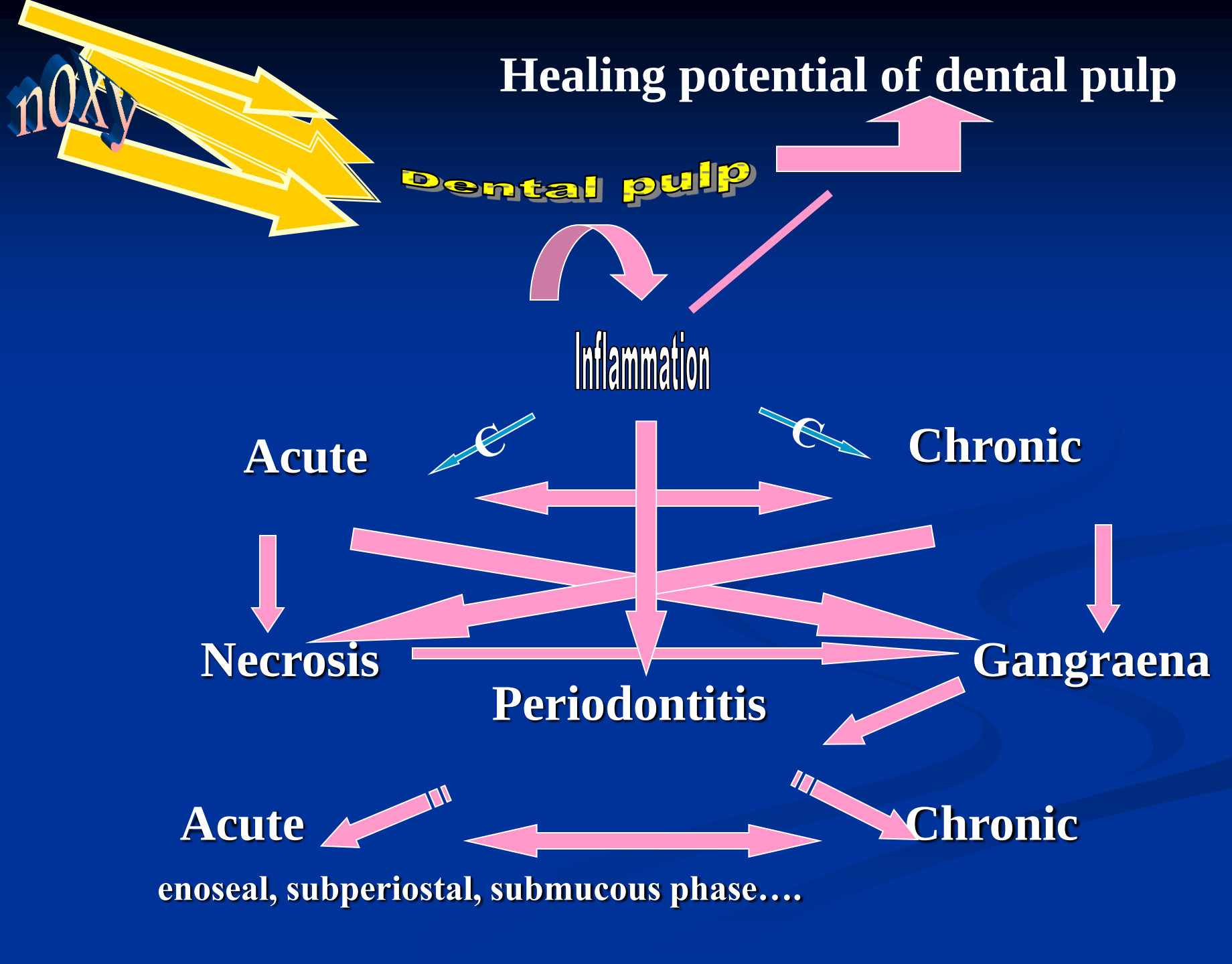
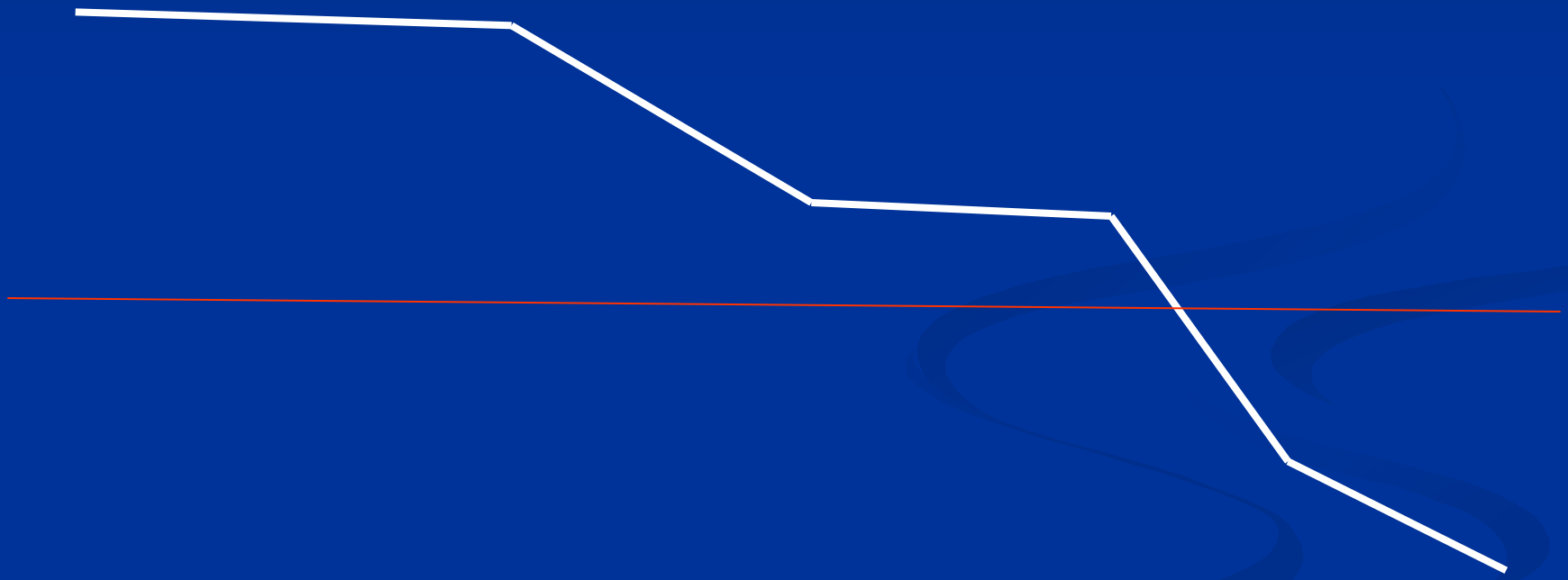
# *Endodontics II. 1*

# Healing potential of dental pulp



# Cummulative trauma of dental pulp



# Diagnosis

- **History**

**Presenting complaint**

**Medical history**

**Dental history**

**Pain history**

***Location***

***Type and intensity of pain***

***Duration***

***Stimulus***

***Relief (analgetics, antibiotics, sipping cold drinks)***

# Diagnosis

Clinical examination

Extraoral (swelling, redness, extraoral sinuses, lymph nodes, degree of mouth opening)

Intraoral examination

Swelling, redness,palpation, percussion, sinus tract examination, teeth mobility,pockets

# Diagnosis

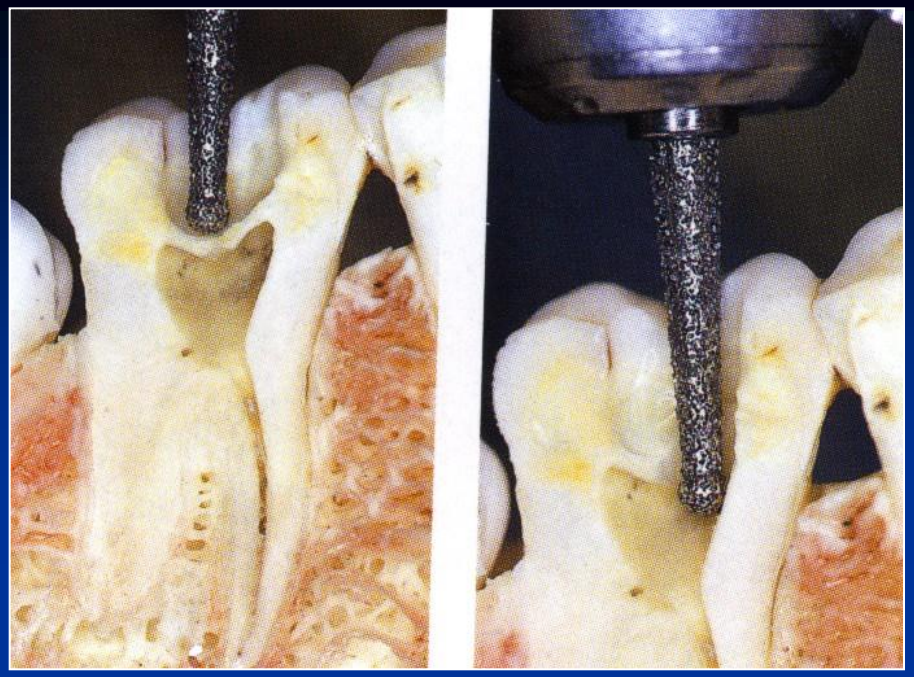
**Clinical examination**

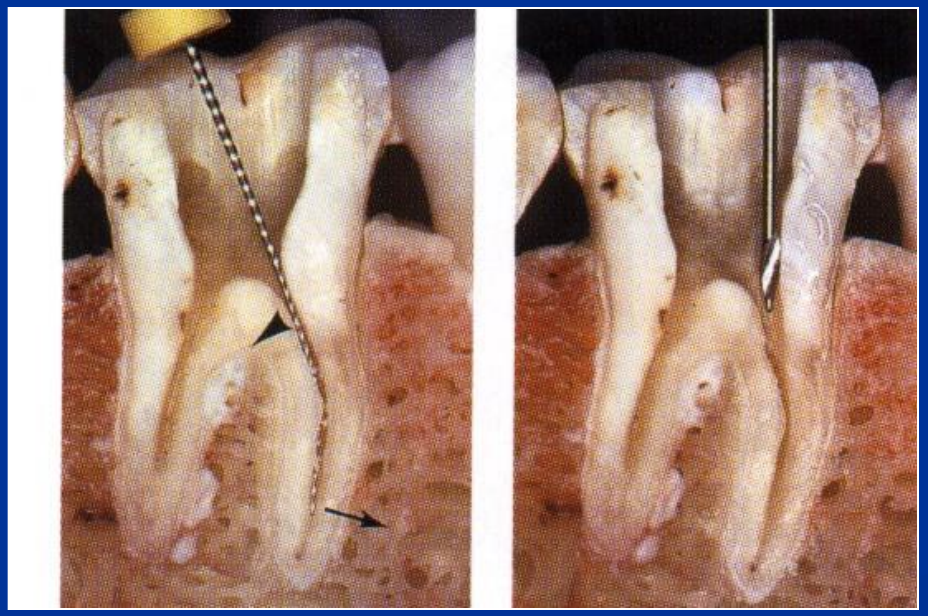
**Pulp sensitivity tests, radiographic examination, transillumination.**

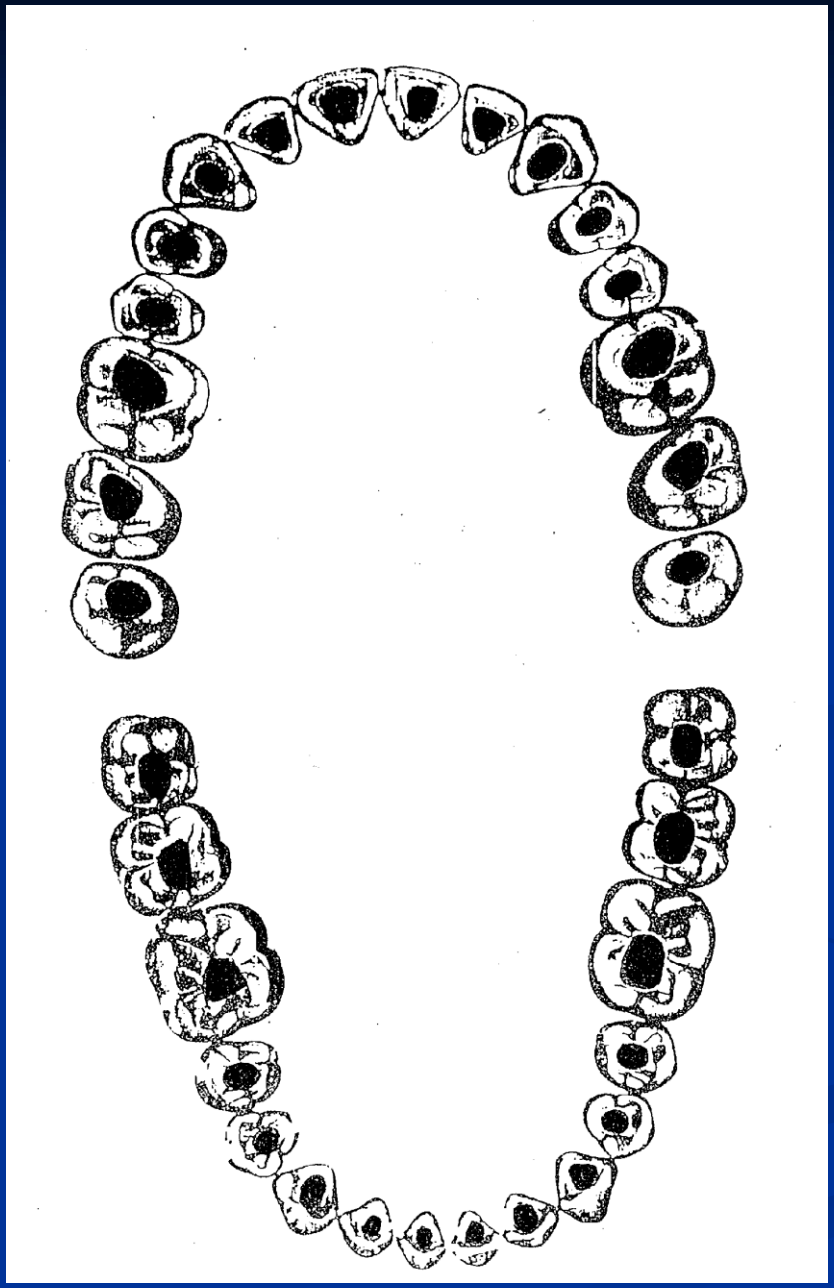
# Phases of the endodontic treatment

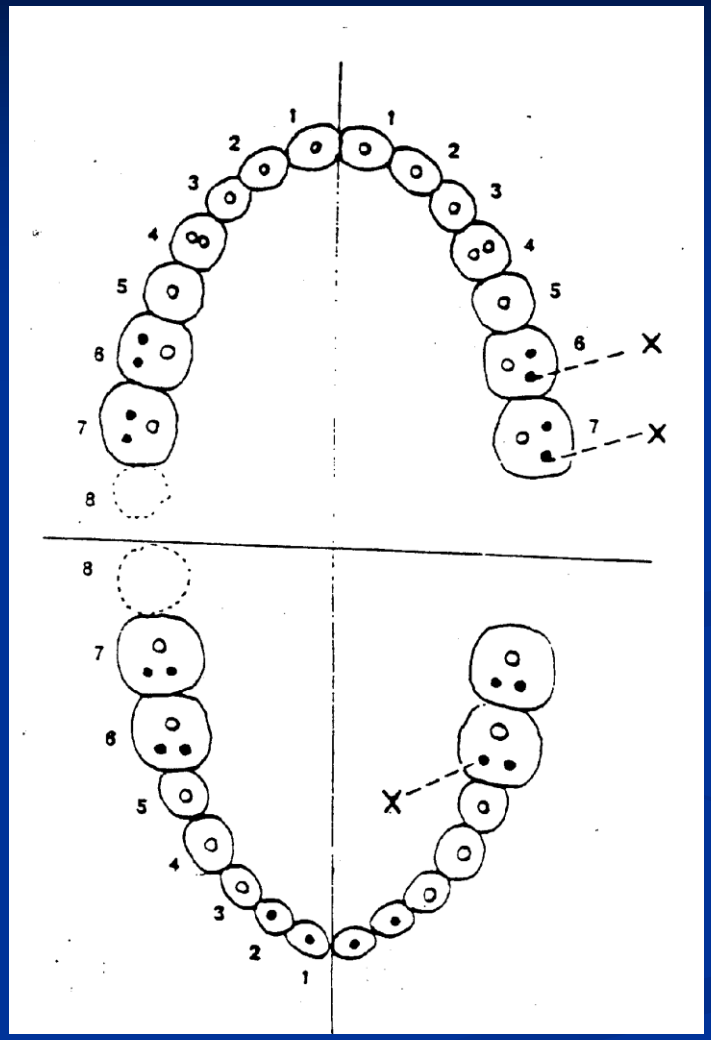
- Diagnosis
- Consideration (local, regional and systemic factors).
- Removal of carious dentin,old fillings, built up the clinical crown or reduction of cusps
- Local anaesthesia
- Dry operating field
- Access to the pulp chamber
- Root canal shaping
- Root canal cleaning
- Root canal filling
- X ray
- Postendodontic treatment

# Access








1
2
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6
7
8
X
X
X

# Access – opening of the pulp chamber

Dia trepan

Dia balls

Round Burs

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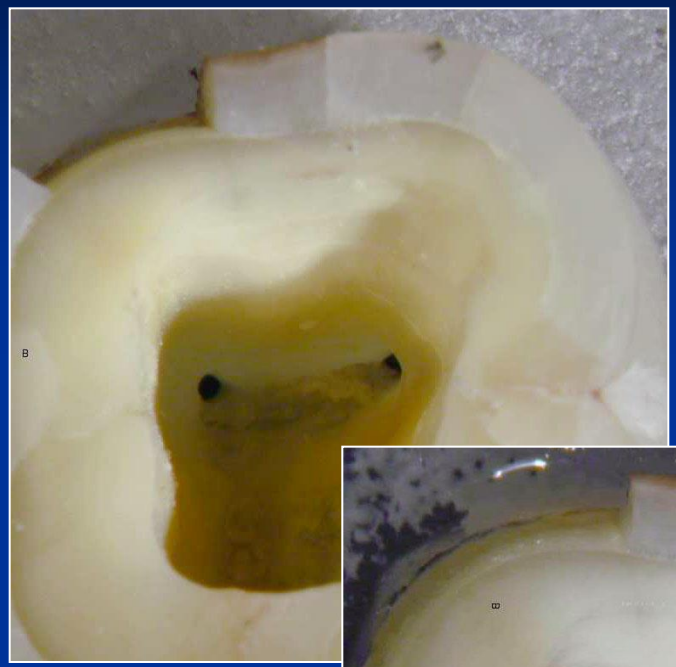
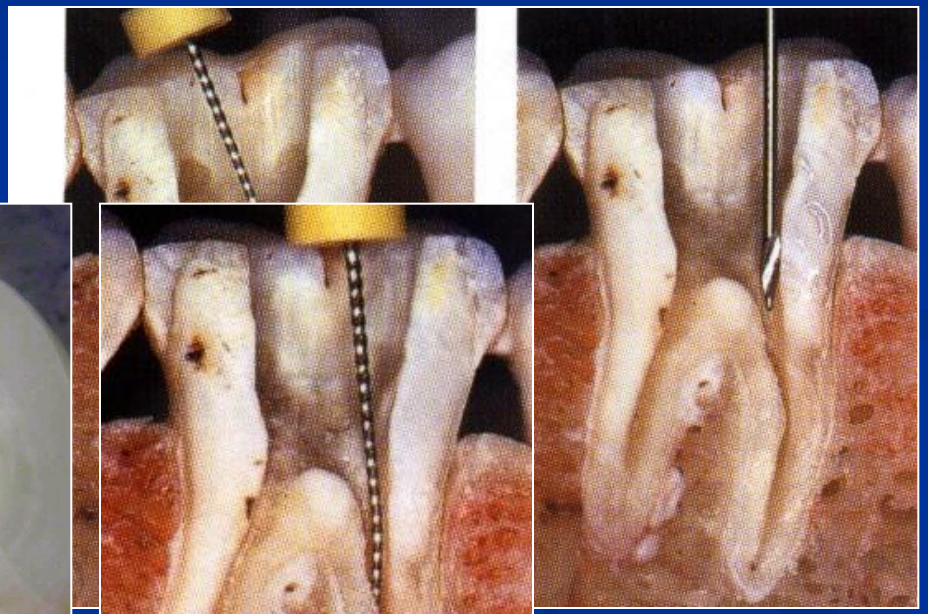
# Preparation of the endodontic cavity –facilitating form

Dia trepan

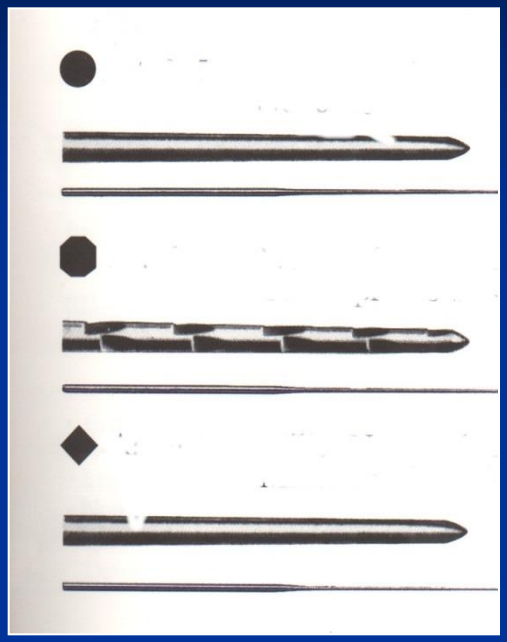
Instruments with safe ended tips),
Acc. to Batt

Fissure burs

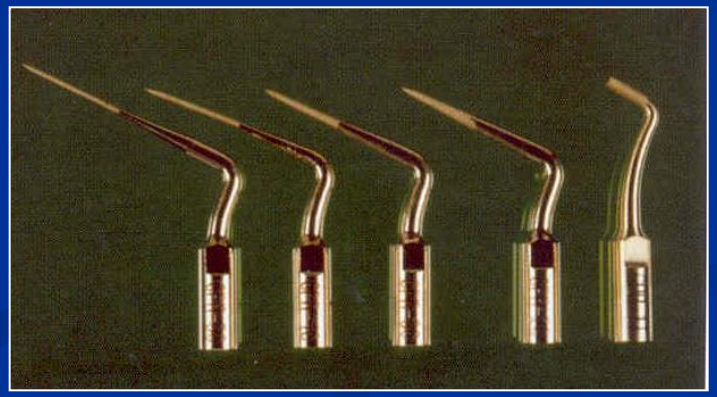




# Root canal access



Endodontic probes
Microopeners

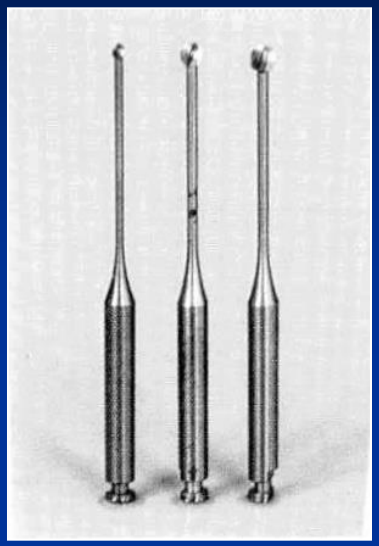


Ultrasound

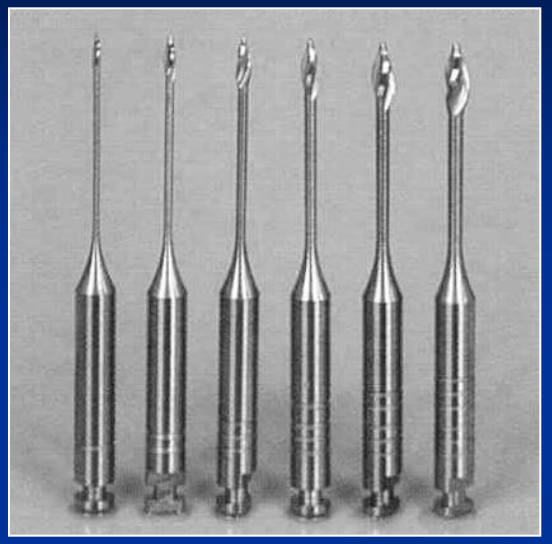

Dye

# Opening of the root canal orifices

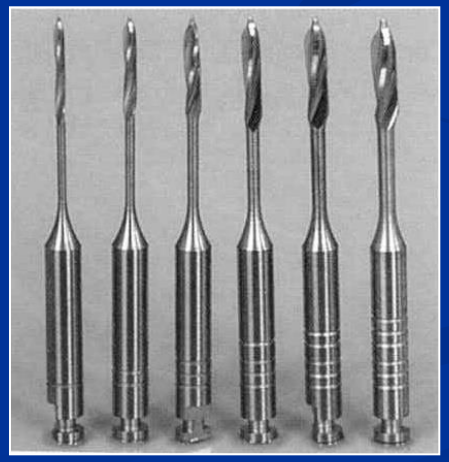
Round burs



Miller´s burs



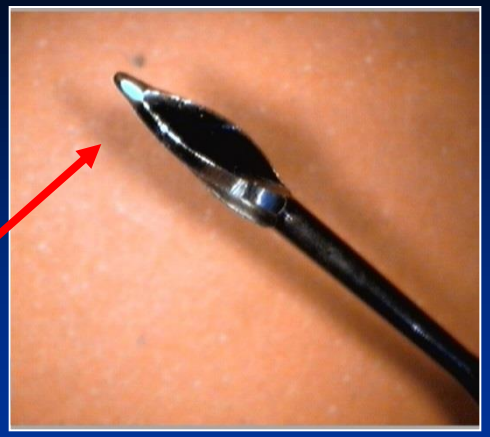
Gates Glidden´s burs



Peeso – Largo burs

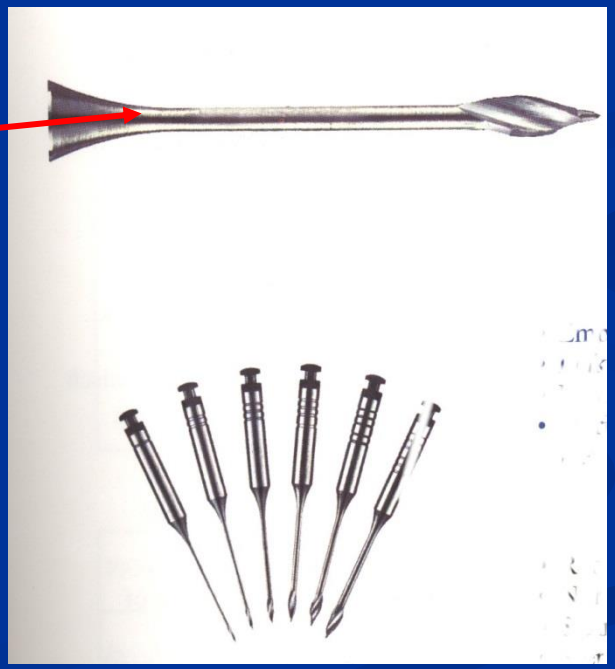
Gates - Glidden

Peeso-Largo



Gates – Glidden:

Point of breakage



Bad endodontic cavity

Good endodontic cavity

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# Přístupové sady
# Access kits



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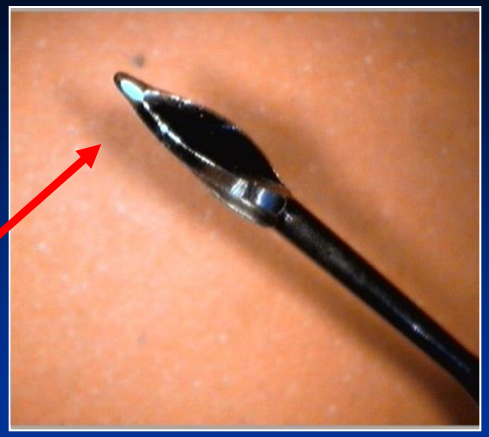
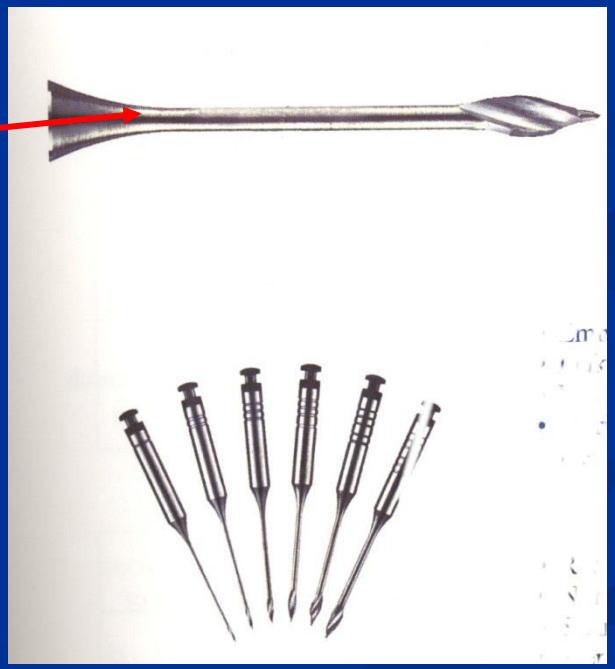


Gates – Glidden:
Tupá, neaktivní vodící špička
Naprogramované místo zlomu



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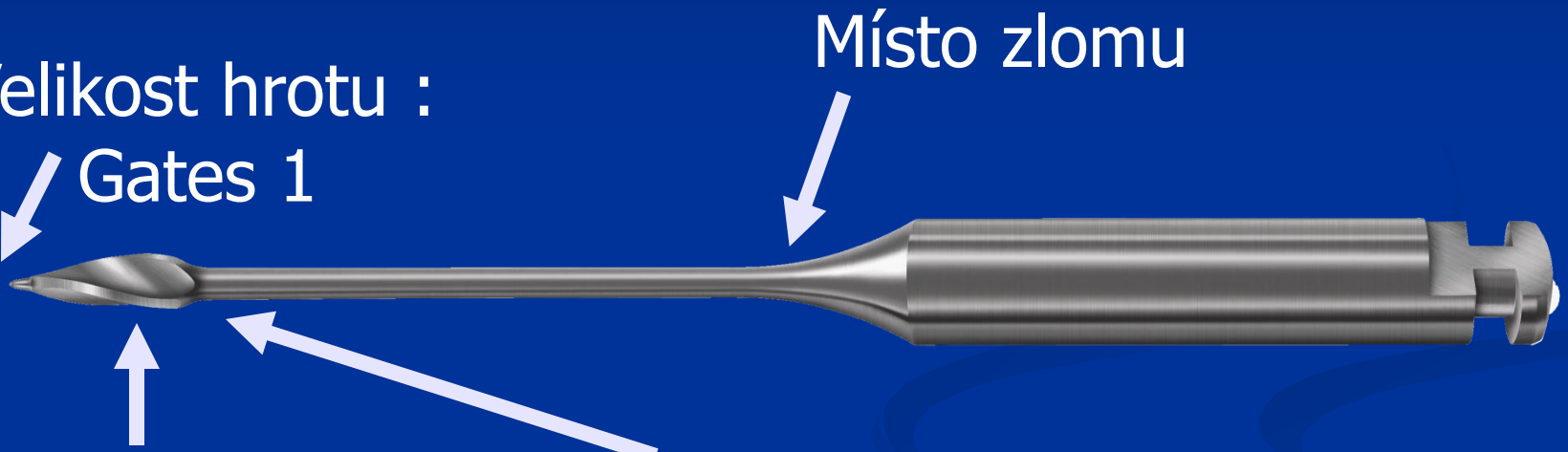
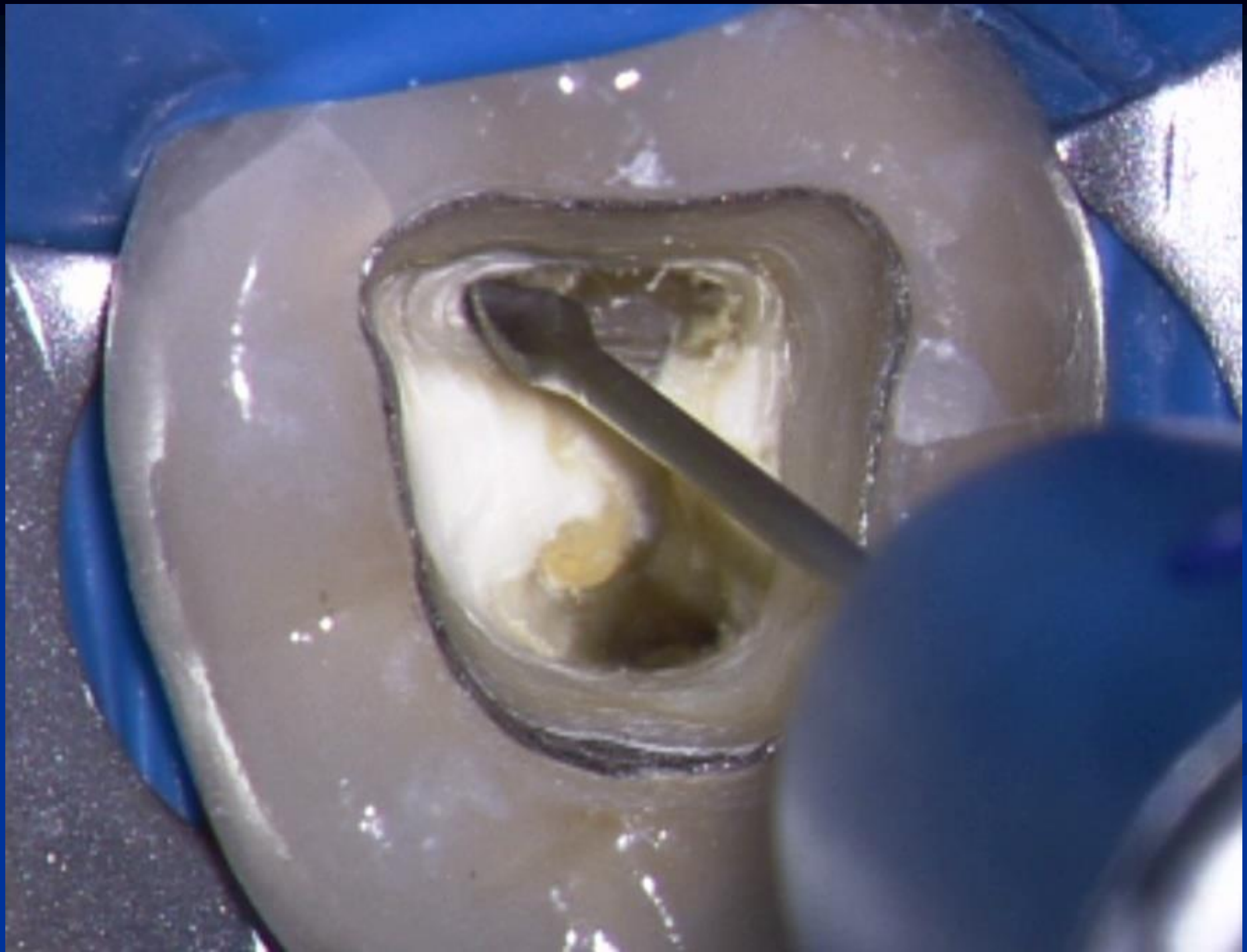
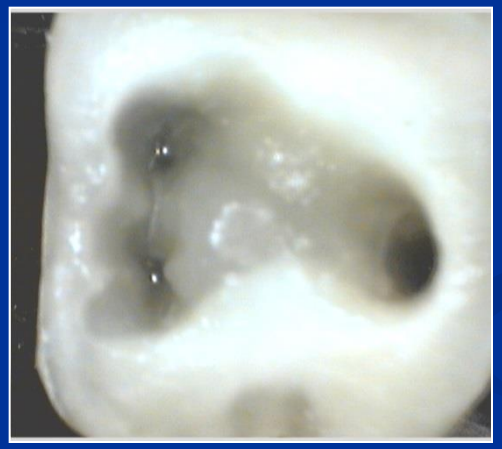
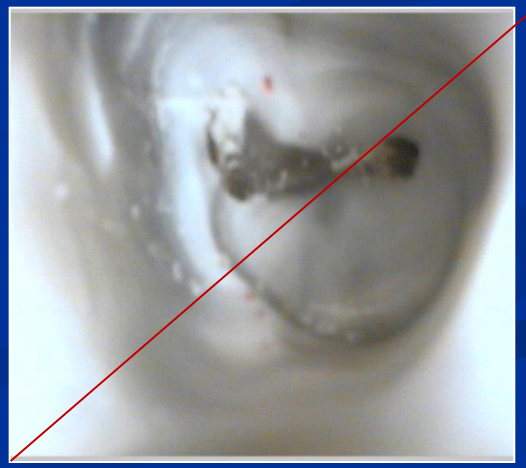
# X-GATES


Místo zlomu
Velikost hrotu :
Gates 1
Maximální průměr
– Gates 4
Dřík: Gates 3



# Nalezení a rozšíření vstupu do kořenových kanálků





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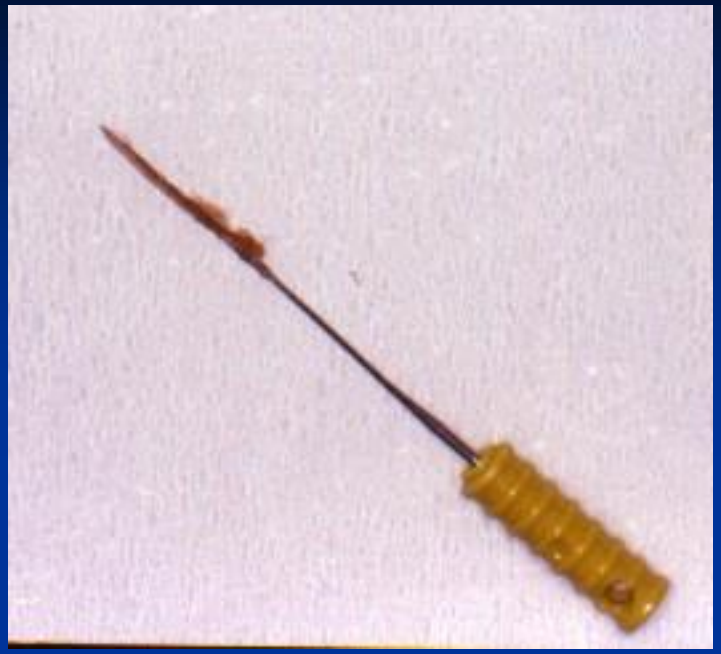
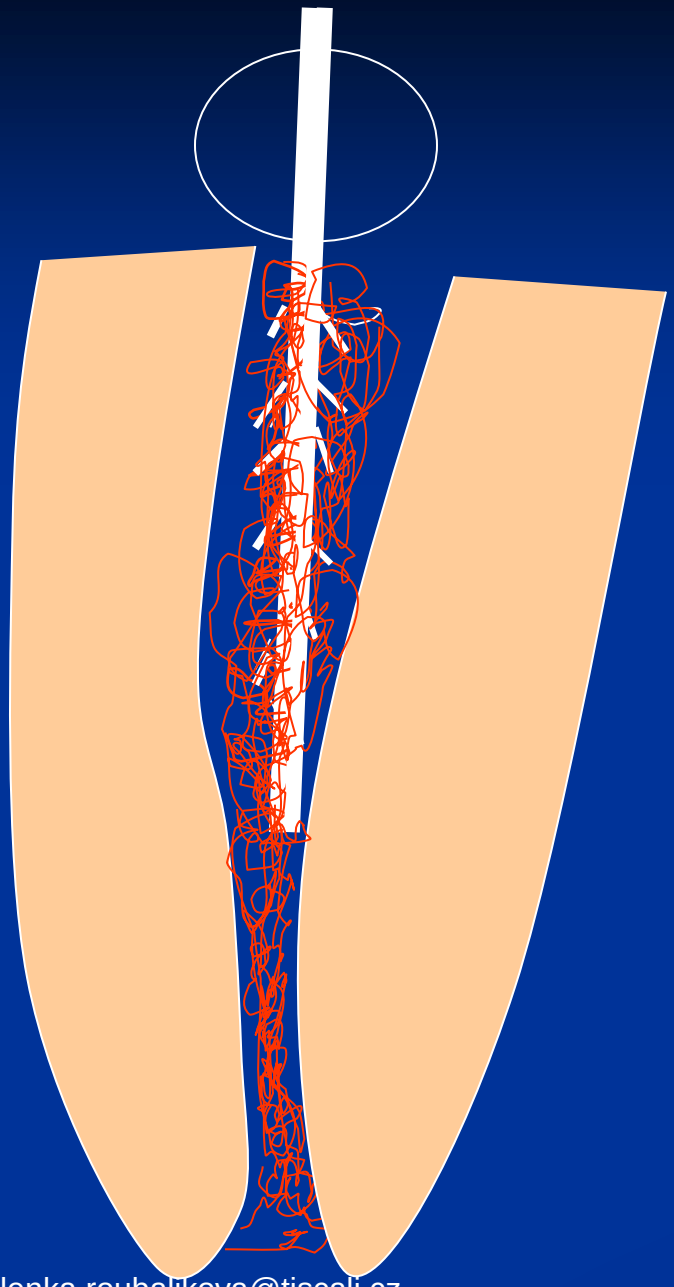


# Extraction of the content of the root canal - exstirpation

Pulpextraktor – made of soft wire
Single use instrument
Rotation
In wider canals only
In narrow canals – the content is extracted using instruments for root canal shaping



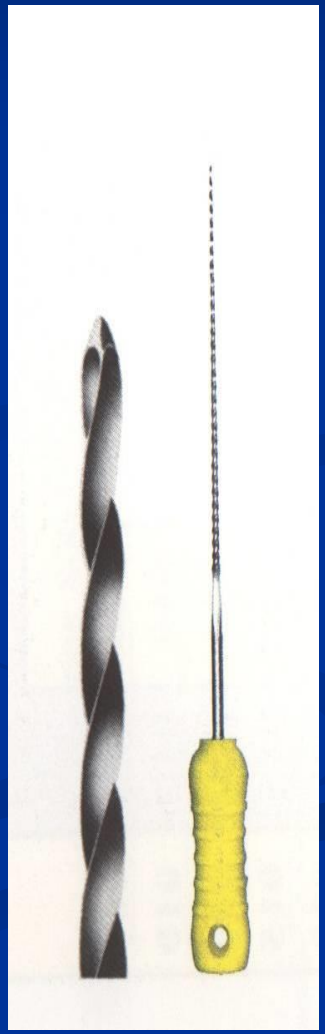
- **Rotation and exstirpation!**

# Canal shaping

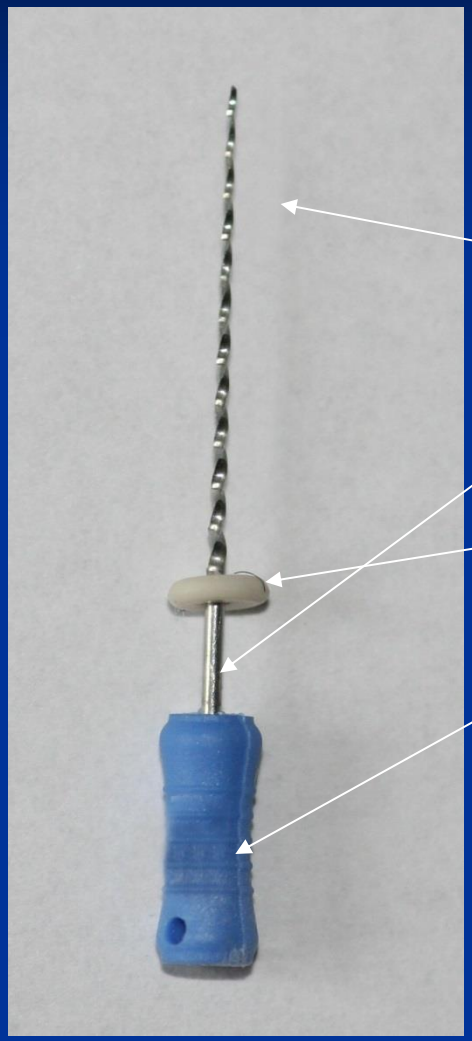
- Reamers
- Files

# Reamer

- **K -reamer**



# Reamer



Working –cutting part

Shank

Stopper

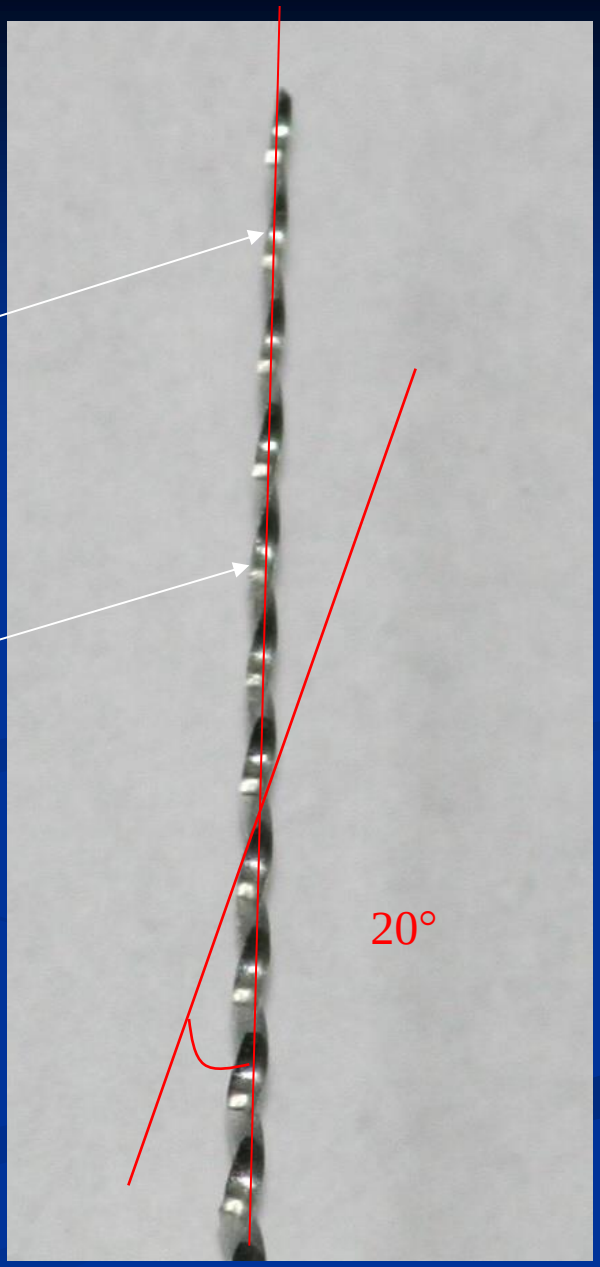
Grip

# Reamer

Cuting edges

Space for chips

***Clockwise rotation***



# Files

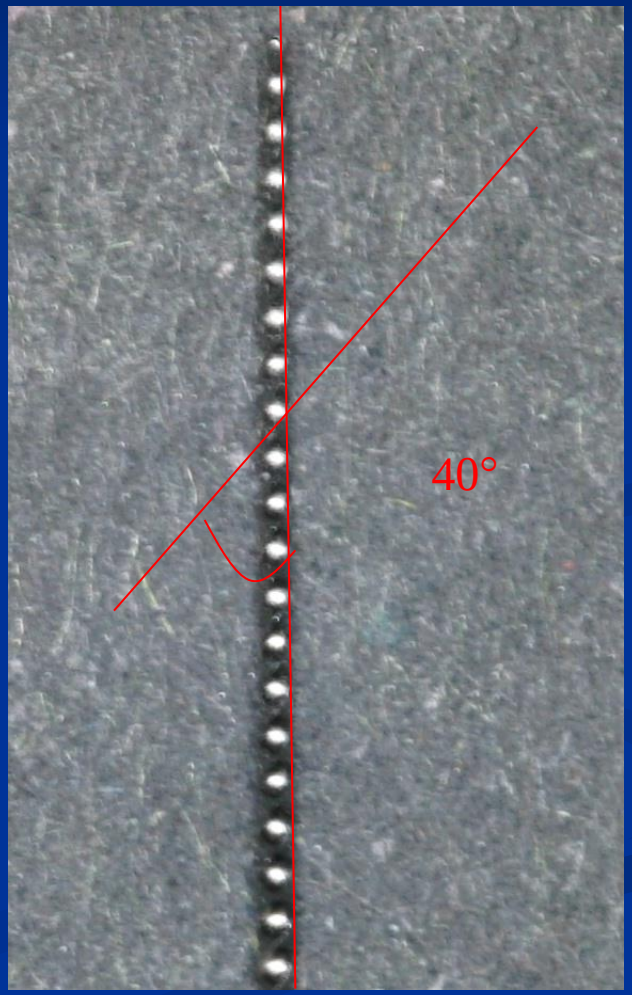
1. K-file
2. K-flexofile, flexicut, flex-R - file
3. K-flex
4. H-file, S-file

# K file

# K-file

***Filing and (or) rotation***

***Straight canals 45° - 90°)***



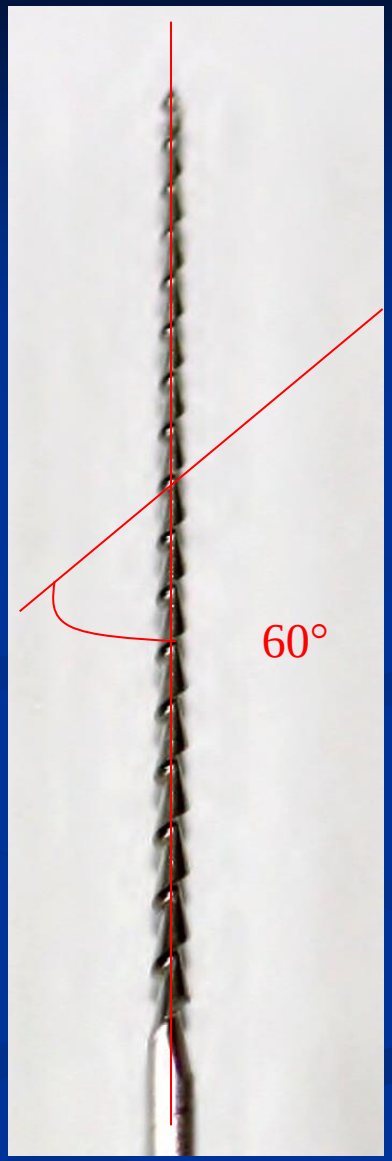
# K-file x reamer

# H-file

= Hedström file

# H- file

Filing only!!!!

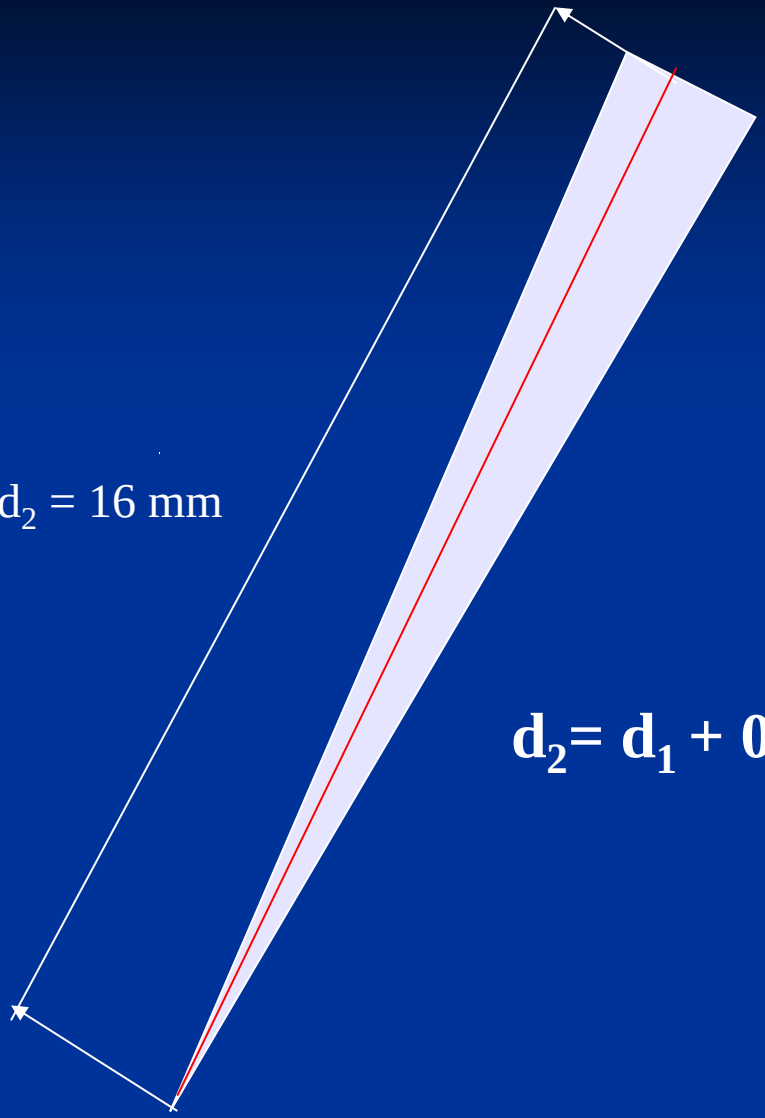


# ISO norma

- Diameter
- Length of the cutting part
- Taper

06 pink
08 gray
10 purple
15 white
20 yellow
25 red
30 blue
35 green
40 black

45 white
50 yellow
55 red
60 blue
70 green
80 black



$d_2$

Taper 2%

$d_1 - d_2 = 16$ mm

$d_2 = d_1 + 0{,}32$

$d_1$

0,02 mm na 1mm

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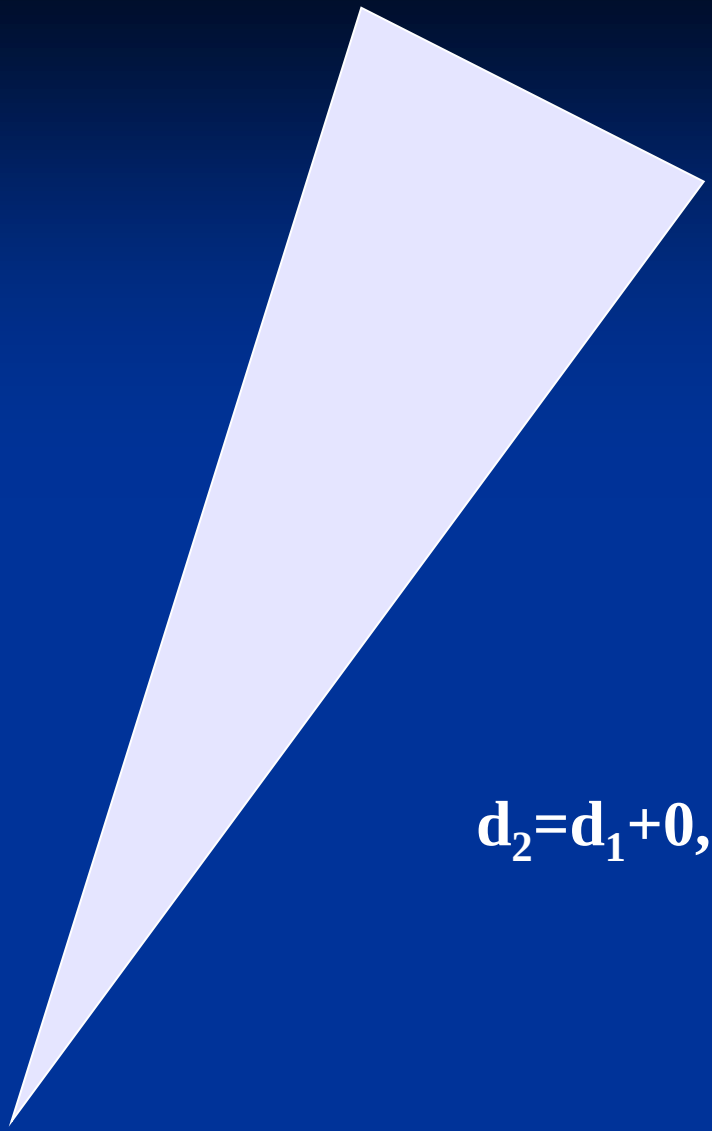
$d_2$

Taper 4%

$d_2$+ 0, 64

$d_1$

0,04mm  na 1 mm



Taper 4%

$d_2$

$d_2=d_1+0,96$

$d_1$

0,06mm na 1 mm

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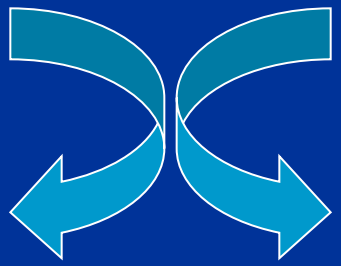
# Instrumentation

- Rotace tam a zpět – 45°

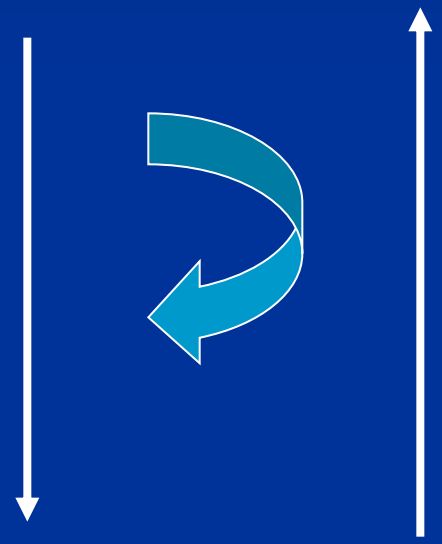


K – reamer

K- file

# Instrumentation

Rotation

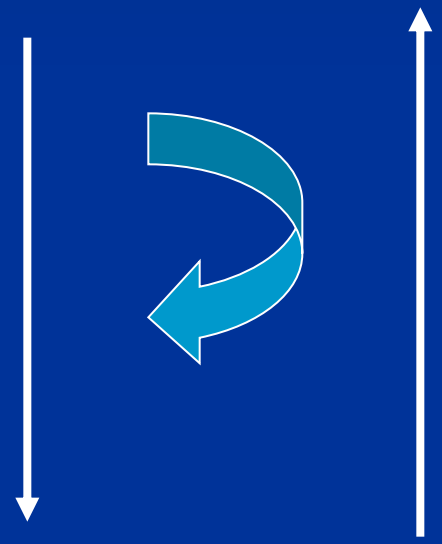


K – reamer

K- file

# Instrumentation

- Filing

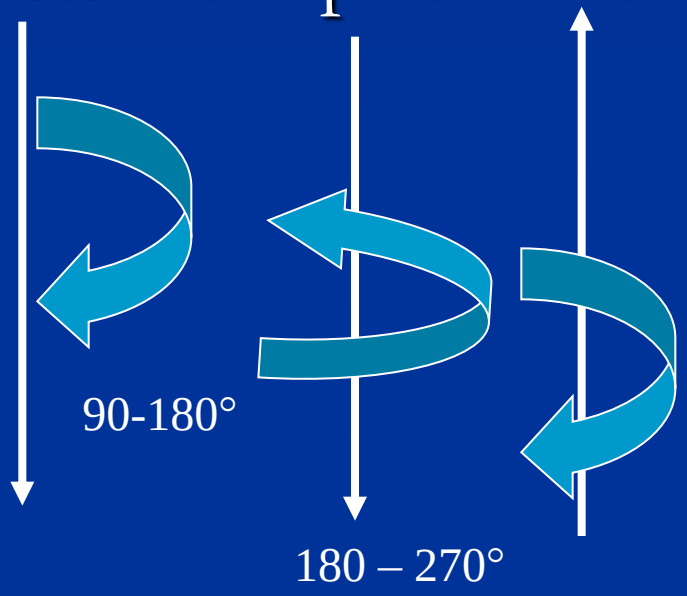


H- file

K – file

# Instrumentation

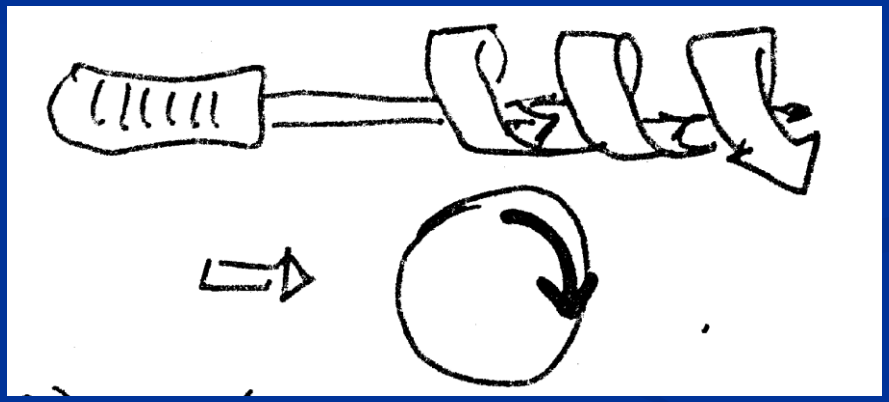
- Ttechnika balancované síly – nástroj o 1číslo větší než apikální velikost




K- flexofile

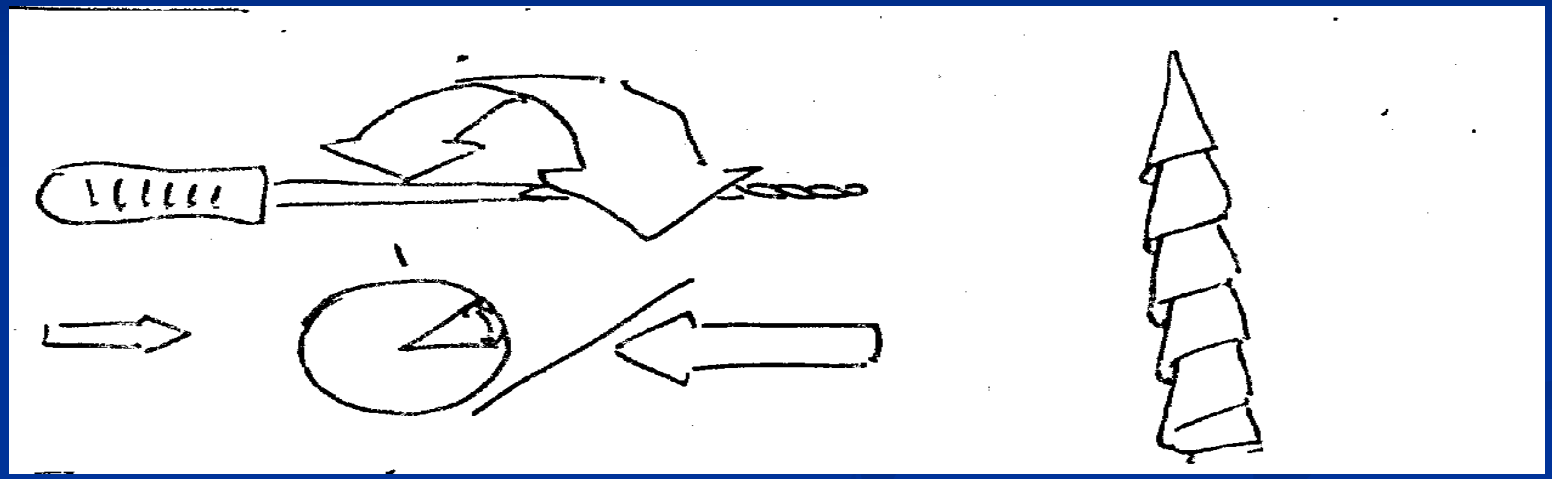
K – file (?)

# Reaming

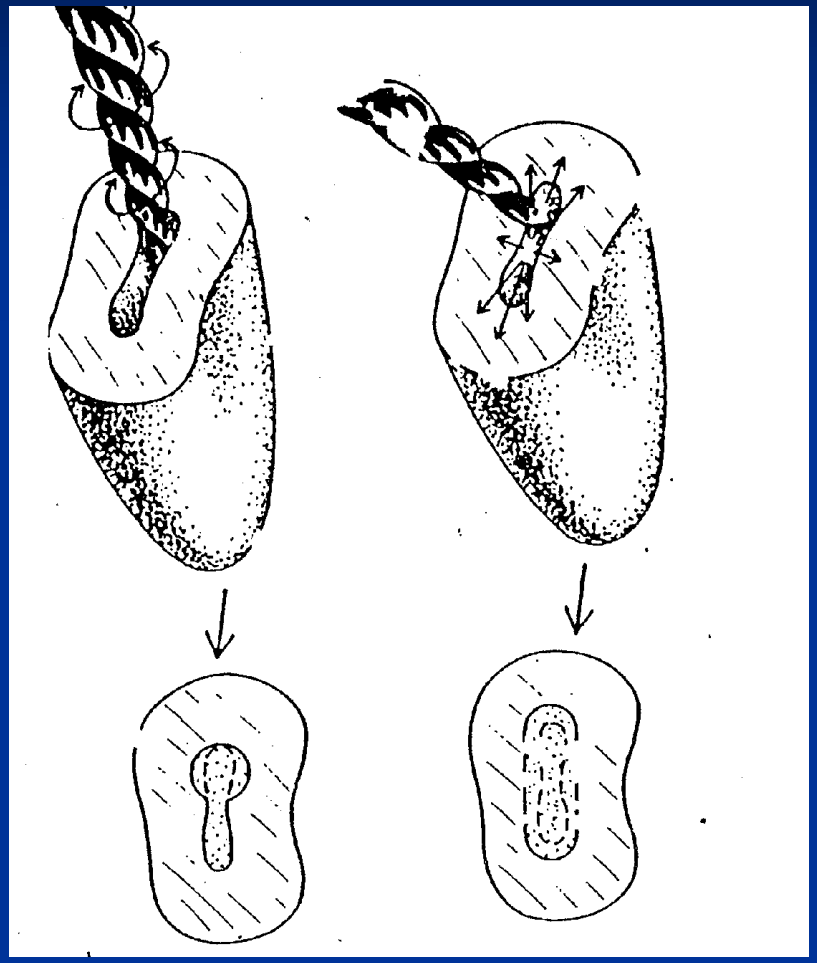


Simple clockwise rotation

# Filing



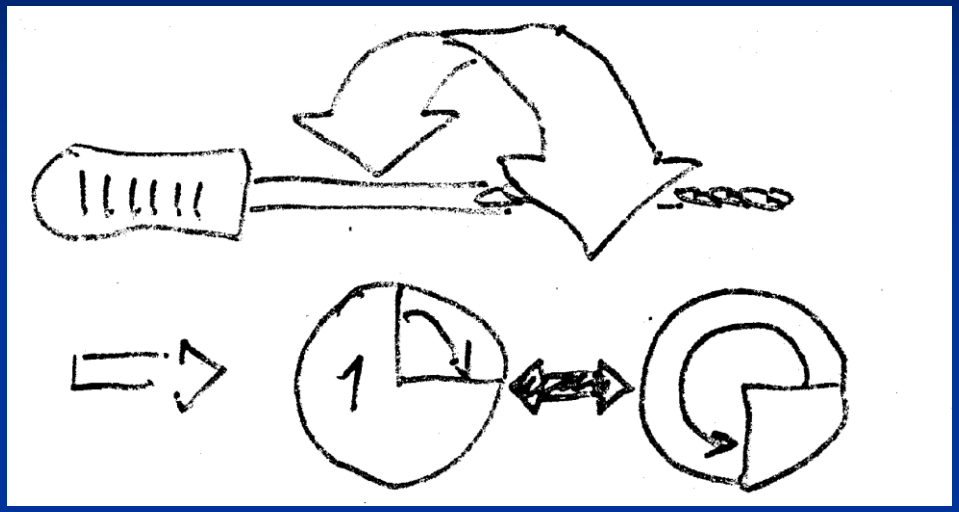
# Circumferential filing



H -file

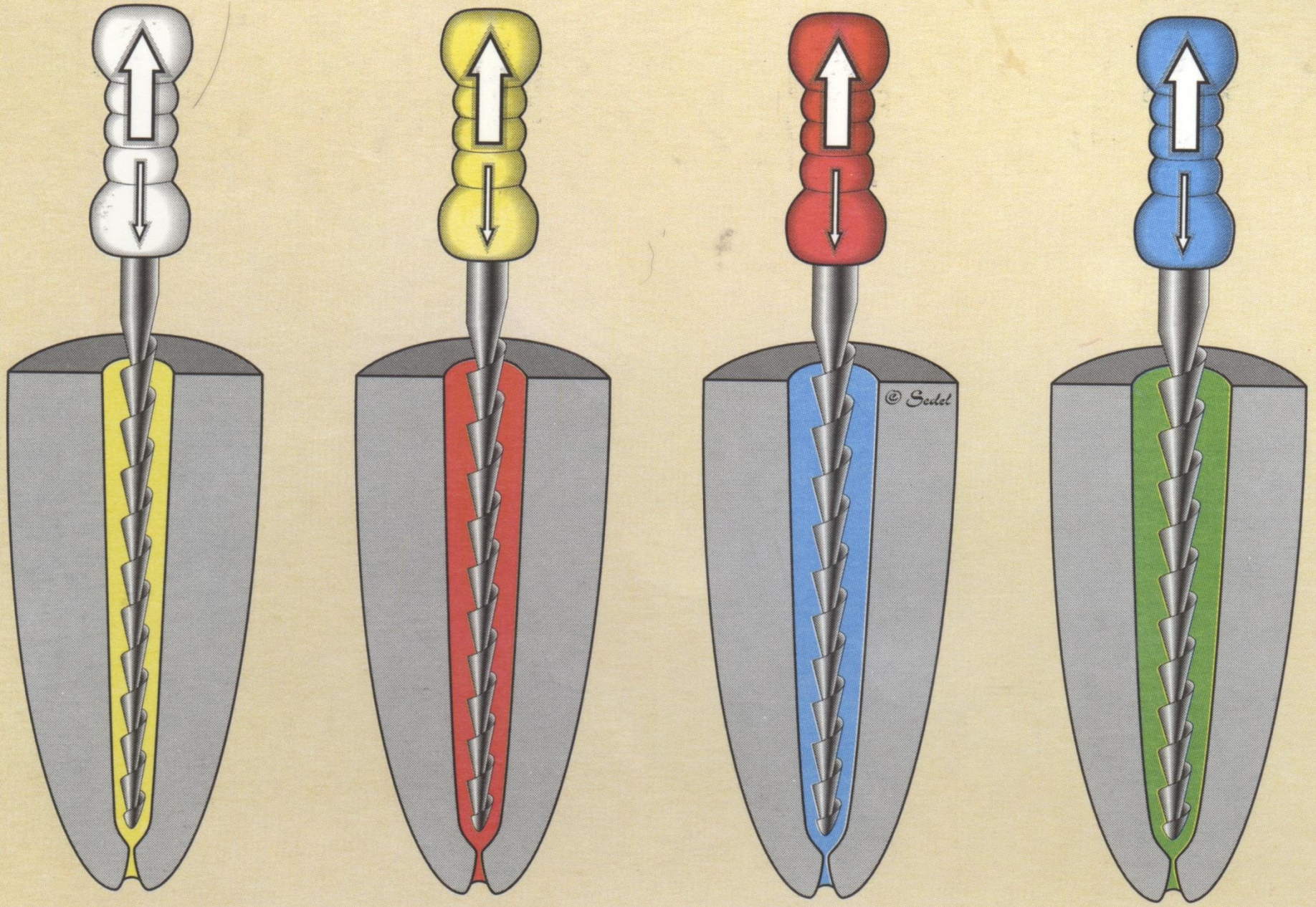
Introduction of th root canal instrument
root canal.
Pull motion – action.
Staying in contact with the root canal wall
Rotate without any action
Go in and pull with action.

# Balance forced technique

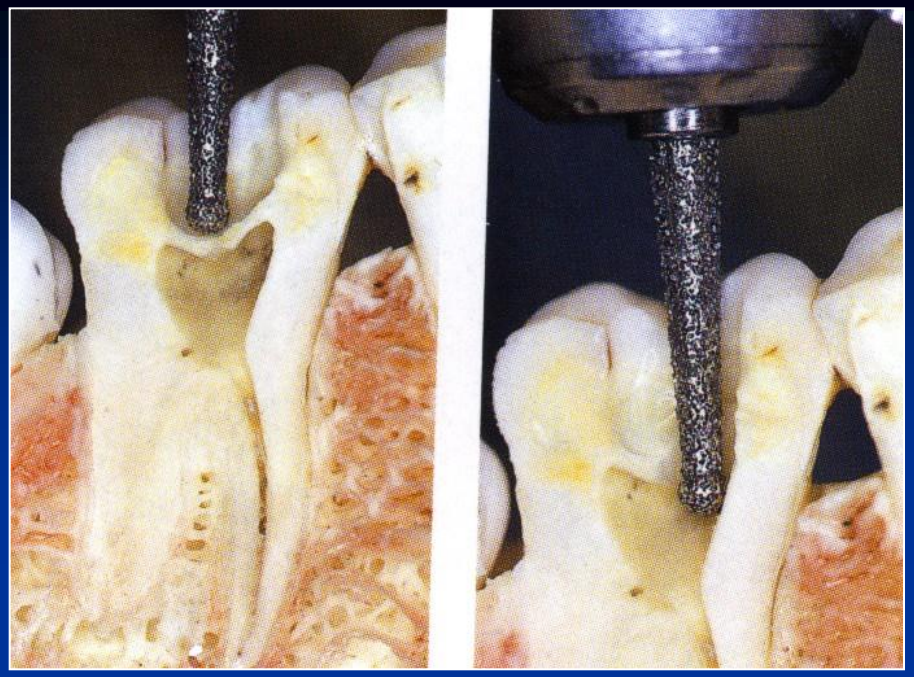


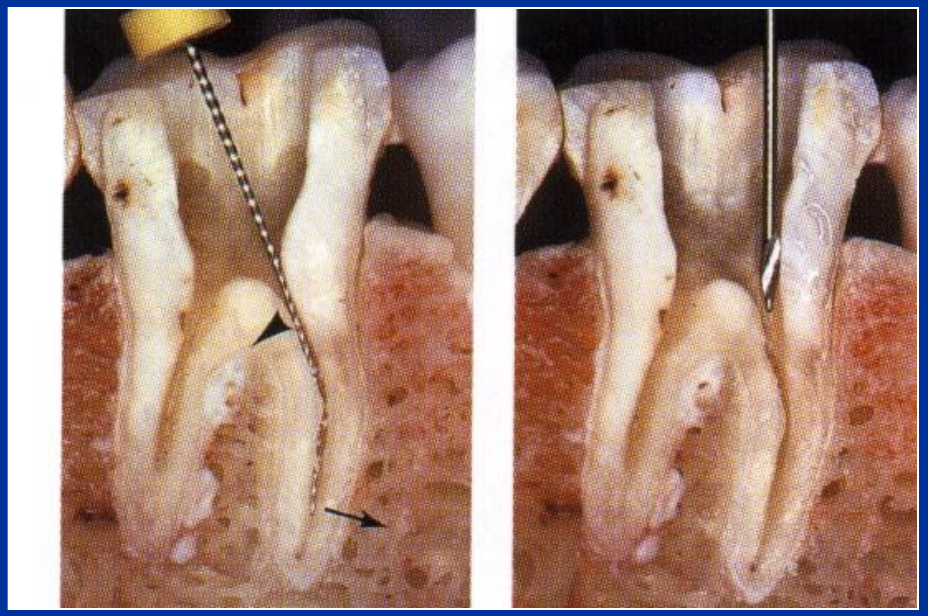

K- file
Flex O file
Fůlex R file

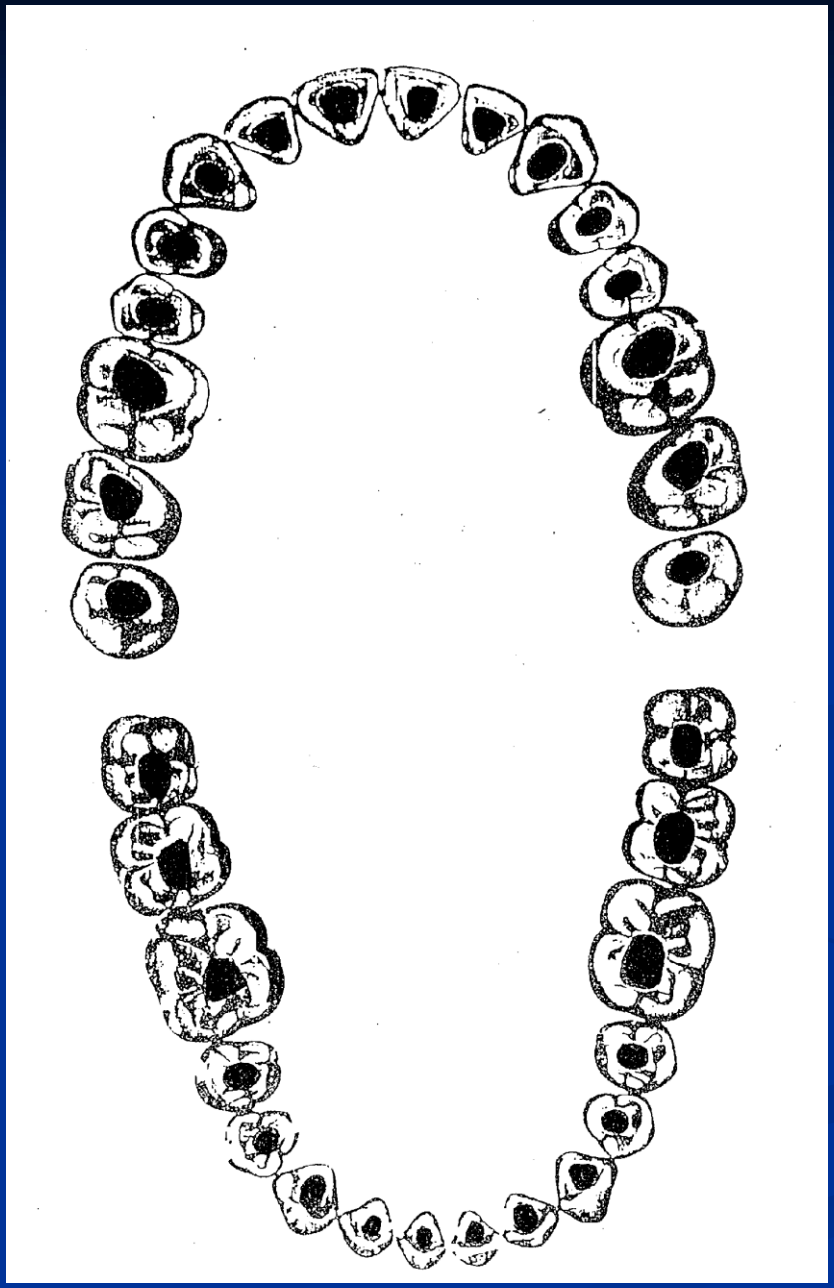
Go into the root canal rotating clockwise
90 – 180°
Until the contact
Slight pressure and rotate
Contraclockwise 270°
Pull out the instrument rotating clockwise again

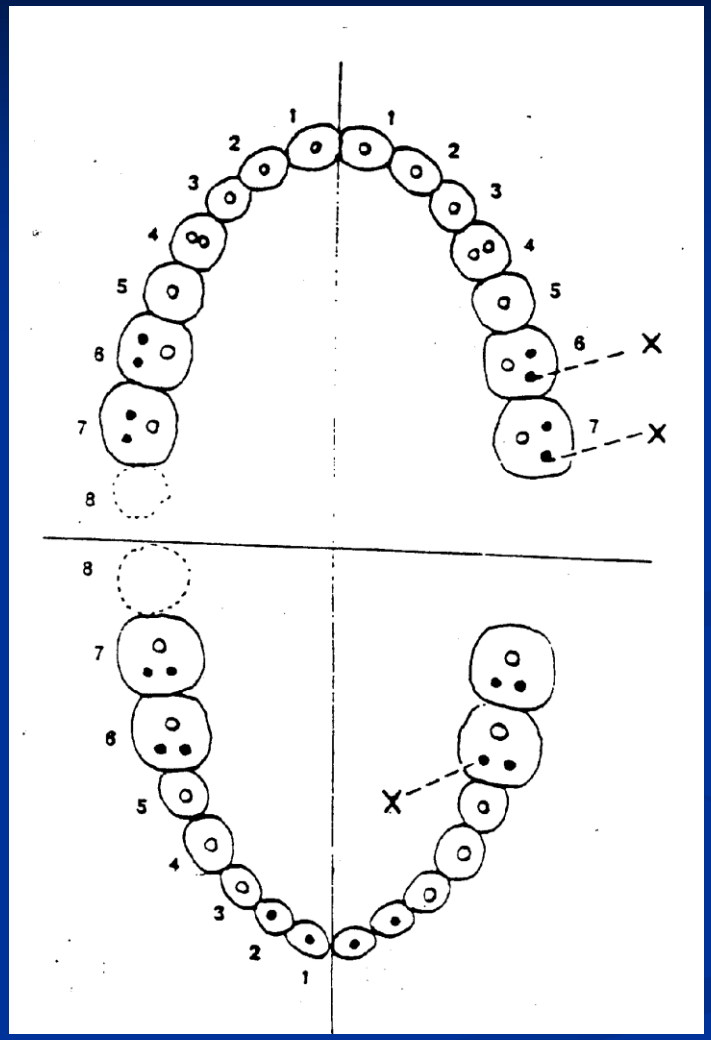

© Sedel

# Access





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X
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X

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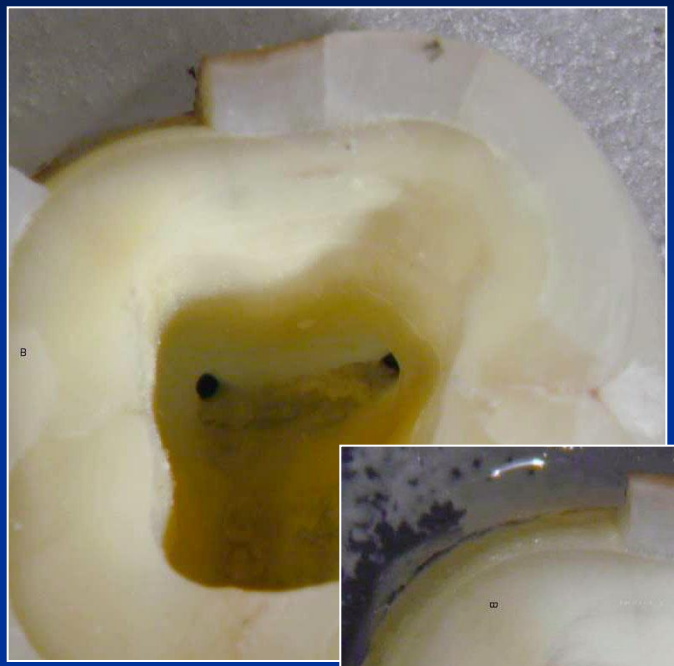
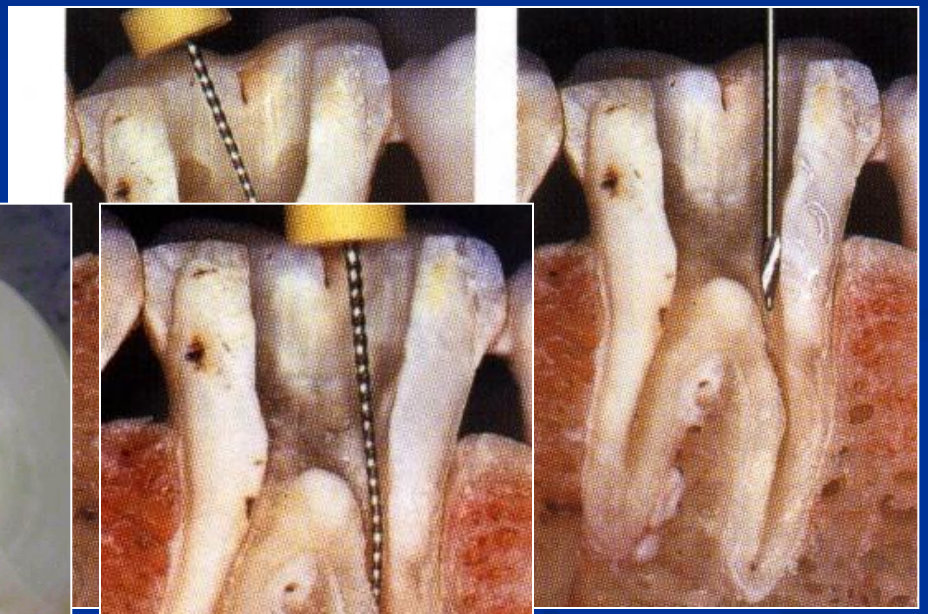
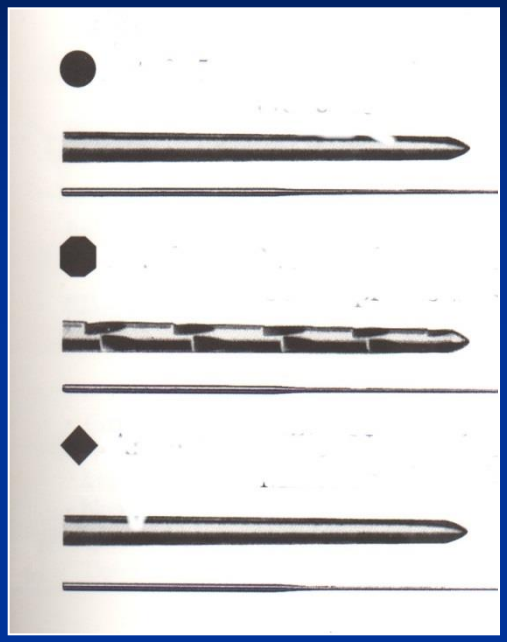




# Root canal access



Endodontic probes
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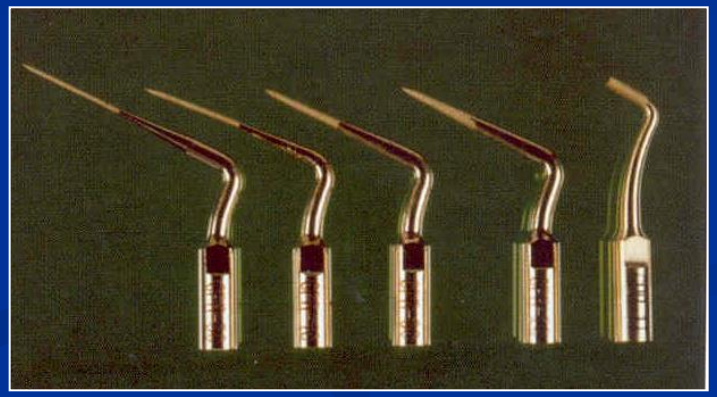
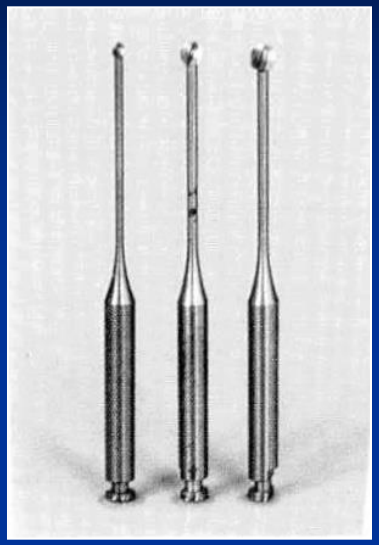


Ultrasound

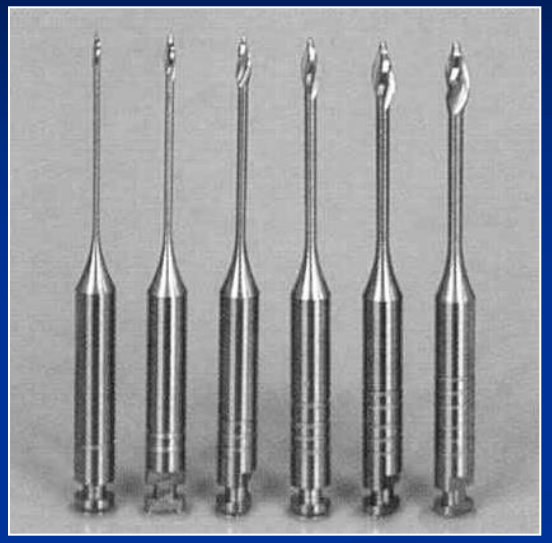

Dye

# Opening of the root canal orifices

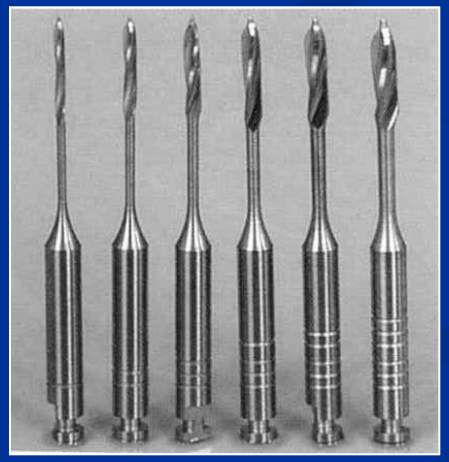
Round burs



Miller´s burs



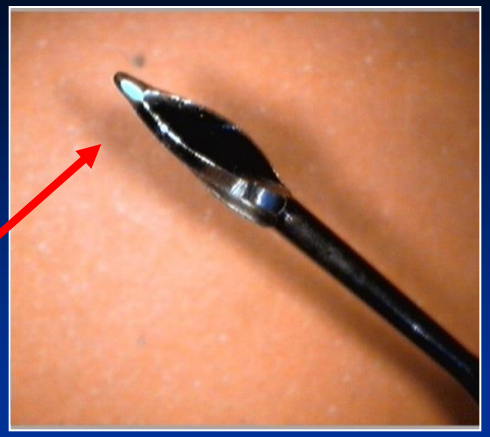
Gates Glidden´s burs



Peeso – Largo burs

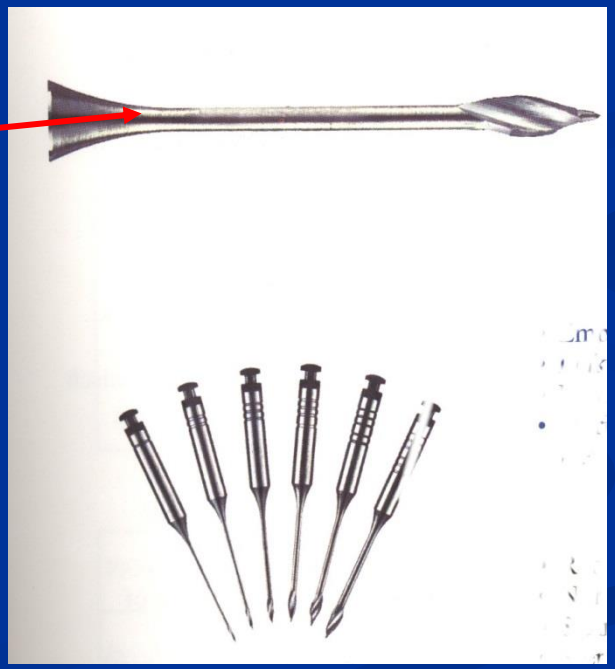
Gates - Glidden

Peeso-Largo



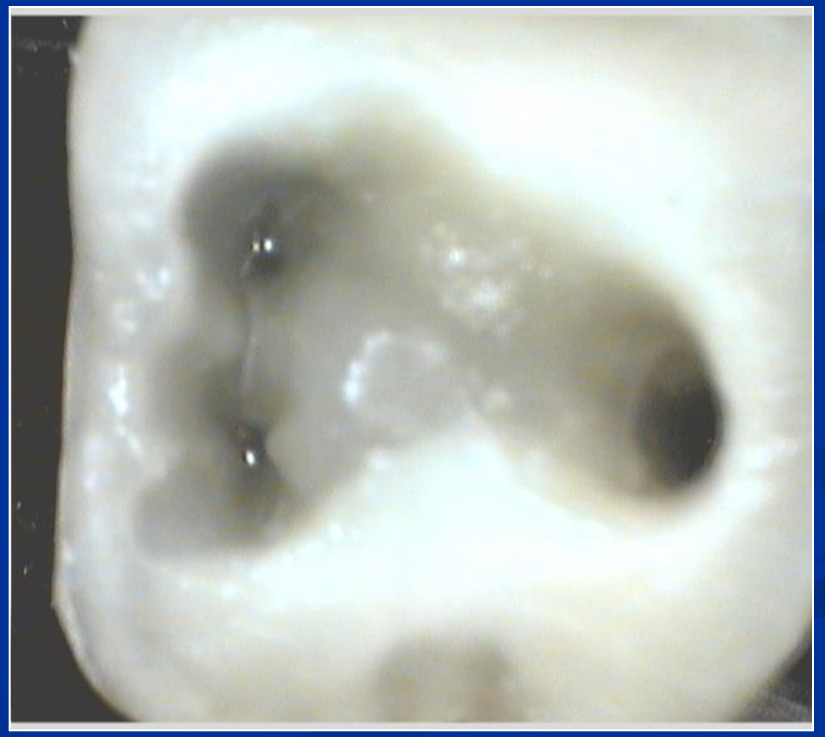
Gates – Glidden:

Point of breakage



Bad endodontic cavity

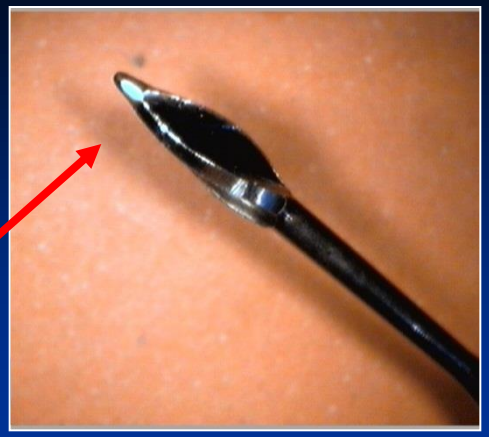
Good endodontic cavity



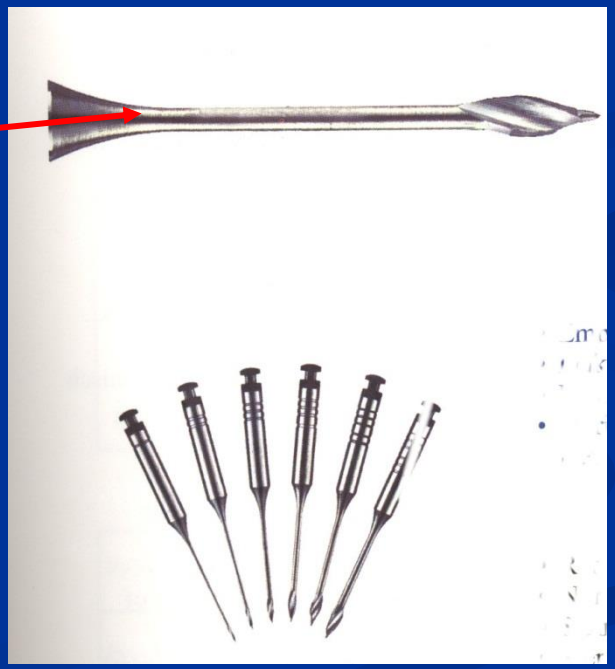

# Přístupové sady
# Access kits



CZ73



Gates – Glidden:
Tupá, neaktivní vodící špička
Naprogramované místo zlomu



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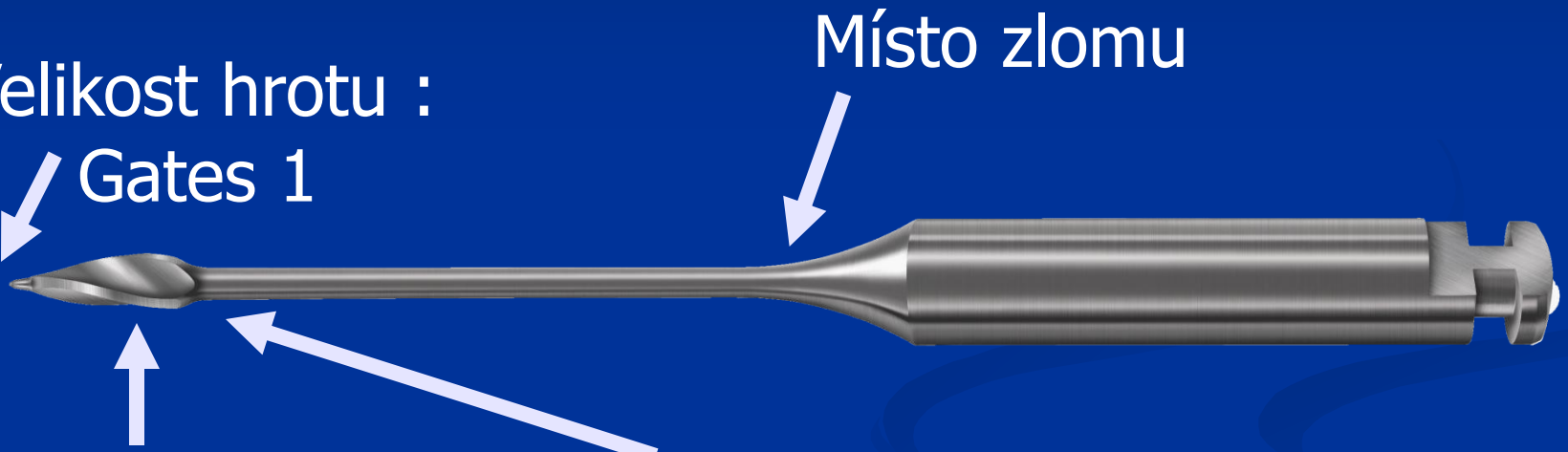
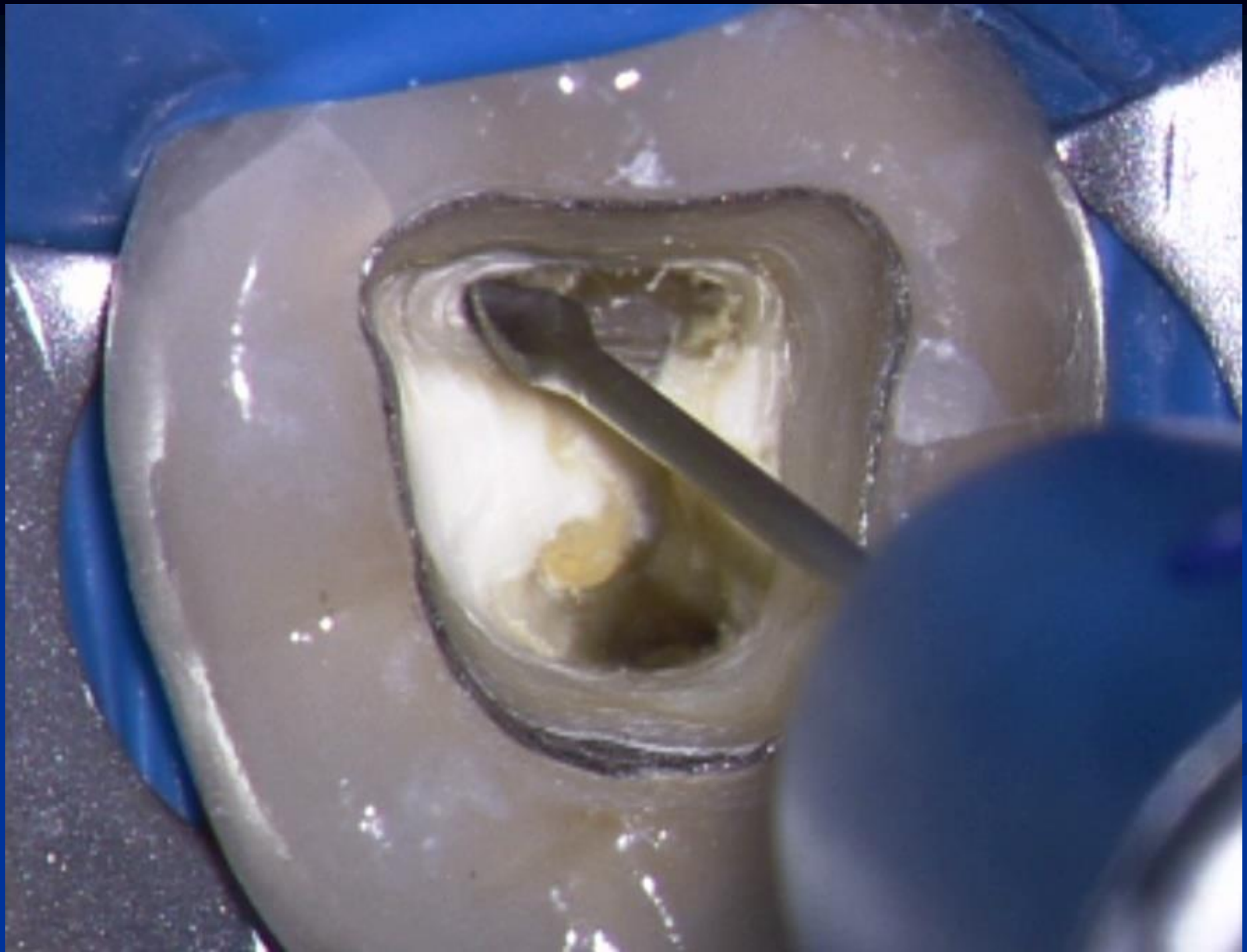
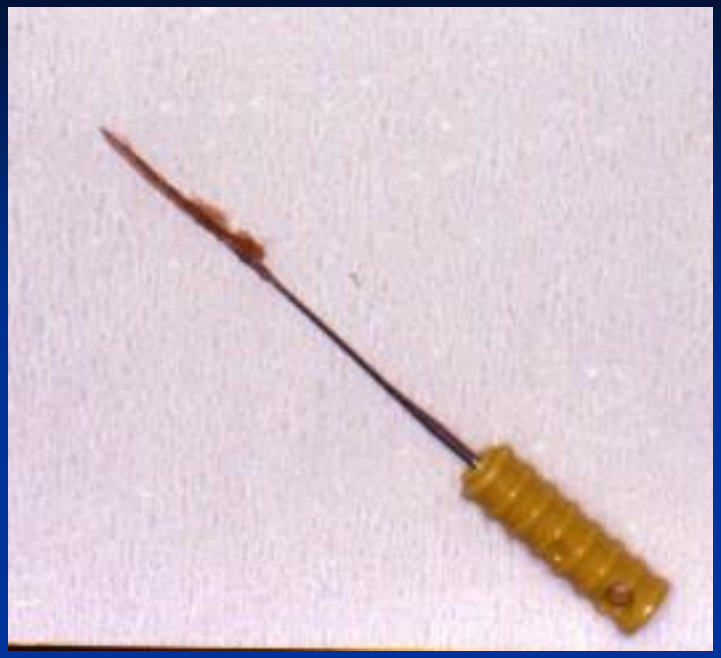
# X-GATES

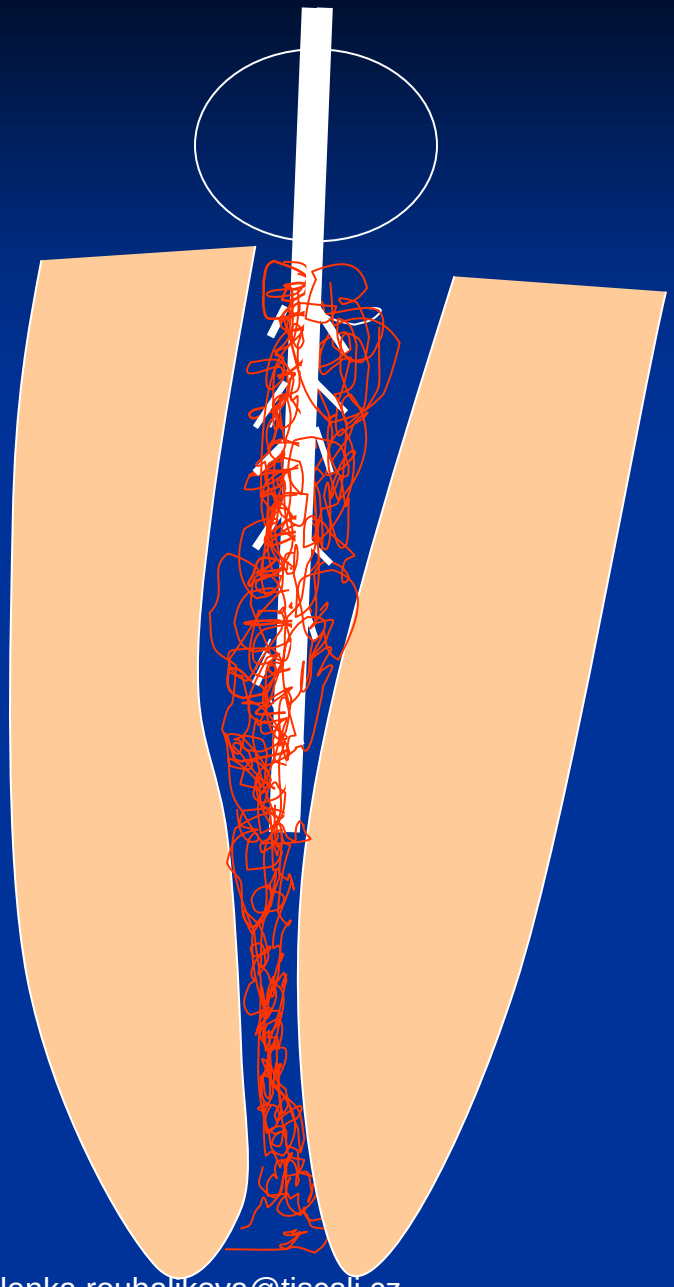

Místo zlomu
Velikost hrotu :
Gates 1
Maximální průměr
– Gates 4
Dřík: Gates 3





# Extraction of the content of the root canal - exstirpation

Pulpextraktor – made of soft wire



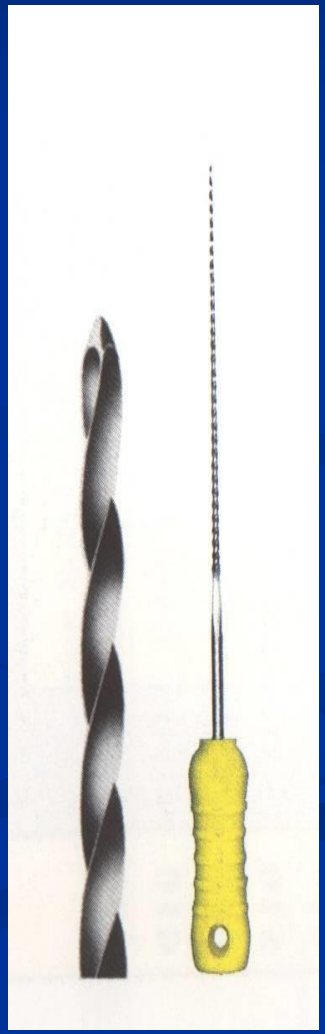
- **Rotation and exstirpation!**

# Canal shaping

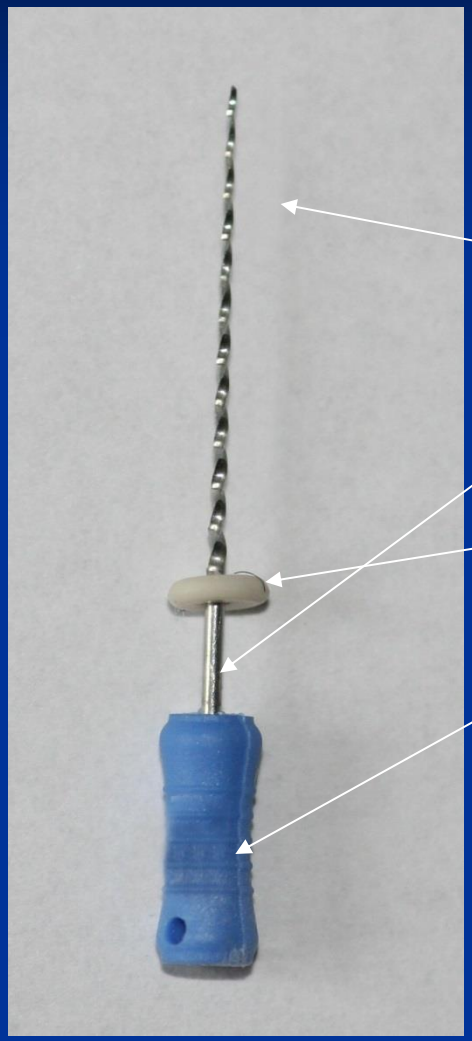
- Reamers
- Files

# Reamer

- **K -reamer**



# Reamer



Working –cutting part

Shank

Stopper

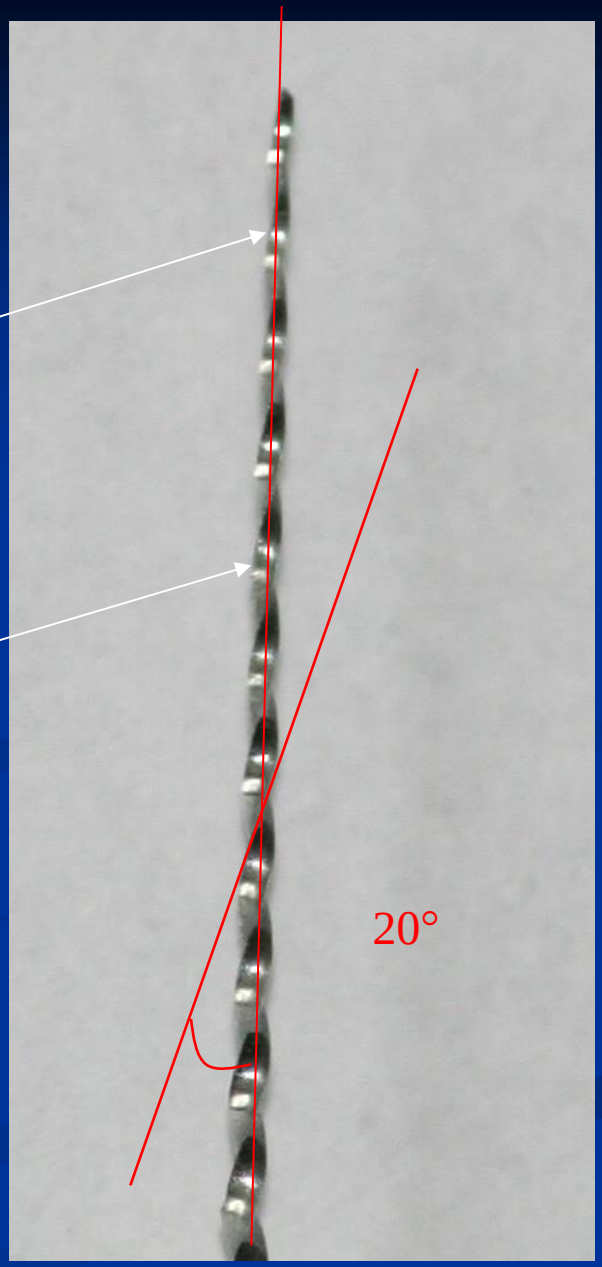
Grip

# Reamer

Cuting edges

Space for chips

***Clockwise rotation***



# Files

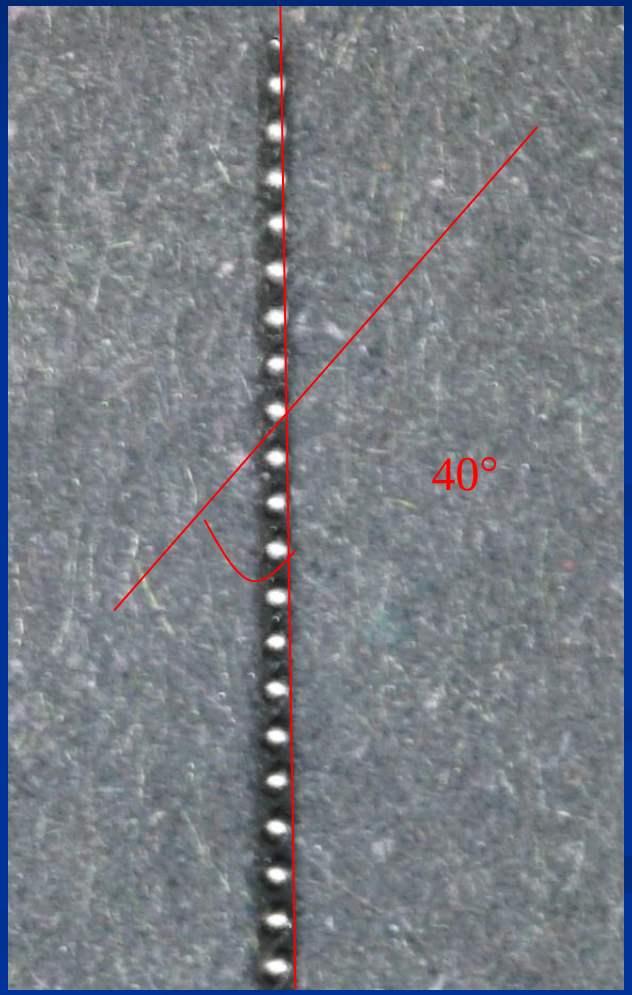
1. K-file
2. K-flexofile, flexicut, flex-R - file
3. K-flex
4. H-file, S-file

# K file

# K-file

***Filing and (or) rotation***

***Straight canals 45° - 90°)***



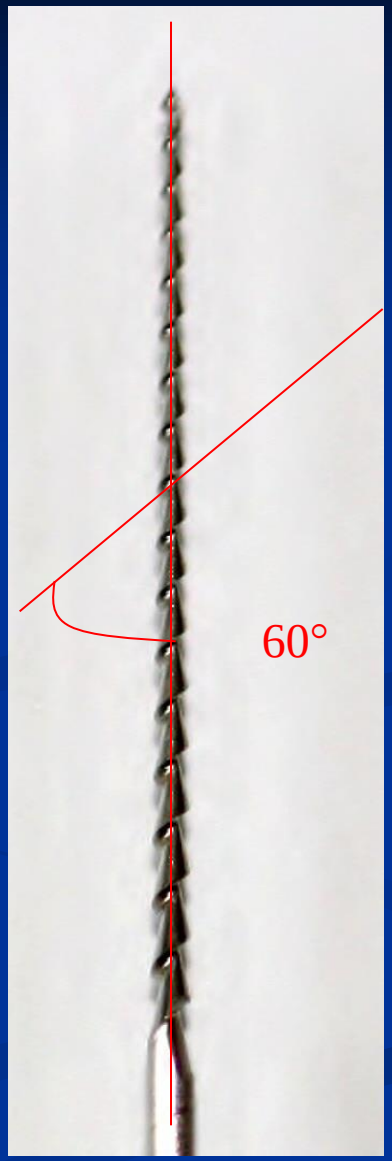
# K-file x reamer

# H-file

= Hedström file

# H- file

Filing only!!!!

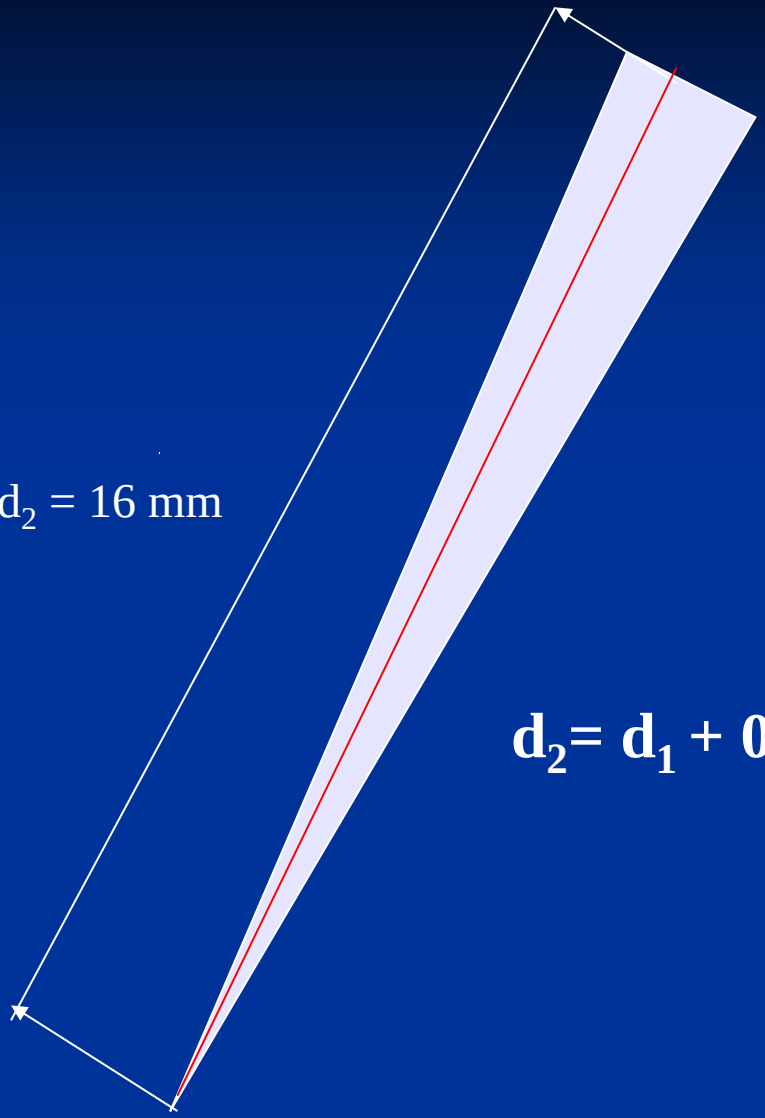


# ISO norma

- Diameter
- Length of the cutting part
- Taper

06 pink
08 gray
10 purple
15 white
20 yellow
25 red
30 blue
35 green
40 black

45 white
50 yellow
55 red
60 blue
70 green
80 black



$d_2$

Taper 2%

$d_1 - d_2 = 16$ mm

$d_2 = d_1 + 0{,}32$

$d_1$

0,02 mm na 1mm

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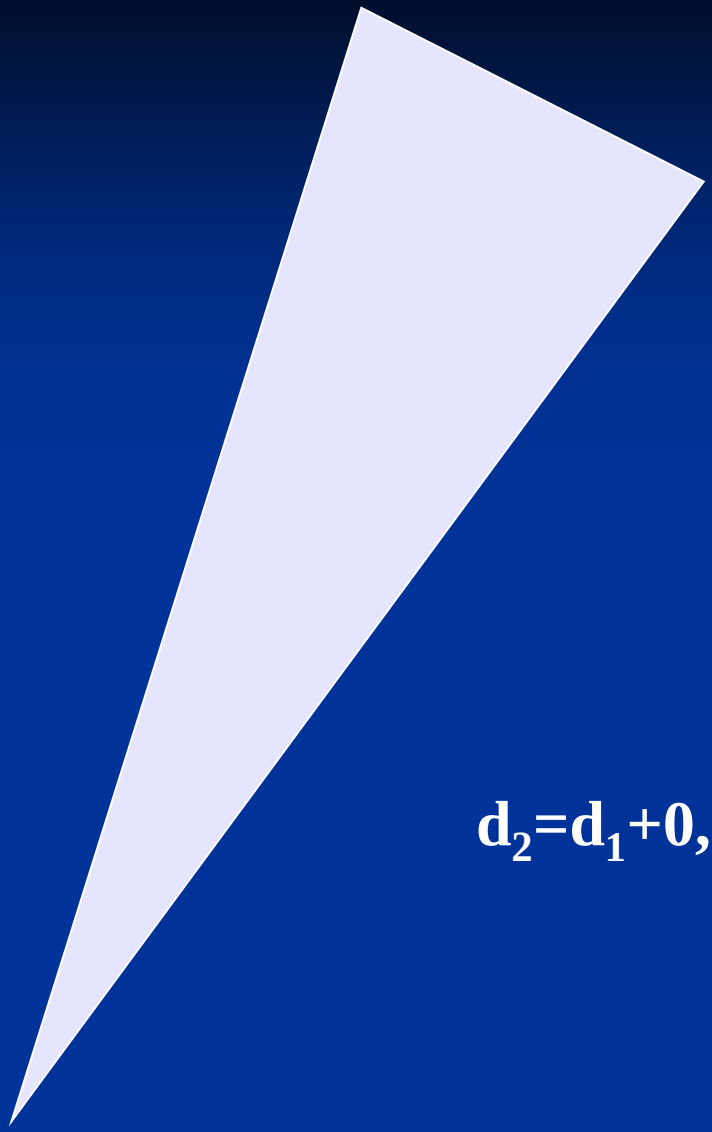
$d_2$

Taper 4%

$d_2$+ 0, 64

$d_1$

0,04mm na 1 mm



Taper 4%

$d_2$

$d_2=d_1+0,96$

$d_1$

0,06mm na 1 mm

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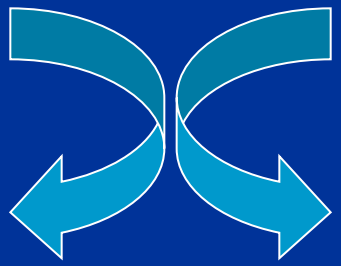
# Instrumentation

- Rotace tam a zpět – 45°

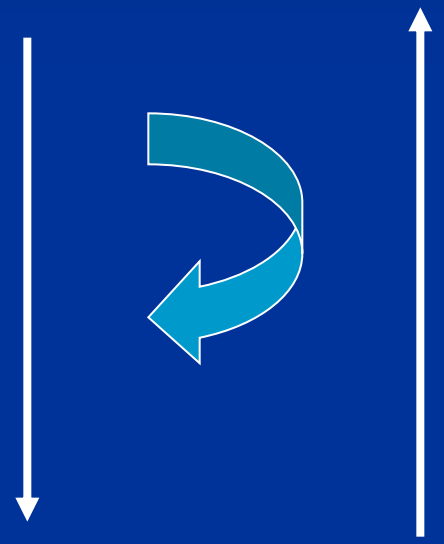


K – reamer

K- file

# Instrumentation

Rotation

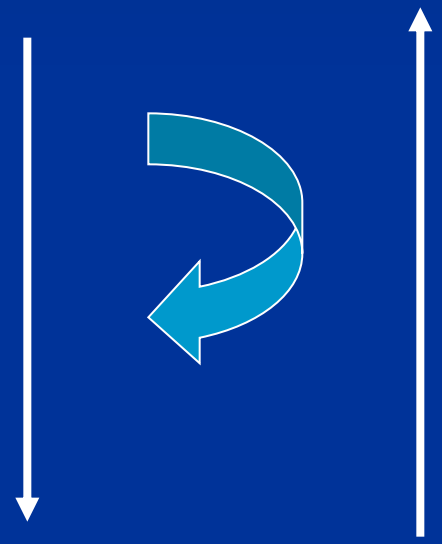


K – reamer

K- file

# Instrumentation

- Filing

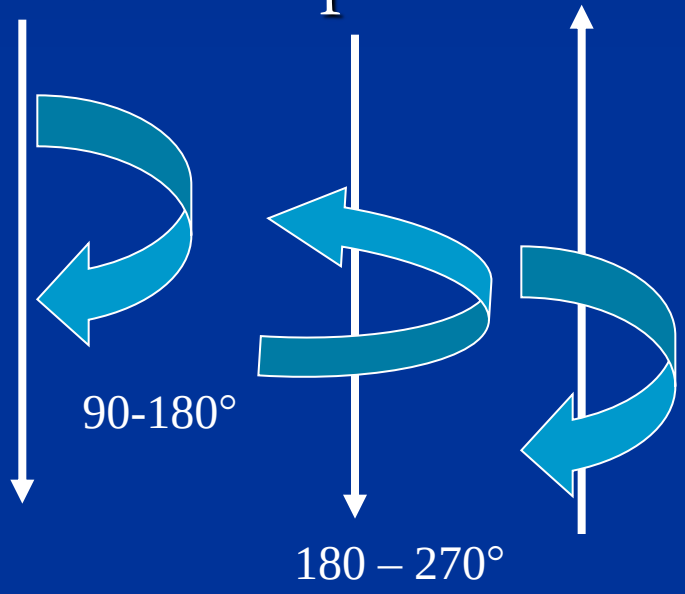


H- file

K – file

# Instrumentation

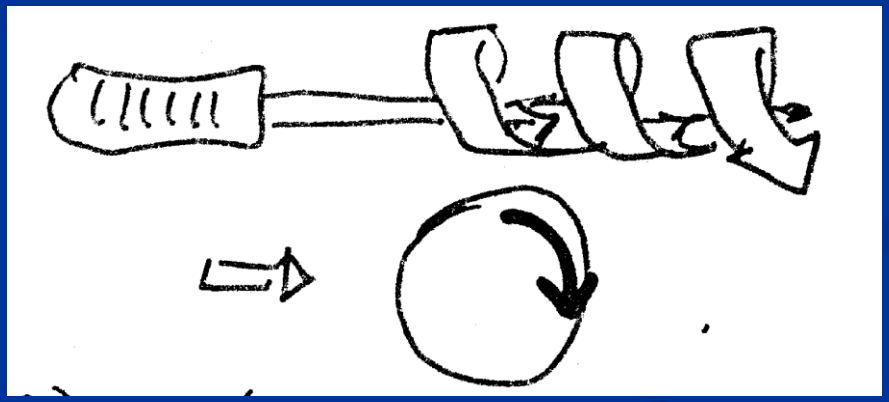
- Ttechnika balancované síly – nástroj o 1číslo větší než apikální velikost




K- flexofile

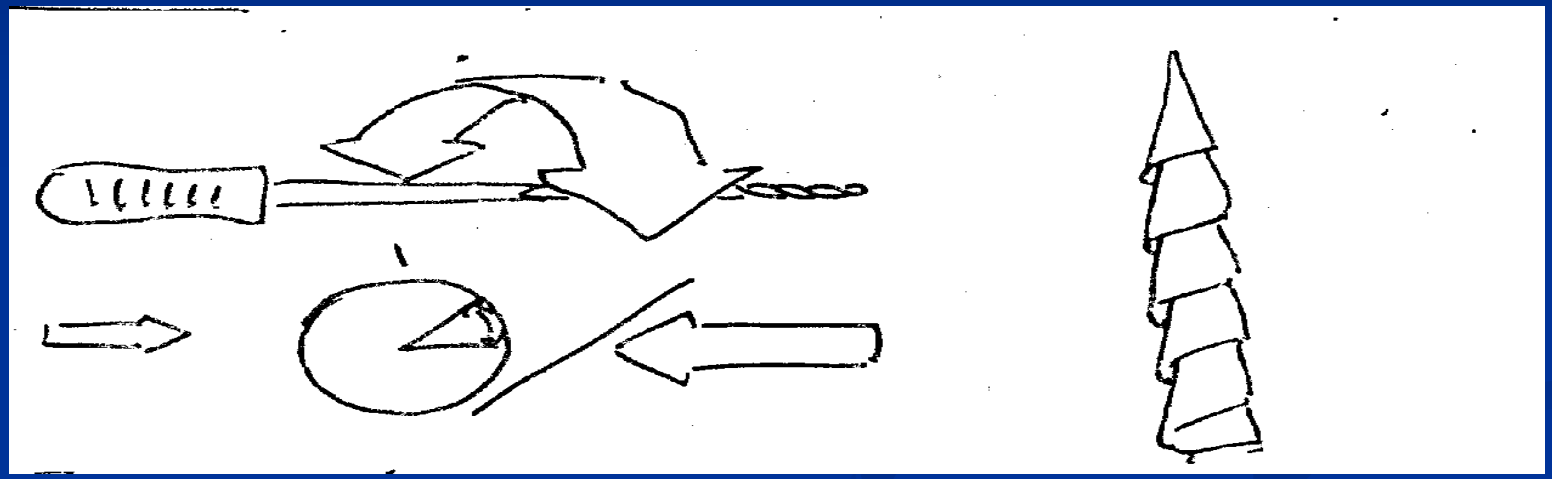
K – file (?)

# Reaming

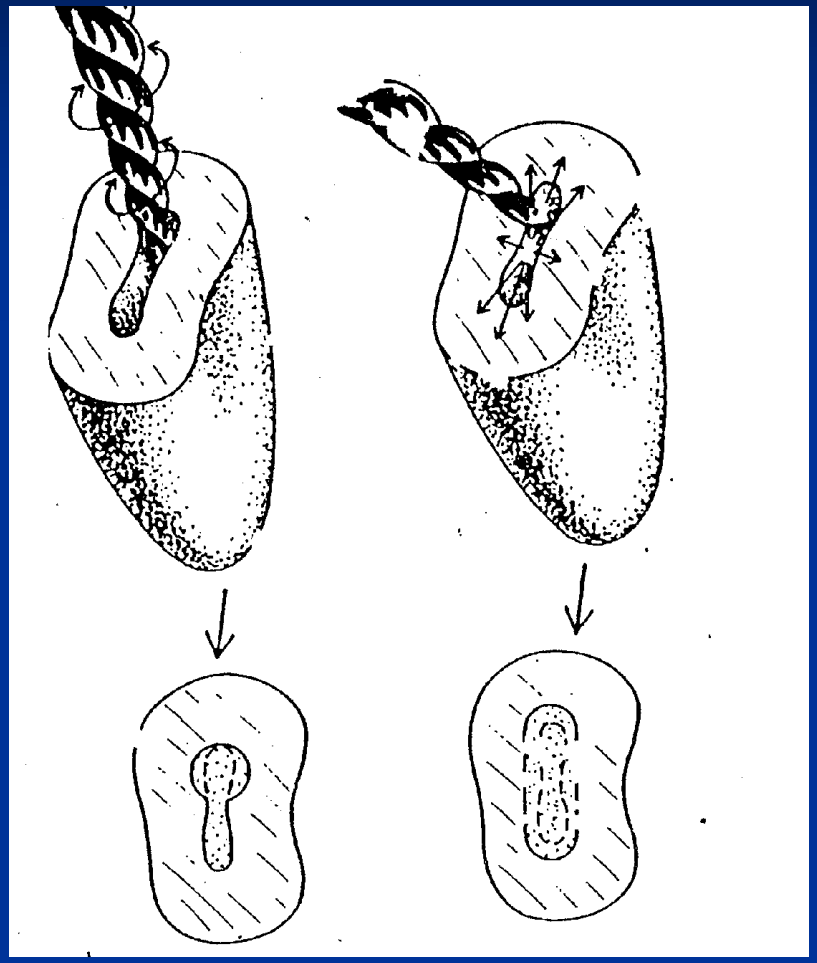


Simple clockwise rotation

# Filing



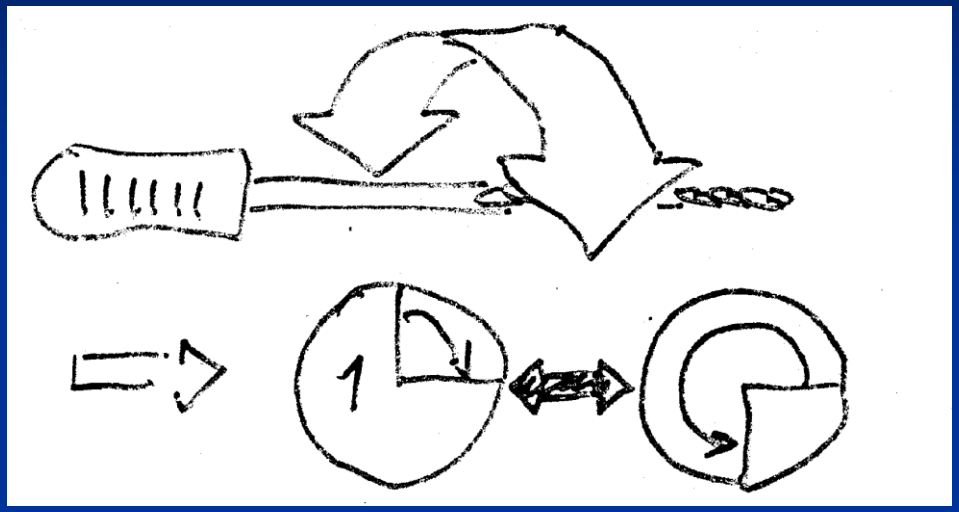
# Circumferential filing



H -file

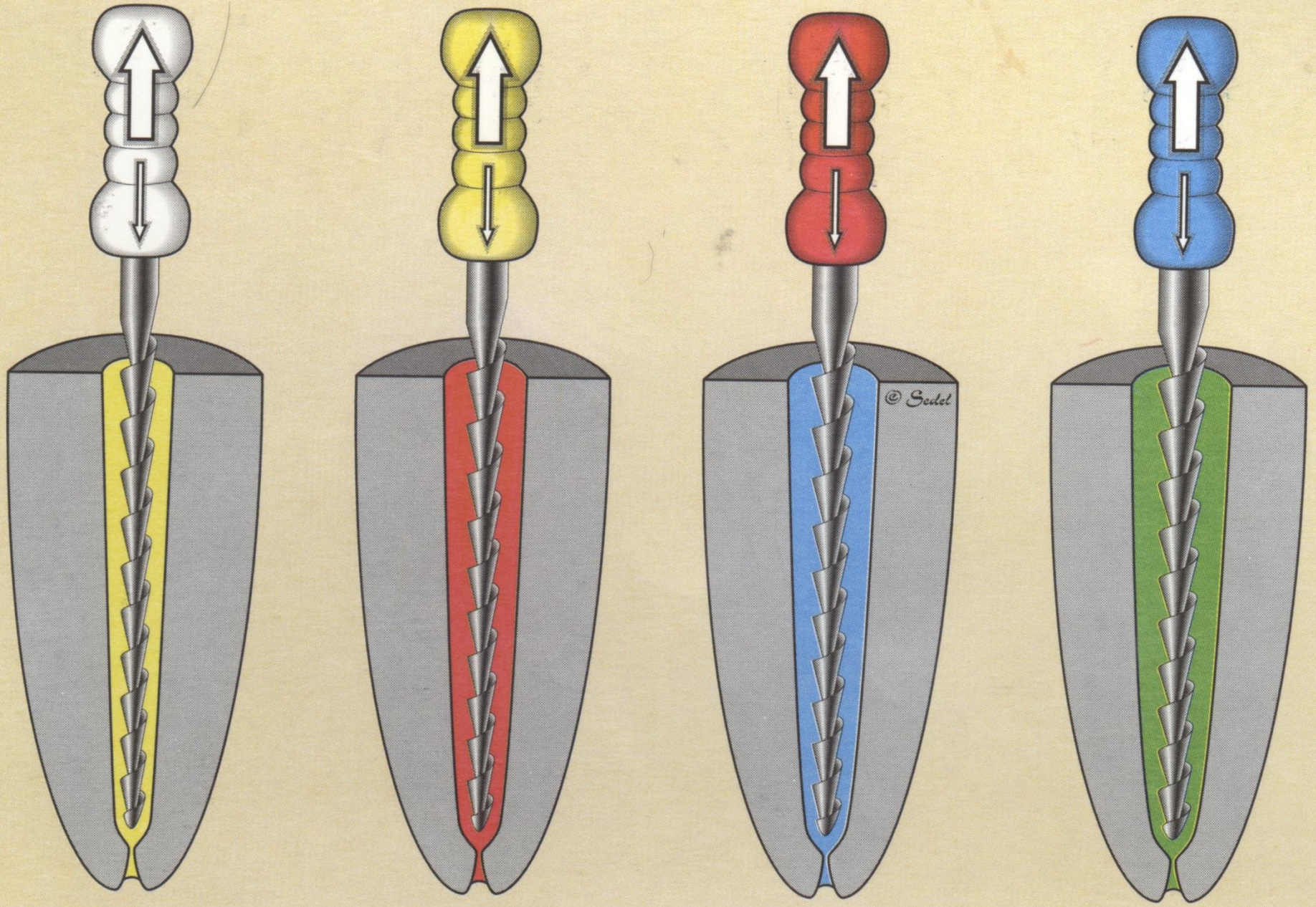
Introduction of th root canal instrument
root canal.
Pull motion – action.
Staying in contact with the root canal wall
Rotate without any action
Go in and pull with action.

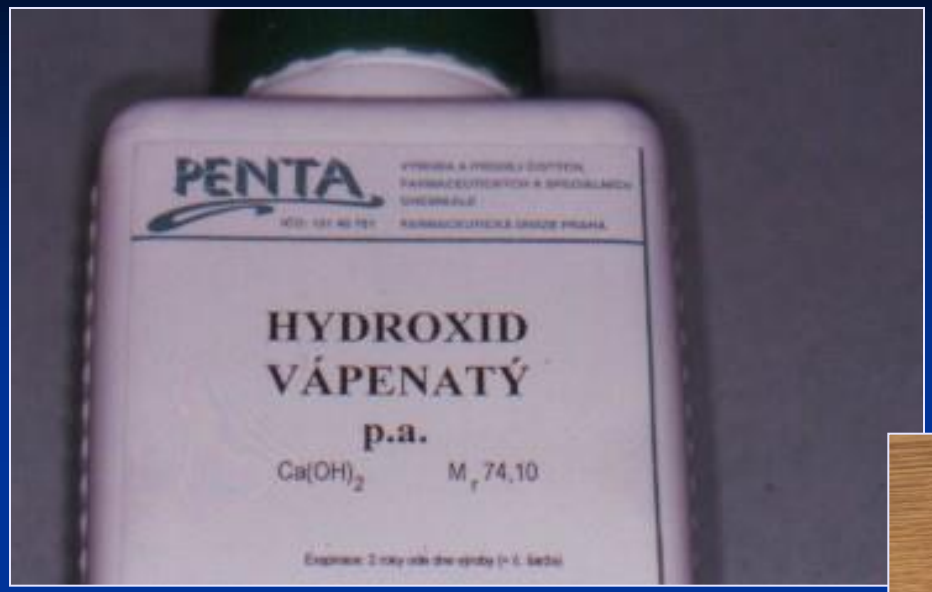
# Balance forced technique



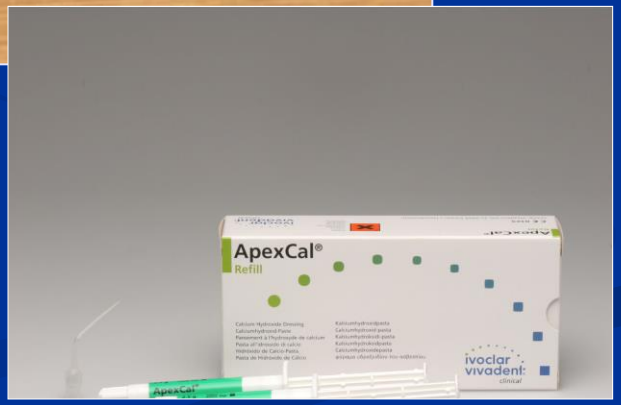

K- file
Flex O file
Fůlex R file

Go into the root canal rotating clockwise
90 – 180°
Until the contact
Slight pressure and rotate
Contraclockwise 270°
Pull out the instrument rotating clockwise again

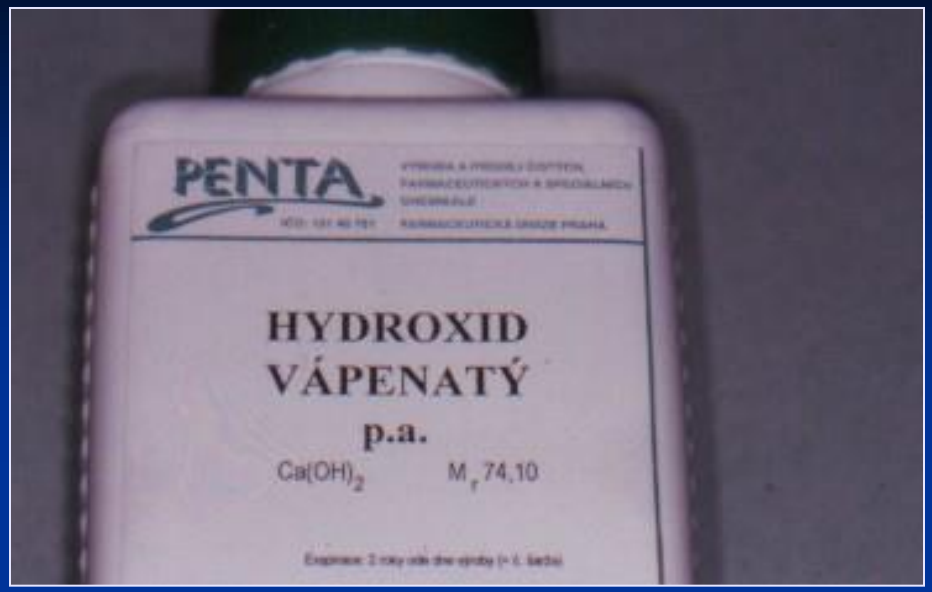

© Sedel


PENTA
HYDROXID
VÁPENATÝ
p.a.
Ca(OH)2
Mr 74,10

$Ca(OH)_2$


ApexCal®
Refill
ivoclar vivadent

**pH 12,5**

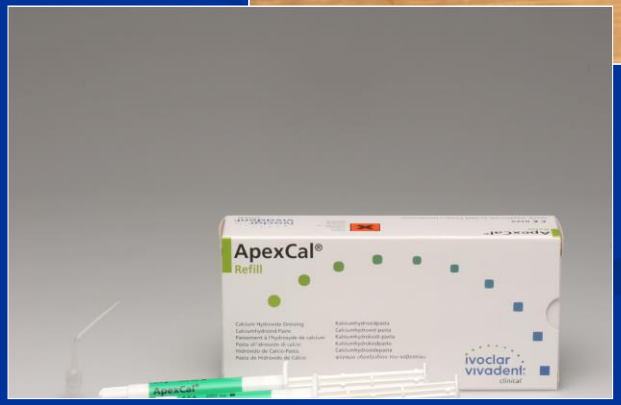


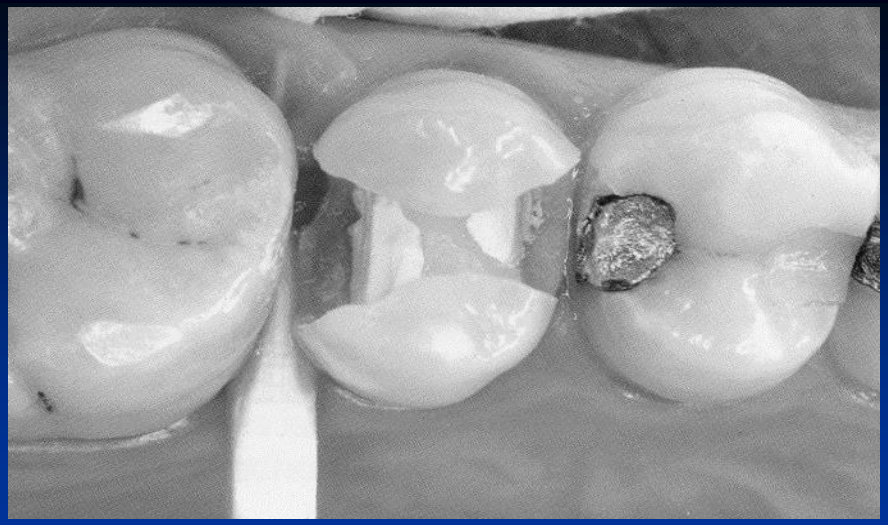

Antiflogistický

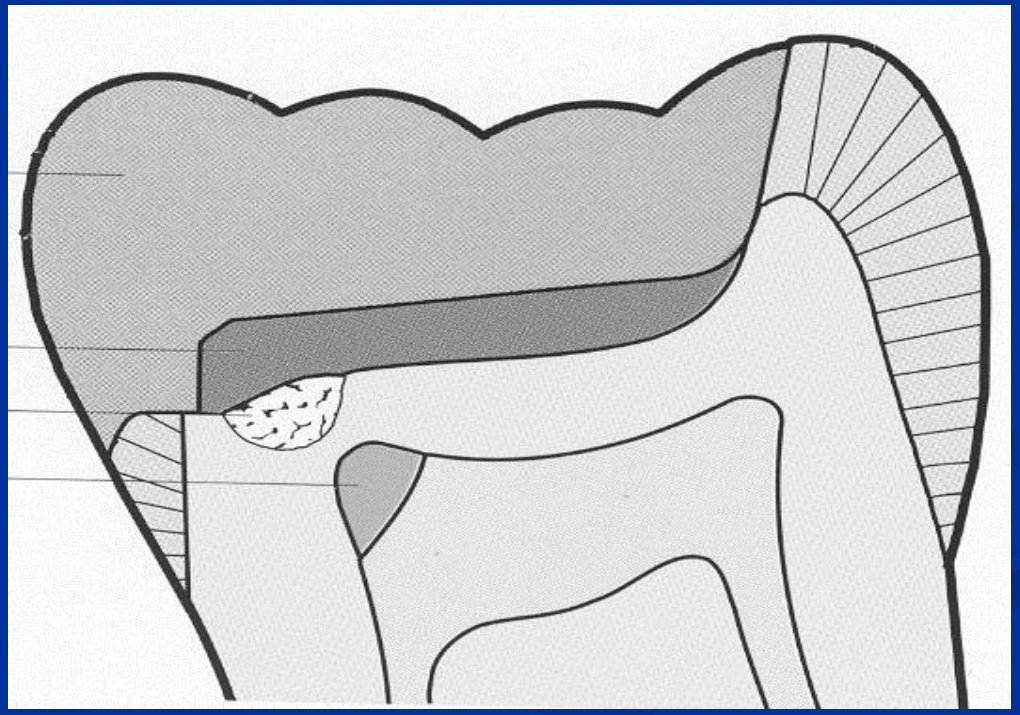
Dentinogenní

Antimikrobiální efekt

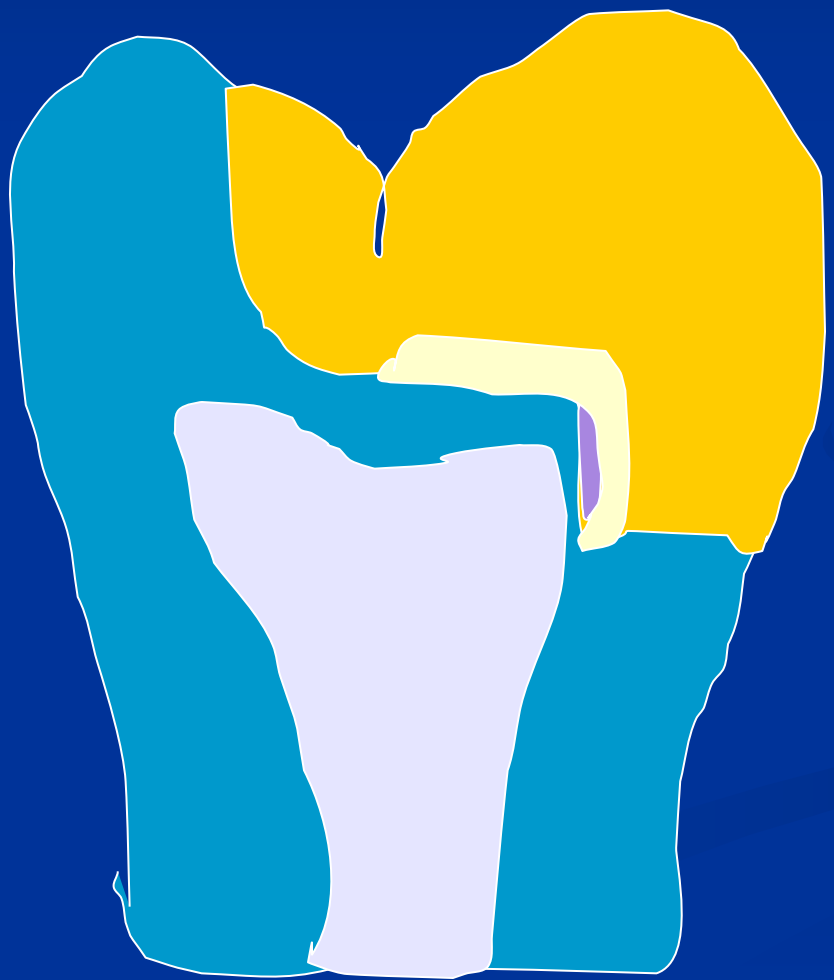
Suspenze
Cementy
Subbase
Kořenová výplň
- krátkodobě
- střednědobě
- dlouhodobě



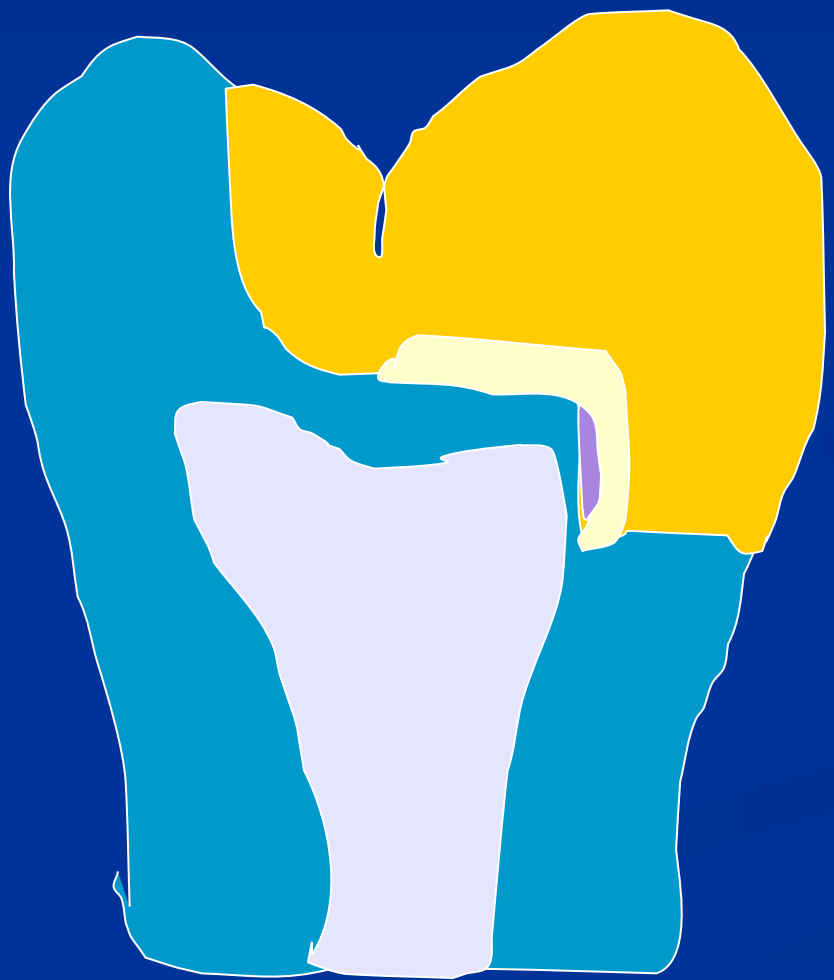




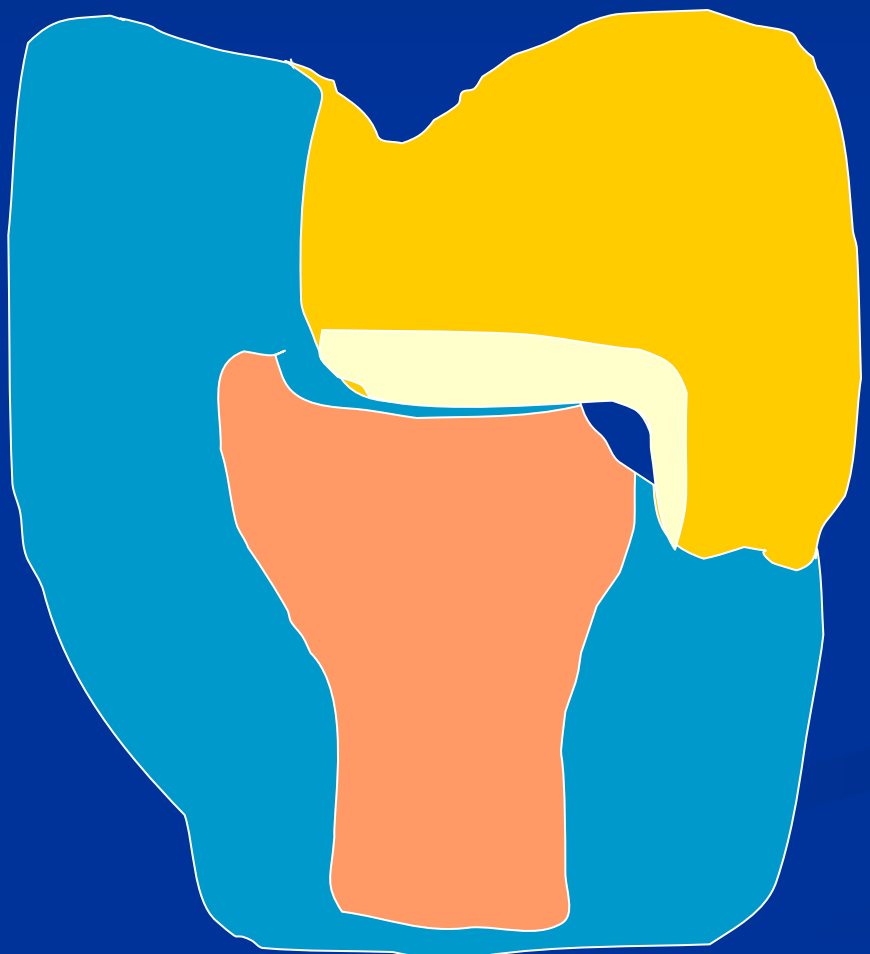
# Indirect pulp capping



# Intermittent excavation



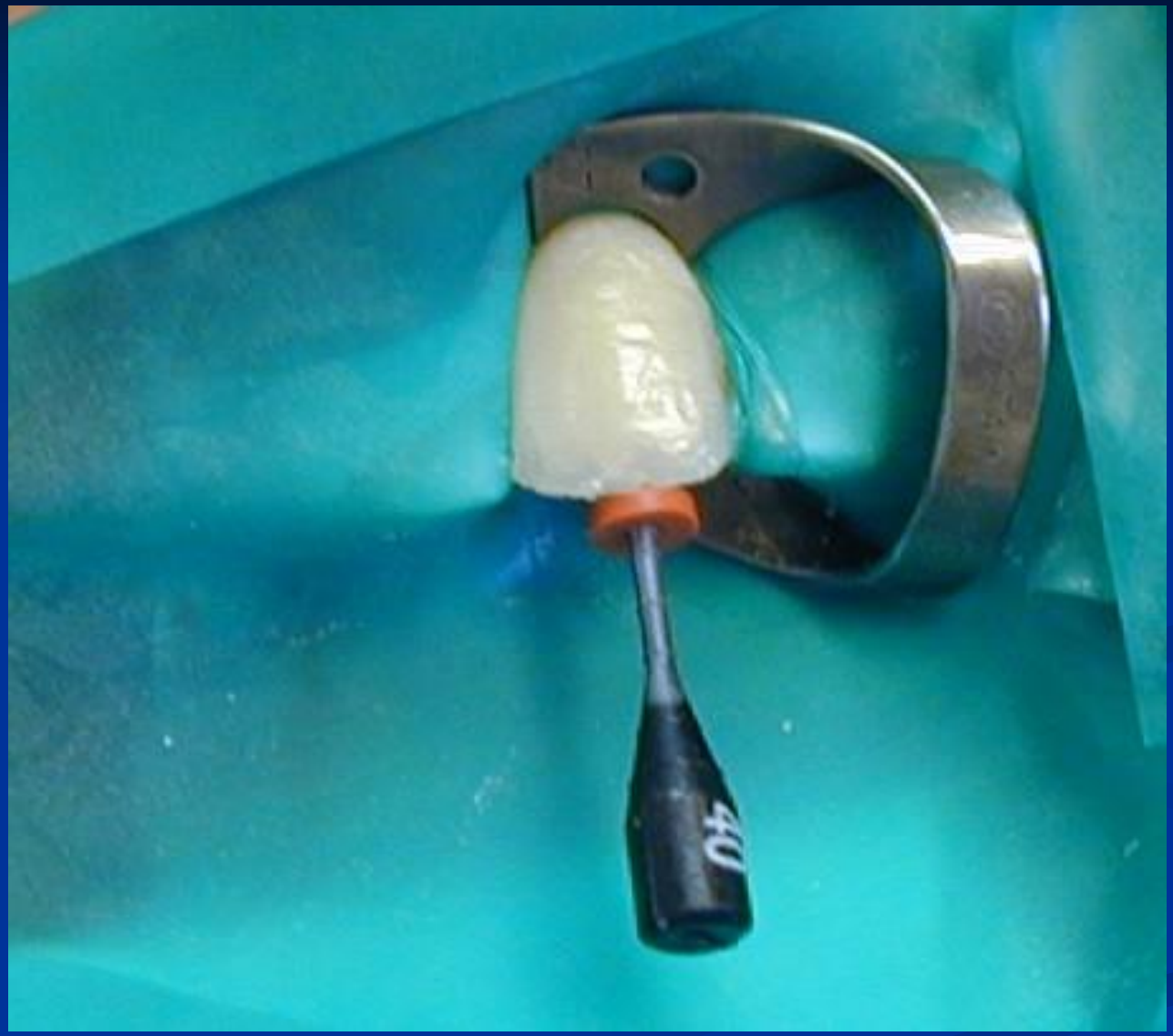
# Direct pulp capping

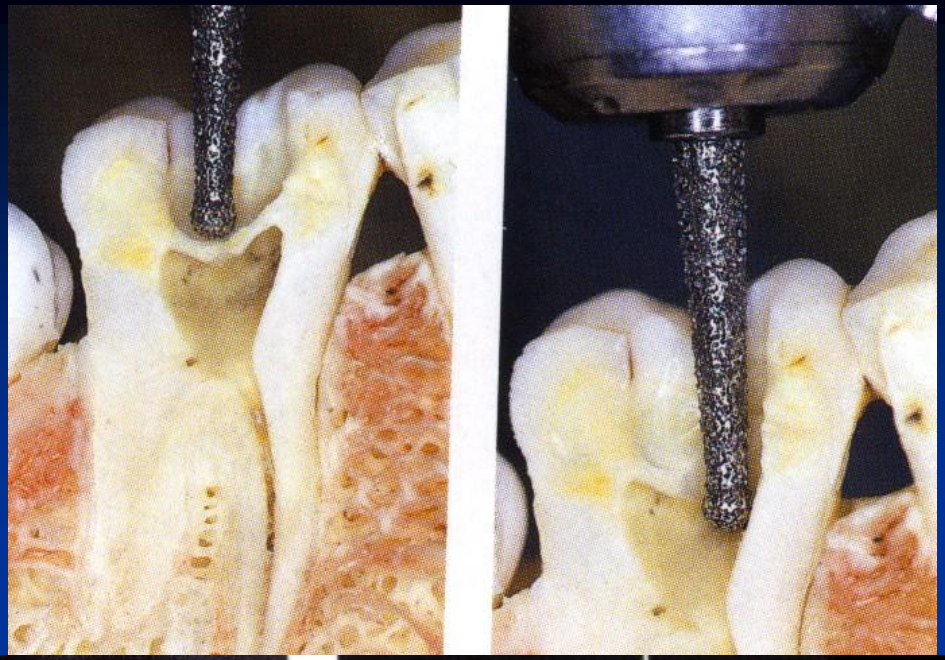


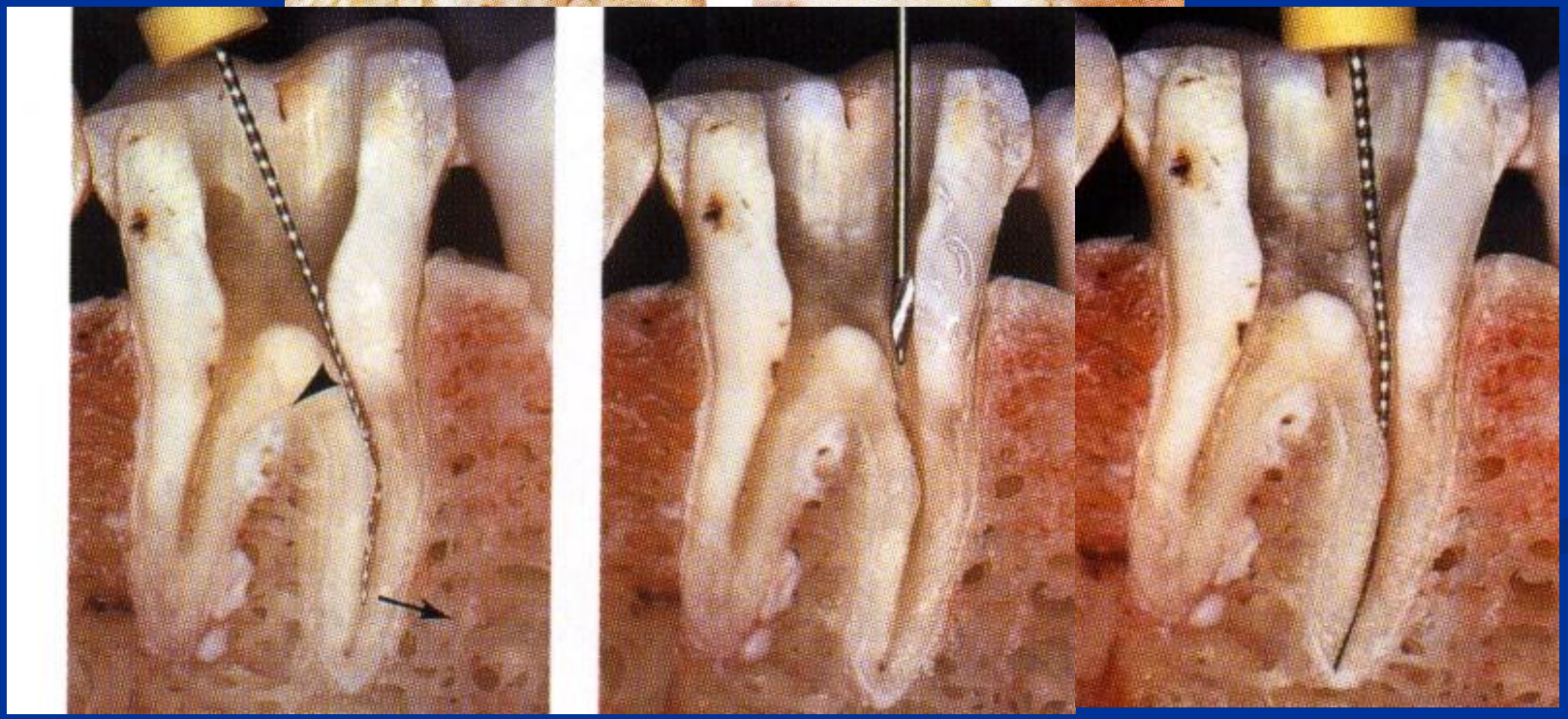
Directly on dental pulp

# Dentin bridge

- Rests of calcium hydroxide
- Connectice tissue
- Calcified connective tissue
- Dentin
- Predentin
- Odontoblasts


40





# Access

Dia trepan

Dia balls

Burs

# Snesení stropu dřeňové dutiny, vytvoření „usnadňující formy“

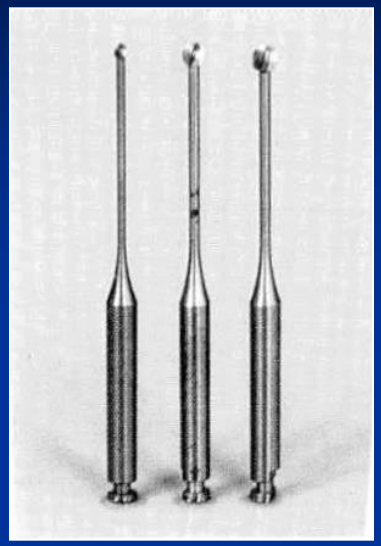
Dia trepan

Batt
(safe ended tips),

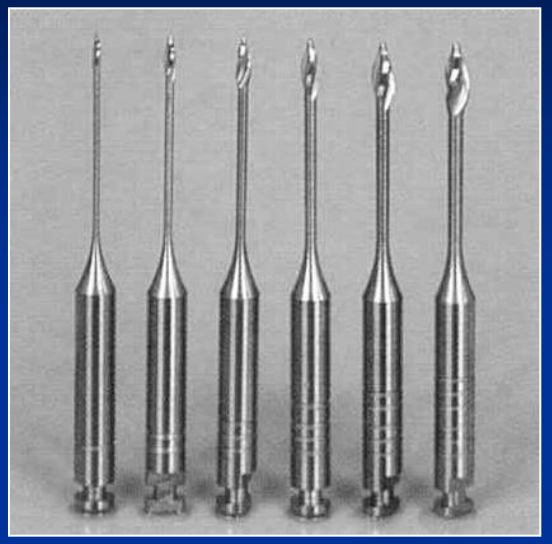
Fissure bur

# Location of root canals

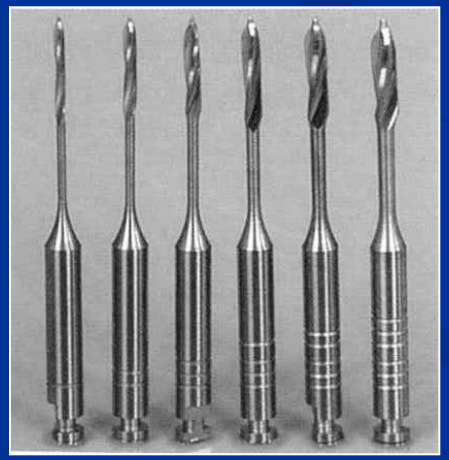
Ball burs



Millerś burs

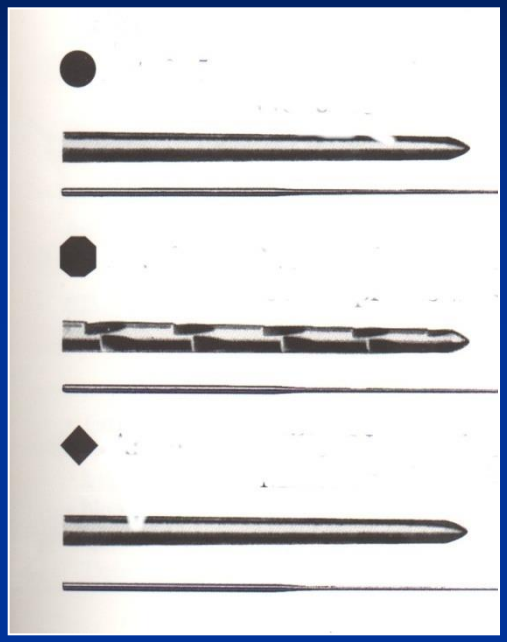


Gates Glidden

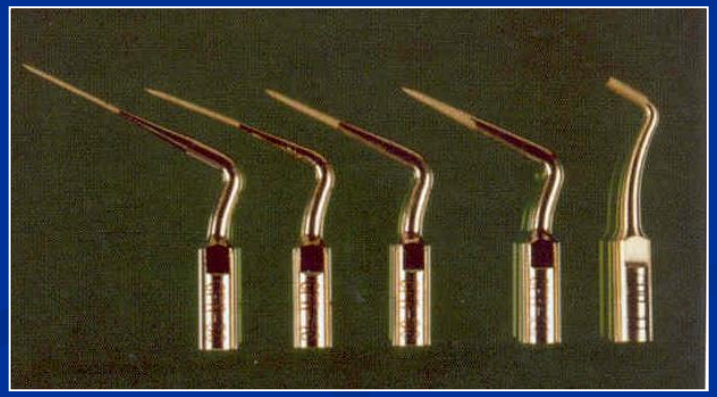


Peeso – Largo

# Location and shaping



Endodontic probes
Microopeners



Uz tips


Dye

# ULTRASONICS & ENDODONTICS

**Main reasons to use ultrasonics in endodontic applications**

***"Improved visualization combined with a more conservative approach when selectively removing tooth structure, particularly in difficult situations in which a specific angulation or tip design permits access to restricted areas, offers opportunities that are not possible with conventional treatment"***

***JOE – "Ultrasonic in Endodontics" Feb 2007***

## Compared to burs/rotating instruments:

- better view of the operative field
- greater cutting precision (better control of the amount of dentin removed)

# TECHNICAL FEATURES

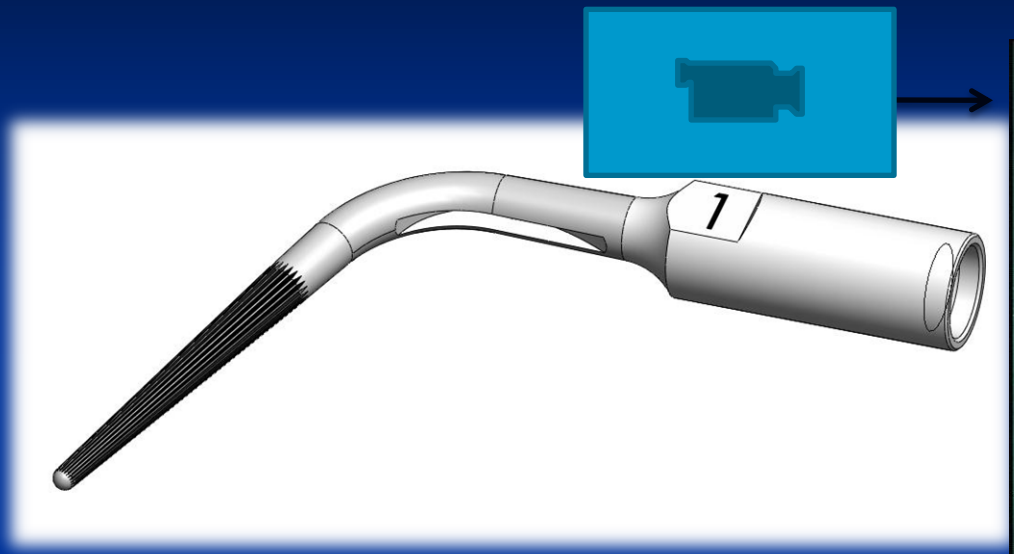
- **Hard-Tempered Stainless Steel**

- **Micro Milled Active Part**
  - → minimized risk of potential diamond grit loss in the patient's mouth

- **Water port**
  - → cools down the insert and avoids overheating the treated tooth (particularly important when removing metal posts)
  - → the intermittent use of irrigation enables the clinician to alternate between dry precision work and debris evacuation

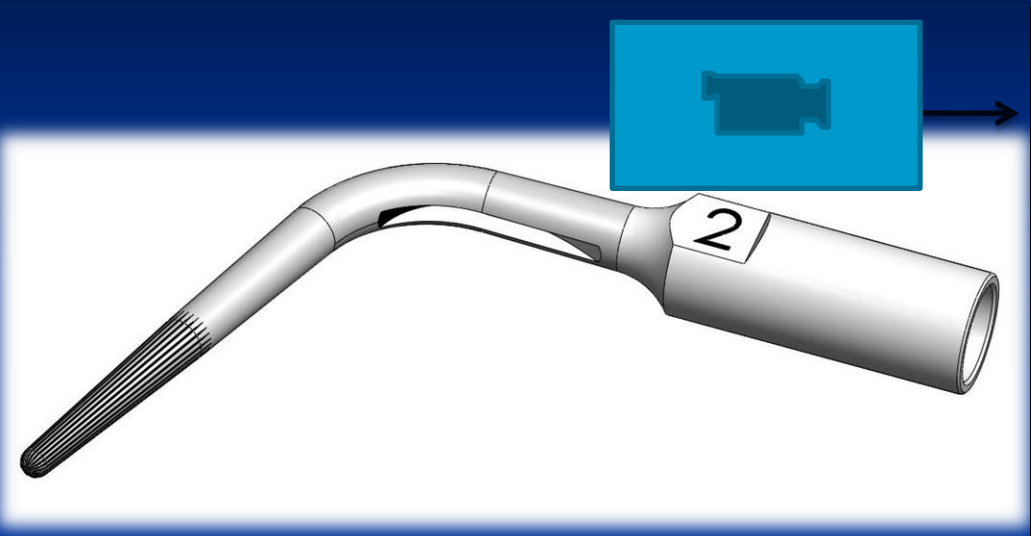
- **Two threads – Satelec type and EMS type**

# START-X™ #1 – ACCESS CAVITY WALLS REFINEMENT




- Non active tip → avoids accidentally damaging the pulp chamber Floor
- Active lateral part → eliminates interferences for a direct access into the canal

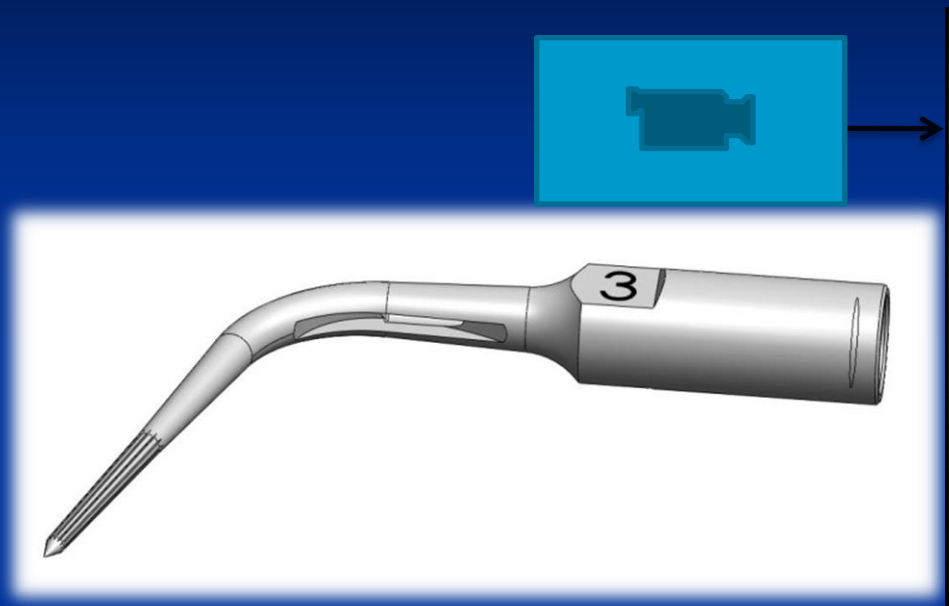
# START-X™ #2 – MB2 CANAL SCOUTER





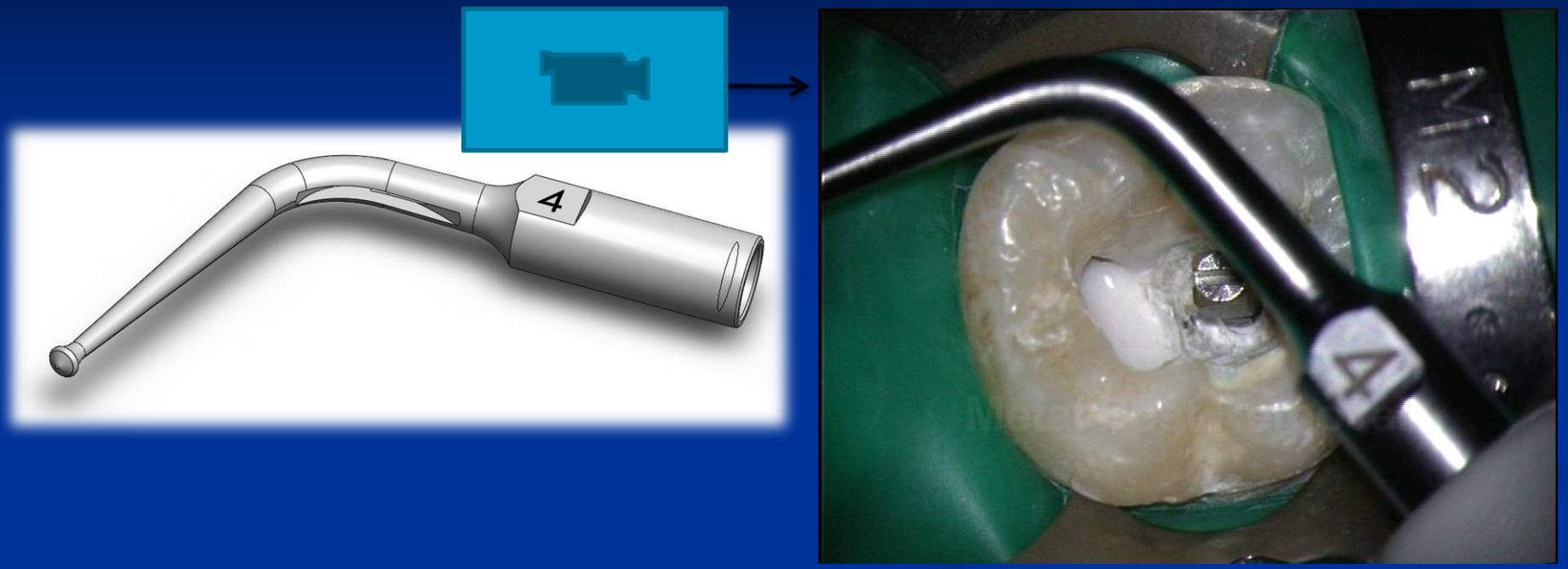
- Active tip → transports the orifice of the MB2 from its original location (underneath the mesial wall) to the floor of the pulp chamber
- Active lateral part → eliminates interferences for a direct access into the canal

# START-X™ #3 – CANAL OPENINGS SCOUTER



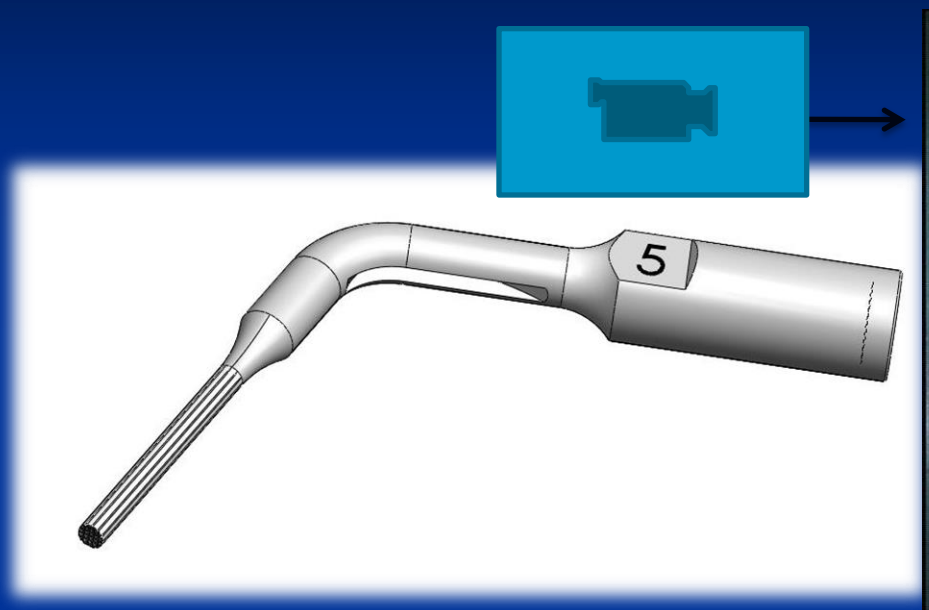

- Active tip → removes the obstructions that prevent a straight access to the canal (calcifications, filling materials, pulp stones)

# START-X™ #4 – METAL POST REMOVAL




- Specific design → suitable for working efficiently both on the top and on the sides of the metal post
- Water port → avoids over heating

# START-X™ #5 – PULP CHAMBER FLOOR





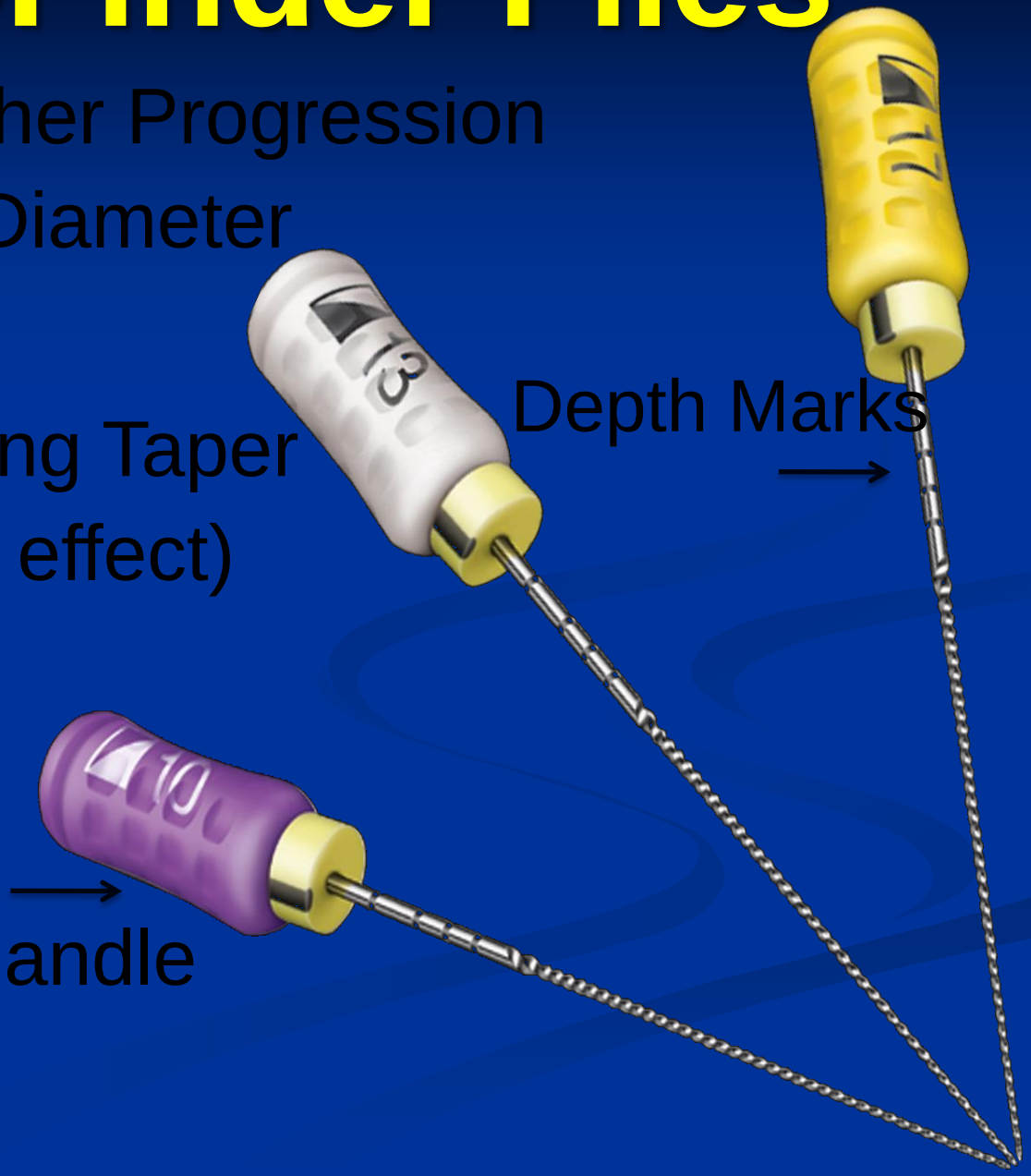
- Active tip → canal orifice location made easier thanks to the removal of calcifications and filling materials that hide the original floor anatomy
- Thin & cylindrical → good visibility

# GLIDE PATH

# ProFinder Files

Smoother Progression
in Tip Diameter

Variable Decreasing Taper
(avoids taper lock effect)

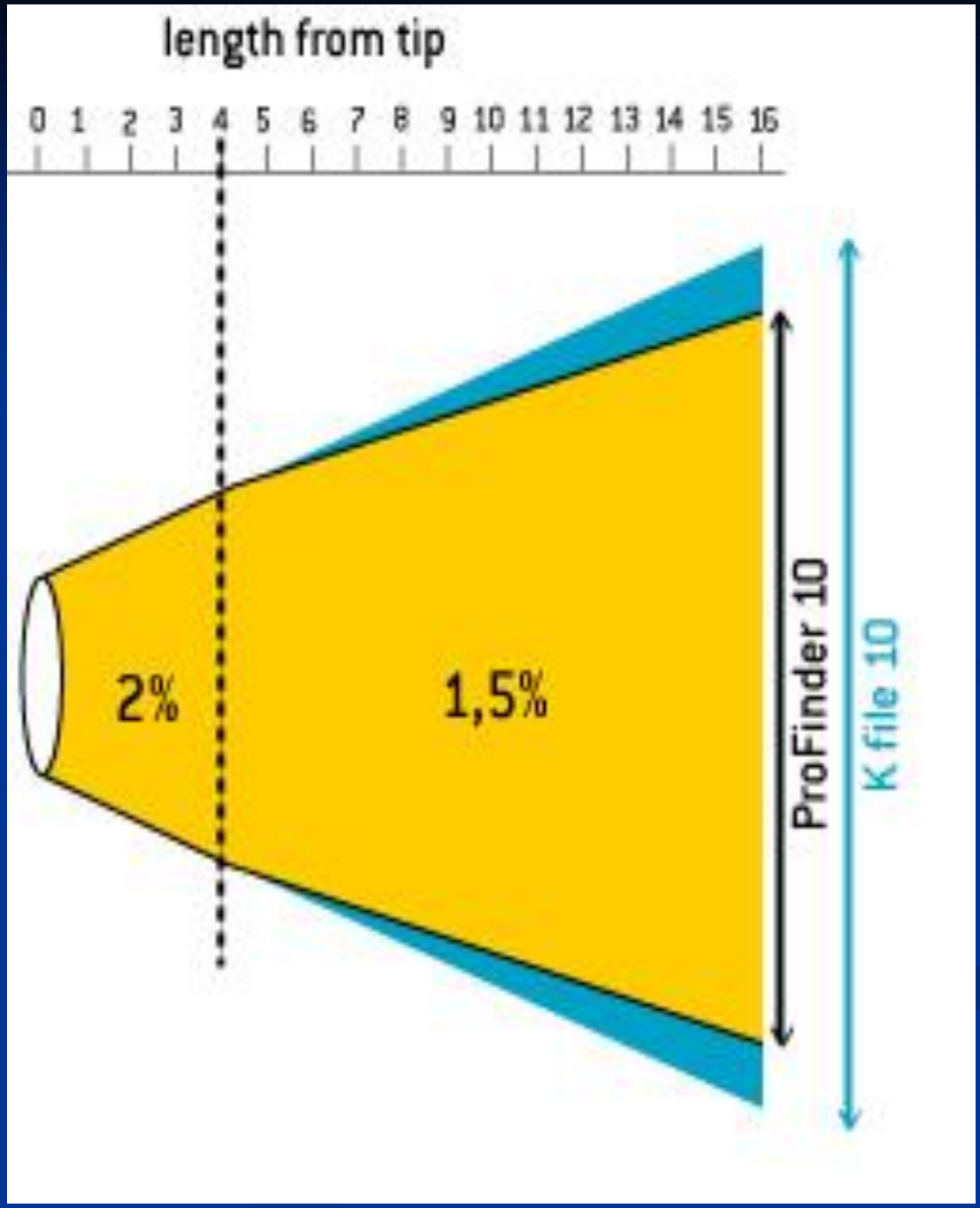


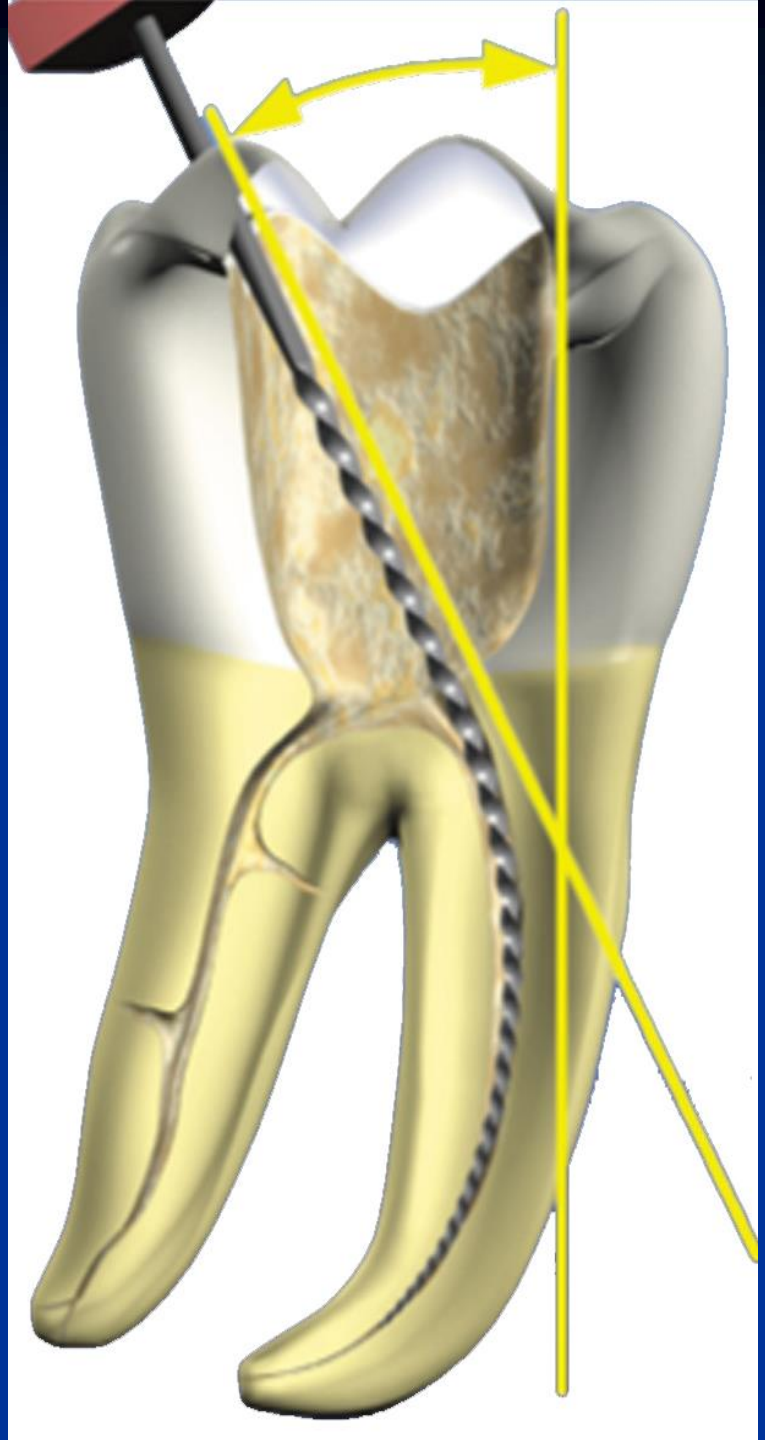
# ProFinder Files

Decreasing Variable Taper avoids Taper Lock Effect

=

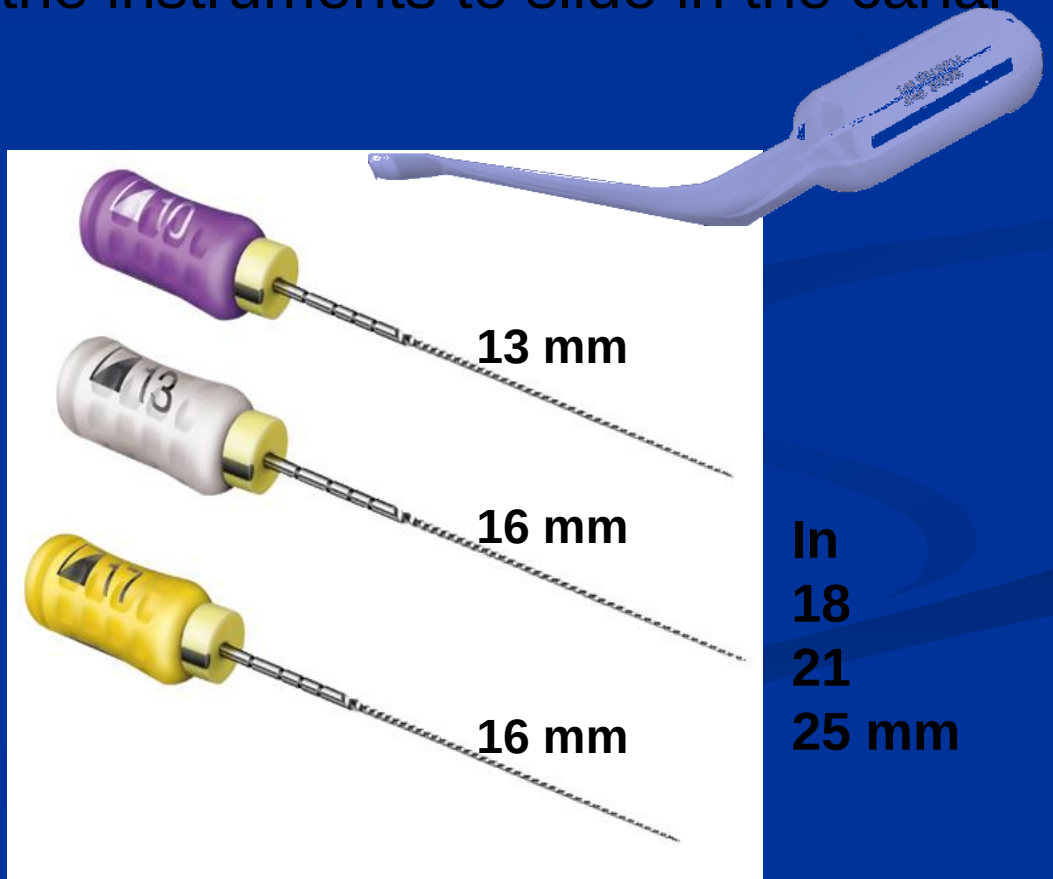
Allows deeper scouting of the canal





# Scout the canal with ProFinder Files 10, 13 & 17

The lubricating action of Glyde helps the instruments to slide in the canal

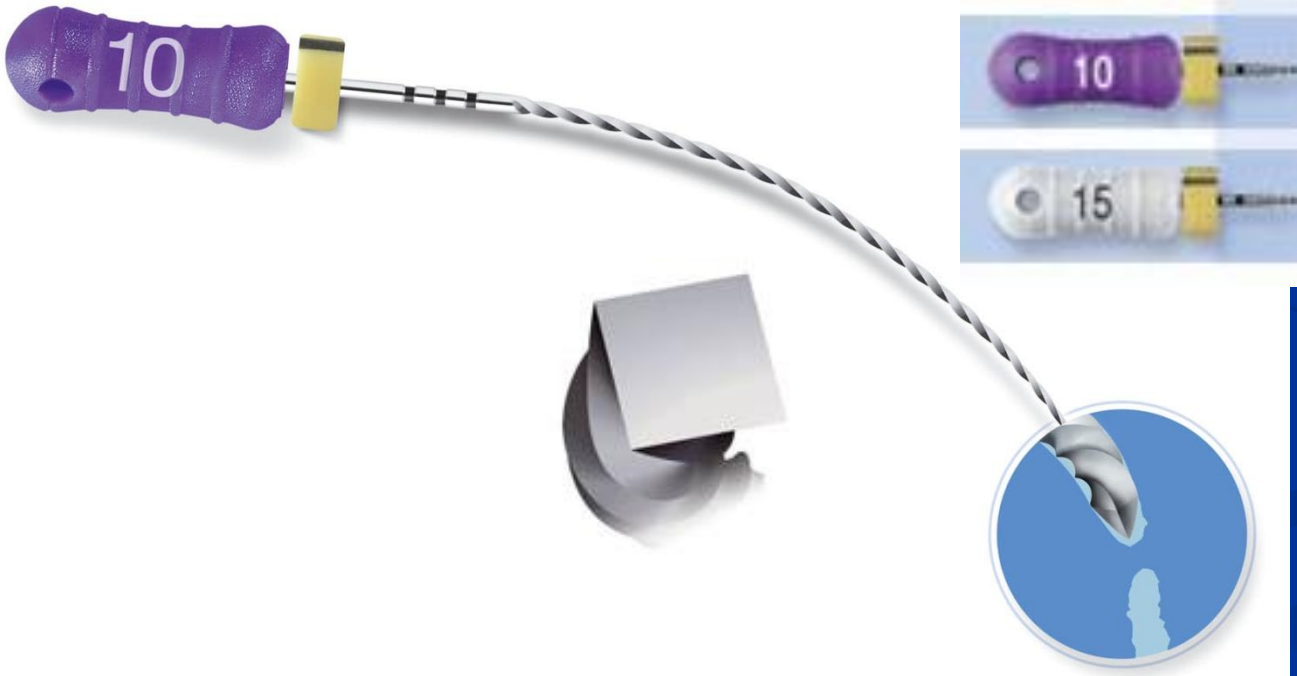



In
18
21
25 mm

# C+Files

**The ideal files for initial instrumentation of the root canals (catheterization)**


**in**
**18**
**21**
**25 mm**




# PathFile™

A new range of 3 NiTi files for mechanical Glide Path and preflaring

# PREFLARING & GLIDE PATH– IMPORTANCE

- **Glide Path** is an essential step:

  - **to fully understand and appreciate the anatomy of the canal to be treated (i.e. mentally develop a three dimensional image of the canal system to shape)**

  - **to reduce the risk of rotary instrument breakage**

# MANUAL PREFLARING – PROBLEMS

- The initial preflaring and glide path are normally carried out with stainless steel hand files.

- Because of the relative stiffness of these instruments, it can be difficult to avoid the risk of:

  - canal transportation
  - ledges
  - apical zip

# PATHFILE™ – THE NEW SOLUTION

- PathFile™, a new rotary Nickel-Titanium solution for Mechanical Glide Path and Preflaring

- A new range available in 3 ISO sizes (013, 016 and 019) and 3 lengths (21, 25 and 31mm).

  Flexible and resistant to cyclic fatigue, they offer many advantages compared to manual solutions.

# PATHFILE™ – FEATURES & BENEFITS

## NiTi – Square Section – 2% Taper

- high strength against cyclic fatigue
- flexibility

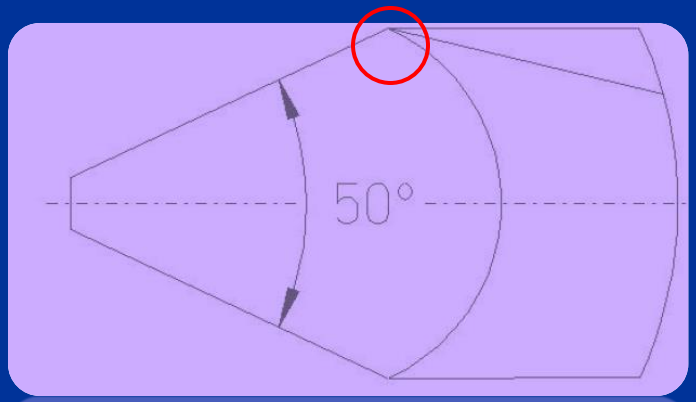
## Tip diameters (013-016-019)

- gradual increase that facilitates the progression of the files without the need for strong axial pressure

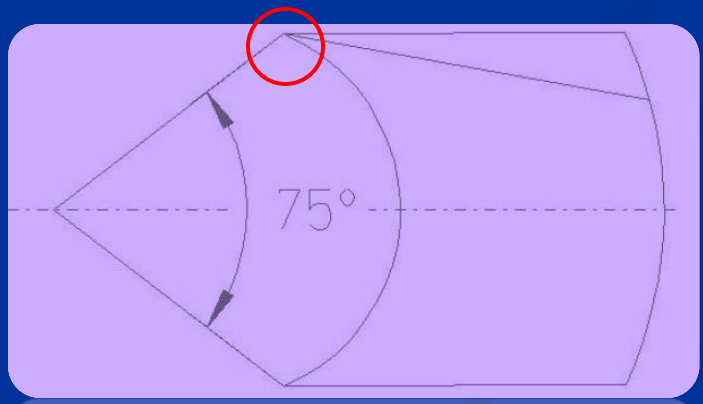
# PATHFILE™ – FEATURES & BENEFITS

## Tip design (transition angle reduction)

- Reduced risk of ledges and canal transportation




PathFile™




K-File

# PATHFILE™ – STANDARD SEQUENCE

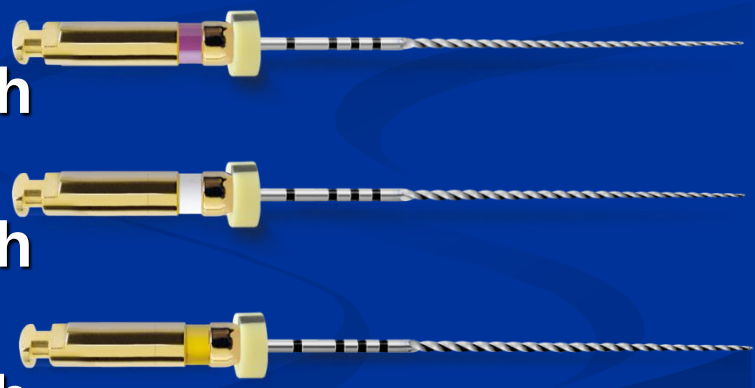
- Scout and negotiation with a **standard K-File #010** until it can move smoothly along the canal

- With same file, working length determination in combination with an Apex locator

- **PathFile™ #013** to working length

- **PathFile™ #016** to working length

- **PathFile™ #019** to working length



  - Canal shaping with any NiTi rotary system

# PATHFILE™ – OTHER SEQUENCES

## LARGE AND EASY CANALS

- If it is possible to reach the full working length with a K-File #020, the Glide Path is not necessary and no PathFile™ will therefore have to be used.

## "INTERMEDIATE" CANALS

- If the user feels, during the initial scouting with the K-File 010, that the canal is rather wide, the recommendation is to use either PathFile™ 016 and 019 or even only PathFile™ 019.

## THIN, CUVED, CALCIFIED CANALS

- In these cases the standard sequence is recommended, i.e. PathFile™ 013, 016 and 019

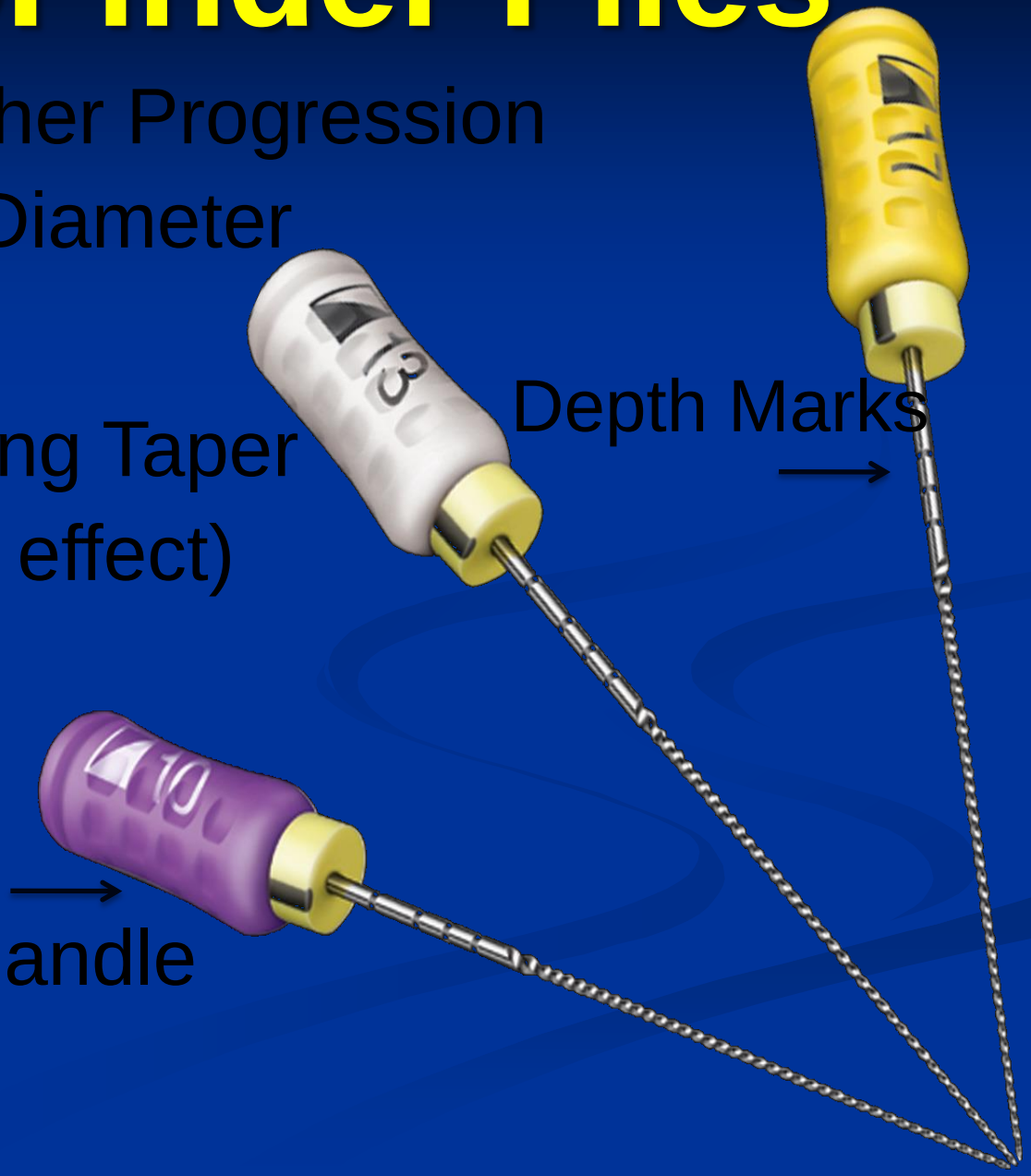
# PATHFILE™ – DIRECTIONS FOR USE

- Rotation speed ≈ 300 rpm
- Instruments should be used with a delicate in/out movement until they reach the full length. Strong axial forces should therefore be avoided.
- Time needed to reach working length normally does not exceed 3-5 seconds/file
- The rotating motion will carry debris in a coronal direction

# ProFinder Files

Smoother Progression
in Tip Diameter

Variable Decreasing Taper
(avoids taper lock effect)

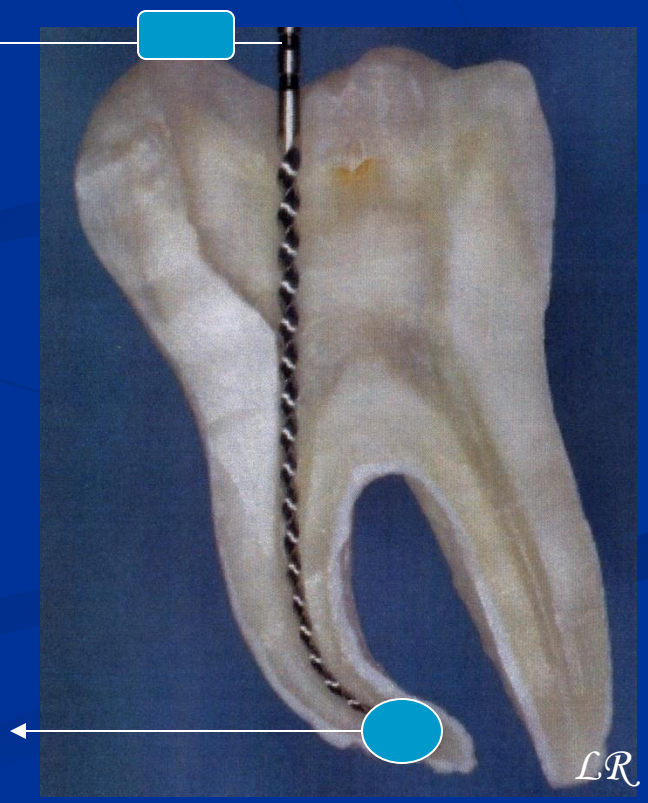


# Working length

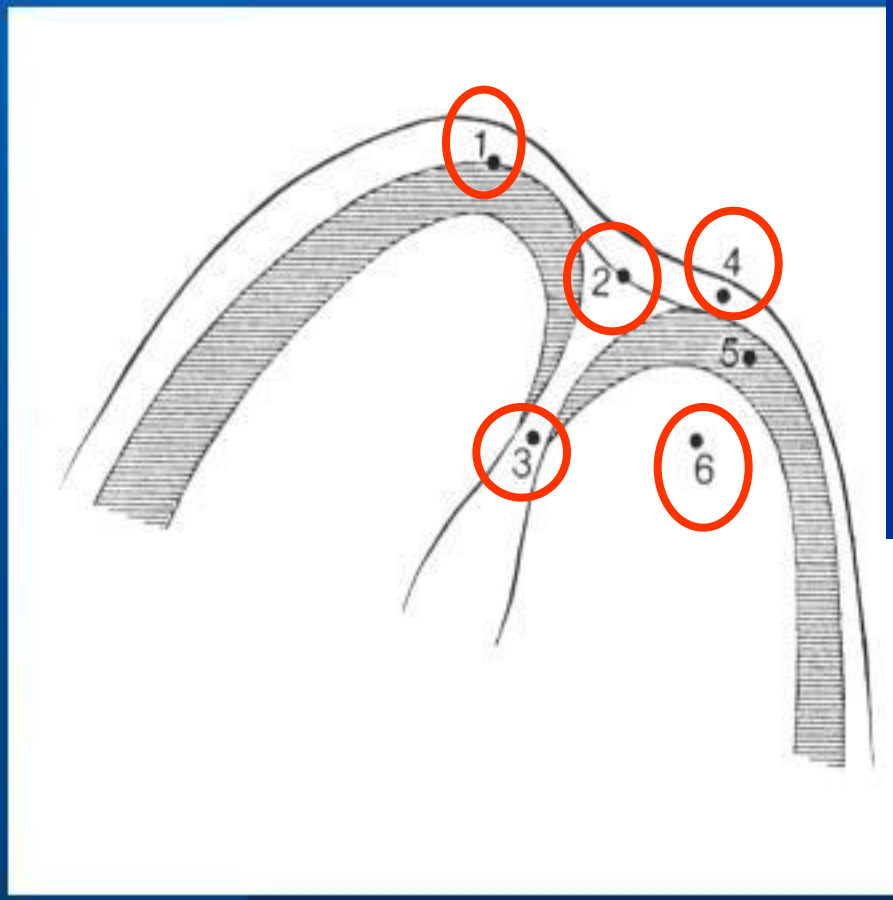
- Distance between referential point on tooth crown an apical constriction

X- ray (safe length, estimation of the position of the apical constriction)

Apexlocators



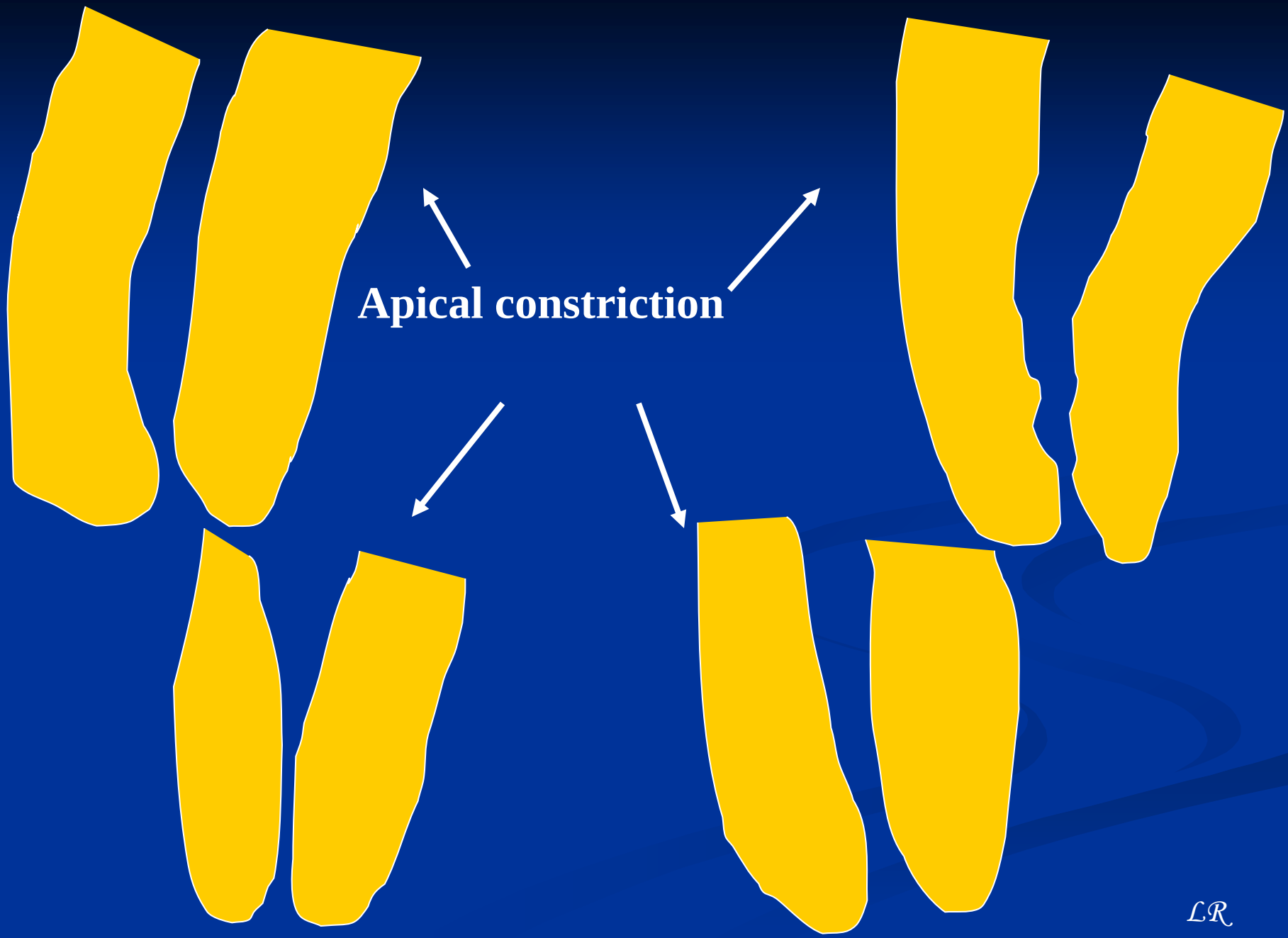
# Apical morphology




1. X-ray apex
2. Apical foramen
3. Apical constriction
4. Periodontal ligament
5. Root cementum
6. Dentin

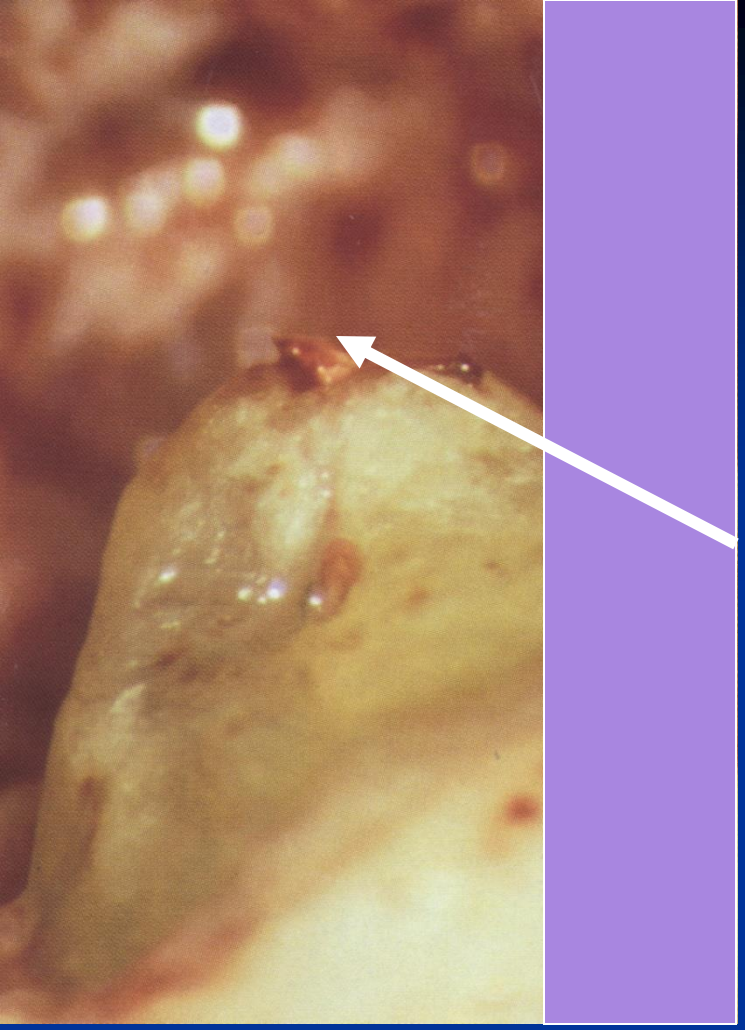
Podle Guldenera a Langelanda

LR


Apical constriction

# Why RTC terminates in apical constriction?

- Small apical communication
- Less risk of damage pof periodontium
- Prevention of overfilling
- Prevention of apical transport of infected metarial
- Possibility of good removal of debris
- Good compaction of guttapercha



Skutečnost

X-ray apex

LR

# Principle of apexlocators

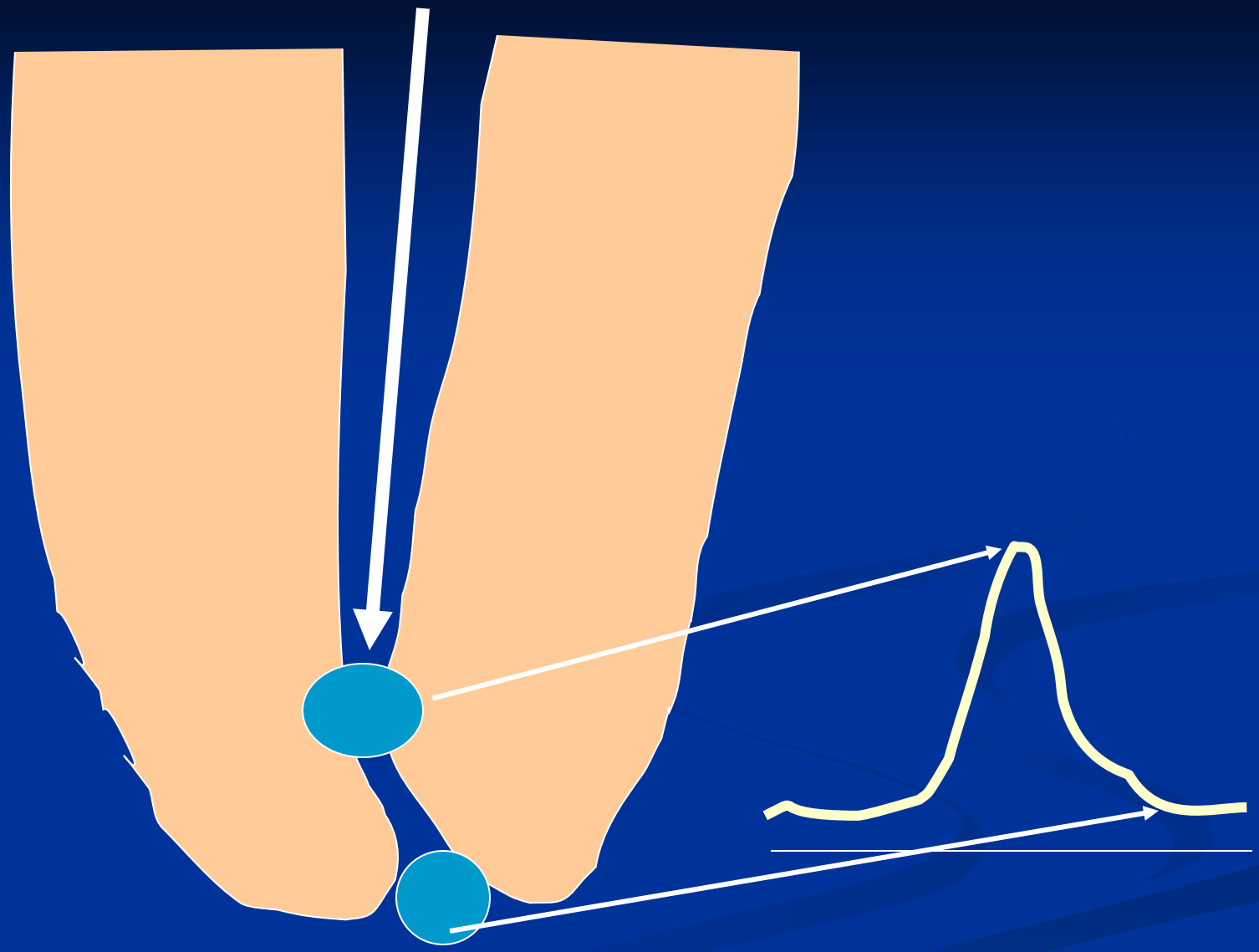
**Measurement of impedance**

**Apexlocator can:**

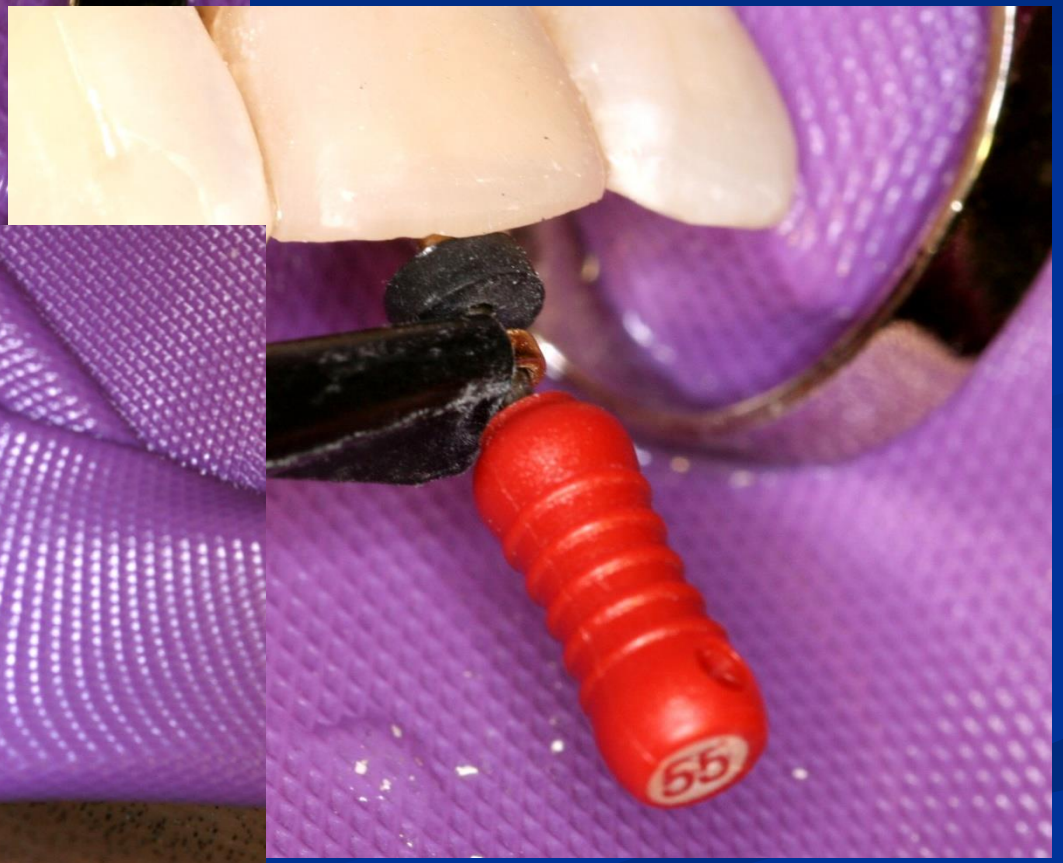
**find the apical constriction**
**no irradiation**
**fals results (abundant irrigation, gingival polyps, metal posts or crowns, too dry root canal)**

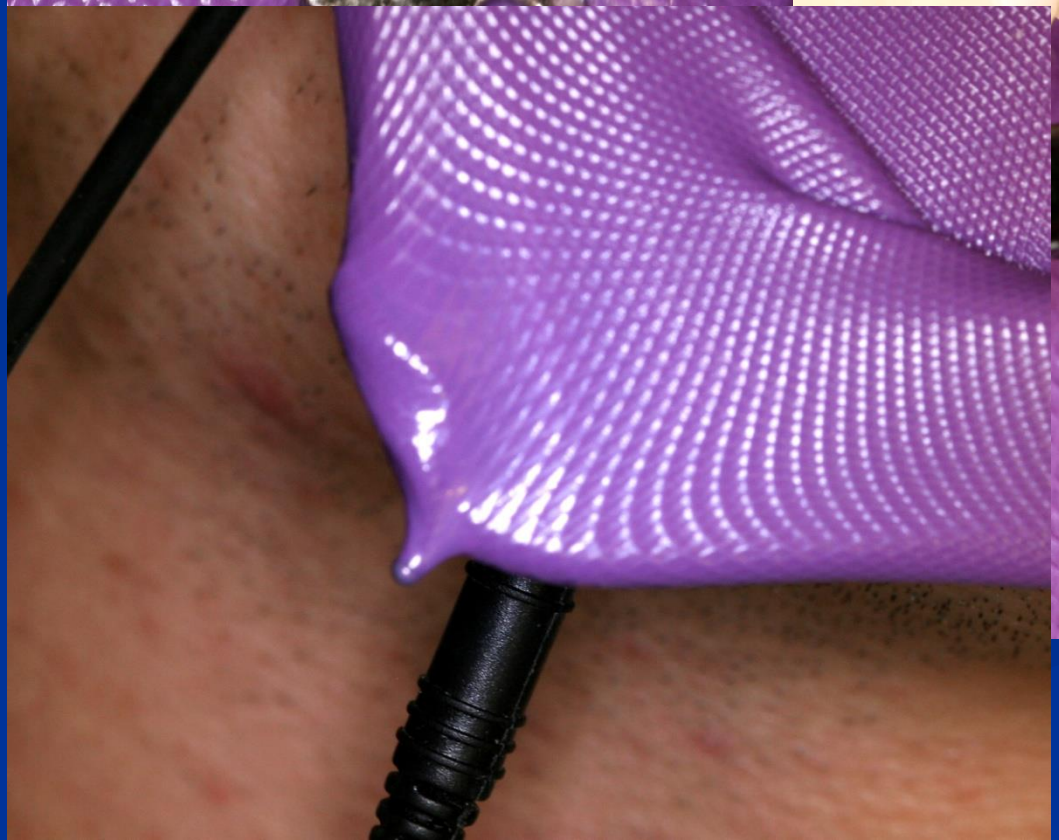
**Best results combination apexlocator plus x ray.**

*LR*



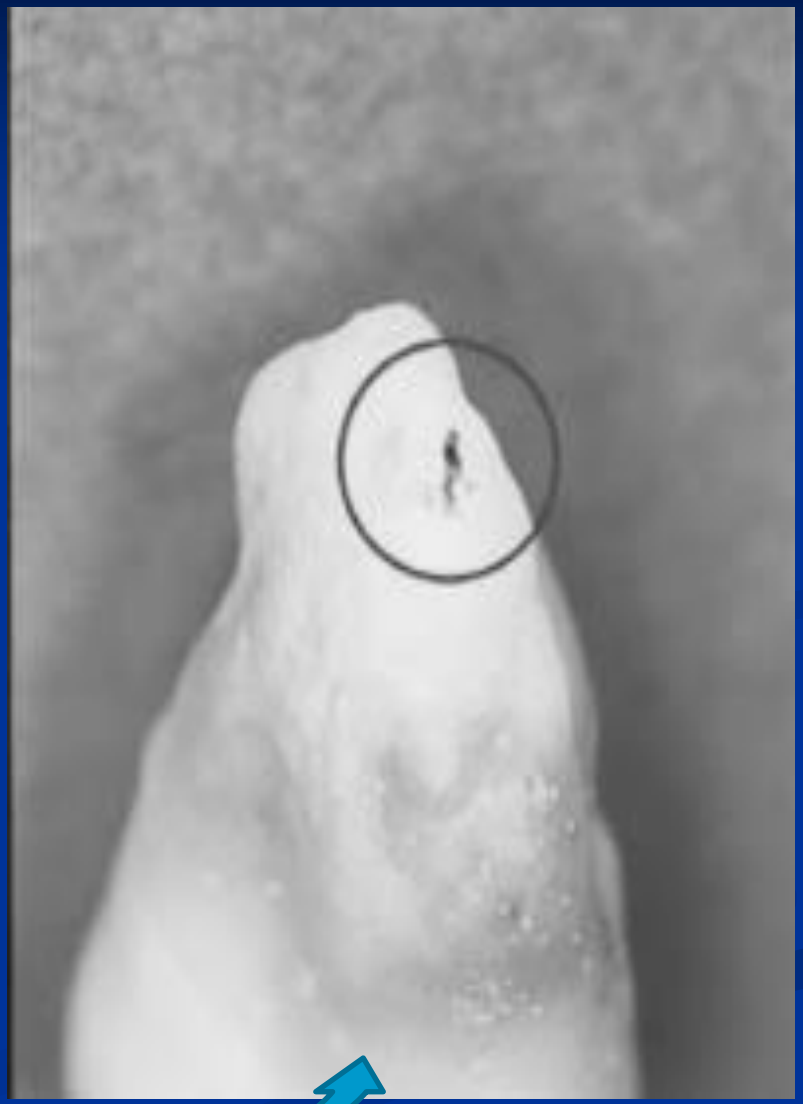
LR

LR

# WORKING LENGTH DETERNIMATION

# Electronic Apex Locators



DENTSPLY
MAILLEFER

DENTSPLY
MAILLEFER


# X-SMART™ DUAL


## Motor & Apex Locator

# Root canal shaping
# - hand
# - power driven

- Nickeltitanium alloy

56 % nickel, 44% titanium,

60% nickel, 40 % titanium

Flexibility

Memory effect

Cutting effect

Fractures

Taper 2%

$d_2$

$d_1$

$d_2 = d_1 + 0{,}32$

Stainless steel instruments

Flexibility with 2% taper

0,02 mm na 1mm

Taper 4%

$d_2$

Ni-Ti allows higher flexibility
Higher taper can be used, flexible enough

$d_2 + 0,64$

$d_1$

0,04mm na 1 mm

Taper 6%

$d_2$

Ni-Ti allows higher flexibility
Higher taper can be used, flexible enough

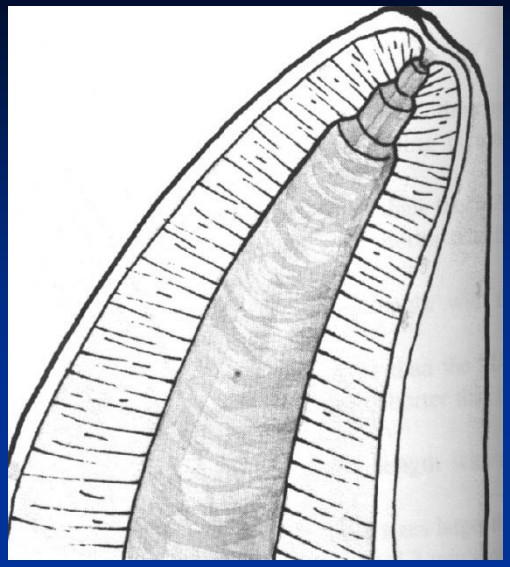
$d_2=d_1+0,96$

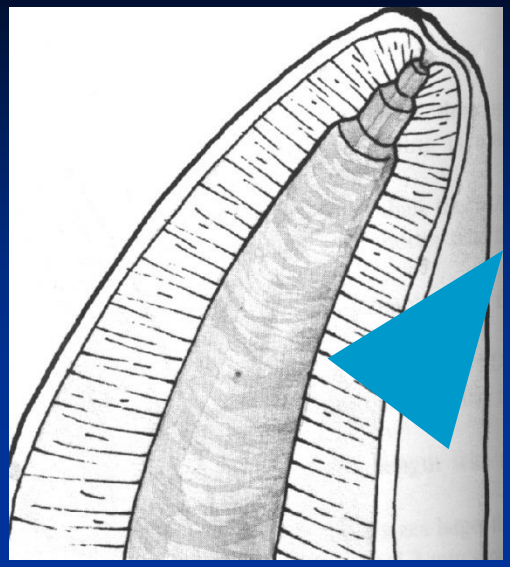
$d_1$

0,06mm na 1 mm

# Higher taper

**Good coronal access**
**Higher effectivity of irrigation**
**Good approach to the apical part of the root canal**
**Good conditions for the root canal filling**





**2% taper**

| | | |
|---|---|---|
| 30 | u apexu | 0,30 mm |
| 35 | 1 mm od apexu | 0,35 mm |
| 40 | 2 mm od apexu | 0,40 mm |
| 45 | 3 mm od apexu | 0,45 mm |

**6% taper**

| | | |
|---|---|---|
| 30 | u apexu | 0,30 mm |
| 30 | 1 mm od apexu | 0,36 mm |
| 30 | 2 mm od apexu | 0,42 mm |
| 30 | 3 mm od apexu | 0,48 mm |

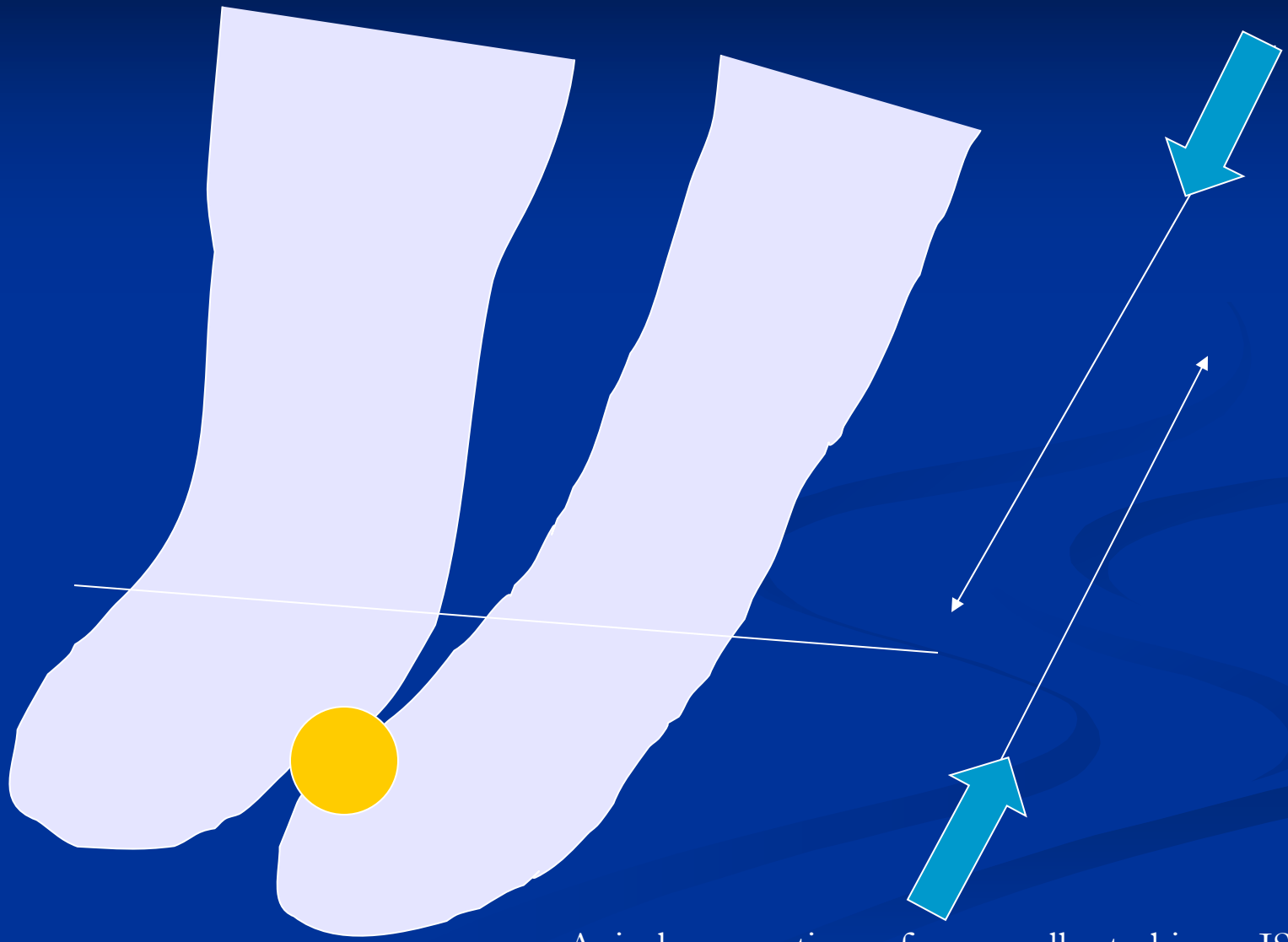
***One instrument with the taper 6%***
***4 instruments with the taper 2%***

**Crown down phase**
Blue - easy
Red - middle
Yelow - difficult
**Apical preparation**:
Green

Bigger taper and
ISO size first

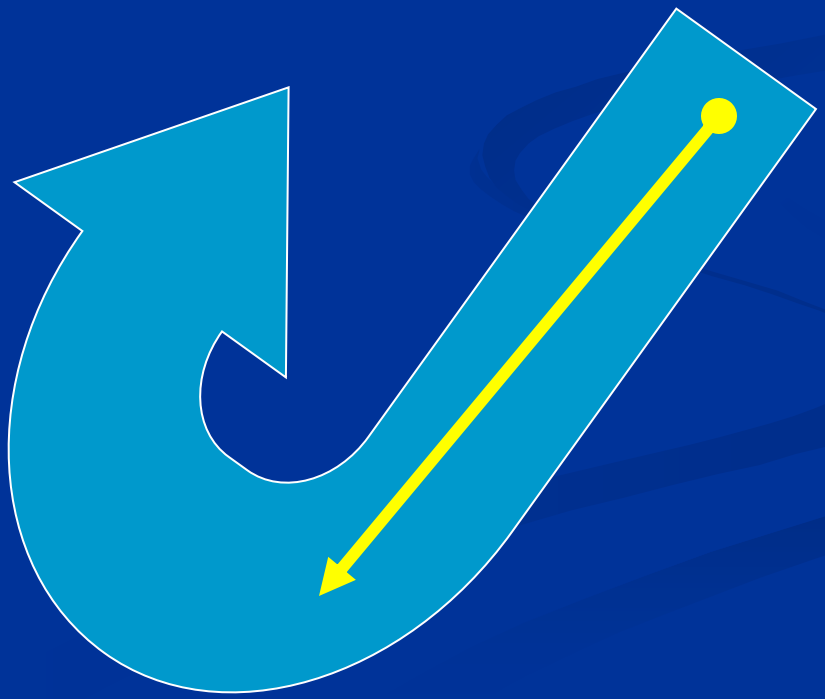
# Crown down

Crown down – from bigger taper and ISO size to smaller

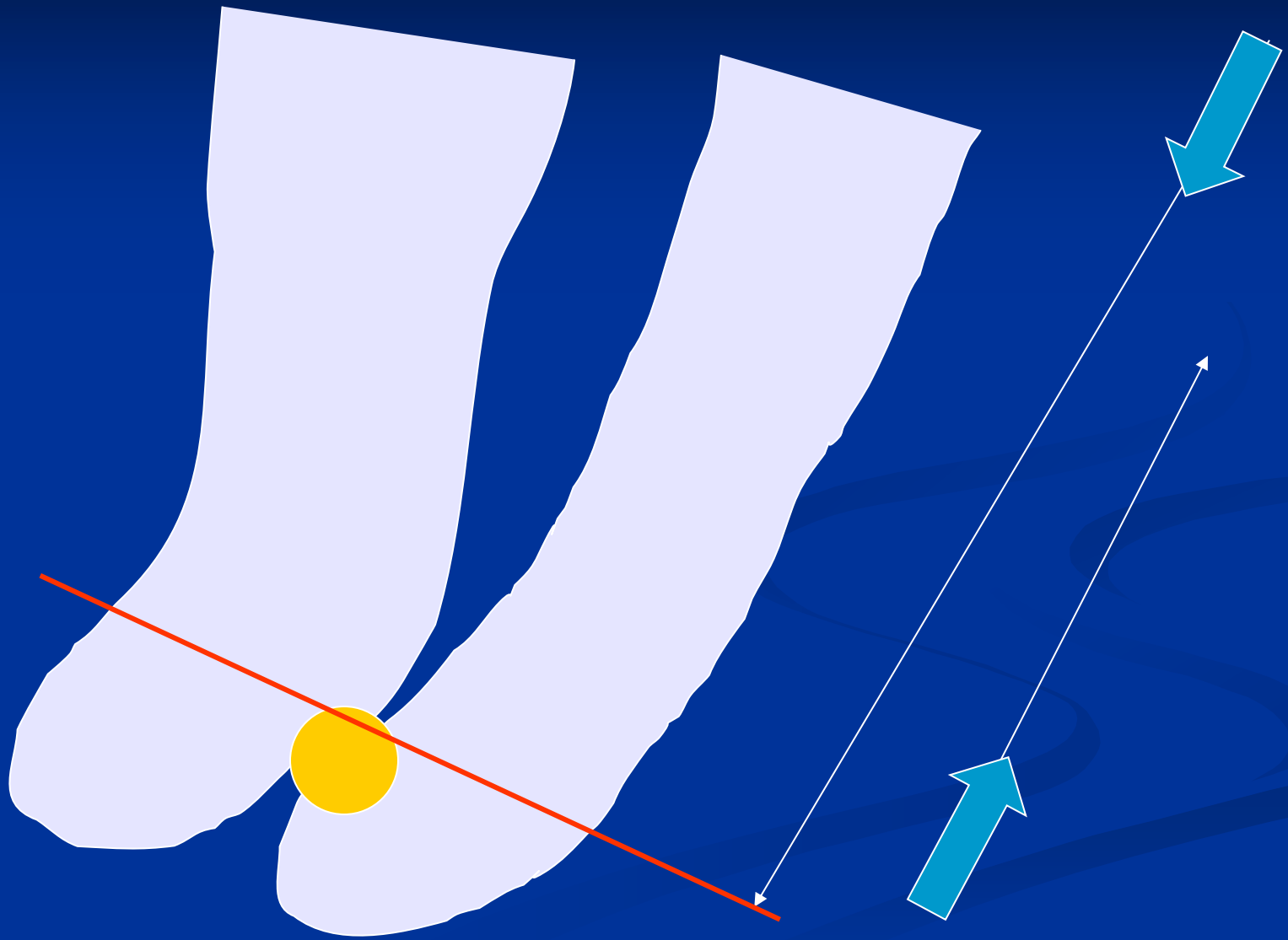


Apical preparation – from smaller to bigger ISO size

# Apical – coronal preparation

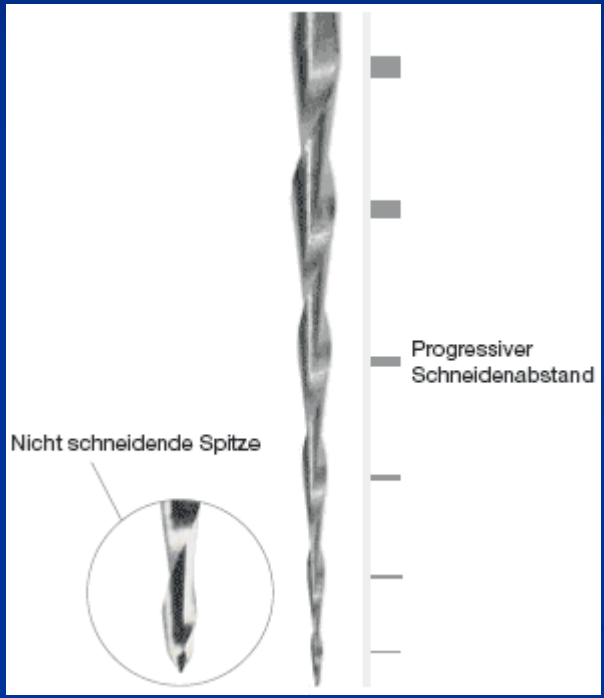


Open the root canal first
Than go to apical constriction
with smaller instzruments and
take biger sizes after




# Less number of instruments


1
10/.04
2
15/.05
3
20/.06
4
25/.06

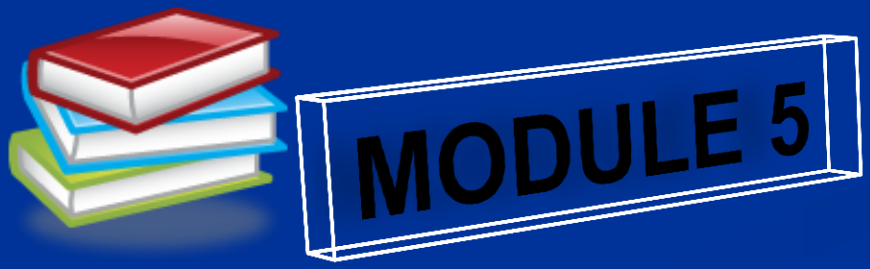

Nicht schneidende Spitze
Progressiver
Schneidenabstand

DENTSPLY MAILLEFER

CONTINUING EDUCATION
CLINICAL EDUCATION

# Shaping with Protaper

## - Rotary and Hand use
## - Protaper Obturators



DENTSPLY

MAILLEFER

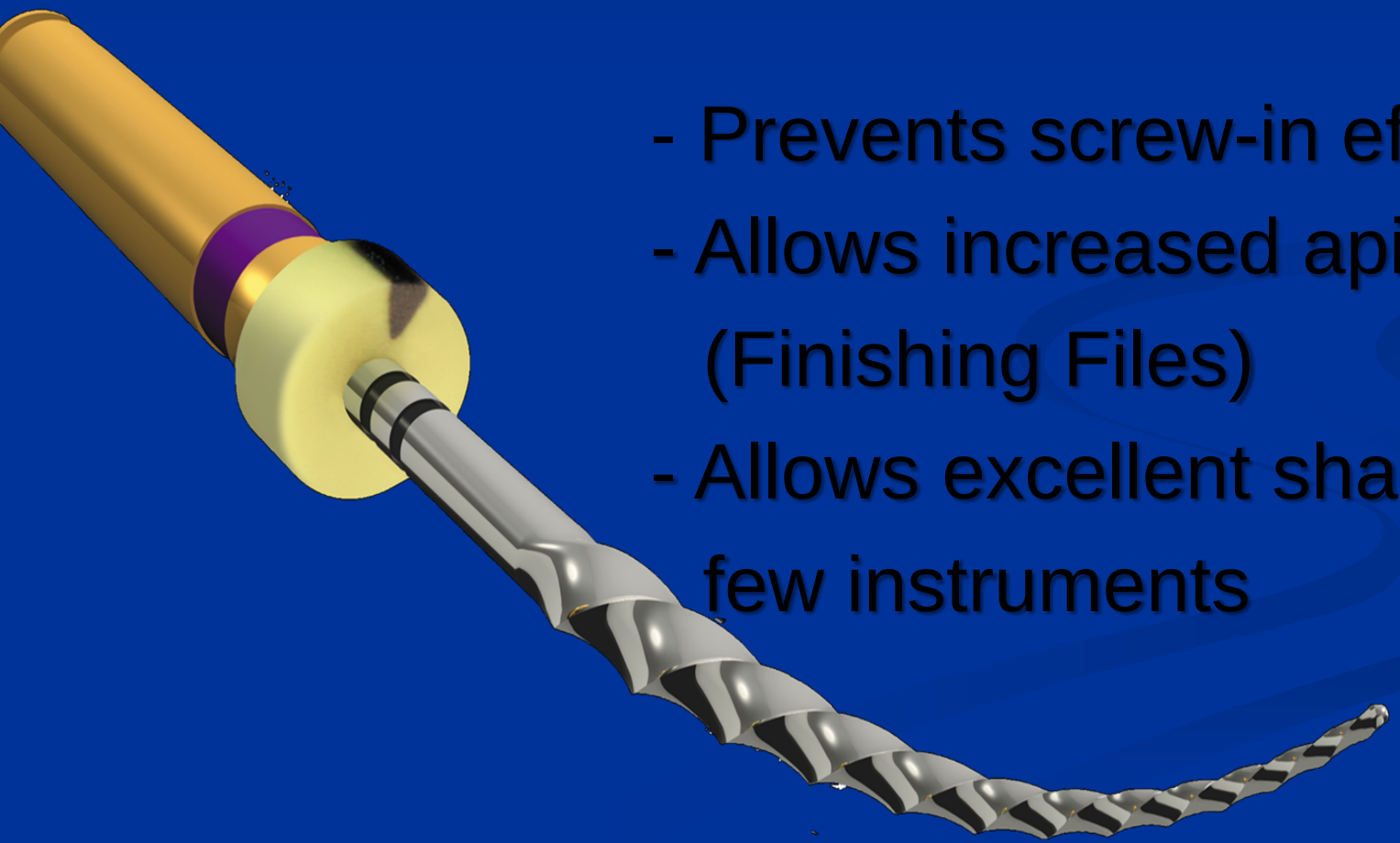
PROTAPER®

UNIVERSAL

*The "Eiffel –Tower" shape Instrument*

# VARIABLE TAPERED INSTRUMENTS

- **Variable Taper:**

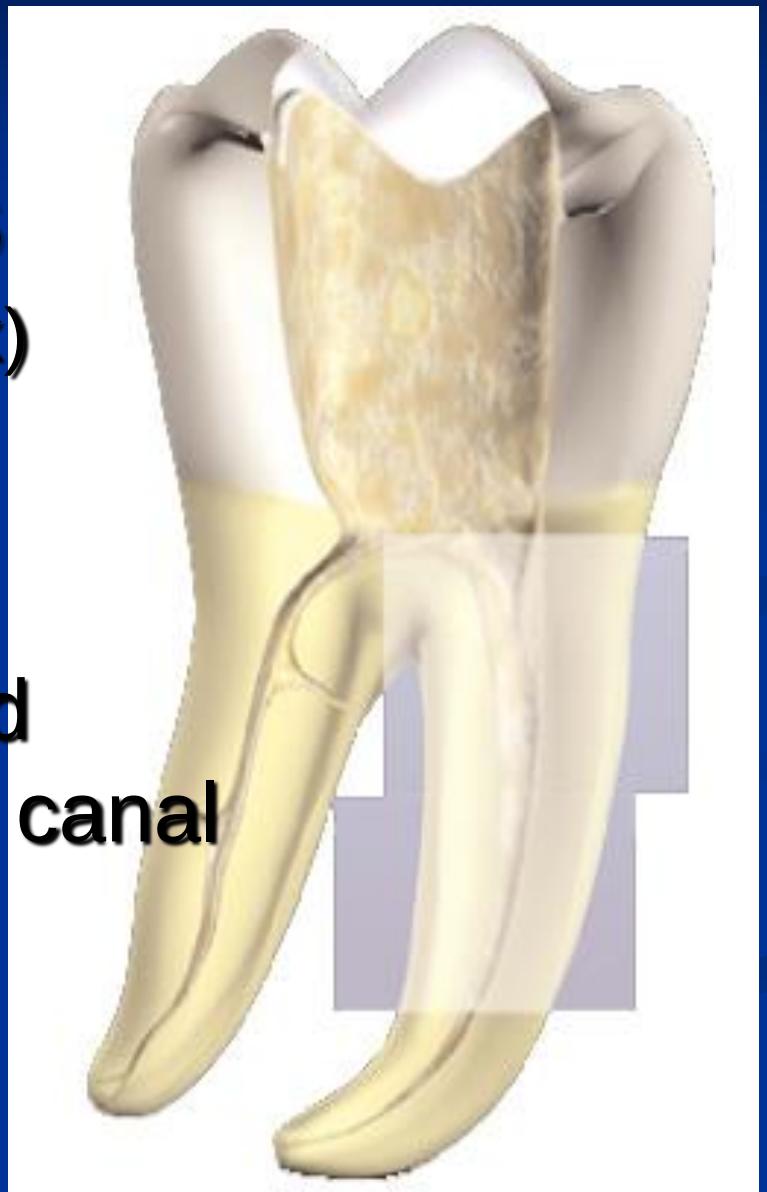


- Prevents screw-in effect
- Allows increased apical tapers (Finishing Files)
- Allows excellent shaping with few instruments

# Shaping Files

(S1 & S2 – Accessory Sx)

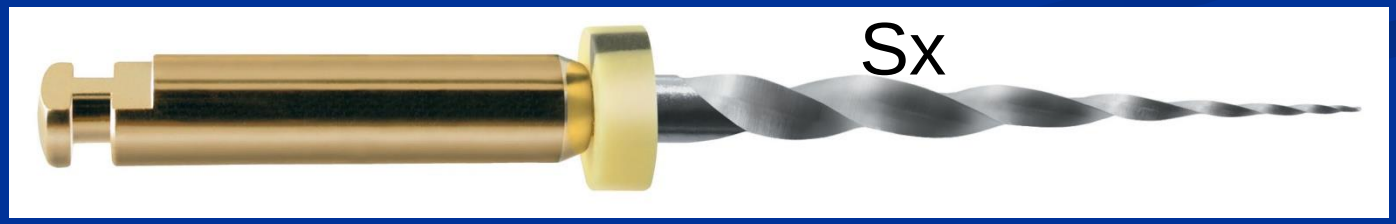
Shape the coronal and the middle third of the canal



# Shaping Files
# Variable Increasing Taper
# (Eiffel Tower shape)

S2

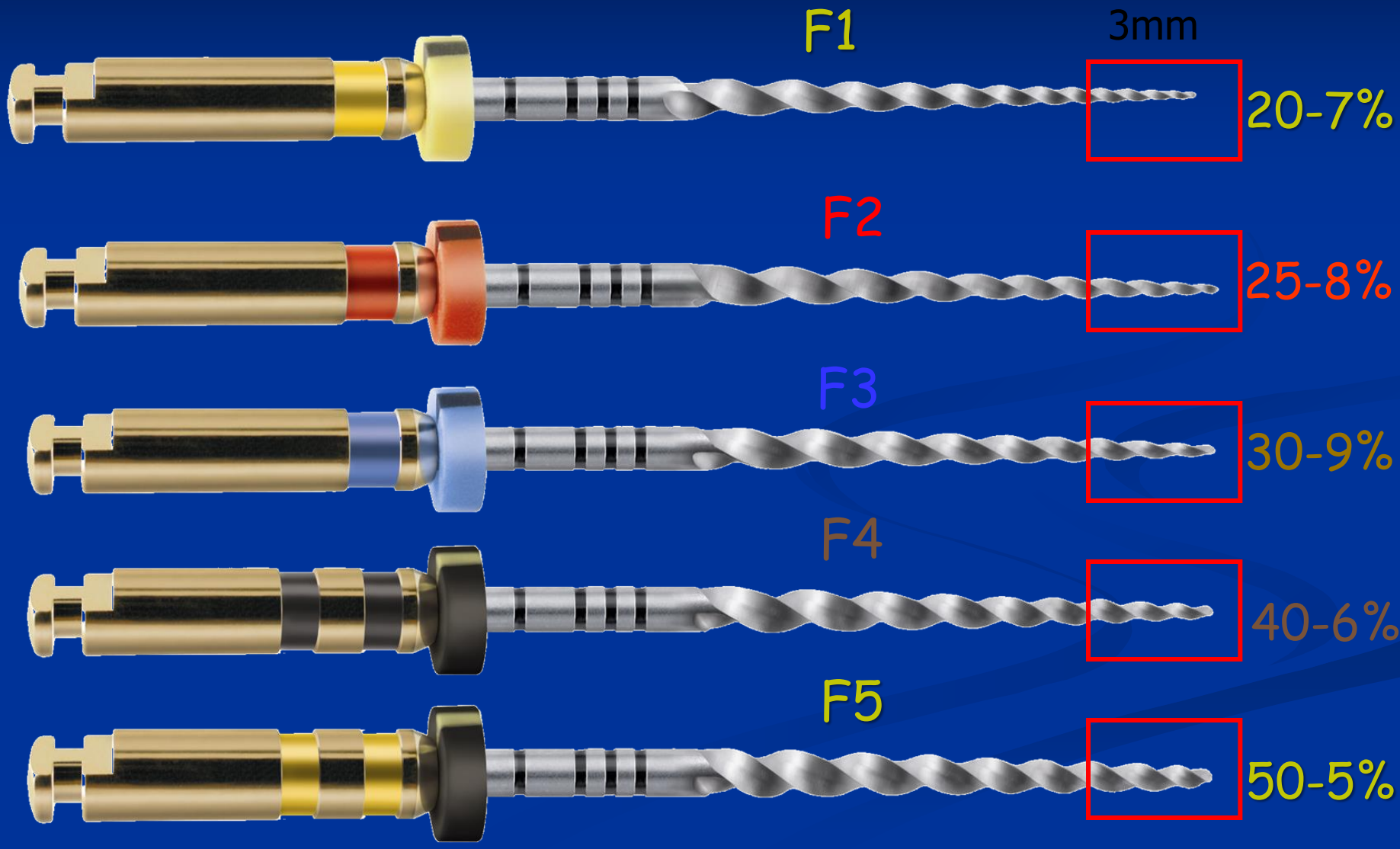




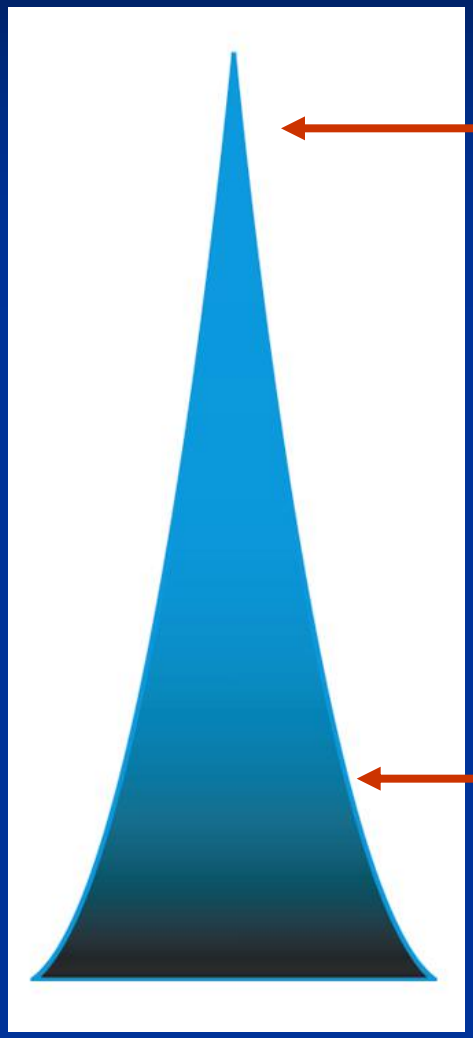
## Finishing Files
## F1, F2, F3, F4, F5

Shape the Apical part of the canal

# Finishing Files (Variable Decreasing Taper)



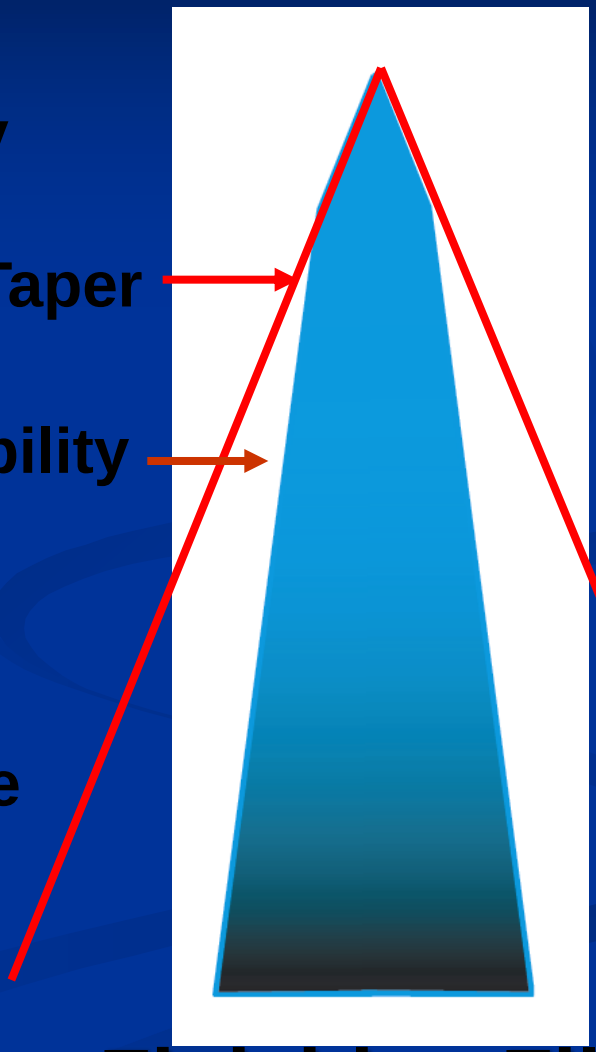
# ProTaper Universal



Flexibility

Resistance

Shaping Files

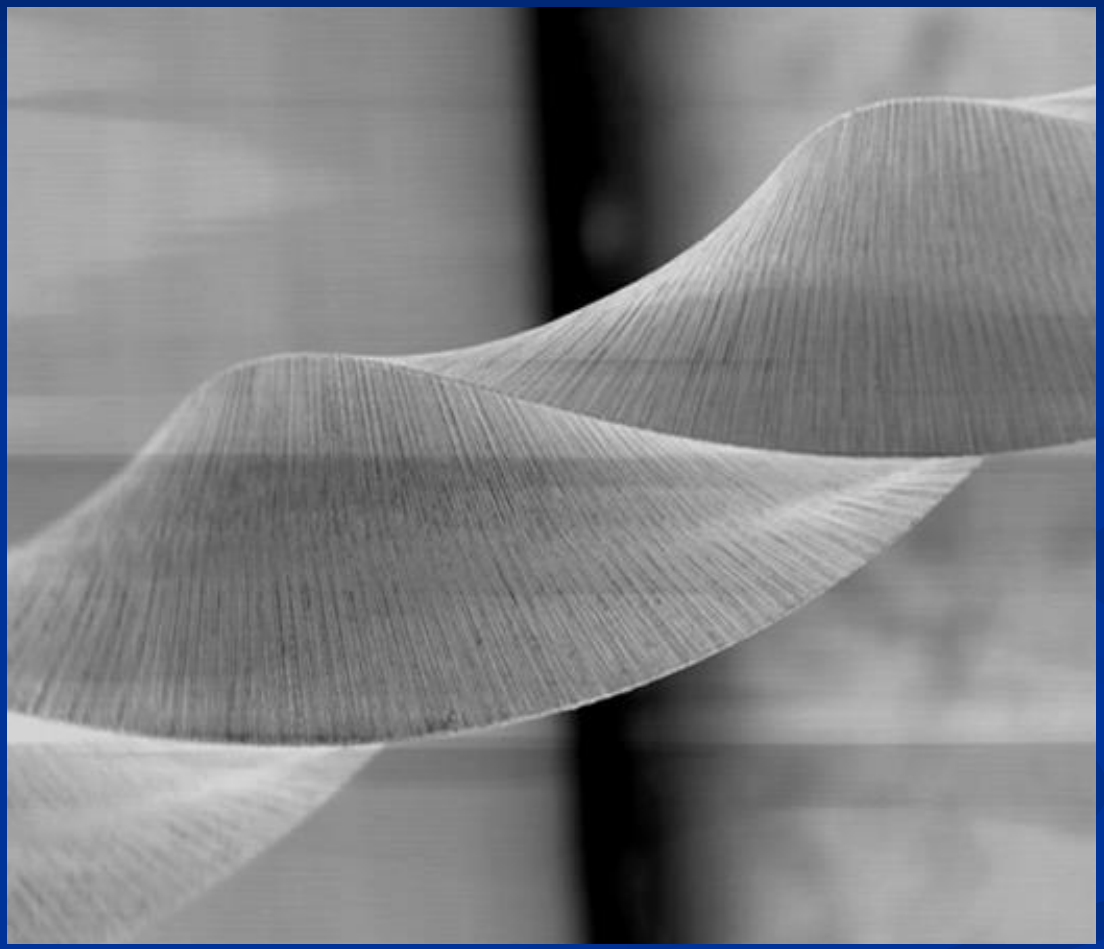


Fixed Taper

Flexibility

Finishing Files

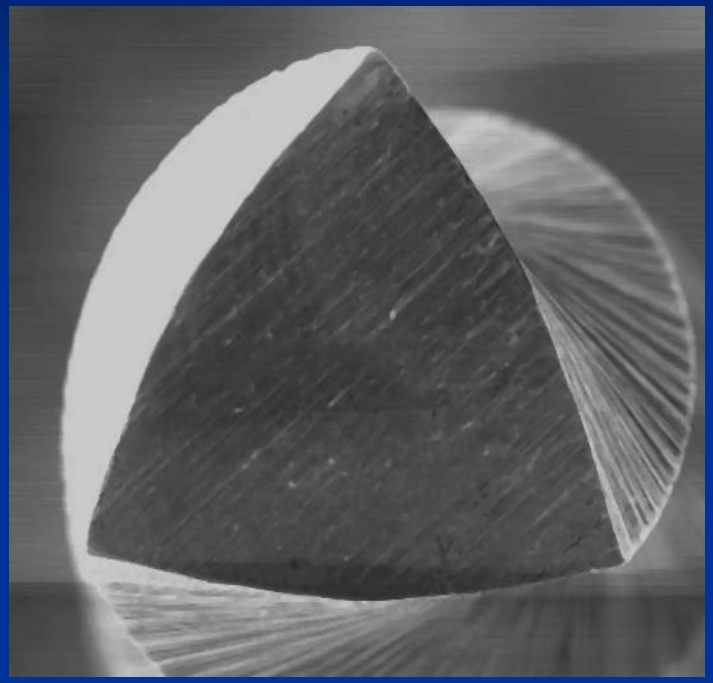
# ProTaper Universal
## Characteristics



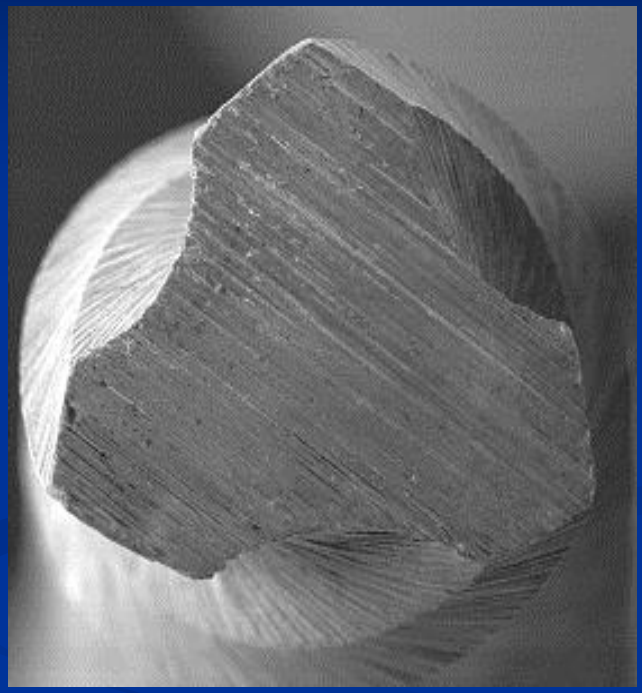
- Cutting blade (no radial land) : Efficiency

# Characteristics

## « Triangular » Cross-Section



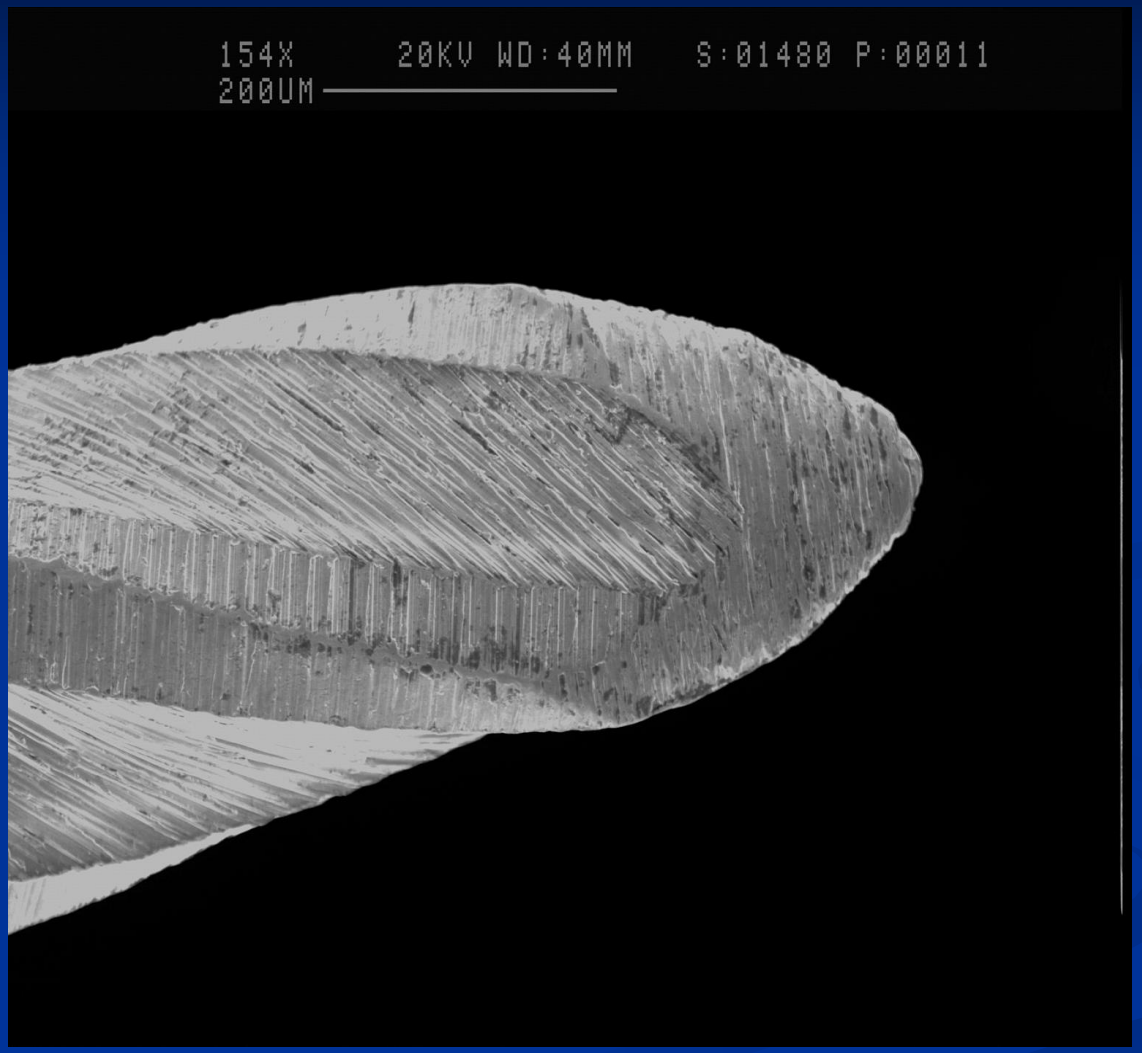
*Convexe : S1, S2, SX, F1, F2*



*Concave : F3, F4, F5*

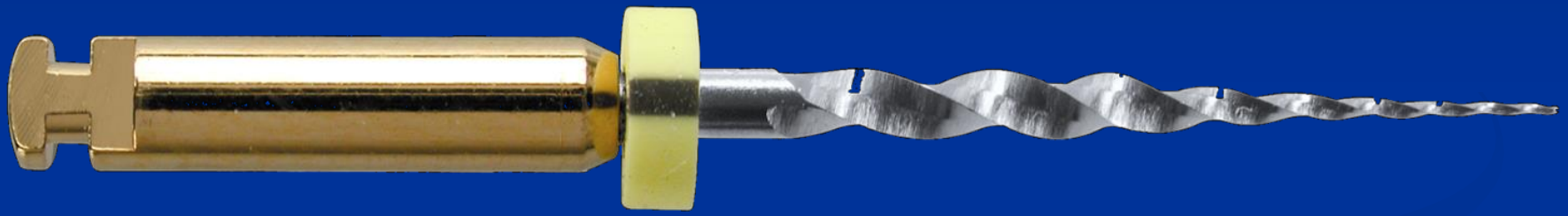
- **Triangular concave cross-section : Flexibility**
- **Triangular convexe cross-section : Resistance**

# Characteristics



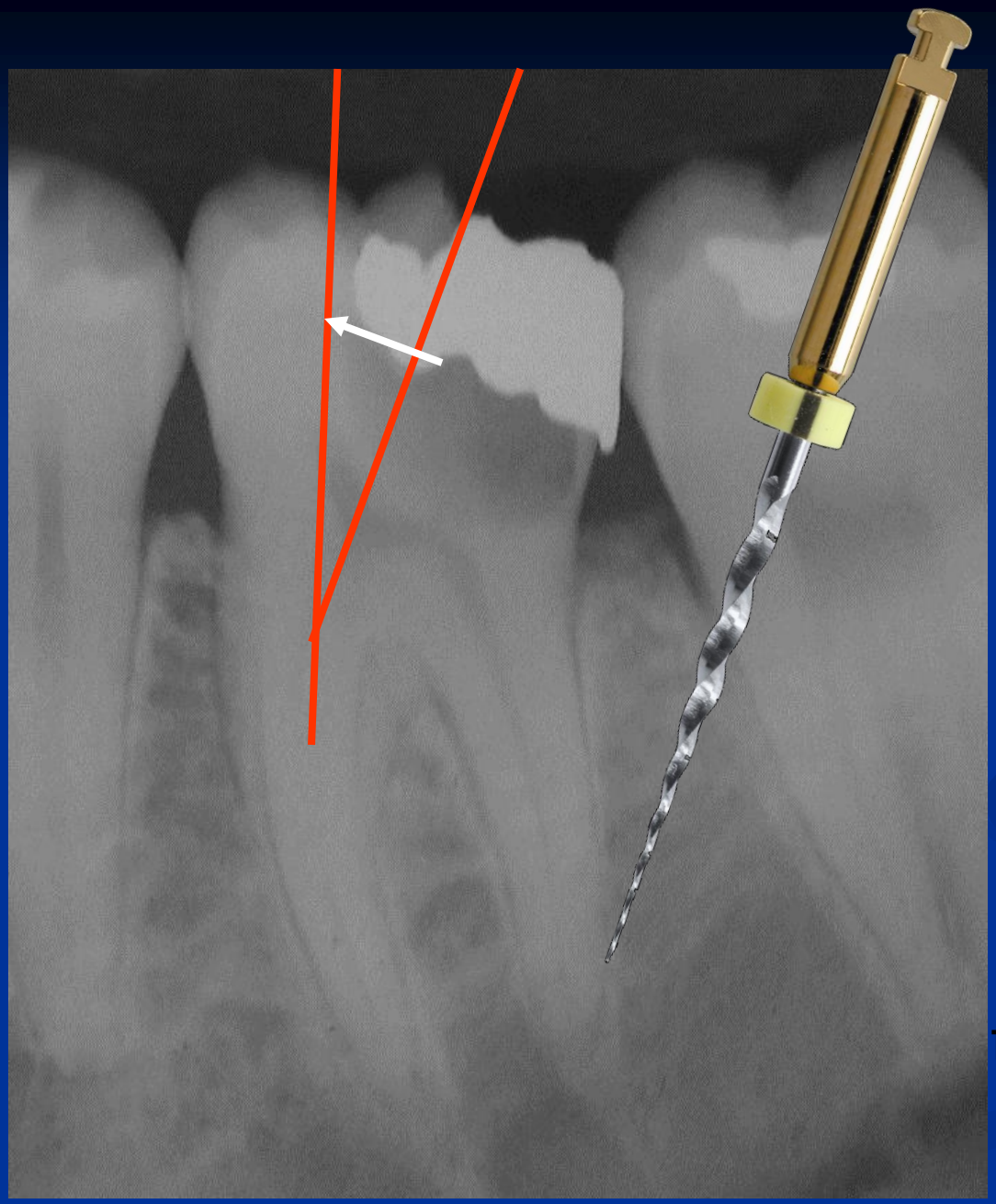

- Safe non cutting tip : acts as a guide

# SHAPING SX
# (accessory)



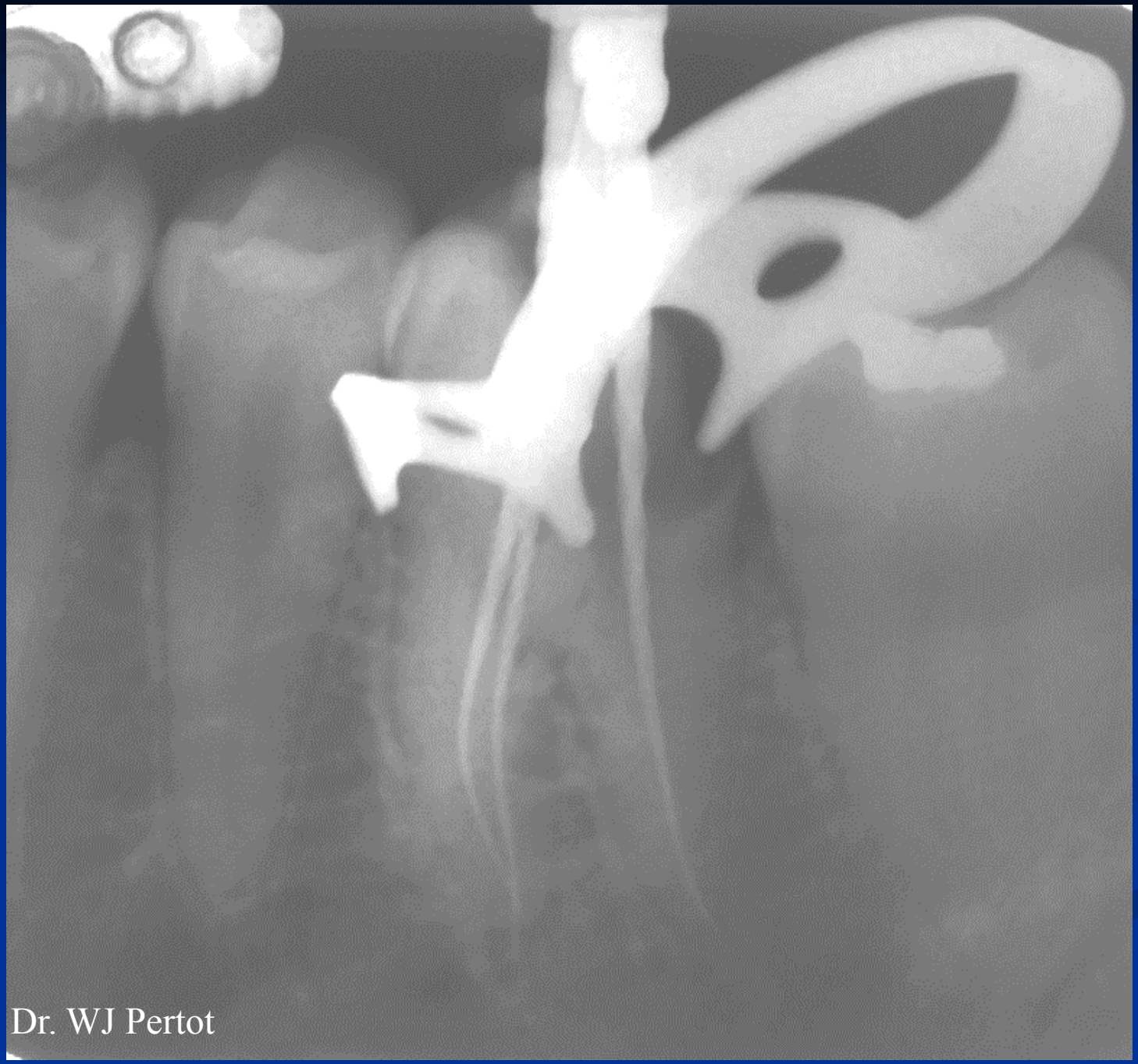

**For Relocating Canal Orifice**

**(only when needed)**



Sx is used with a
**brushing motion**

to relocate
the orifice and insure a
**straight line access**


Dr. WJ Pertot

Dr. WJ Pertot

# Basic rules of rotary endodontics

Controlled rotation
(low rpm – around 250 - 300
Moment of rotation (the instrument must not stop in contact with the root canal wall)
Torque control
Rotate the instrument before doing ti the root canal
Irrigation and lubrication
No pressure
Push and pull motion
Short intervals of shaping – 10 – 15 s
Clean the instrument
Do recapitulation
Do not stay oh one point
Touching the apical constriction – go out!
Keep the sequency!

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CONTINUING EDUCATION
CLINICAL EDUCATION

PROTAPER® UNIVERSAL

# Treatment Sequence

# SCOUTING THE CANAL :


K-File 008 or 010

## Then hand instruments

to the level they are accepted in the canal.

Stainless steel


ProFinder Files
10,13,17

Stainless steel


C+ File
08,10,15

## OR NiTi ROTARY INSTRUMENTS : Pathfiles

# PathFile™

NiTi Rotary

❑ PathFile™ #013 to working length

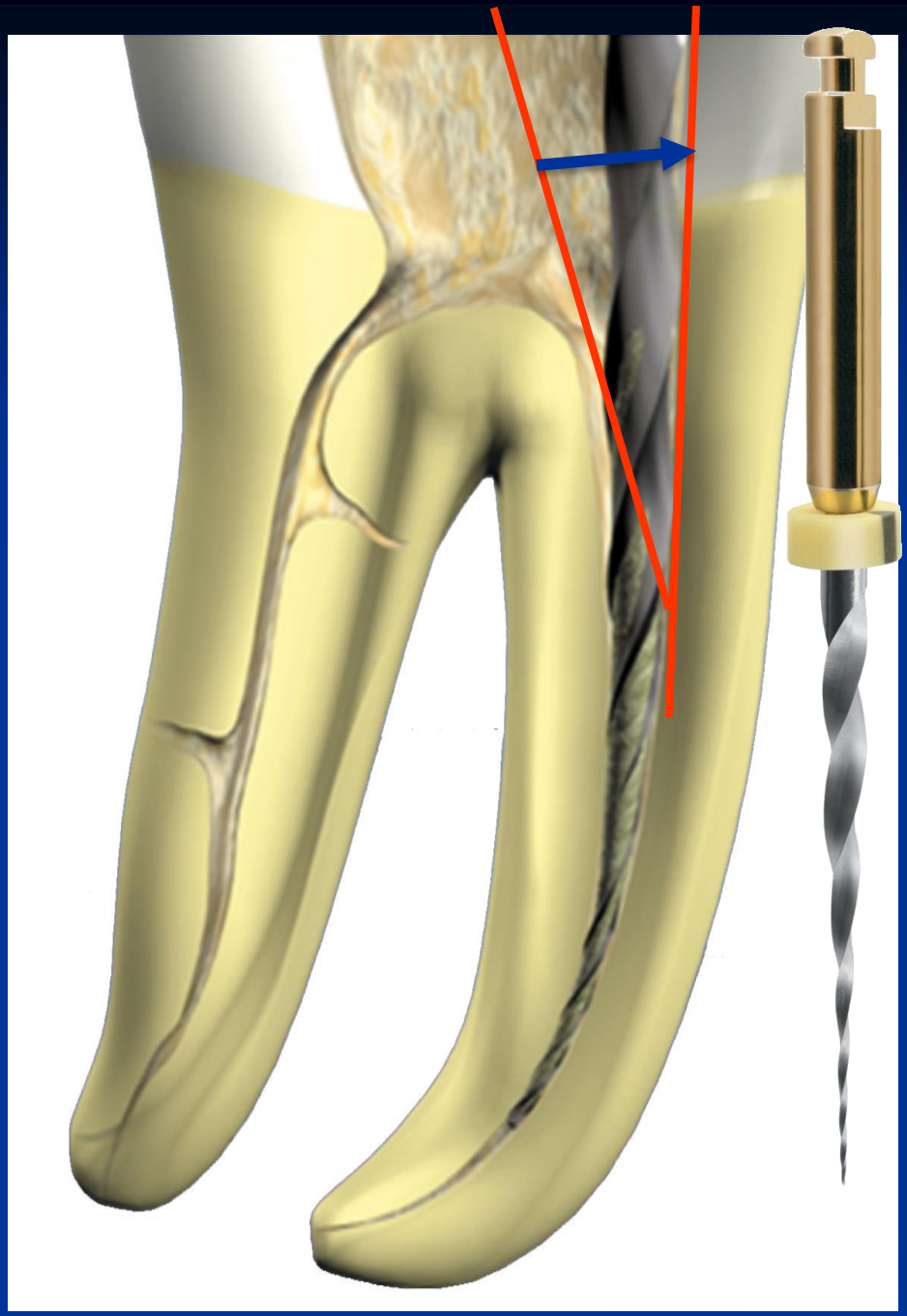
❑ PathFile™ #016 to working length

❑ PathFile™ #019 to working length

Establish WL before

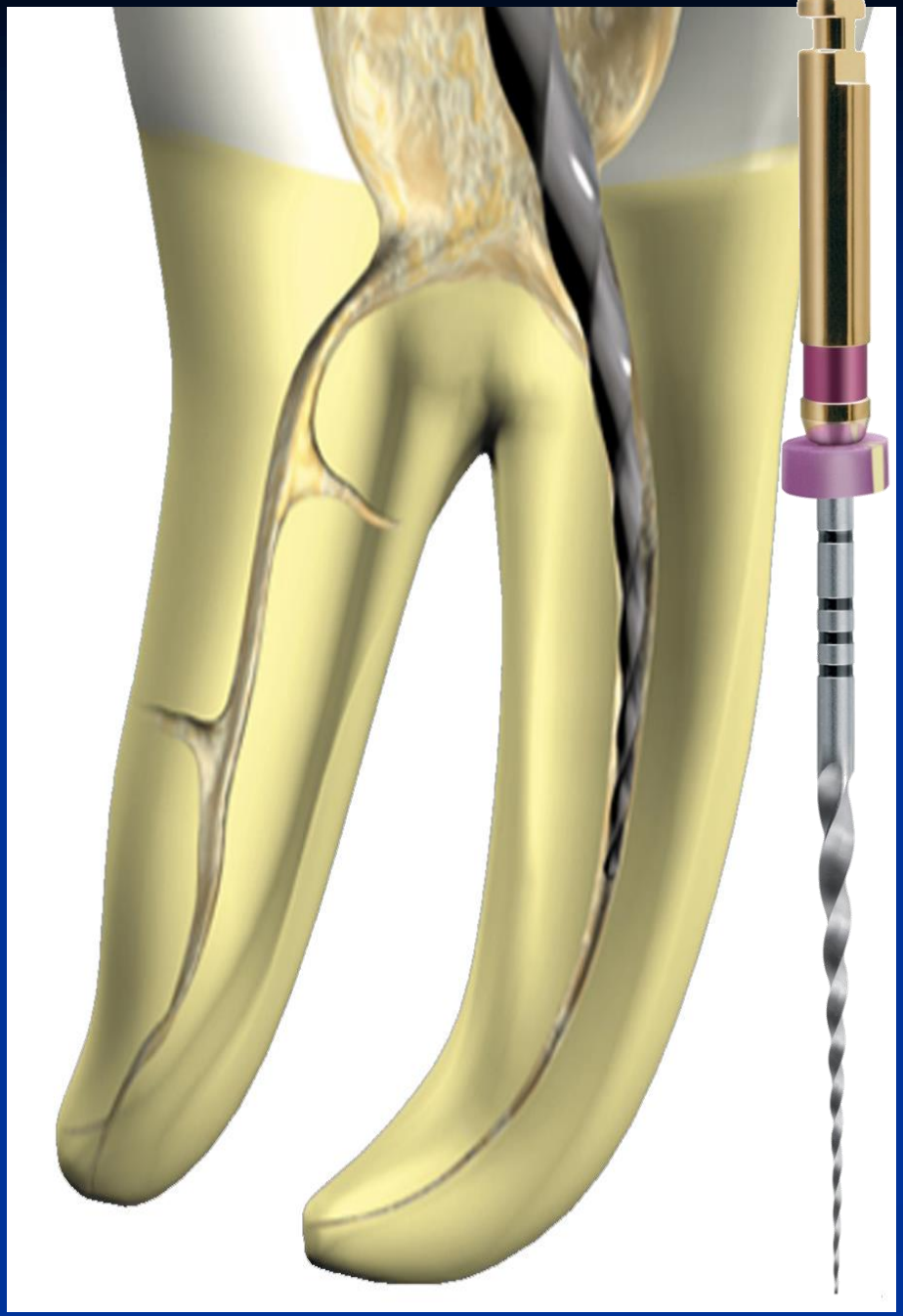
Glyde™ FILE PREP Root Canal Conditioner

**The lubricating action of Glyde helps the instruments to slide in the canal**



If needed, use SX with a **brushing motion** to relocate the orifice of the canal and create a straight line access

(don’t use Sx deep in the canal)

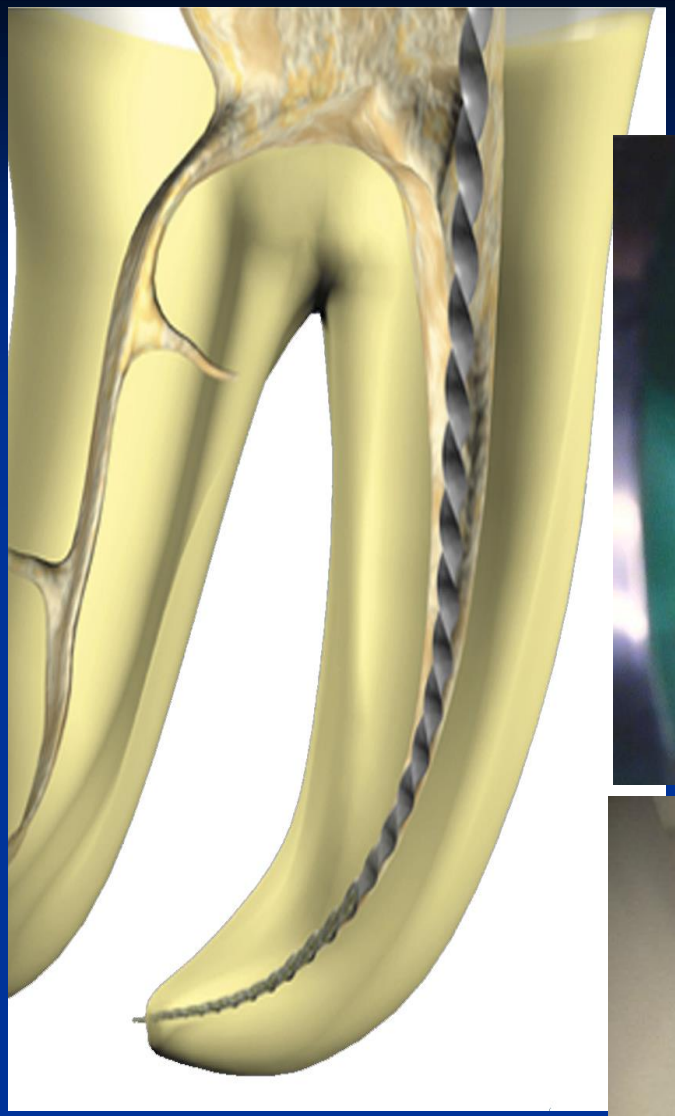


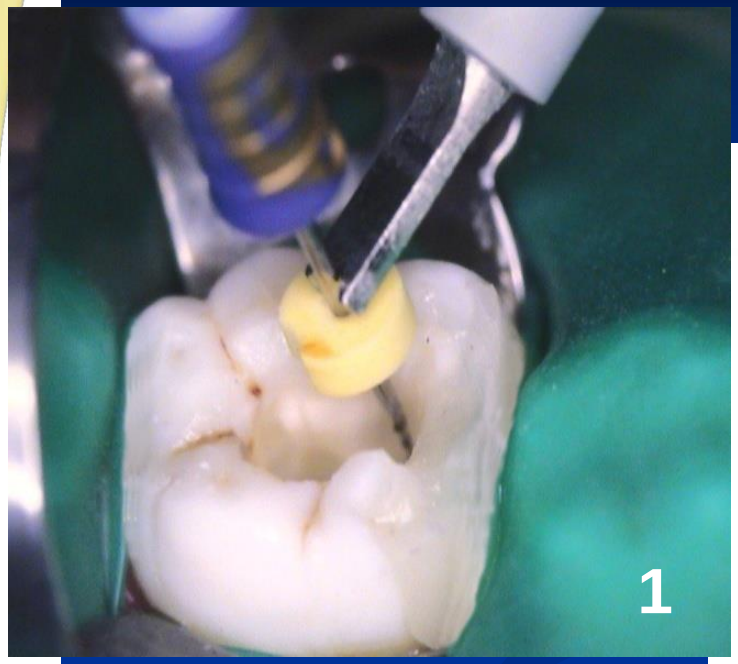
**Use S1** with a brushing motion and enlarge the canal, ***no deeper*** than the level of the penetration of the scouting file

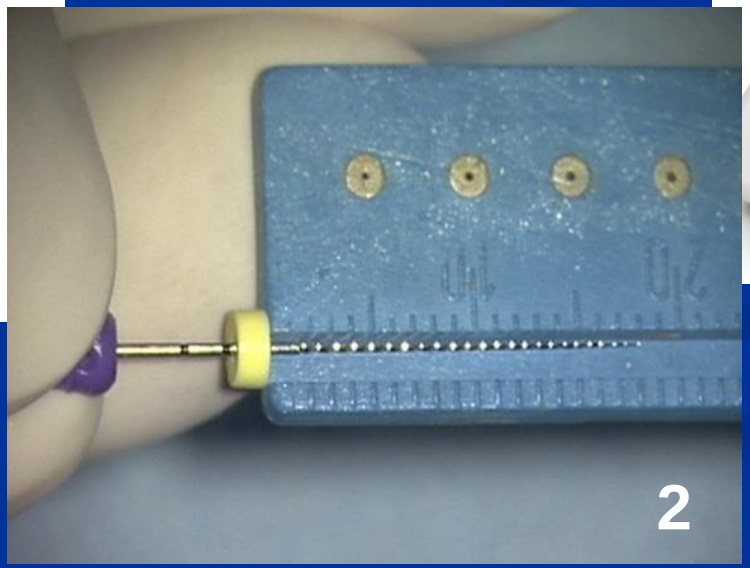
(to make sure that the tip of S1 is never blocked)

Using Pathfile, go to working length that you established right before

# Determine WL







**Apex Locator**

After going to length with a stainless steel file size 15, use :

**<u>*S1* to working length</u>**

with a brushing motion.

*Using Pathfile this step is skipped*

When S1 reaches working length, use :

**<u>*S2* to working length</u>**

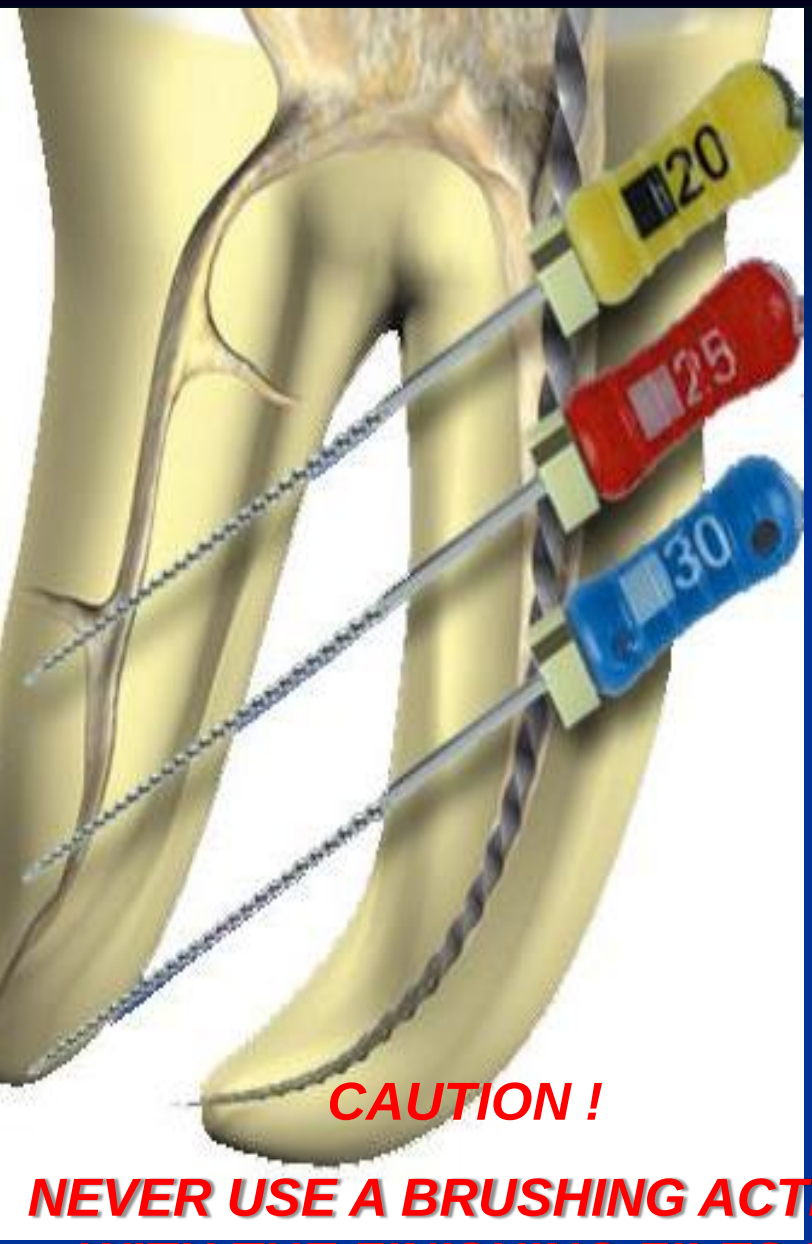
with a brushing motion

When S2 reaches working length, use :

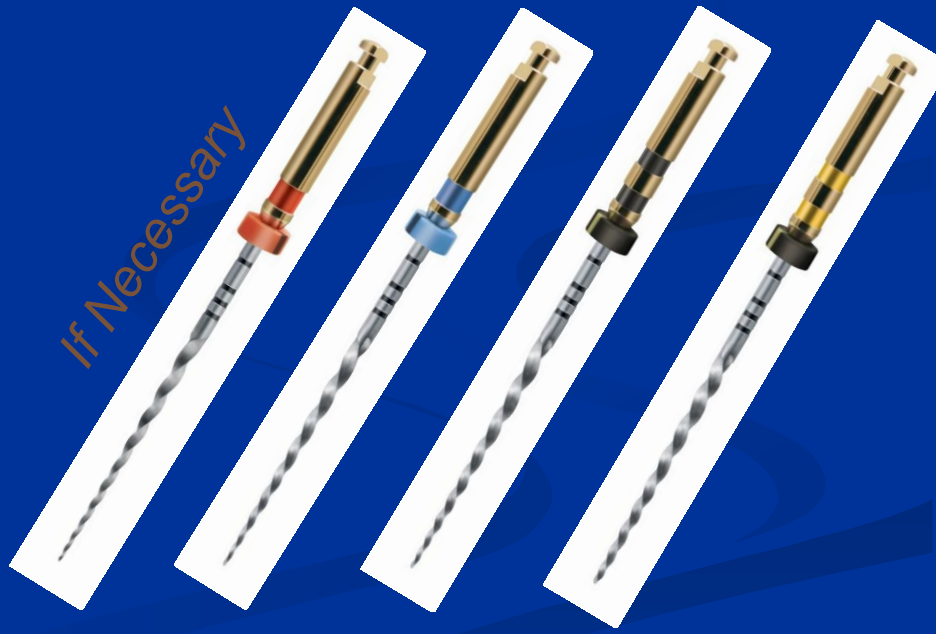
**_F1_ to working length**.

***CAUTION !***
***NEVER USE A BRUSHING ACTION***
***WITH THE FINISHING FILES !!!***

***When a finishing file reaches the working length, It is immediately withdrawn.***




**Gauge** the diameter of the foramen with stainless steel files and if the foramen is larger than 20, use F2, F3, F4 or F5 to working length, according to the **real apical diameter**.




***CAUTION !***

***NEVER USE A BRUSHING ACTION WITH THE FINISHING FILES !!!***

***When a finishing file reaches length, it is immediately withdrawn.***

PROTAPER® UNIVERSAL

# Rotary Instruments sequence

DENTSPLY MAILLEFER

CONTINUING EDUCATION
CLINICAL EDUCATION

# ProTaper®

## For Hand Use

# Treatment Sequence

# ProTaper®

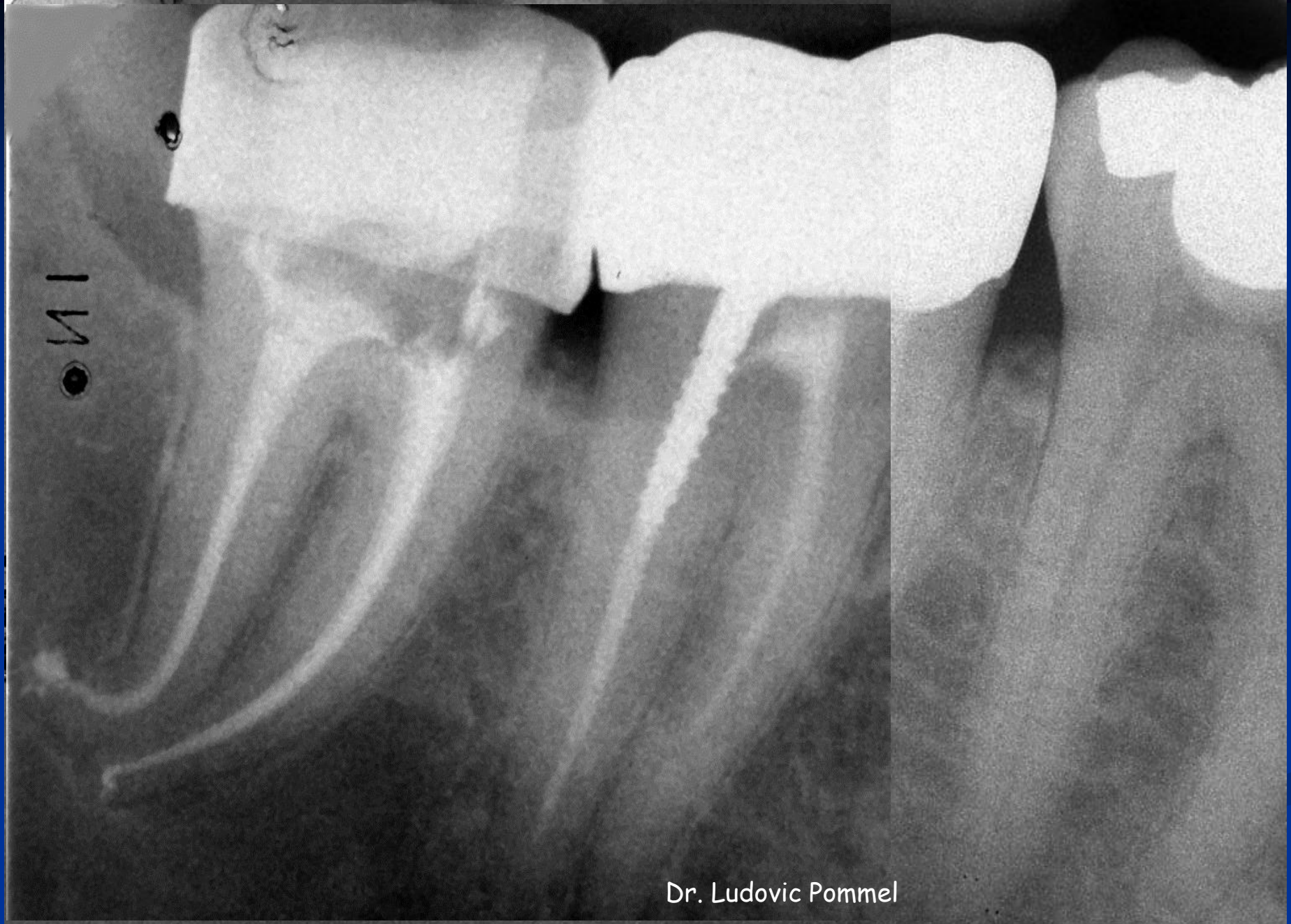
## For Hand Use

### For Hand SS File Users

- Less Instruments
- No Canal Transportation
- Less Extruded Debris
- Excellent Apical Taper

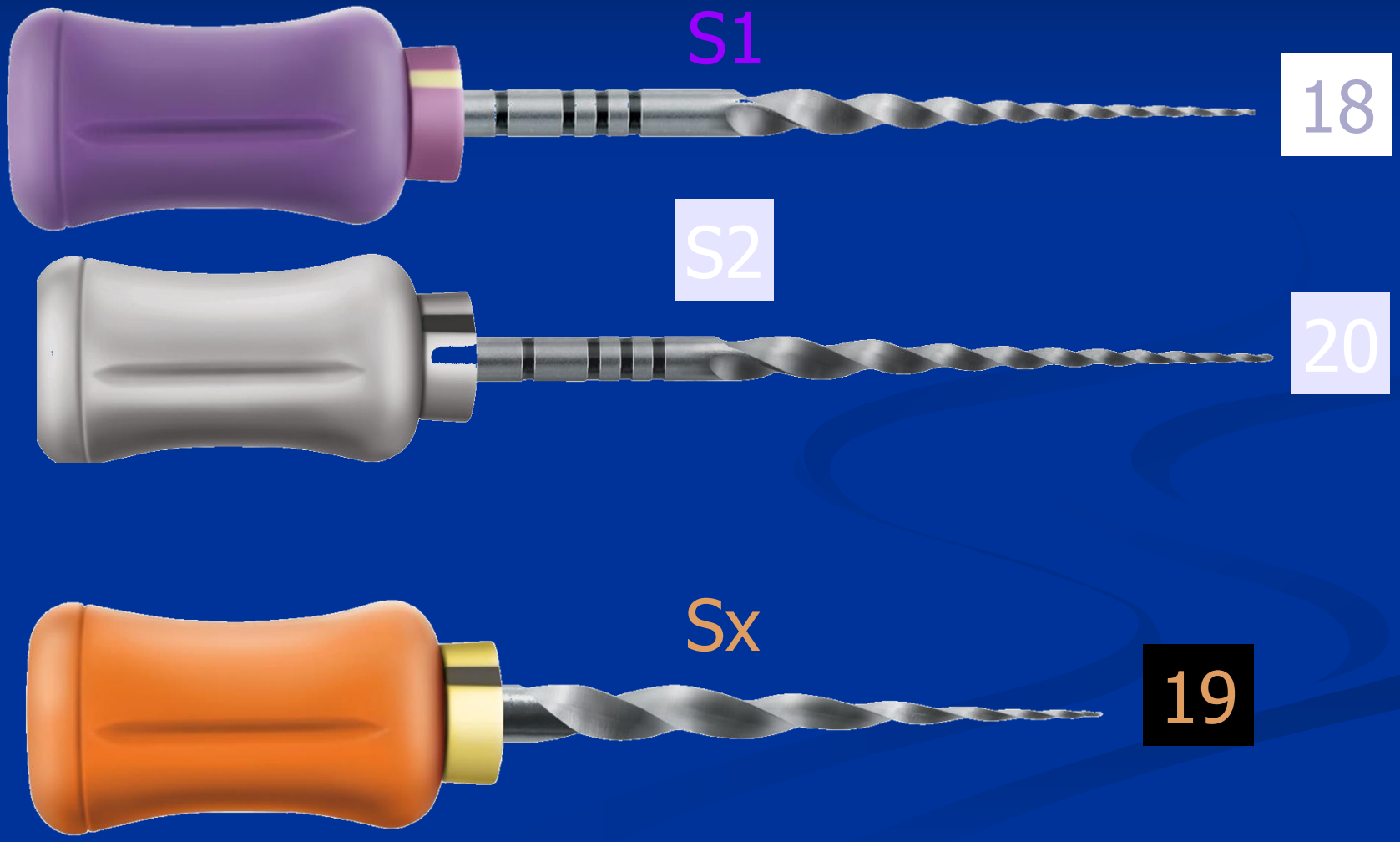
### For NiTi Rotary Users

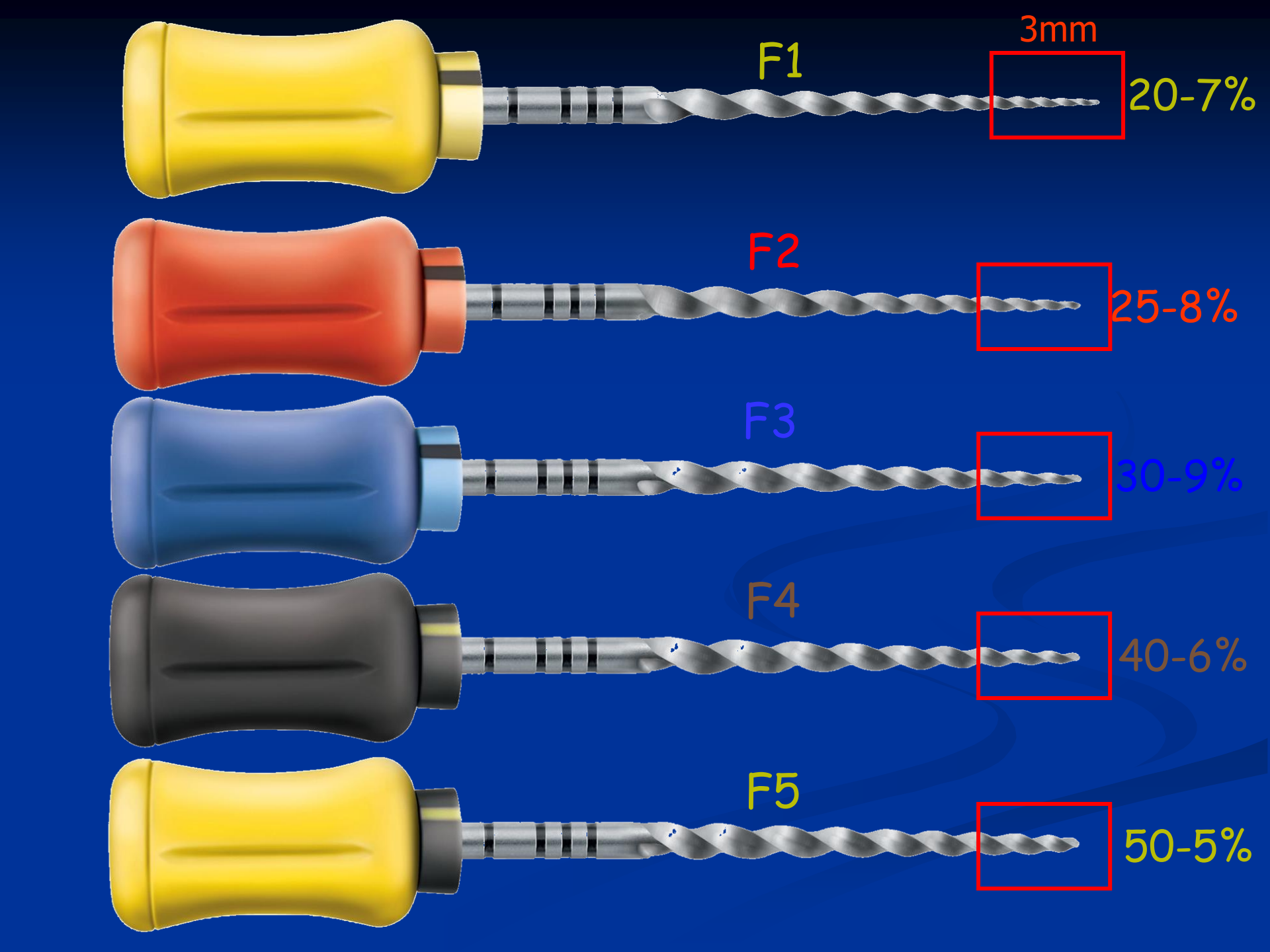
- In Case of Contra Indication to Continuous Rotation. (Example : Apical Hooks, joined canals)


Dr. Ludovic Pommel

# ProTaper®

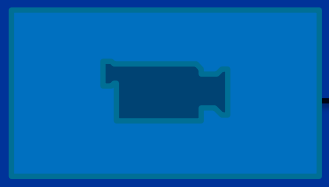
## For Hand Use




3mm
F1
20-7%
F2
25-8%
F3
30-9%
F4
40-6%
F5
50-5%

# ProTaper®

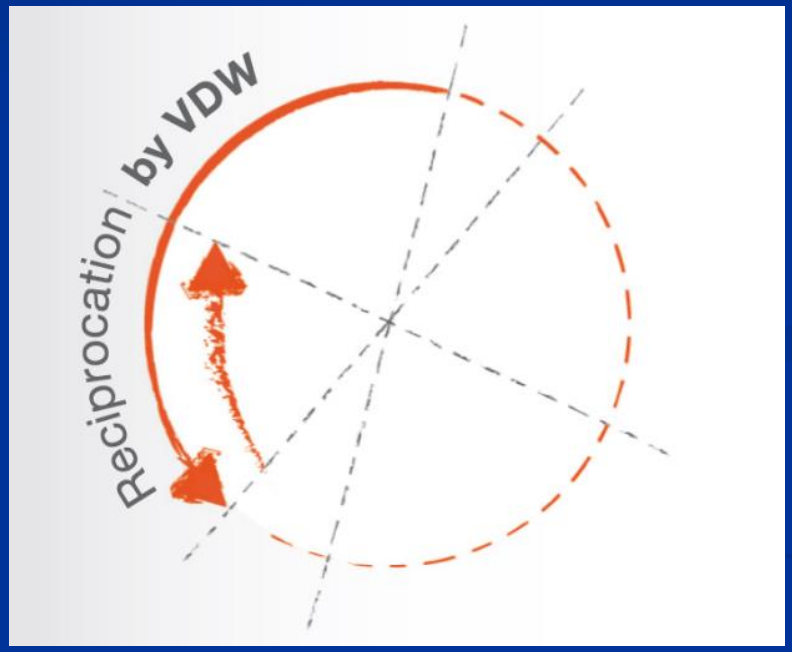
## For Hand Use



# RECIPROC

## Wave One

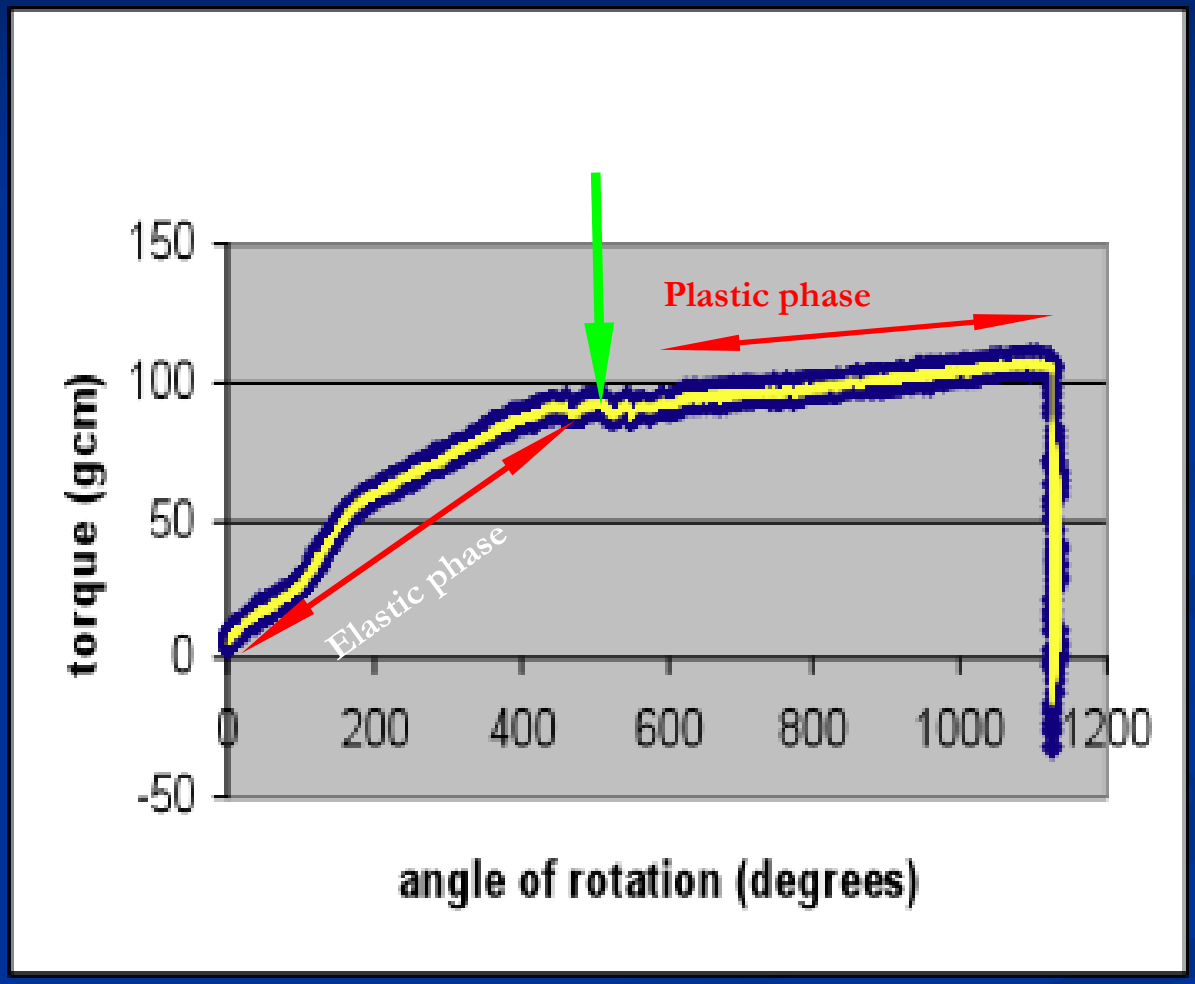
- One file endo
- Reciprocation


Reciprocation by VDW

# Advantages

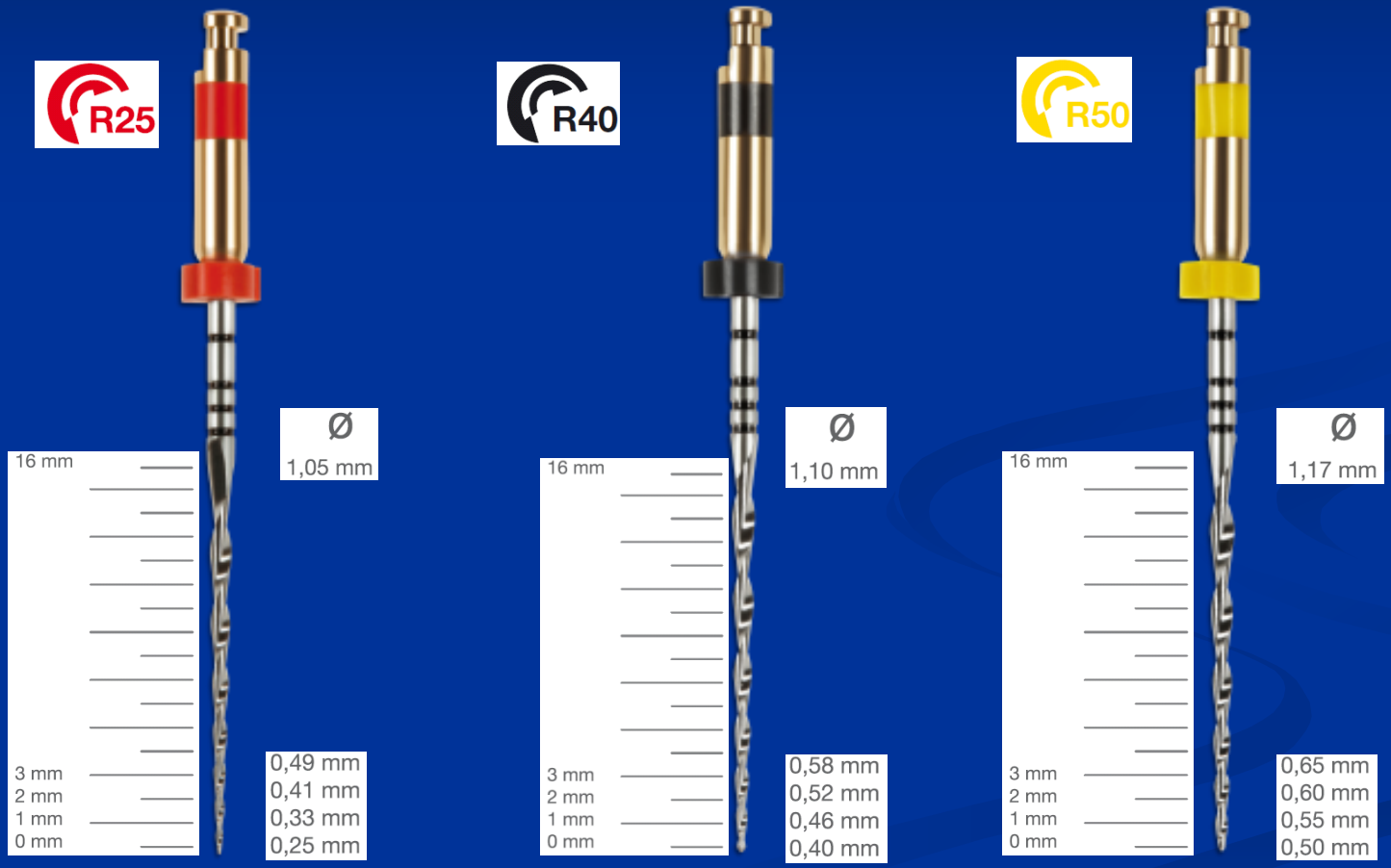
- Simple
- **Safe**
  - 
  - Minimuám risk of fracture
  - No risk of cross infection
  - 

# Reciprokation




Dr. Ghassan Yared, Canada

# RECIPROC®


R25
Ø
1,05 mm
16 mm
3 mm
2 mm
1 mm
0 mm
0,49 mm
0,41 mm
0,33 mm
0,25 mm
R40
Ø
1,10 mm
16 mm
3 mm
2 mm
1 mm
0 mm
0,58 mm
0,52 mm
0,46 mm
0,40 mm
R50
Ø
1,17 mm
16 mm
3 mm
2 mm
1 mm
0 mm
0,65 mm
0,60 mm
0,55 mm
0,50 mm

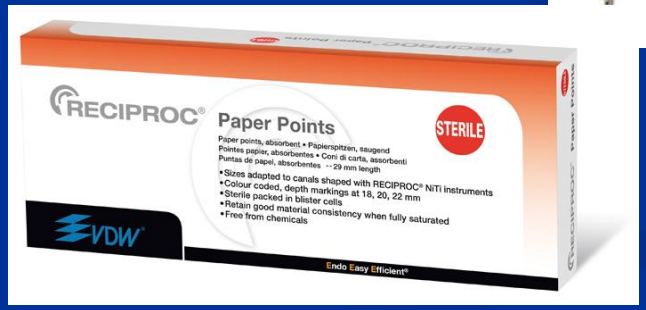
# RECIPROC®



Dr. David Sonntag, Universita Düsseldorf

# RECIPROC®

- RECIPROC® sterilní papírové čepy
- RECIPROC® gutaperčové čepy
  - Metoda jednoho čepu
  - Vertikální kondenzace


# Bigger taper

**Flaring**
**Irrigation effectivity**
**Good approach to apical area**
**Good conditions for 3D root canal filling**

# Disadvantages

**Loss of hard dental tissue**

**Hihger risk of stripping**

# Raciproc and Wave One have regressive taper

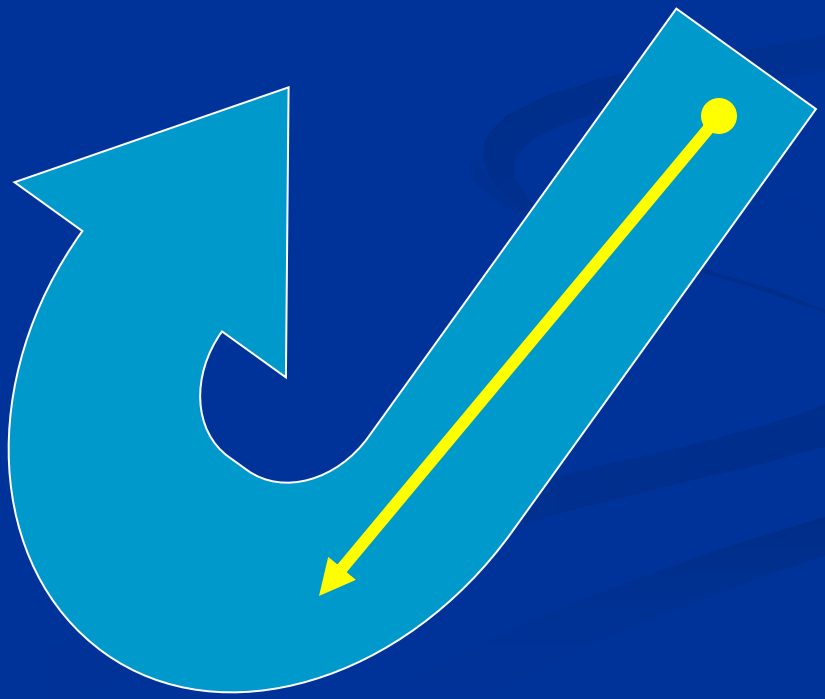
Lower risk of stripping or fracture of the endodontically treated tooth

# Basic rules of reciprocation instrumentation

- Switch the motor onafter the insgtrumkent is in the root canal
- Do three packs up and down (amplitue 3 mm) and take instrument off
- Create the glide path – ISO 10 for number 25
- ISO 20 for instrument 40
- Iso 30 for instrument 50
- Irrigate the root canal
- Recapitulate
- Do not stay on one point

Crown down

# Apical – coronal direction



# Controlled rotation

**Low rpm**

**Moment of rotation**

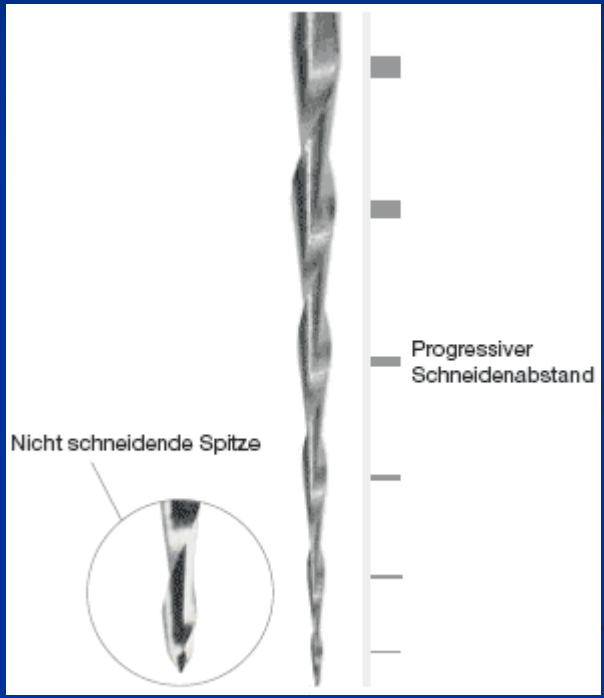
**Torque control**

# Motor, handpiece


Röntgensichtbare
Tiefenmarkierungen
21 mm
Arbeitsteil
16 mm
Arbeitsteil
VDW


10/.04
15/.05
20/.06
25/.06
30/.05
35/.04
40/.04
25/.07
VDW


1
10/.04
2
15/.05
3
20/.06
4
25/.06


Nicht schneidende Spitze
Progressiver
Schneidenabstand

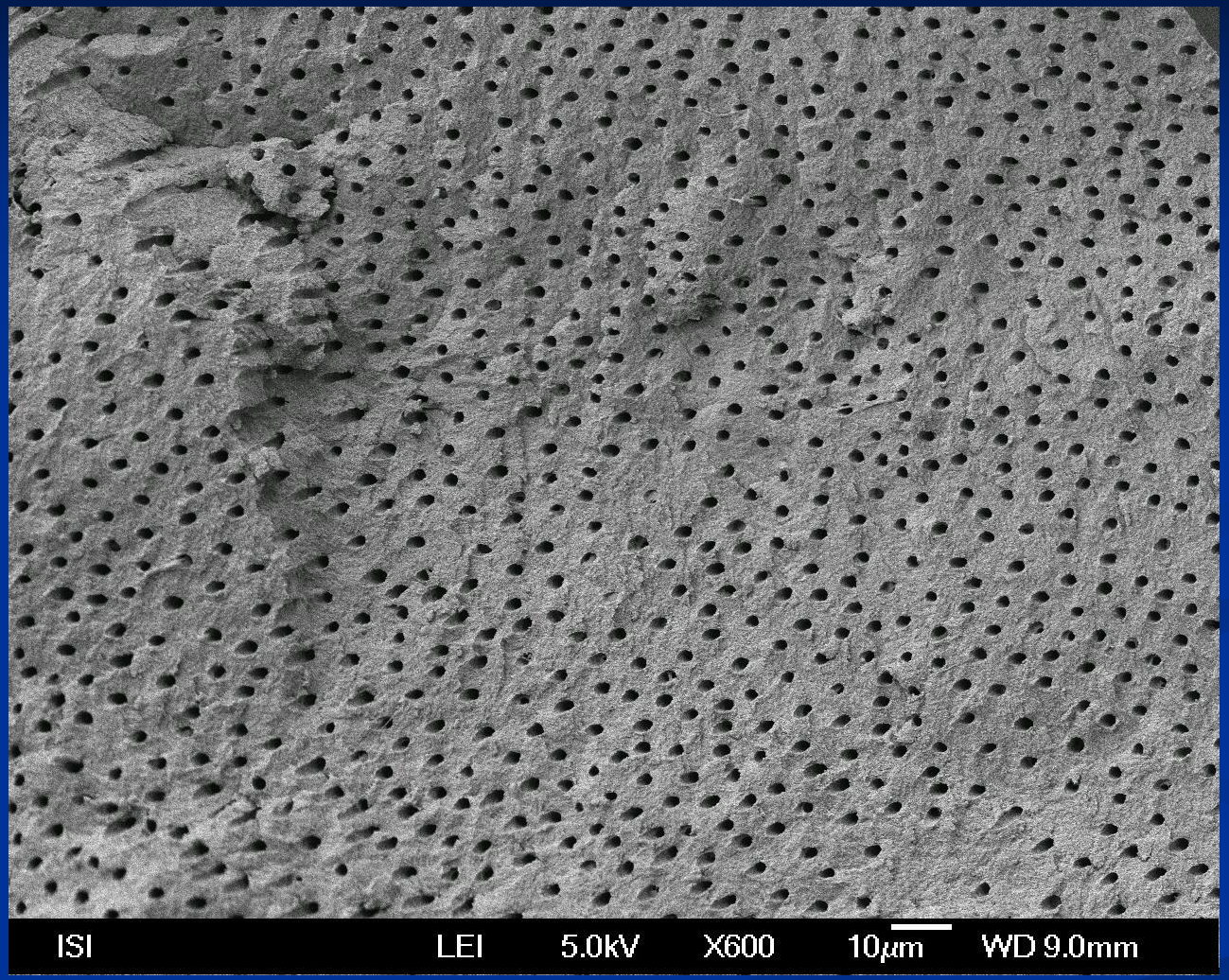
# Systems of power driven endodontics

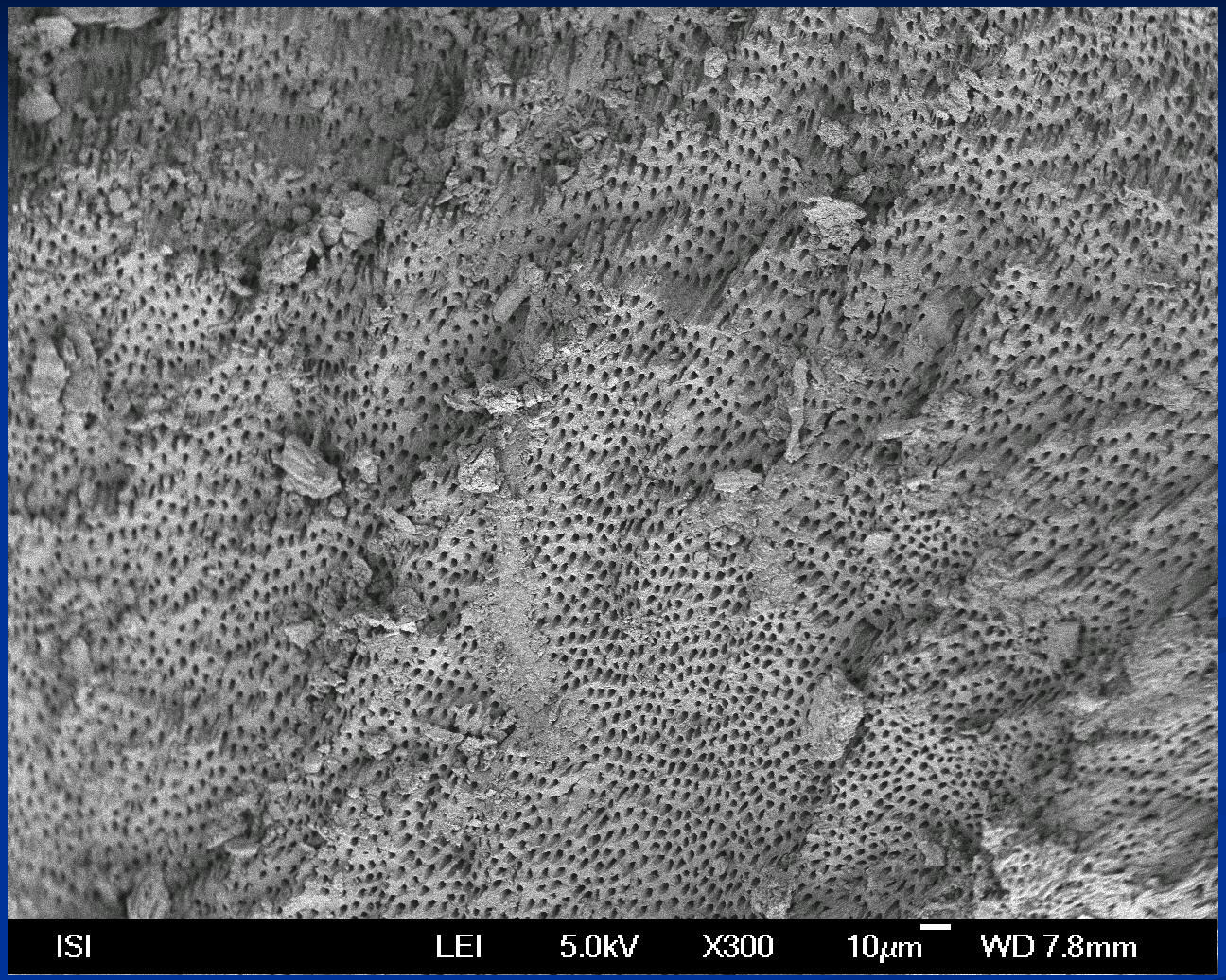
- ProTaper
- MTWO
- Wizard
- Revo S

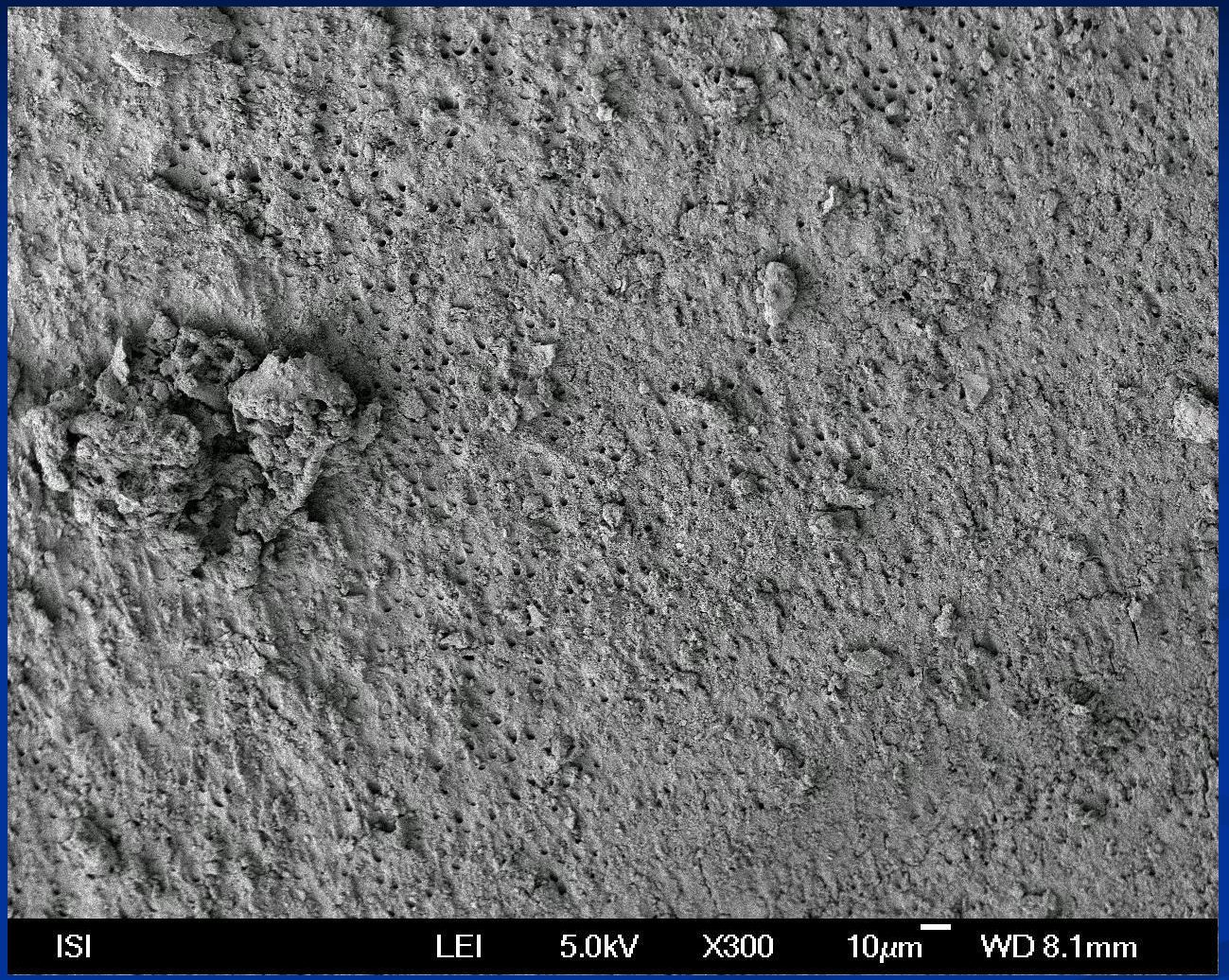
} Rotation

- Tilos
- Reciproc

} Oscillation / Reciprocative movement


ISI
LEI
5.0kV
X600
10µm
WD 9.0mm


ISI
LEI
5.0kV
X300
10μm
WD 7.8mm


ISI
LEI
5.0kV
X300
10μm
WD 8.1mm

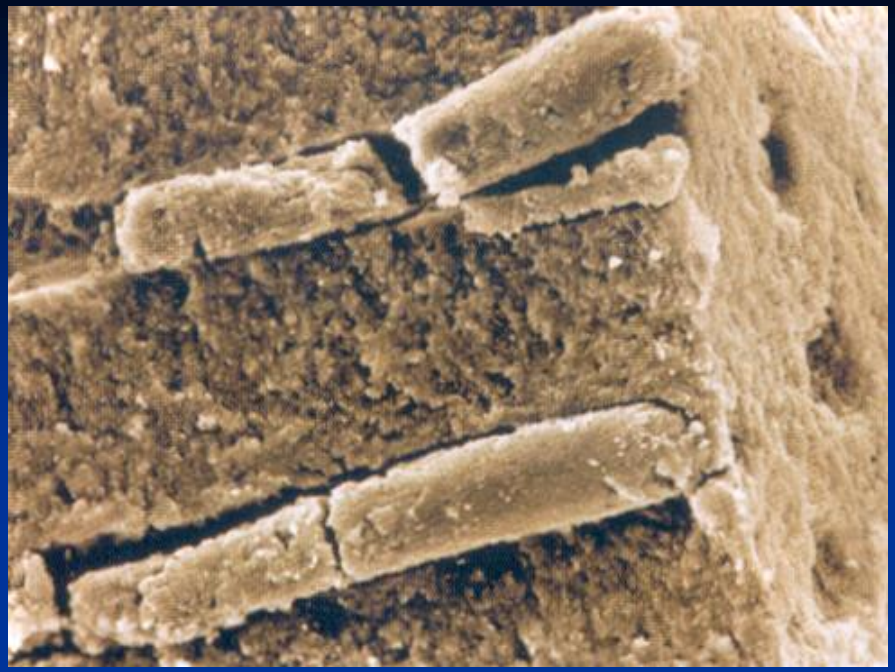
# Basic rules of power driven endodontics

Controlled movement
Keep the sequency
The instrument moves befor ingoing to the root canal
Irrigation, lubrication
No pressure
Movement up and down
Working cycle 10 – 15 s

# Irrigation

- **debridement**

- **desinfection**

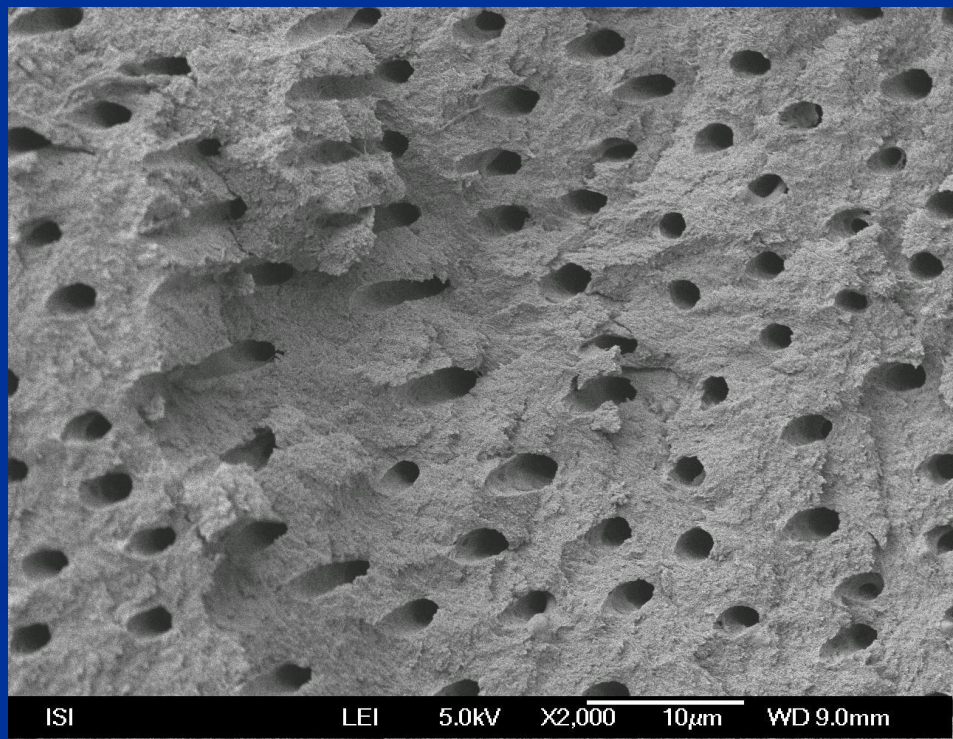


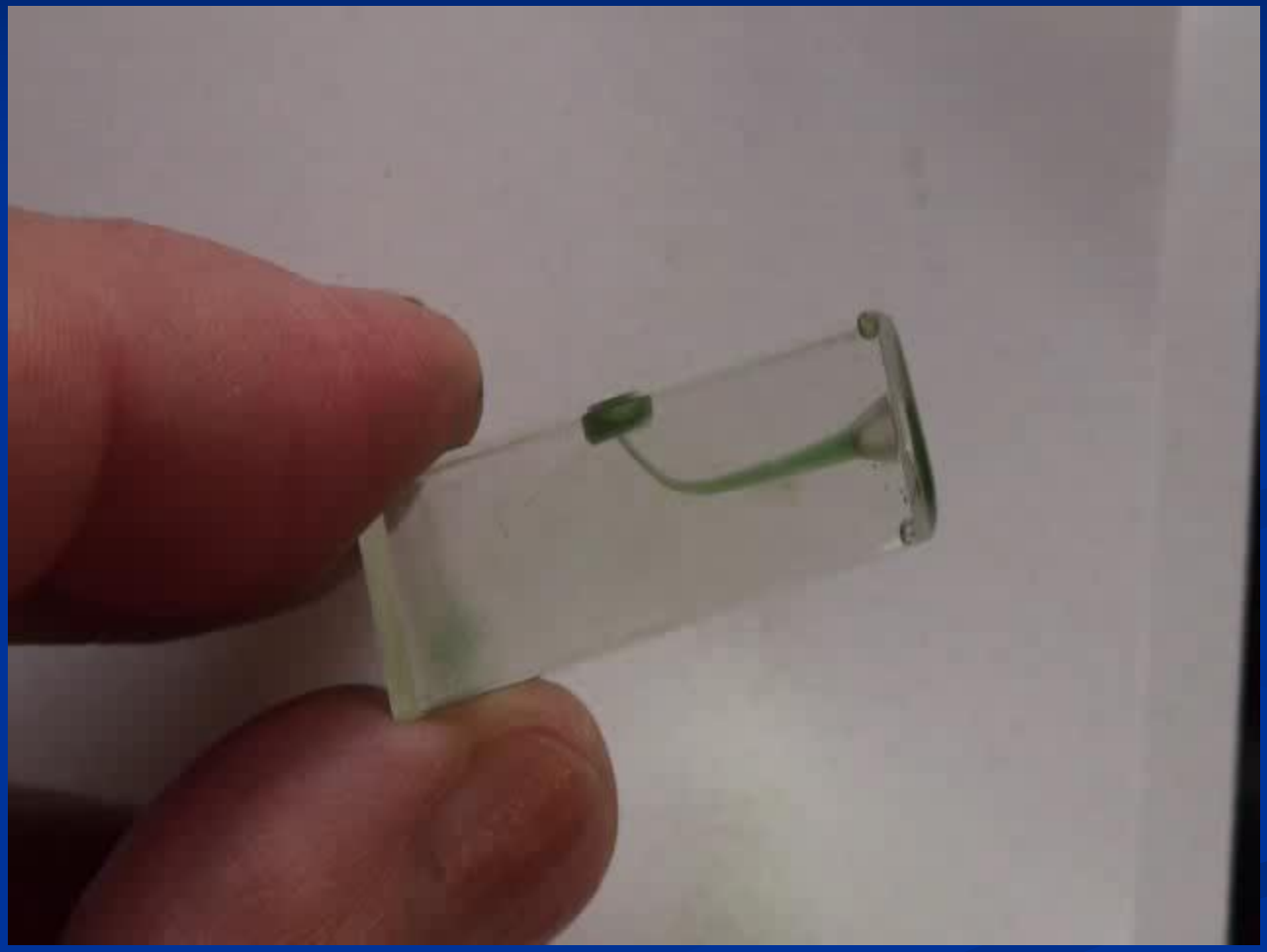
# CANTATORE G.

Irrigation Canalaire: avantages potentialisation et sequence operatoire

Endo Contact 1999 - 5:13-21

**Irrigation NaOCl**

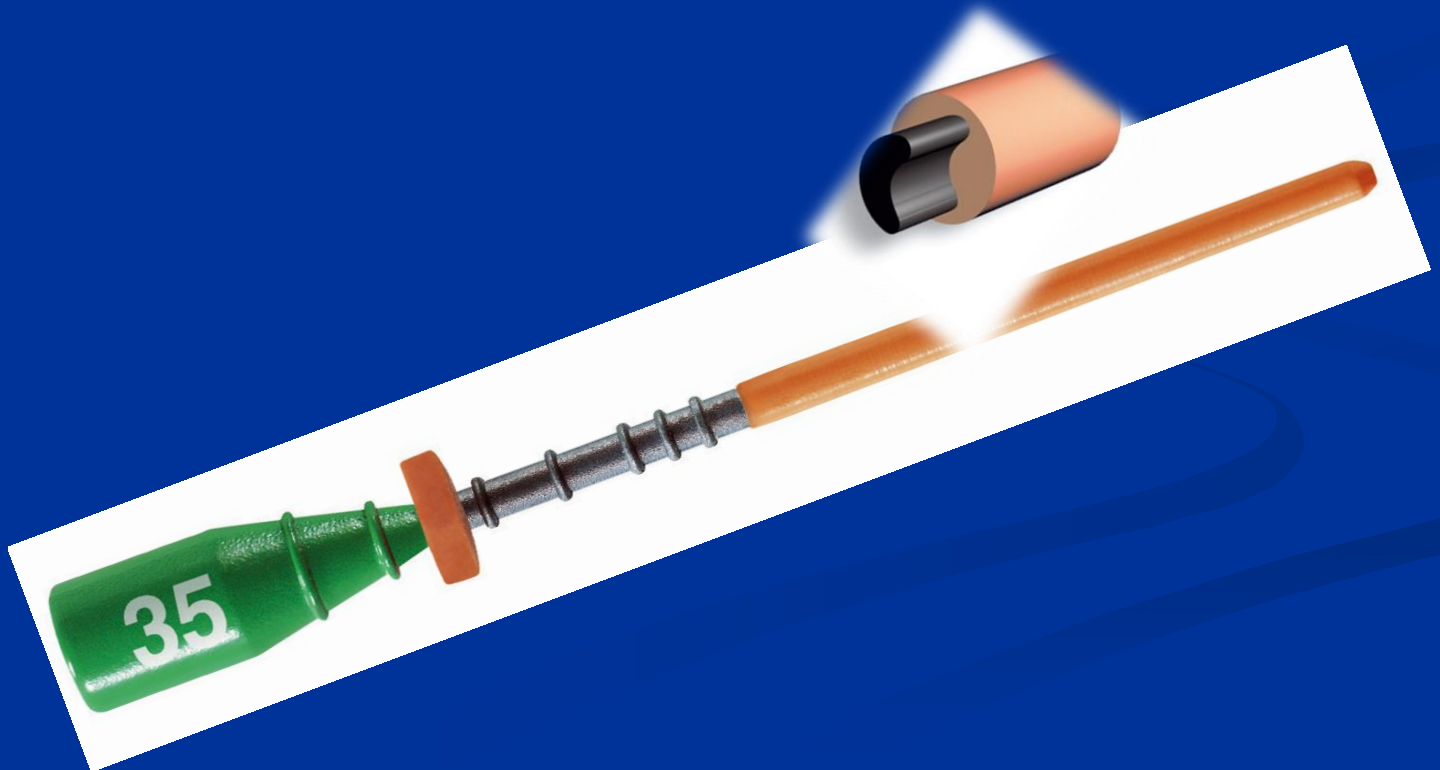




DENTSPLY MAILLEFER

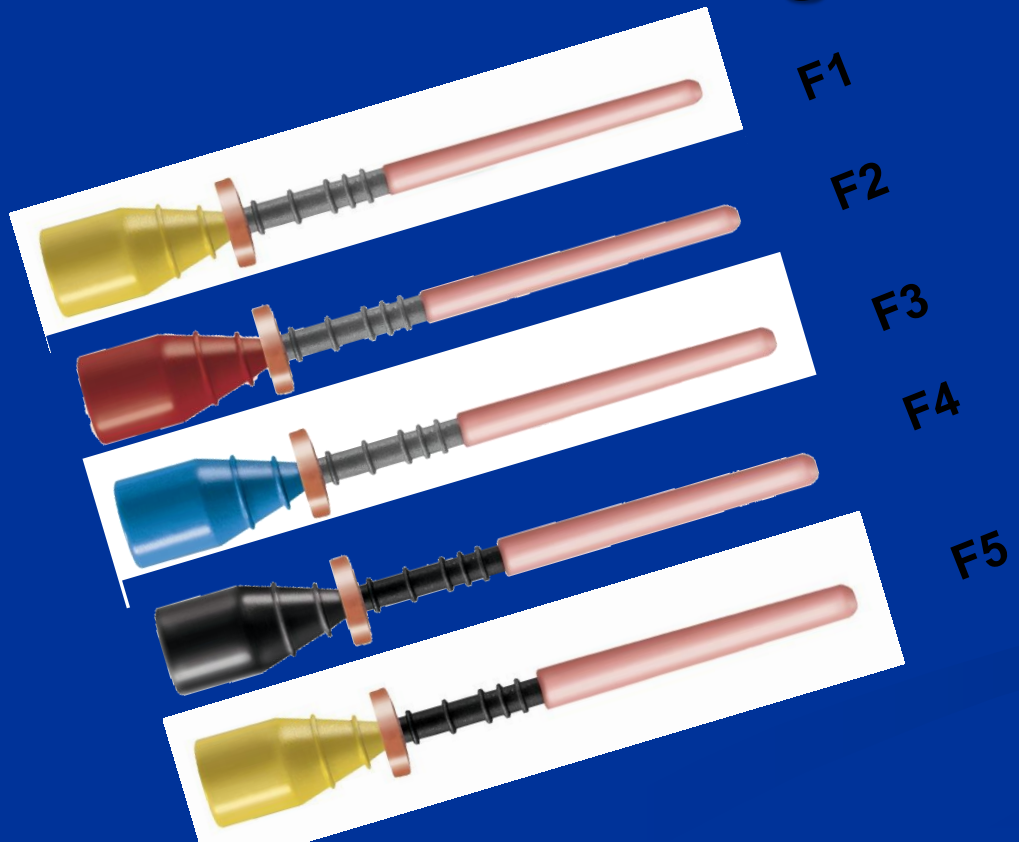
# THERMAFIL®

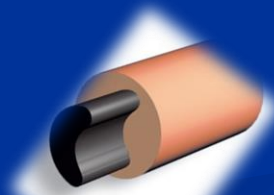
## Core-Carrier (PP) - Gutta-Percha Filling Technique



# Obturators PROTAPER

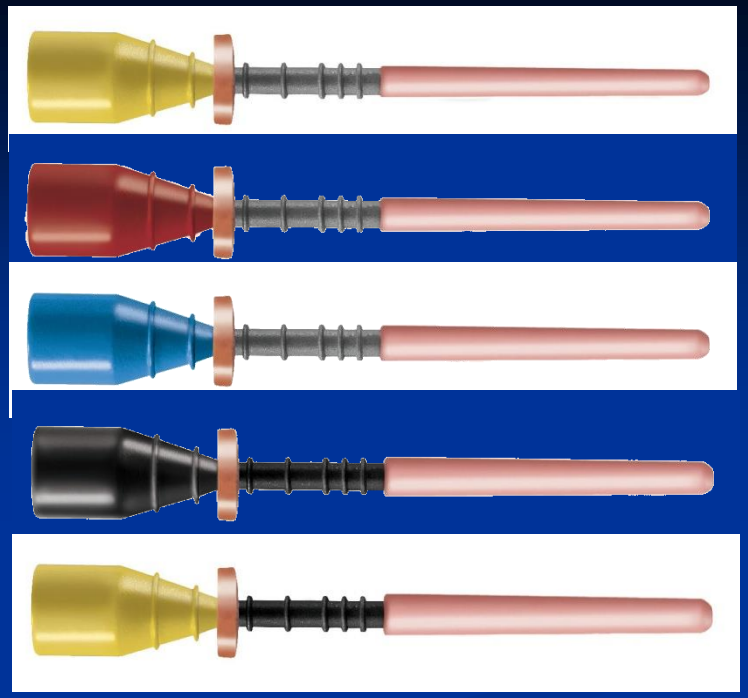
## Core-Carrier Gutta-Percha Filling Technique



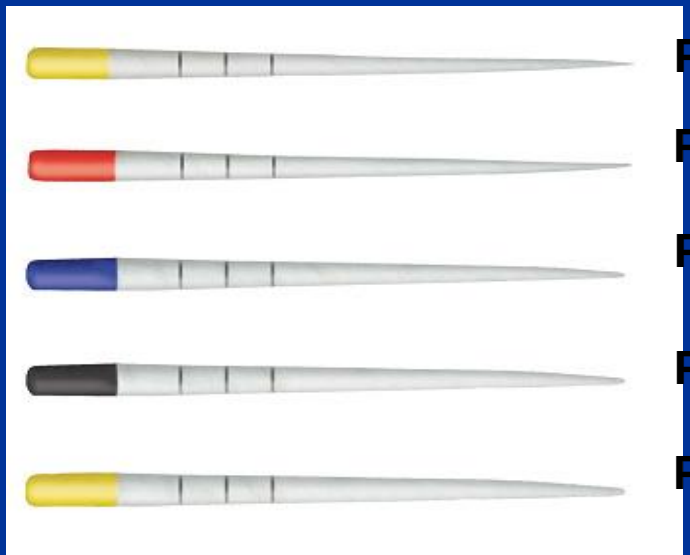
## Finishing Files (Apical shape)


## Calibrated Gutta-Percha Cones



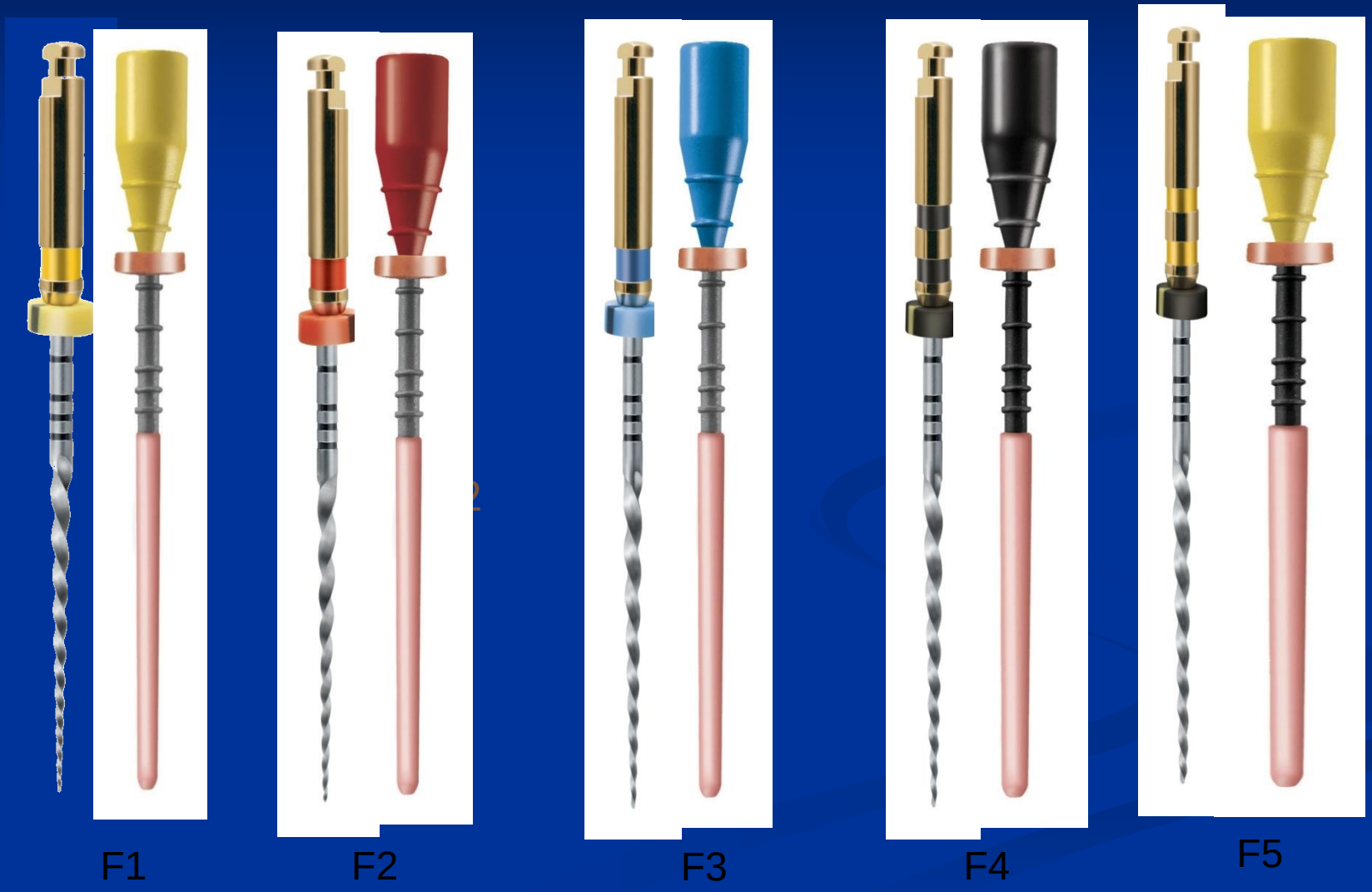
***Obturators - Protaper sizes***

## Sterile Paper Points




***Paper points - Protaper sizes***

# ProTaper Obturator calibrated to each Finishing File



# 3D Filling of the Root-Canal System with

# THERMAFIL
# Or
# PROTAPER OBTURATOR


Thermaprep Oven


Size verifier to measure the apical size

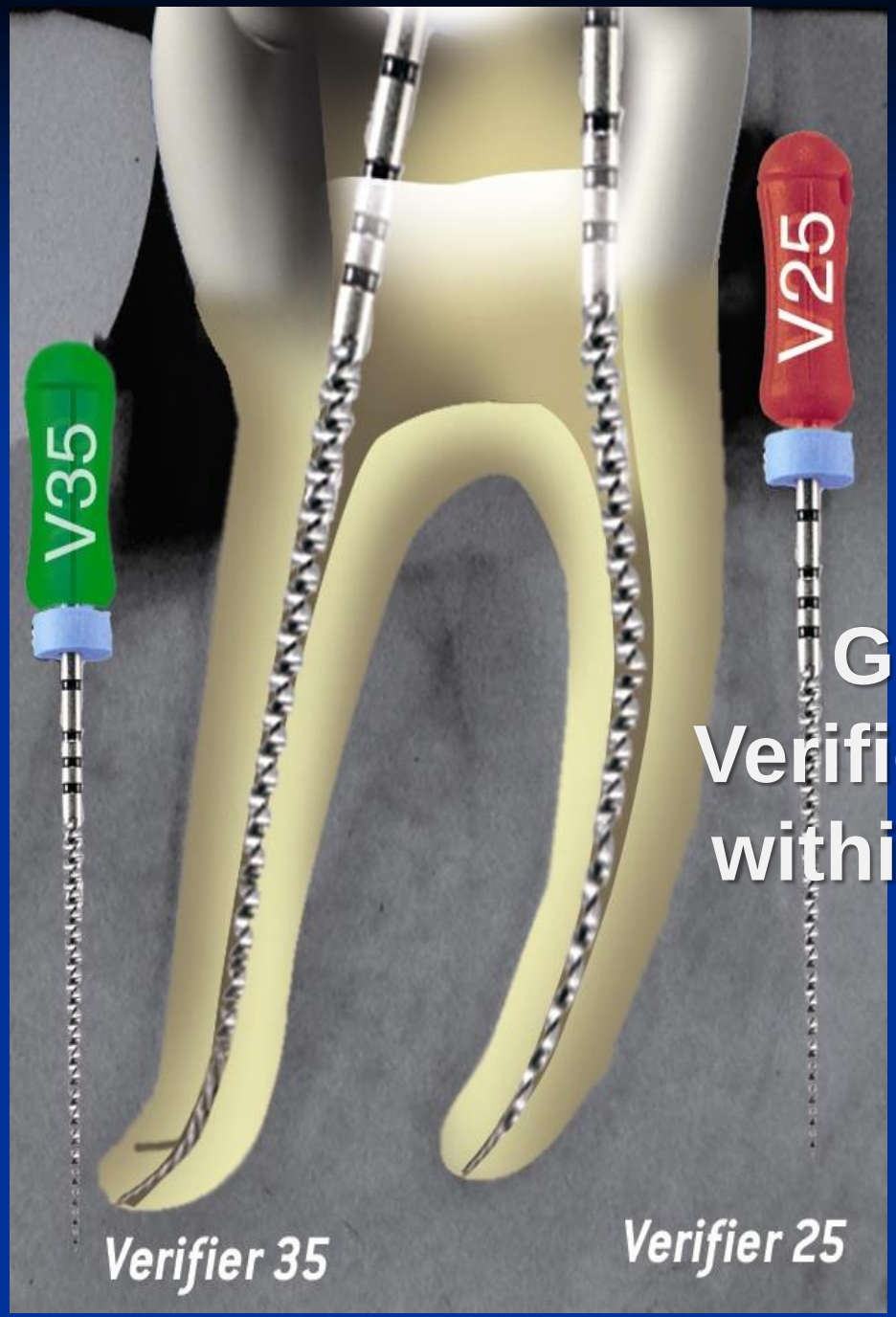

Thermacut bur

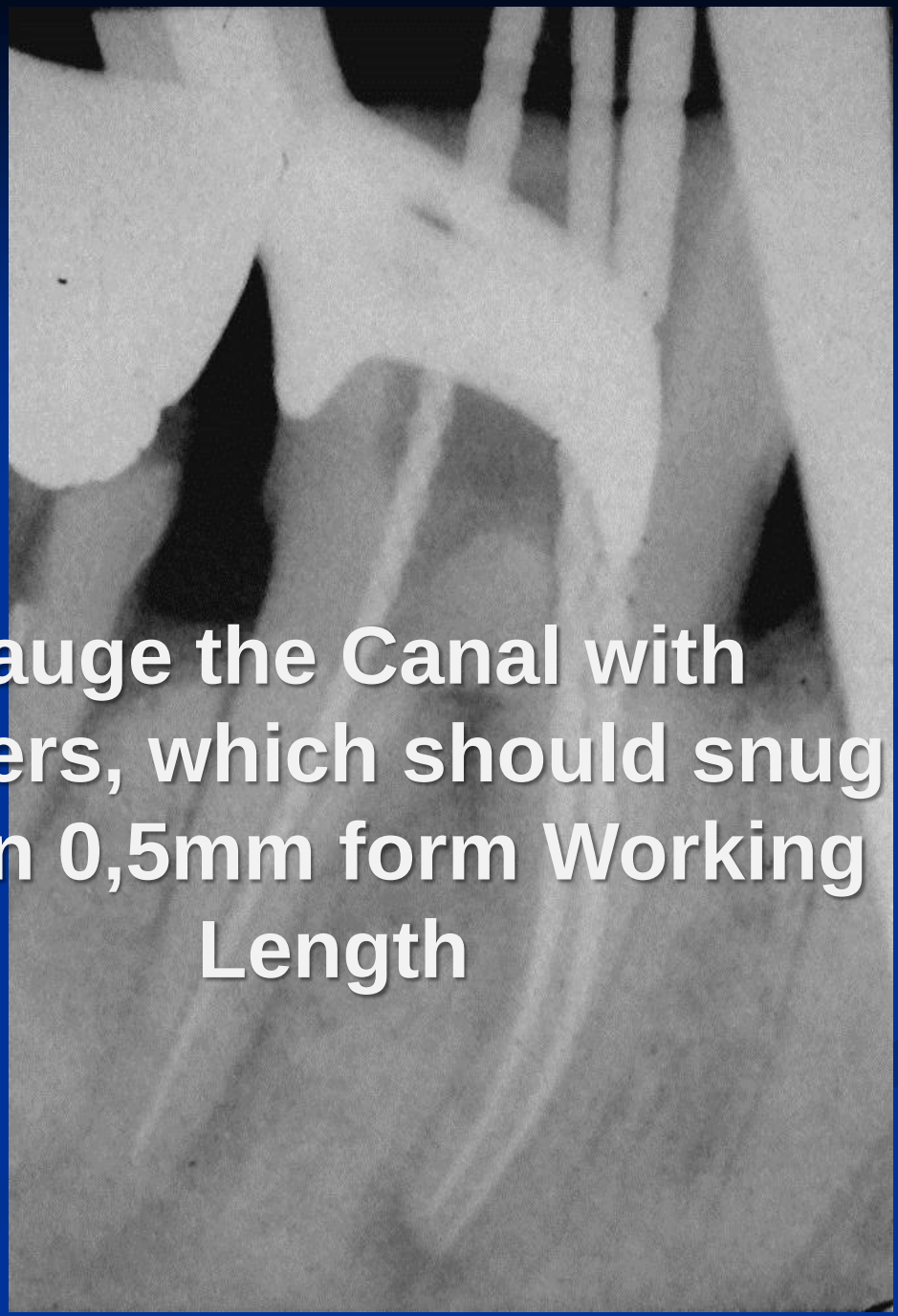
Post space bur

# *Core-Carrier Obturator Technique*

**1st step :**

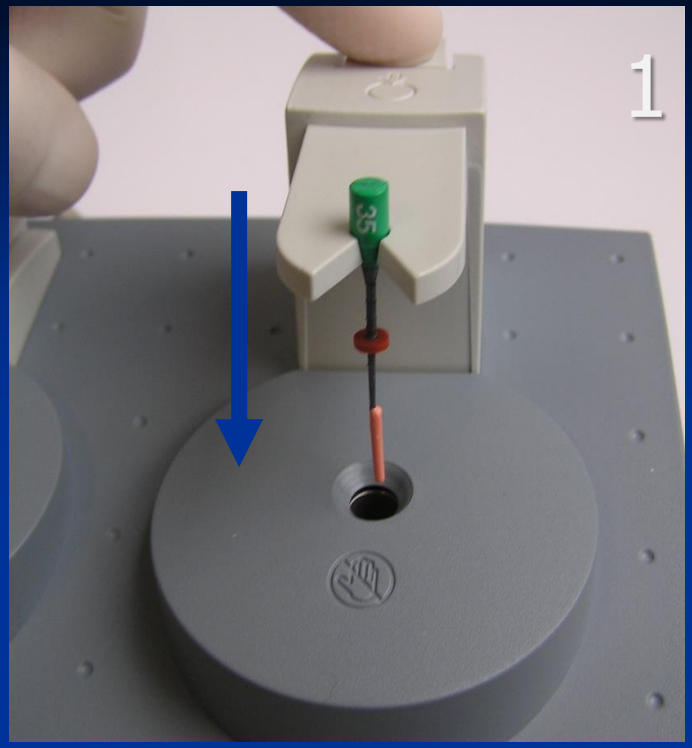
**Opening**
**cleaning**
**Shaping …**



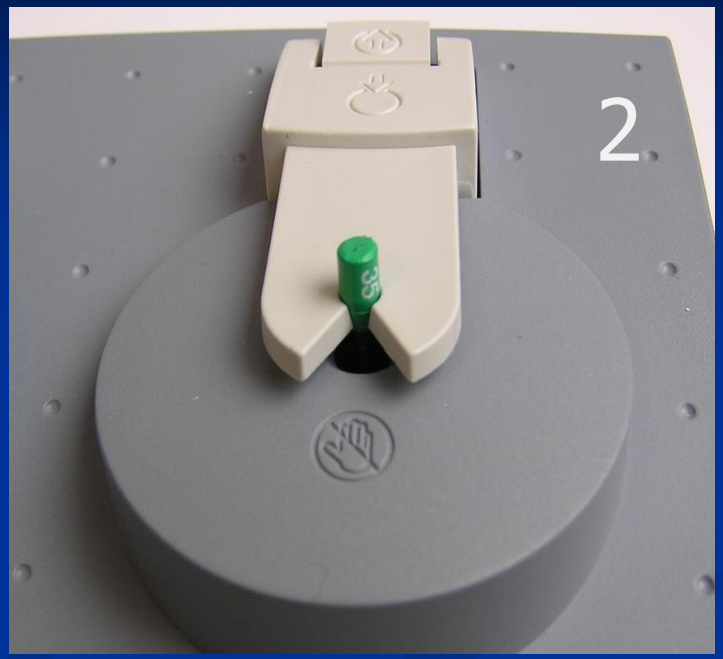



**Gauge the Canal with Verifiers, which should snug within 0,5mm form Working Length**

# Place the Obturators



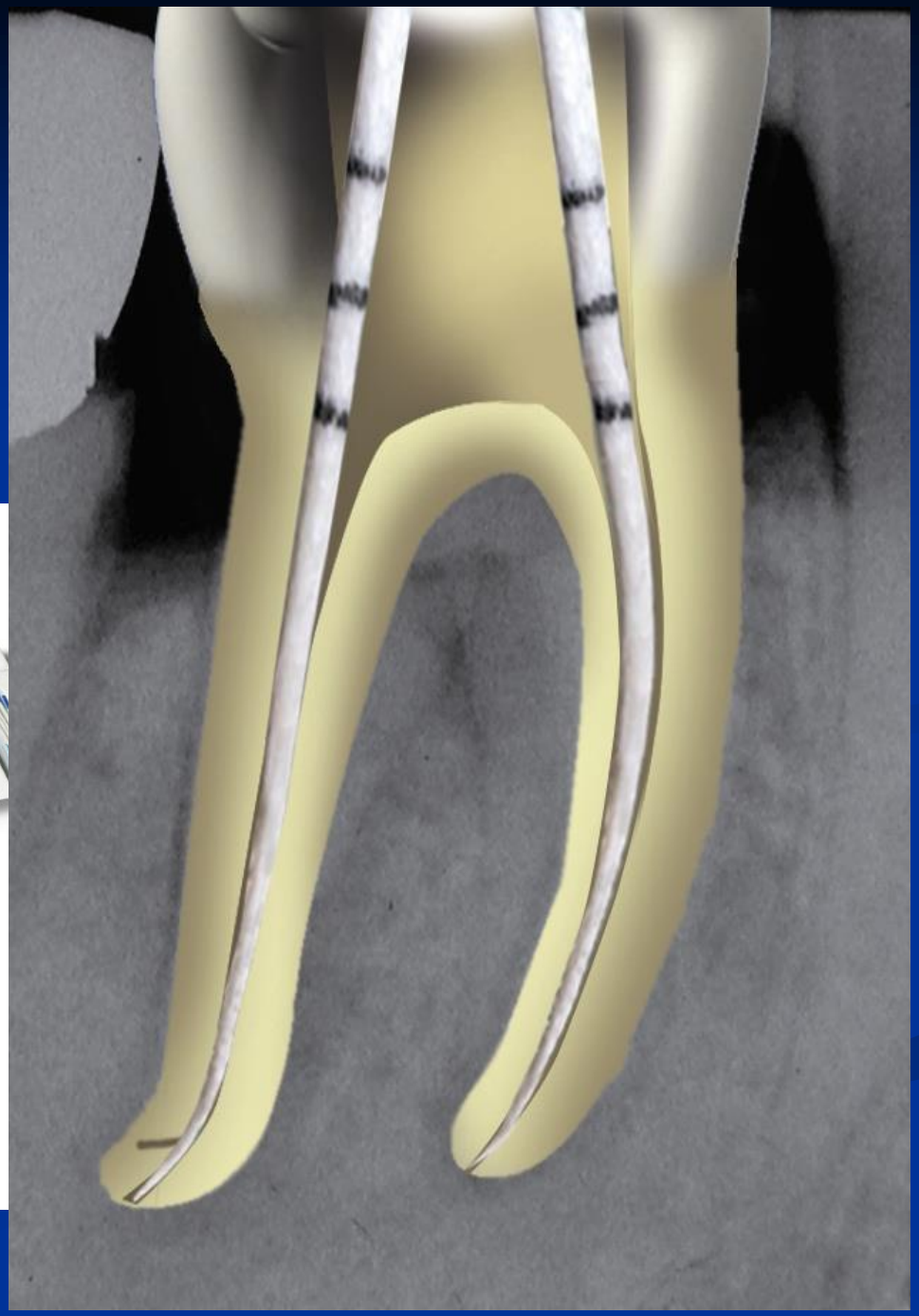

Heat The Obturator





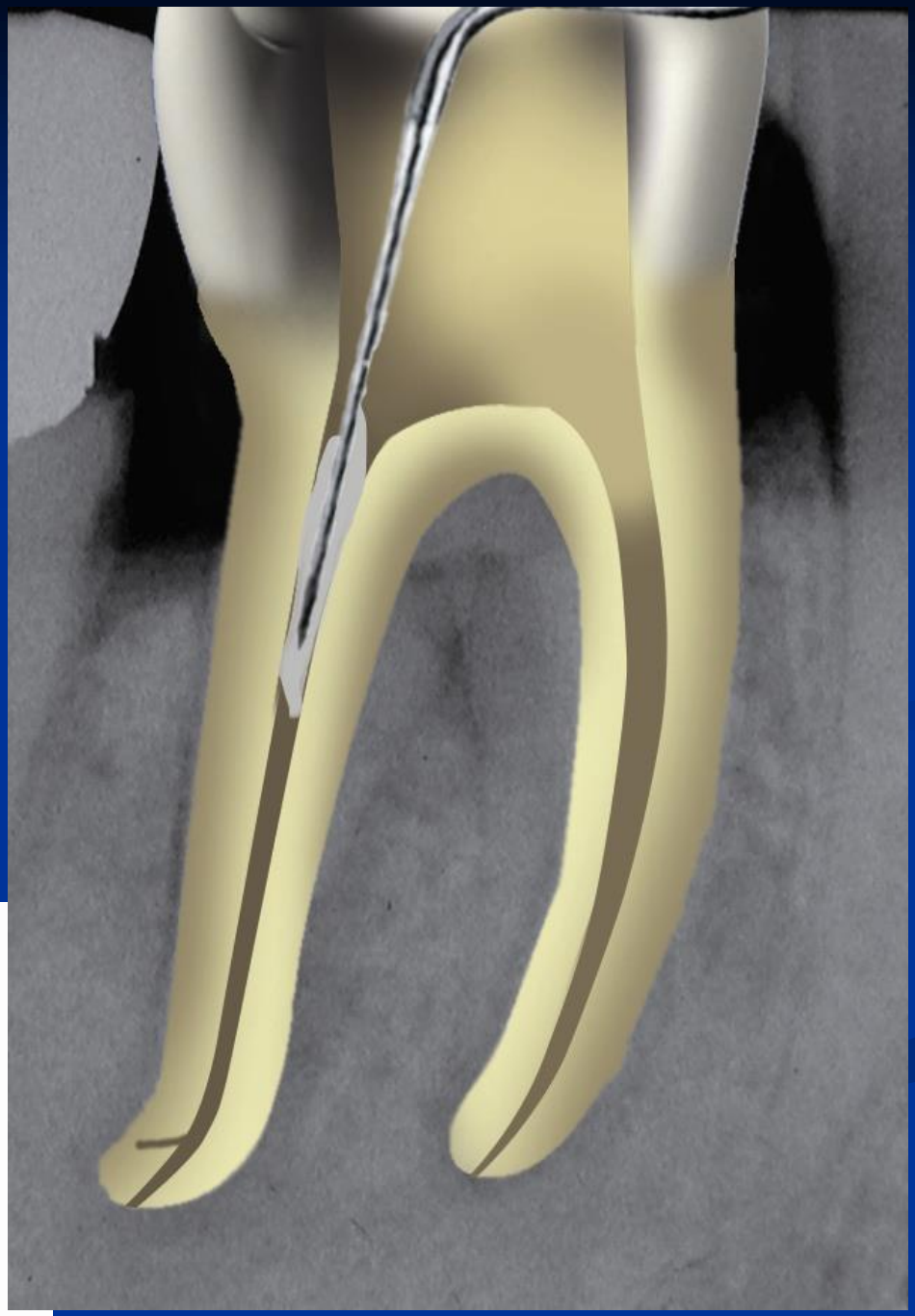
Select the right size and start

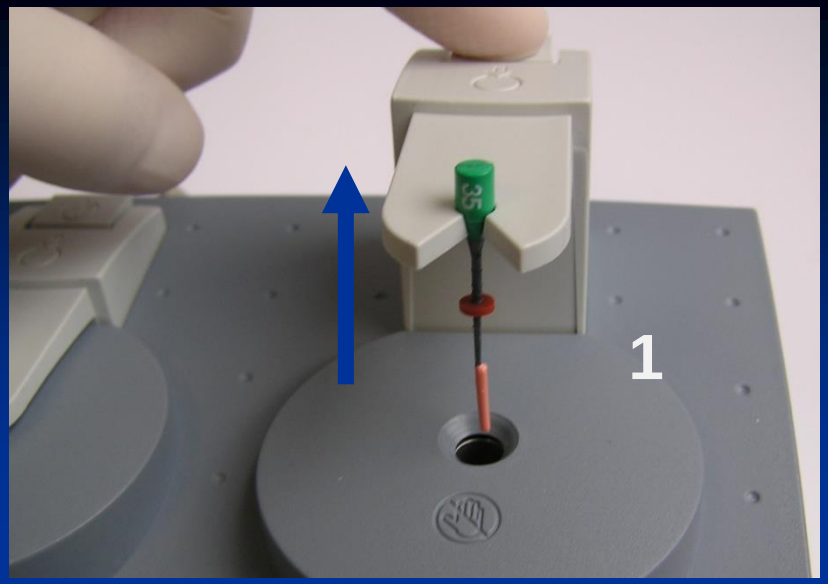
# Dry the Canals with *Sterile* Paper Points

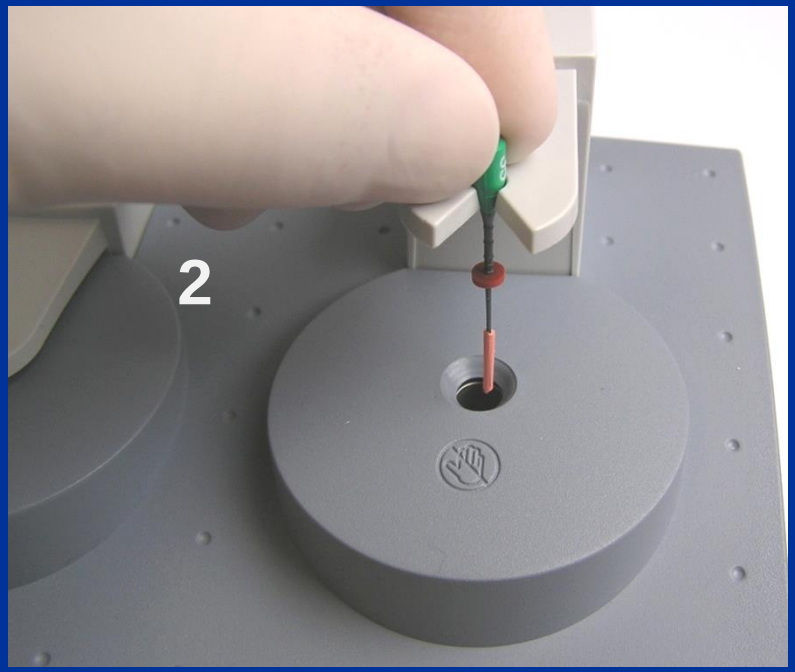
**Mix the Sealer and coat thewalls of the canal with a thin layer using a Probe or a paper point**

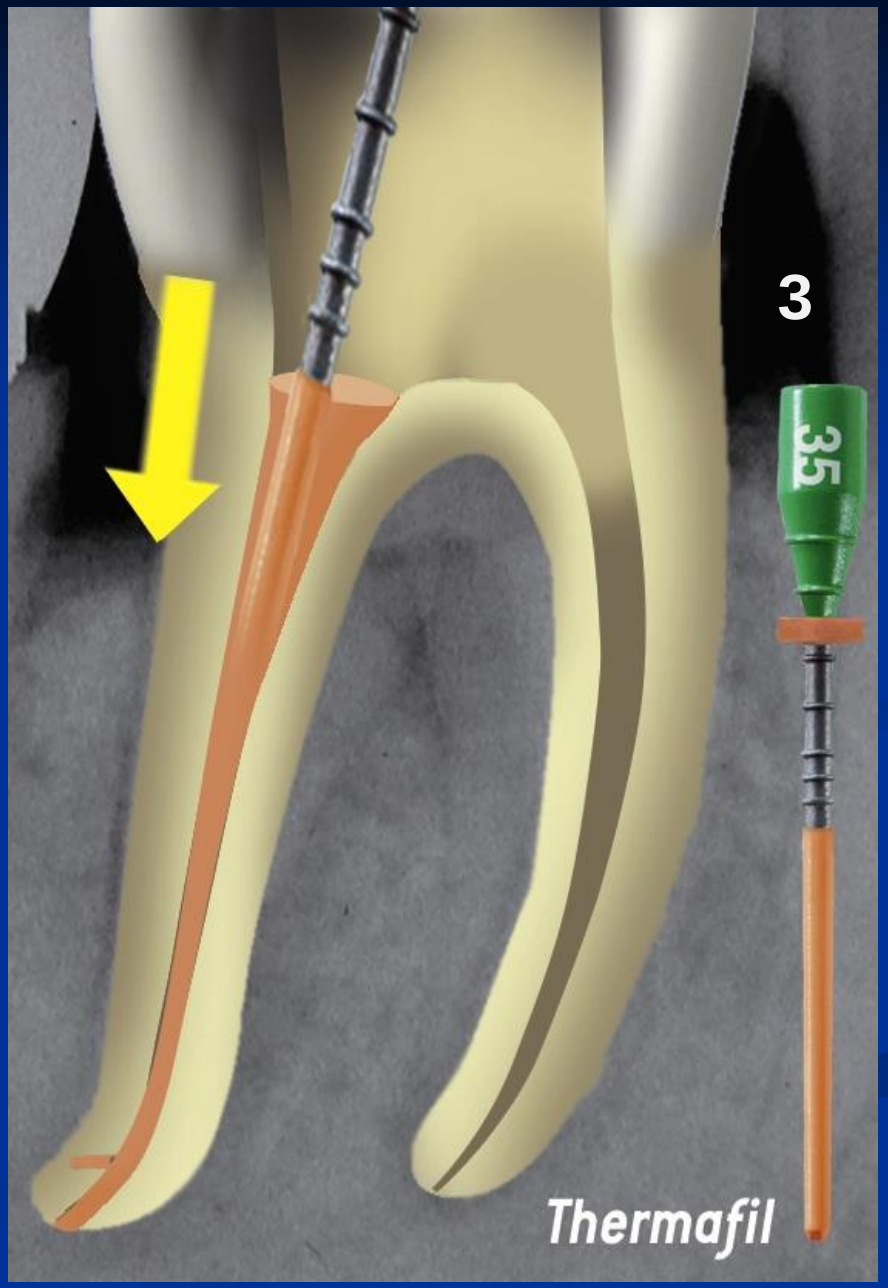

**Topseal MIX**

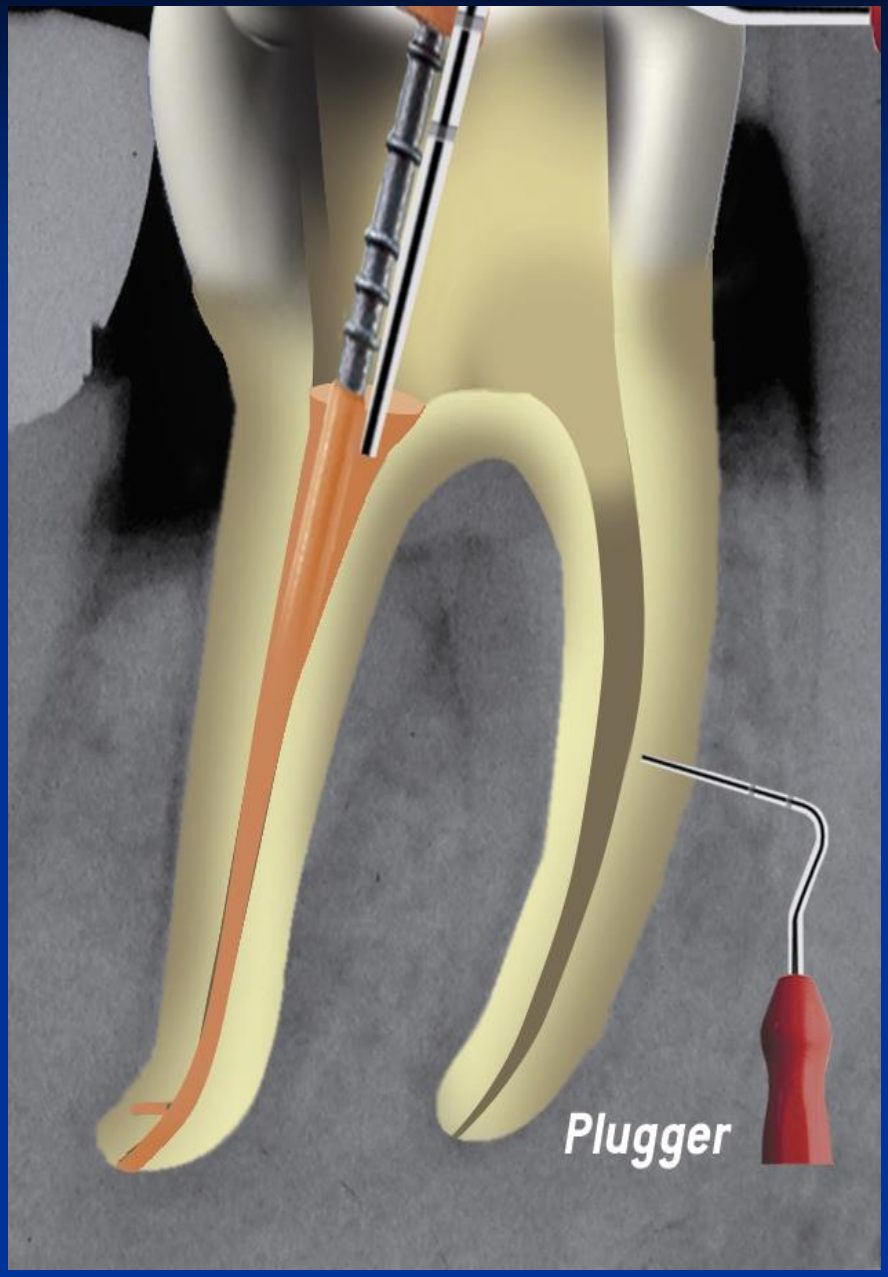



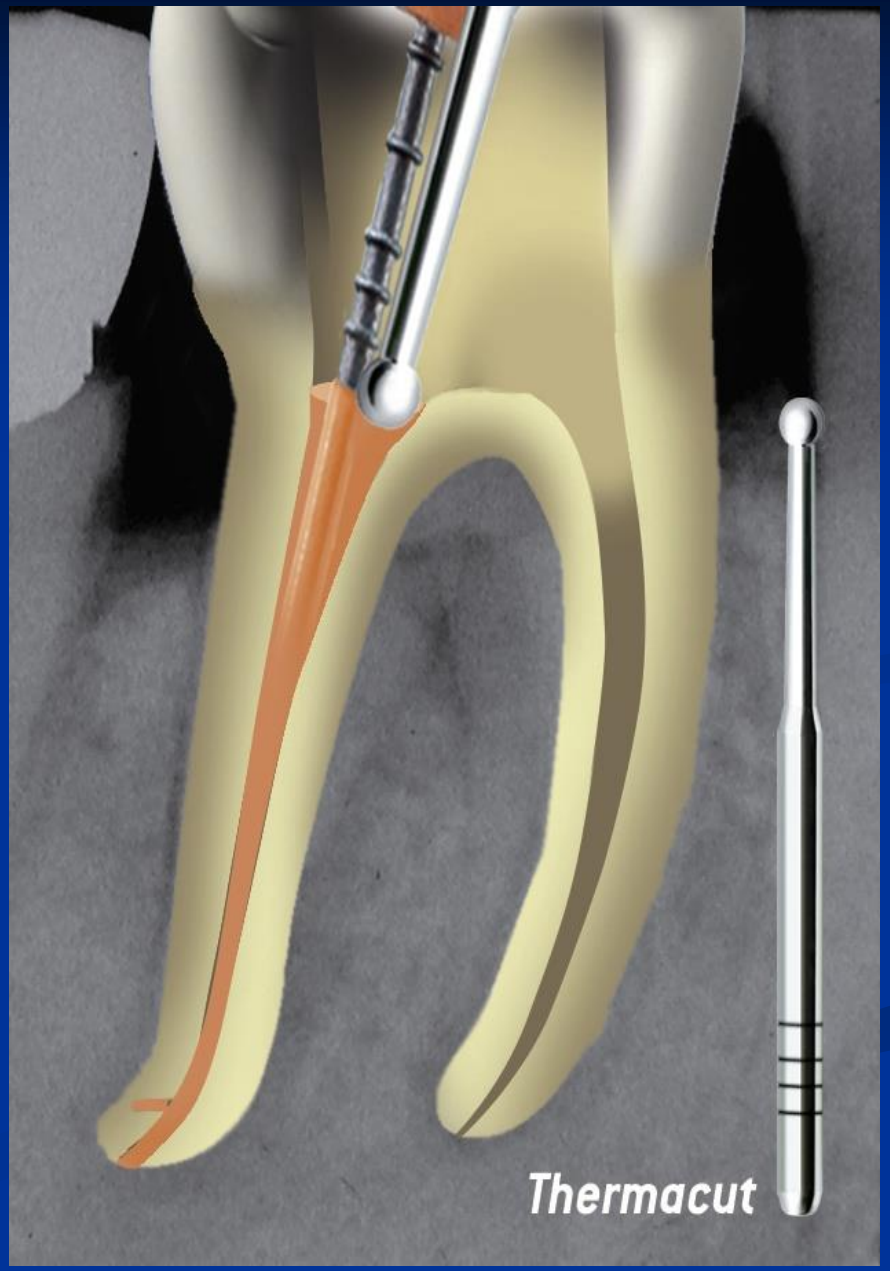



**Take it out**
**and insert it in the canal**

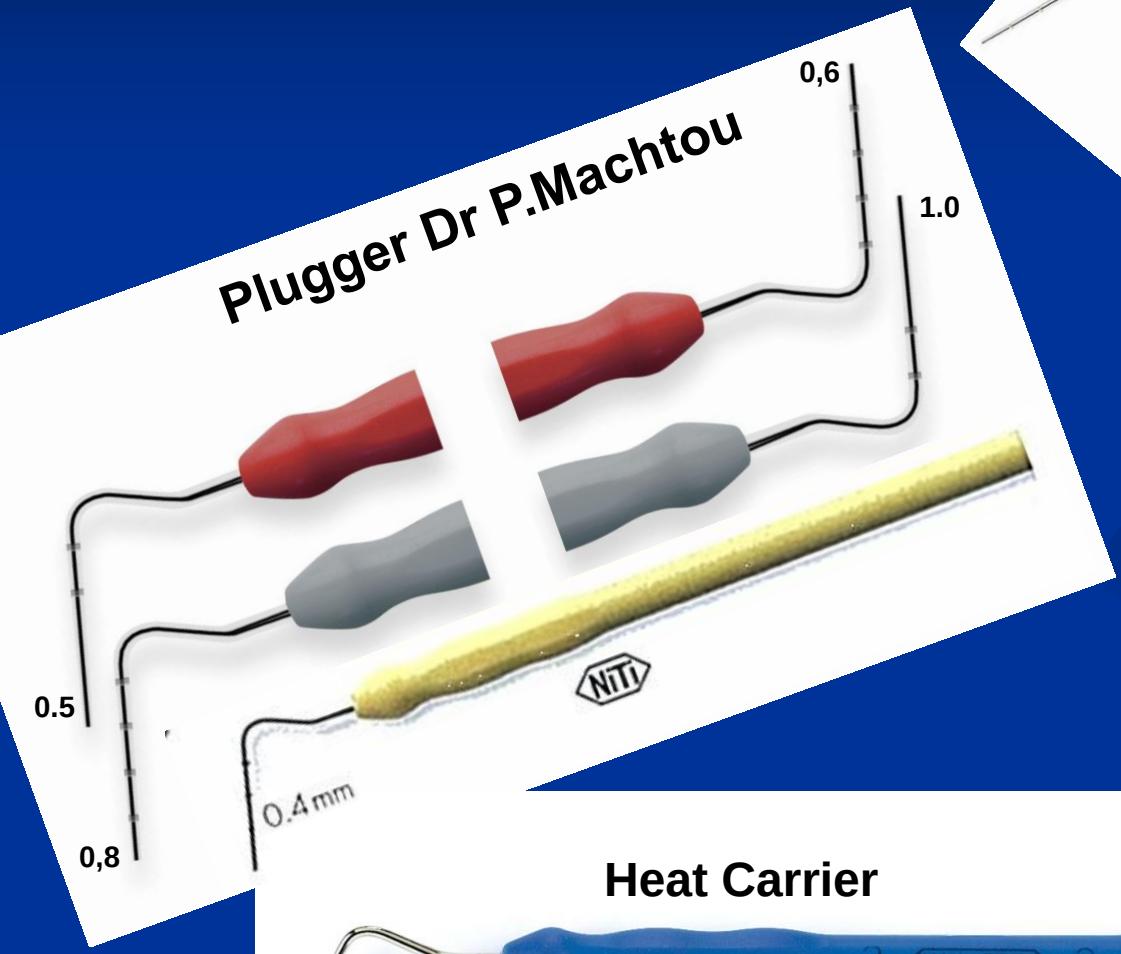


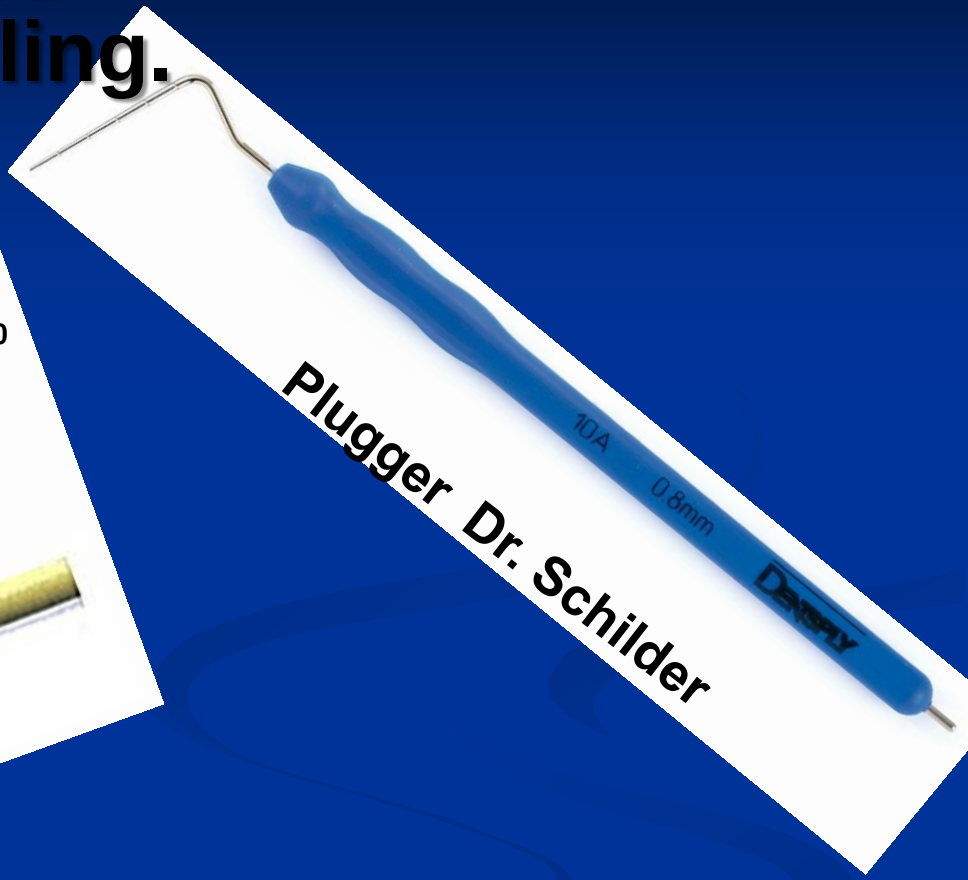



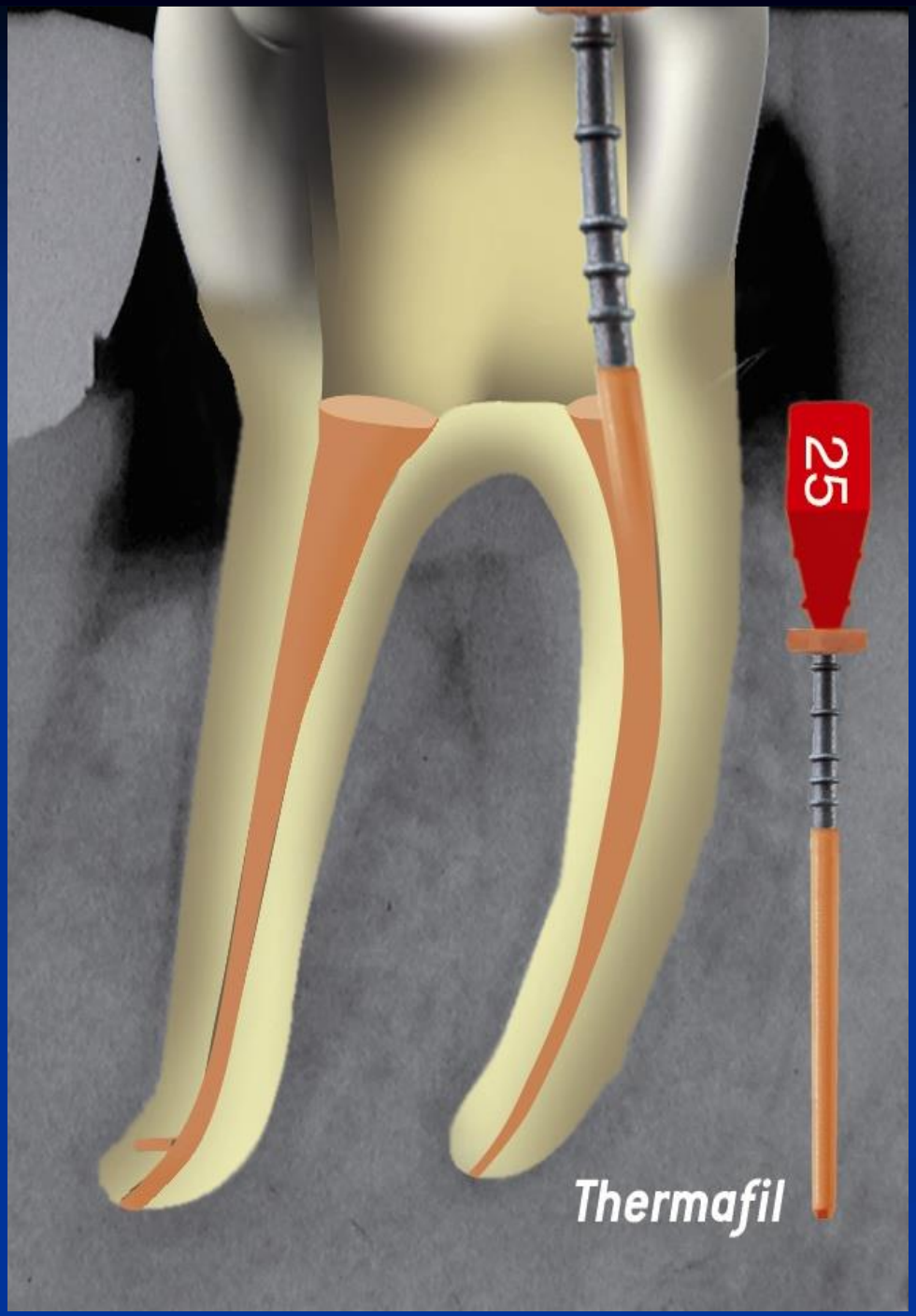

Plugger

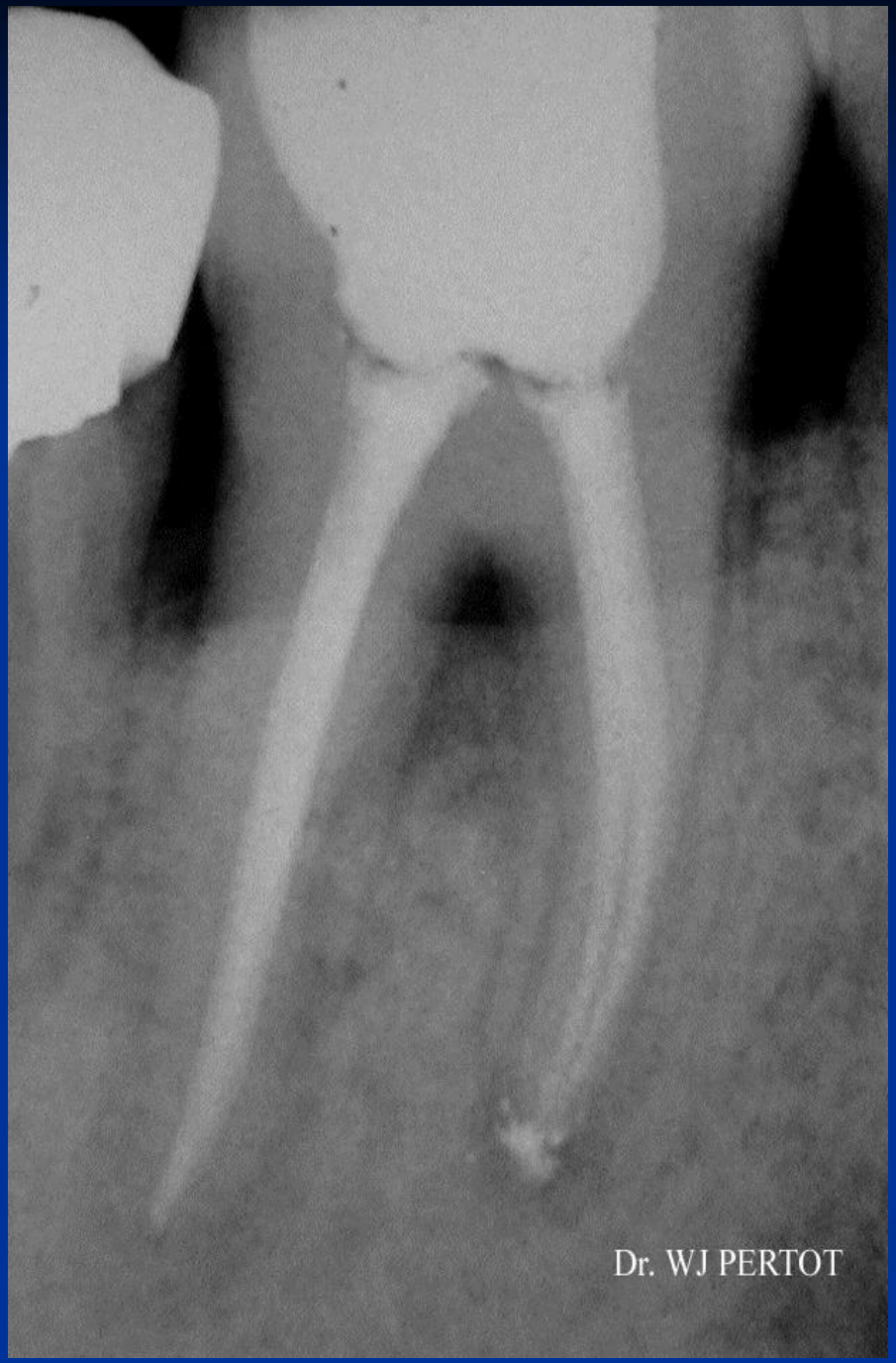

Thermacut

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





25
Thermafil


Dr. WJ PERTOT


Dr. WJ PERTOT