

# Root canal treatment



# Phases of the endodontic treatment

- Investigation, diagnostic radiogram, consideration ( local, regional, systemic factors)
- Removal of old fillings, carious dentin, temporary restoration - contours of treated tooth. It is preendo.
- Dry operating field
- Preparation of the access (endodontic cavity)

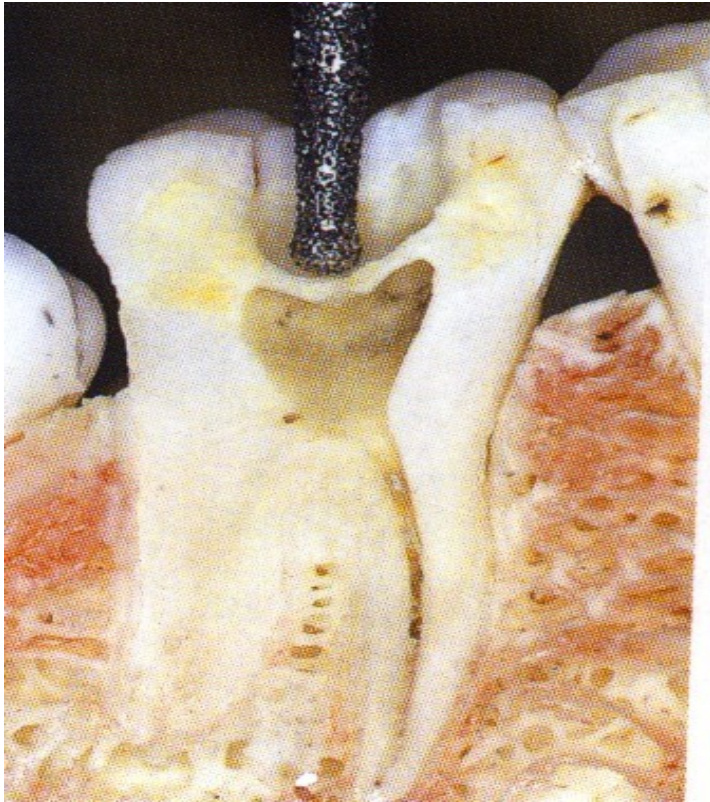


# Phases of the endodontic treatment

- **Opening of root canals**
- **Initial flaring and removal dental pulp or necrotic material from the root canal**
- **WL (working length)**
- **Root canal shaping and cleaning (irrigation)**
- **Recapitulation**
- **Drying**
- **Filling**
- **Radiogram**
- **Postendodontic treatment**



# Access opening



Shapes of endo cavities

See special material on is



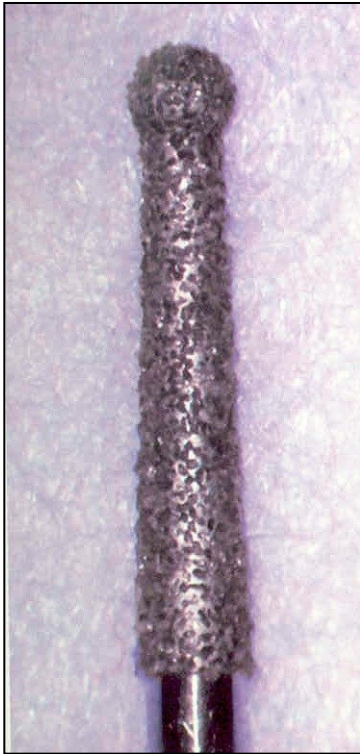
## Number of root canals

Maxillary molars have usually 4 root canals

Mandibular molars have 3, 4b or 2 root canals



# Opening of the pulp chamber Access



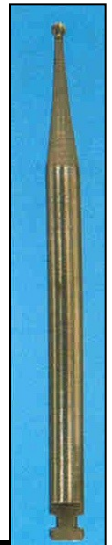
Dia trepan



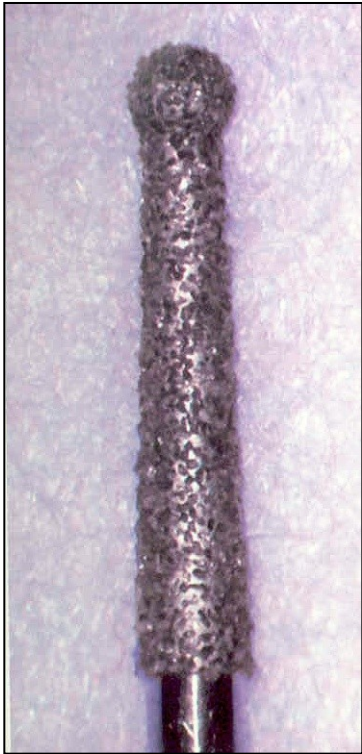
Dia round burs –  
balls



Tungsten carbide round burs



# Preparation of the endodontic cavity



Dia trepan



Safe ended tips  
Batt's instruments

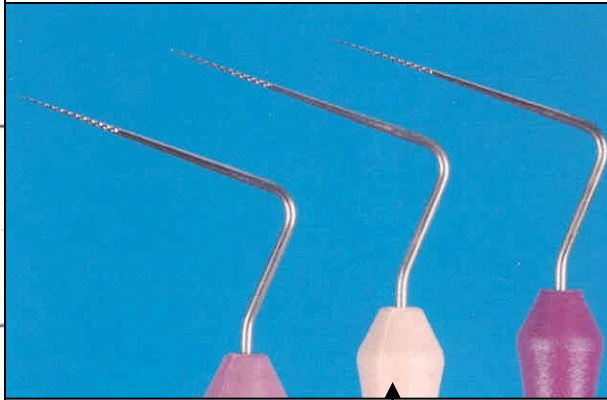
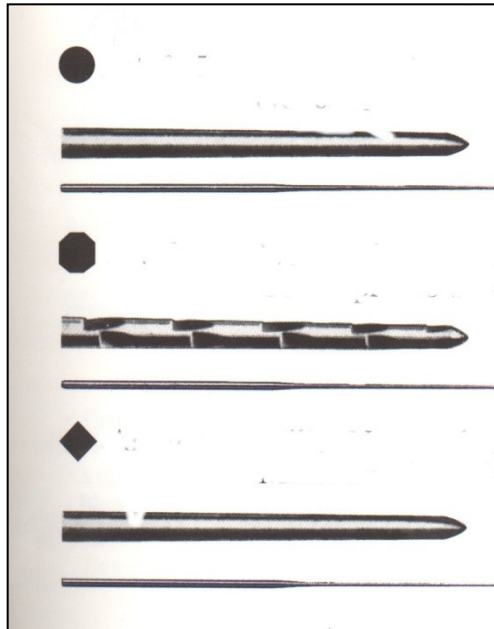


Fissur bur

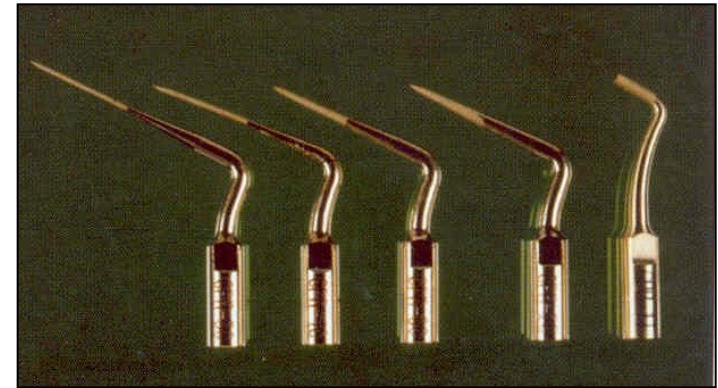




# Finding and opening of root canal orifices



Endodontic probes  
Microopeners



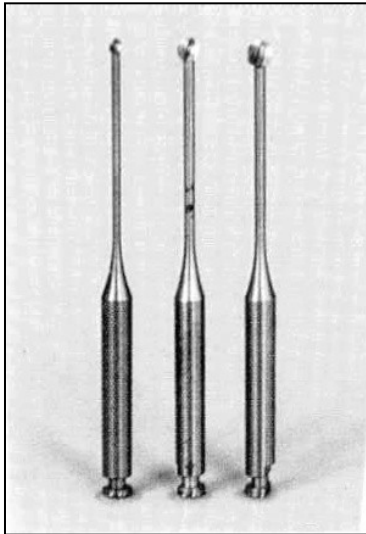
Ultrasound tips



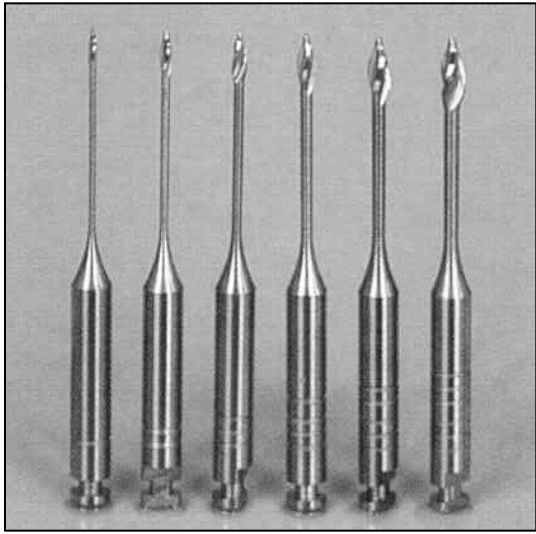
# Opening of root canals



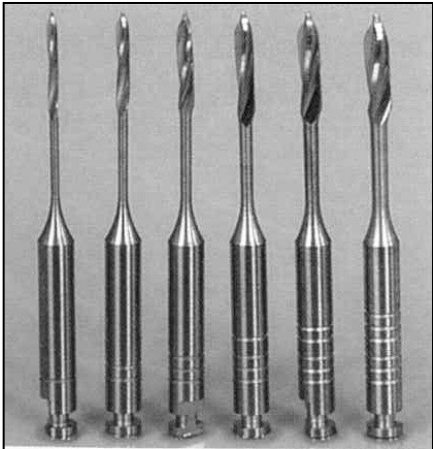
Ball burs



Miller's burs



Gates Glidden's burs



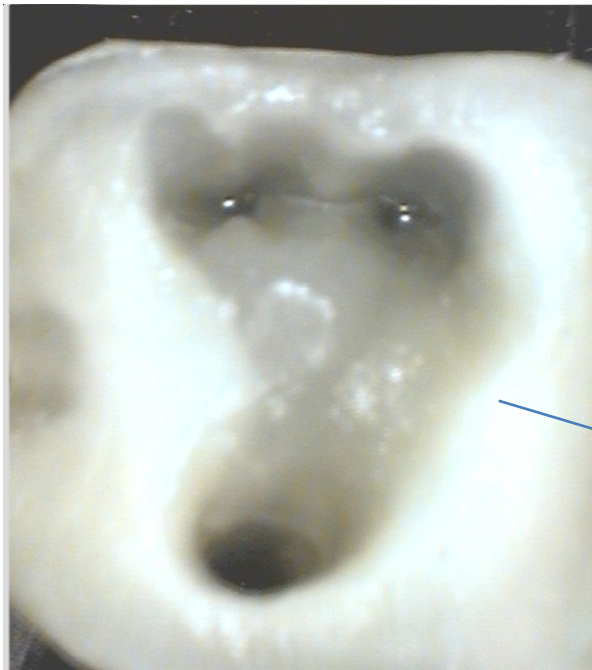
Peeso – Largo





## Access kits



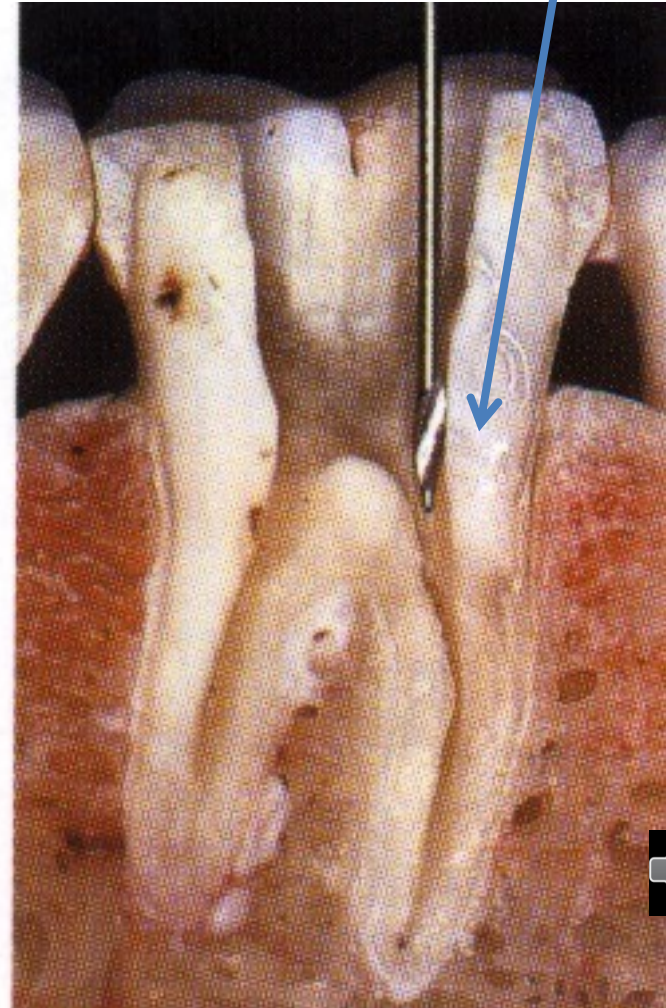
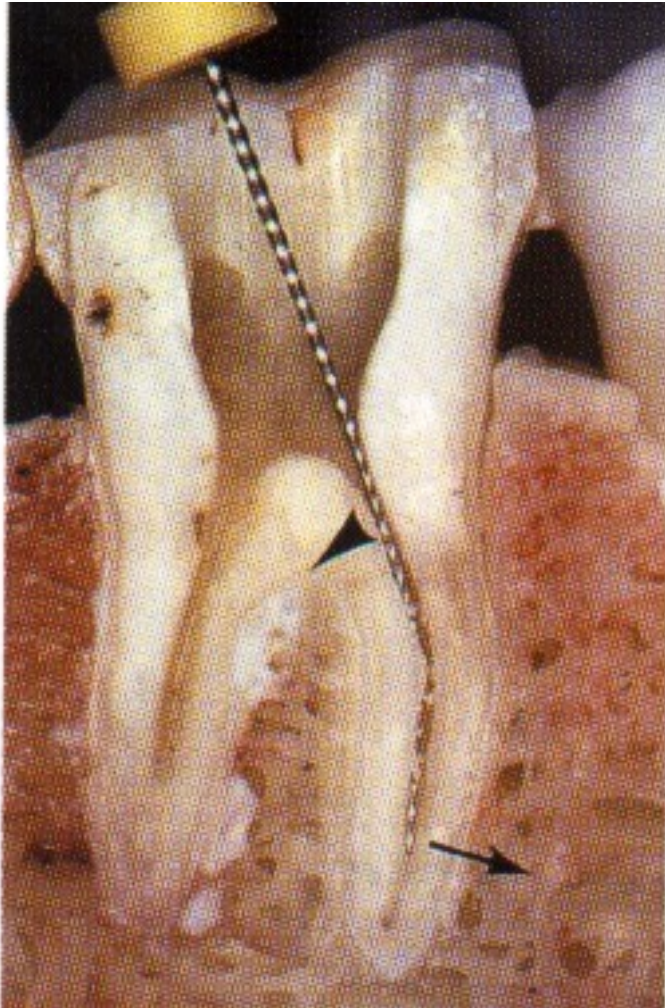


The wall is weakend

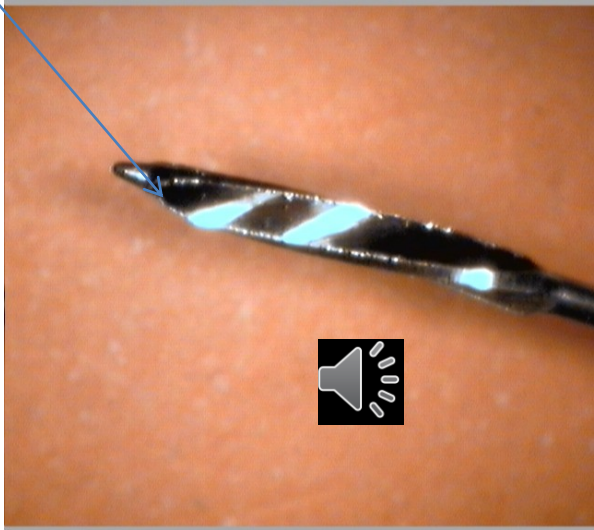
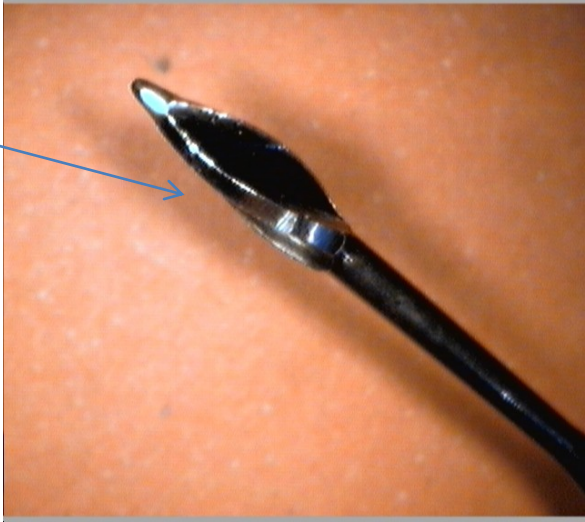
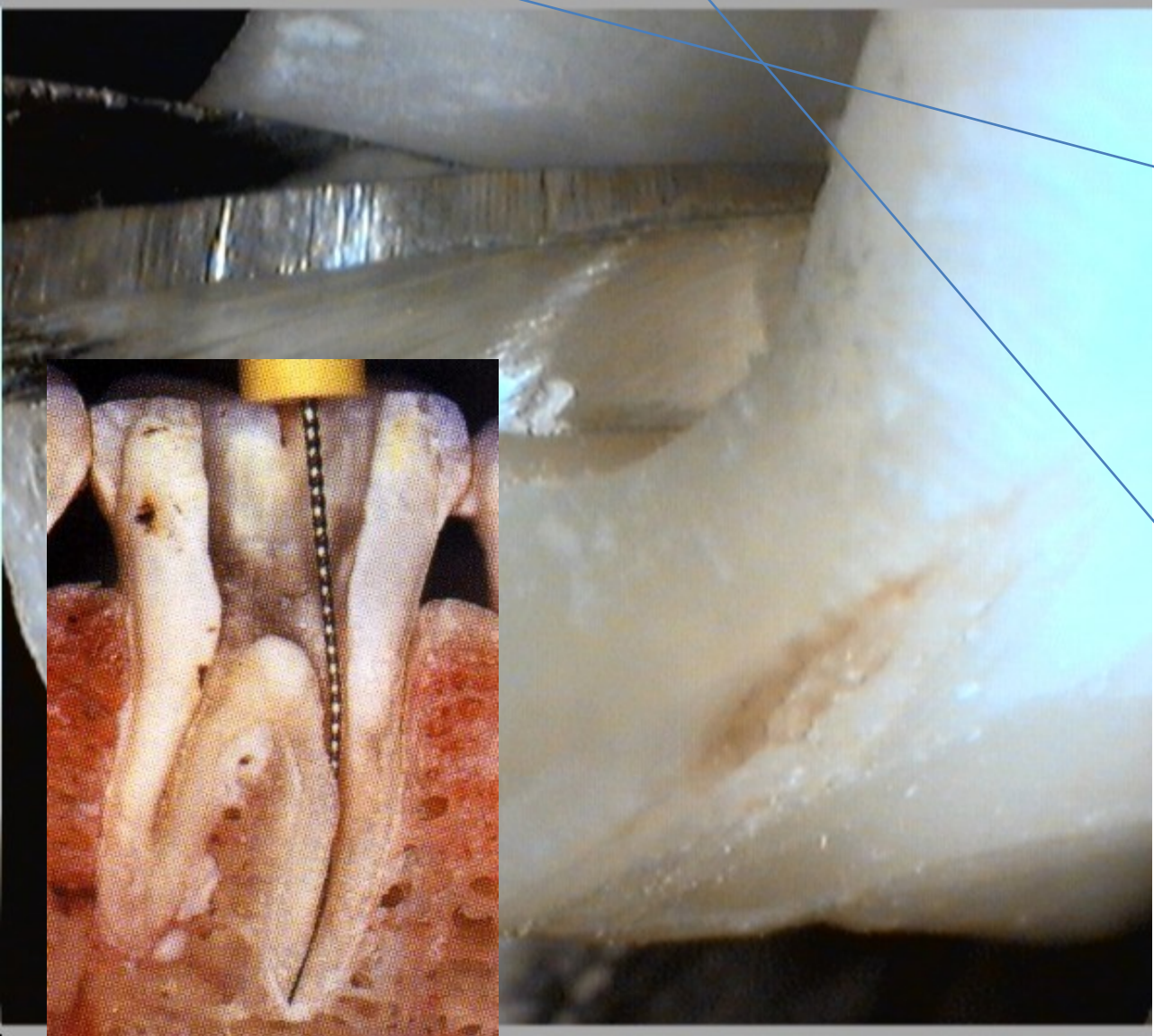
The pulp chamber correctly open



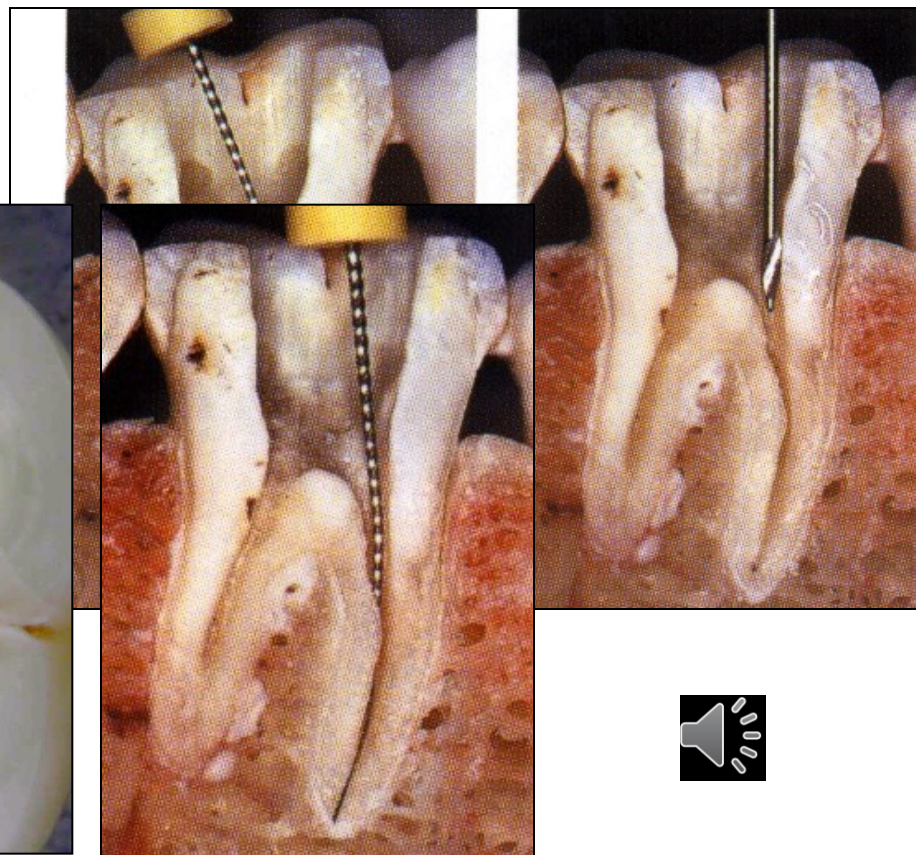
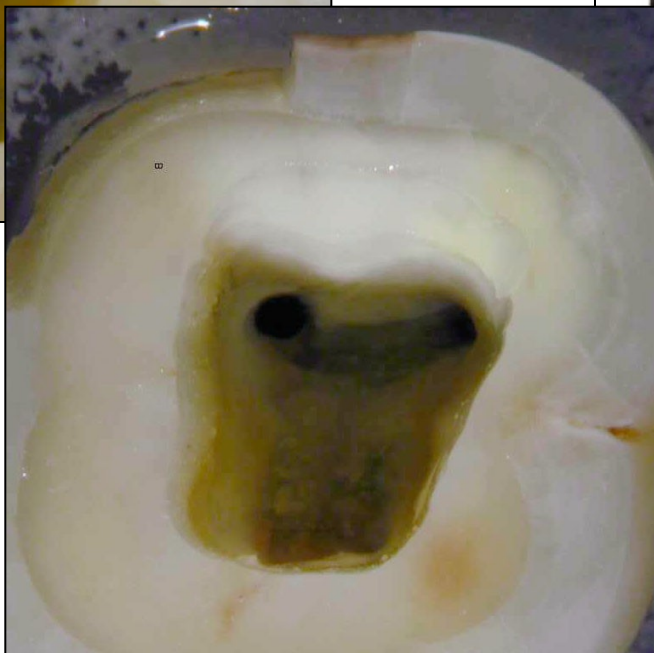
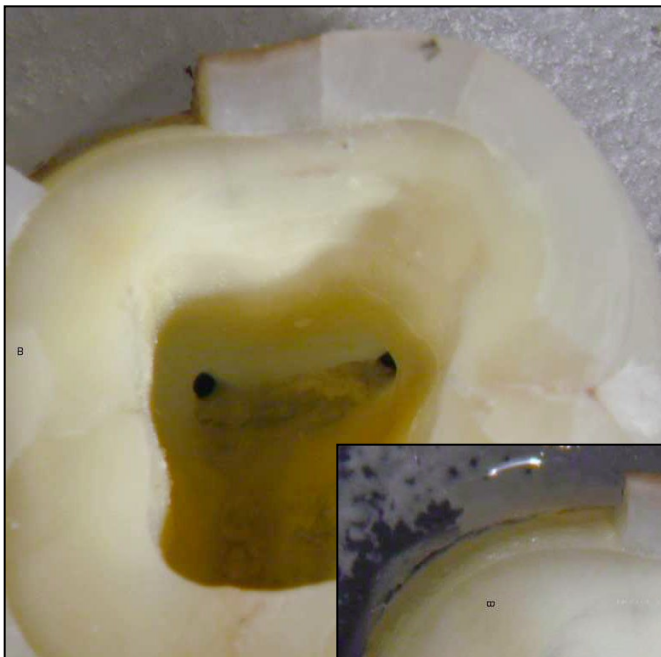
# Opening of the root canal

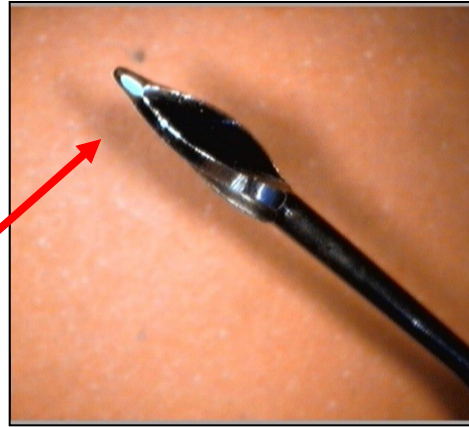


Gates Glidden, Peeso - Largo

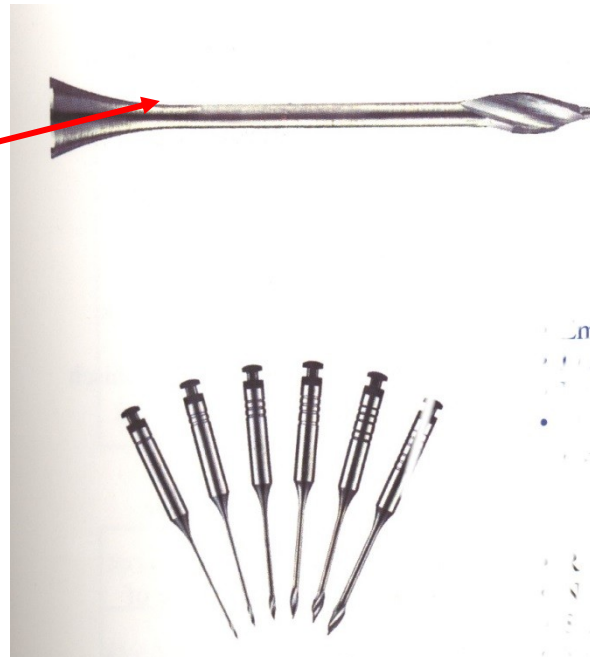


# Finding of the root canal orifice





Gates – Glidden:  
Blunt, non active tip



Programm point of breakage

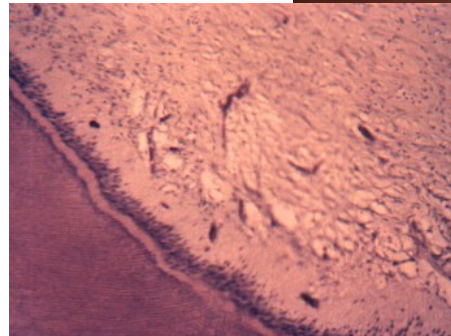
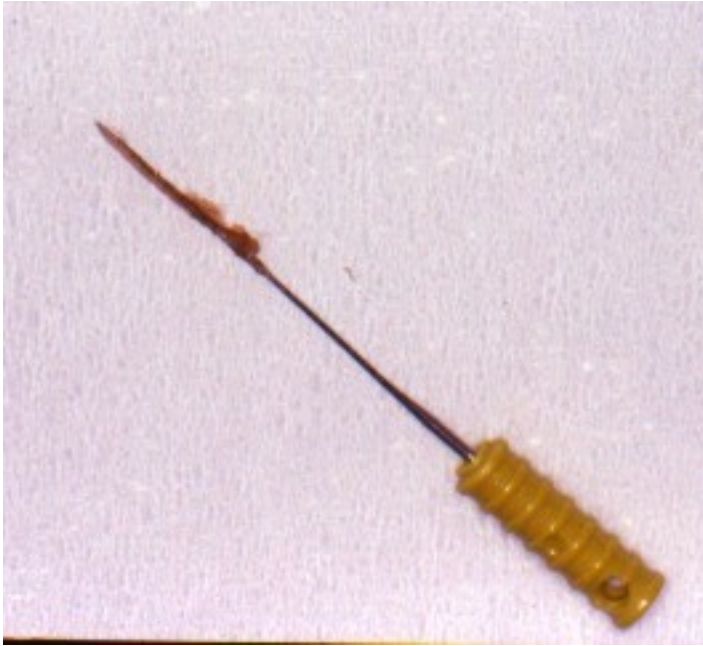






Ultrasound

# Pulpextractor



Soft wire  
Prickles like harpune  
Insertion  
Rotation  
Exstirpation



# Canal shaping

- Reamers (penetration)
- Files ( shaping)

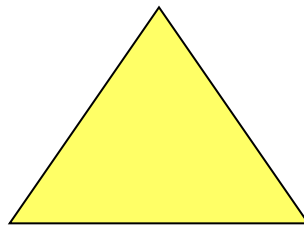


# Reamer

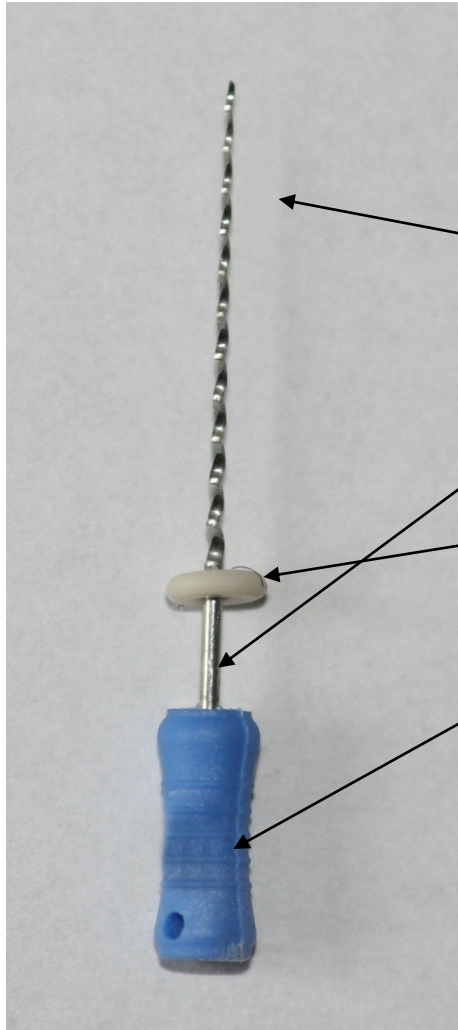
**K -reamer**

**Triangl or square wire spun**

**Symbol**



# Reamer

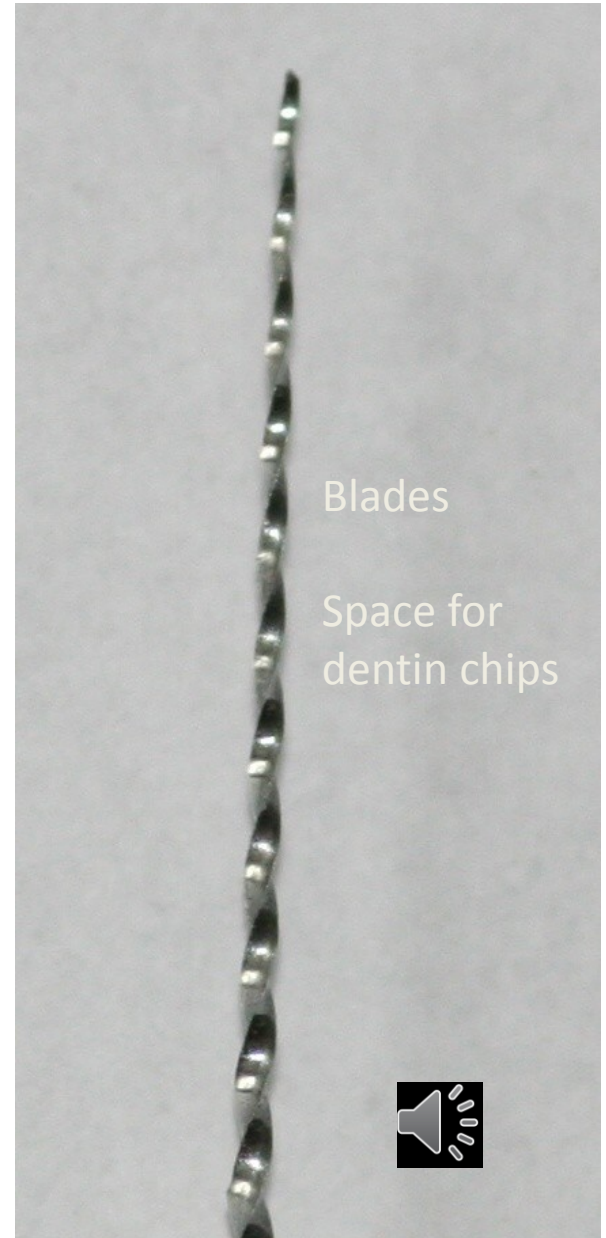


Bladed part

Shank

Stopper

Grip



Blades

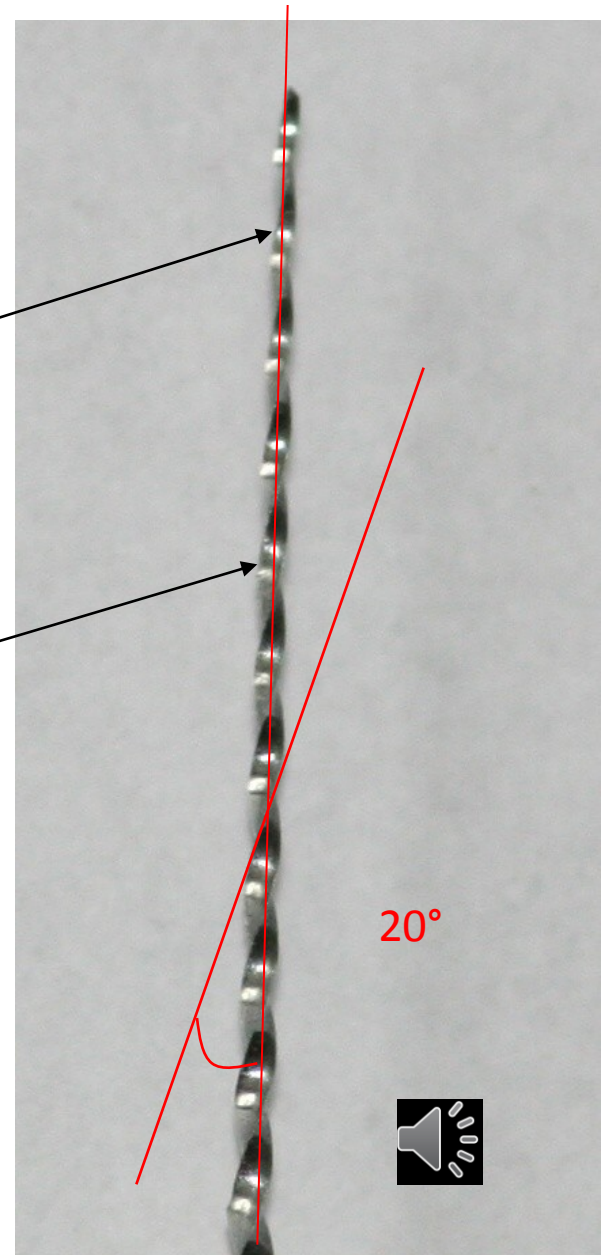
Space for dentin chips

# Reamer

Blades

Space for dentin chips

***Rotation – reaming action - penetration***



# Reamer

**Rotation (clockwise) – penetration**

**Application of plastic material  
(counterclockwise)**



# Files

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

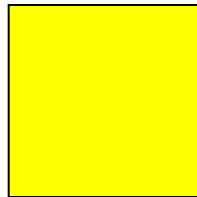




# K file

Wire trianagl or square

Symbol is always square

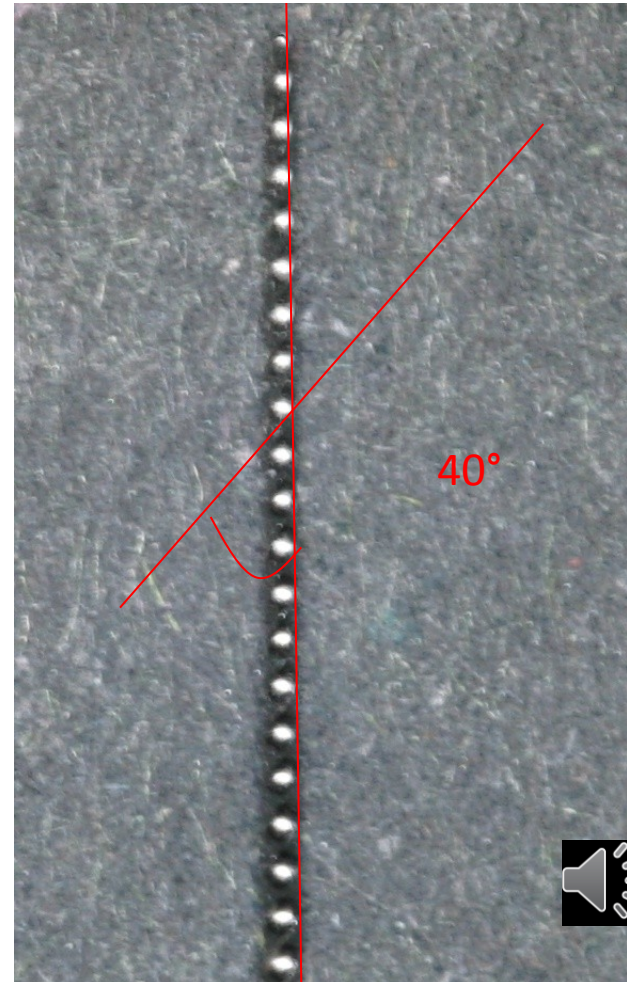


# K-file

***Filing***

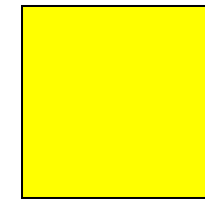
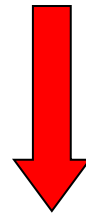
***Also rotation***

***45° – 90°***



# K-flexofile, flexicut, flex-R

- Triangle wire always



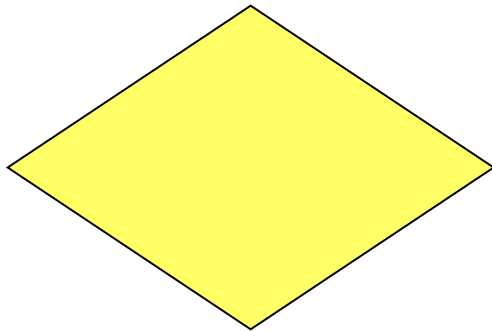
Flexibility

K- flexofile a flex – R file: non cutting tip and first blades are blunt

Like K-file



# K- flex



Rhombus

Two blades in action

Enough space for dentin chips

Flexibility, efficacy



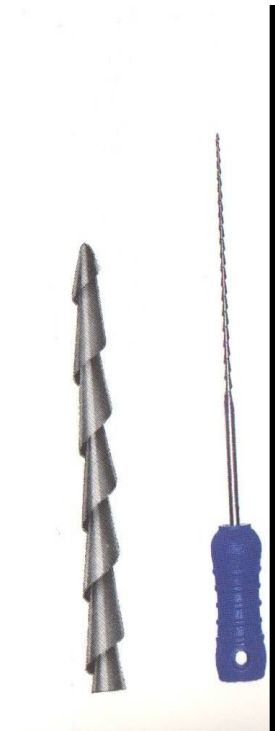
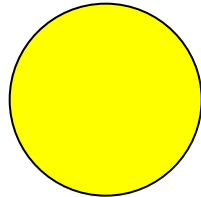
## K-file a reamer: a difference



# H-file

= Hedstroem file

Ring

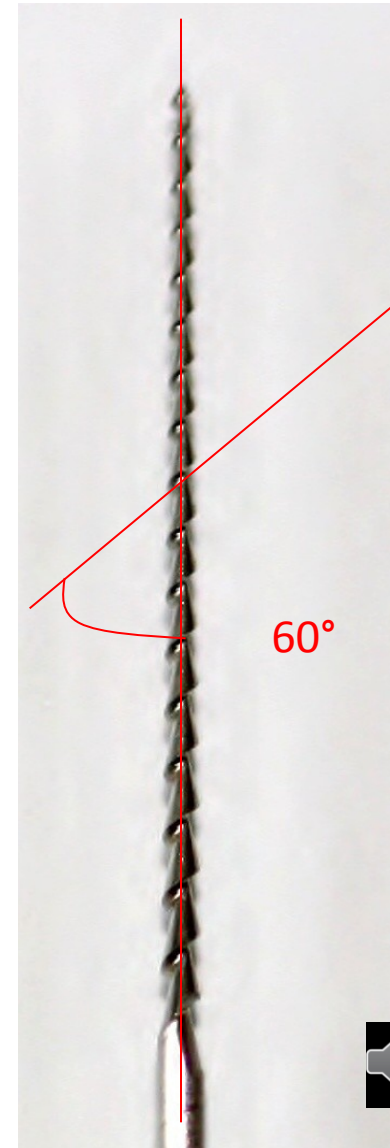
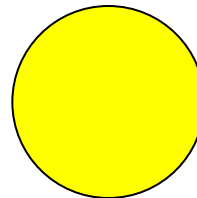


# H- file

No rotation!!

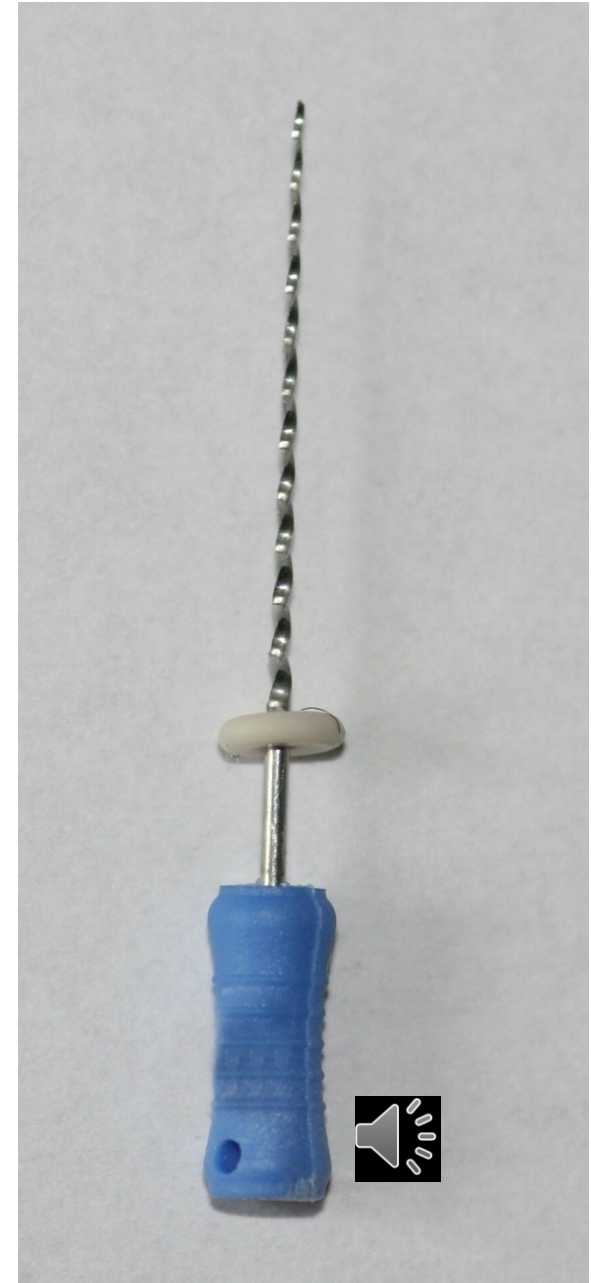
Pull motion only!!

Risk of breakage in small sizes



# ISO

- Diameter of the tip
- Length of the cutting part
- Taper





# ISO standard

06

08

10

15

20

25

30

35

40

45

50

55

60

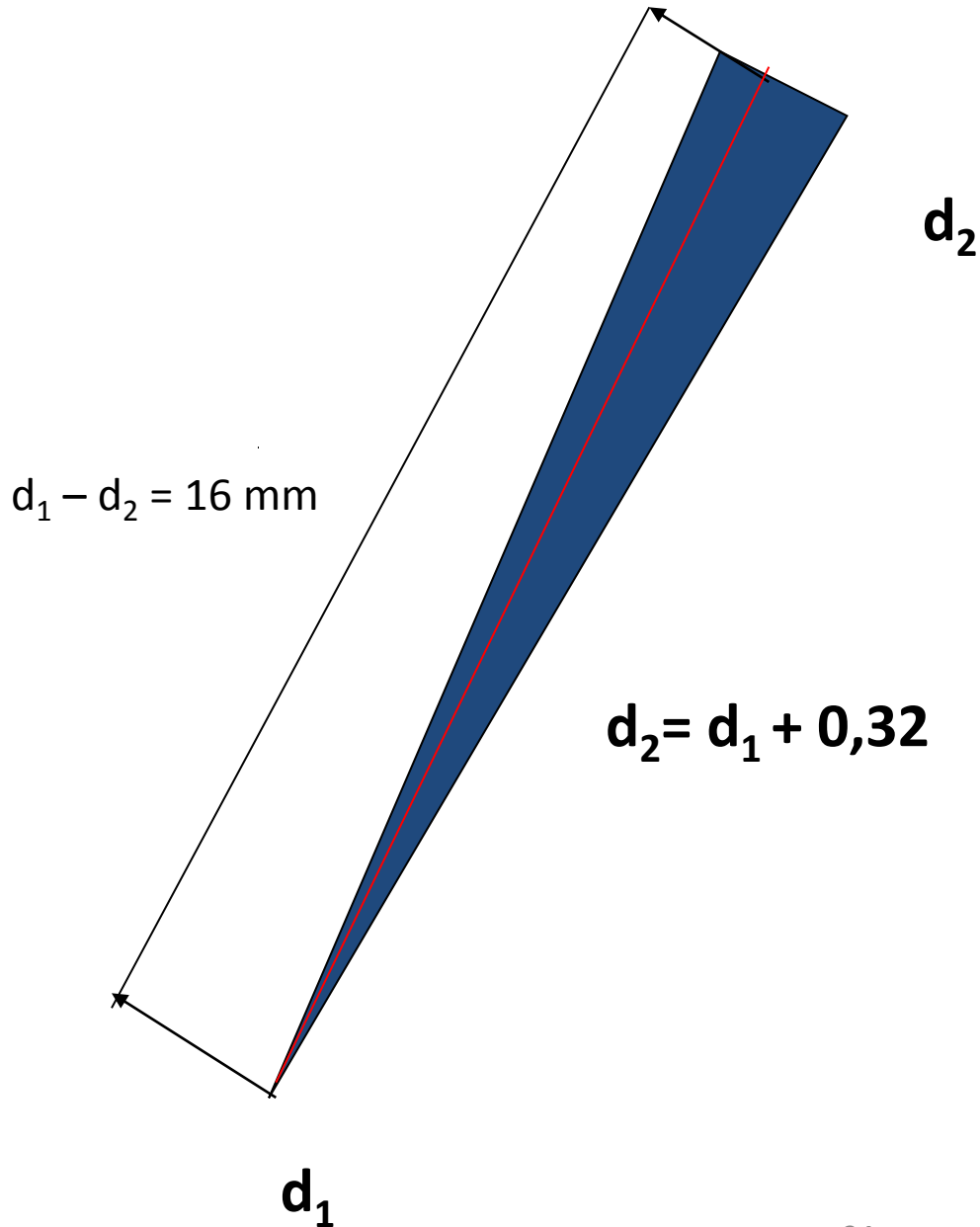
70

80

Size – diameter at the tip



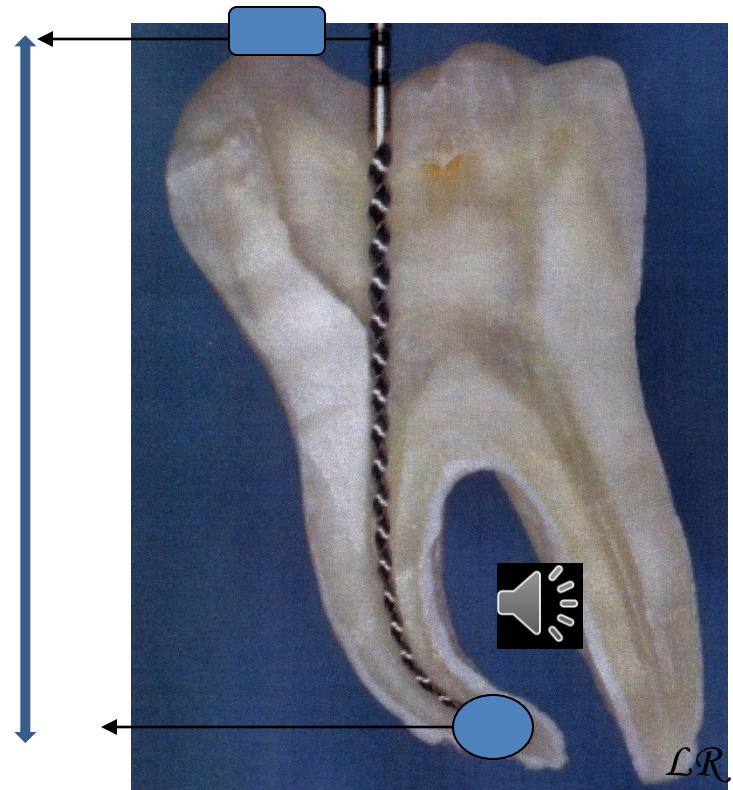
**Taper 2%**



0,02 mm na 1mm

# Working length

- Distance between the referential point and apical constriction
- Radiographically
- Apexlocators
- Combination



# Why apical constriction

- Small apical communication
- Minimal risk of damage of periodontium
- Prevention of overfilling
- Prevention of extrusion of infection
- Good decontamination
- Good condition for root canal filling



# Radiogram

X-ray with inserted root canal instrument

Safe length: average length of teeth reduced for  
2 – 3mm

Tooth with clinical crown



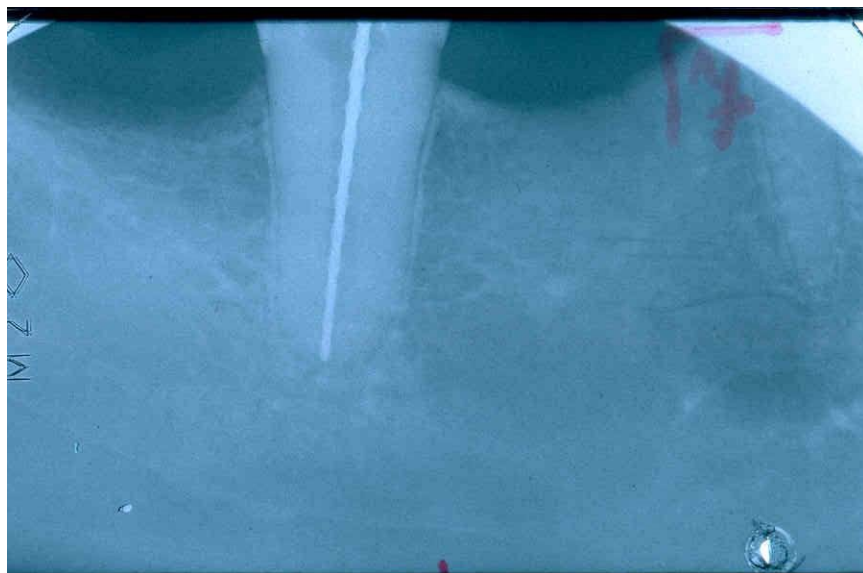
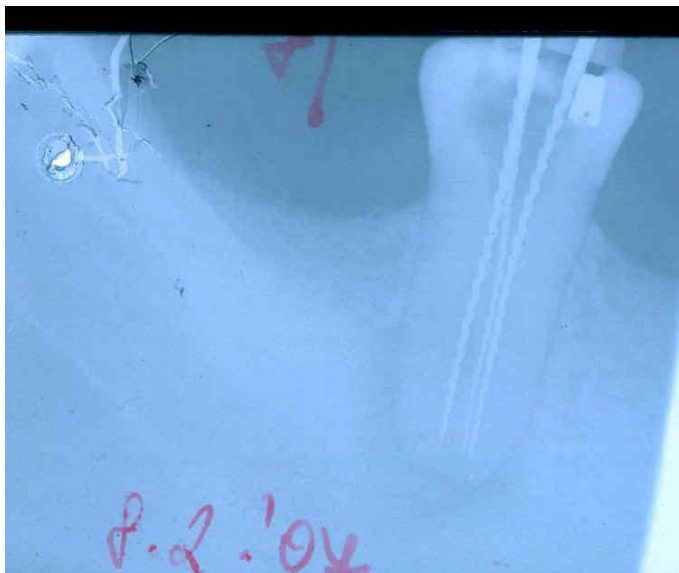
# Procedure

- Instrument ISO 15 inserted into the root canal, stop at the referential point
- Estimation of location of apical constriction (1 – 1,5 mm distance from x-ray apex.

If difference in the radiogram more than 2 mm - repeat

If 2 mm or less – add to the safe length





# Safe length

- Maxilla:

I1 20

I2 18

C22-24

P20

M 18 mkk, 20 P





# Safe length

- Mandible

I 18

C20 -22

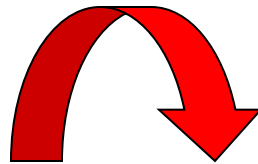
P18

M18



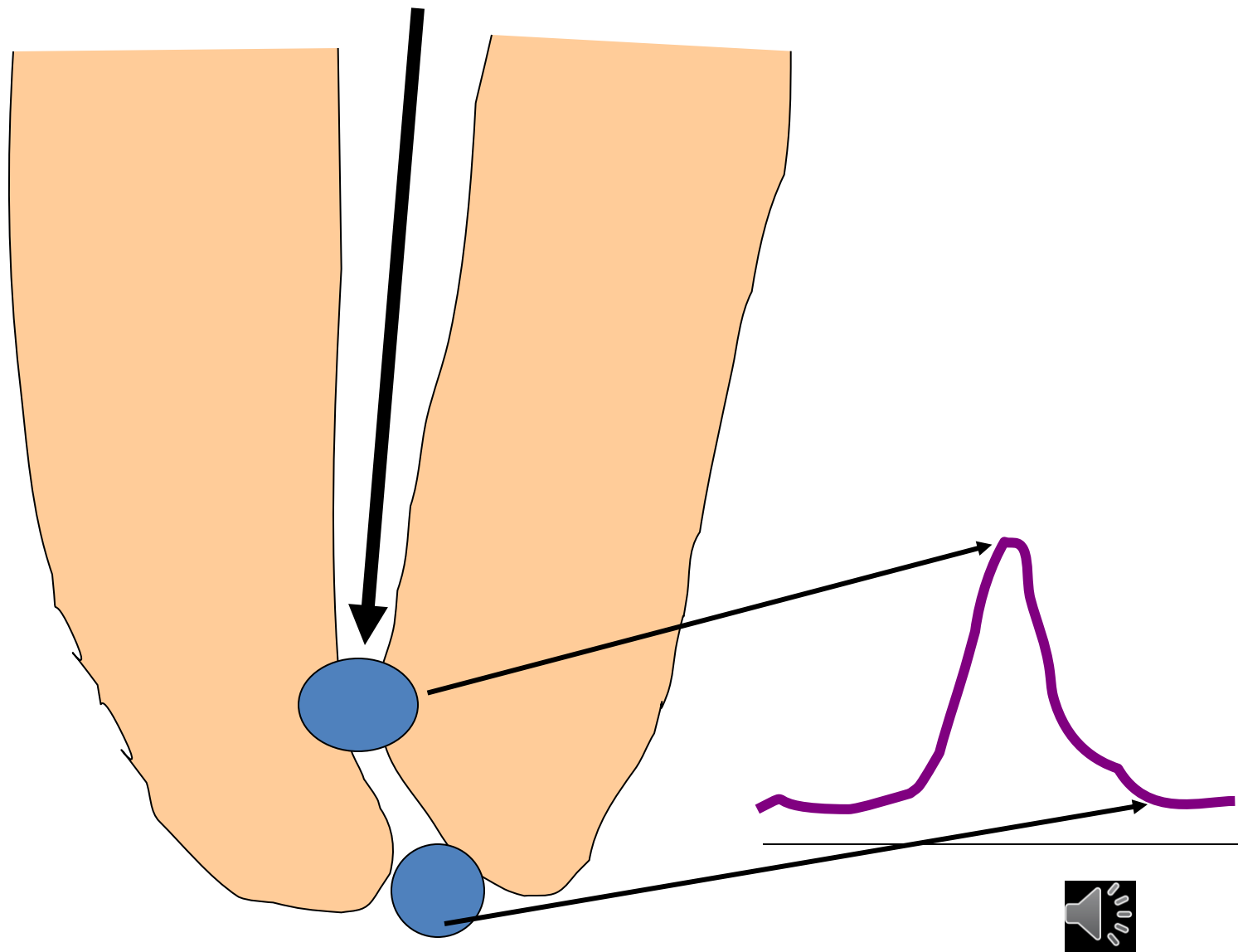
# Endometry, odontometry

- Endometry

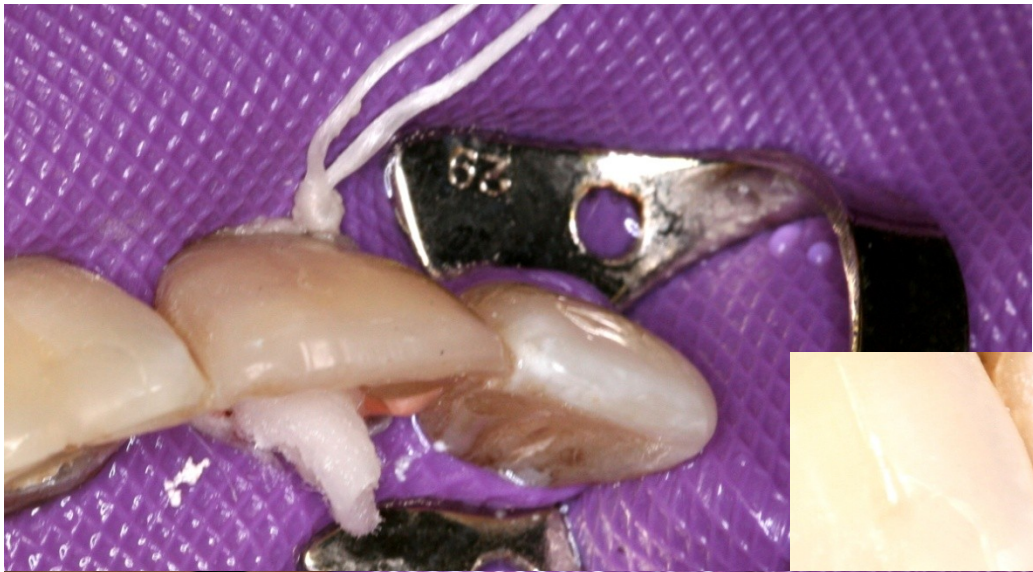


**edevices based on measurement of electrical resistance**





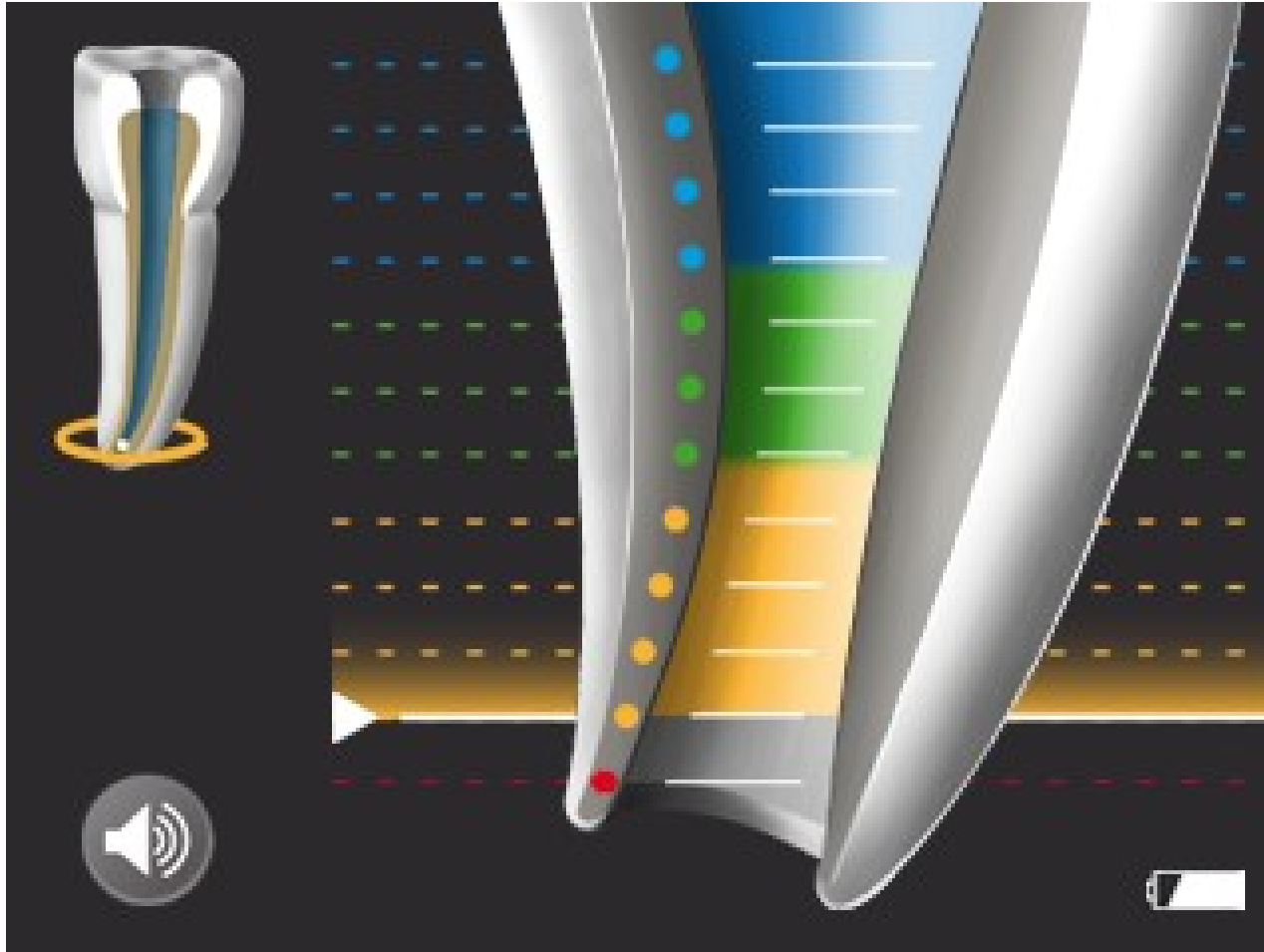
$\mathcal{LR}$



# RAYPEX<sup>®</sup> 6



# Apical zoom



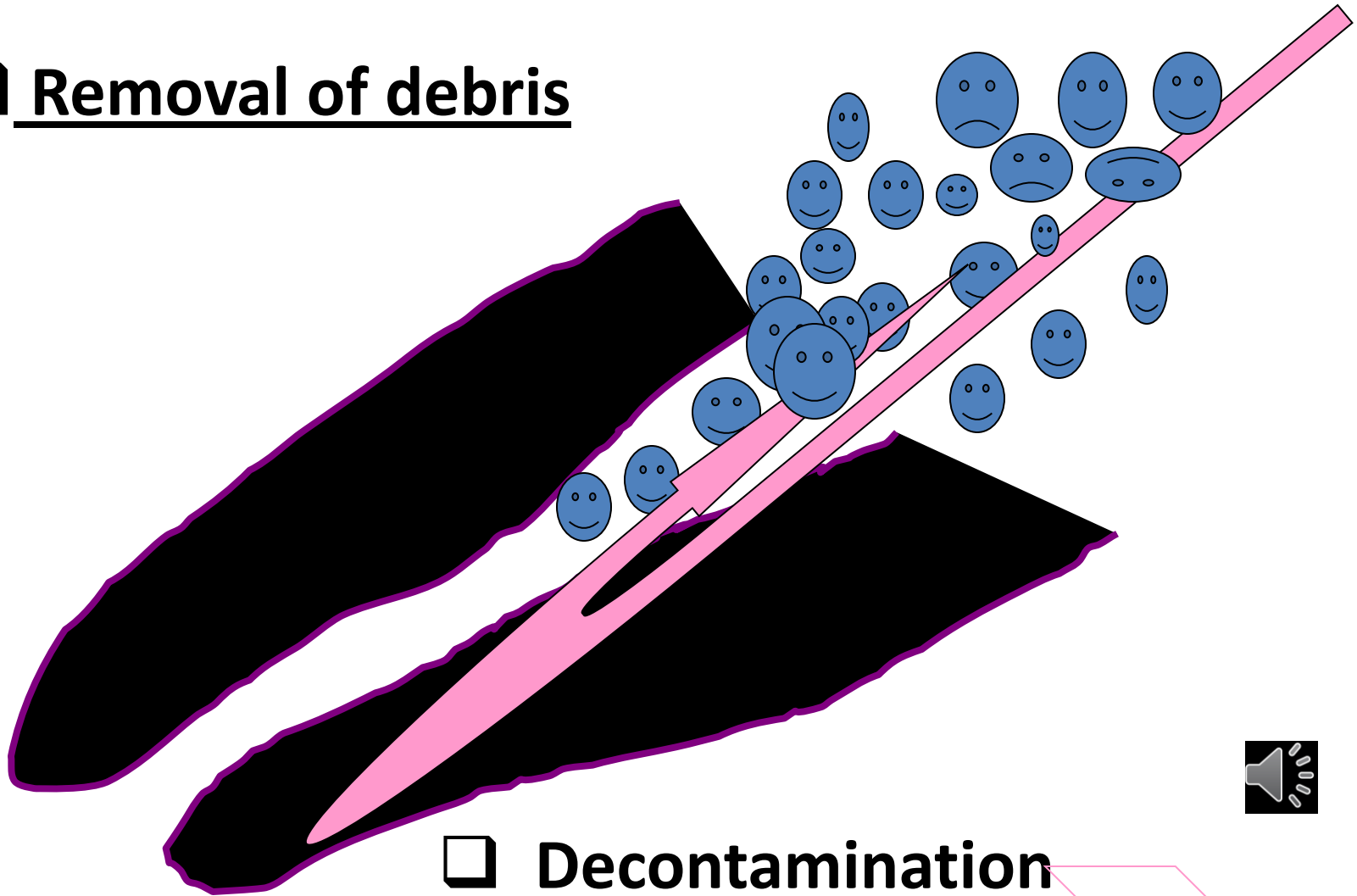


4. Instrument im Interim-  
Stand bringen.



# Irrigation

Removal of debris



Decontamination





# Irrigants

- **Sodium hypochlorite (1,5 – 6%)**
- **Chlorhexidin (0,12% - 0,2%)**
- **EDTA – etyléndiaminotetraacetic acid 17%**



# Irrigants

- Sodiumhypochlorite

1,5 – 6%

- Oxidation a chloration
- Dissolving efect
  
- Bad smell, irritant.



# Irrigants

- **Chlorhexidin (0,12% - 0,2%)**

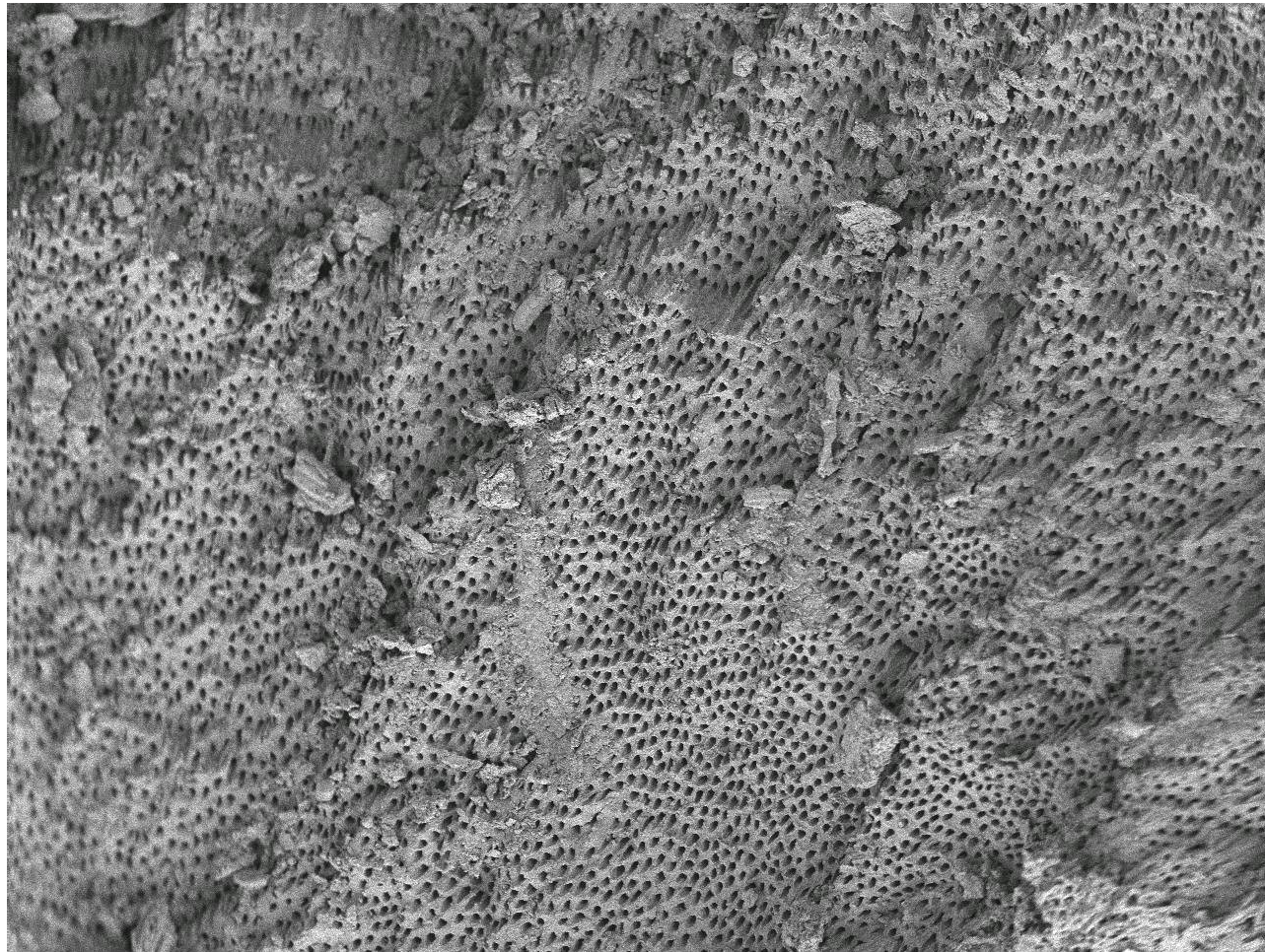
**Good antimicrobial efect, but no dissolving effect**



# Irrigants

- **EDTA – etyléndiaminotetraacetic acid 17%**
- **Chelator, removes inorganic parts of smear layer, weak antimicrobial effect**





ISI

LEI

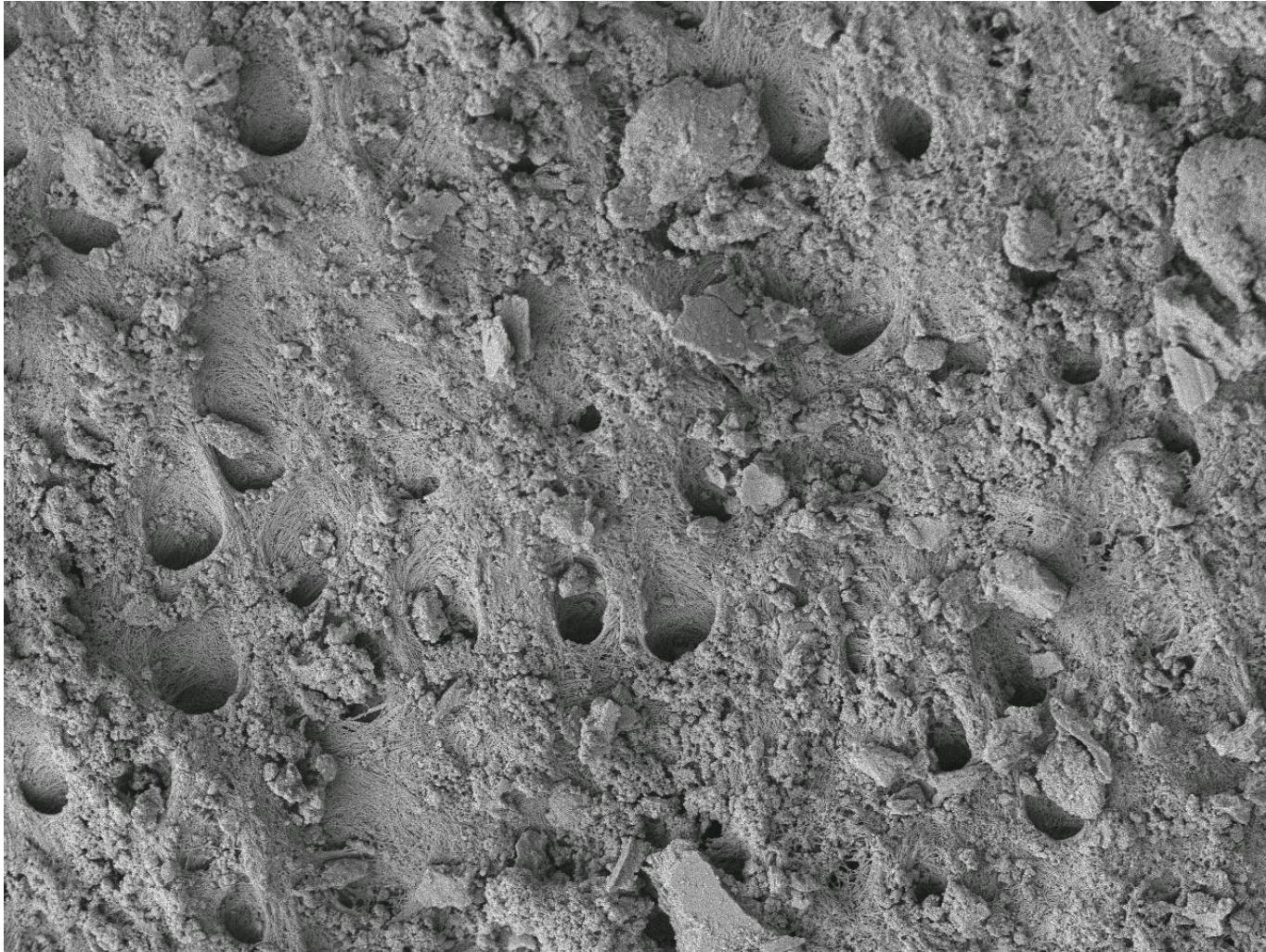
5.0kV

X300

10 $\mu$ m

WD 7.8mm





ISI

LEI

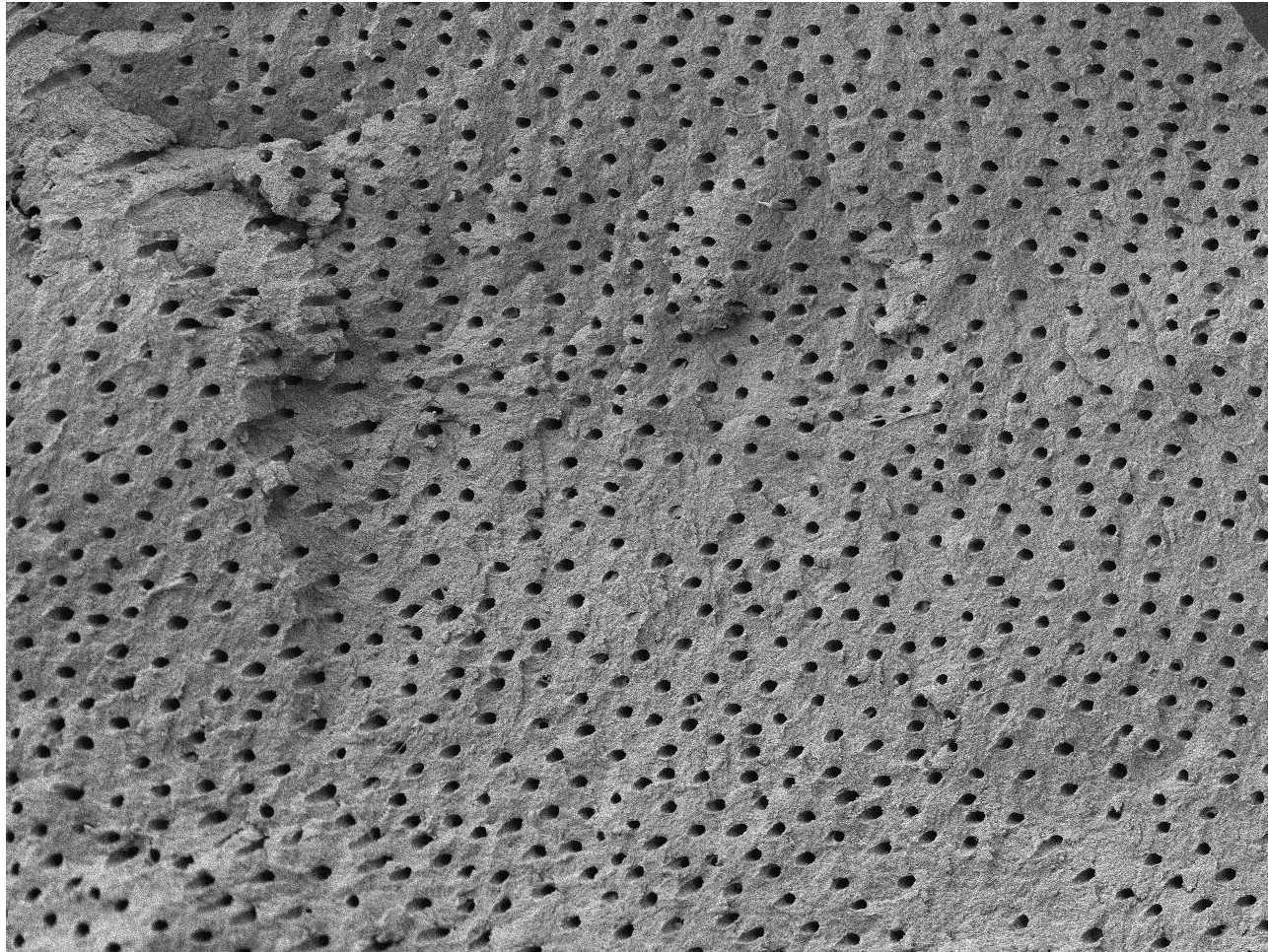
5.0kV

X2,000

10μm

WD 8.1mm





ISI

LEI

5.0kV

X600

10 $\mu$ m

WD 9.0mm



# Syringe and cannula

- Blunt, side apertures, smallest ISO 35
- No pressure





# Activation of irrigation

- Increased effectivity

Vibration

Increasing of temperature

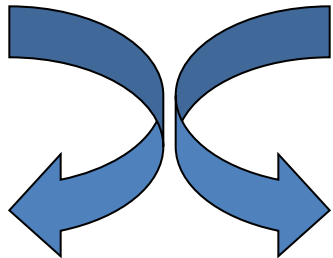
Decomposition of irrigants - dissociation





# Shaping techniques

- Rotation – 45°



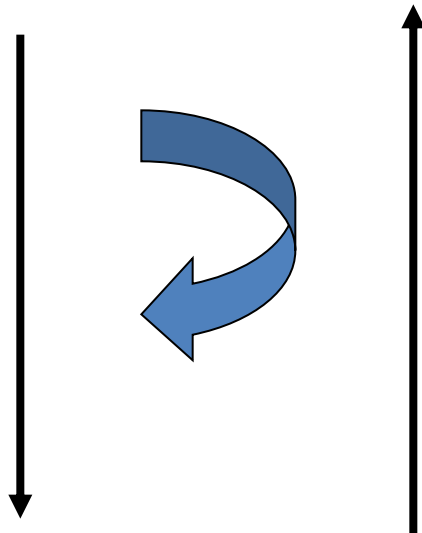
K – reamer

K- file



# Shaping techniques

- Rotation 45° pressure and pull motion



K – reamer

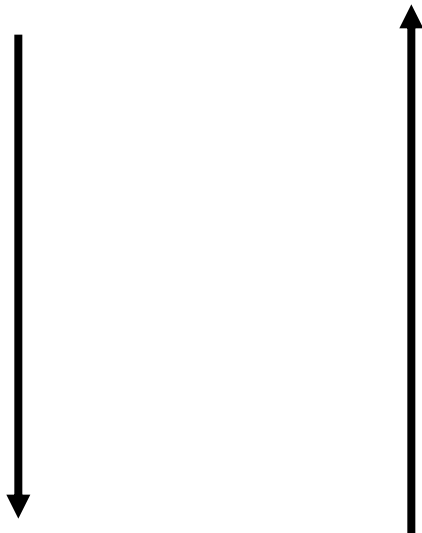
K- file

*Risk of ledging  
Zip, elbow effect  
Via falsa*



# Shaping techniques

- Filing



H- file

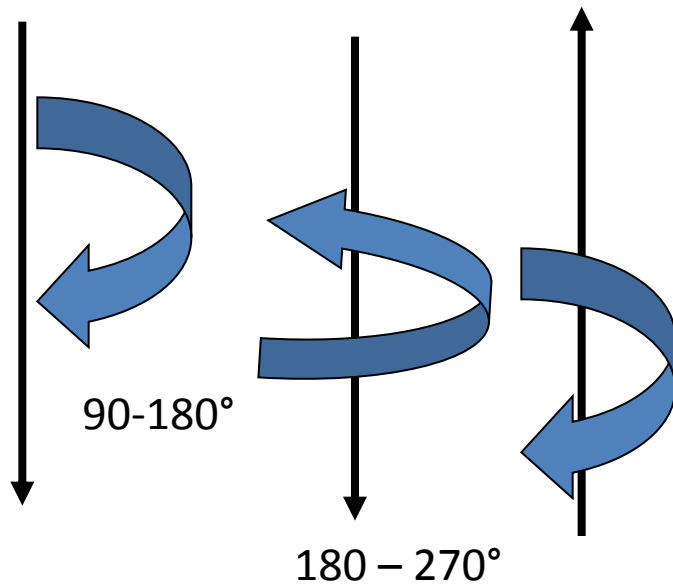
K – file

*Risk of periapical infection*  
*Risk of plug*



# Shaping techniques

- Balanced force



K- flexofile

K – file (?)



# Methods of shaping

- Rotation and filing combined

K - reamer

H- file



# Methods of shaping

- Combination of rotation and filing

Start with rotation

Finishing with filing

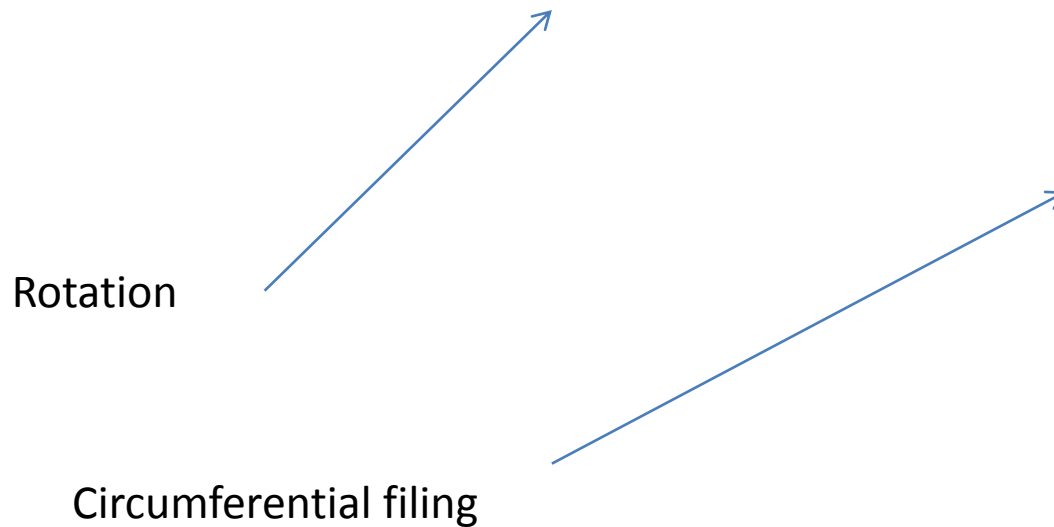
Suitable for straight root canals

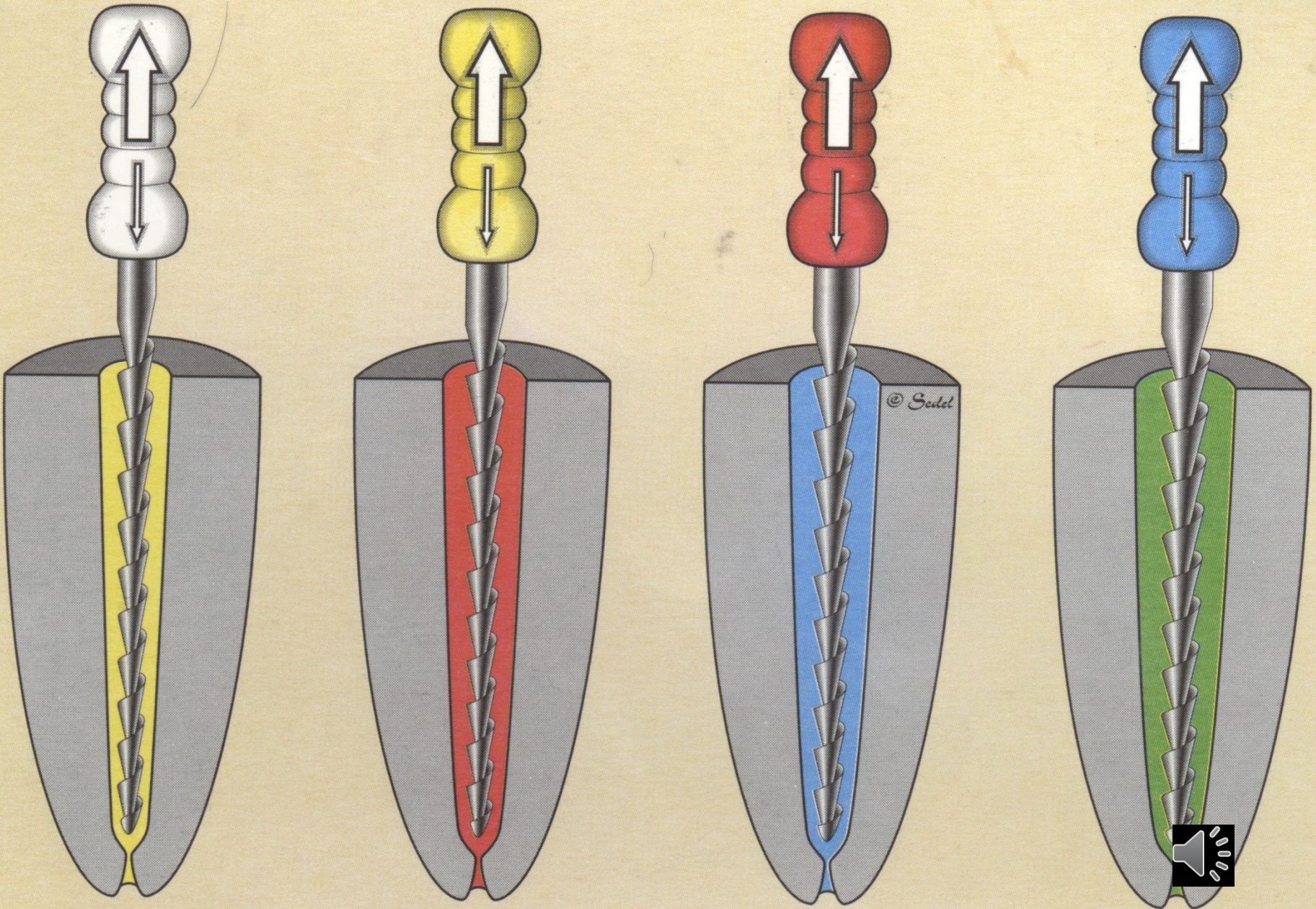




# Methods of shaping

- Circumferential filing





# Methods of shaping

- Step back method

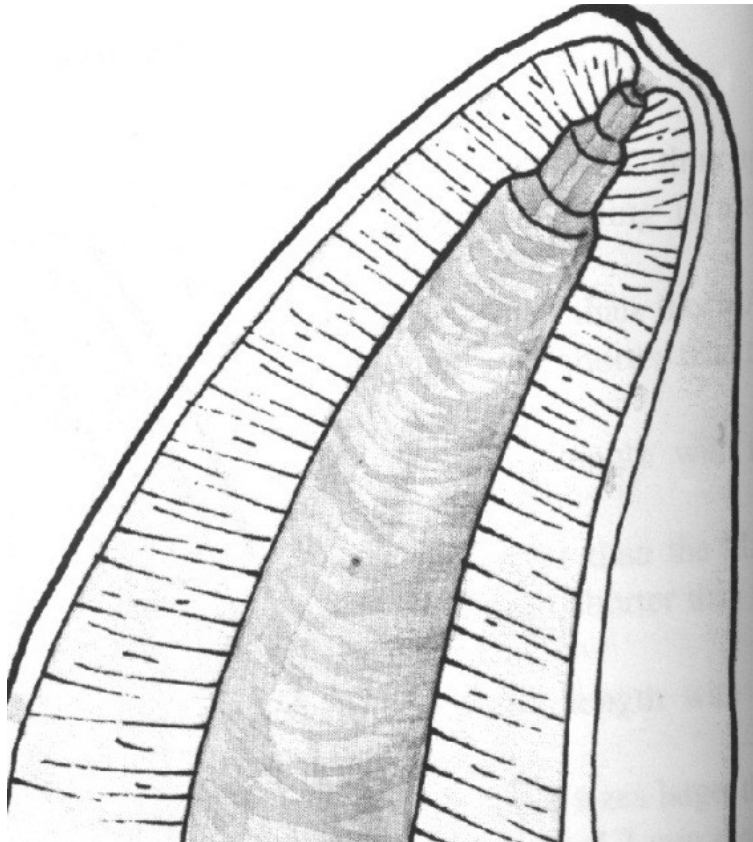
Increasing size with decreasing length.

Insertion of root canal instrument – WL

Next – 1 mm shorter

...





Taper  
Final flaring with  
the smallest instrument

H- File nebo K - Flexofile.

