Obturation of the Root Canal System: Lateral Compaction and Radiological control

Dr János Vág Phd

Department of Conservative Dentistry

Semmelweis University

Based on Cohen's Pathways of the Pulp 10th edition, Chapter 10

CHAPTER OUT

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- CANAL SYSTEM
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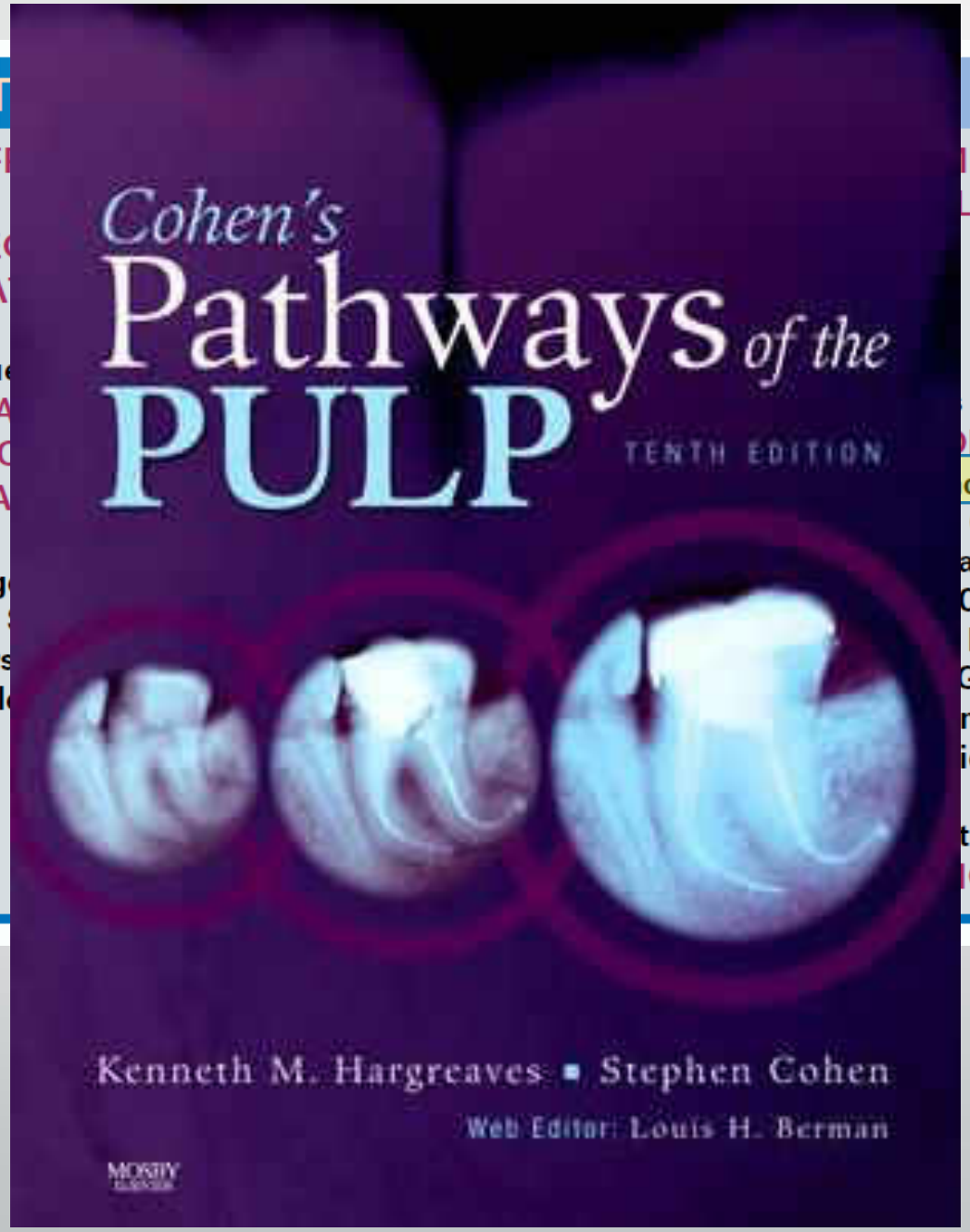

- IENT
- LS
- BTURATION
- ction
  - Compaction
  - ave Compaction Technique
  - Compaction
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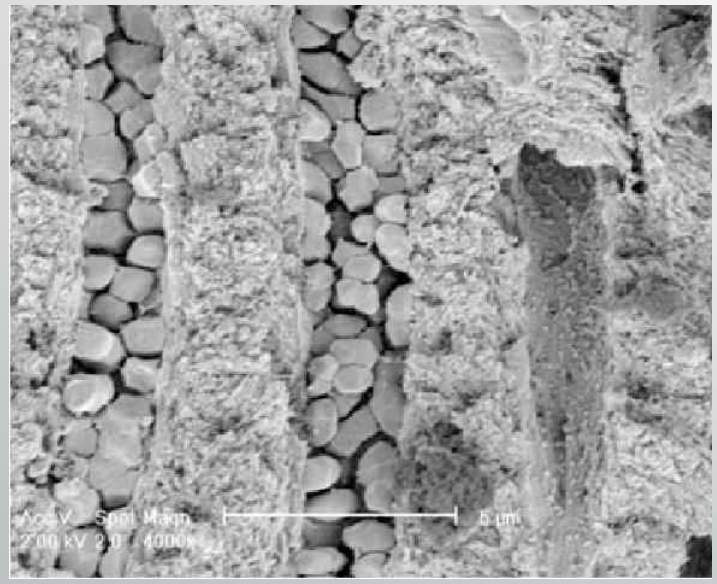
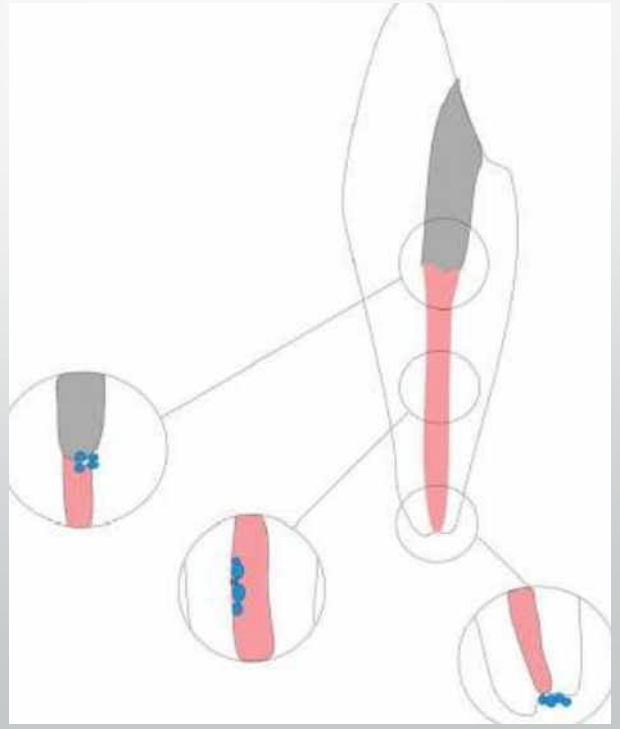
  - Gutta-Percha
  - nical Compaction
  - iques
- turation
- ICE SEAL

The neccessity of obturation

- Pulpal remnants, necrotic tissue, bacteria, and bacterial by-products remaining - initiate a lesion
- Cannot be completely cleaned and disinfected

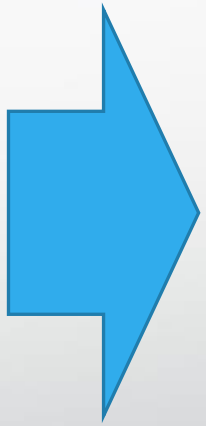


- Obturation reduces coronal leakage
- seals the apex
- entombs the remaining irritants



Timing of obturation

- patient's signs and symptoms,
- status of the pulp and periradicular tissue
- the degree of difficulty
- patient management.



- Vital Pulp Tissue - one-step
- Necrotic Pulp Tissue - one-step vs multiple

		symptoms	Periapical pathosis	One step	Multiple step
Vital pulp	Accidental, prosthetic, pulpitis	+/-	-	+	
Non vital pulp	Necrosis, chronic apical periodontitis, chronic apical abscess, condensing osteitis	-	+/-	+	
	Acute apical periodontitis, acute apical abscess	+	+		+

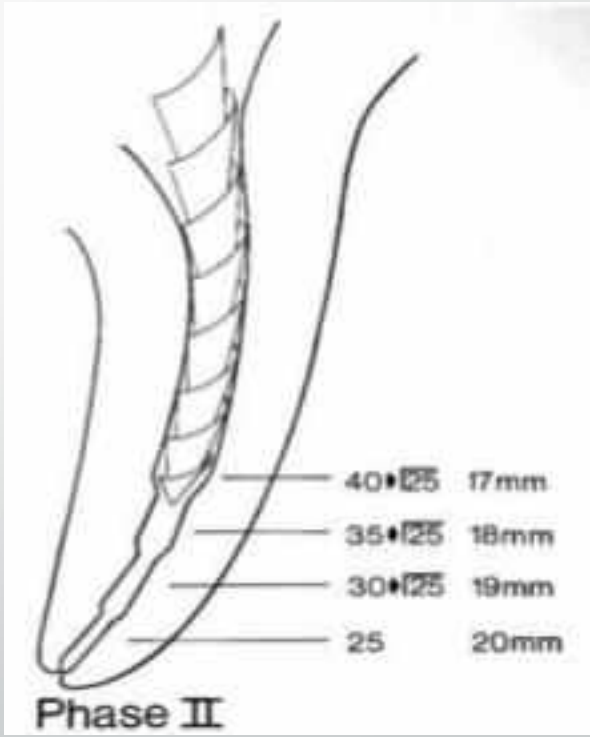
Open 1 day ?

Calcium hydroxide intracanal medicament
1 week

Preparation for obturation

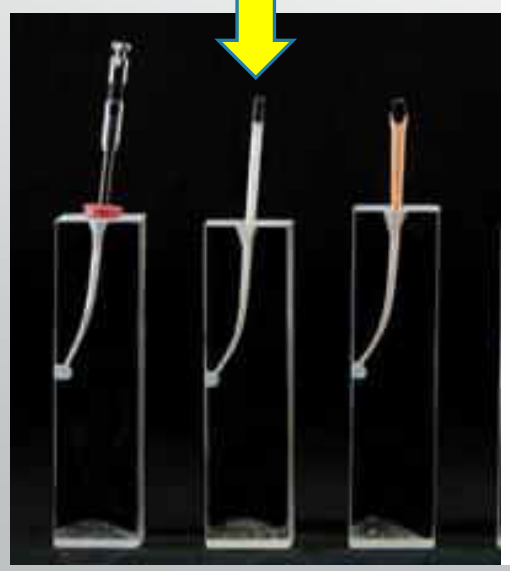
Working sheet

	Estimated WL	AL (-0.5mm)	Needle Control	Adjusted WL	MAF	enlargement
MB	21 mm	19.5mm	19.5mm (15 Hedström)	19.5mm	25	40
ML	21mm	19.5mm	19.5mm (15 K-file)	19.5mm	25	45
D	20mm	21mm	21mm (20 K-file)	21mm	35	50



Preparation for obturation

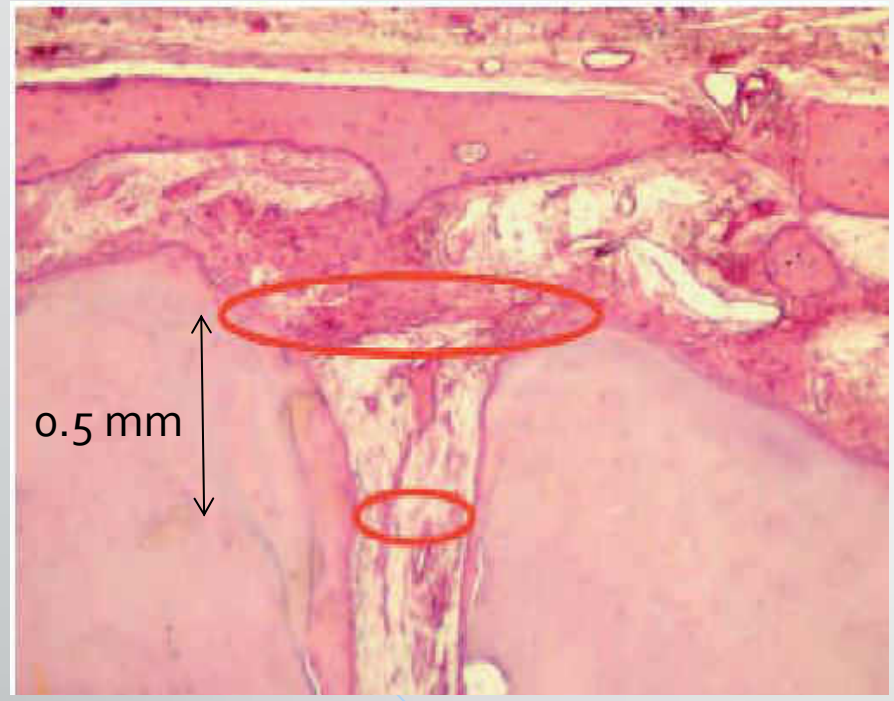
- Smear layer removal – increase adhesion – 17% Na2-EDTA -1-5min
- Rinse – neutral solution (dH2O, 0.9%NaCl)
- Dry –paper point, vacuum



Ideal root canal filling

- Upto the apical constriction
- obturated root canal should reflect the original canal shape
- Radiographic interpretation

The length of the obturation



Core material + sealer

Function of the Sealer

- to seal the space between
  - the dentinal wall and the obturating core
  - gutta-percha points used in lateral condensation.
- To fill voids and irregularities in the root canal, lateral and accessory canals
- lubricants

Ideal sealer (Grossman)
At present no sealer satisfies all the criteria.

Properties of an Ideal Sealer

- Exhibits tackiness when mixed to provide good adhesion between it and the canal wall when set
- Establishes a hermetic seal
- Radiopaque, so that it can be seen on a radiograph
- Very fine powder, so that it can mix easily with liquid
- No shrinkage on setting
- No staining of tooth structure
- Bacteriostatic, or at least does not encourage bacterial growth
- Exhibits a slow set
- Insoluble in tissue fluids
- Tissue tolerant; that is, nonirritating to periradicular tissue
- Soluble in a common solvent if it is necessary to remove the root canal filling

Types of Sealers

- zinc oxide–eugenol
- calcium hydroxide sealers
- glass ionomers
- resins

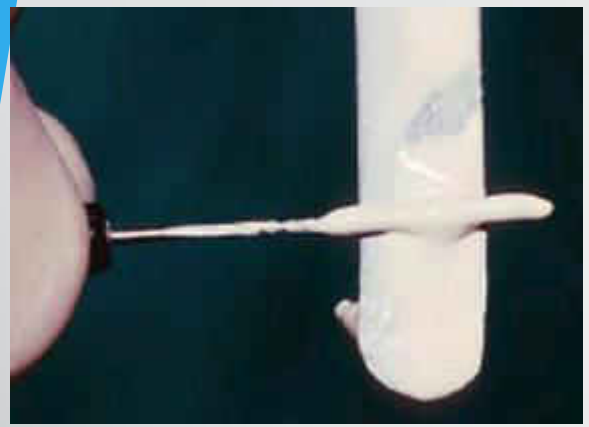
Resin based

- – 50 years –
- Epoxy resin: rtg fillers, SiO2, amines,
  - AH series (Dentsply): AH26, AH Plus
  - Diaket a polyvinyl resin (3M ESPE)
  - EndoRez – resin-coated guttapercha point
  - Epiphany/resilon RealSeal (Kerr?) 2004.
- Low water absorbtion, - but significant dissolution (<3% 24h, H2O)
- Good dentin adhesion

AH Plus (gold standard)

- (http://www.dentsply.ch/bausteine.net/f/7299/SCAHPlus050419rMV(Germanmarket).pdf?fd=2: upgrade of the AH26: ~~shrinkage, disoloration, formaldehide, powder-liquid~~
  - Low solubility
  - High stability
  - Slighlty Thixotrop
  - Adhesion to dentin, good penetration
  - Good sealing
  - Slight expansion
  - 4 hours
- Disadavantage:
  - No bonding to guttapercha

Sealer Placement



- master cone, files, reamers
- lentulo spirals
- ultrasonics.

Core Materials

- Silver Cones
- Gutta-Percha
- Activ GP
- Resilon
- Custom Cones

2005

ENDODONTOLOGY

GUTTA-PERCHA – AN UNTOLD STORY

Dr. R. Prakash*
Dr. V. Gopikrishna**
Dr. D. Kandaswamy***

ABSTRACT

"GUTTA-PERCHA" was first introduced as a restorative material and later developed into an indispensable endodontic filling material. It has become the "soul" of endodontics, in its development as a specialty.

Many articles have dealt about the various techniques of usage of Gutta-percha, but the present article deals briefly with its history, sources, chemistry, commercial manufacture, its evolution and material, wh

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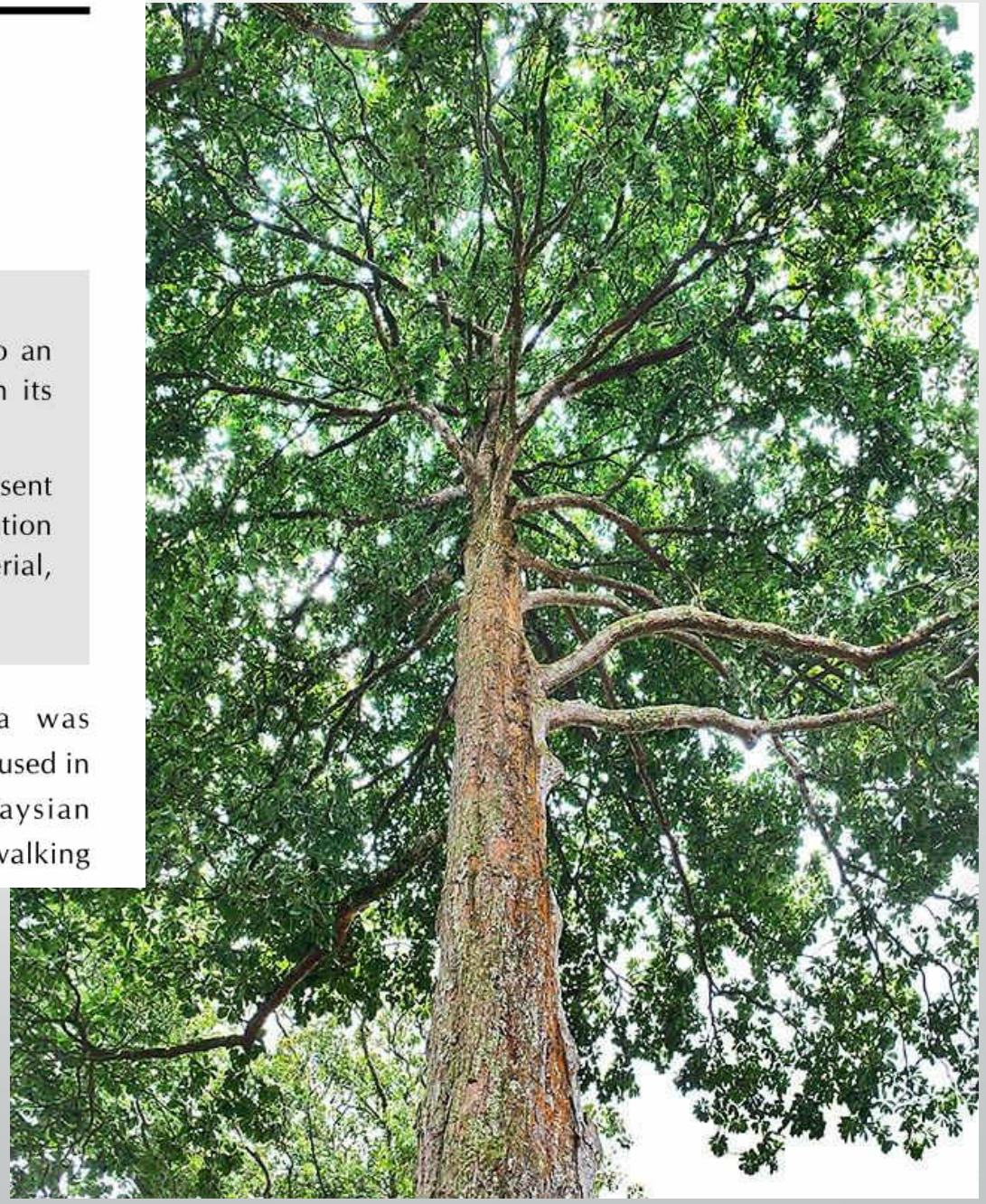
Gutta-percha fa
(Sapotaceae család,
Palaquium gutta, Isonandra gutta, Dichopsis gutta)

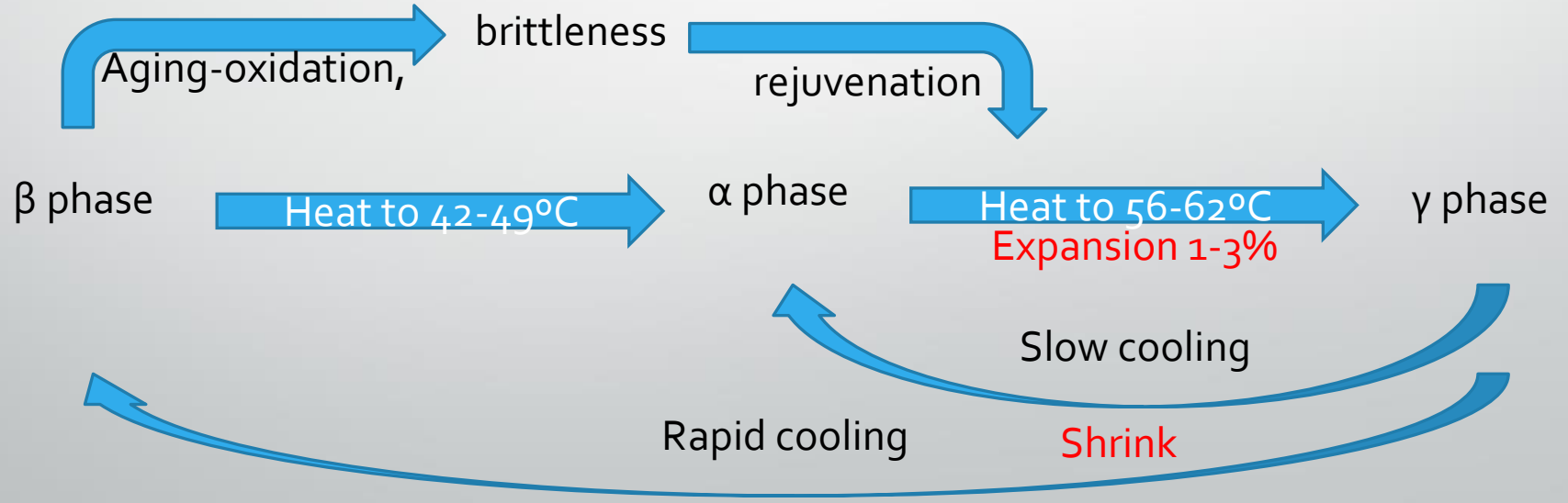
"GETAH"- gumi
"PERTJA"- fa neve (Maláj nyelven)

1656 - John Tradescant hozta először Angliába távol keletről
1867 - Bowman - gyökértömés.
1887 - S.S White cég – első guttapercha poén
1959 – Ingle és Levine - standardizálás



Gutta-percha

- *trans* isomer of polyisoprene (rubber)
- Gutta-percha cone: 20% guttapercha, 65% zinc oxide, 10% radiopacifiers, 5% plasticizers
- two crystalline forms
  - α.....natural form, runny, tacky and sticky, lower viscosity, THERMOPLASTIC FILLING
  - β.....most common commercial form solid, compactible and elongatible, higher viscosity
  - γ phase - amorphous
  - Slow cooling result in α form rapid cooling result in β form



Gutta-Percha

- plasticity
- ease of manipulation
- minimal toxicity
- radiopacity
- ease of removal with heat or solvents.
- disadvantages: lack of adhesion to dentin
- shrinkage on cooling

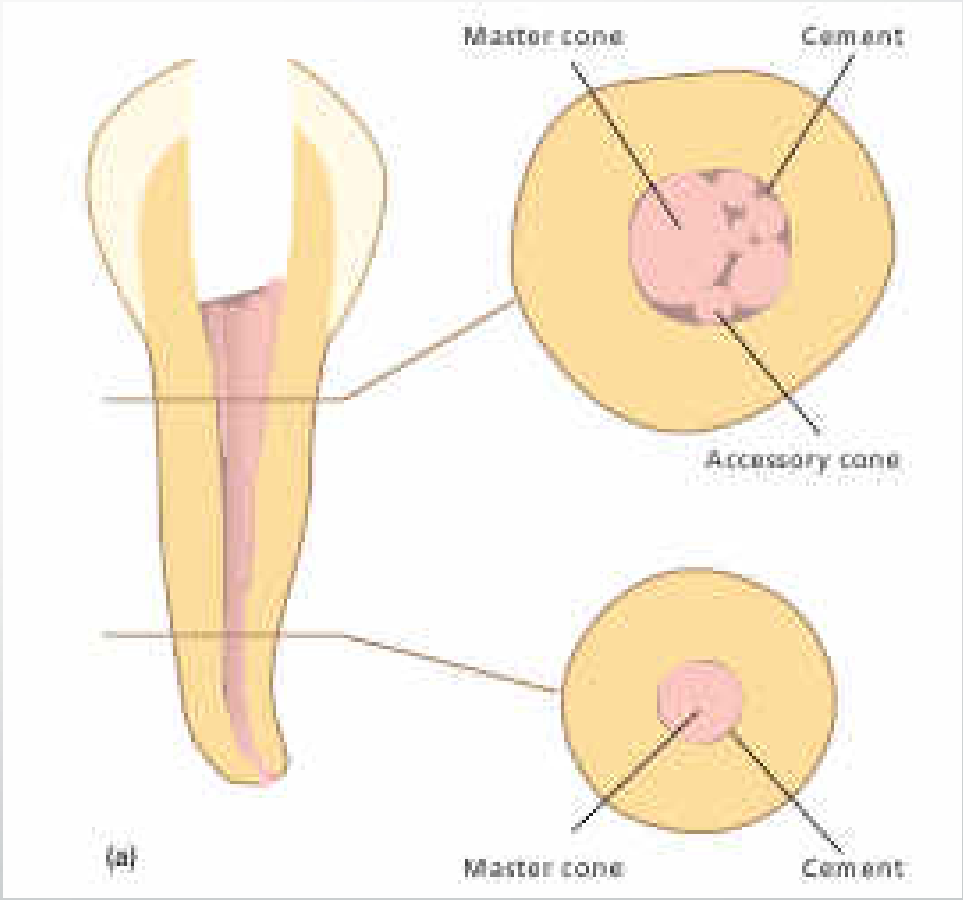
Gutta-percha

Gutta-percha

- Sterilization before use: placing the cones in 5.25% NaOCl for 1 minute

Lateral Compaction

- most clinical situations
- length control during compaction
- with any of the acceptable sealers
- only a few instruments (cheap spreaders)
- may not fill canal irregularities



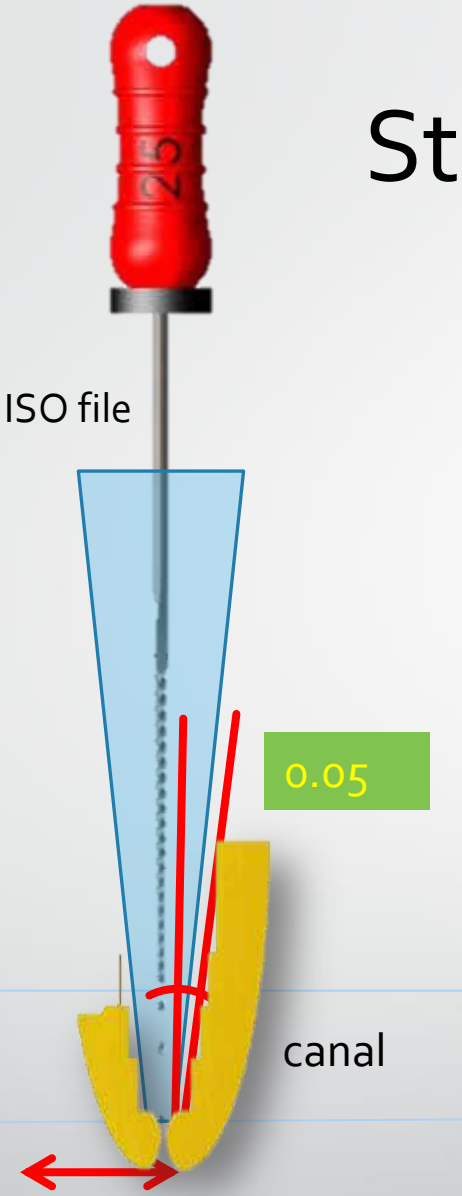
Lateral compaction
Step by step

Dr. Gaurav Garg

Lecturer

College of Dentistry, Zulfi

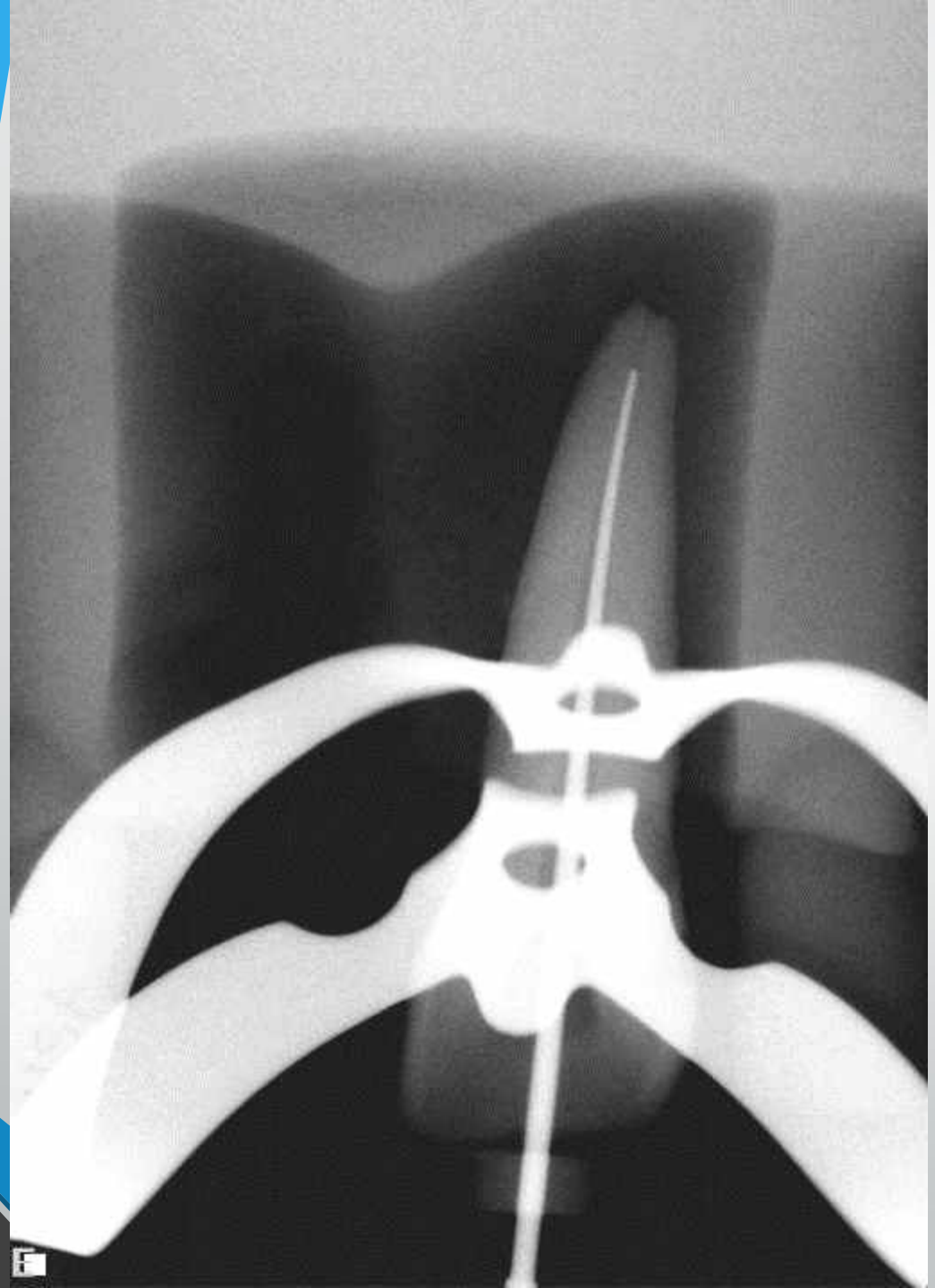
Step-back technique



Type of spreaders

- long handled spreaders
- finger spreaders

Finger spreaders provide: better tactile sensation & less likely to induce fractures



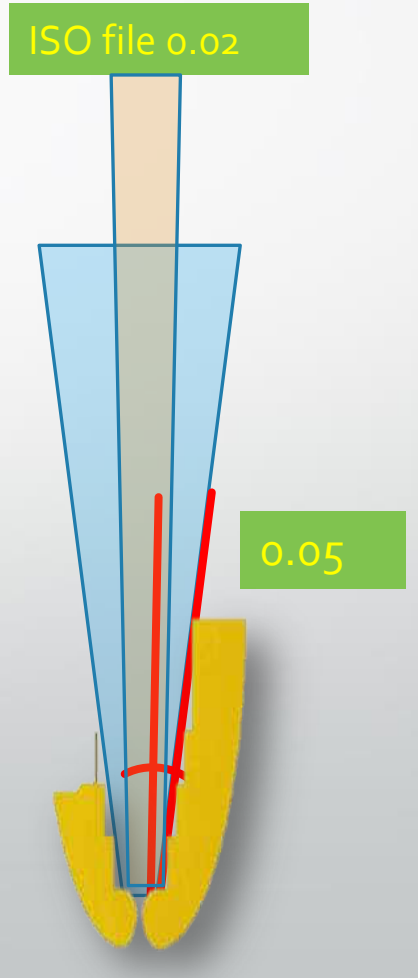
Spreader fit

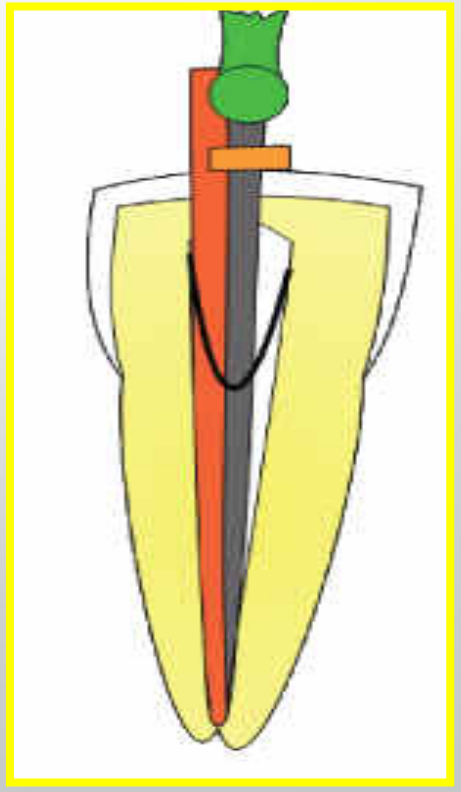
- Fit within at the WL.
- If not, more shaping is required because apical size and taper is inadequate.

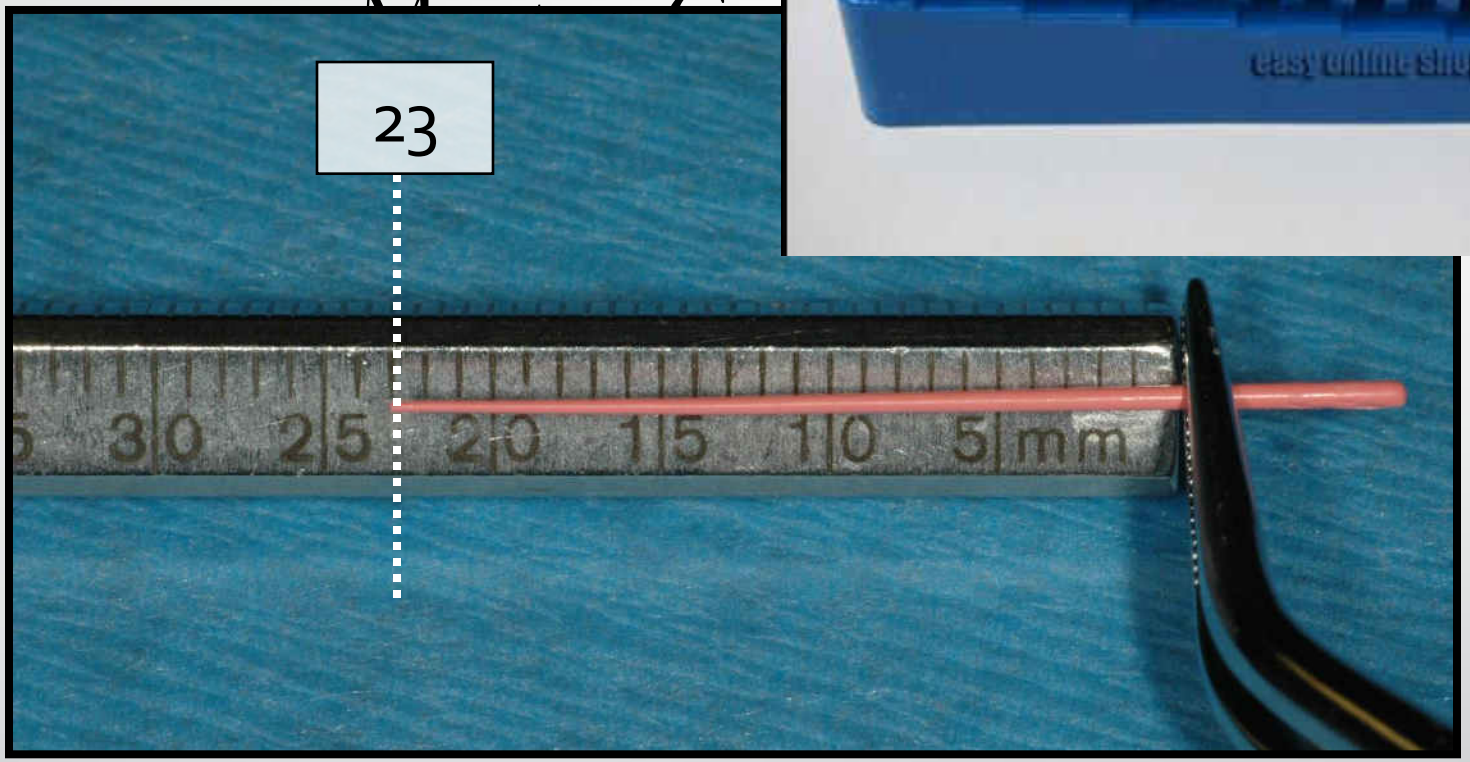
➢Excessive force should be avoided—cold gutta-percha is not greatly compressible, and as little as ***1.5 kg of pressure are capable of fracturing the root.***

Master Cone Fit

- Select Master Cone size that corresponds to your MAF size.







- If MC is at FWL, you are ready to obturate.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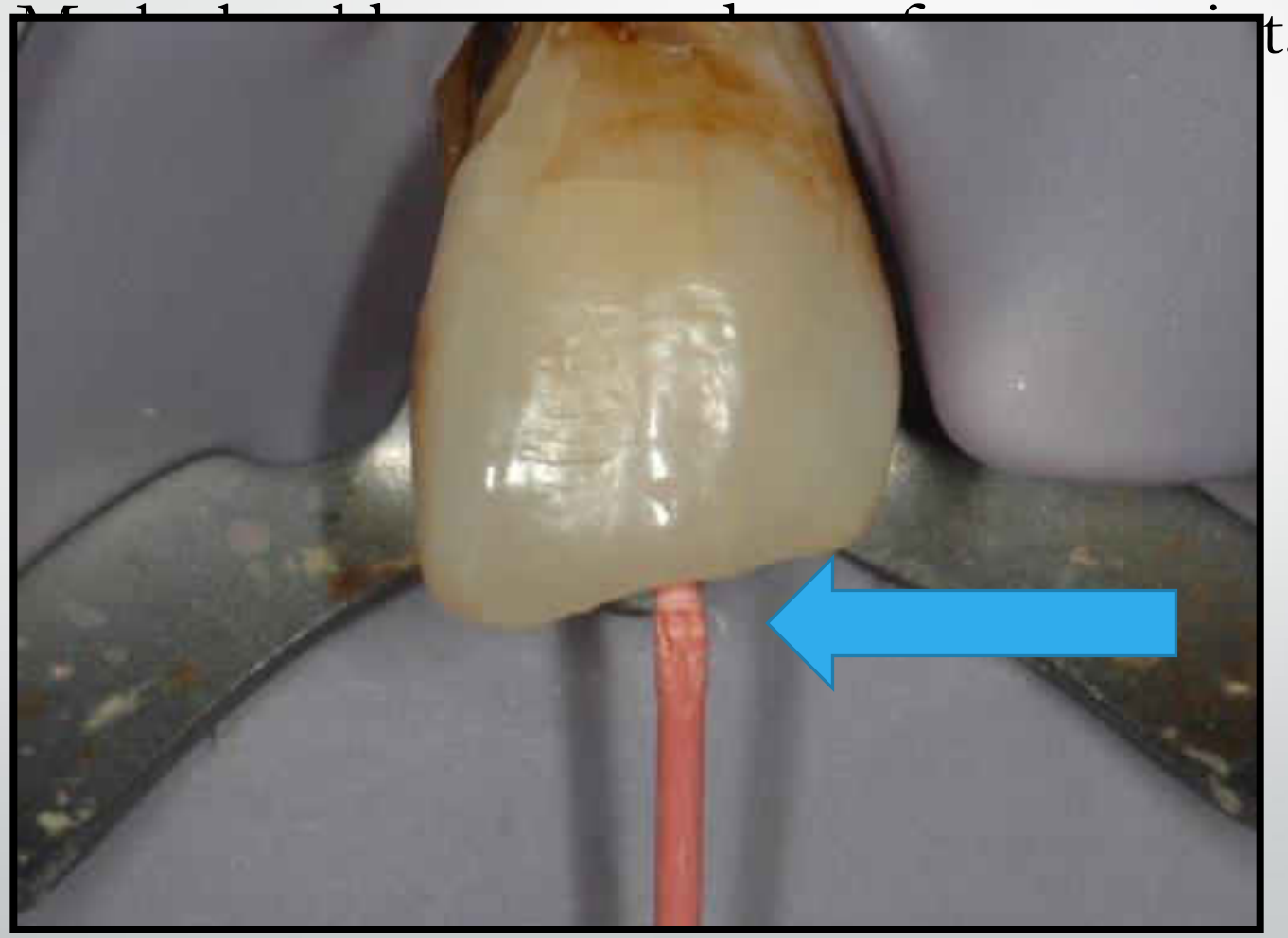
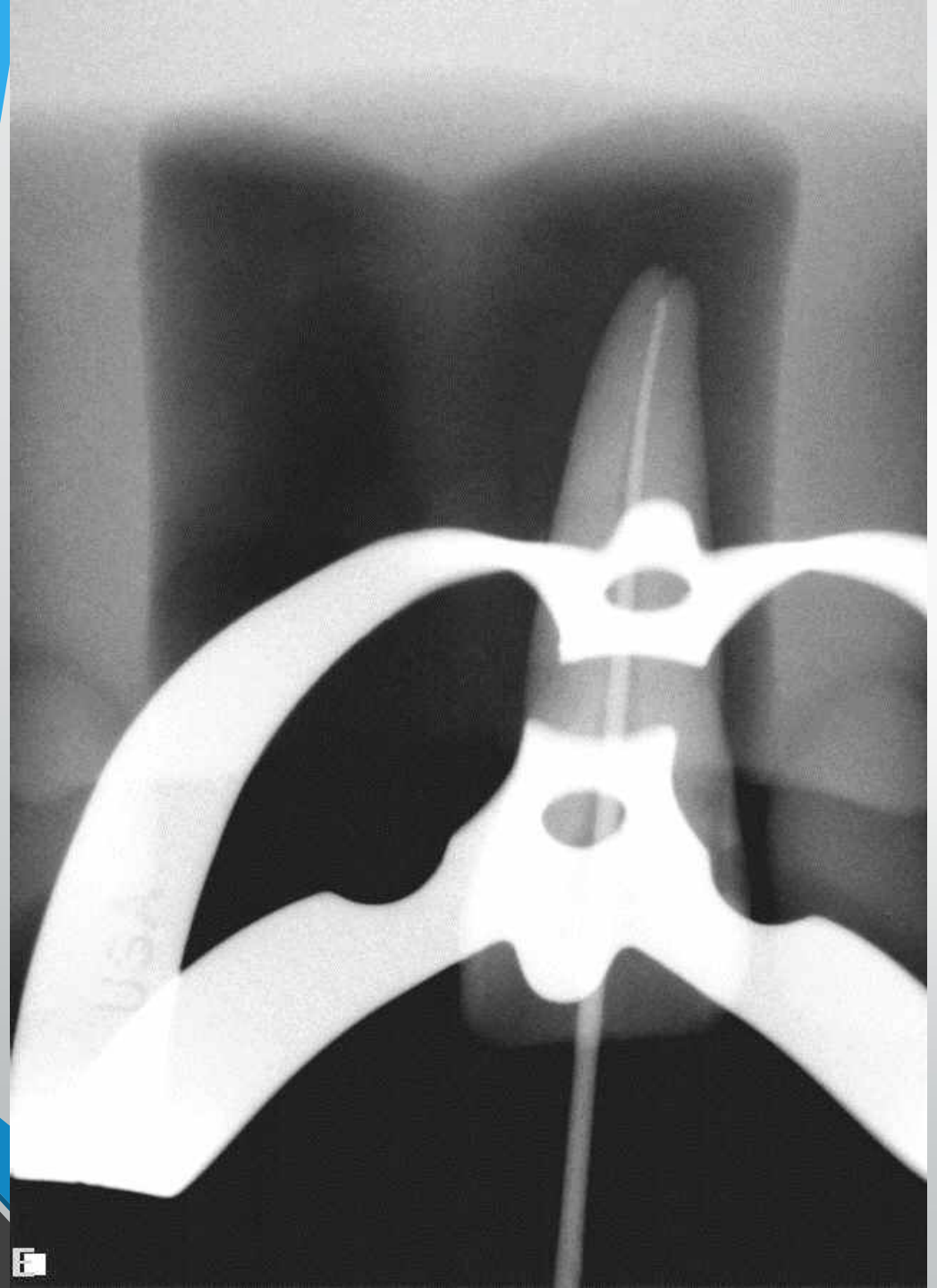
- The MC should have a definite apical resistance when MC is placed to FWL.
- The MC should exhibit “tugback” or resistance to removal.

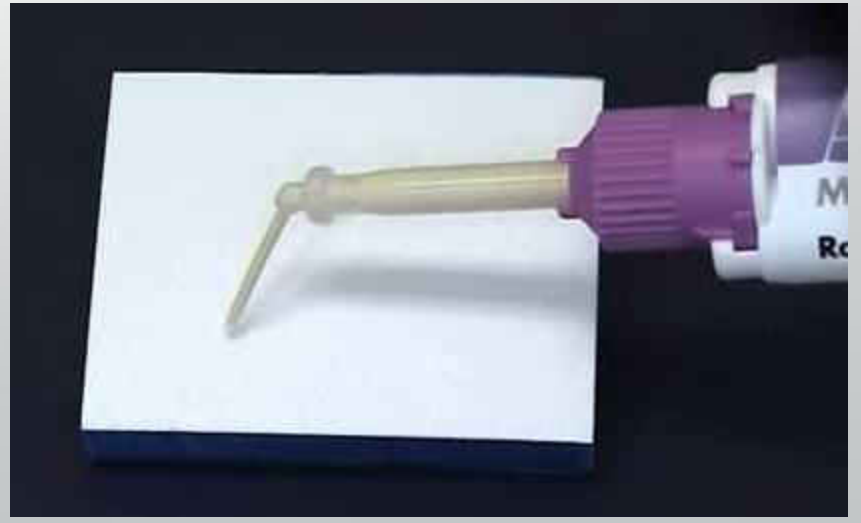




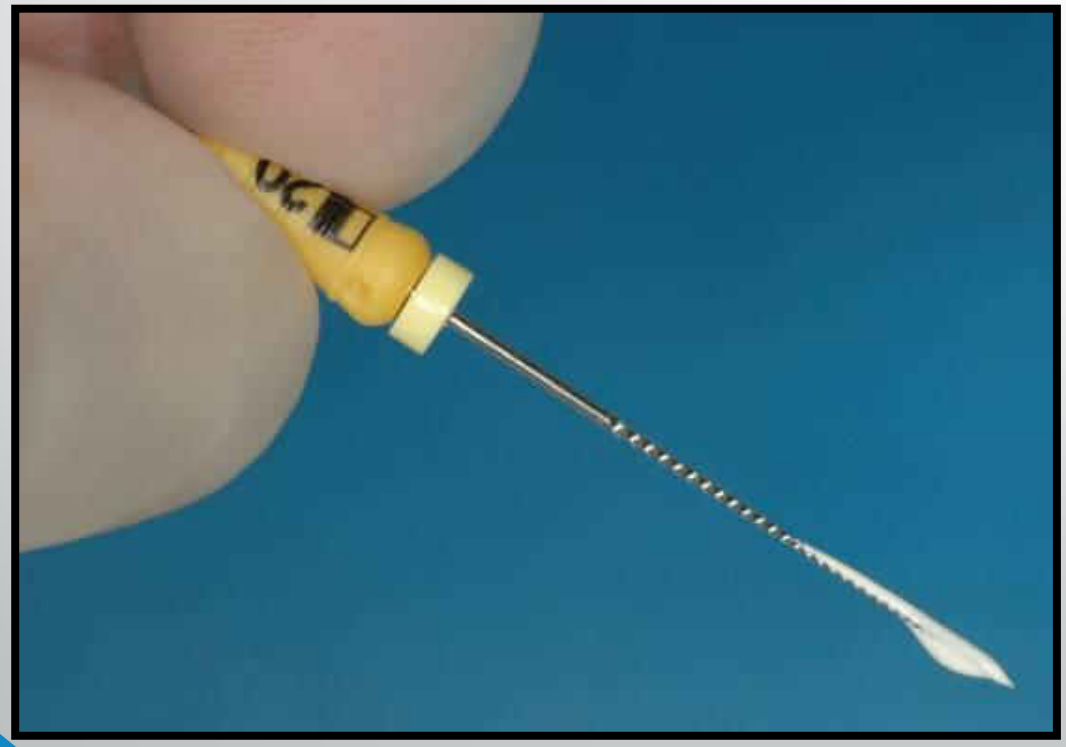
Master Cone Fit

- The Master Cone should seat to final working length.
- **Obturation length= FWL**

Mix the Sealer



Optional

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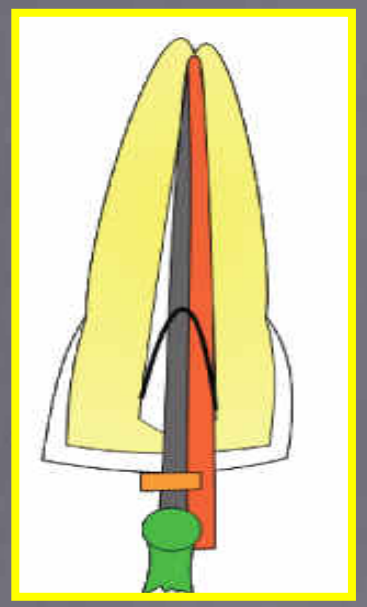
HILDY USA 9



1-2mm

30 sec constant pressure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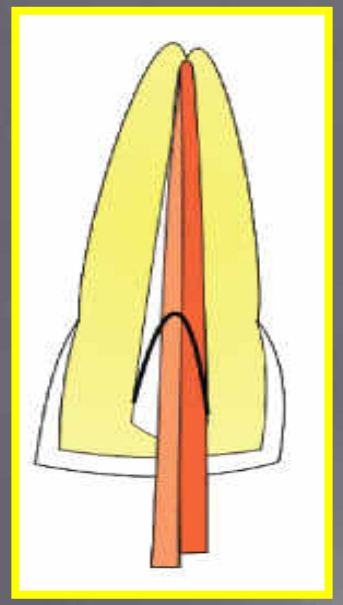

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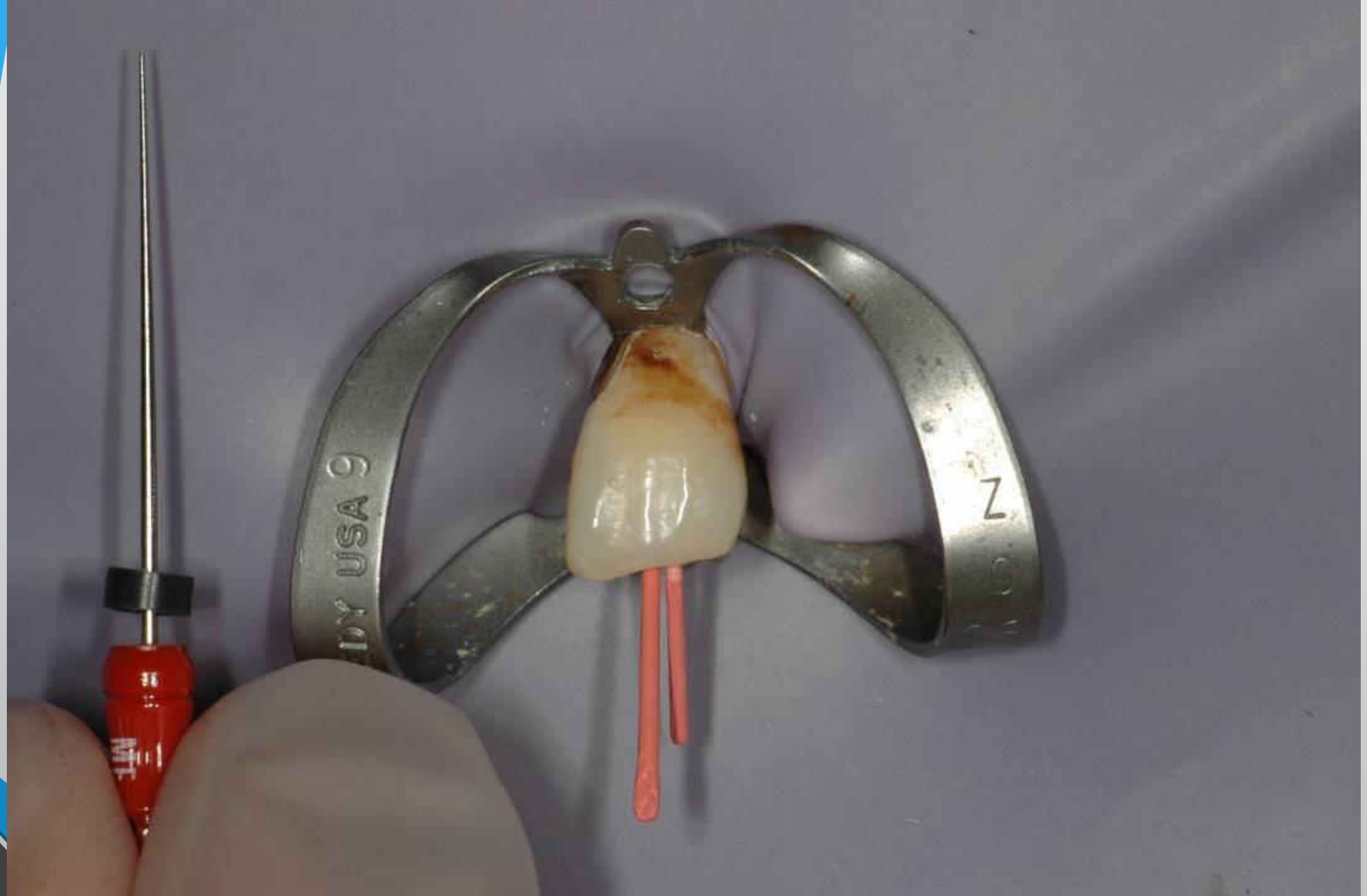
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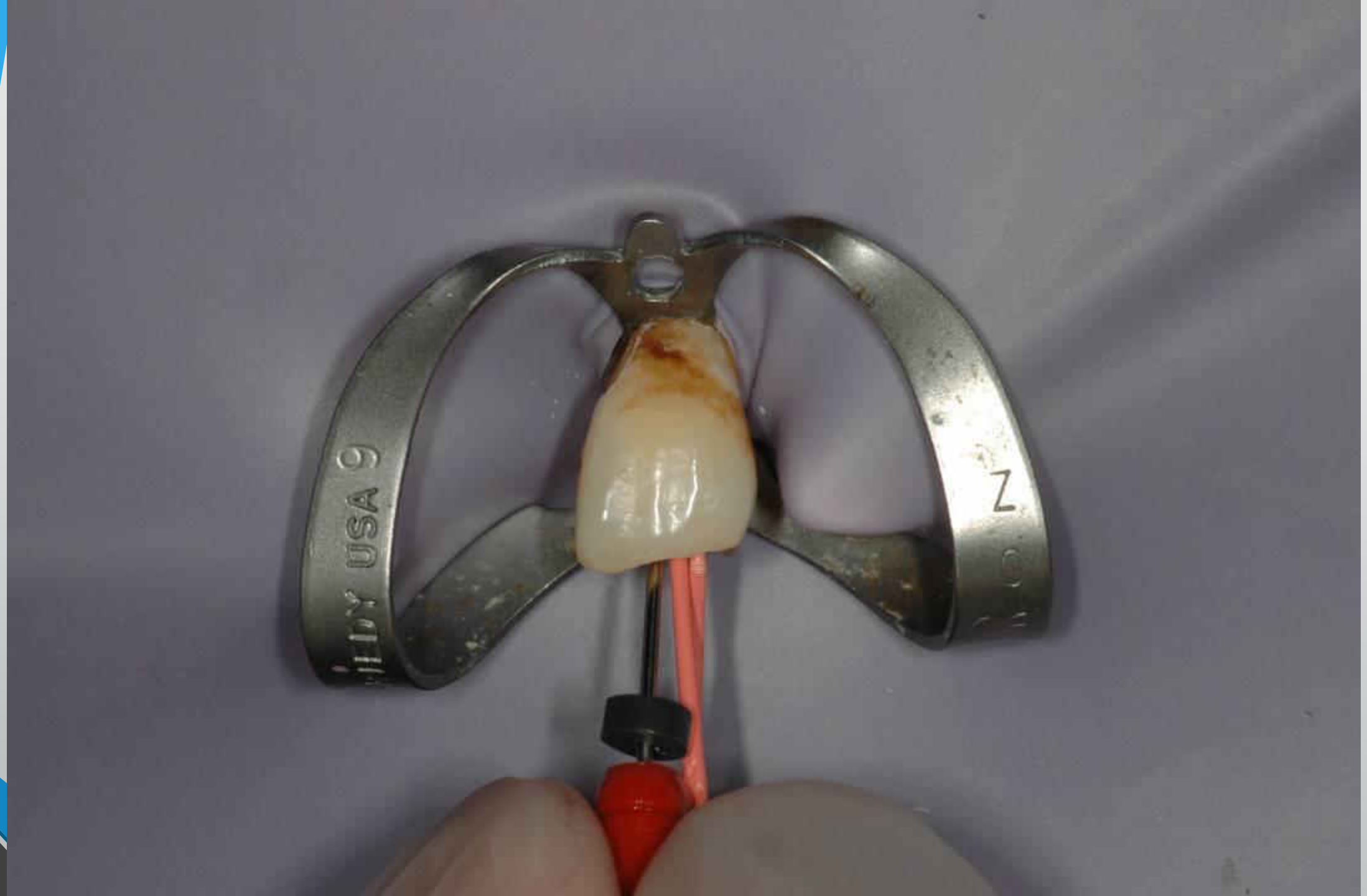
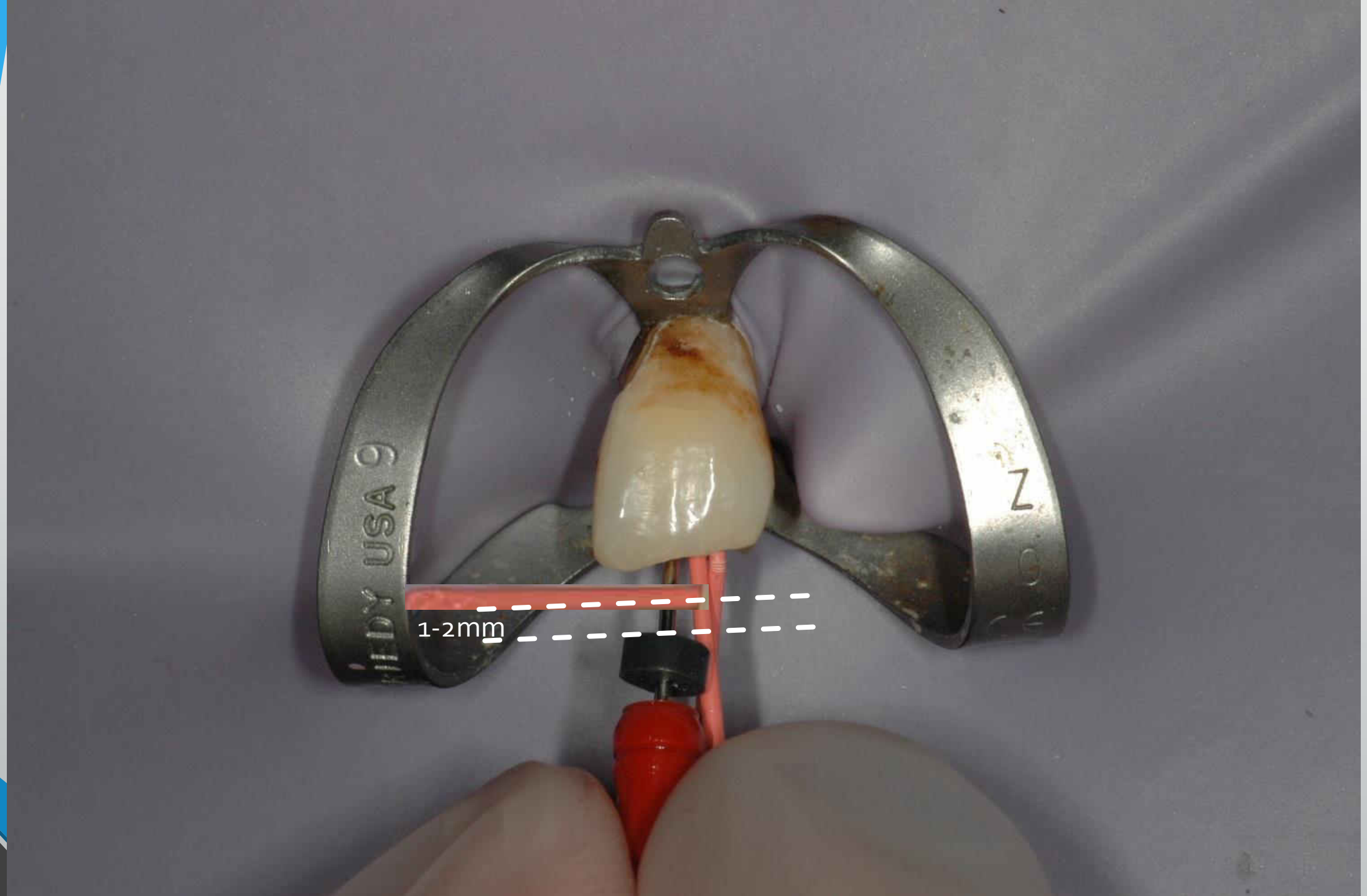
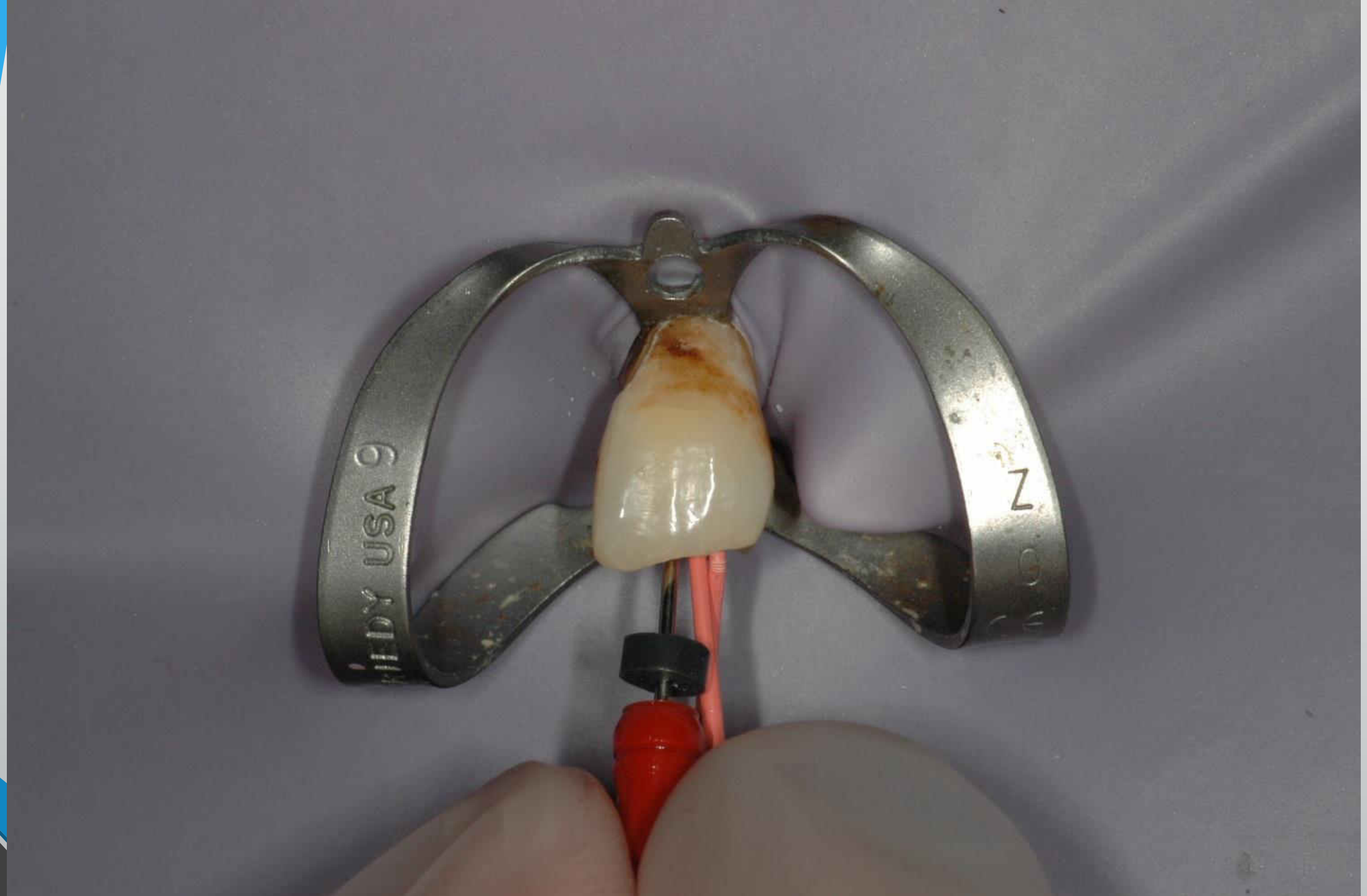

USA 9


HEDY USA 9
1-2mm


USA 9
Z


HEDY USA 9
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HIDY USA 9
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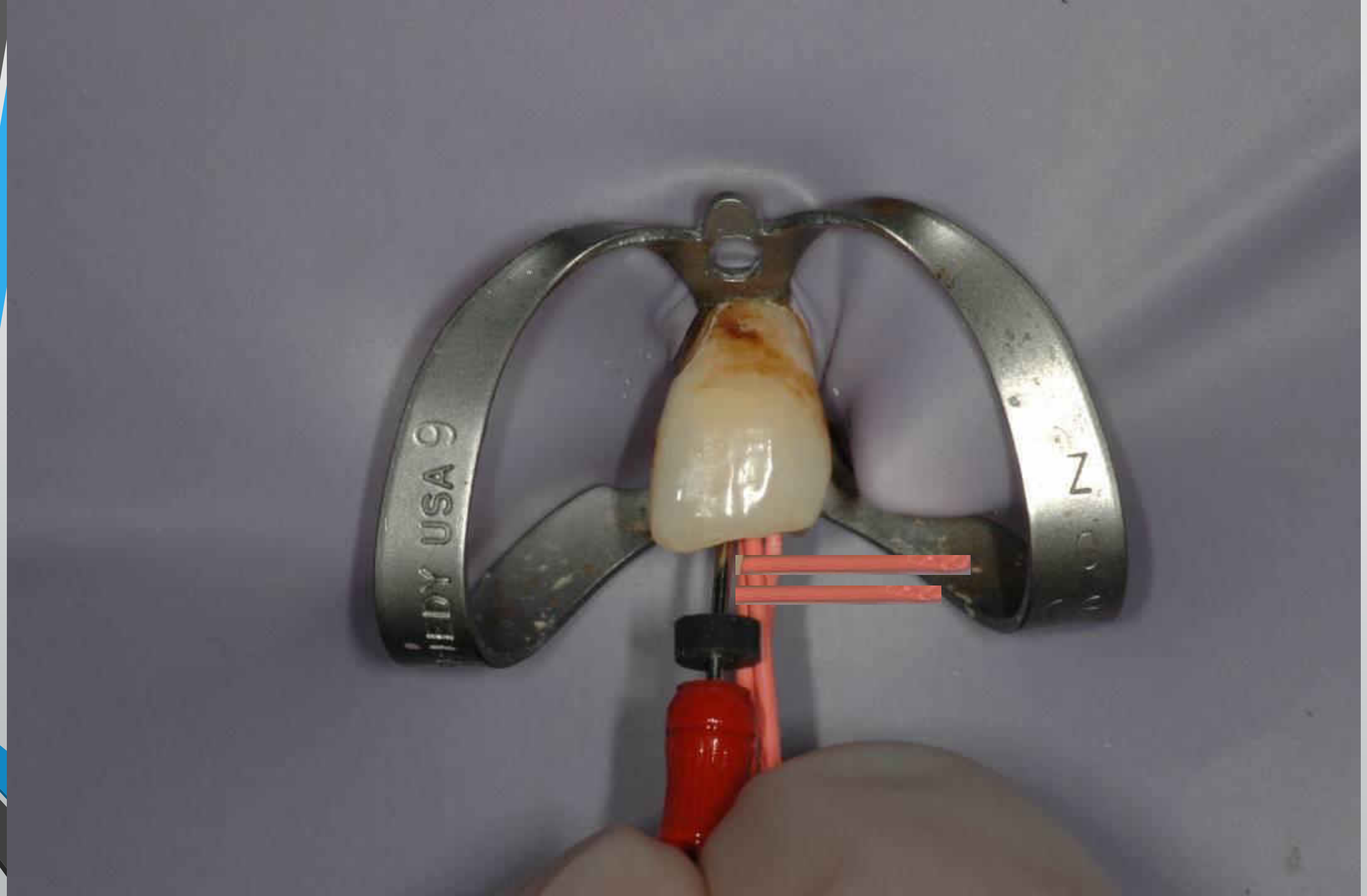
USA 9


USA 9

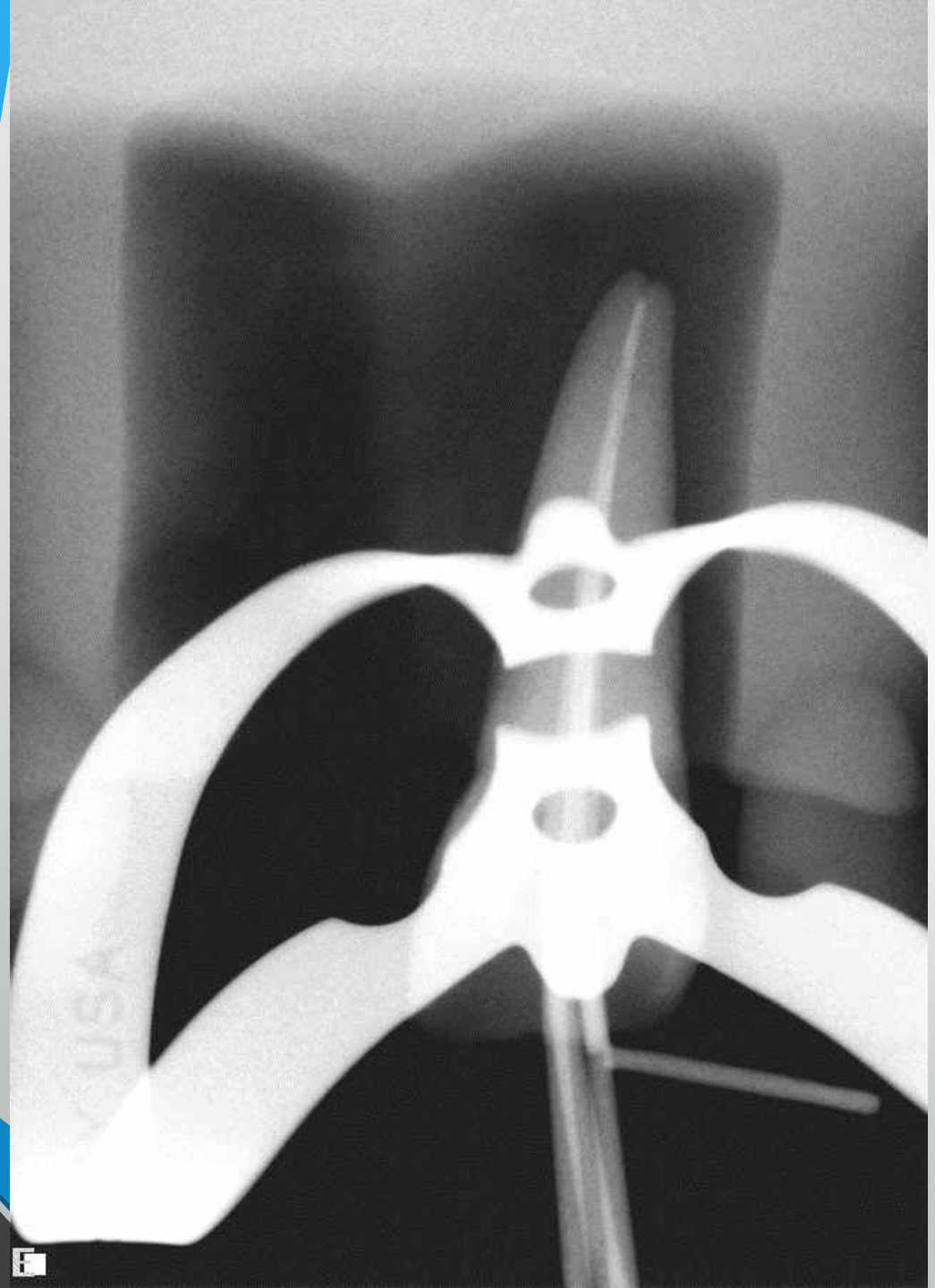

HEDY USA 9
Z


USA 9


HU-FRIEDY USA 9
Z

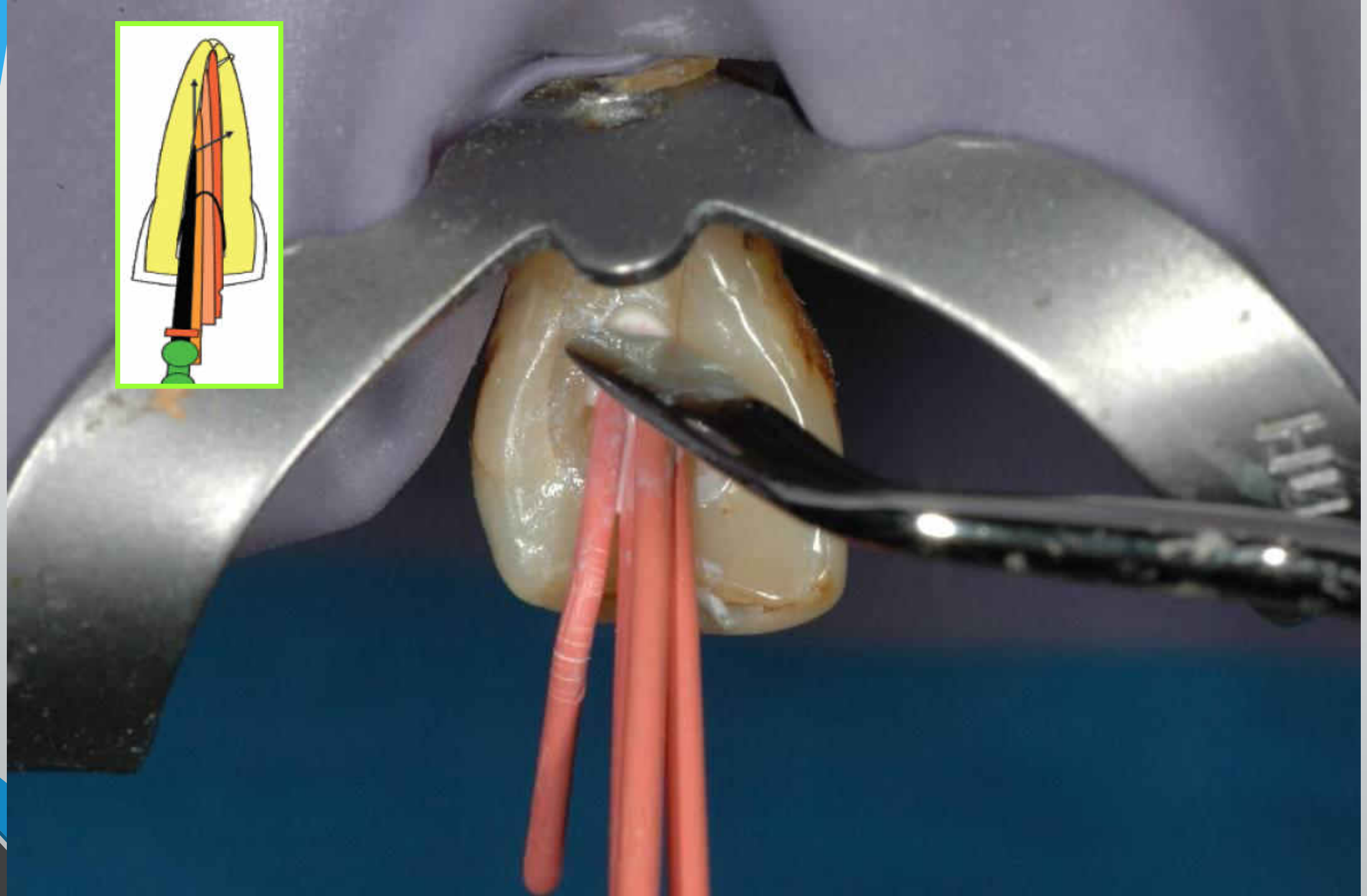

HIDY USA 9
Z

Repeated until no longer goes beyond the coronal one third of the canal.



Lateral Compaction

- Take a radiograph at this time and evaluate fill.

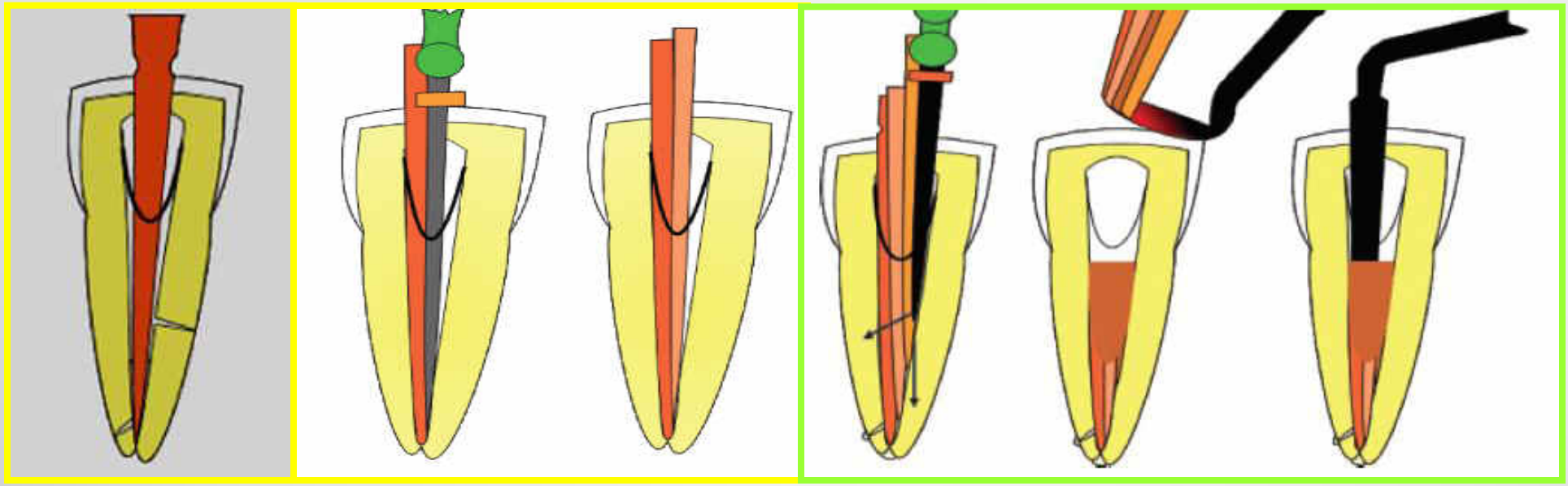


- Temporary restoration is placed.
- Remove the rubber dam clamp and rubber dam material and take the radiograph.

Coronal Orifice Seal

- Cavit (3M Espe Dental Products) -3.5mm
- Dentin-bonded composite
- Resin-modifies glassionomer - 1mm

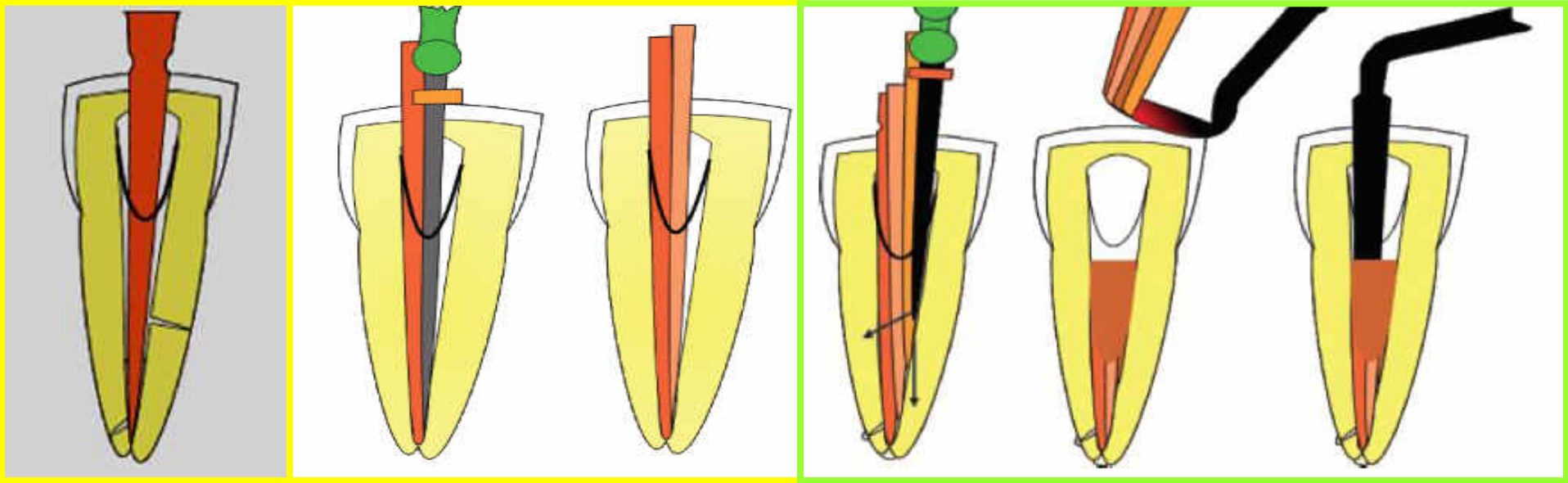
SUMMARY



❖Selection of Spreader:

❖A spreader is selected that matches the taper of the canal and When placed in the canal it should be within 2 mm from the working length.

SUMMARY



❖Selection of master cone:

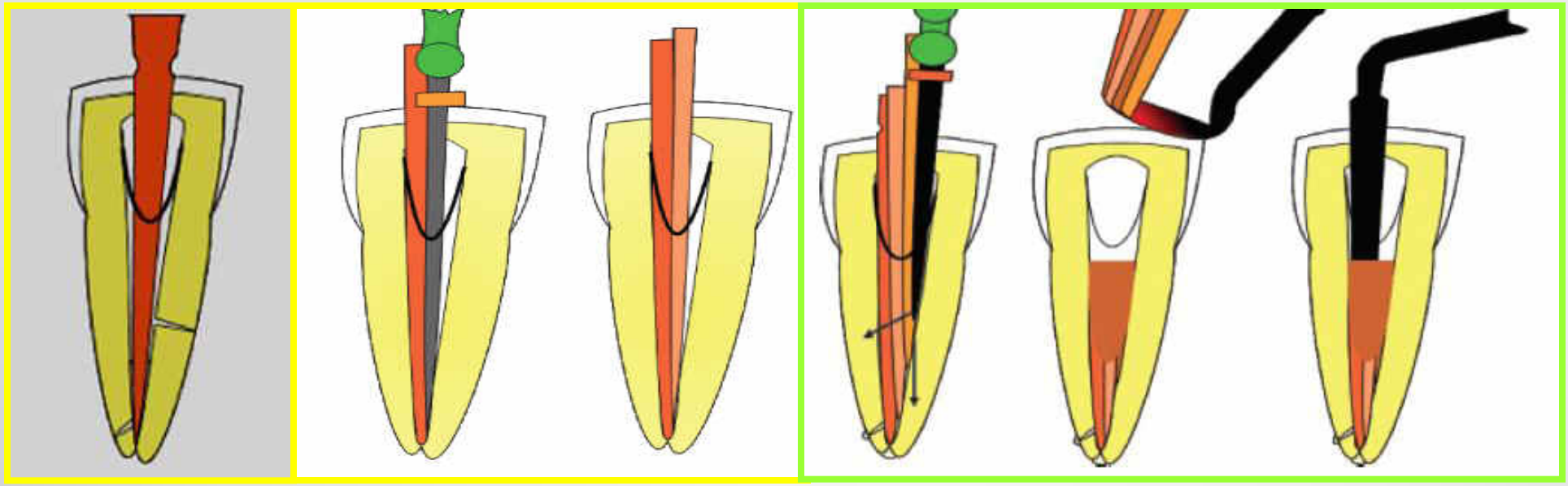
❖Following canal preparation a master cone is selected that has a diameter consistent with the Master Apical File (MAF).

❖This “master cone” is measured & grasped with a forceps so that the distance from the cone tip to the forceps is equal to the prepared length.

❖The cone is placed in the canal & if an appropriate size is selected, there will be resistance to displacement or “tug back”.

❖The master cone placement is confirmed with a radiograph.

SUMMARY

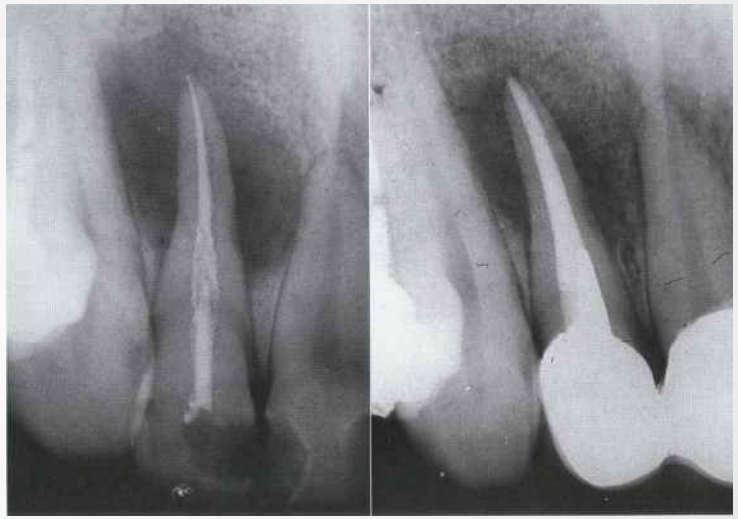


❖Lateral Condensation:

❖Canal is irrigated and dried with paper points.
❖Sealer is applied to the canal walls and also to the master cone and it is placed in the canal.
❖Now spreader is inserted to make space for accessory cone.
❖After placement the spreader is removed by rotating it back & forth as it is withdrawn.
❖An accessory cone is placed in the space vacated by the spreader.
❖The process is repeated until the spreader no longer penetrate the coronal 2-3 mm of the canal.
❖The excess gutta-percha is removed with heated instrument & the coronal mass is compacted with a plugger.
❖Obturation is checked radiographically.

Radiographic evaluation of obturation

➢**Radiolucencies:** Voids within the body or at the interface of obturating material and dentin wall represent incomplete obturation.



➢**Density:** Material should be of uniform density from coronal to apical aspects. The margins of gutta-percha should be sharp and distinct with no fuzziness, indicating close adaptation.

➢**Length:** The material should extend to the prepared length and be removed apical to the gingival margin (anterior teeth) and orifices (posterior teeth).

➢**Taper:** The gutta-percha should reflect the canal shape; that is, it should be tapered from coronal to apical regions.

➢**Restoration:** Whether permanent or temporary, the restoration should be contacting enough dentin surface to ensure a coronal seal.

Final restoration

Thank you for your attention

- what you take out of a root canal may be more important than what you put in it.

http://intranet.tdmu.edu.ua/data/kafedra/internal/stomat_ter/classes_stud/en/stomat/ptn/Propaedeutics%20of%20Therapeutic%20dentistry/2%20year/12.%20Materials%20for%20root%20canal%20filling.%20Technique.htm