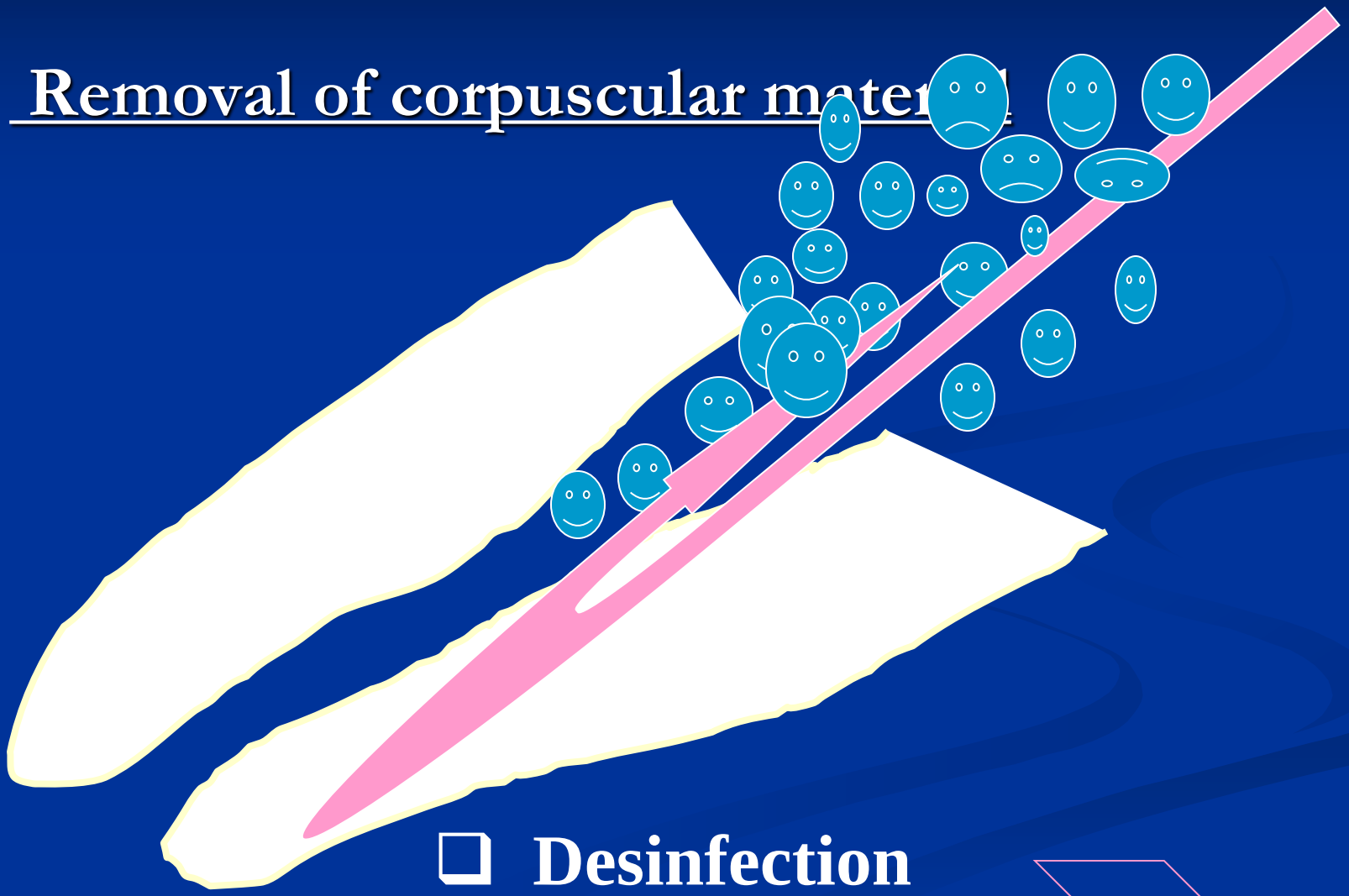
Irrigation of the root canal

- **Removal of corpuscular material**



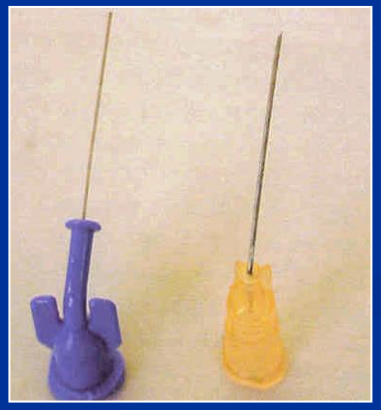
- **Desinfection**

Irrigants

- ✓ Sodium hypochlorite – 0,5% – 6%
- ✓ Chlorhexidin (0,12 – 0,2%)
- ✓ EDTA 17% solution or lubrication gel
- ✓ Hydrogen peroxide 3%

- Cannula

Opening at sides



Activation of irrigation

- **Hand**
- **Ultrasound**
- **Hydrodynamic**
- **Laser**

Desinfection

- Calcium hydroxide

- Antibiotics and corticosteroids

Irrigants

Sodium hypochlorite1,5 –6%

Desinfection - oxidation a chloration

Dissolves organic material (does not dissolve smear layer)

Bad smell

Risk of hemoragic necrosis in soft tissues

Irrigants

- Chlorhexidin

0,12%, 0,2%, 2%

Good antibacterial spectrum

Binding to surfaces

Improves biofilm

With calcium hydroxide - parachloranilin

Does not dissolve smear layer

Precipitation with calcium hydroxide

Irrigants

- EDTA 17% - 18% solution

No significant antibacterial effect

Dissolves smear layer

Slightly decreases effect of sodium hypochlorite

Is a part of lubficants (together with carbamide peroxide and vehiculum)

Irrigants

- Citric acid 20% roztok

Dissolves smear layer.

Irrigation protocols

- Sodium hypochlorite

Into access cavity and root canal

(combination with lubrication gel on the root canal instrument – not necessary)

Irrigation protocols

Sodium hypochlorite

2% - 6%

(Uctivation with ultrasound 3x 20s v průběhu ošetření)

- EDTA 17% irrigation in final phase

Irrigation protocols

- NaOCl
- EDTA gel
- EDTA solution 18% 30s – 1min

Irrigation protocols

- NaOCl
- EDTA gel
- EDTA solution 18% 30s – 1min

- NaOCl 1min
- Sterile water
- Chlorhexidin 5 min

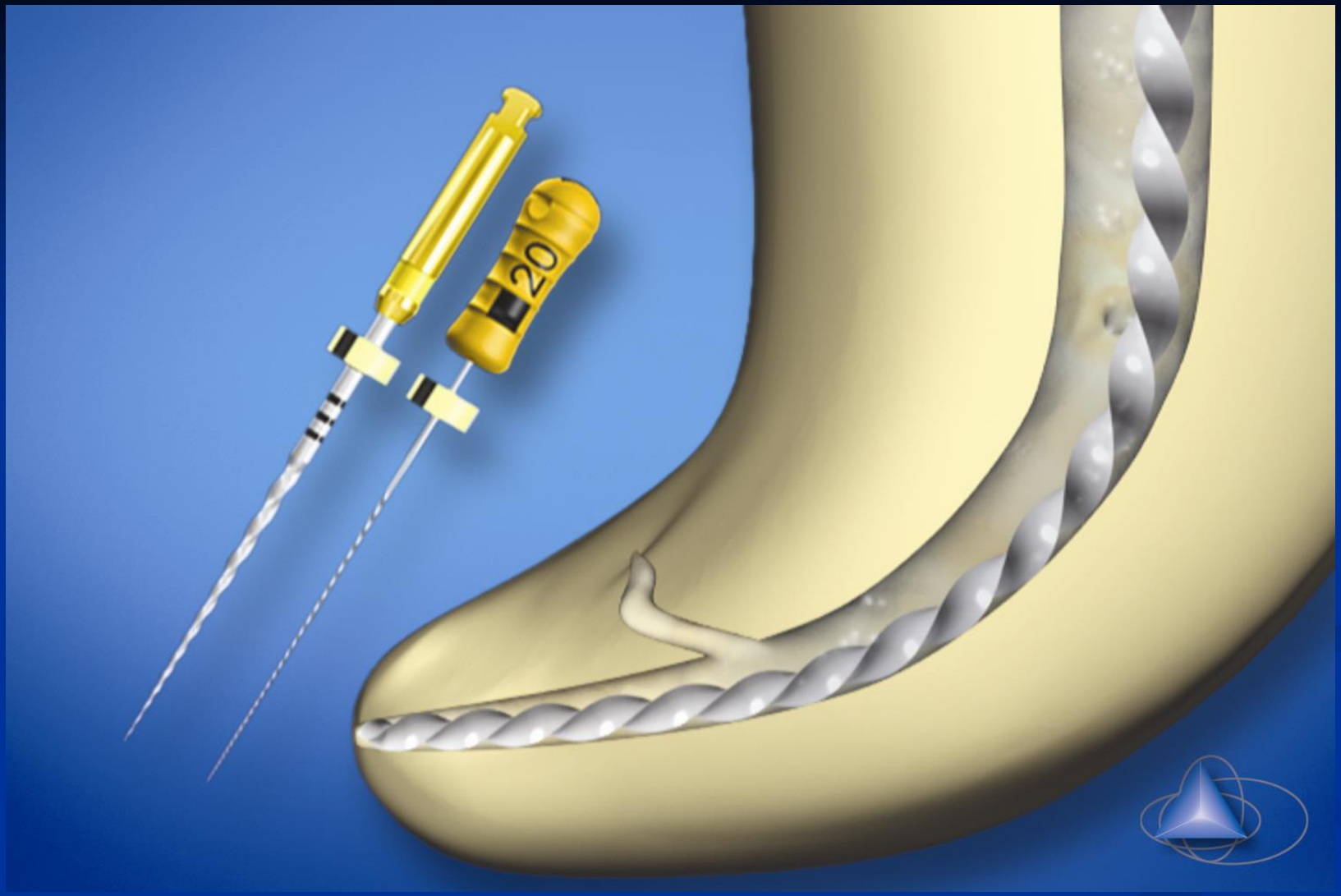
Activation of irrigation

- Sonic (Endo Activator)
- Ultrasound
- Laser (erbium laser, photodynamic activation – chromofor in the root canal)
- Hydrodynamic activation
- Endovac

SONIC SYSTEM

ENDOACTIVATOR™ SYSTEM

3 speed sonic motor, 2’000, 6’000 and 10’000 cpm



Well-shaped root canal.

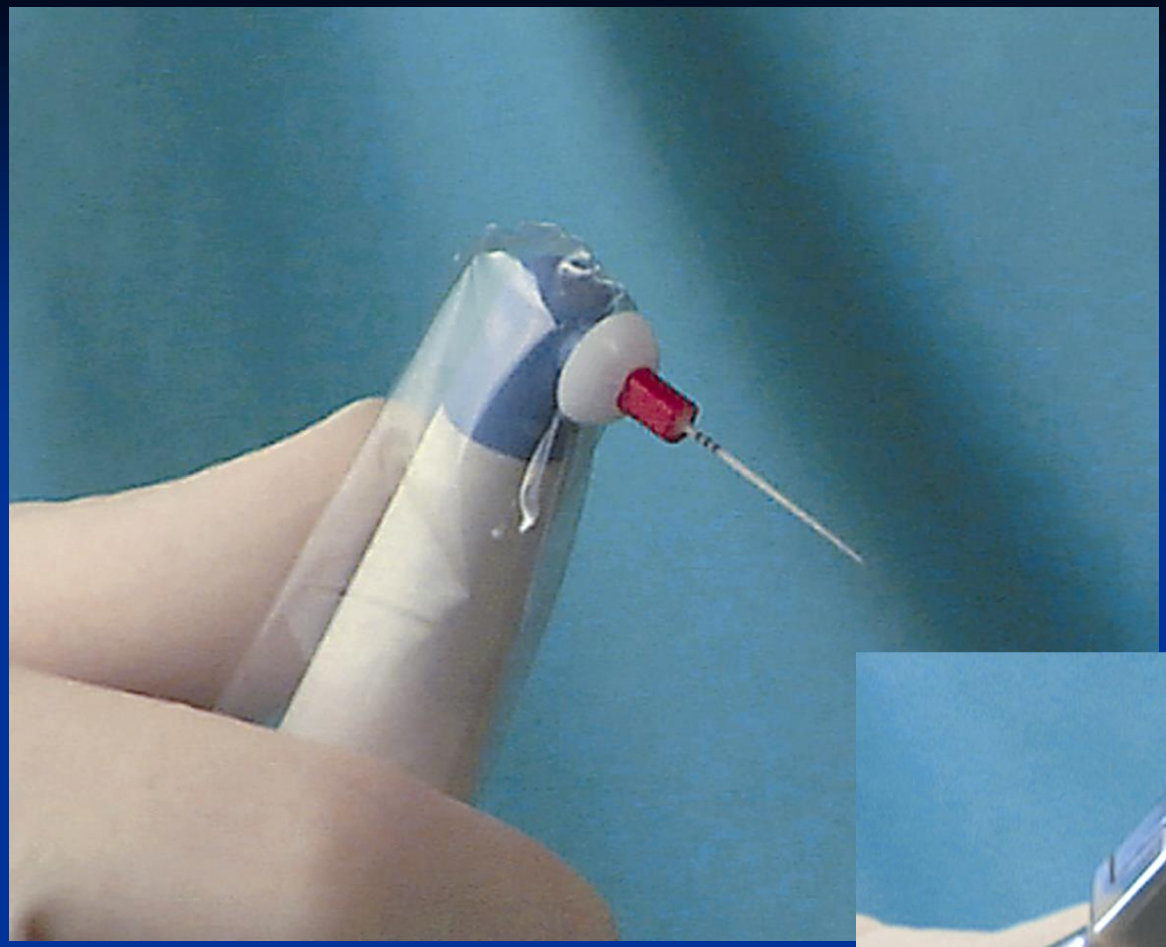
CLINICAL APPLICATIONS

1. Debridement • Smear Layer • Biofilm
2. Adapt and Remove Calcium Hydroxide
3. Adapt Mineral Trioxide Aggregate
4. Remove Residual Obturation Materials

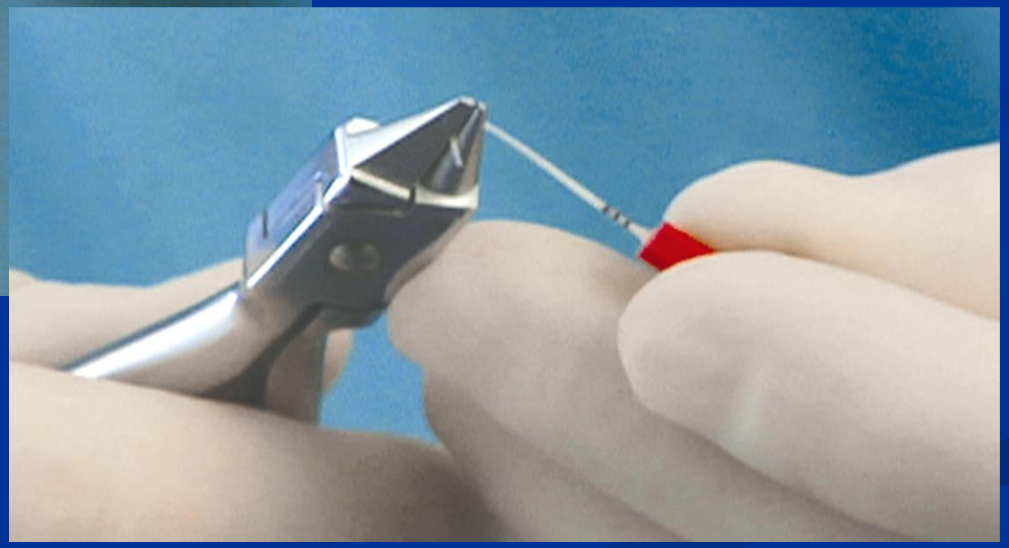
CLINICAL PROTOCOL

- EndoActivator Tip Selection
- Activate 17% EDTA for 1 Minute
- Activate 6% NaOCl for 30 Seconds

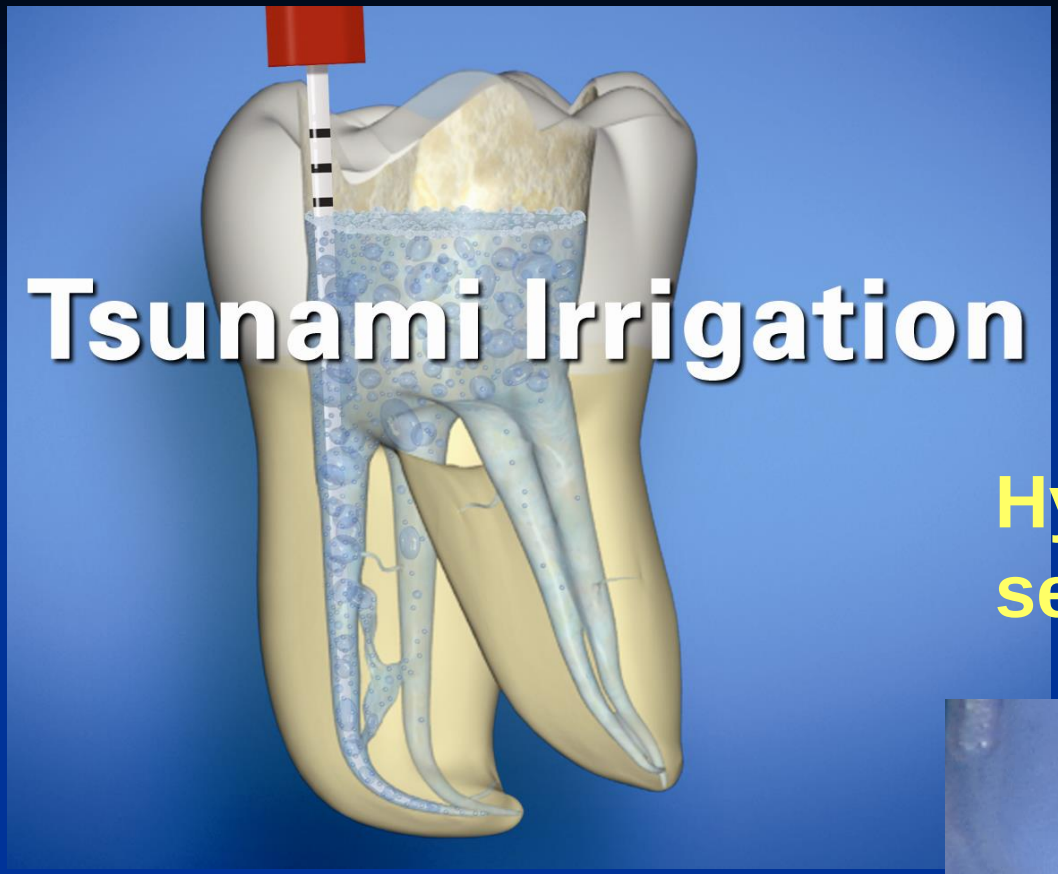
Custom protective barrier sleeves designed to slide over the handpiece



Fix the tip

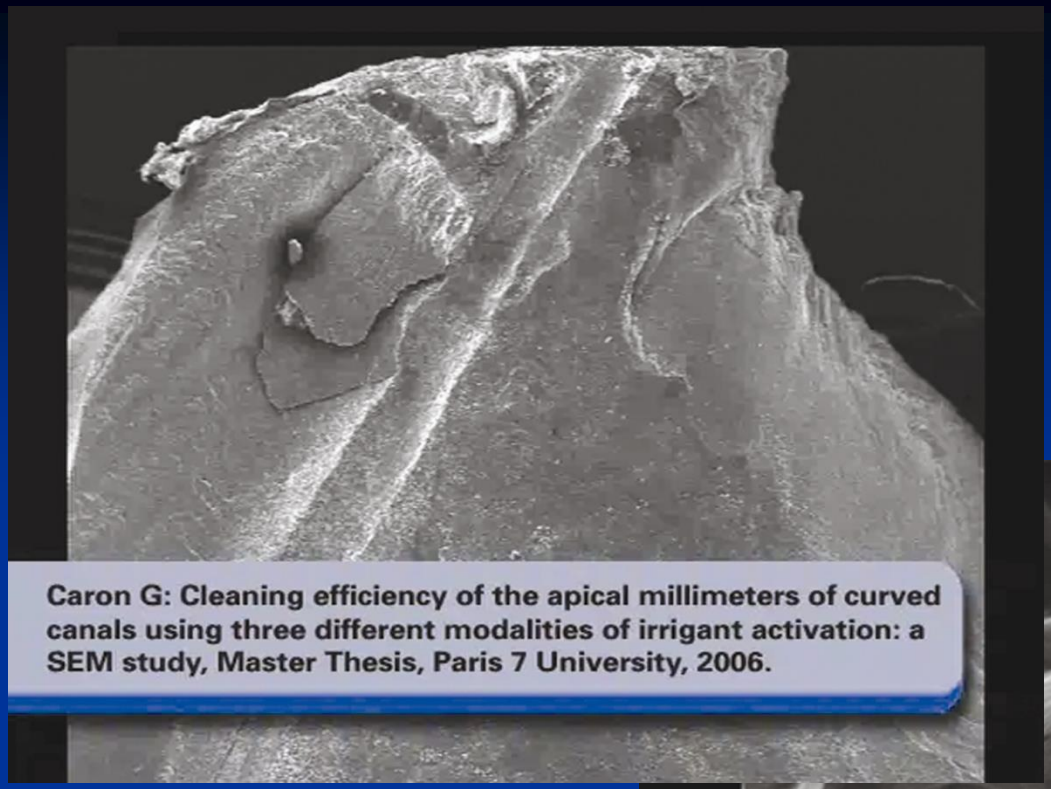


Tip could be bent, if necessary

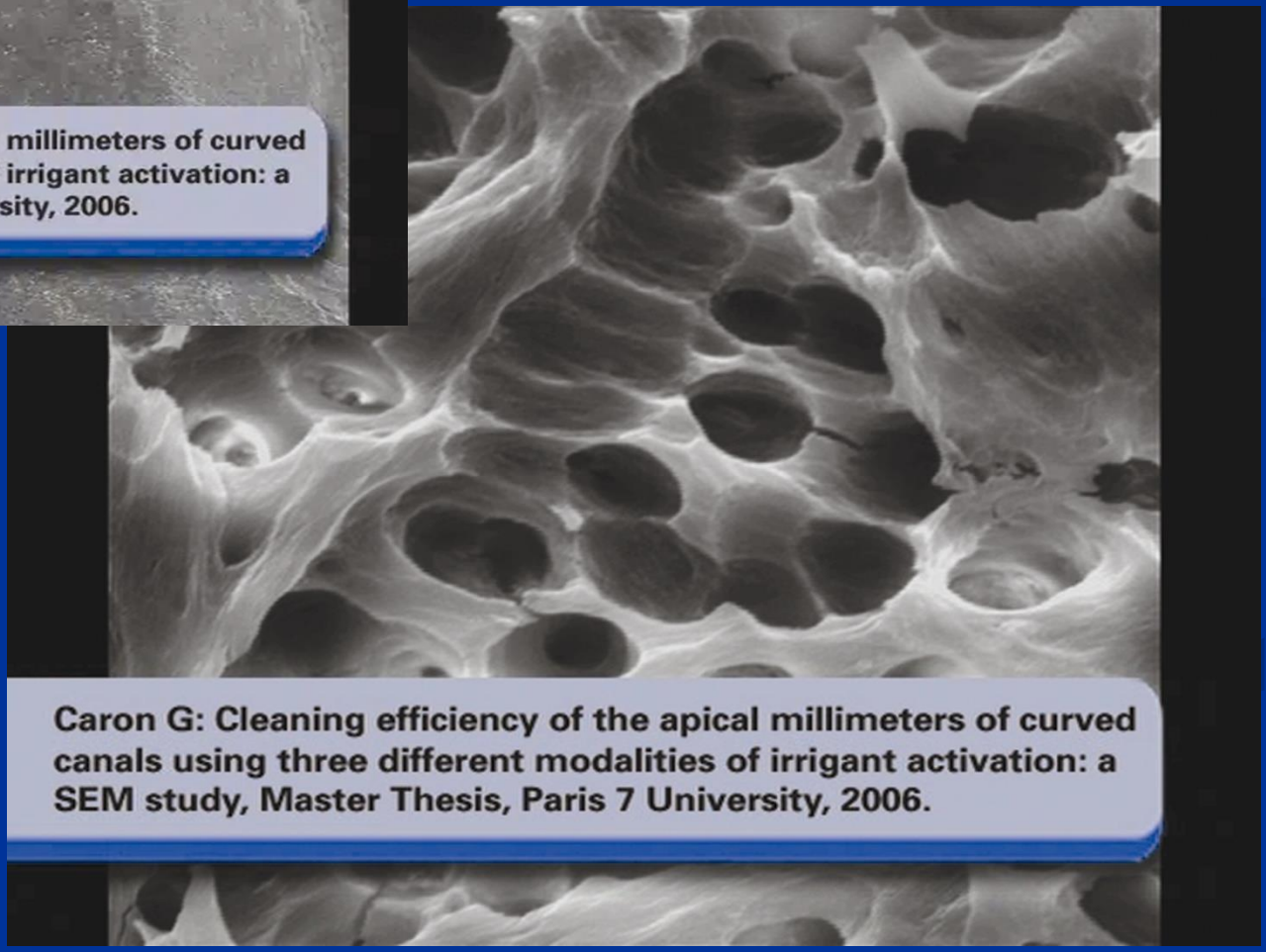


Hydrodynamic activation serves to improve

the penetration, circulation and flow of irrigant



Caron G: Cleaning efficiency of the apical millimeters of curved canals using three different modalities of irrigant activation: a SEM study, Master Thesis, Paris 7 University, 2006.



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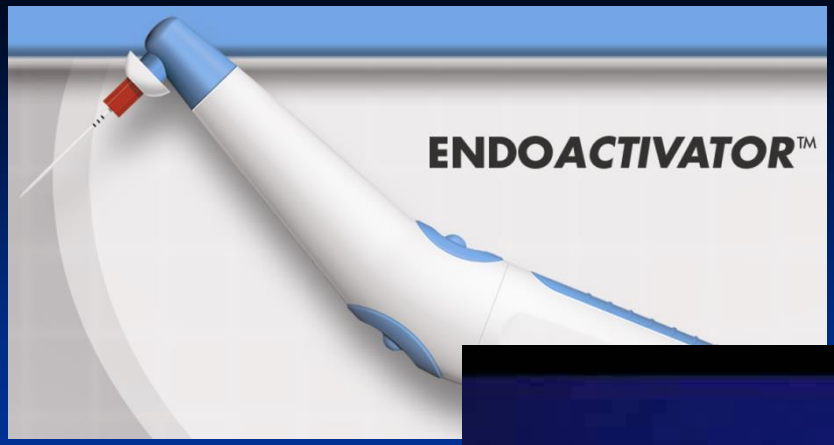
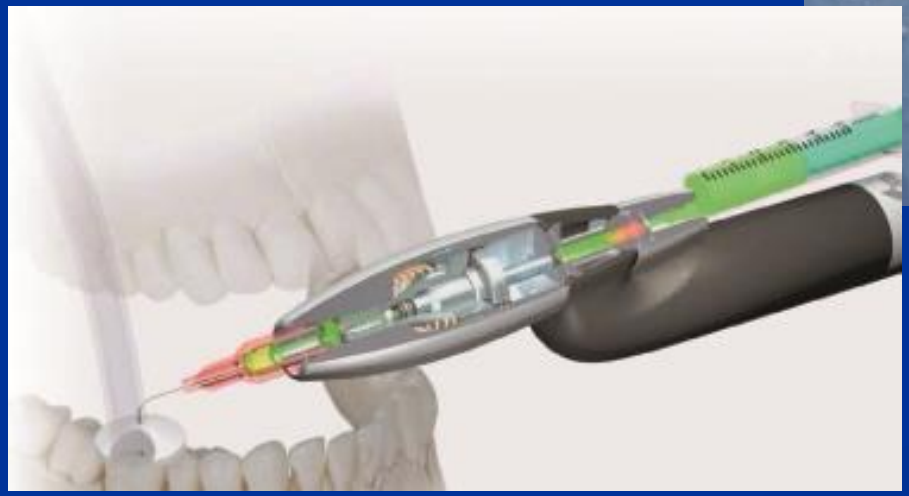

ENDOACTIVATOR™

Ultrasound

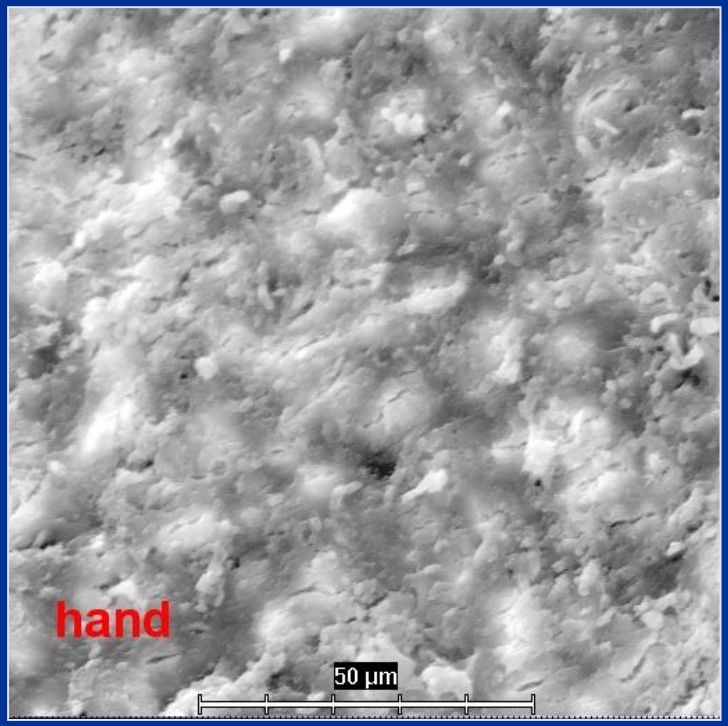


EndoVac

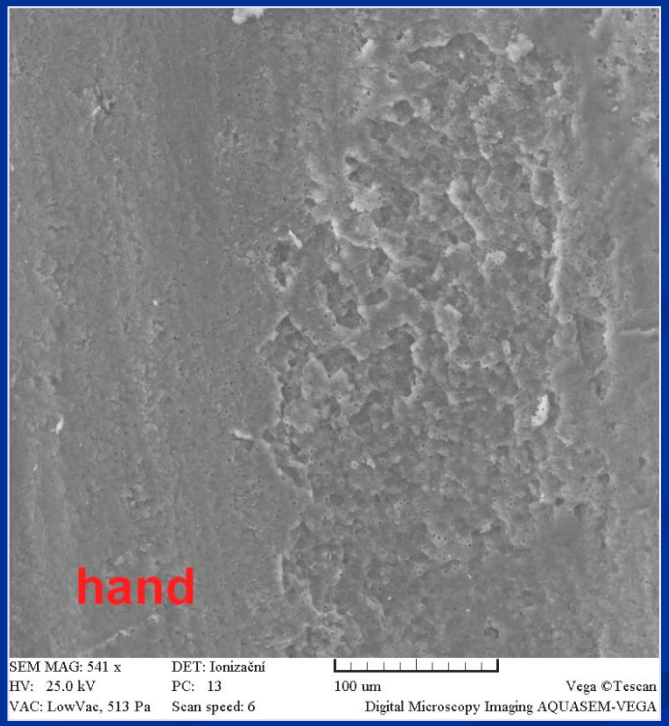
Active suction of the irrigant

Smear layer

SEM

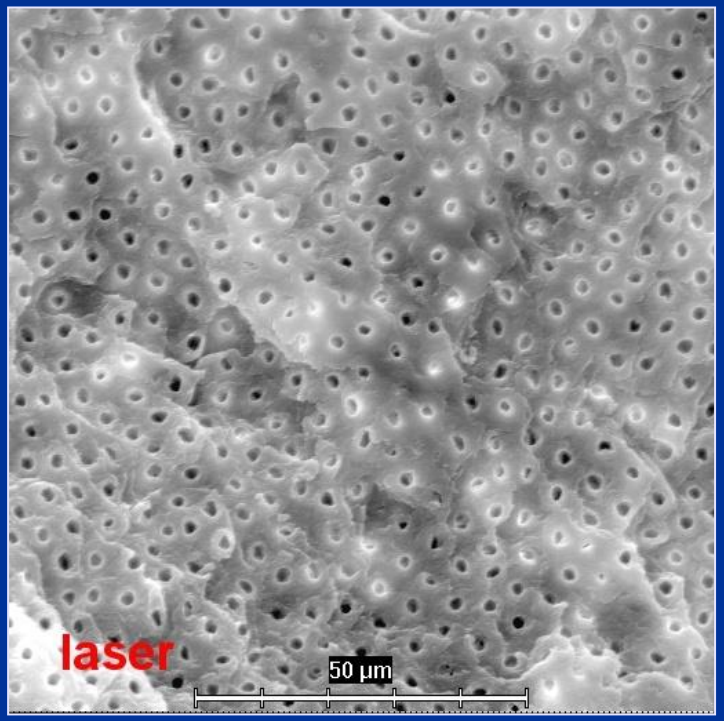


ESEM

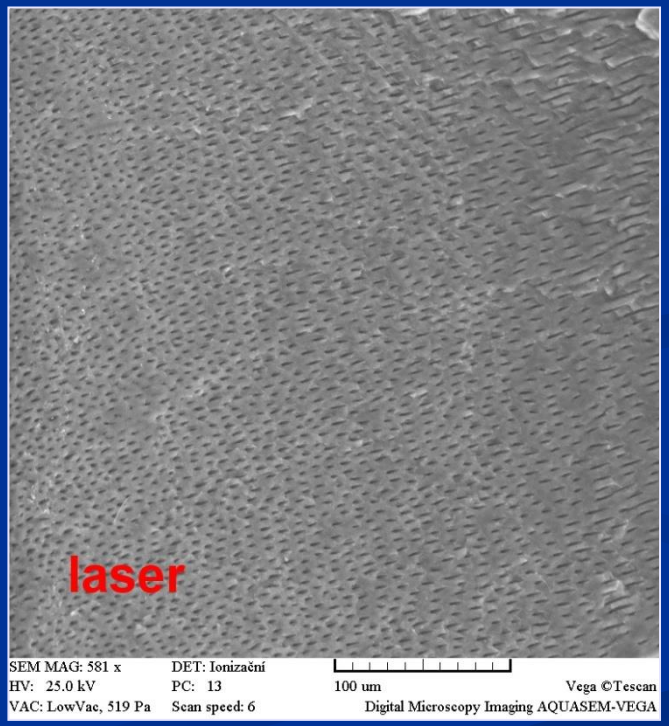


Clean root canal wall

SEM



ESEM



Calcium hydroxide

- Alcaline
- Antibacterial
- Stimulation of hard tissue formation
- Haemostatic and antiphlogictic

Calcium hydroxide

Temporary root canal filling

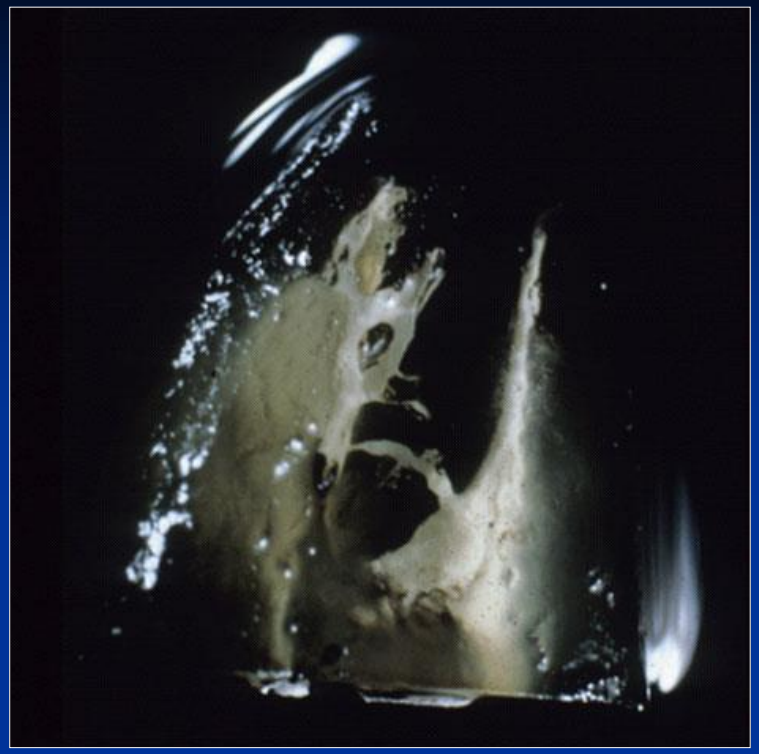
Subbase

Component of sealers

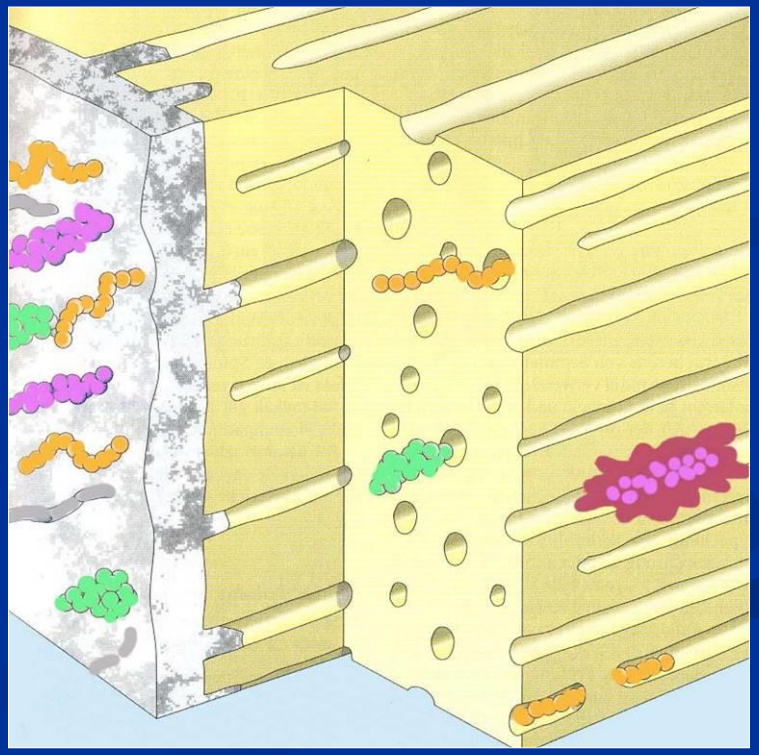
Mode of action

- Realease of hydroxyl ions
- Long term alkalinization
- Stimulation of hard tissues formation

Koçkapan, C.:Curriculum Endodontie, p. 377-385, Quintessenz, Berlin 2003



Dressing



Calcium hydroxide

- Short term action

1 – 2 weeks

Desinfection, haemostasis

Calcium hydroxide

- Midle term action

2 – 3 months

Apexification

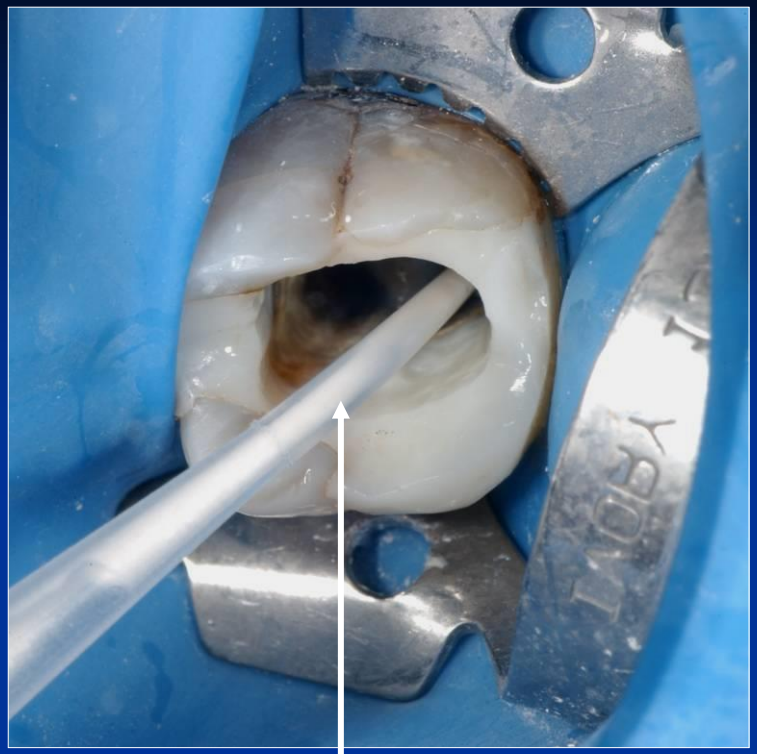
Chronic form of apical periodontitis

Calcium hydroxide

- Long term action

3 months and more

Prevention of resprption



Magistraliter

The powder is mixed with destilled water

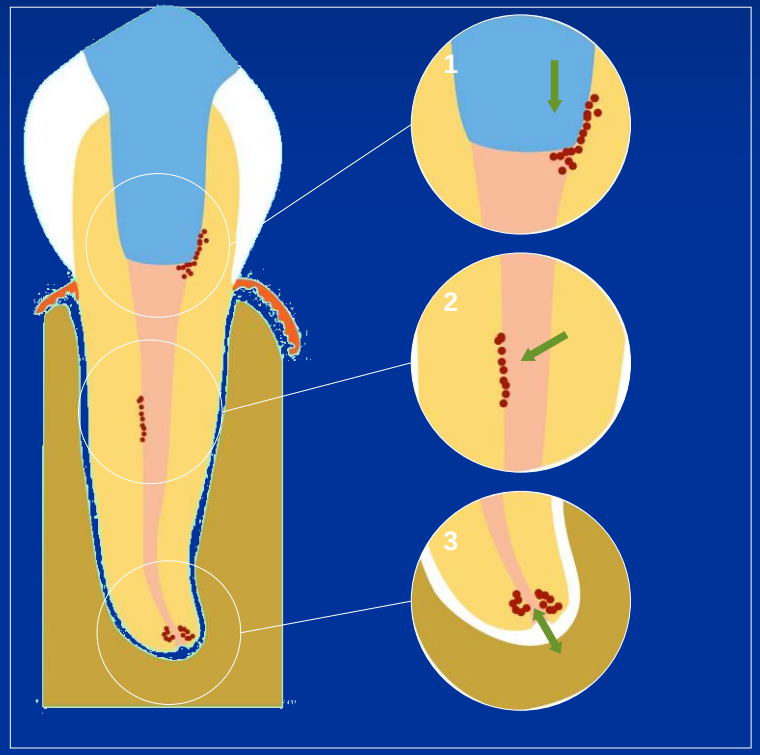
Lentule 2 mm less than WL !!!!!

Apexit® Plus

ApexCal®

Root canal filling

Root canal filling



Good coronal,

Middle

Apical seal.

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

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)

<u>Cooling process</u>

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

Sealers

Chemically curing materials

(their consistency is paste, cements)

Good adhesion to root canal walls as well as solid cones

X- ray contrast

Biocompatibility

Sealers

Importance

Filling of the spaces between the solid cones

↓

Seal of the root canal filling

Sealers

Zinc Oxide-Eugenol

Chloropercha

Calciumhydroxide

Resins

Glasionomer

Silicone

Zinc - Oxid Eugenol

Powder:

Zinc oxide

Liquid:

Eugenol

Acidic resins

Good adhesivity, antimicrobial effect, cytotoxicity?

Resorbable, no compatible with adhesive materials)

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

Calcium hydroxide sealers

Catalyst (paste)

Zinc stearat

Titanium dioxide

Baryum sulphate

or

Eugenol,. Eukalypt

Other components…

Kalciumhydroxide sealers

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

But!

Resorbable if not homogeneus

Not suitable for the single cone technique

Resins

- Rezorcin formaldehyd (toxic, obsolete)
- Epoxide
- Polyketone
- Metacrylate

Epoxide resin

- Base (powder, paste)

Bismuth oxid

Titanium dioxide

Hexametylentetramine

(Silver)

- Catalyst (liquide, paste)

Bisphenoldiglycidylether

Epoxid resin *(advantages)*

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

Epoxid resins
(disadvantages)

- Difficult removal
- Staining
- Initiatiory toxicity

AH 26, AH Plus, 2 Seal

Polyketone

- Base

Zinc oxide

Bismuth phosphate

Hexametylentetramine

- Liquid

Bisphenolglycidylether and other components

Polyketon resins

Advantages

Good adhesion

No contraction

No dissolution

Disadvantages

High stickness

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 wett 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
Hydrofillic

Calcium hydroxide

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- Haemostatic and antiphlogictic

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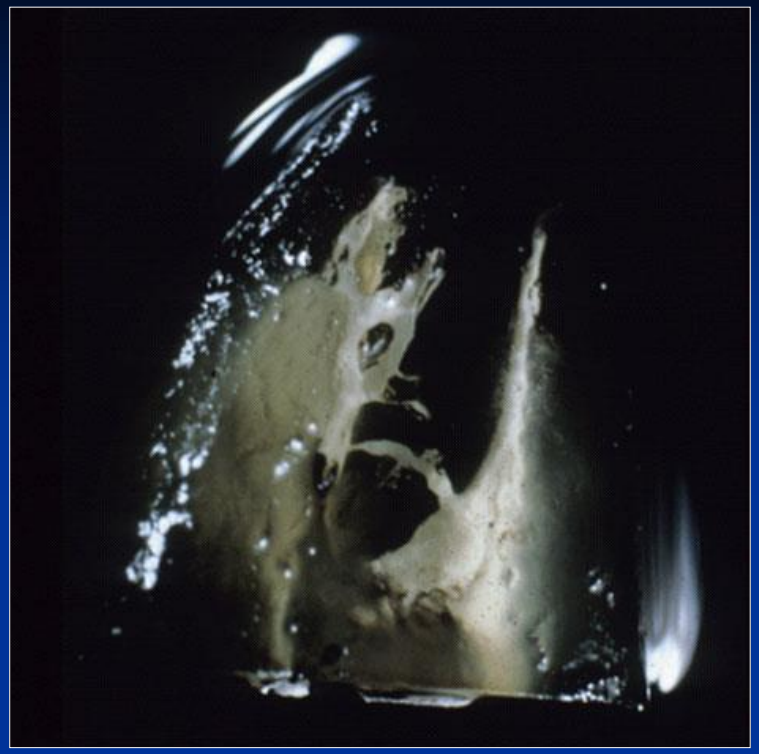
Koçkapan, C.:Curriculum Endodontie, p. 377-385, Quintessenz, Berlin 2003



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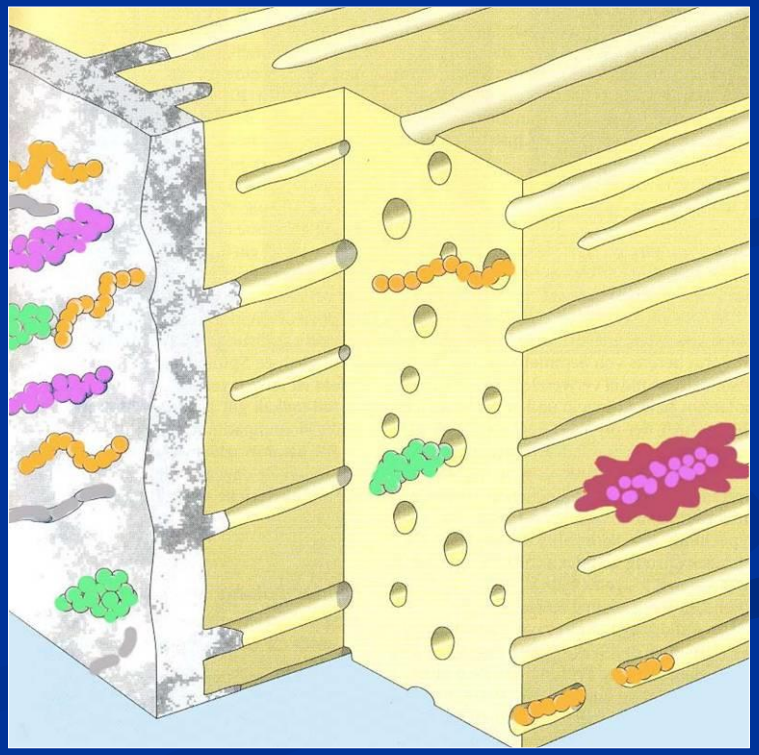

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Chronic form of apical periodontitis

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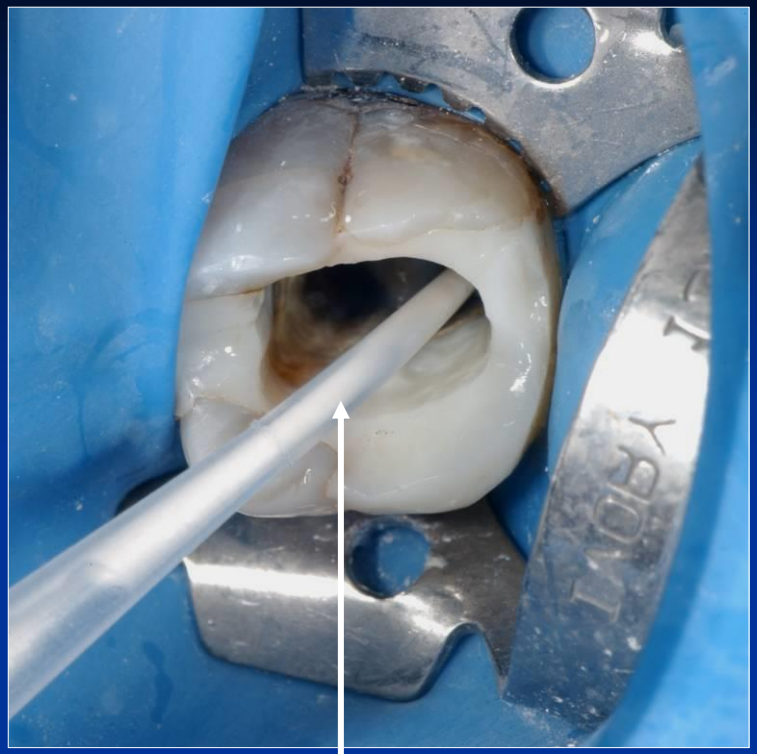
- Long term action

3 months and more

Prevention of resprption



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The powder is mixed with destilled water

Lentule 2 mm less than WL !!!!!

Apexit® Plus

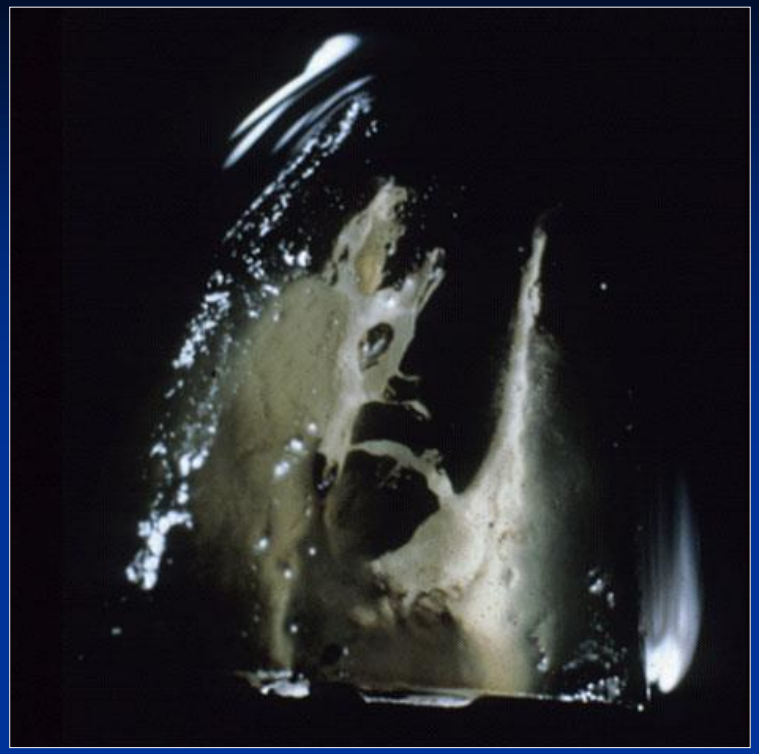
ApexCal®

Calcium hydroxide

Temporary root canal filling

Subbase

Component of sealers



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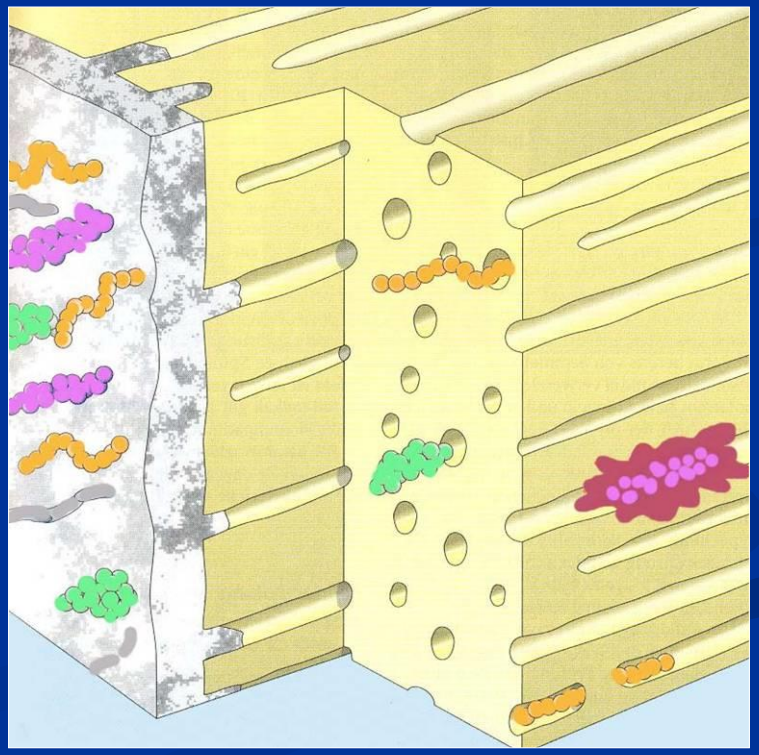

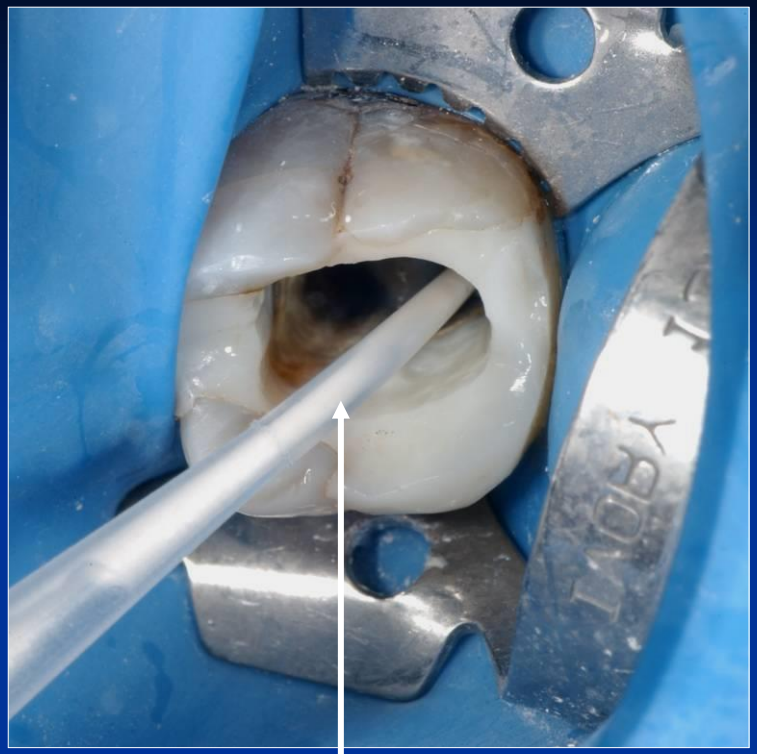

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Apexit® Plus

ApexCal®

Instruments

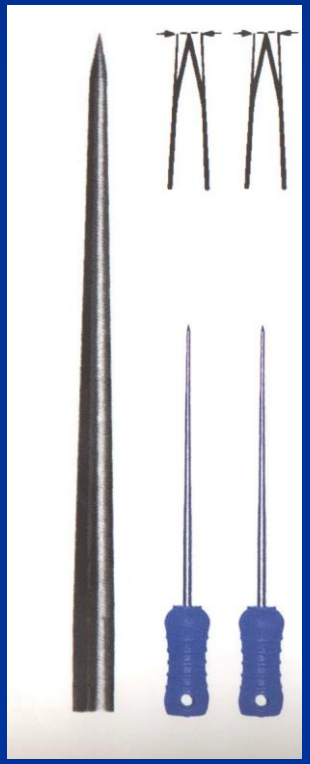
- Paste carries - lentulo
- Compactors
- Compactors - carriers
- Others

Lentulo

- delivers pastes
- 1,5 – 2 mm ahead
- for sealers

Compactors

Spreader



Pointed

Vertical introduction

Lateral compaction technique
(cold, warm)

Compactors

Plugger

Not pointed

Vertical introduction

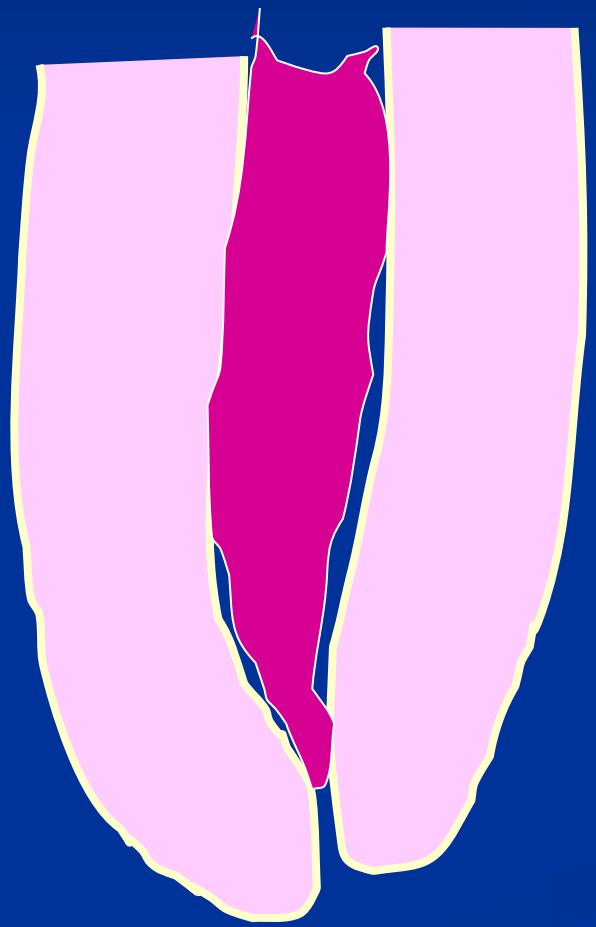
Vertical - compaction

Filling techniques

Cold

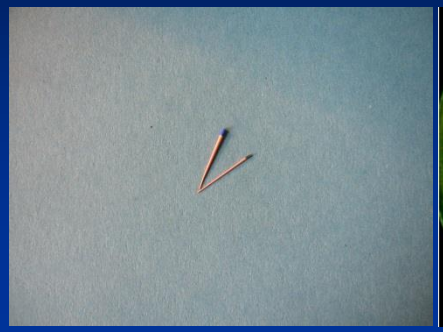
Warm

Paste only



Shrinkage, difficult removal

Single cone technique



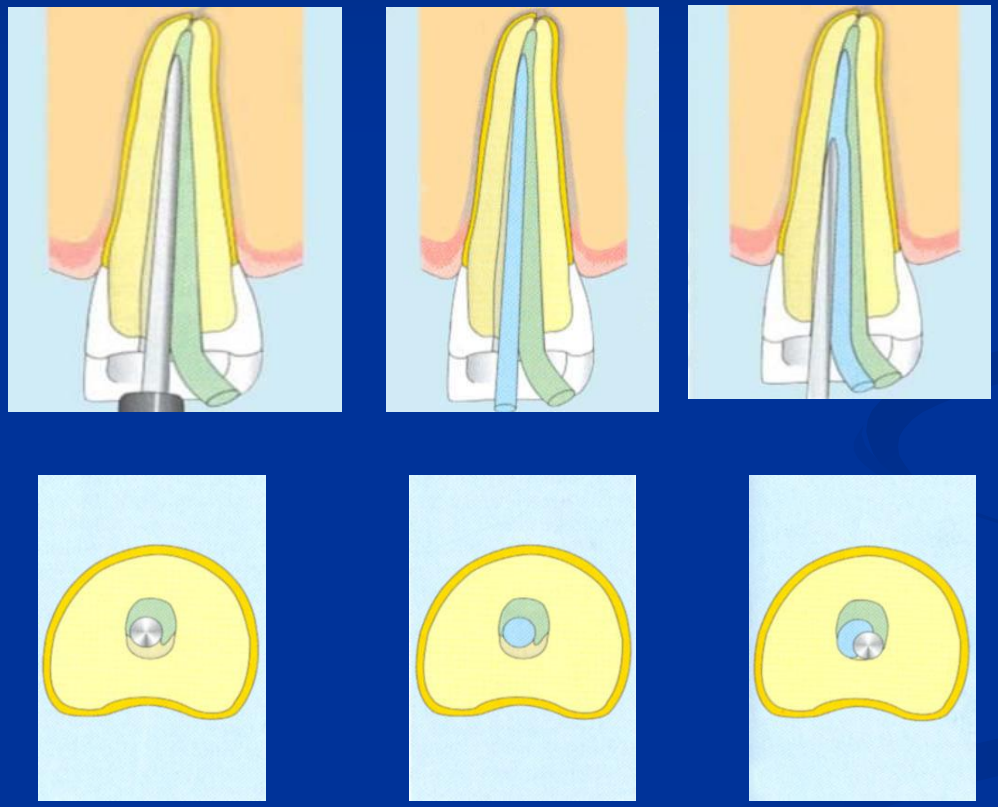
- Easy
- Fast
- Good control of WL
- Standard round preparation – risk of leakage

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

lenka.roubalikova@tiscali.cz

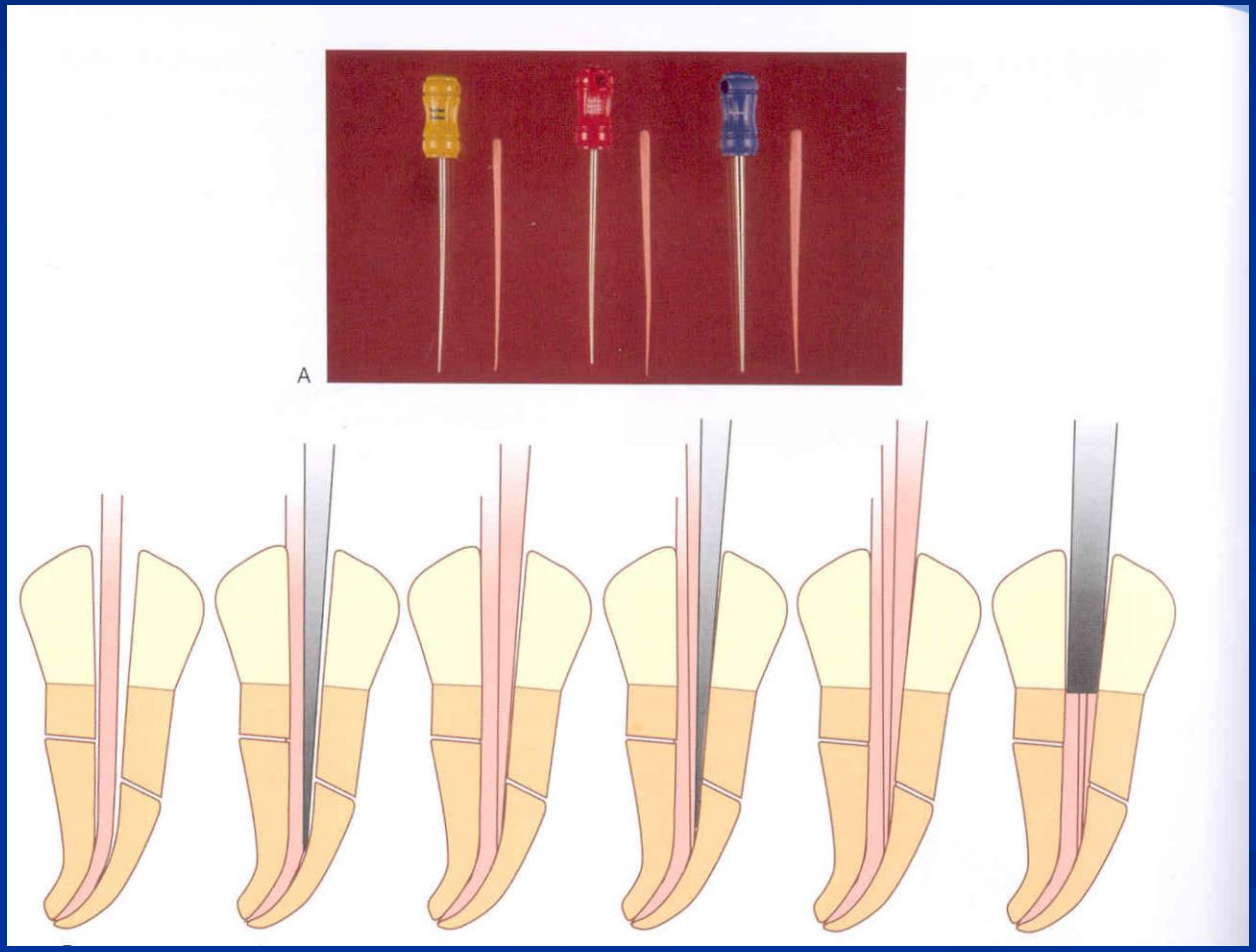
Lateral compaction

- Standard cold technique



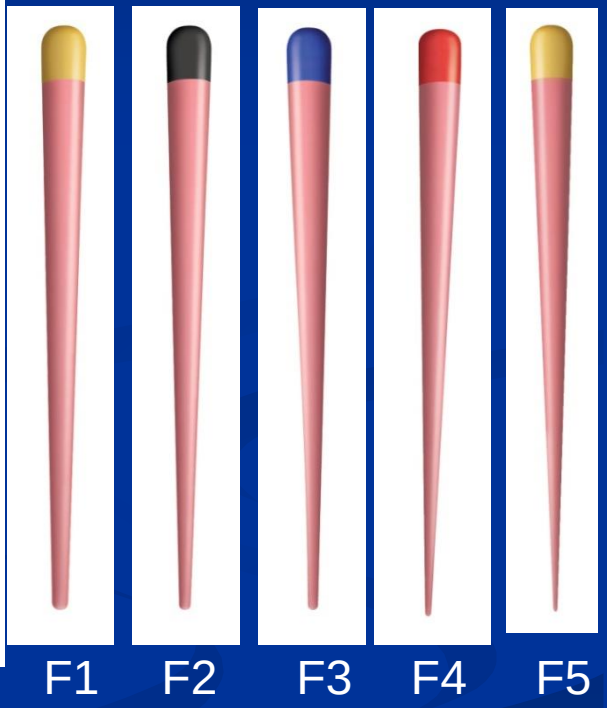
Good control of WL
Risk of the root fracture

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


A

LATERAL CONDENSATION (compaction)

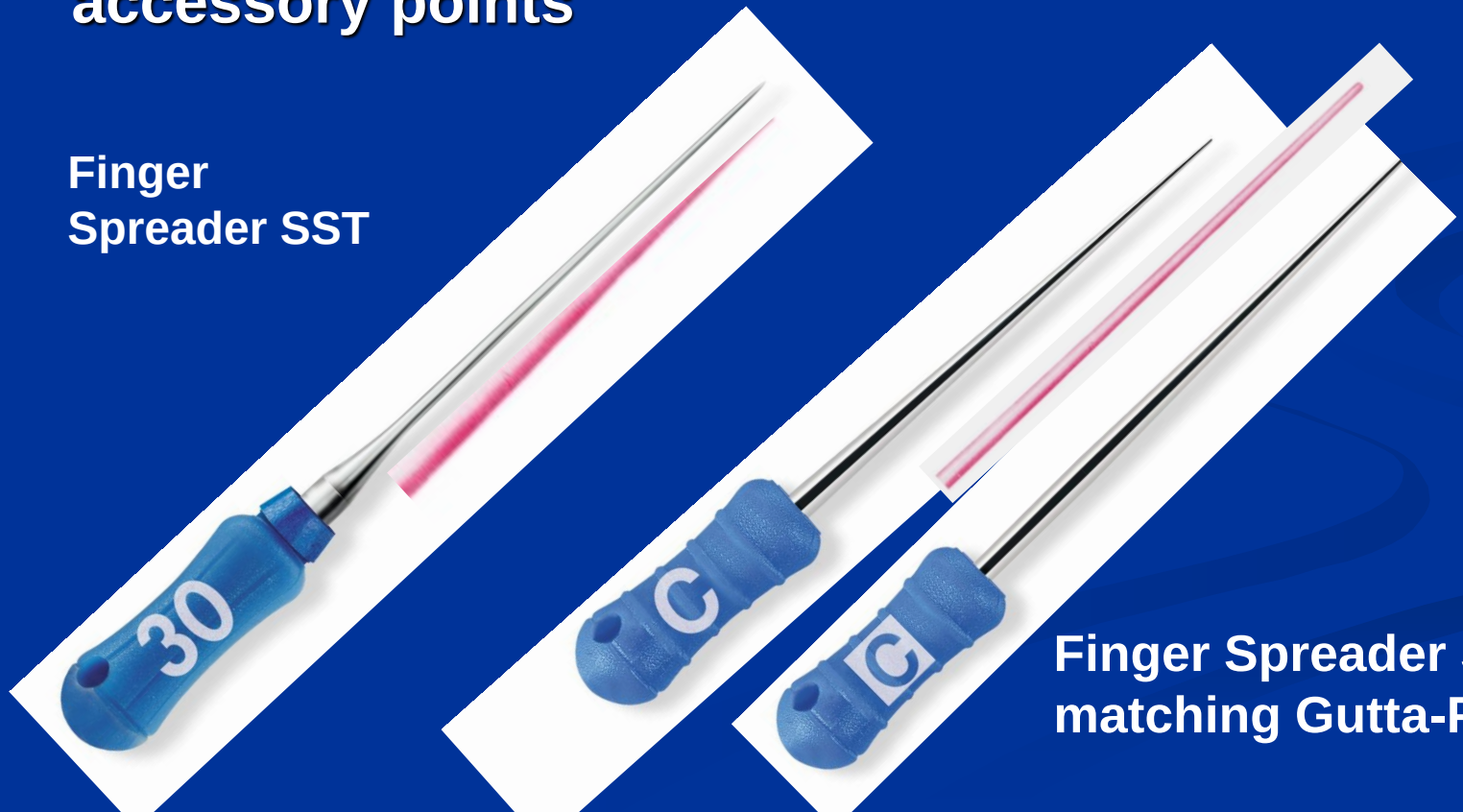
Standardized and non-standardized Paper Points and Gutta Percha Points



Lateral Condensation

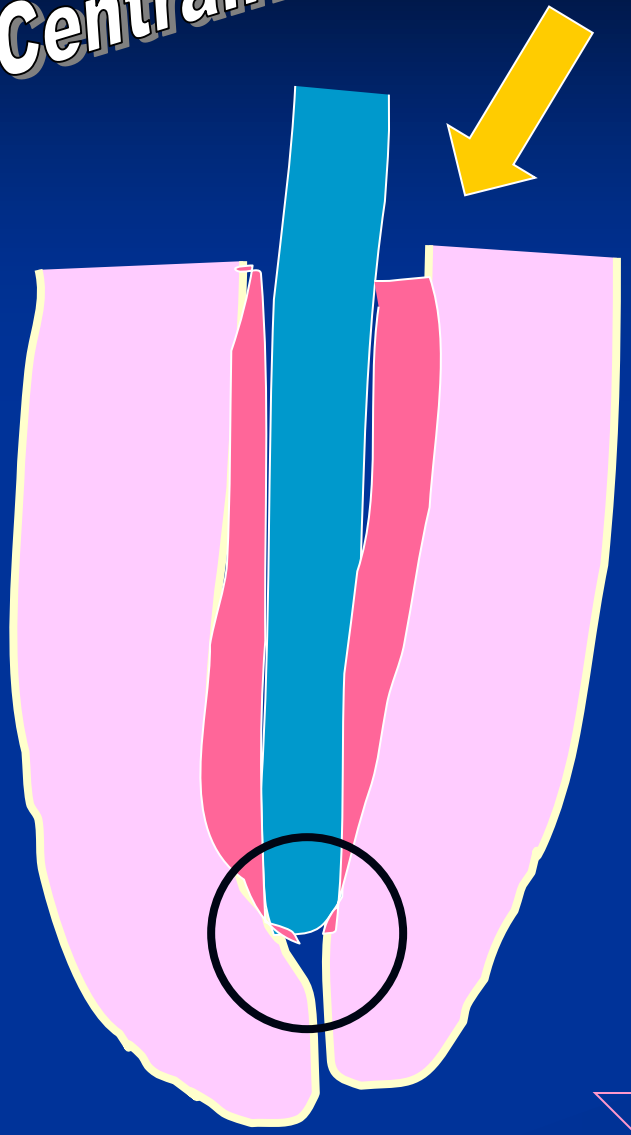
A sealer is placed in the canal followed by a fitted gutta percha Master Point compacted laterally by a tapering Spreader to make room for additional accessory points

Finger Spreader SST

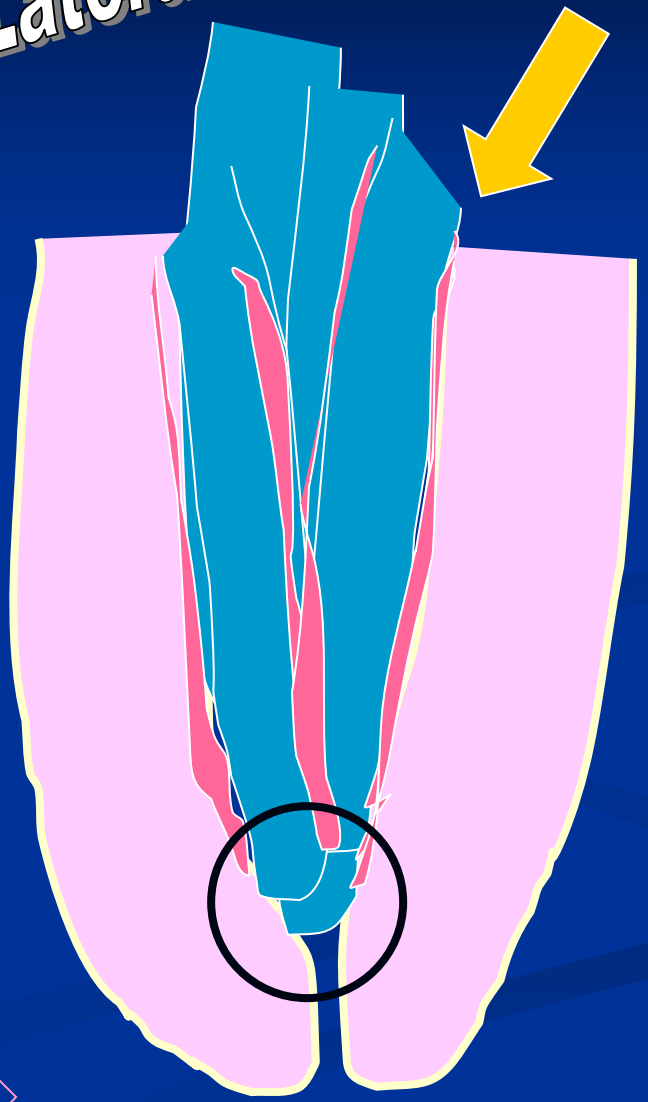


Finger Spreader SST and NiTi matching Gutta-Percha A-D

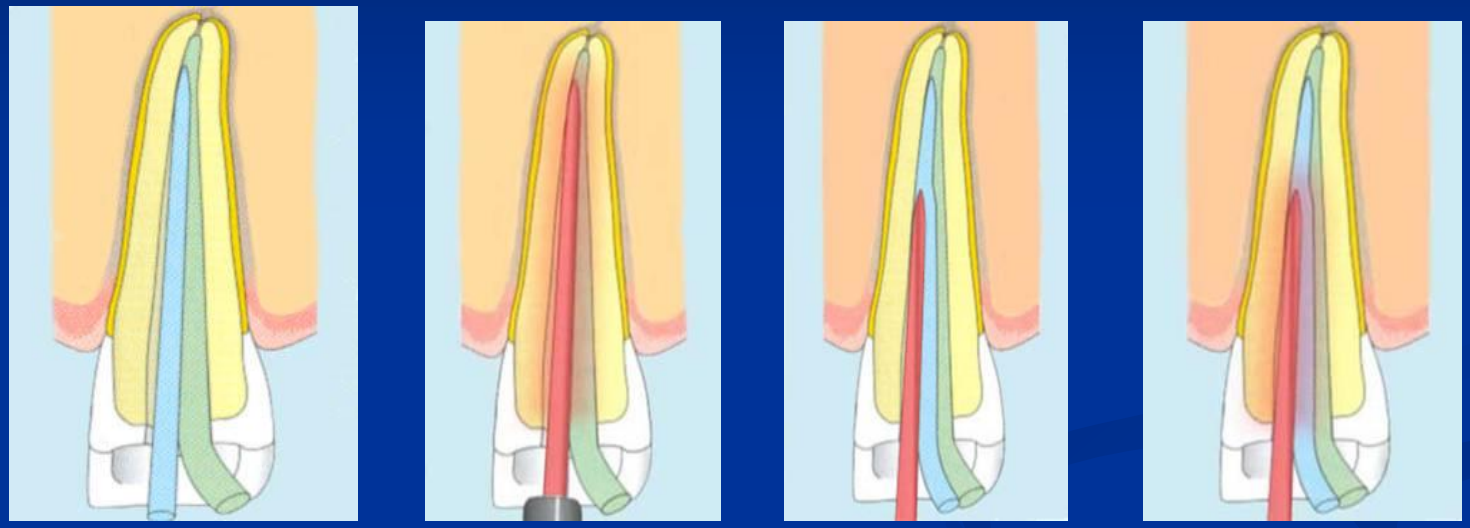
Centrální čep



Laterální kondenzace



Warm lateral compaction

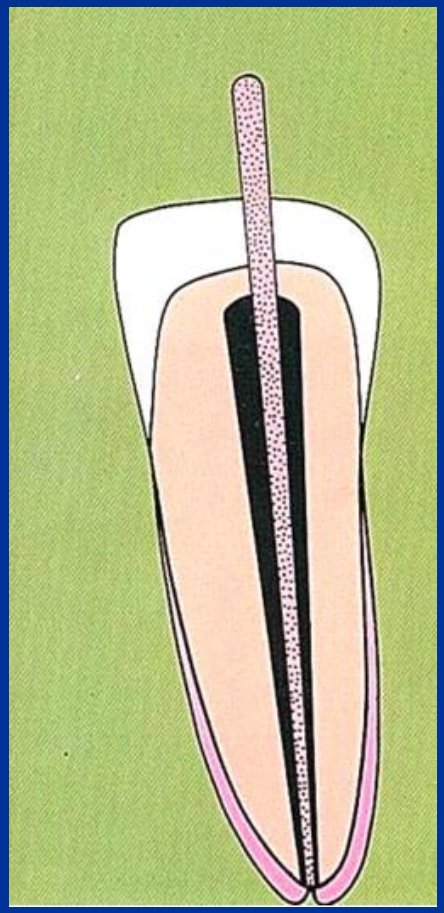


Heated spreader

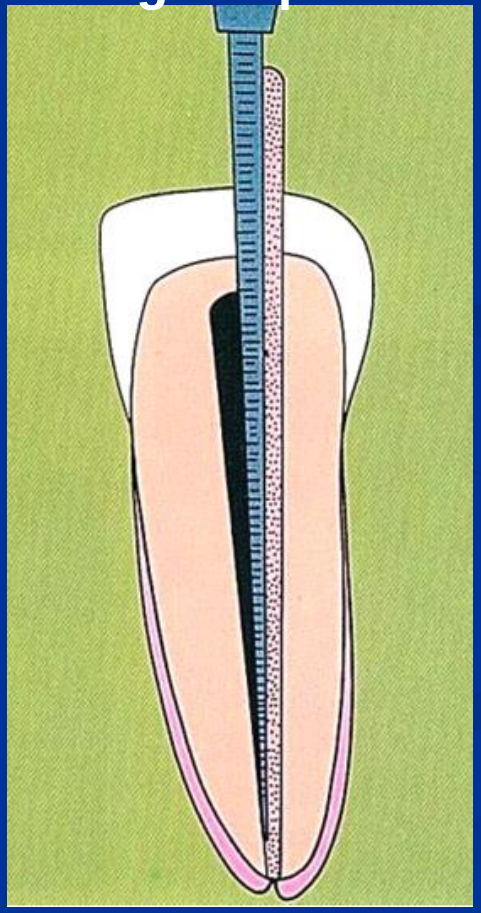
Better 3D filling

Modifiction – instead of spreader special instrument - rotary

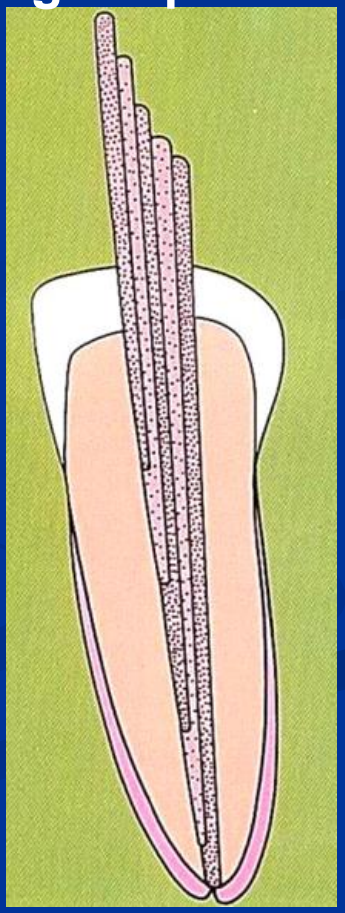
Insert a cone with sealer



Apply a Finger Spreader along the points

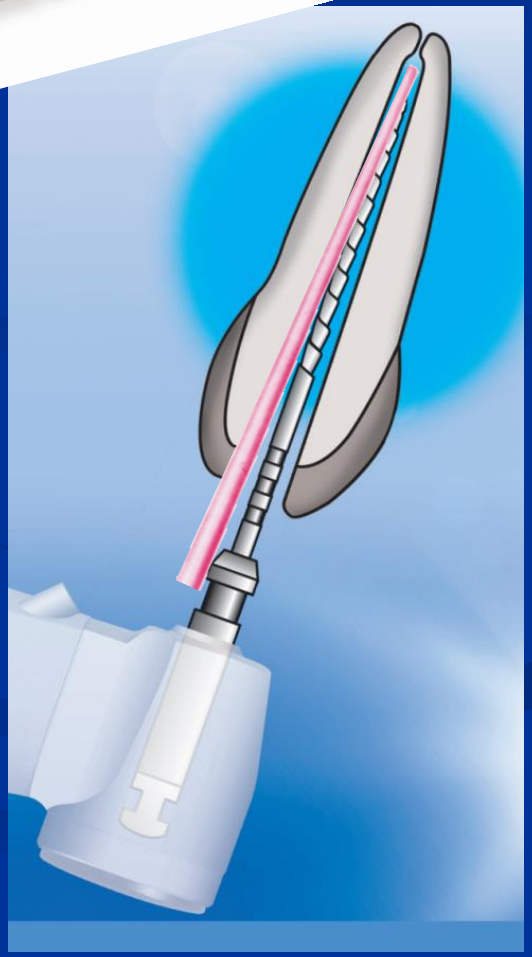


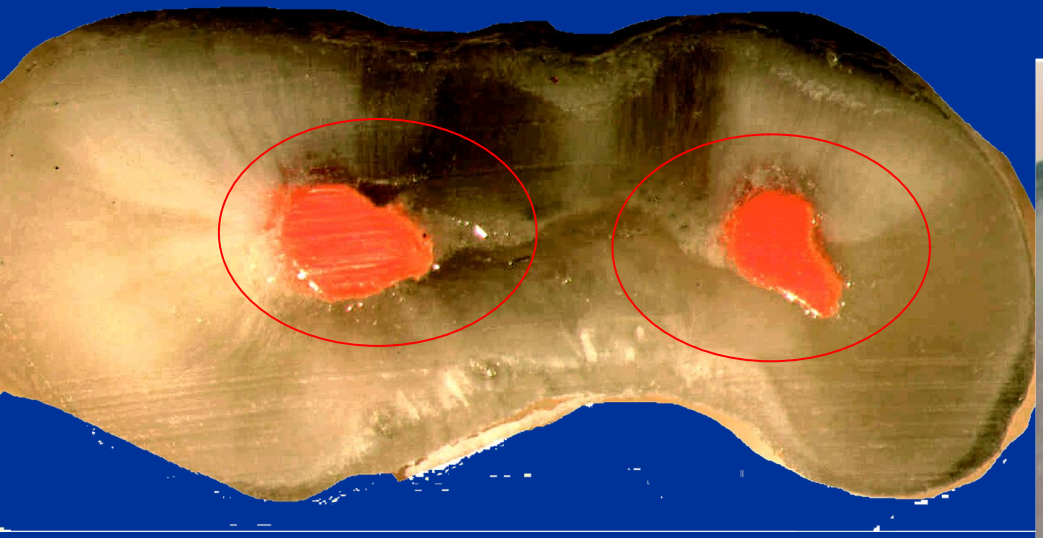
Then a new cone and again a Finger Spreader ….



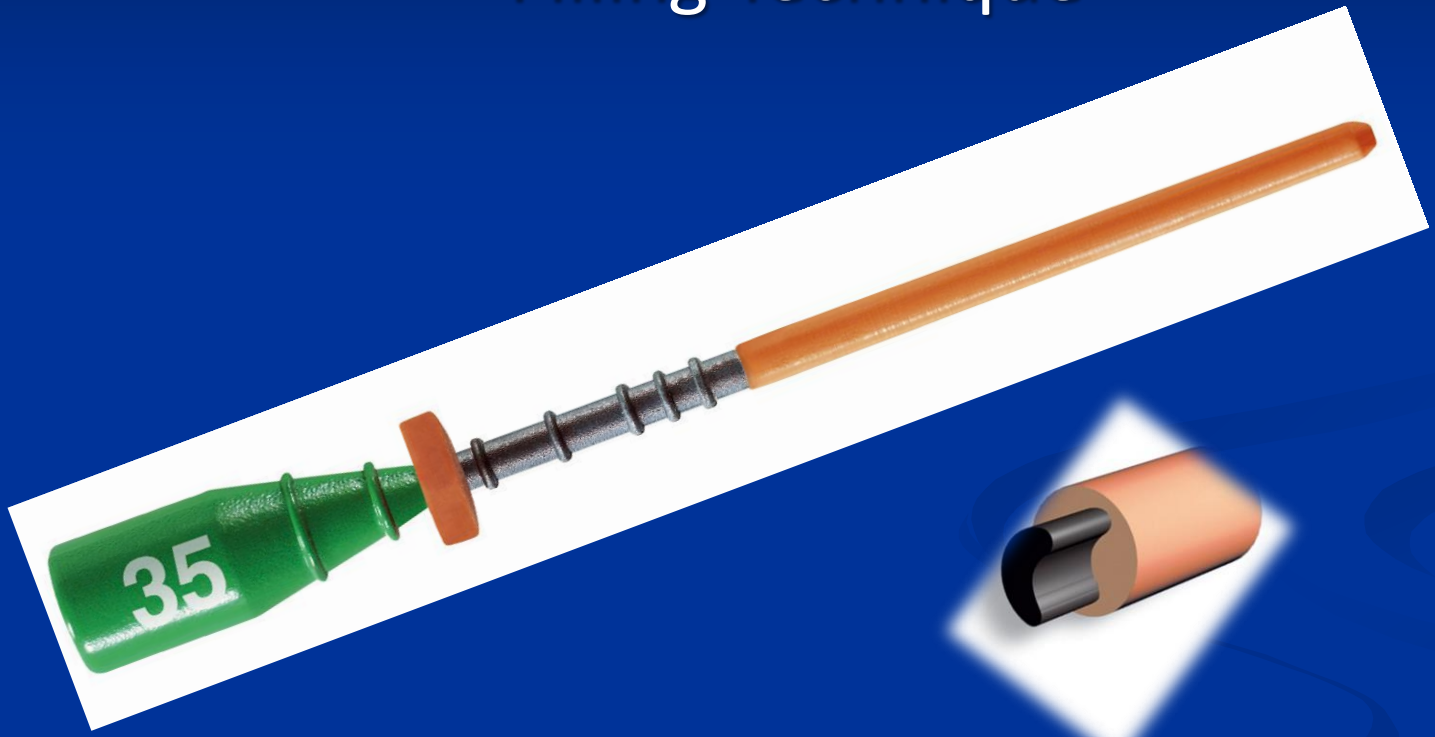
Hybrid Technique with Gutta-Condenser (Compaction acc to Mc Spadden)

After each point of Gutta-Percha with sealer, use the Gutta-Condensor to melt and fill the canal.

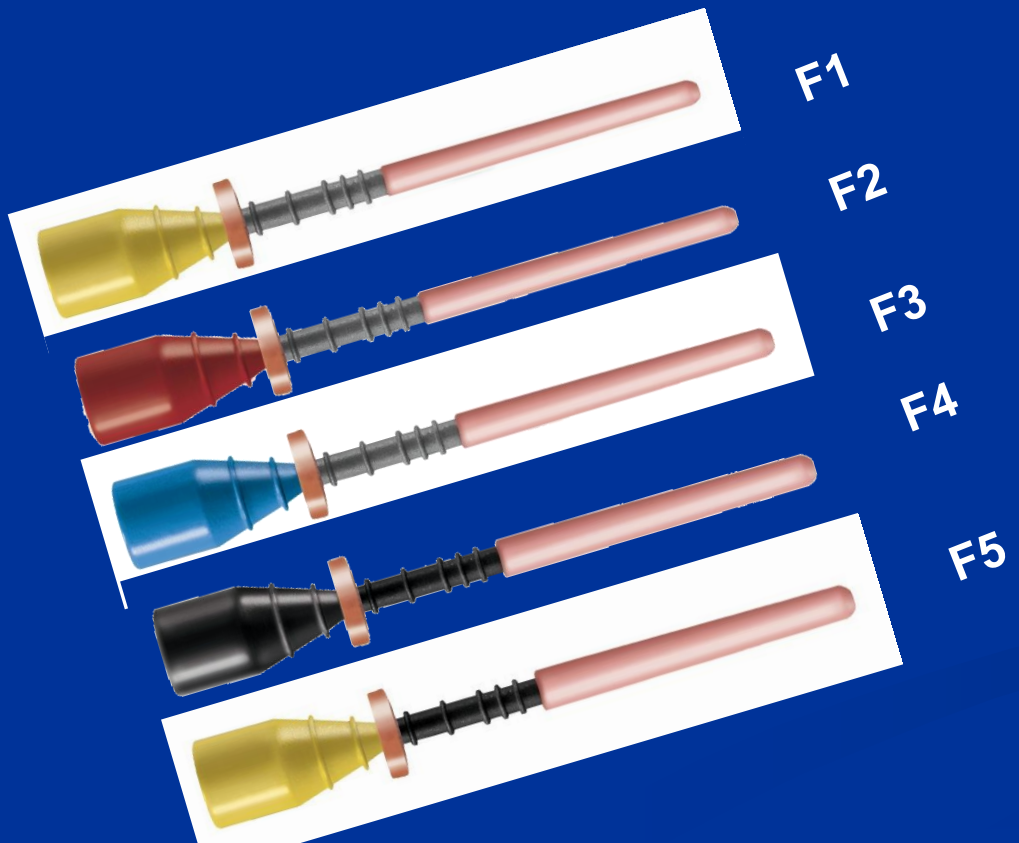




Core-Carrier (PP) - Gutta-Percha Filling Technique



Obturators compatible with instruments



Finishing Files (Apical shape)

F1

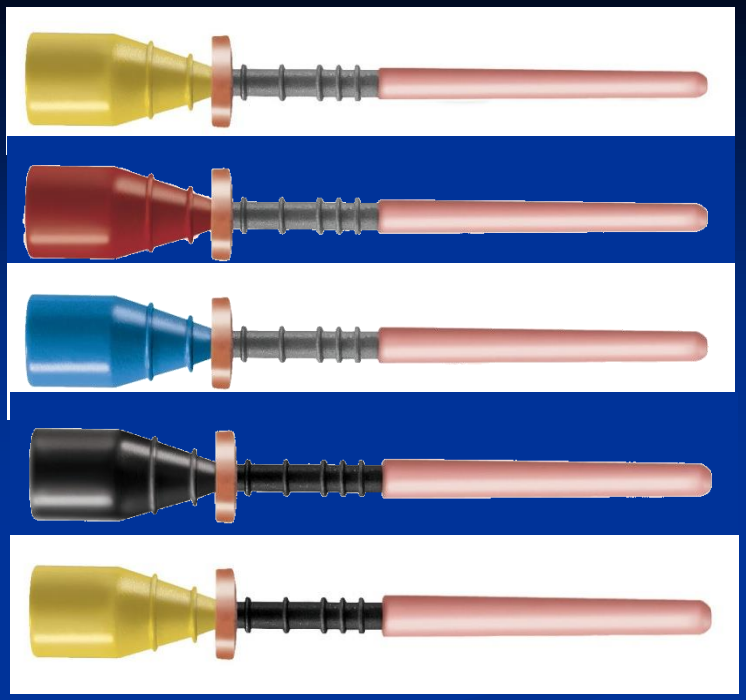
F2

F3

F4

F5

Calibrated Gutta-Percha Cones



Obturators - Protaper sizes

F1

F2

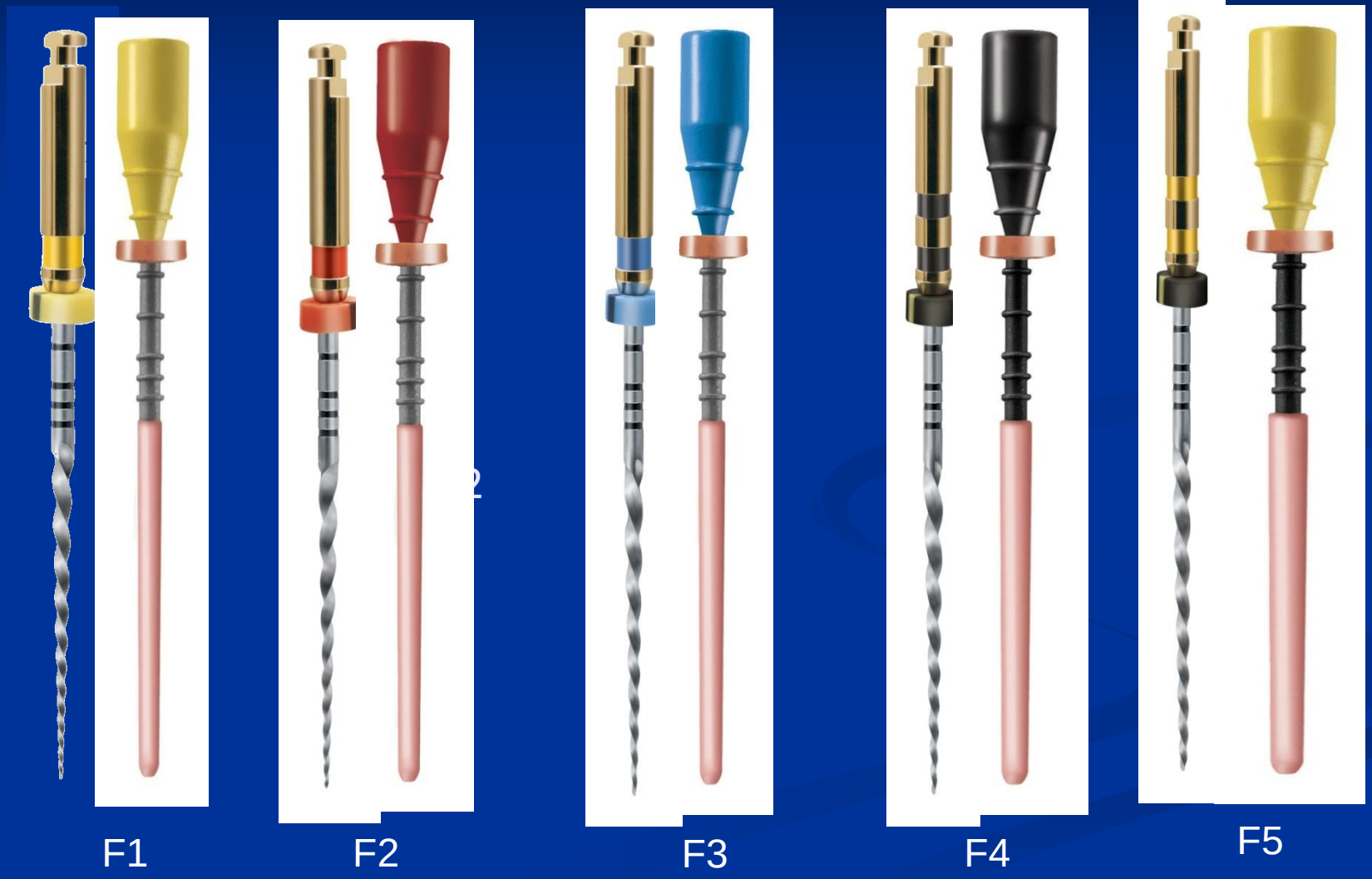
F3

F4

F5

Paper points - Protaper sizes

ProTaper Obturator calibrated to each Finishing File



3D Filling of the Root-Canal System with THERMAFIL Or PROTAPER OBTURATOR

Thermaprep Oven

Size verifier to measure the apical size

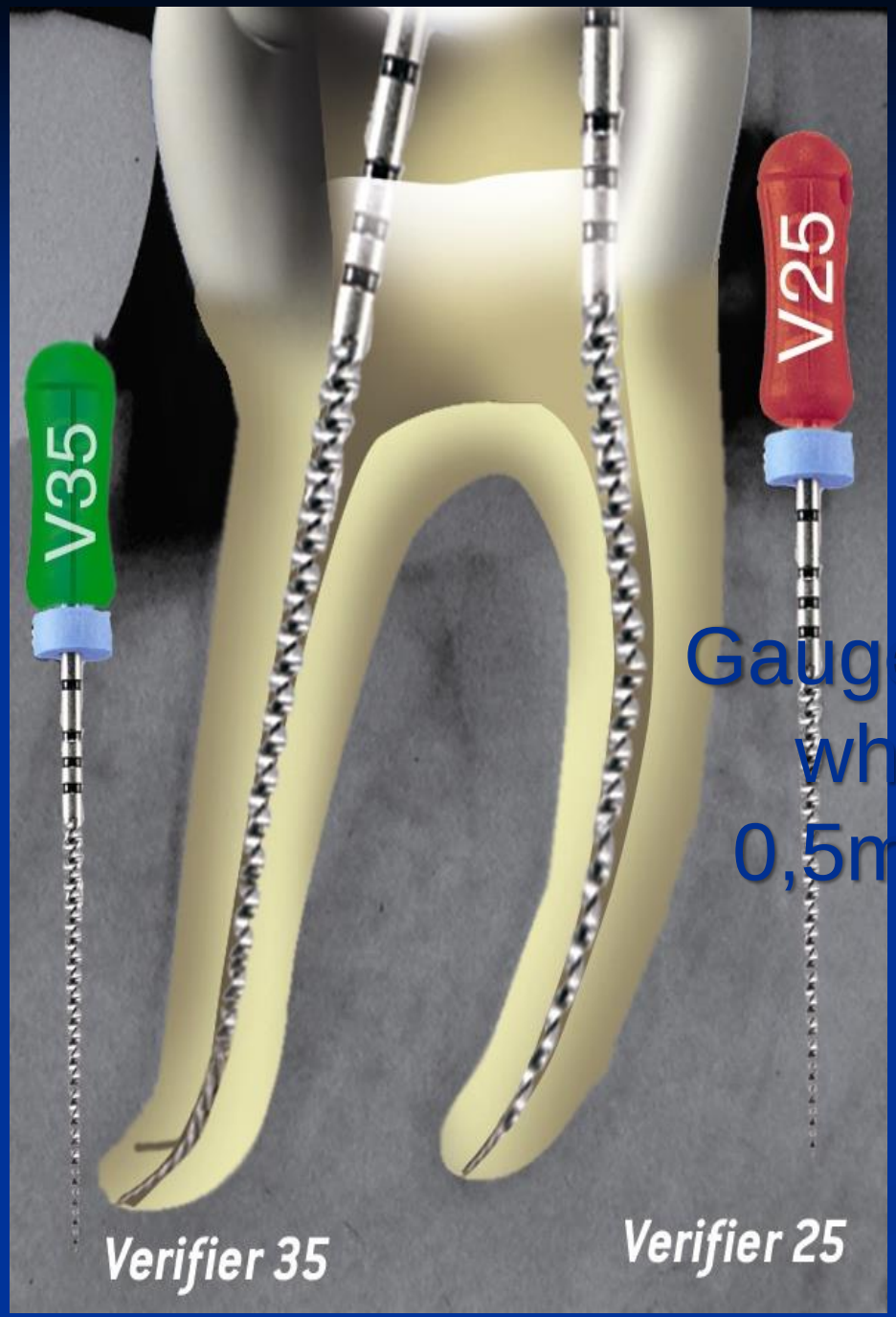
Thermacut bur

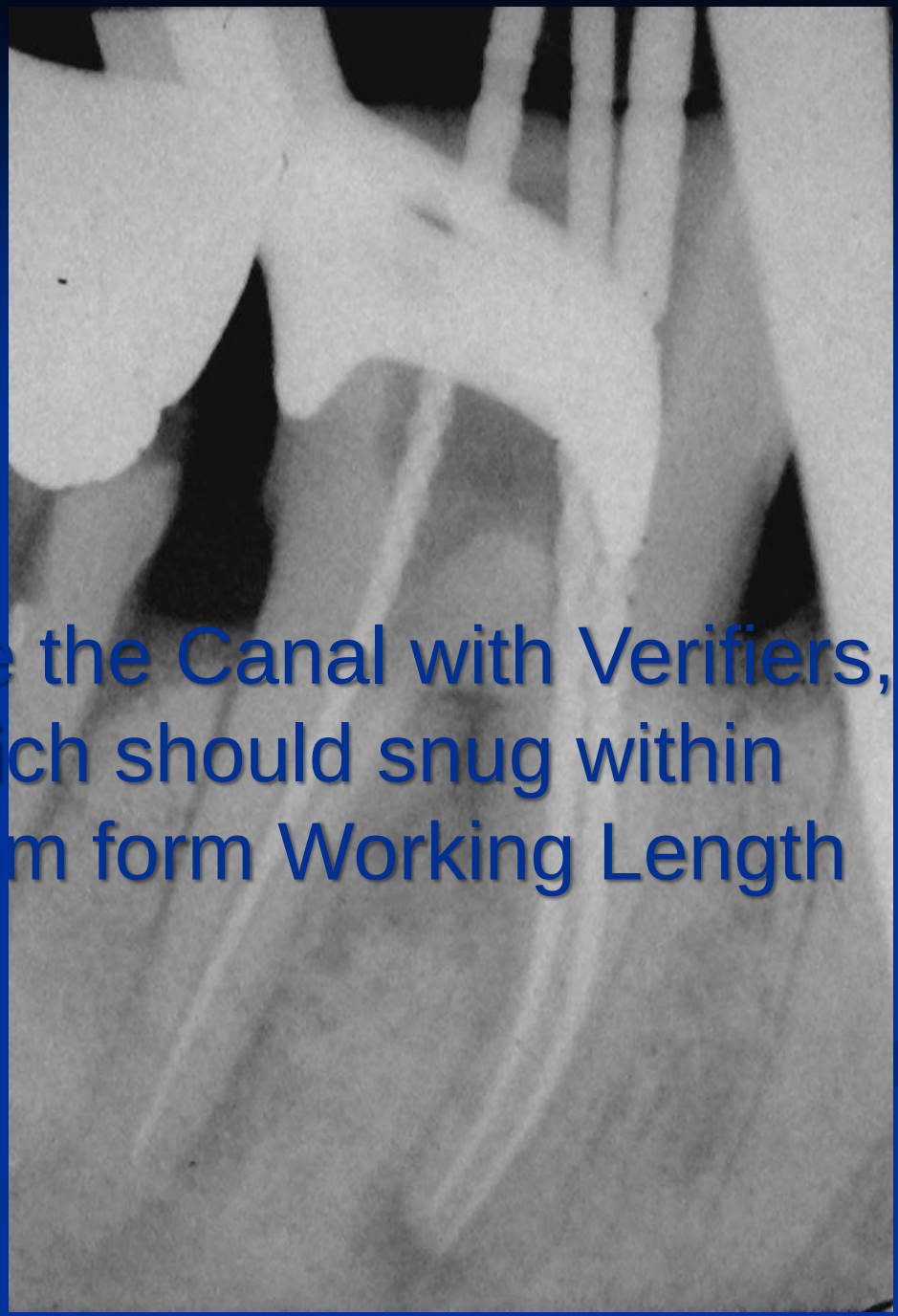
Post space bur

Core-Carrier Obturator Technique

1st step :

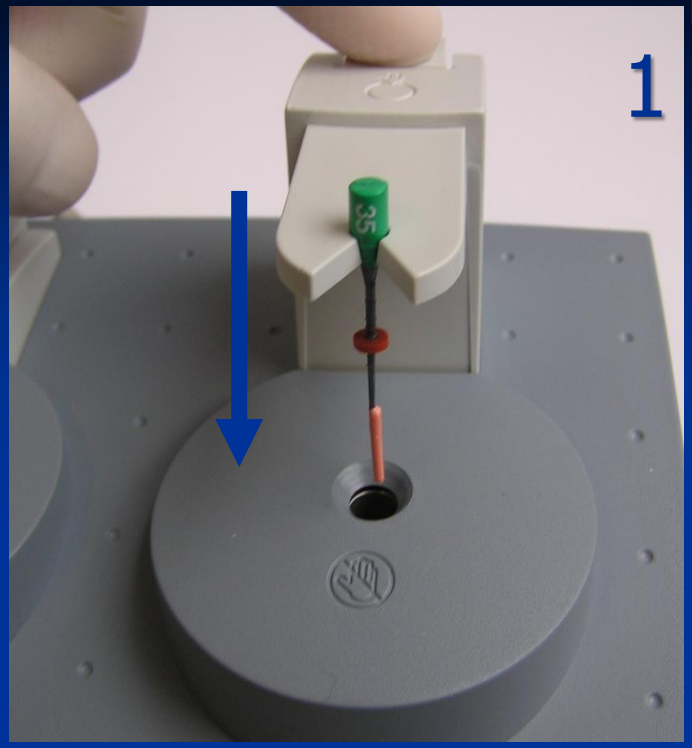
Opening
cleaning
Shaping …



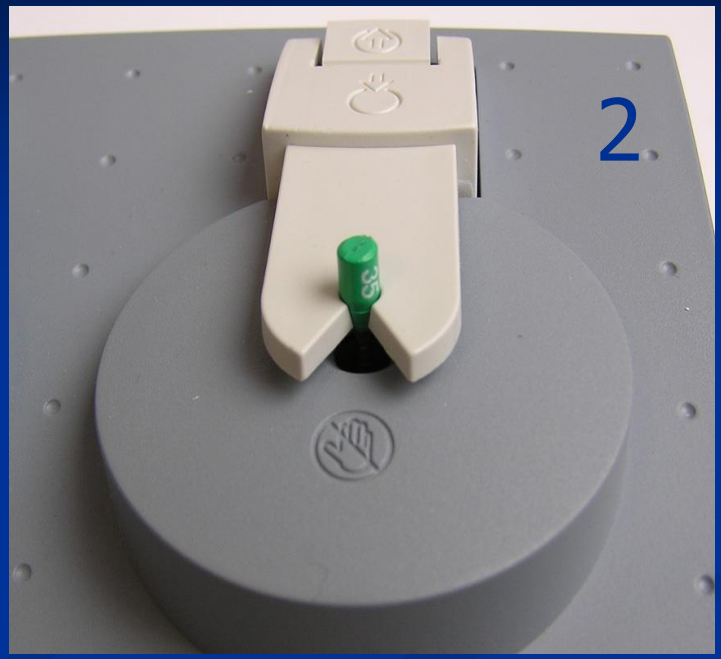


Gauge the Canal with Verifiers, which should snug within 0,5mm form Working Length

Place the Obturators

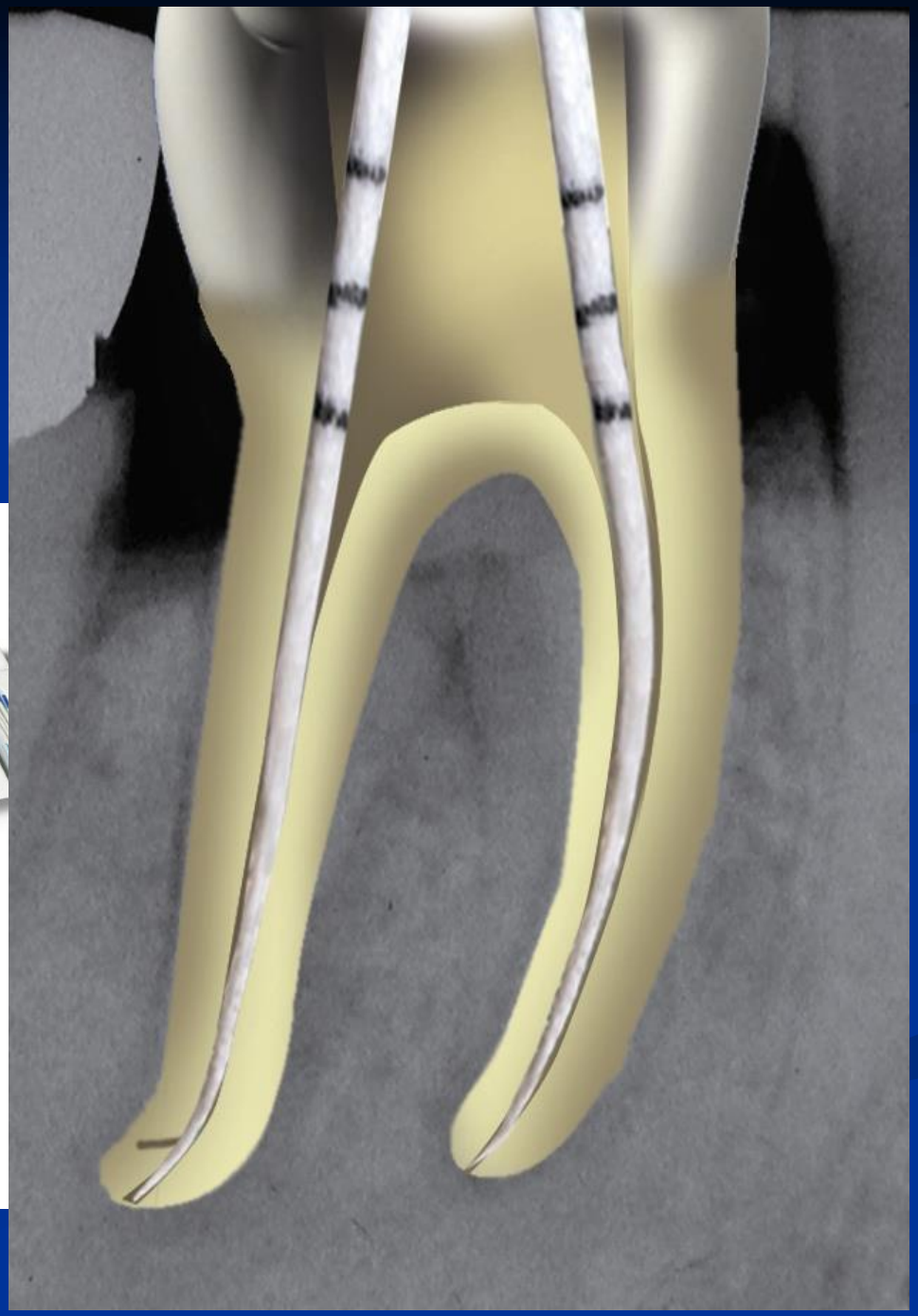


Heat The Obturator

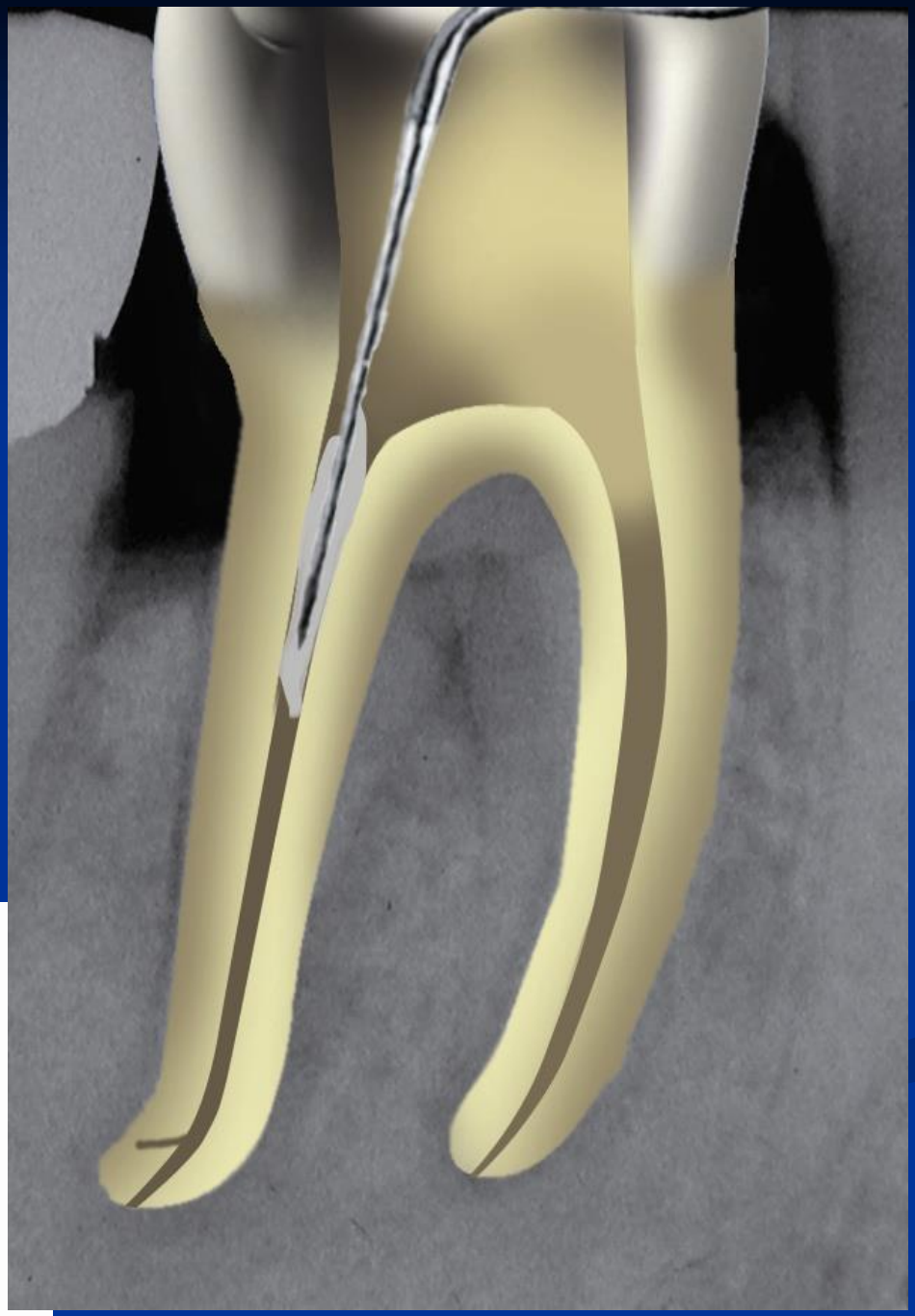


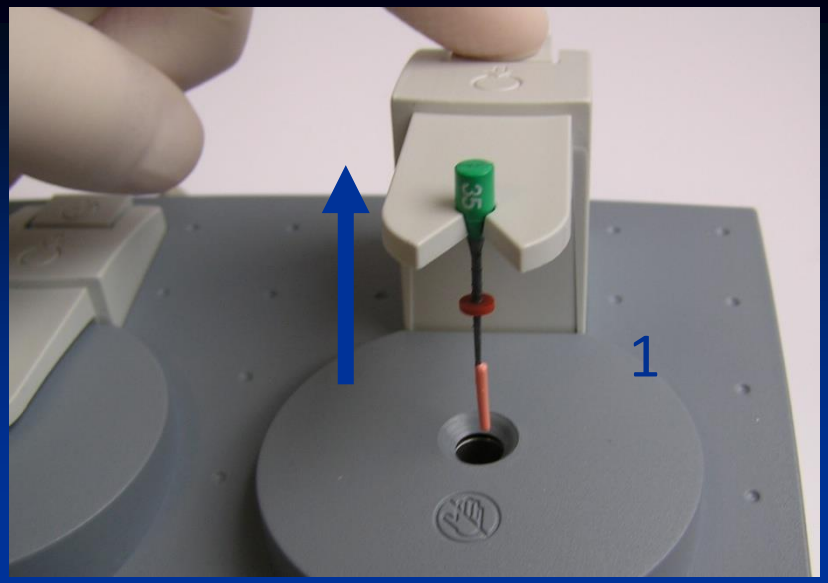
Select the right size and start

Dry the Canals with *Sterile* Paper Points

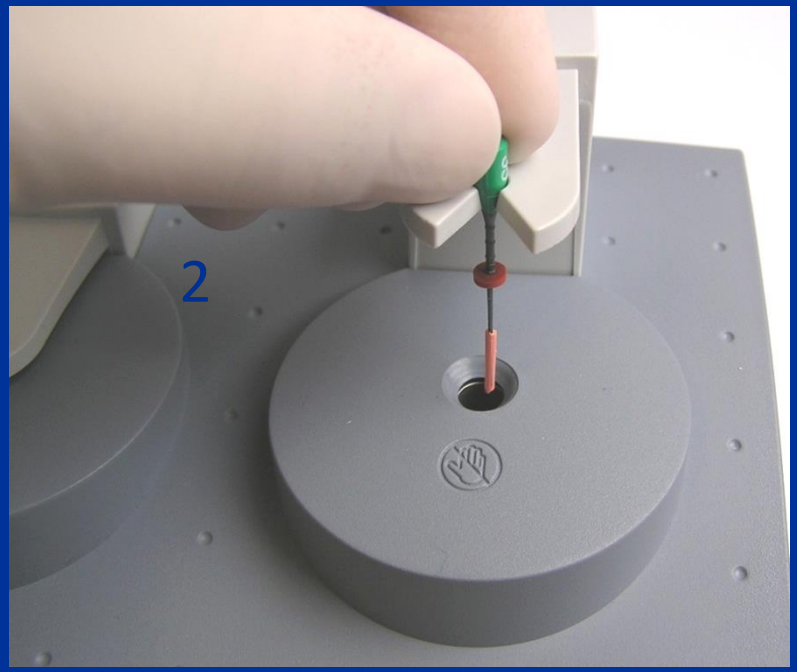


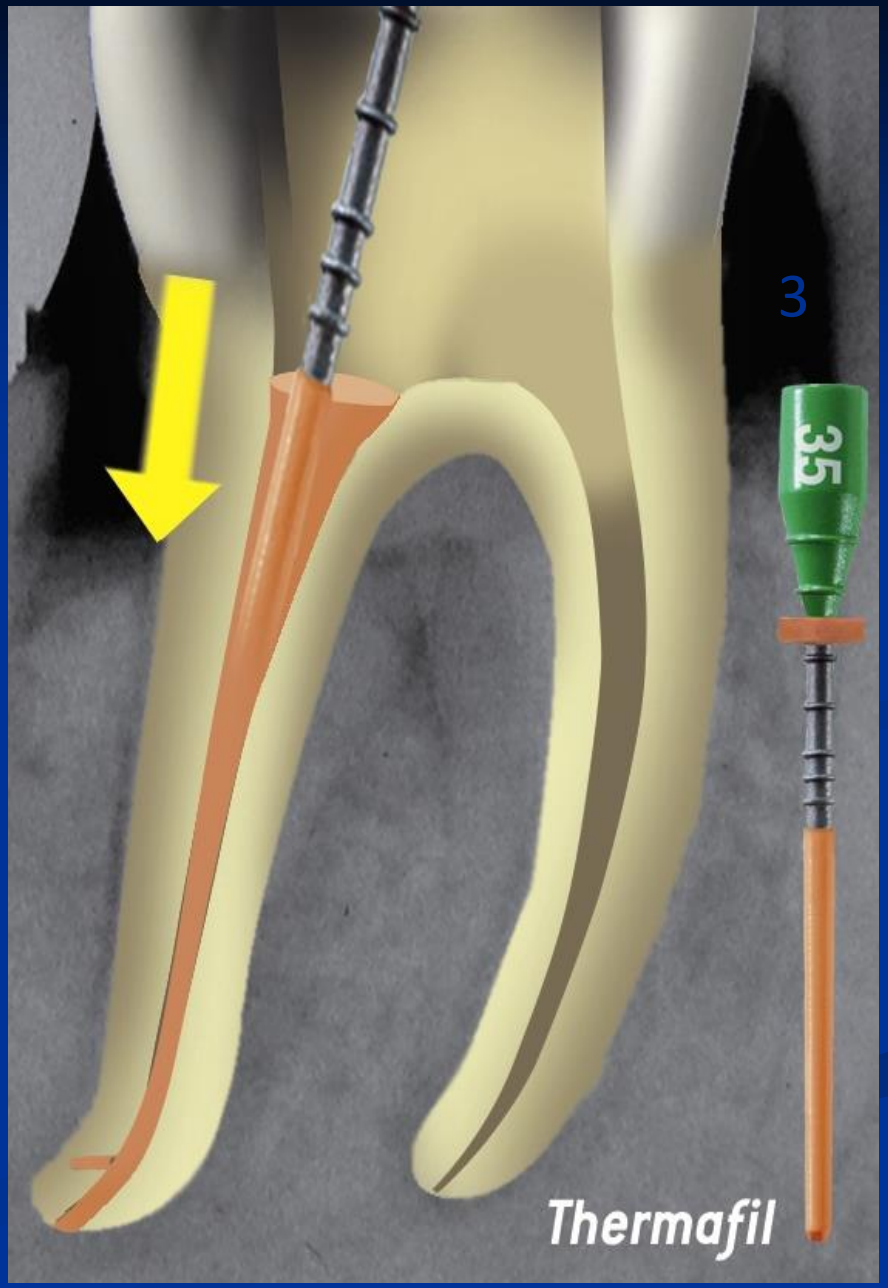
Mix the Sealer and coat thewalls of the canal with a thin layer using a Probe or a paper point

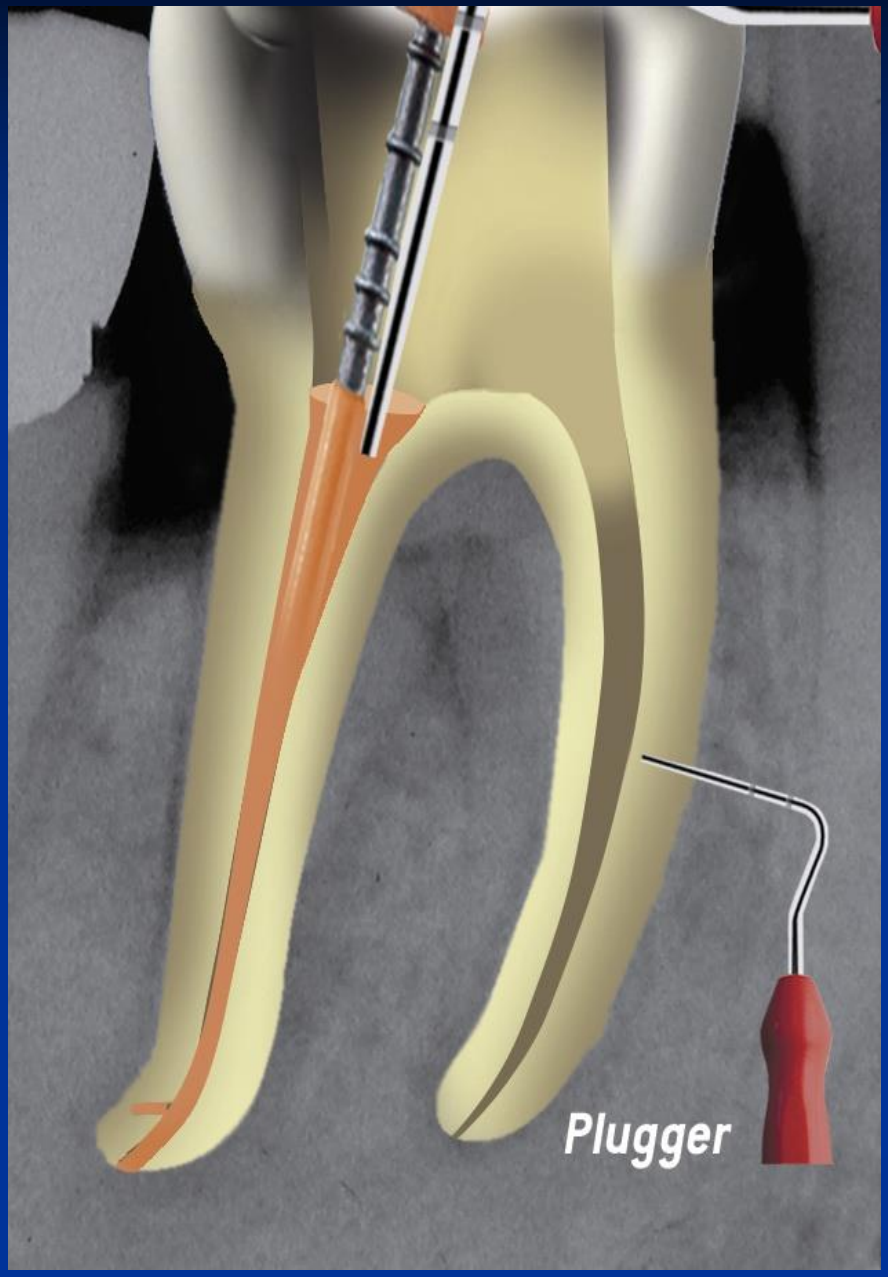


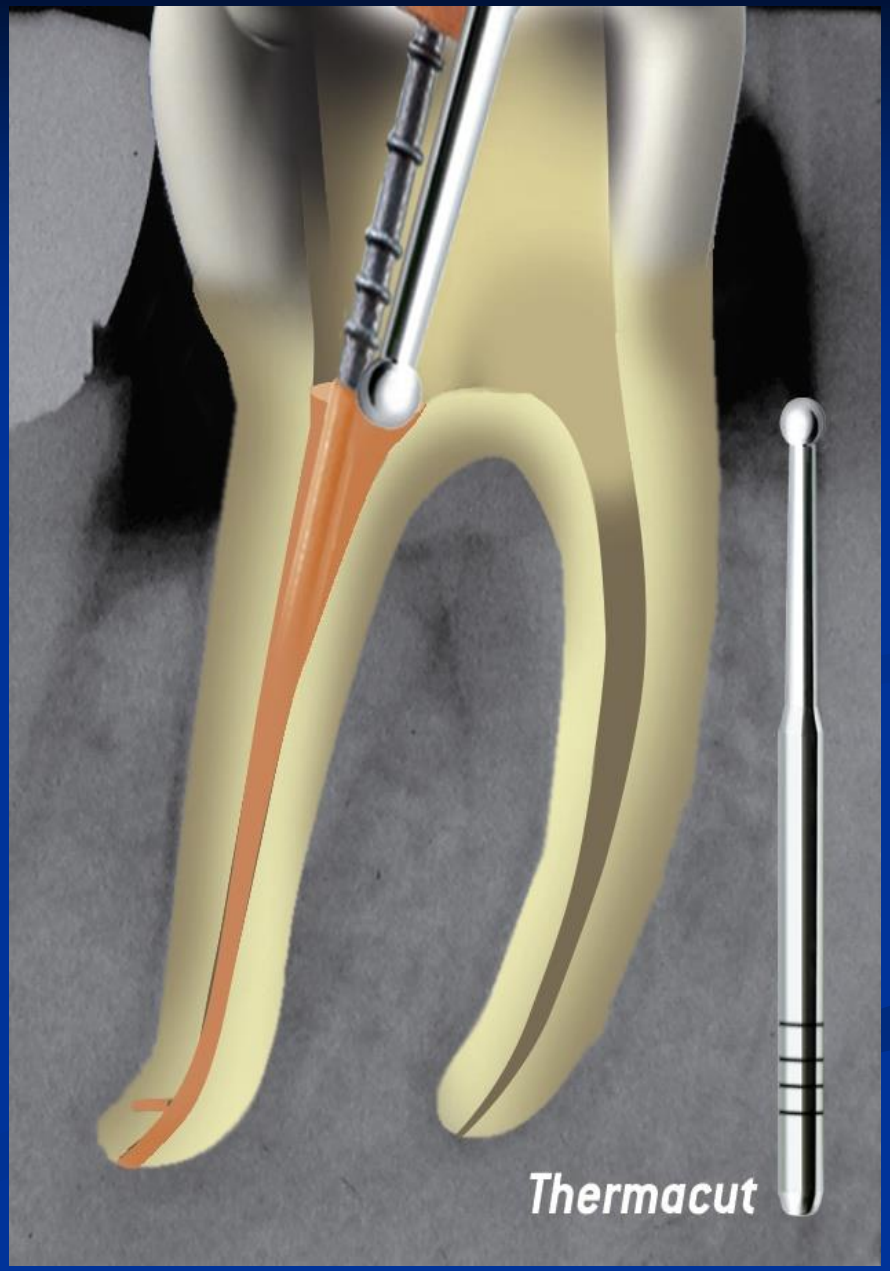


Take it out
and insert it in the canal

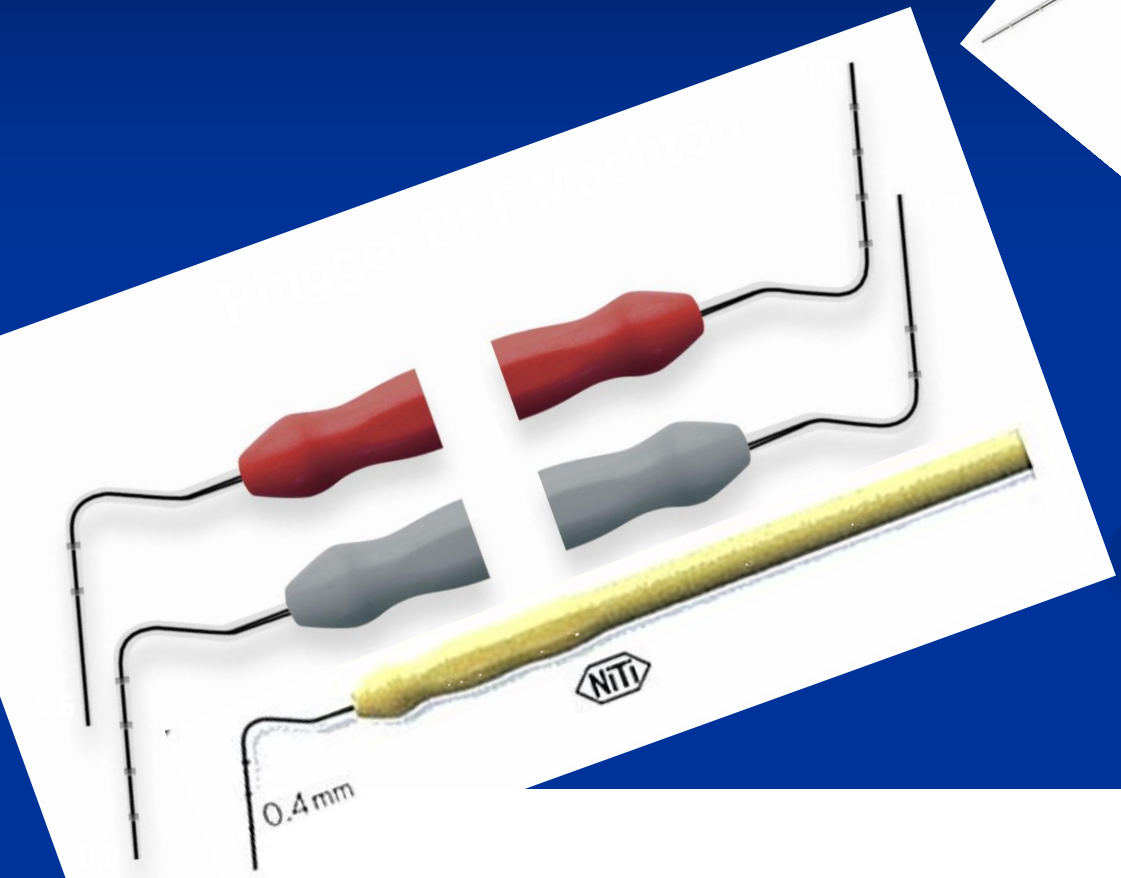


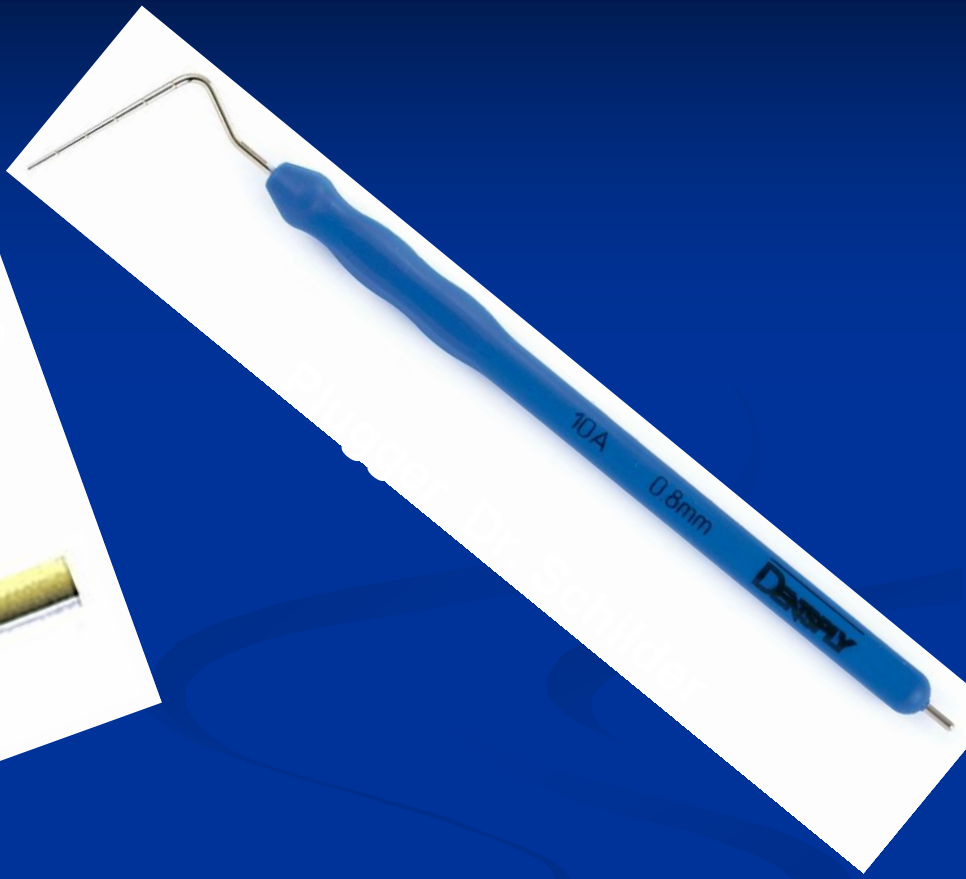


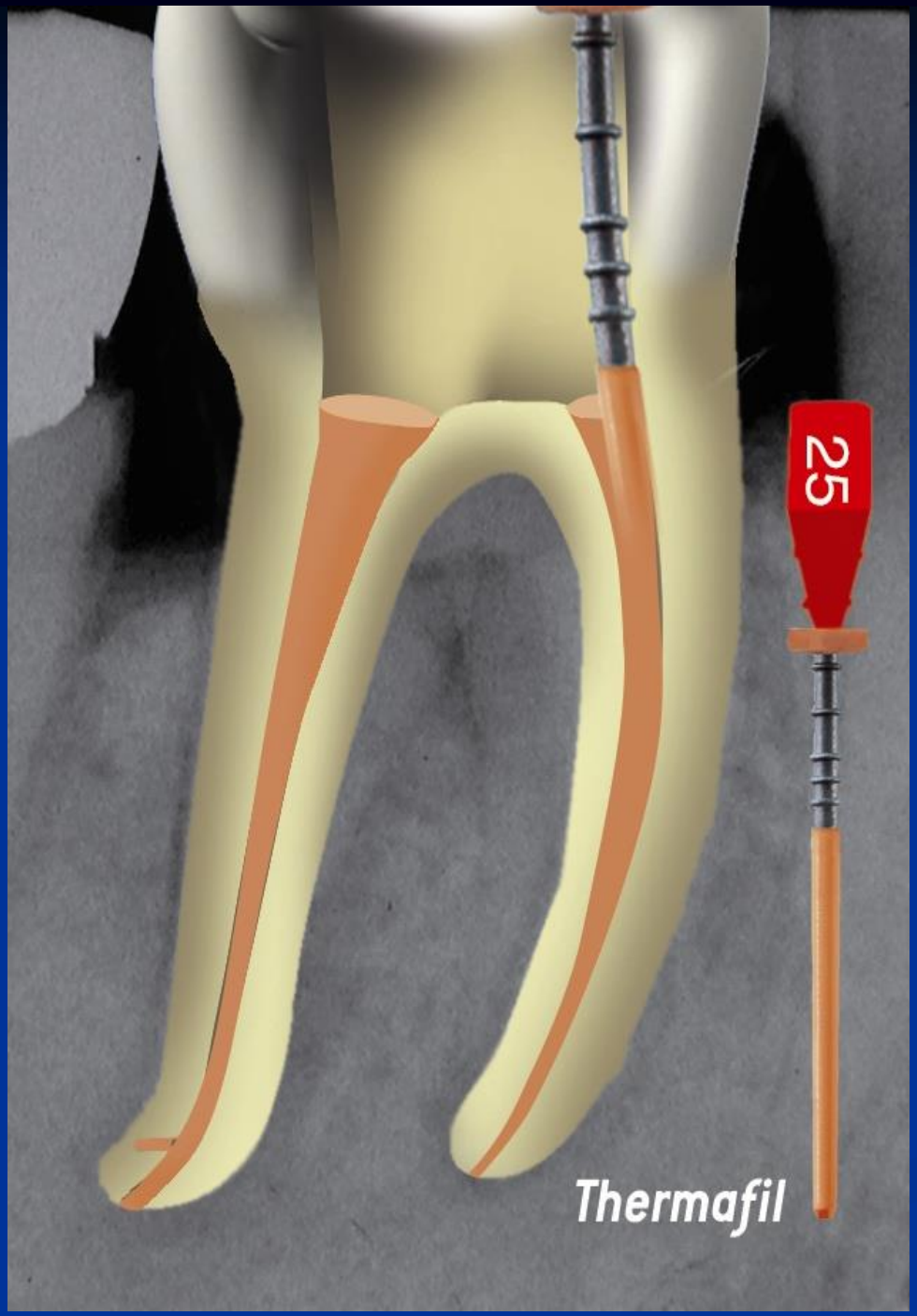

Plugger


Thermacut

Use of a selected Plugger to ensure homogeneity of the filling.






25
Thermafil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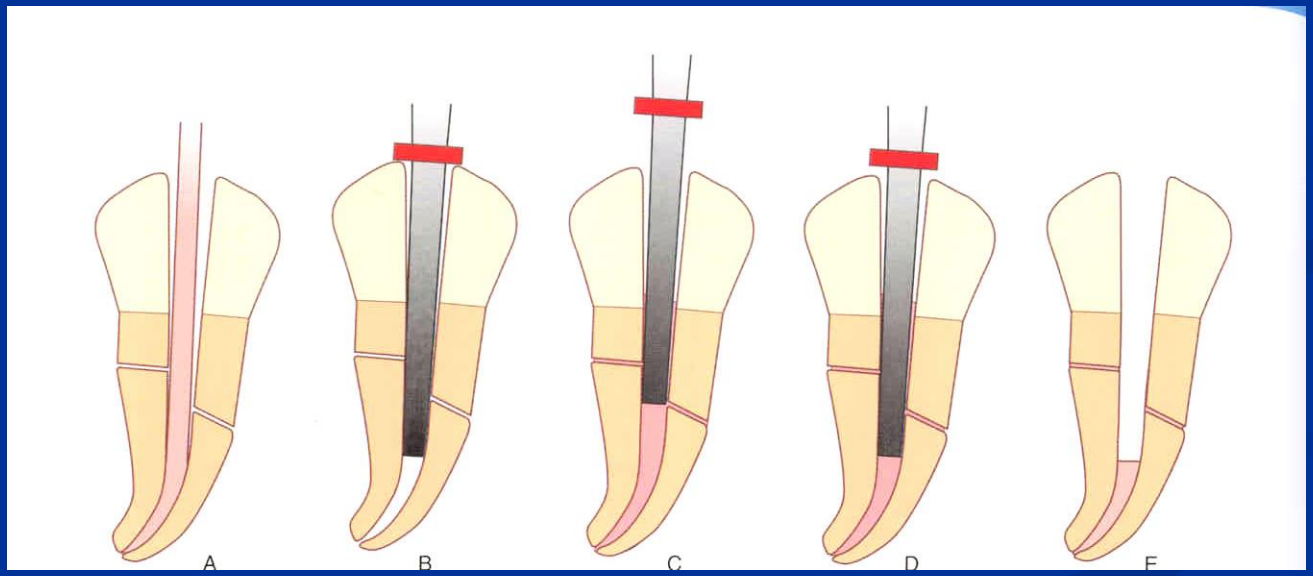
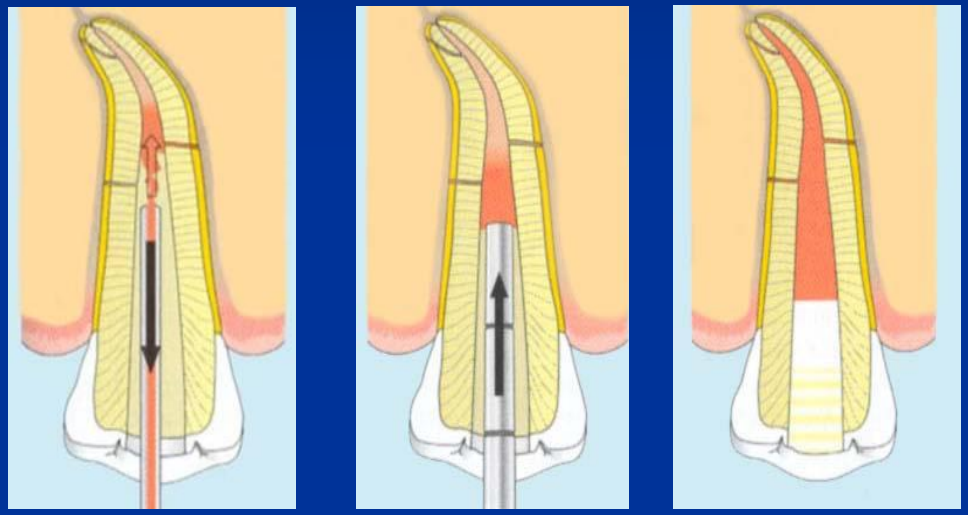
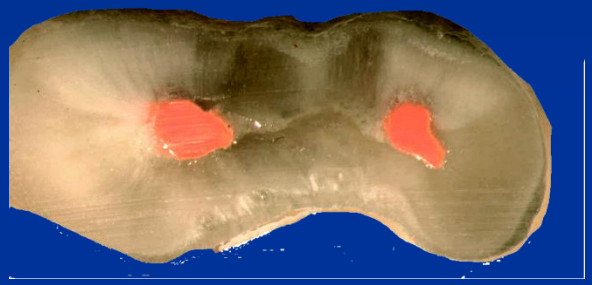
WARM VERTICAL COMPACTION


A
B
C
D
E

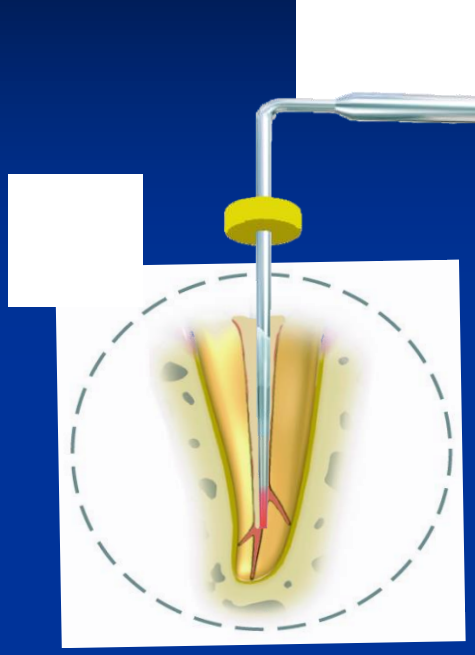
Injection



Fast technique
Possible extrusion of sealer
Risk of thermal damage of PL

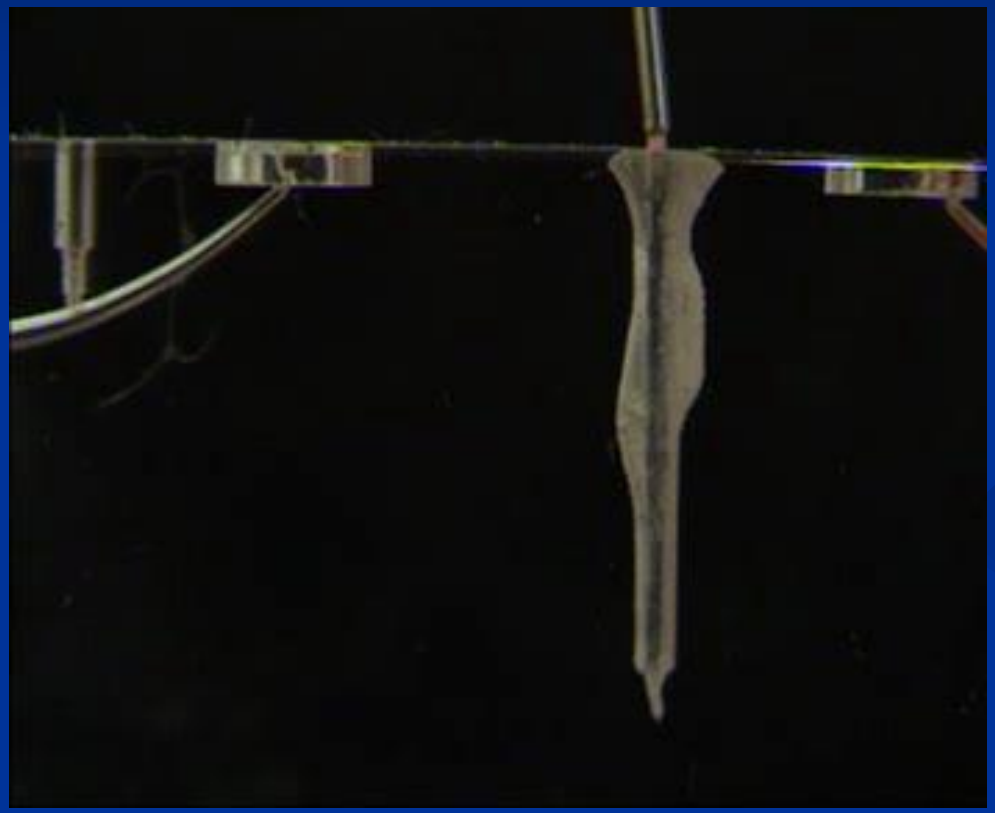


HERMETICKY!, RYCHLE, A LEVNĚ zaplním



Downpack

Backfill

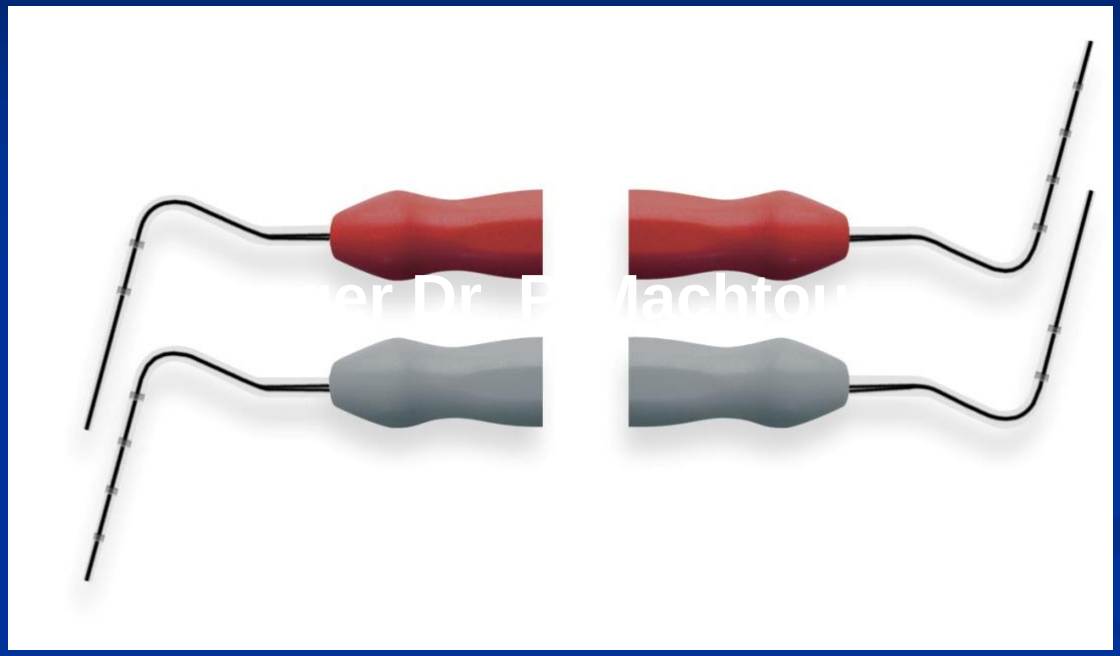


plnění granulom

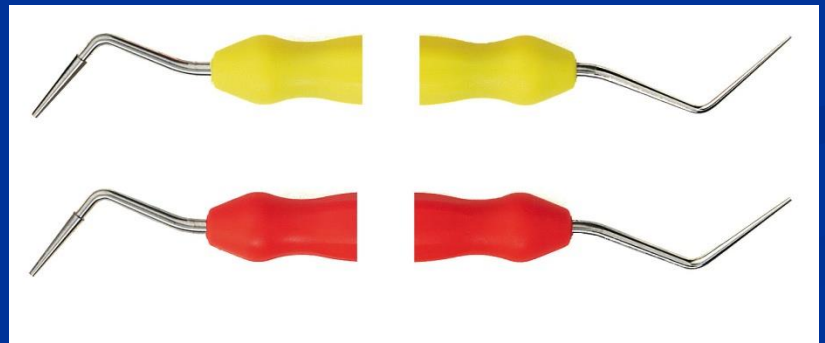
Warm Vertical Compaction Continuous Wave Technique

SCHILDER Technique

Similar technique to the Warm Gutta-Percha vertical condensation with Calamus device described later in this module

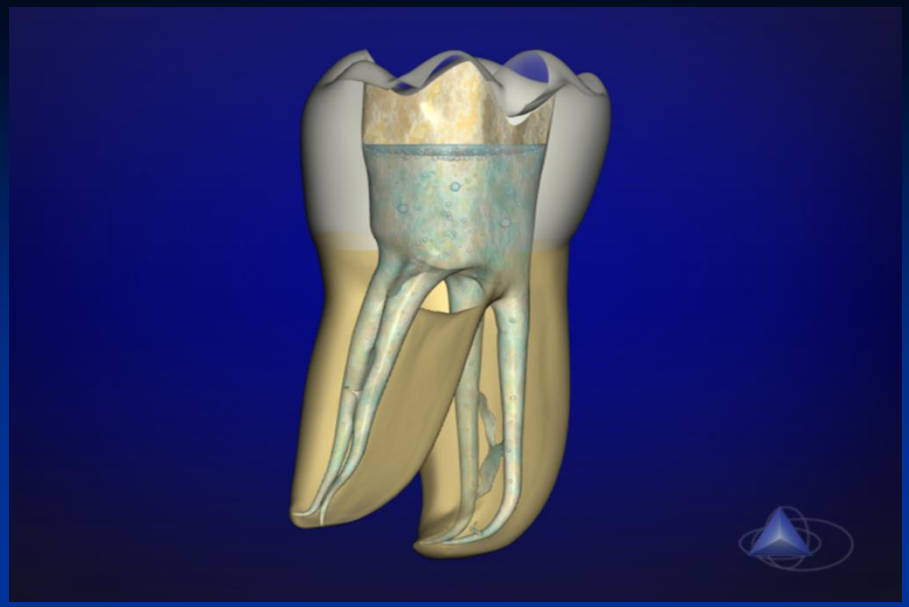


Other type of Heat-Carrier / Plugger



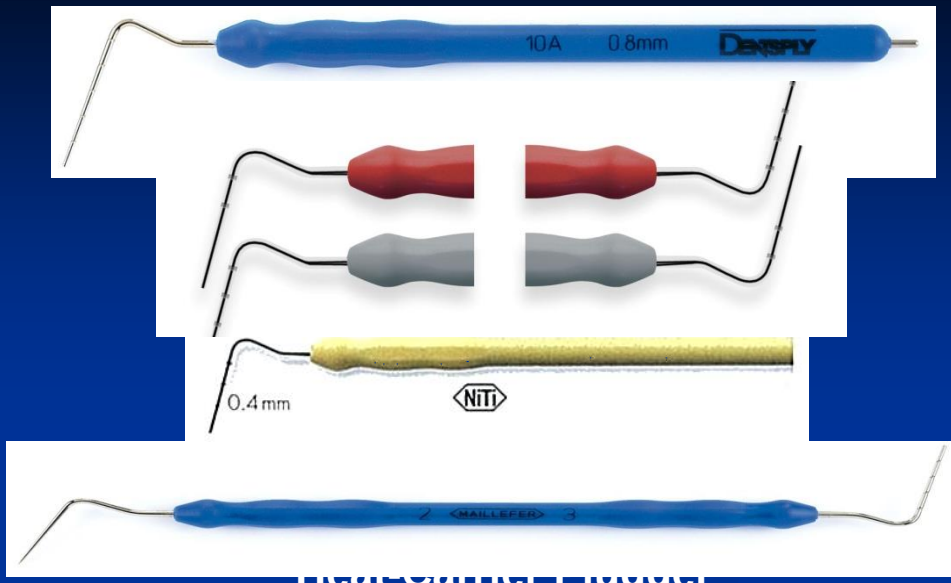
Heat Carrier

Cone Fit & Plugger Selection

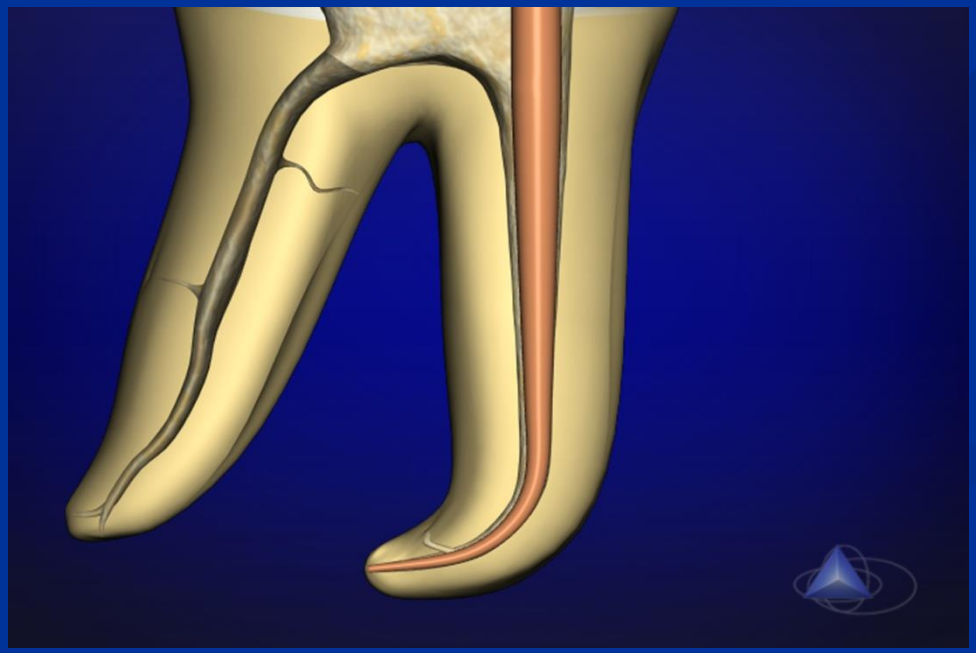


Irrigation and desinfection
of root canal system

Schilder Pluggers

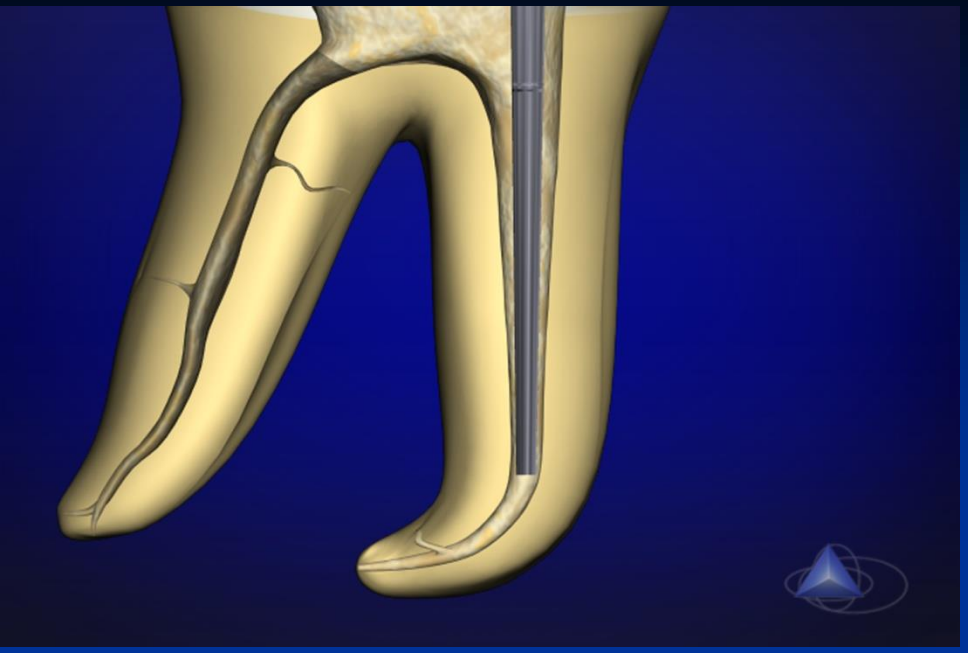


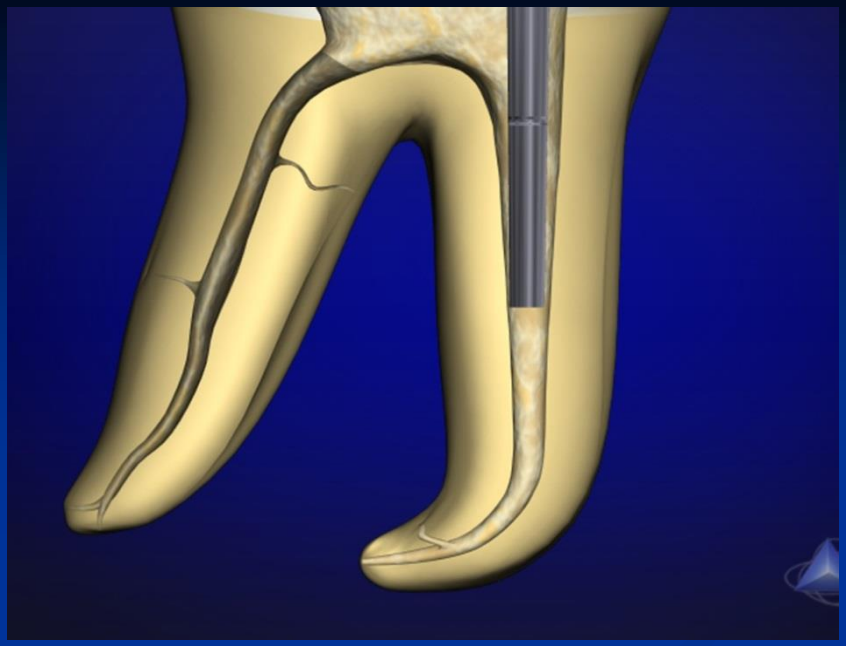
Heat-Carrier Plugger

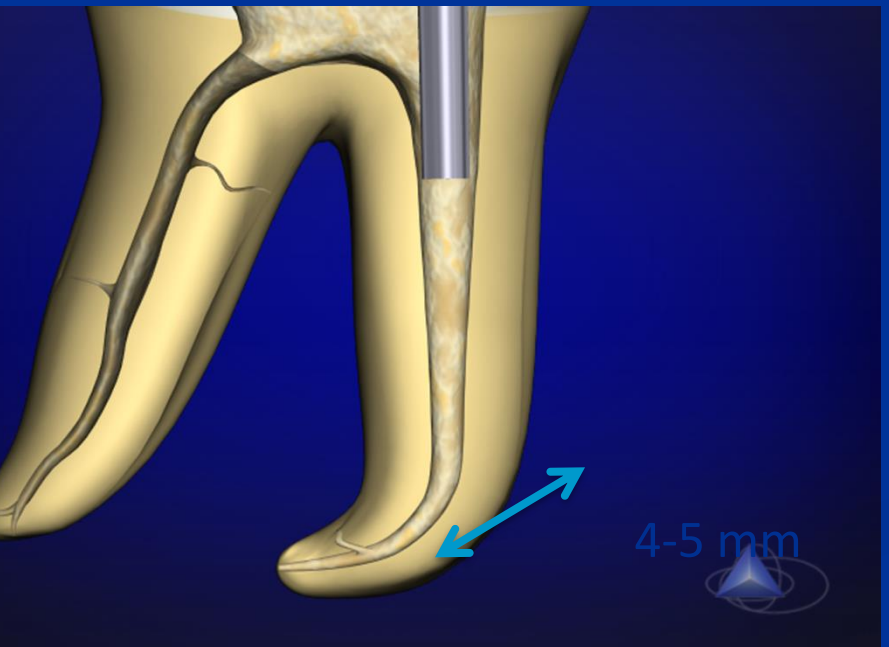


Manual Pluggers
for compaction

Fit a master cone



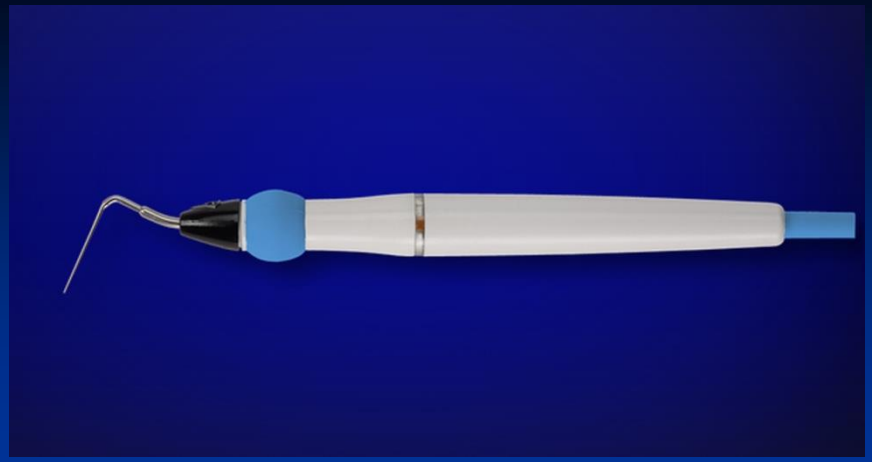




Selection small size manual plugger

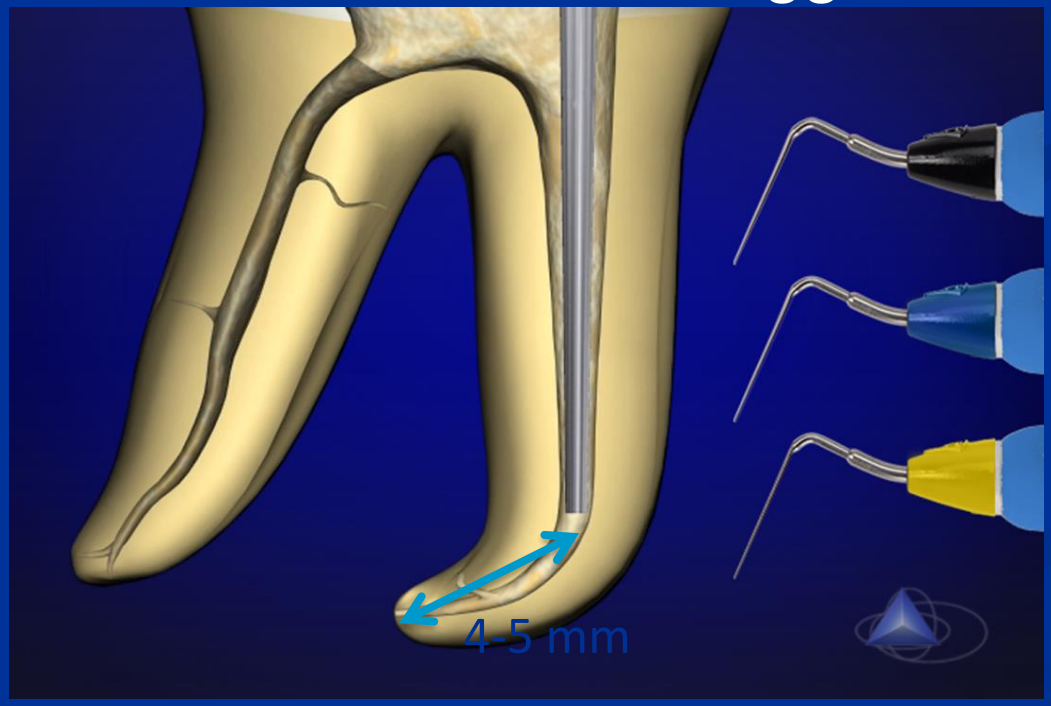
Selection medium size manual plugger

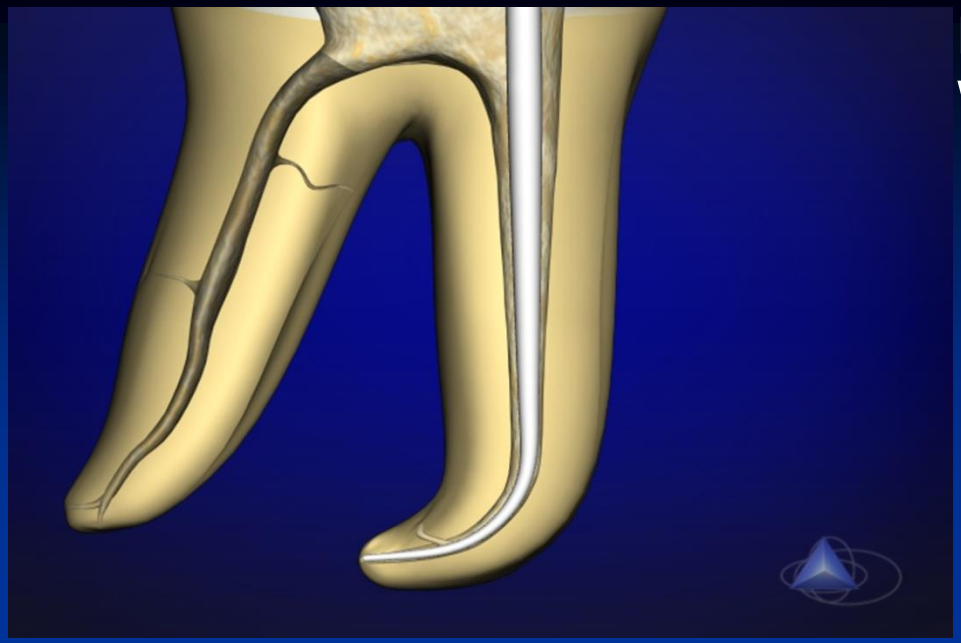
Selection large size manual plugger



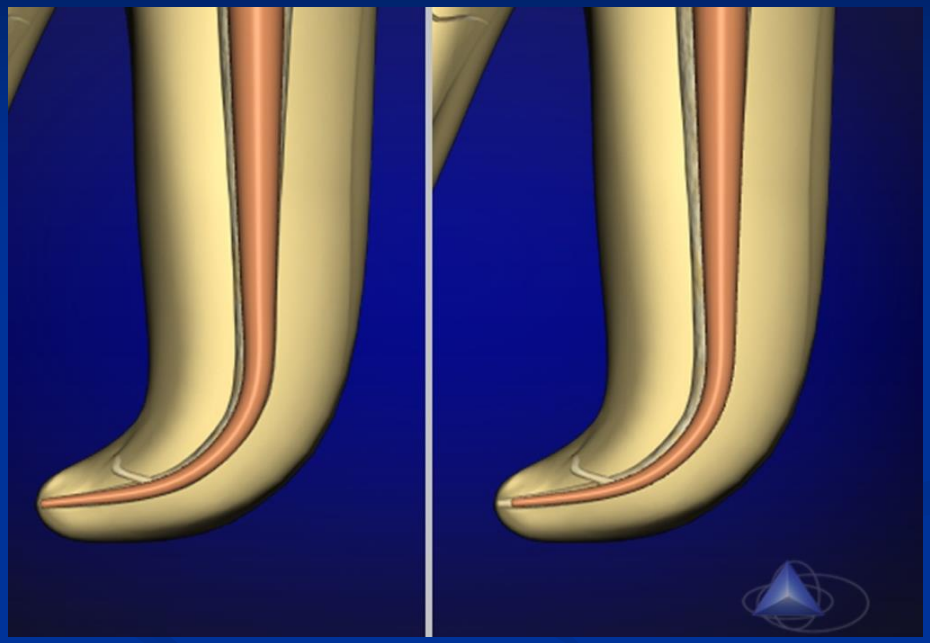
Down-Pack handpiece

Selection of the Heat Plugger

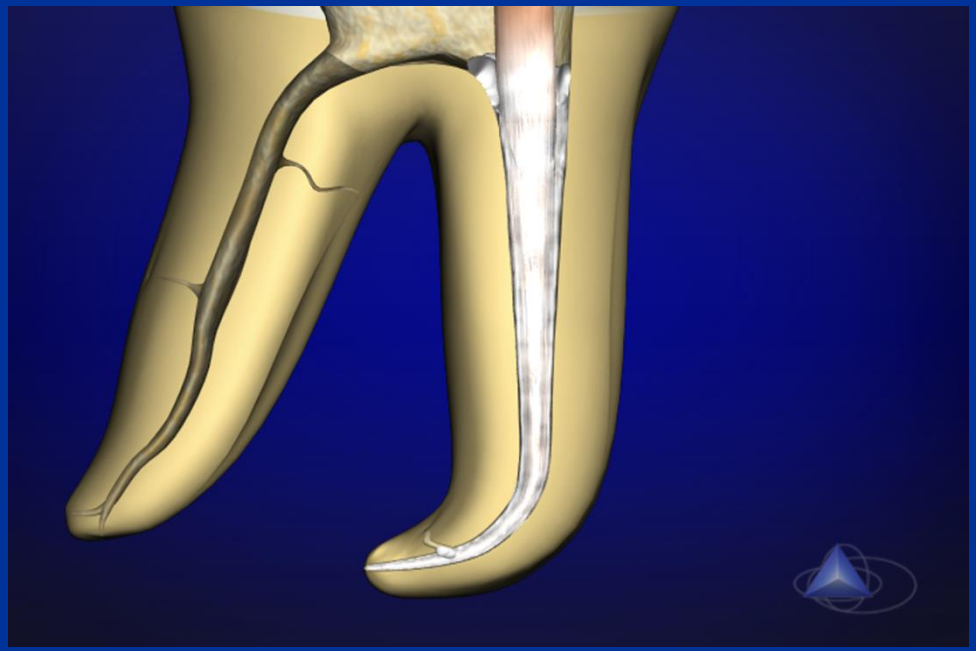




Mesured paper point to Working Length



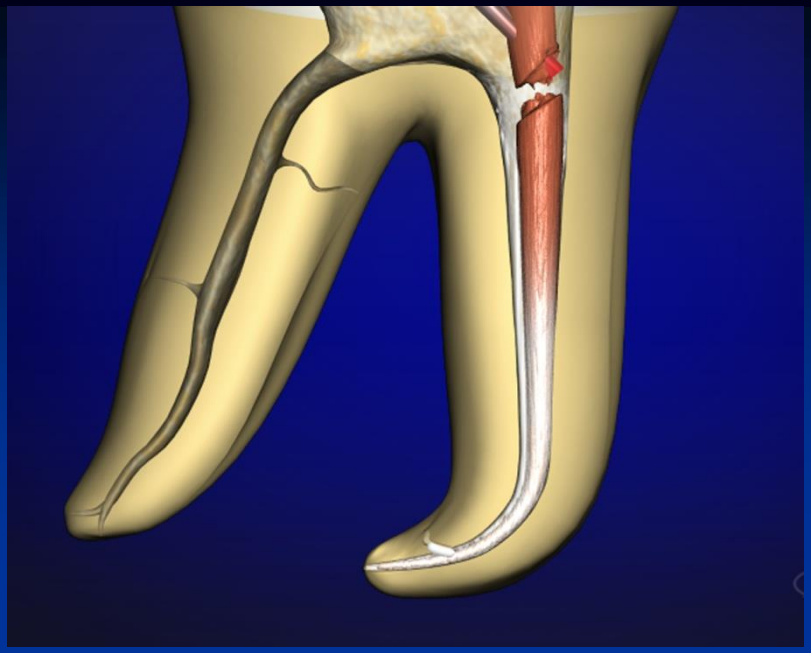
Trim the master cone



Insert lubricate (sealer) master cone

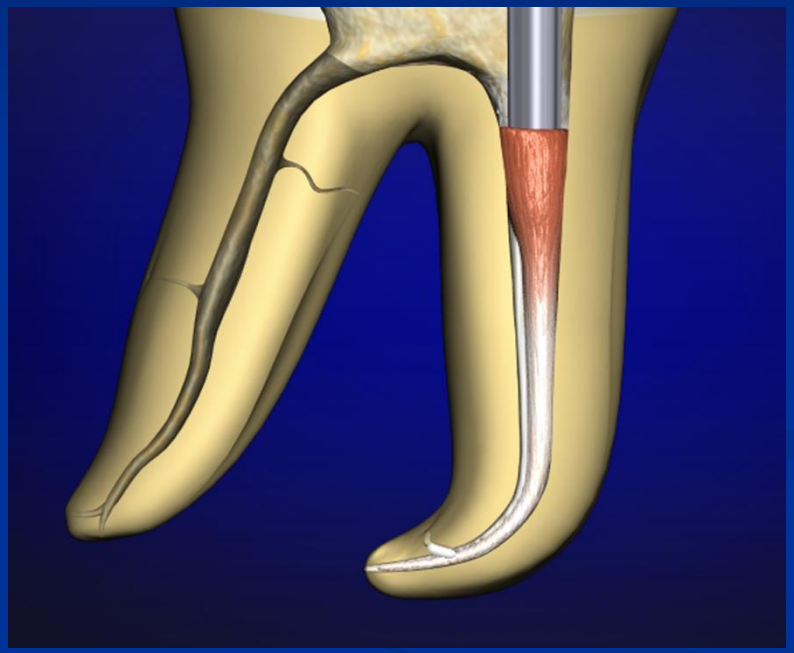
Heat of the plugger

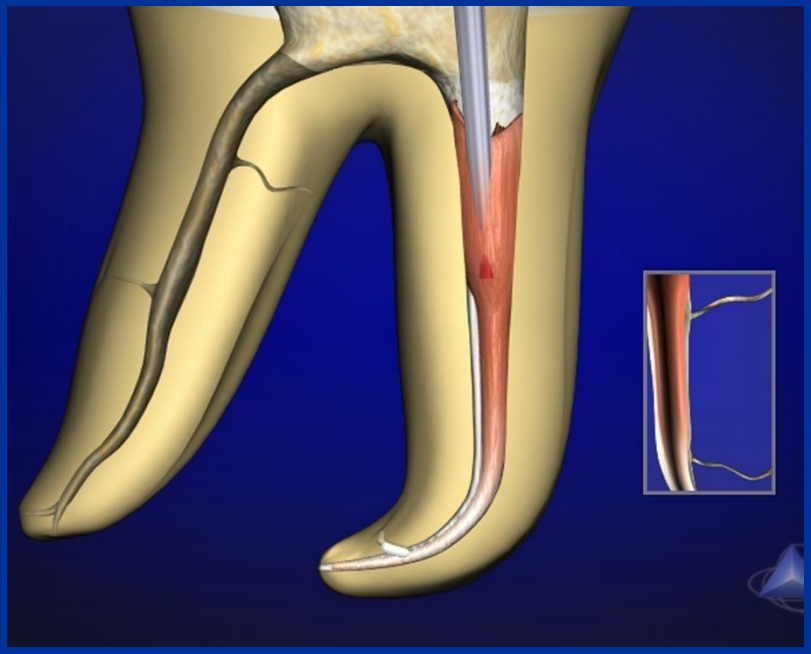
Downpack : Vertical Condensation



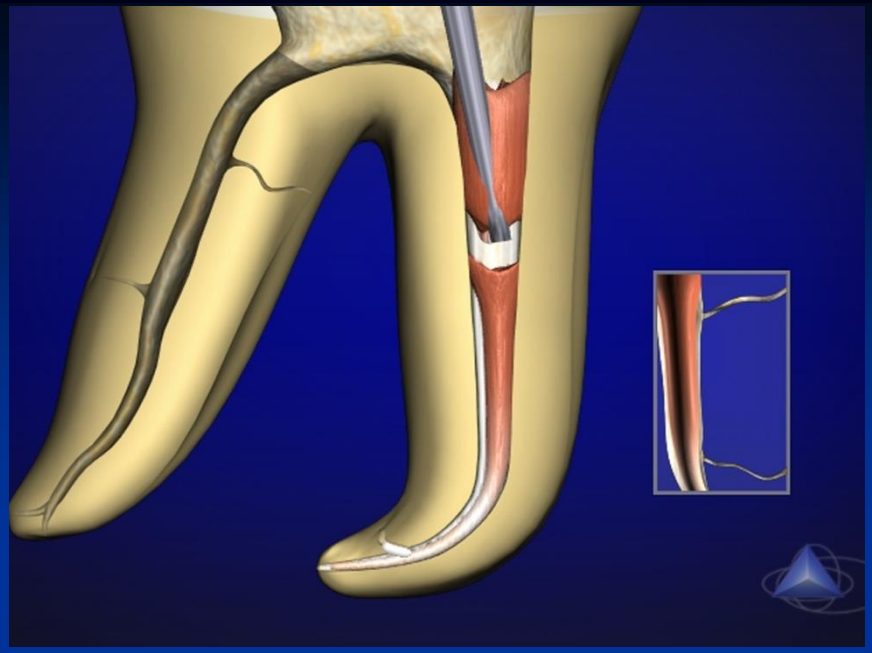
Activate Calamus and sear off the master cone

Select the larger prefit, manual plugger and move Gutta Percha apically



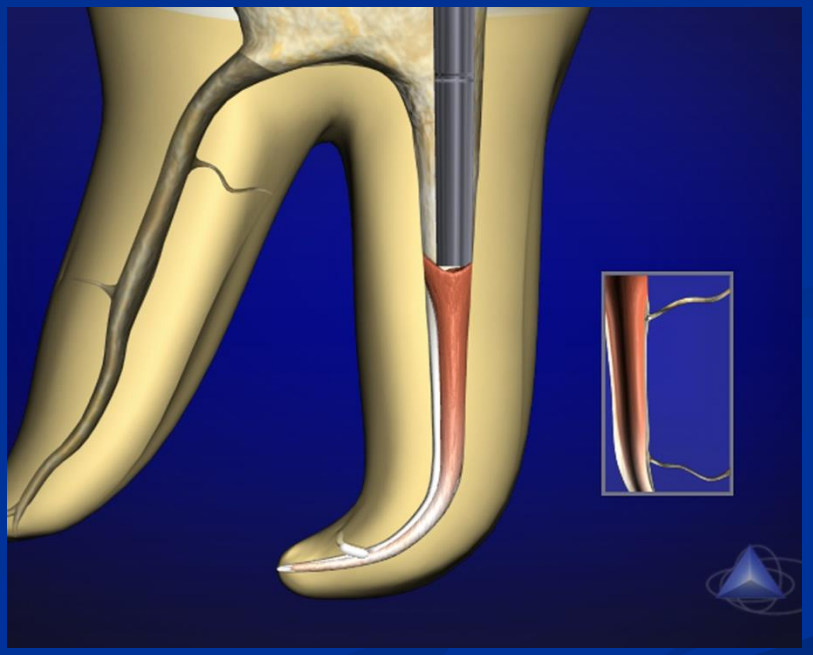


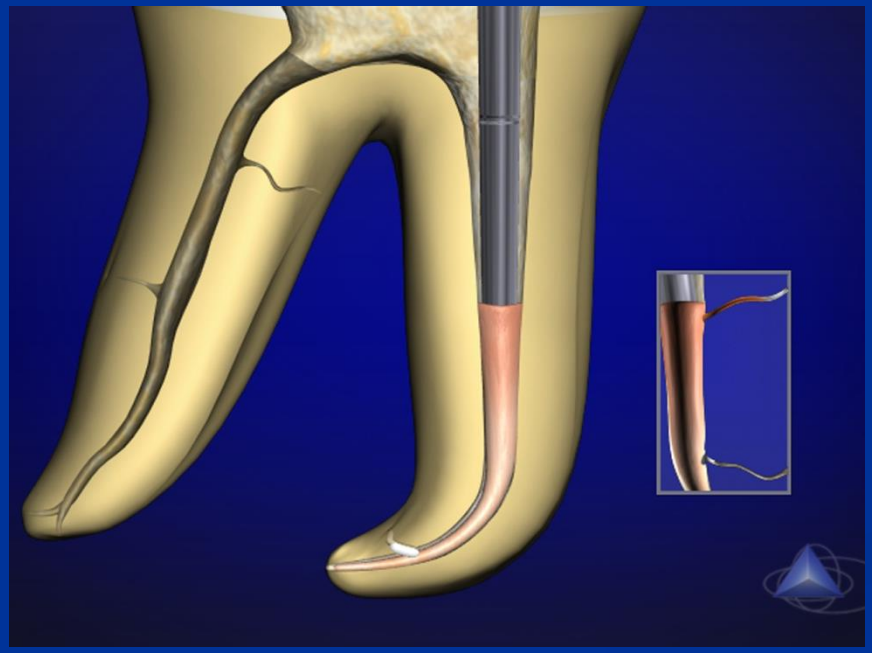
Activate Calamus and plunge 3-4 mm into the gutta-percha



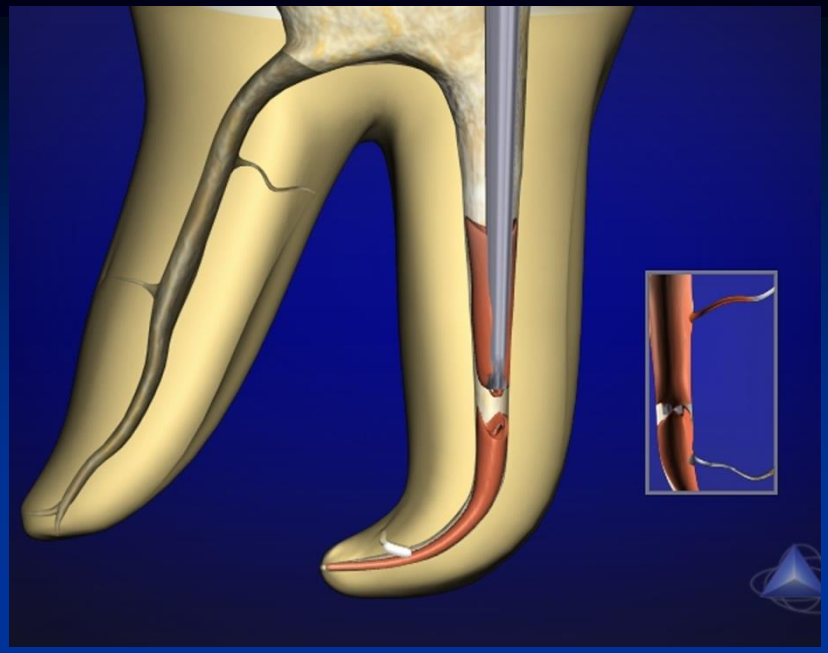
Desactivate Calamus 1-2 seconds, then remove “bite” of Gutta Percha

Select the medium size, manuel plugger and move Gutta Percha apically



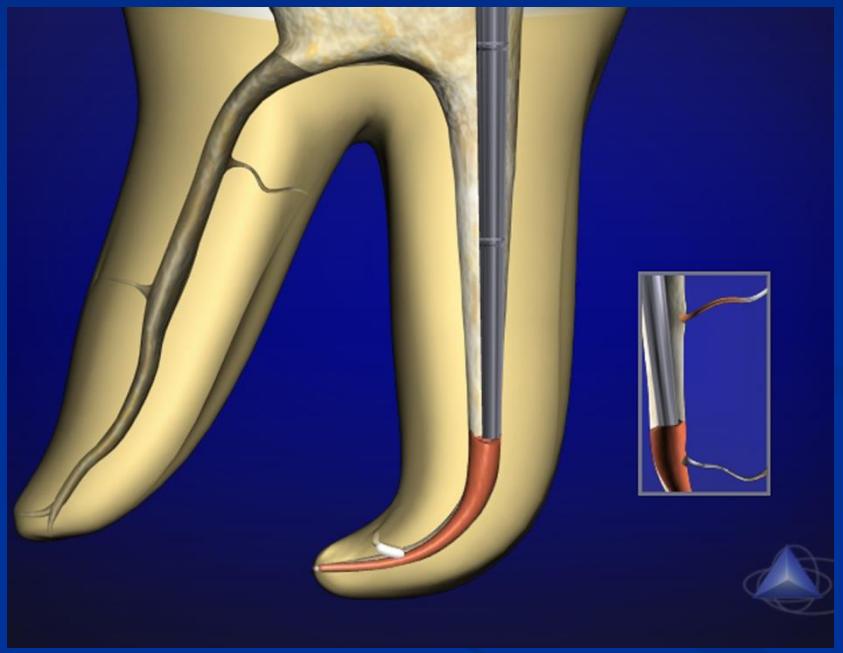


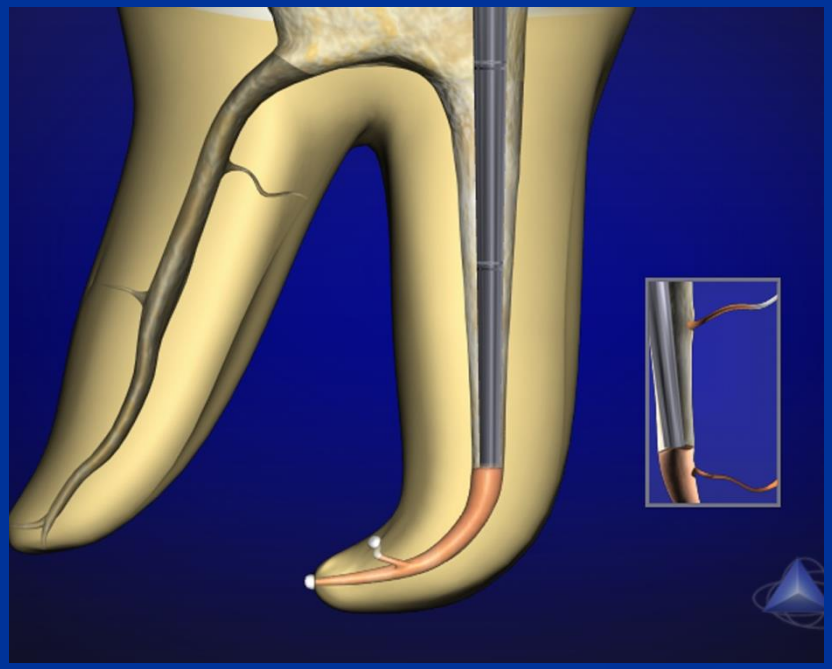
Press apically for 5 seconds



Activate Calamus, plunge deeper 3-4mm and wait 1-2 seconds after desactivate it

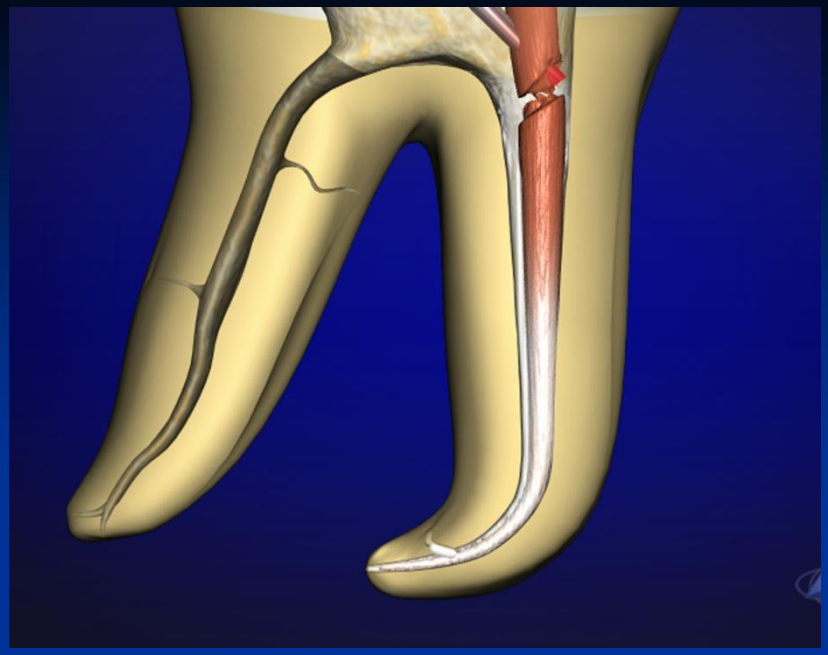
Select small size manuel Plugger, move gutta-percha apically





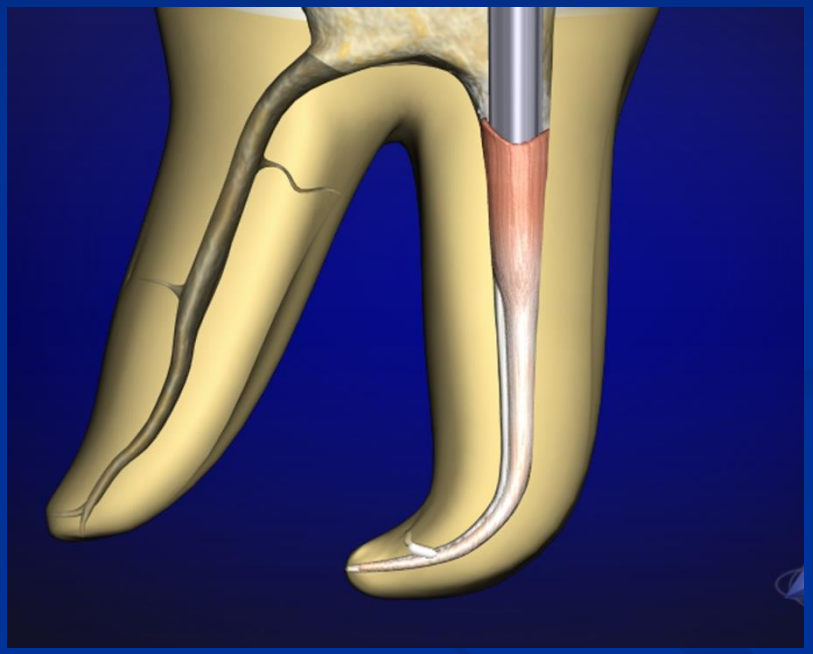
Press small Plugger 5 seconds into the apical third

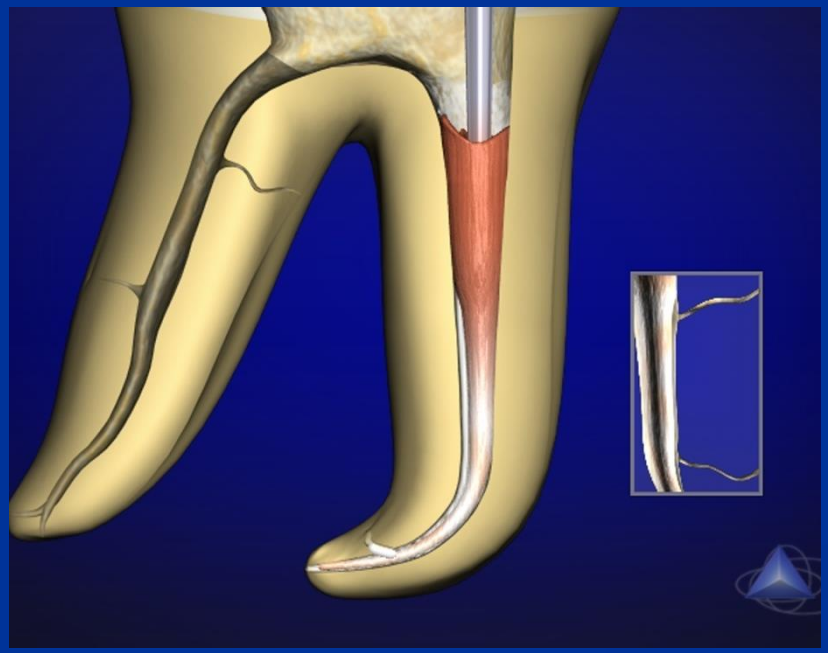
Downpack : Continuous Wave Technique



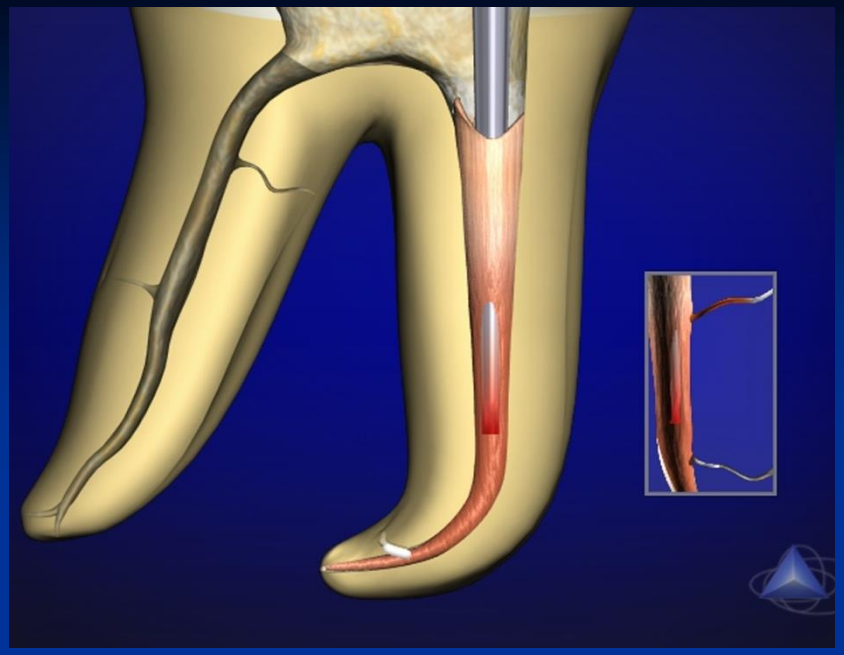
Activate Calamus and sear off the master cone

Select the larger prefit, manual plugger and move Gutta Percha apically



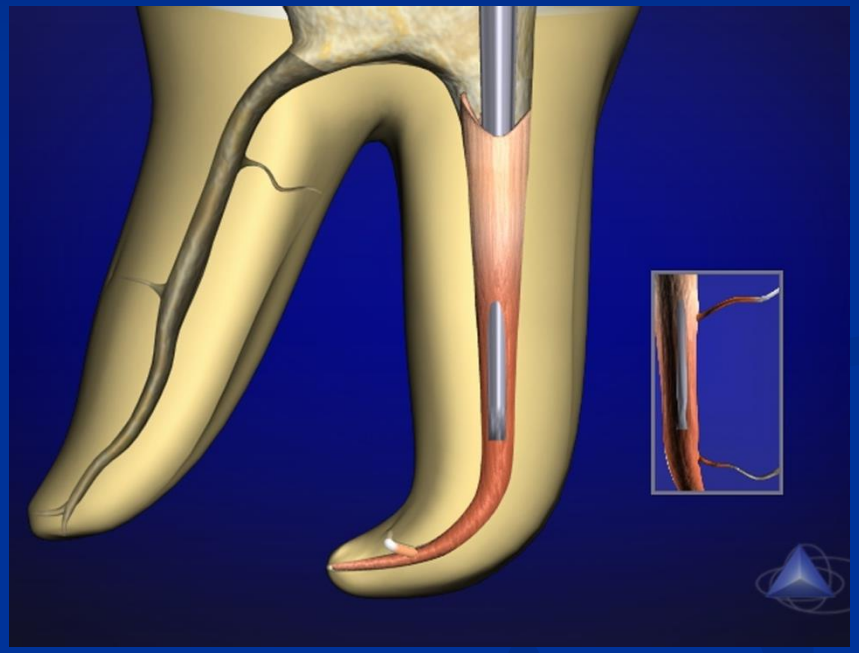


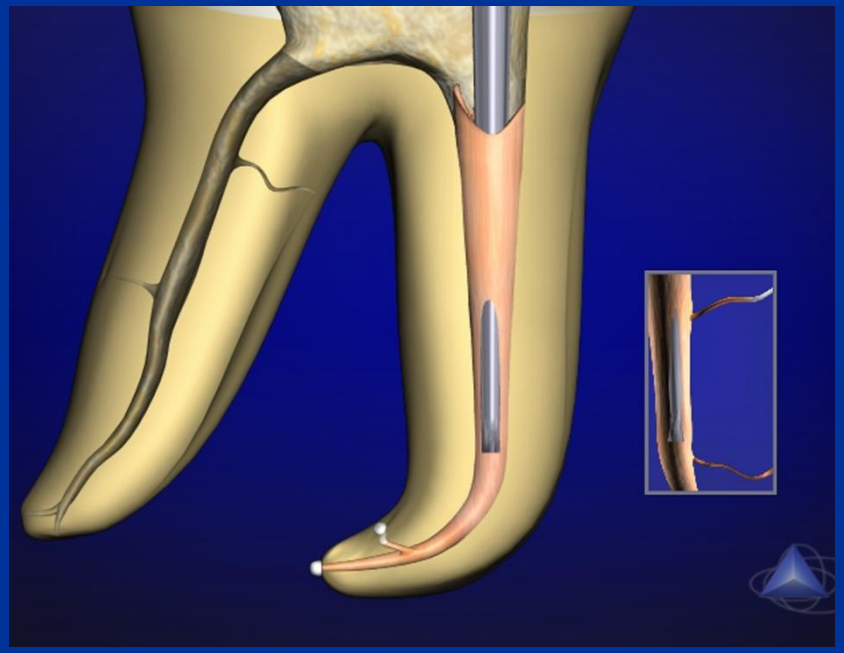
Activate Calamus



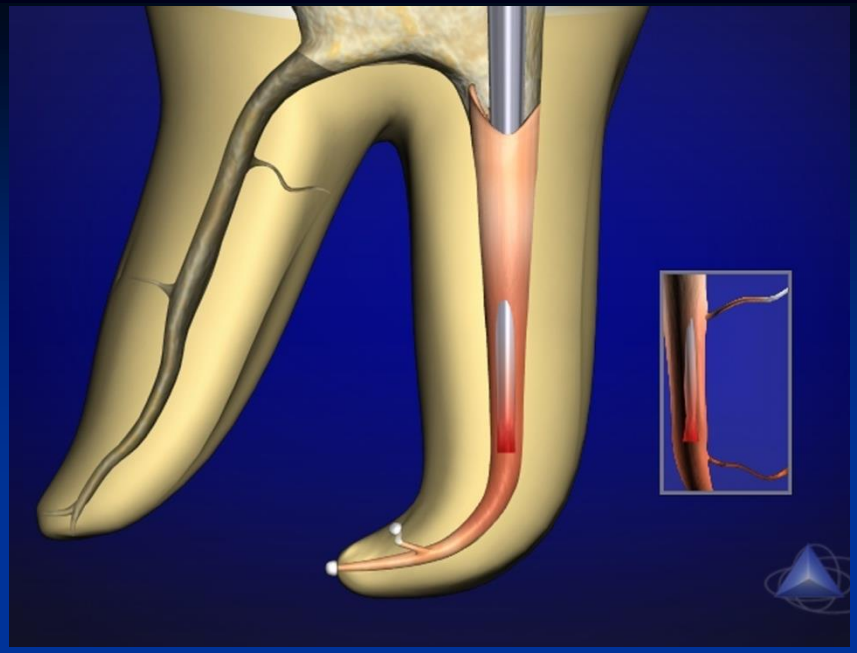
In one continuous motion press until the "stop" is at 2 mm of the reference point

Desactivate Calamus, maintain firm apical pressure till the reference point is reached



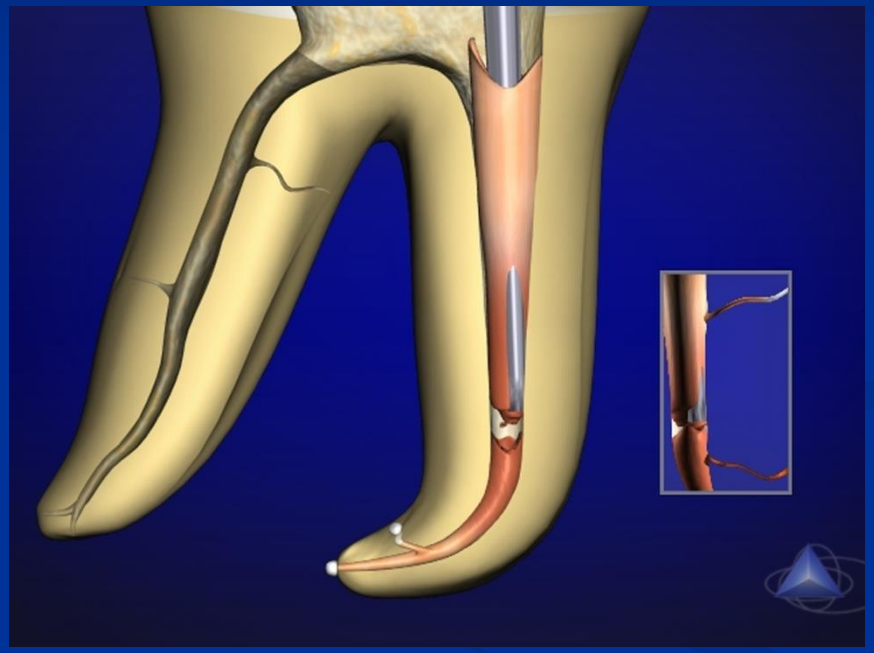


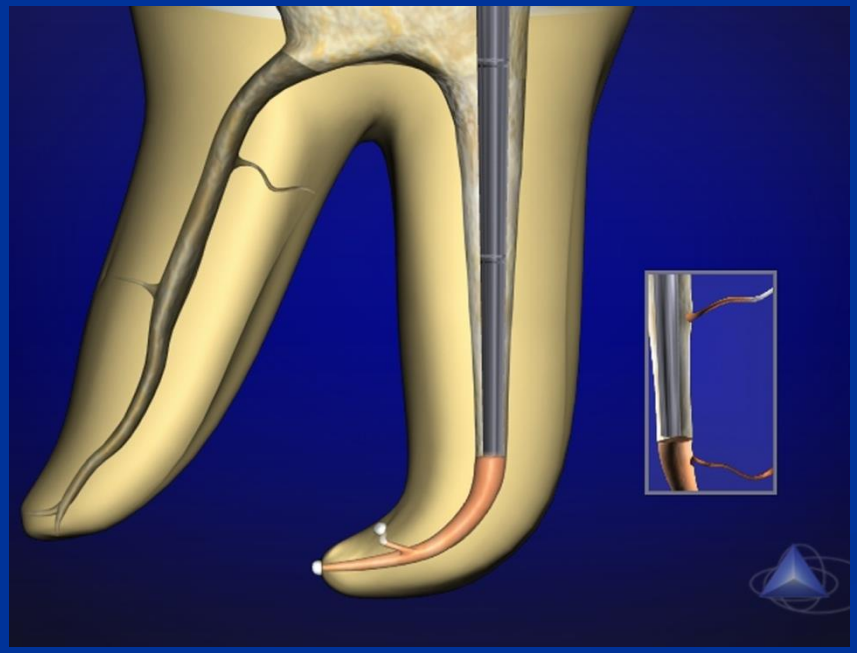
Maintain firm pressure for 10 seconds



Activate Calamus for 1-2 seconds and desactivate , then remove the plugger

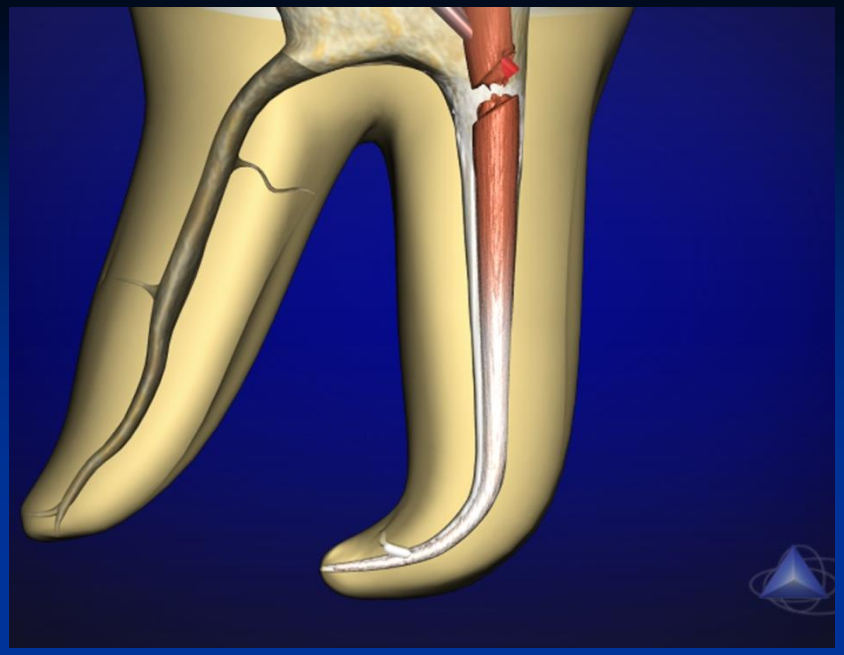
This will separate and remove Gutta-Percha





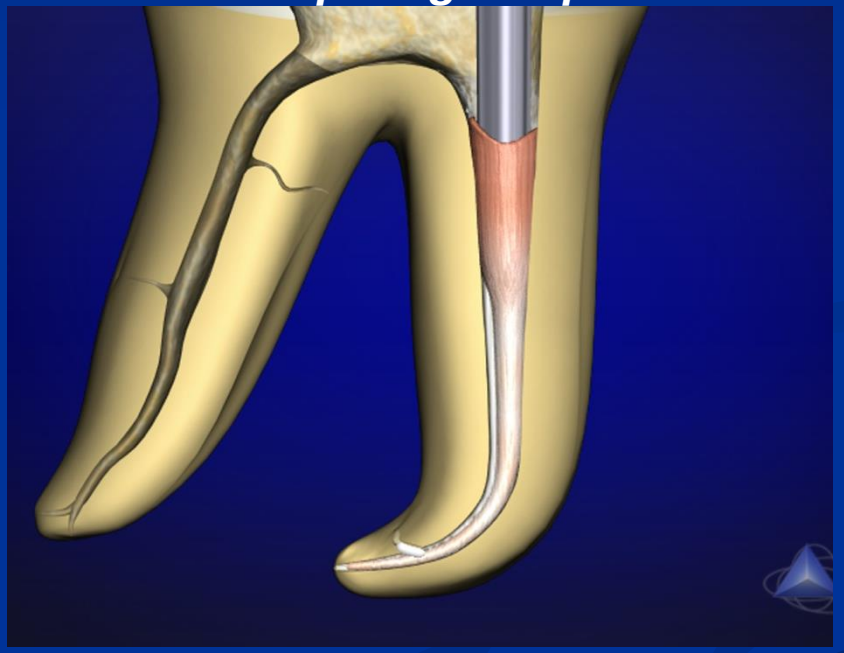
Select the small size, prefit manual plugger and condense the Gutta-Percha

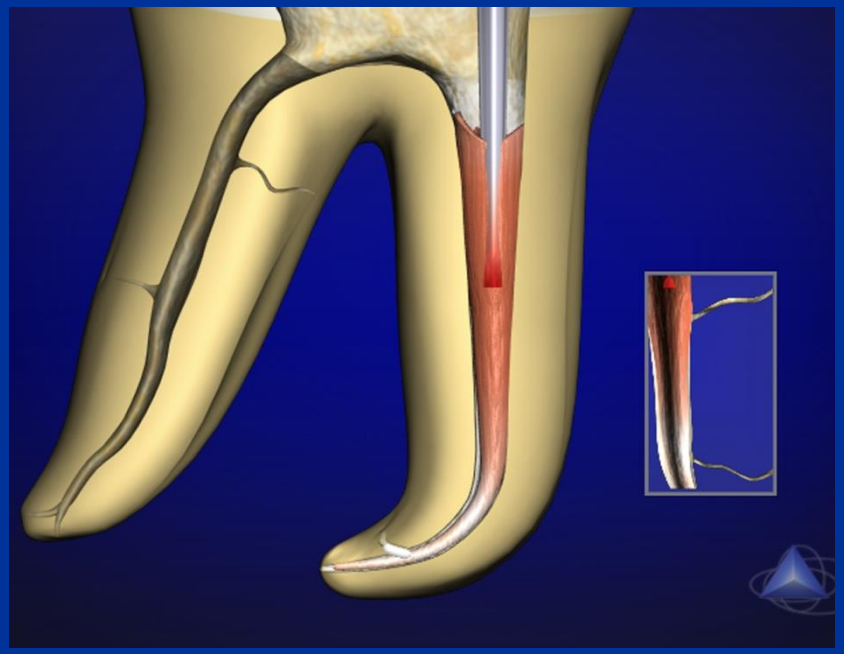
Downpack : Hybrid Technique



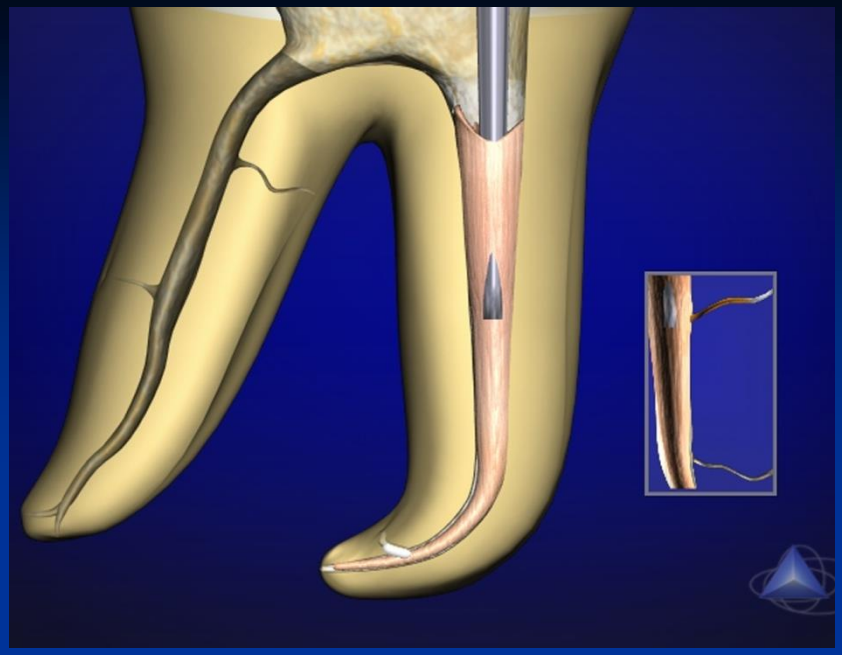
Activate Calamus and sear off the master cone

Select the larger prefit, manual plugger and move Gutta Percha apically, press 5 seconds to compact gutta-percha



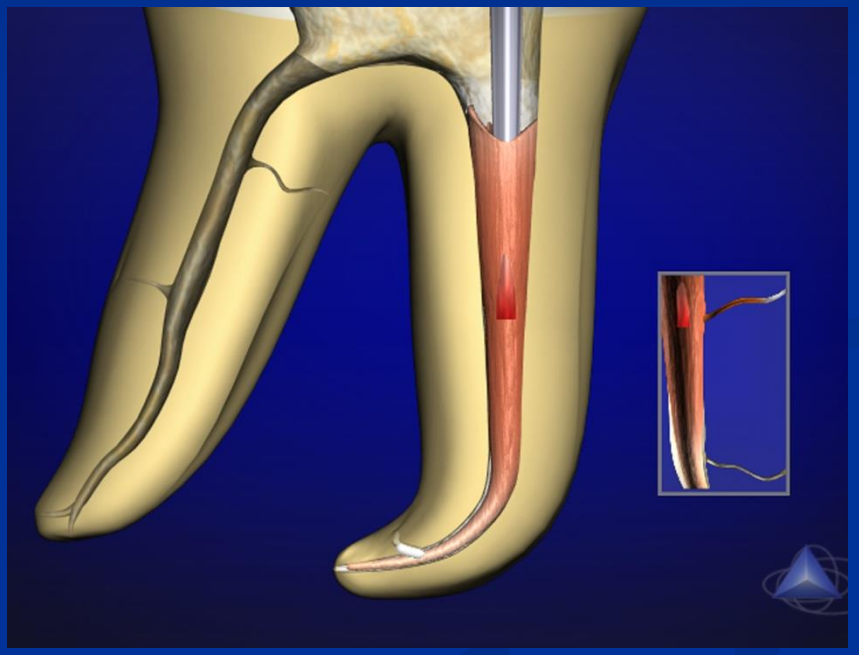


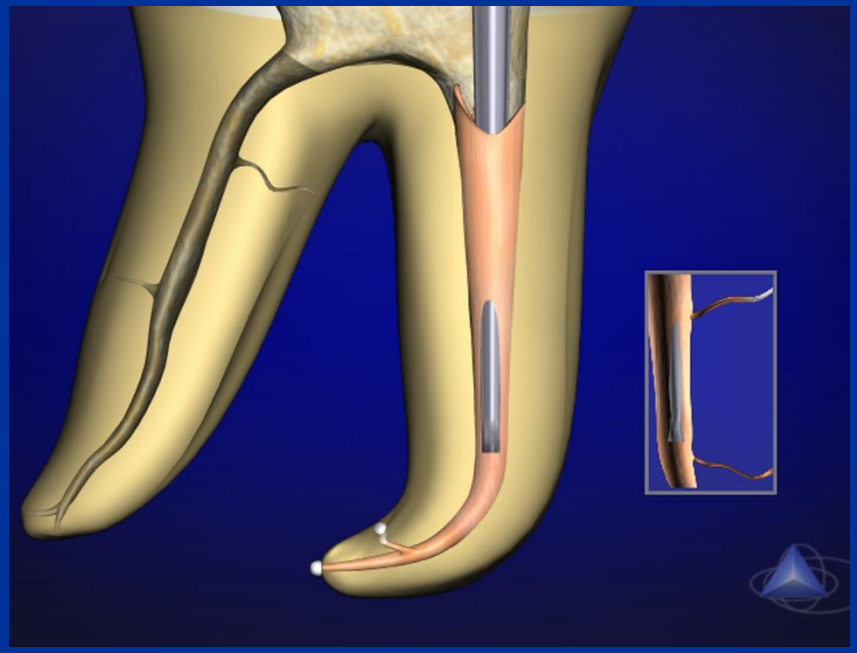
Activate Calamus and plunge 3-4 mm into the gutta-percha



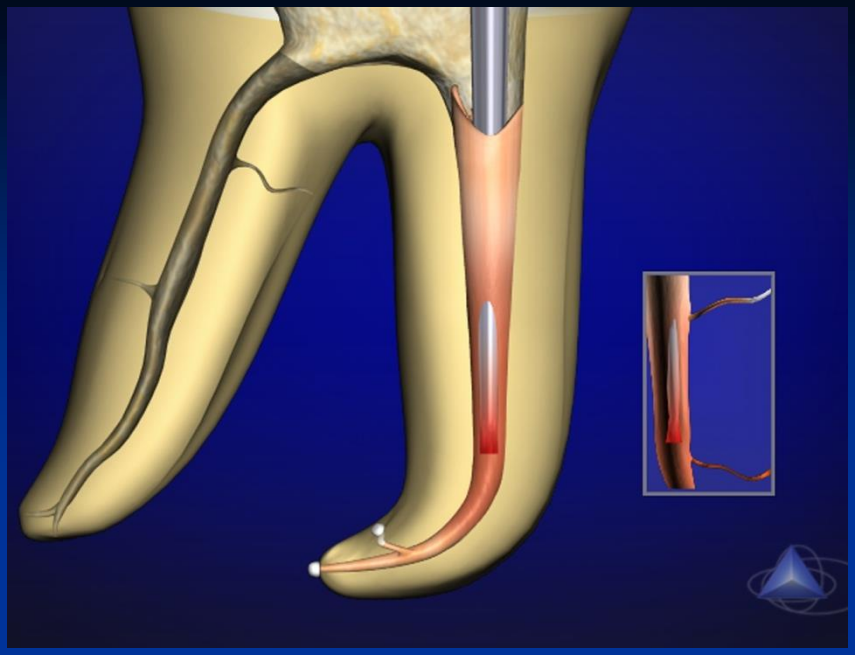
Desactivate Calamus maintain 5 seconds pressure to compact gutta.percha

Activate Calamus



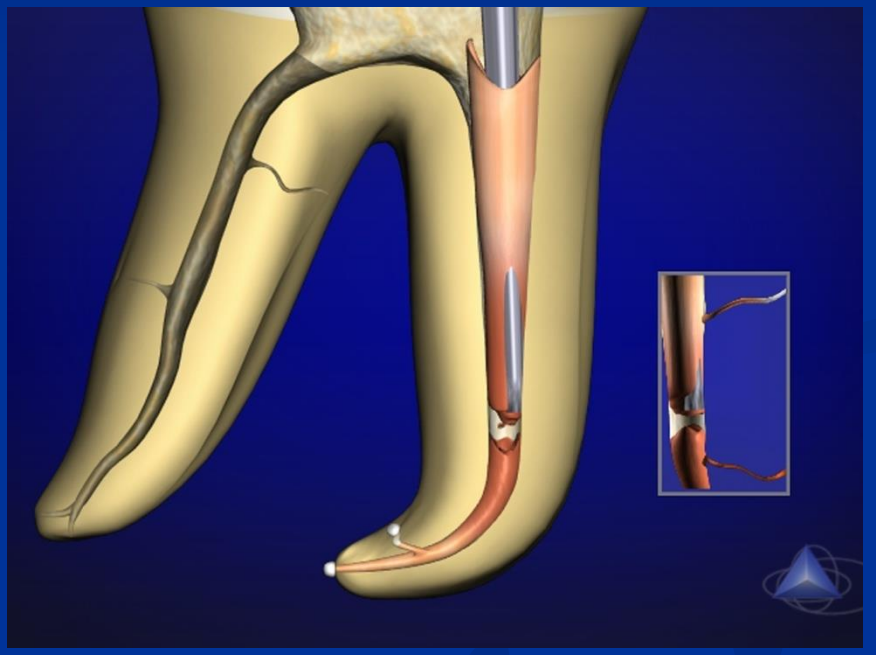


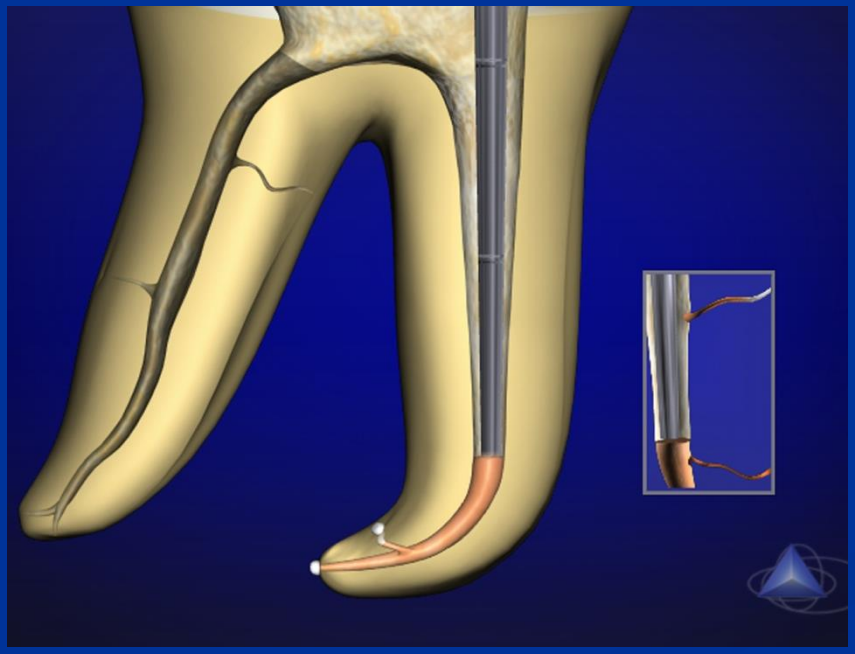
Desactivate and maintain 5 seconds . Maintain apical pressure till the working depth is reached



Activate Calamus 1-2 seconds

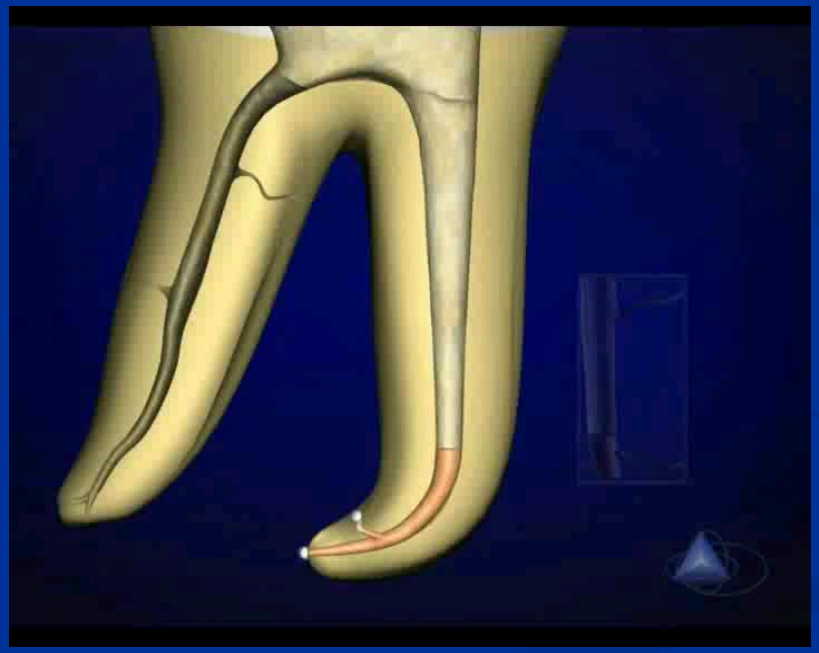
Desactivate and remove the plugger.





Select the small size, prefit manual plugger and condense the Gutta-Percha

Backpack (backfill) Technique (flow)




DENTSPLY
MAILLEFER
CALAMUS
DUAL
180
°C
°C
1
2

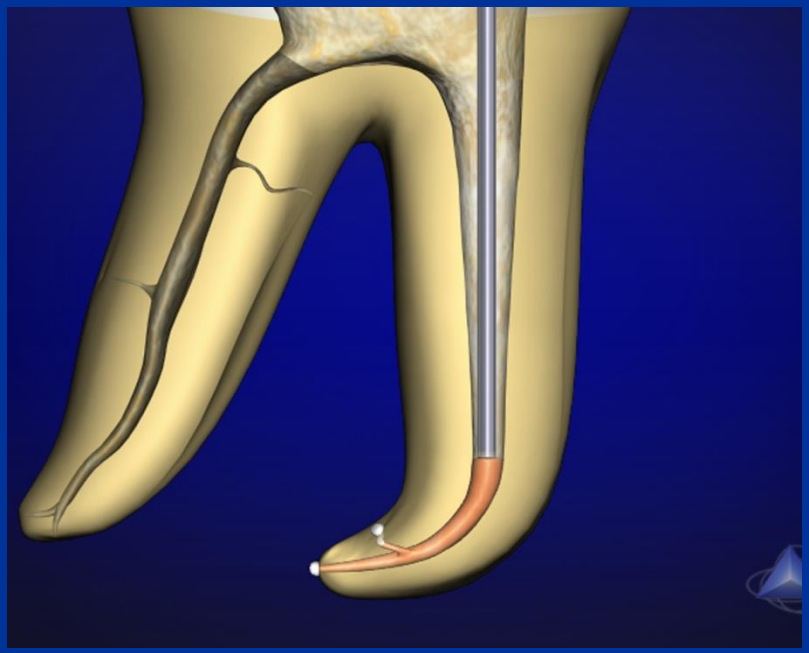
Calamus flow handpiece

#20(0,8) and
#23(0,6)

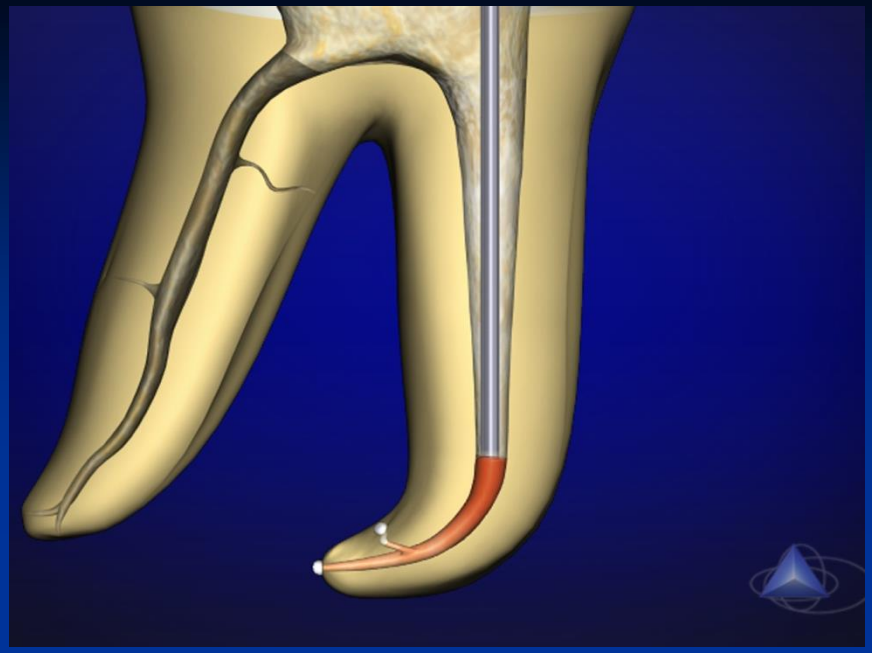
Cartridge of Gutta-Percha

Cartridge ... bender

Internal view of activated flow handpiece

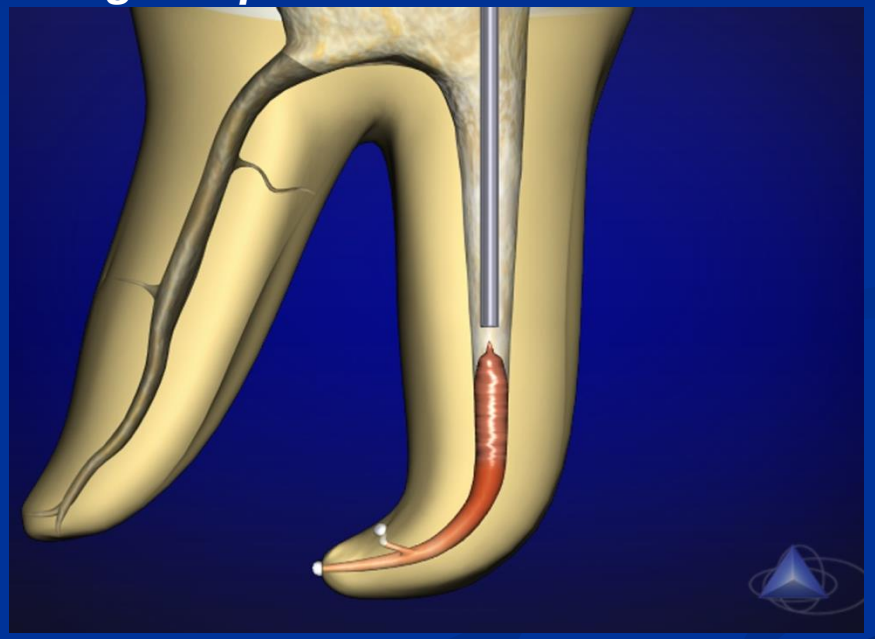


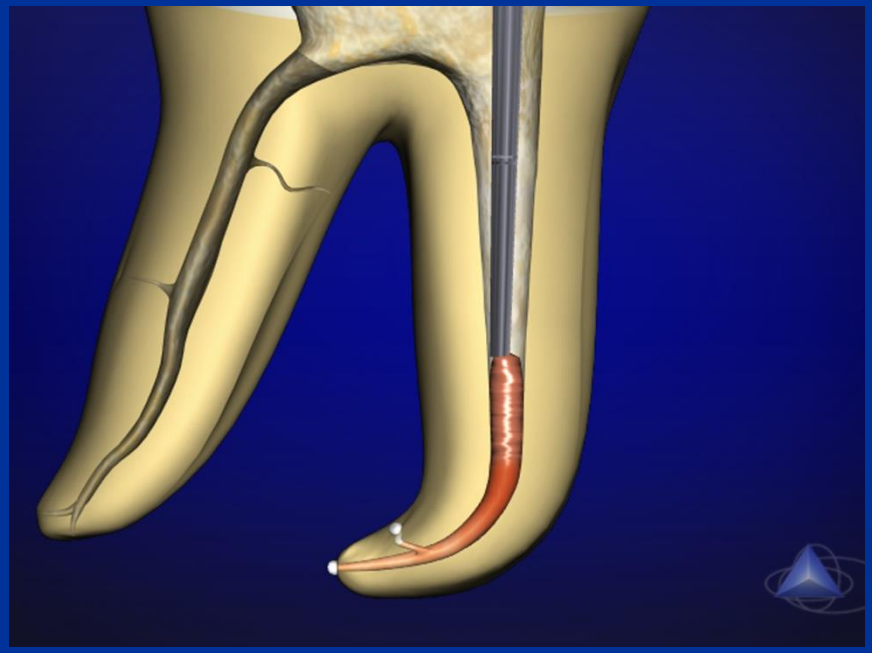
Position the tip against the packed filling material



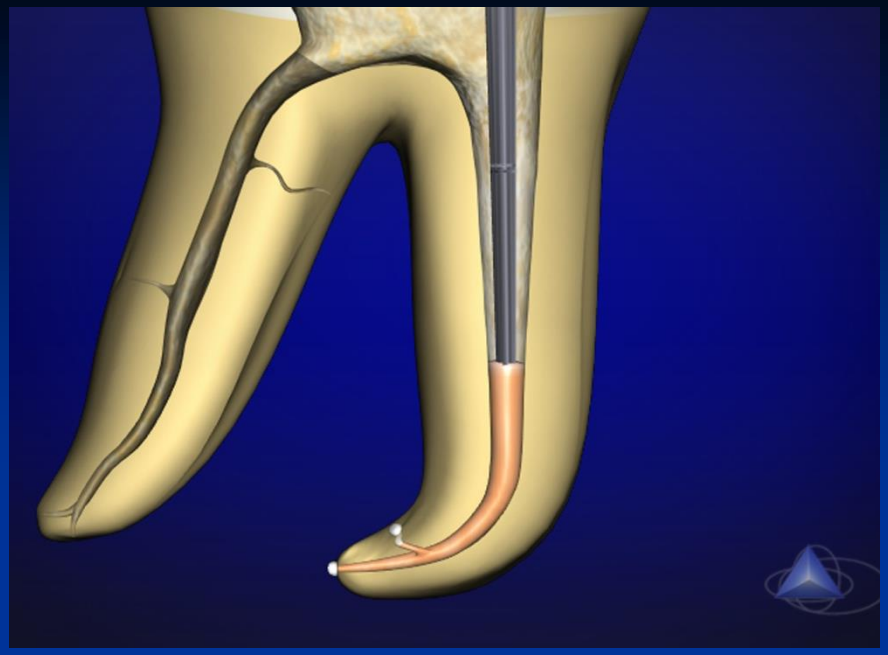
Placing warm tip against packed-material re-thermosoftens gutta-percha

Activate Calamus flow , dispense 2-3 mm warm gutta-percha



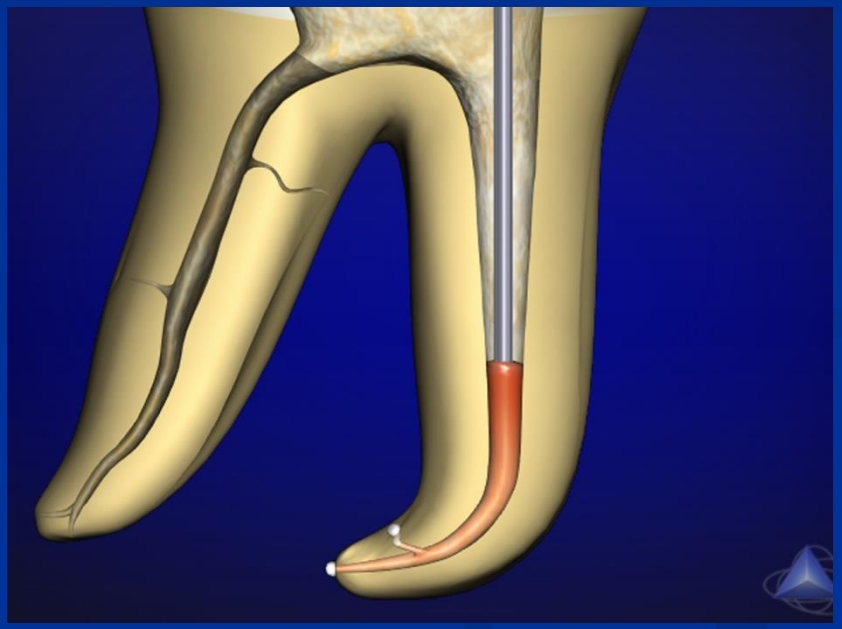


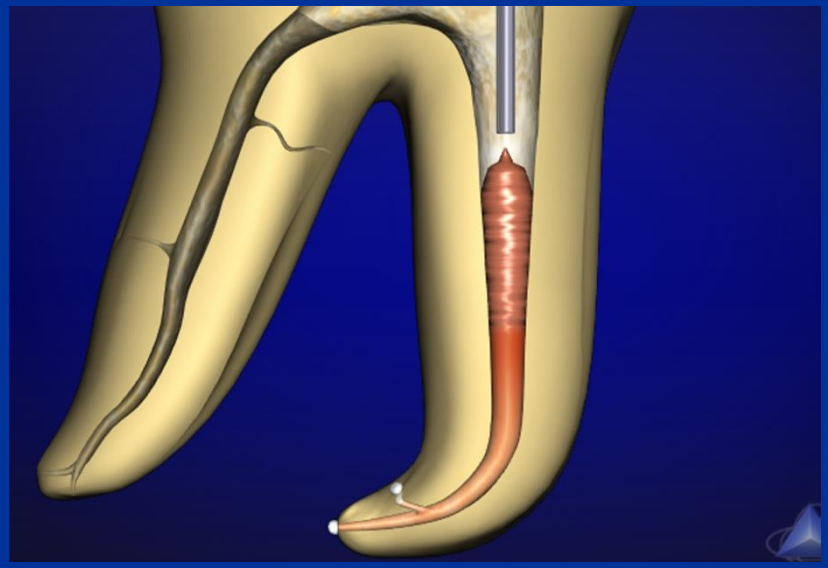
Select smaller prefit manuel plugger and condense material



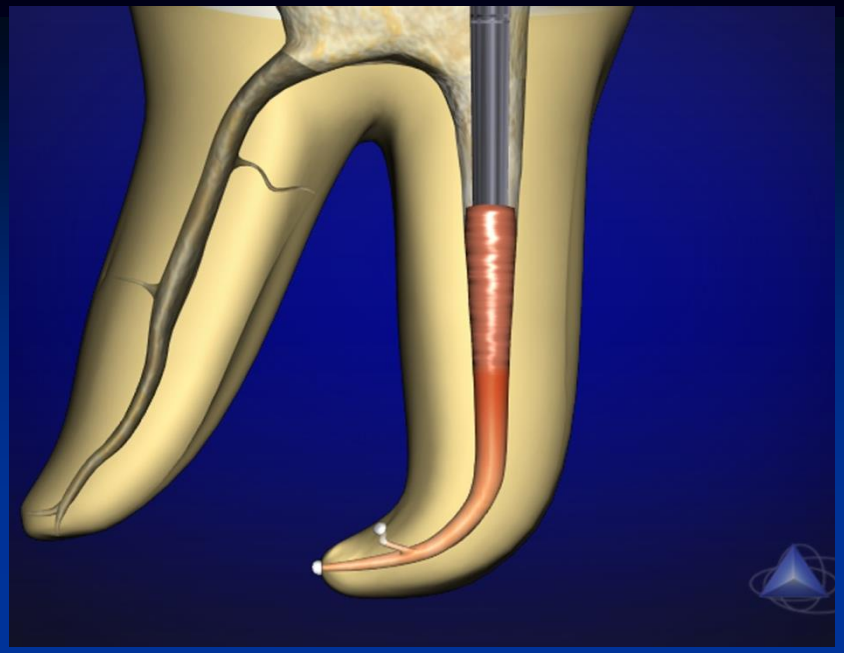
With the same plugger, press 5 seconds to avoid shrinkage during cooling phase

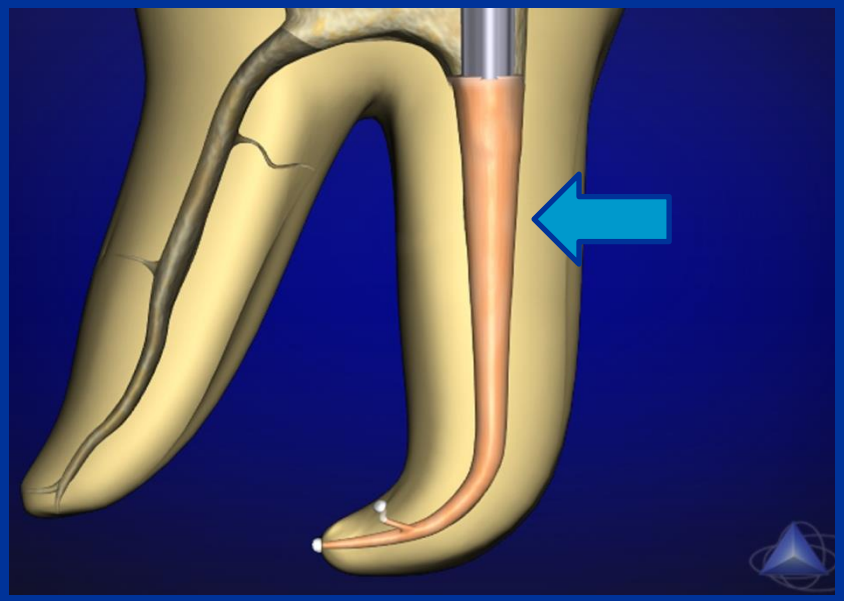
Position tip 5 seconds aginst packed material





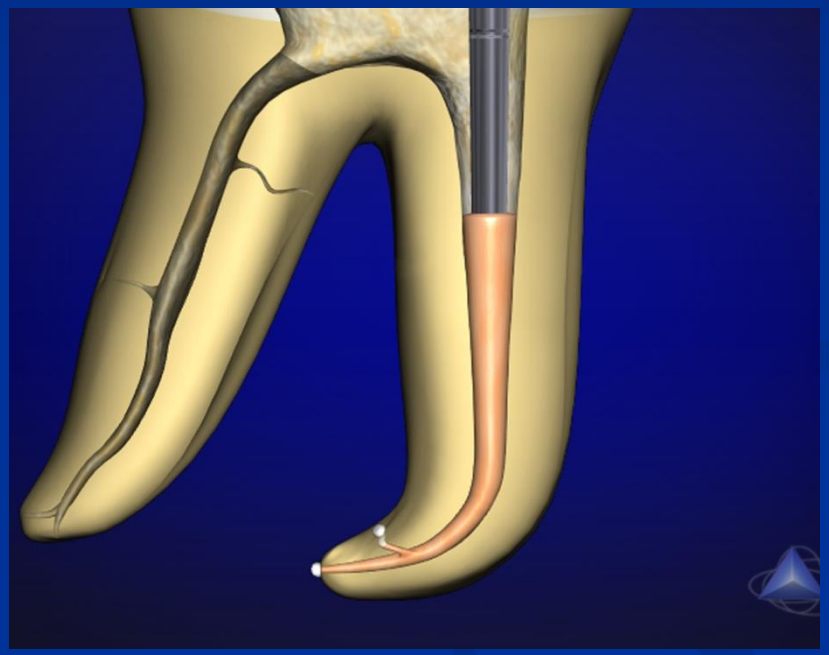
Activate Calamus flow and dispense 3-4 mm warm gutta-percha





With a prefit, medium size manual plugger condense the material

And press the material for 5 seconds (avoiding shrinkage)



Continue the backfilling in the same manner until the canal is full OR stop to accommodate a post for restorative

VIDEO

CALAMUS®
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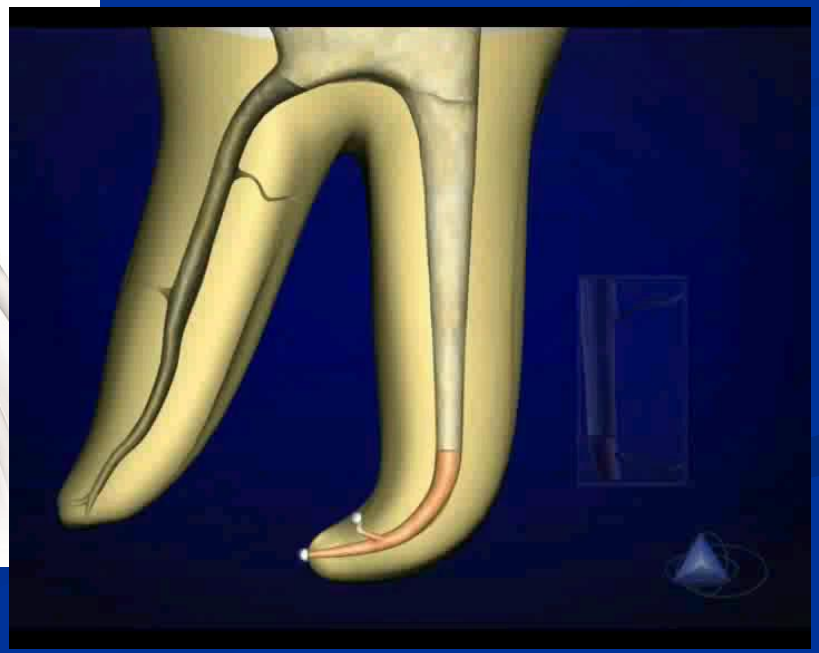
Backpack Technique (flow)



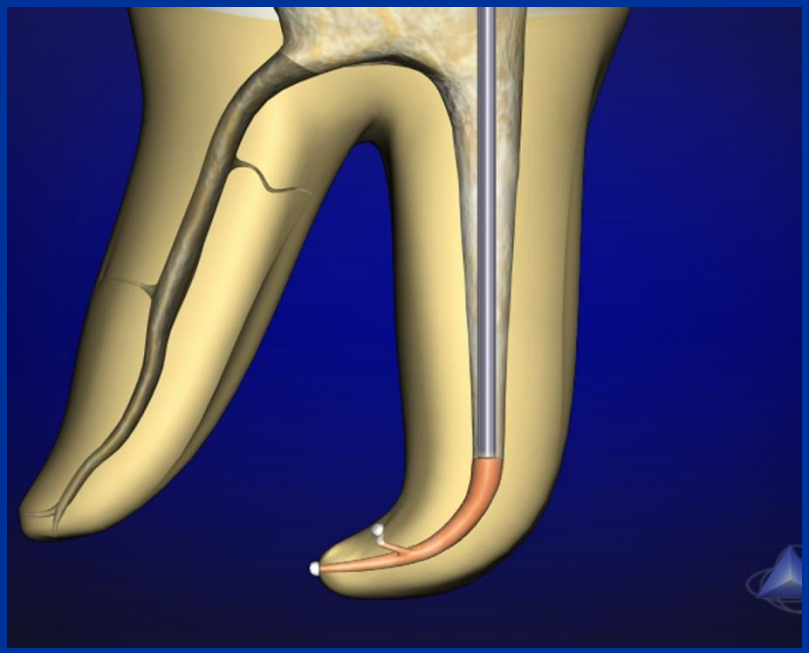
Calamus flow handpiece

#20(0,8) and
#23(0,6)

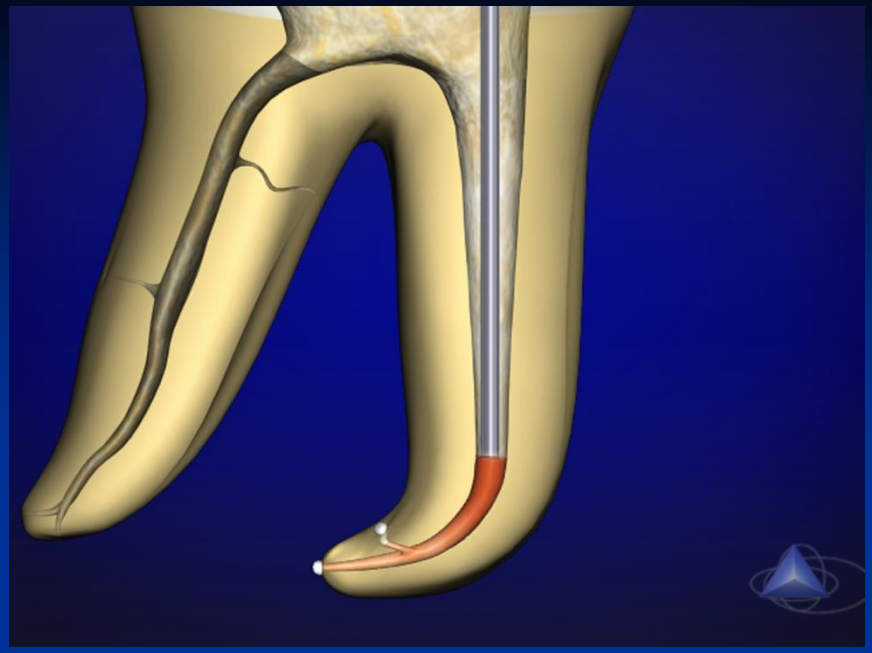
Cartridge of Gutta-Percha

Cartridge ... bender

Internal view of activated flow handpiece

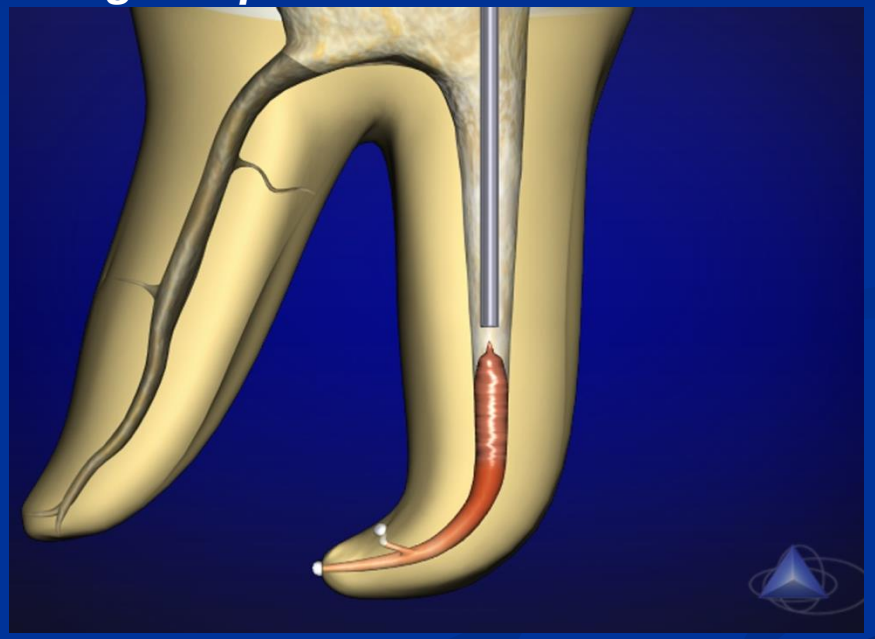


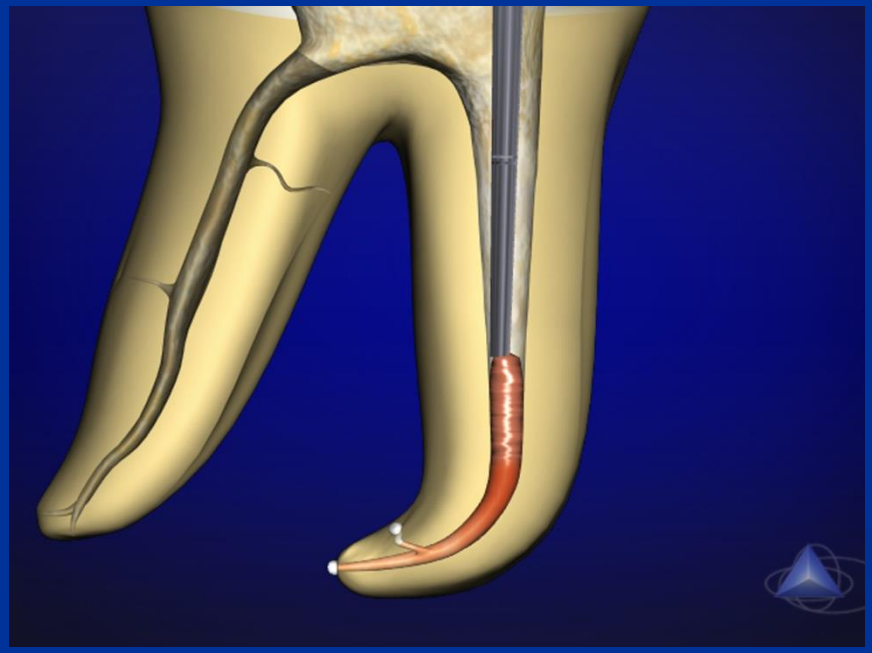
Position the tip against the packed filling material



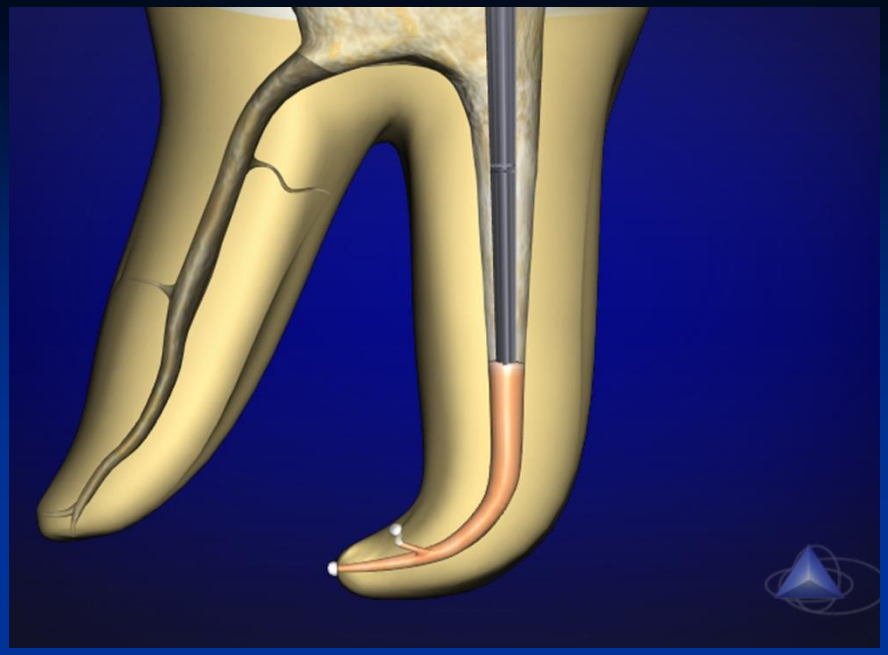
Placing warm tip against packed-material re-thermosoftens gutta-percha

Activate Calamus flow , dispense 2-3 mm warm gutta-percha



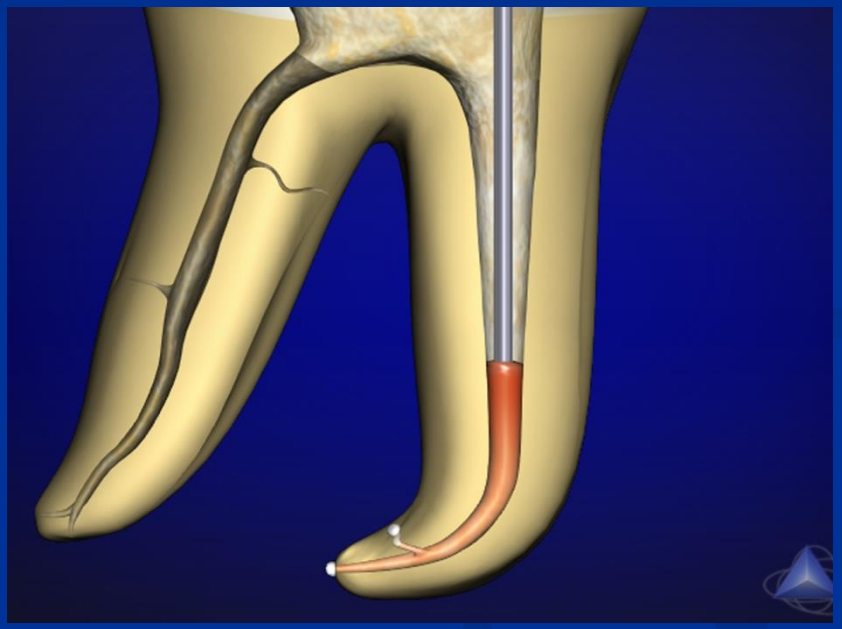


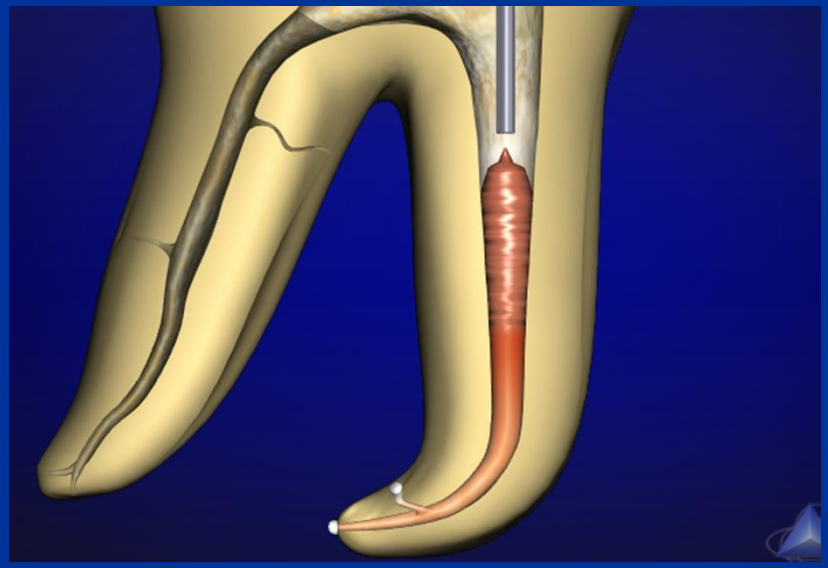
Select smaller prefit manuel plugger and condense material



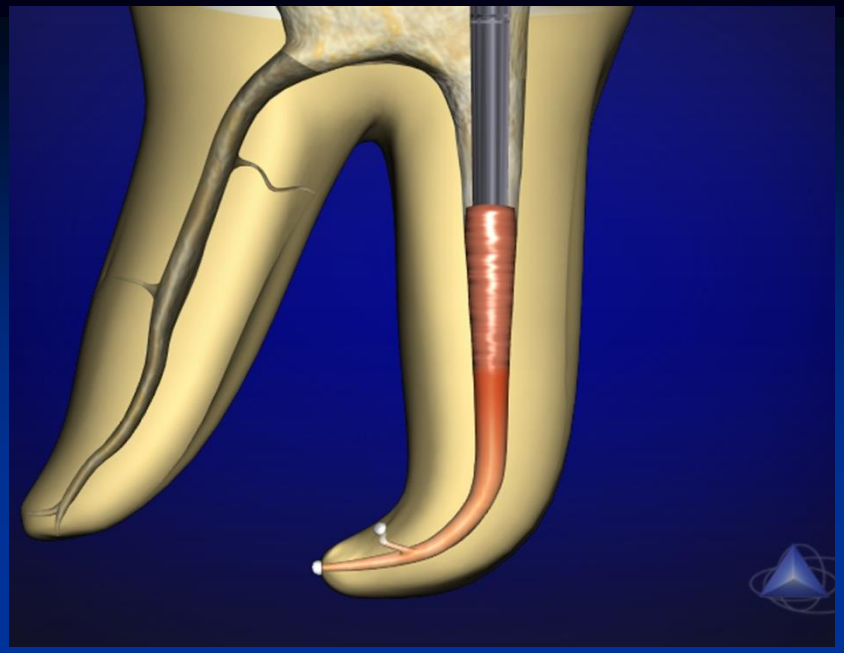
With the same plugger, press 5 seconds to avoid shrinkage during cooling phase

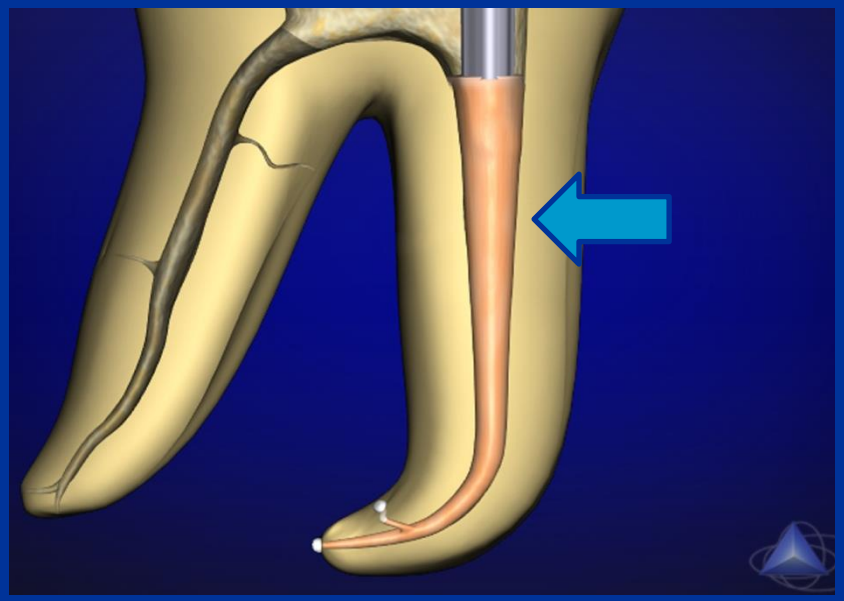
Position tip 5 seconds aginst packed material





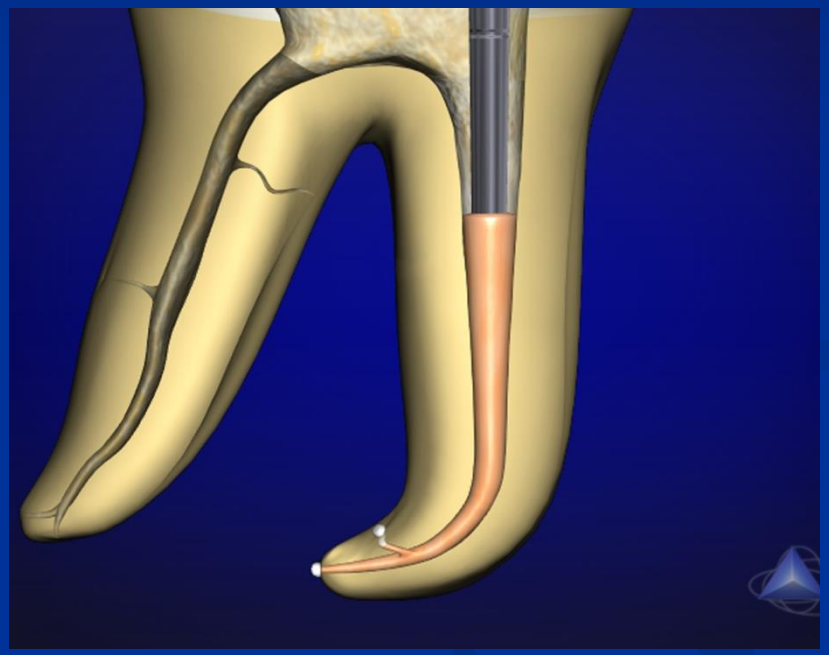
Activate Calamus flow and dispense 3-4 mm warm gutta-percha





With a prefit, medium size manual plugger condense the material

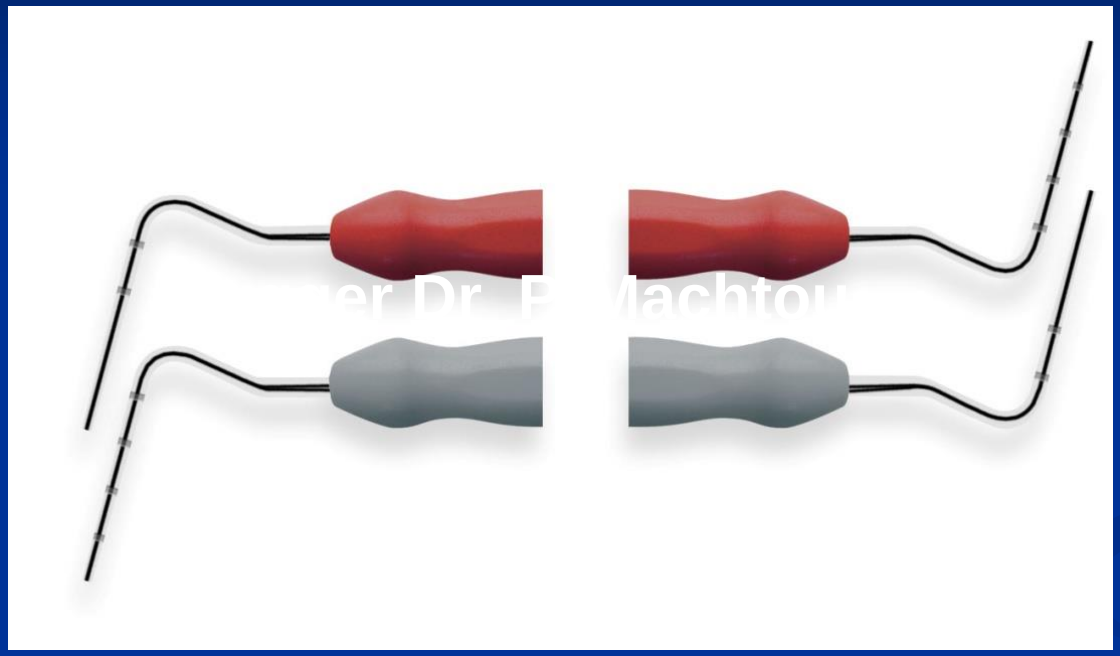
And press the material for 5 seconds (avoiding shrinkage)



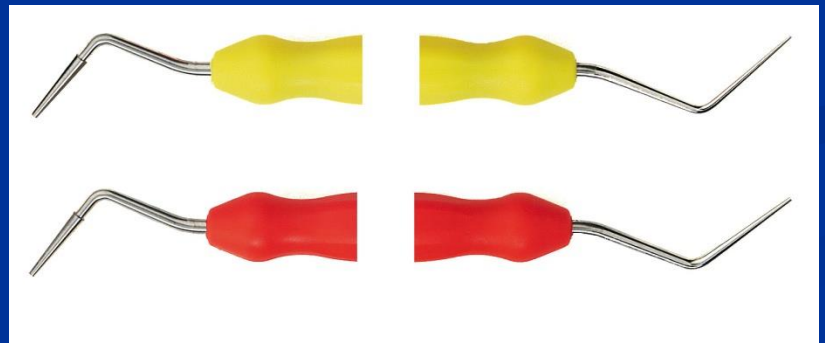
Continue the backfilling in the same manner until the canal is full OR stop to accommodate a post for restorative

SCHILDER Technique

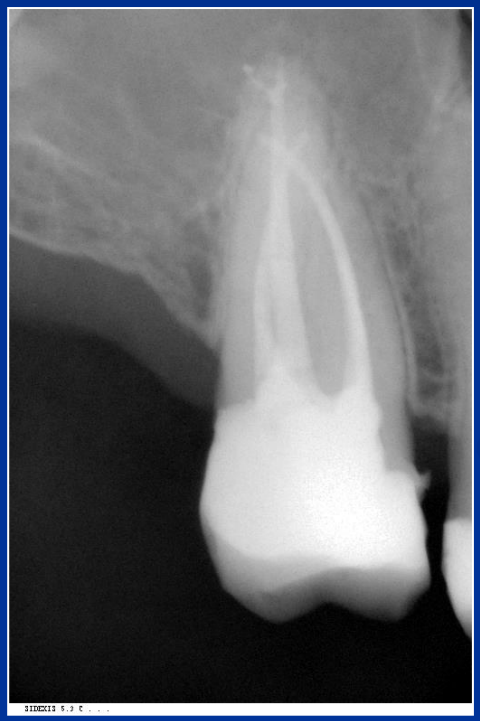
Similar technique to the Warm Gutta-Percha vertical condensation with Calamus device described later in this module



Other type of Heat-Carrier / Plugger



Heat Carrier

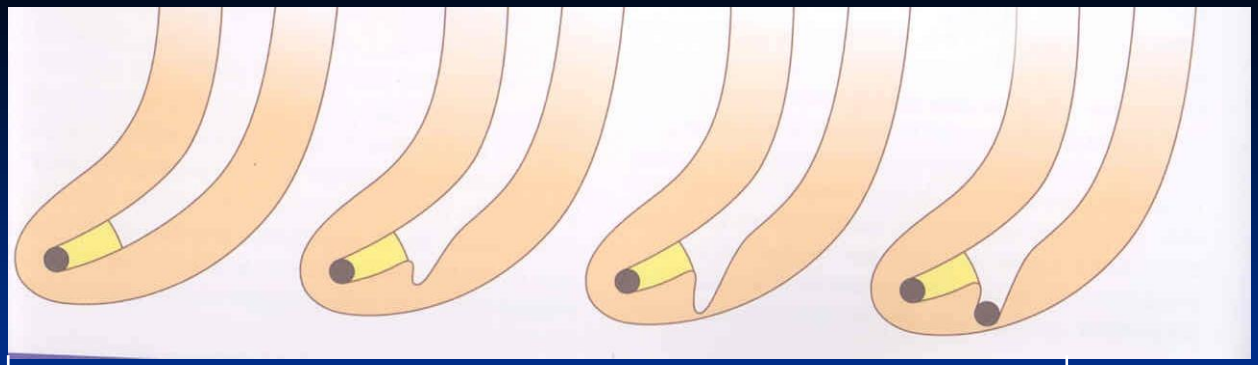


Complications of endodontic treatment

Local

Regional

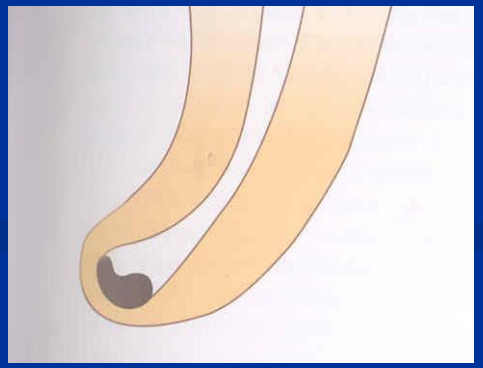
Systemic



Plug of
dentin chips

Ledging

Transportation of the root canal

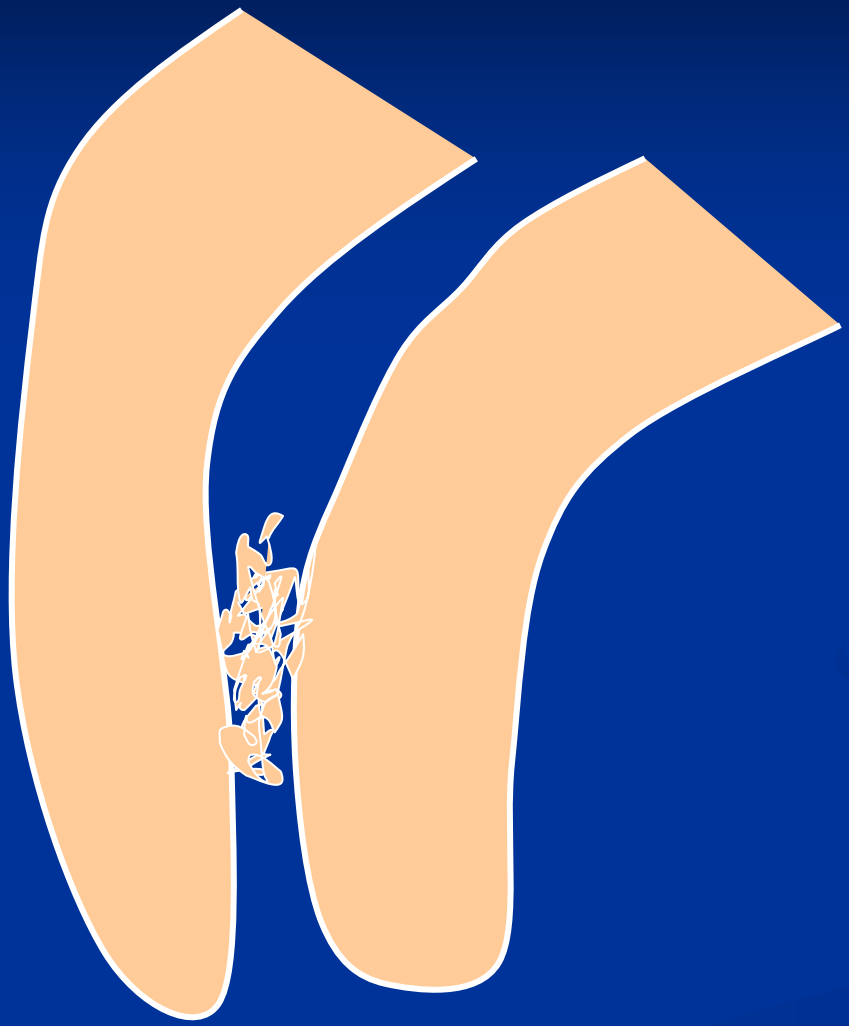


Via falsa

Zipping a elbow

Local complications

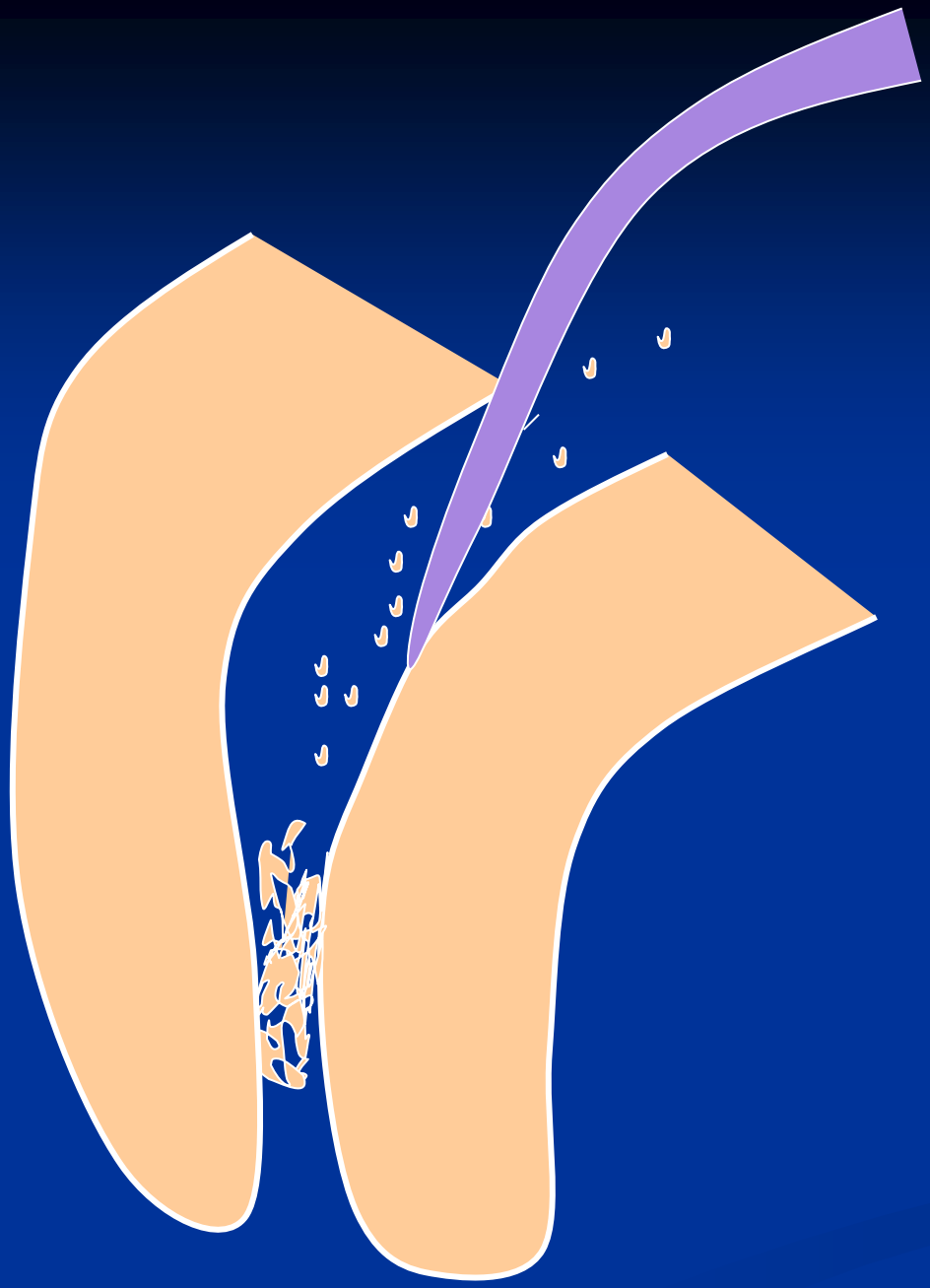
Plug



<u>Reasons</u>

Insufficient irrigation and recapitulation

Loss of the working length



Solution

Repeated careful instrumentation with a thin instrument

Irrigation is not effective in this case!!!

Ledging

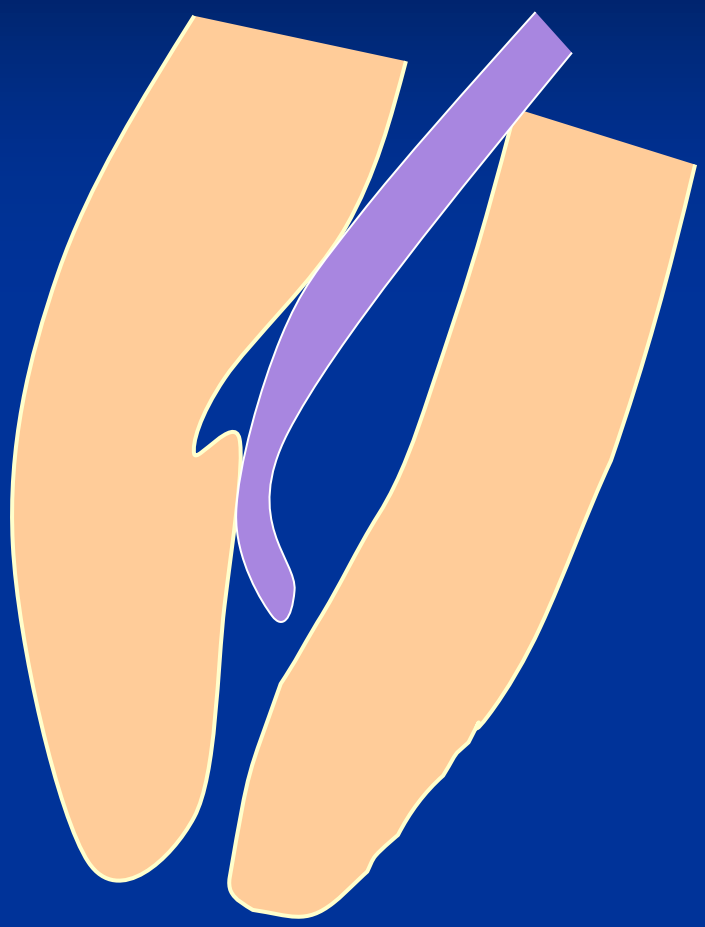
Reasons

The instrument is not bended in advance!

No control of the WL

=

No recapitulationLoss of the WL



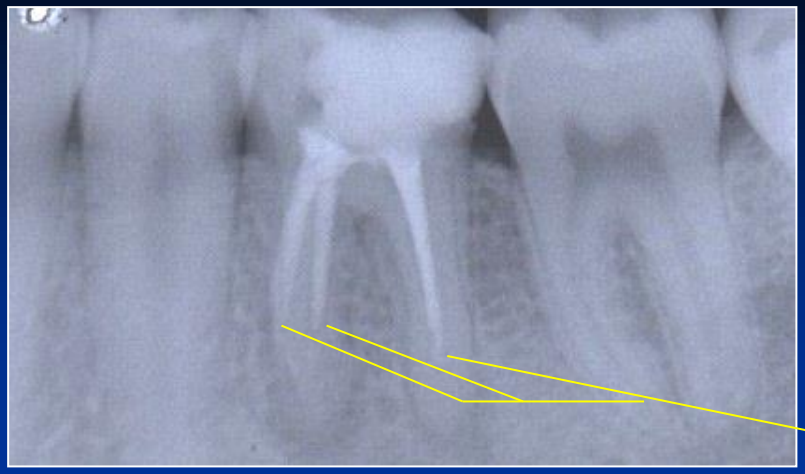
Solution

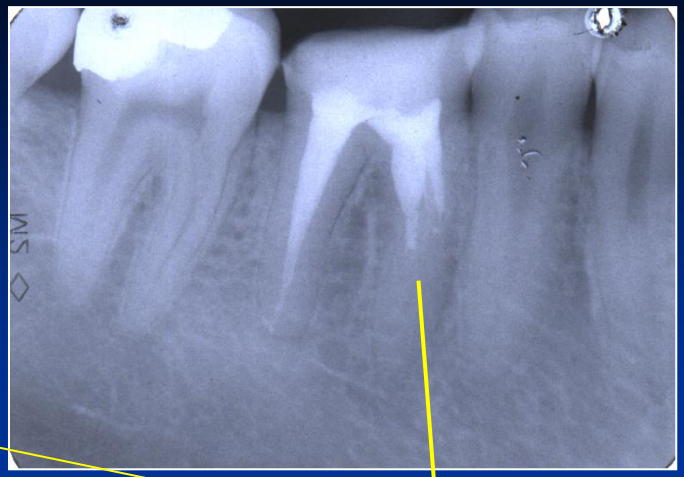
The instrument must be bended in advance

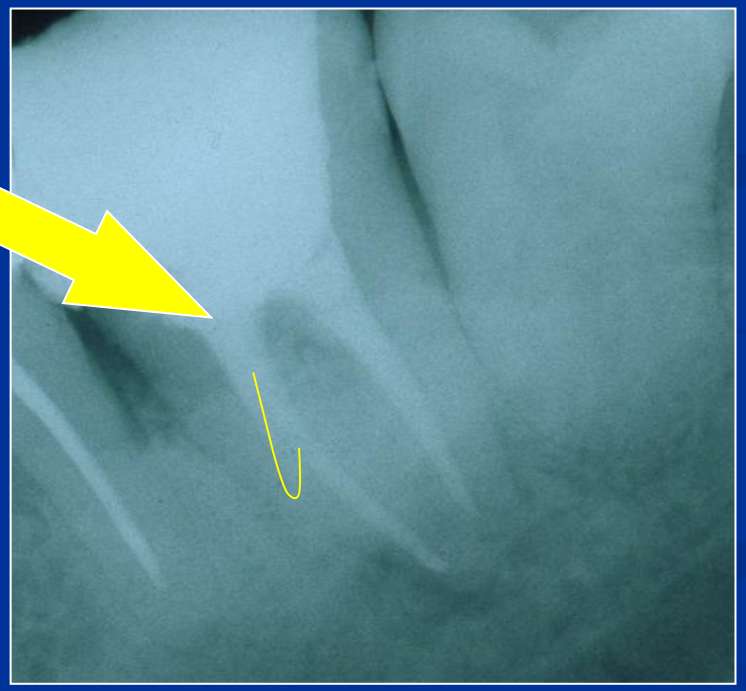
Careful but complete rotation

Finishing with the fine filing

No NiTi!!!







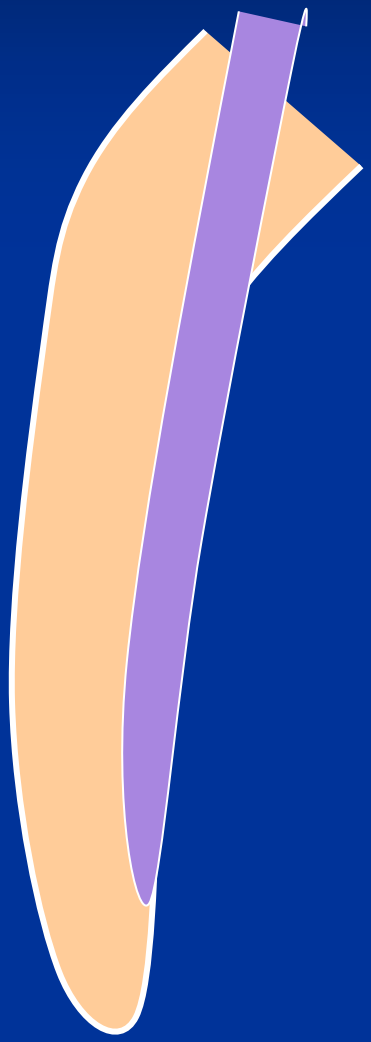
Ledging

Zipping a Elbow

The instrument is not bended in advance!

Rotation in curved canals

Stripping



Reasons

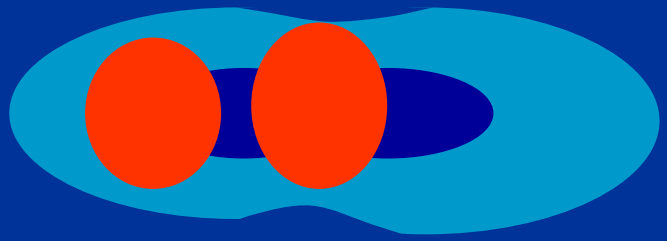
Bad orientation in morphology – no diagnostic x-
Instruments are nod bended
Rotary NiTi with a big taper

Dangereous zones
Mandibular molars – mesial roots

Premolars, esp. maxillar
Mandibular incisors

Oblast isthmu

Stripping



Důkladný přehled!

Šetřit oblast isthmu!

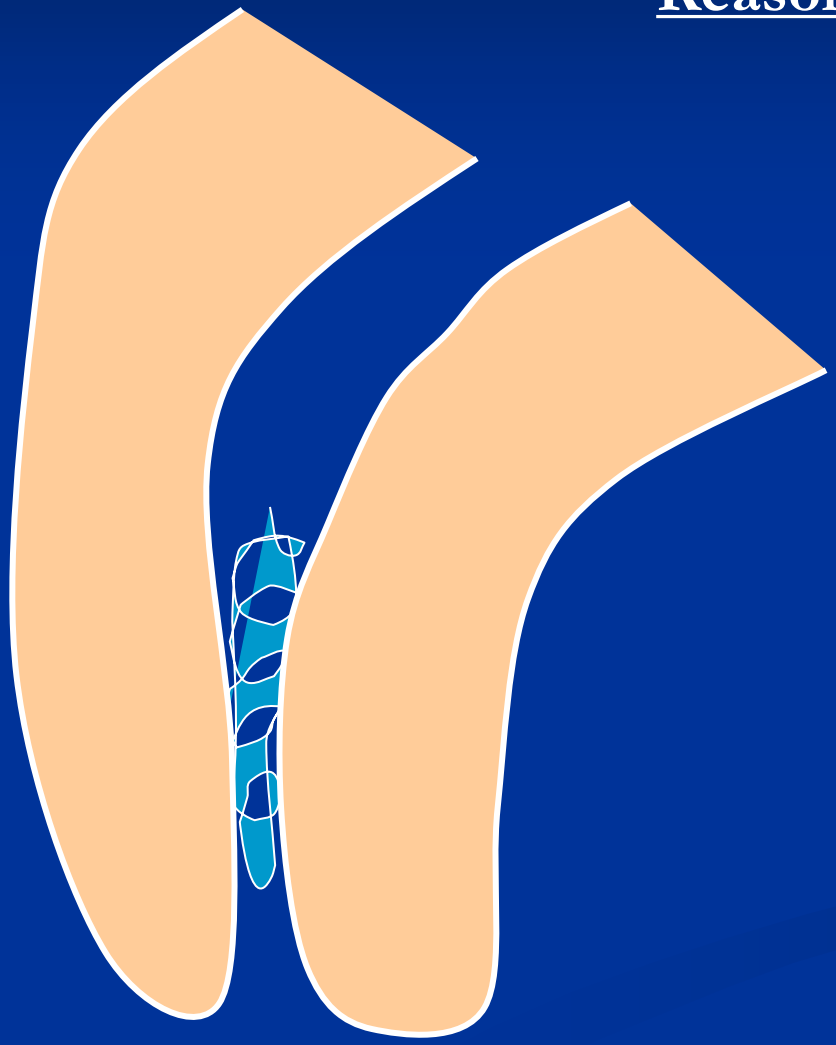
Ruční preparace!

Menší kónus NiTi !

Stripping

Bend the instrument and eventually blunt it !

Fracture of the root canal instrument



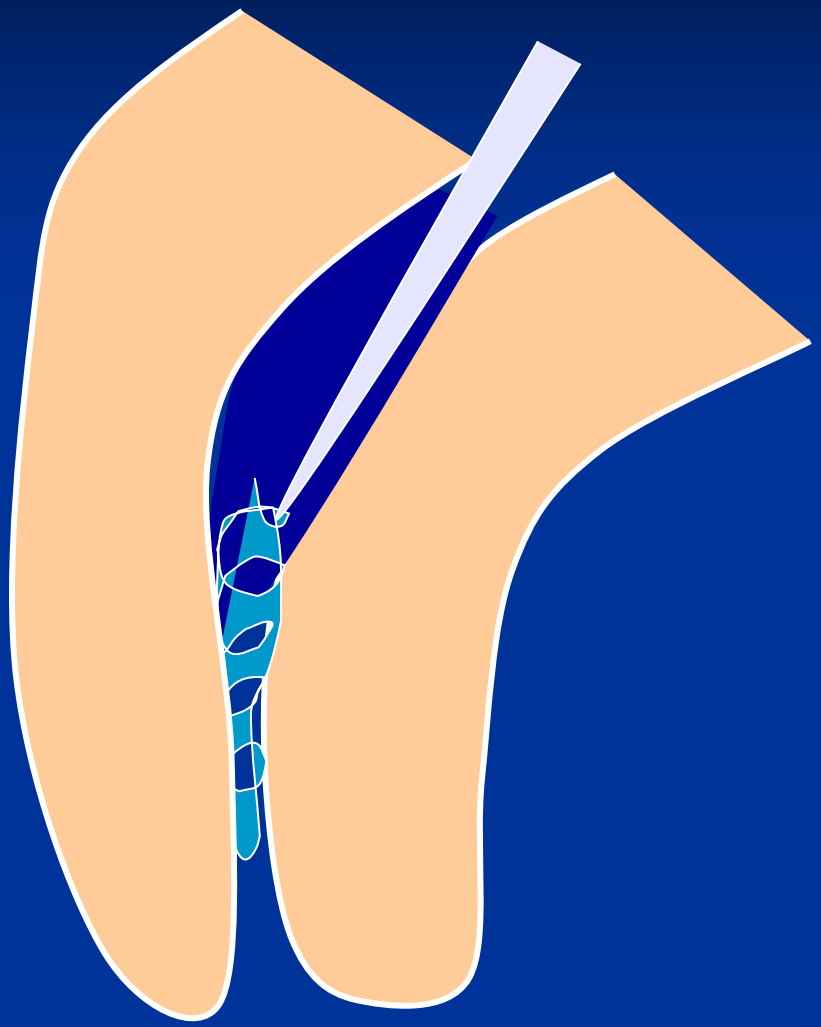
Reasons

Insufficient coronal flaring

Old root canal instrument

Aggresive force

Incorrect movement of the root canal instrument



Solution

Enlargement of the root canal till the instrument

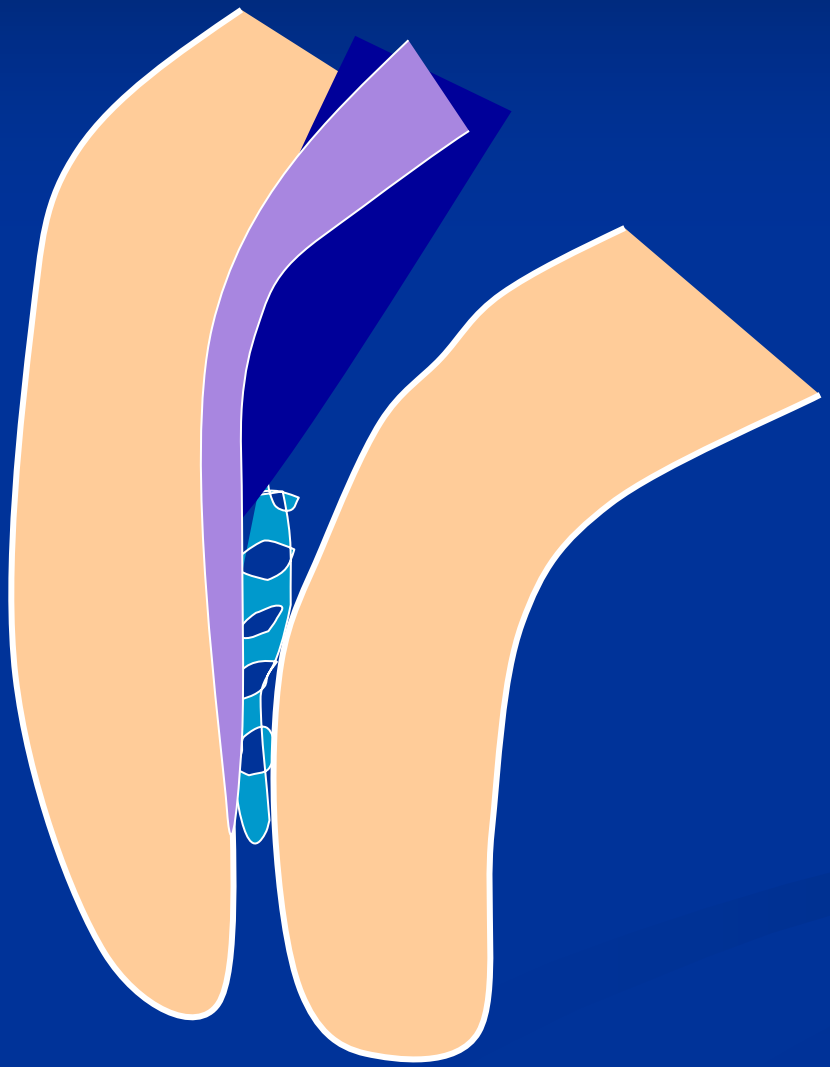
Ultrasound tips

Rotating root canal instrument – caution!

Bypass

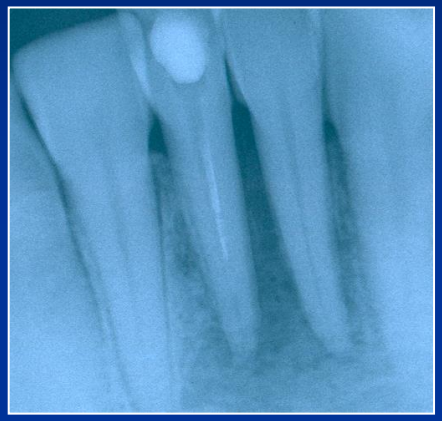
Leaving in

Surgical treatment



Bypass

Fractured instrument



Obliteration

Partial

Obliterace

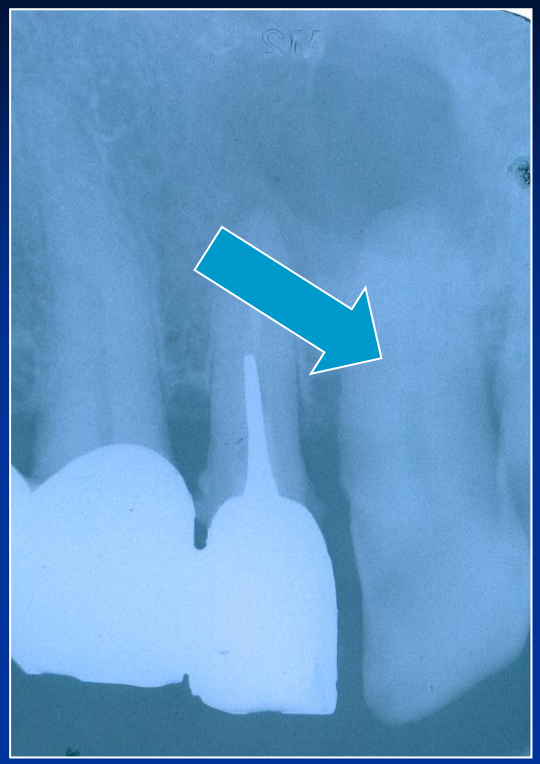
Access!!!

Hand thion Instrument!

Steel or NiTi

EDTA

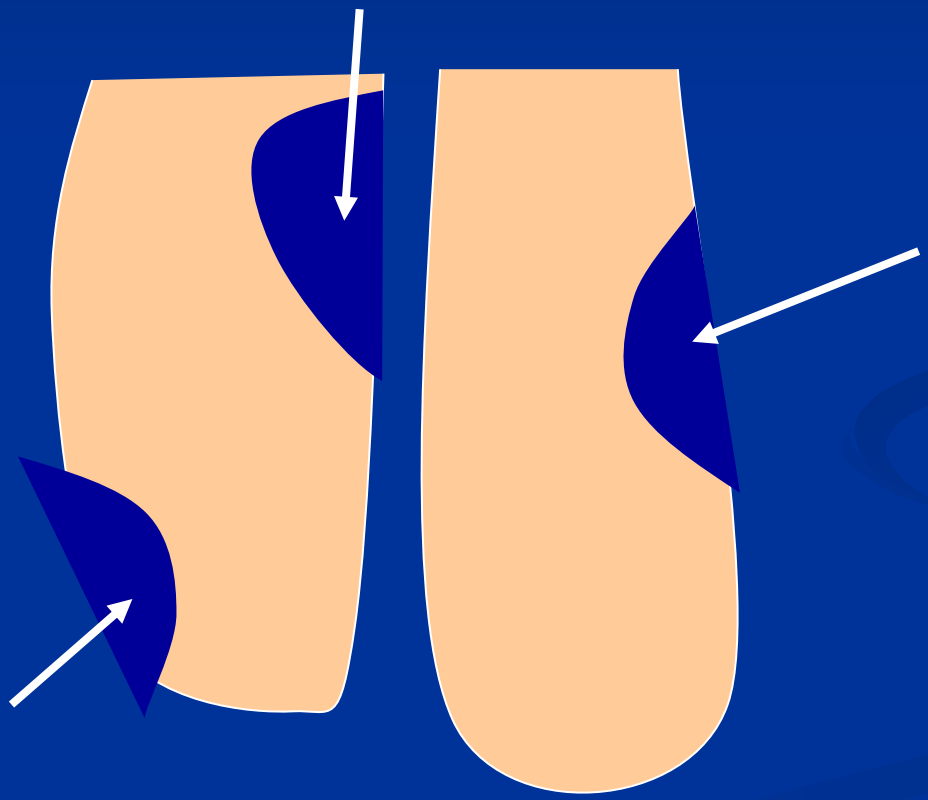
Patience



Obliterace

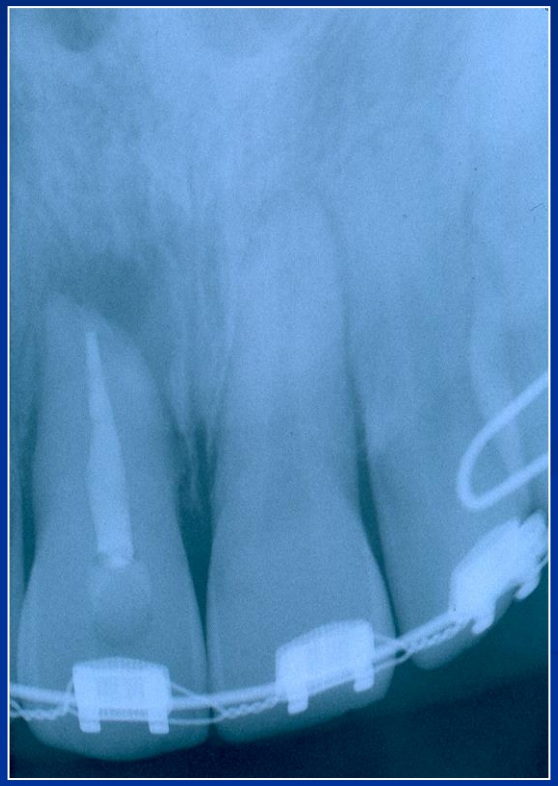
Úplná - ponechat.

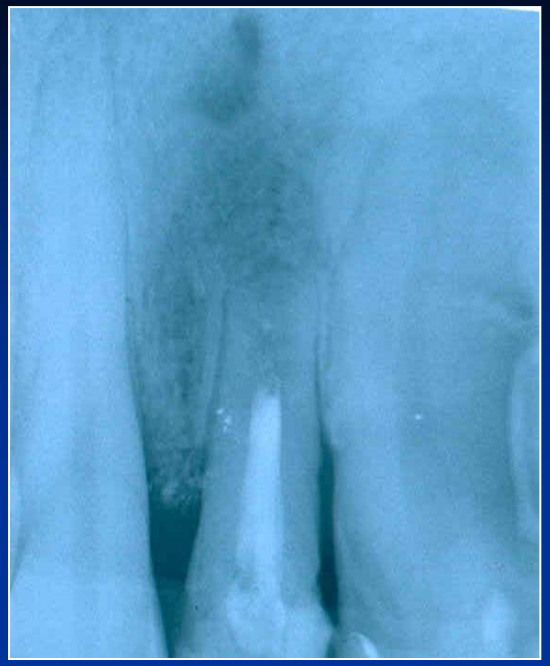
Resorption

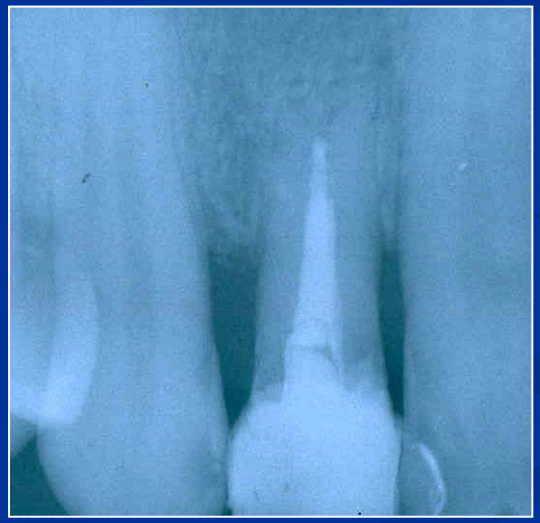


Calcium hydroxide

- Long term
- Middle term
- Short term







Via falsa

- Perforation of the bottom of the pulp chamber or the coronal part of the root canal
- Perforation in the middle part of the root canal
- Apical perforation


LOT 000721 EXP 050
DENTSPLY
PRO ROOT™
MTA (Mineral Trioxide Aggregate)
Root Canal Repair Material
Contents: 1 gram (1 treatment)
CE
0120
MTA Water
Lot 000724

MTA composition

- Dicalcium silicate
- Trikalcium silicate
- Trikalcium aluminate
- Tetrakalcium aluminate
- Cuprum sulphate
- Bismuthum trioxide

= Portland cement

MTA

- Umožňuje hojení – dobrý okrajový uzávěr !

Zabraňuje přístupu mikroorganismům, umožňuje hojení dřeně a periodoncia tvrdou tkání.

Via falsa - treatment

- No bleeding
- Desinfection
- MTA – moisture (wet cotton pellet)

- Calcium hydroxide
- Filling

Via falsa

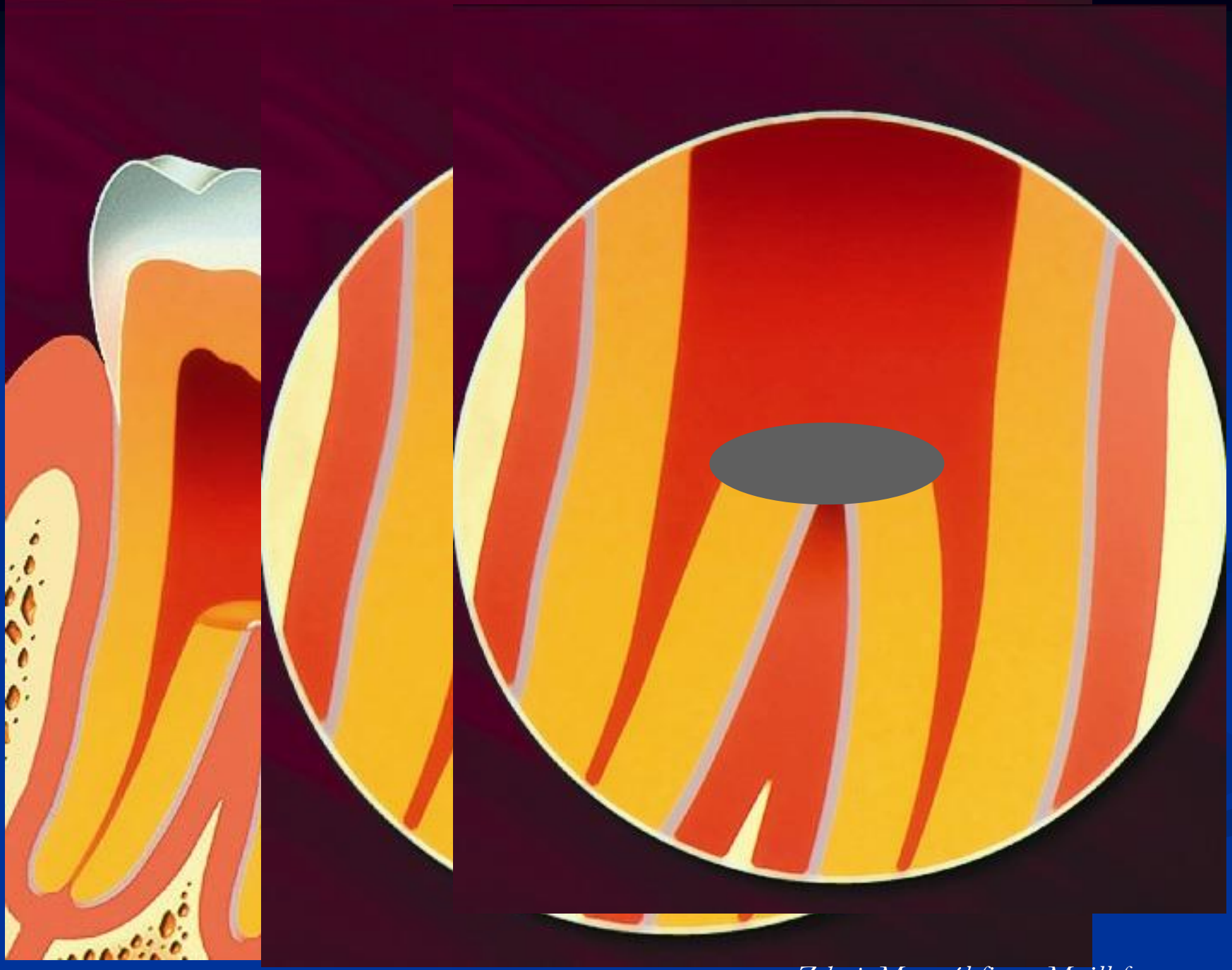
- Perforace apikálně

Hydroxid kalcia, kořenová výplň.

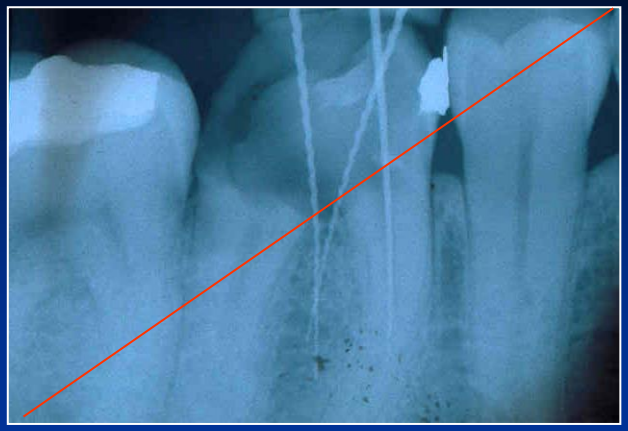
MTA

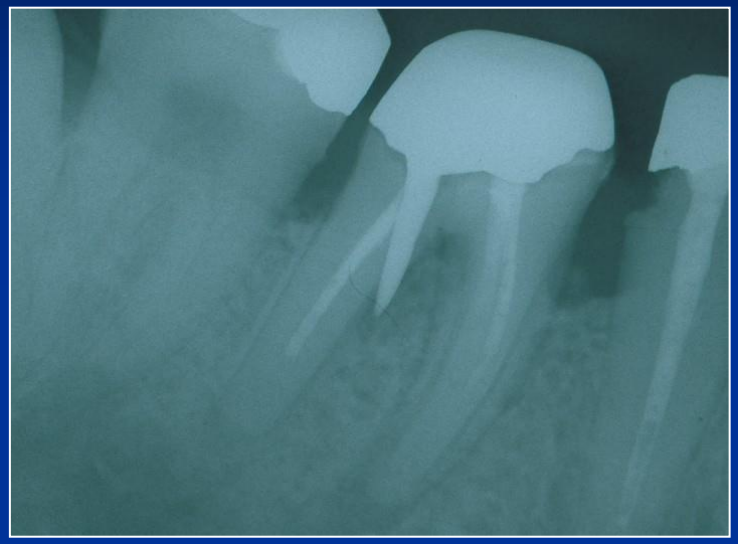
- Umožňuje hojení – dobrý okrajový uzávěr !

Zabraňuje přístupu mikroorganismům, umožňuje hojení dřeně a periodoncia tvrdou tkání.

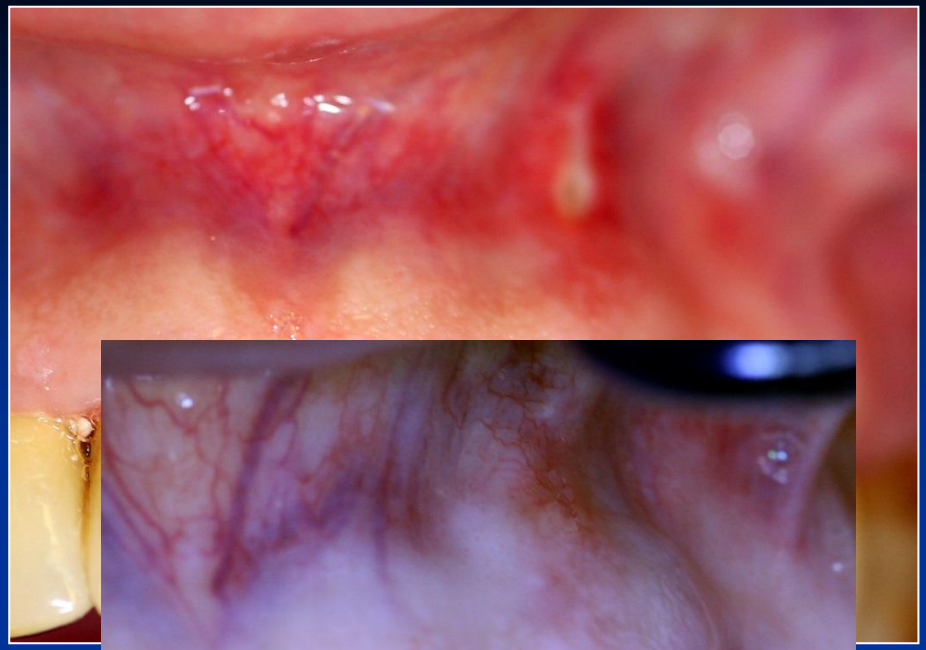


Zdroj: Manuál firmy Maillefer





Regional complications



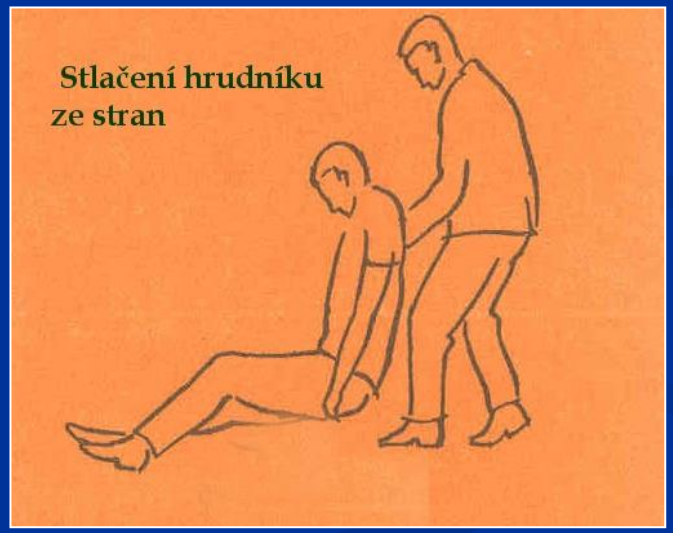
Píštěl

Systemic complications

Systemic complications

- Periostitis
- Inflammation of soft tissues (face, neck)
- Gulp of the instrument (X ray, remnant diet, information)- cough
- Aspiration of the instrument -emesis


Odstranění cizího
tělesa z hrtanu


Stlačení hrudníku
ze stran

Caution!

Always find the loss instrument !!!!!!

Obliteration

Partial

Obliterace

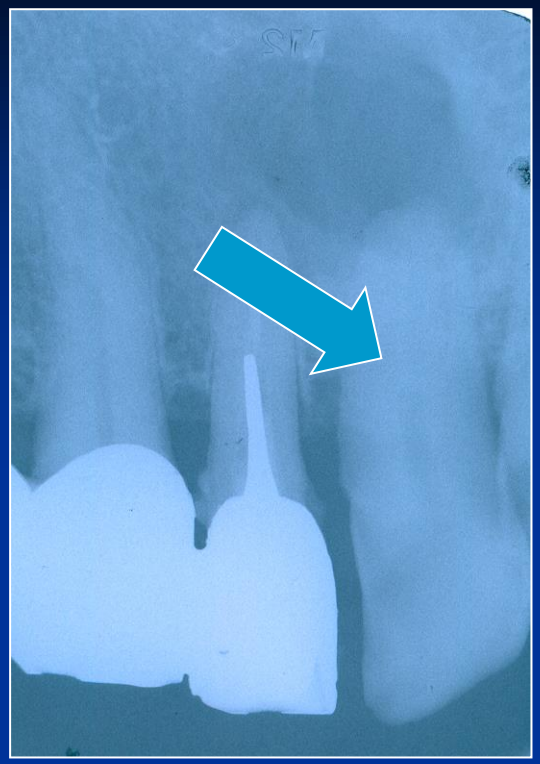
Access!!!

Hand thion Instrument!

Steel or NiTi

EDTA

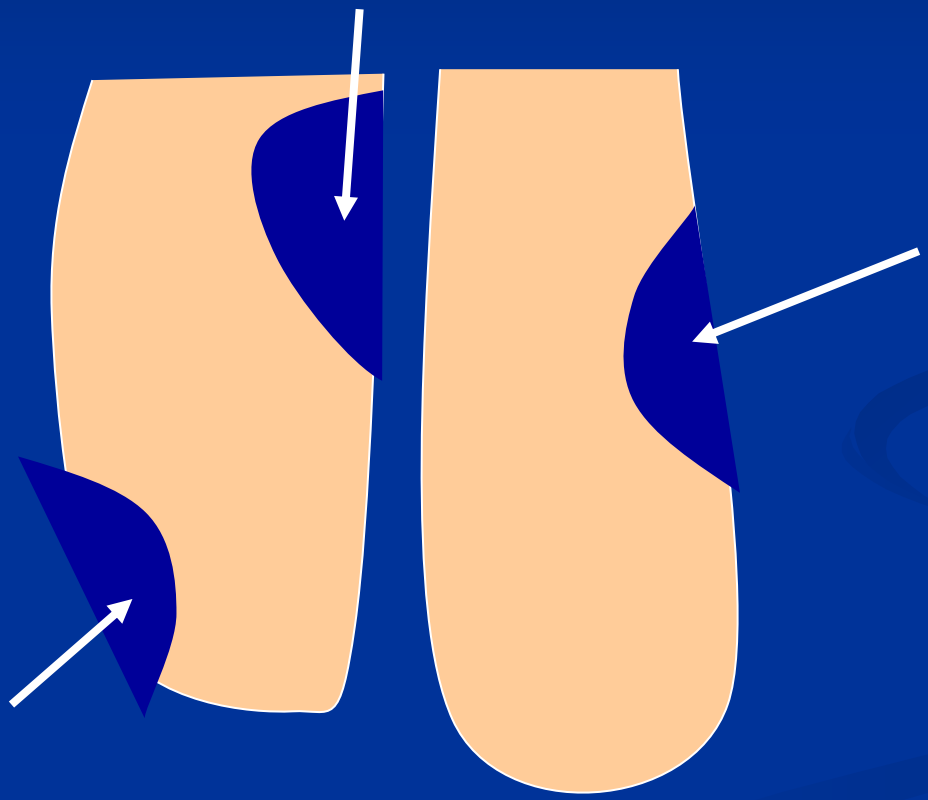
Patience



Obliterace

Úplná - ponechat.

Resorption



Calcium hydroxide

- Long term
- Middle term
- Short term