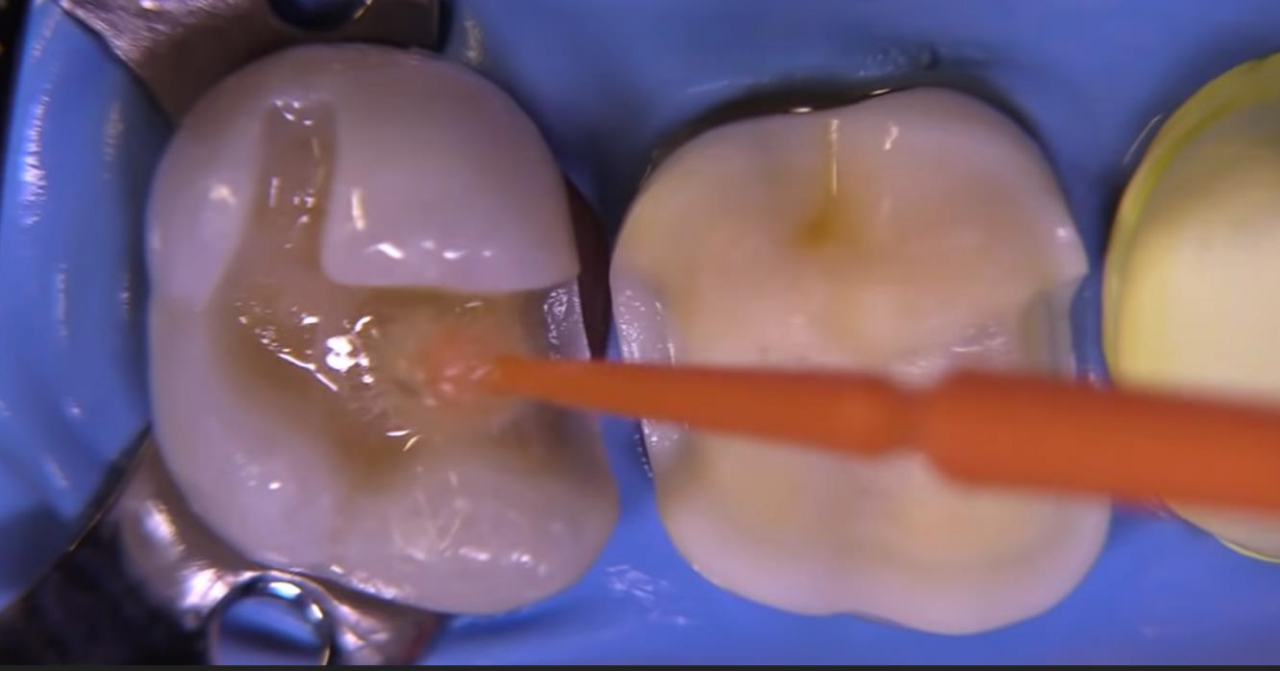
IDS after impression requires careful application of a very thin film-thickness bonding agent (no filled adhesives!)



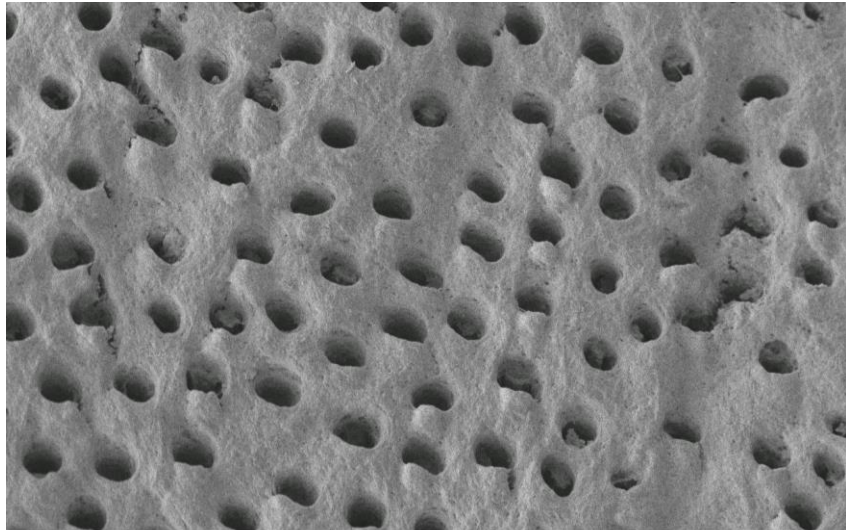
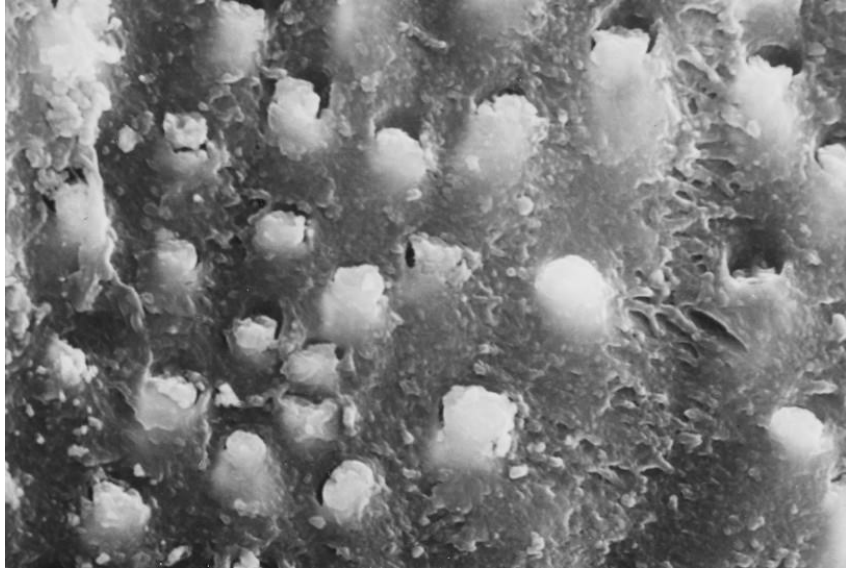
7 A, Specimens after IDS and air blocking (before impression) of Optibond FL, and B, SE Bond.



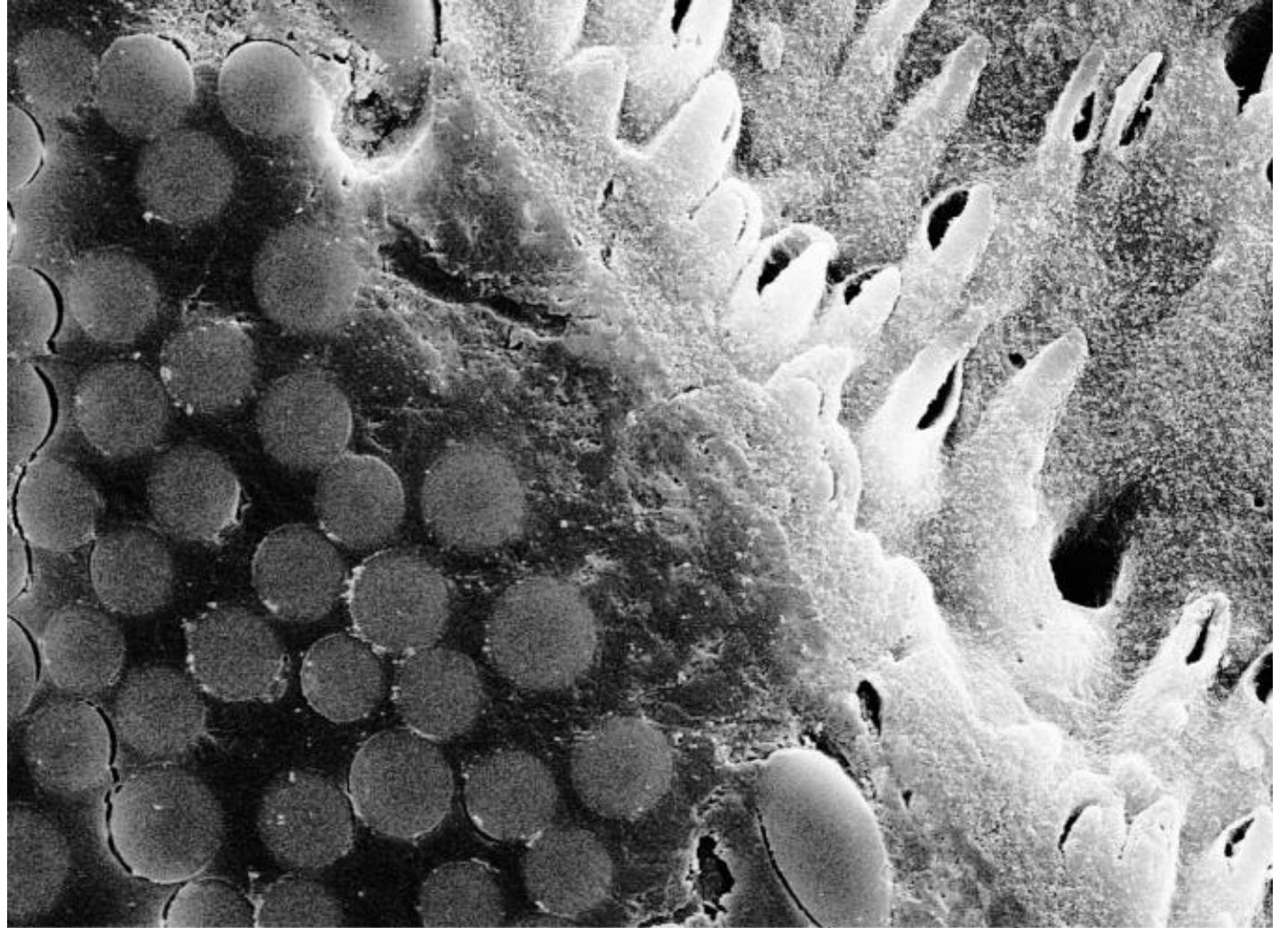








ISI LEI 5.0kV X2,000 10µm WD 8.6mm



SEM MAG: 4.00 kx

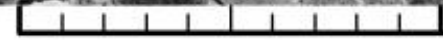
HV: 20.0 kV

VAC: HiVac

DET: SE Detector

DATE: 06/19/07

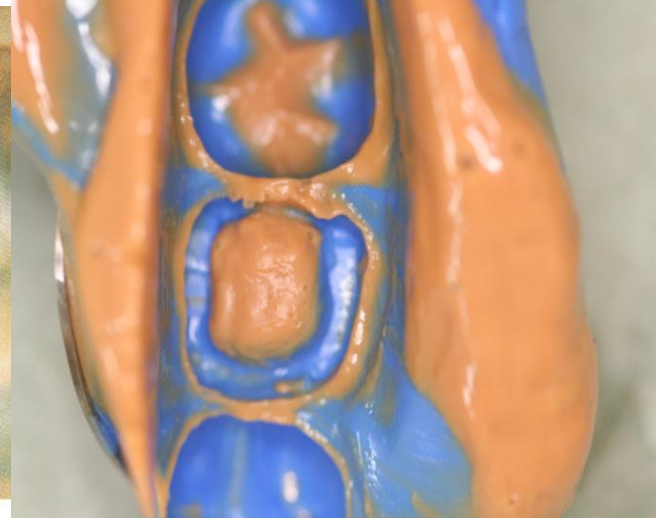
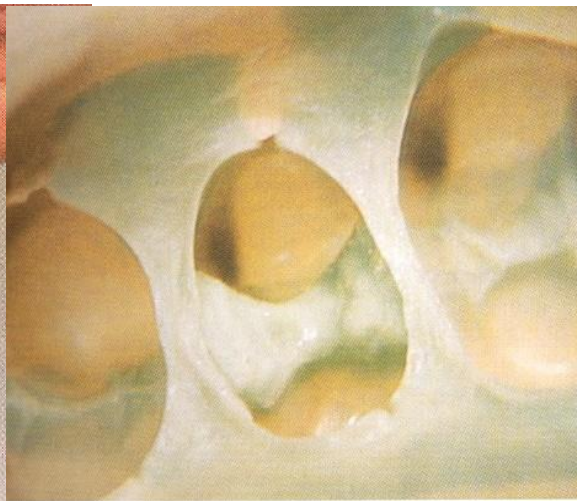
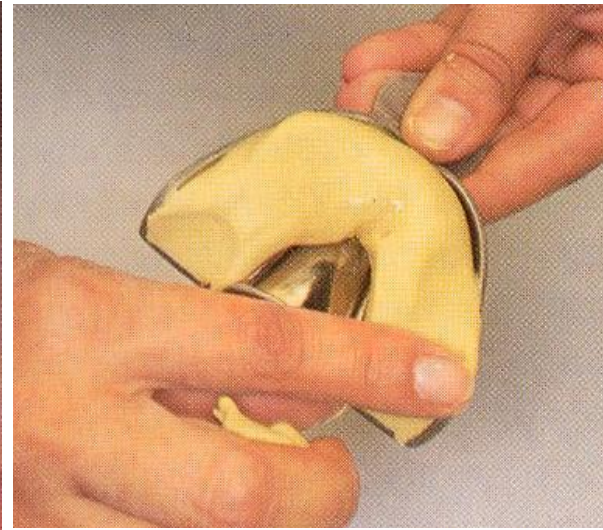
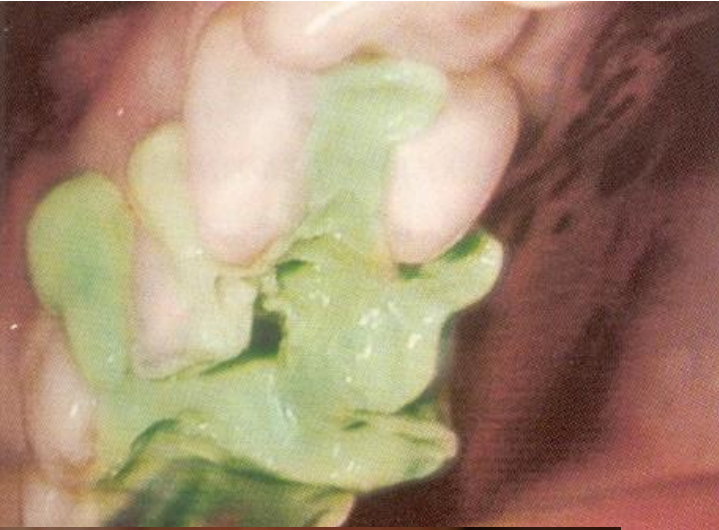
Device: TS5136XM



20 µm

Vega ©Tescan  
Digital Microscopy Imaging





Impression or scan



# Temporary?

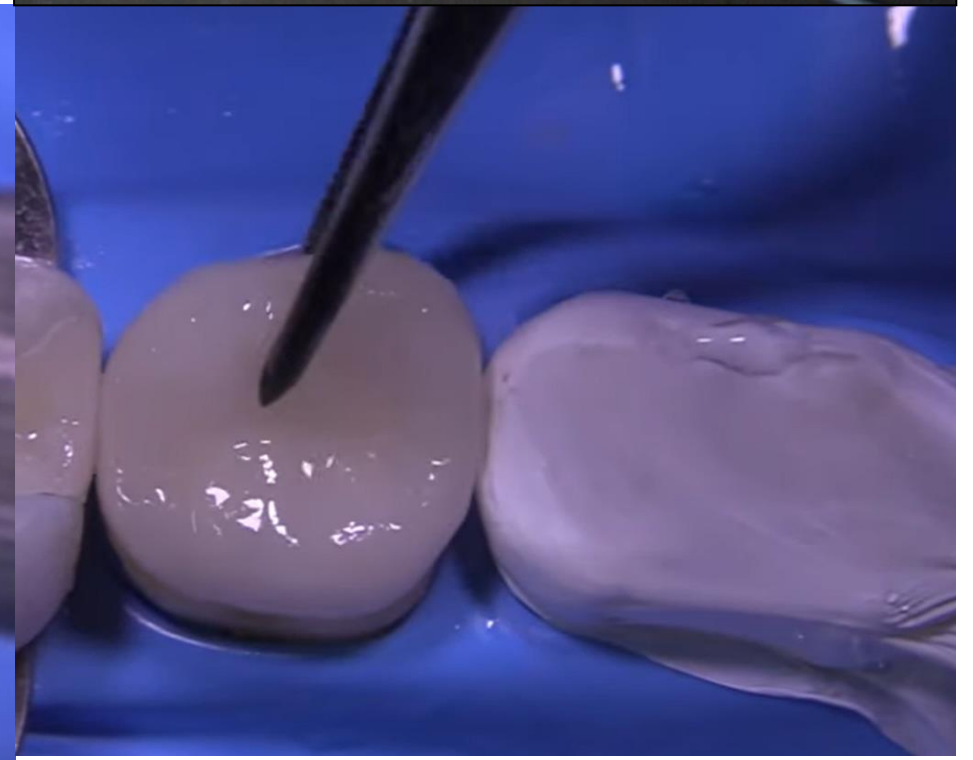
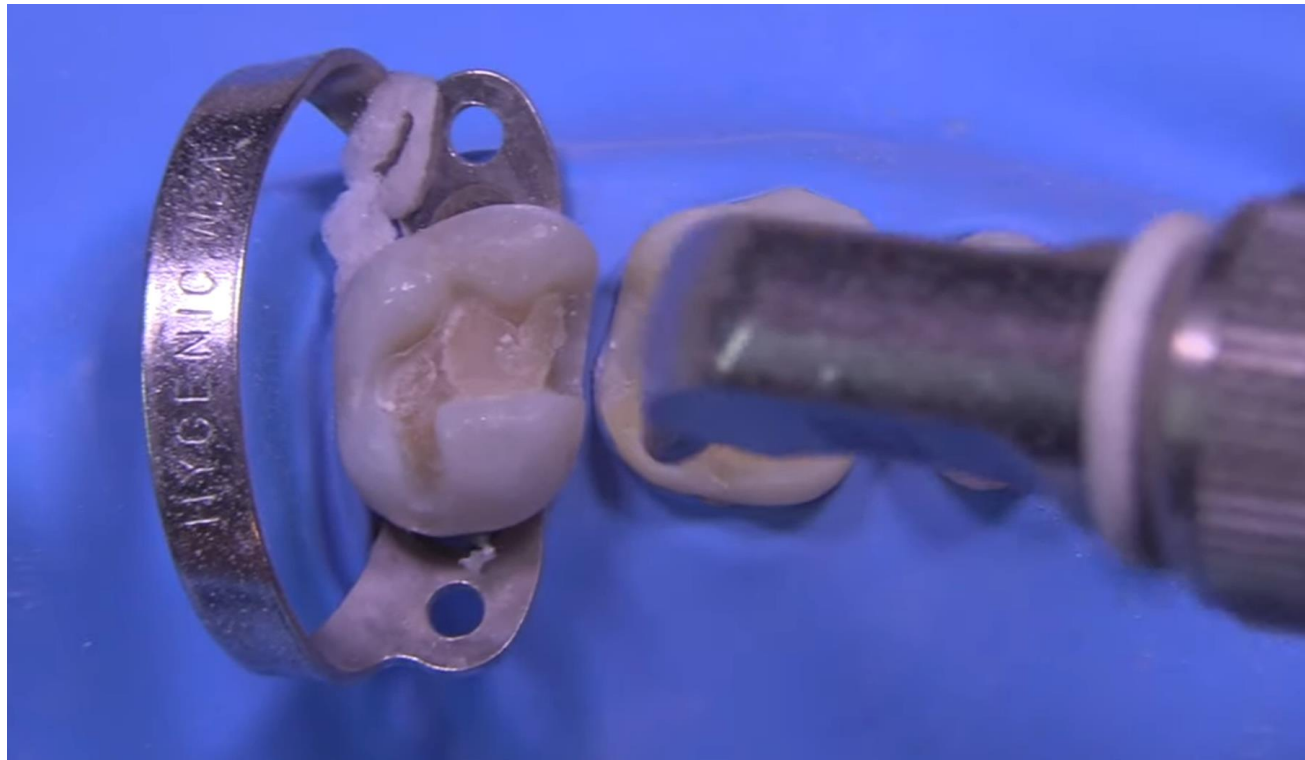
- Stamp method (Pro Temp)
- Proviso or Cavit (one component soft material)





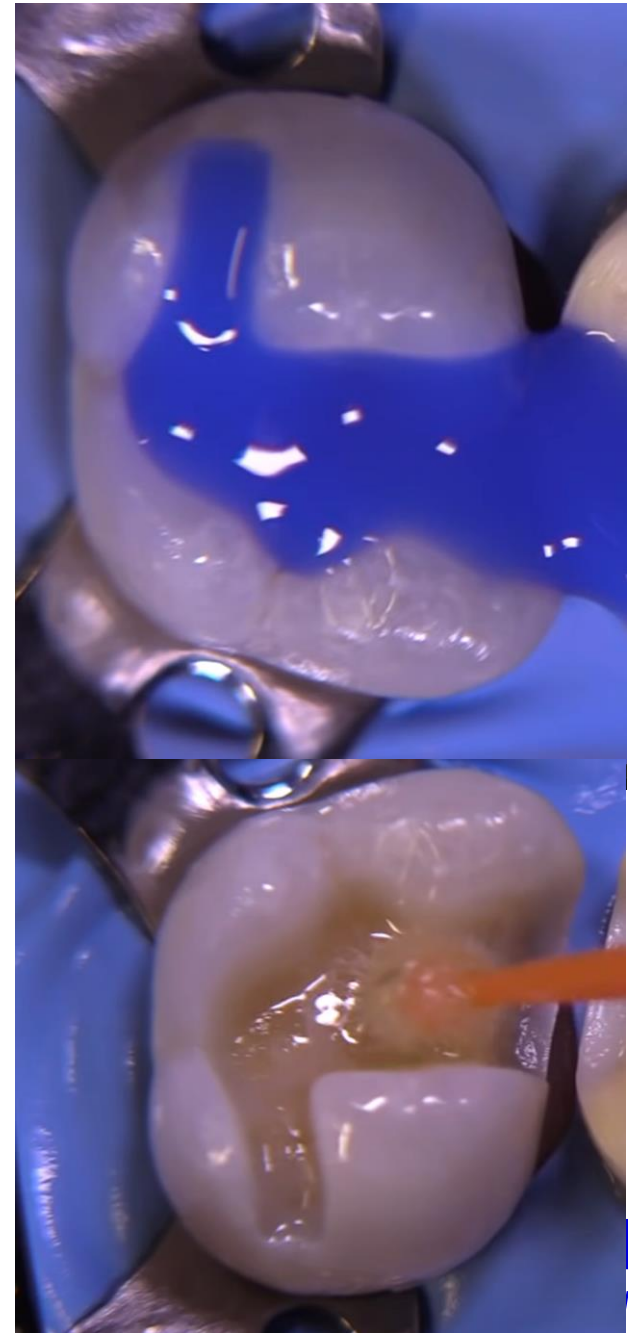
# Before luting

Sandblasting  
Aluminium dioxide 50 $\mu$ m  
Trying



# Preparation of hard dental tissues

After sandblasting acid etching and bonding

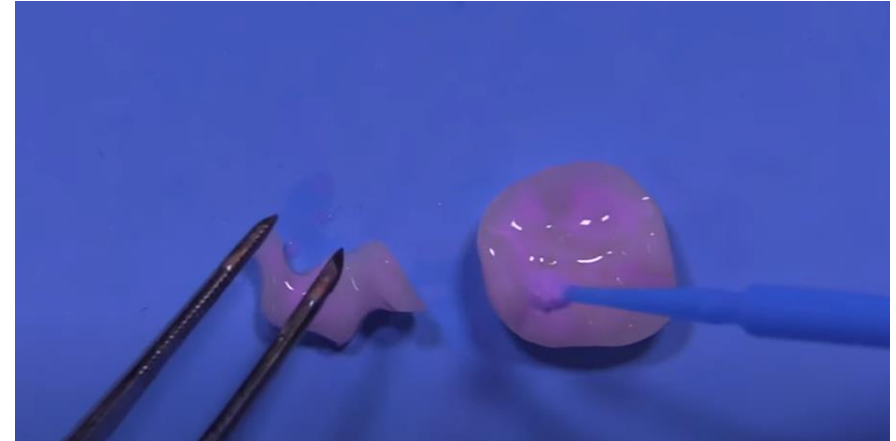






# Lithiumdisilicate ceramics

Cleaning



Etching



Silanization



MUNI  
MED

# Metal and composite restorations

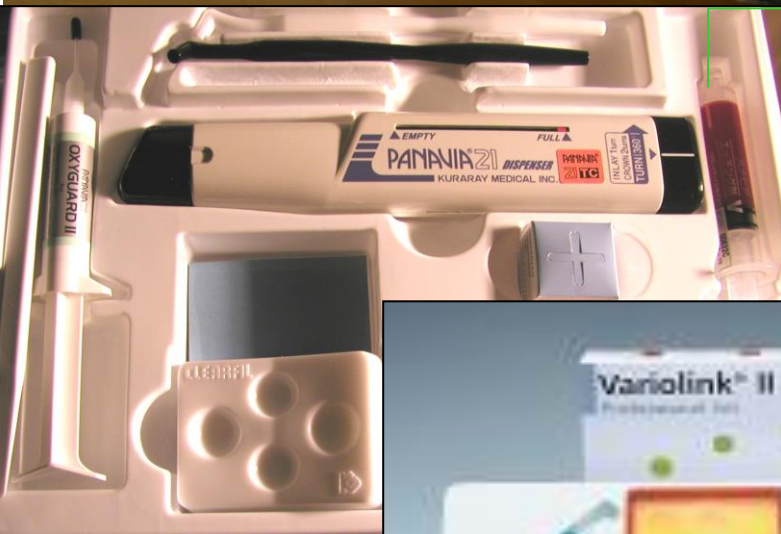
Sandblasting

Silanization



# Composite cements





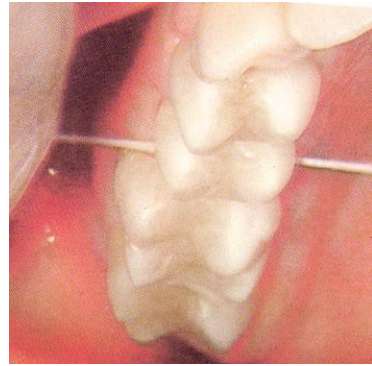
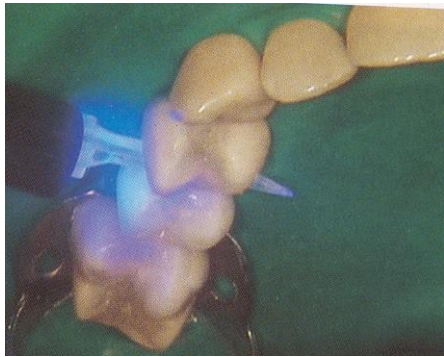
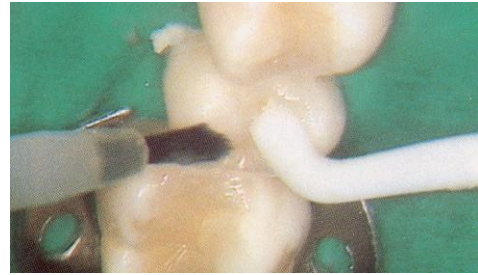
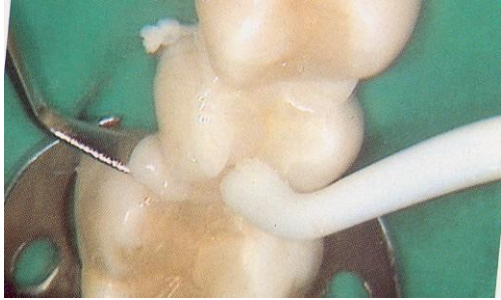
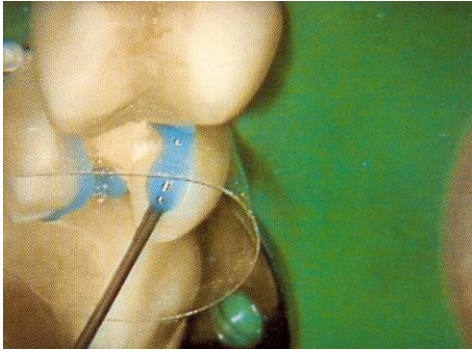
# Cementation

- Adhesive materials – composite cements
- Chemically or dual curing low viscosity materials



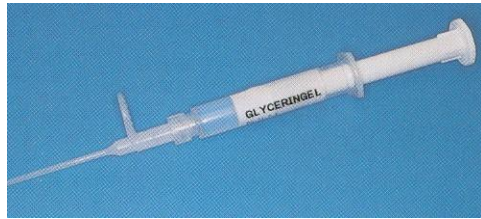
- Adhesive systems that must be compatible with adhesive cements

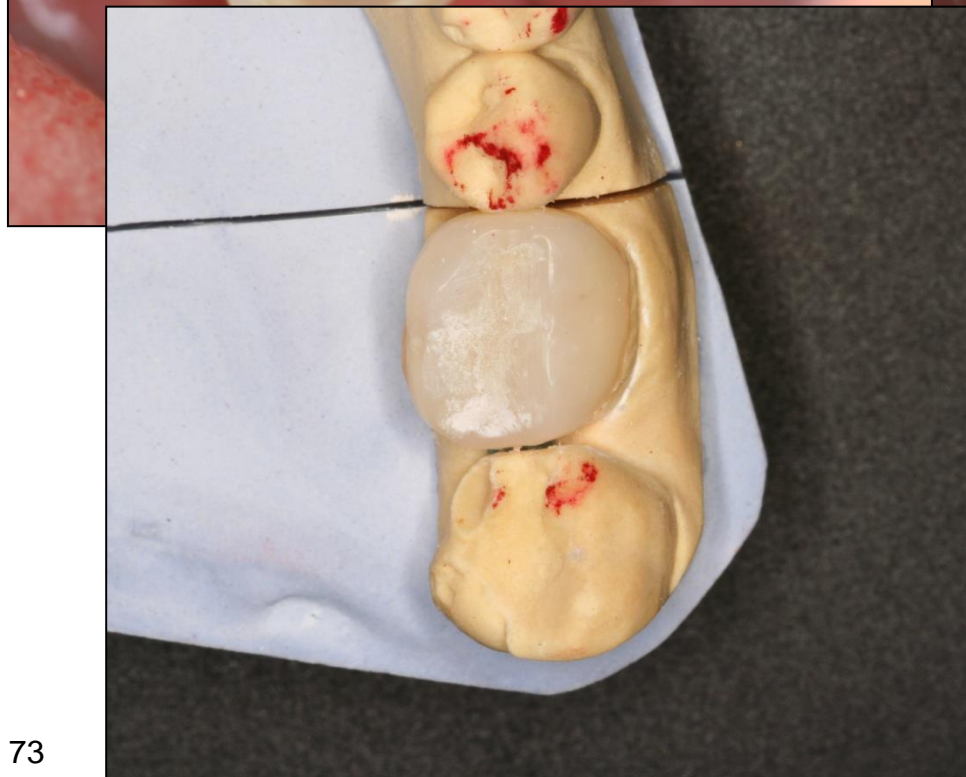






# The cement is covered with glycerin gel Inhibition layer is not present











# Selfcuring cements

Panavia 21 (Kuraray)

Dyract Cem (DENTSPLY De Trey)

# Light curing cements

- For thin veneers only





# Dual curing cements

- Two initiating systems









# Indirect restoration of anterior teeth

- Veneers

- Crowns

- Ceramics

- Composites (rare)

# Indications

- Hypoplasia
- Diastema, spaced frontal teeth
- Discoloration
- Multiple filling

# Contraindications

- High caries risk
- Bad oral hygiene
- Bruxism, deep bite

Consider full crown



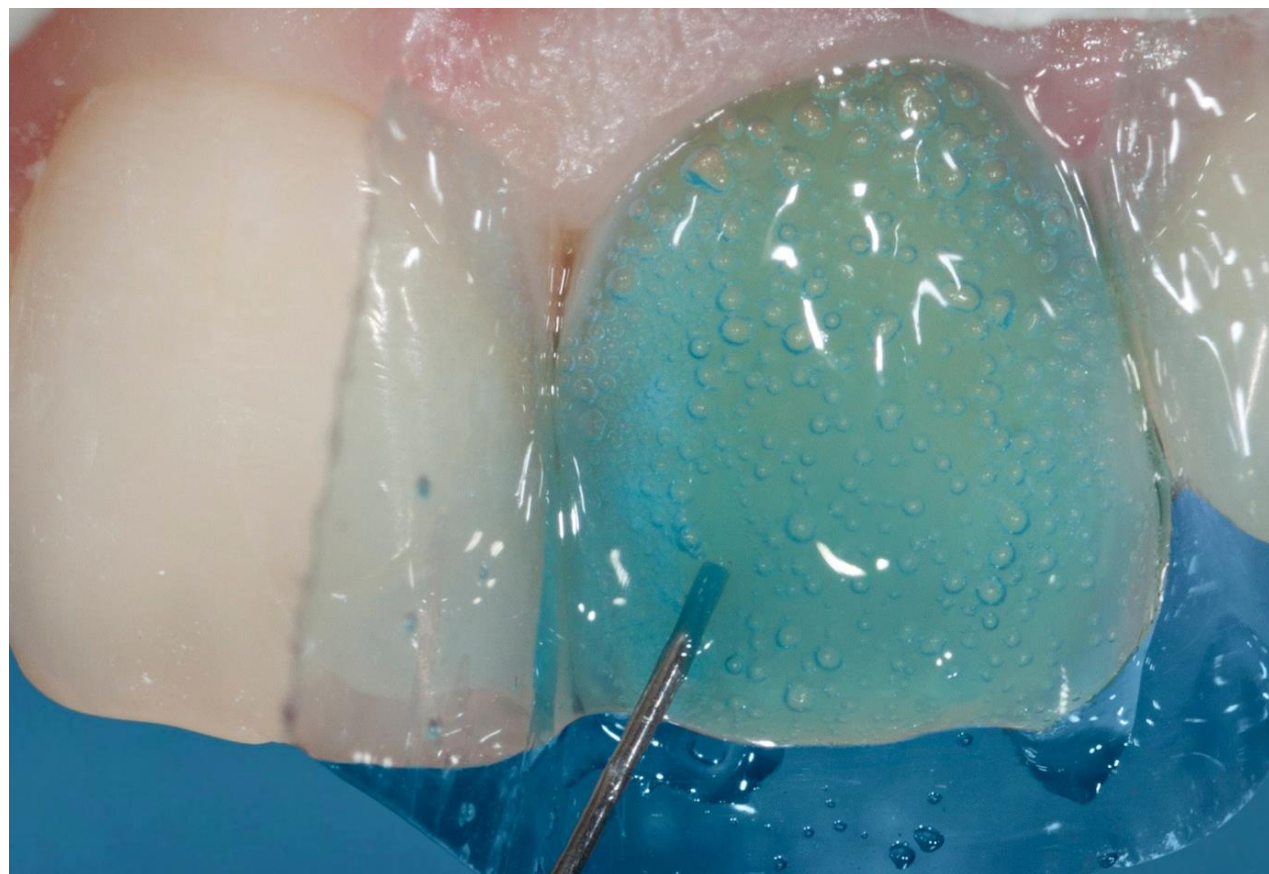
# Material

- Lithidudisilicate ceramics
- Made on model or CAD Cam

# Preparation – incisal edge involved



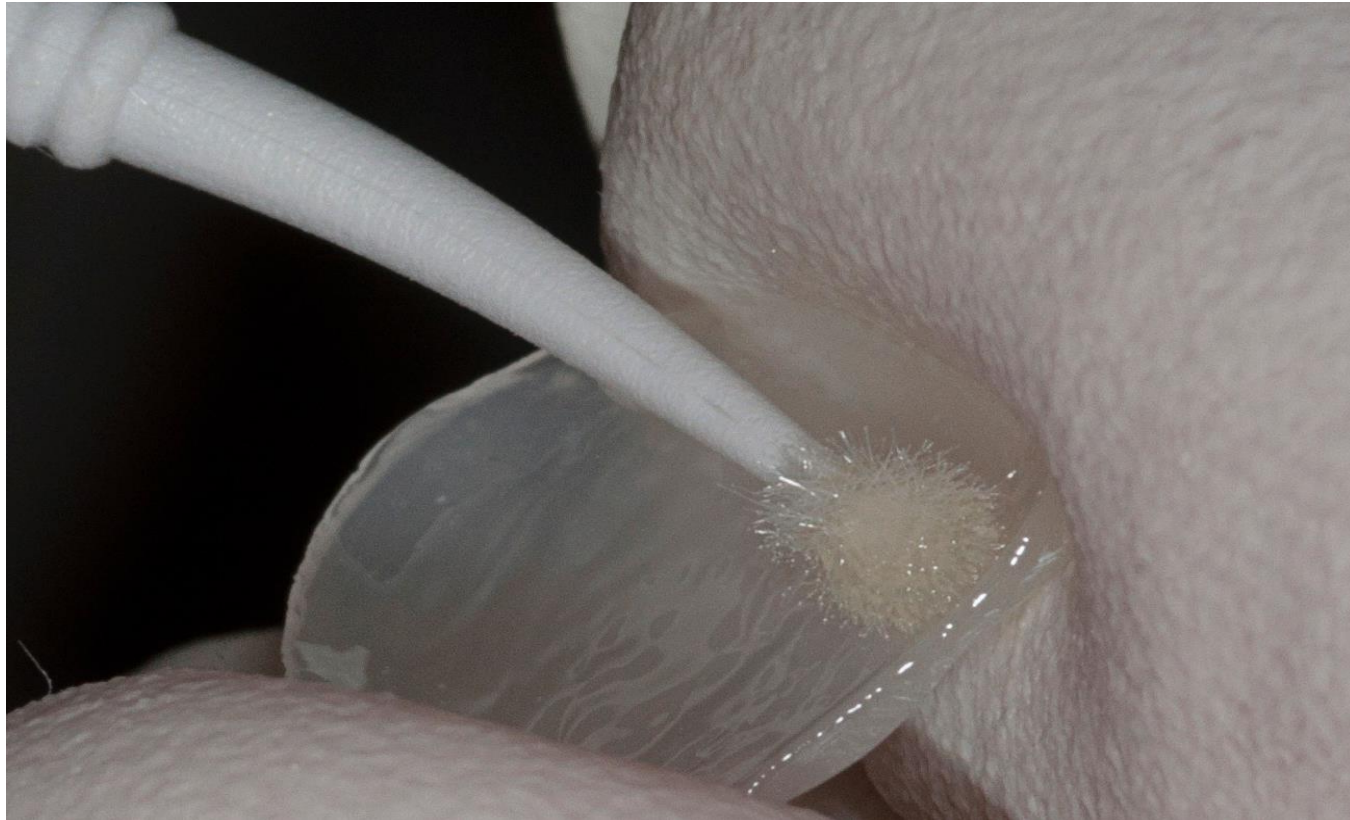
# Acid etching





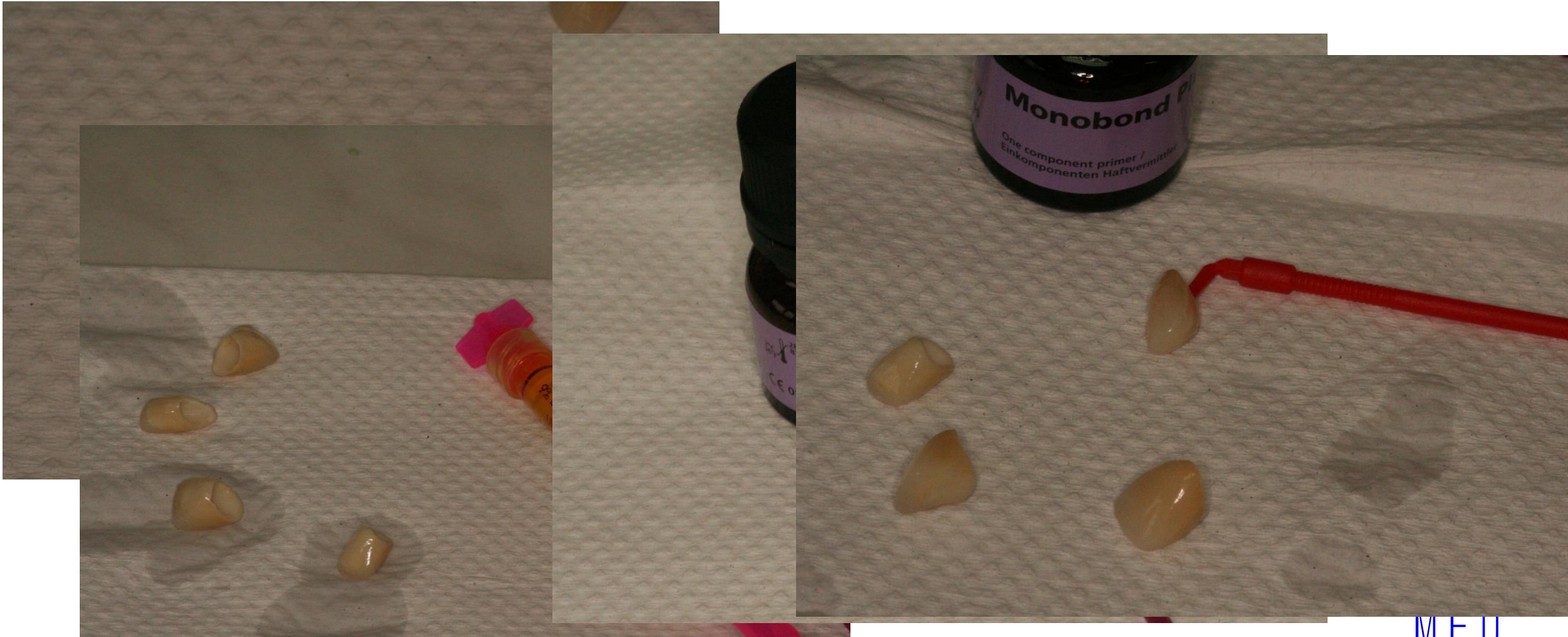
# Bonding







# Adhesive preparation of veneers and crowns



# Cementation





# Cementation







# Material

- Lithidudisilicate ceramics
- Made on model or CAD Cam



# Luting (cementation)

- Adhesive cements
- Particles filled composites

# Contemporary trends – filling material

Transitory decreasing of viscosity

Access removal easier

Less risk of bubbles



**Standard Composite Tray**

Holds and warms 8 Composite Compules plus well for extruded material.



**Calset Tri-Tray**

Holds and warms 2 Finishing Instruments. Holds and warms 3 spare Compules. Warms Compule in Composite Dispenser. Compatible with the CoMax, Kerr (Original), Caulk & Clinician's Choice Dispensers.



**Multi-Tray**

Accepts composite dispenser, 2 finishing instruments, 2 syringes and 4 composite compules. Compatible with the CoMax, Kerr (Original), Caulk & Clinician's Choice Dispensers.

