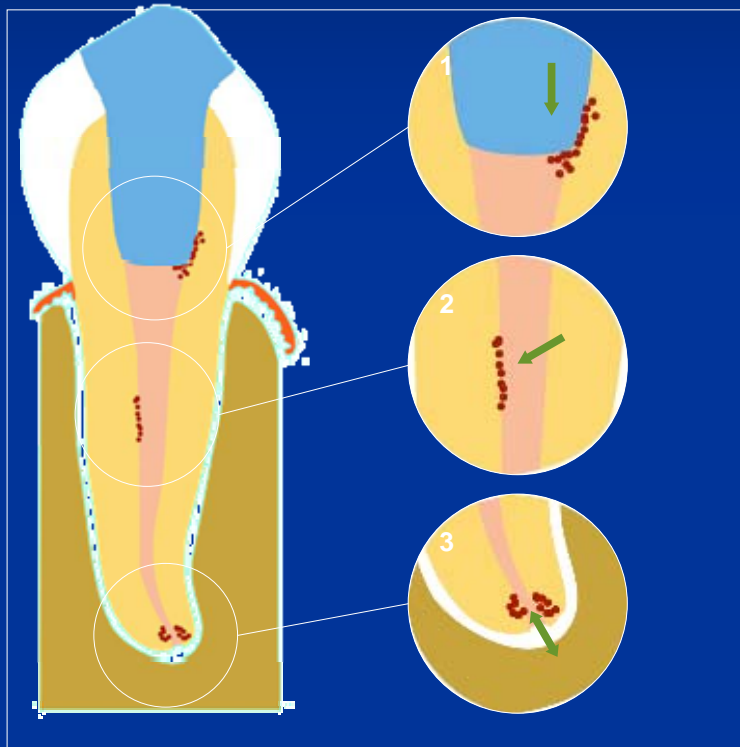


Root canal filling

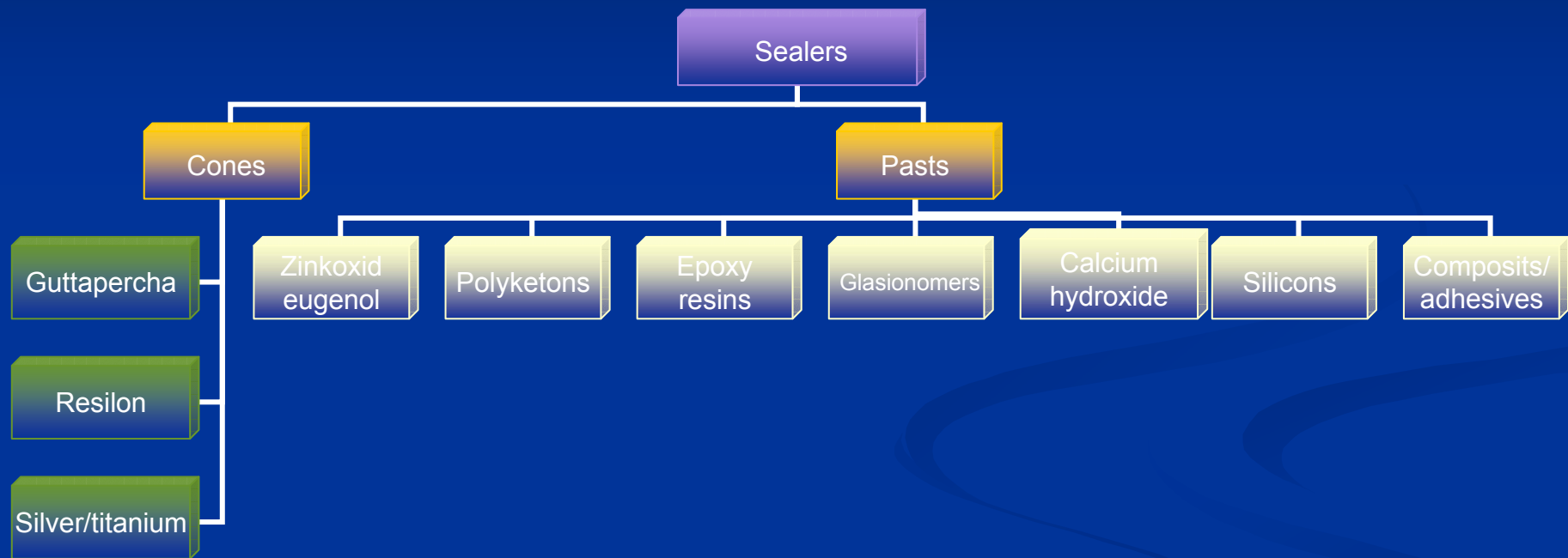
Root canal filling



Good coronal,
Middle
Apical seal.

Quality guidelines for endodontic treatment,
European Society of Endodontology (ESE), 1994

Root canal fillings



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, antimicrobial 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

Chloroperča

Vlastnosti:

Good adhesivity

Shrinkage

Toxicity

Calcium hydroxide sealers

Catalystr (paste)

Zinc stearat

Titanium dioxide

Baryum sulphate

or

Eugenol,. Eukalypt

others

calciumhydroxide 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

Epoxide resin

➤ Base (powder, paste)

Bismuth oxid

Titanium dioxide

Hexametylentetramine

(Silver)

➤ Catalyst (liquide, paste)

Bisphenoldiglycidylether

Epoxide resins

(advantages)

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

Epoxide resins *(disadvantages)*

- Difficult removal
- Staining
- Initiatory toxicity

No suitable for the single cone technique !

Polyketone

- Base

Zinc oxide

Bismuth phosphate

Hexametylentetramine

- Lequid

Bisphenolglycidylether and other components

Polyketonové pryskyřice

(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

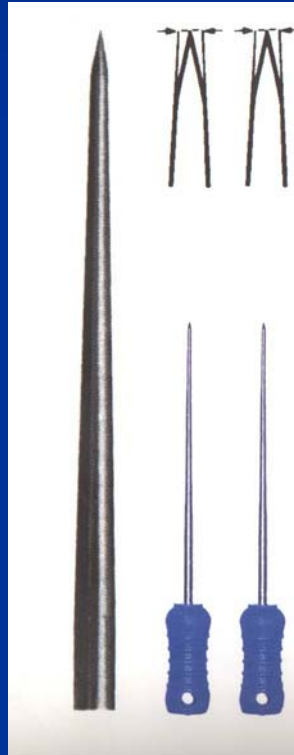
Lentulo



- 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 insertion

*Vertical condensatuion
- compaction*

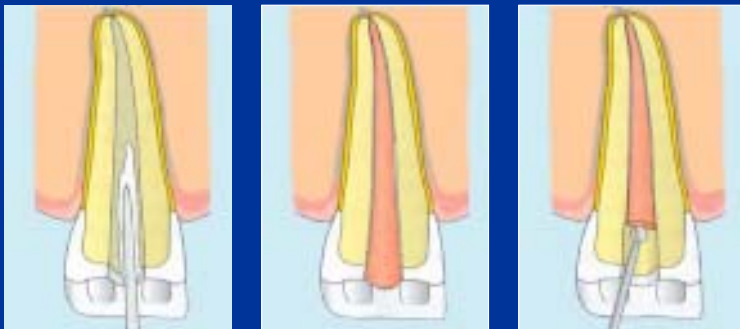
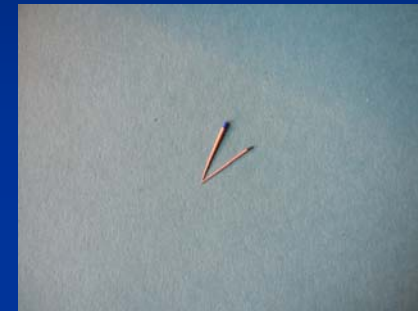
Filling techniques

Cold

Warm

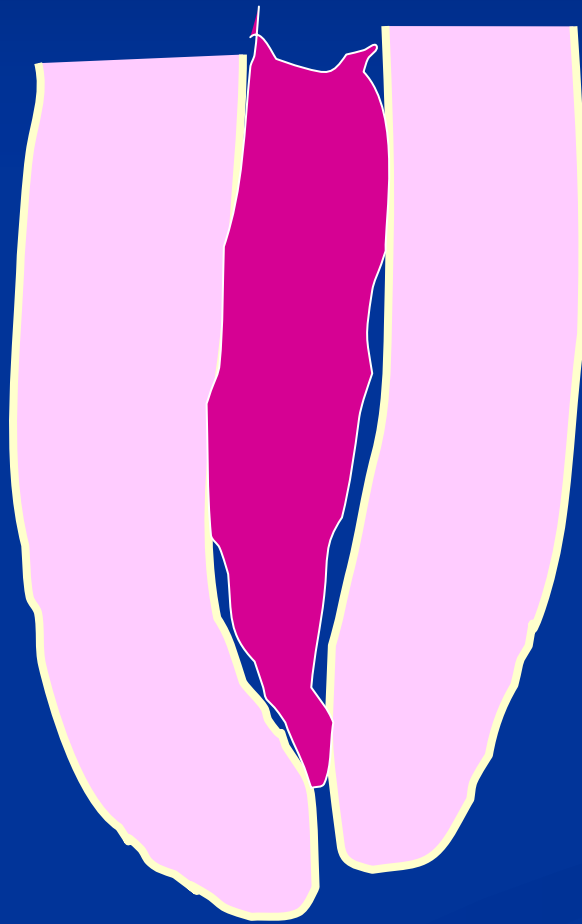
Single cone technique

- Easy
- Fast
- Good control of WL
- Standard round preparation – risk of leakage



Wesselink, P.: Root filling techniques, Textbook of Endodontology; p. 286-299, Blackwell Munksgaard 2003, Oxford

Paste only

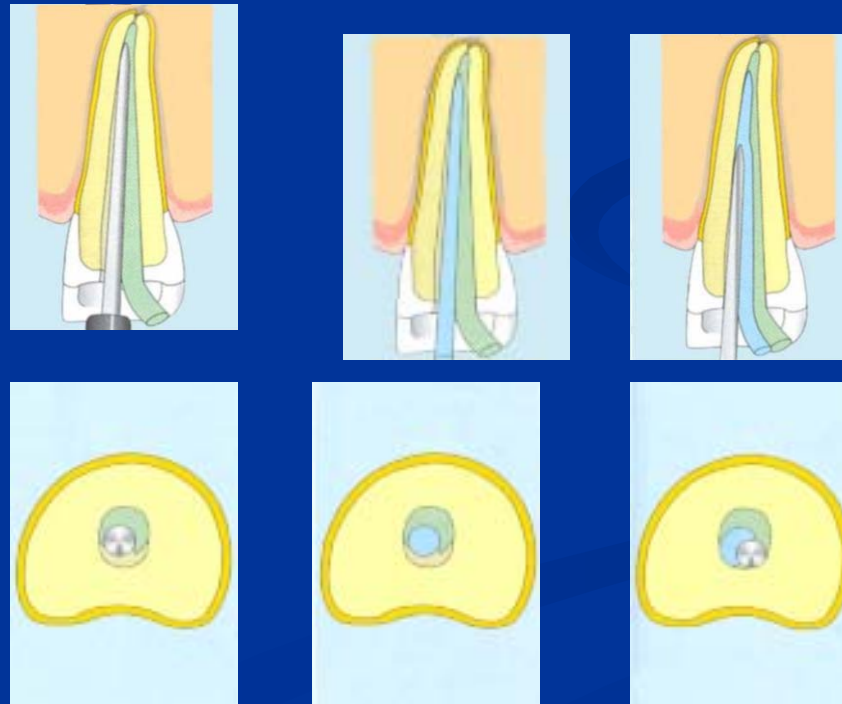


**Shrinkage, difficult
removal**

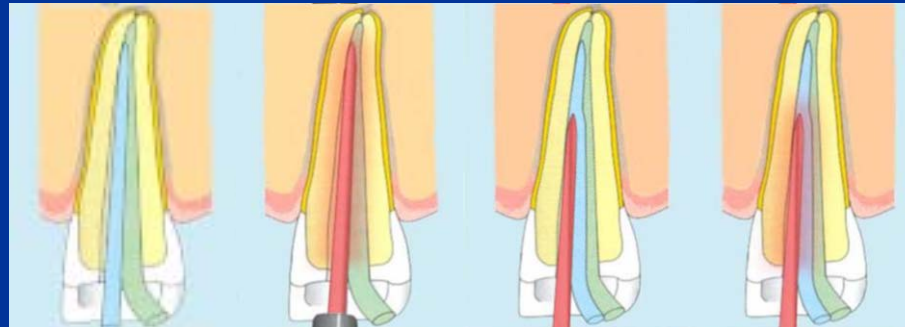


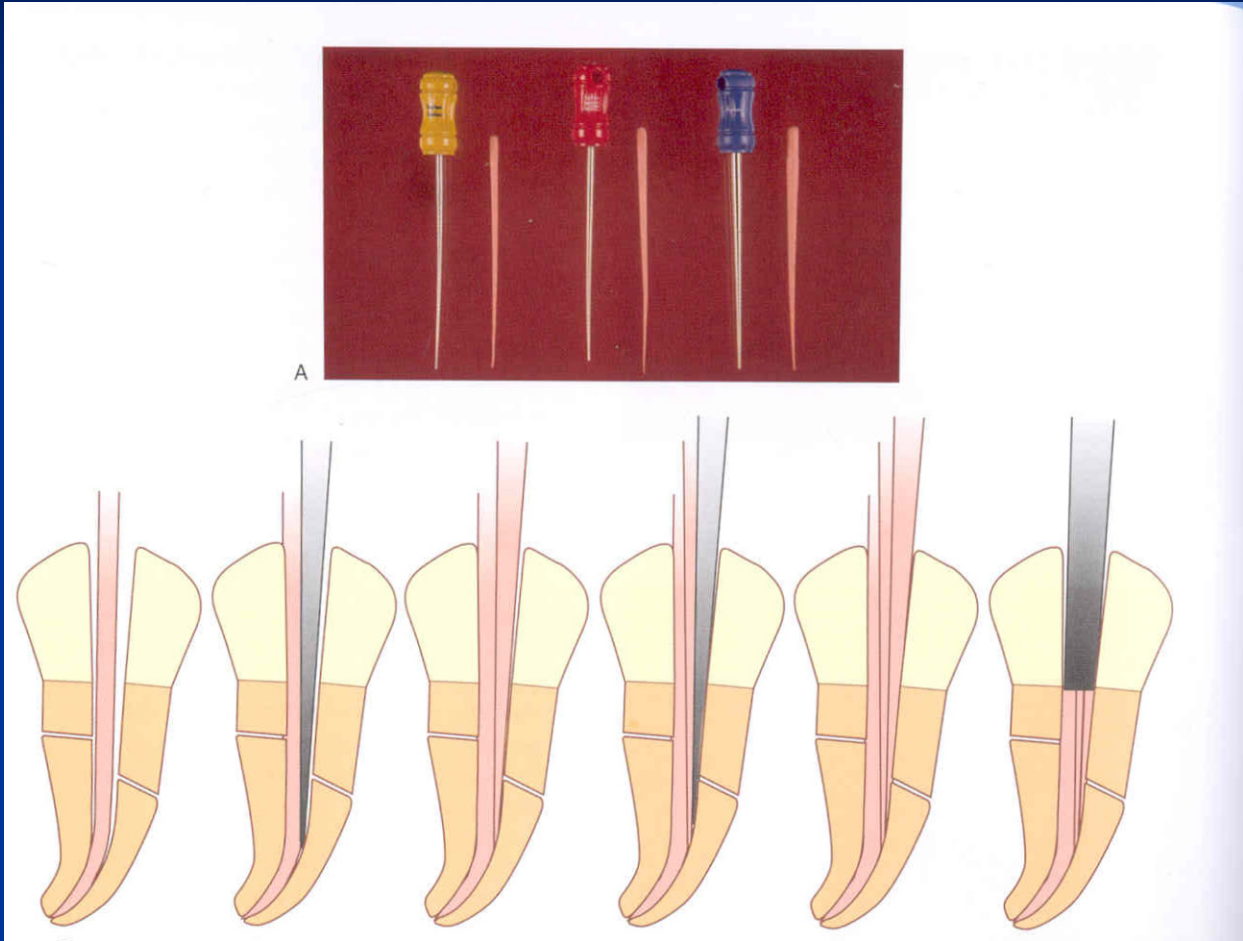
Lateral condensation

-
- Standard cold technique



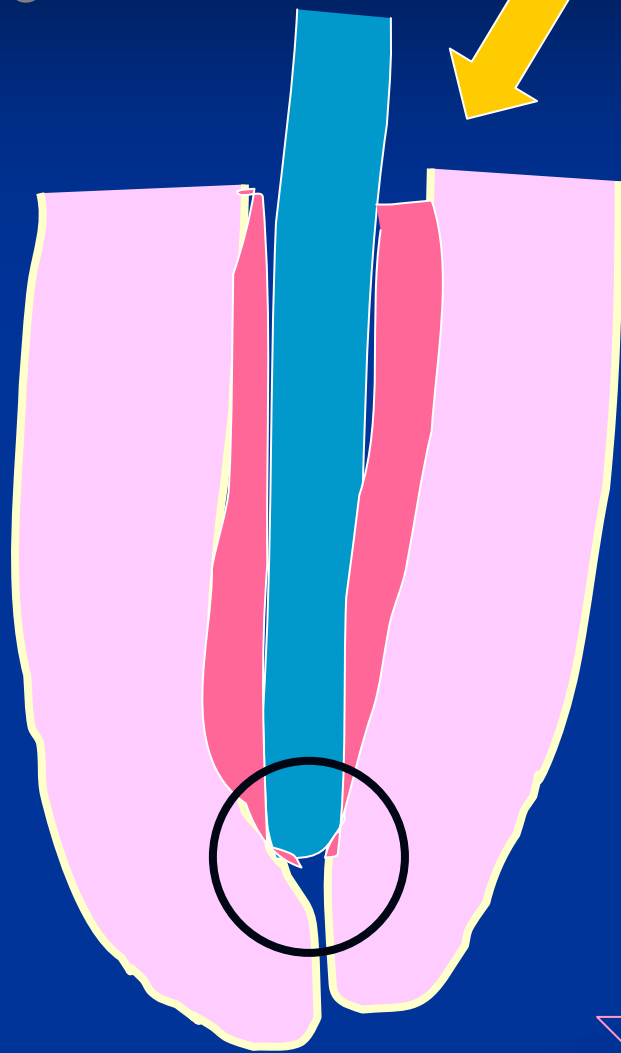
Warm lateral condensation



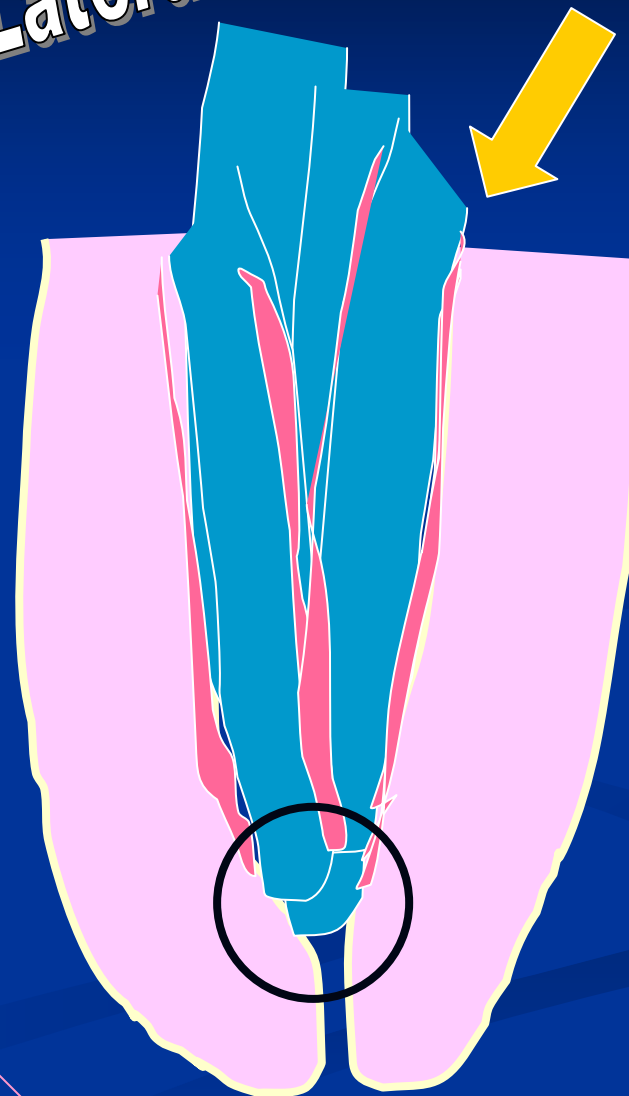




Centrální čep

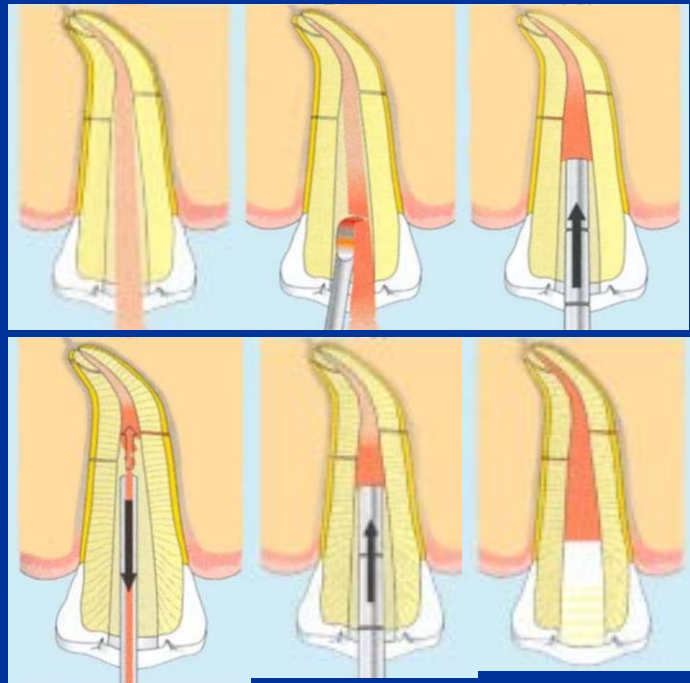


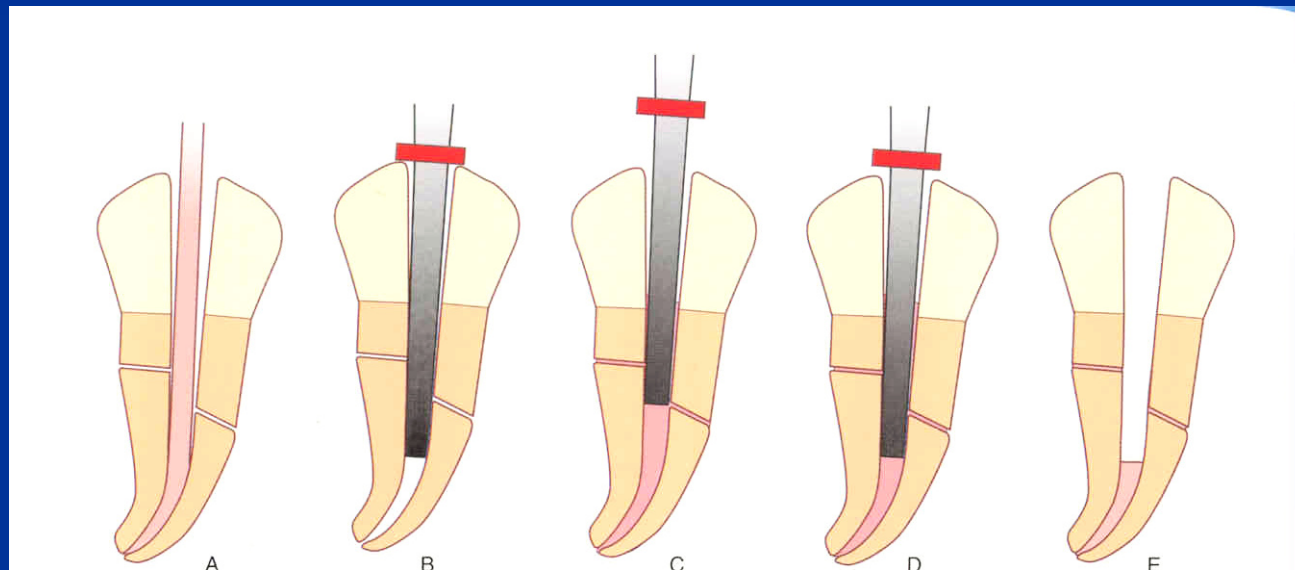
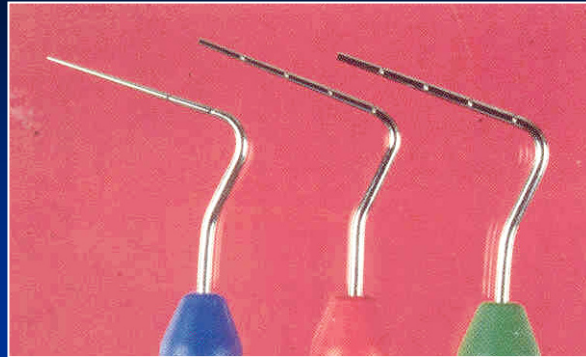
Laterální kondenzace



Vertical condensation

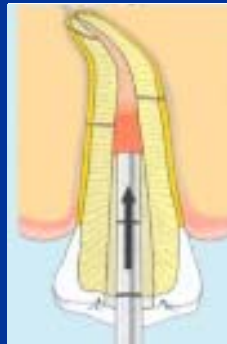
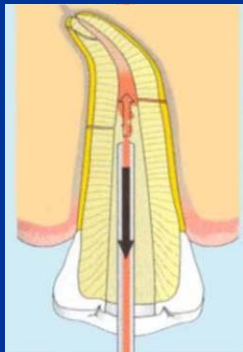
- Risk of overfilling
- Warm

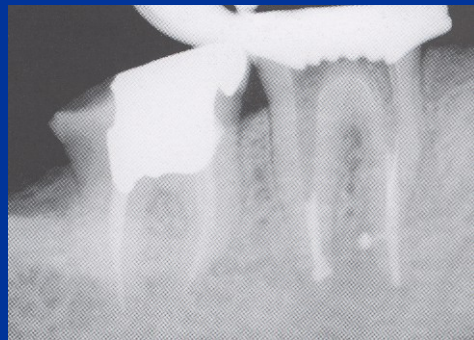
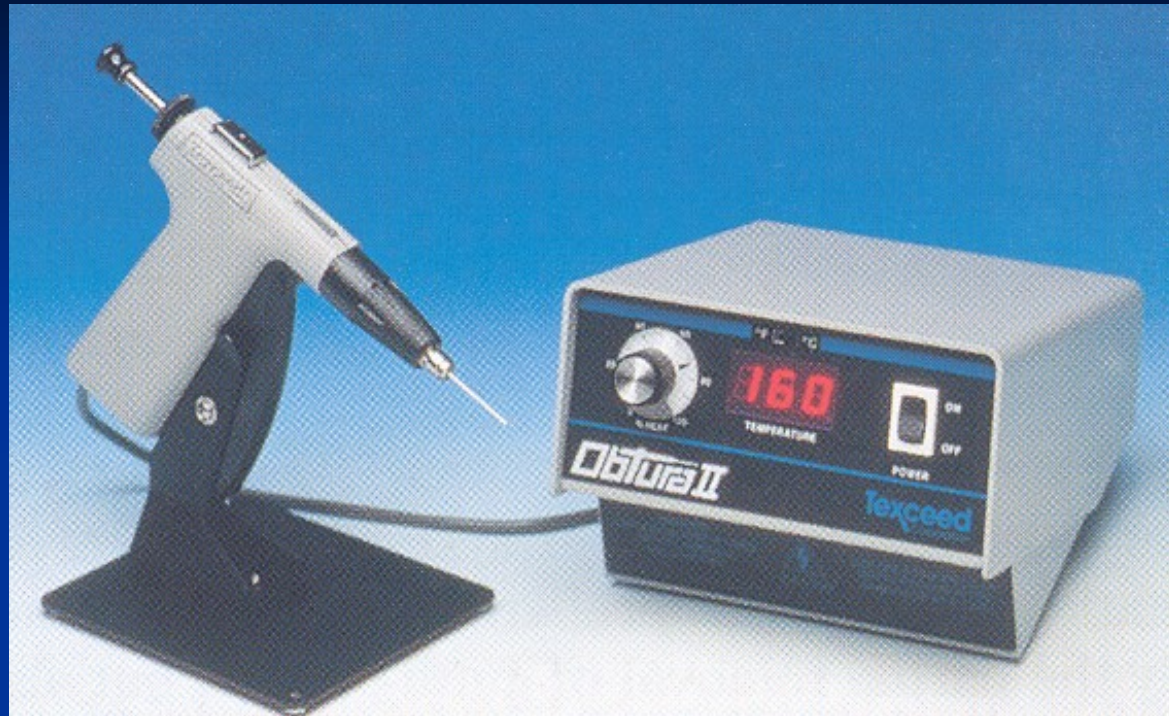




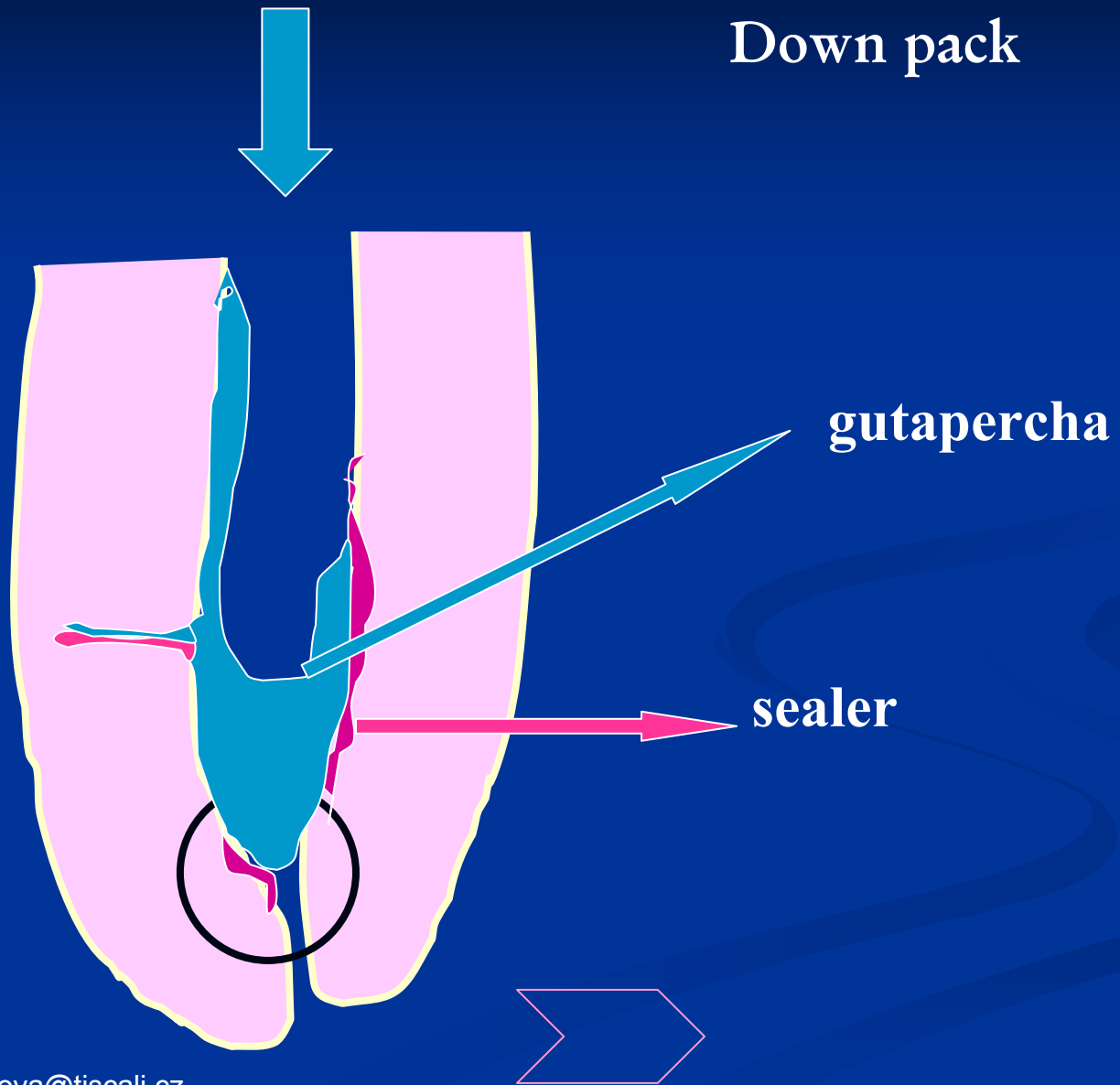
Injection of heated guttapercha

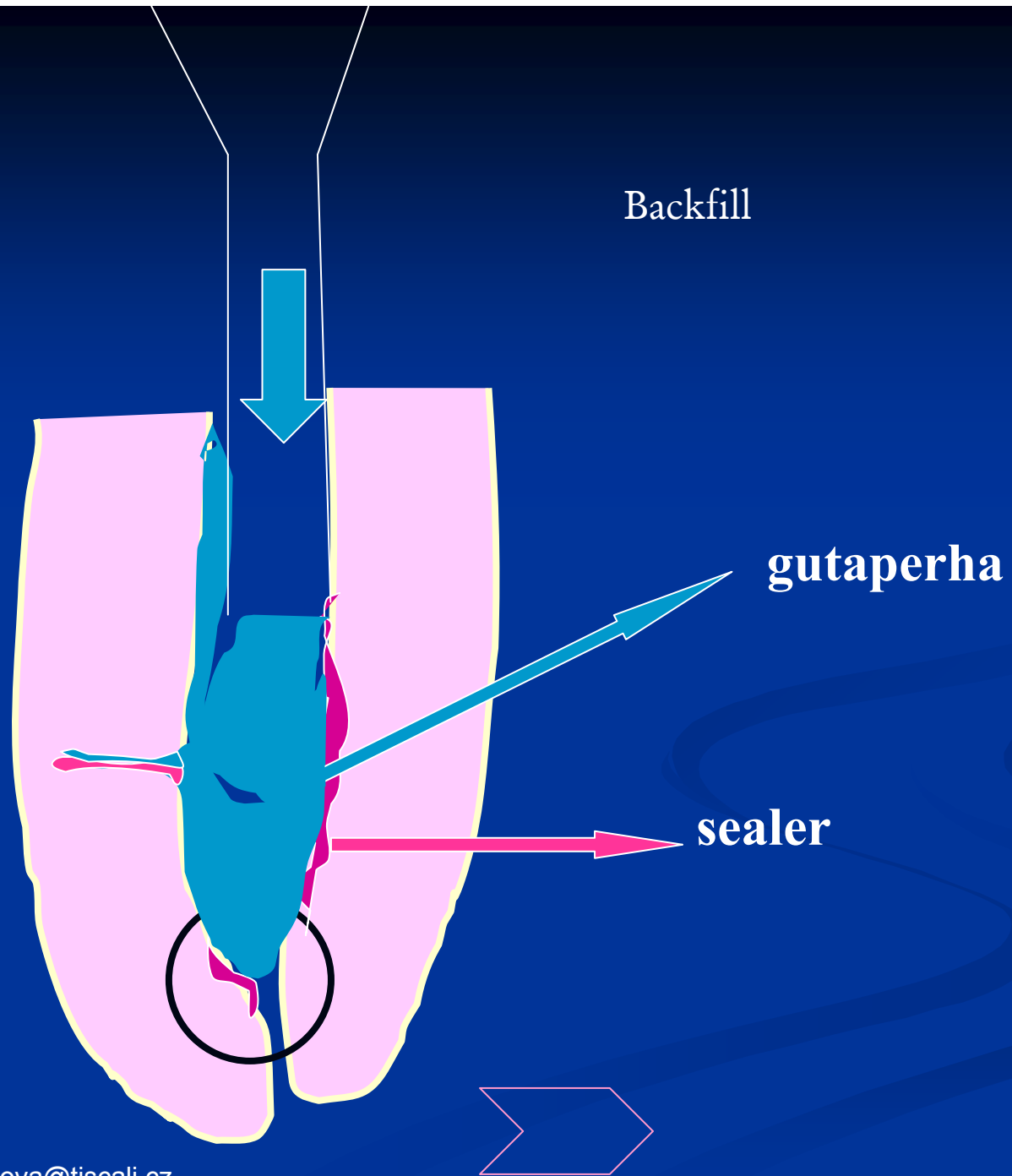
- Fast
- Risk of overfilling
- Warm



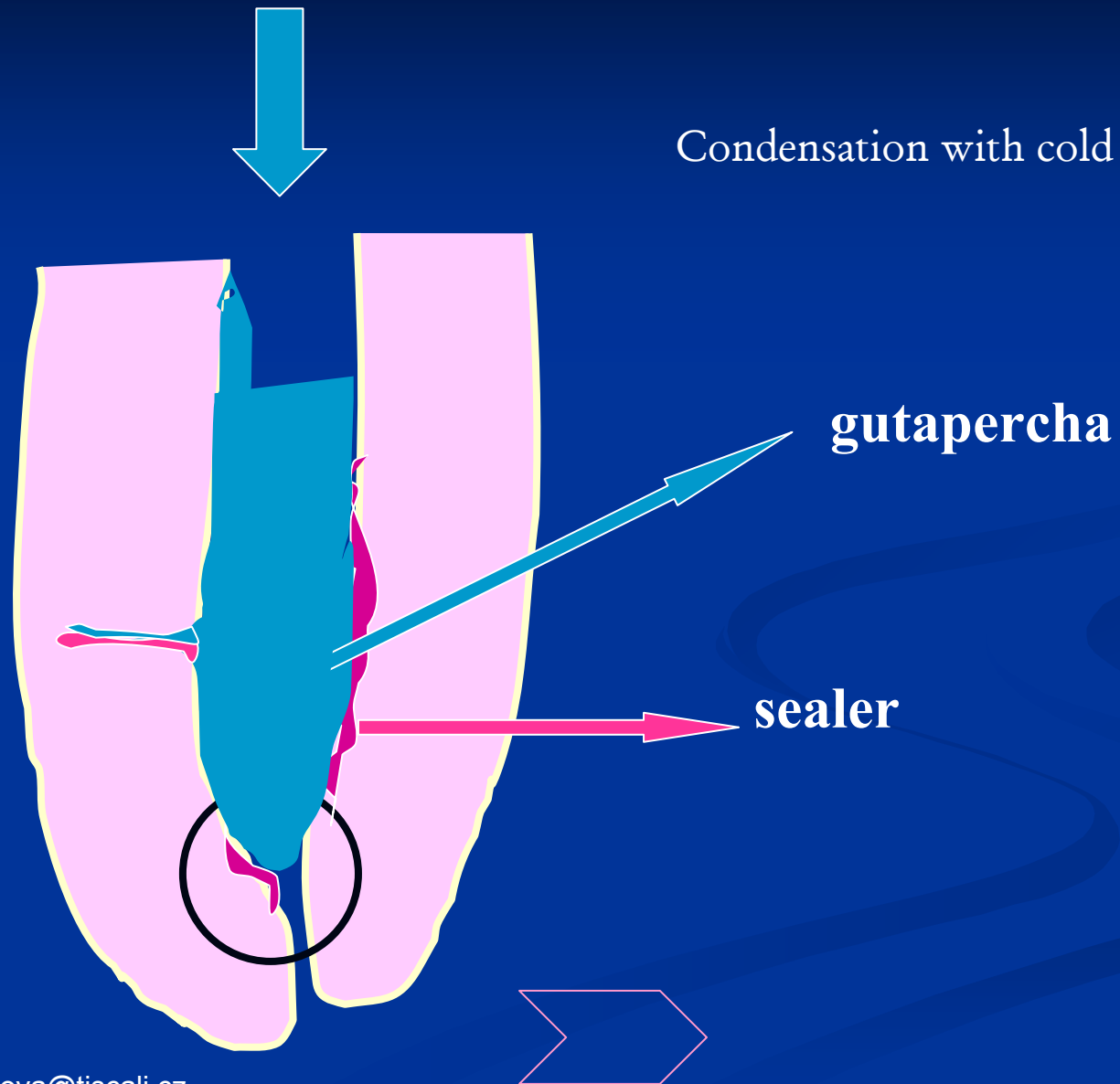


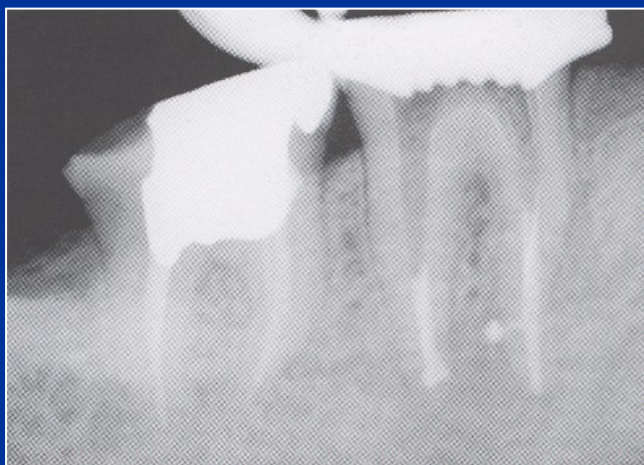
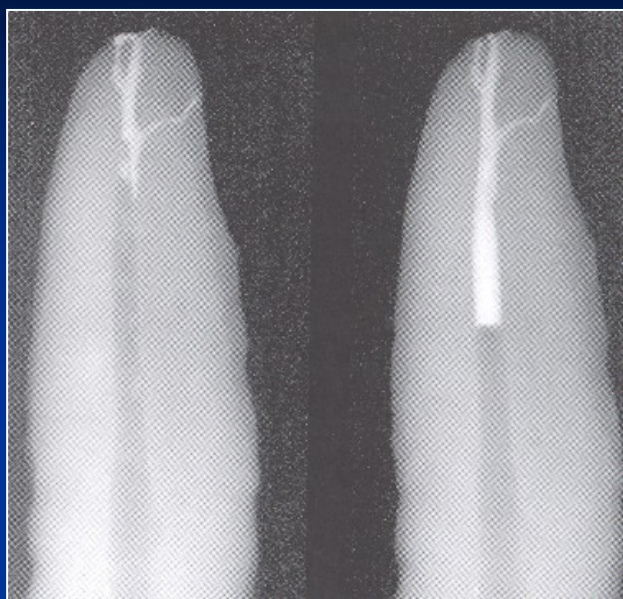
Down pack

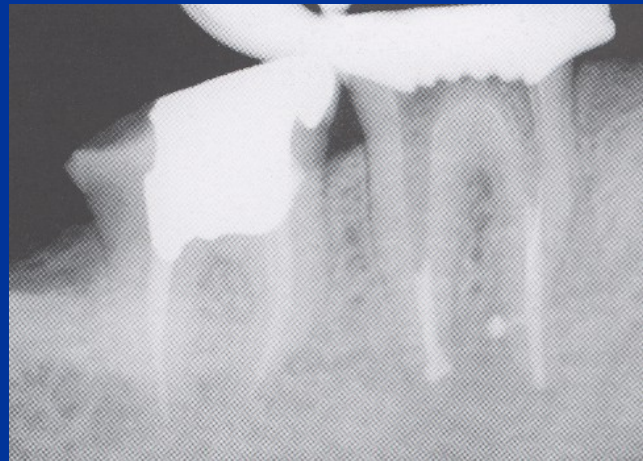
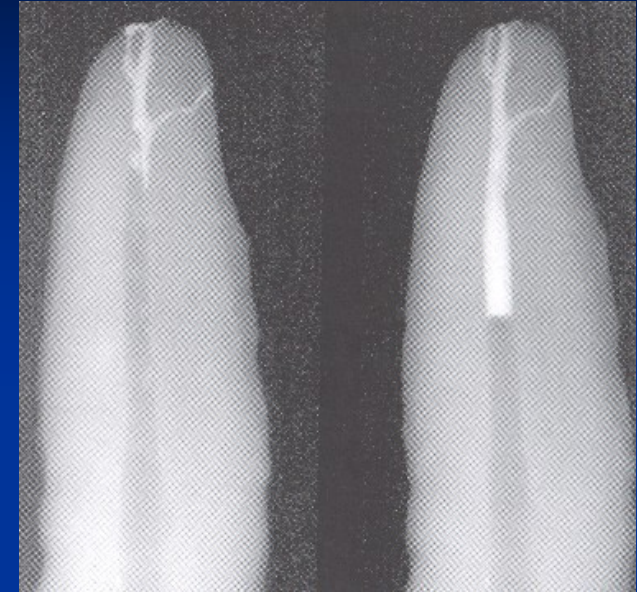


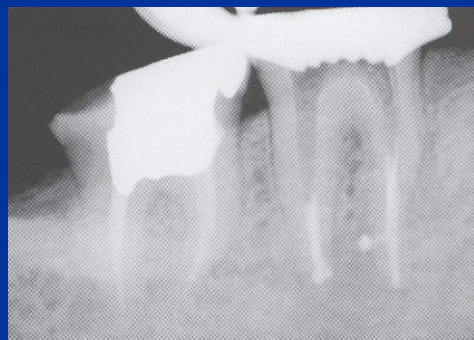
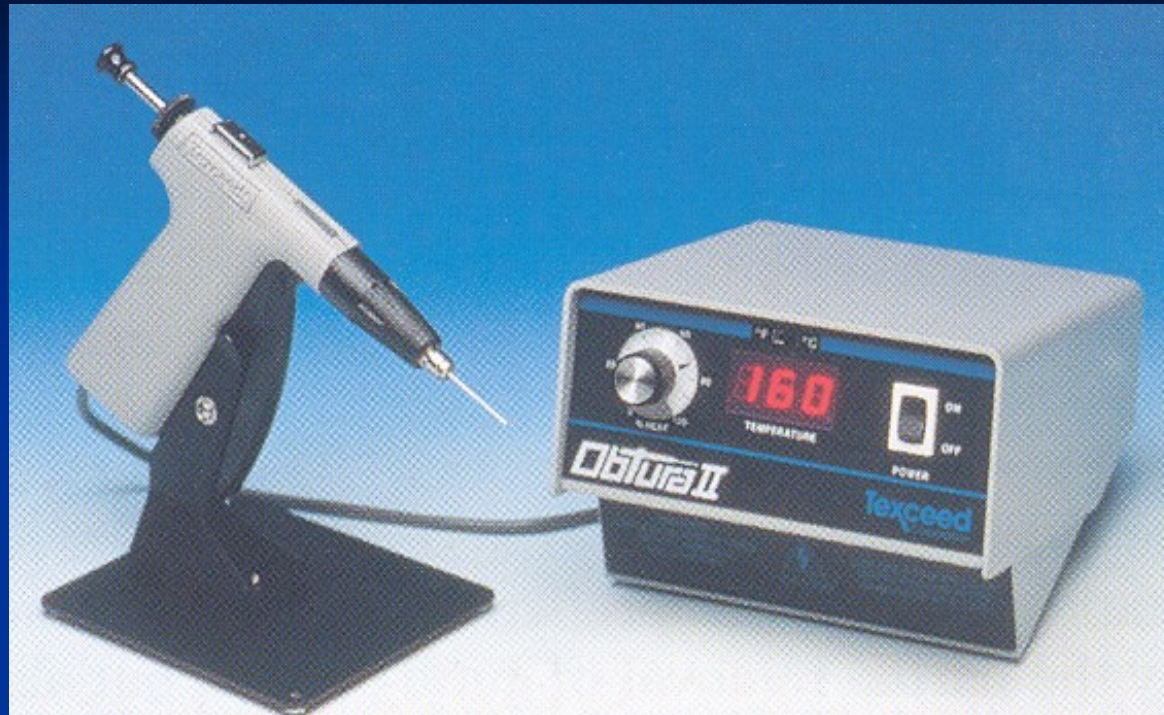


Condensation with cold plugger

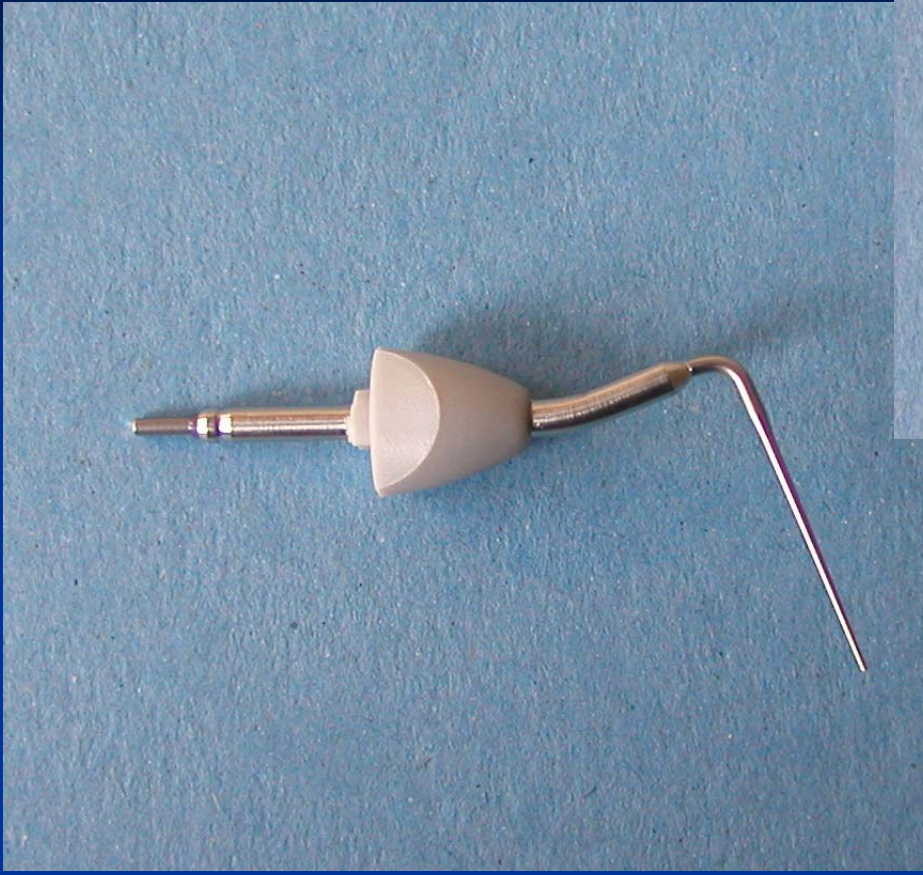








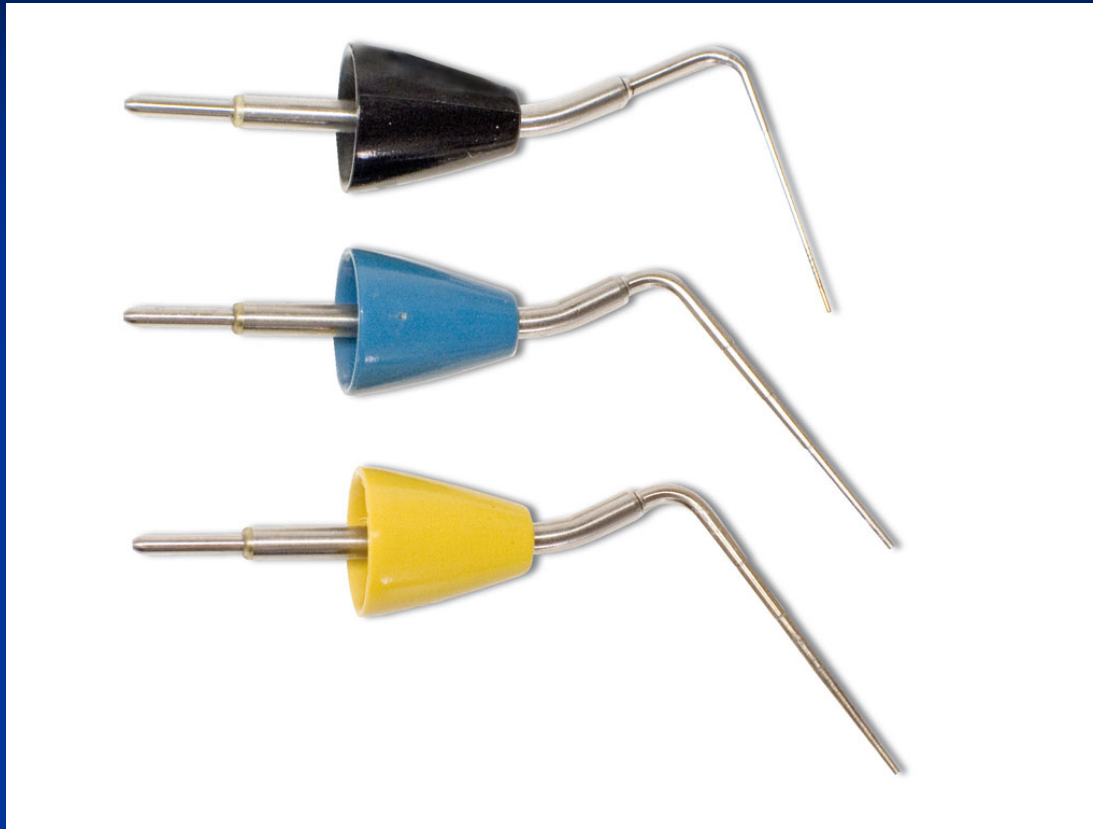




BeeFill



Pluggery



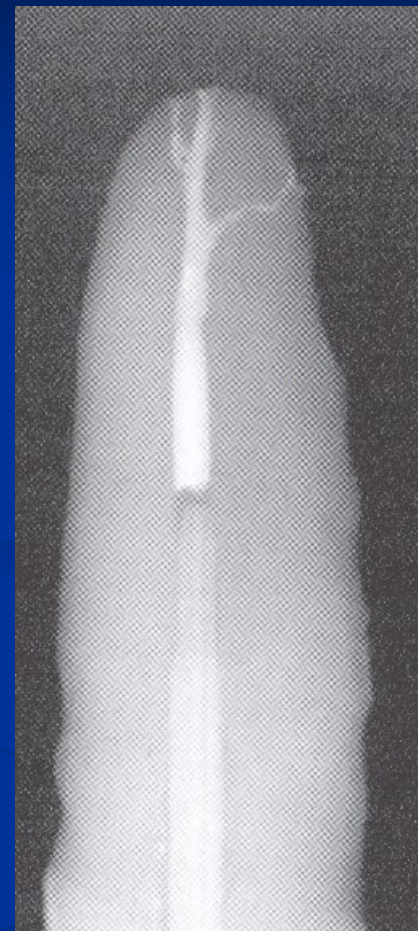
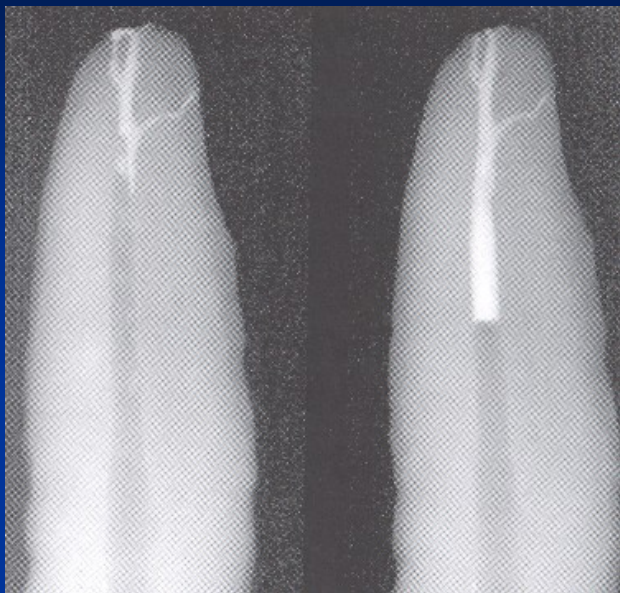
ISO 40/.03 standard

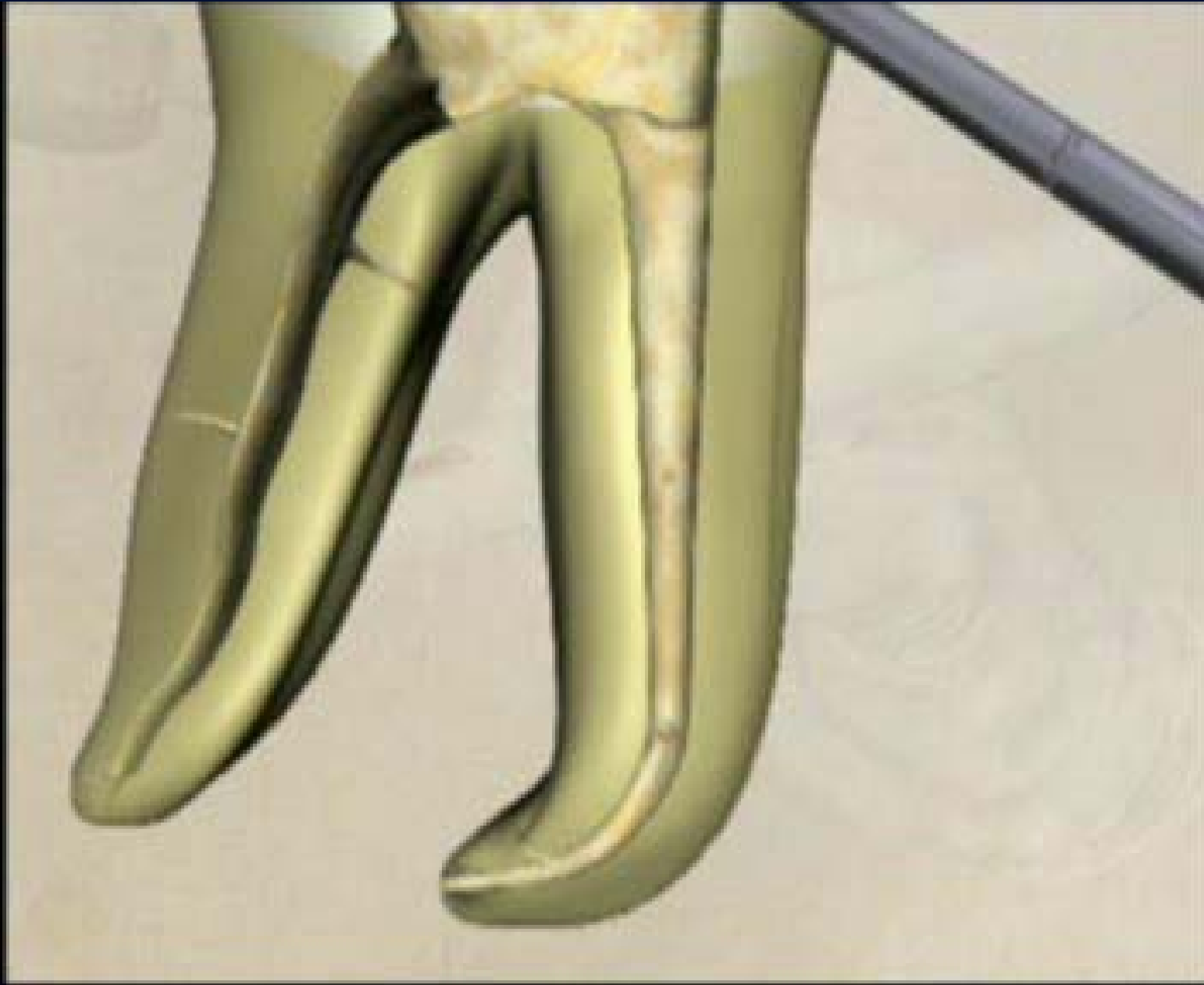
ISO 60/.06 soft

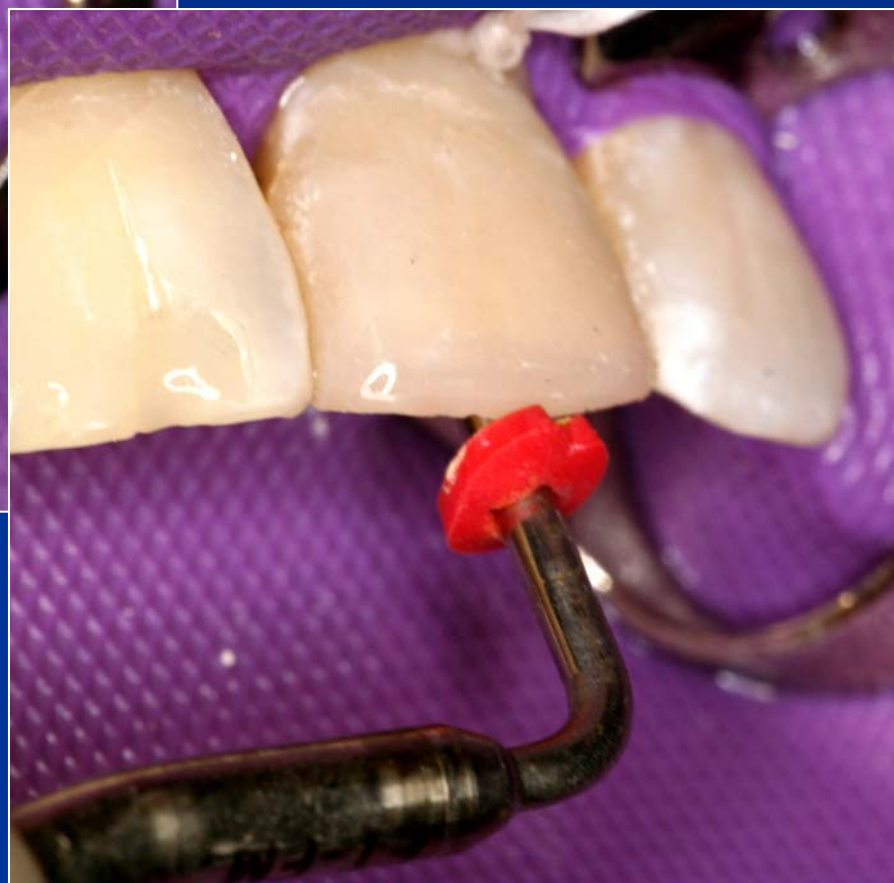
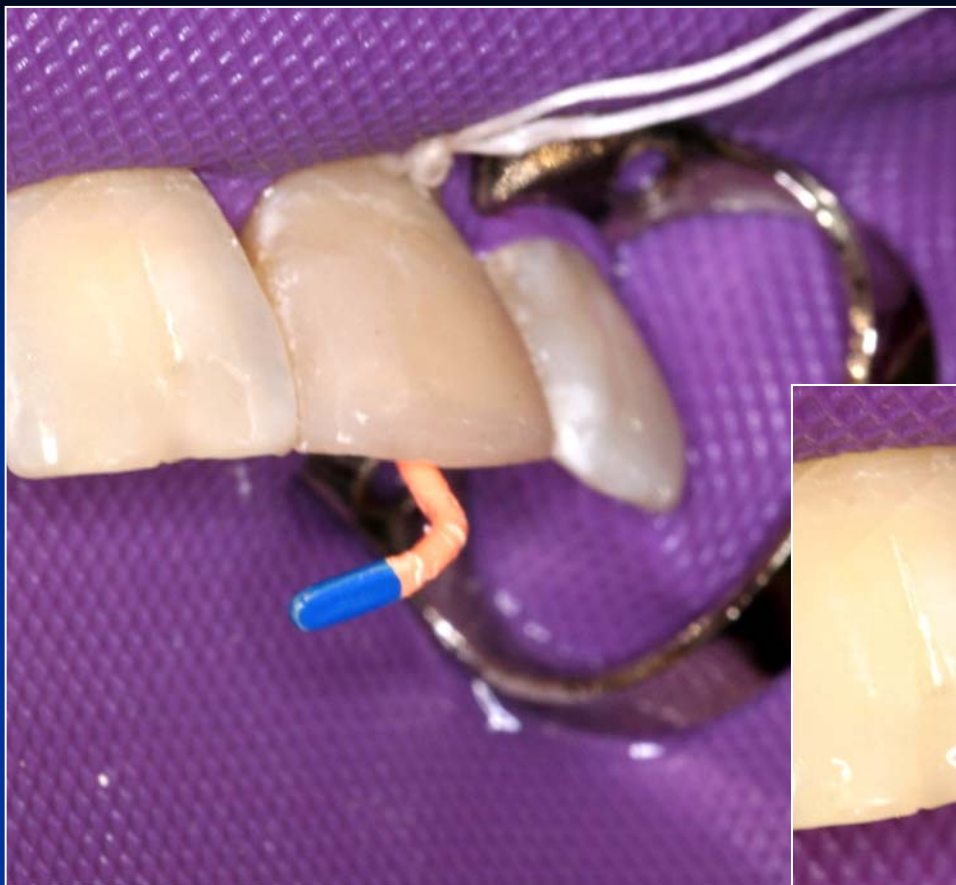
ISO 50/.05 soft





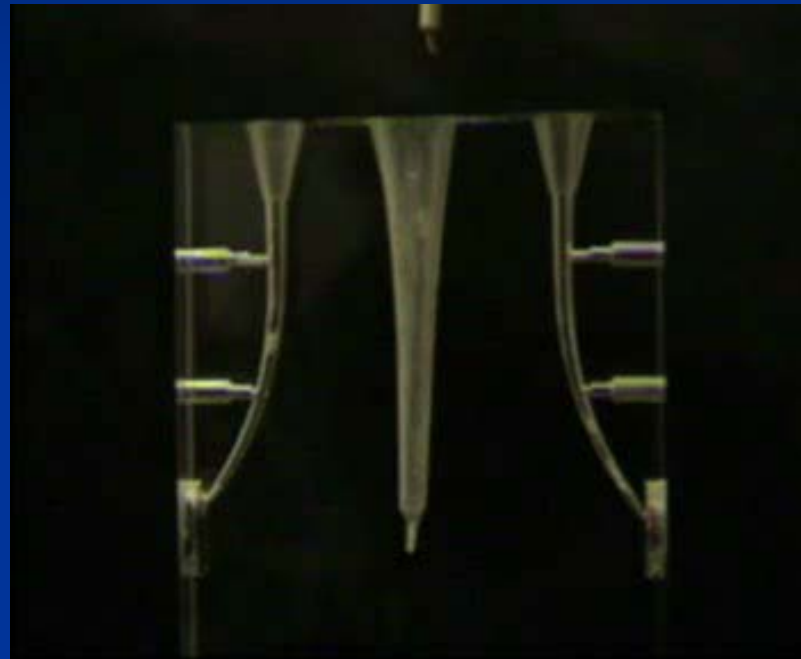






VIDEO UKÁZKA

Široké oválné rovné kanálky

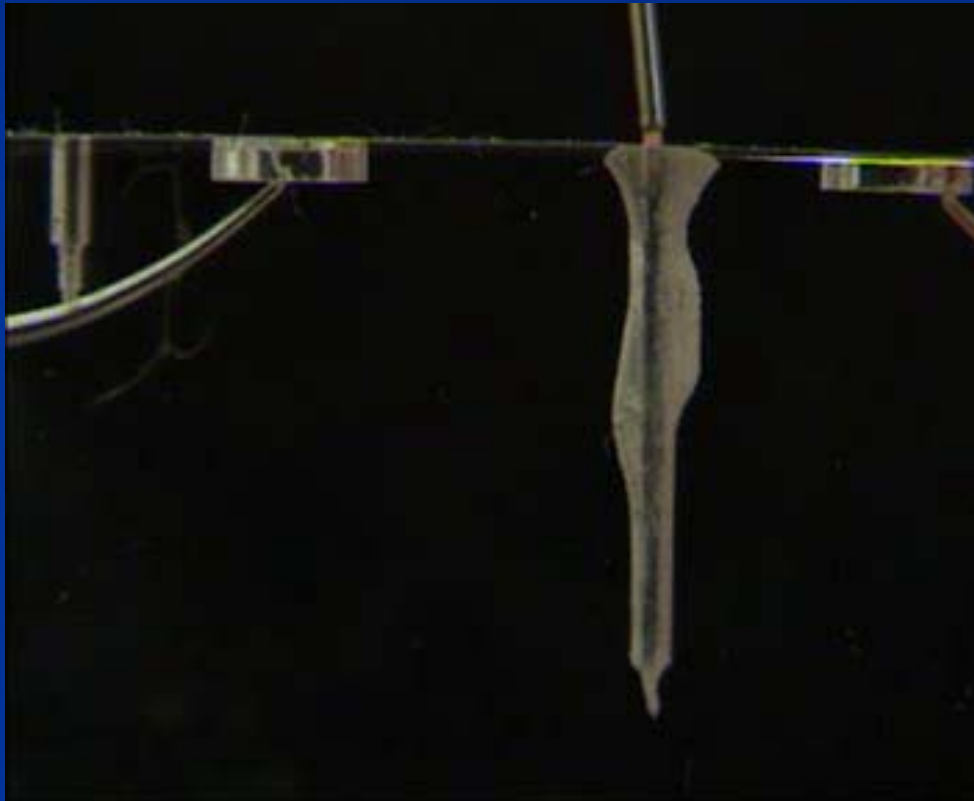


1,3 min.



VIDEO UKÁZKA

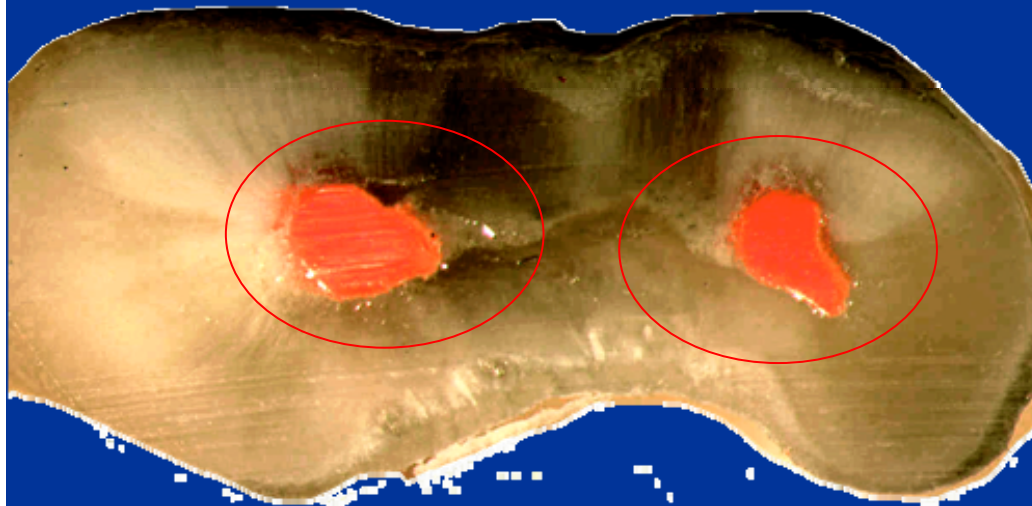
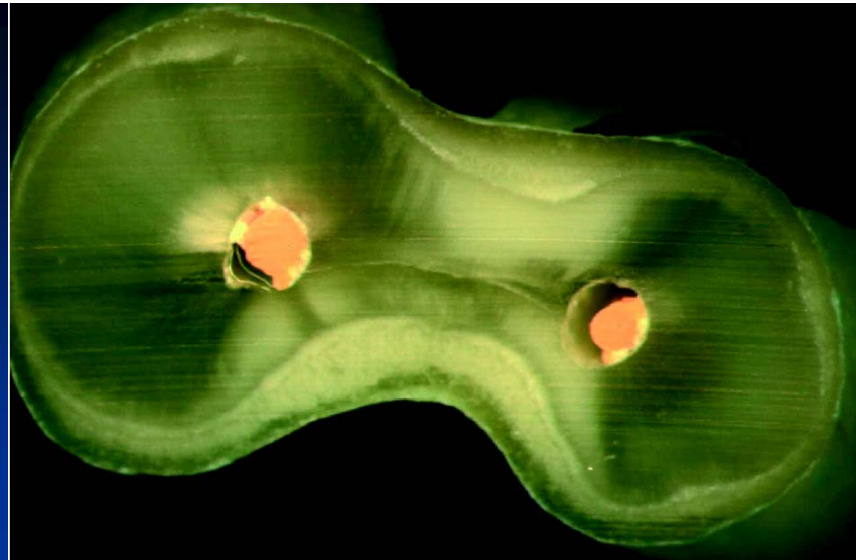
Rezorbované, nebo nepravidelně opracované
kanálky



Netěsnosti při plnění centrálním čepem, nebo při nedokonalé laterální kondenzaci.

V nezaplněných místech kanálku hrozí vznik a množení bakterií a mikroorganismů což vede k zánětům atd.

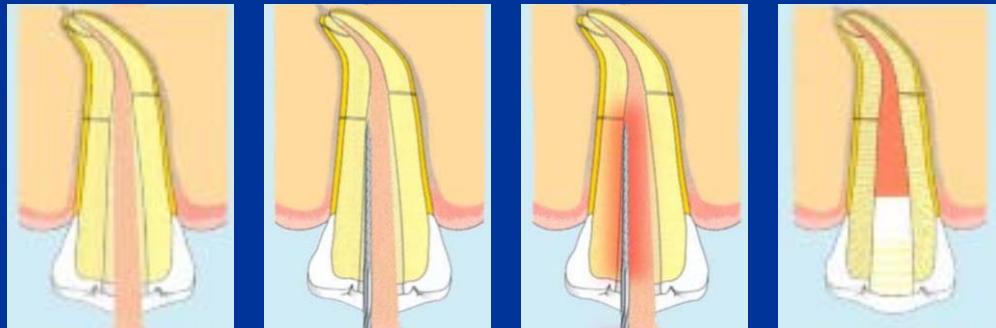




Perfektní hermetický uzávěr i u kanálků s nepravidelným tvarem

Termomechanical compaction

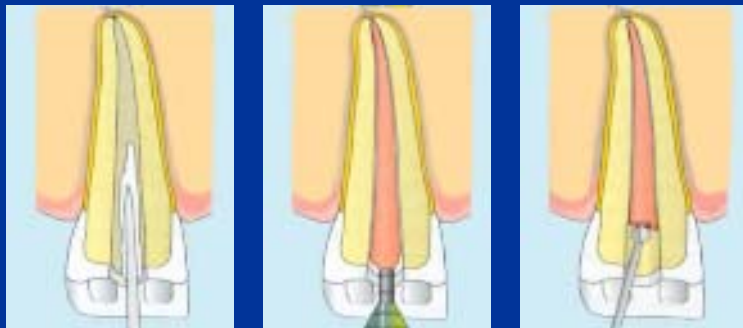
- Fast
- Risk of overfilling
- Warm
- Risk of fracture of the instrument



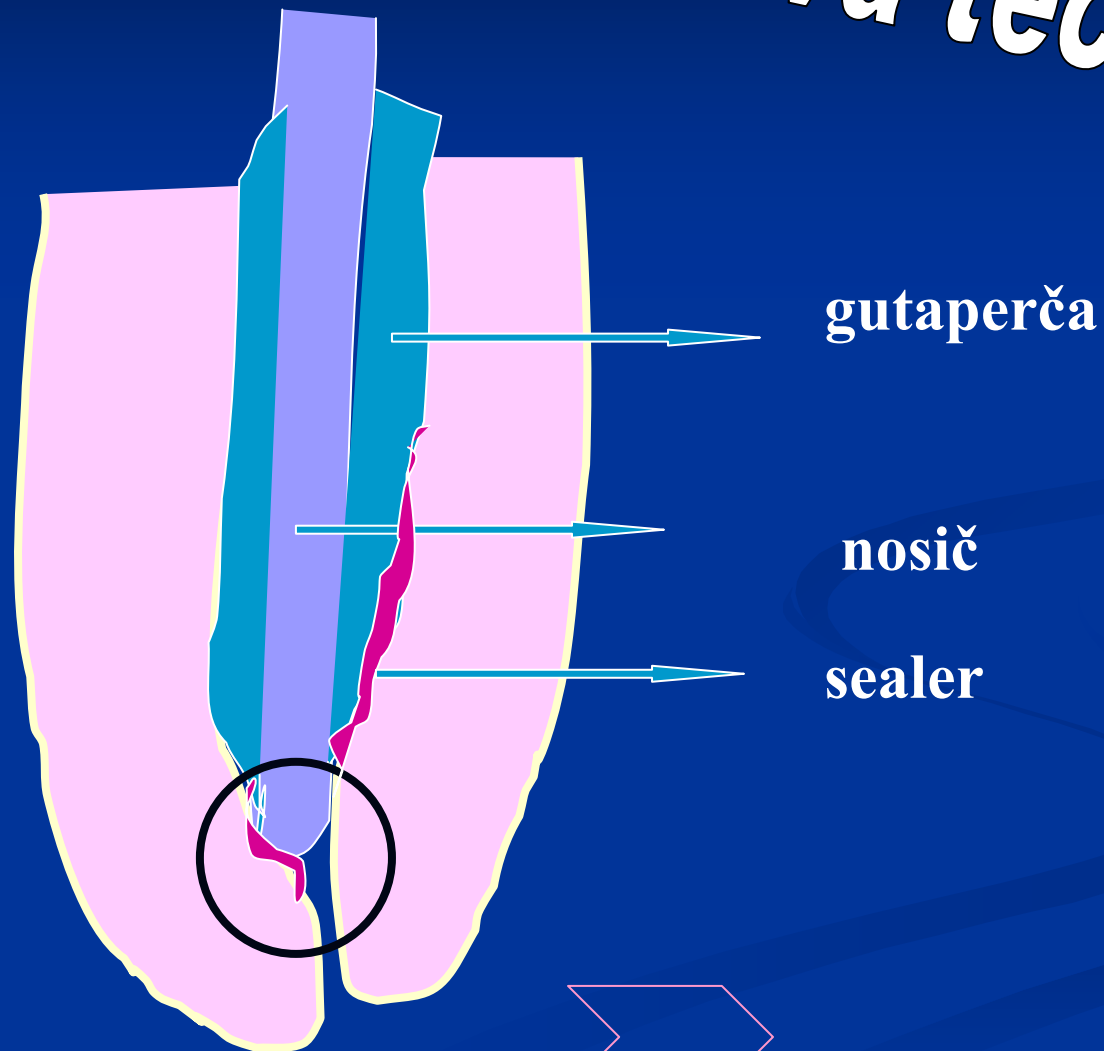
Wesselink, P.: Root filling techniques, Textbook of Endodontology; p. 286-299, Blackwell Munksgaard 2003, Oxford

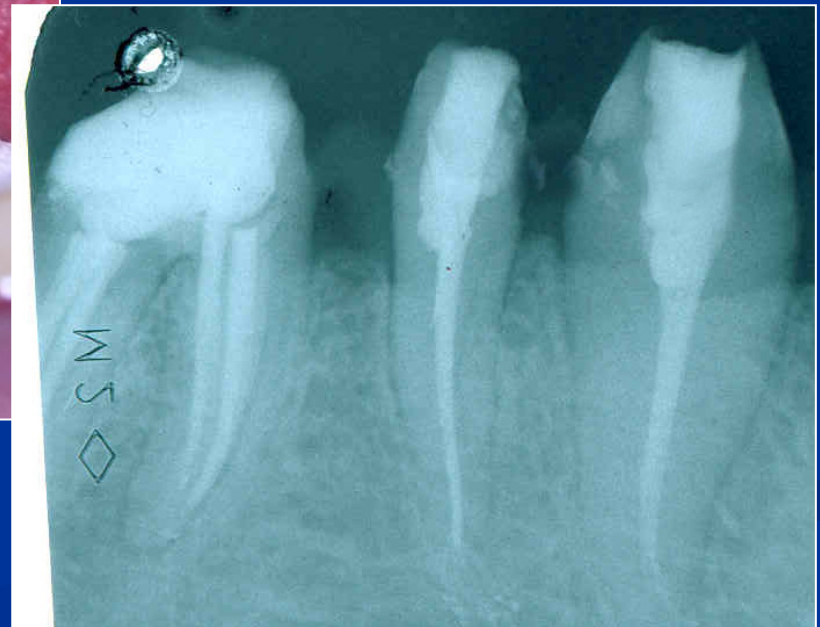
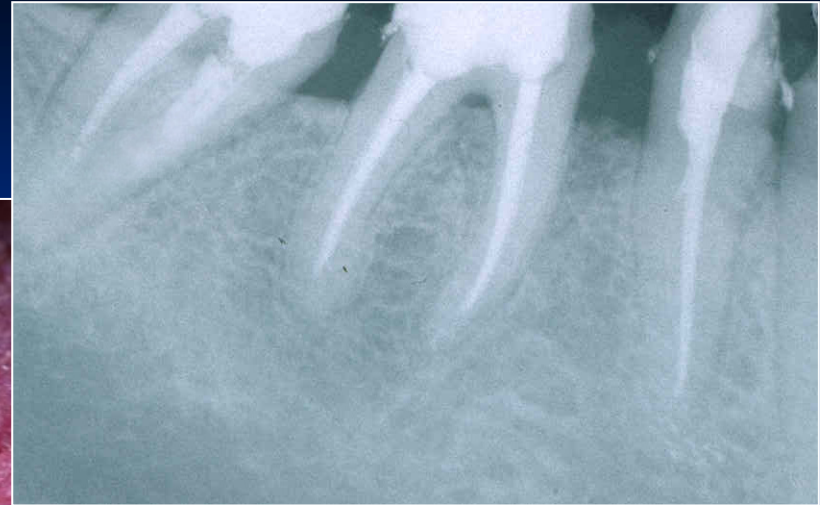
Gutaperča na nosiči

- Rychlá technika
- Riziko extruze
- Možnost sesmeknutí gutaperči z nosiče
- Teplo
- Obtížné odstranění

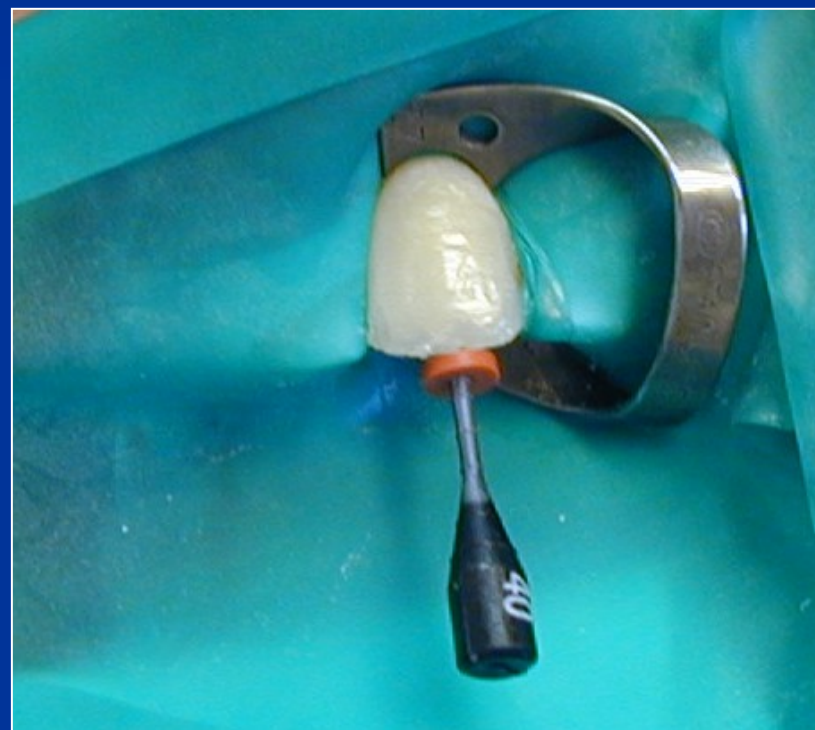


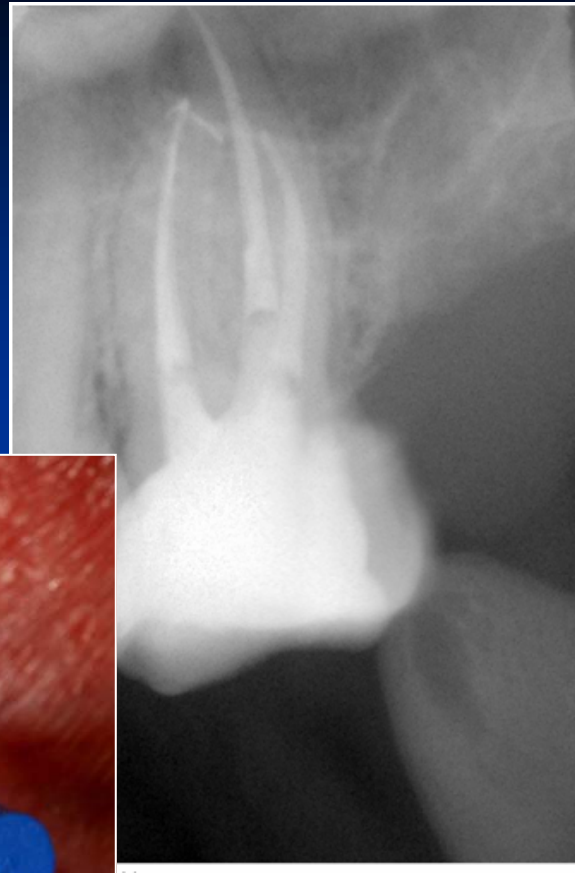
Termafilová technika

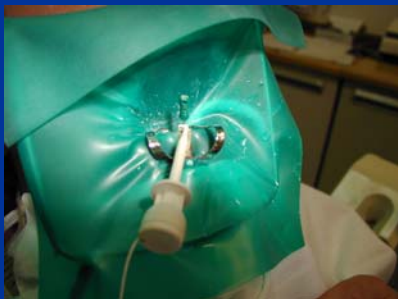
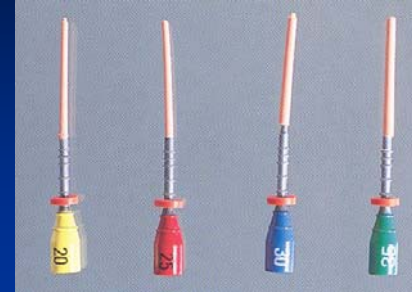




Thermafil, Soft Core aj.





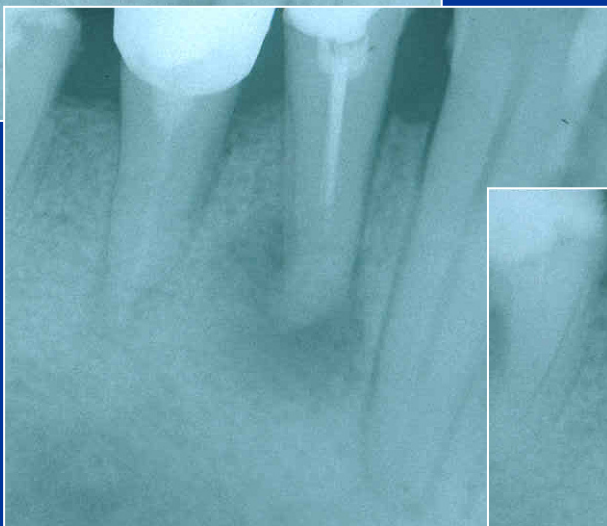
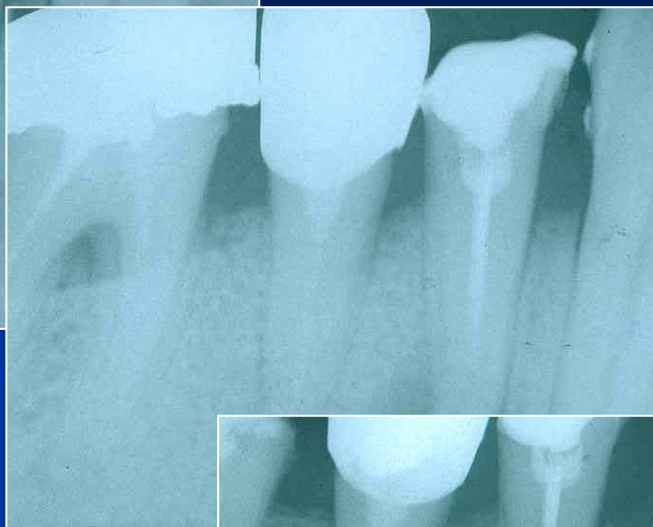




Chronic periodontitis



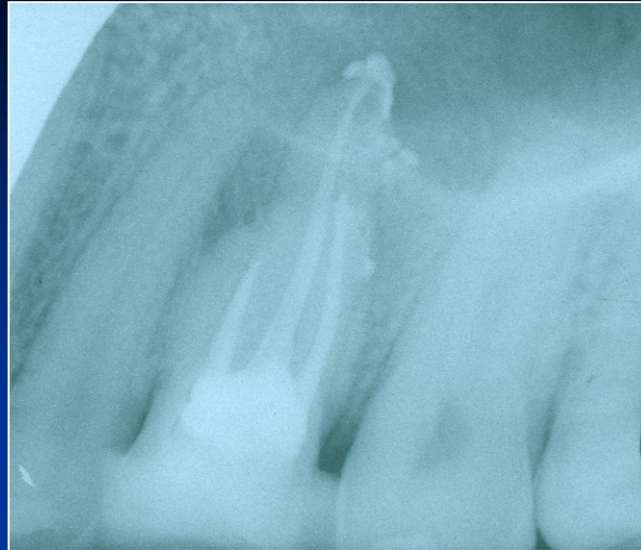


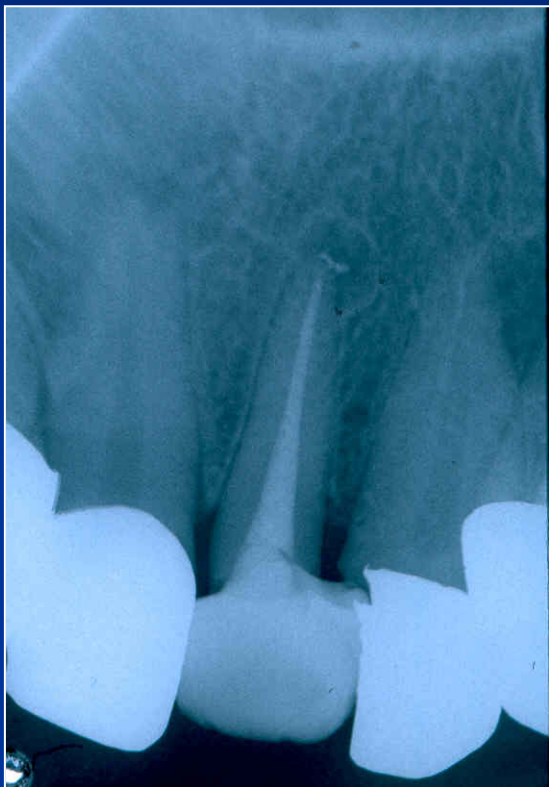


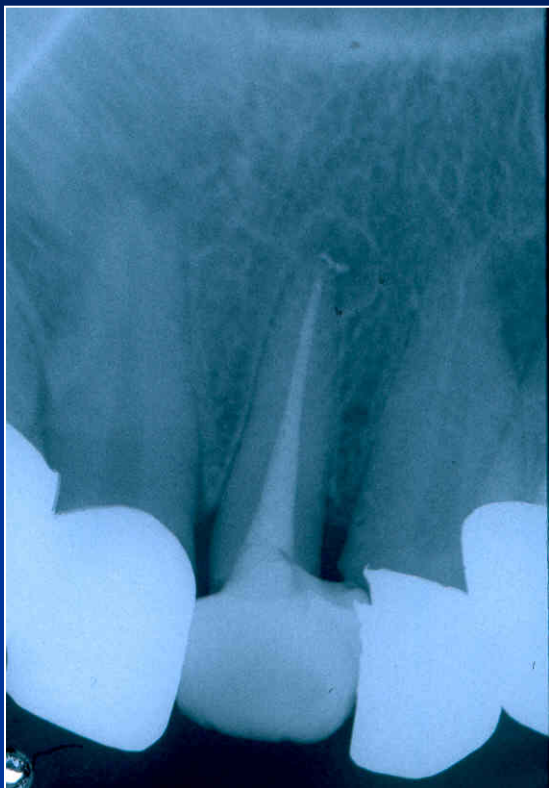




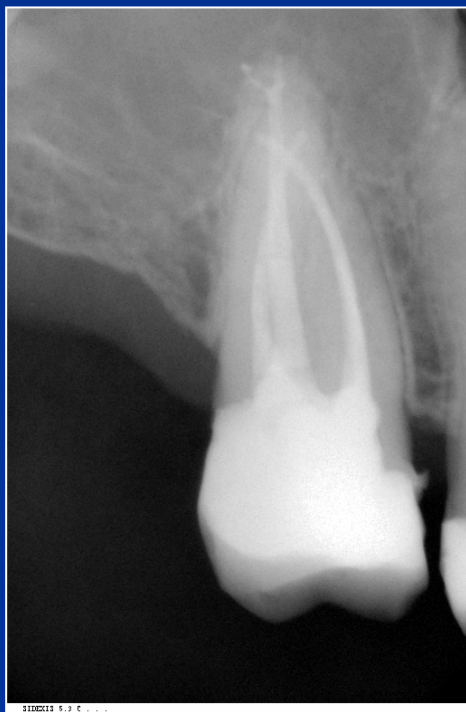


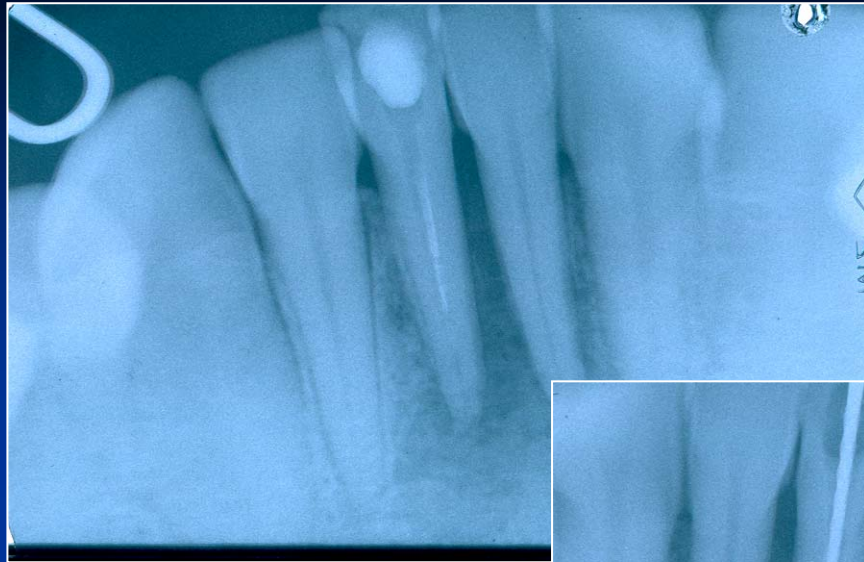




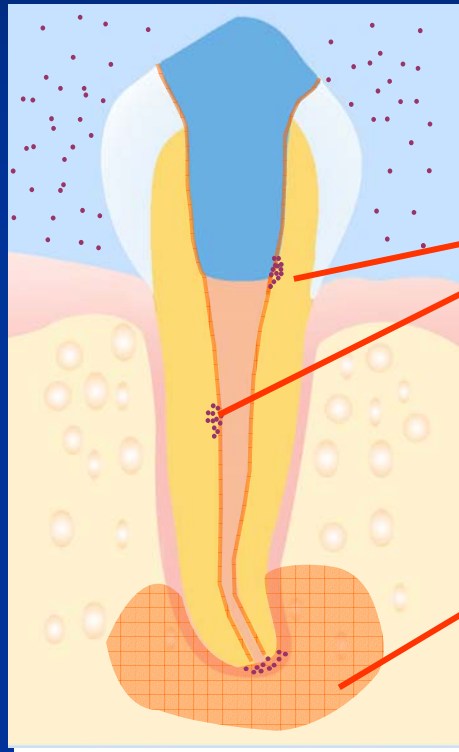








Sealing of the root canal filling

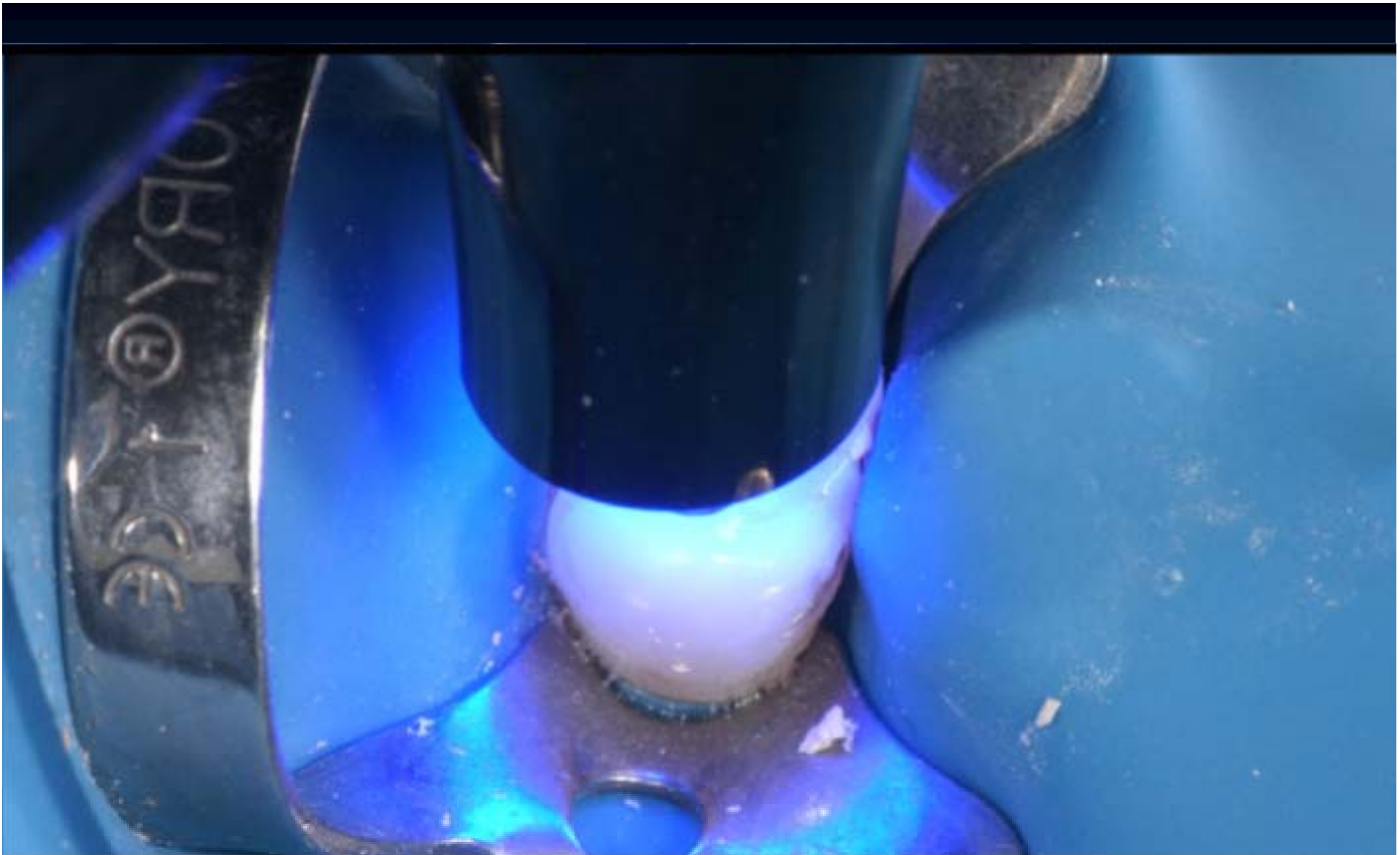


Risk of reinfection

Periodontitis

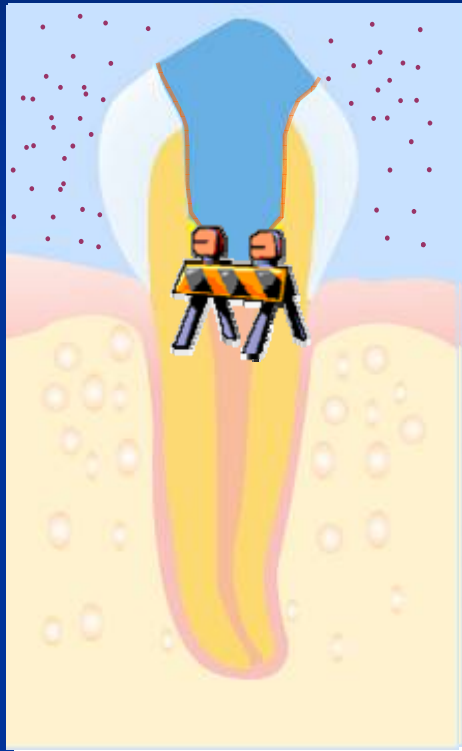


Dr Arnd Peschke, Liechtenstein



Dr Arnd Peschke, Liechtenstein

We have to seal the root canal filling



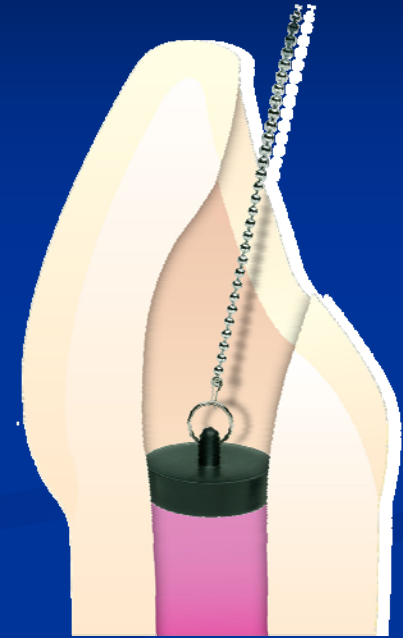
Adhesive
materials

Úkoly rekonstrukce

■ Zabránit reinfekci

Hermetický koronální uzávěr

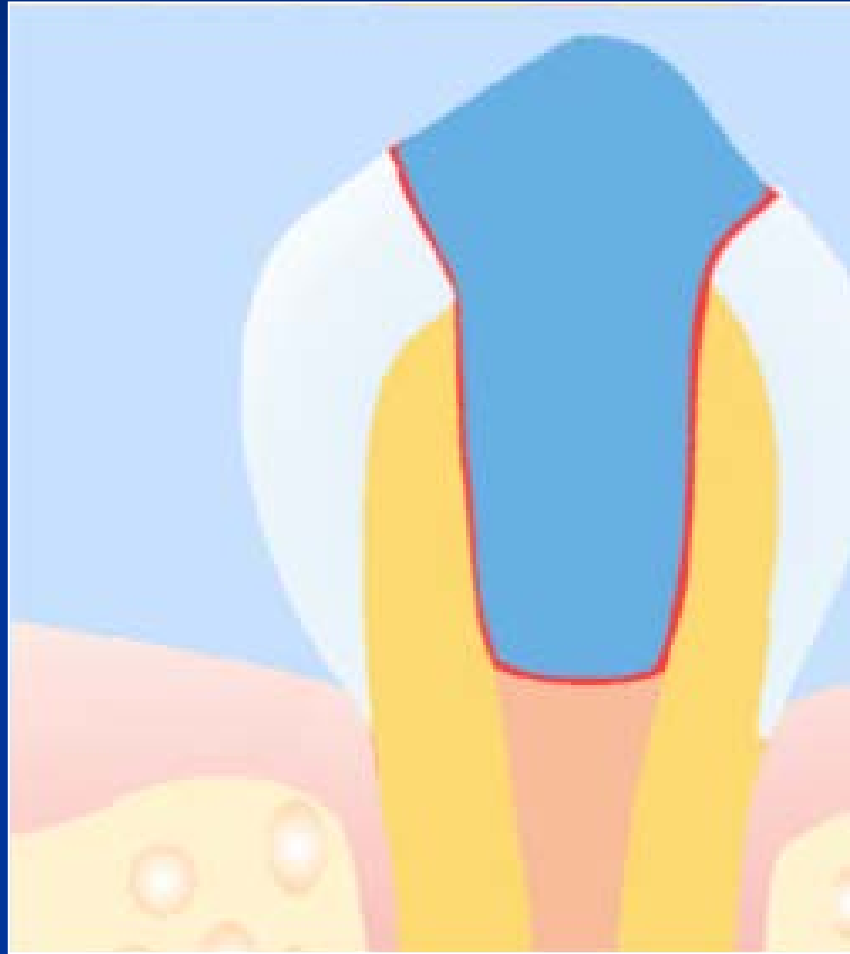
- Odstranění přebytku gutaperči
- Pečetění kořenové výplně
- Hermetická výplň endodontické kavity



provizorní, definitivní, dostavba,

nástavba

Co ovlivňuje koronární netěsnost ?



- Permeabilita a netěsnost provizorní výplně
- Provizorní výplně jsou ponechány příliš dlouho
- Permeabilita definitivní výplně

Indikace: pečetění hned po zaplnění

