

# Calcium hydroxide

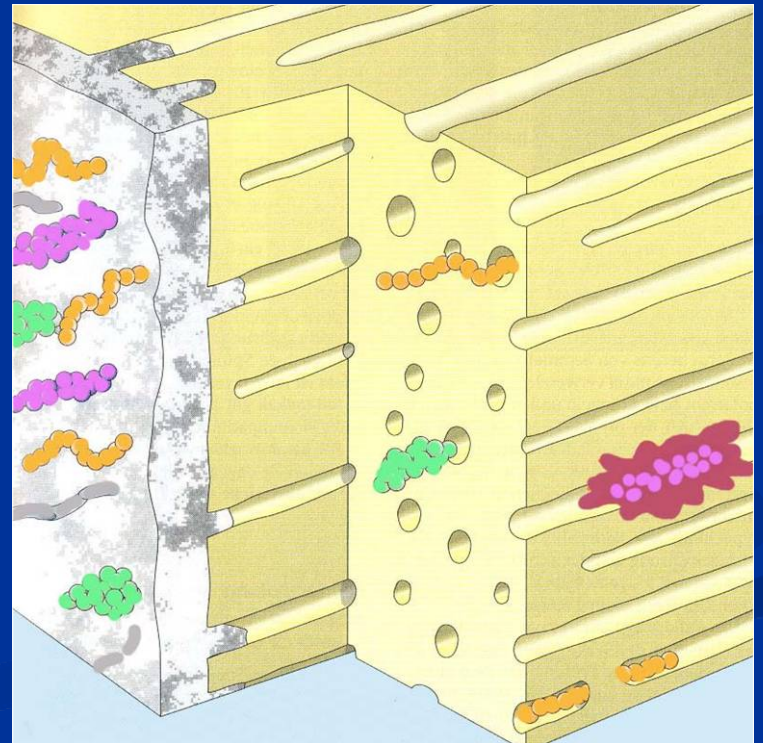
Temporary root canal filling

Subbase

Component of sealers



# Dressing



# Calcium hydroxide

- Short term action

1 – 2 weeks

Desinfection, haemostasis

# Calcium hydroxide

- Middle term action

2 – 3 months

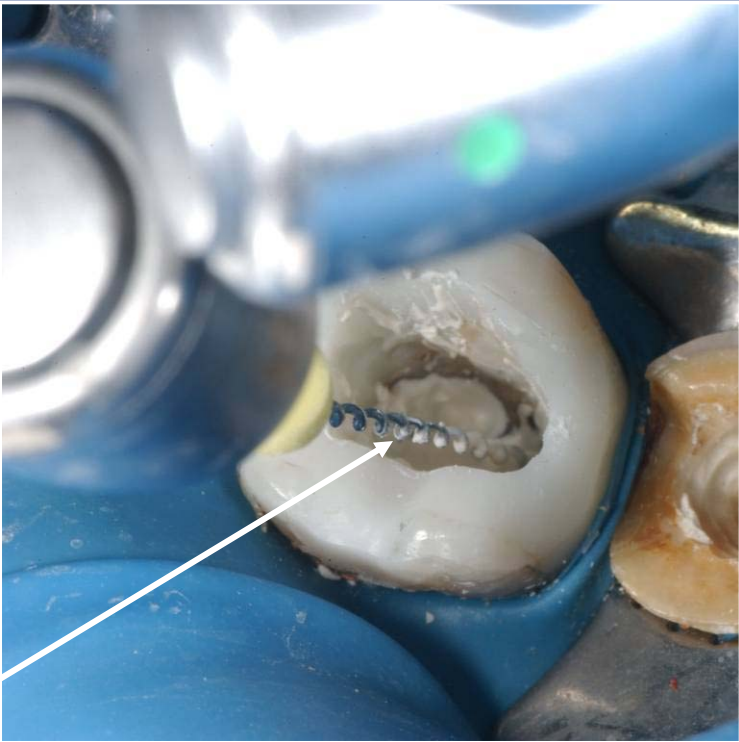
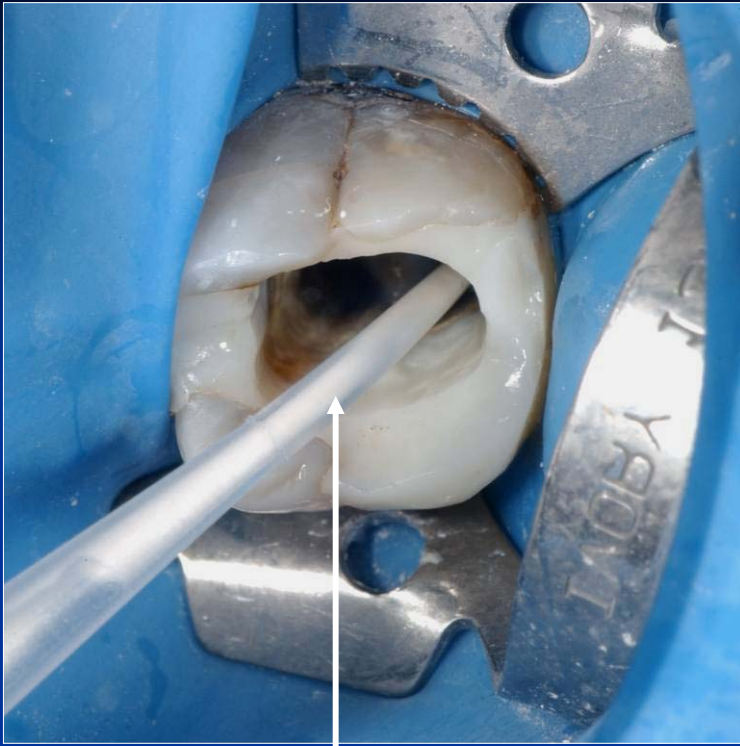
Apexification

Chronic form of apical periodontitis

# Calcium hydroxide

- Long term action  
3 months and more

Prevention of resorption



Magistraliter

The powder is mixed with distilled water

**Lentule 2 mm less than WL !!!!!**



Apexit® Plus

ApexCal®

# Root canal filling



# Ideal root canal filling (Grossman 1988)

1. Easy mixing
2. Sufficient working time
3. Good seal
4. X- ray contrast
5. Easy removal
6. No shrinkage
7. Long term volume stability
8. No bacterial growing
9. No permeability for fluids
10. Biocompatibility
11. No staining

# Classification of root canal fillings

- Solid
- Semisolid
- Pastes

# Guttapercha

Dried juice of the Taban tree (*Isonandra percha*)  
(gutta)

1,4 - polyisoprene

Crystallin structure (60%)

Brittle

# Guttapercha

## ■ Beta phase

## ■ Alpha phase 42 – 49 °C

- plastic

- **Gamma phase** 56 – 62° (amorfní)

## Cooling process

very slowly (less than 0,5°C) – alpha phase

normal cooling– beta phase

# Composition of guttapercha materials in endodontic

Guttapercha 19% – 22%

Zinc oxide 59 - 79%

Heavy metal salts 1% - 7%

Wax or resin 1% - 4%

# Resilon

*(Pentron)*

- Thermoplastic synthetic polymer
- Points or material for injection

*Composition:*

*Polyester polymers*

*Bioactive glass*

*Radioopaque fillers (bismuthum oxichlorid a and baryum sulphate)*

# Silver or titanium cones

- No good seal
- Silver cones - corrosion

# Sealery

## Chemically curing plastic materials

*Good adhesion to root canal walls as well as solid cones*

*X- ray contrast*

*Biocompatibility*



# Sealers

Zinc Oxide-Eugenol

Chloropercha

Calciumhydroxide

Resins

Glasionomer

Silicone

# Sealers

## Importance

*Filling of the spaces between the solid cones*



*Seal of the root canal filling*

# Zinc - Oxid Eugenol

Powder:

Zinc oxide

Liquid:

Eugenol

Acidic resins

Good adhesivity, antimikrobial effect, cytotoxic.  
(resorbable)

# Zink Oxid Eugenol sealers

Pulp Canal Sealer (Kerr, USA))

Tubuli- Seal (Kerr, USA)

Caryosan (Spofa Dental, ČR)

# Chloropercha

Powder

Canadian balsam

Resins

Guttapercha

Zinc oxide

Liquid:

Chloroform

Resins

# Chloropercha

## Vlastnosti:

Good adhesivity

Shrinkage

Toxicity

# Calciumhydroxide sealers

Base ( powder)

Calcium hydroxide

Zinc oxide

*Other components and vehicula*

# Kalciumhydroxidové sealery

Catalystr (paste)

Zinc stearat

Titanium dioxide

Baryum sulphate

or

Eugenol, Eukalypt

others



# Kalciumhydroxide sealers

- Increase of the healing potential of periapical tissues
- Antibacterial effect
- Easy manipulation

*But!*

*Resorbable if not homogeneous*

*Not suitable for the single cone technique*

# Resins

➤ Rezorcin formaldehyd

➤ Epoxide

➤ Polyketone

➤ Metacrylate

# Rezorcín formaldehydové pryskyřice

Toxicity

N2, Endomethason, Riebler's paste, Foredent

# Epoxide resin

➤ Base (powder, paste)

Bismuth oxid

Titanium dioxide

Hexametylentetramine

(Silver)

➤ Catalyst (liquide, paste)

Bisphenoldiglycidylether

# Epoxide resin

## Advantages

- Long working time
- Hydrophilic (good penetration)
- Good adhesion to the root canal walls
- Volume stability
- No dissolution
- Antibacterial

# Epoxide resin *(disadvantages)*

- Difficult removal
- Staining
- Initiatory roxicity

*No suitable for the single cone technique !*

# Polyketone

- Base

Zinc oxide

Bismuth phosphate

Hexametylentetramine

- Lequid

Bisphenolglycidylether and other components

# Polyketone

*(advantages and disadvantages)*

## Advantages

Good adhesion

No contraction

No dissolution

## Disadvantages

High stickiness

Not removable

Products: Diaket, Diaket A (3M ESPE)



# Methacrylate resins

Endo ReZ (Ultradent) – UDMA

For injection – single cone technique

Epiphany (Pentron)

Bis- GMA, etoxy bif- GMA, hydrophilic bifunctional methacrylates

Calcium hydroxide, baryum sulphate, baryum glass silica.

*Sealer in combination with Resilon*

# Glasionomer sealers

➤ Base (powder)

Aluminium silicate glass

➤ Liquid

Polyacrylic acid, polymaleic acid, tartaric acid

# Glasionomer sealers

## *(Advantages and disadvantages)*

### Advantages:

Curing under wet conditions, chemical bonding to hard dental tissues, no staining

### Disadvantages

Short working time, difficult removal,  
porous

### Products

Ketac Endo (3M ESPE), Endion (VOCO)

# Silicon based sealers

Polyvinylsiloxane (ev. in mixture with powdered guttapercha)

Biocompatibility

Hydrophilic

*Further investigation desirable.*

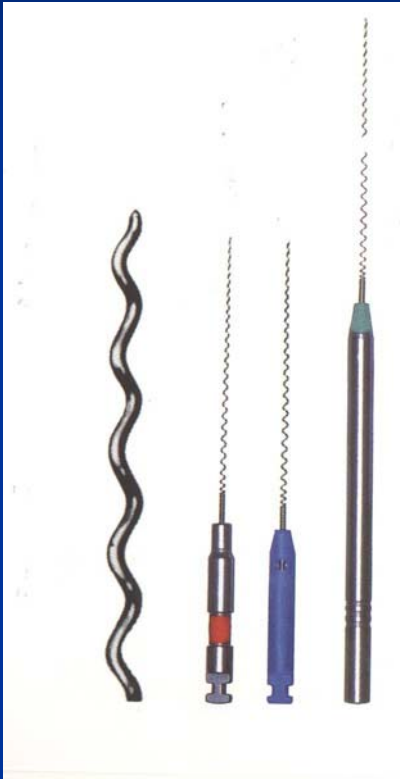
# Root canal fillings - forms

- **Points (Cones)**
- **Materials for injection**
- **Plastic materials**

# Instruments

- Lentulo
- Compactors
- Compactors - carriers
- Others

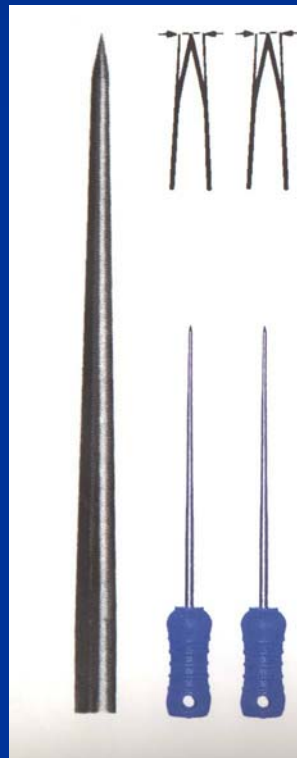
# Lentulo



- delivers pastes
- 1,5 – 2 mm ahead
- at most for  $\text{Ca}(\text{OH})_2$

# Compactors

Spreader



Pointed

Vertical introduction

*Lateral condensation*  
*technique* ↓



# Compactors

## Plugger



Not pointed

Vertical introduction

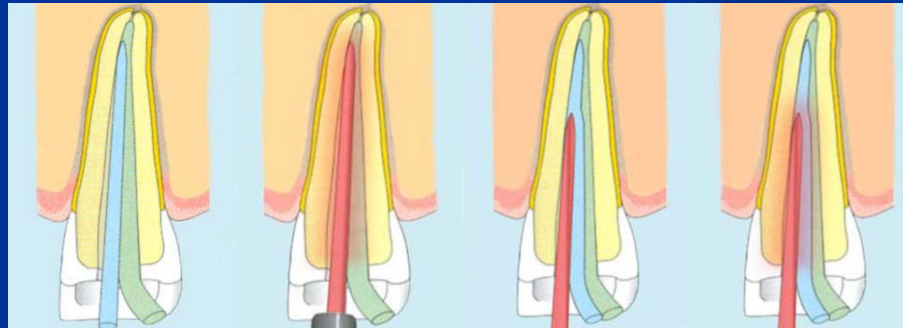
*Vertical condensatuion  
- compaction*

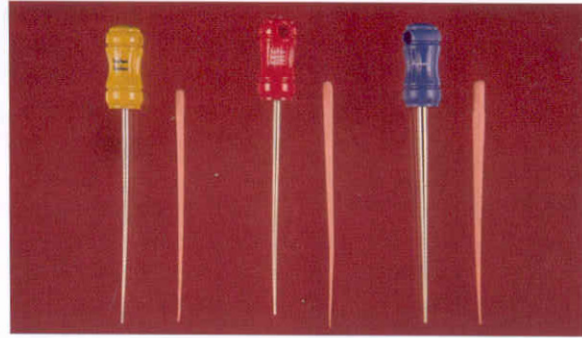
# Filling techniques

Cold

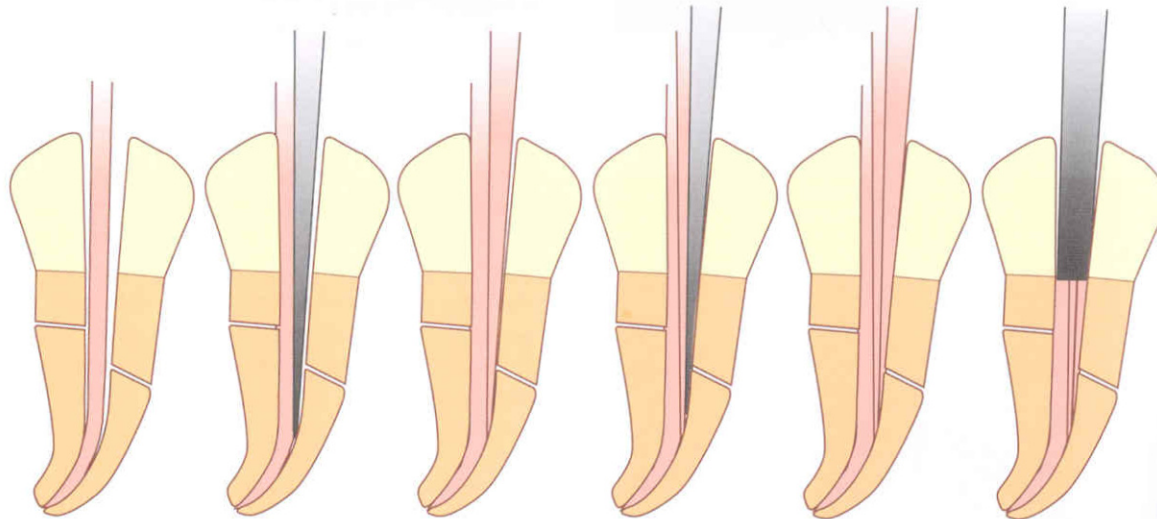
Warm

# Warm lateral condensation

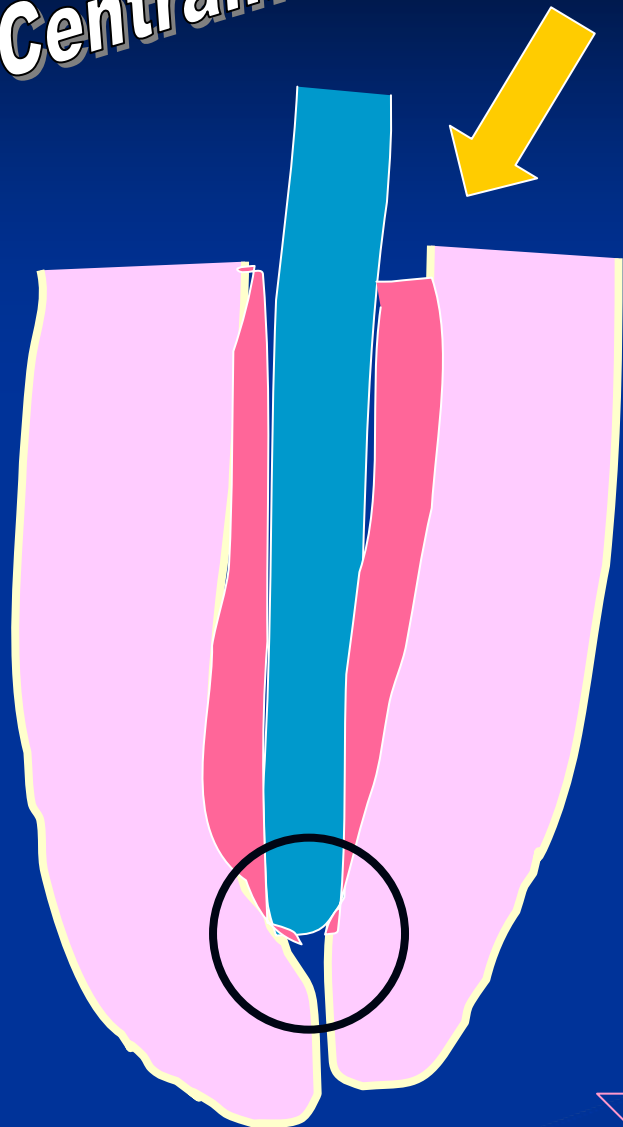




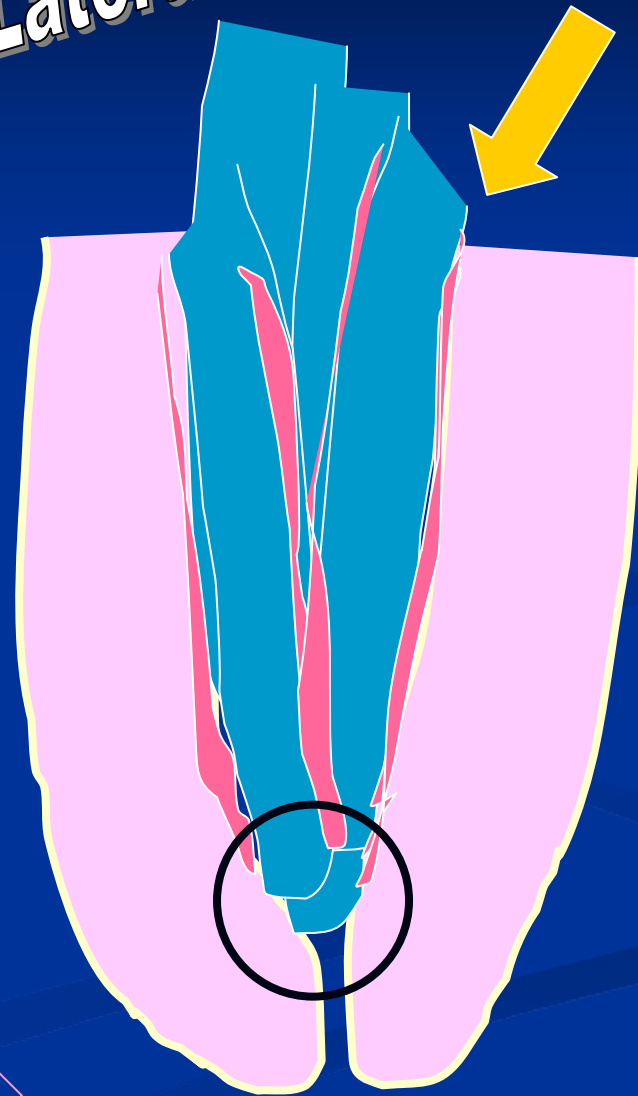
A



**Centrální čep**

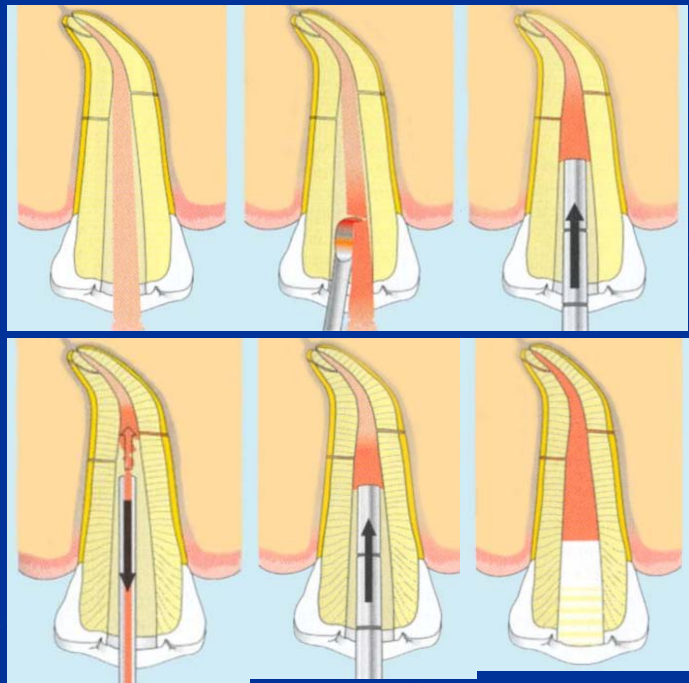


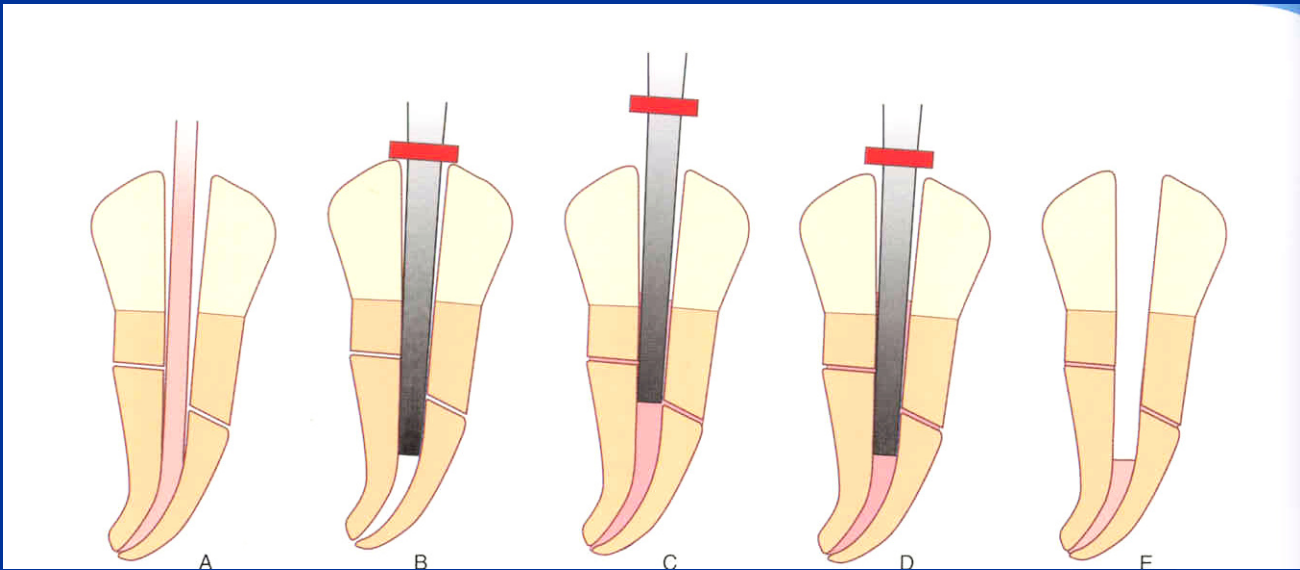
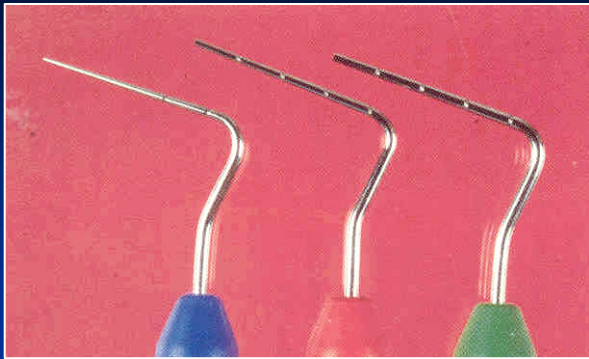
**Laterální kondenzace**



# Vertical condensation

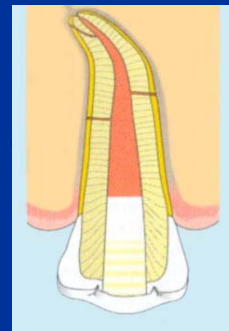
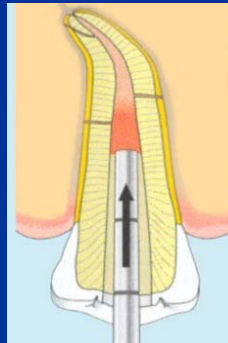
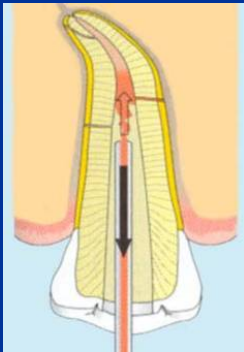
- Difficult control of the working length
- Possible extrusion of the sealer
- Warm





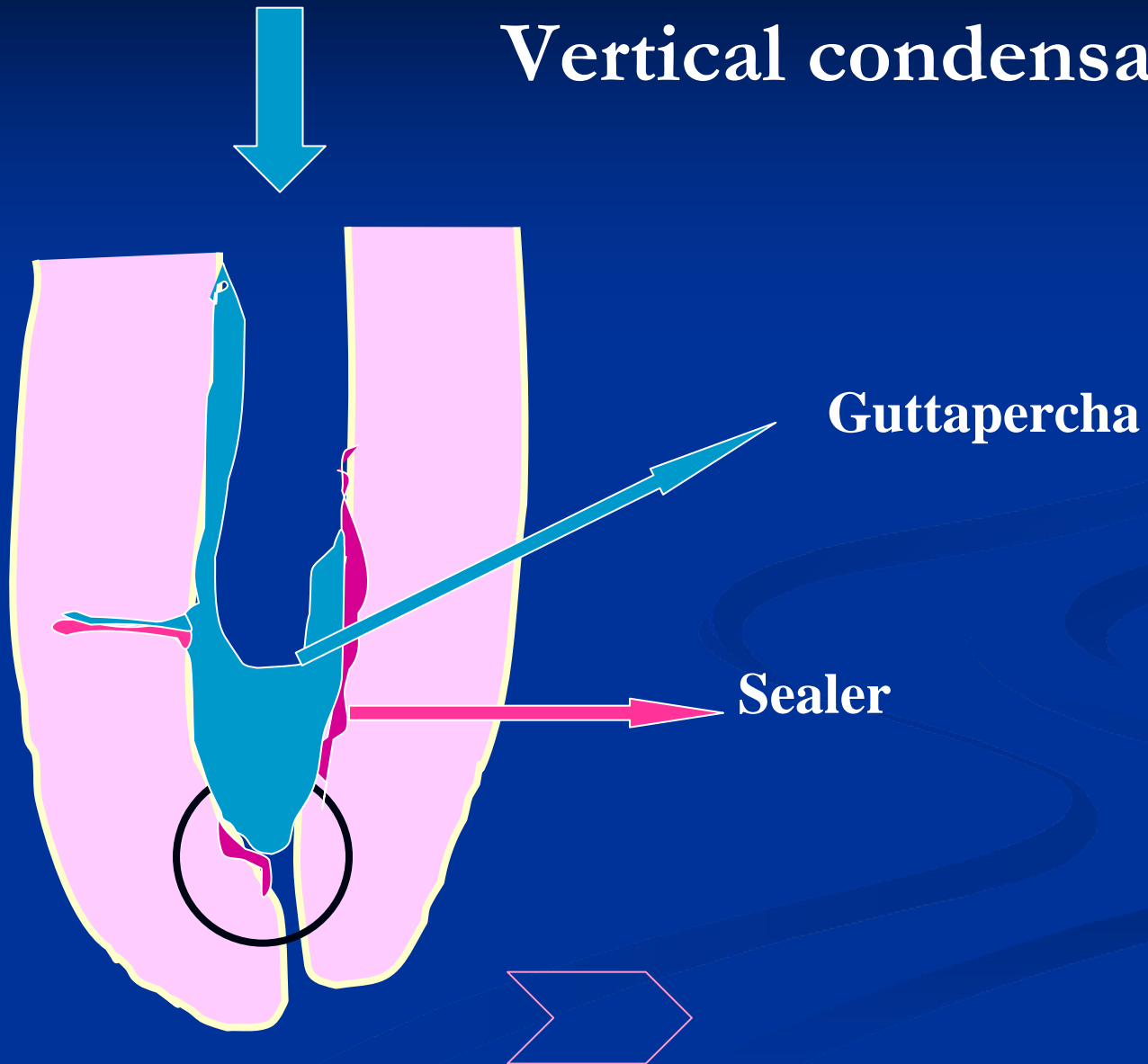
# Injection of heated guttapercha

- Fast
- Possible extrusion
- Warm

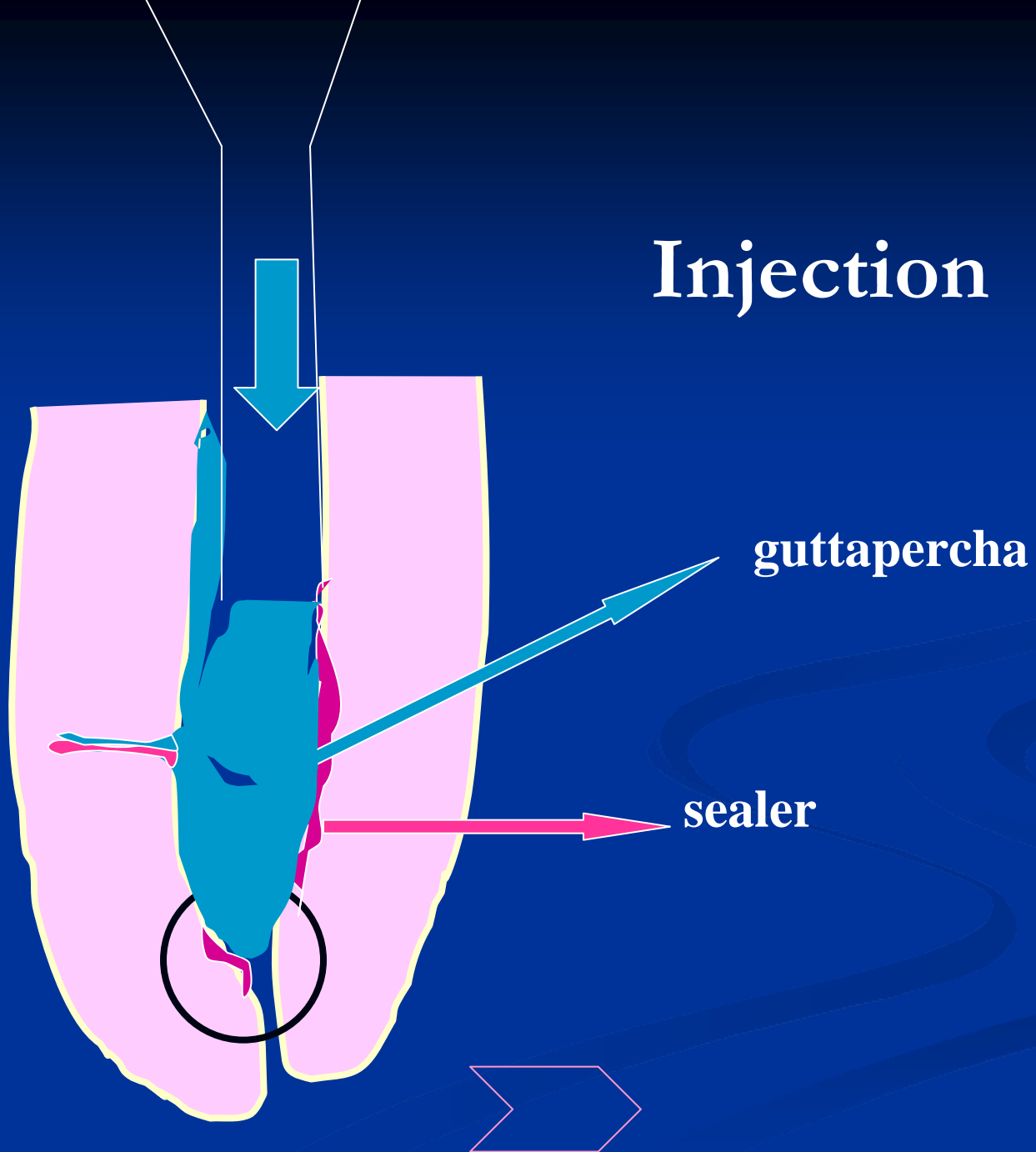




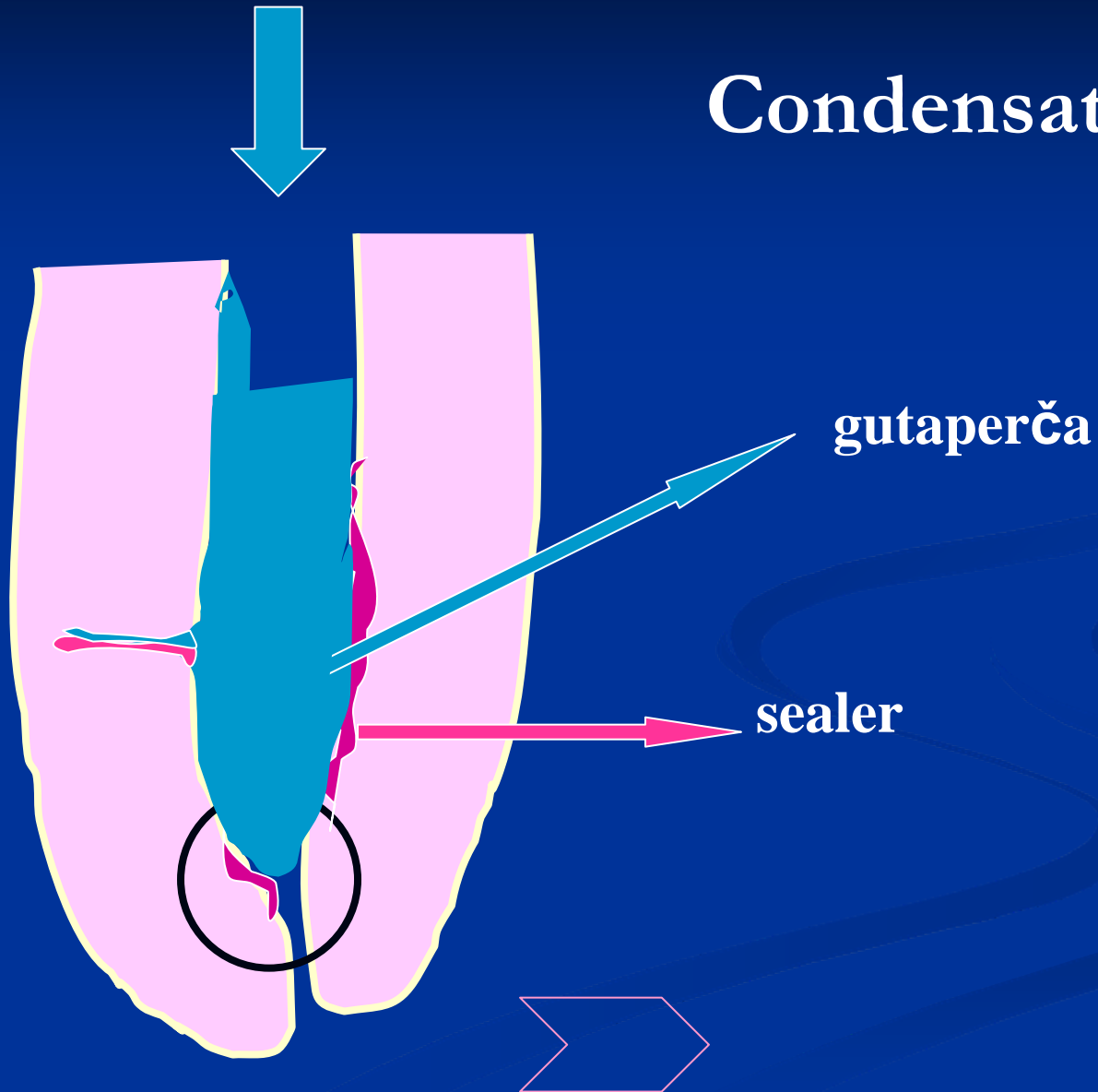
# Vertical condensation



# Injection

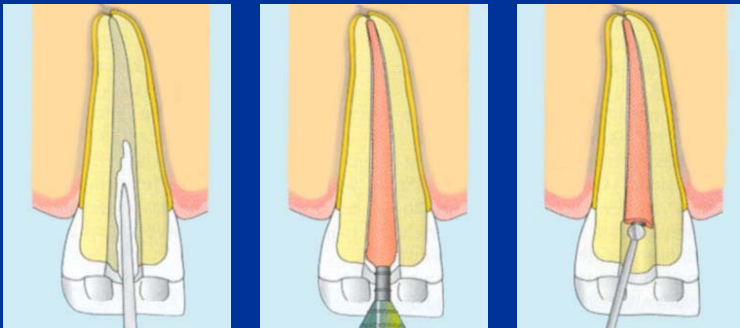


# Condensation

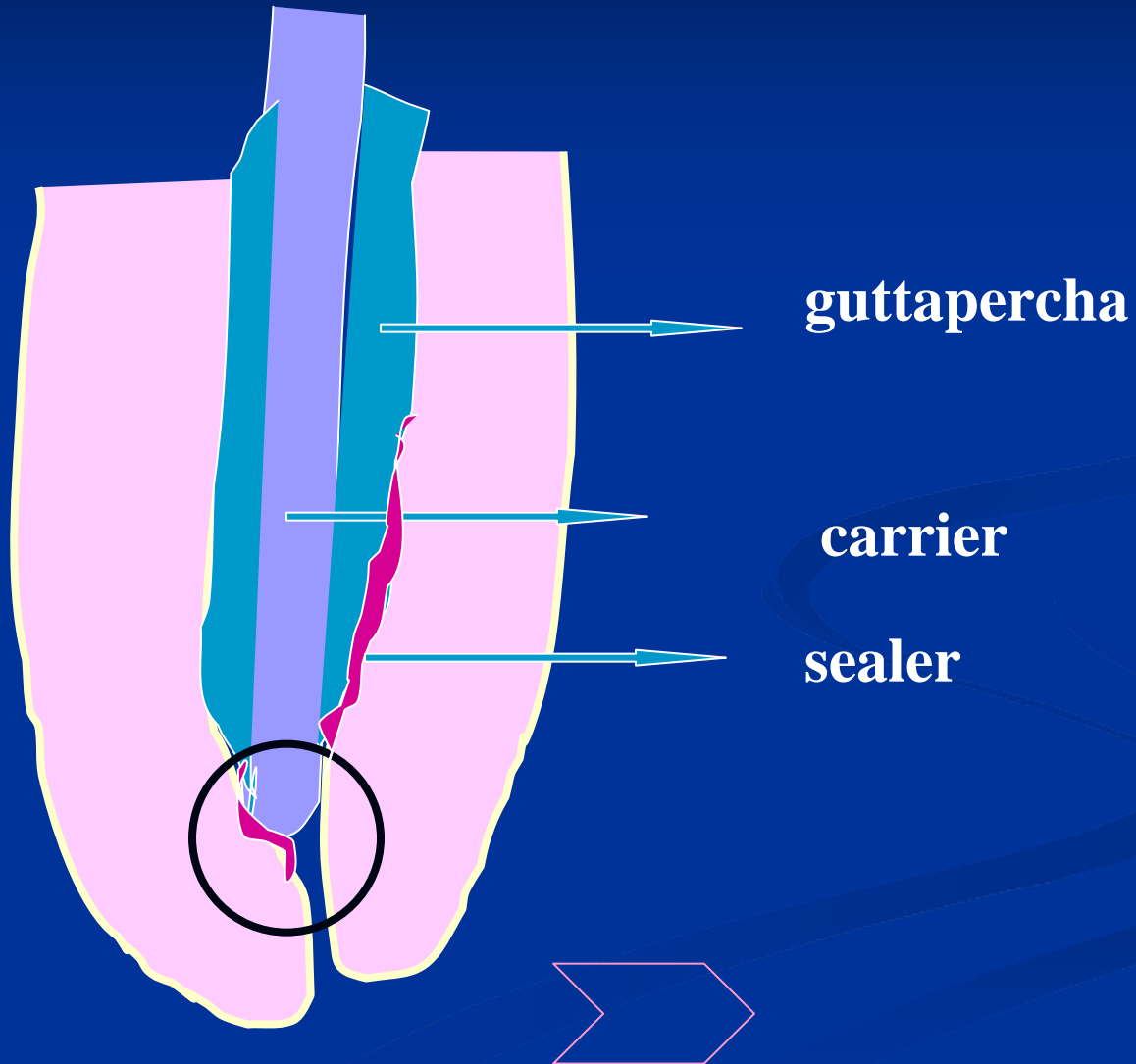


# Thermafil

- Fast
- Risk of extrusion
- Warm
- Difficult to remove



# Thermafil



# Thermafil, Soft Core and others.

