Caries therapy
Class III., Class IV. composite restorations

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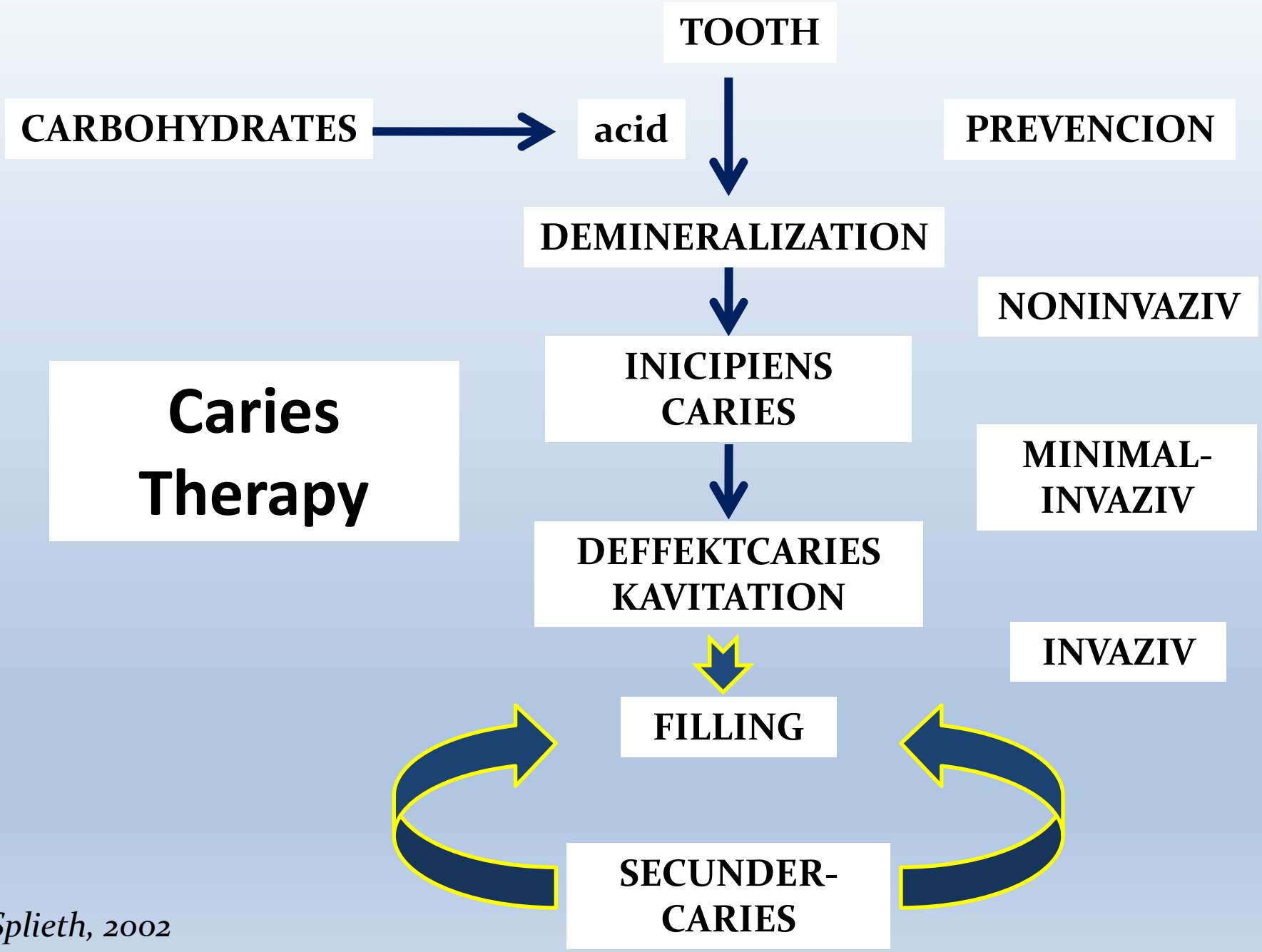


Splieth, 2002

Reversible process

- deminerilazation
- caries incipiens

Therapy

oral hygiene,

tooth brushing 2 times with fluoride contain tooth paste

Irreversible process

* **Cavitation → therapy: filling**
  - Caries superficialis
  - Caries media
  - Caries profunda

Definition of class III and IV cavity

Class III

located on the proximal surface of anterior teeth

Class IV

located on the proximal surface of anterior teeth and involve the incisal edge

Initial steps of the filling

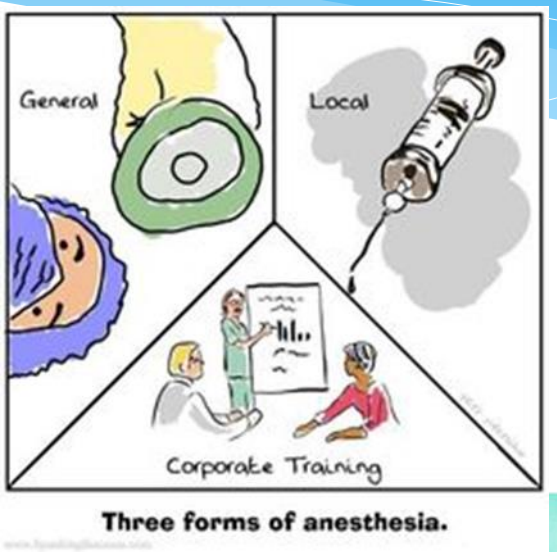
1. **Extra- and intraoral examination**
2. **Examination of the tooth**

   Inspection, palpation, percussion, sensitivity test, x-ray (if it is needed)
3. **Diagnosis**
4. **Check the articulation points!**

to help in properly adjusting the restoration's function and in determining the tooth designe

Initial steps of the filling

5. Anesthesia



Three forms of anesthesia.

6. Cleaning

depuration

fluoride-free polishing pasta!!!!!

Initial steps of the filling

7. Shade selection

The shade must be selected before:

* the tooth dehydrates
* the experiences concomitant lightening
* rubber dam cover the neighbor teeth

Use natural light (not direct sunlight!)

Cavity designe

* Conventional cavity preparation
* Beveled conventional
* Minimal invasive (modified)

Cavity preparation

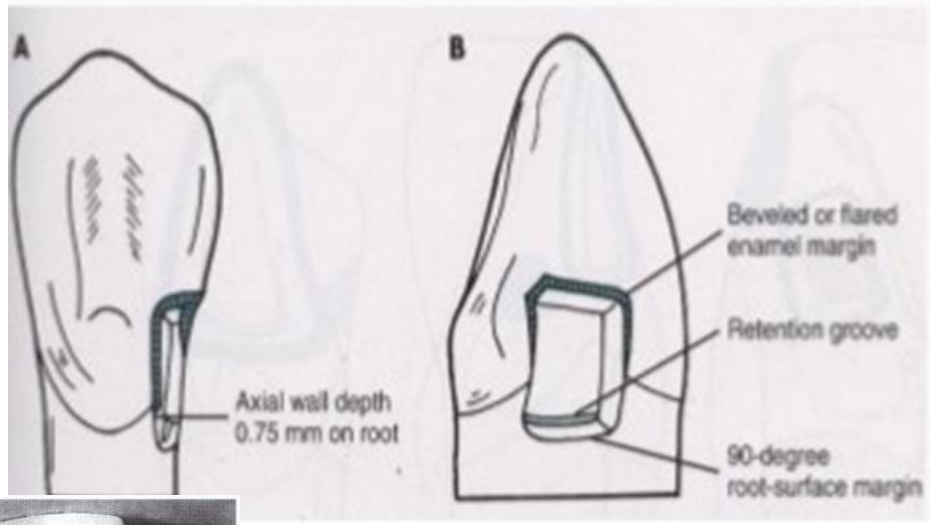
Conventional cavity preparation

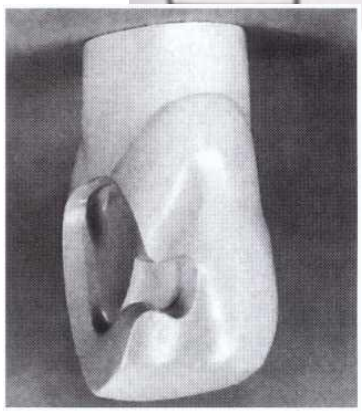
Indication

preparation is necessery on the root surface

Cavity forming features:

* Box shape
* depth: 0,75mm on root, 0,2mm in dentin
* 90° cavosurface margin is requied
* Groove retention can be prepared
  0,25mm into the dentin
  of the axiogingival line
  and incisoaxial line
* dovetail extension



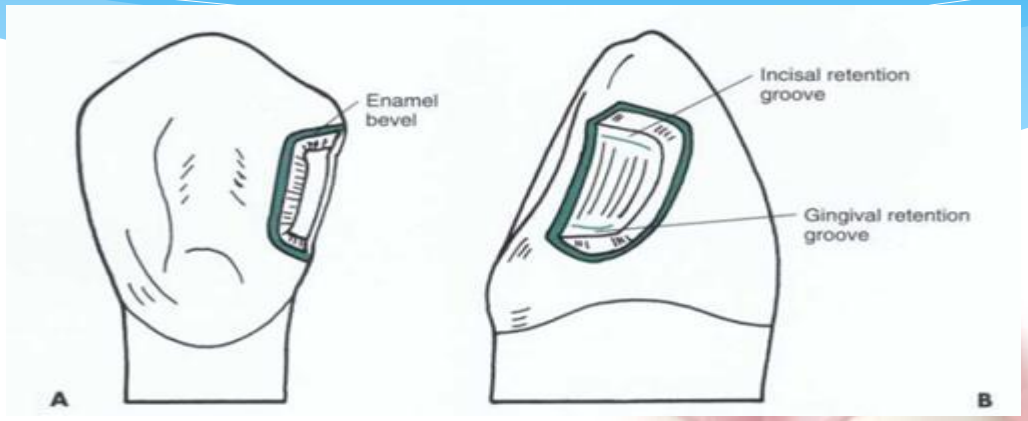


Cavity preparation

Beveled conventional

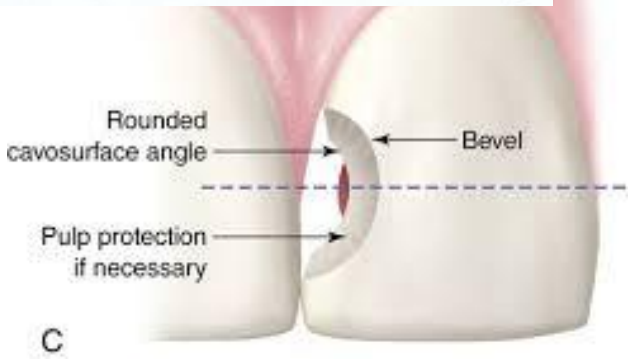
Indication

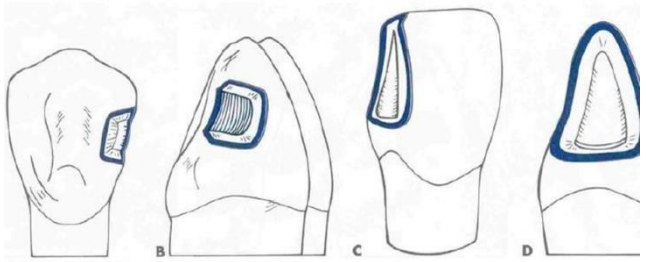
replacing an existing defective restoration in the crown



Cavity forming features:

- Similar to conventional, but **beveled enamel margin**
- Box shape
- 0,75- 1,25 mm depth
- 0,2 mm in the dentin
- axial wall in convex, following the external contour of the tooth





Cavity preparation

Reason of beveling is the microretention

- The end of enamel rods are more effectively etched producing deeper „microundercuts” than when only the sides of enamel rods are etched
- The composite filling has stronger adhesion to the tooth structure
- Better esthetic

* Use diamond bur 45 degrees to the external tooth surface
* Width should be 0,25-0,5mm

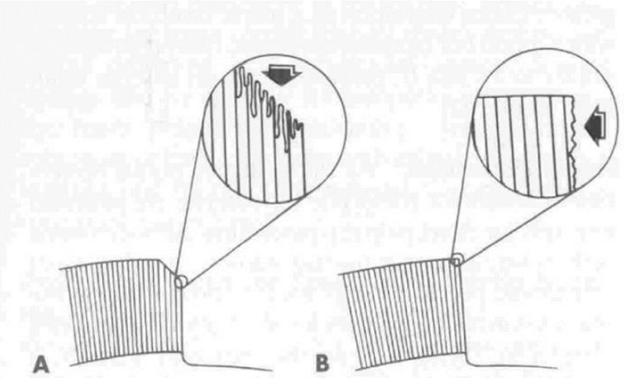


FIGURE 11-25 Ends of enamel rods **(A)** are more effectively etched, producing deeper microundercuts than when only the sides of enamel rods are etched **(B)**.

Cavity preparation

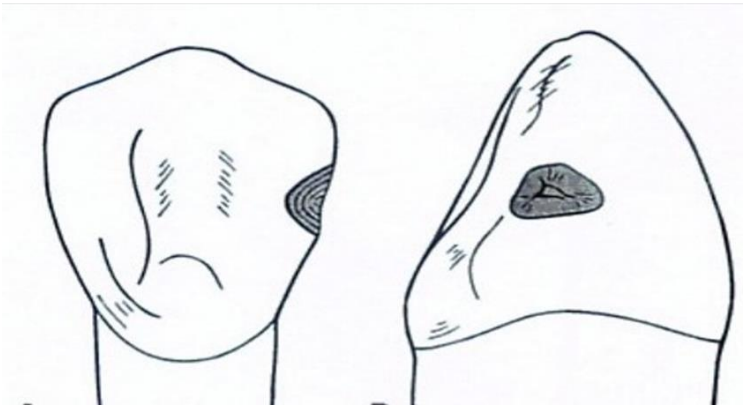
Minimal invasive

* **Indication**

small and moderate lesions or faults

Cavity forming features

* designed to be as conservative as possible
* walls extent only of the fault or defect area
* no specific shapes or forms
* no groove retention
* **but bevel the enamel**



Facial or lingual entry ?

Lingual approach is preferable

* The facial enamel is conserved for enhanced aesthetics.
* Some unsupported enamel may be left on the facial wall
* Colour matching of the composite is not as critical

Indications for a facial approach include

* The carious lesion is positioned facially
* The teeth are irregularly aligned, making lingual access undesirable
* An extensive carious lesion extends onto the facial surface

Instruments for cavity preparation

Preparation of the enamel

high speed turbine

micromotor (red)

water cooling is necessary

Preparation of the dentin

low speed (blue or green)

water cooling is not required

Bevel the enamel
45 degrees to the surface
micromotor (red)
(high speed turbine)
water cooling is necessary

Restorative technique

Isolation

* relative isolation
* absolute isolation

Place the rubber dam or cotton rolls

Restorative technique

Support matrix band and wedge

before etching and bonding

* The clear matrix allows the curing light to penetrate
* The clear wedge has a light reflecting core, thus directing the polymerization shrinkage towards the margin
* Better marginal closing

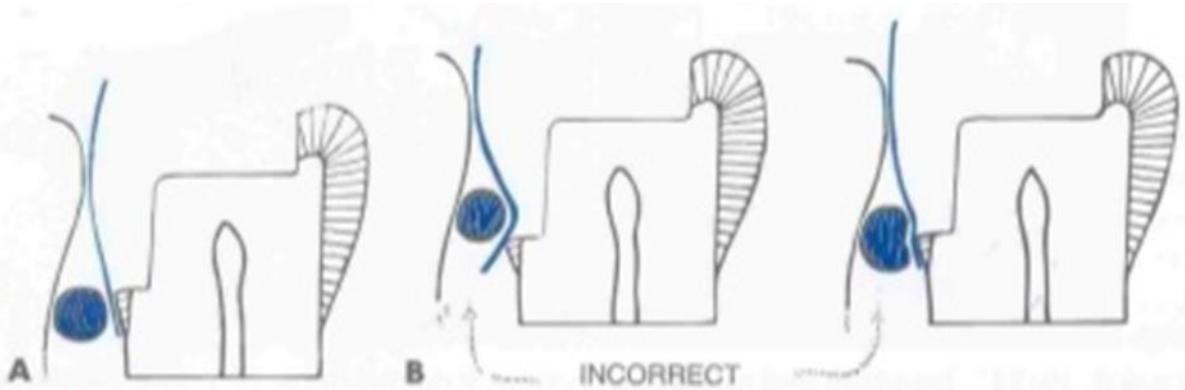
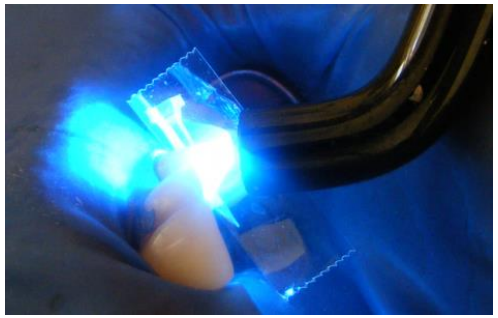


FIGURE 11-33 A, Correct wedge position. B, Incorrect wedge position.

Restorative technique

Etching and bonding

* 37% phosphoric acid
* etching time:
  enamel: 30-40 sec
  dentin: 15-20 sec
* Rinse the acid- 30-40 sec, use exhauster!
* Dry the tooth surface with air - 2-3 sec, but NOT OVERDRY!!!
* Bond application with brush



* With soft air
  - ✓ Thin the layer
  - ✓ Blow the bond into the dentin tubules and enamel micro-and macro-tags
  - ✓ Evaporate the solvent agent of the bond
* Light cure with the polymerization lamp 20-40 sec

Restorative technique

Application of composite

* Place 1st increment of composite
* Usually dentin and opaque shade or
* enamel shade to form first the oral wall
* Place 2nd increment of composite

(usually dentin shade) to establish contact and internal bulk
Internal shades should be established at this time.

* Place 3rd increment of composite
* (usually enamel shade) to establish facial form and incisal form

* Light Cure for 20-40 sec between the increments

Restorative technique

Mock- up

A mock-up is the creation of a “trial smile” allowing the patient the exciting prospect of actually being part of his/her own smile .

Indications

* Large missing tooth structure
* Changes the shape and forms of the teeth

Steps

* Dentist applies tooth-colour filling materials temporarily to the tooth/teeth.
* Changes the shape and forms of the teeth, closes spaces between teeth, or simulates the ideal balance between the gum line and the teeth.
* Dentist treats the teeth with the help of a silicone template **direct.**

Mock- up

Original appearance.

“trial smile” which is created by applying tooth colour materials on top of the patient's teeth

The dentist will reduce a small amount of the surface of the patient's teeth creating adequate space for the new veneers.

Silicone template

The final result creating a new smile which closed spaces and replaced worn, uneven teeth.

Mock-up

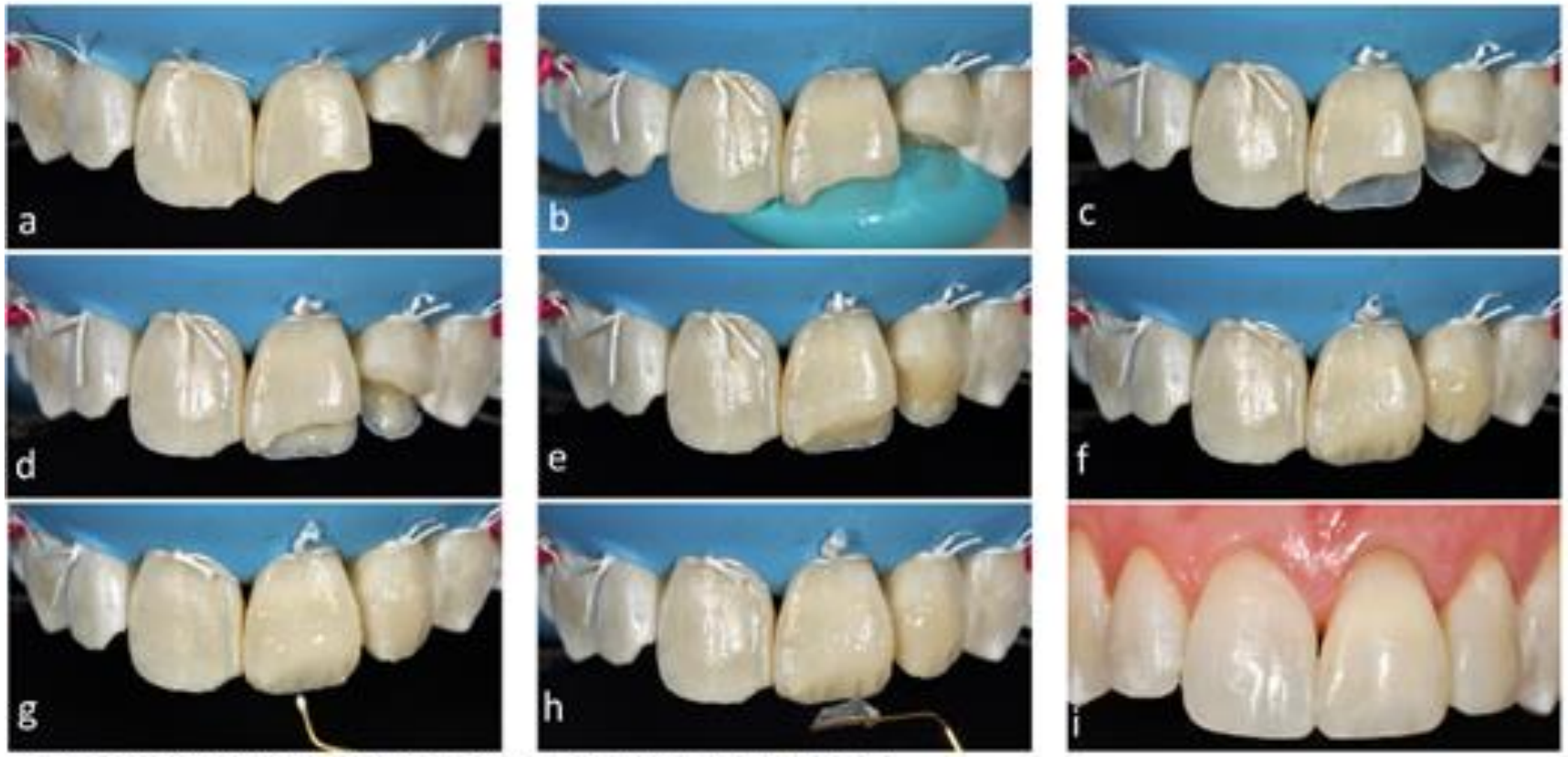
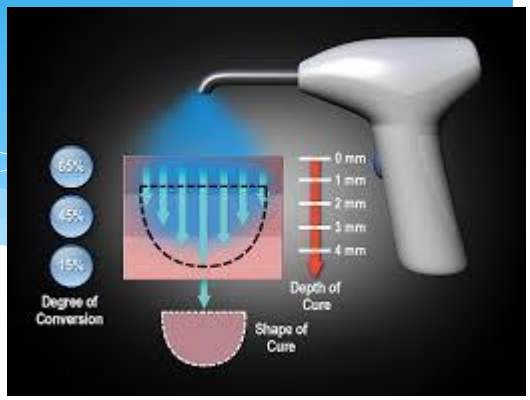


Figure 16. Use of different composite shades to replicate the layers seen in natural teeth.

Restorative technique



Light curing

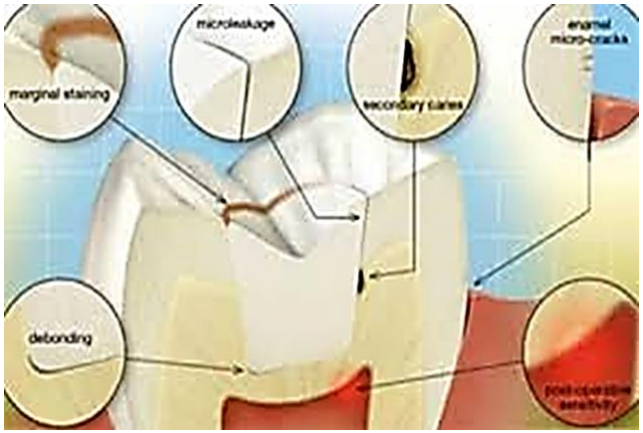
We should reduce polymerization shrinkage

* Soft start polymerization
* Perpendicular to the composite material
* Distance between the end of the lamp and the composite material is 10mm
* eye protector is recommended

* Polymerization time depends on the power of the lamp:
  * Halogen polymerization lamp: 400-800 mW: 40sec
  * Ledpolymerization lamp: 850-1200 mW: 15-20 sec

Polymerisation shrinkage

* Marginal leakage
* Postoperative sensitivity
* Secunder caries
* Marginal discoloration
* Enamel microcracks
* Microcraks in the filling
* Reduced durability



Polymerisation shrinkage

Depends from:

* **Compliance of the tooth and filling material**
* **Type and amount of filler**

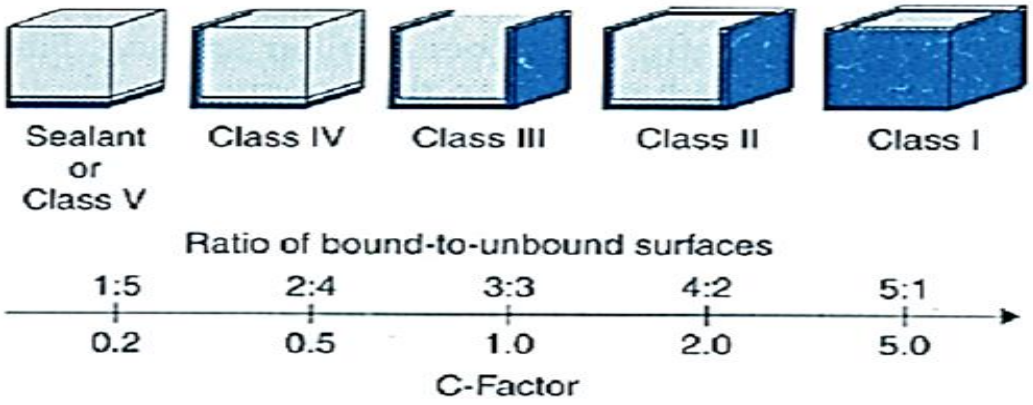
Volumetric shrinkage, material stiffness, degree of conversion from double carbon bonds into single carbon bonds

* **The size of monomer conversion**

The high molecular weight monomers result lower shrinkage

* **Configuration factors**

The restorative resin shrinks and pulls the opposing walls and floor



Filling materials

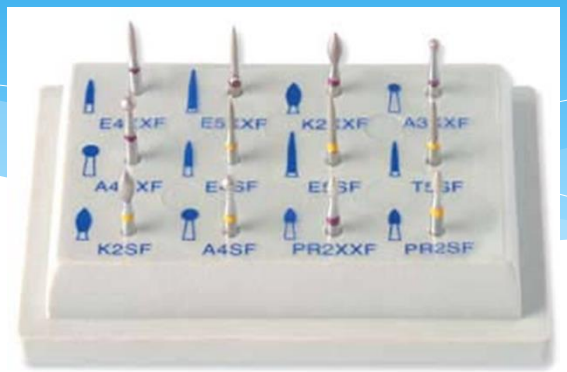
Polychromatic composite resin materials designed to be applied in layers

* HFO/HRI/Vit~l~Escence (Ultradent)
* **Clearfil Majesty** ES-2 Classic (Kuraray)
* Miris 2 /Synergy D6 (Coltene/Whaledent)
* Renamel Microfill/Nano (Cosmedent)
* Venus diamond/ Durafill VS (Heraeus Kulzer)
* **Esthet-X HD** /Ceram X duo (Dentsply)
* **Filtek Supreme Ultra** (3M ESPE)
* **IPS Empress Direct**/ Tetric Evoceram (Ivoclar)
* **Gradia** (GC)
* GrandiSO/ Amaris (Voco)
* Herculite Ultra/ XRV (Kerr)
* Micerium SpA

Instruments for filling

Figure 17. Tinted flowable composite may be
using suitable instruments to create
ncisal effects.

Finishing and polishing

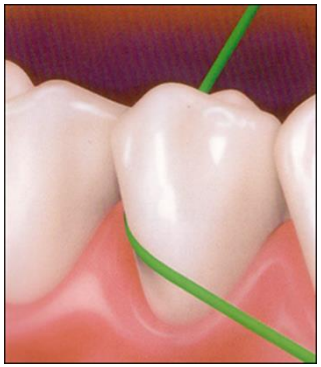


* Contouring

  remove the access

* Finishing

* Check the articulation
* Polishing



* Check the smoothness

Instructions for the patients

* Care for the restored tooth: brushing and flossing.
* Patient can eat and drink normally after the anesthesia wears off .
* Patient should avoid biting into very hard object as the restoration might break (bruxism's).
* Patient might experience some minor discomfort of the tissues around the restored tooth due to the irritation of the gingival wedge and the finishing of the gingival marginal area.
* The restoration might appear slightly too translucent after removal of the rubber dam. (This is due to the desiccation of the tooth, which makes it appear more opaque. The tooth will rehydrate in a few hours and the shade should acceptable)
* If the bite does not feel comfortable (too high, tight) this could cause the failure of the restoration.

PRINCIPLES OF ANTERIOR COMPOSITE RESTORATION

- 1. Smile Design
- 2. Color and Color Analysis
- 3. Tooth Color
- 4. Tooth Shape
- 5. Tooth Position
- 6. Esthetic Goals
- 7. Composite Selection
- 8. Tooth Preparation
- 9. Bonding Techniques
- 10. Composite Placement
- 11. Composite Sculpture and
- 12. Composite Polishing to properly restore anterior teeth with composite: