Missouri Dental
ASSOCIATION

Endodontic Instrumentation and Obturation

Joseph Bernier, DDS

• Sponsored by Dentsply Sirona •

Friday, June 21, 2024
1:30p-4:30p

ADA C·E·R·P® | Continuing Education Recognition Program

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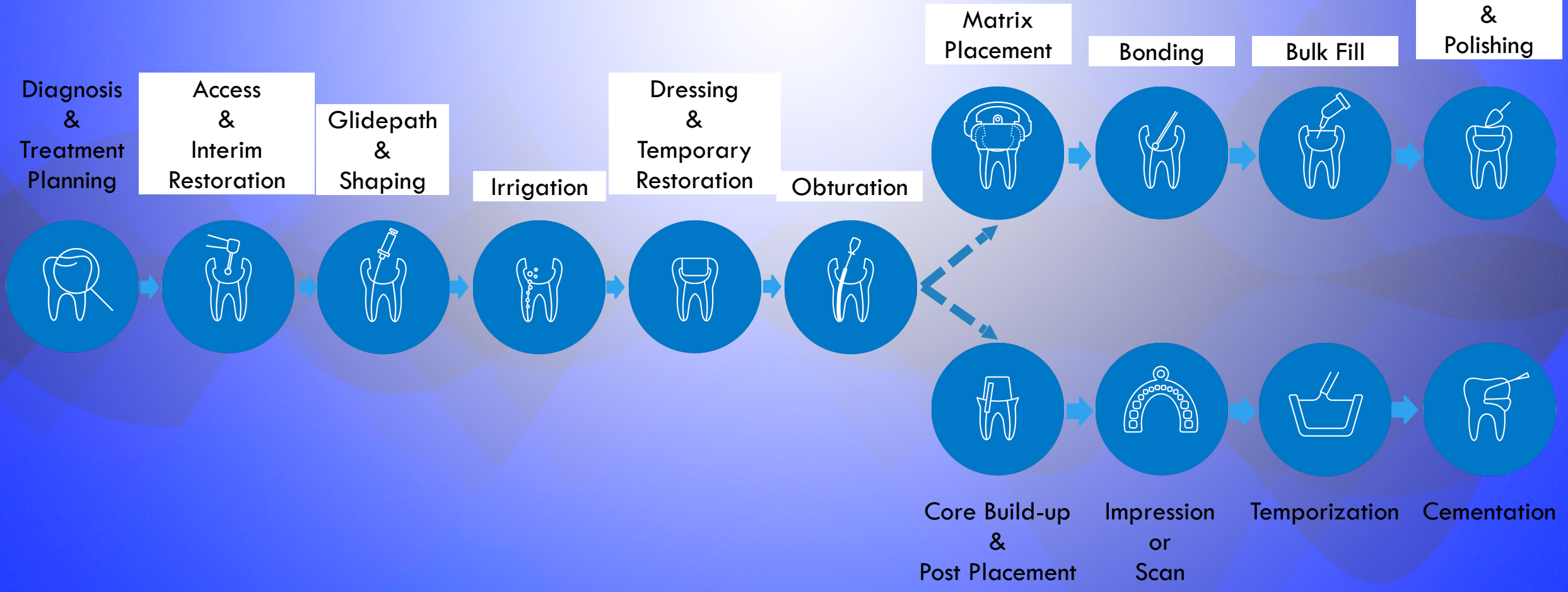
IMPORTANCE OF INSTRUMENTATION

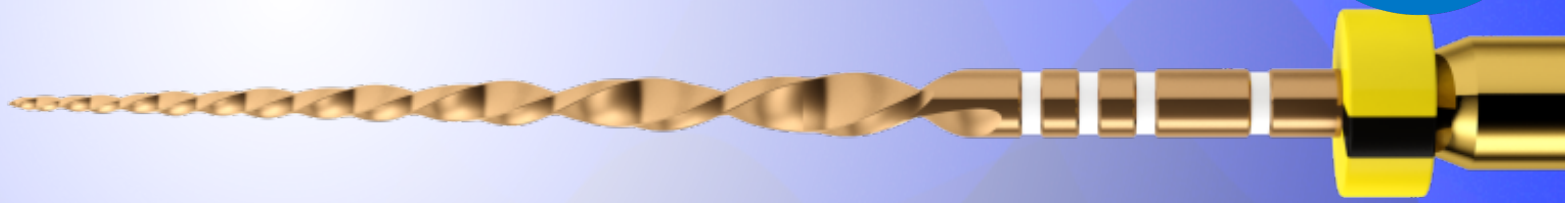
Make..."a shape that facilitates optimal irrigation, debridement and placement of local medicaments and permanent root filling."

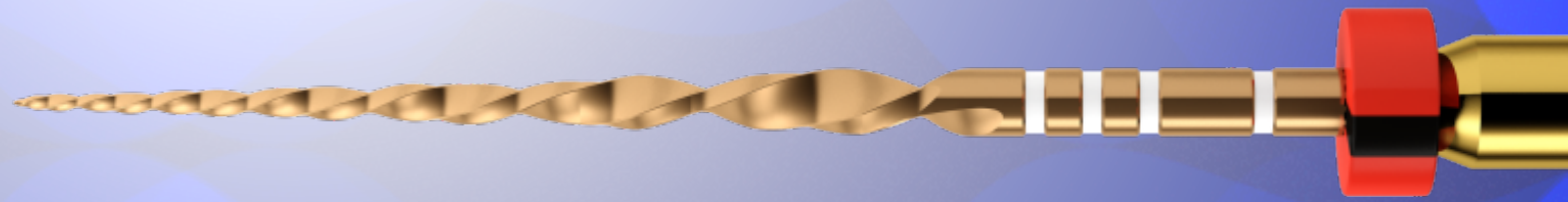

Diagnosis & Treatment Planning
Access & Interim Restoration
Glidepath & Shaping
Irrigation
Dressing & Temporary Restoration
Obturation
Matrix Placement
Bonding
Bulk Fill
Capping, Finishing & Polishing
Core Build-up & Post Placement
Impression or Scan
Temporization
Cementation

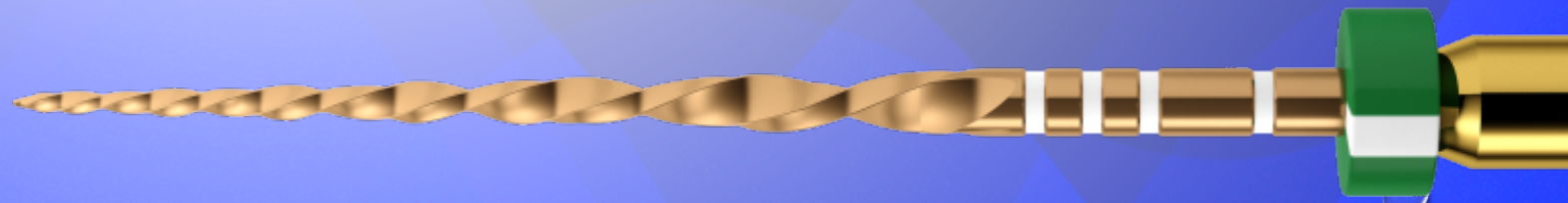
OBJECTIVES FOR INSTRUMENTATION

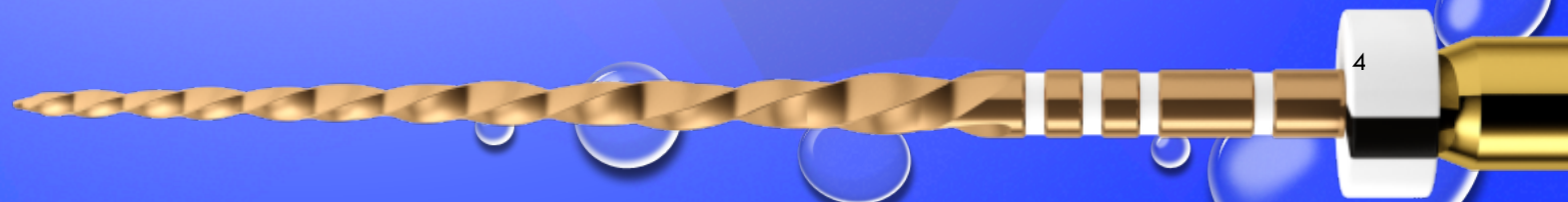
- INSTRUMENT DESIGN FACTORS
- SHAPING EFFECTIVENESS OF VARYING TAPERS
- FLEXIBILITY AND FATIGUE RESISTANCE/METALLURGY
- USAGE RULES AND PROTOCOLS

ENDODONTIC FILE DESIGN ELEMENTS

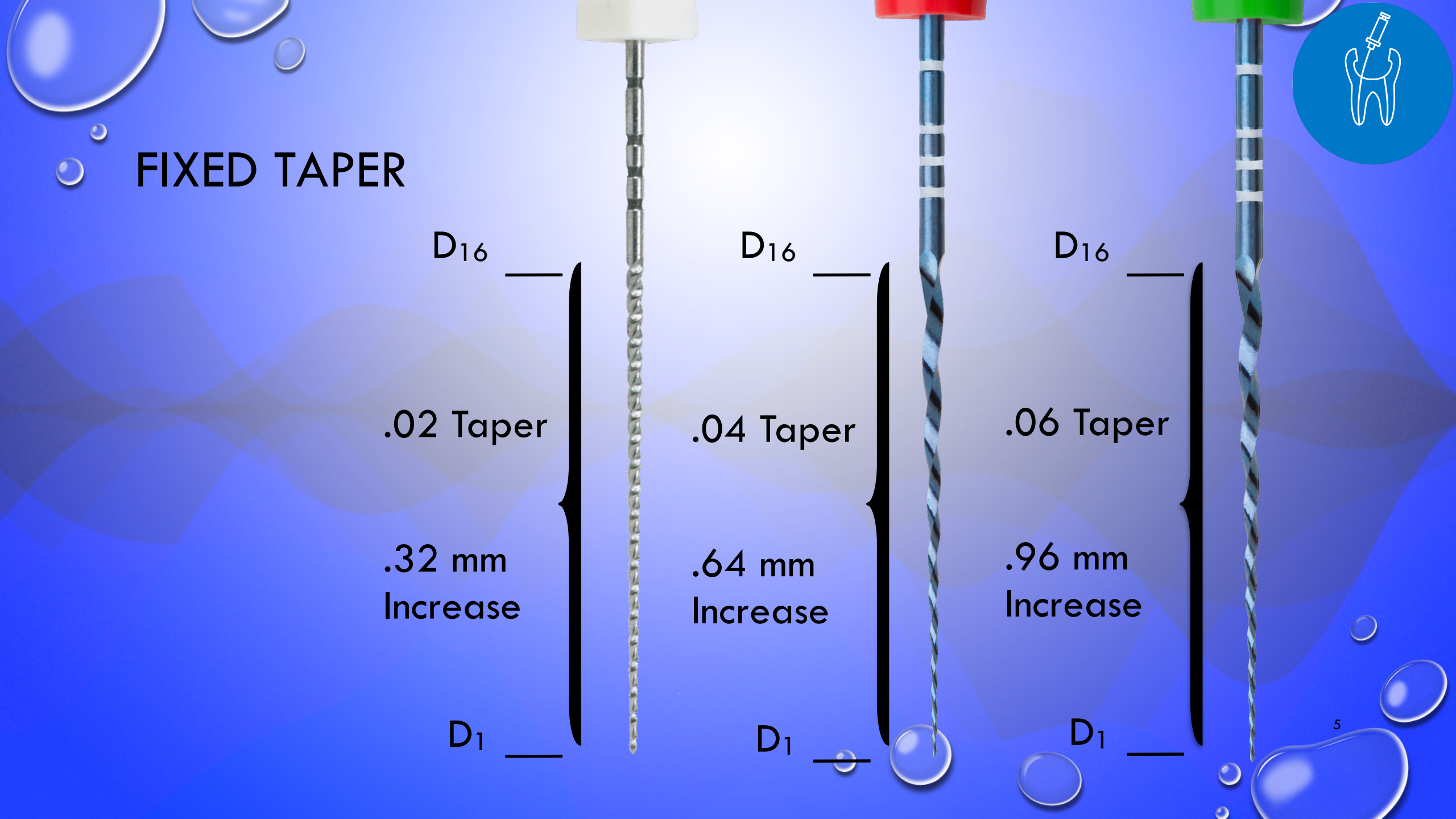




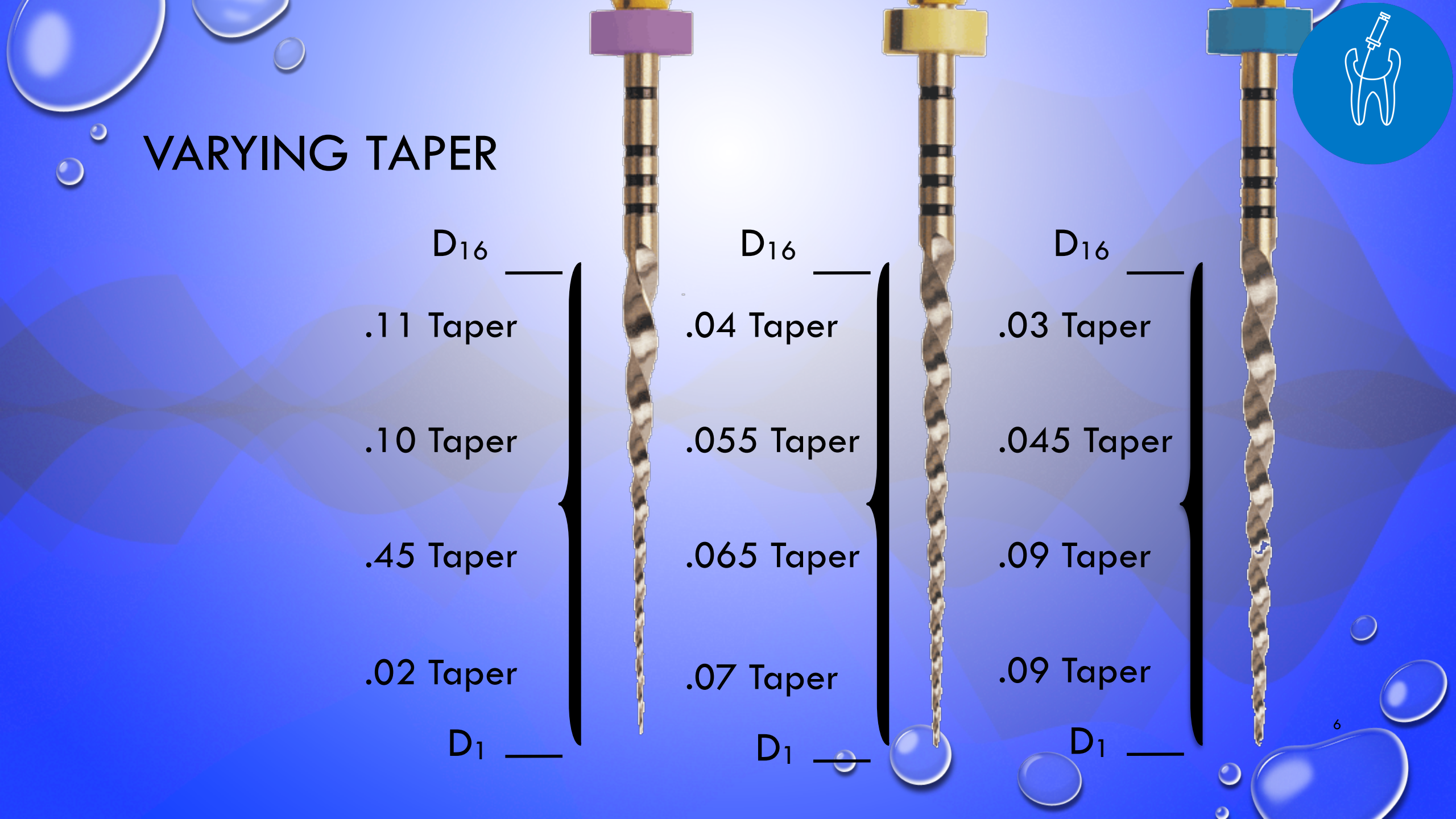




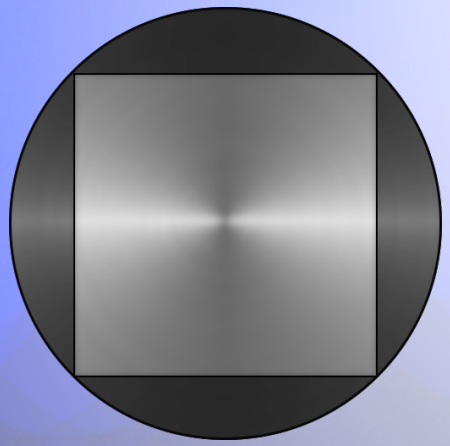
FIXED TAPER


D16
.02 Taper
.32 mm Increase
D1
D16
.04 Taper
.64 mm Increase
D1
D16
.06 Taper
.96 mm Increase
D1

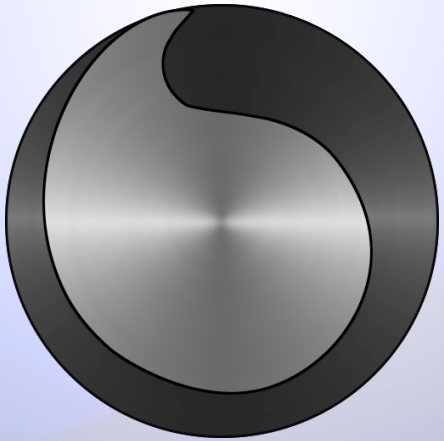
VARYING TAPER



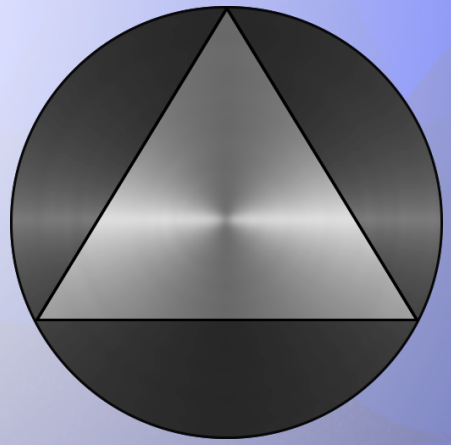
CROSS SECTIONS



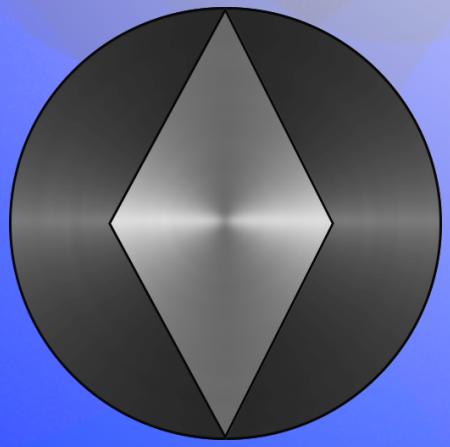
K-File



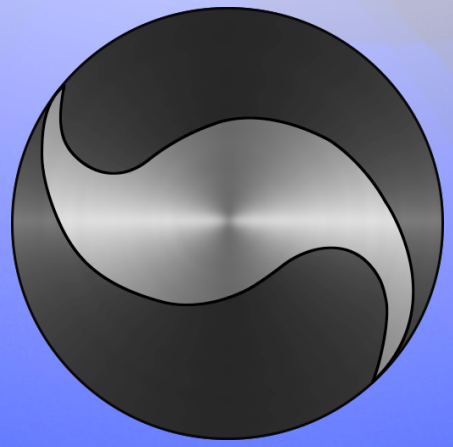
Hedstrom File



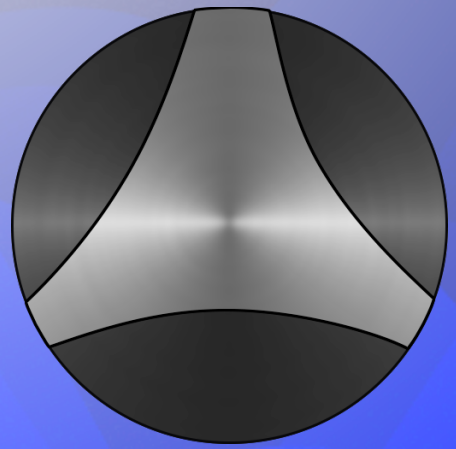
Reamer



K-Flex®

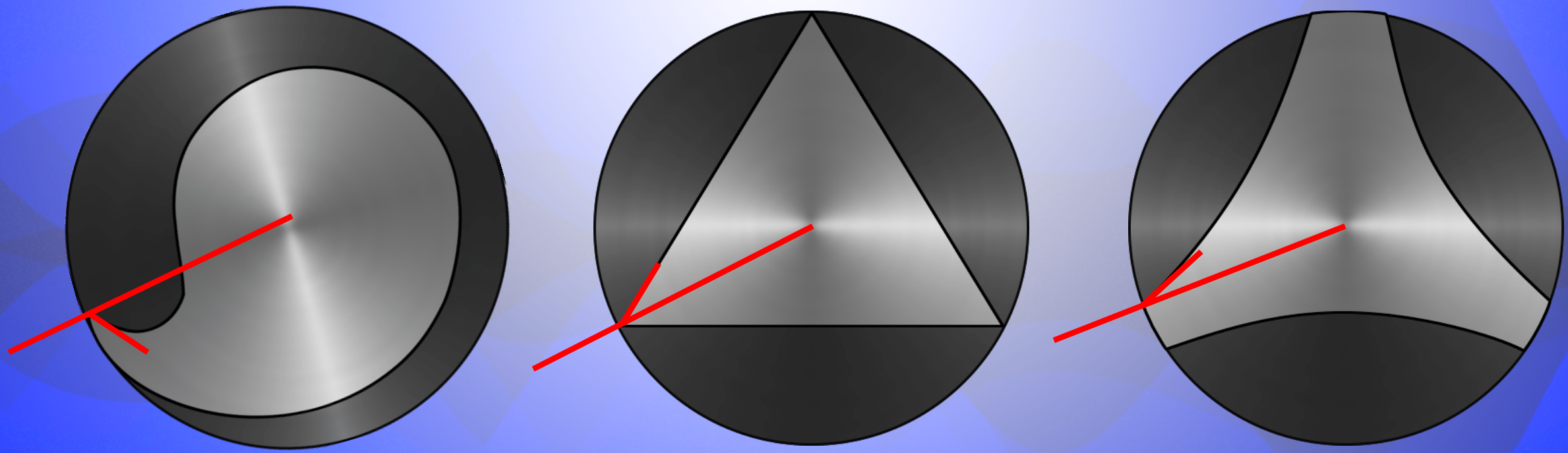


Unifile®



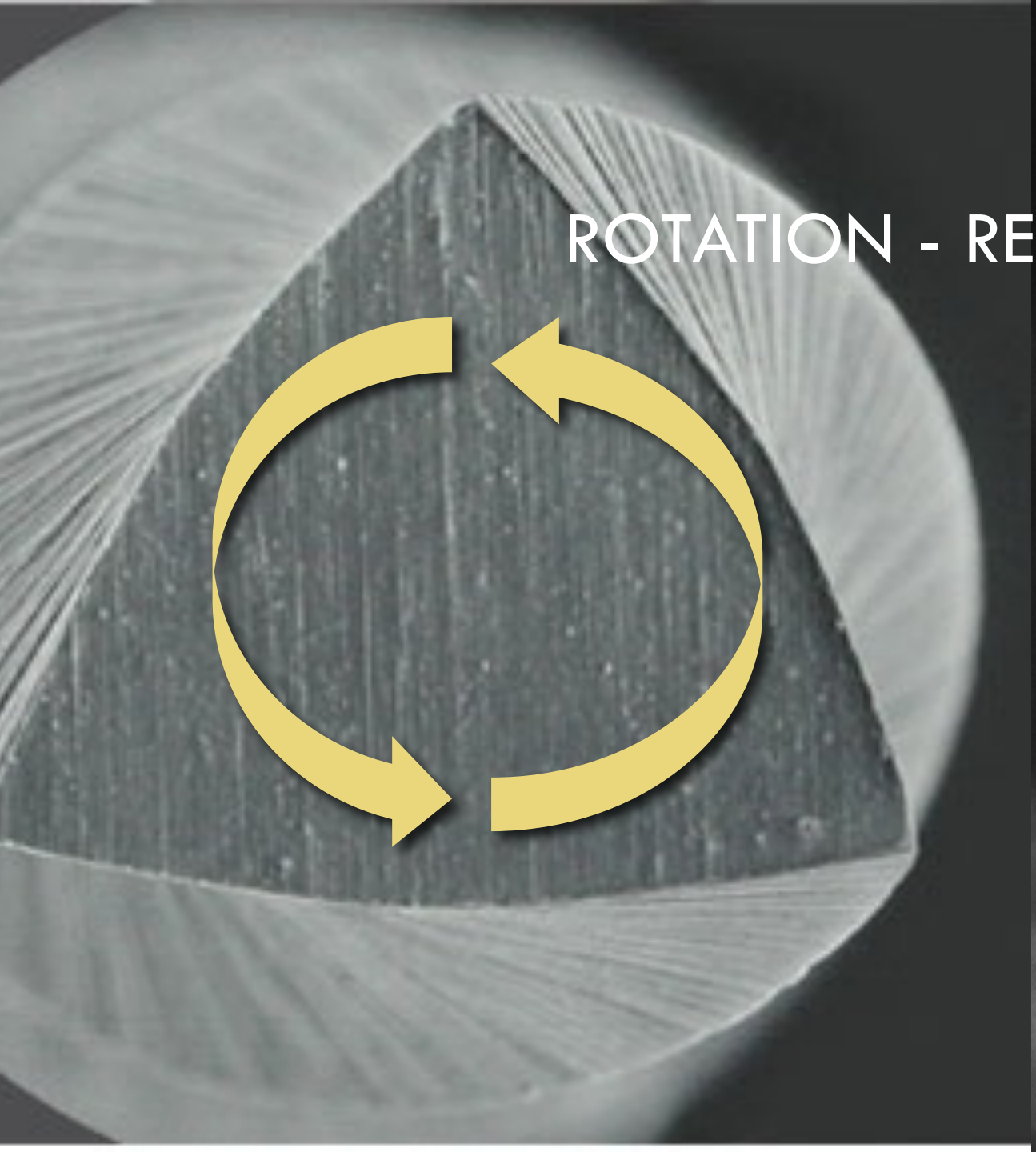
U-Blade

RAKE ANGLE

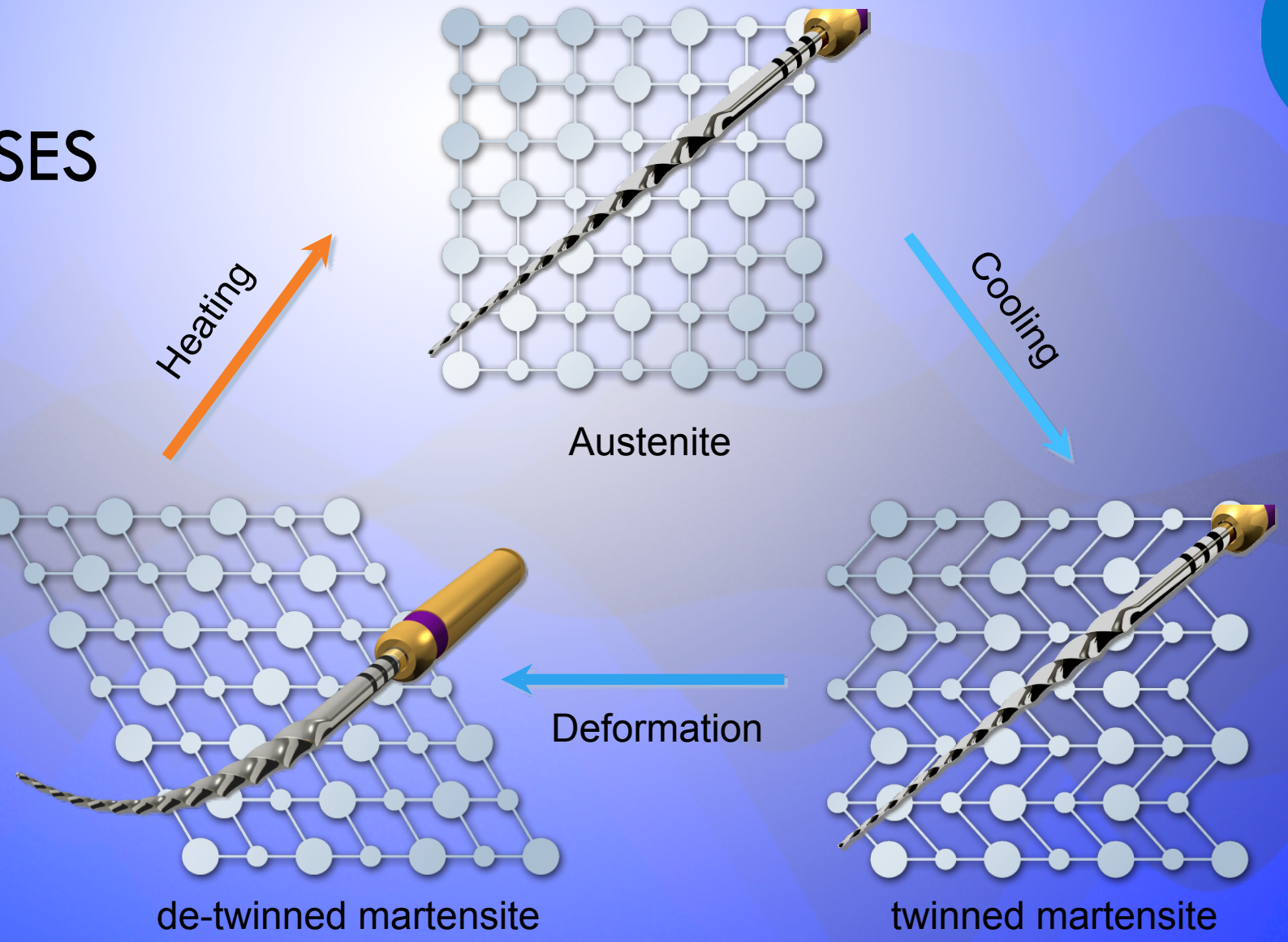


PITCH / HELICAL ANGLE

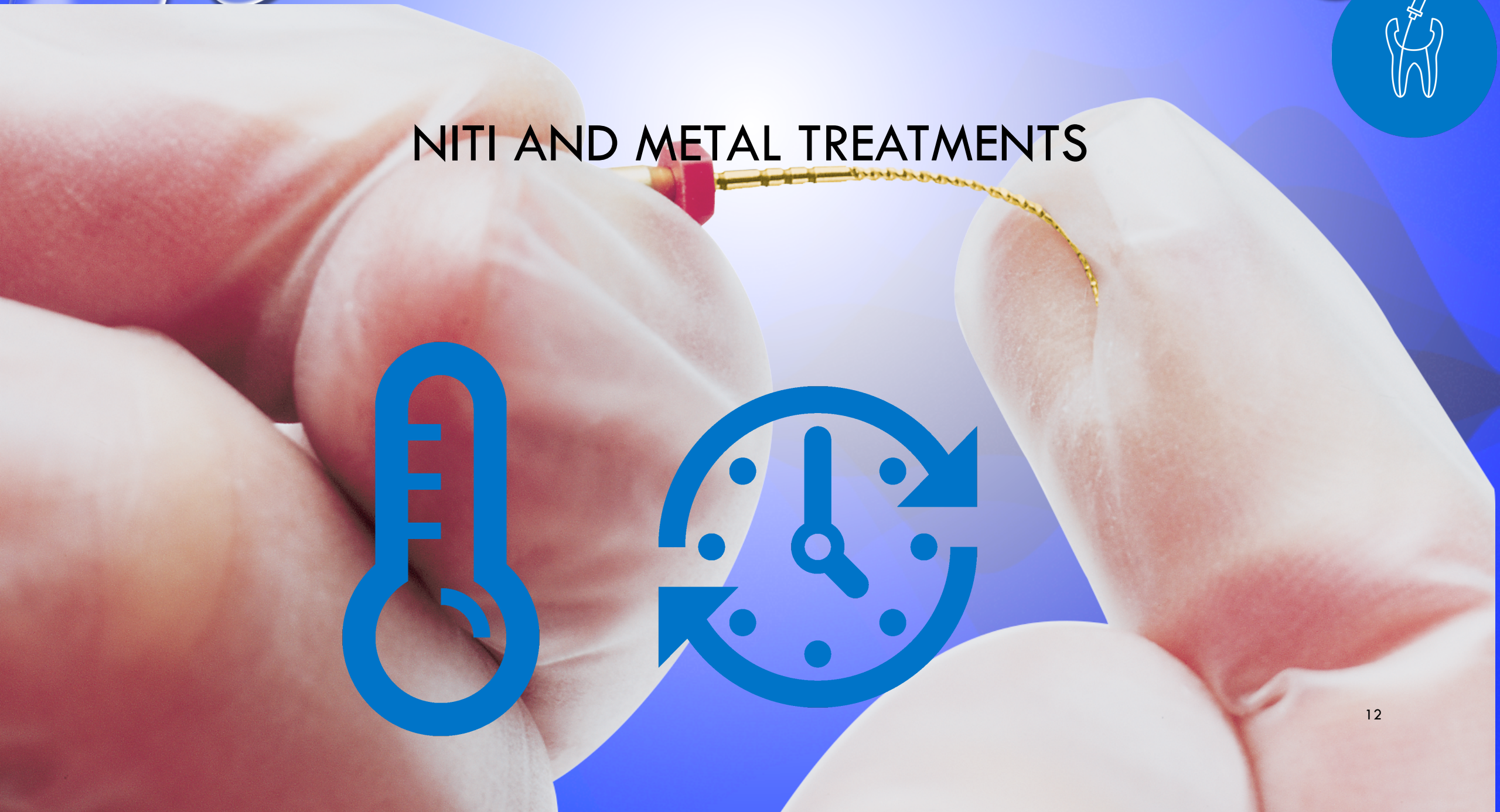
ROTATION - RECIPROCATION



NITI PHASES


Heating
Austenite
Cooling
twinned martensite
Deformation
de-twinned martensite

NITI AND METAL TREATMENTS



METALLURGICAL CONSIDERATIONS

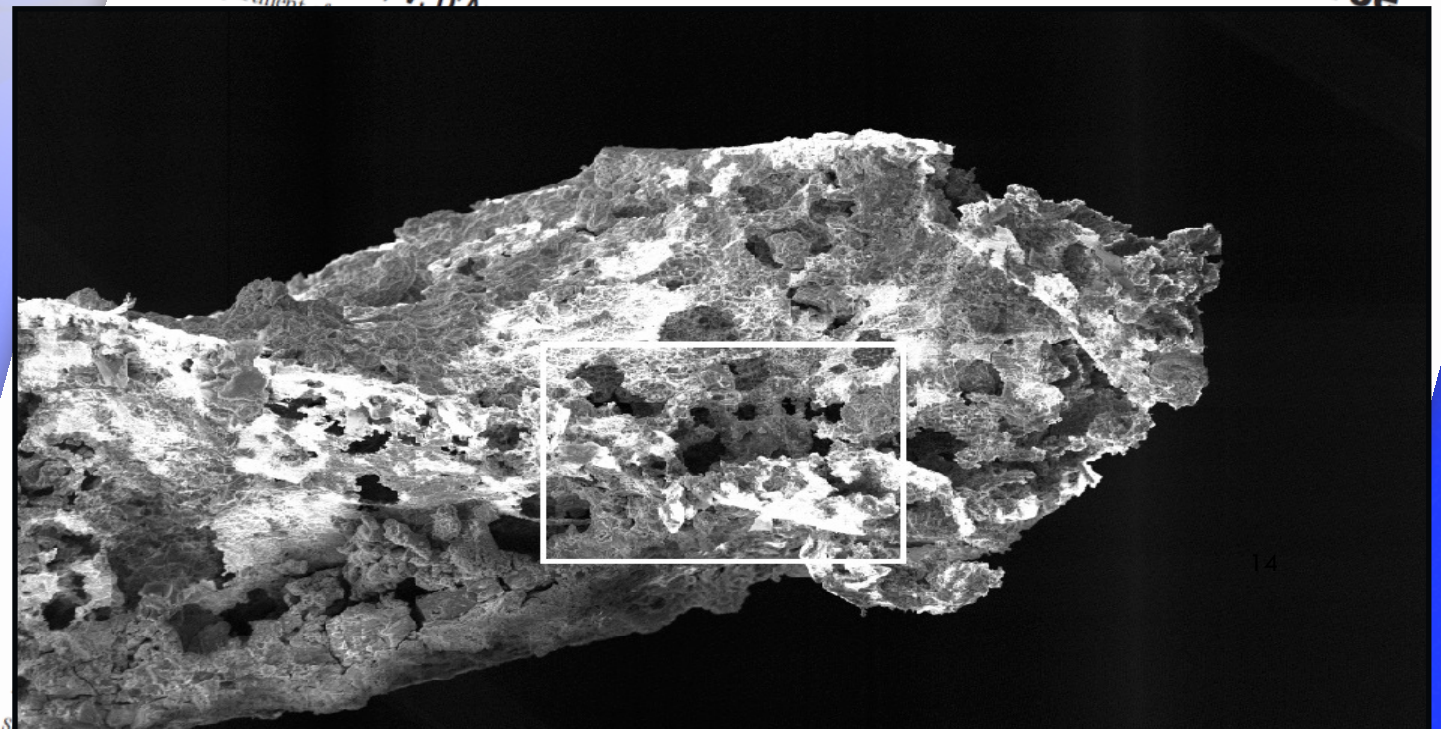
- INSTRUMENT WEAR
- MECHANICAL PROPERTIES
  - CYCLIC FATIGUE
  - TORSIONAL RESISTANCE
- CUTTING EFFICIENCY
- CORROSION
- STERILIZATION

METALLURGIC CONSIDERATIONS - CORROSION

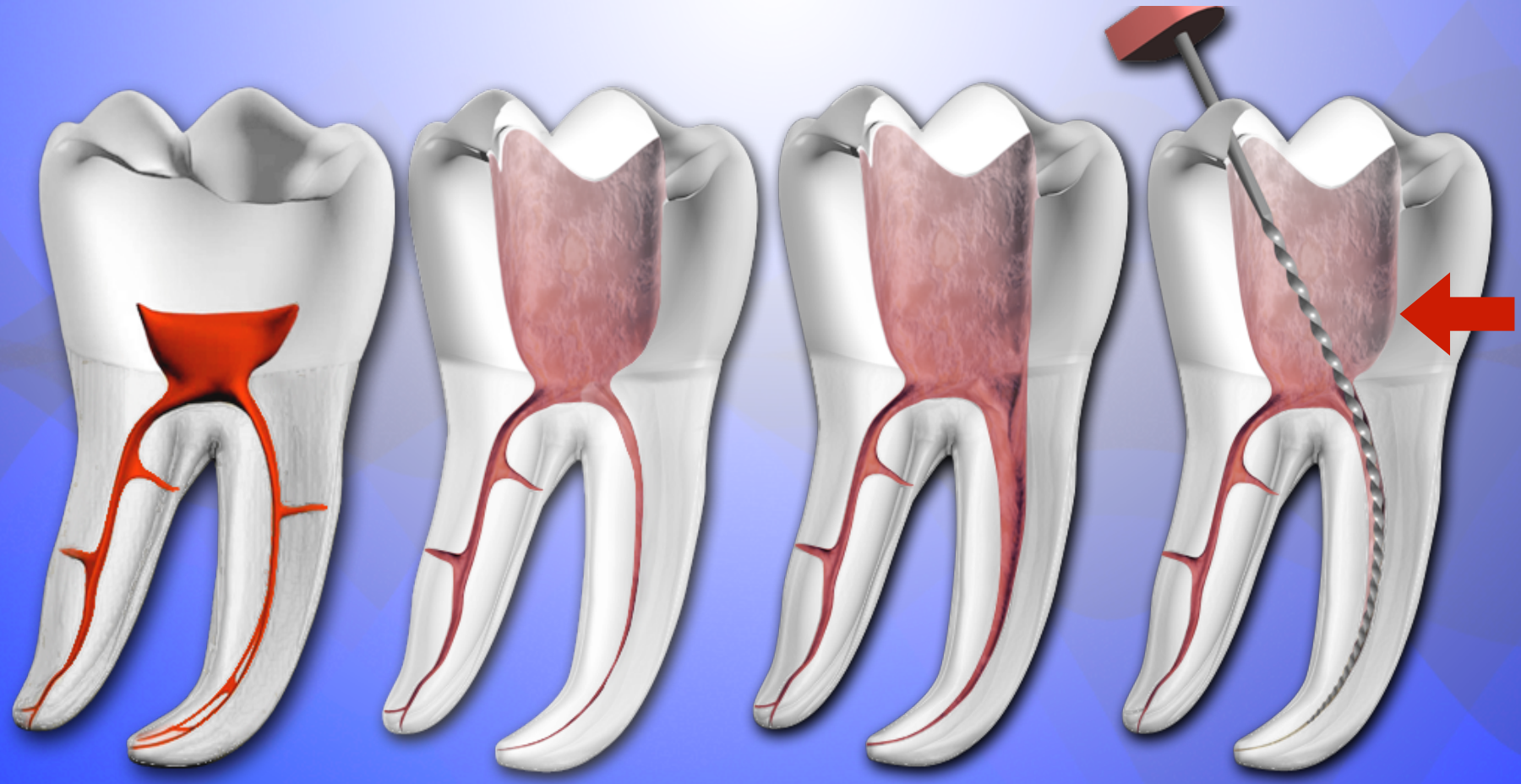
- SHORT TERM CONTACT BETWEEN NAOCL AND EDTA CAUSED ALTERATIONS IN THE SURFACES

Effects of sodium hypochlorite and ethylenediaminetetraacetic acid on rotary nickel–titanium instruments evaluated using atomic force microscopy

G. Ametrano*, V. D'A



CARDINAL RULES - STRAIGHT LINE ACCESS



CARDINAL RULES – GLIDE PATH AND PATENCY

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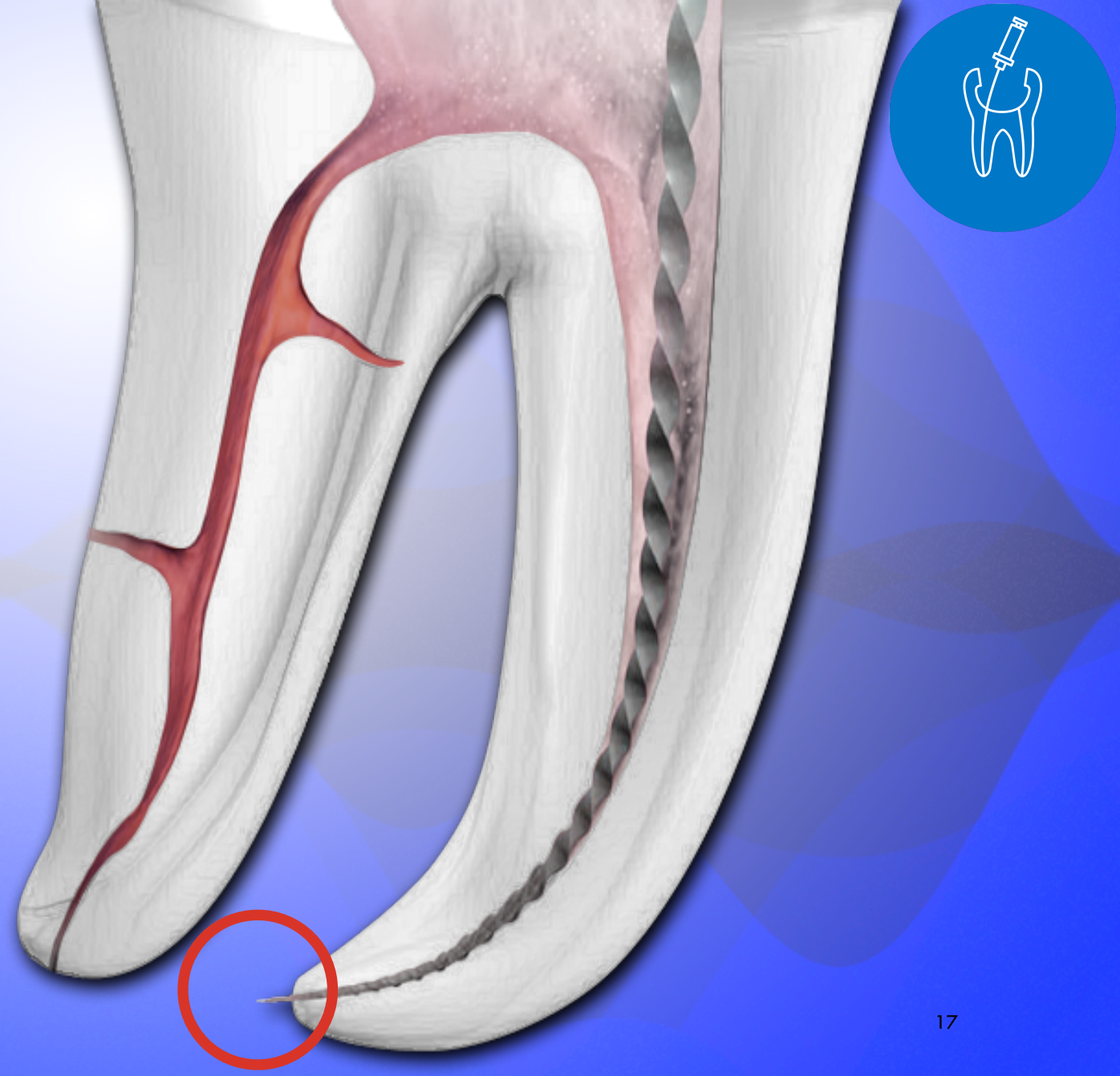
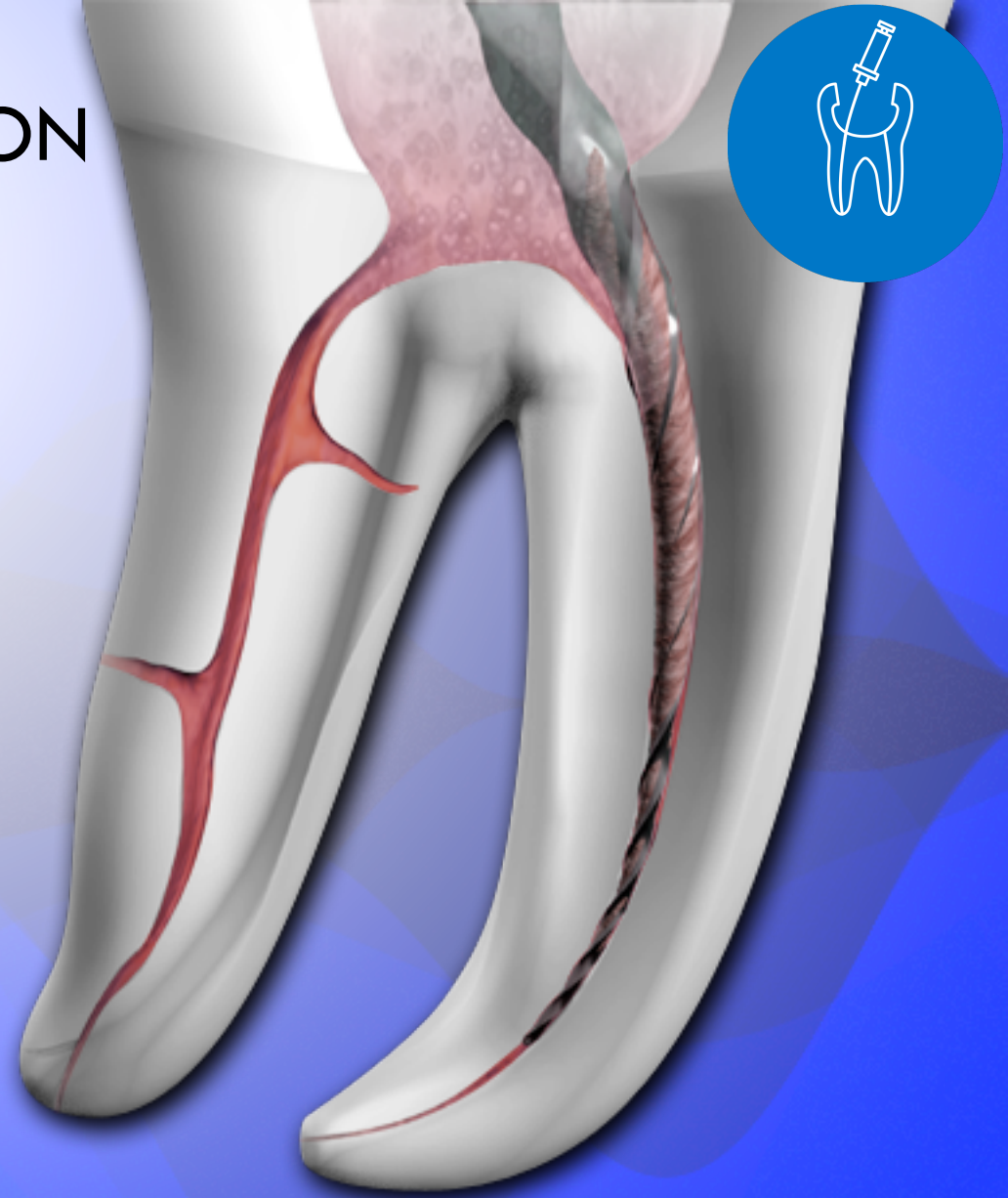


CARDINAL RULES - ABUNDANT IRRIGATION



CARDINAL RULES - MINIMAL APICAL PRESSURE

CARDINAL RULES - MINIMAL APICAL PRESSURE

CARDINAL RULES - INSTRUMENTATION TIME

CARDINAL RULES - INSPECT AND CLEAN FILES

WHAT IS… AND WHY CREATE A GLIDE PATH

The Effect of Preflaring on the Rates of Separation for 0.04 Taper Nickel Titanium Rotary Instruments

David D. Roland, DDS, Wallis E. Andelin, DDS, David F. Browning, DDS, G-Hong Robert Hsu, DDS, and Mahmoud Torabinejad, DMD, MSD, PhD

The purpose of this study was to compare the rates of separation of 0.04 taper nickel titanium (NiTi) rotary instruments using two different instrumentation techniques. Twenty sets of 0.04 taper Profile Series 29 rotary instruments, sizes 2 to 6 were used in the mesial (mandibular) or buccal (maxillary) canals of extracted human molars with a 20 to 30 degree root curvature according to the Schneider classification. The rotary instruments were used up to 20 times either with the crown-down technique recommended by the manufacturer or with a combination of preflaring with hand files in a passive step-back technique followed by rotary instrumentation. Statistical analysis of the data showed that the combination technique allowed more uses before separation compared with the crown-down technique recommended by the manufacturer $p < 0.0001$.

- "…PREFLARING IS NECESSARY TO MINIMIZE THE CHANCE OF PERMANENTLY BLOCKING A CANAL WITH A BROKEN ROTARY INSTRUMENT."

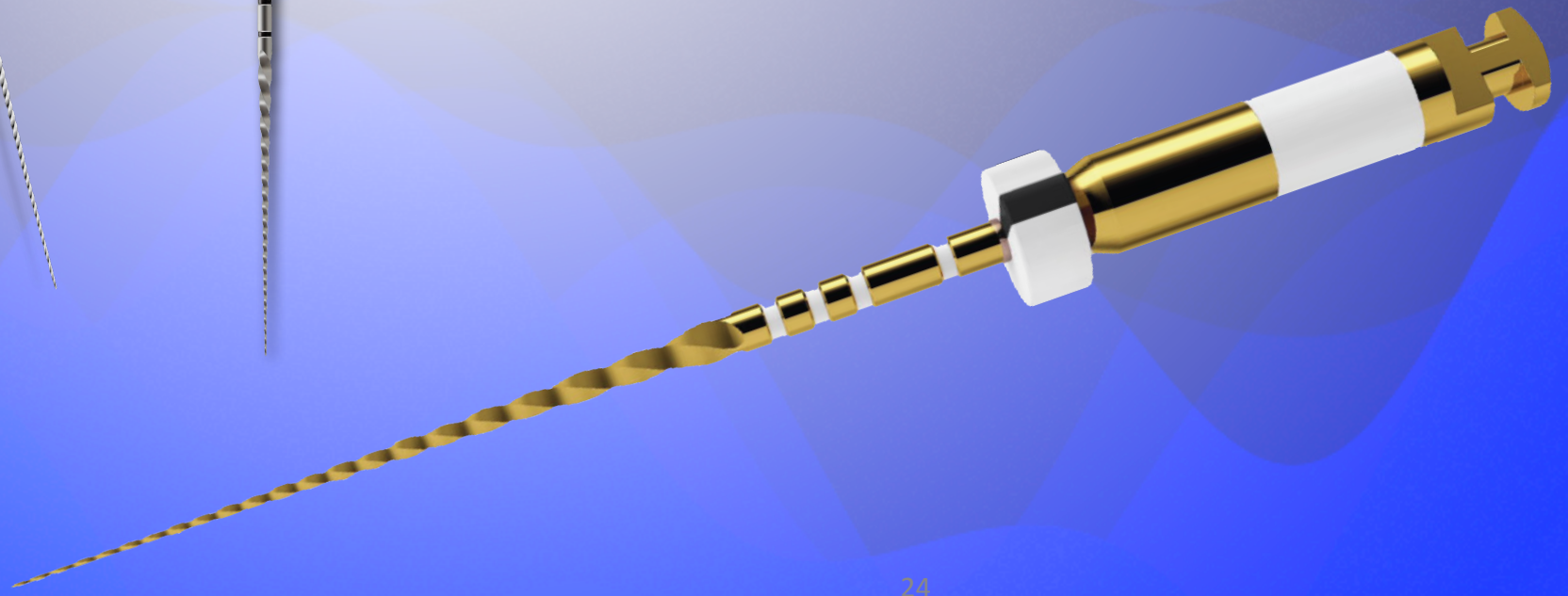
GLIDE PATH OPTIONS

Hand files

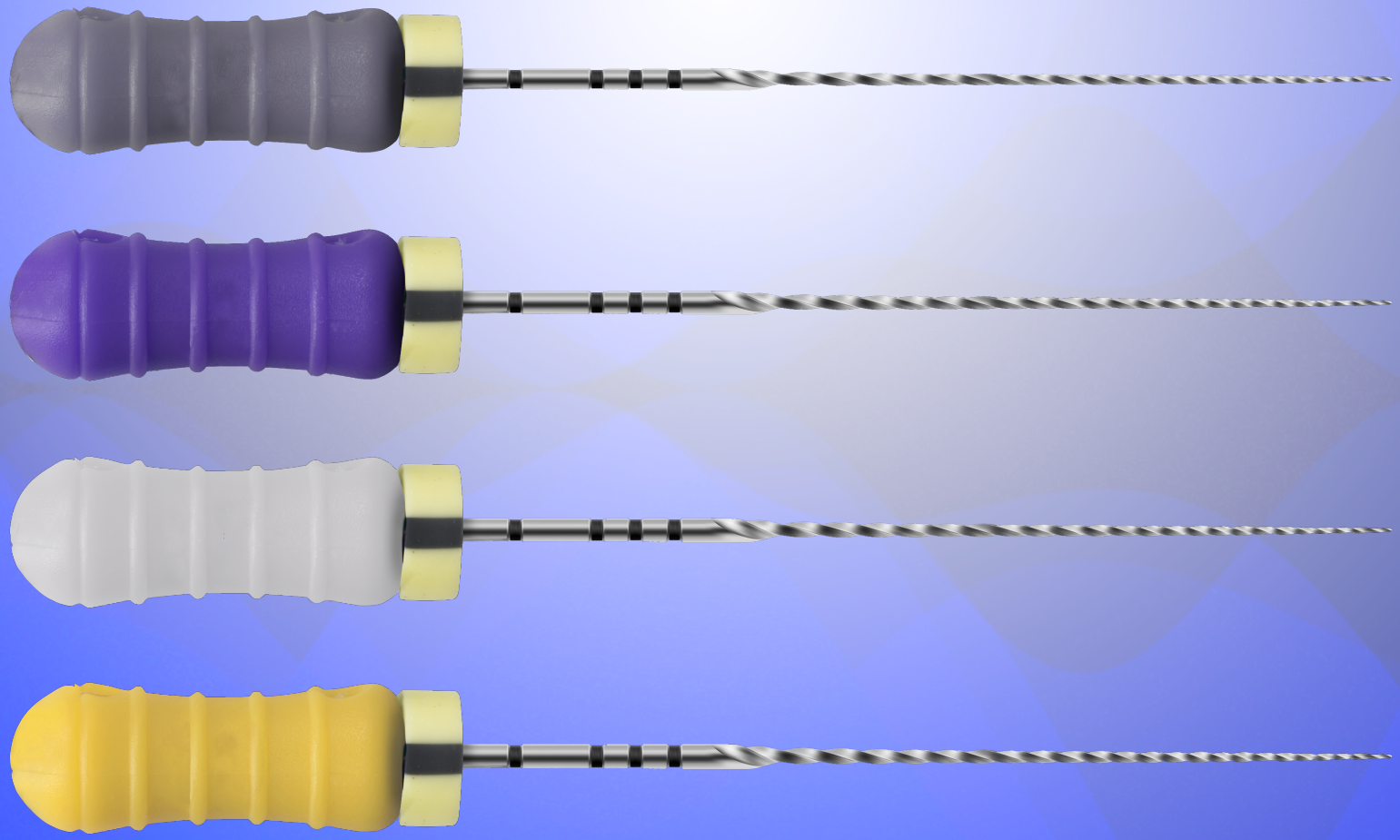
Pathfiles

ProGlider

WaveOne Gold Glider



TRADITIONAL TECHNIQUE



FIRST: "OPENING THE GLIDE PATH"

The road map to the apex…follow gently…

TIME TO GIVE CREDIT…

- THE INFORMATION ABOUT GLIDEPATH IS MOSTLY FROM DR. JOHN WEST AND TWO ARTICLES HE WROTE IN DENTISTRY TODAY IN SEPTEMBER OF 2010 AND JANUARY OF 2011.

- WEST, J.D. "THE ENDODONTIC GLIDEPATH: "SECRET TO ROTARY SAFETY". DENTISTRY TODAY. 2010: 86-93.
- WEST, J.D. "MANUAL VERSUS MECHANICAL ENDODONTIC GLIDEPATH". DENTISTRY TODAY. 2011: 136-145.

REMEMBER:

ALL ROTARY INSTRUMENTATION BEGINS WITH A HAND FILE!

WHY DO WE NEED TO KNOW ABOUT HAND FILING?

- NO ROTARY INSTRUMENT SHOULD ENTER A CANAL FIRST
- USE SMALL HAND FILES TO EXPLORE THE CANAL
- DETERMINE WORKING LENGTH WITH A HAND FILE
- A GLIDE PATH FOR THE ROTARY INSTRUMENTS SHOULD BE CREATED FIRST WITH HAND FILES
- A #10 HAND FILE SHOULD BE **SUPER LOOSE** IN THE CANAL AT WORKING LENGTH

INSTRUMENTATION BEGINS WITH HAND FILES BECAUSE..

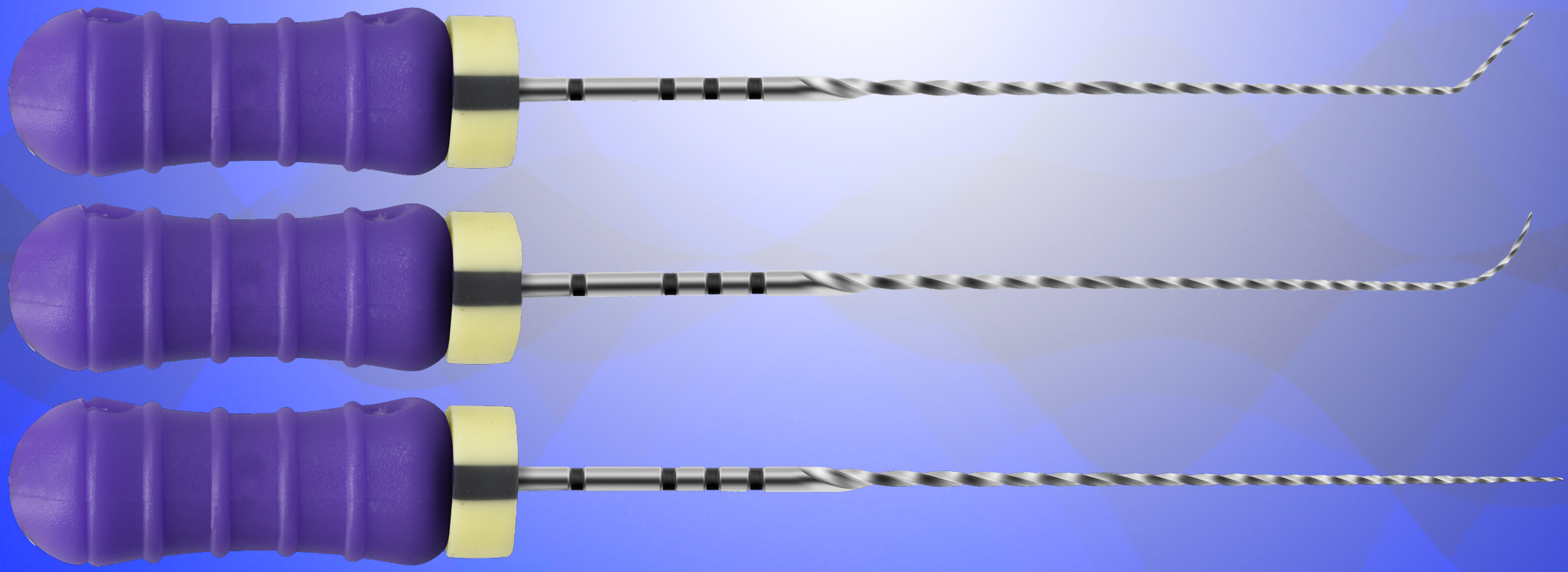
- SMALL FLEXIBLE HAND FILES CAN BE PRE-CURVED
- WE MUST CREATE A GUIDE PATH FOR ROTARY FILES
- THEY MAP THE ANATOMY OF THE CANAL SYSTEM

WHY STAINLESS STEEL?

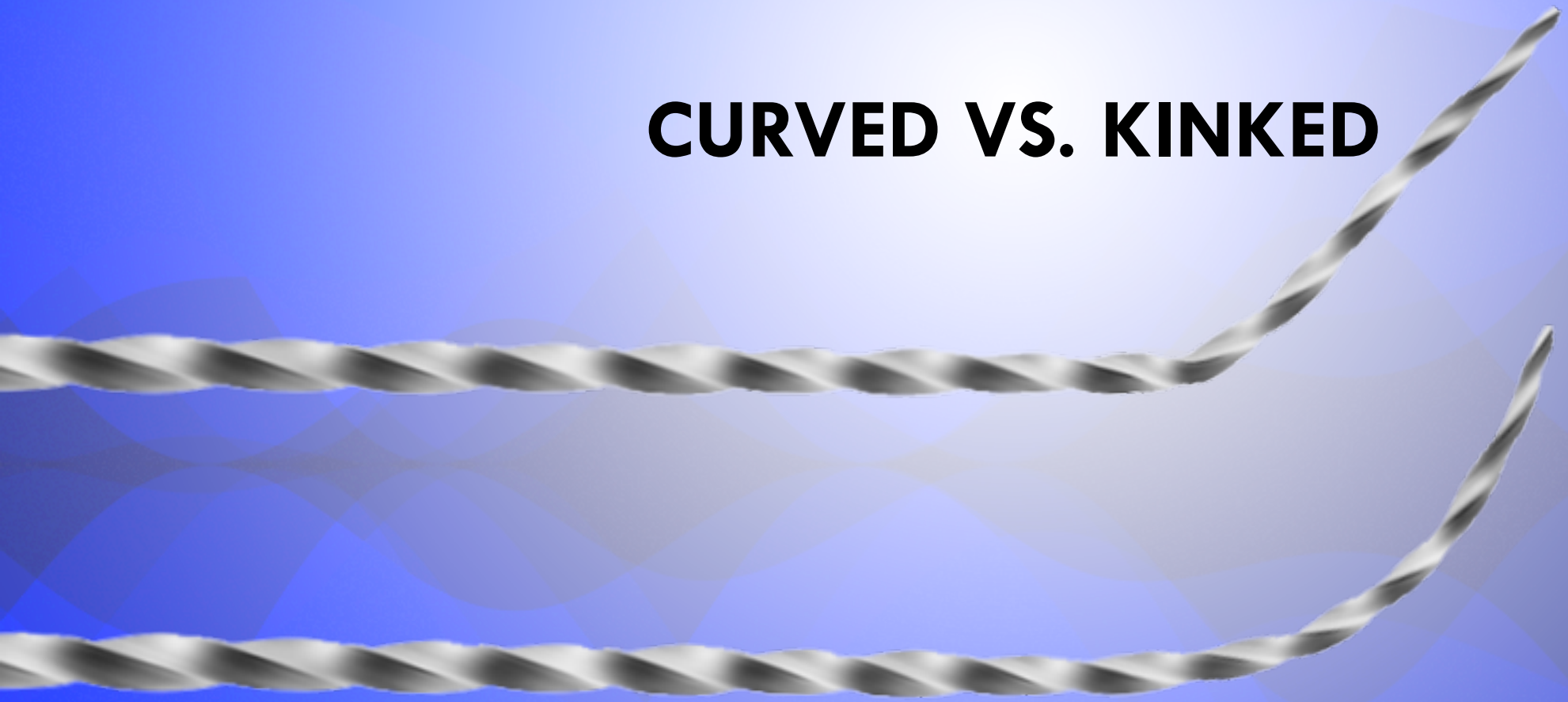
PROPERTIES OF STAINLESS STEEL

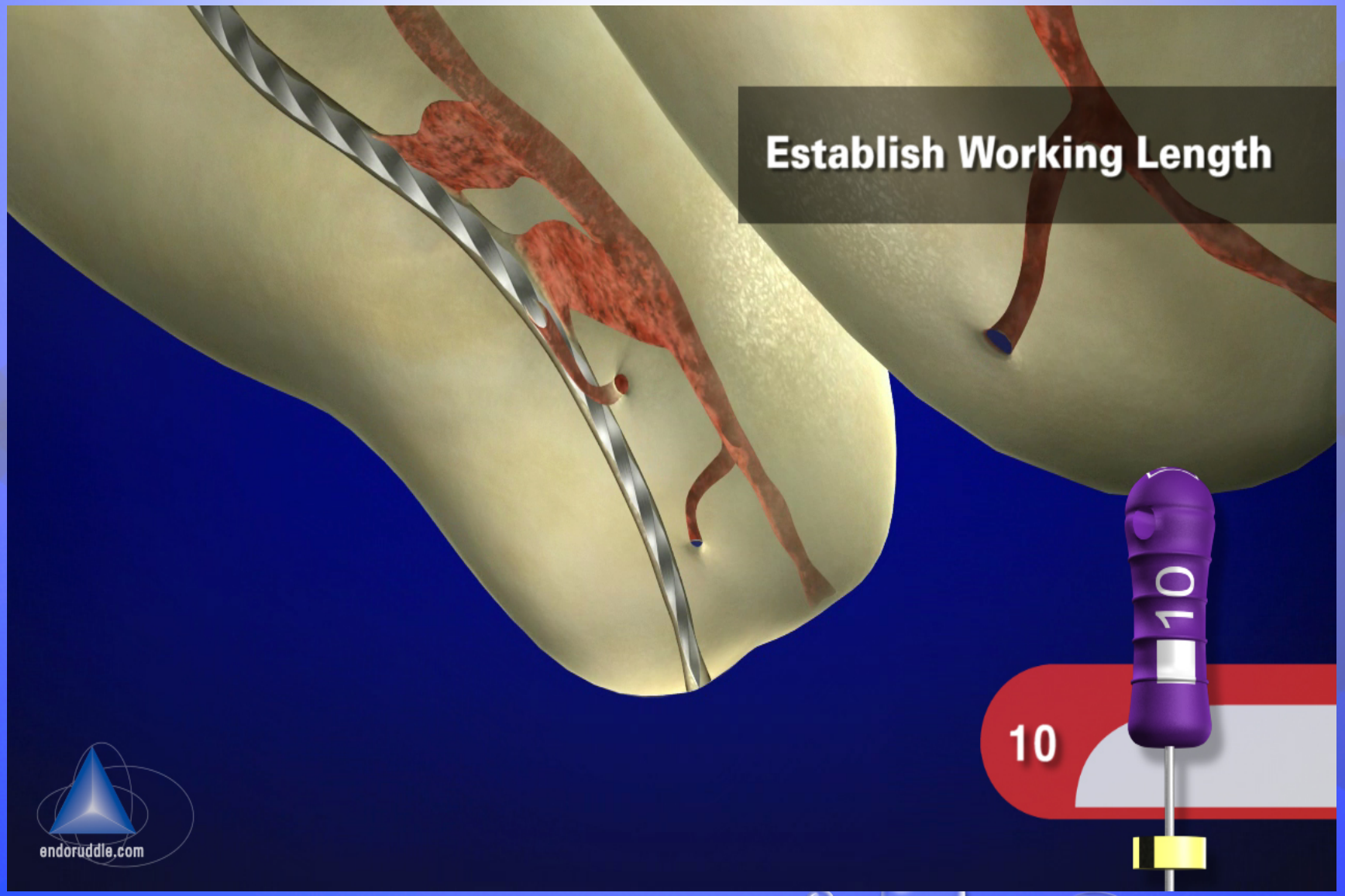
- STRONG (FRACTURE RESISTANT)
- FLEXIBLE-ACCEPTS PRE-CURVING

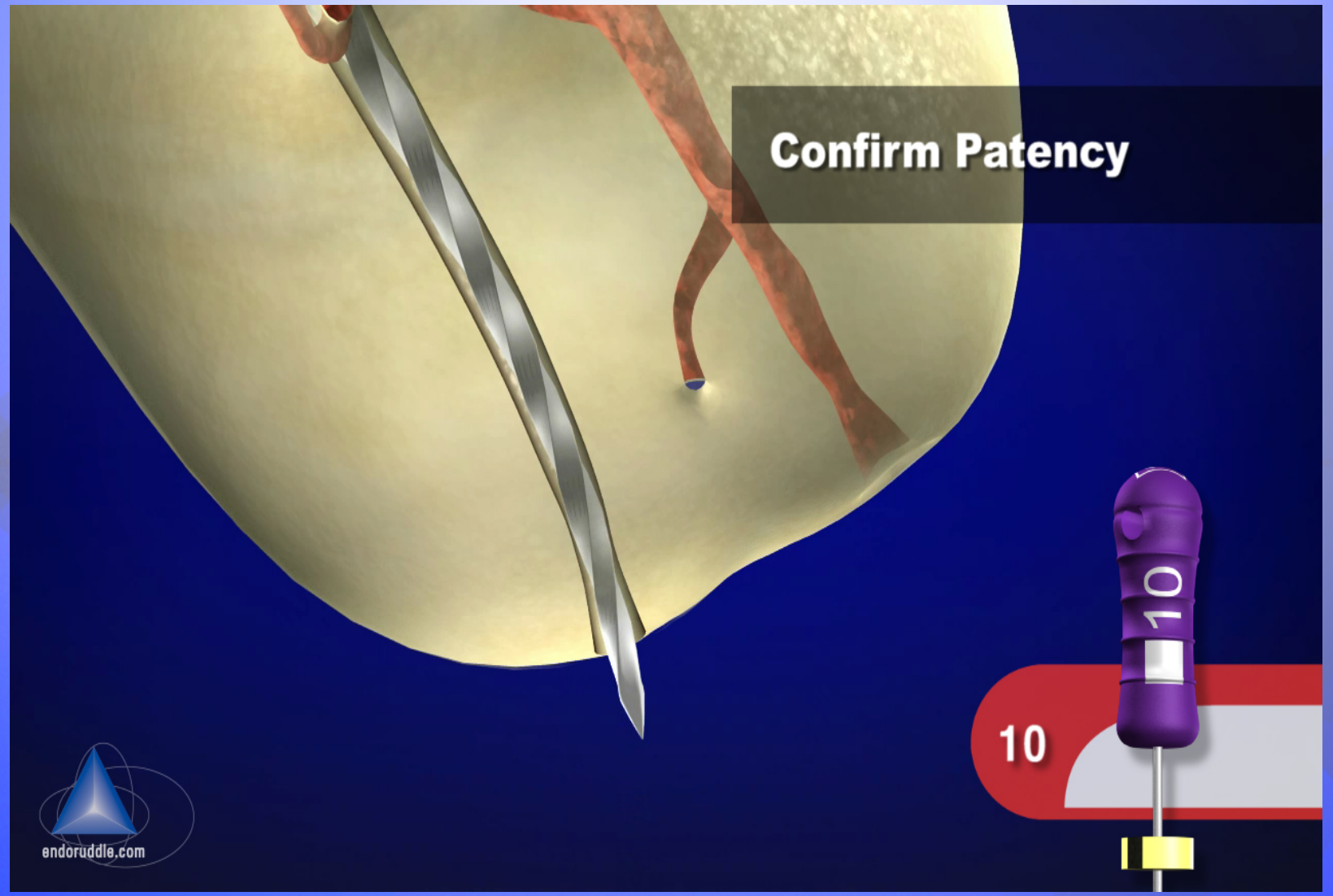
CURVED VS. KINKED



CURVED VS. KINKED




Establish Working Length
10
10
endoruddle.com


Confirm Patency
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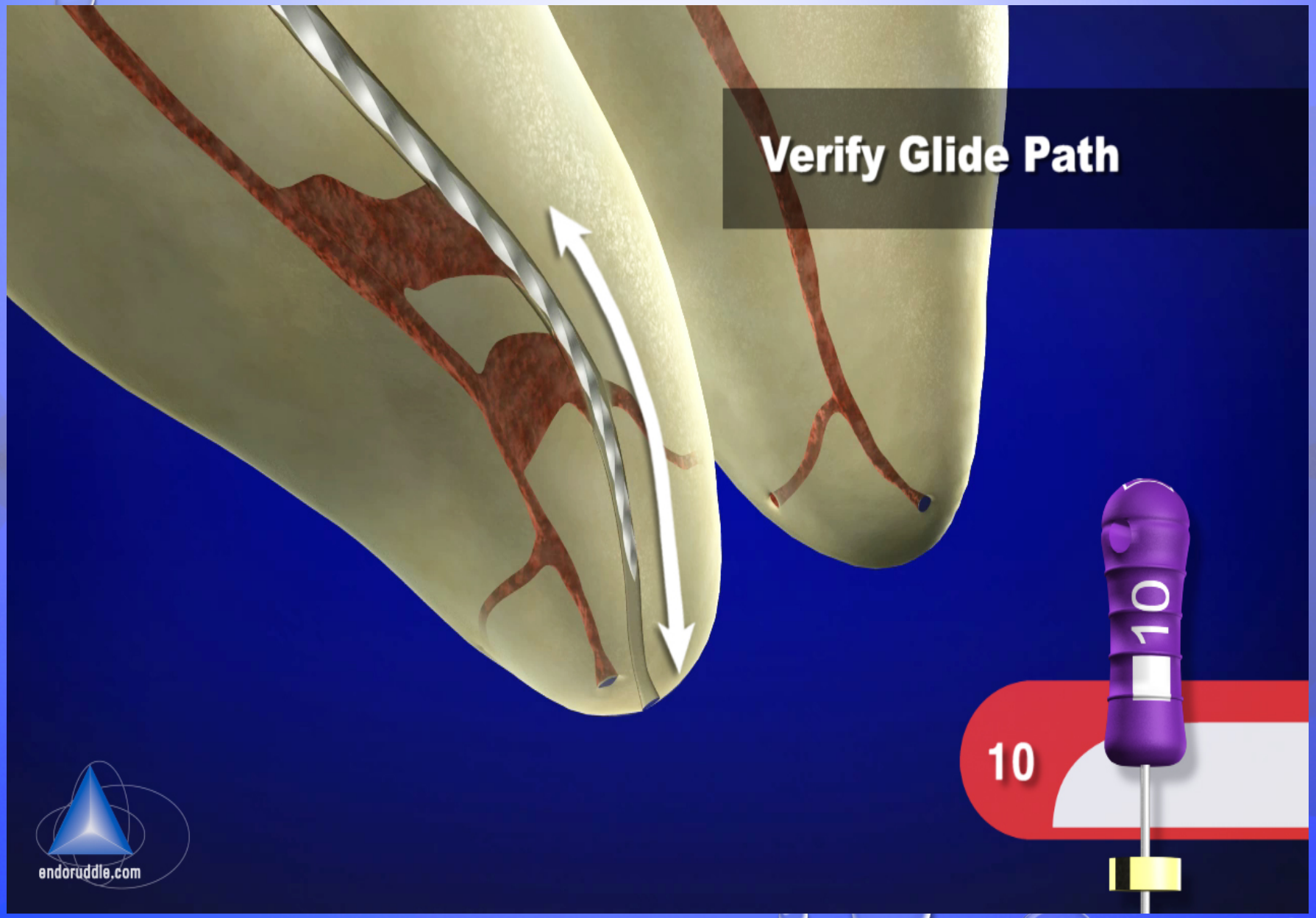
endoruddle.com


Verify Glide Path
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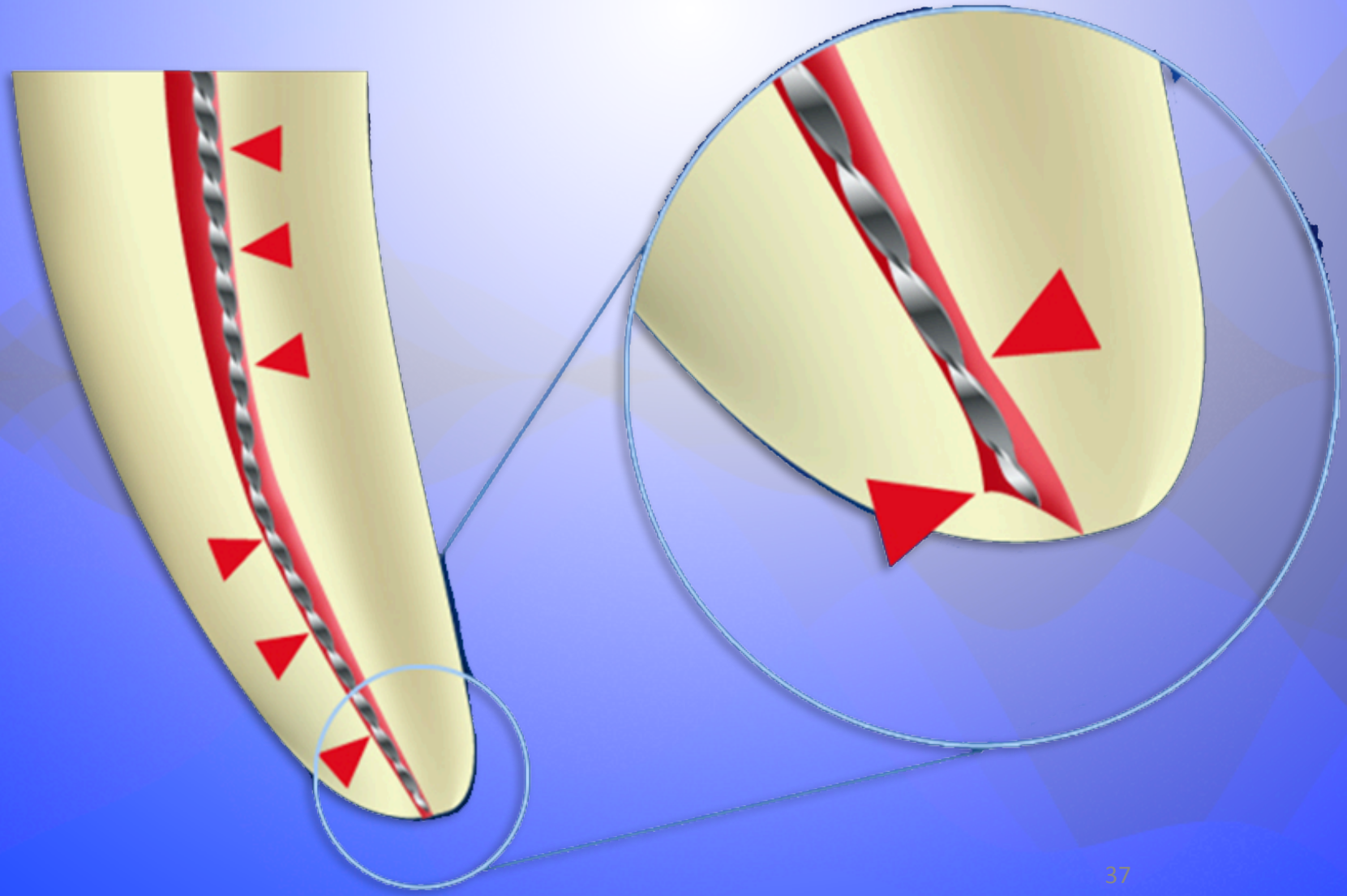
endoruddle.com

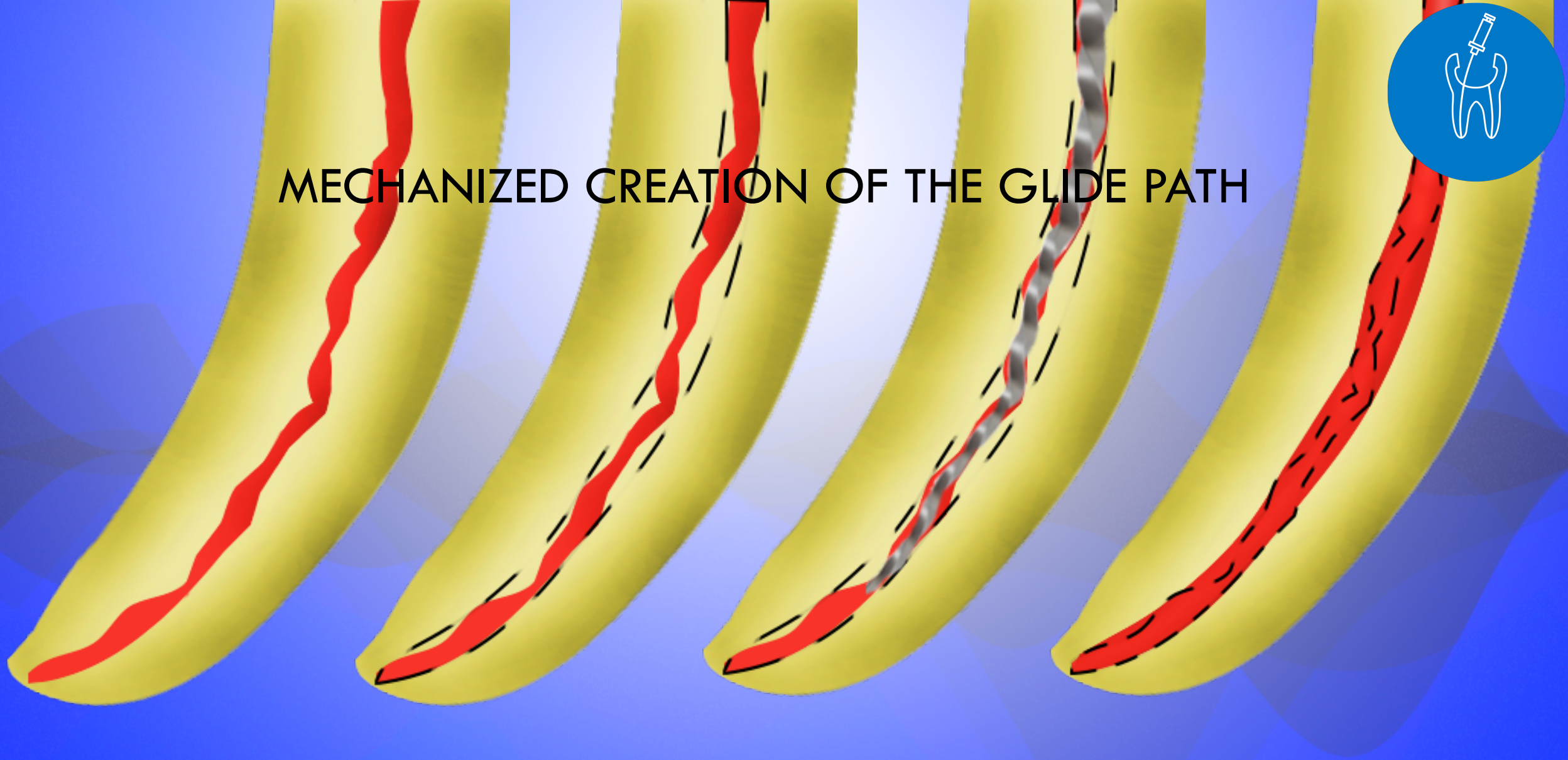
MANUAL GLIDEPATH ISSUES



RISK OF MANUAL GLIDE PATH CREATION

Courtesy of Dr. Arnaldo Castellucci

MECHANIZED CREATION OF THE GLIDE PATH



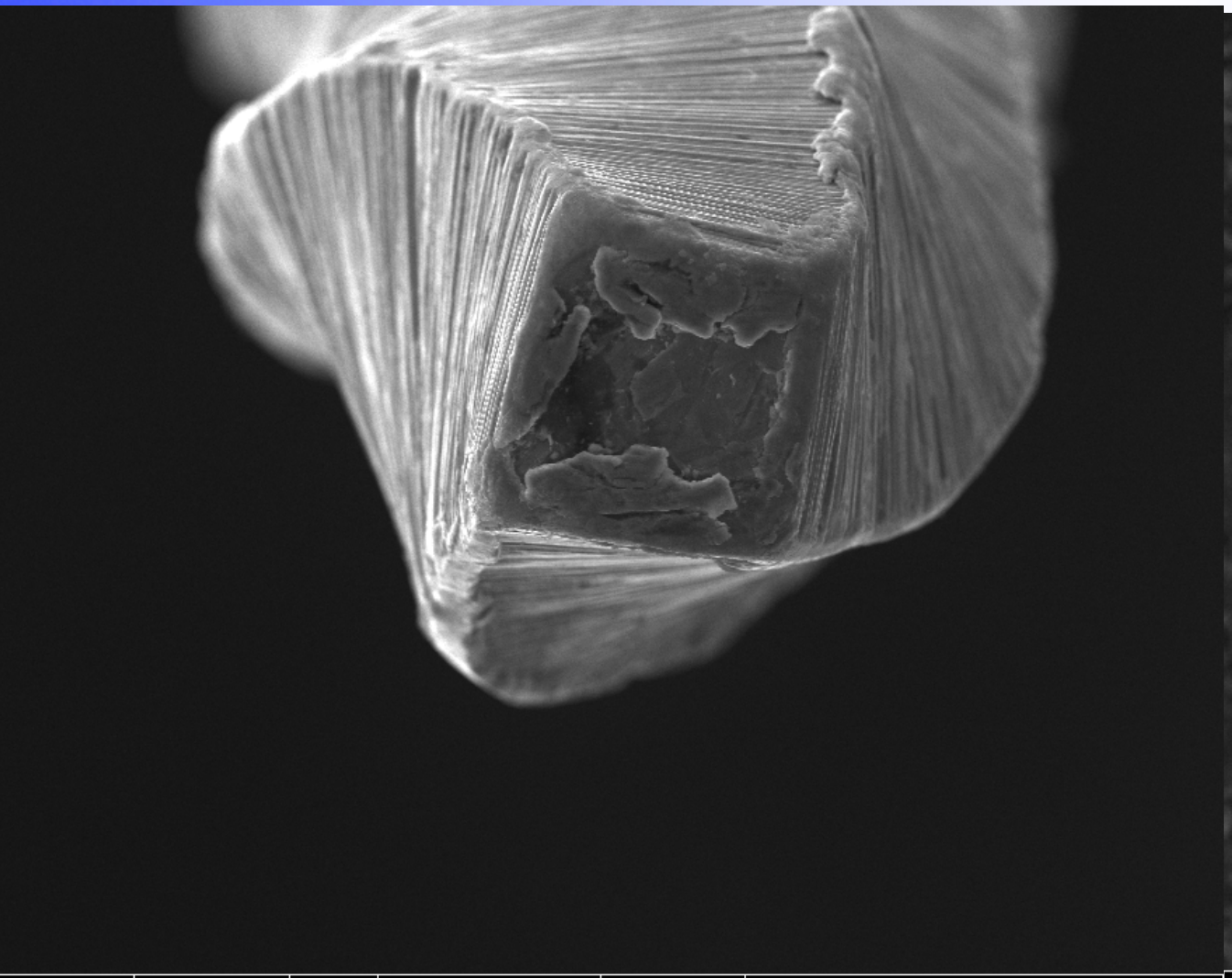
Hand files

Pathfiles

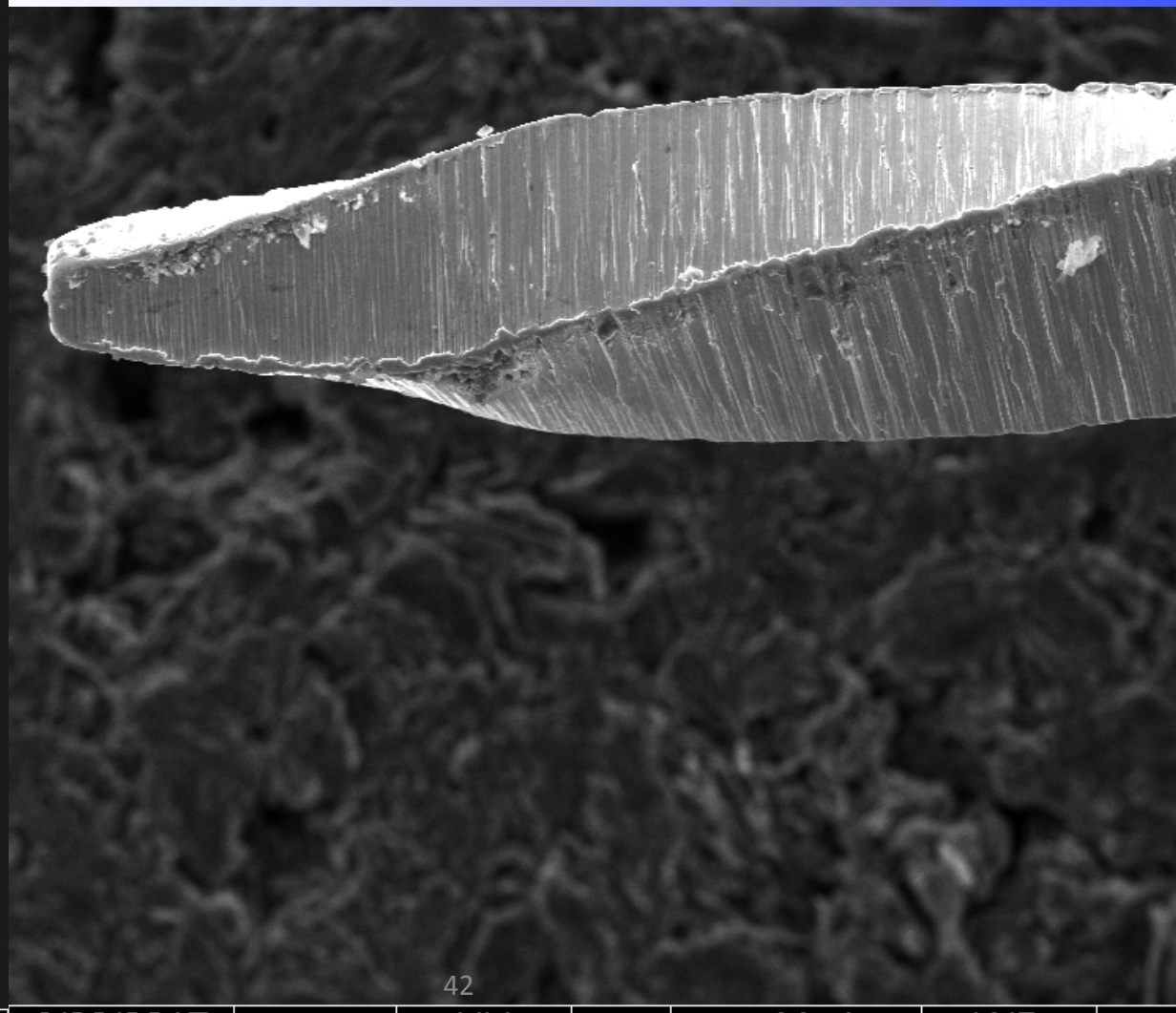
ProGlider

WaveOne Gold Glider

SEMI-ACTIVE TIP – ISO 015

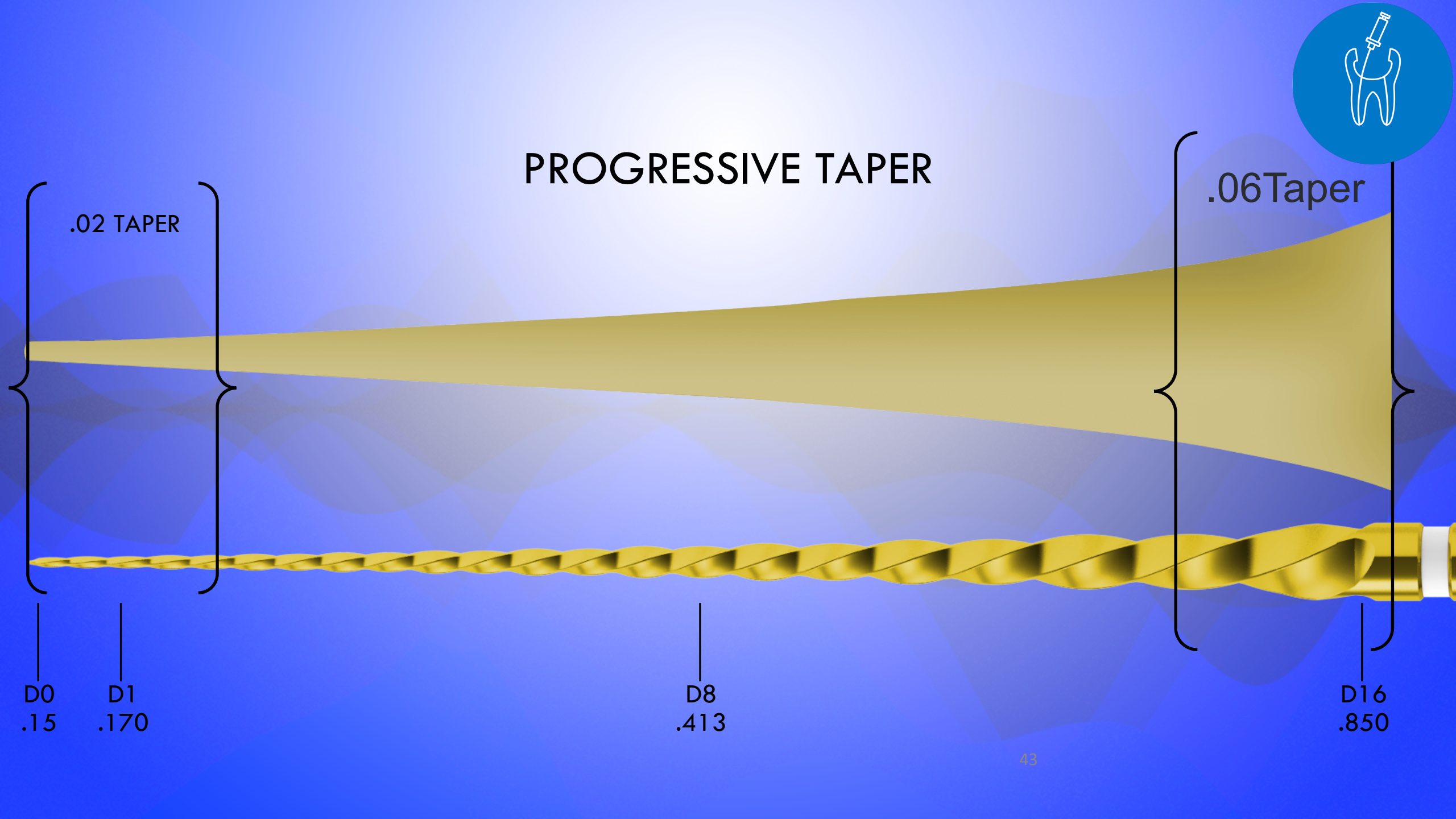


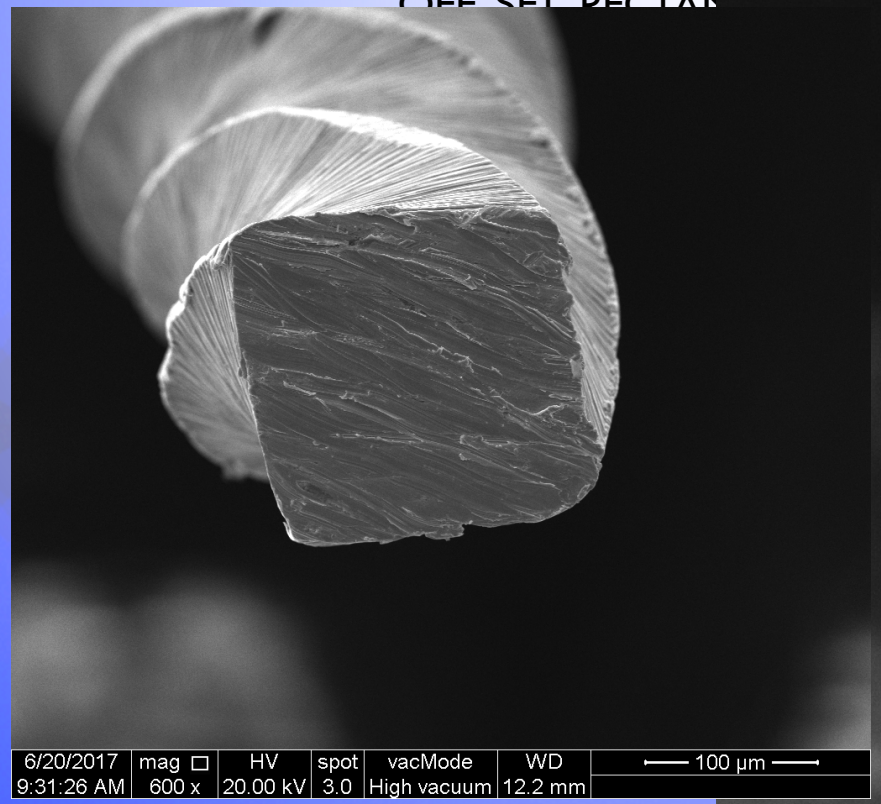
mag	HV	spot	vacMode	WD	50 µm
1 000 x	25.00 kV	3.0	High vacuum	5.4 mm	



6/20/2017	mag	HV	spot	vacMode	WD	
9:59:03 AM	400 x	20.00 kV	3.0	High vacuum	20.0 mm	

PROGRESSIVE TAPER

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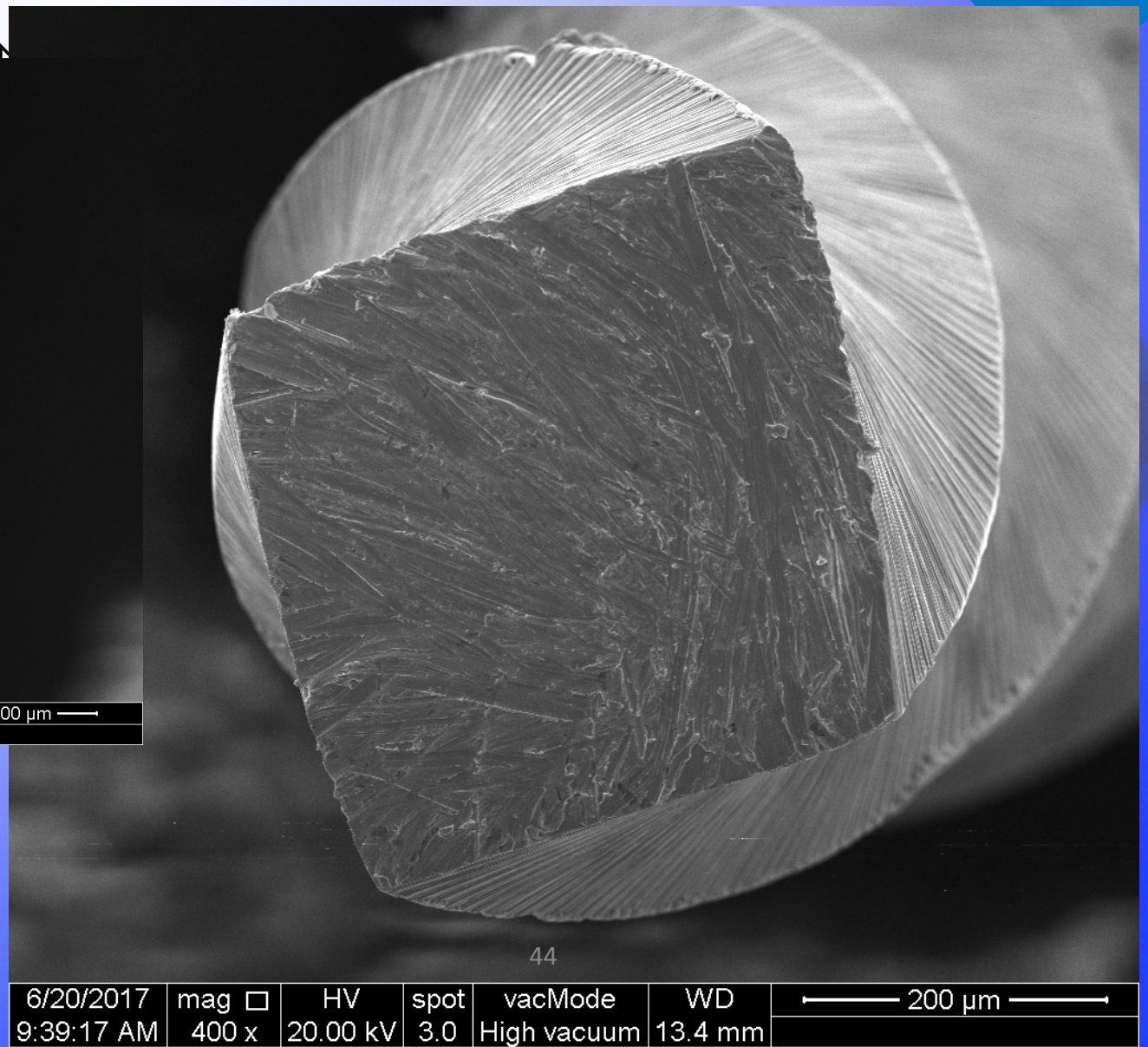
mag
600 x
HV
20.00 kV
spot
3.0
vacMode
High vacuum
WD
12.2 mm
100 µm


6/20/2017
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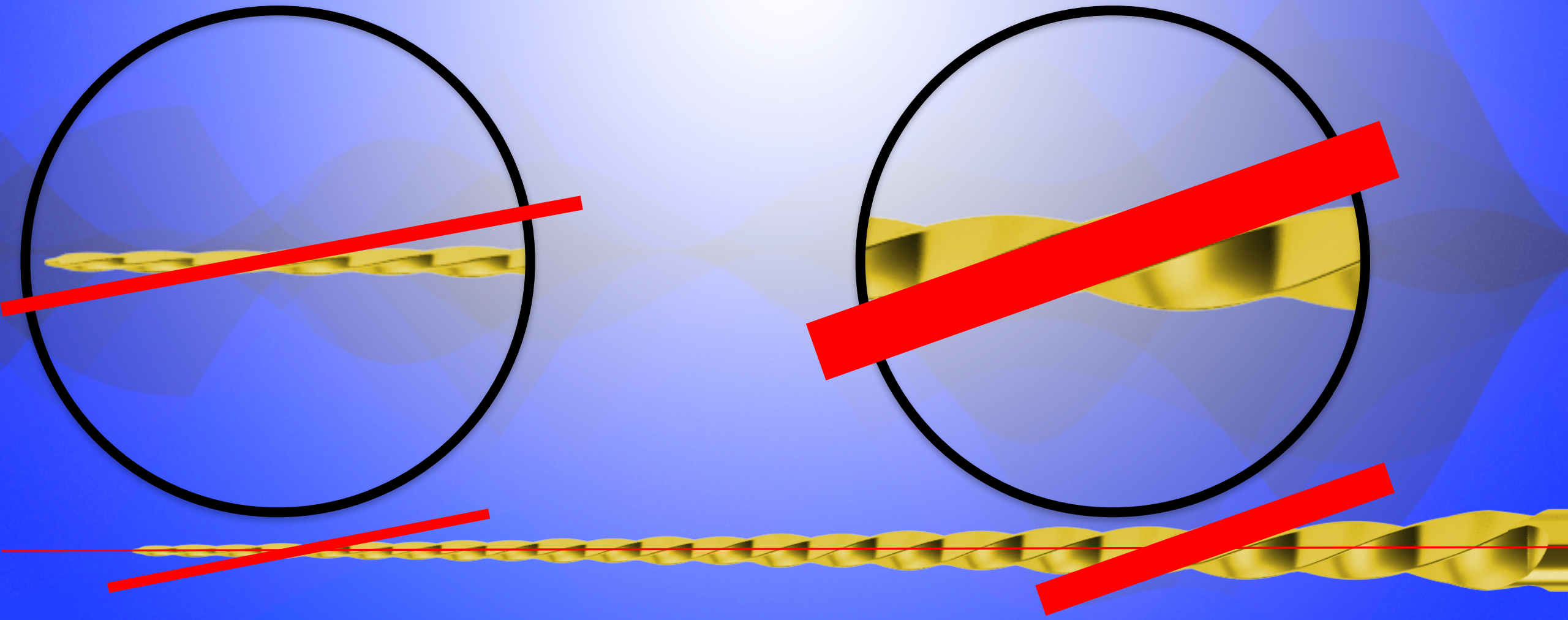
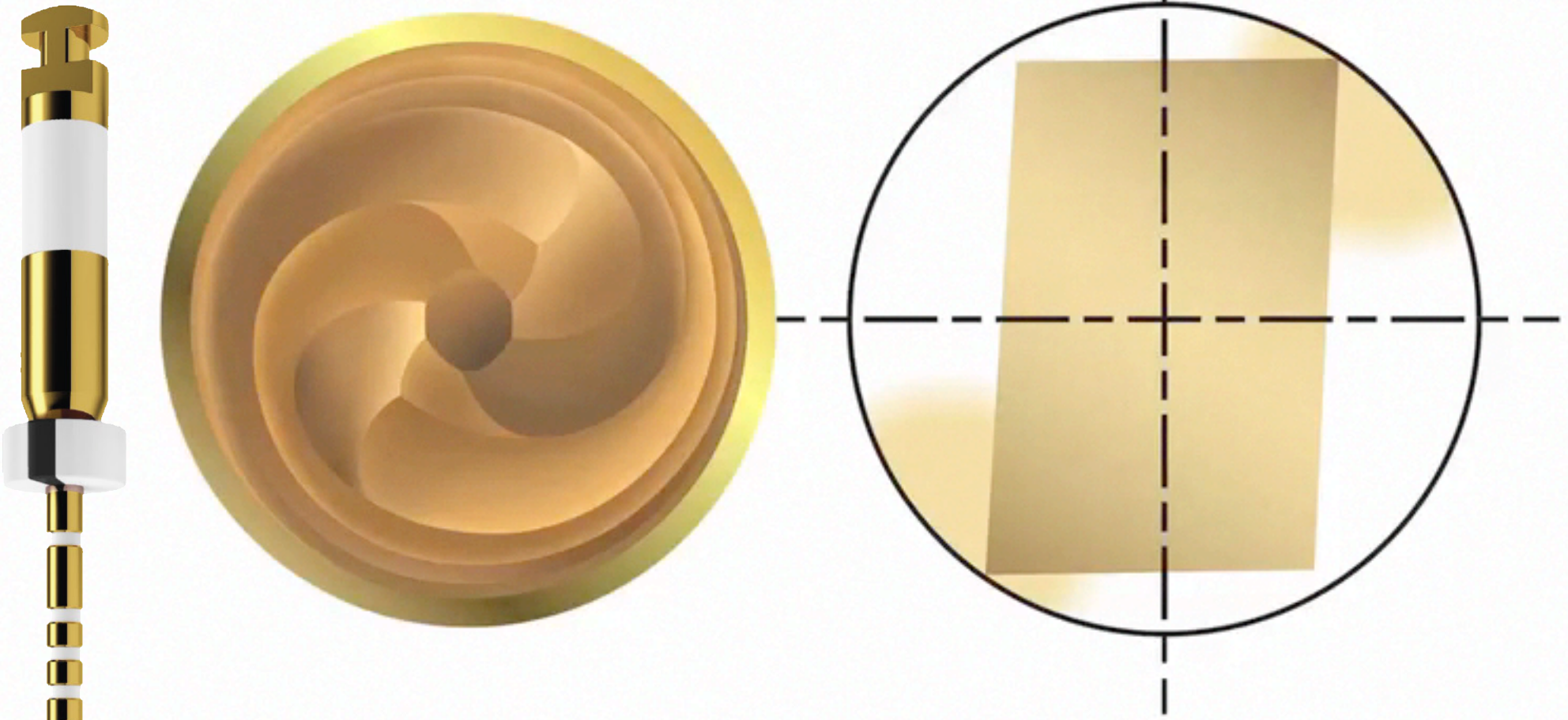
mag
400 x
HV
20.00 kV
spot
3.0
vacMode
High vacuum
WD
13.4 mm
200 µm

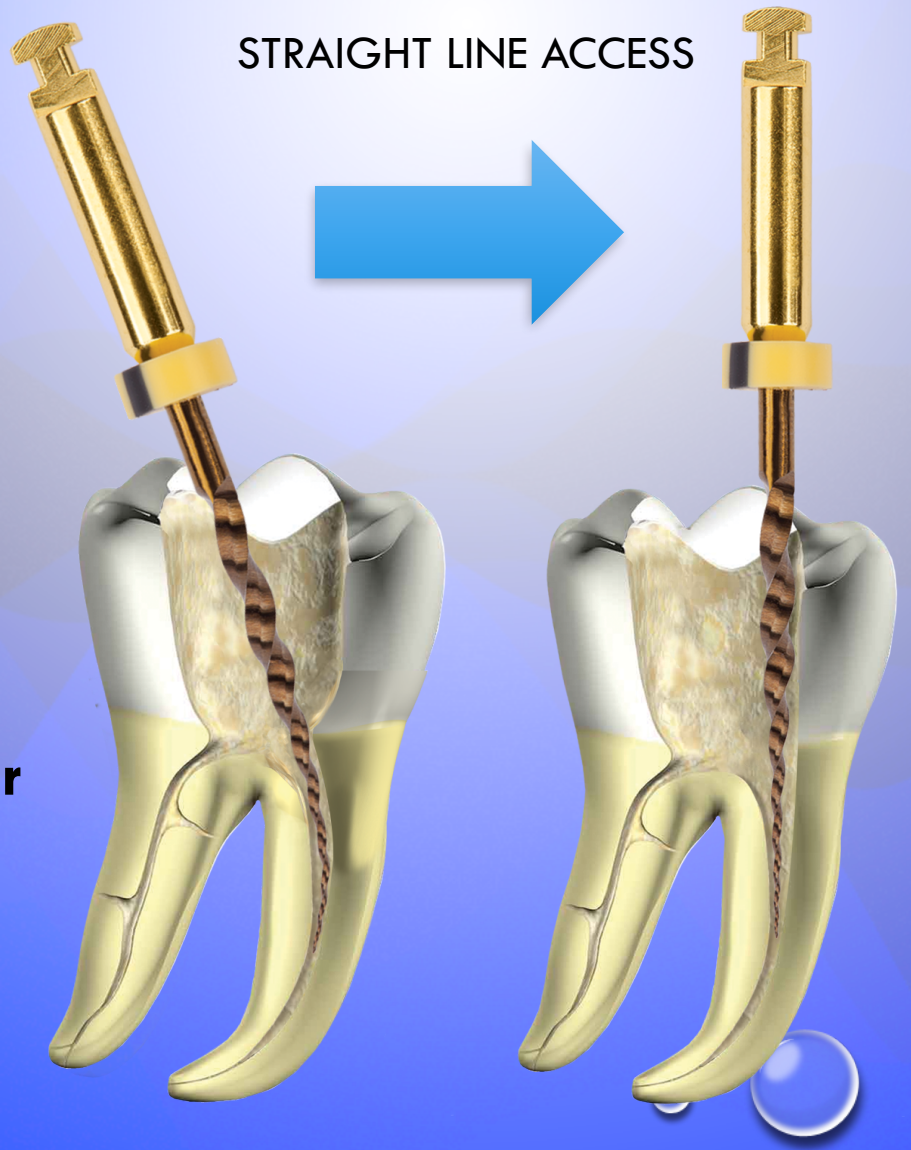
VARIABLE HELICAL ANGLES



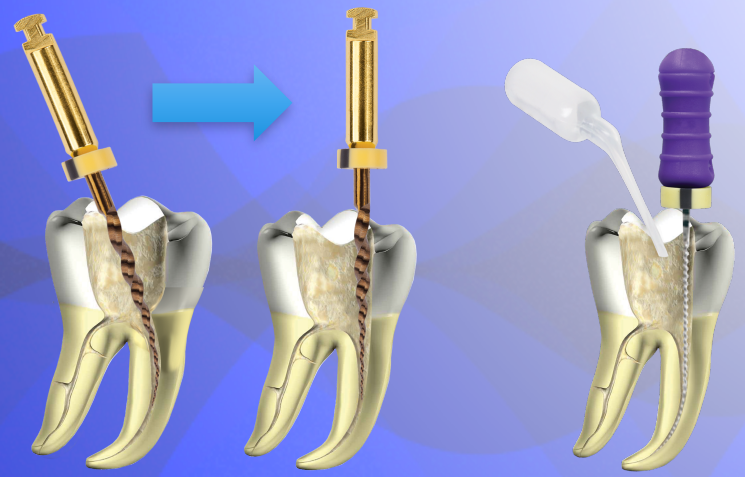
Patented Reciprocating Motion



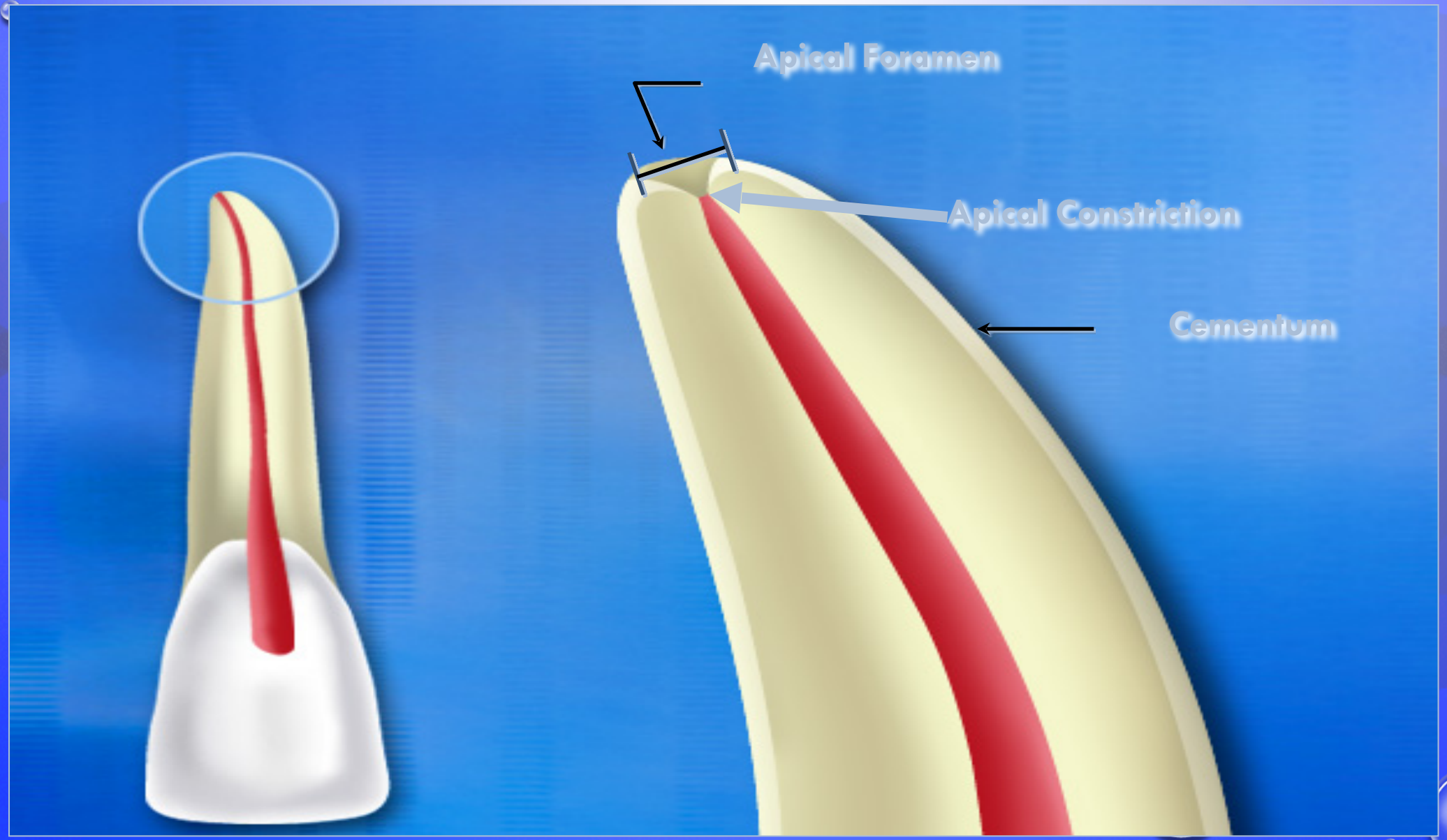
Vortex 30/12 Orifice Opener



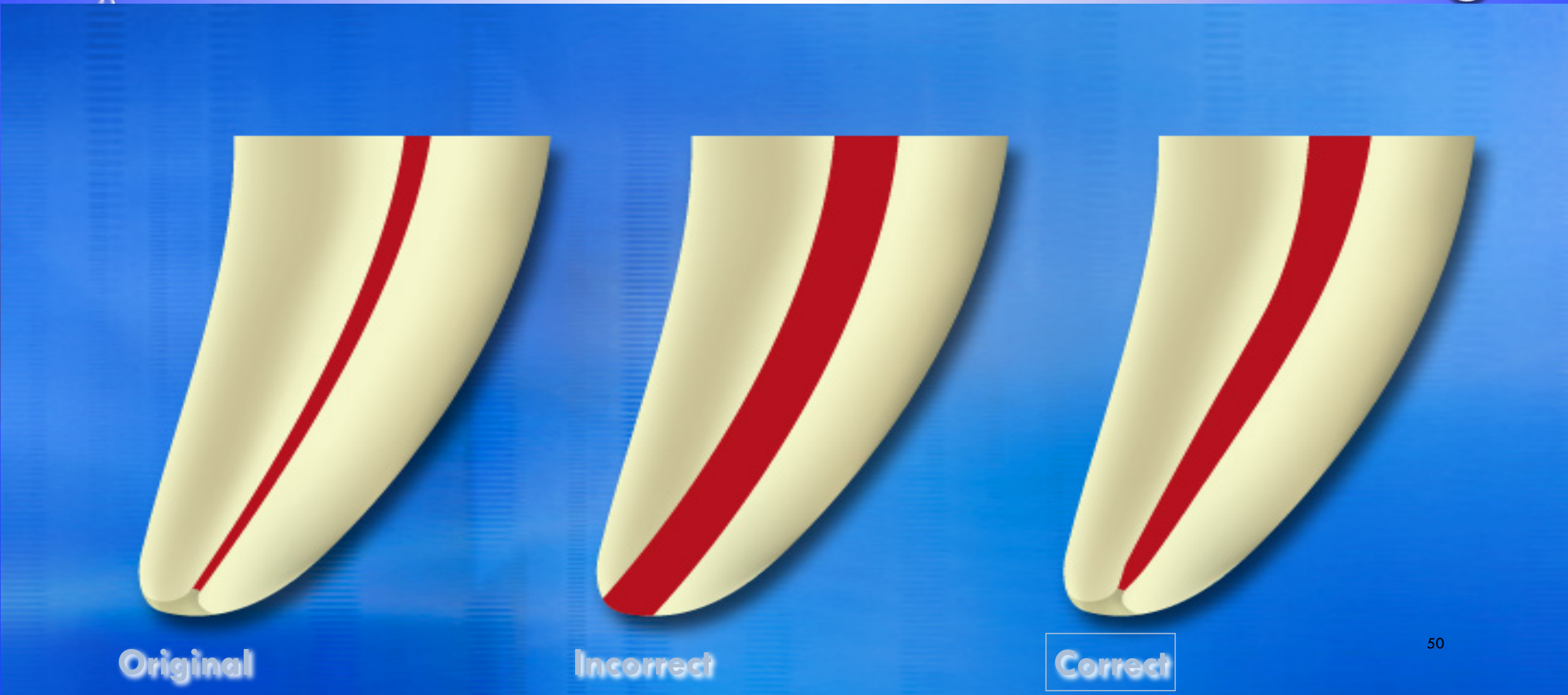
DETERMINE WORKING LENGTH



WORKING LENGTH

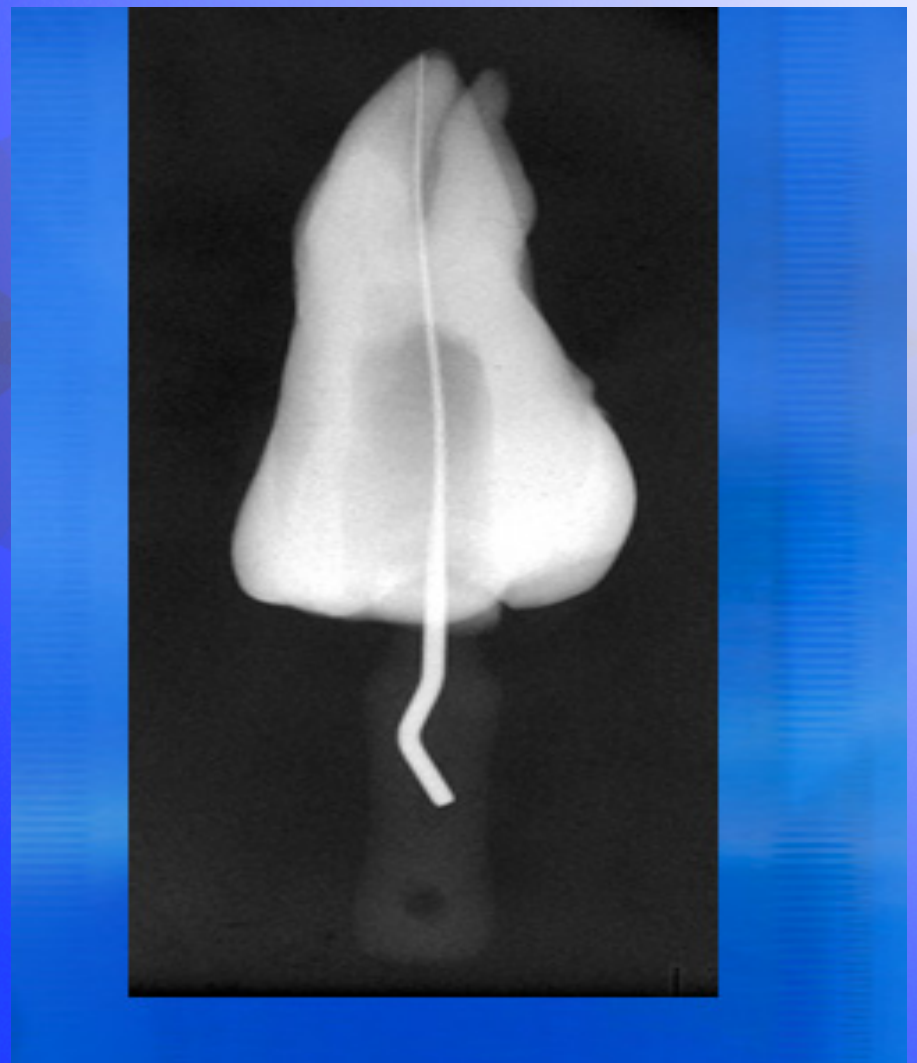


WORKING LENGTH



SO HOW DO WE FIND THIS APICAL CONSTRICTION ACCURATELY?…

RADIOGRAPHIC WORKING LENGTH

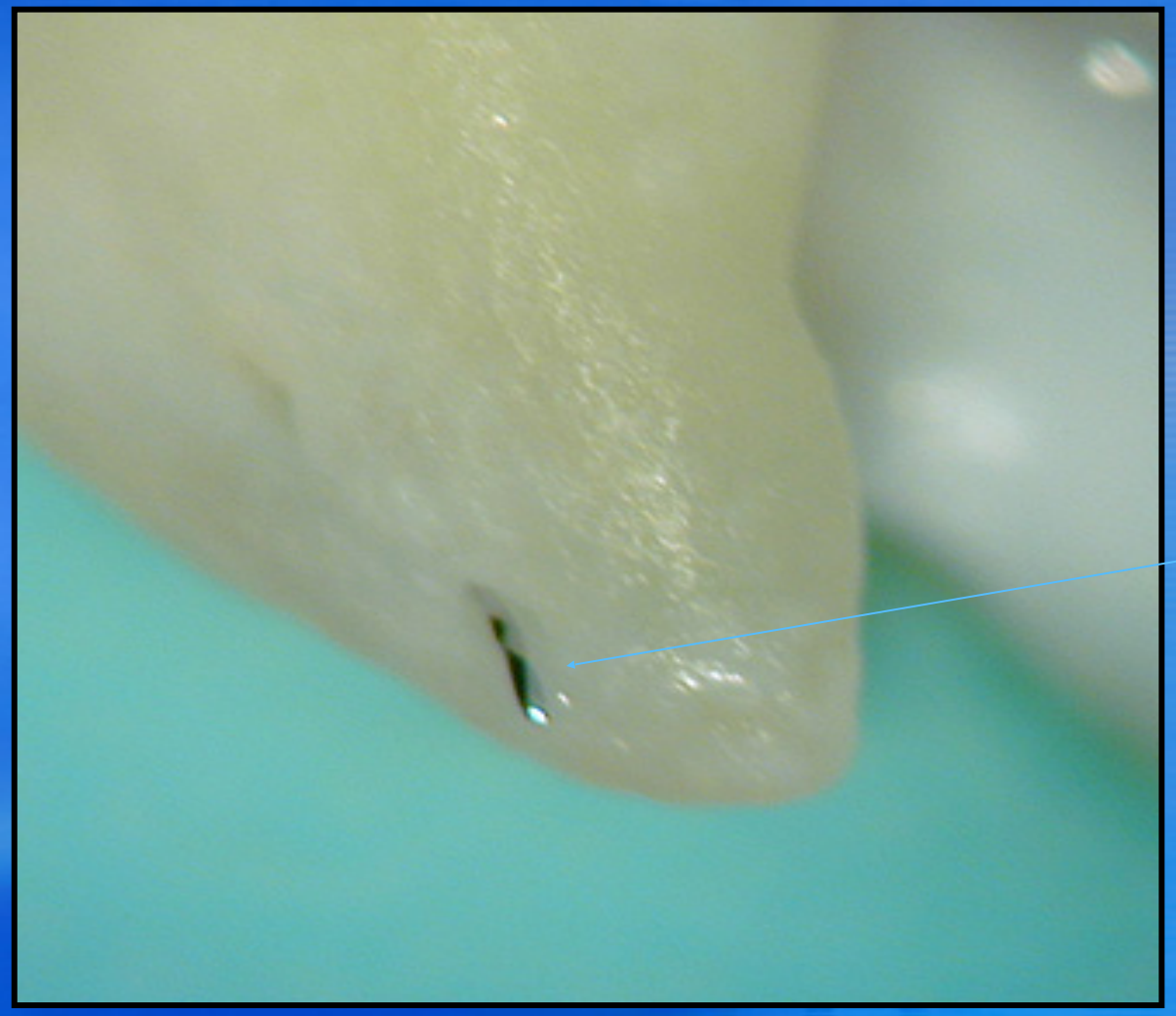


Best guess?

RADIOGRAPHIC WORKING LENGTH

- ACTUALLY…WE ARE WRONG AND LONG!

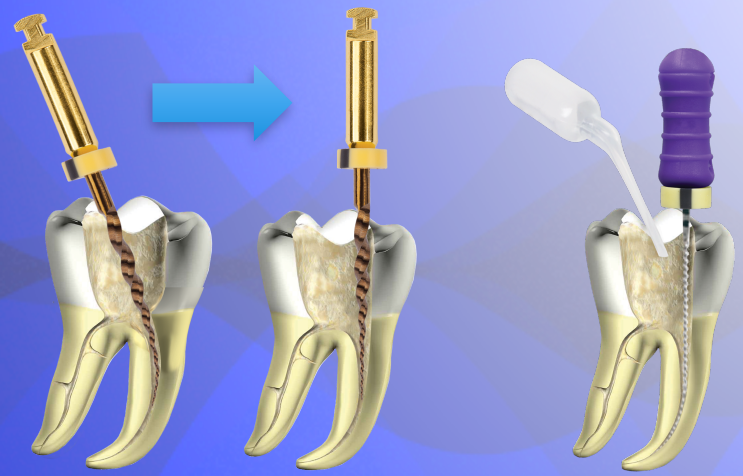
RADIOGRAPHIC WORKING LENGTH



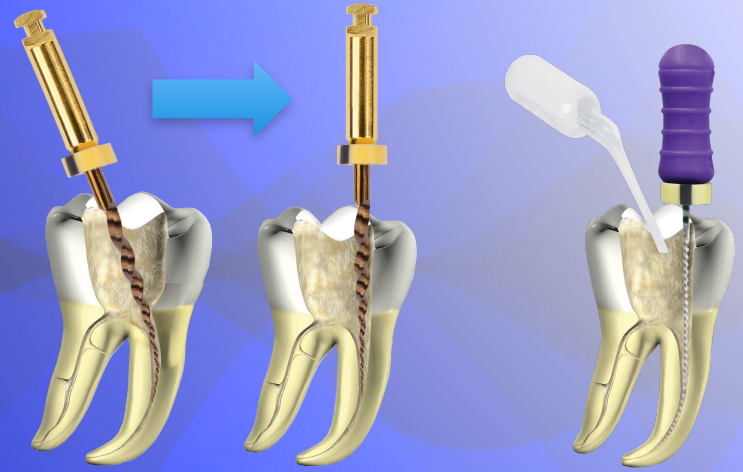
- CLOSE UP OF THE ERROR


NIKE
NIKE
NIKE

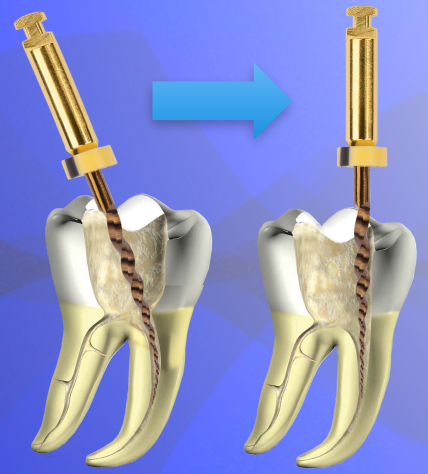
DETERMINE WORKING LENGTH



IRRIGATION



GLIDEPATH



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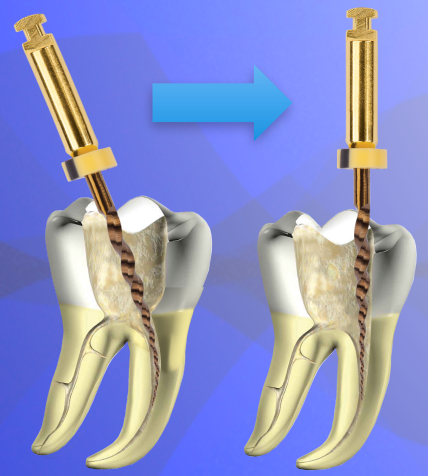
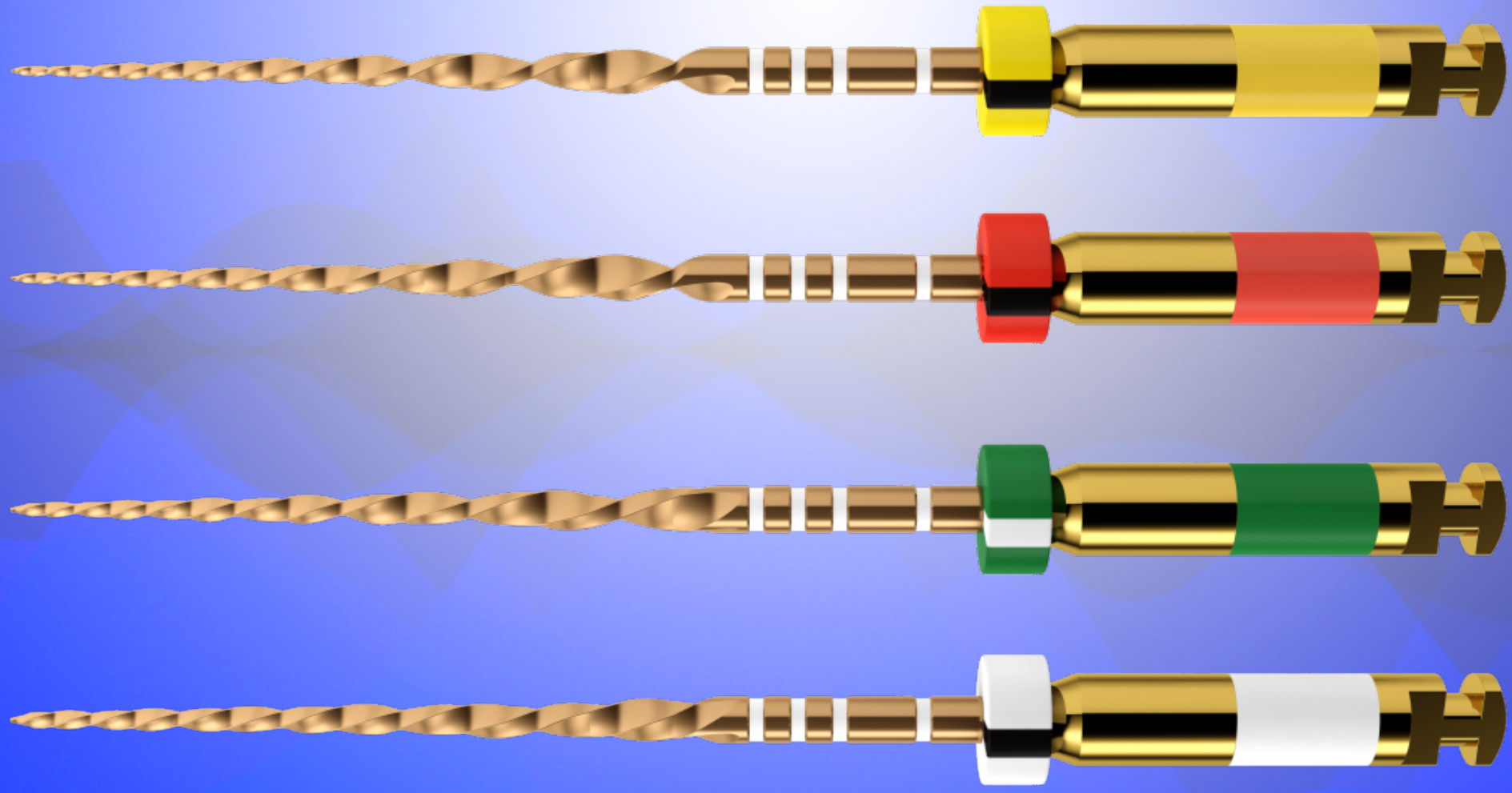


WAVEONE® GOLD RECIPROCATING SYSTEM



WAVEONE GOLD DESIGN PRINCIPALS

- RECIPROCATION REDUCES STRESSES
- APICAL CONSTRICTIONS ARE GENERALLY SMALL
- BACTERIA IN APICAL DENTINAL TUBULES
- SUFFICIENT TAPER ALLOWS FOR GOOD IRRIGATION
- BETTER METALLURGY IMPROVES PERFORMANCE

SAFETY FACTOR OF RECIPROCATION

"…even when the apical 3mm of the instrument was bound and remained stationary, the instrument still had sufficient strength to endure the torsional load generated by the reciprocating movements."

Basic Research—Technology

Safety of the Factory Preset Rotation Angle of Reciprocating Instruments

Jin-Woon Kim, DDS, MS, PhD,* Jung-Hong Ha, DDS, MS, PhD,† Gary Shun-Pan Cheung, BDS, MDS, MSc, PhD,‡ Antheunis Versluis, PhD,§ Sang-Won Kwak, DDS, MS,* and Hyeon-Cheol Kim, DDS, MS, PhD*

Abstract

Introduction: This study aimed to investigate the torsional resistance of 2 reciprocating nickel-titanium instruments (Reciproc [VDW, Munich, Germany] and WaveOne [Dentsply Maillefer, Ballaigues, Switzerland]) operated at the maximum rotating angle in a proprietary motor. **Methods:** With the file tip secured at various levels (3, 4, or 5 mm) of Reciproc R25 and WaveOne Primary, the distortion angles and torsional loads were monitored during counterclockwise movement at 2 rpm until fracture ($n = 10$ at each level) for a load-distortion graph. The rotation angles and loads at the beginning point of the plateau, the ultimate torsional strength, final fracture angle, and toughness were determined. The data were analyzed using 1-way analysis of variance and the Tukey post hoc test at $\alpha = .05$. The lateral longitudinal aspect and the fracture cross-section of each specimen were examined by scanning electron microscopy after the test. **Results:** The rotation angle at the beginning point of the plateau was significantly greater for a binding site farther away from the tip of the instrument for both systems ($P < .05$), and all were greater than 170° (preset in the dedicated motor from manufacturer). The ultimate strength and toughness also increased significantly at levels farther away from the instrument tip ($P < .05$). All specimens showed typical topographic features of torsional fracture, including the circular abrasion marks and fibrous dimples near the rotation center after the test. **Conclusions:** It was determined that the 2 brands of reciprocating files are safe when operated at the rotational angle in the proprietary motor. (J Endod 2014;40:1671–1675)

Key Words

Distortion, Reciproc, reciprocating nickel-titanium file, torsional resistance, WaveOne

Nickel-titanium (NiTi) rotary files are now an important adjunct in endodontic therapy and are used extensively by both specialists and general dentists. NiTi instruments offer many advantages over stainless steel files, including excellent flexibility and improved cutting efficiency (1, 2). The superelasticity of NiTi rotary instruments allows preservation of the root canal anatomy and curvature while conserving more root structure (1–3). Despite these advantages, NiTi instruments appear to be vulnerable to separation (4, 5).

The separation modes of rotary NiTi instruments can be categorized as either cyclic flexural fatigue or torsional failure (5, 6). In the clinic, the separation of NiTi instruments probably occurs under the simultaneous influence of torsion and flexure, resulting in mixed mode failure (6, 7). Researchers and manufacturers have explored various ways to increase failure resistance as well as clinical efficiency (8–15). Geometric characteristics, heat treatments, and surface treatments have all been shown to have a considerable effect on the mechanical properties and clinical performances of NiTi instruments (9–17).

Recently, a different form of motion has been proposed for NiTi instruments. Yared (18) reported the use of a reciprocating technique and managed to shape a root canal successfully with only 1 instrument. Since then, 2 NiTi systems have been introduced to the market that use the reciprocation concept: Reciproc (VDW, Munich, Germany) and WaveOne (Dentsply Maillefer, Ballaigues, Switzerland). These manufacturers claim that the reciprocating motion reduces the torsional fracture by periodically reversing the rotation directions of the file (19). Several studies have shown that reciprocating motion can extend the fatigue life span of an NiTi instrument and thus may increase clinical efficiency compared with continuous rotation (20–23). The life span extension may be explained by the reduced effect of cyclic stress buildup that can negatively influence the fatigue resistance for continuously rotating instruments. On the other hand, little information is available on the torsional resistance of NiTi files operating in the reciprocating mode despite the manufacturers' claim. The reciprocating file continues to be susceptible to torsional breakage, at least in theory. The torsional resistance of an instrument varies according to the cross-sectional shape and area, which may differ at different levels of the instrument (19). The rotation angle surely will affect the internal stress built up in these instruments. However, the dedicated motors of these systems possess only 1 preprogrammed setting for the reciprocating files (170° counterclockwise and 50° clockwise, which were recorded in a preliminary study using a high-speed video camera [IXUS 115HS; Canon, Tokyo, Japan] at 240 frame/s). Therefore, the aim of this study was to investigate the torsional resistances of the reciprocating instruments at various levels by measuring torsional

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- BACK TO WHY THE WAVE ONE GOLD FILE IS THE SIZE IT IS…


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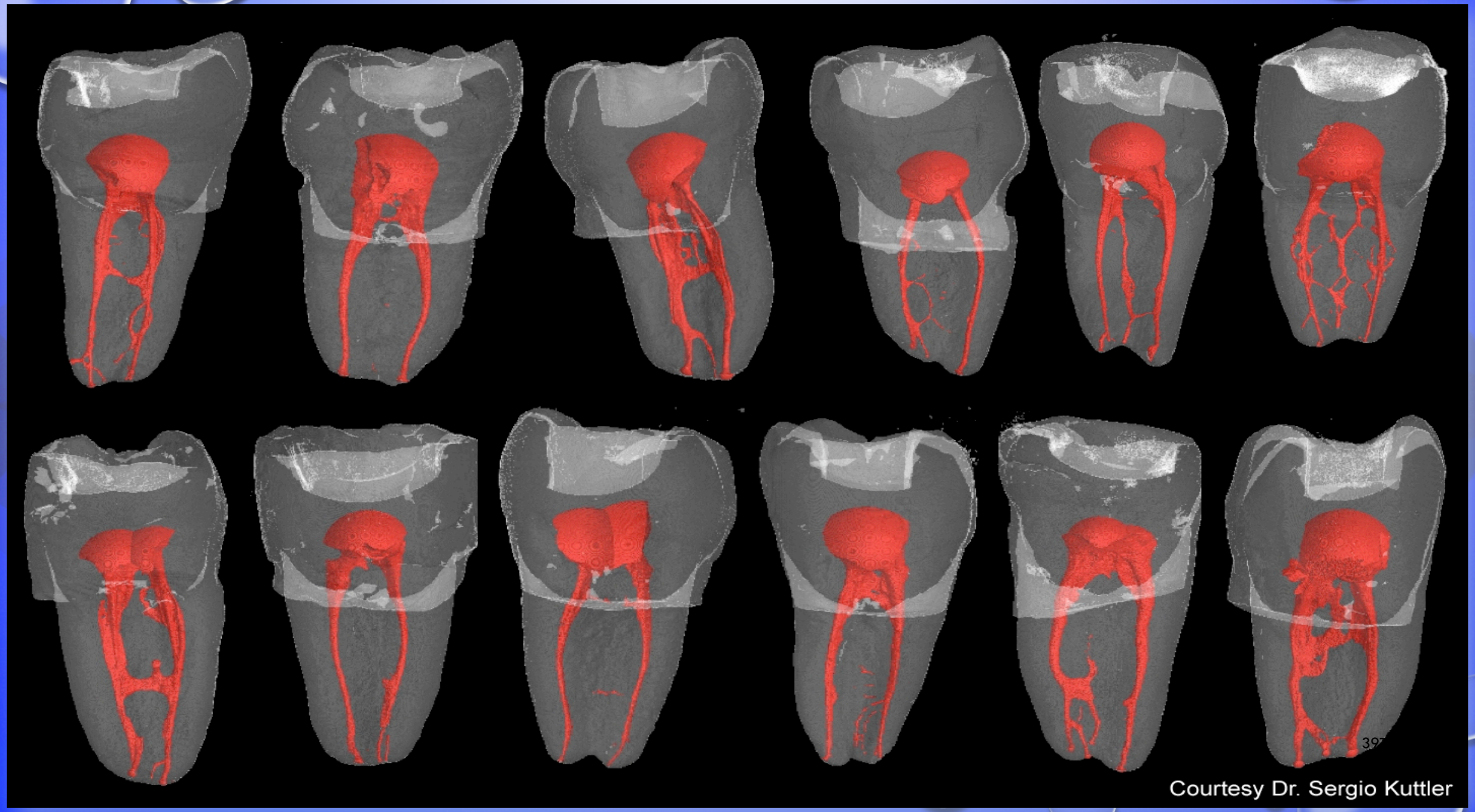
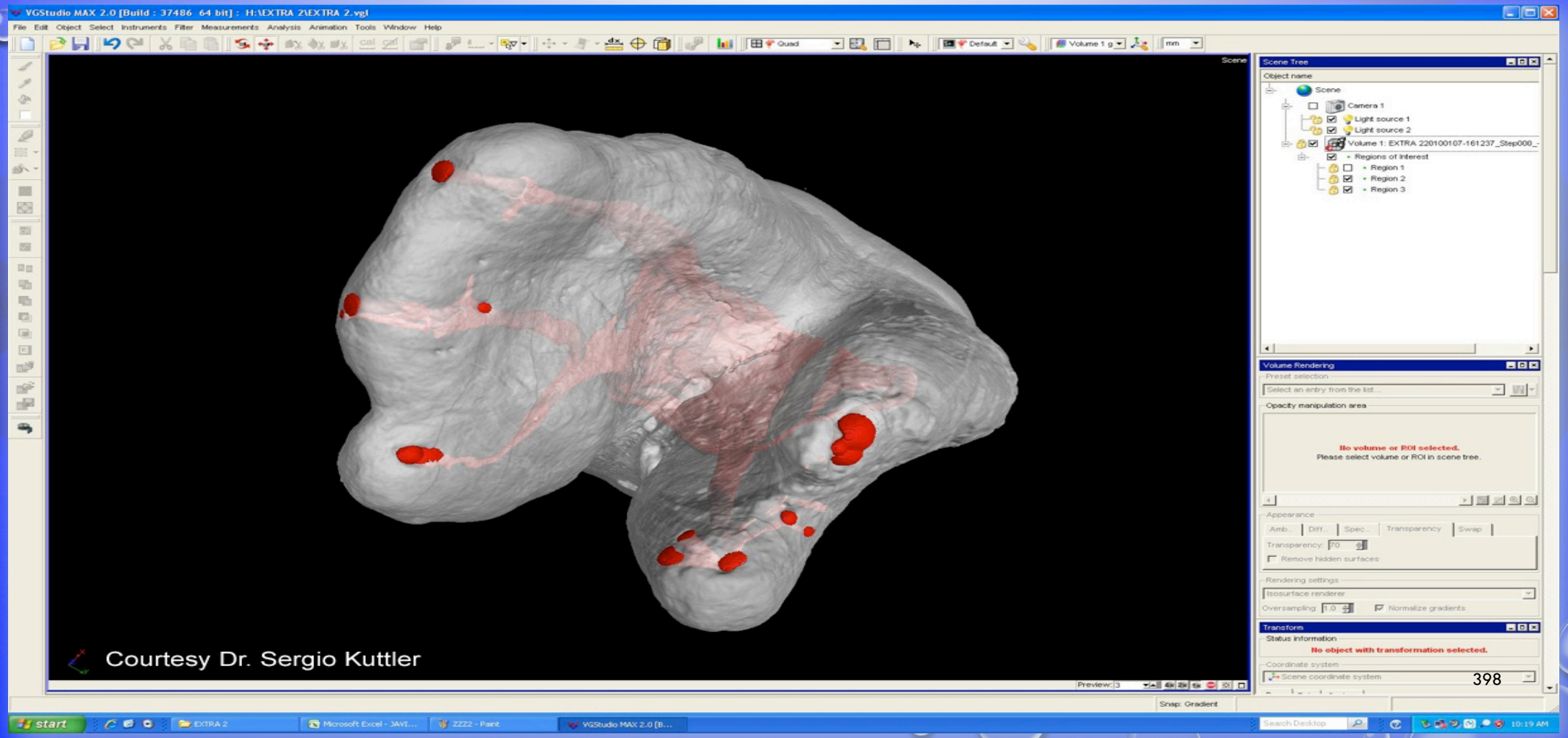

Courtesy Dr. Sergio Kuttler

Instrumentation



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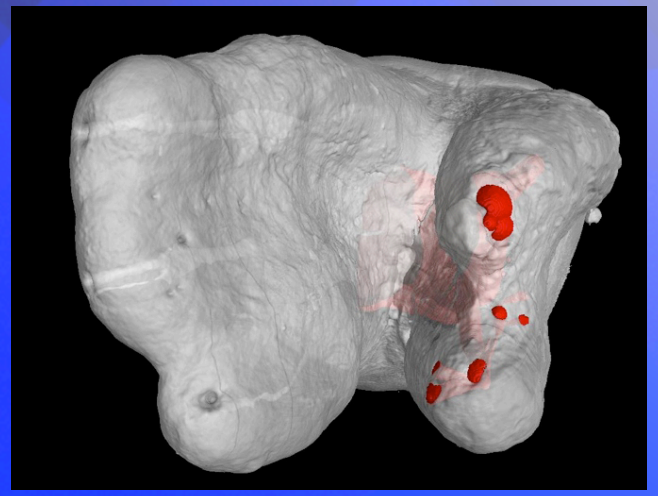
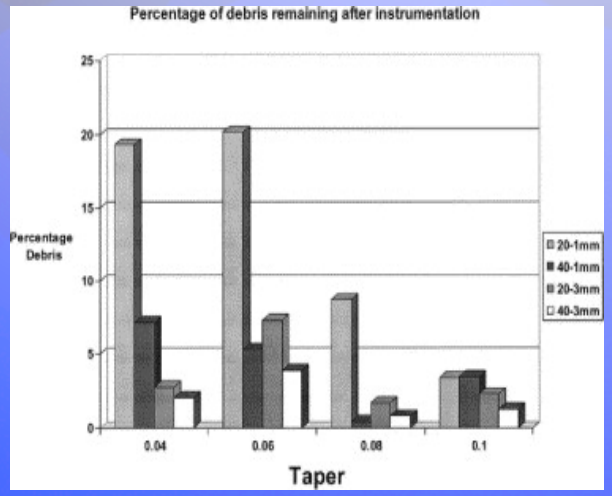
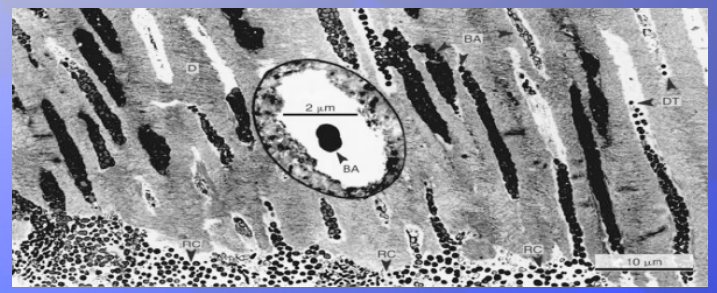
RATIONALE FOR APICAL TIP SIZE

- DIAMETER OF APICAL FORAMINA
- BACTERIAL PENETRATION IN APICAL DENTIN
- TIP DIAMETER VS. PREPARATION TAPER







Pathways 9th ed 2006

Albrecht JOE 2004

Morphology of the Physiological Foramen: I. Maxillary and Mandibular Molars

Benjamín Briseño Marroquín, Prof. Dr. med.dent., Mohammed A. A. El-Sayed, Dr. med.dent., and Brita Willershausen-Zönnchen, Prof. Dr. med.dent.

Information concerning the anatomy of the physiological foramen is limited. The aim of this study was to investigate the distance between the physiological and anatomical apex, accessory foramina frequency, and the shape and diameter of the physiological foramen in maxillary and mandibular molars. The apical anatomy of 523 maxillary and 574 mandibular molars from an Egyptian population was investigated by means of a computer-aided stereomicroscope (40× magnification). The following results were obtained:

(a) There was a high percentage of two physiological foramina in mesial (87.06%) and mesiobuccal (71.15%) roots of mandibular and maxillary first molars, respectively.
(b) There was a high frequency of accessory foramina in maxillary mesiobuccal (33%) and mandibular mesial (26%) roots.
(c) The most common physiological foramen shape was oval (70%).
(d) The mean of the narrow and wide physiological foramen diameters was as follows:

- **0.20 to 0.26 mm in mandibular molars**
- **0.18 to 0.25 mm in the maxillary mesiobuccal and distobuccal root**
- **0.22 to 0.29 mm in the maxillary palatal root**

information about the apical area. Typically, the root canal narrows toward the apex into the apical constriction or physiological foramen and expands to form the physiological foramen (3). Yet, Wu et al. (8) reported that an apical constriction was found in less than half of the teeth they examined. Moreover, the most apical portion of the root canal has been reported to have not only tapered but also parallel walls (9). Other authors have suggested that the apical constriction is often not present, particularly when apical pathosis and root resorption are present (1). Few studies concerning the root anatomical apex and anatomical foramen morphology have been conducted, and they mainly discuss the distance between these two entities (3, 9, 10). Even fewer studies concerning the diameter (2, 11) and shape (12) of the anatomical foramen have been conducted.

The aim of the study was to investigate the distance between the physiological and anatomical apex; accessory foramina frequency; and the number, shape, and diameter of the physiological foramen in the roots of maxillary and mandibular first, second, and third molars.

MATERIALS AND METHODS

A total of 1097 extracted human permanent molars from an Egyptian population were obtained and stored in 5.25% sodium hypochlorite. The teeth had to show an intact or almost intact crown for clear identification of the tooth type and location (13, 14). Primary teeth and roots evidencing fractures, resorption, or underdevelopment (40× magnification) or that had received any previous endodontic treatment were discarded. The teeth were

J Endod 2004;30:321-8.

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Regional Variation in Root Dentinal Tubule Infection by *Streptococcus gordonii*

Robert Matthew Love, MDS

The purpose of this study was to investigate the pattern of bacterial invasion of dentinal tubules at different regions in human roots. Specimens were obtained from single-rooted teeth that had their root canals prepared in a standard manner. Roots were then sectioned longitudinally through the canals and the resulting specimens chemically treated to remove the smear layers. Specimens were immersed in a suspension of *Streptococcus gordonii* for 3 weeks and then prepared for histological analysis. Sections from the cervical, midroot, and apical areas were examined. The pattern of bacterial infection of the cervical and midroot areas was similar, characterized as a heavy infection with bacteria penetrating as deep as 200 μm. Invasion of the apical dentin was significantly different, with a mild infection and maximum penetration of 60 μm.

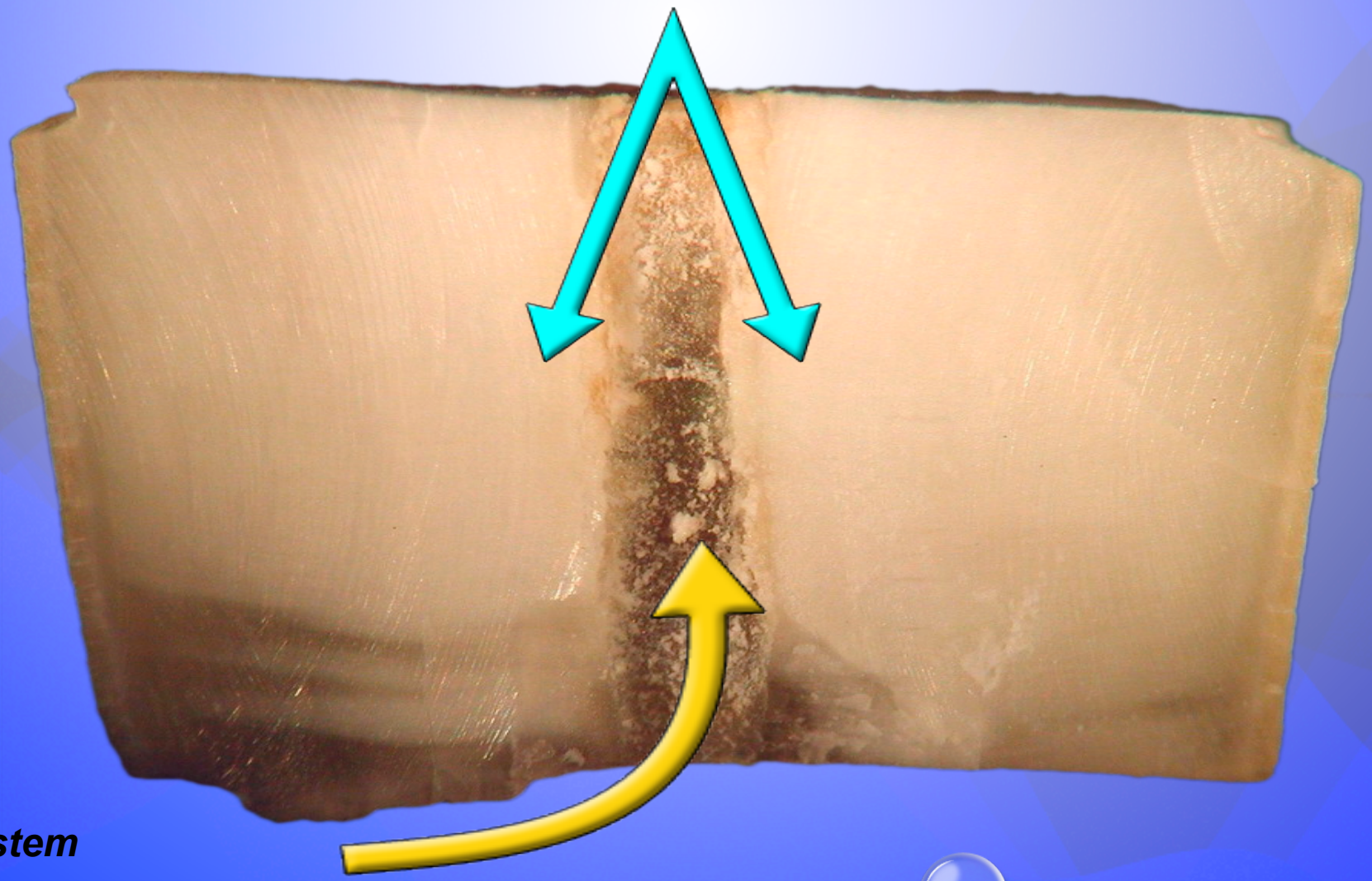
the teeth were cleaned to remove adherent hard and soft tissues, with care being taken not to damage the cementum, and stored in 5% formalin. Using a rotating diamond saw (Isomet Saw, Buhler Ltd., Evanston, IL) with water irrigation, the crowns were removed to produce roots of equal length. Roots were inspected for root fractures or lateral canals with a stereomicroscope at 12 times magnification, and canal patency was confirmed by passing a #15 K-file through the apex.

Canals were instrumented with a step-back circumferential filing technique using K-files and copious irrigation with 17% EDTA and 5.25% sodium hypochlorite (NaOCl). An apical stop was prepared 1 mm from the apex to three file sizes larger than the first file to bind, or at least to size 30. Roots were then sectioned longitudinally through the root canal with the diamond saw to produce two matching specimens. Ten of these specimens plus three controls were used in this study.

To ensure complete removal of the smear layers, the specimens were placed in an ultrasonic bath (Metason 120, Struers) with 17% EDTA for 4 min, followed by 5.25% NaOCl for 4 min. One

J Endod 1996;22:290–3

Dentinal tubules



Main canal system

DESIGN RATIONALE – BACTERIAL MIGRATION

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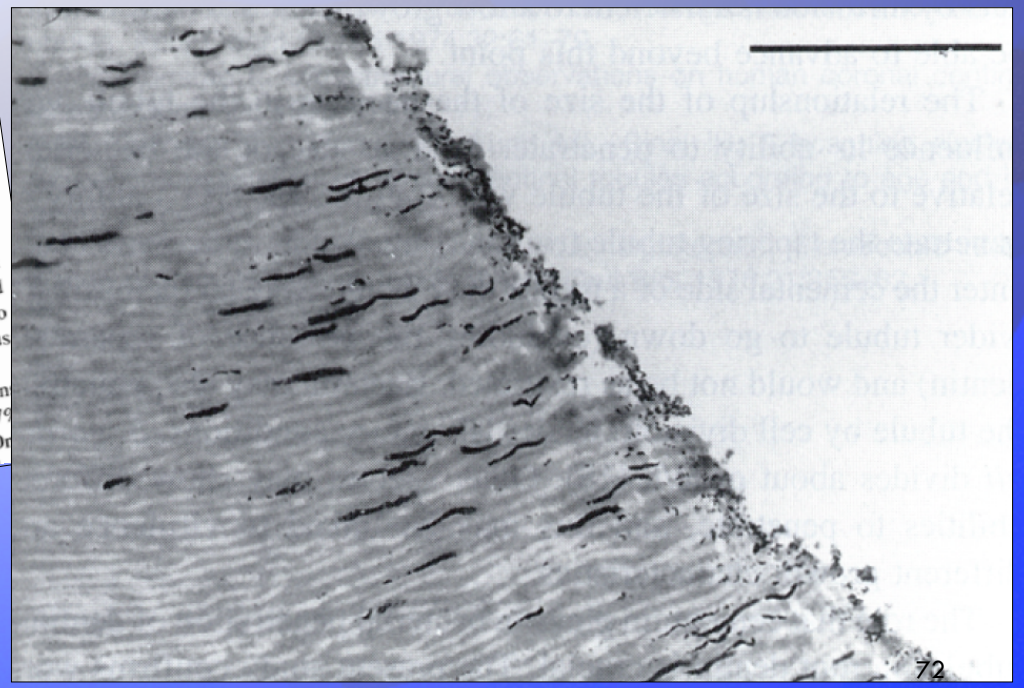
- **BACTERIAL MIGRATION INTO APICAL DENTINAL TUBULES IS < 60 MICRONS**



DESIGN RATIONALE – SMALL ANATOMY

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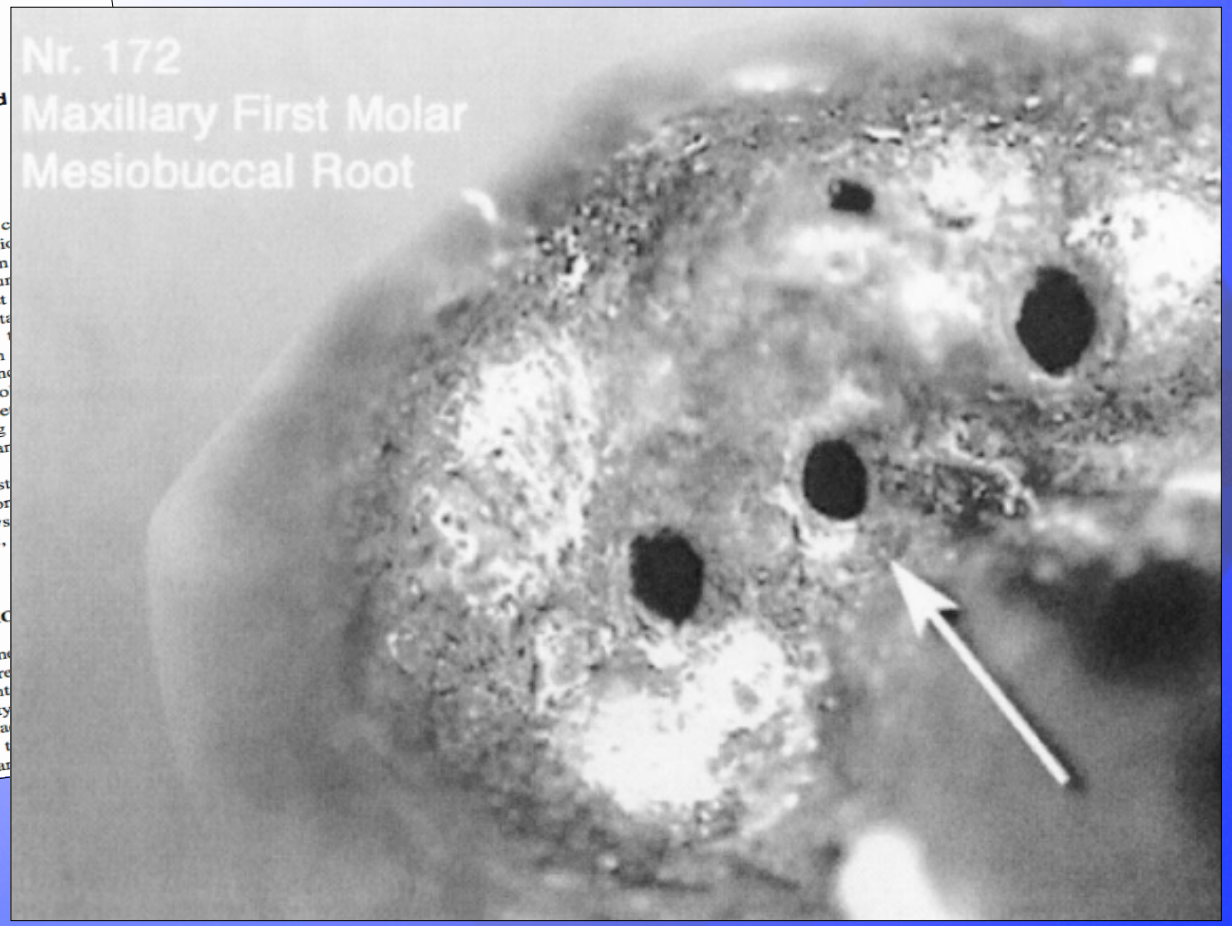

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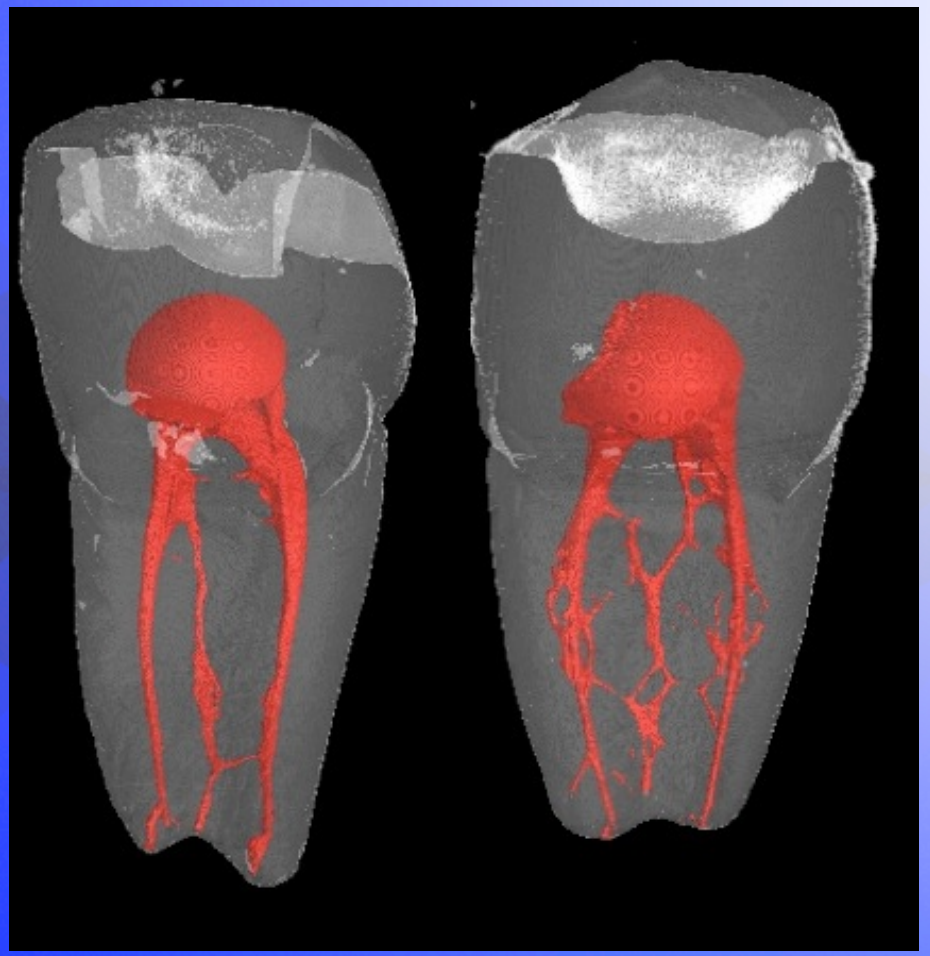
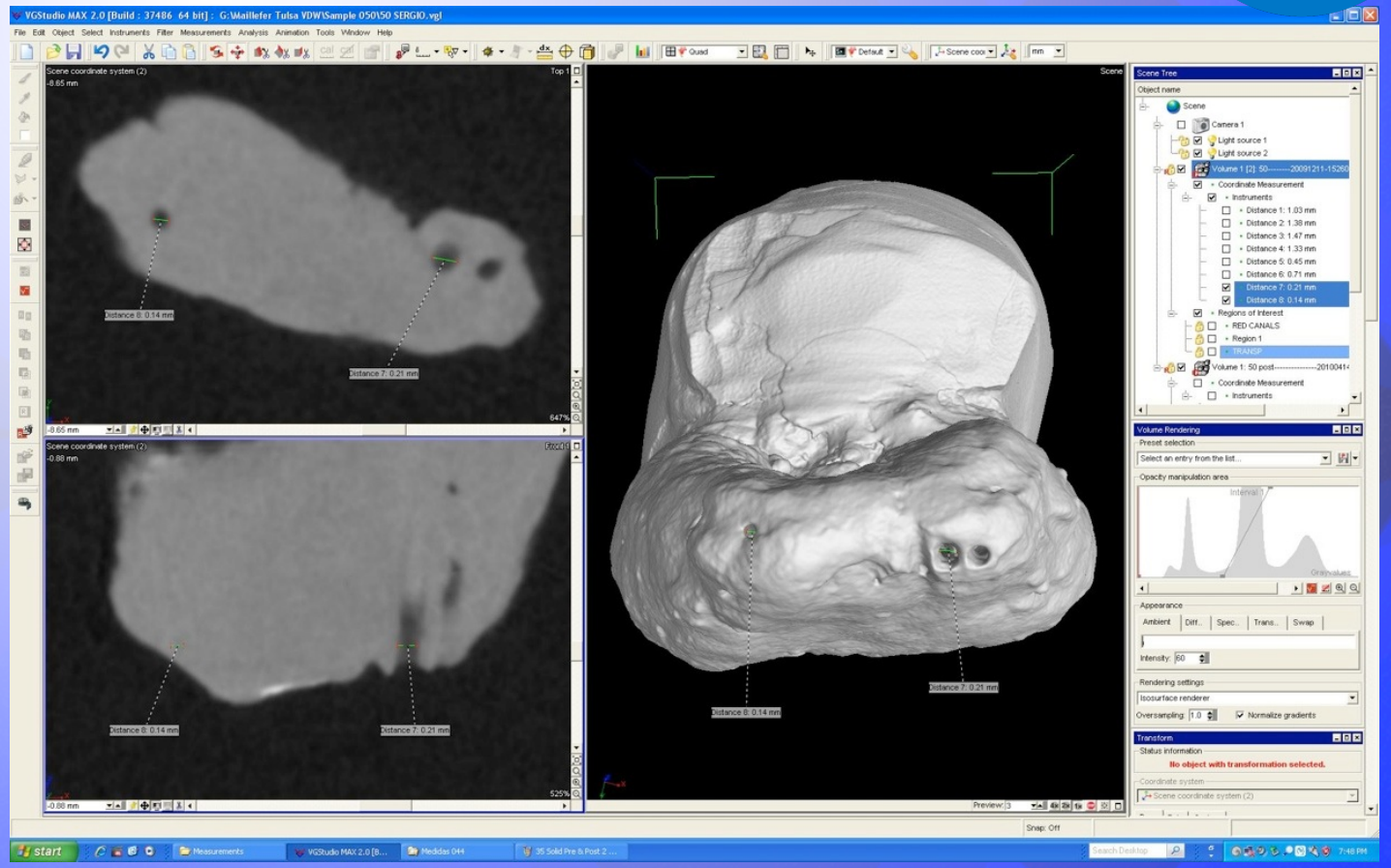
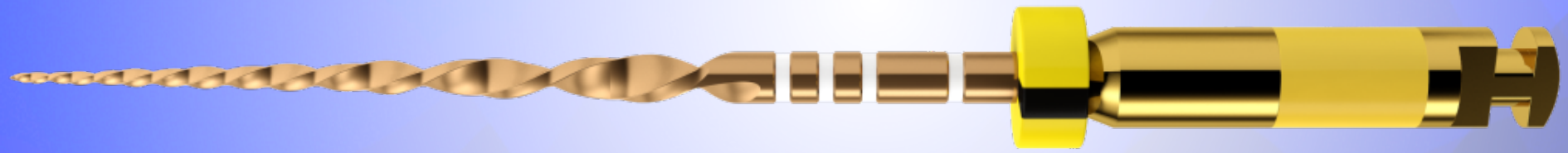




WAVEONE® GOLD RECIPROCATING SYSTEM



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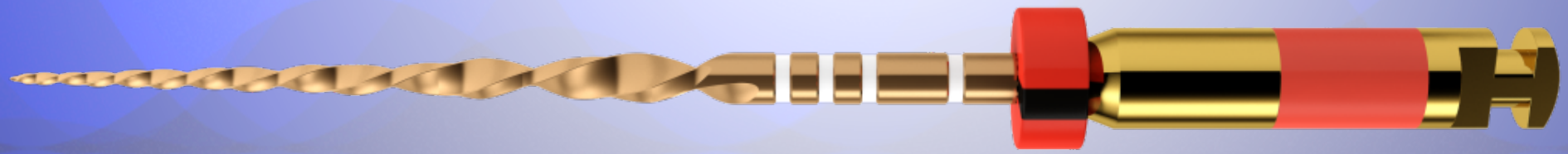
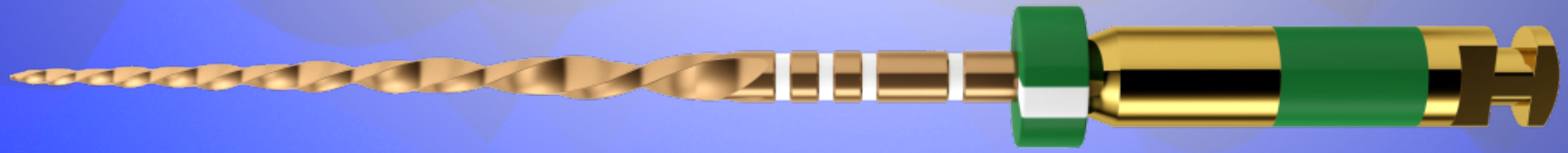
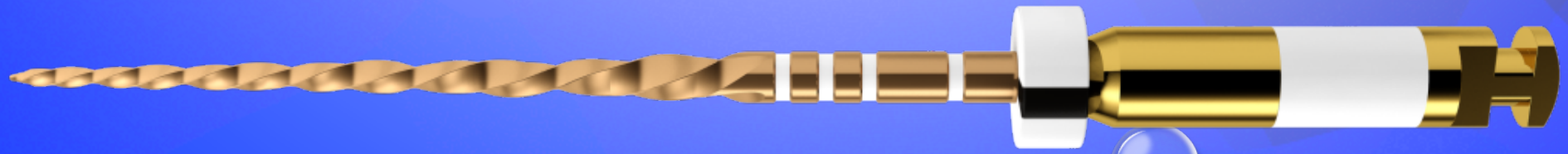


Primary

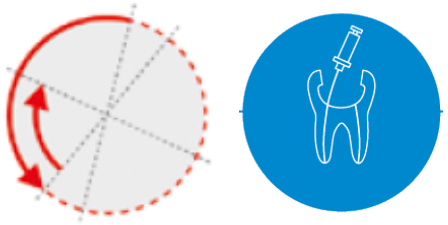


Medium

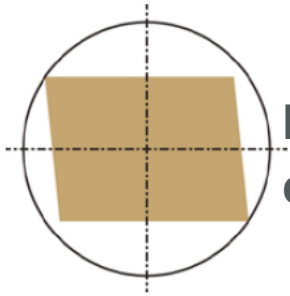


Large

WaveOne® Gold



Possible to shape the majority of cases (80%) with one single file



Parallelogram cross-section

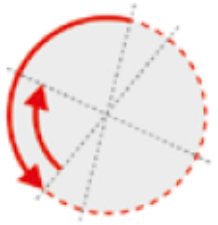
ABS plastic ring to avoid sterilization and multiple re-use

NiTi with GOLD Heat Treatment

WaveOne Reciprocating Movement

Dentsply Sirona Endodontics

WaveOne Gold covers a maximum of clinical cases

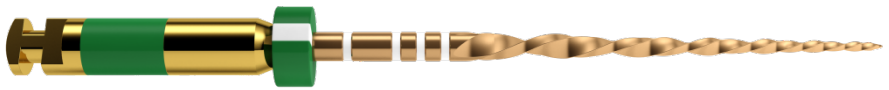


WaveOne® Gold

Small

Primary

Medium



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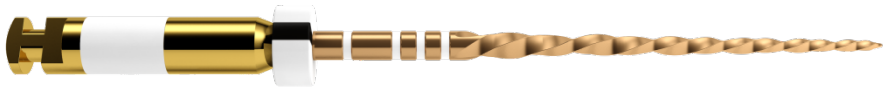
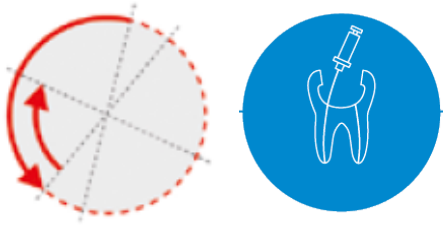


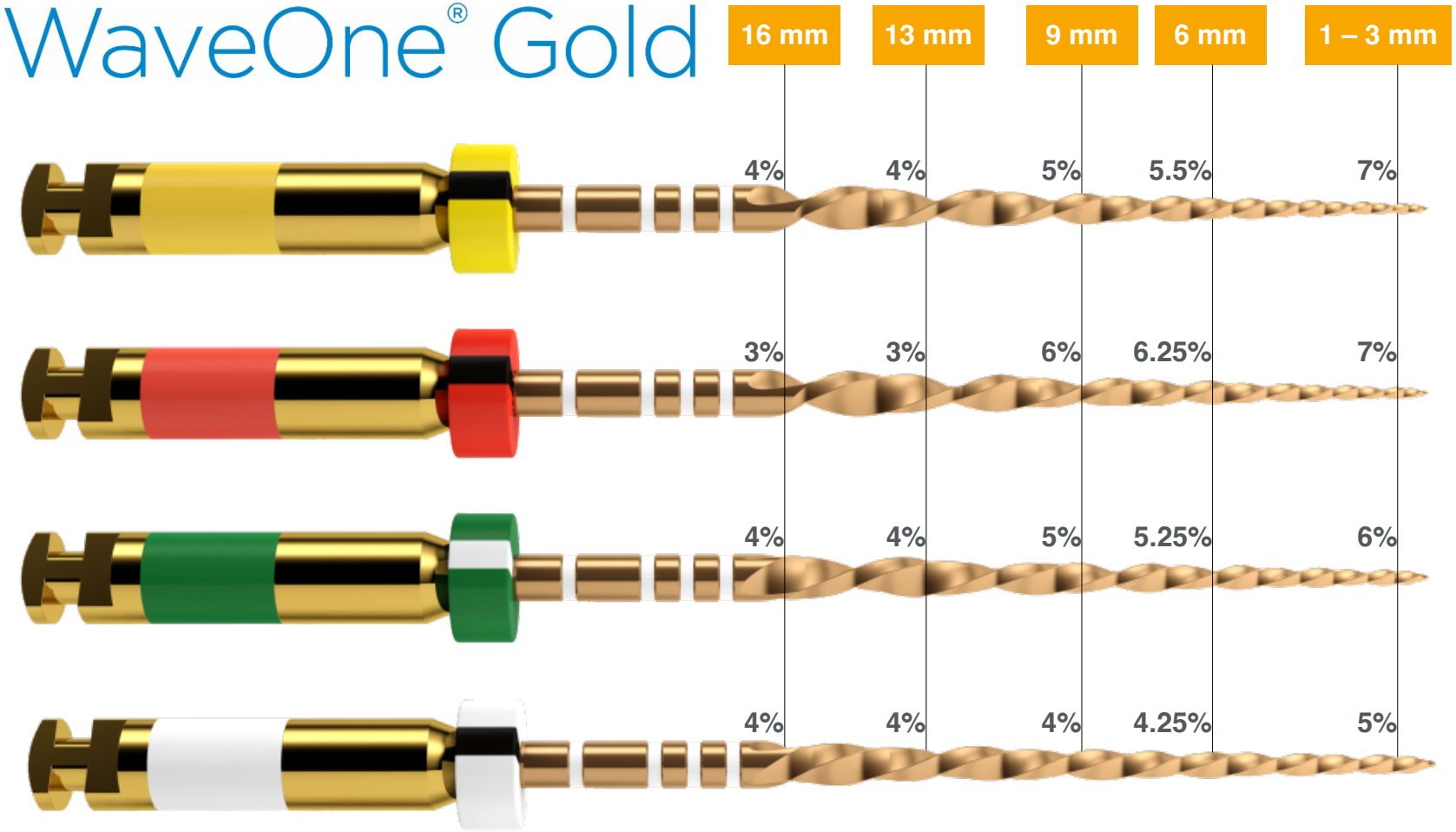
Tip diameter	Taper at tip
020	7%
025	7%
035	6%
045	5%

Dentsply Sirona Endodontics

Variable tapers along the active part of the files

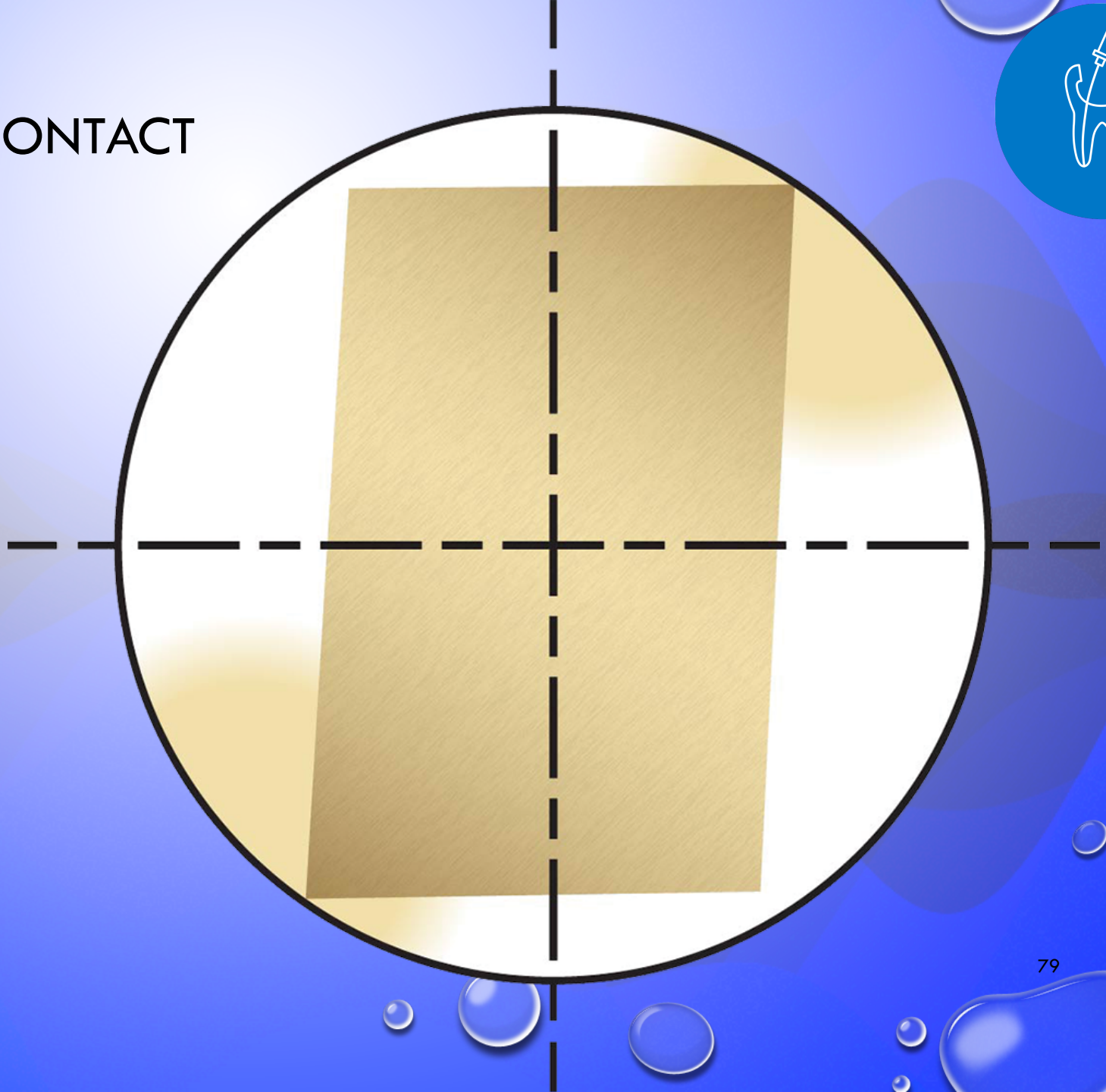


WaveOne® Gold

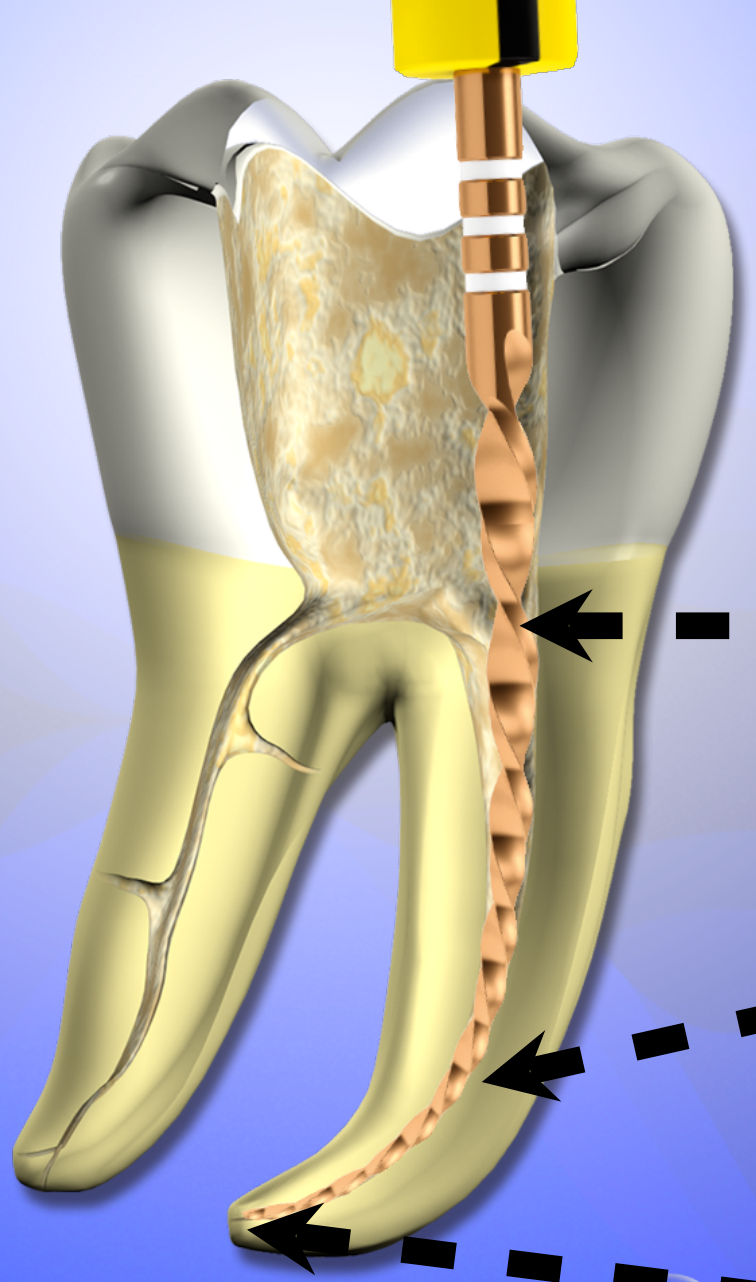


Dentsply Sirona Endodontics

2 POINTS OF CONTACT



Small

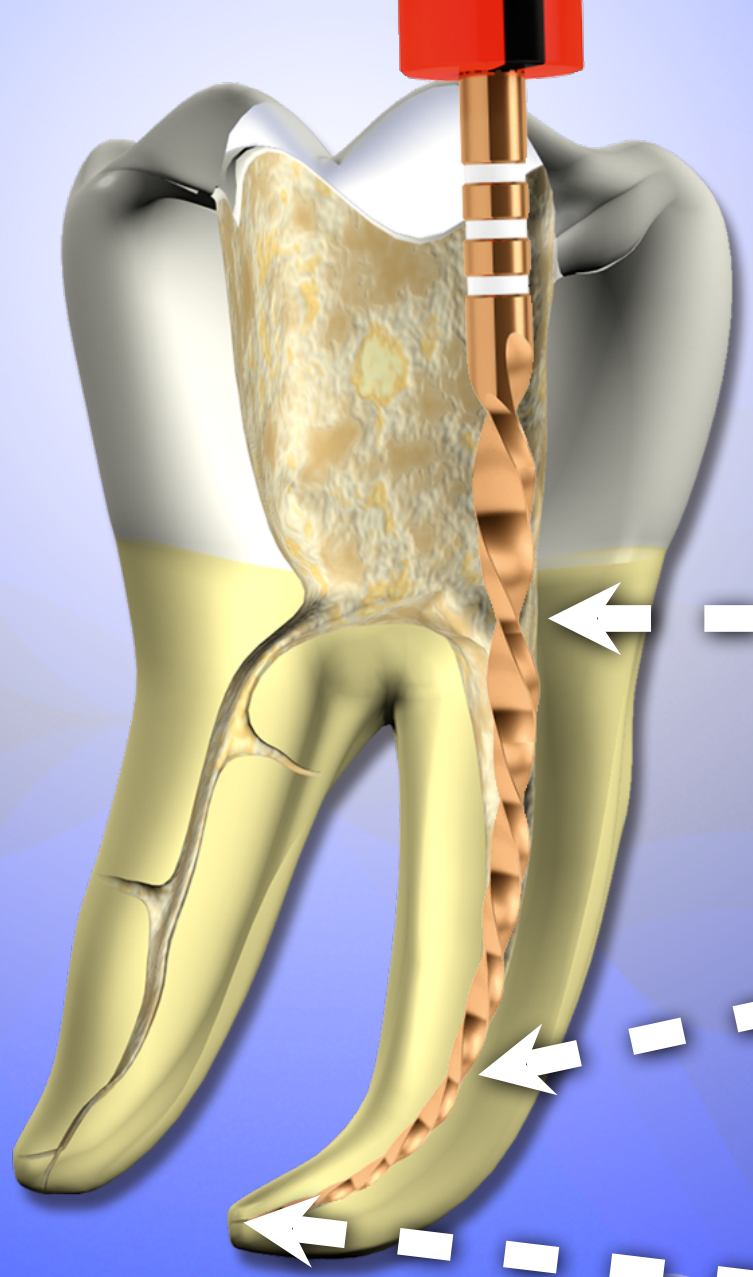


0.845 .045 Taper

0.345

0.275 .07 Taper

0.205



0.955

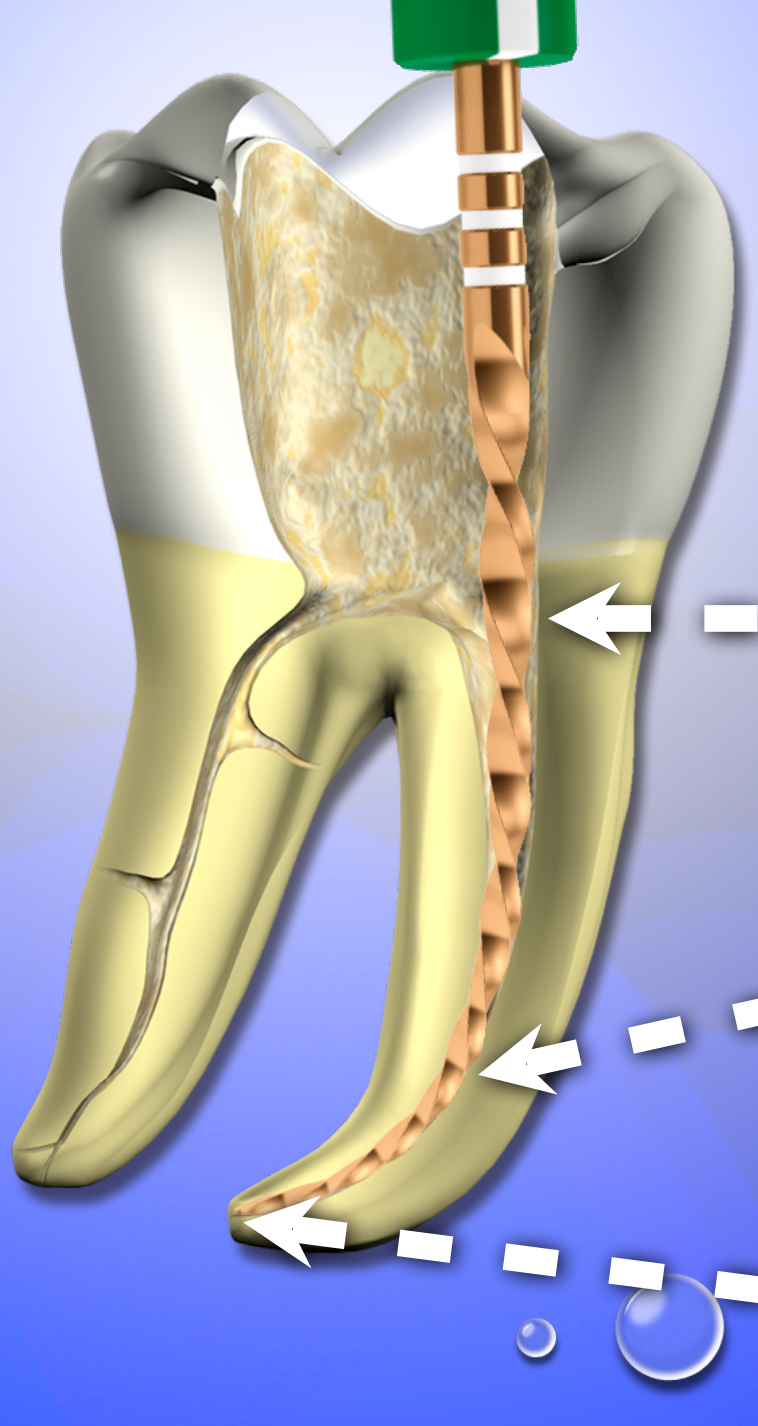
.06 Taper

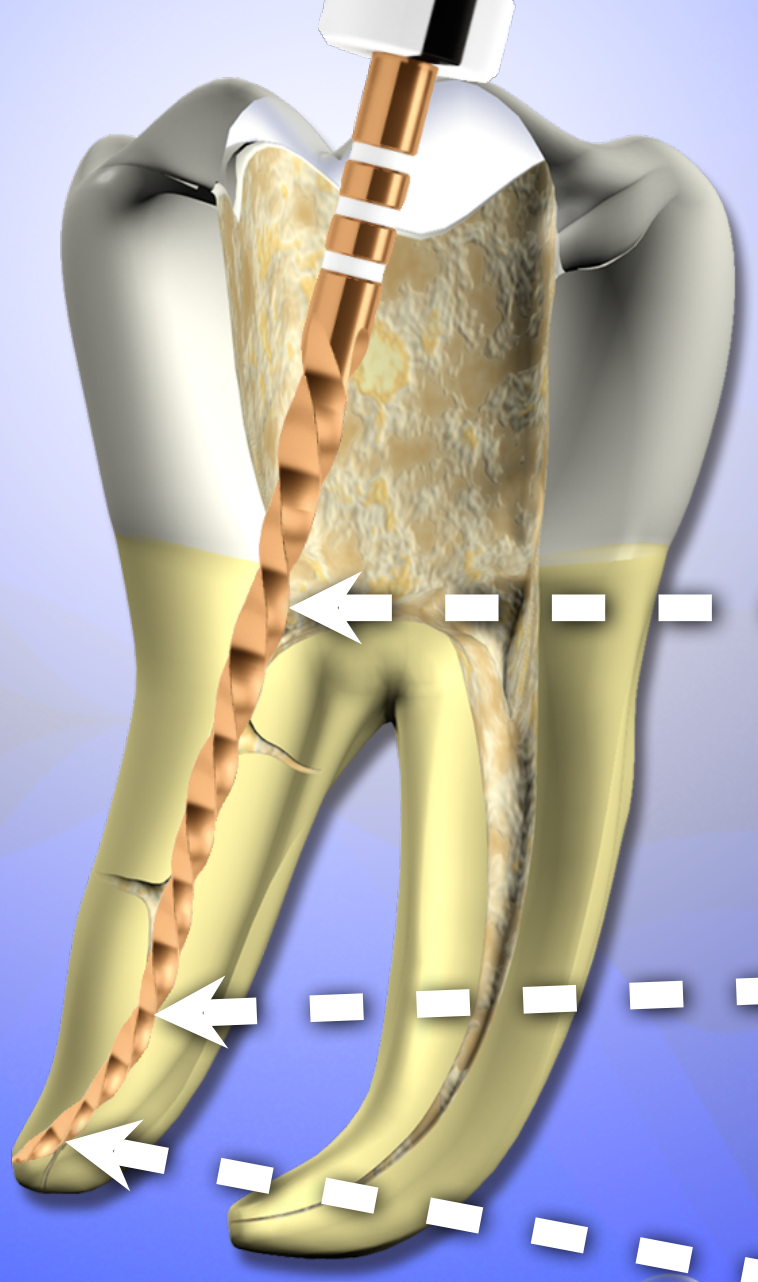
0.390

0.320

.07 Taper

0.250


0.945
.05 Taper
0.470
0.410
.06 Taper
0.350



0.895 .04 Taper

0.550

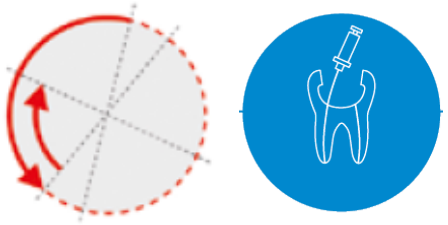
0.500 .05 Taper

0.450

WAVEONE GOLD OVERVIEW

- GOLD RESULTS FROM POST-GRIND HEAT TREATMENT
- MORE FLEXIBILITY
- HIGHER RESISTANCE TO CYCLIC FATIGUE

WaveOne Gold brings you Zen



SSt Hand File

WaveOne® Gold Glider

WaveOne® Gold

Primary

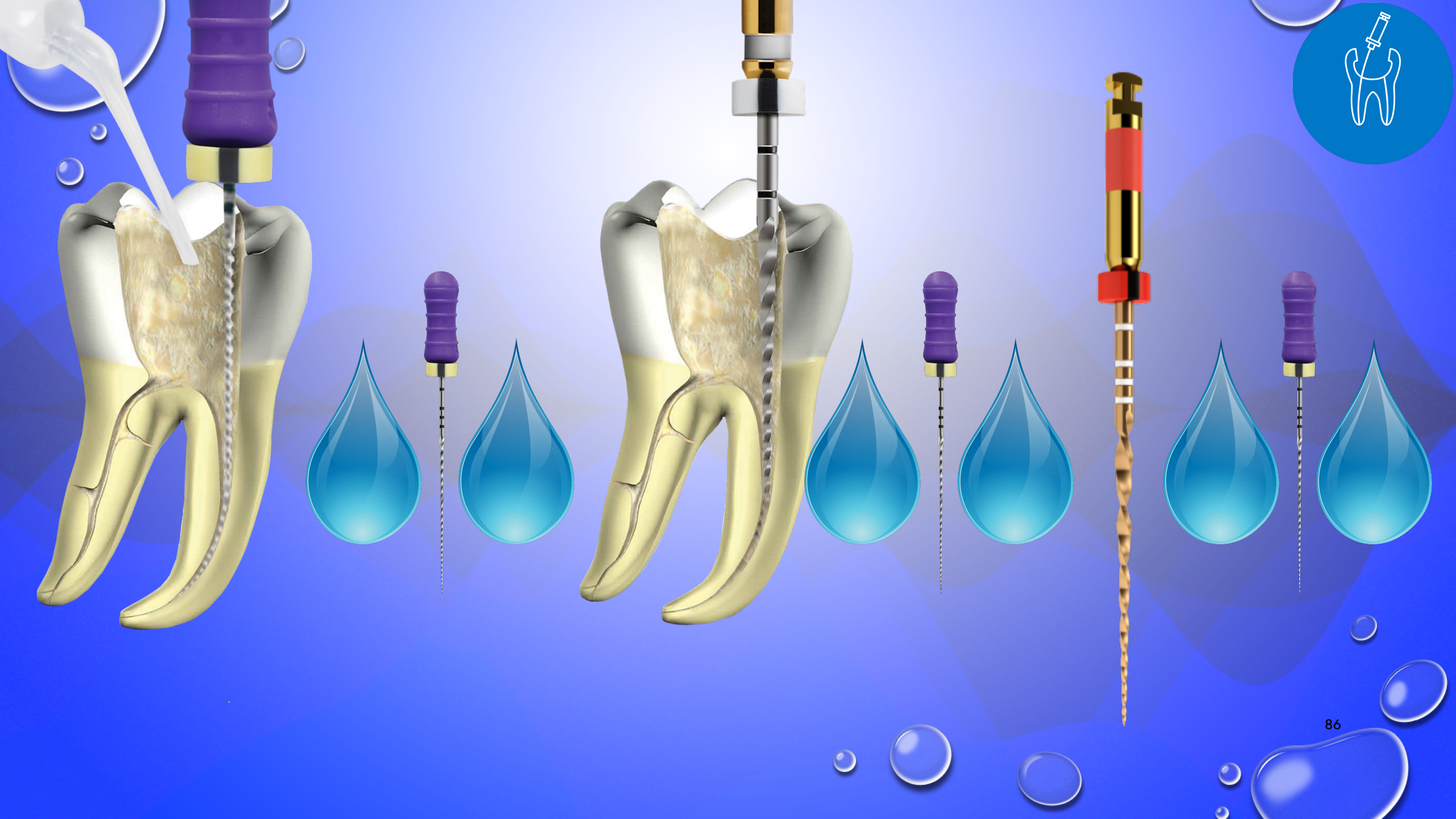
Possible to shape around 80% of cases with only one shaping file

Small

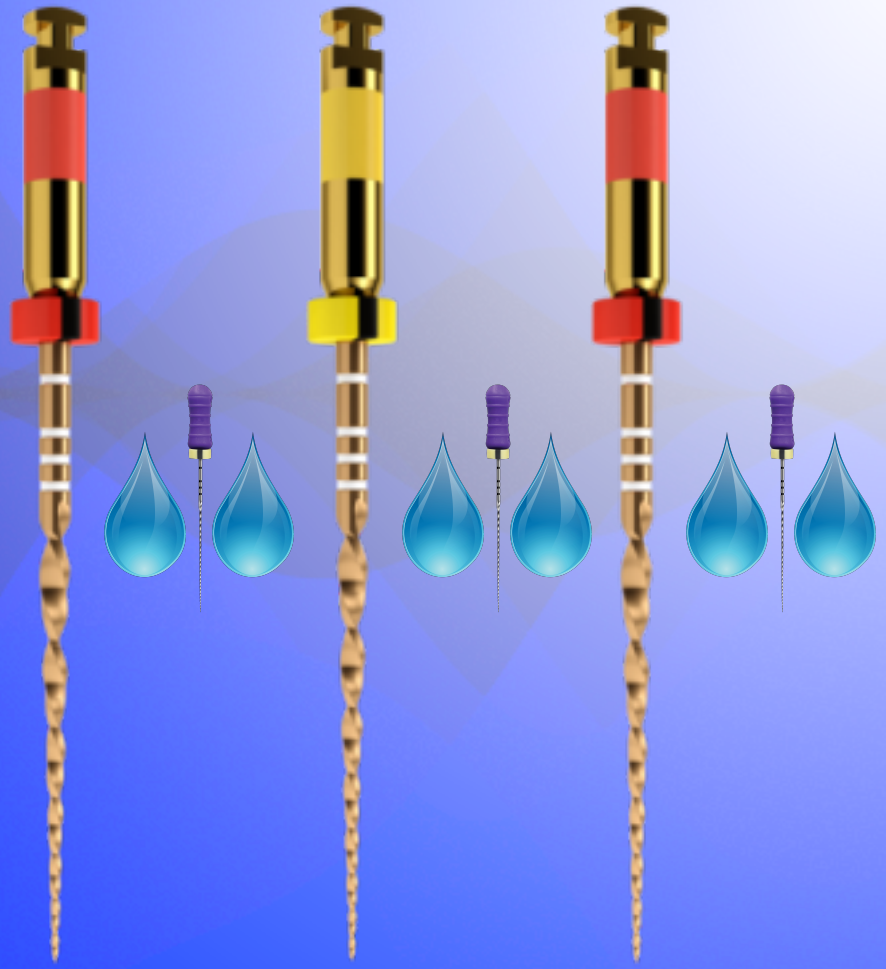
Medium

Large

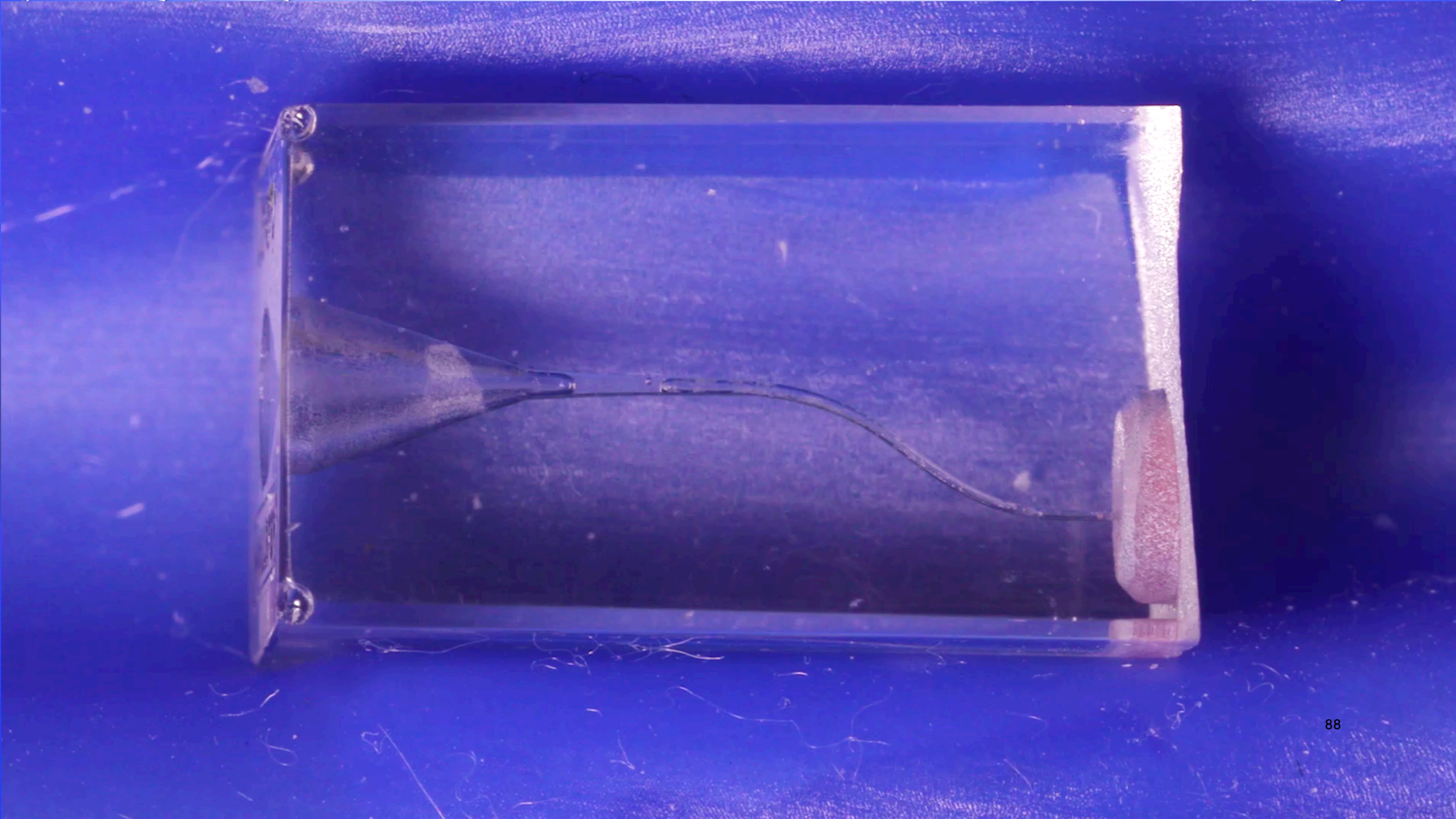
Dentsply Sirona Endodontics



Small Canals



Large Canals



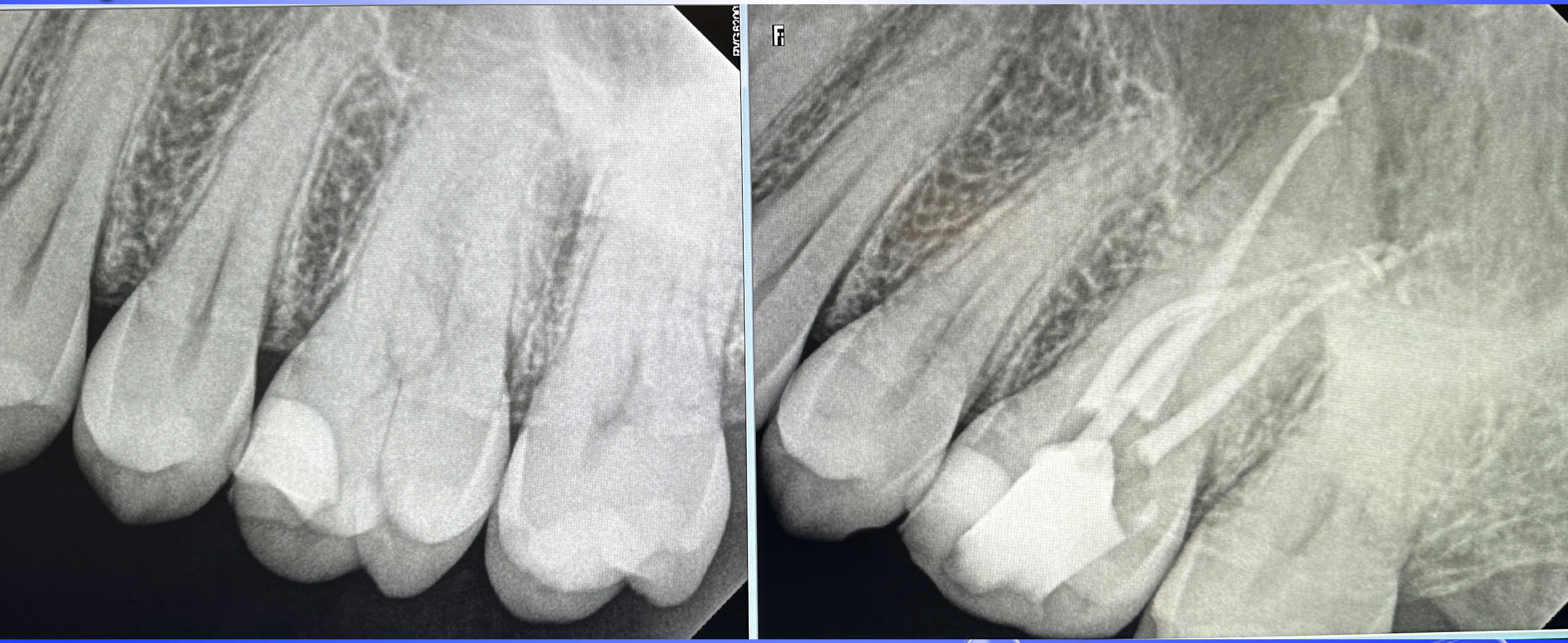
KEY LEARNING POINTS

- ACTIVE INSTRUMENTS ARE MORE EFFICIENT
- VARYING TAPERS IMPARTS OPTIMAL SHAPES
- THERMAL TREATMENTS IMPROVE FLEXIBILITY AND FATIGUE RESISTANCE
- ALWAYS ESTABLISH A GLIDEPATH
- APPLY MINIMAL PRESSURE
- CLEAN INSTRUMENT FREQUENTLY

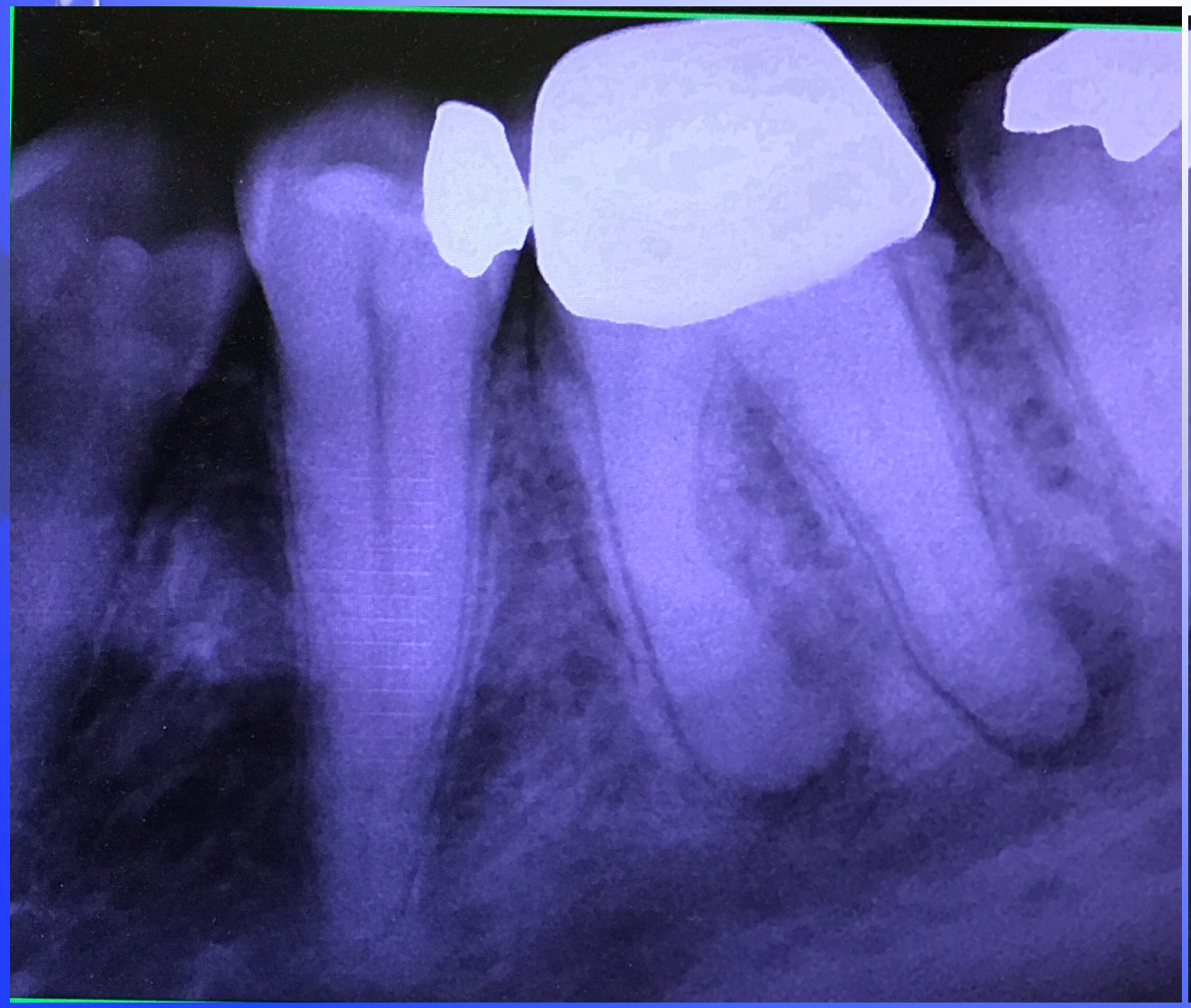
TAKE AWAY MESSAGE:

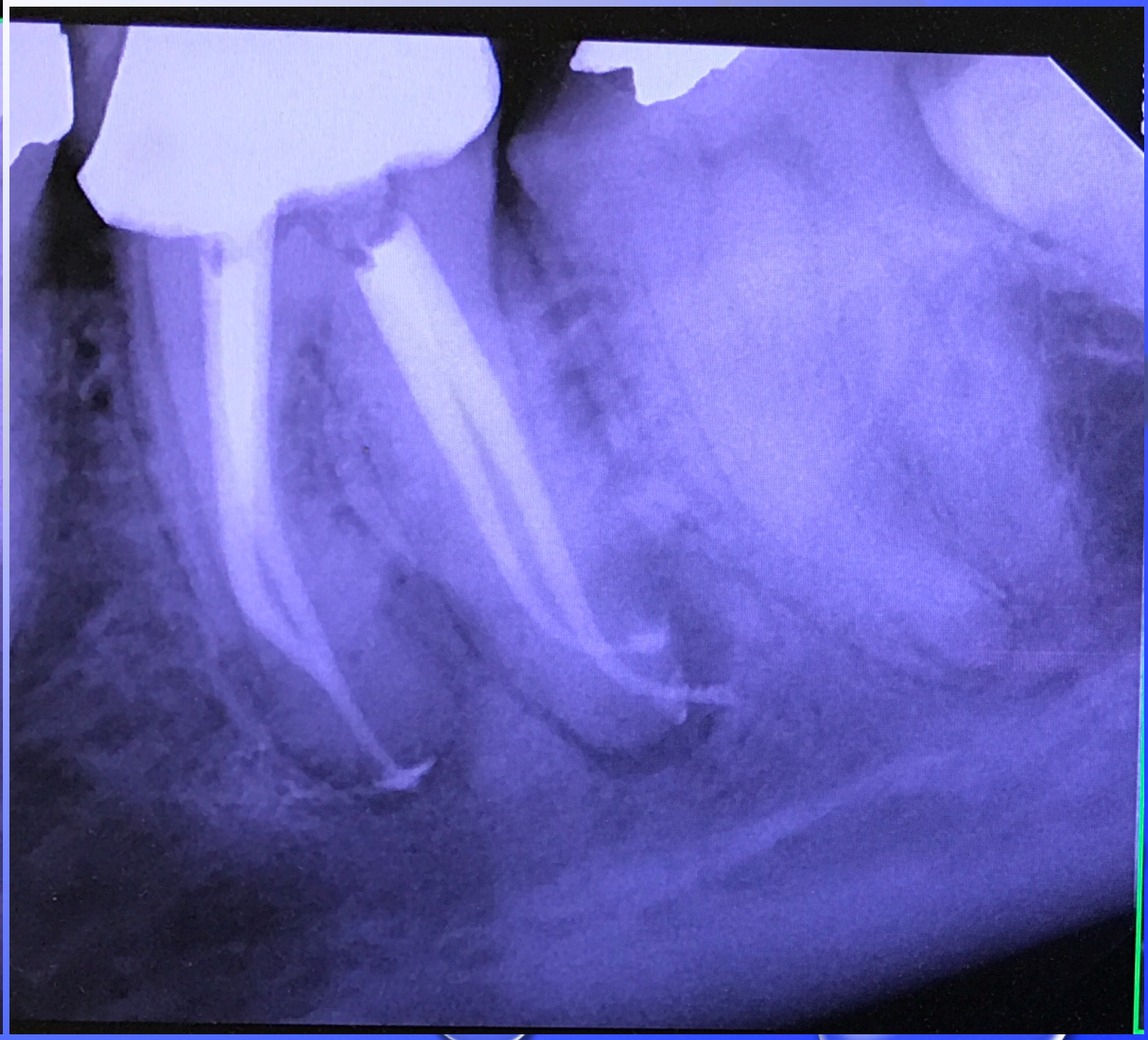
- W1G PRIMARY FILE
- WHY IS IT 0.25 WITH 7% OF TAPER?

WaveOne Gold



WaveOne Gold





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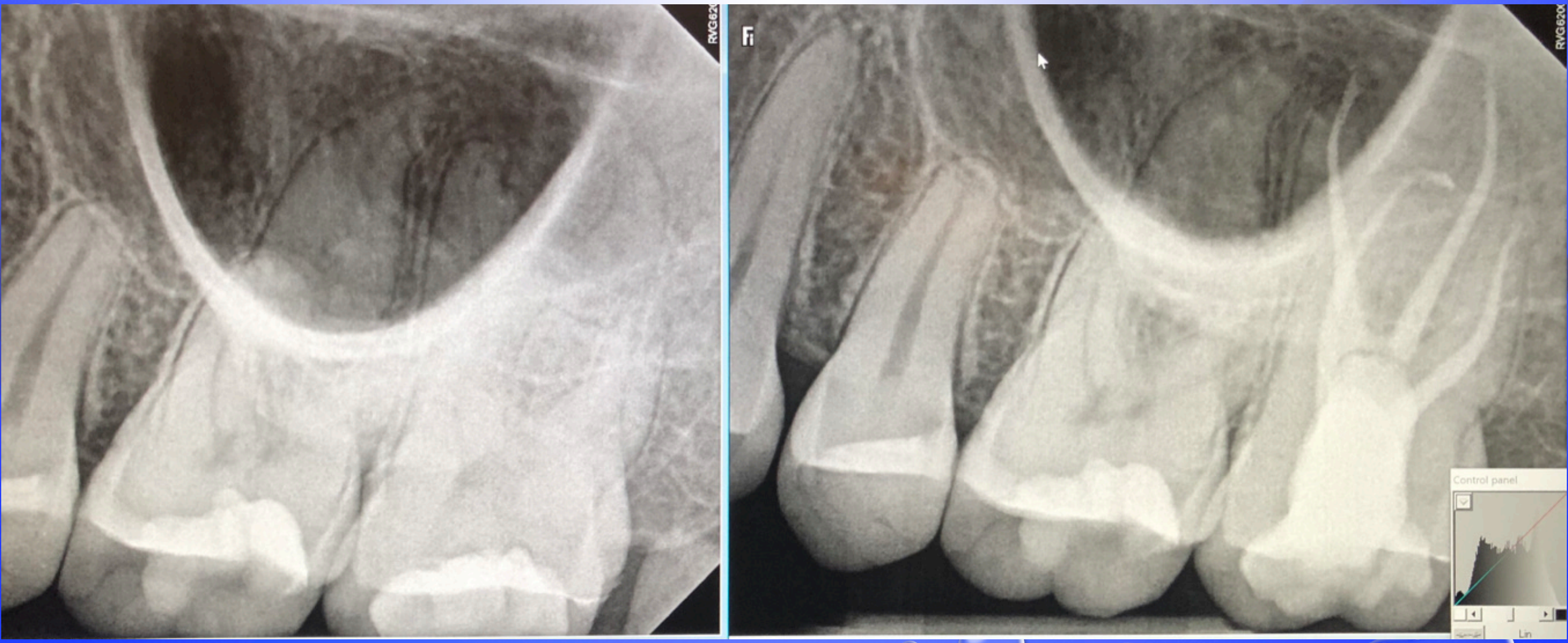
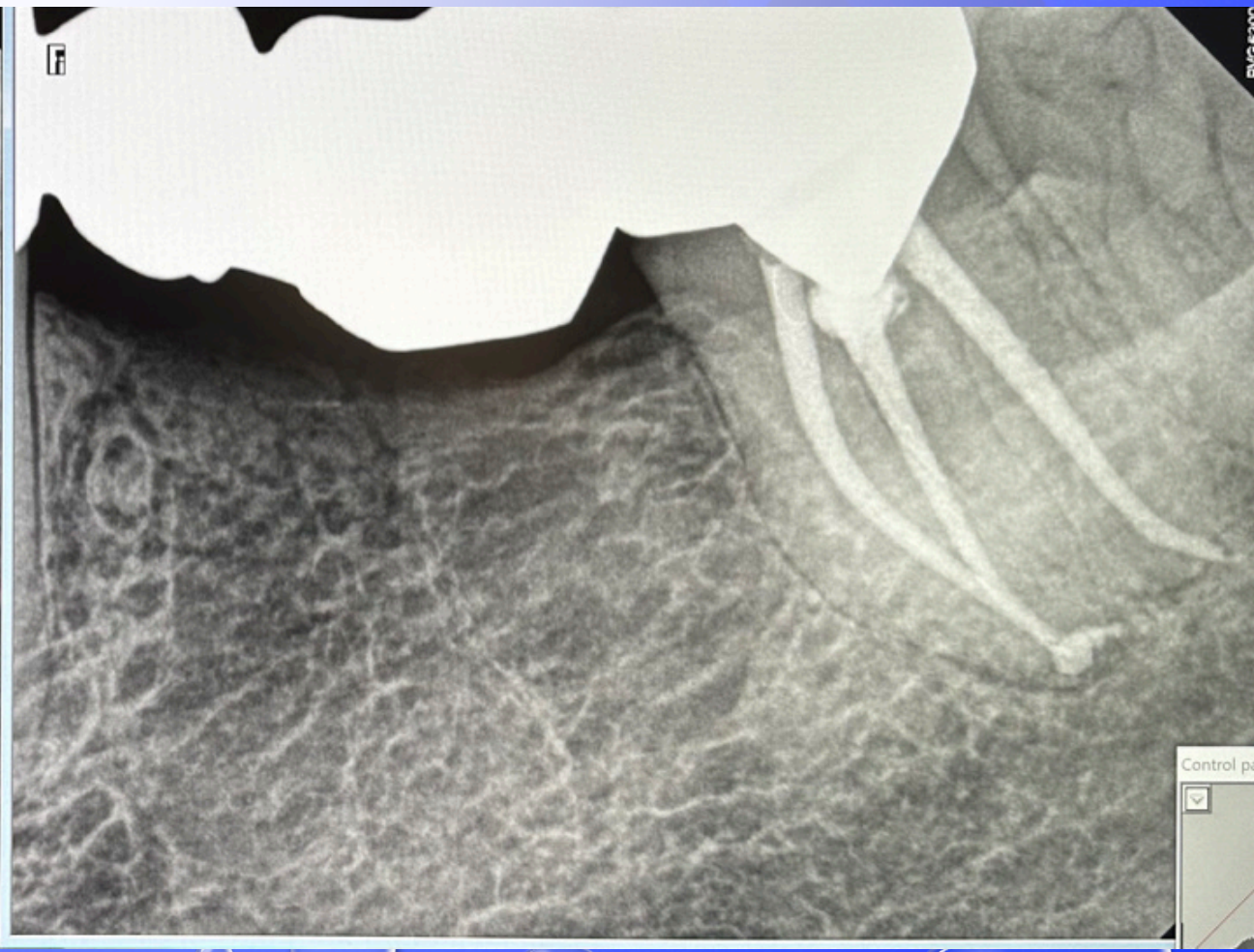
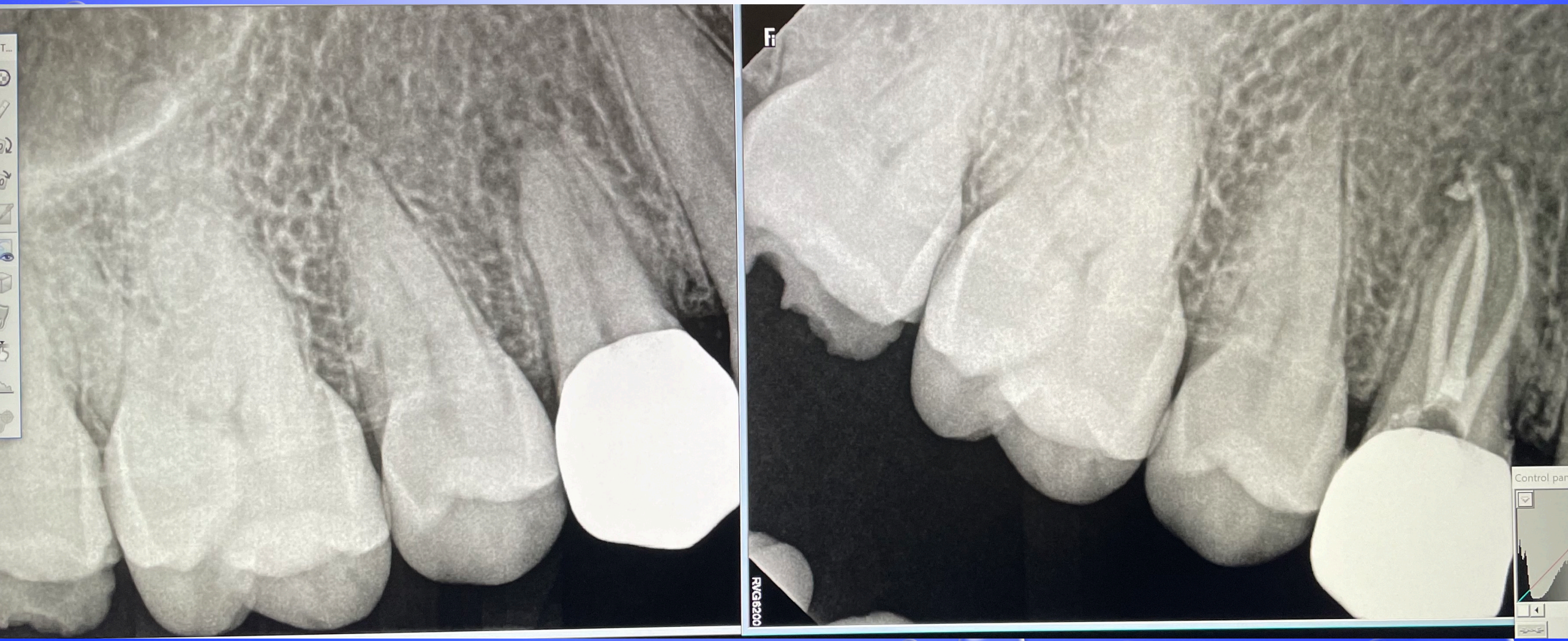


WaveOne Gold

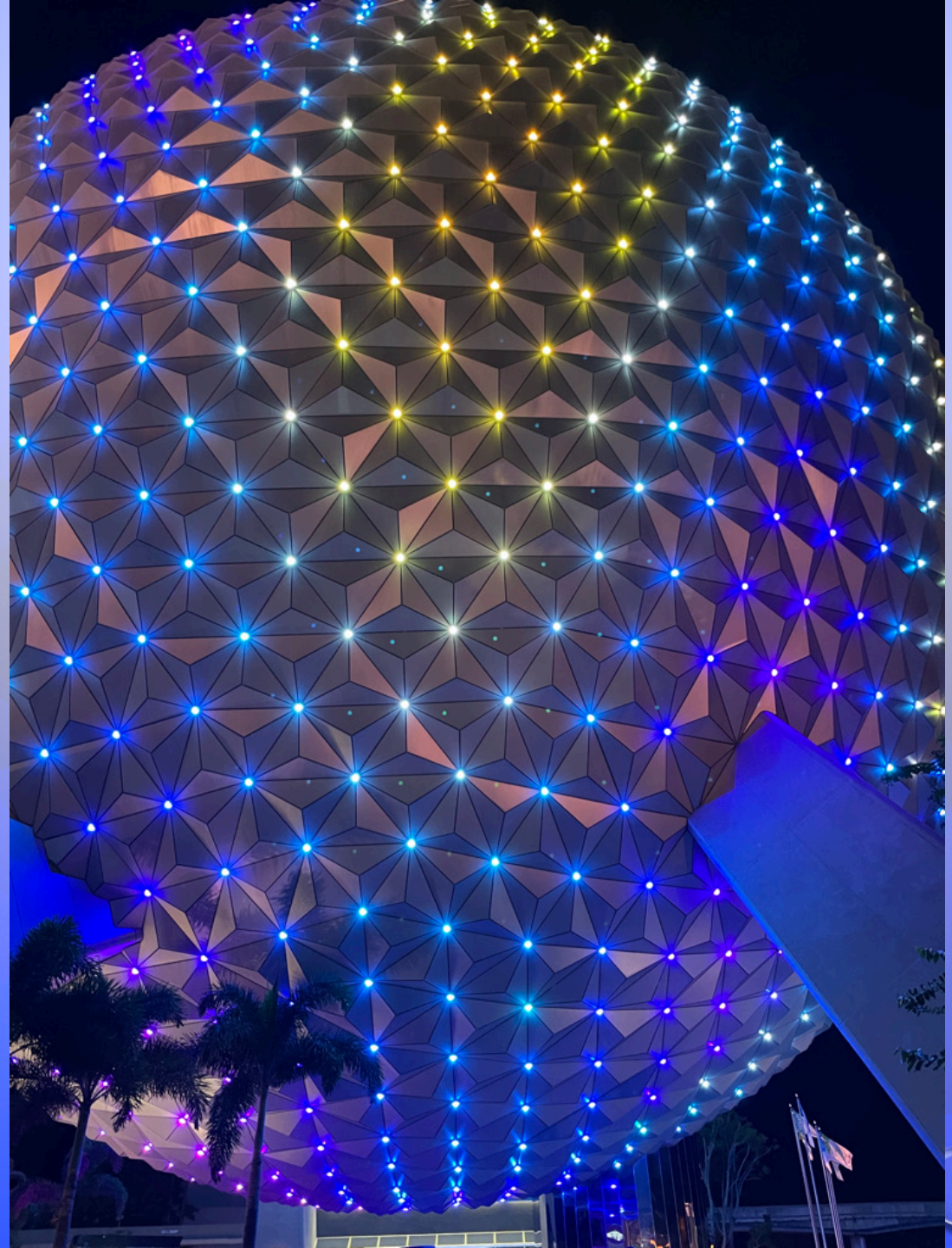


WaveOne Gold

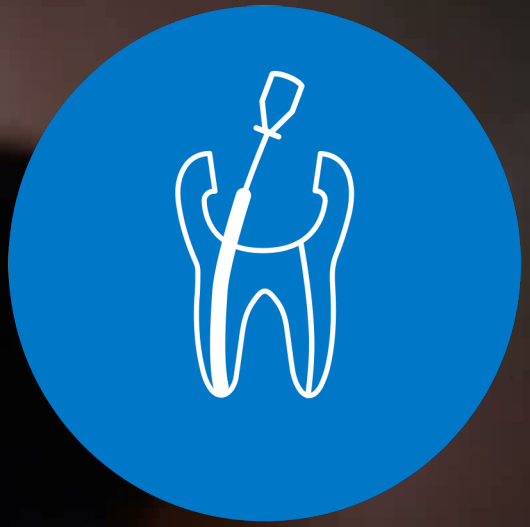


WaveOne Gold

WaveOne Gold



IMPORTANCE OF OBTURATION



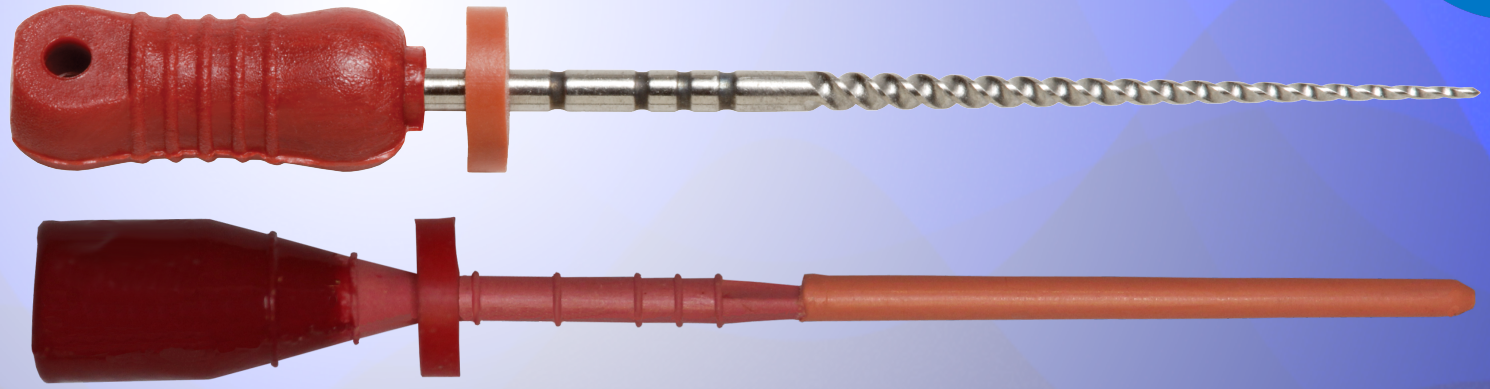
A Well Shaped and Cleaned Canal Must Be Filled as Completely as Possible to Limit the Entrance of Nutrients or Oral Microorganisms.

OBTURATION

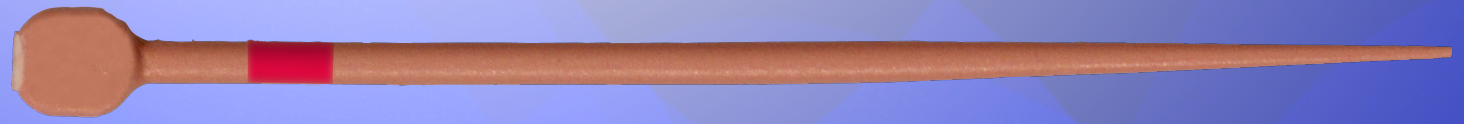
THE **PURPOSE OF OBTURATION** IS TO:

- **3-DIMENSIONALLY FILL** THE CANAL SPACE
- ENCAPSULATE THE VESTIGES OF TISSUE AND BACTERIA THAT REMAIN
- **MINIMIZE APICAL PERCOLATION**
- **CREATE AN OPTIMAL CORONAL SEAL**

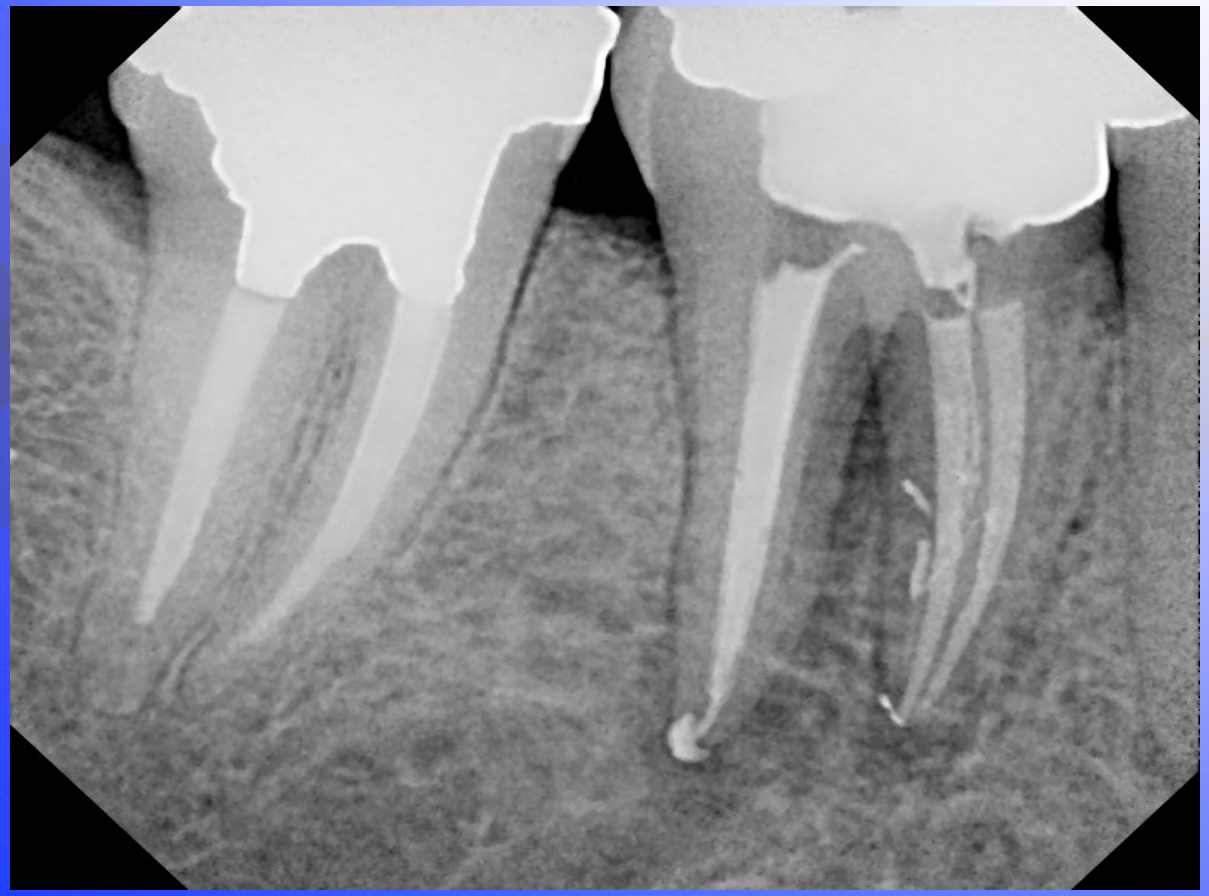
OBTURATION OPTIONS

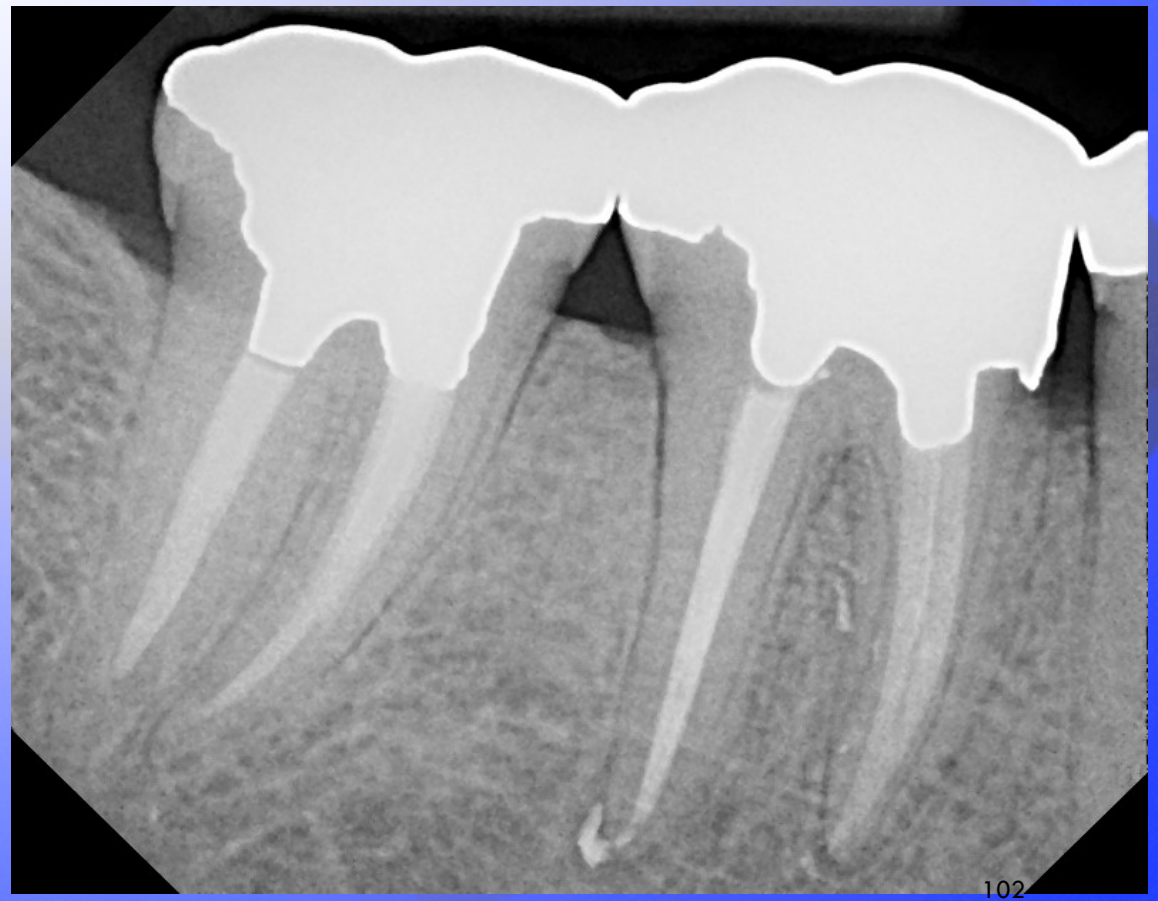


Or



CLINICAL EXAMPLE…OF A "SIMPLE" MOLAR CASE…

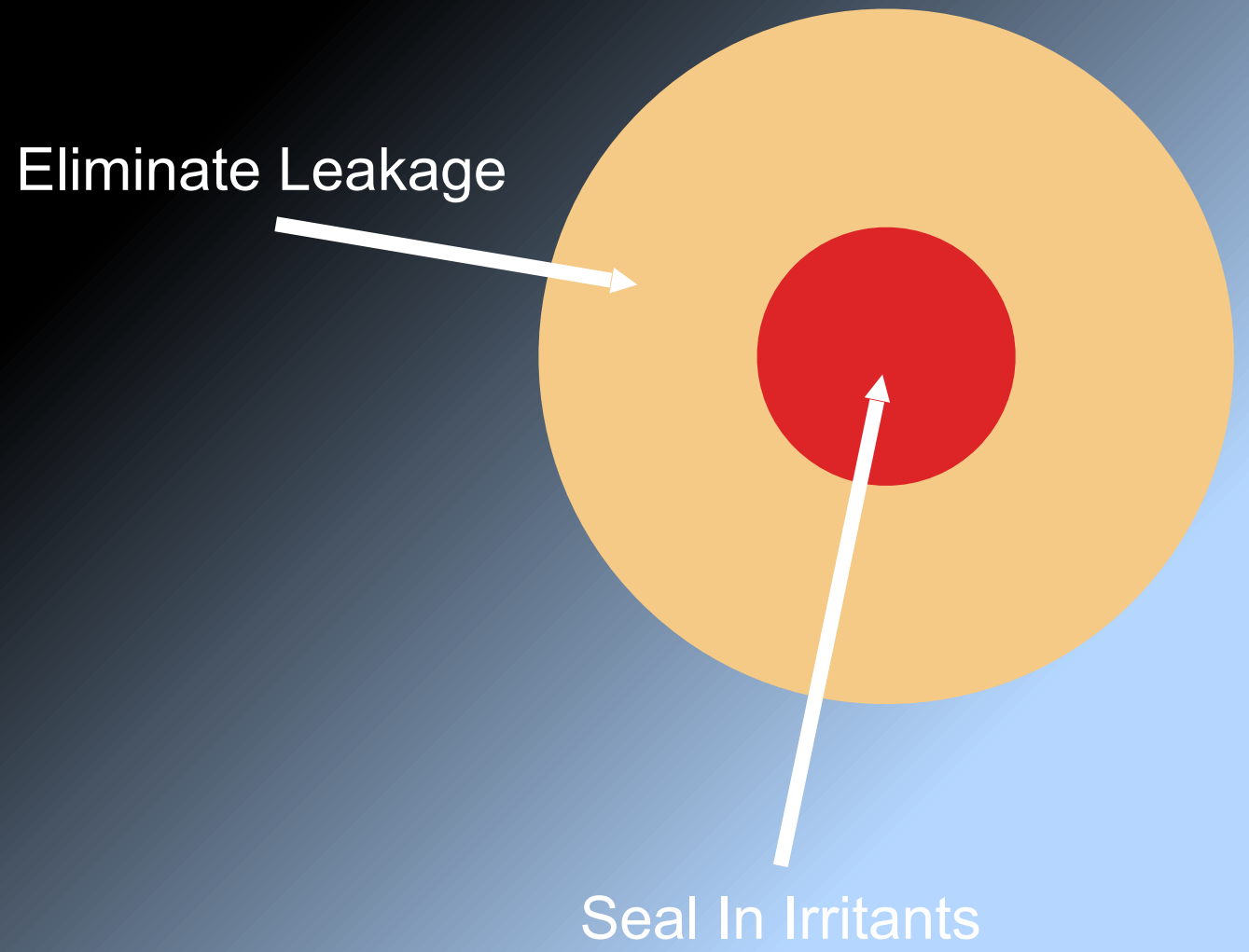




LEARNING OBJECTIVES

- OBTURATION PURPOSE
- SUCCESS FACTORS
- PURPOSE OF SEALER
- TECHNIQUE DIFFERENCES

PURPOSE OF OBTURATION



SUCCESS DEPENDS ON…

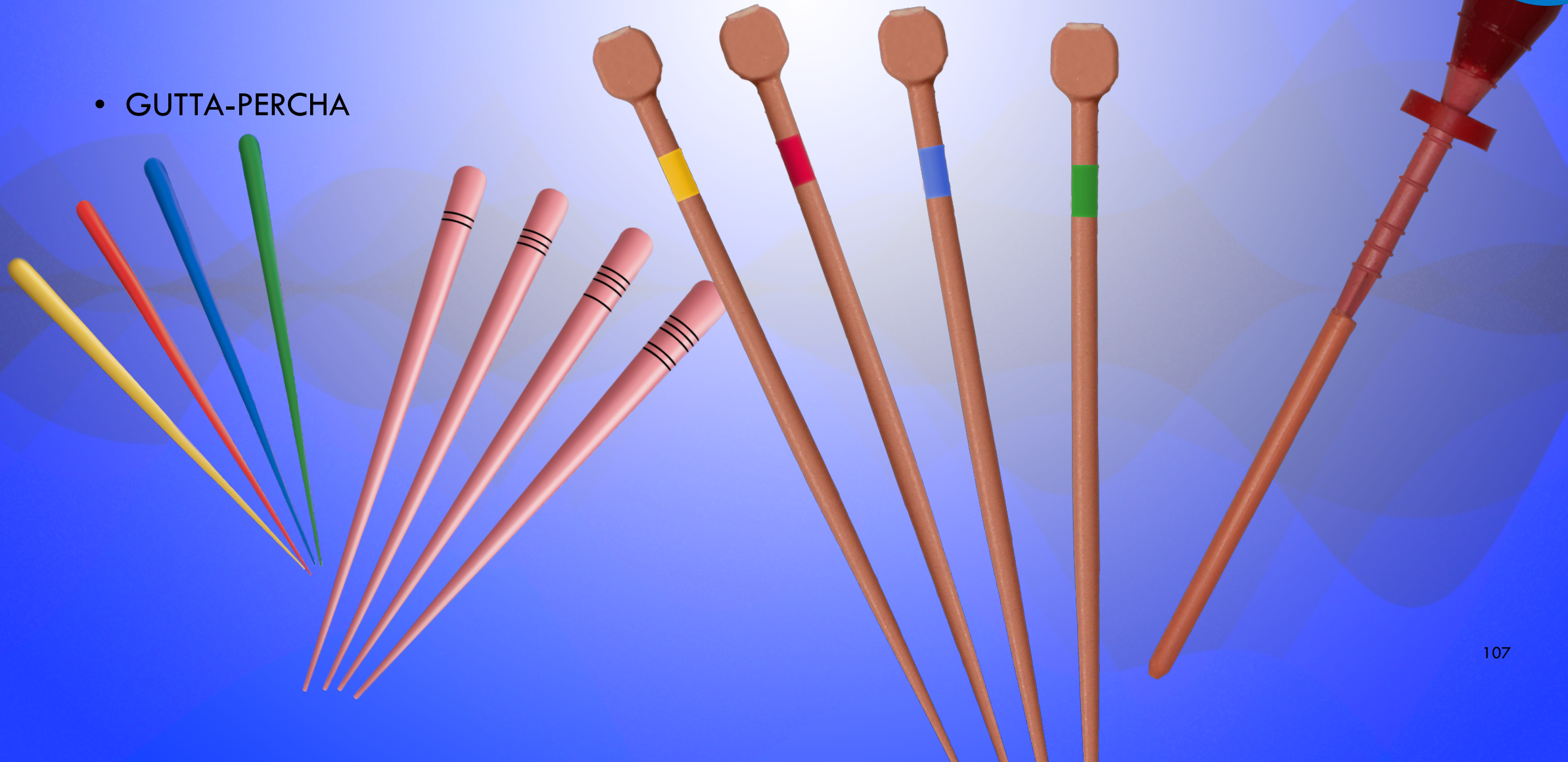
- QUALITY OF SHAPING AND CLEANING
- CLINICIAN'S SKILLS
- MATERIALS
- RADIOGRAPHIC INTERPRETATION
- RESTORATION

CHARACTERISTICS OF AN IDEAL ROOT CANAL FILLING MATERIAL

- GUTTA-PERCHA IS MATERIAL OF CHOICE
- SEALER / CEMENT REQUIRED
- SOME COMPACTION REQUIRED

CONTEMPORARY CORE FILLING MATERIALS

- GUTTA-PERCHA



CONTEMPORARY SEALERS/CEMENTS

ALL ROOT CANAL FILLING TECHNIQUES RESULT IN A TIGHTER ROOT CANAL OBTURATION, IF APPLIED IN CONJUNCTION WITH A SEALER.

PURPOSE OF ROOT CANAL SEALER

THE ROOT CANAL FILLING SHOULD CONSIST OF A (SEMI-) SOLID MATERIAL IN COMBINATION WITH A ROOT CANAL SEALER TO FILL THE VOIDS BETWEEN THE (SEMI-) SOLID MATERIAL AND ROOT CANAL WALL.

CONTEMPORARY SEALERS/CEMENTS

- BIOCOMPATIBLE AND ANTIMICROBIAL

AH Plus® Bioceramic Sealer

A tricalcium silicate-based root canal sealer
It does not contain resin, silicone or other fillers

Free of bismuth oxide
It does not discolor the tooth

High flowability
Allows for control of hydraulics when used with Conform Fit®

A convenient, easy-to-use 3gr syringe
With a 24-gauge cannula that can be placed directly into the canal

Dentsply Sirona

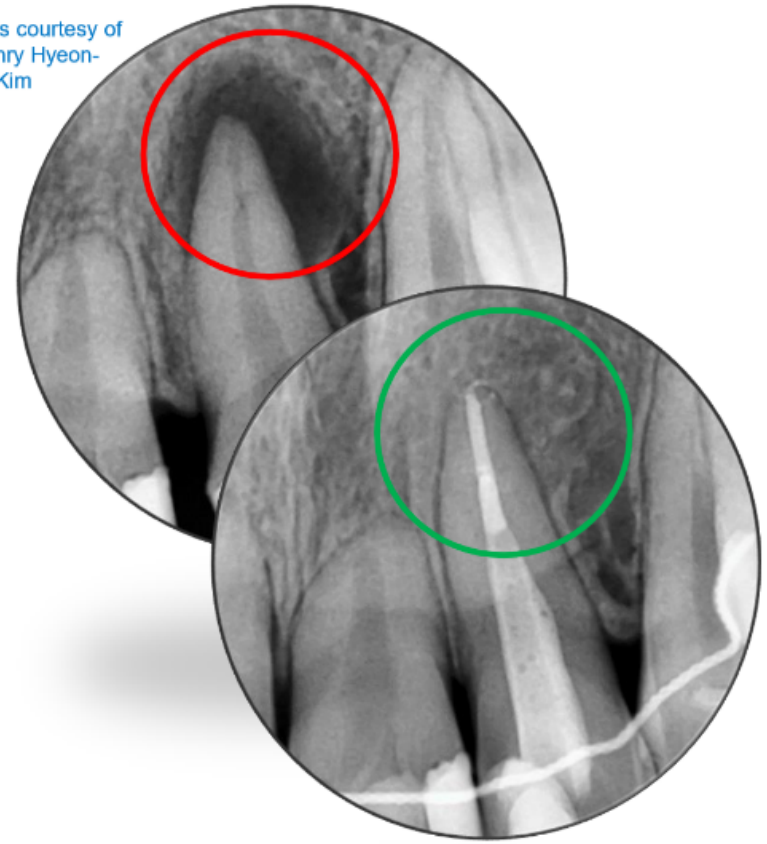
The bioactivity you expect from a bioceramic sealer

…calcium silicate-based sealers are considered to be bioactive materials because they can induce hard tissue formation in both the periodontal ligament (PDL) and bone.[1]

Most research has concluded that calcium silicate sealers show stronger bioactive effects on PDL, osteoblasts, and stem cells than other sealers.[1]

Clinical Insight: AH Plus® Bioceramic Sealer provides the ideal environment for the formation of hydroxyapatite which induces the healing response.

-Images courtesy of Dr. Henry Hyeon-Cheol Kim



AH Plus Bioceramic Sealer promotes hard tissue formation around the infected tooth.

1. Miyoung Lim. *Calcium silicate-based root canal sealers: a literature review*. Restor Dent Endod. 2020 Aug; 45(3):e35

Dentsply Sirona

AH Plus® Bioceramic Sealer

A sealer that predictably sets
60% faster than the EndoSequence BC Sealer

A sealer that is dimensionally stable
Low solubility (0.11%) that does not shrink or resorb after setting

A sealer that is highly radiopaque
25% more radiopaque than the EndoSequence/TotalFill BC Sealer

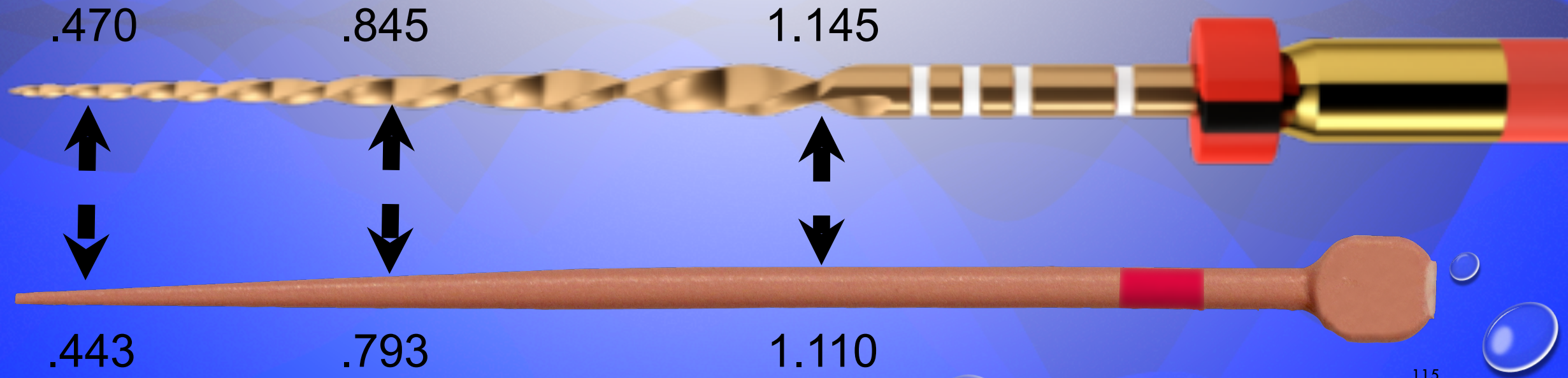
A sealer that is retreatable
Can be easily removed using a standard retreatment protocol

Dentsply Sirona

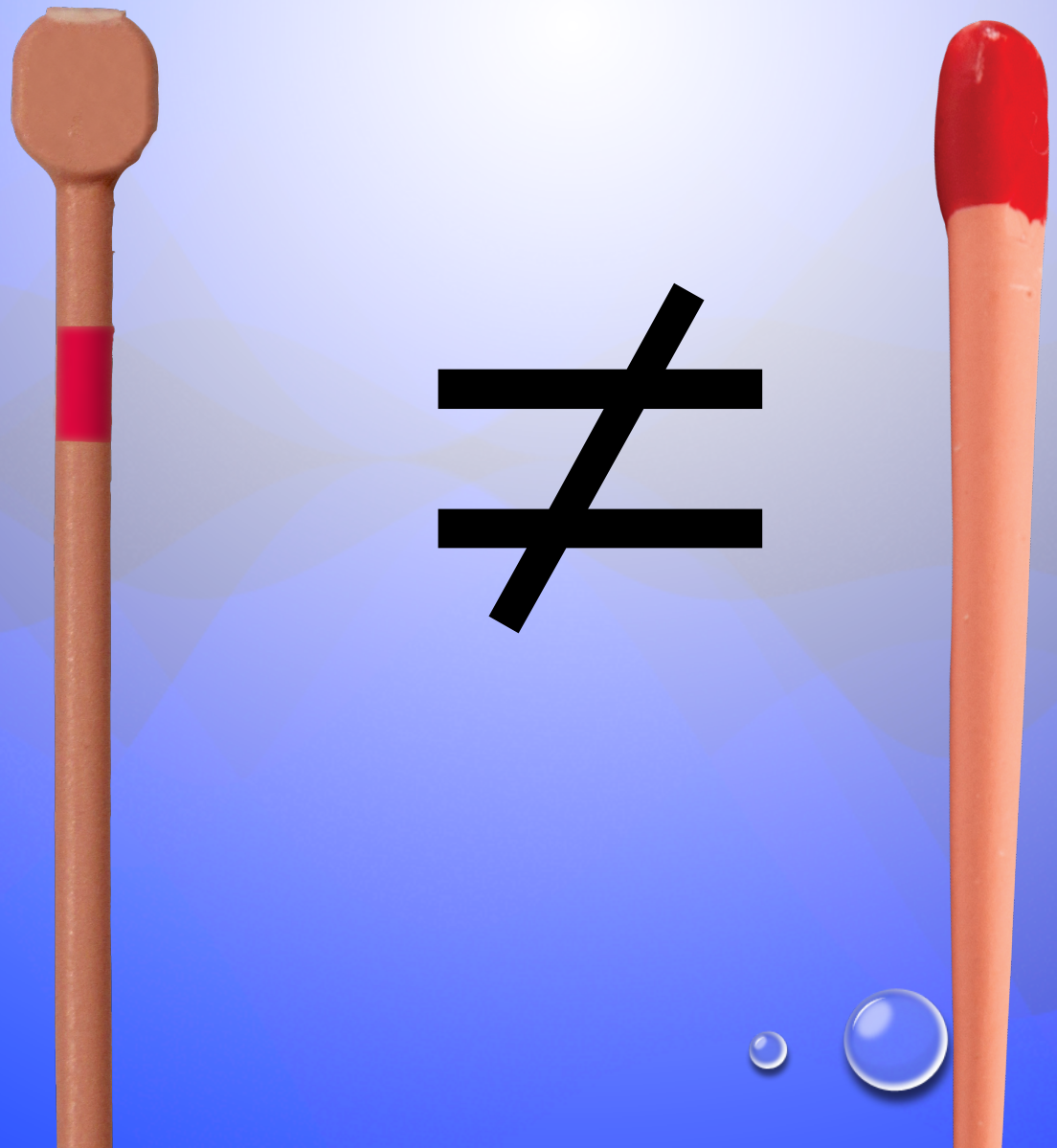
BEST WAY TO FILL IRREGULARITIES?

WAVEONE GOLD AND MATCHING GUTTA-PERCHA

Select Based on MAF Used



ALL GUTTA-PERCHA CONES ARE NOT THE SAME

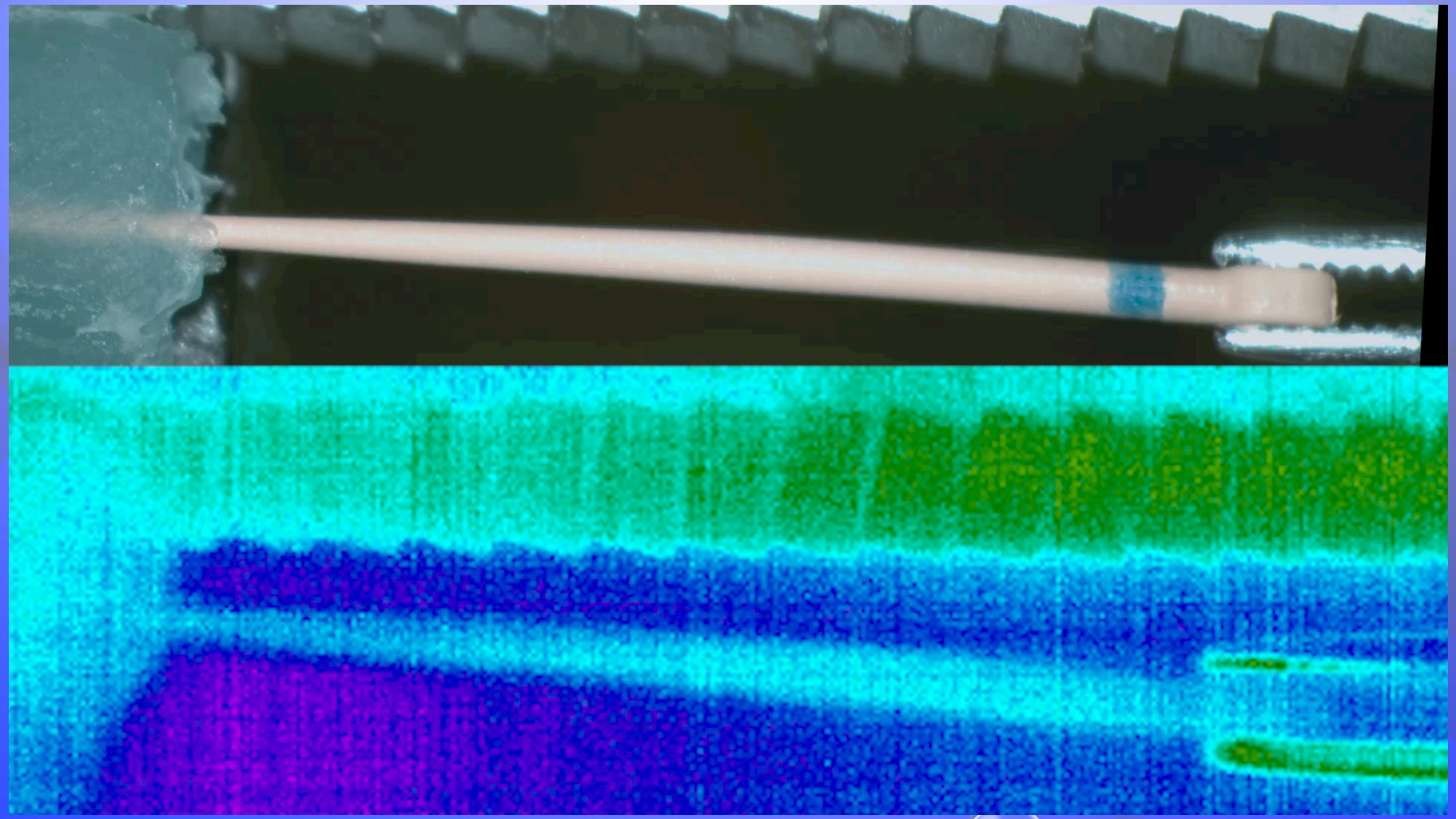


≠

MATCHING GUTTA-PERCHA

- Micronized Formula
- Heat Transfer to 4mm
- Sized to Match Files

DENTSPLY SIRONA MICRONIZED GP THERMAL PROFILE



CONFORM FIT GUTTA-PERCHA

- Micronized Formula
- Heat Transfer to 4mm
- Cones Sized to Match Files

CONFORM FIT GUTTA-PERCHA THERMAL PROFILE

THE PACK HANDPIECE

Annealed stainless steel electric heat pluggers

360° Activation cuff

Audible tone sounds when tip is activated

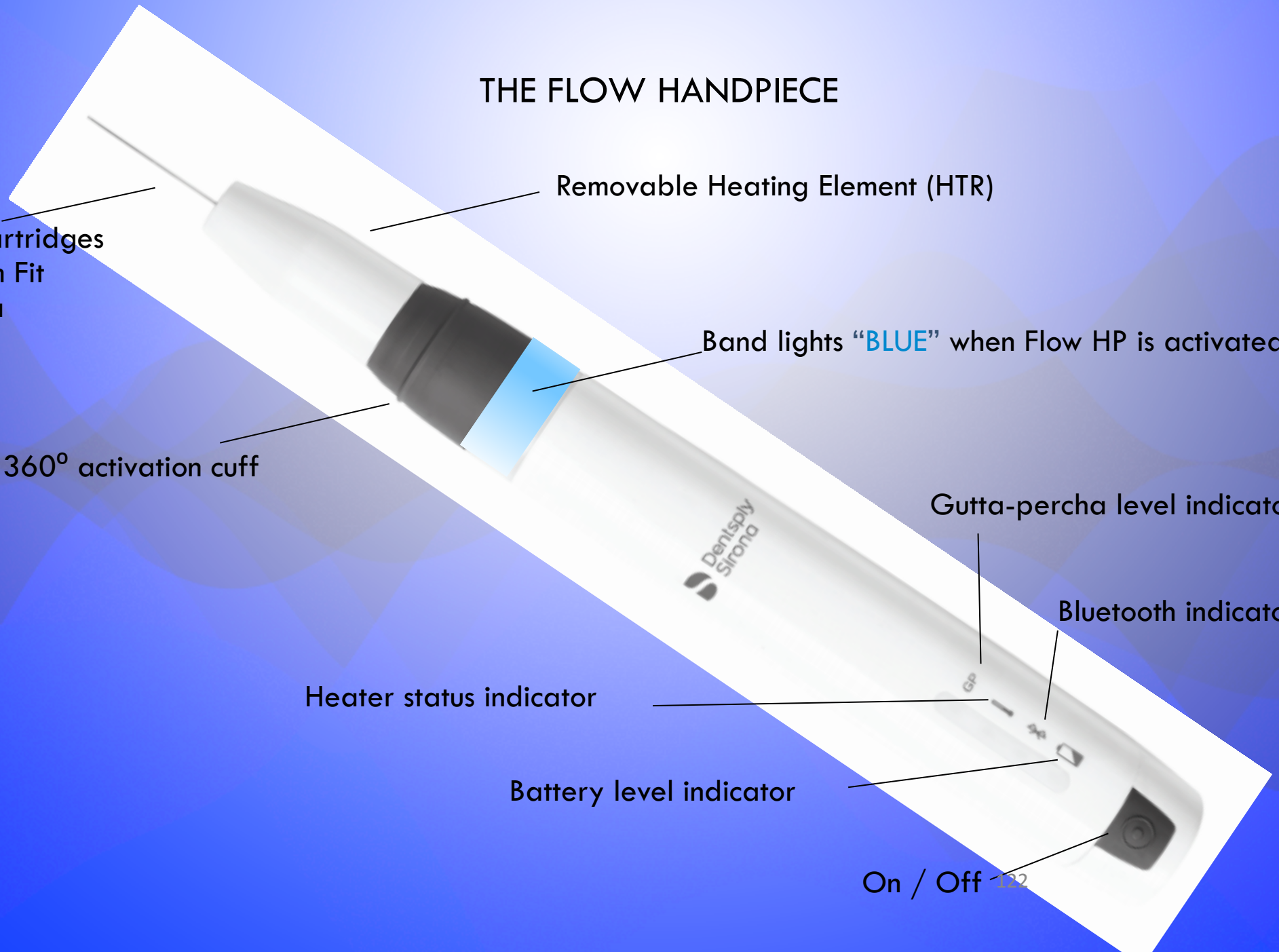
Band lights "BLUE" when Pack HP is activated

Battery level

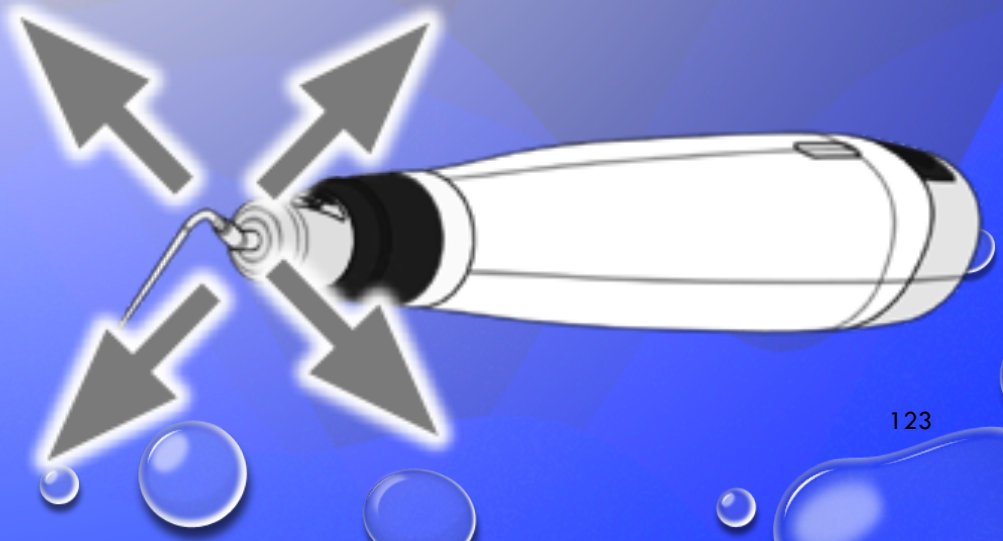
Bluetooth indicator

On / Off

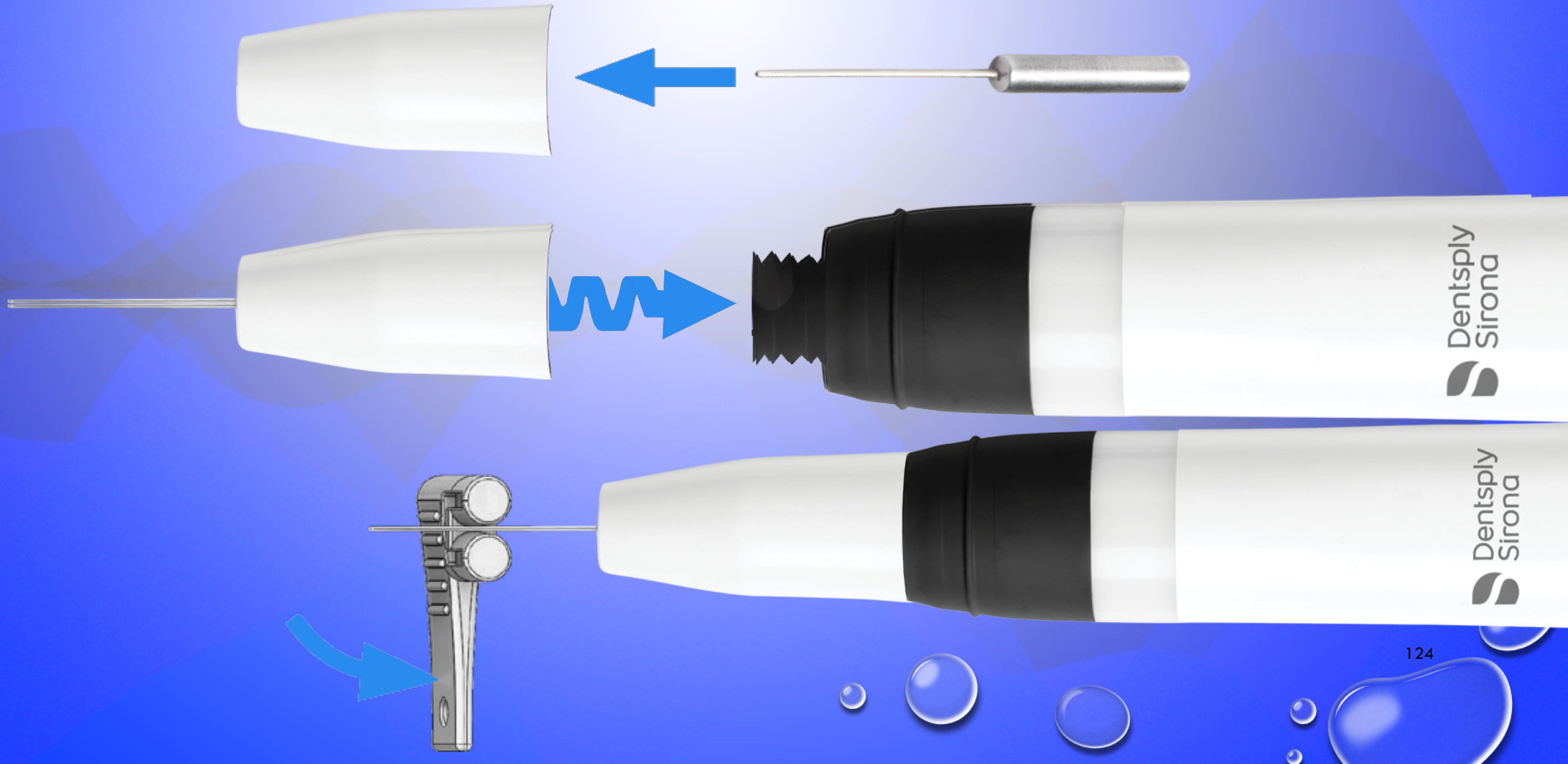
THE FLOW HANDPIECE



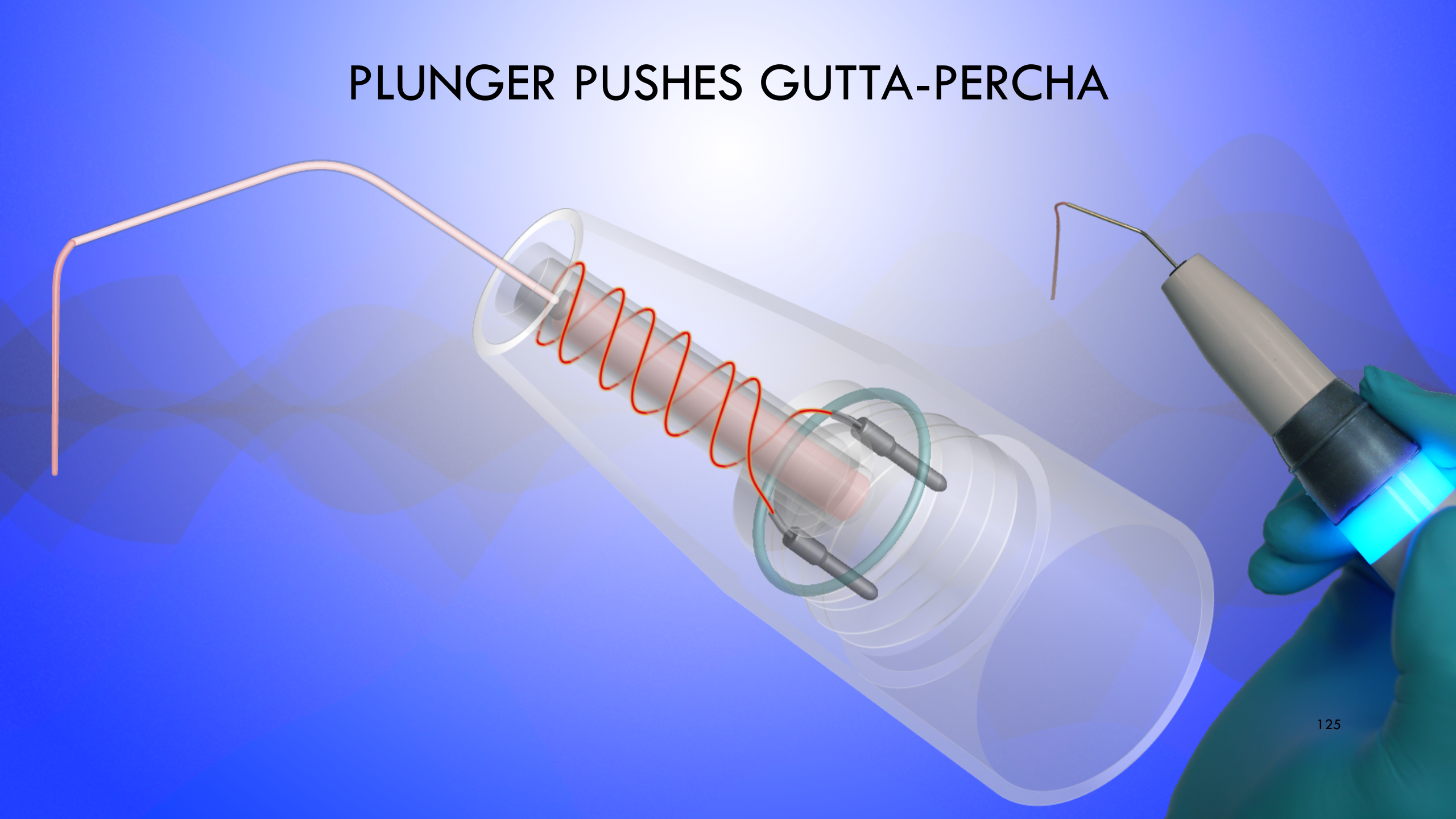
ATTACHING HEAT PLUGGER TO PACK



INSERTING GP CANNULA AND ATTACHING HEATER



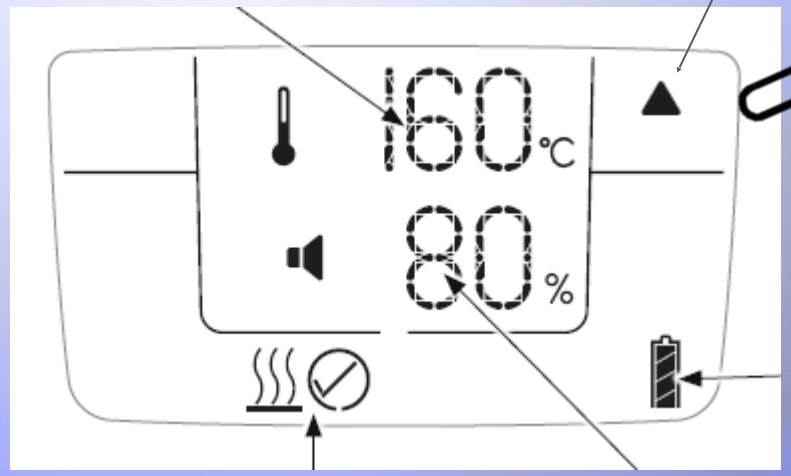
PLUNGER PUSHES GUTTA-PERCHA



BASE STATION TOUCH SCREEN

Touch to adjust temperature

Indicates which handpiece is currently active on display



Battery Level

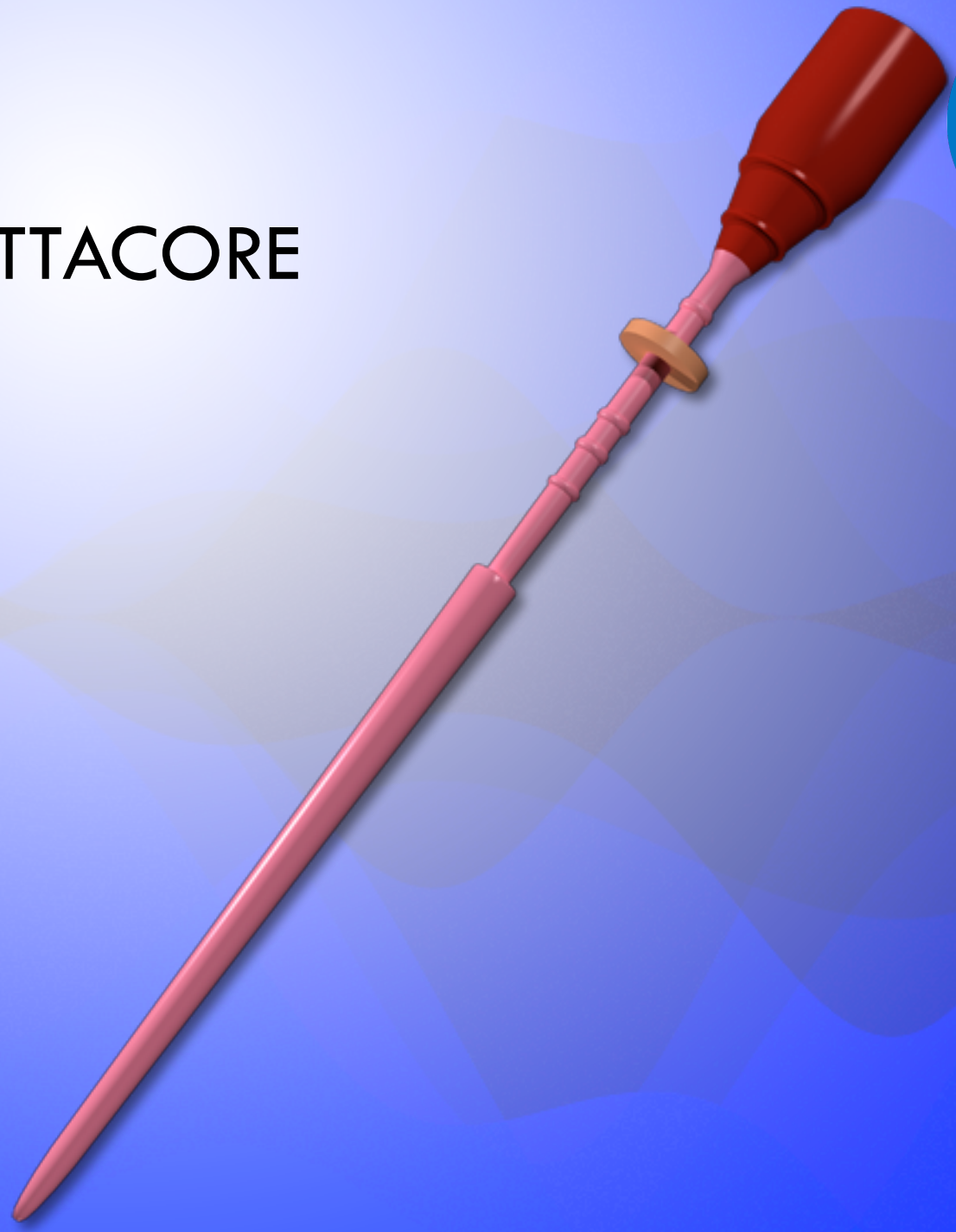
Indicates if EHP (Pack)
or HTR (Flow)
is installed and working properly

Touch to adjust volume (Pack)
Touch to adjust GP flow rate (Flow)

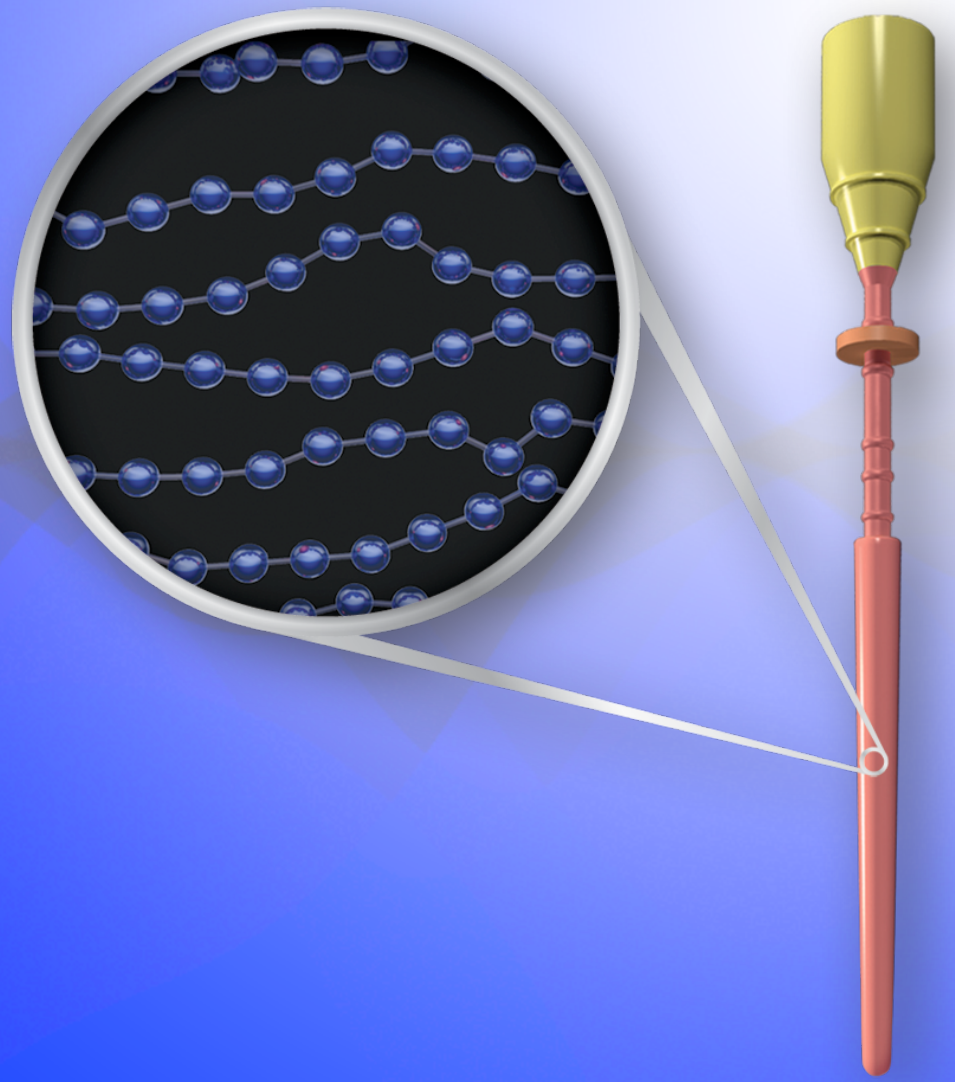
- Either handpiece can be placed in either side of the base station and automatically recognized

GUTTACORE

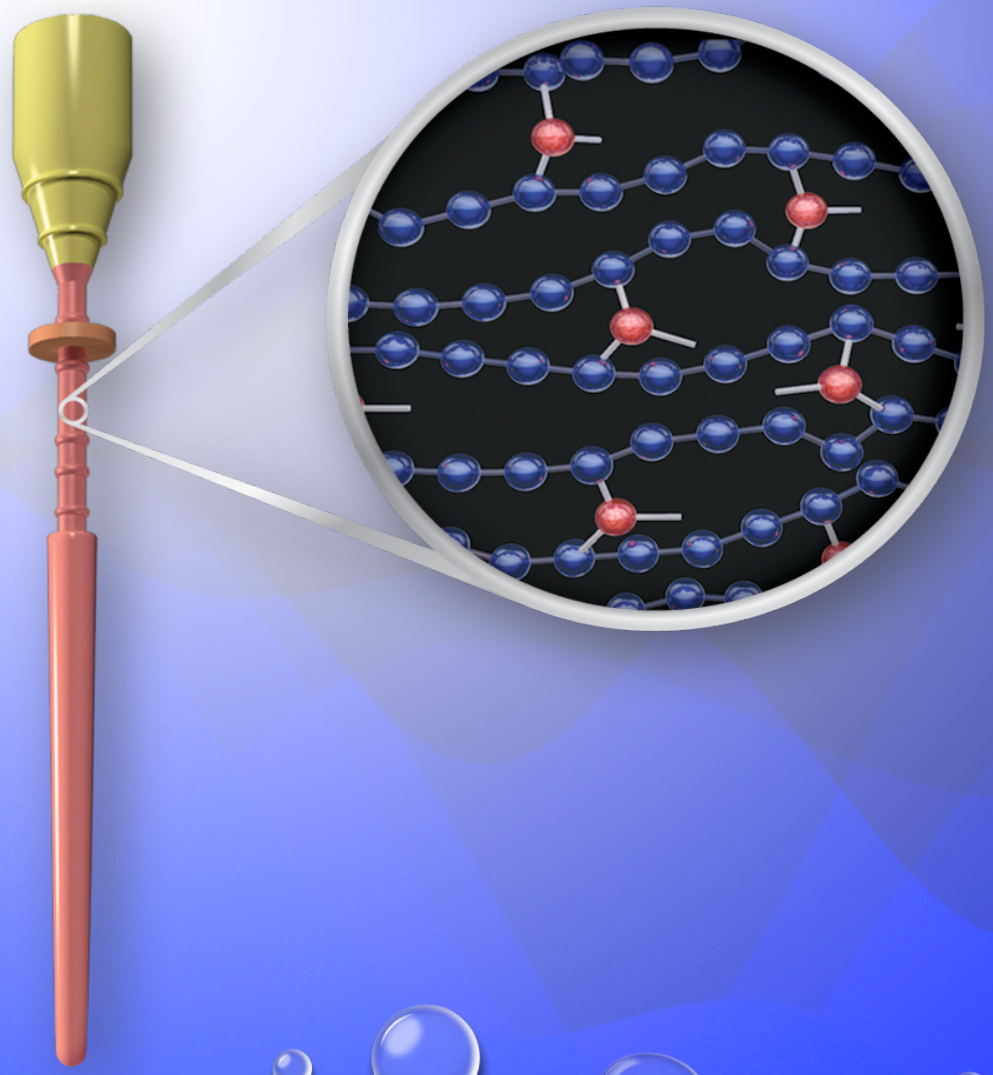
- TRANSFORMED GUTTA-PERCHA
  - CENTRALLY CONDENSED
  - FLOWABLE TO APEX
  - REMOVES WITH EASE



GUTTACORE CROSSLINKING

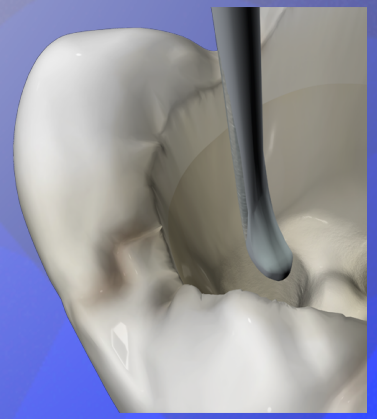


GUTTACORE CROSSLINKING



TECHNIQUE KEYS

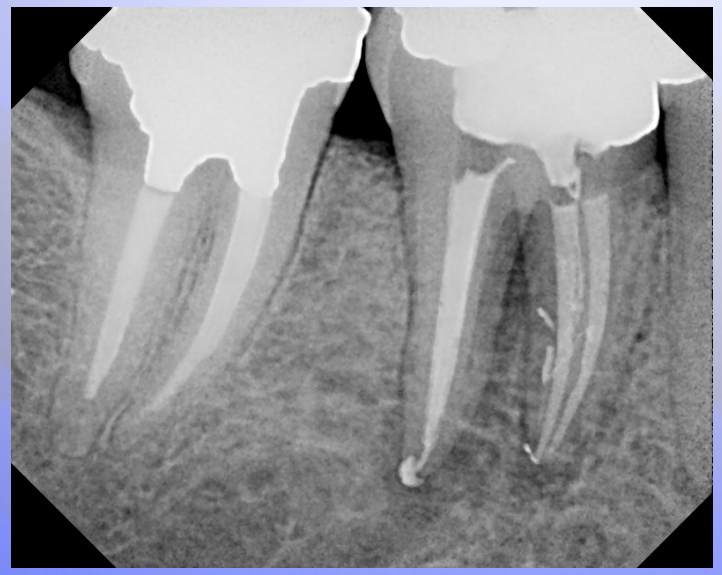
- COMPLETE CLEANING, SHAPING, AND DISINFECTION
- USE SIZE VERIFIER – MUST ROTATE FREELY
- **DRY CANALS**
- SELECT OBTURATOR TO MATCH VERIFIER
- MINIMAL SEALER PLACED TO WORKING LENGTH

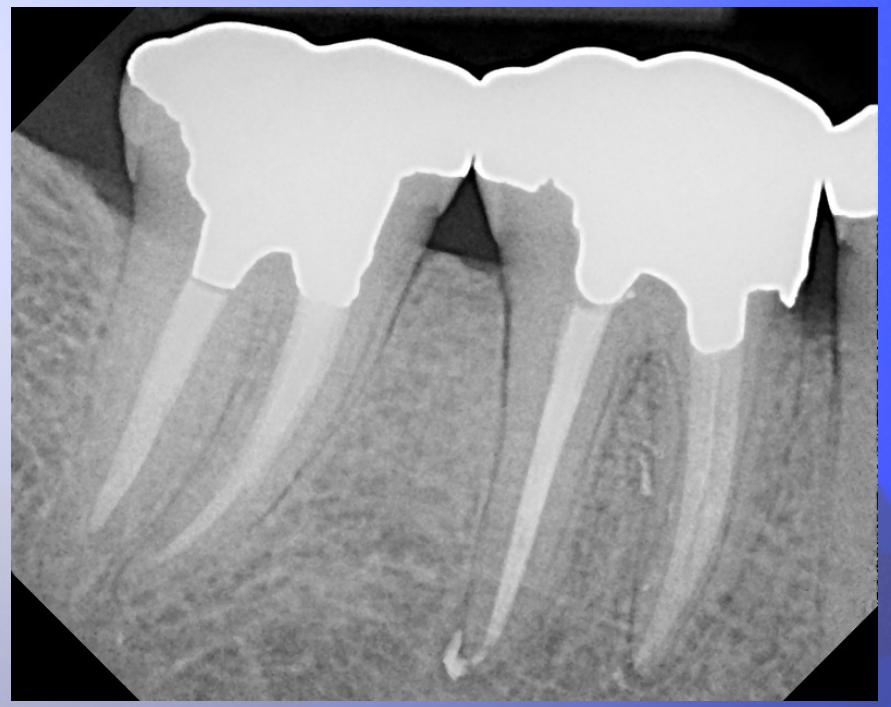


- Simple example of a clinical outcome…

Pre-tx

Post op



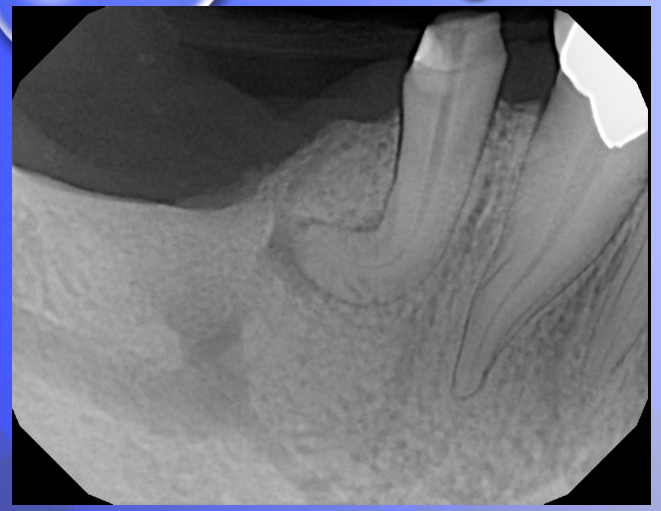


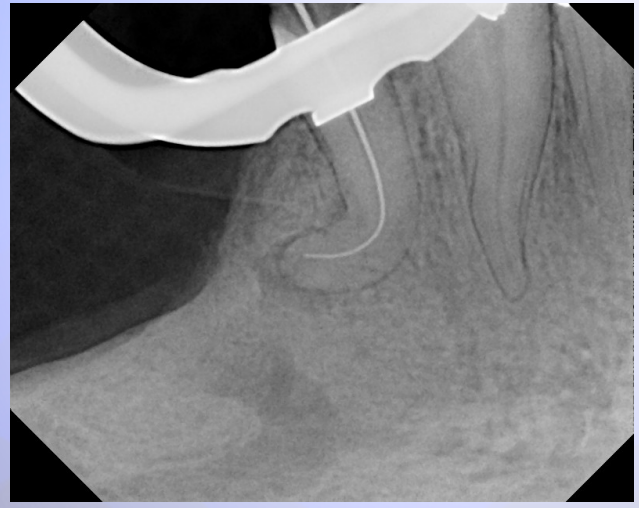
Six months later

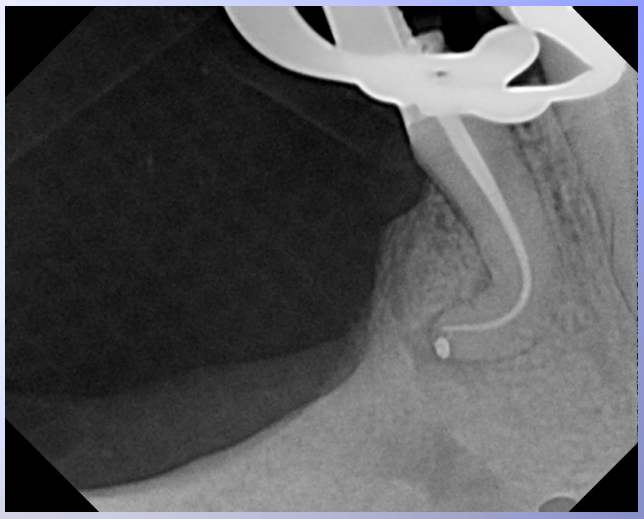
Courtesy: Dr. Michael Nimmich

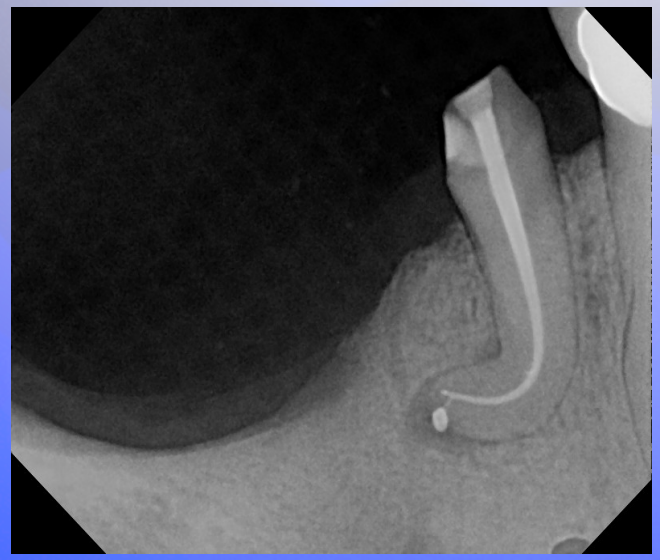
A MORE DIFFICULT CLINICAL EXAMPLE…

Courtesy: Dr. Michael Nimmich







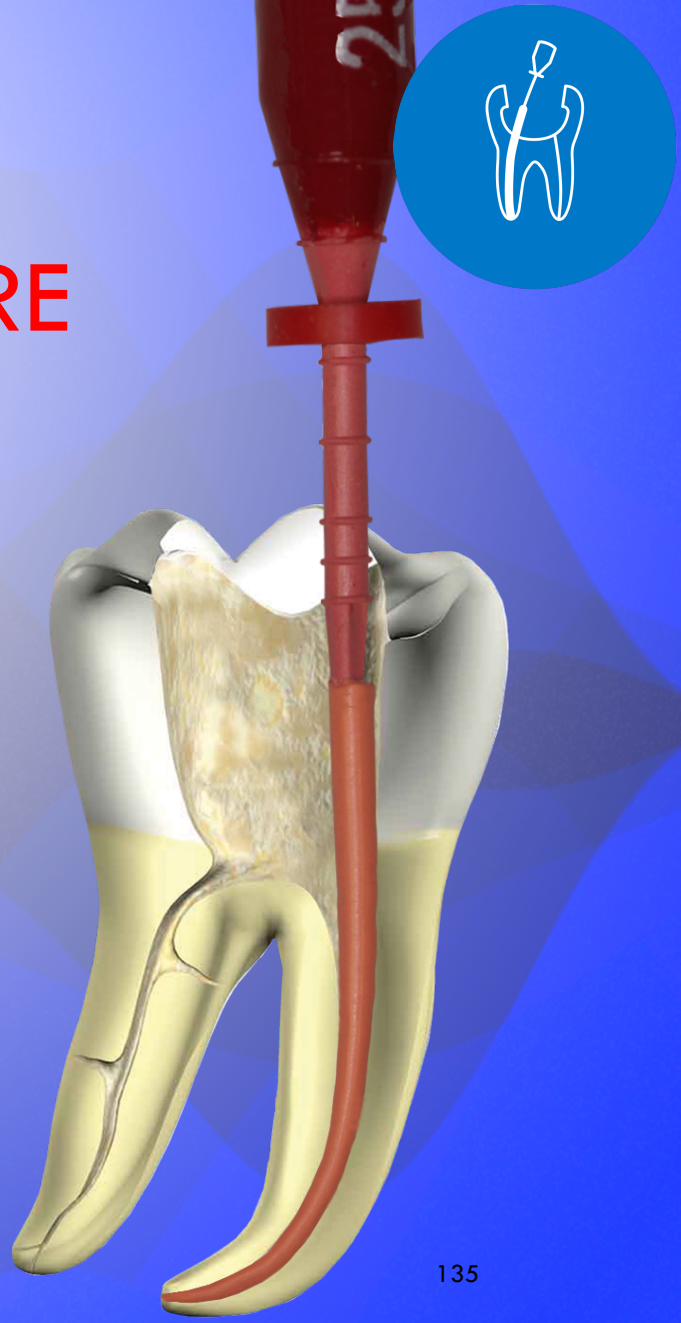


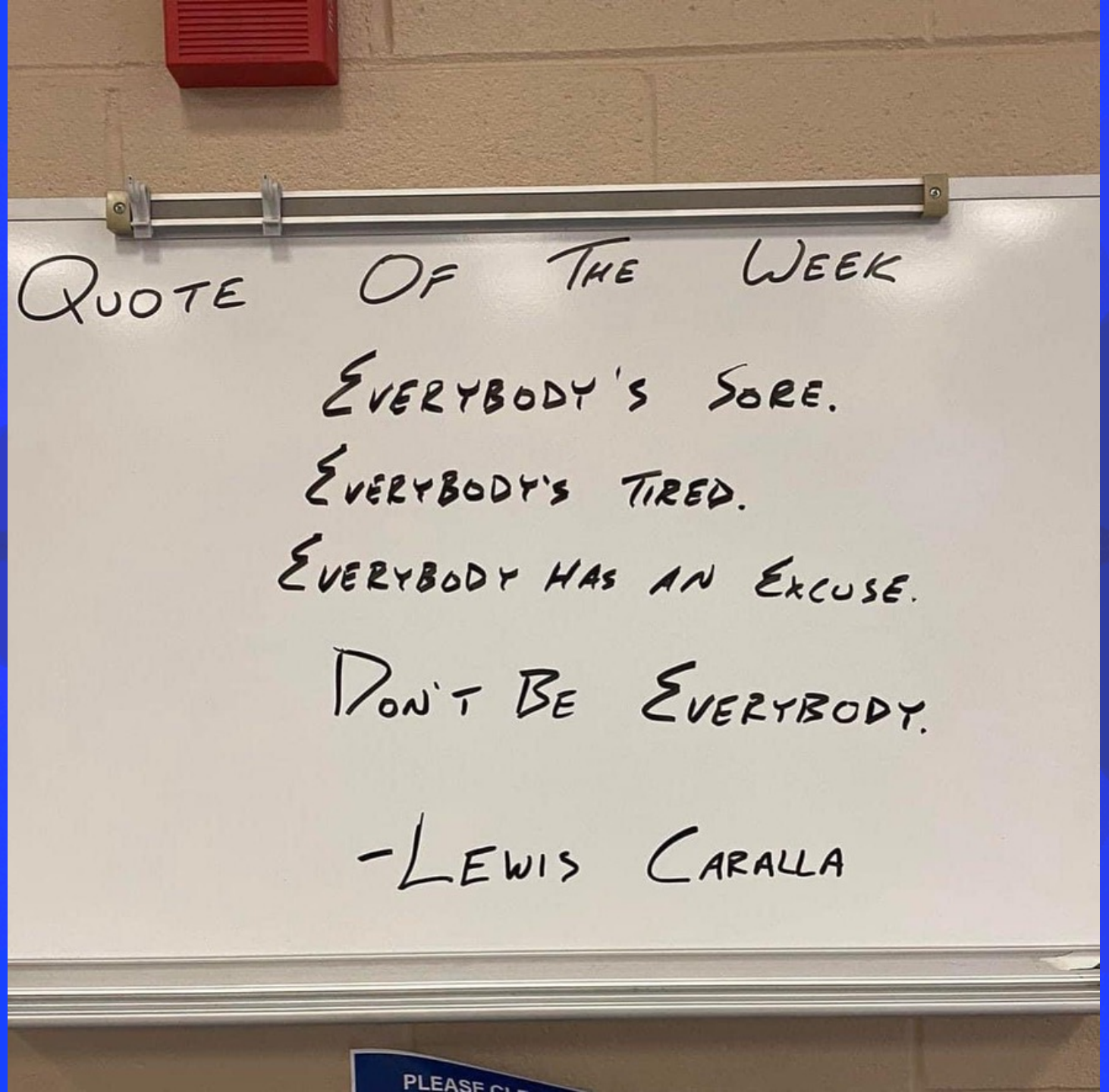
How would you obturate?

Courtesy: Dr. Michael Nimmich

KEY LEARNINGS - GUTTACORE

- ***EXTERIOR – WARM FLOWABLE GP***
- ***INTERIOR – SOLIDIFIED GP***
- ***LIGHT COAT OF SEALER ACTS AS LUBRICANT***
- ***EASY POST SPACE CREATION / RETREATABILITY***
- ***ALWAYS USE SIZE VERIFIER – PASSIVE ROTATION***
- ***ALWAYS SEAL CORONAL REGION***




QUOTE OF THE WEEK
EVERYBODY'S SORE.
EVERYBODY'S TIRED.
EVERYBODY HAS AN EXCUSE.
DON'T BE EVERYBODY.
-LEWIS CARALLA

Thank you for listening and sharing your time with me. Good luck on your next endodontic case!

ENDODONTIC
ASSOCIATES OF BELLAIRE

Joseph A. Bernier, DDS
josephbernier@yahoo.com