

Power driven endodontics

History

- Stainless steel – no rotation, oscillation, translation, combination – risk of perforation, ledging.
- Nickel titanium alloy – rotation, reciprocation, oscillation

Ni Ti instruments

Controlled rotation



NiTi alloy

56 % Ni, 44% Ti,

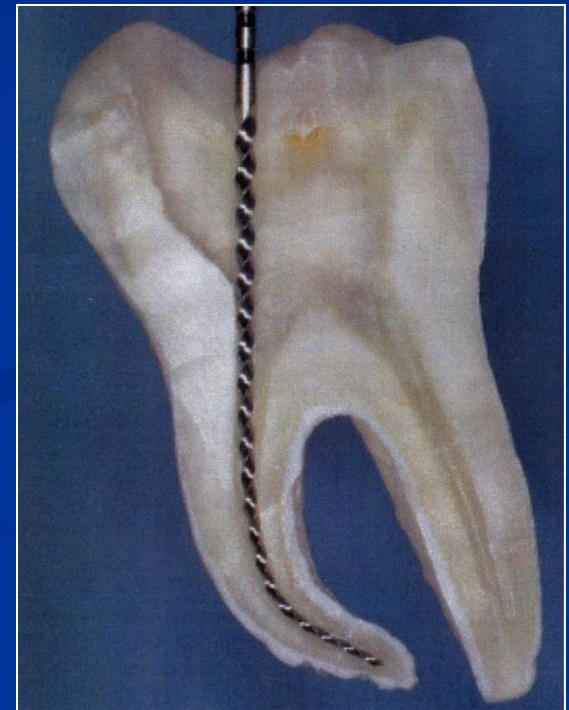
60%Ni, 40 % Ti

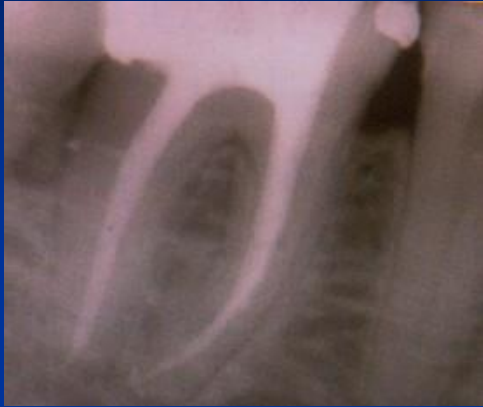
Flexibility

Memory effect

Effectiveness

Fractures ?





Martensitic transformation

Austenit



Martensit



Heating or releasing of bending stress –
back to austenit - superelasticity

Contemporary trends

- Treatment of the wire

- Heating

- Mechanical forming

Increasing: effectiveness

Decreasing: the risk of the fracture

- Design (taper, shape of the cutting part, centralization)

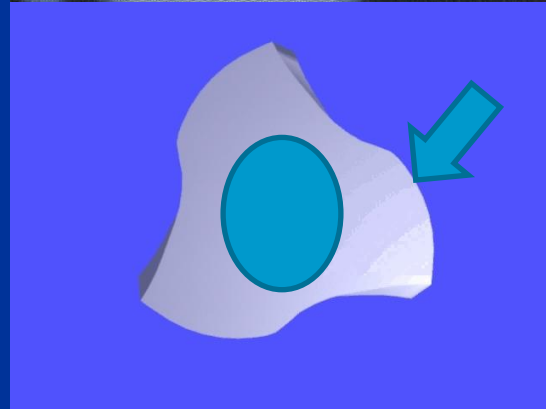
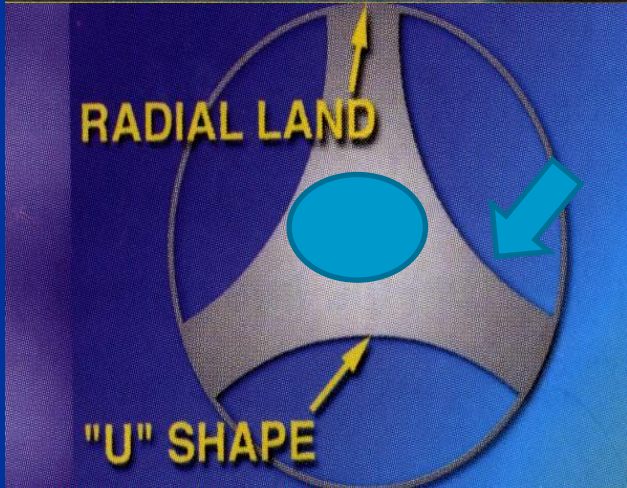
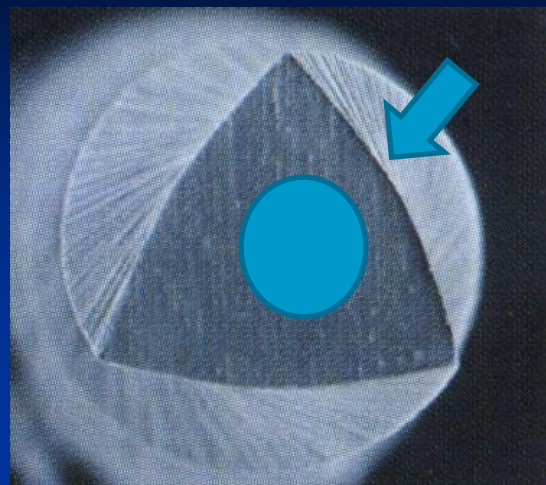
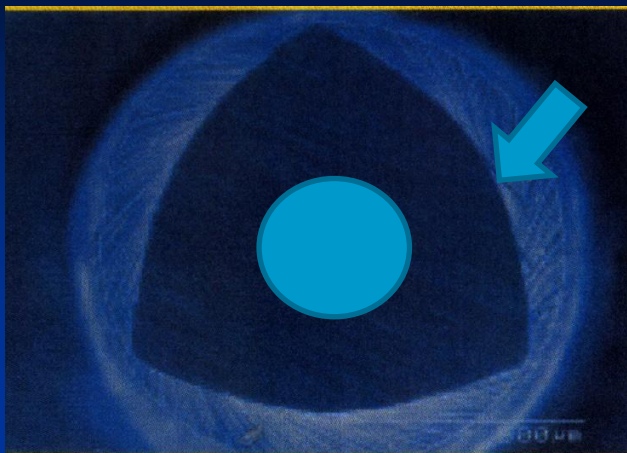
Shape

- Core



- Cutting part

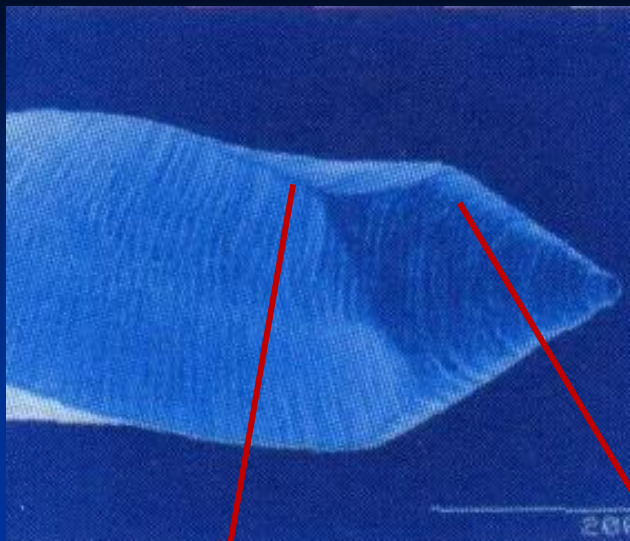
- Space for the transport of dentin chips



CORE



CUTTING EDGES



Sharp edges



Grooves after the grinding

Radial land – flat „edges“



Tip

Controlled rotation

Low rpm

Torque control





Handpieces – no complete control

Gear

Electromotor: 128:1

Air motor: 64:1

Motors

- Controlled rotation
- Reciprocation
- More programmms
- Dr's choice



Motors:

More programmes
Dr's choice





X-SMART™ DUAL



Motor &
Apex Locator

X-SMART *DUAL*: twice as SMART

3 MODES OF USE:

- Motor alone
- Apex locator alone
- *DUAL* mode - Motor and apex locator combined

SAFER with an Endo motor

- Torque control & auto reverse limit risk of file breakage
- Auto reverse / stop at the apex mode limits the risk of over-preparation*



SPACE SAVING & CONVENIENCE

Endo motor and apex Locator in one device

SIMPLE TO USE

- Automatic start / stop when the file enters / is withdrawn from the canal
- Programmable
- Intuitive keyboard
- Large LCD screen

* Follow the recommended clinical sequence

X-SMART DUAL: twice as SMART



X-SMART EASY : cordless and user friendly

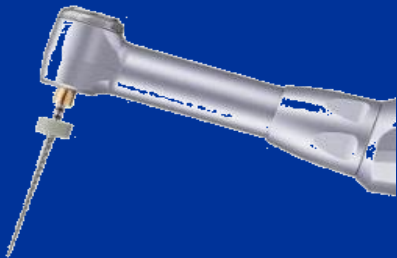
X-SMART

friendly

“The cordless version of X-SMART

- freedom of movement
- Safe – torque control, auto
- Miniature contra-angle as X-SMART
- User friendly – featuring LCD display + very explicit intuitive control panel
- Ergonomic fits well in the hand, anti-slip grip

Miniature contra-angle head



The X-SMART EASY on its charging base

FORWARD

REVERSE

Torque 0.6-4 Ncm

Speed 100-800 rpm

Auto reverse ON/OFF

INCREMENTS +/-

SELECT
(torque /speed /
auto reverse)



- Niti alloy enables using of higher taper
(4%, 6%)

Taper 2%

d_2

$$d_2 = d_1 + 0,32$$

d_1

0,02 mm / 1mm



Taper 4%



d_2

$d_2 + 0,64$

d_1

0,04mm / 1 mm

Taper 6%



d_2

$$d_2 = d_1 + 0,96$$

d_1

0,06mm / 1 mm

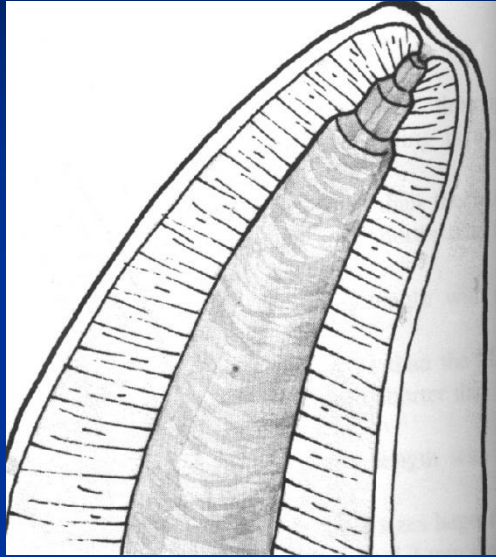
Higher taper

Coronal flaring

Higher effect of irrigation

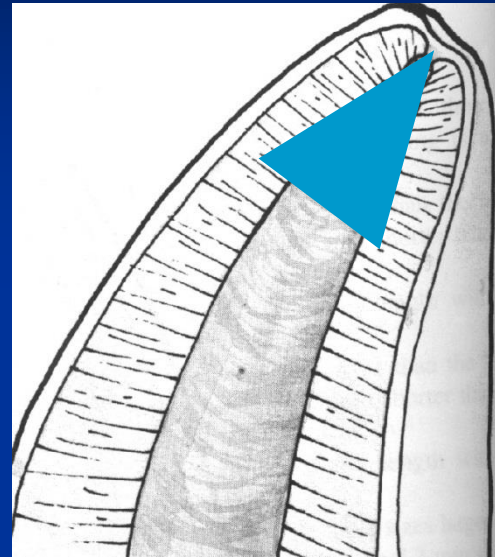
Good approach to apical part

**Good conditions for 3D
filling**



2% taper

30	at the apex	0,30 mm
35	1 mm from the apex	0,35 mm
40	2 mm from the apex	0,40 mm
45	3 mm from the apex	0,45 mm



6% taper

30	at the apex	0,30 mm
30	1 from the apex	0,36 mm
30	2 from the apex	0,42 mm
30	3 mm from the apex	0,48 mm

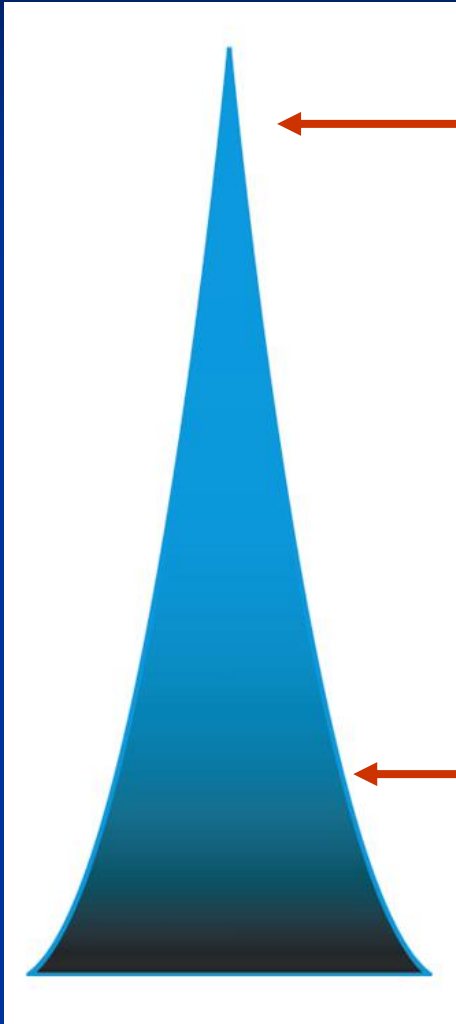
Shape of the apical

Classification of instruments acc. to the taper

- Fixed taper

- Variable taper
 - Progressive
 - Regressive

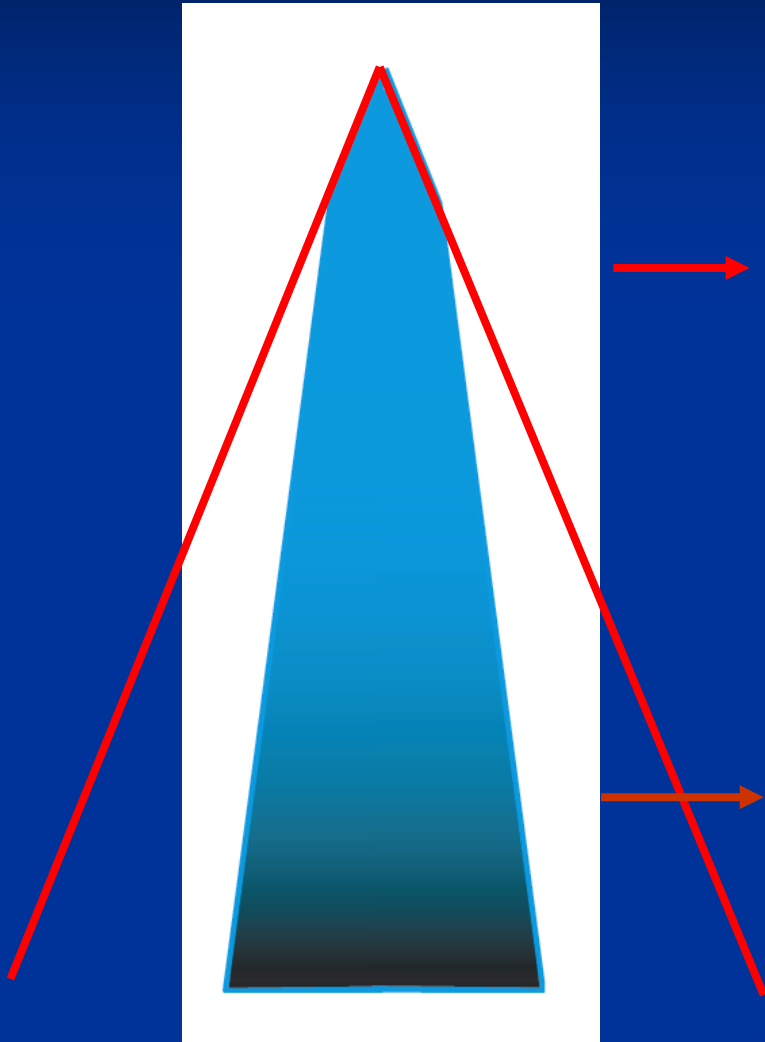
Progressive taper



Flexibility, penetration,
small shaping

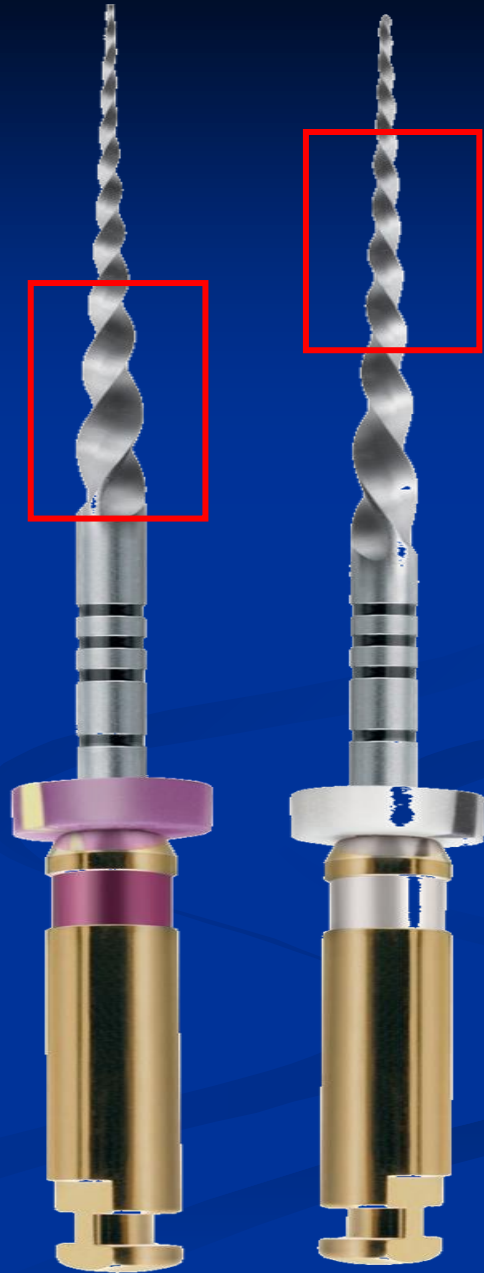
Resistance maximal
opening of the root canal,
approach to the apical part

Regressive Taper



Stability in the apical part

Finishing Files

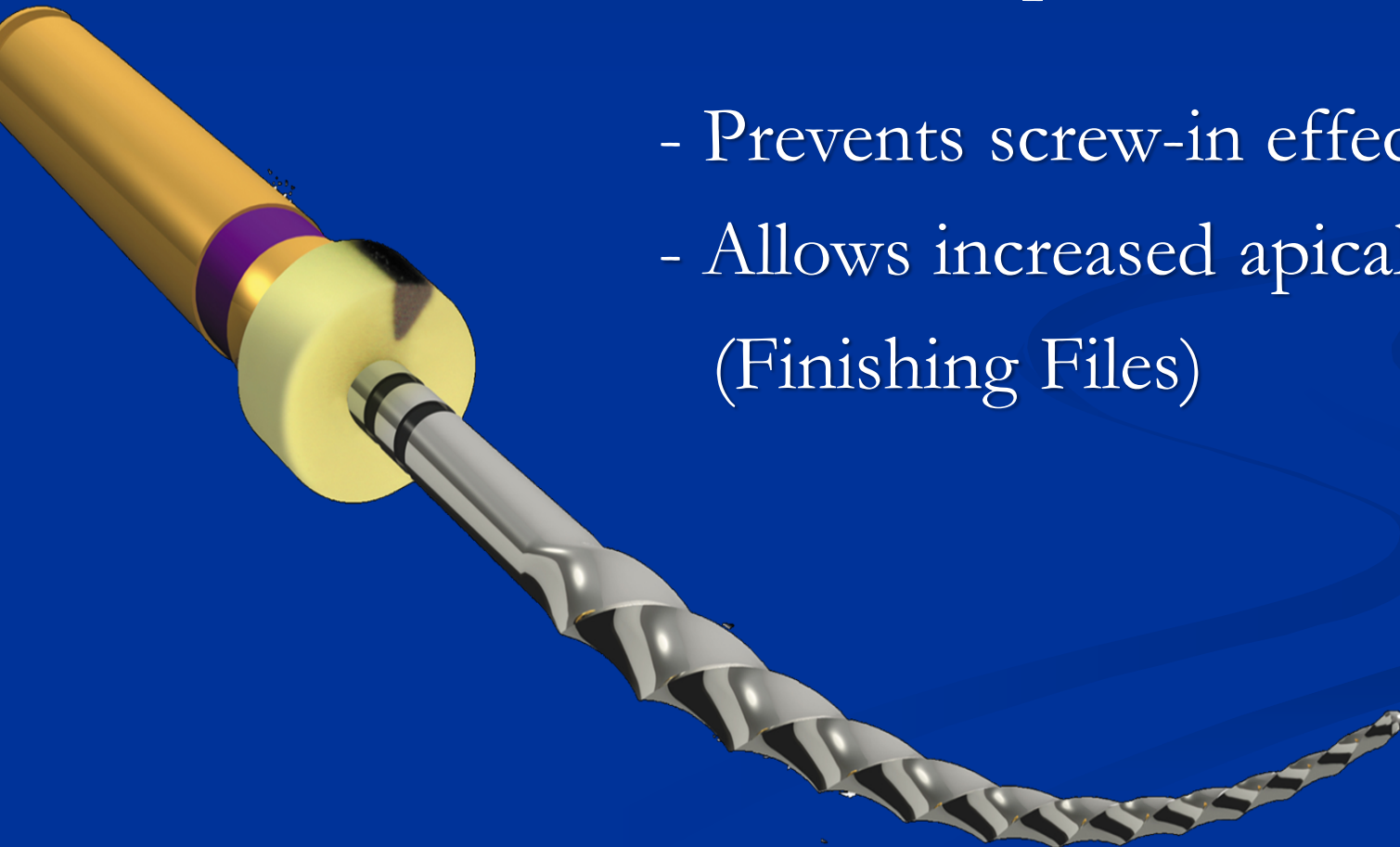


VARIABLE TAPERED INSTRUMENTS

- Variable Taper:

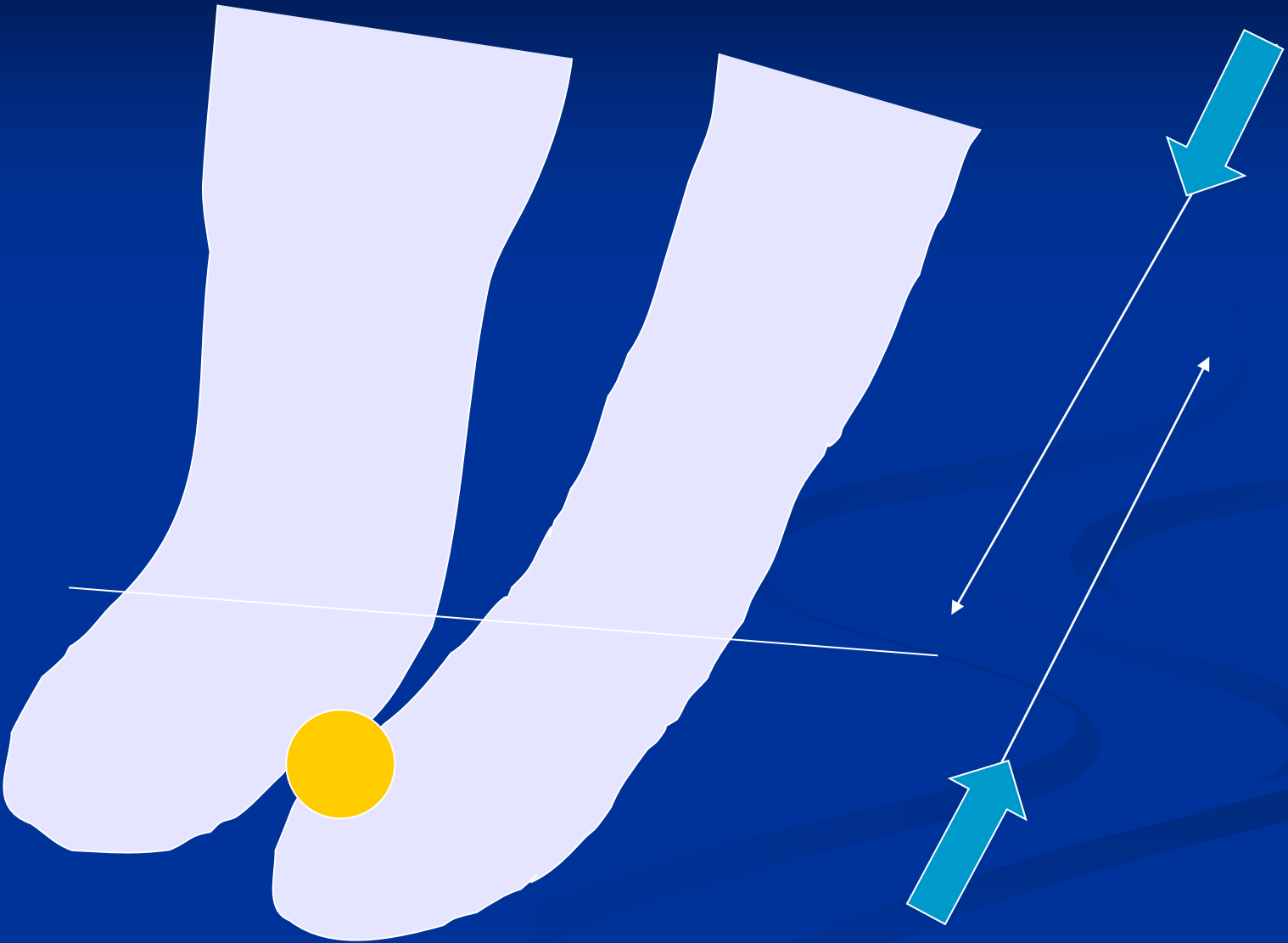
- Prevents screw-in effect

- Allows increased apical tapers
(Finishing Files)





Crown down



Flex Master organizér

Crown down:

Modrá

Červená sekvence

Žlutá

Apikální

preparace:

Zelená sekvence

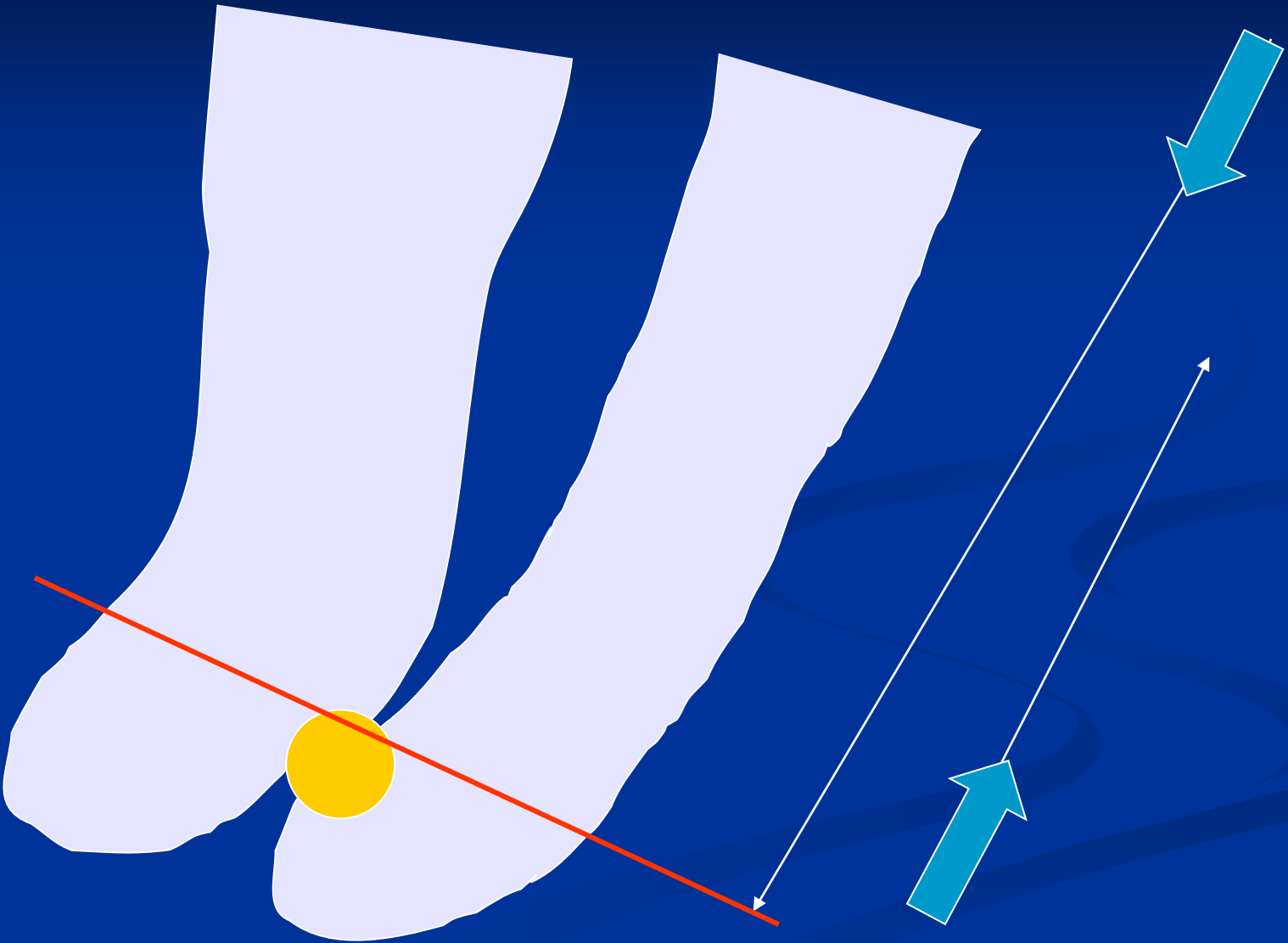


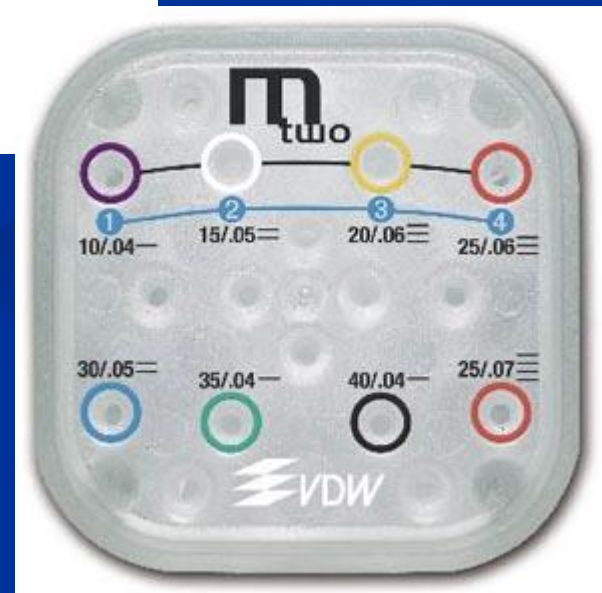
Apical - coronal

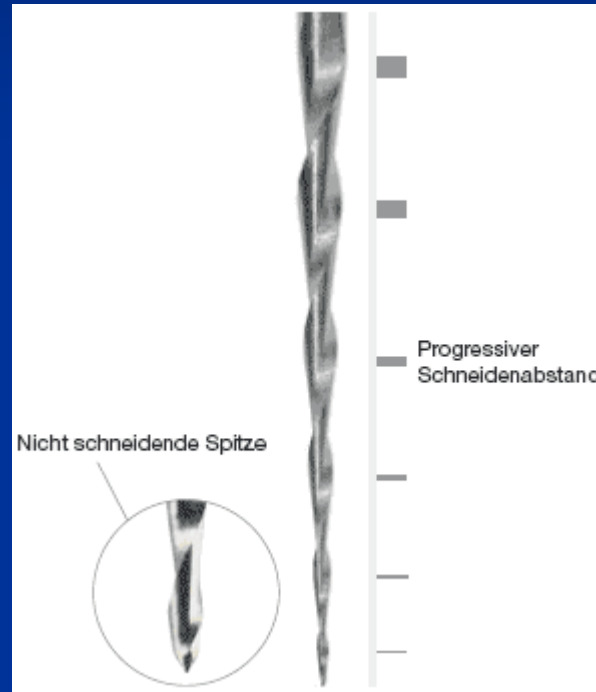


Step back









System ProTaper

- Universal
- Gold
- Next

System ProTaper

- Universal

- Gold

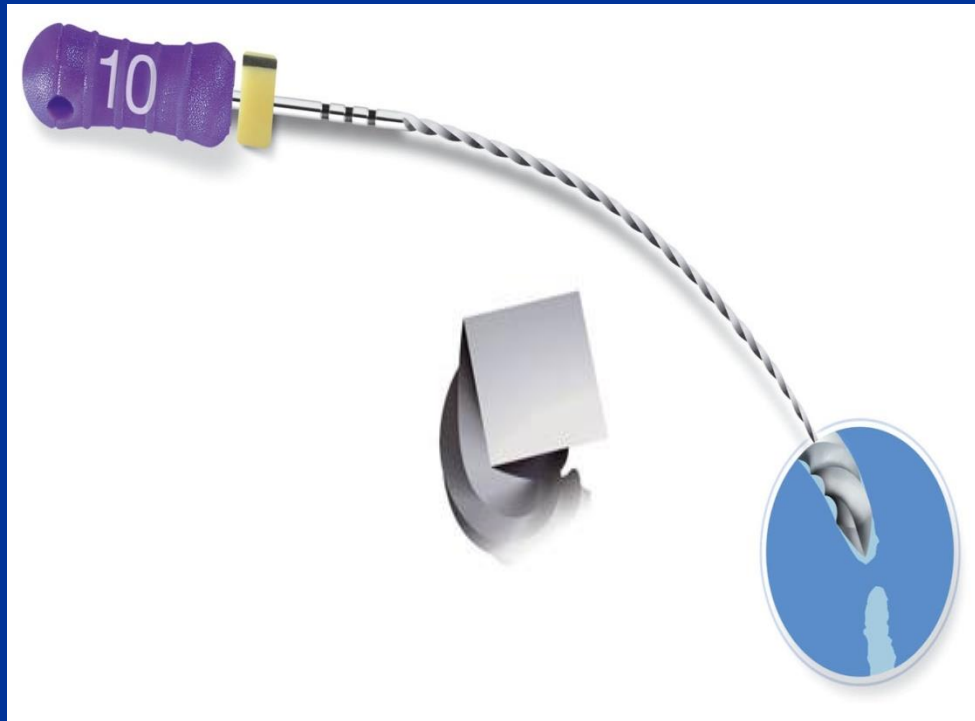


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y 17/0
Maillefe 4/20
r/ 24

INIITIAL FLARING – GLIDE PATH



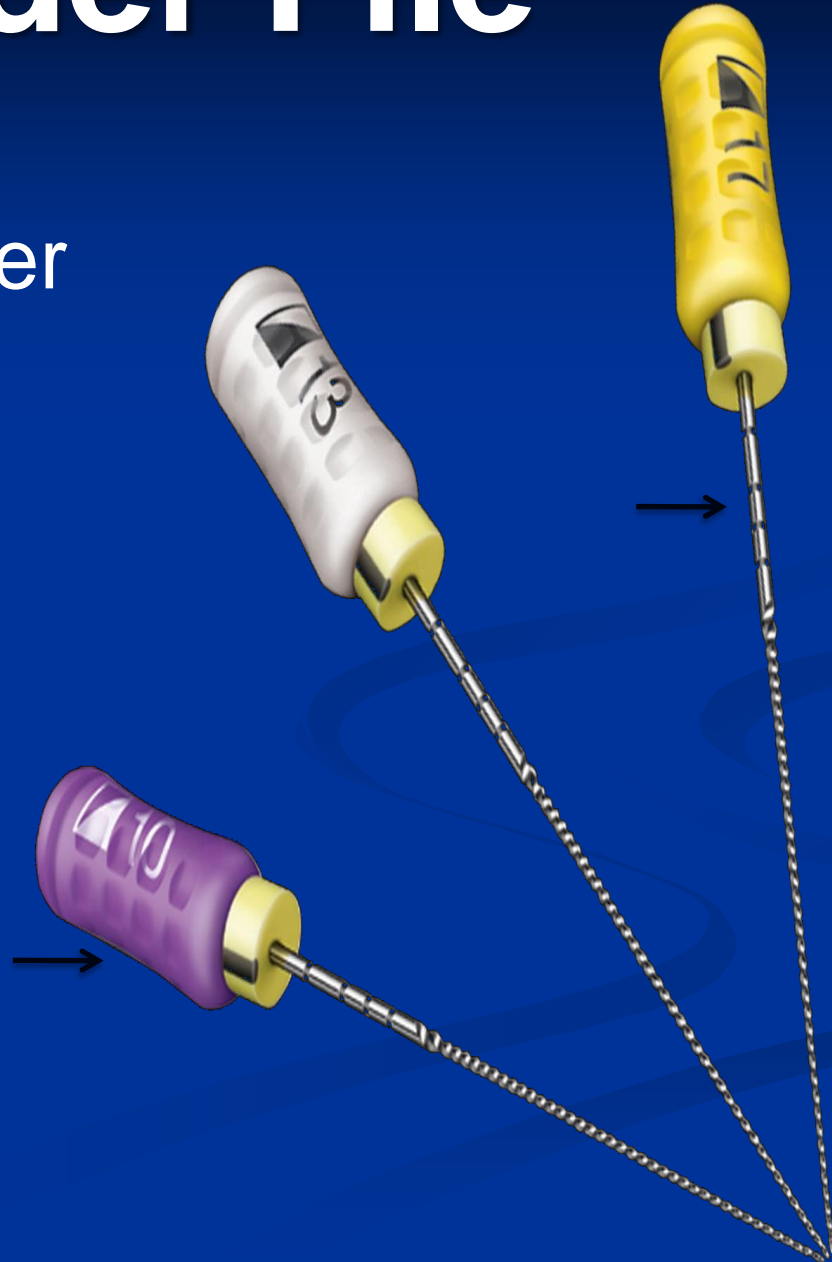
C- File



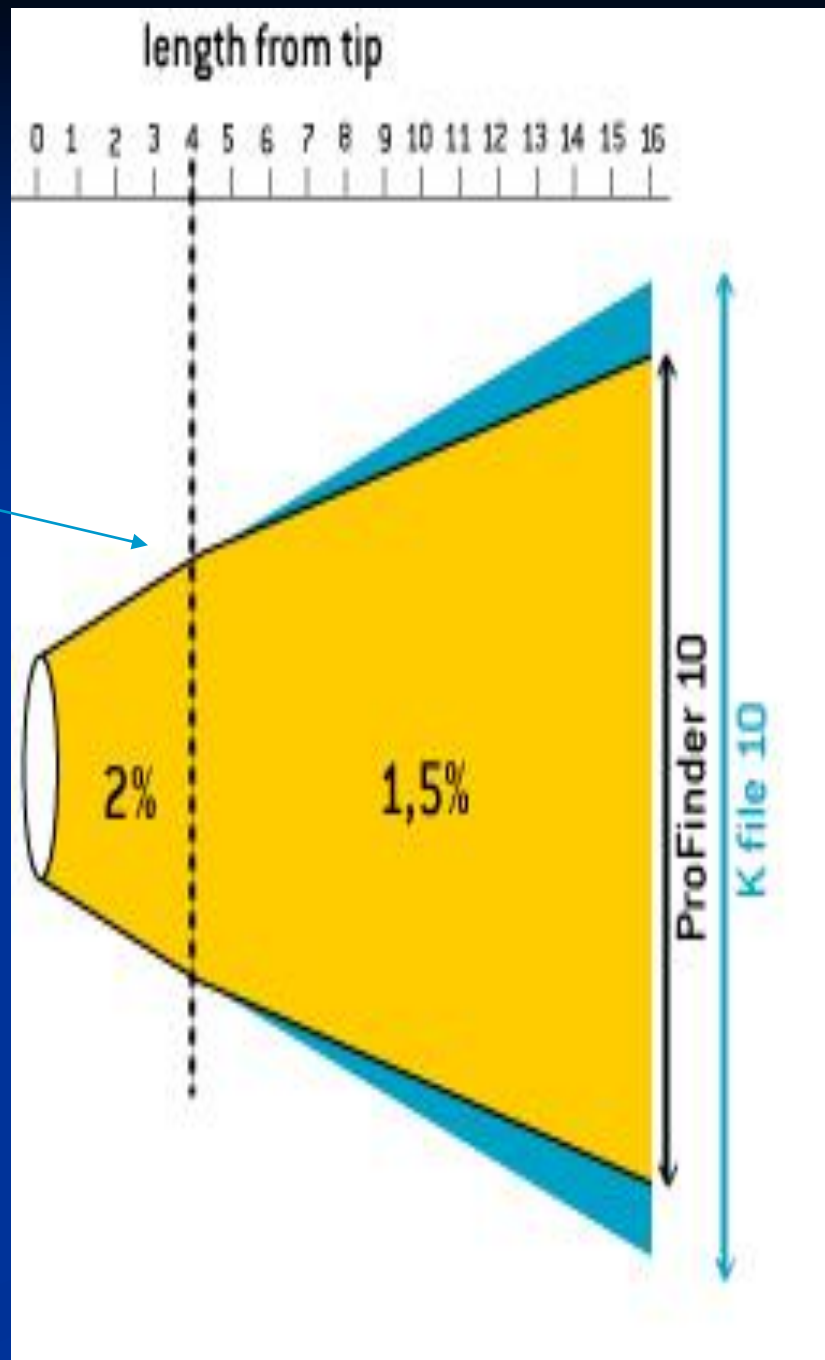
ProFinder File

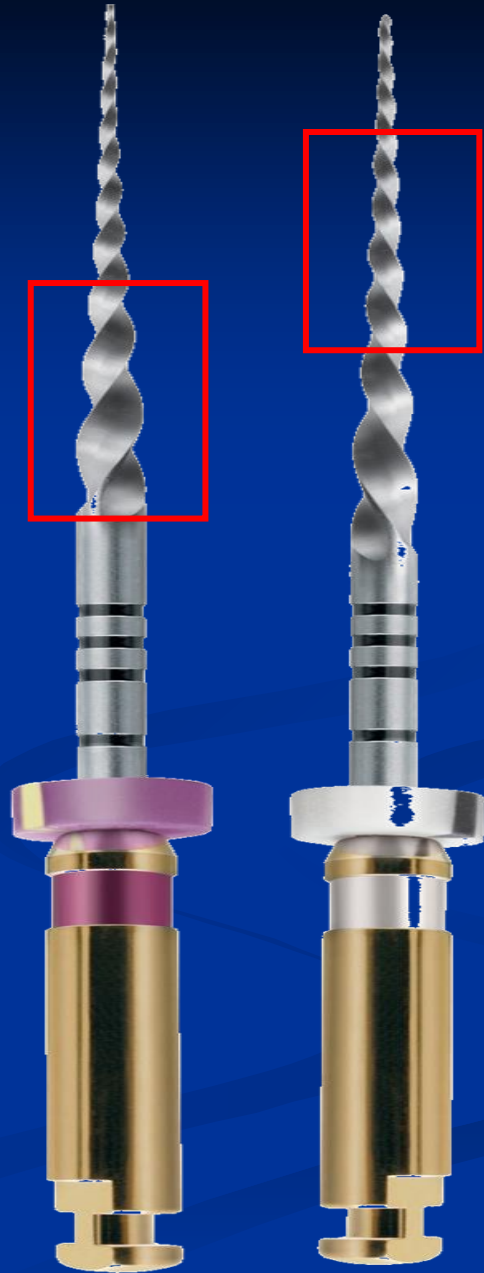
Regressive taper

Silicone grip



Stability



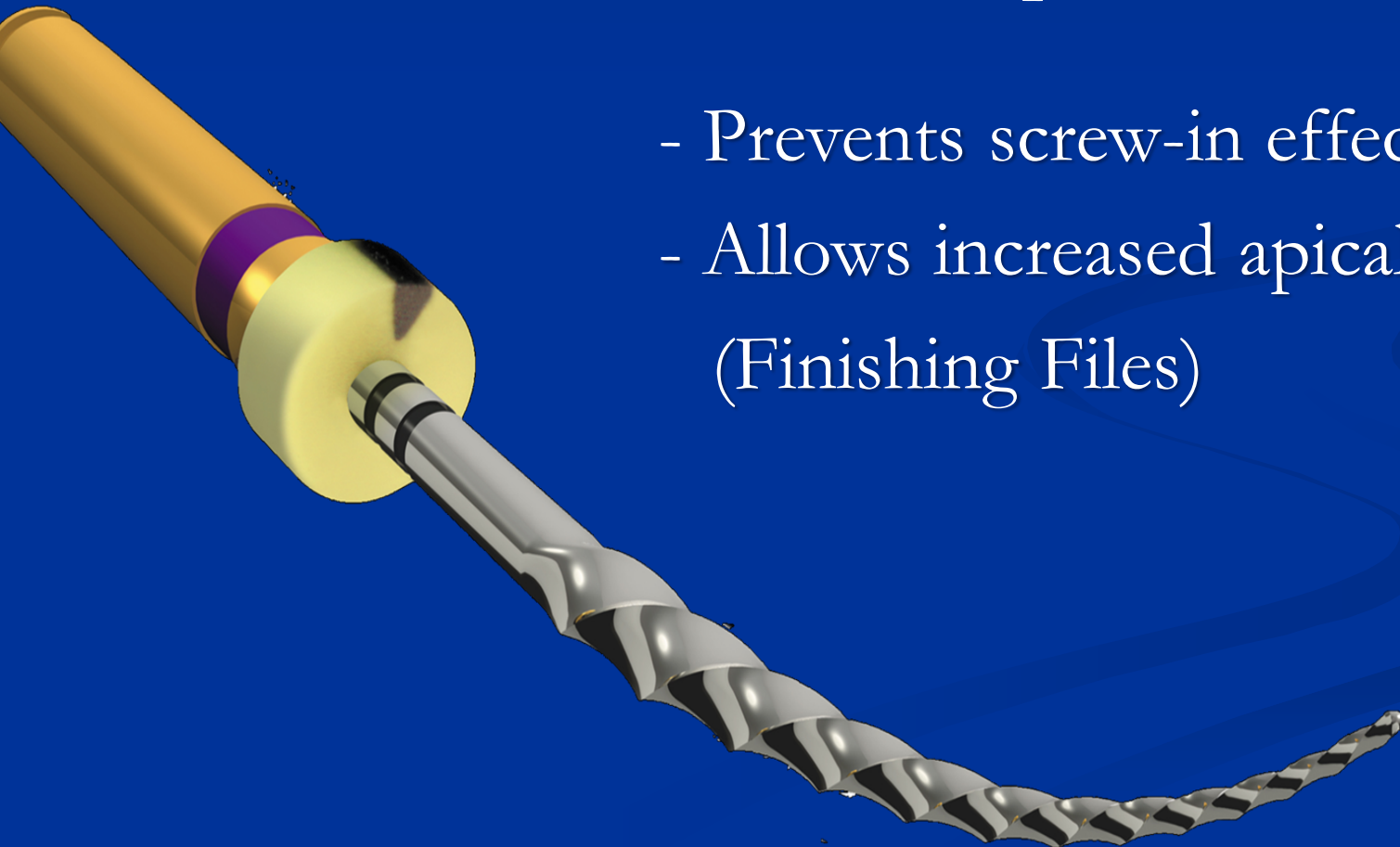


VARIABLE TAPERED INSTRUMENTS

- Variable Taper:

- Prevents screw-in effect

- Allows increased apical tapers
(Finishing Files)



Shaping Files

(S1 & S2 – Accessory Sx)



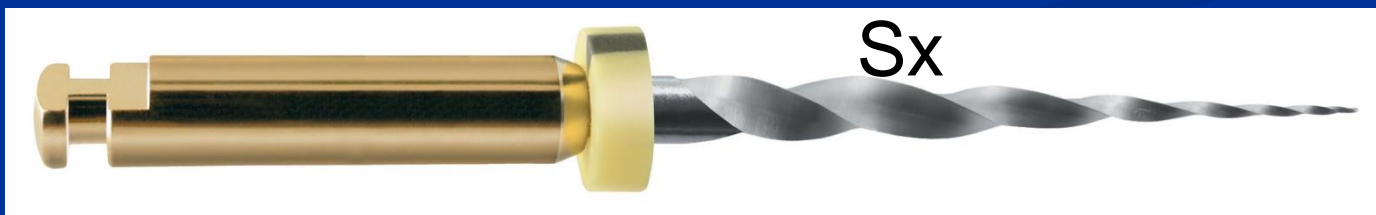
Shape the coronal and
the middle third of the canal



Shaping Files

Variable Increasing Taper (Eiffel Tower shape)

S2



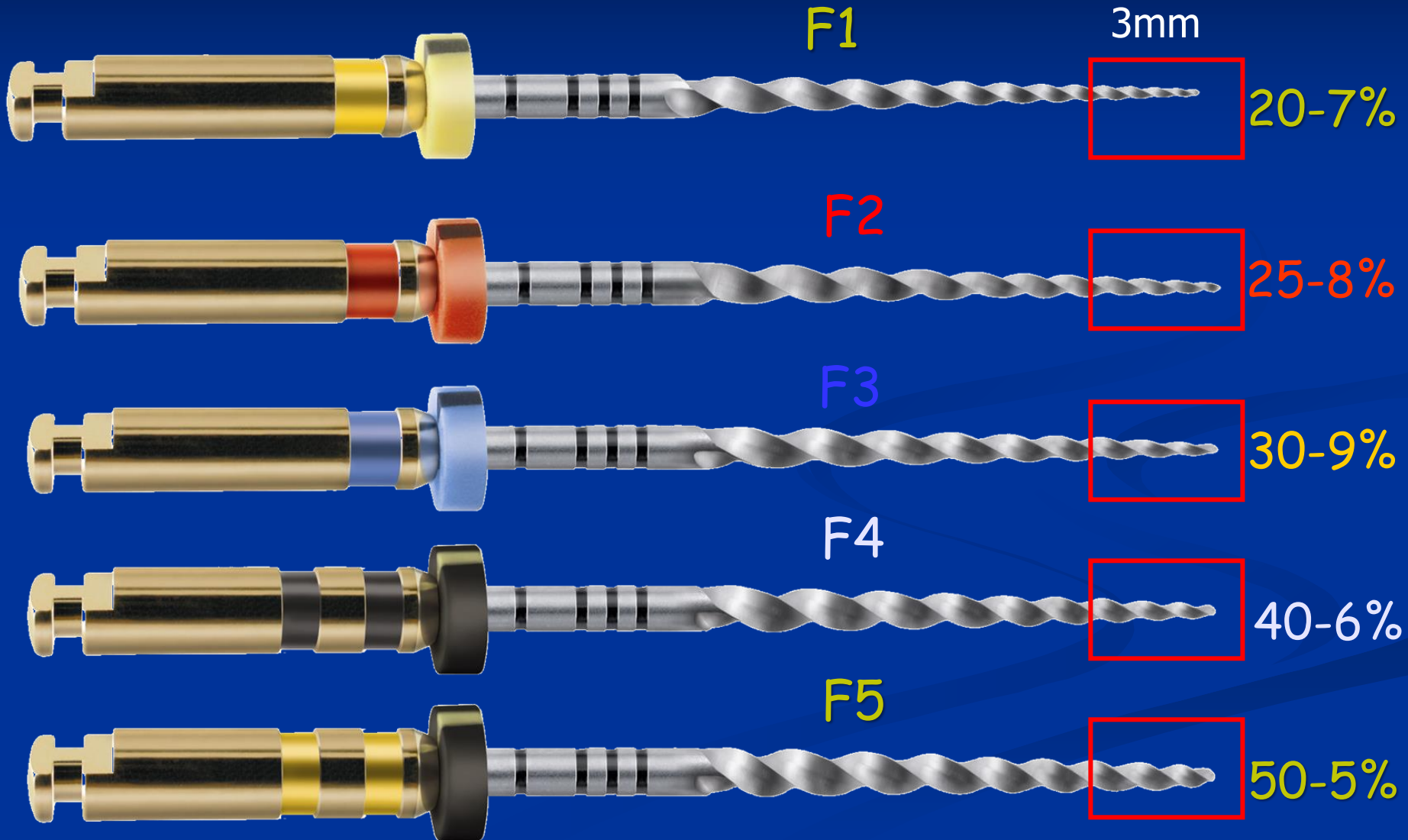
Finishing Files

F1, F2, F3, F4, F5

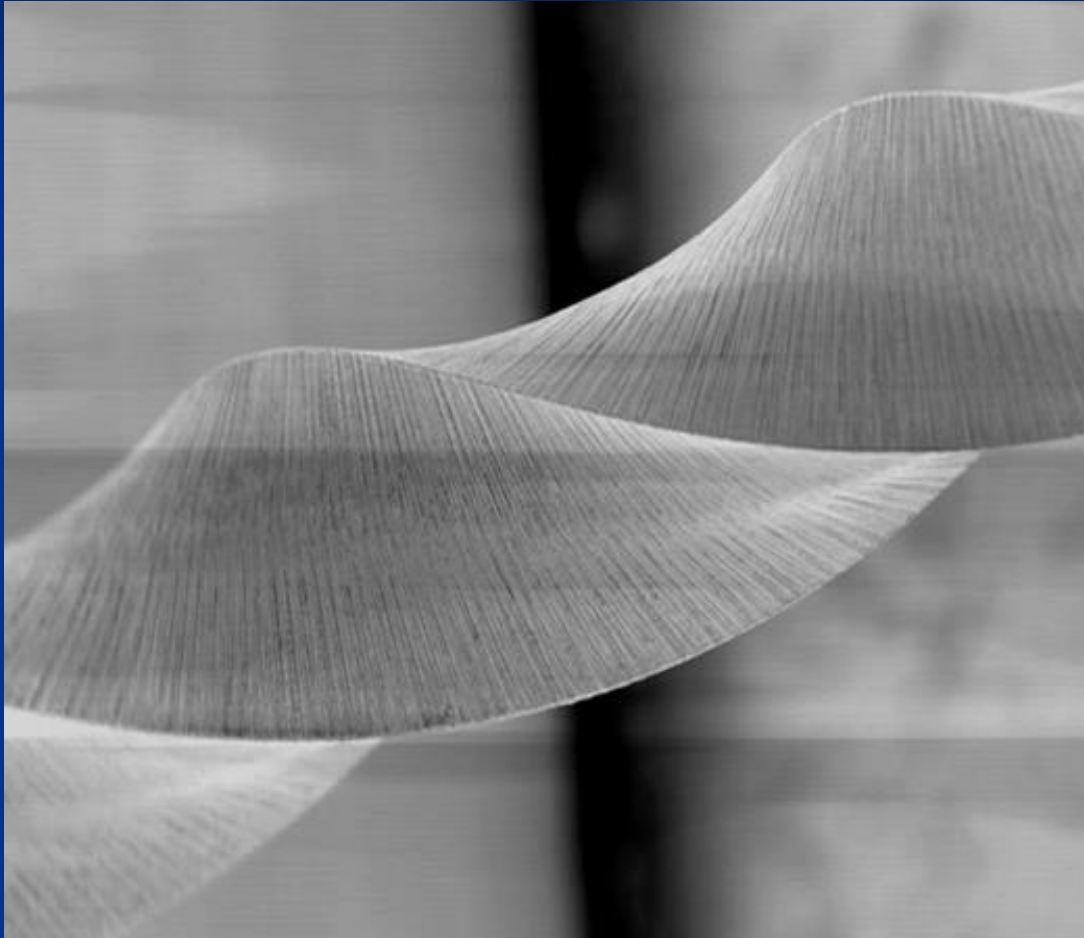


Shape the Apical part of the canal

Finishing Files (Variable Decreasing Taper)



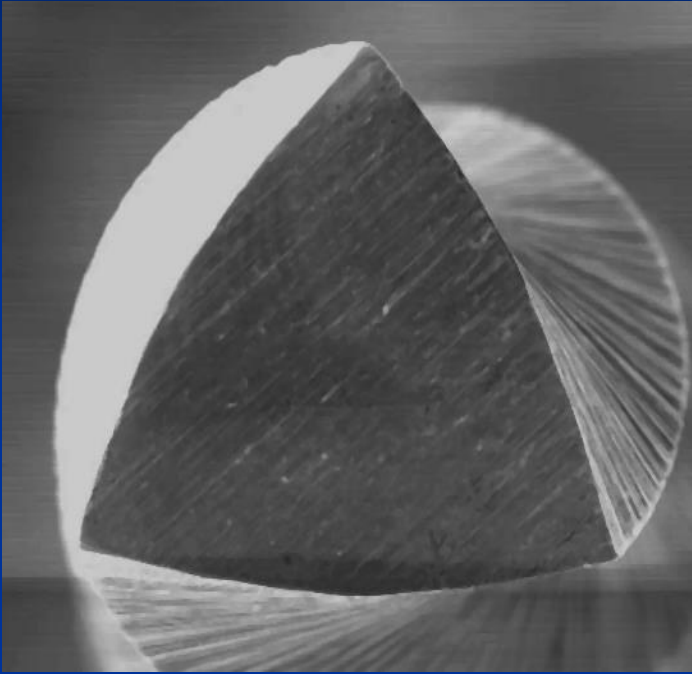
Morphology



- Cutting blade (no radial land) : Efficiency

Characteristics

« Triangular » Cross-Section



Convexe : S1, S2, SX, F1, F2

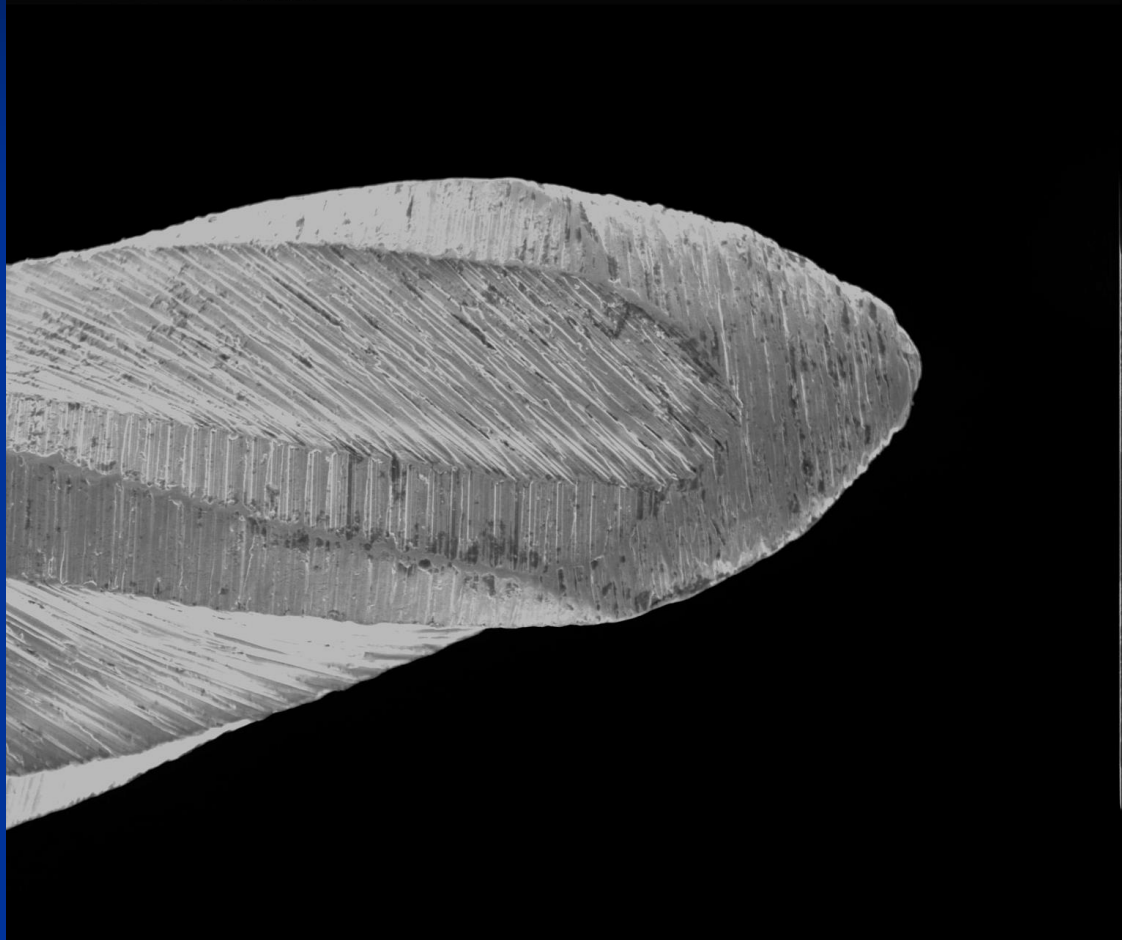


Concave : F3, F4, F5

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

Characteristics

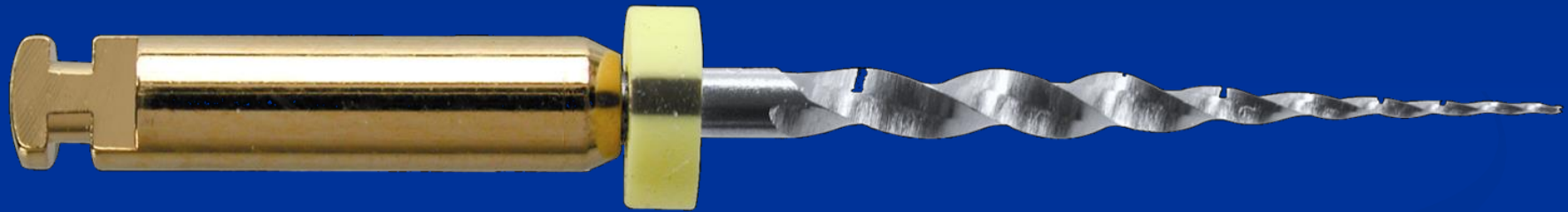
154X 20KV WD:40MM S:01480 P:00011
200UM



Radial land

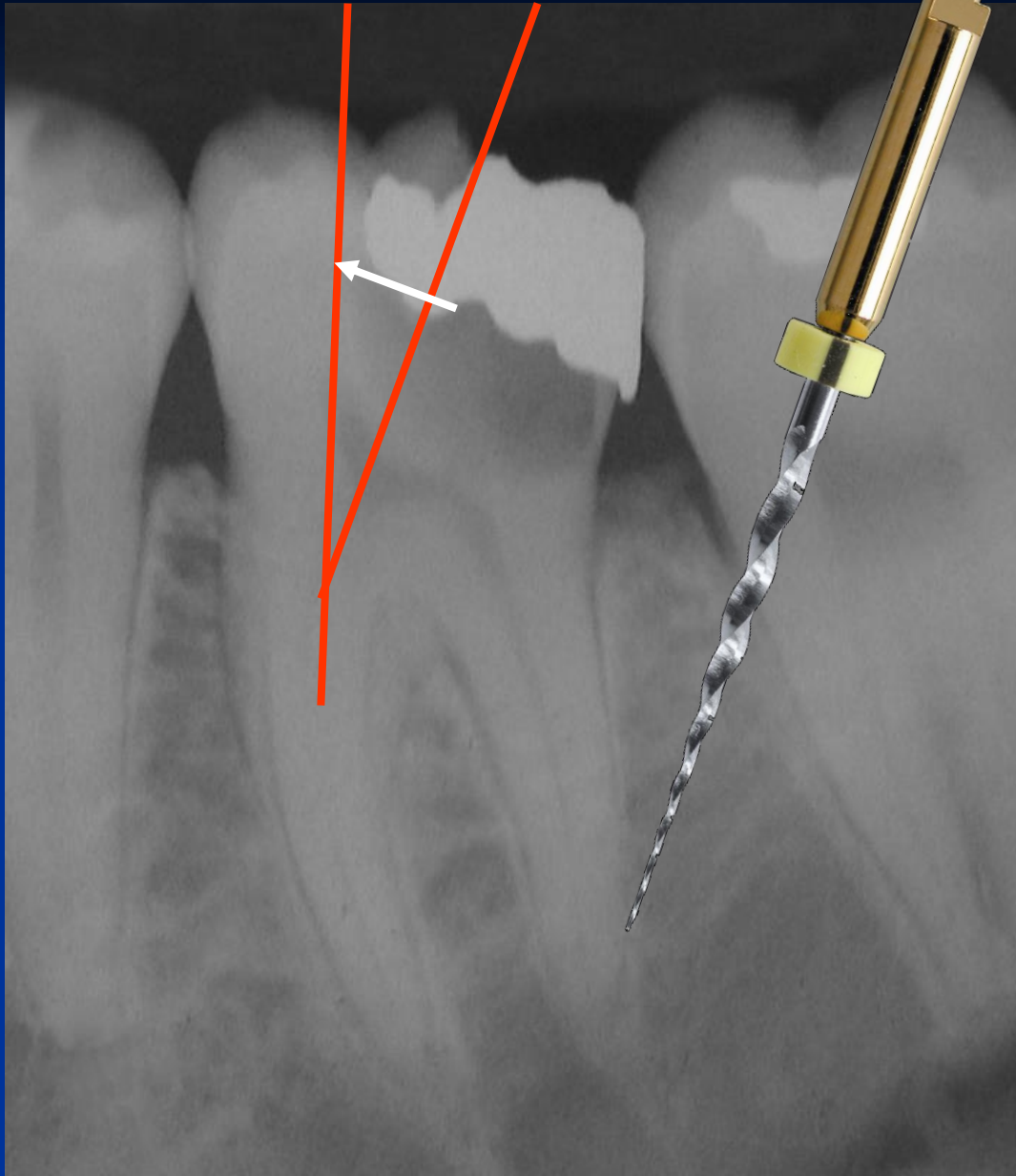
- Safe non cutting tip : acts as a guide

Short instrument with high taper



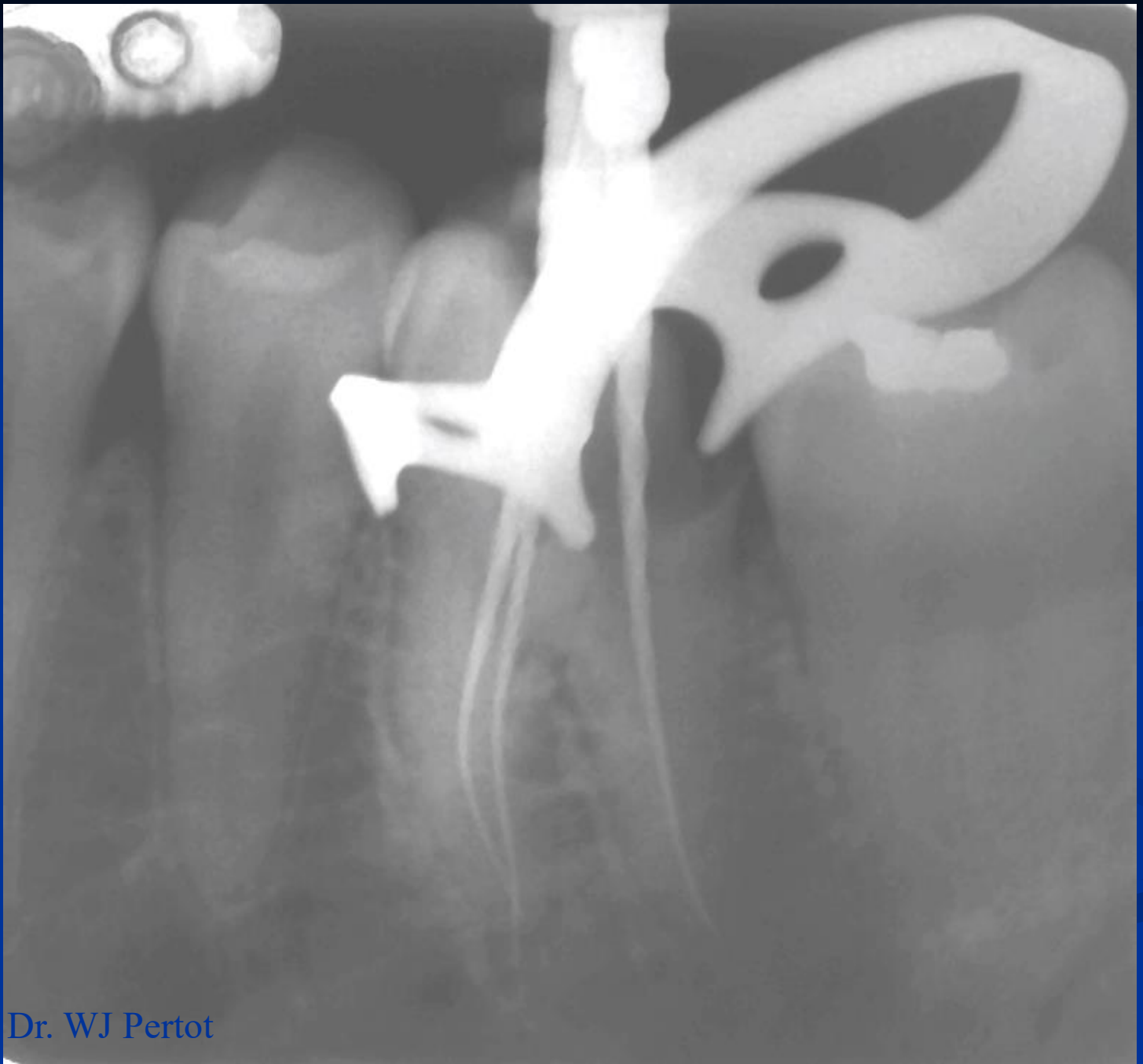
19

For Relocating Canal Orifice
(only when needed)



Sx is used with a
brushing motion

to relocate
the orifice and insure a
straight line access

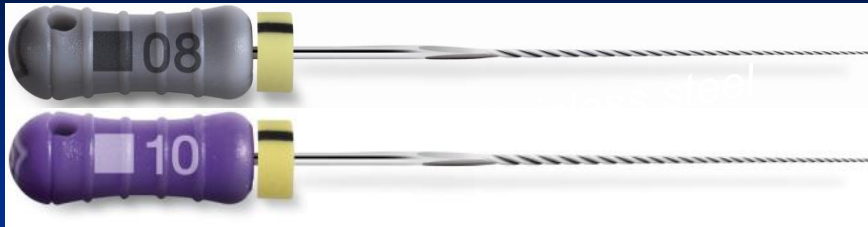


Dr. WJ Pertot



Dr. WJ Pertot

SCOUTING THE CANAL :



K-File 008 or 010

Then hand instruments
to the level they are accepted in the canal.

Stainless steel



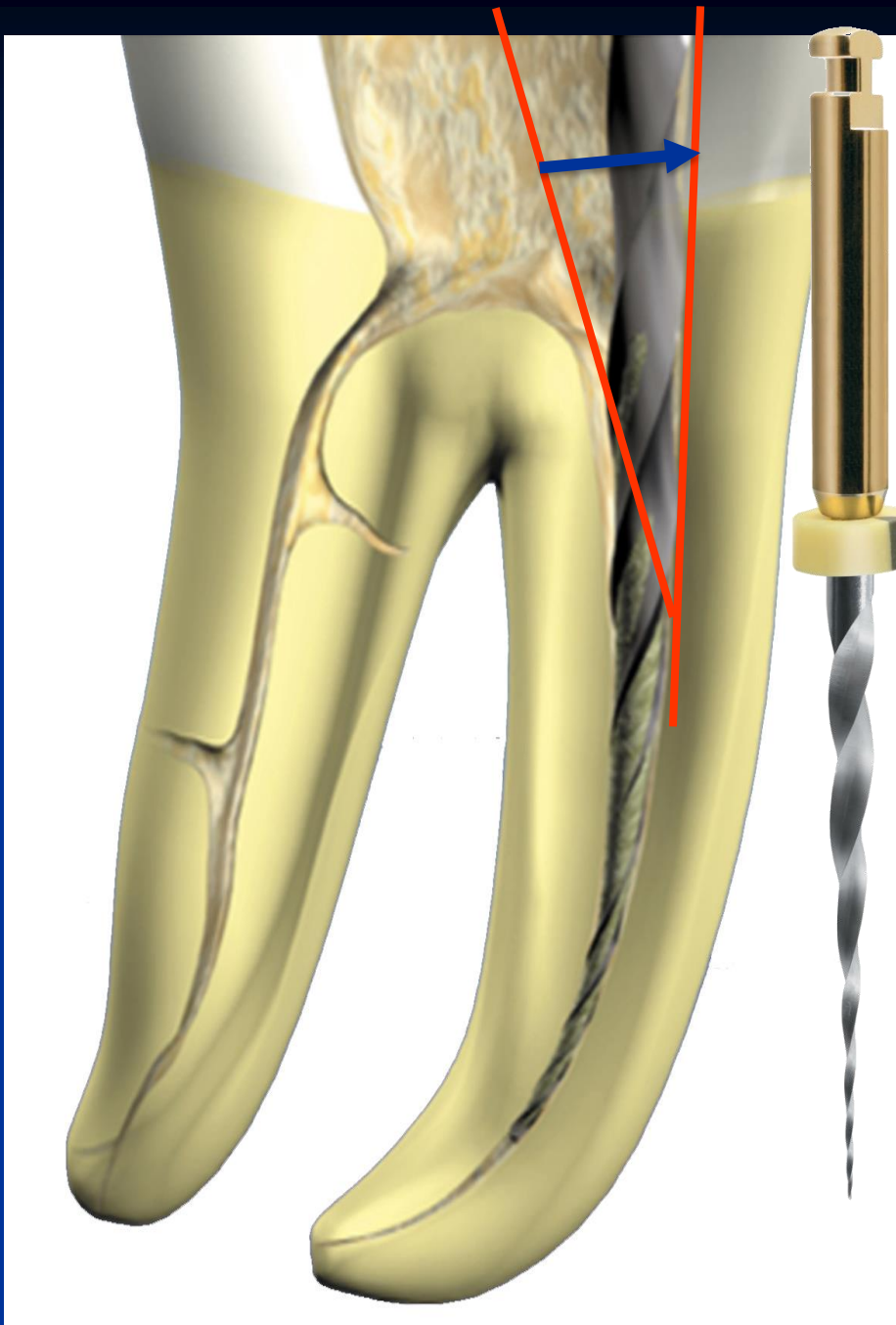
Hand Files
3,17

Stainless steel



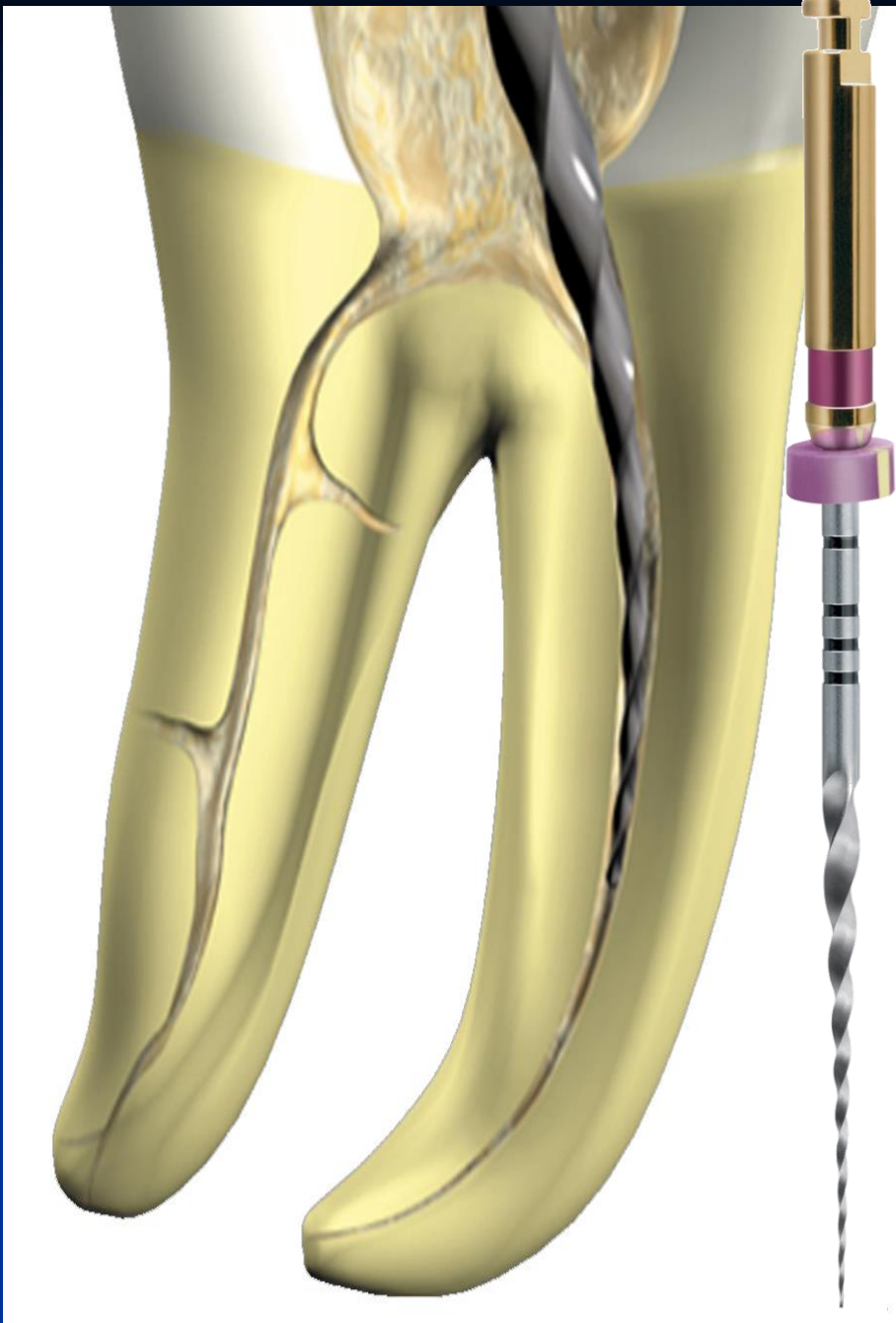
Hand File
10,15

OR NiTi ROTARY INSTRUMENTS : Pathfiles



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)

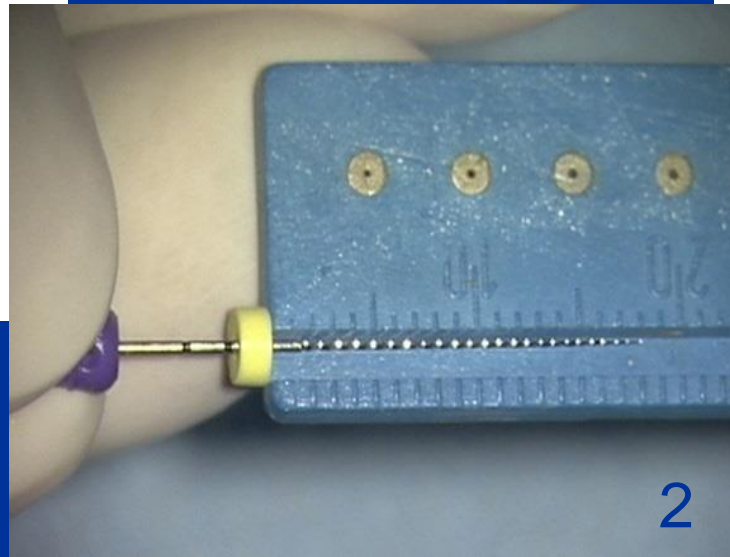
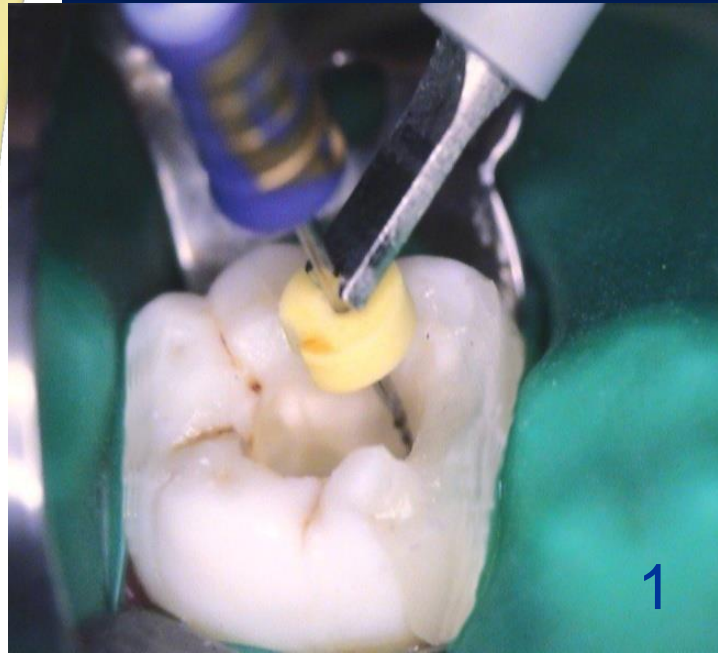
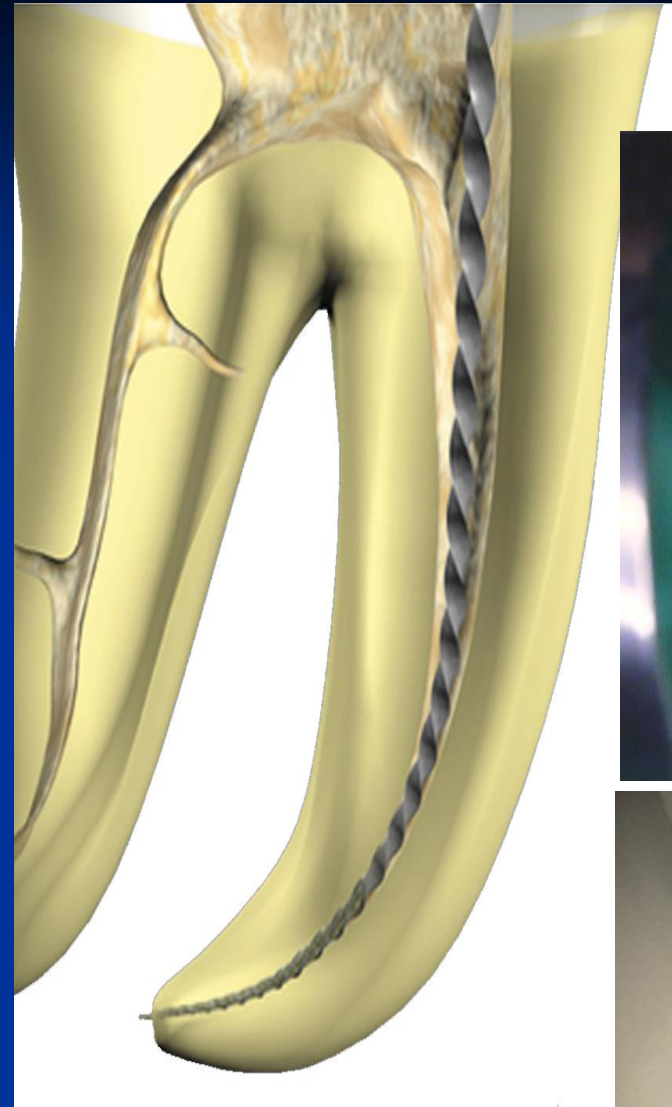


Use S1 with a brushing motion and enlarge the canal, *no deeper* than the level of the penetration of the scouting file

(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 :

S1 to working length

with a brushing motion.

Using Pathfile this step is skipped



When S1 reaches working length, use :

S2 to working length

with a brushing motion

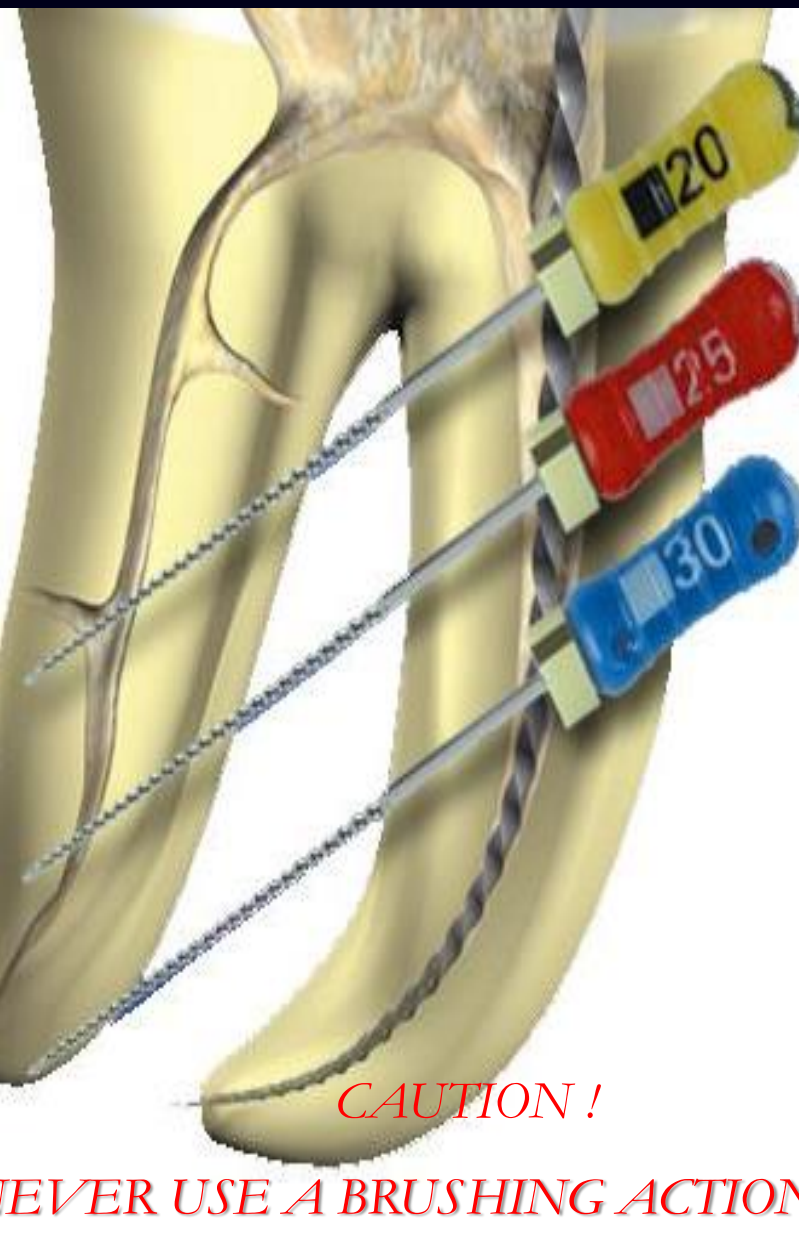


When S2 reaches working length, use :

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.*

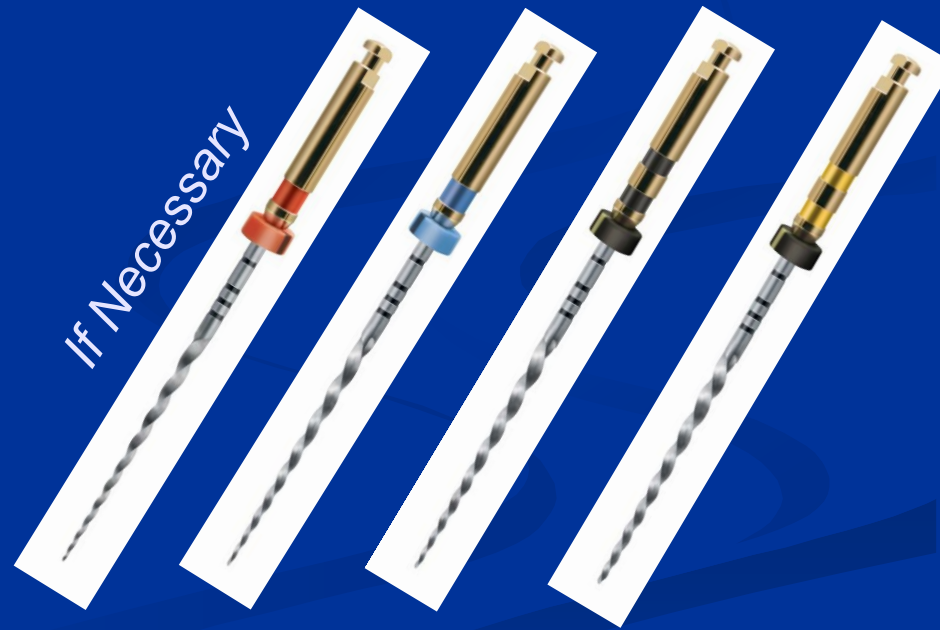


CAUTION!

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

When a finishing file reaches 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.





PROTAPER[®]

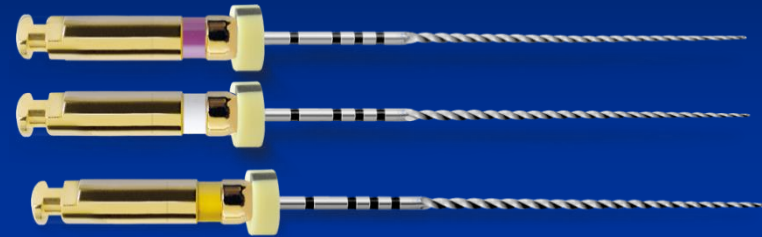
Rotary instruments sequence

VIDEO



Power driven instruments in creating of the glide path

- Pathfile



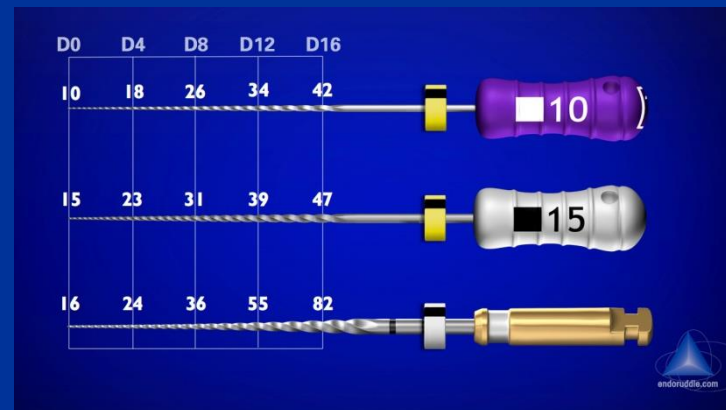
- Proglider file

Progressive taper 2% - 8%

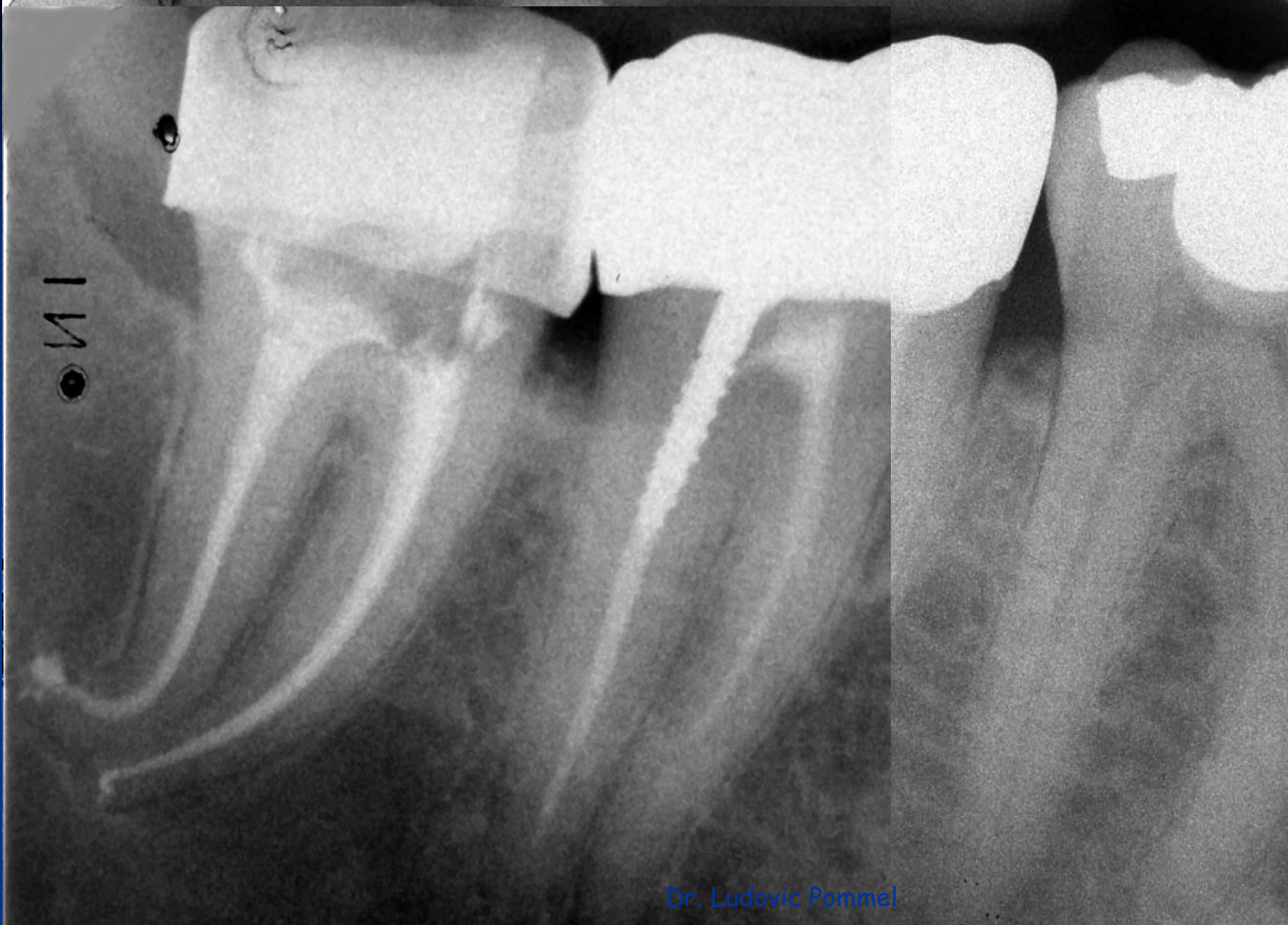
„glide path“

M-wire

Rotary Always combination with hand

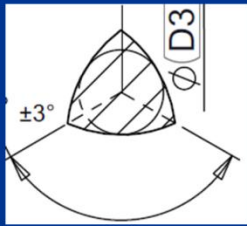






Dr. Ludovic Pommel

Gold instruments – upgrade



Convex Triangular shaped
cross-section

PROTAPER•GOLD™



ProTaper Next

1.



- Material M-wire

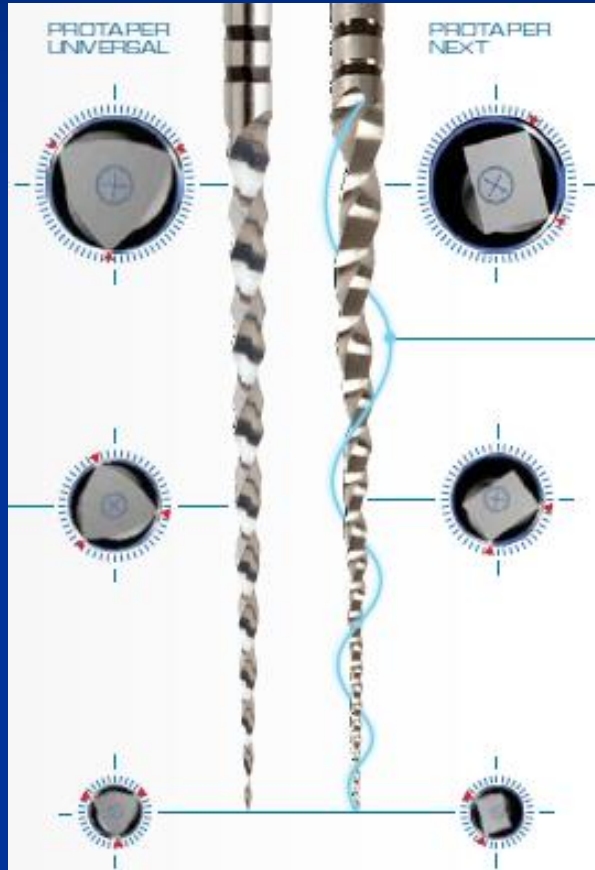
ProTaper Next

1. Excentric – two edges in action
Bigger space for the transport of dentin chips

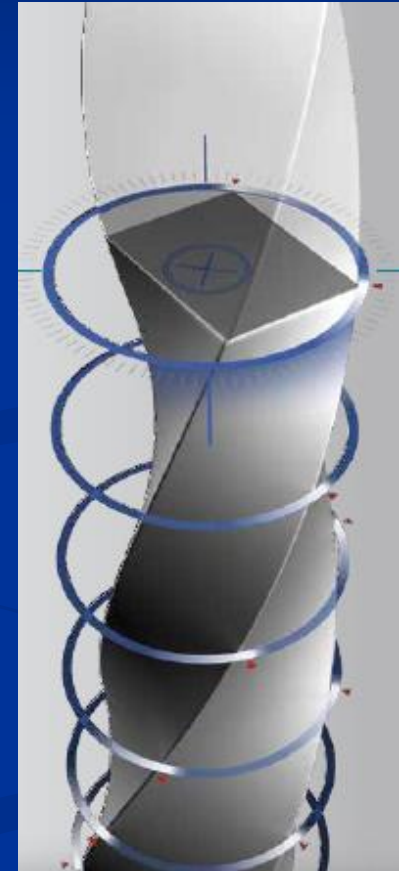


ProTaper Next

1.



ProTaper next in the root canal



2 nástroje většinou postačí k vypracování k
Nástroje jsou na 1 použití

PTN

X1 017

X2 025

X3 030

X4 040

X5 050

PTU

S1 018

S2 020

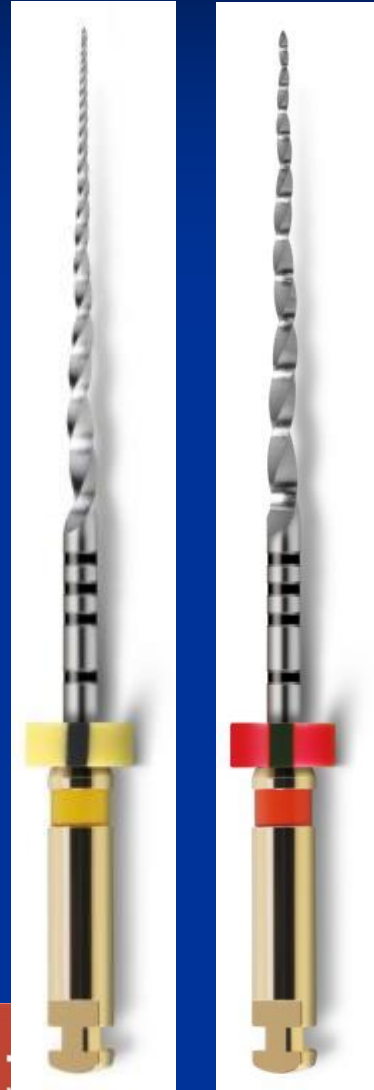
F1 020

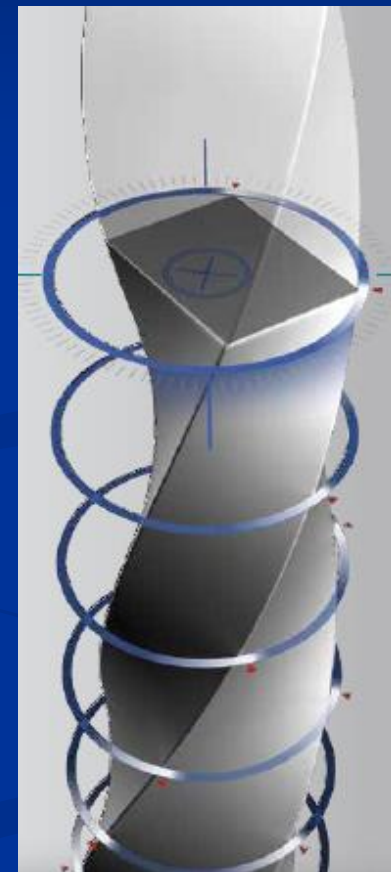
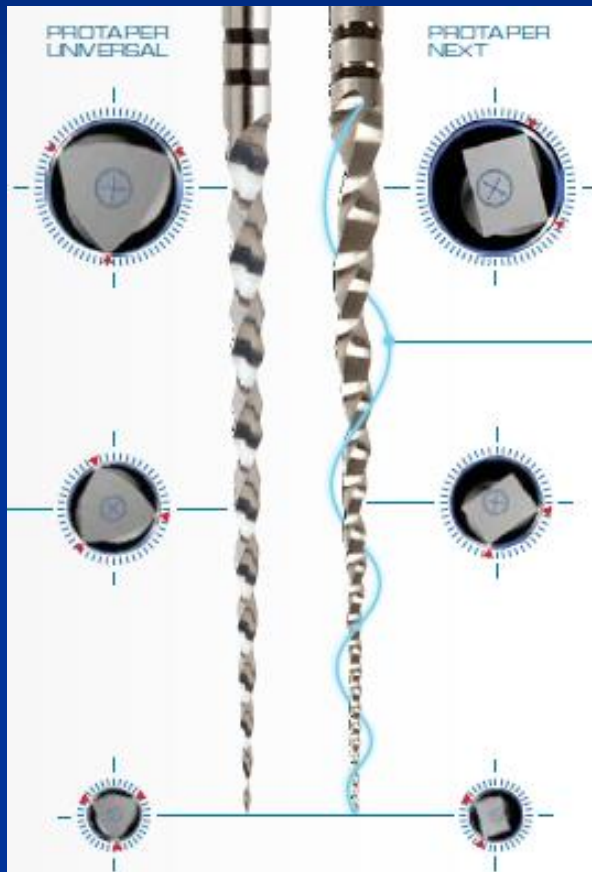
F2 025

F3 030

F4 040

F5 050





ProTaper Ultimate Slider

Sterile, flexible NiTi instrument

M-WIRE



ProTaper Ultimate Shaper

- Sterile NiTi nástroj
- GOLD
- High effect



ProTaper Ultimate Finishers

- Sterile NiTi instruments
- Gold, flexibility, resistance against
- cyclic fatigue



Sterile

BLUE

Special for wide
and straight root canals



Basic rules of power driven endodontics - rotary

Initial flaring

Controlled rotation

Following sequences

Abundant irrigation

No pressure

Movement up and down

10-15s work in one phase, cleaning and checking the instrument

Recapitulation

Touch apical constriction and going back

Check apical size after the preparation

One file endodontics

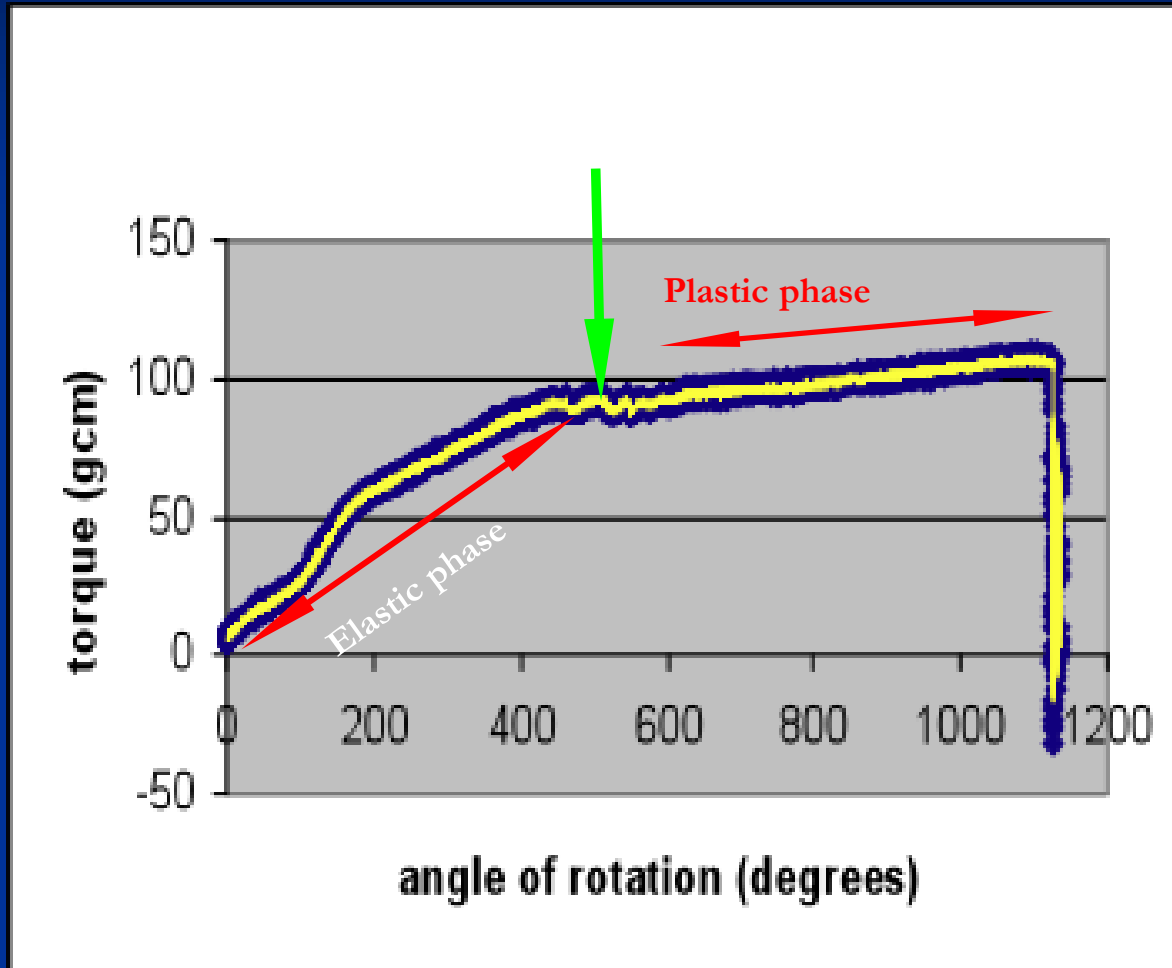


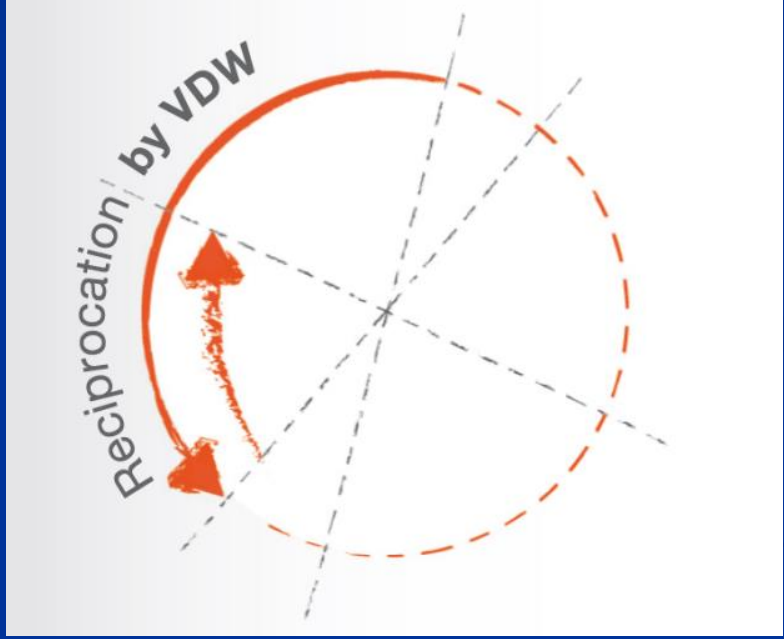
Wave one....



The instrument releases within the elastic phase

Reciprocation - benefits





Reciprocation - benefits

■ Simplicity

- Ony one instrument for one tooth
- Sterile – single use

■ Safety

- Minimized risk of fracture
- No risk of contamination
- Users friendly

Wave One

- Regressive taper

Wave ONE GOLD

M - wire (Dentsply Tulsa Dental)

Před broušením tepelné ošetření

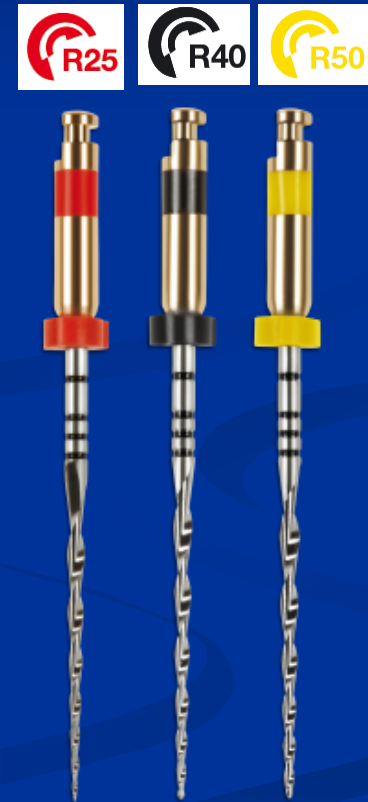
- **Výhody:**
 - **Vysoká flexibilita**
 - **Menší riziko cyklické fraktury**



RECIPROC

Příkladem je Reciproc,
Reciproc Blue:

3 velikosti nástrojů



RECIPROC®



Ø
1,05 mm

0,49 mm
0,41 mm
0,33 mm
0,25 mm



Ø
1,10 mm

0,58 mm
0,52 mm
0,46 mm
0,40 mm



Ø
1,17 mm

0,65 mm
0,60 mm
0,55 mm
0,50 mm

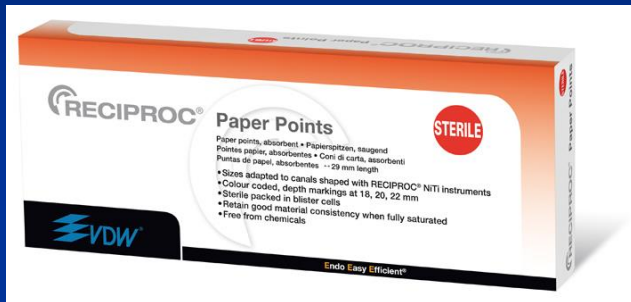
RECIPROC®

VDW.SILVER® RECIPROC® motorC

- Endo motor
 - Reciprokační systémy
 - RECIPROC®, WaveOne™
 - Rotační systémy
 - Mtwo®, FlexMaster®, ProTaper®, K3™, Gates, Dr.`s Choice



Compatibility – paper and gutta cones



- Sterile
- For single use
- No autoclaveable



Remnants of tissue after cleaning and sterilisation



Abb. 4 ▲ Nickel-Titan-Instrument mit Rückständen nach klinischer Anwendung trotz Durchführung eines Reinigungsprotokolls zur Prionendekontamination

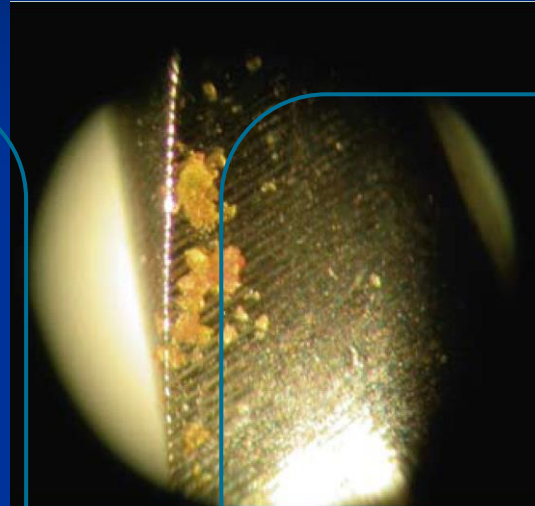


Abb. 5 ▲ Organische Rückstände auf einem Edelstahl-Handinstrument nach Sterilisationsprozess

Basic Research—Technology

Effect of Prion Decontamination Protocols on Nickel-Titanium Rotary Surfaces

David Sonntag, DMD,* and Ove A. Peters, PD, DMD, MS, FICD[†]

Abstract

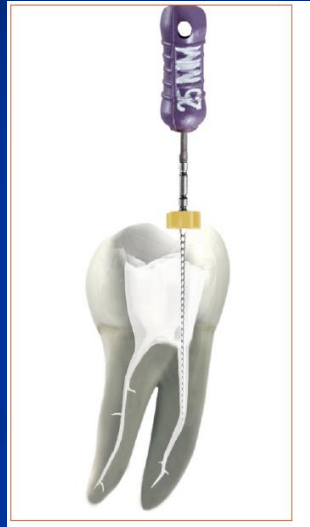
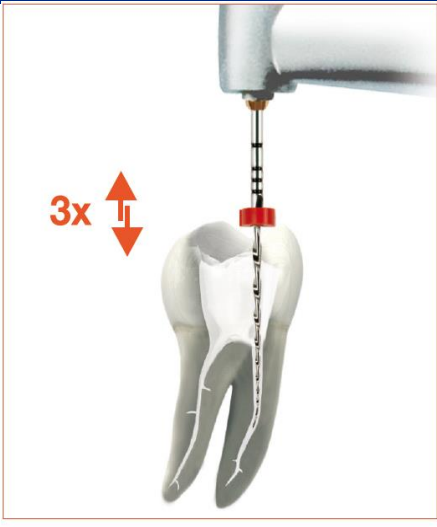
Decontamination of instruments is a prerequisite for their potential reuse but may affect surface integrity. Hence, the effect of prion removal protocols on 7 brands of nickel-titanium files was investigated. Baseline debris scores were determined under magnification

Prions are proteins that have been linked to fatal neurodegenerative diseases commonly called transmissible spongiform encephalopathies. The term *prion* (PrP) was coined by Prusiner (1) in 1982, when he described a protein with a nonpathogenic isoform PrP^C and the infectious agent PrP^{Sc} as a cause of scrapie, a veterinary disease. Similar agents may infect humans with Creutzfeldt Jacob Disease (CJD), which in fact

Choice of the instrument

- Hand instrument ISO 30: 50
- Hand instrument ISO 20: R40
- Hand instrument ISO 10: 20, 25

- The hand instrument must reach the WL without any bending



Basic rules of power driven endodontics - reciprocation

- Movement in amplitudes: up/down 3 mm
- Cleansing of instruments each 3 amplitudes
- Reach the apical constriction and go out !





Rotary instruments for glide path

■ Pathfile



■ Proglider file

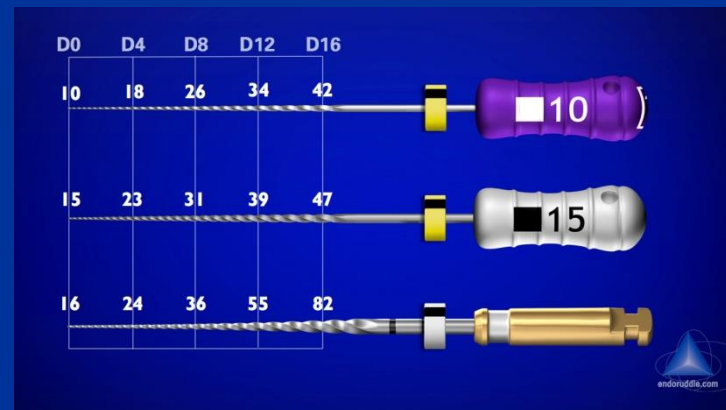


progressive taper 2% - 8%

„glide path“

M-wire

Controlled rotation



Always combination with hand instruments

Reciprocating instrument for glide path

- Gold Glider File

Progressive taper 2°-6°

Gold wire

Reciprokační pohyb





Twisted adaptive files (Kerr)

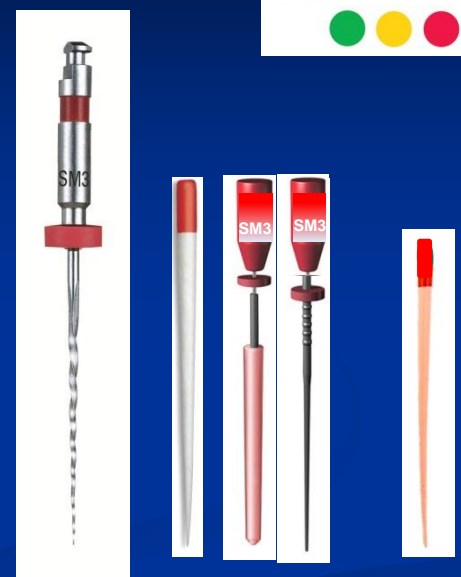
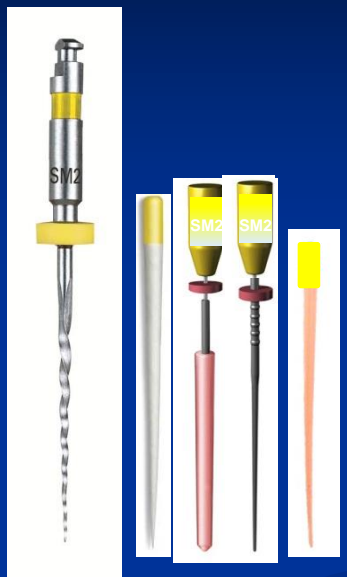
- Grinding twisting, electrogalvanic treatment
- Rotation – reciprokation according to the loading
- Sequences for various root canals



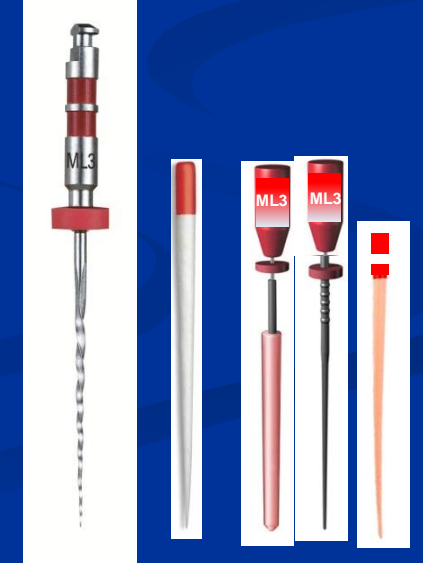
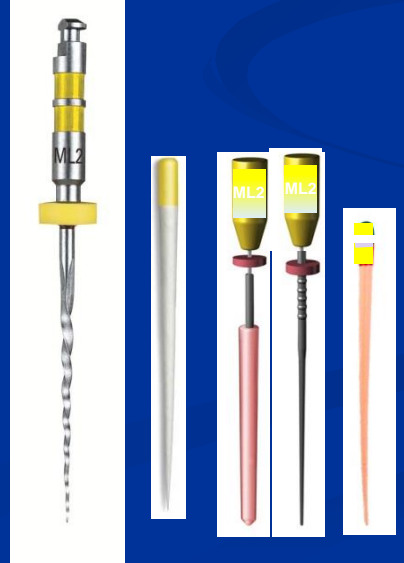
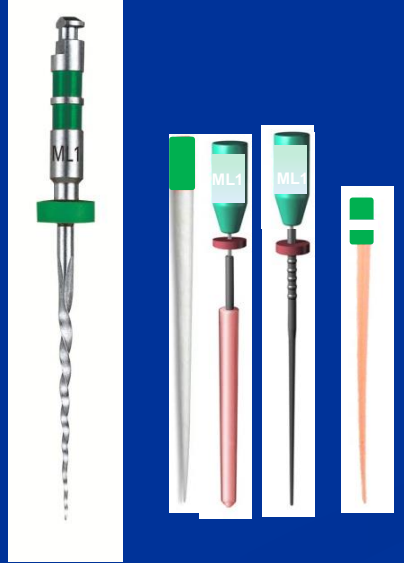
Kompletní systém



Malé
1 barevný pruh



Střední / Velké
2 barevné pruhy

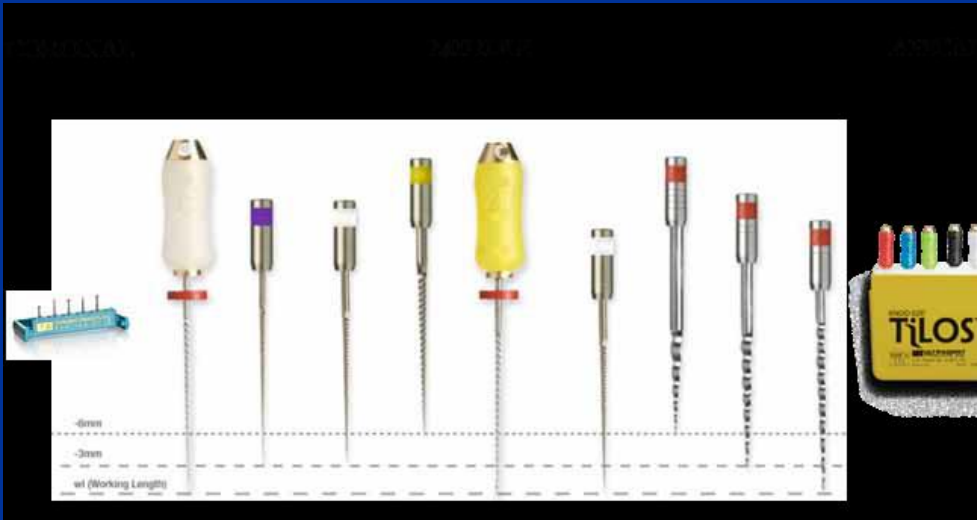




ADAPTIVE MOTION
TECHNOLOGY

Oscillating instruments – AET technique

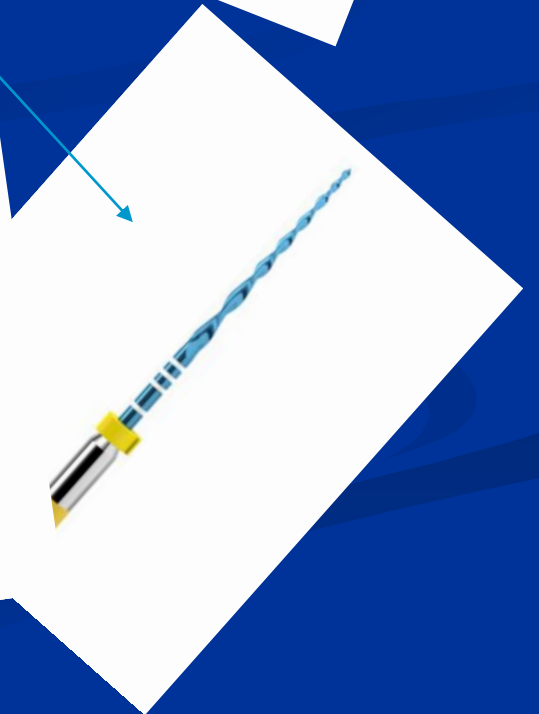
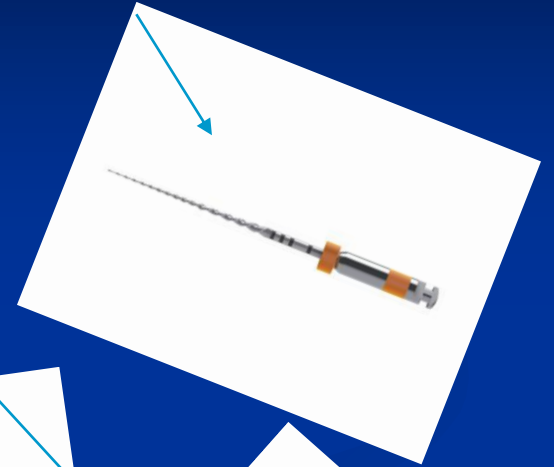
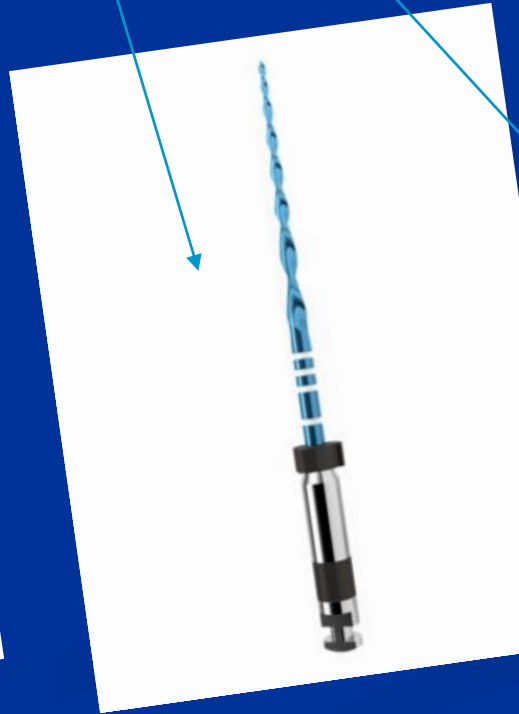
- Tilos
- Special handpiece



Basic rules for all systems

- No pressure
- Short periods
- Checking the instrument
- Recapitulation
- Do not shape too much the apical constriction
- Measure the apical size at the end
- Abundant irrigation

Reciproc Blue R Pilot



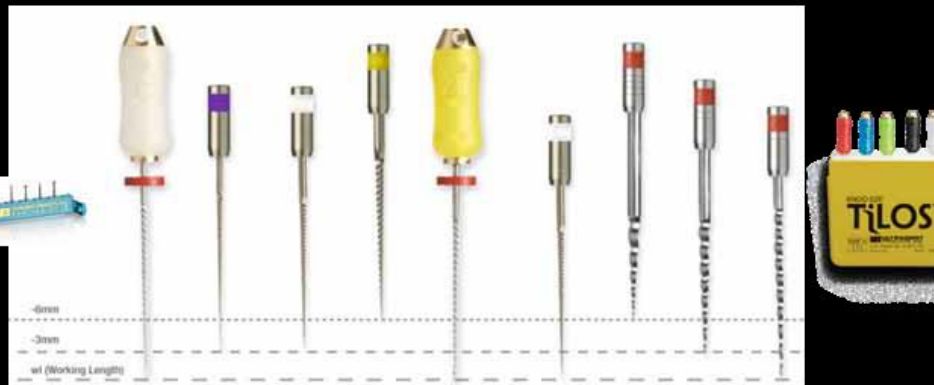
Unicone Plus




UNICONE
PLUS

AET (anatomic endodontic technique)

- Tilos
- Special handpiece



AET

- Oscillation 30°
- Combination with hand preparation – glide path, recapitulation and the shaping of apical part
- The middle part is shaped using oscillating instruments
- Combination of stainless steel and NiTi

Instruments for reendo

- Special design – variable taper – regressive
- Active tip

Good selection and lege artis work

