SEEING IN ENDODONTICS AND MANAGING ENDODONTIC FAILURE



Thank you


Northern Ireland
mdta
Medical & Dental Training Agency


Dentsply
Sirona


Swordfish
medical



Justin Barnes

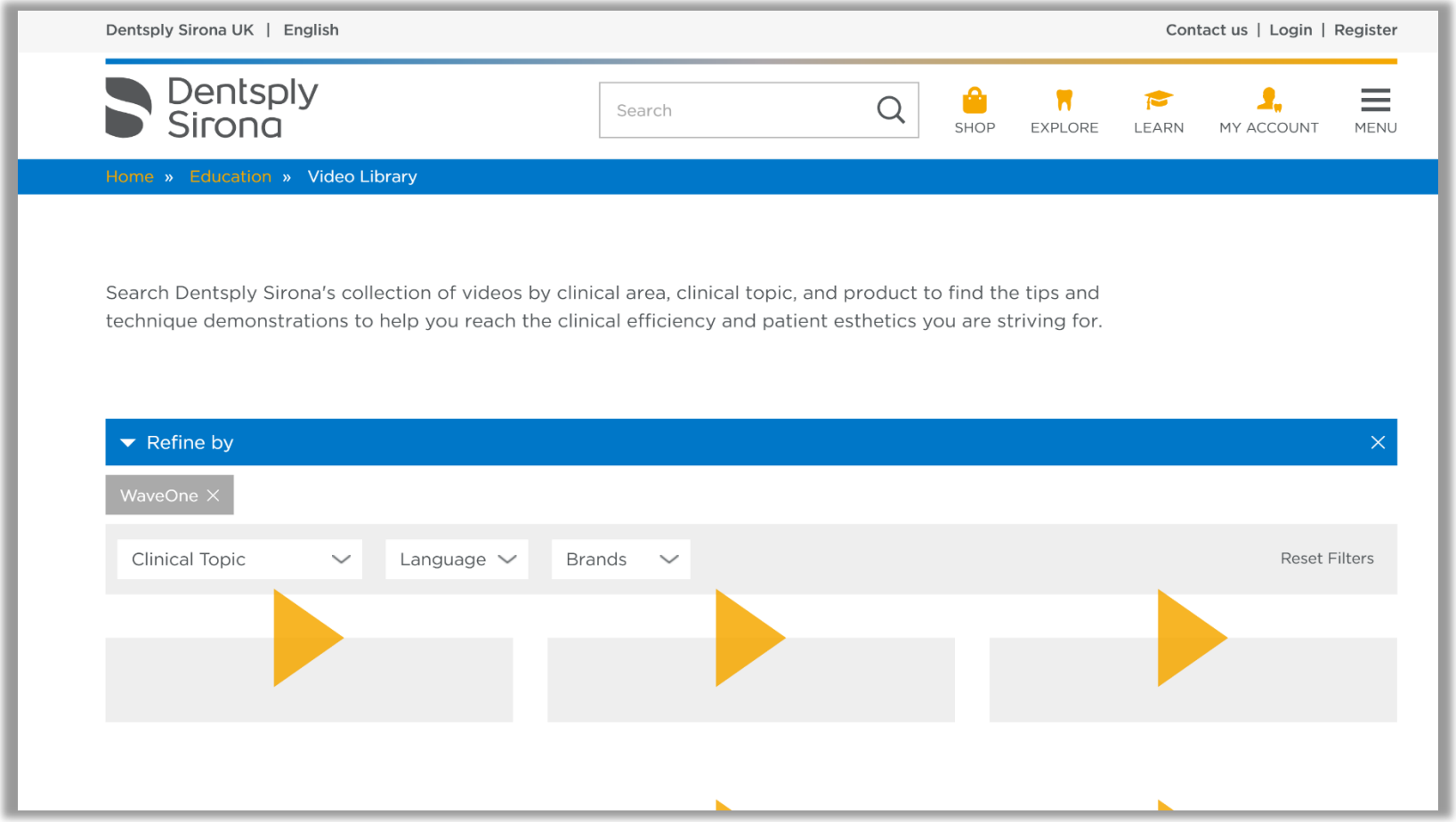
Specialist in Endodontics

Advice + Referral + Education

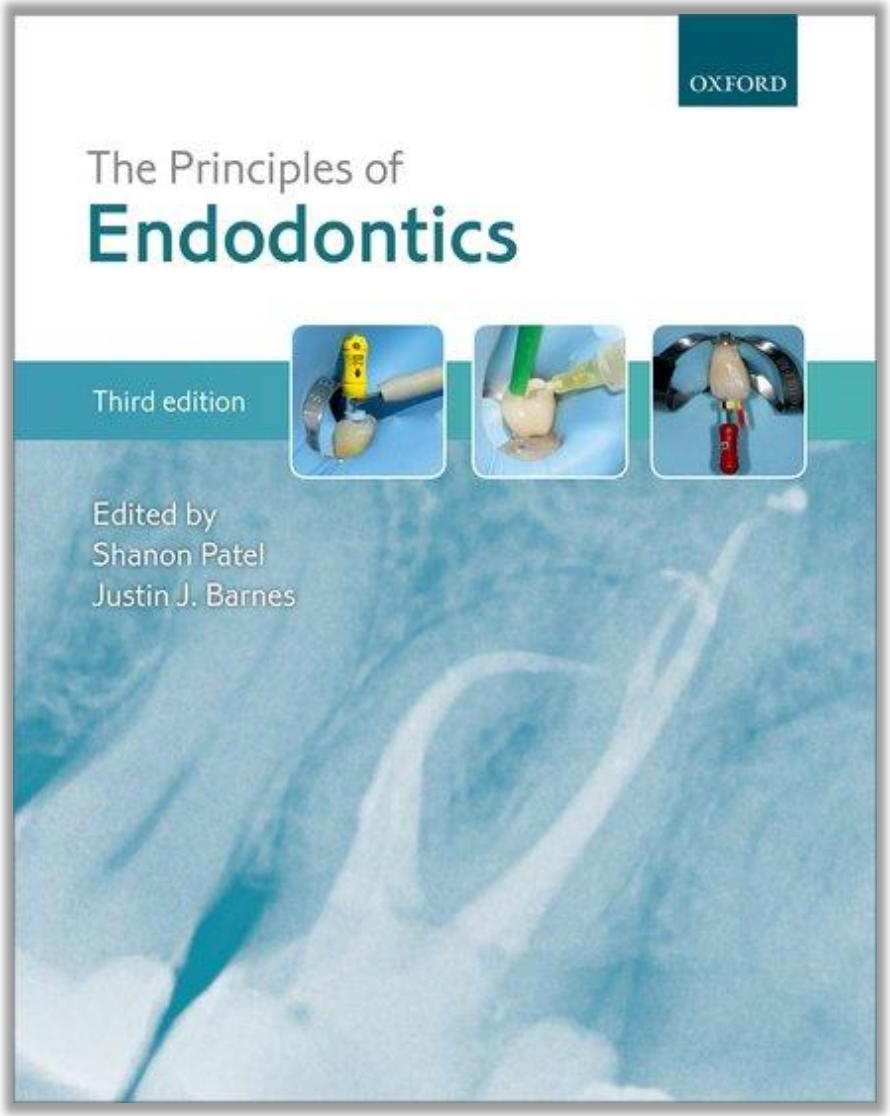
www.barnesendo.com

mail@barnesendo.com

www.dentsplysirona.com

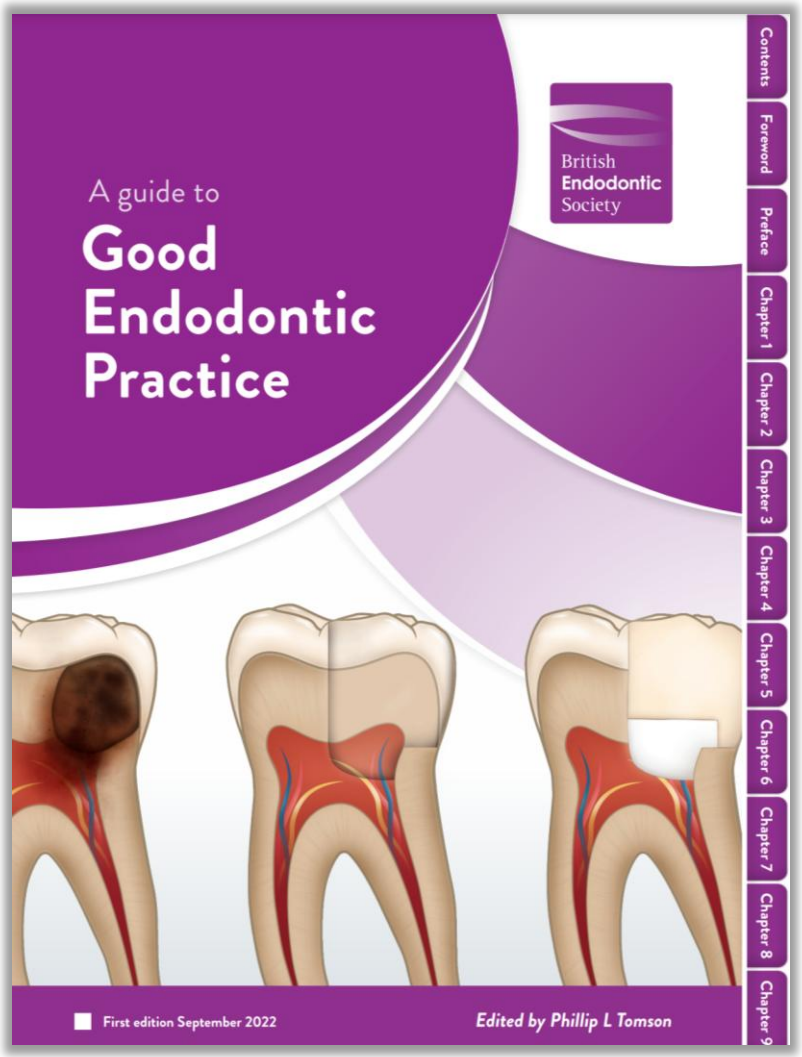


Credits



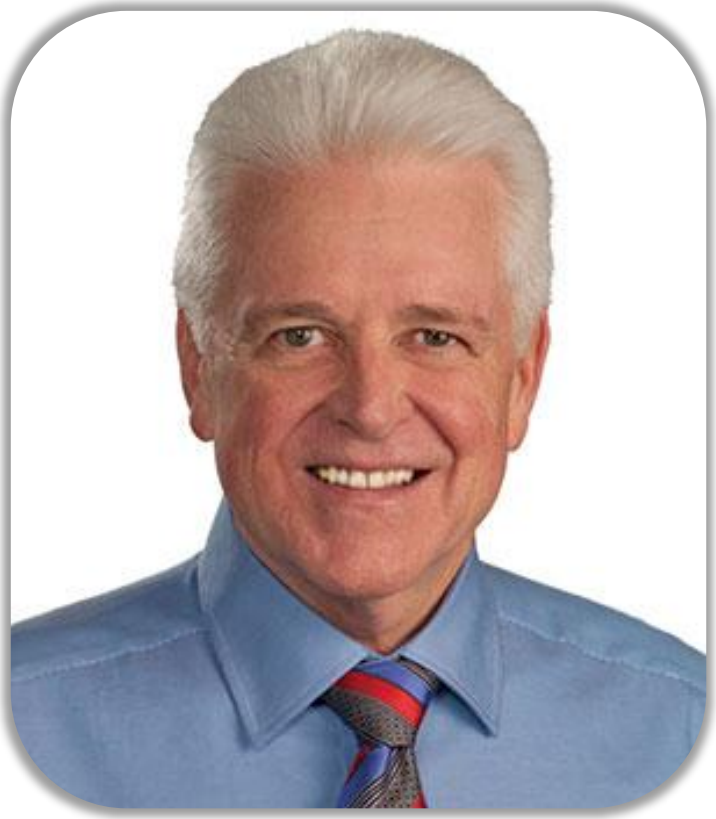
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Credits



www.britishendodonticsociety.org.uk

Credits



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ONLINE EDUCATION

www.endoruddle.com/jit

Anticipated Outcomes

Participants should have an understanding of:

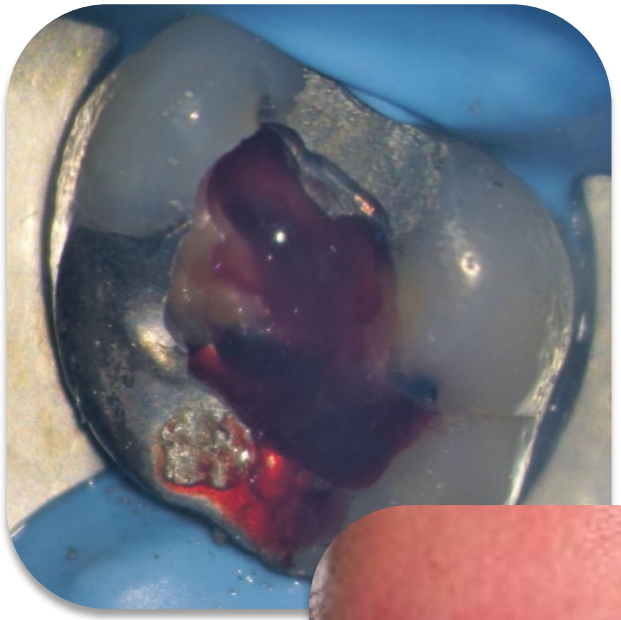
- The benefits of **magnification devices** in endodontics
- The theory behind shaping, cleaning, and filling root canals with discussion of **WaveOne Gold** and **GuttaCore**
- The definition, causes and management of **endodontic failure**
- When to **treat**, **not treat** or **refer** endodontic cases that have failed

Parachute use to prevent death and major trauma related to gravitational challenge: systematic review of randomised controlled trials

Gordon C S Smith, Jill P Pell



Endodontic disease





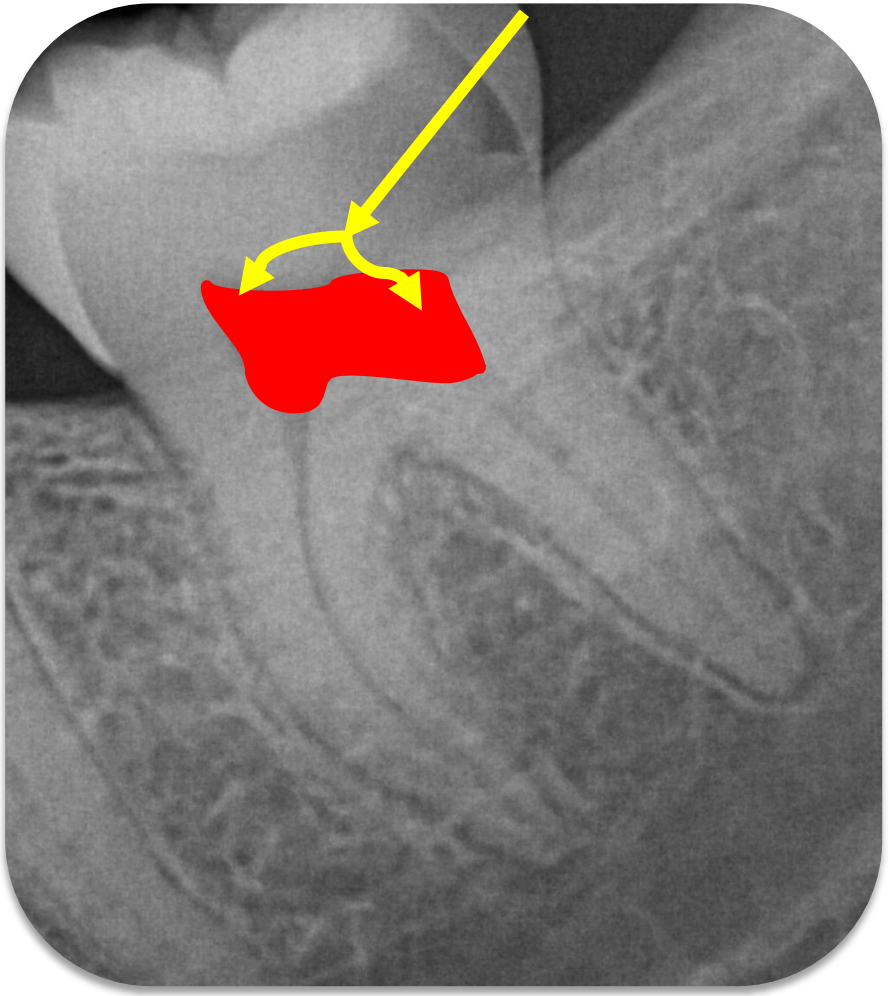




What is PULPITIS?
What is APICAL PERIODONTITIS?

Microbial induced inflammatory disorder of the pulpal tissues and/or periradicular tissues

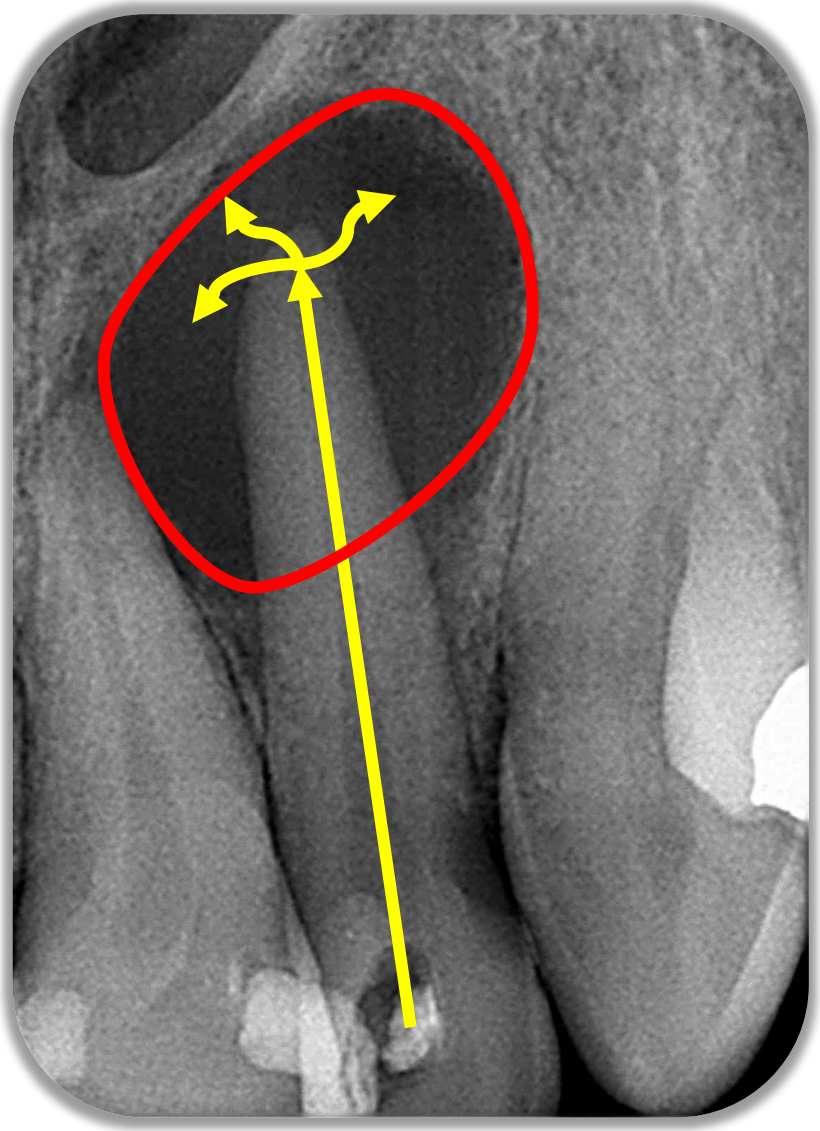
What is pulpitis?

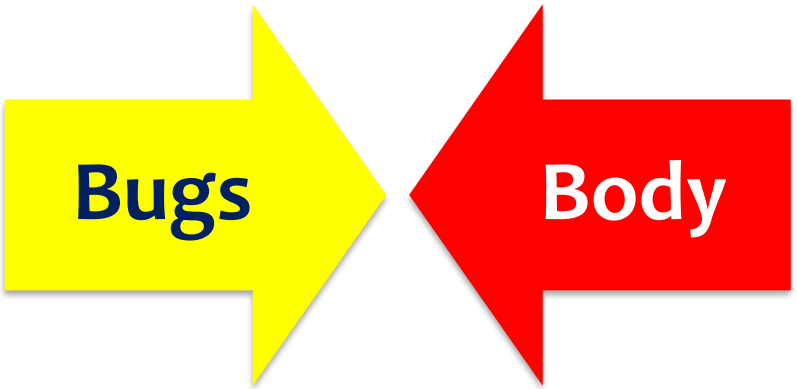


Bugs

Body

What is apical periodontitis?

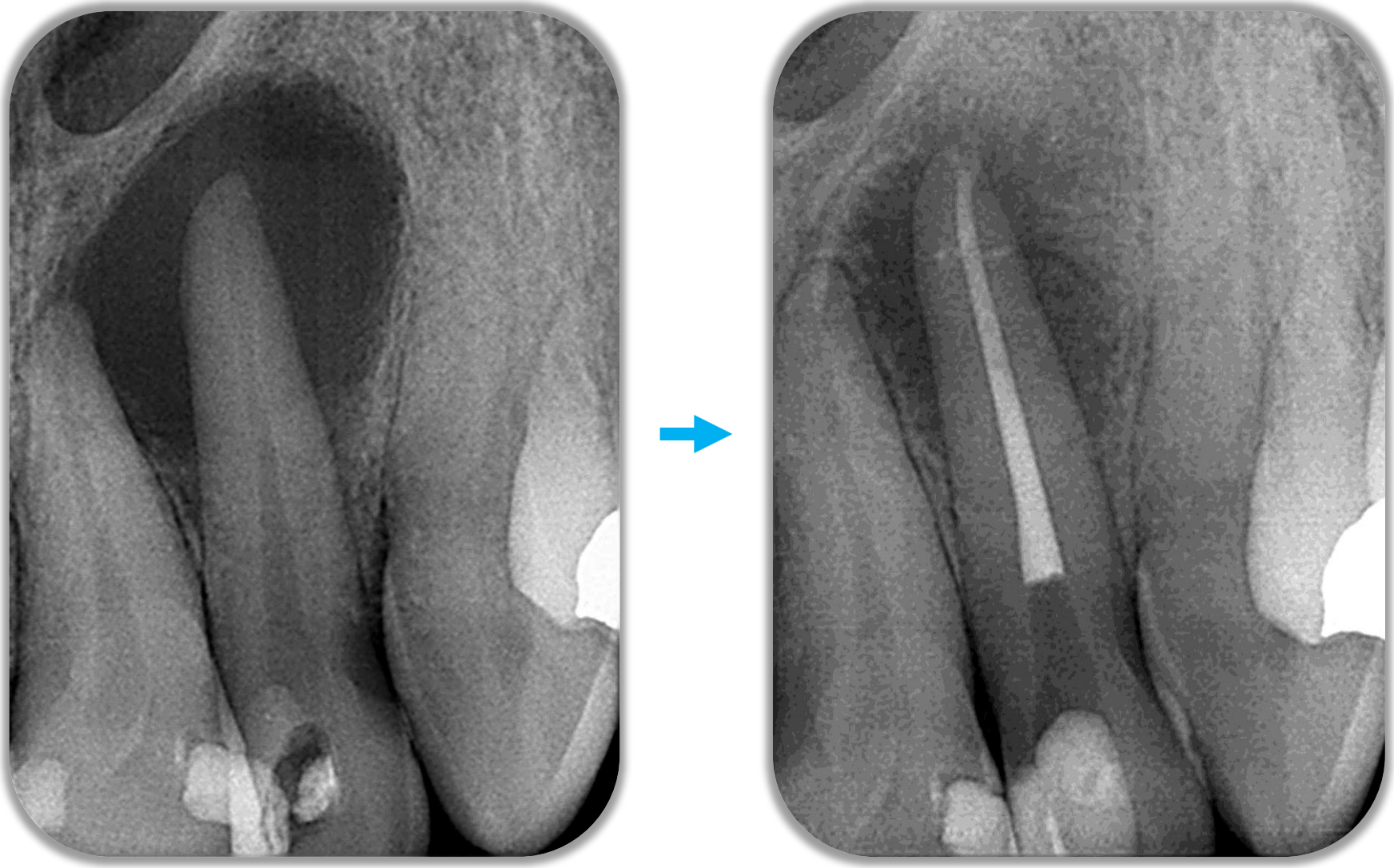




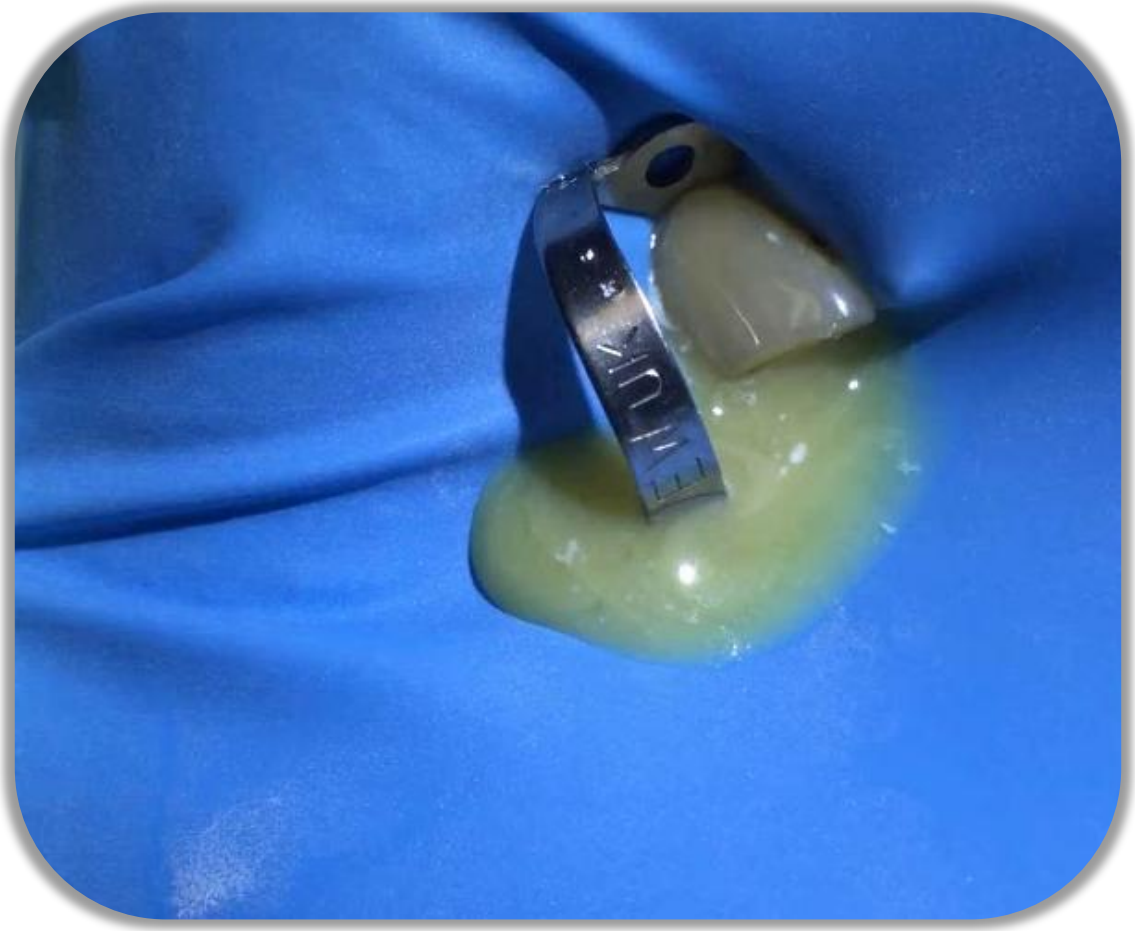
How do you treat it?



Extraction



Why do we do RCT?



Relieve pain

Inflict pain?



Restore function

Restore aesthetics

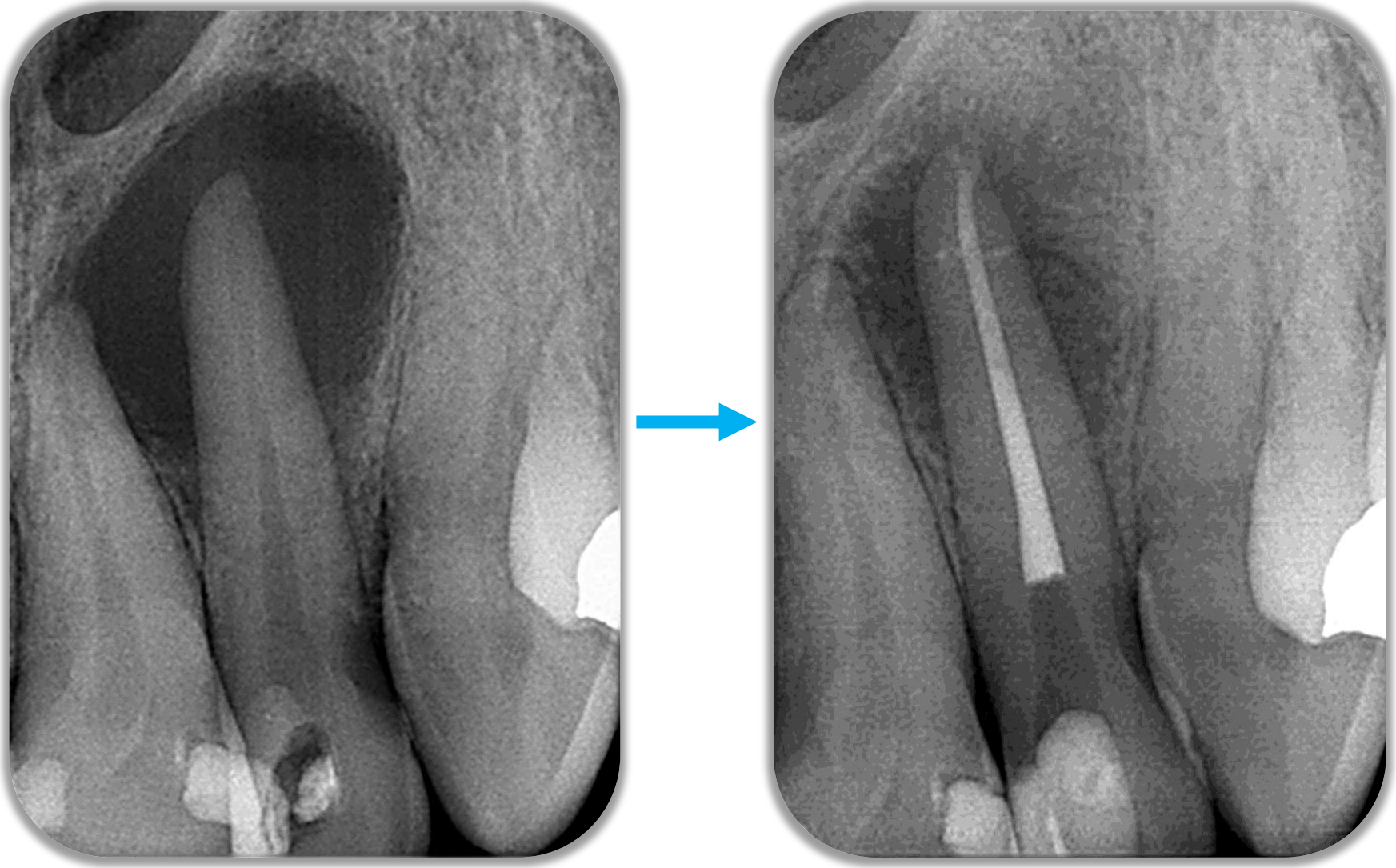
Retain tooth

Job satisfaction

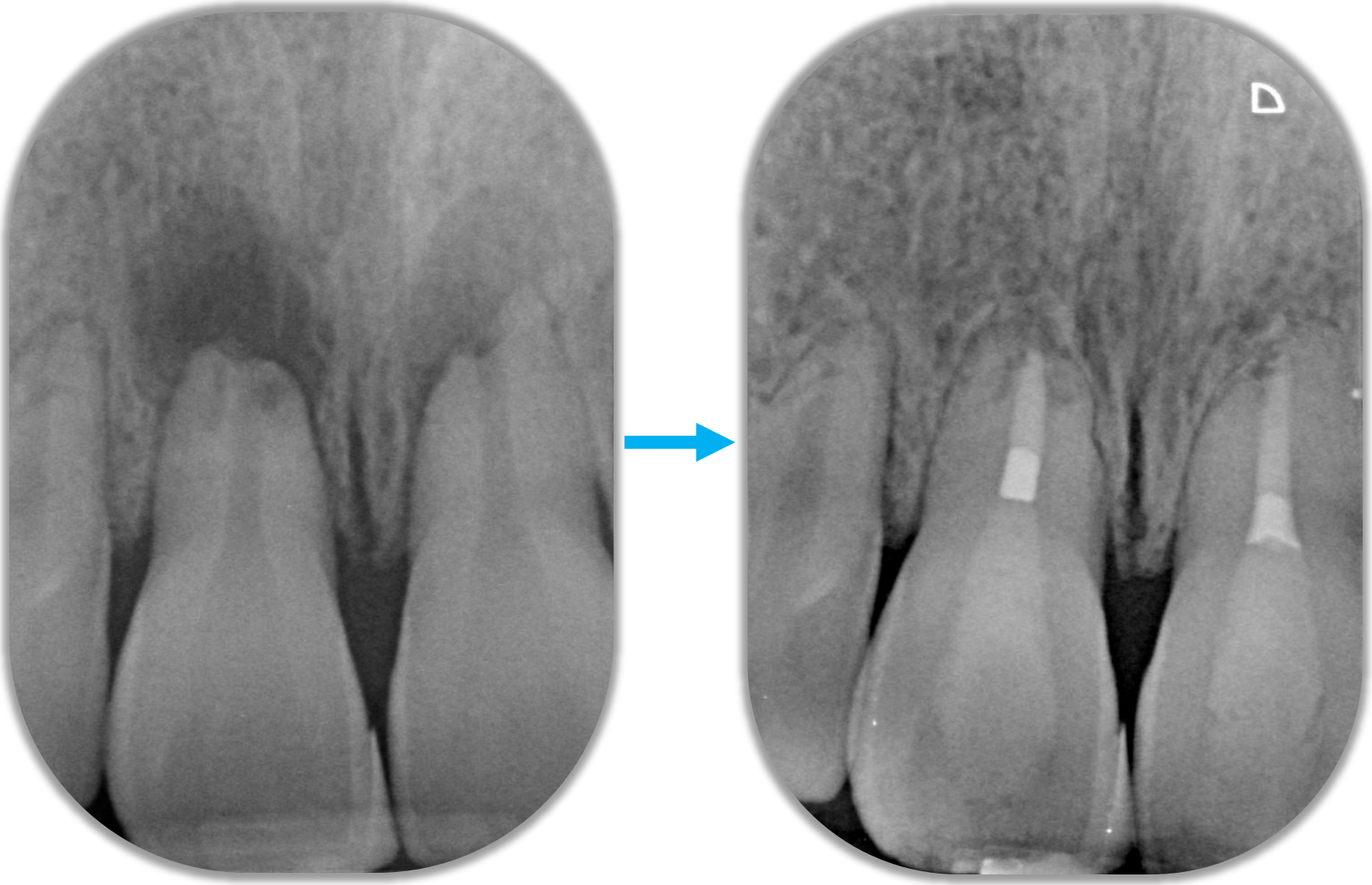
To achieve clinical healing



Bone healing 80-90%



Bone healed <70%

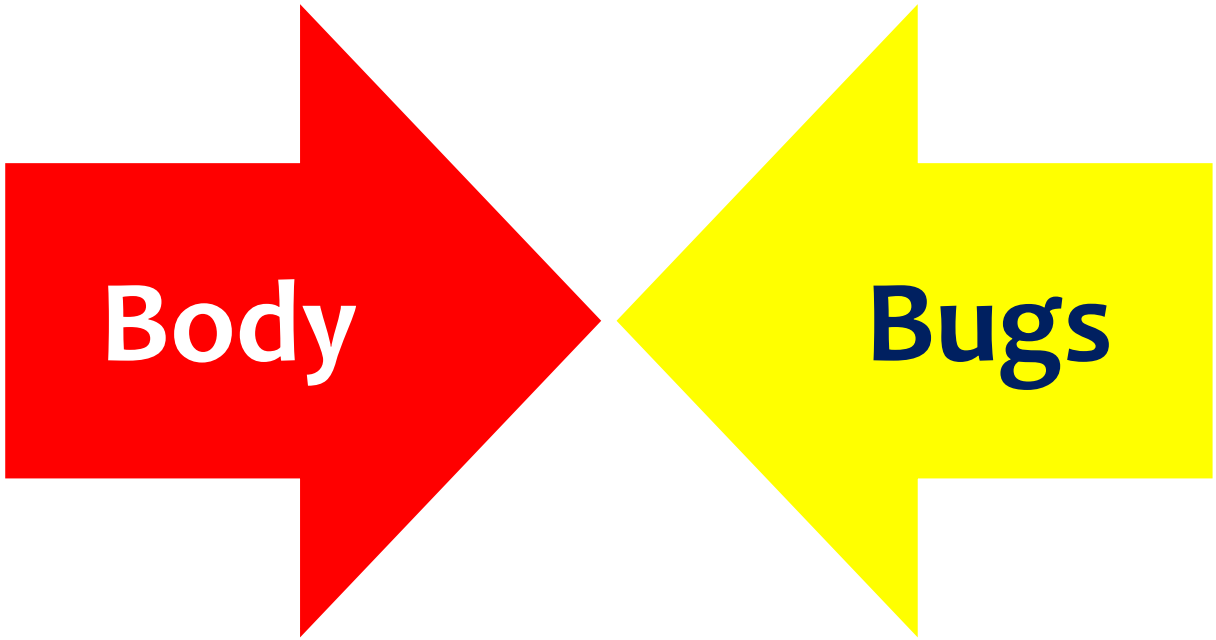


100% no bugs 100% no disease



Extraction

Biological basis for RCT

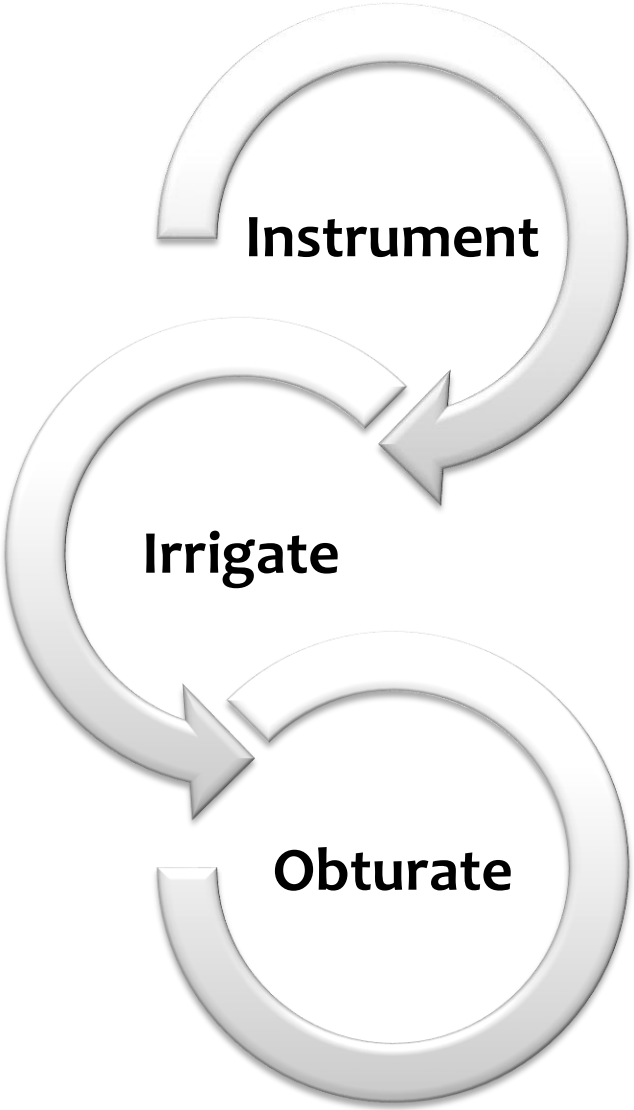


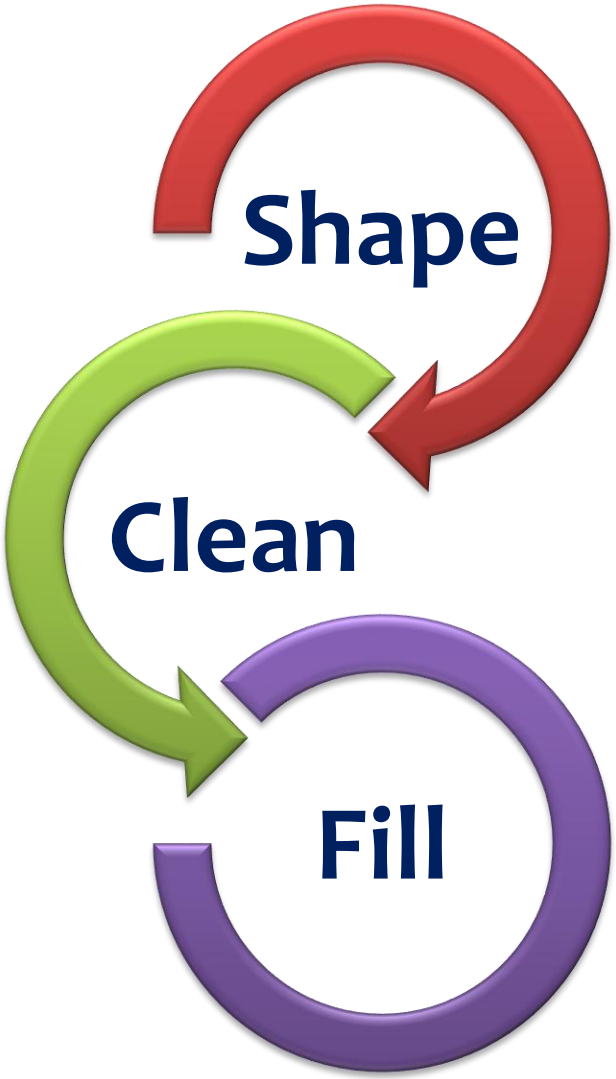
Control infection + promote healing

Summary – Biological Basis

- ✓ Treat irreversible pulpitis
- ✓ Treat apical periodontitis
- ✓ Control infection
- ✓ Promote healing

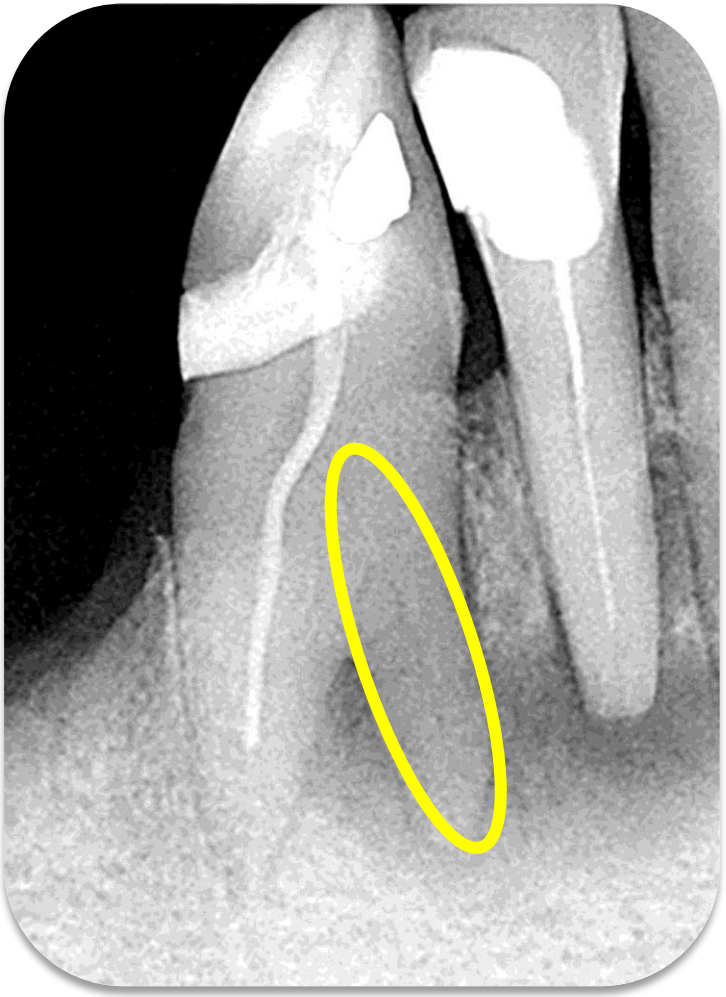
How do we do RCT?





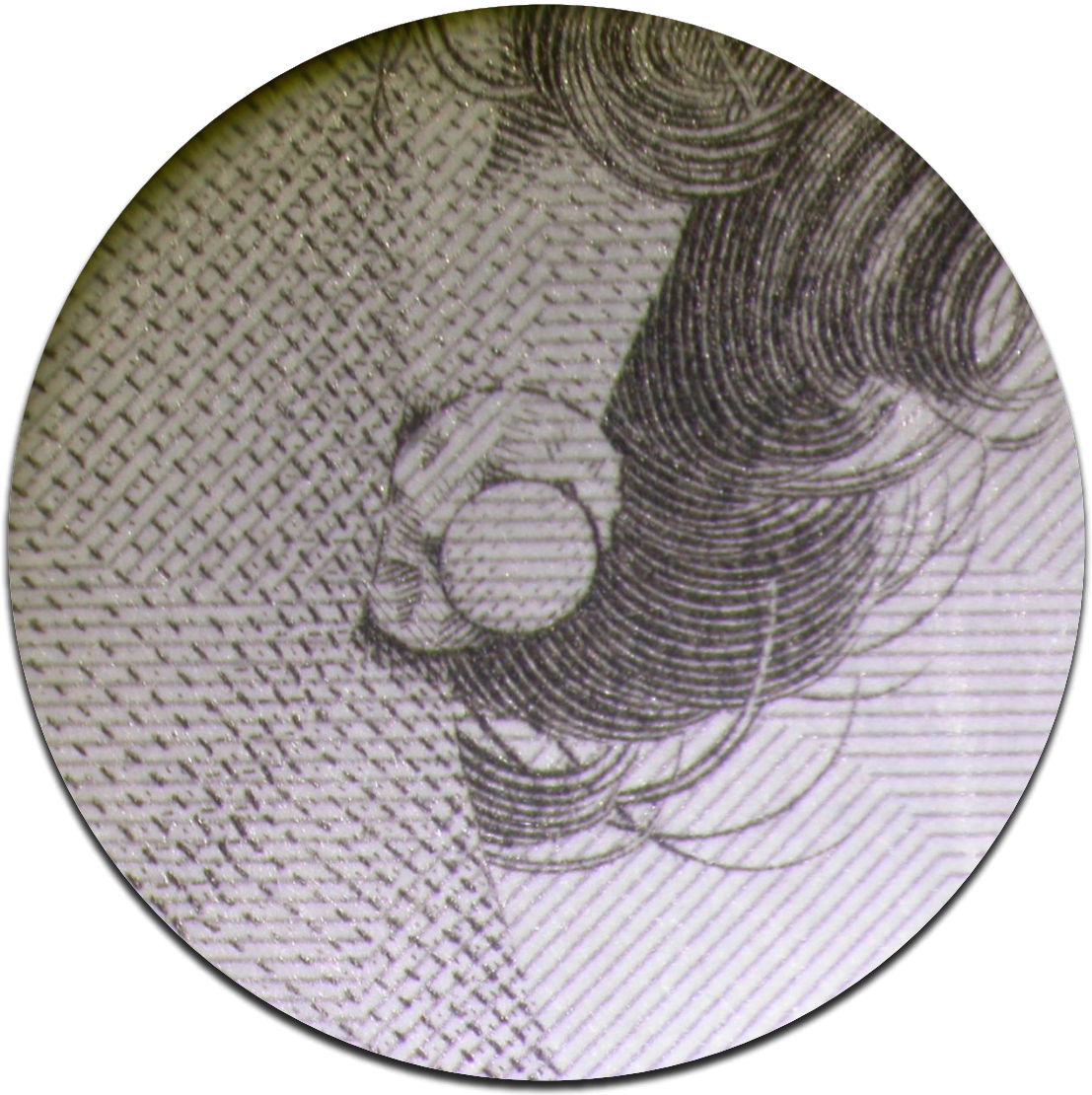
Avoid!!!





Human vision

Resolving power is 0.2 mm



We need help seeing!





COMPOUND



- Galilean system
- Two lens
- Magnification x2 - x4.5
- Light and compact

PRISMATIC



- Keplarian system (telescope)
- Complicated light paths
- Magnification up to x6
- Heavier

THROUGH-THE-LENS





FLIP-UP



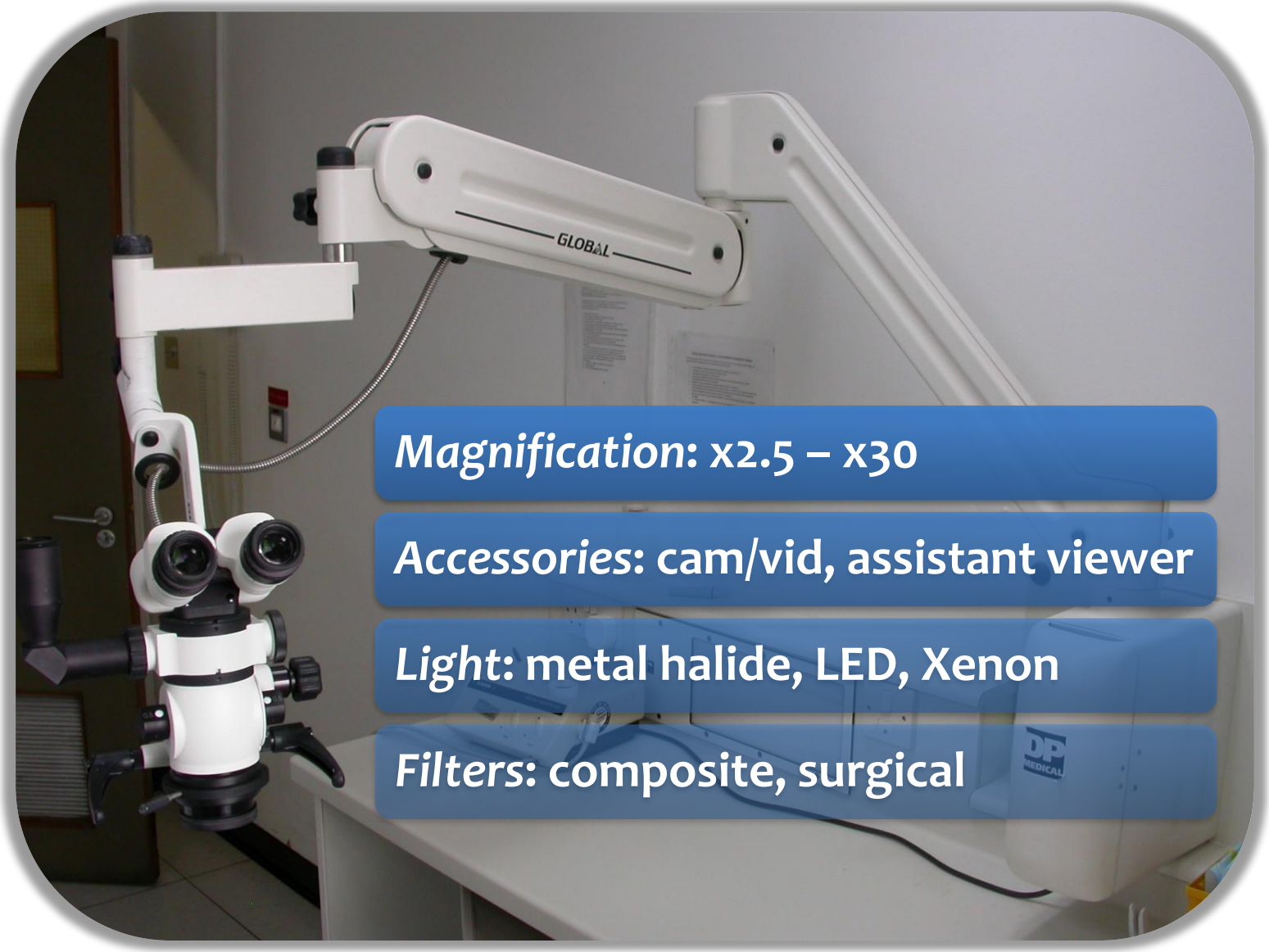








Operating microscope



Magnification: x2.5 – x30

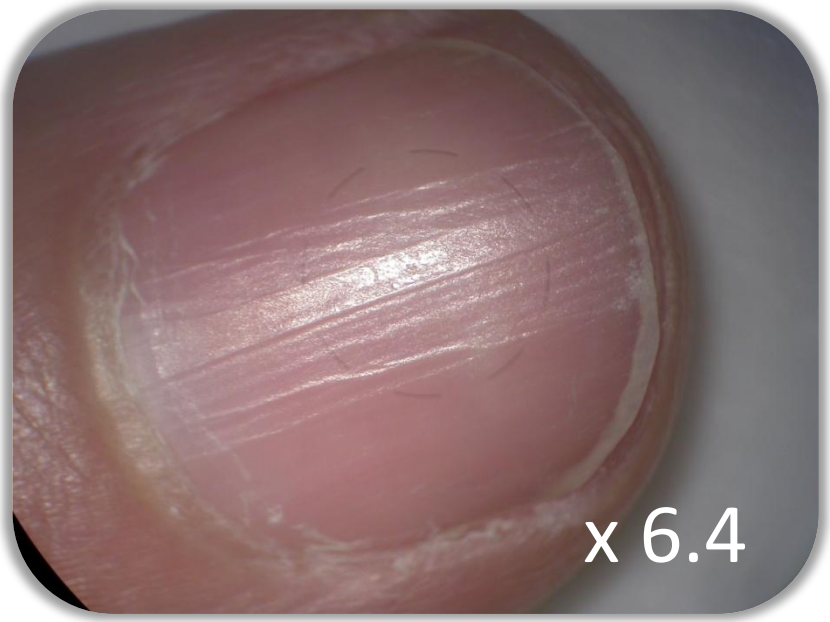
Accessories: cam/vid, assistant viewer

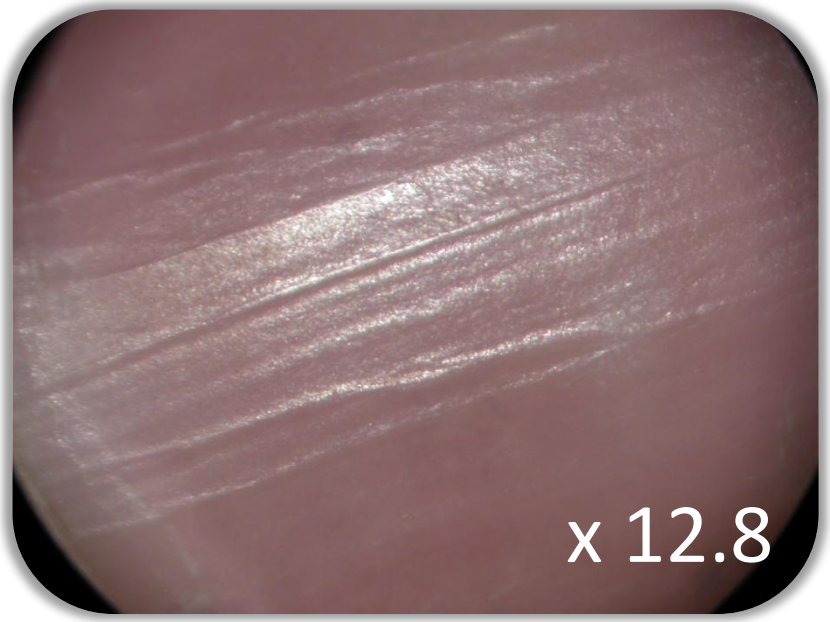
Light: metal halide, LED, Xenon

Filters: composite, surgical




x 3.2


x 6.4


x 12.8

Aid to diagnosis

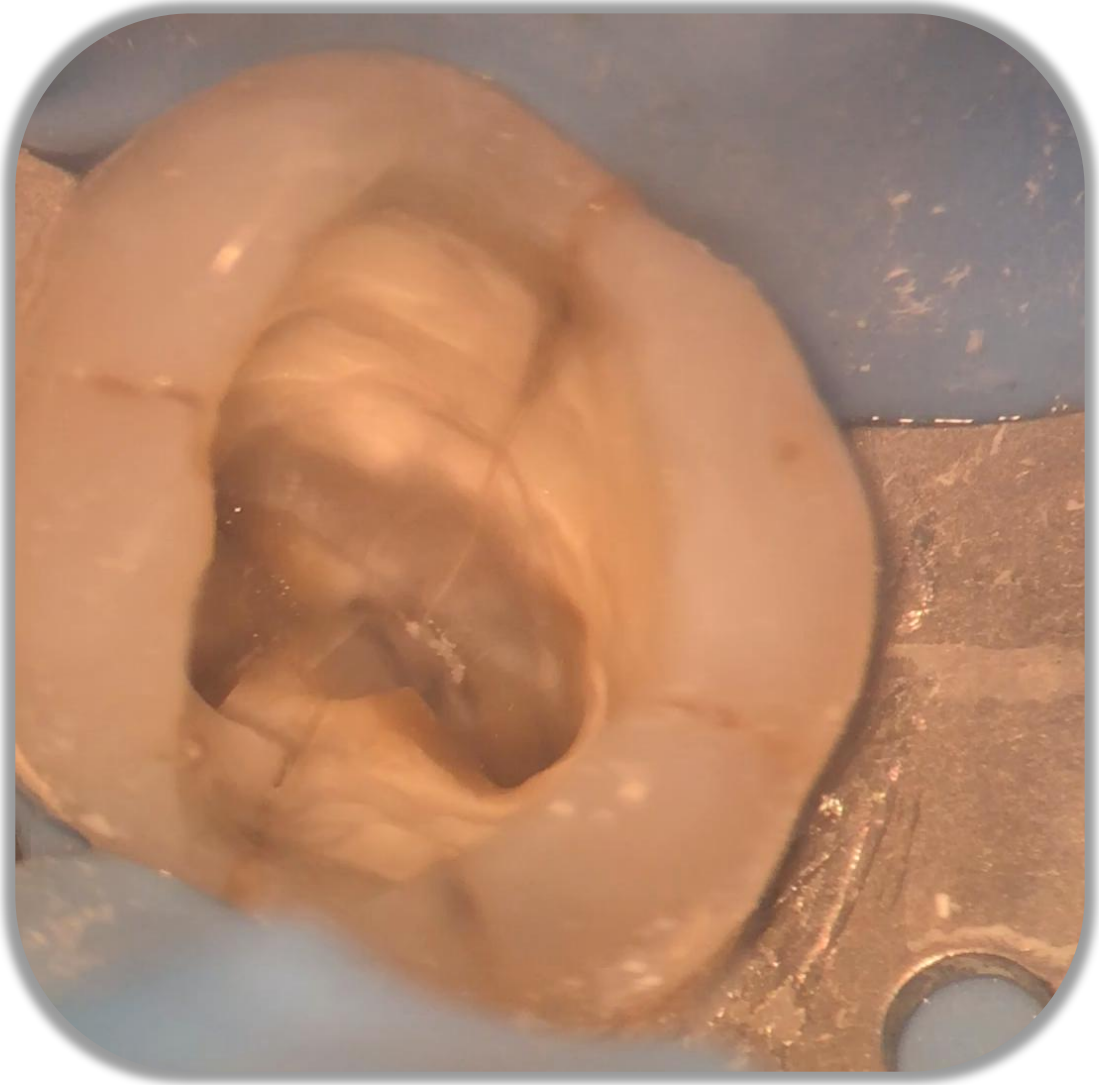


Aid to diagnosis

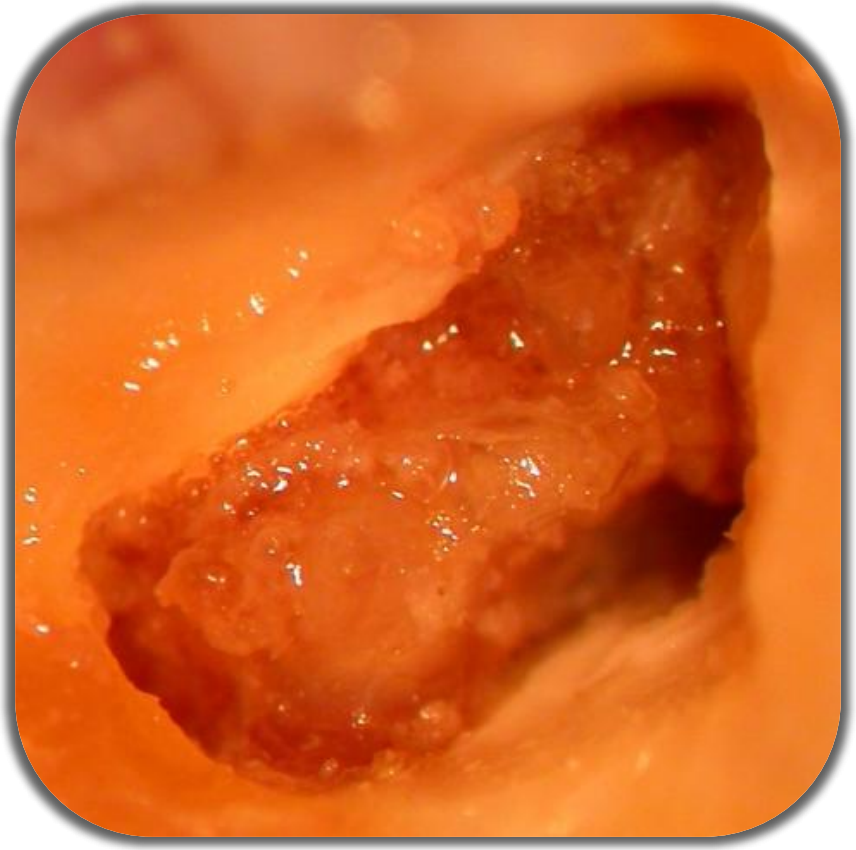


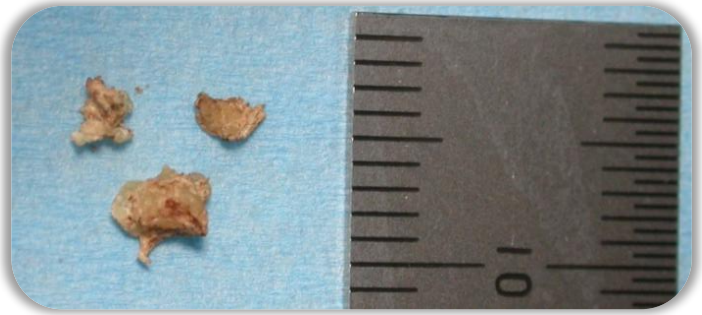


Aid to diagnosis



Aid to treatment - calcifications





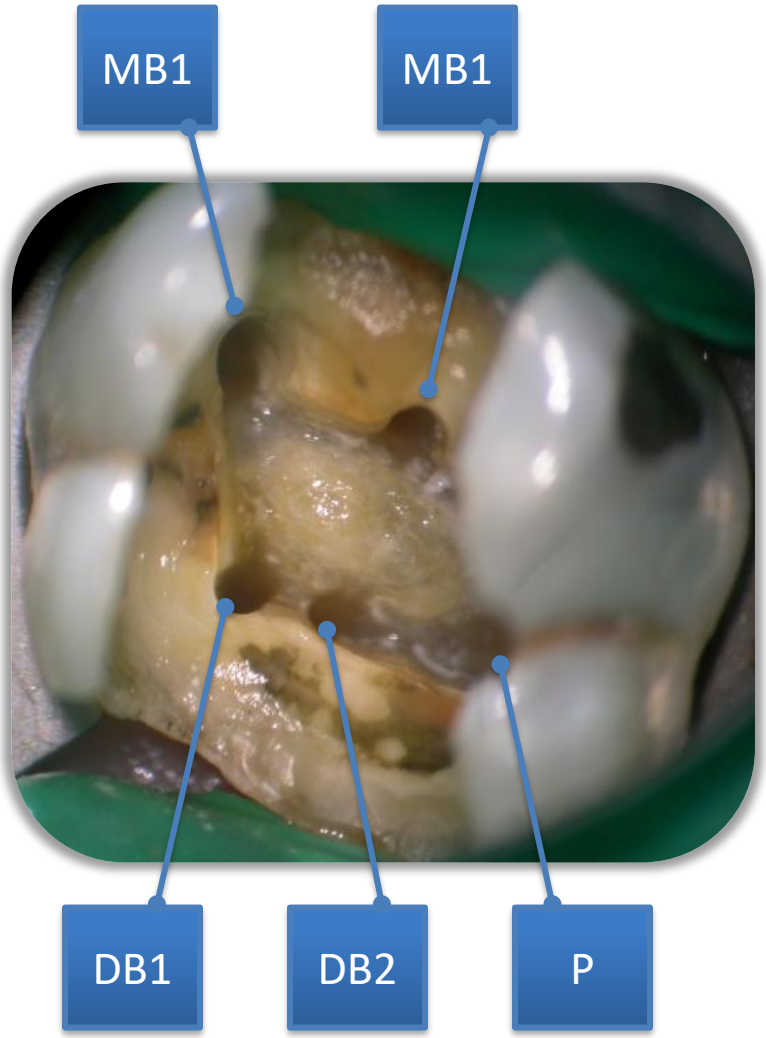
Aid to treatment – finding root canals

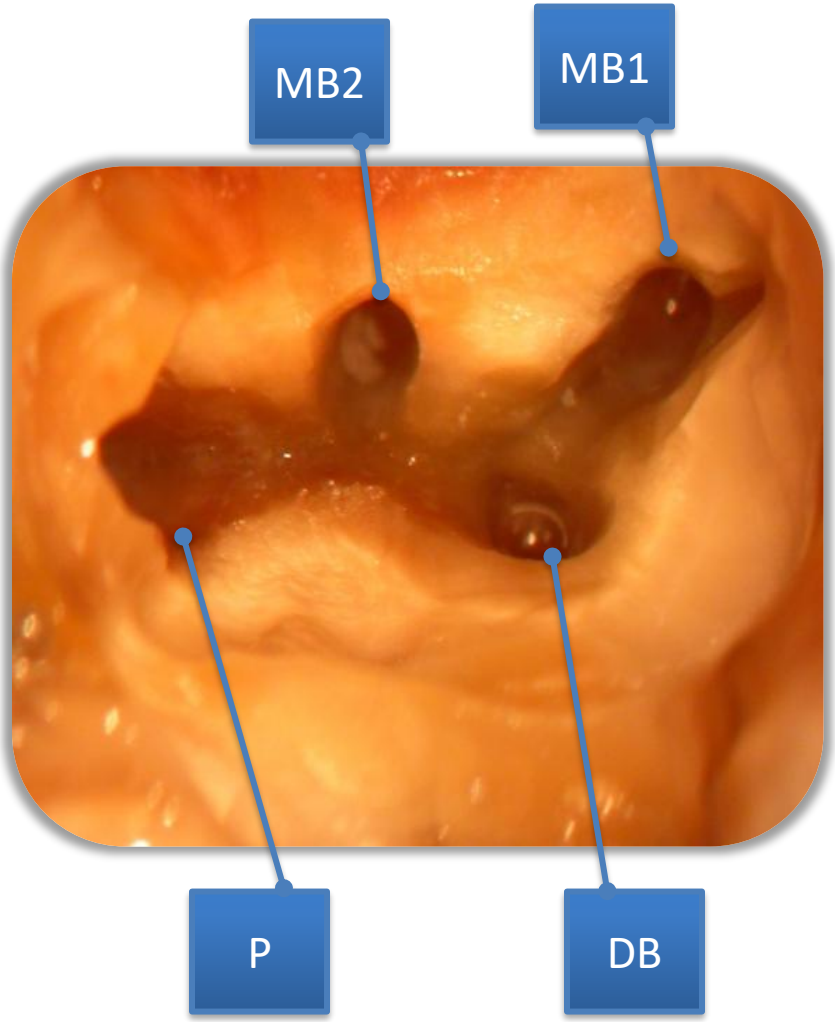




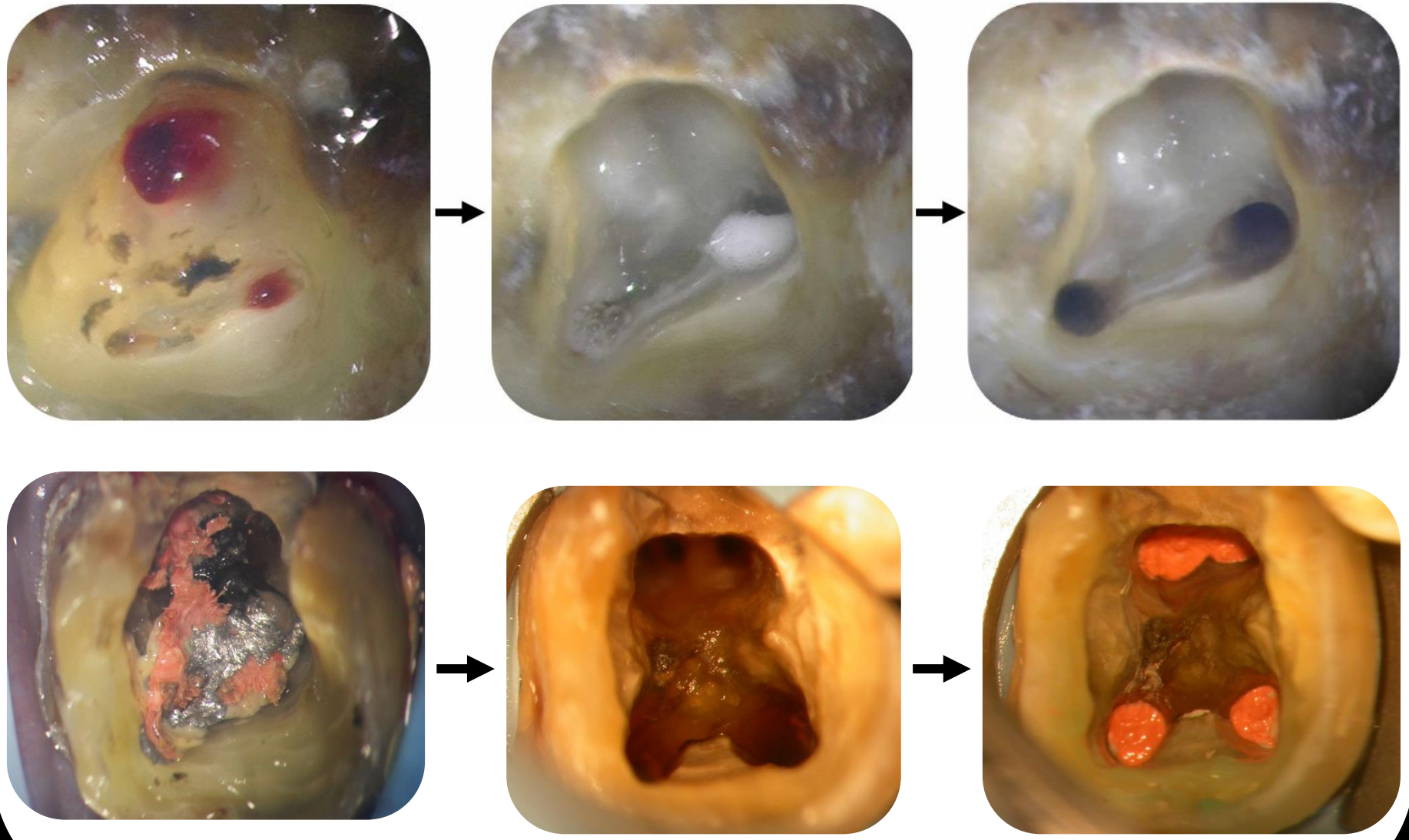


Aid to treatment – finding root canals

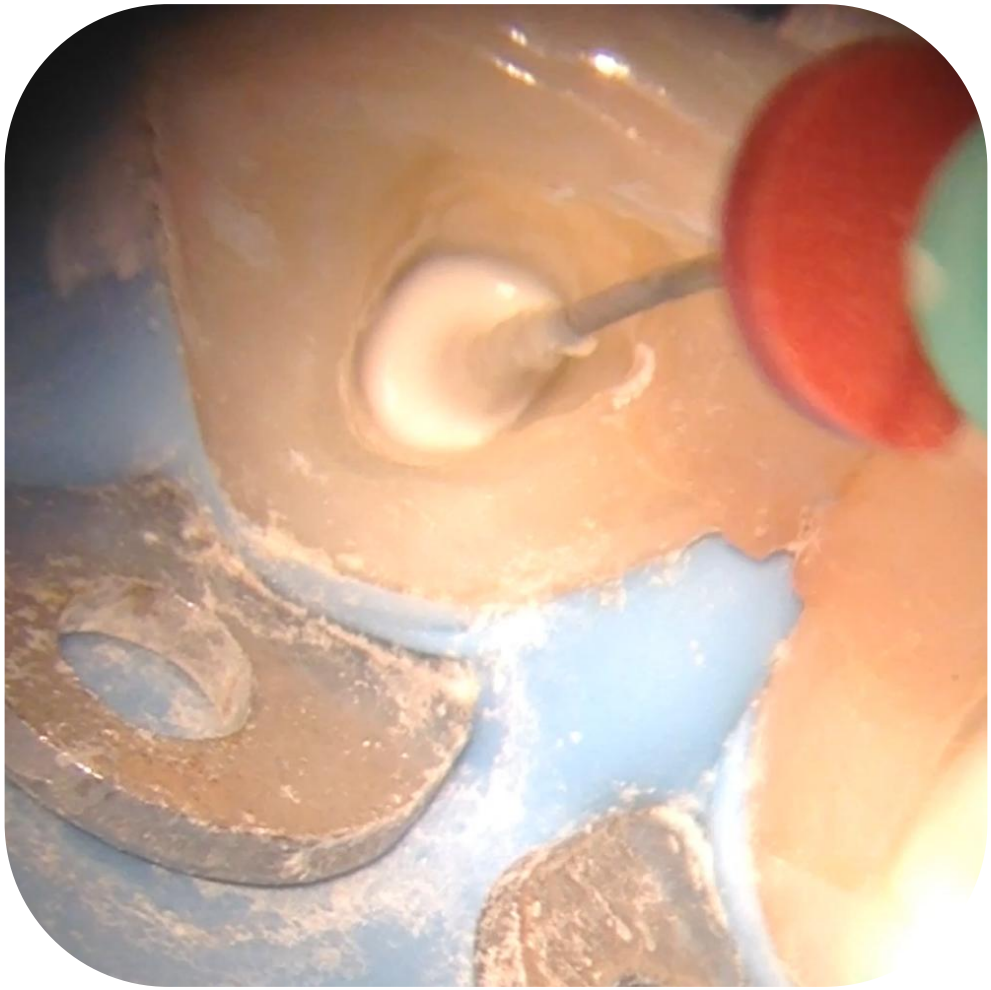




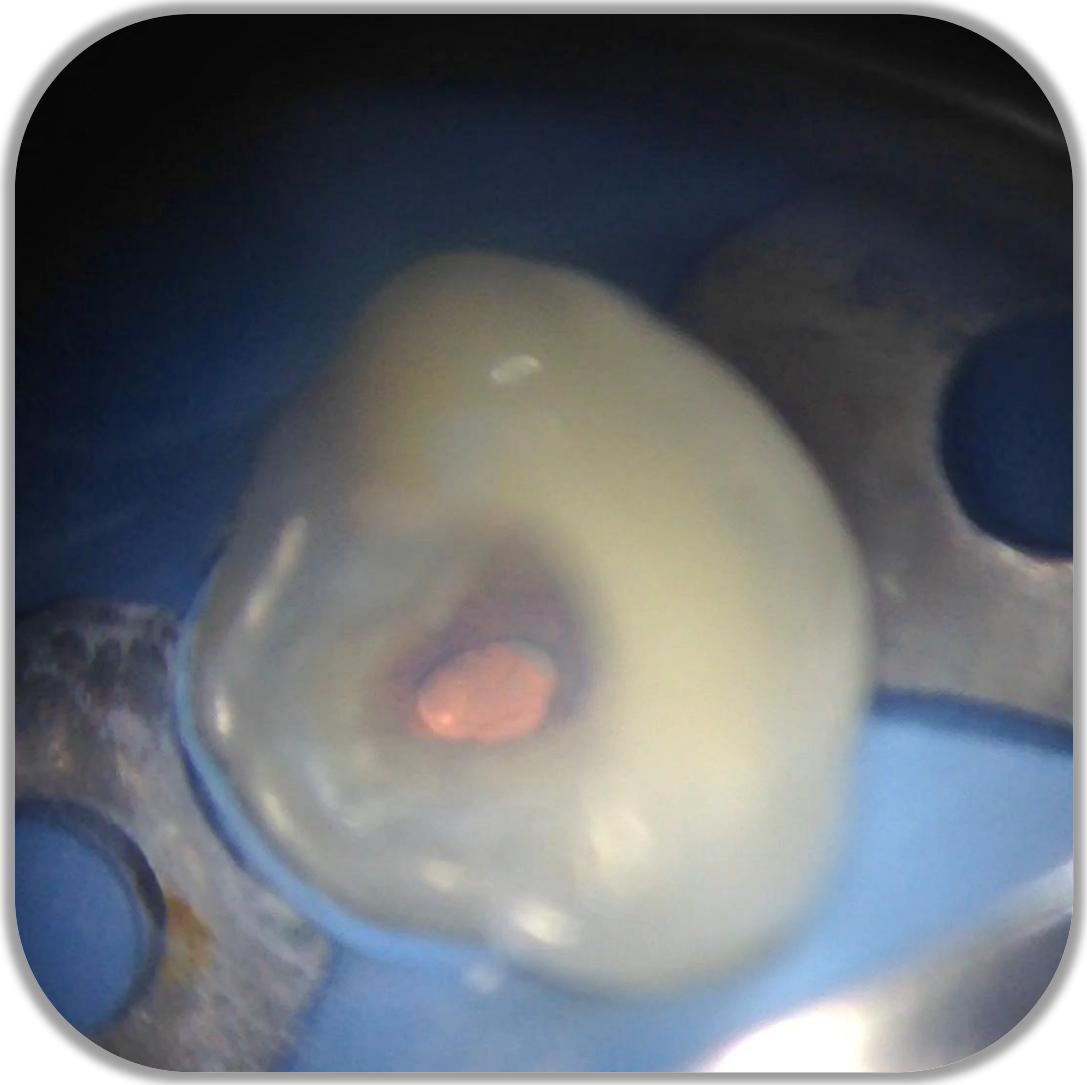
Aid to treatment



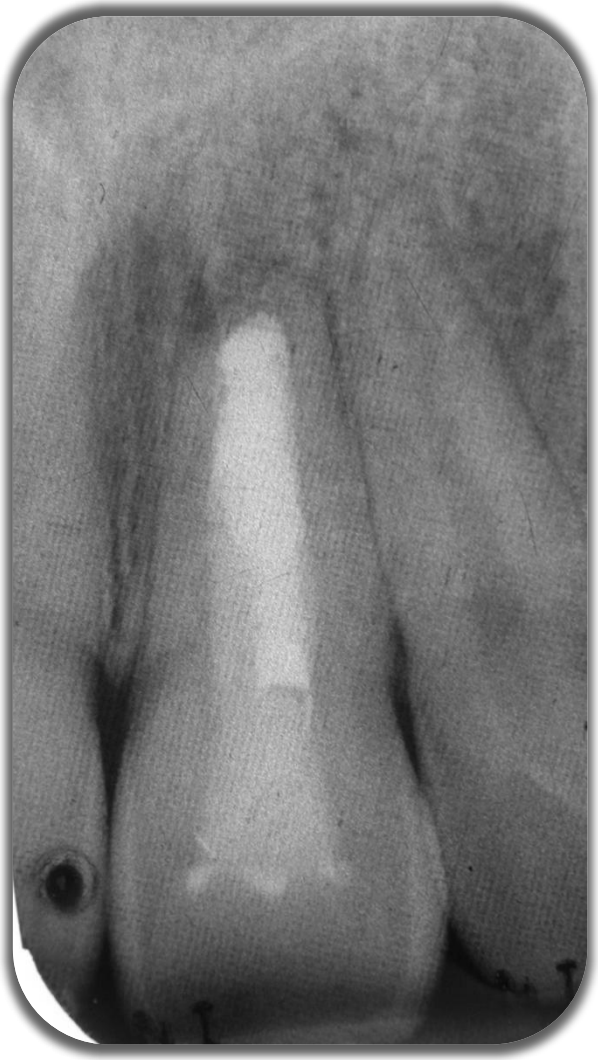
Placement of medicament

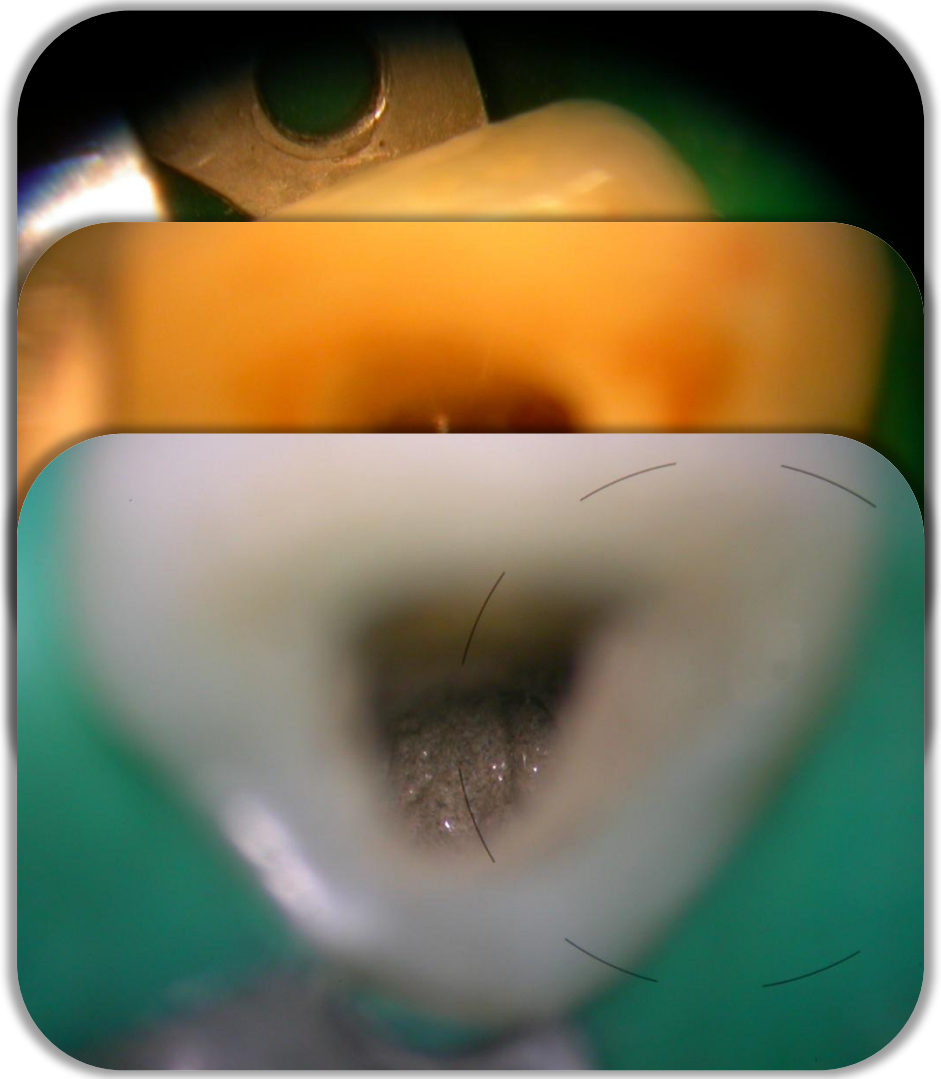


Placement of root filling material

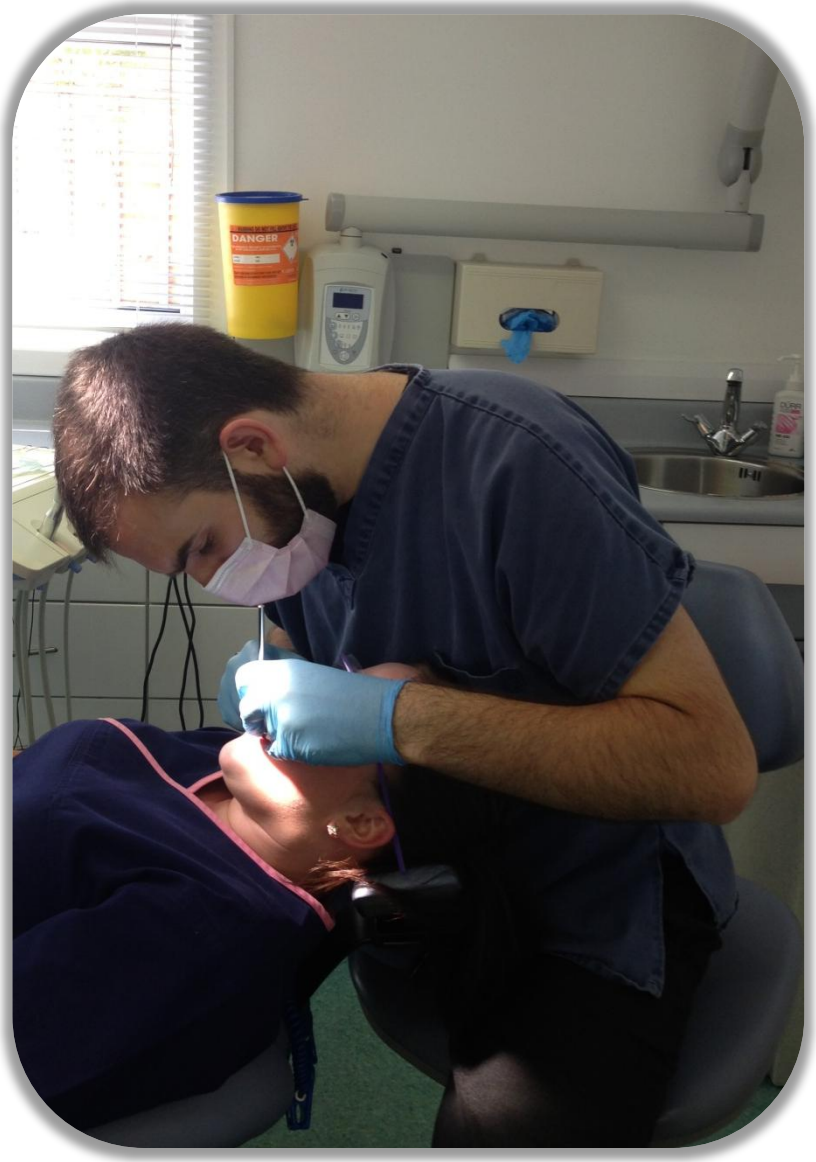


Placement of root filling material





Improved posture











The Royal College *of* Surgeons *of* England

Things to consider



- Single magnification
- Cost ££
- Learning curve



- Restricted portability
- Cost £££££££
- Learning curve +++

Benefits of magnification



Prerequisites for Magnification

- ✓ Restorable tooth
- ✓ Cooperative patient
- ✓ Rubber dam
- ✓ Front surface mirror
- ✓ Co-axial lighting

How to Safely and Effectively SHAPE Root Canals

How do we SHAPE root canals?

Hand

- Step back e.g. K-Flexofiles

Machine

- Rotary e.g. ProTaper Gold / Next
- Reciprocation e.g. WaveOne Gold

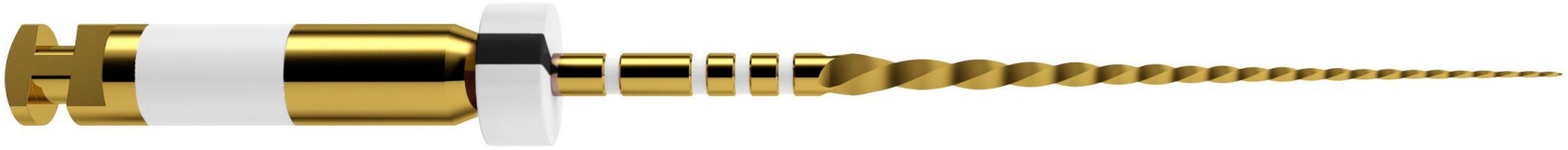
Coronal flare

- No coronal interferences
- File is free in coronal 2/3rds
- Better tactile feedback of apical 1/3
- Greater volume of NaOCl
- Less likely to push debris apically

Create a glide path!!!



WaveOne® Gold Glider



Expands the glide path

Useful for difficult cases

Gold NiTi	015 tip 2% → 6% taper	Parallelogram cross-section

Benefits of apical patency

- Ensures negotiation is smooth + reproducible
- Allows accurate determination of working length
- Ensures larger files will slide + glide to working length
- Disrupts biofilm + debris
- Reduces risk of errors occurring
- Improves outcome

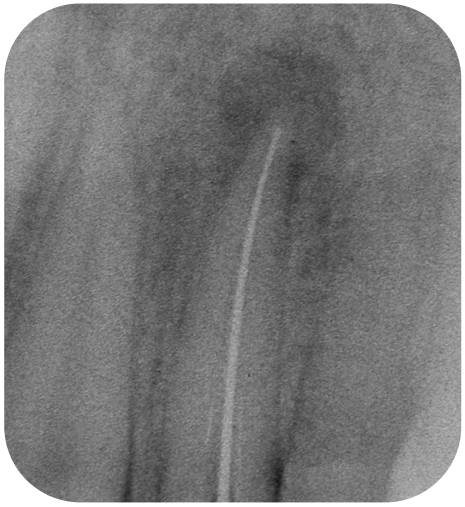
Confirm the working length





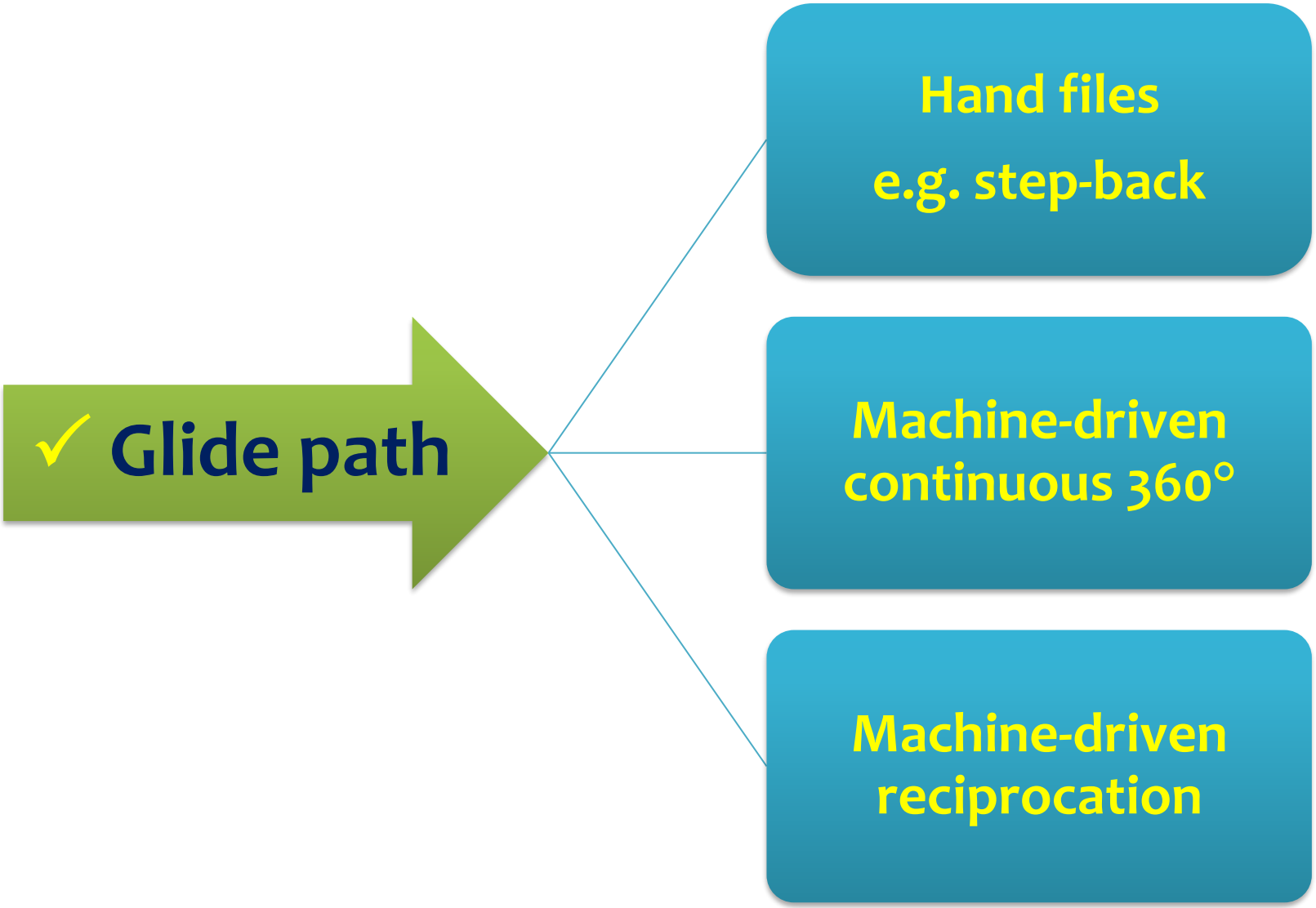




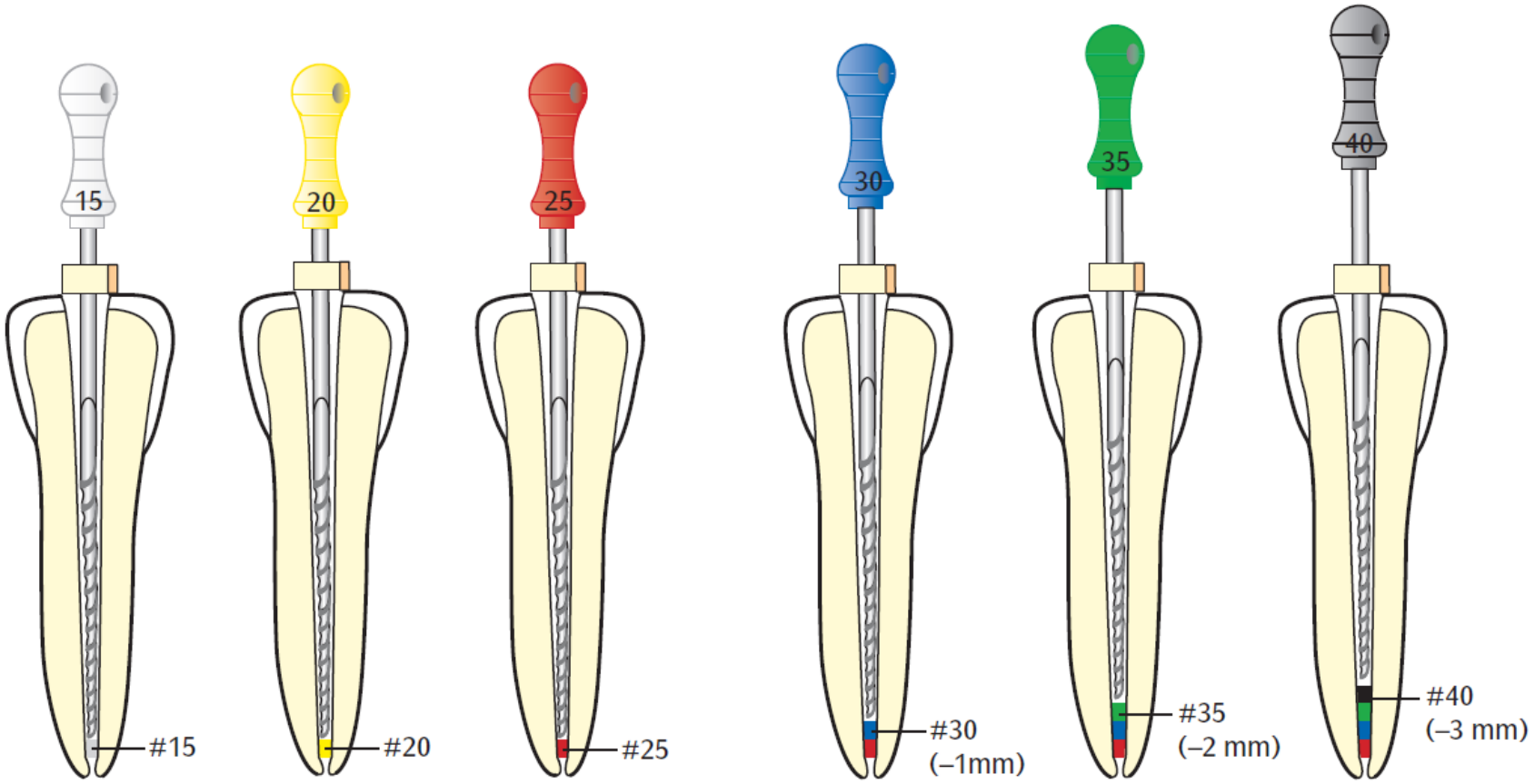


Checklist for initial shaping

- ✓ Scout coronal portion
- ✓ (Flare coronal portion)
- ✓ Create glide path up to #10
- ✓ Confirm working length
- ✓ Confirm apical patency
- ✓ (Expand glide path with WOG Glider)


✓ Glide path
Hand files
e.g. step-back
Machine-driven
continuous 360°
Machine-driven
reciprocation

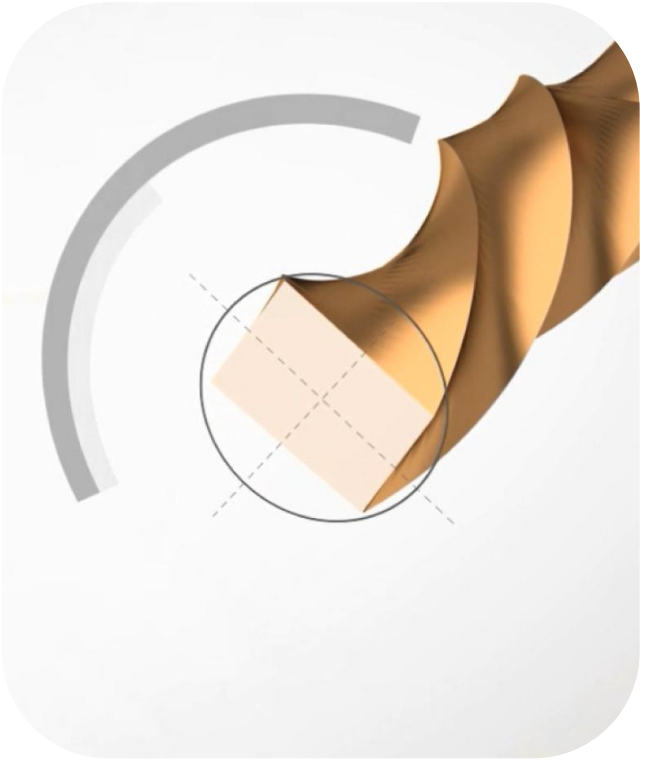
Hand filing



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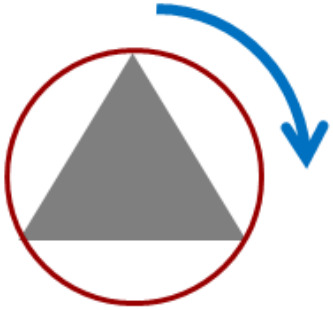
What is WaveOne Gold (WOG)?





Balanced-force technique

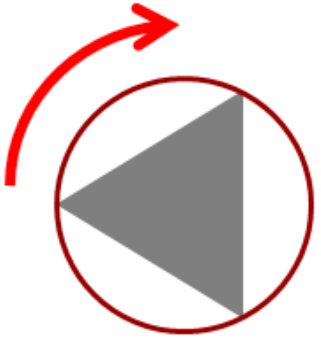
(Roane *et al.* 1985)



(a) Engage dentine:



(b) Cut dentine:



(c) Remove dentine:

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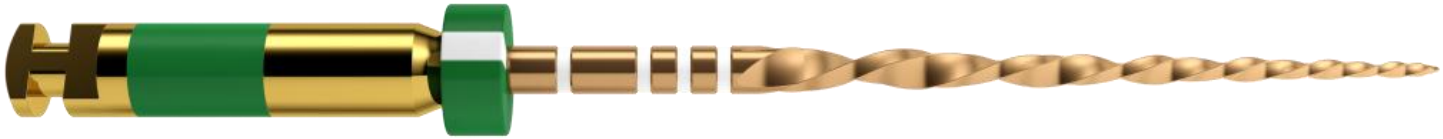
SMALL → if Primary does not progress



PRIMARY → majority of cases



MEDIUM → if Primary is loose



LARGE → if Medium is loose





Latch shank (11 mm)

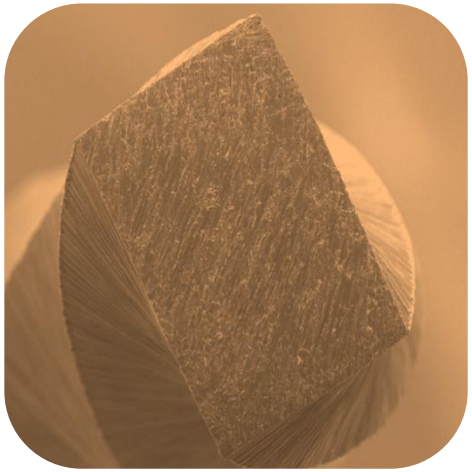
Cannot be sterilised

Length markings

Cutting portion (16 mm)

WaveOne® Gold

Heat treatment
AFTER grinding



1-2 point(s) of contact

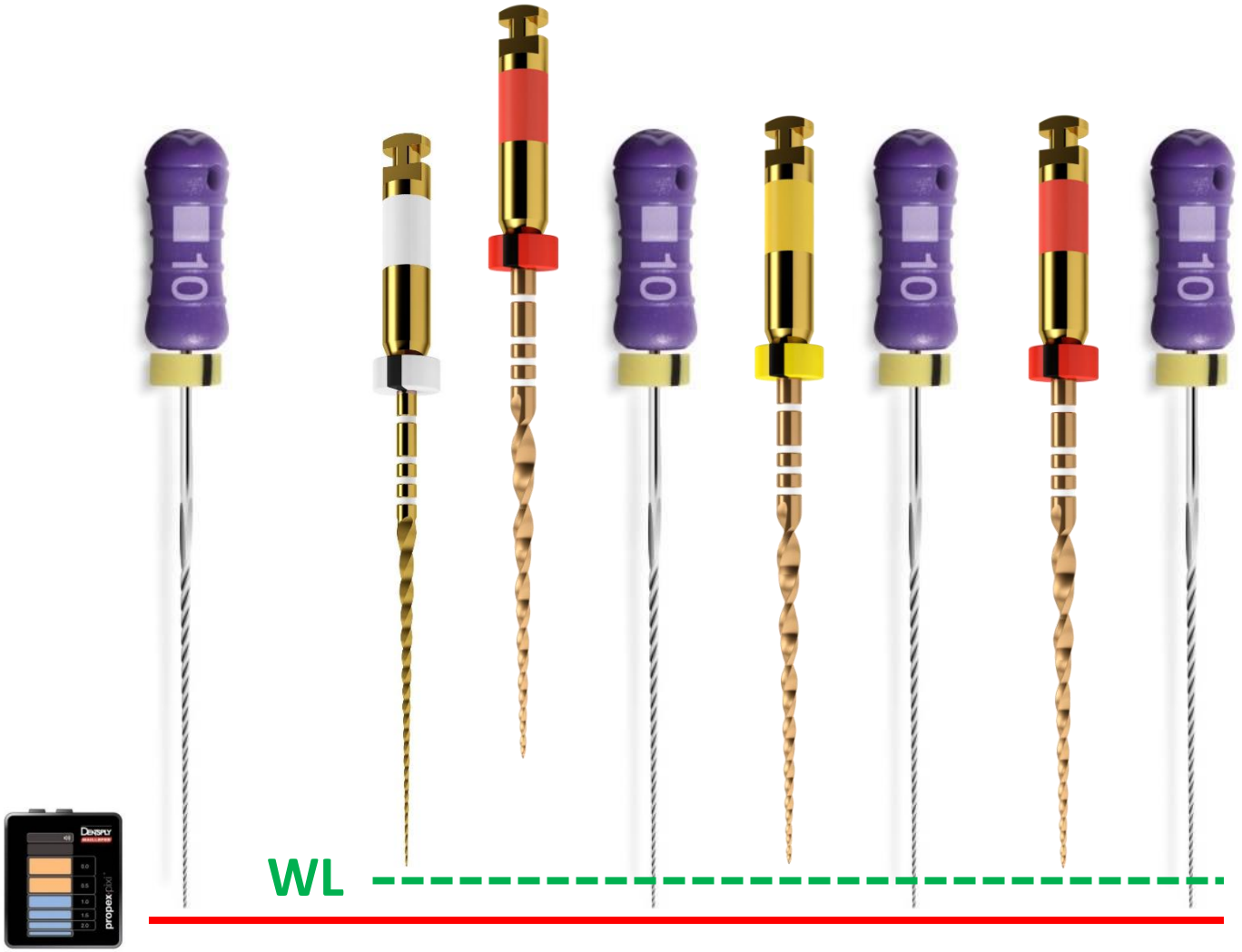
- Gold NiTi
- More flexible
- Less resistant to fatigue
- Quicker shaping time


Dentsply Sirona
Ncm
4.0
400
rpm
over
ProTaper Ultimate
ProTaper Ultimate, F2
Cal
X-Smart Pro+

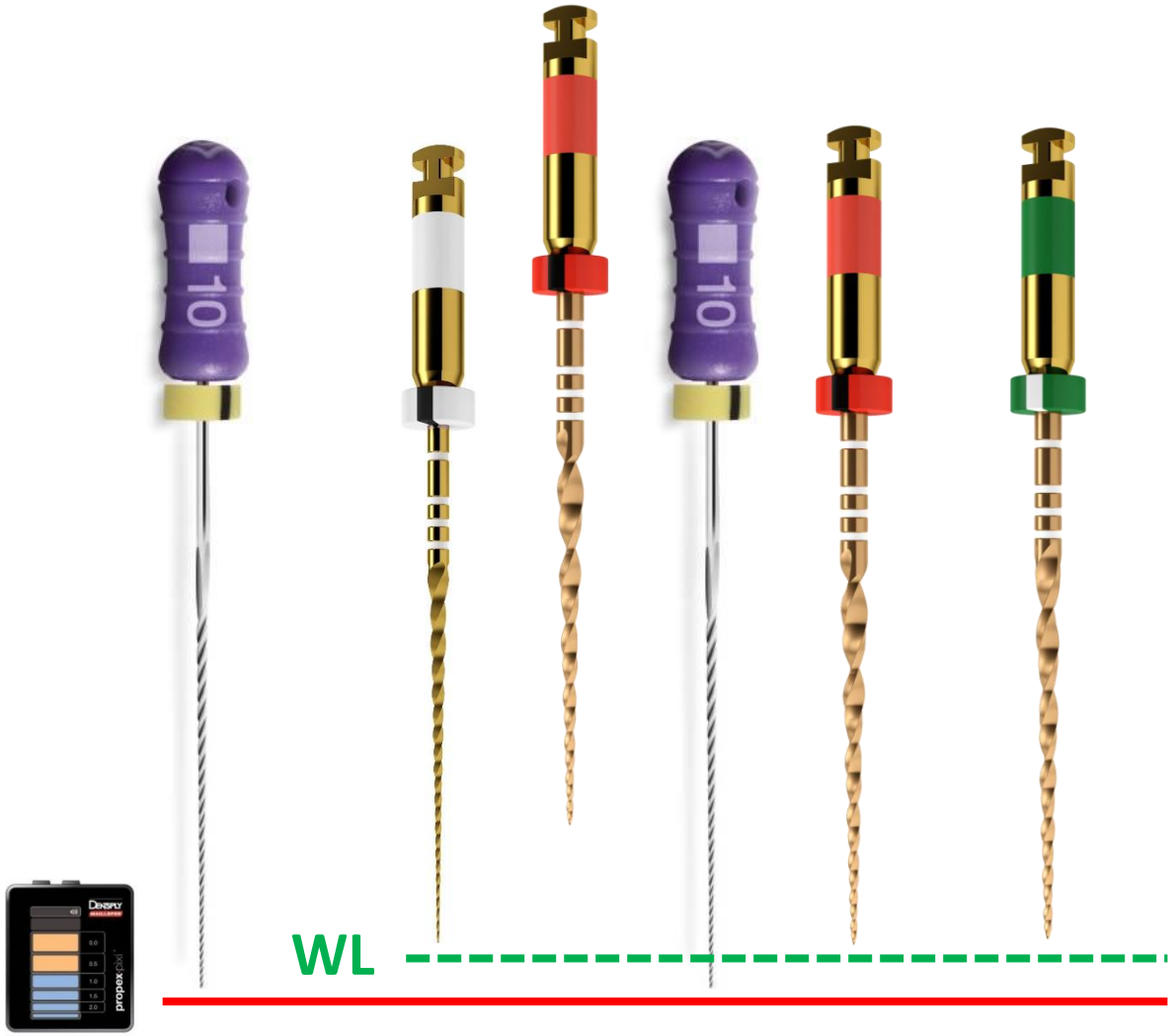
Sequence: MAJORITY of cases



Sequence: NARROW cases



Sequence: WIDER cases



Golden Rules / Checklist

- ✓ Glide path + apical patency
- ✓ Clean *frequently* (after each file)
- ✓ Always start with WOG Primary
- ✓ Light inward pressure (2-3 mm)
- ✓ Brush on outstroke
- ✓ Inspect file and remove debris

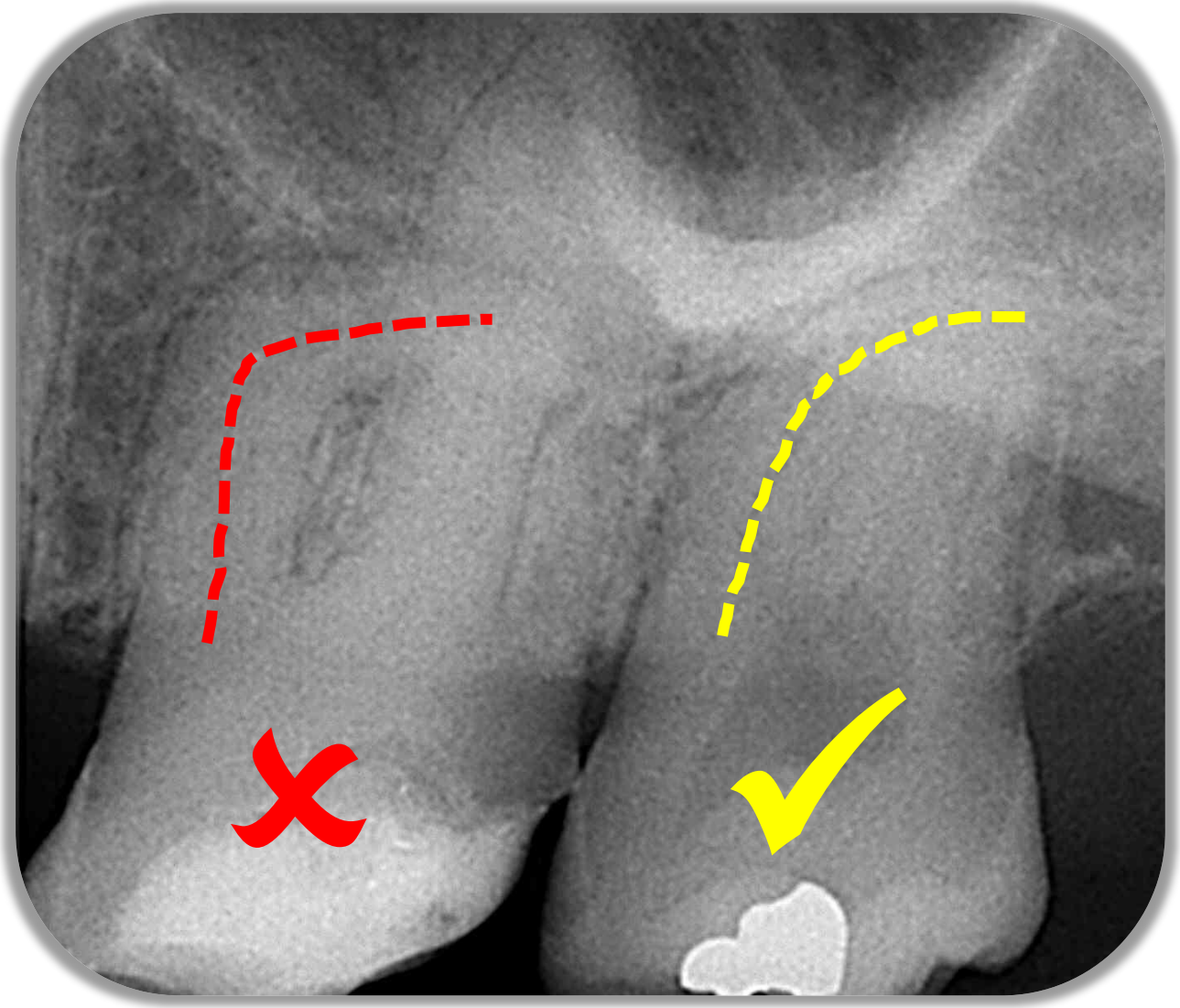
Golden Rules / Checklist

- ✓ IN passively
- ✓ BRUSH OUT
- ✓ Away from furcation
- ✓ Keep moving

Benefits

- ✓ Easy to learn
- ✓ Quicker shaping time
- ✓ More time for cleaning
- ✓ Safer with less errors

Limitations

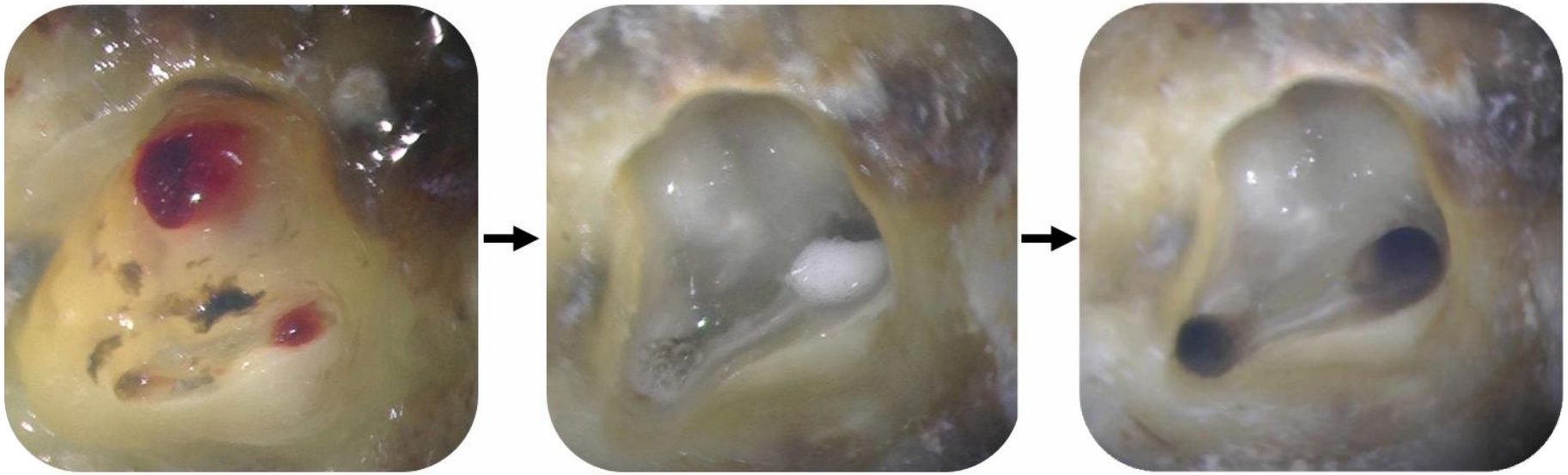


Hands-on


Dentsply Sirona
Ncm
6.0
rpm
WaveOne Gold
25 / 0.7
WaveOne Gold, Primary
Cal
X-Smart Pro+

How to Safely and Effectively CLEAN Root Canals

Optimally clean root canals









Dissolves tissues

Kills microbes

Anti-biofilm

Managing irrigant accident

DON'T PANIC!

Allow drainage from root canal

Anti-inflammatories +/- antibiotic

Urgent referral if nerve or eye damage

Regular monitoring and reassurance

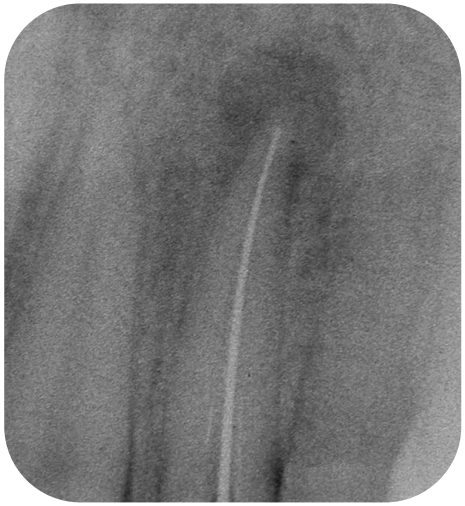
Determine correct working length



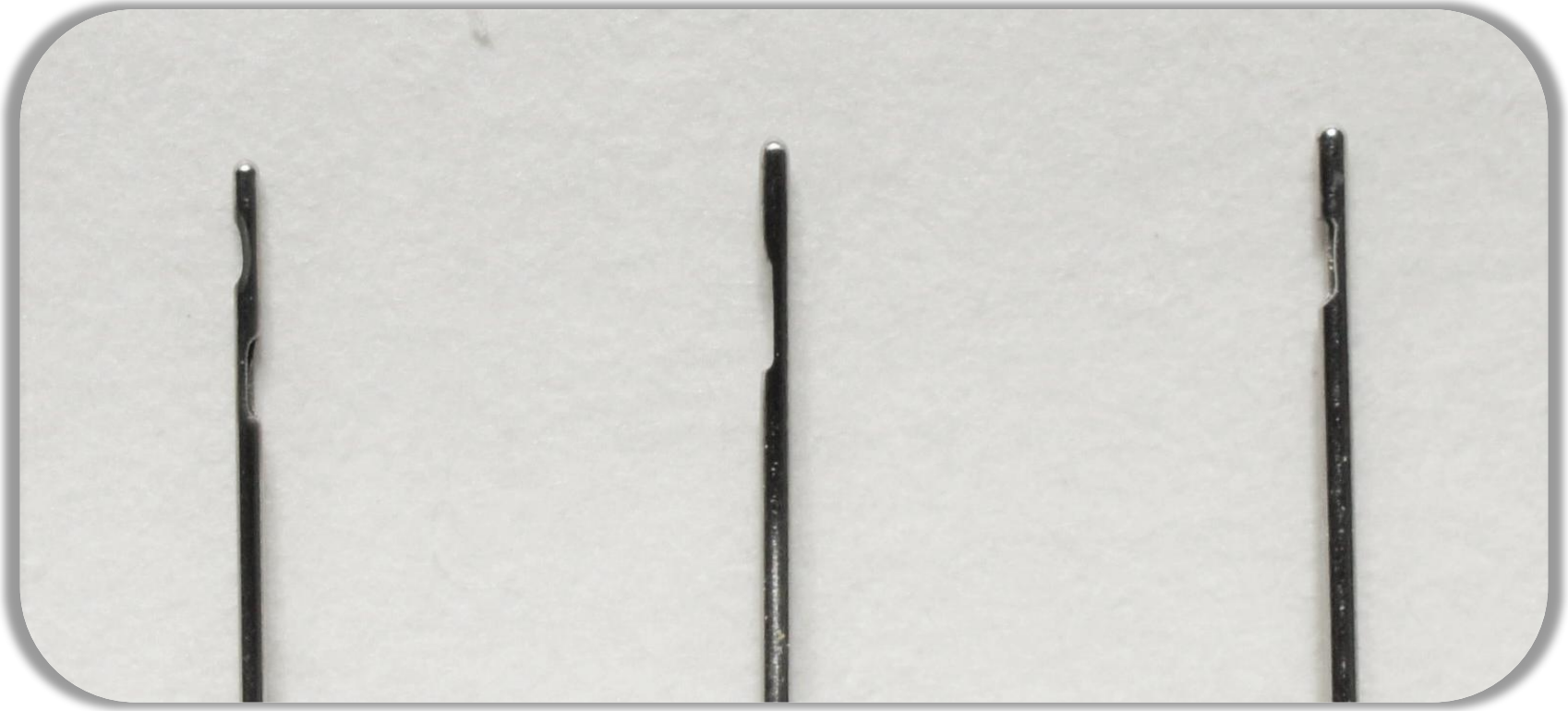








Narrow gauge + side-venting



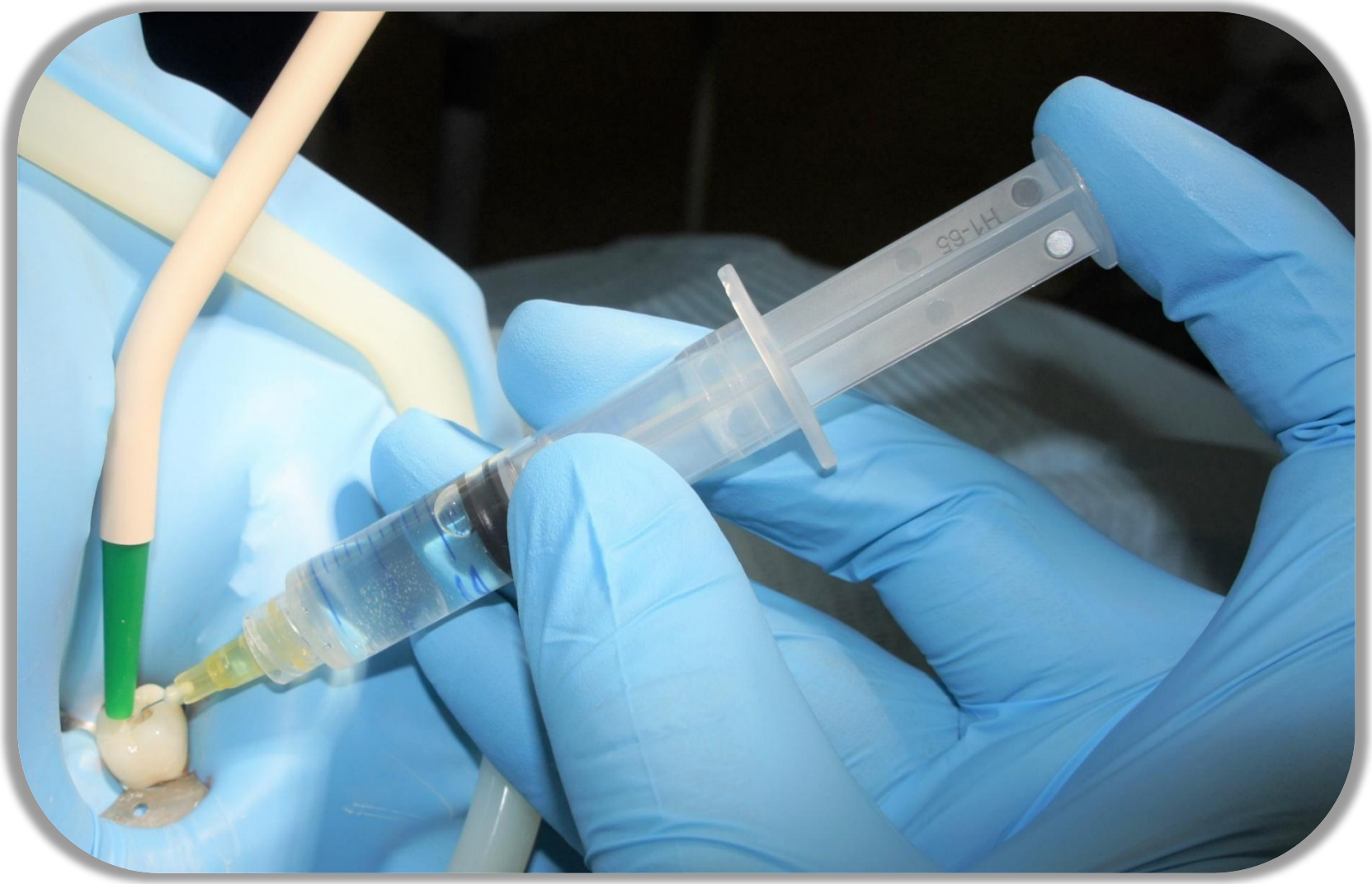
DO NOT BIND IN ROOT CANAL

IrriFlex needle

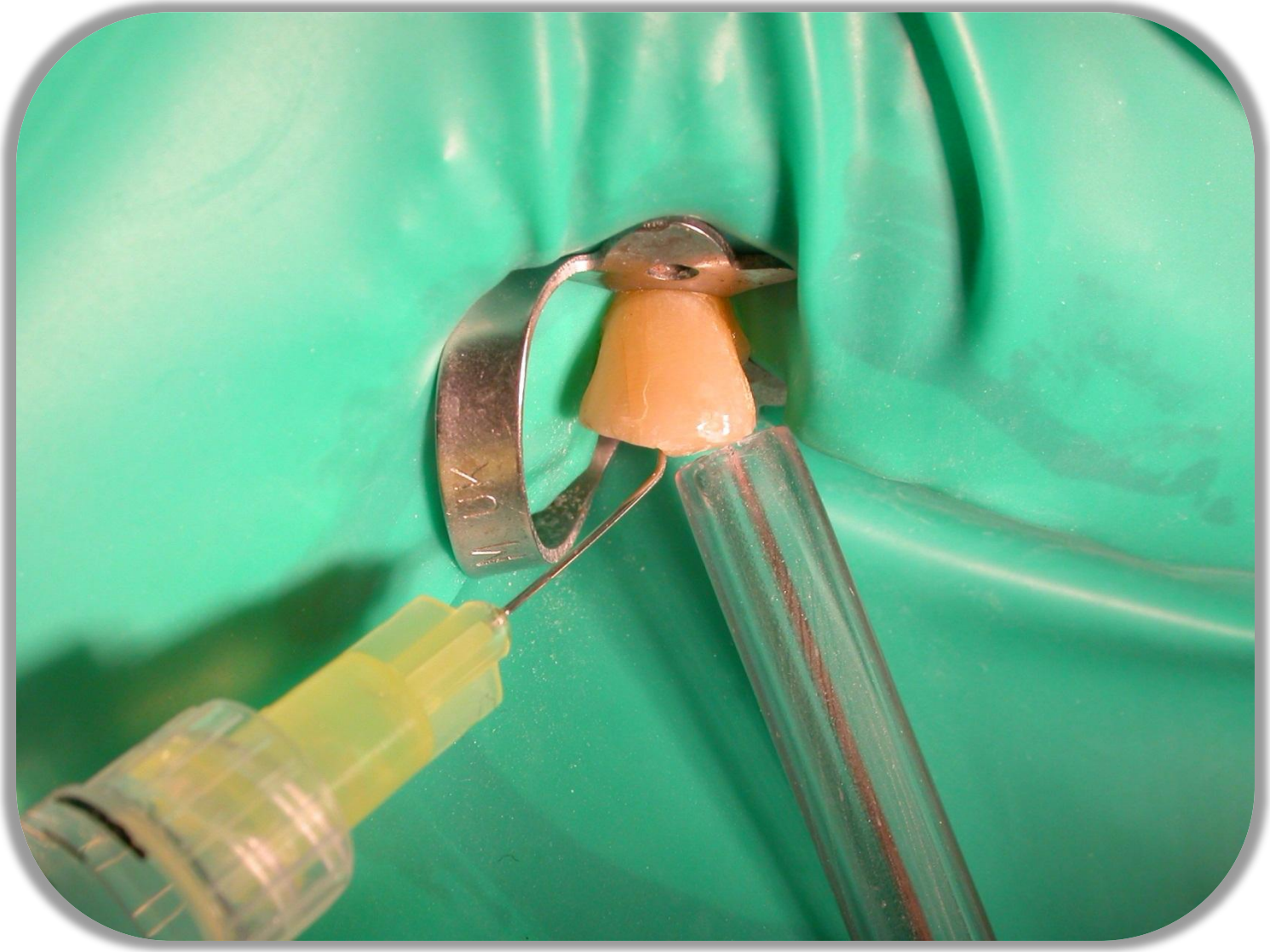




Gentle FINGER pressure



Is positive pressure adequate?



Problem no 1: complex anatomy

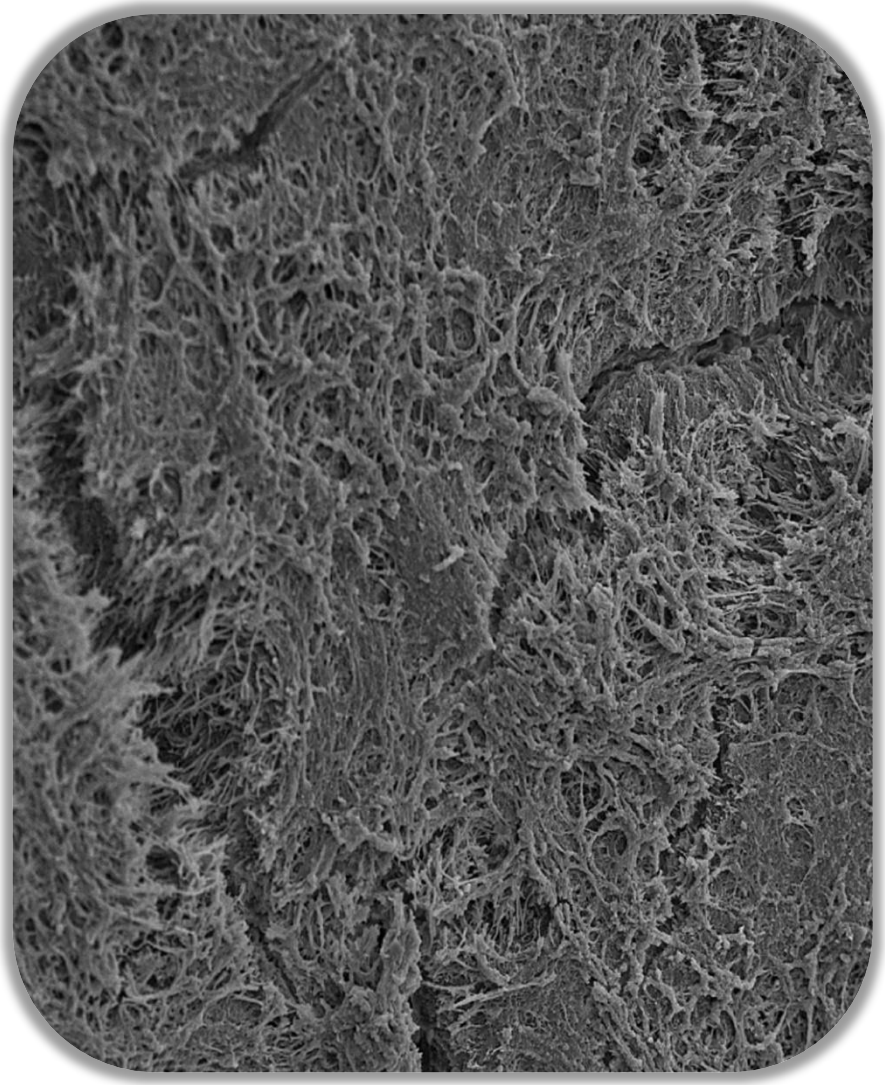


Complex apical anatomy = happy microbes



http://rootcanalanatomy.blogspot.com/

Problem no 2: biofilm

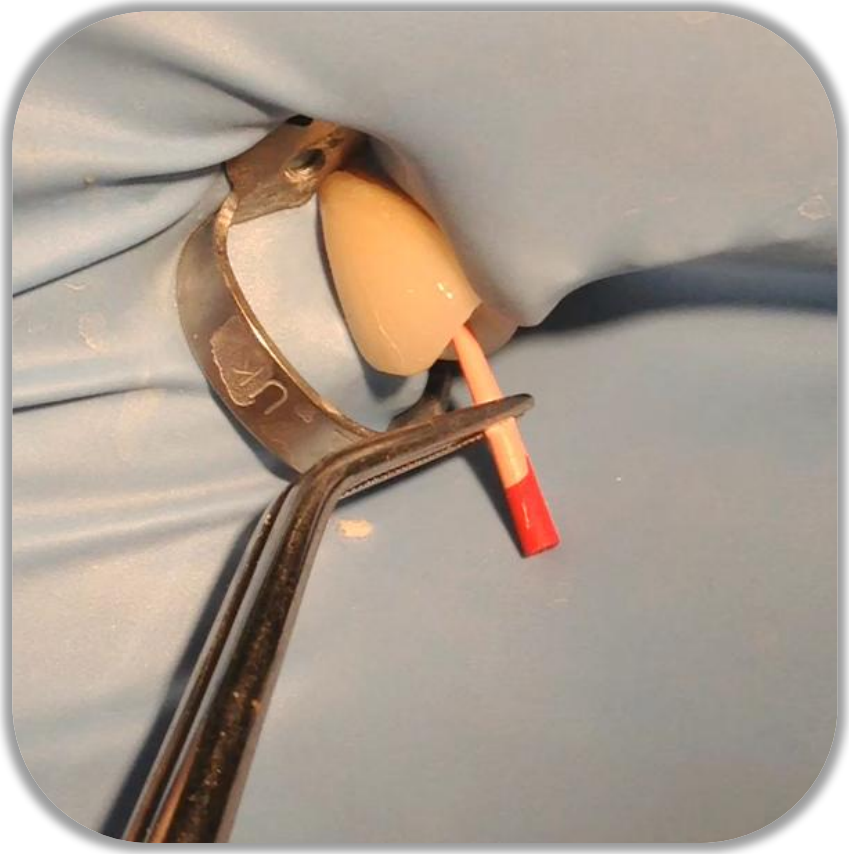


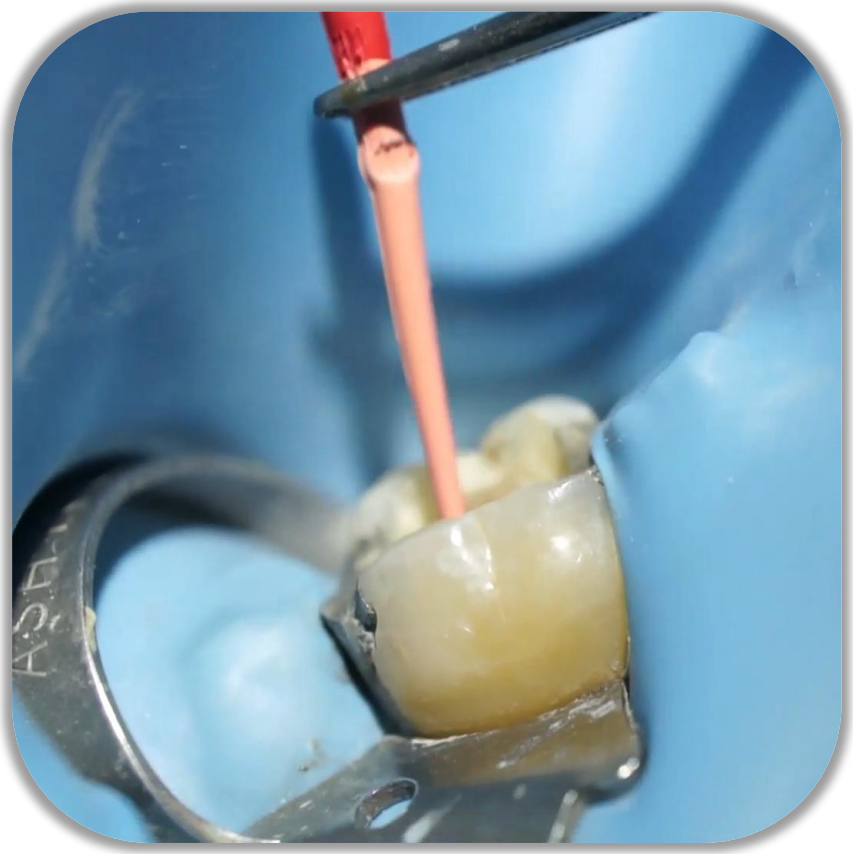


Syringe pumping (do not bind, index finger)



Gutta-percha pumping





Sonic Agitation - EndoActivator



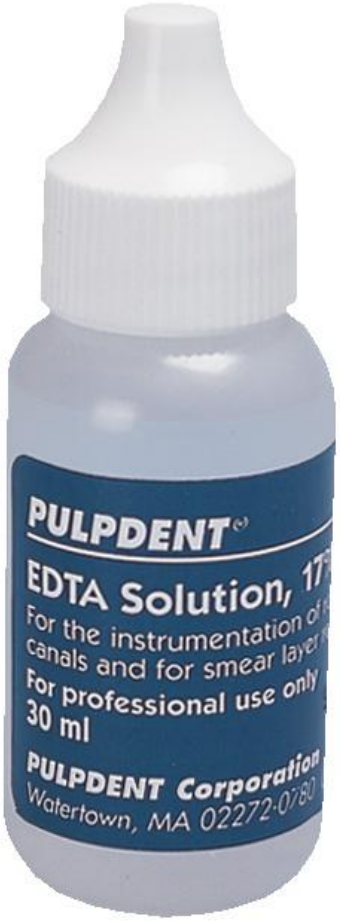
Ultrasonic Agitation



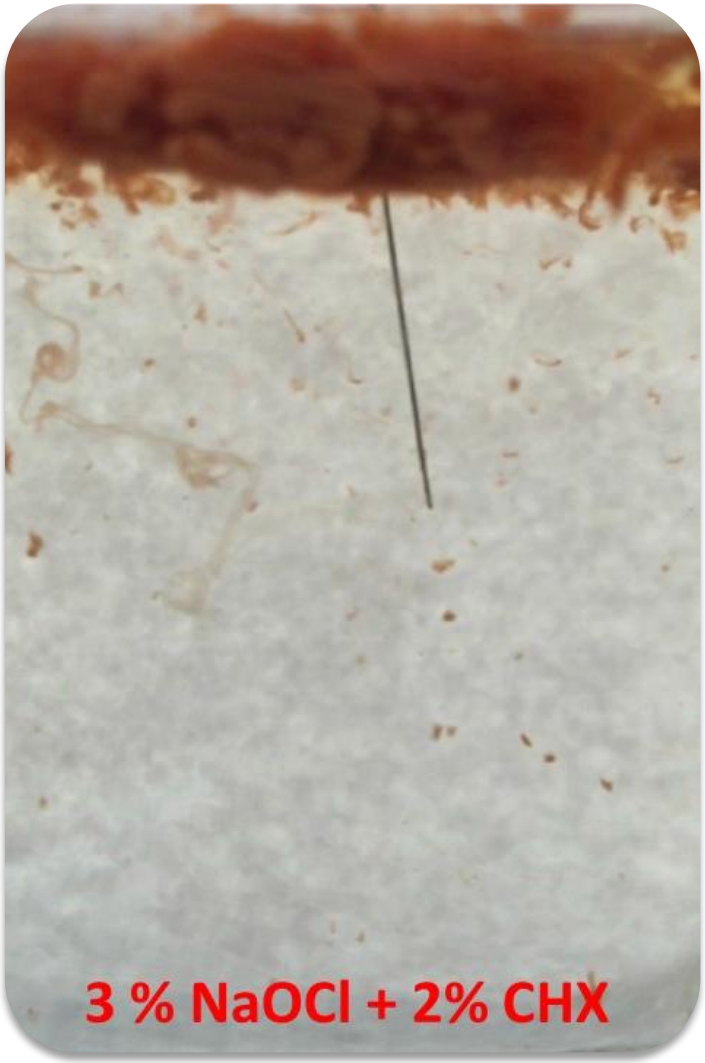
30-60
seconds

EDTA solution





Chlorhexidine 2%



- ✗ Does not disrupt biofilm
- ✗ Does not dissolve tissue
- ✗ Interacts with NaOCl

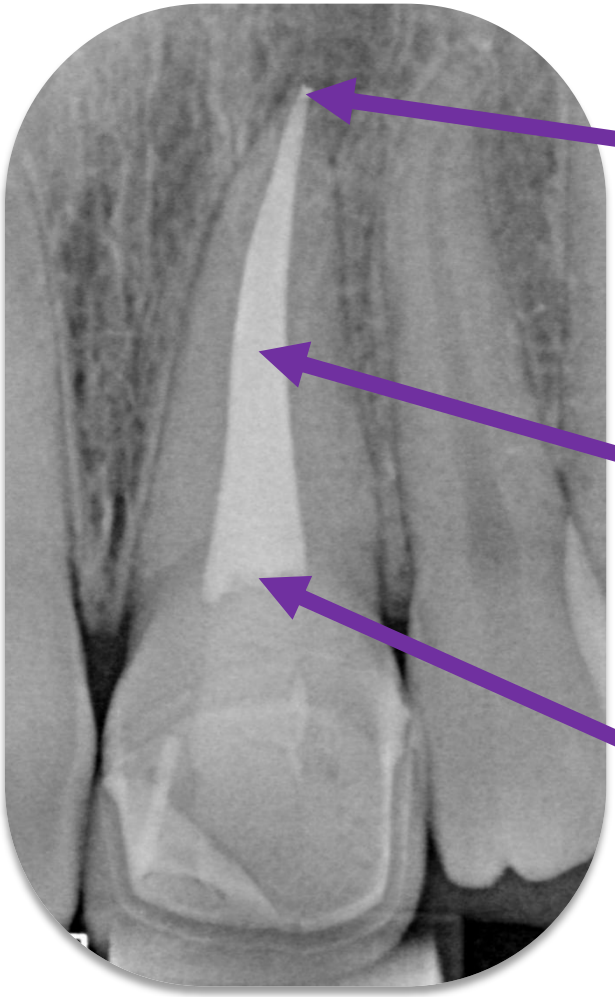
NaOCl + CHX = PCA

Checklist for CLEANING

- ✓ Use appropriate solution
- ✓ Agitate
- ✓ Safe technique

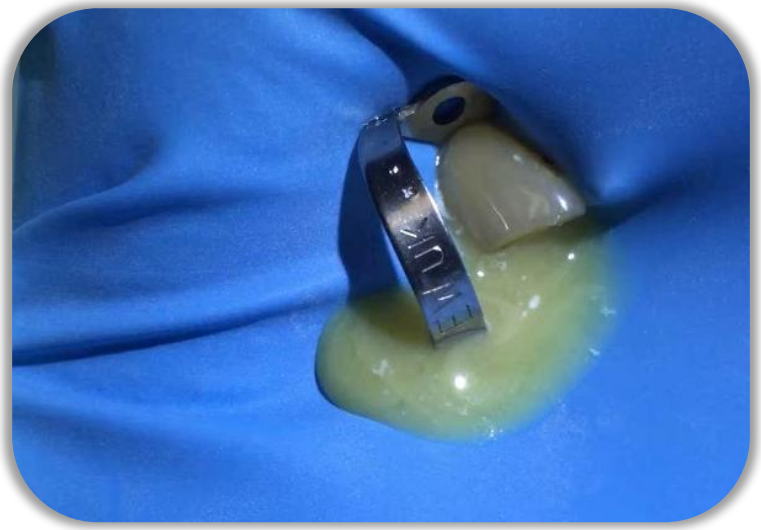
How to Safely and Effectively FILL Root Canals

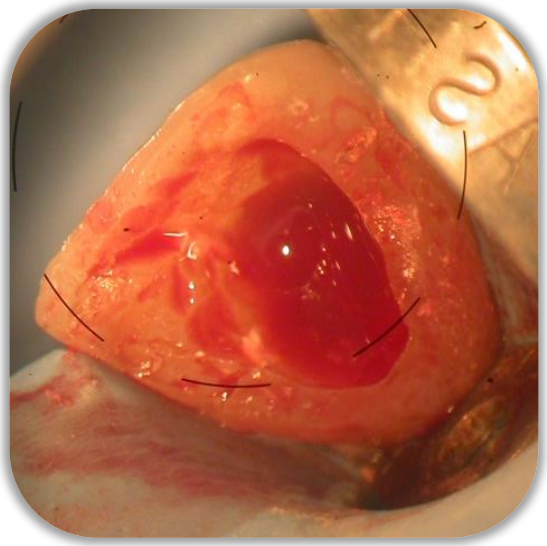
Why FILL root canals?



- Prevent food source
- Entomb residual microbes
- Prevent re-infection

When to FILL root canals?





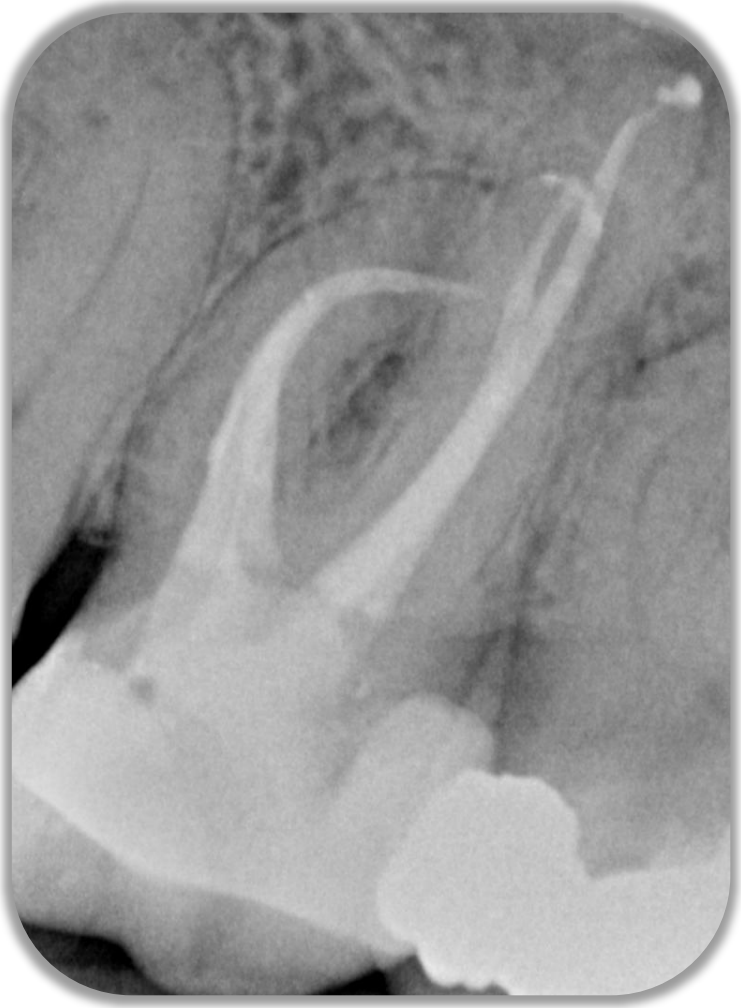


Avoid!!!





Optimal root canal fillings

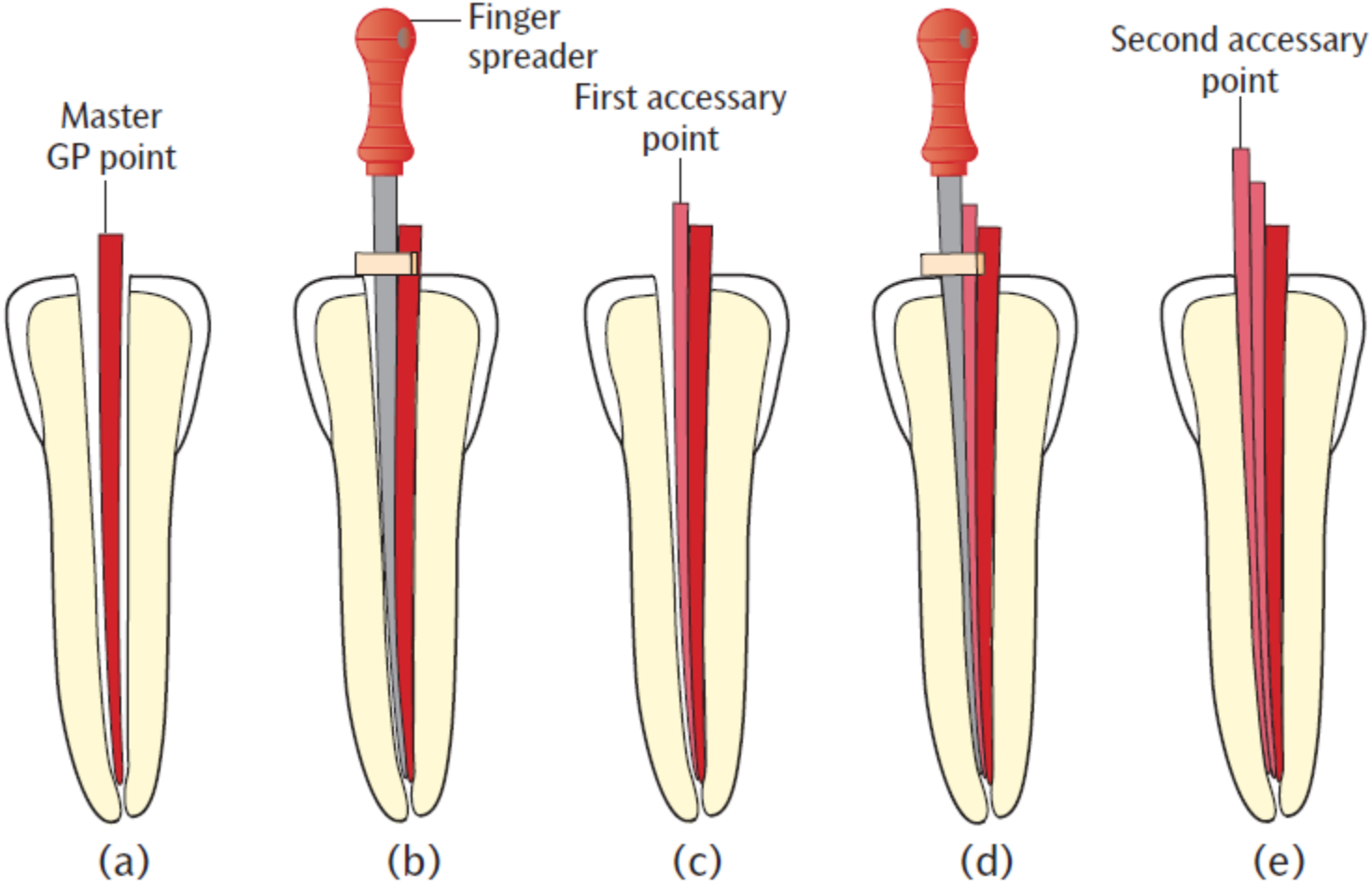




How do we FILL root canals?

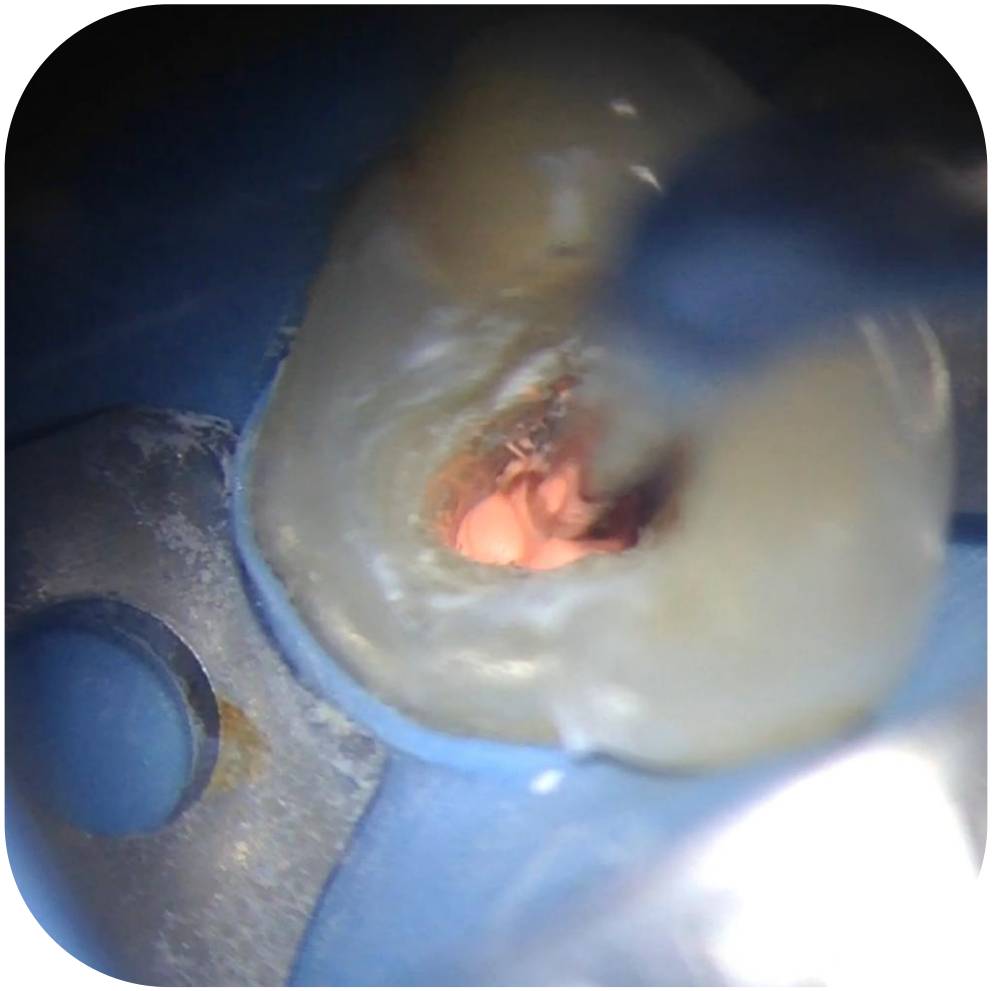
- Single cone
- Cold compaction
- Warm compaction

Cold compaction

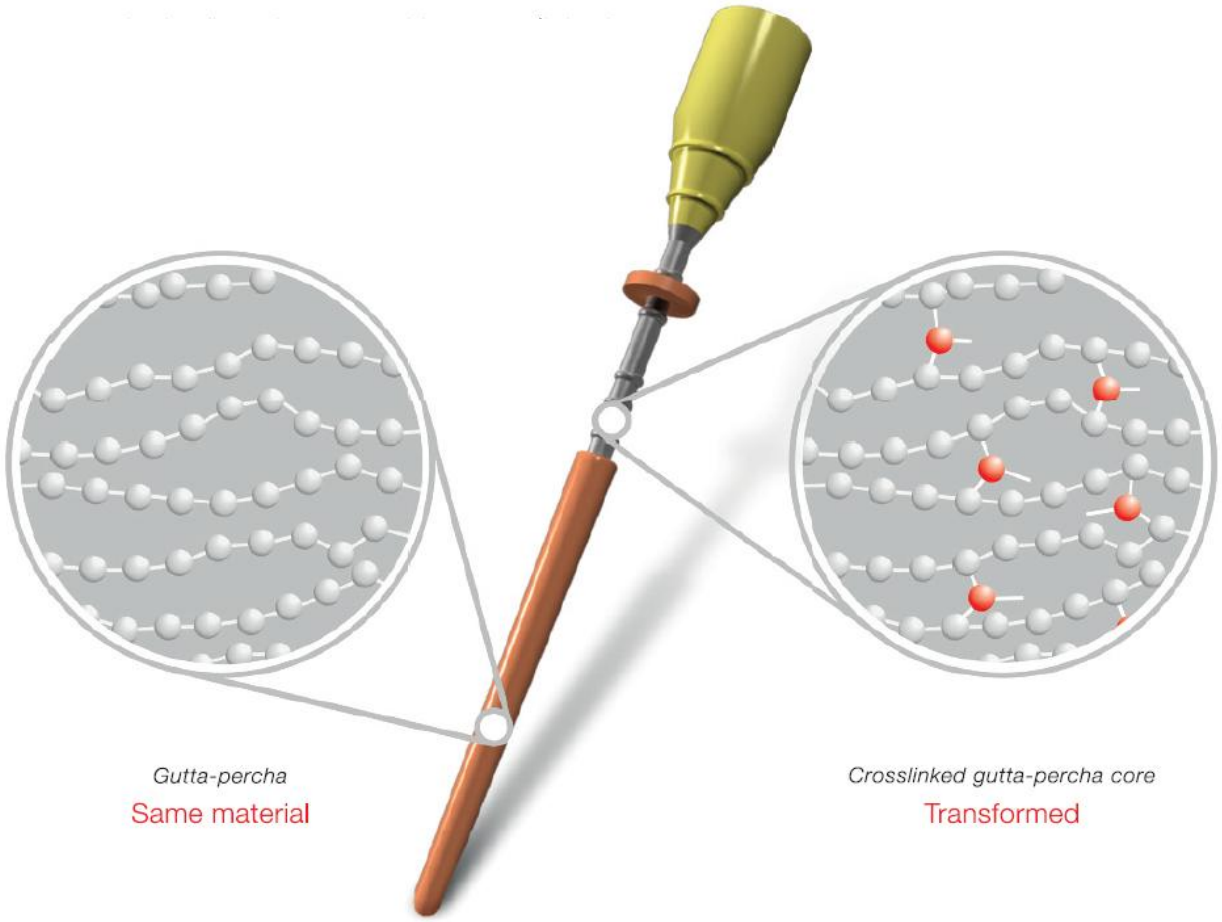


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UNIVERSITY PRESS

Warm compaction

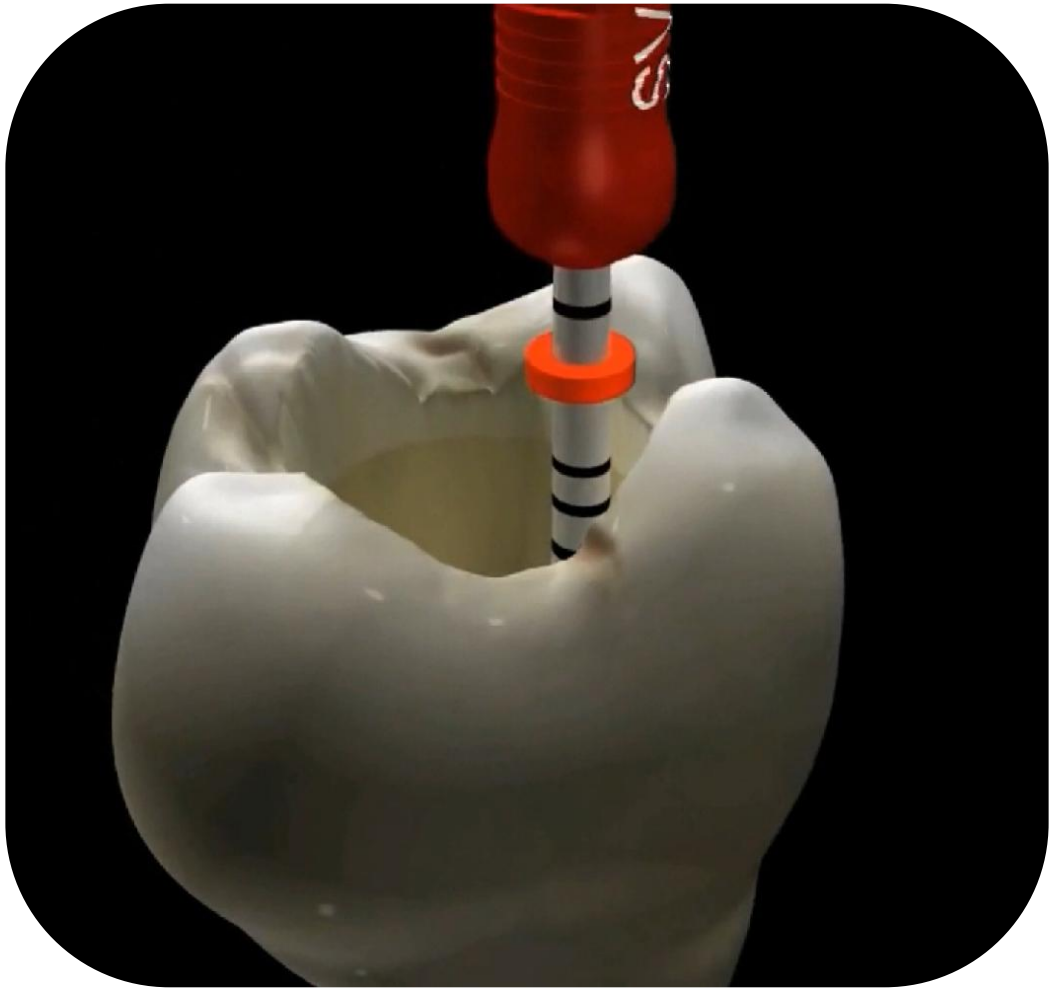


gutta•core™



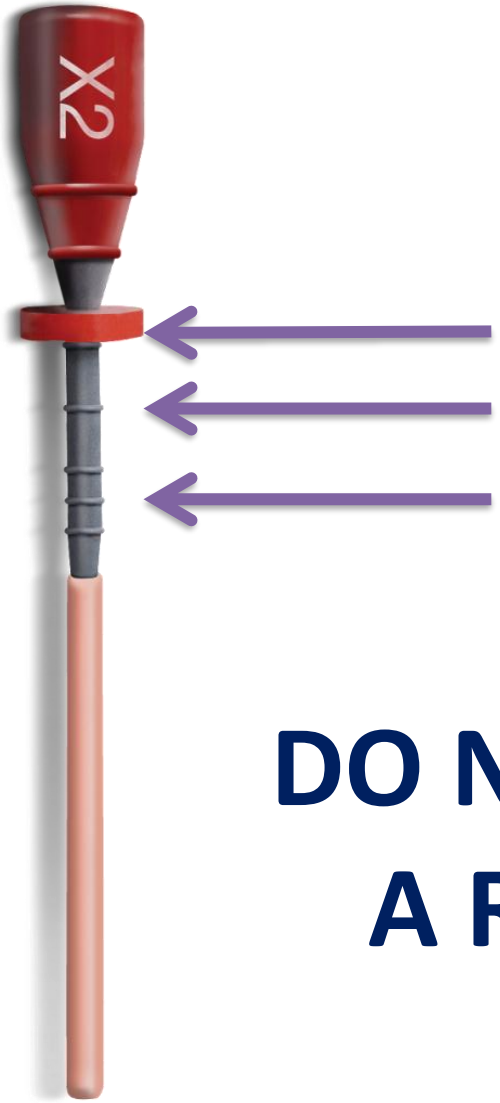
‘Obturator’ with a cross-linked gutta-percha core

Step 1 Verify shape



www.endoruddle.com/jit

Step 2 Set the Working Length



24 mm

22 mm

18, 19, 20 mm

DO NOT USE A RULER

Step 3 Warm the GuttaCore

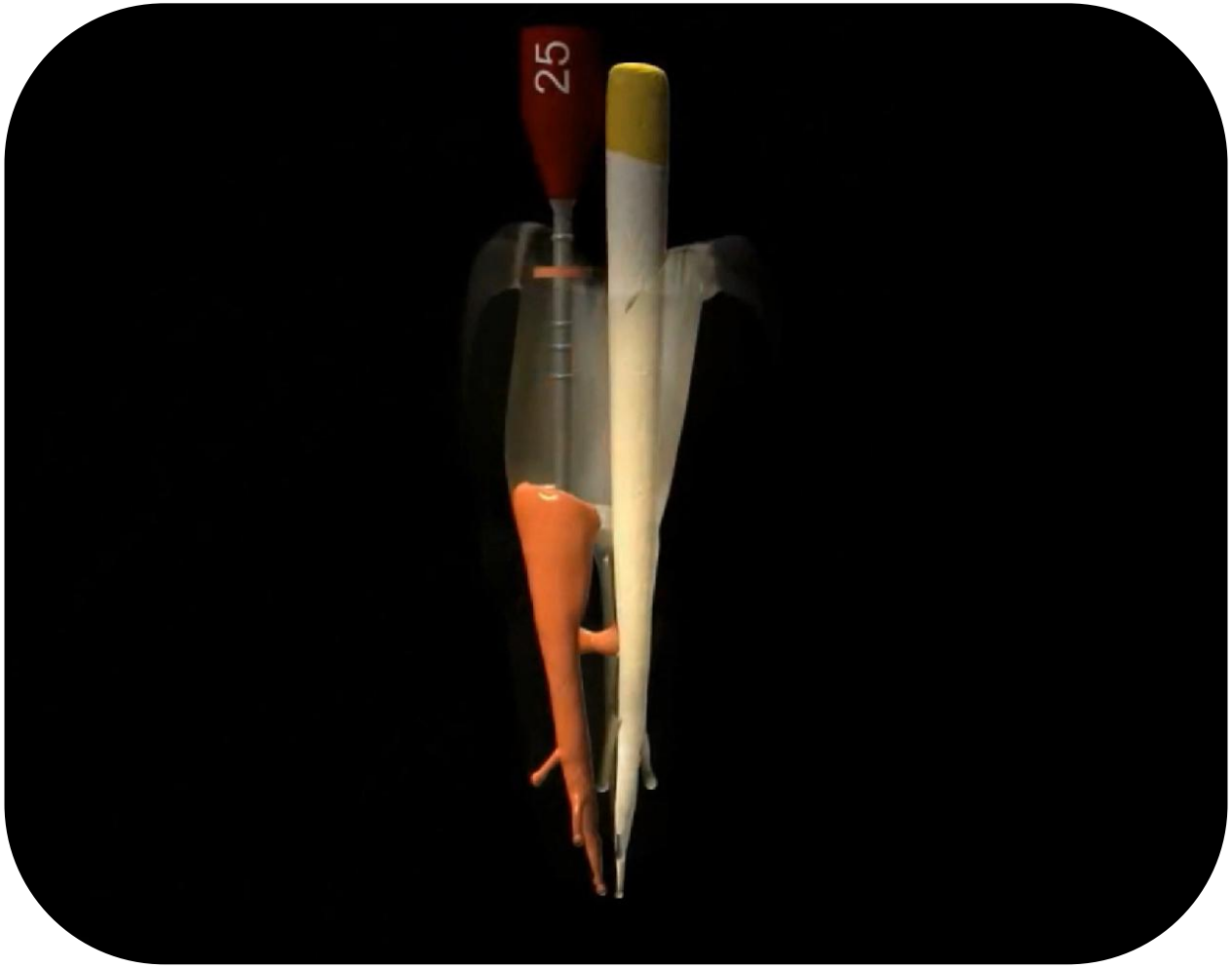


Step 4 Dry Canal + Apply Sealer



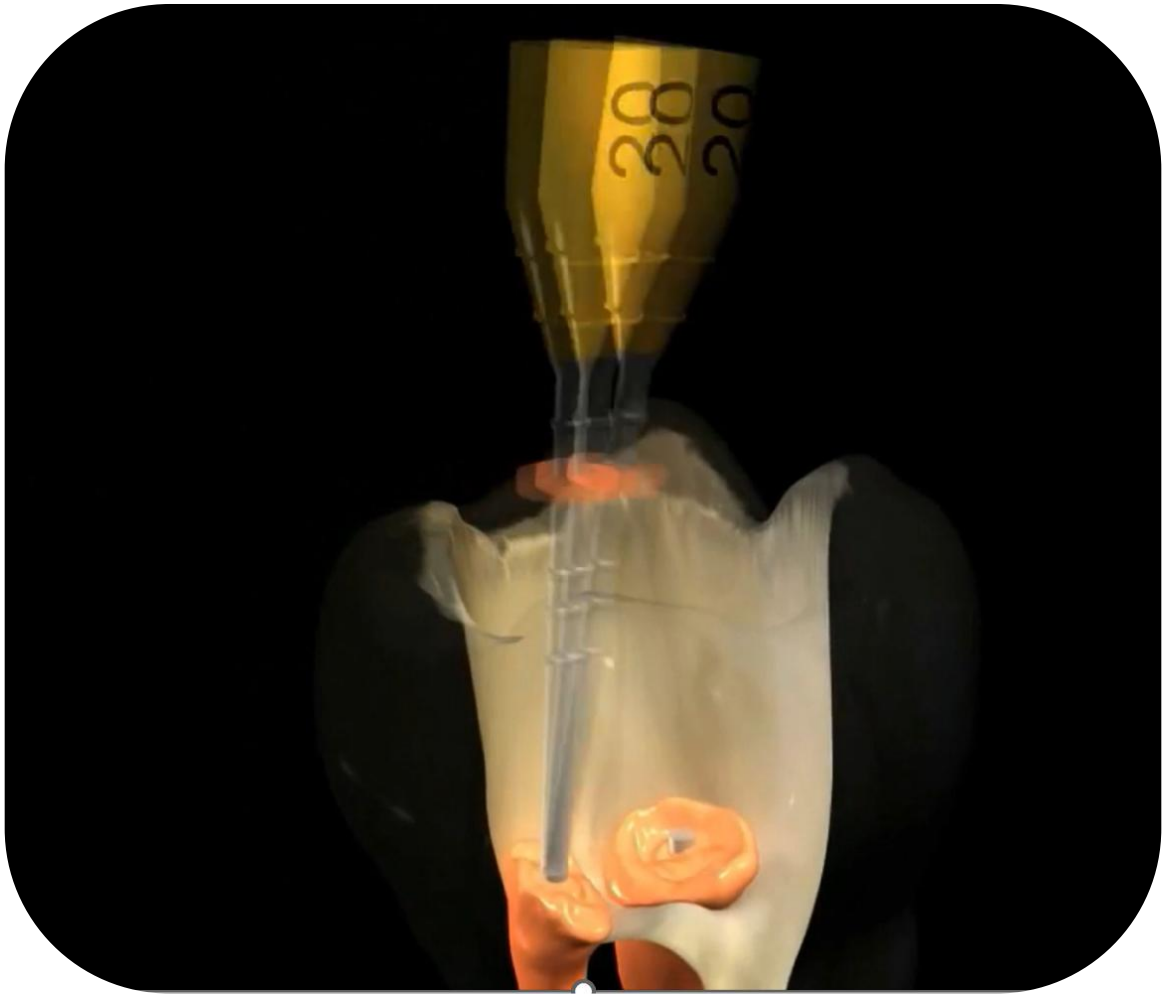


Step 5 Place the Obturator



www.endoruddle.com/jit

Step 6 Remove the Handle



www.endoruddle.com/jit

Benefits of GuttaCore

- ✓ Easy to learn
- ✓ Quick filling time
- ✓ Fills anatomical complexities
- ✓ Less complex to remove

Checklist for FILLING

- ✓ Only if root canals are clean and dry
- ✓ Optimal length and compaction
- ✓ Consider heated technique

SUMMARY

Treat disease	**CONTROL** infection	SHAPE CLEAN FILL
Rubber dam	Loupes	Glide path Apical patency
Apex locator	Agitate NaOCl	Optimal root filling