The Techniques of Rotary NiTi Instrumentation

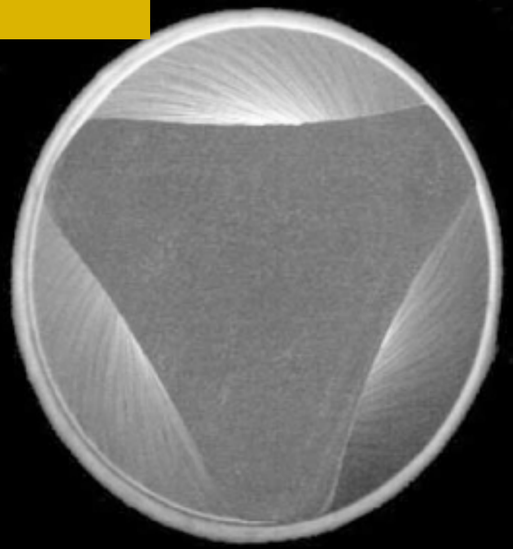
The University of Western Australia, School of Dentistry

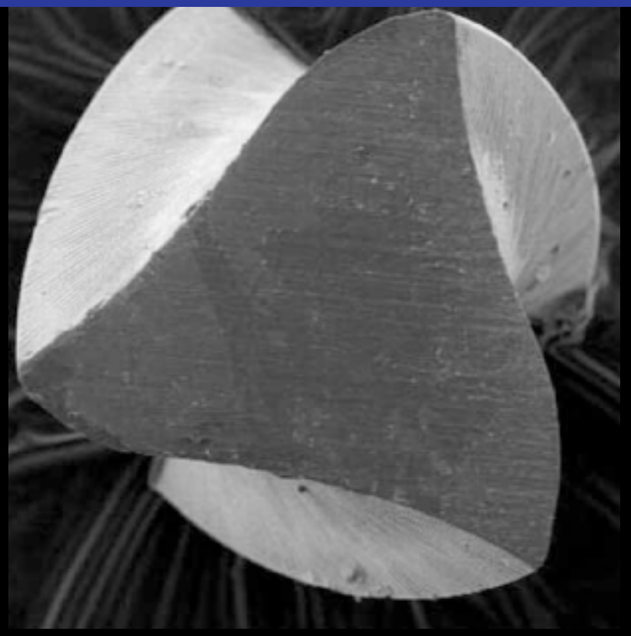
Dr Mostafa Elkholy, BDS, MSc, PhD

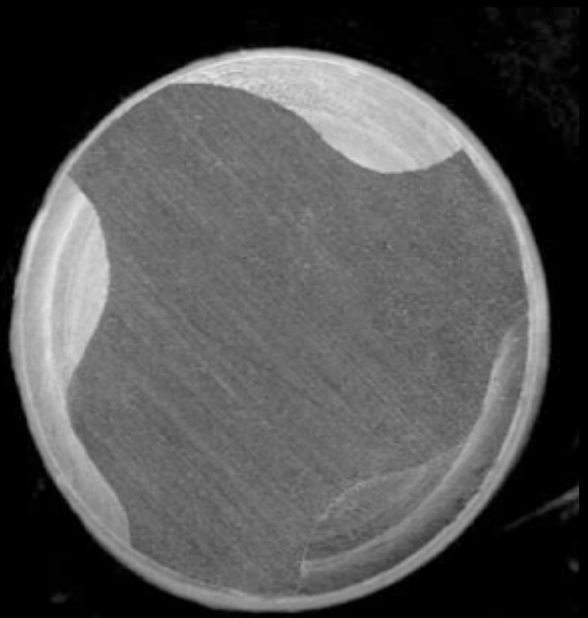
THE UNIVERSITY OF WESTERN AUSTRALIA

Shaping

Parametres







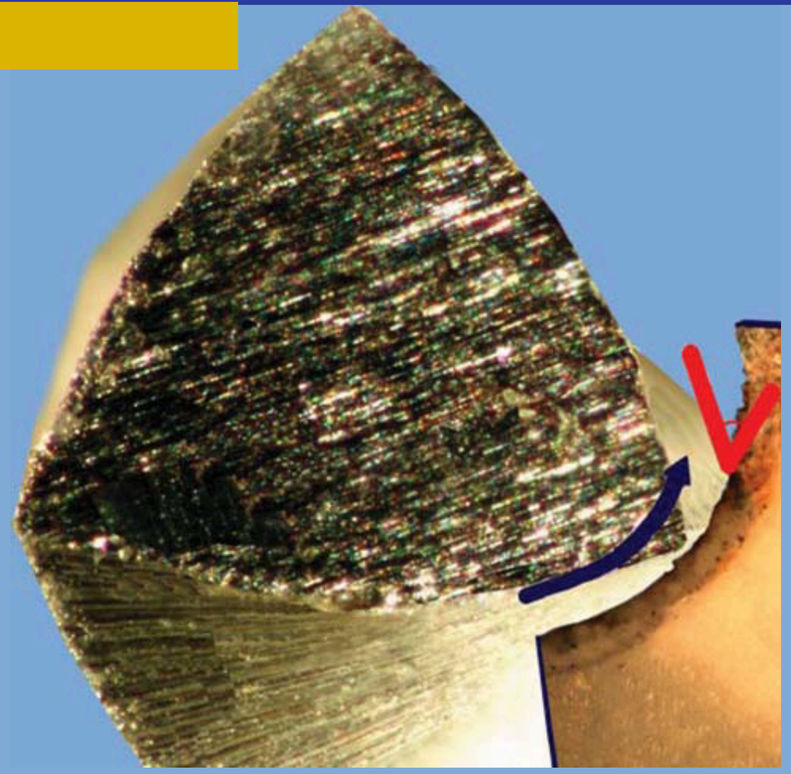
Shaping

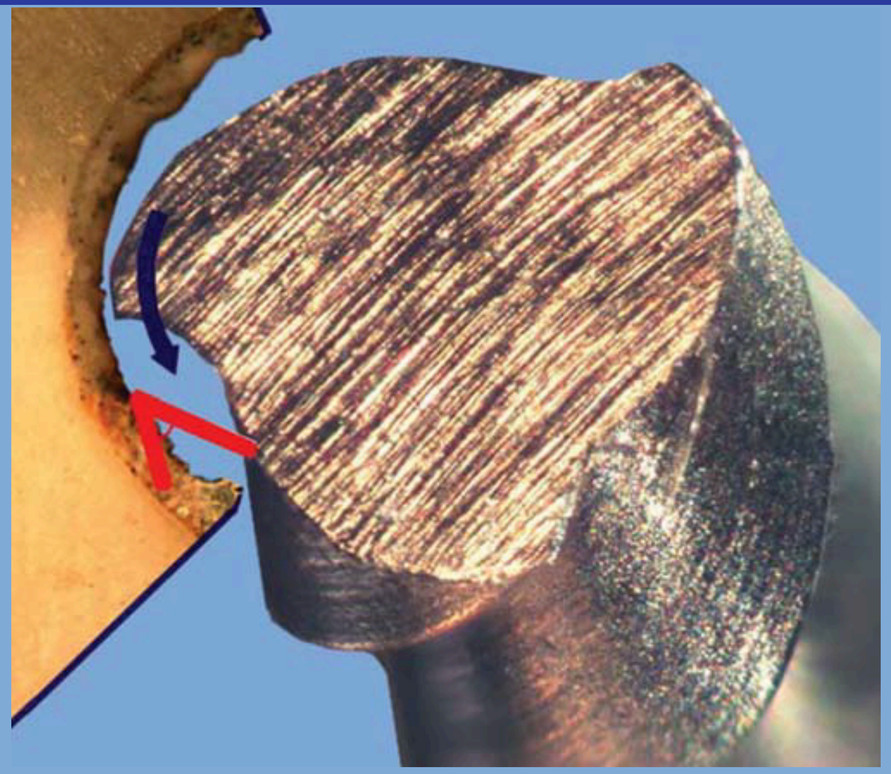
Parametres

Cross Section

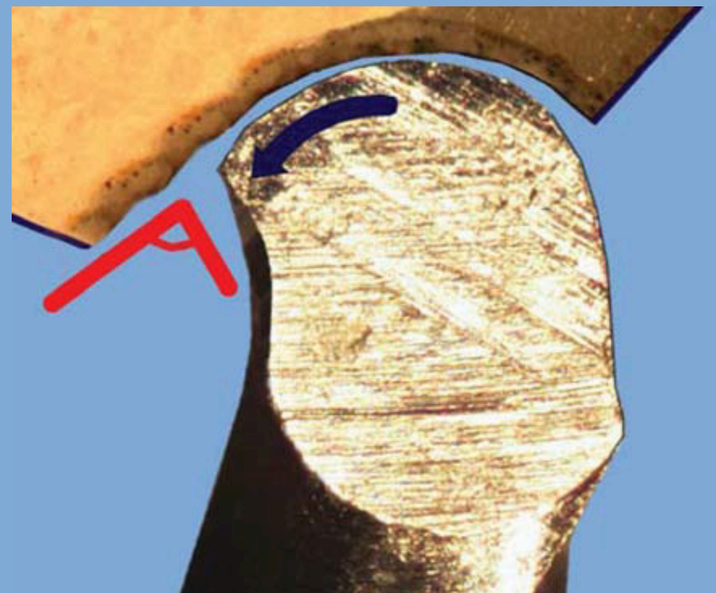
Shaping

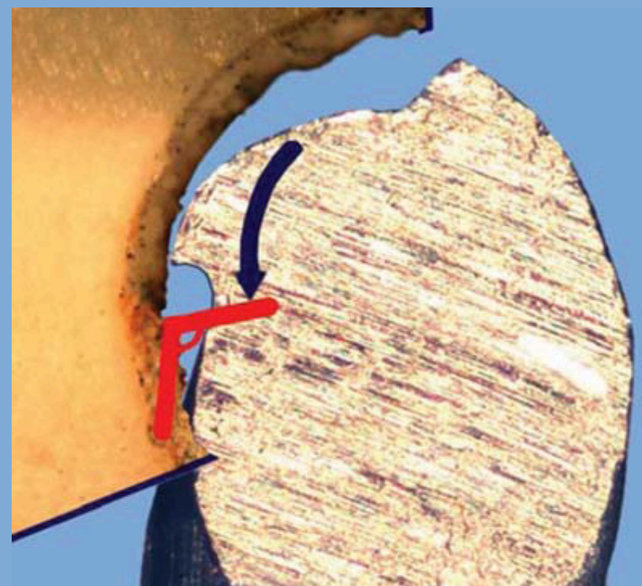
Parametres





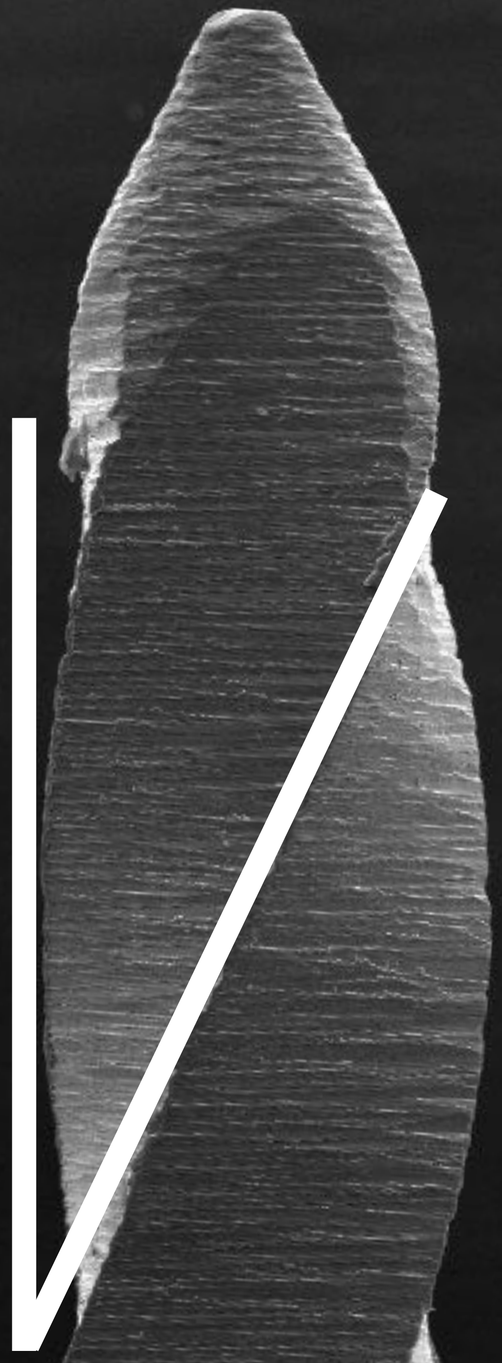
Rake Angle





Shaping

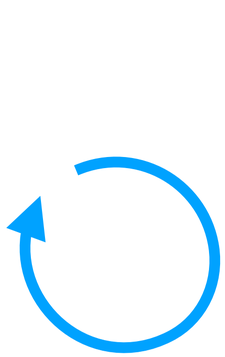
Parametres

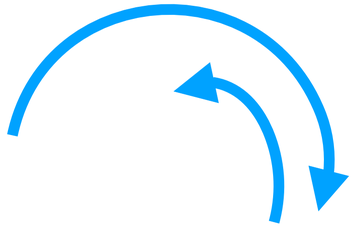


Helical Angle

Shaping

Parametres

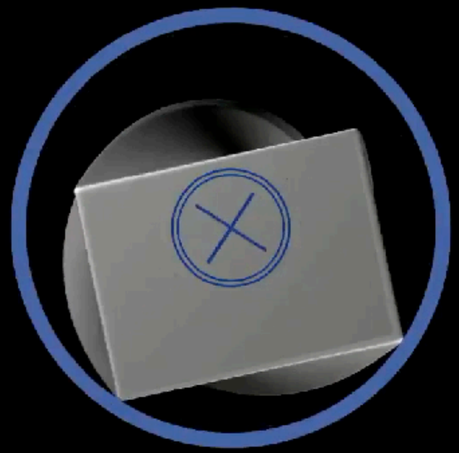




Kinematics

Shaping

Parametres



Rotation Mass

Shaping

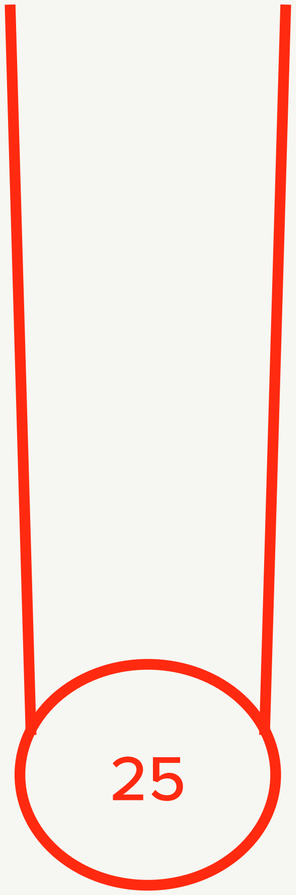
Parametres

Number of Instruments

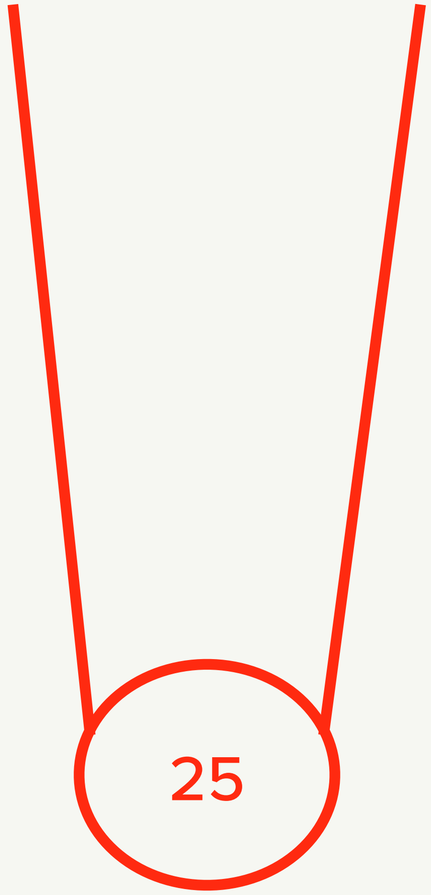
Shaping

Parametres

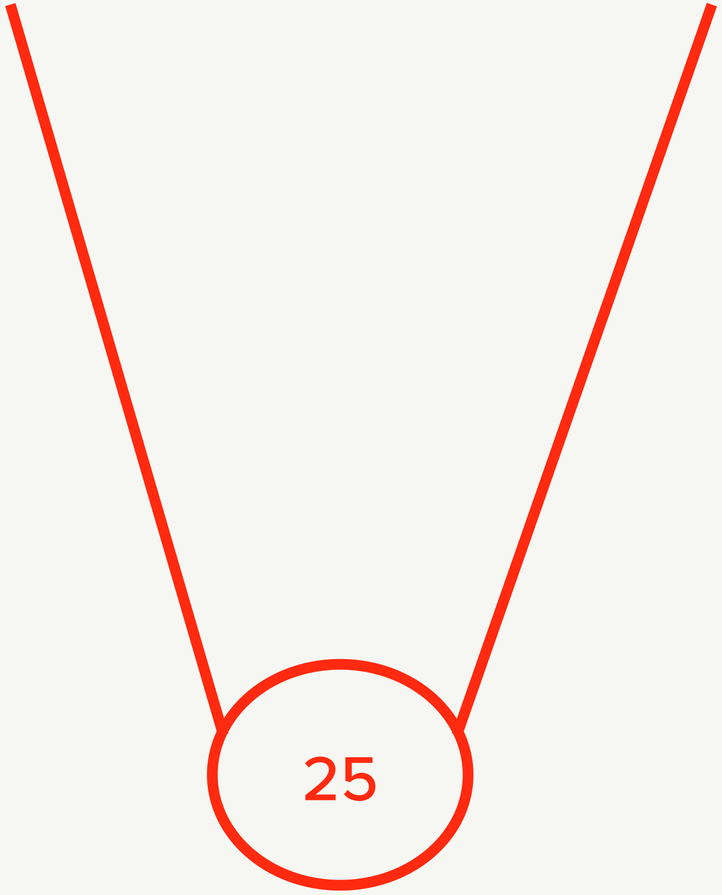
Taper



2%

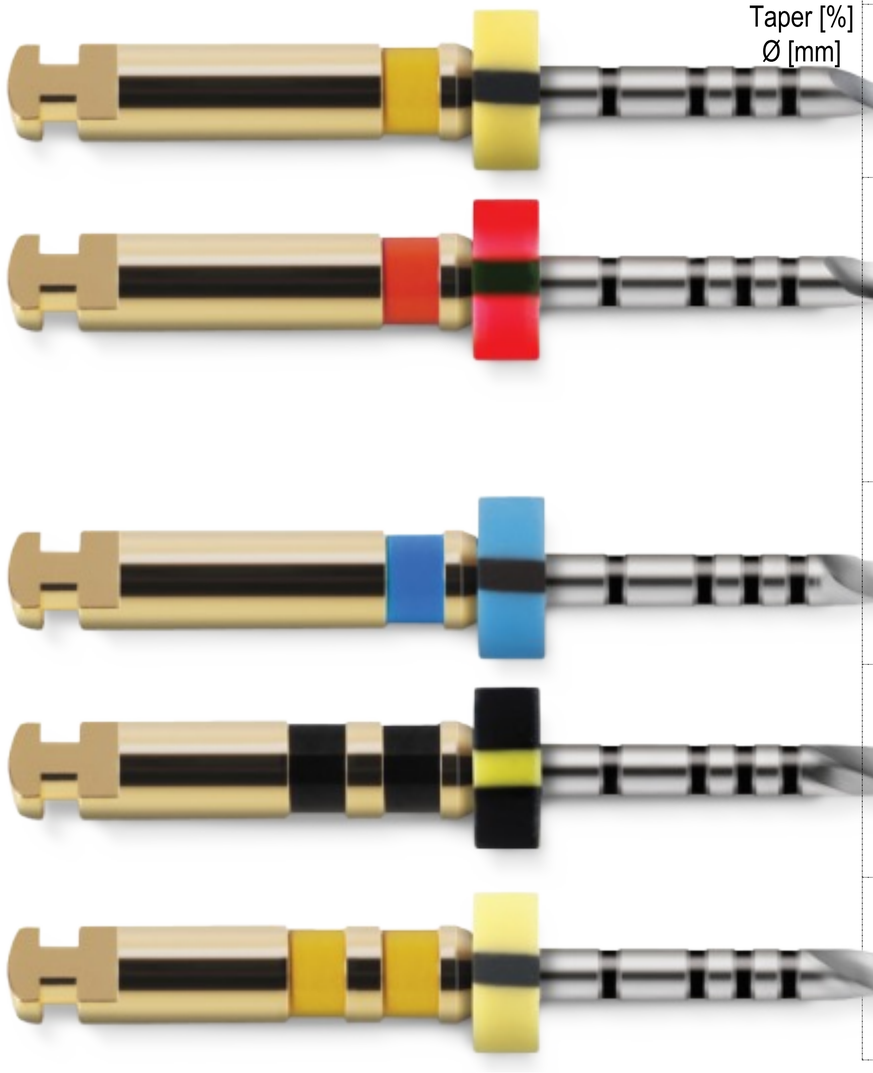


4%

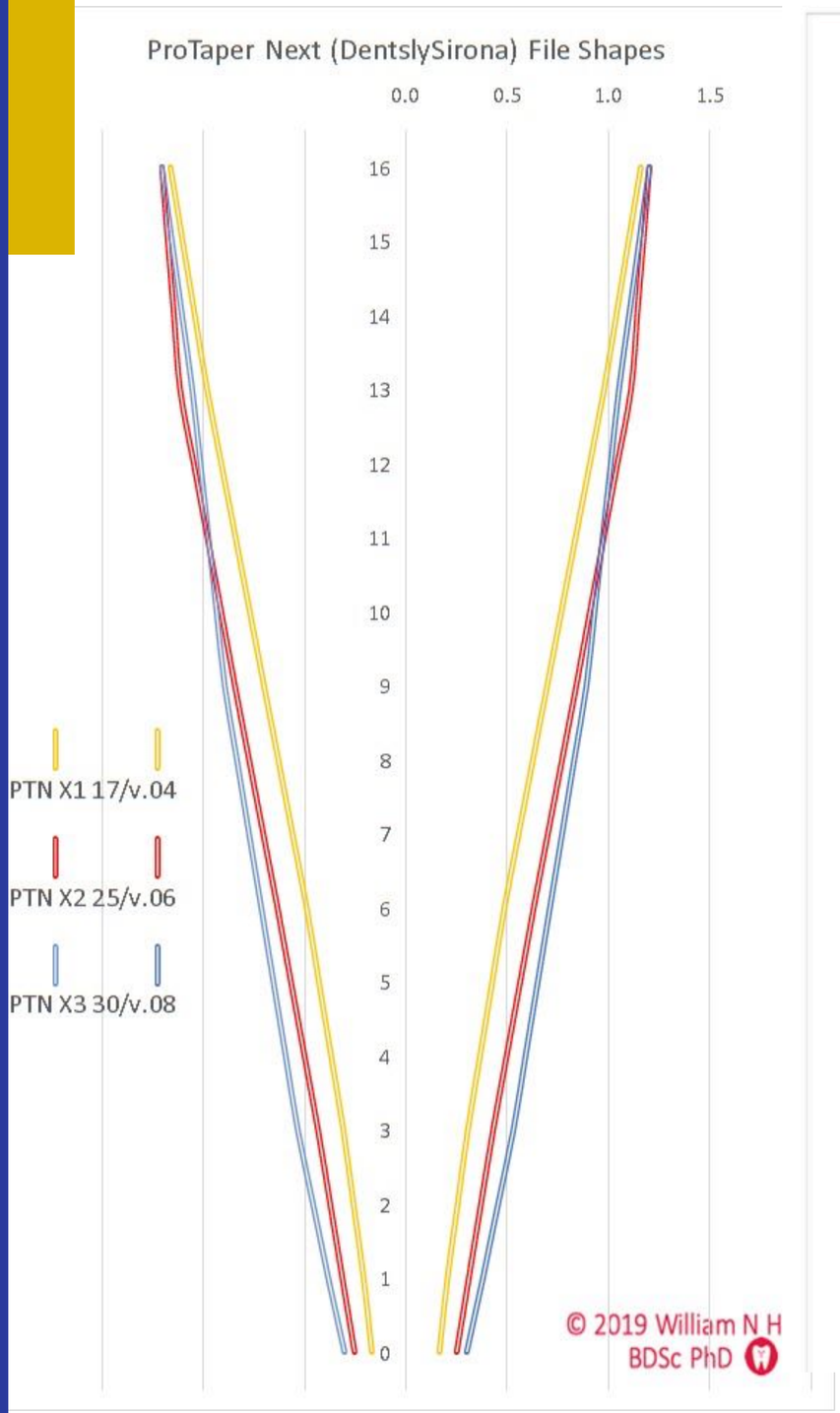


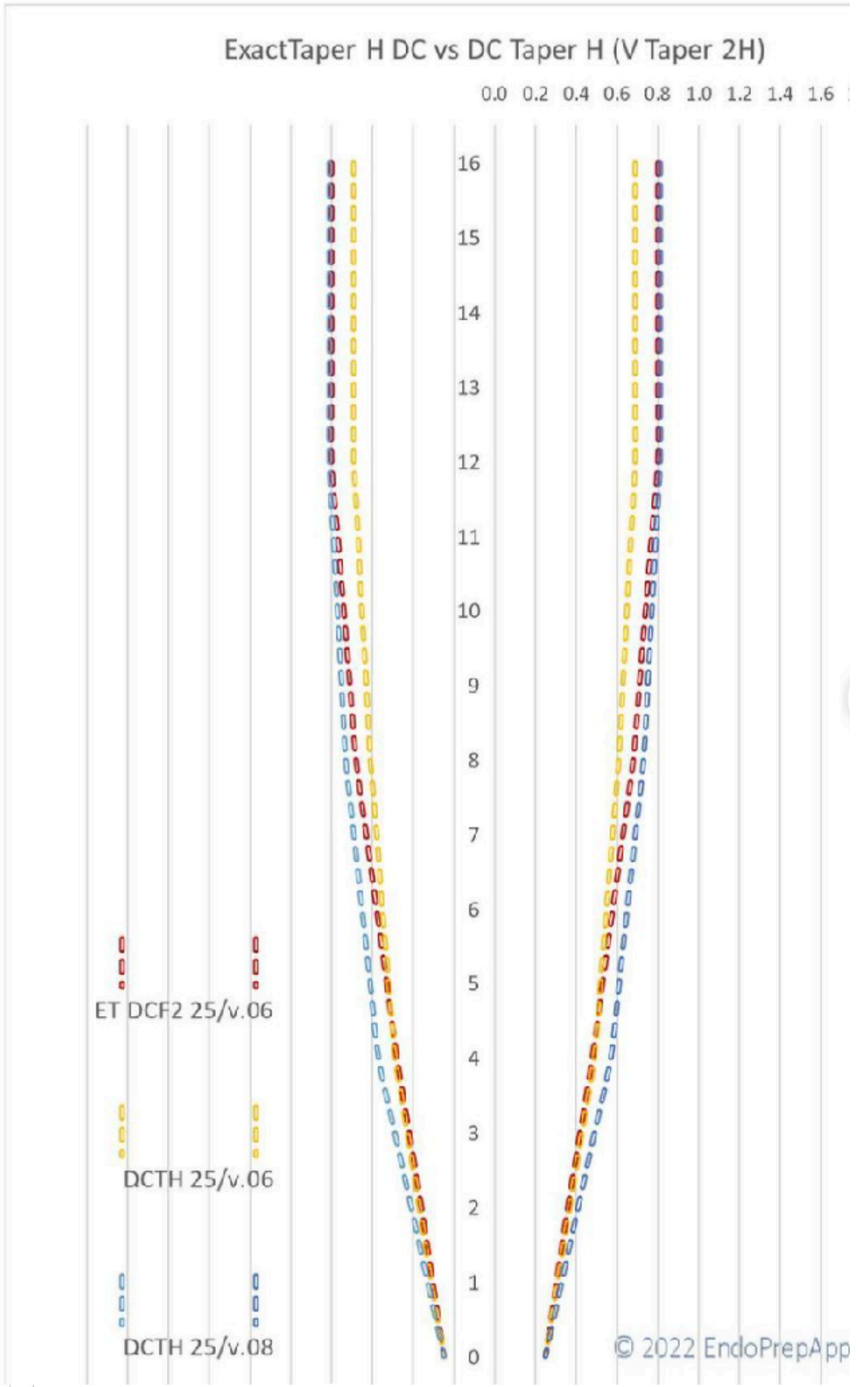
6%

ProTaper Next®



Taper [%] Ø [mm]	Active part lengths						
	16mm	13mm	9mm	6mm	3mm	1mm	Tip Ø
X1	6% Ø 1.16	6% Ø 0.98	7.5% Ø 0.70	6.5% Ø 0.49	5% Ø 0.31	4% Ø 0.21	0.17
X2	4% Ø 1.20	6% Ø 1.11	7% Ø 0.84	7% Ø 0.63	6% Ø 0.43	6% Ø 0.31	0.25
X3	5% Ø 1.20	5% Ø 1.09	6% Ø 0.89	6% Ø 0.71	7.5% Ø 0.53	7.5% Ø 0.38	0.30
X4	4.5% Ø 1.20	5% Ø 1.13	5% Ø 0.93	6% Ø 0.78	6.5% Ø 0.60	6.5% Ø 0.47	0.40
X5	4% Ø 1.20	4% Ø 1.14	4% Ø 0.98	5% Ø 0.84	6% Ø 0.68	6% Ø 0.56	0.50

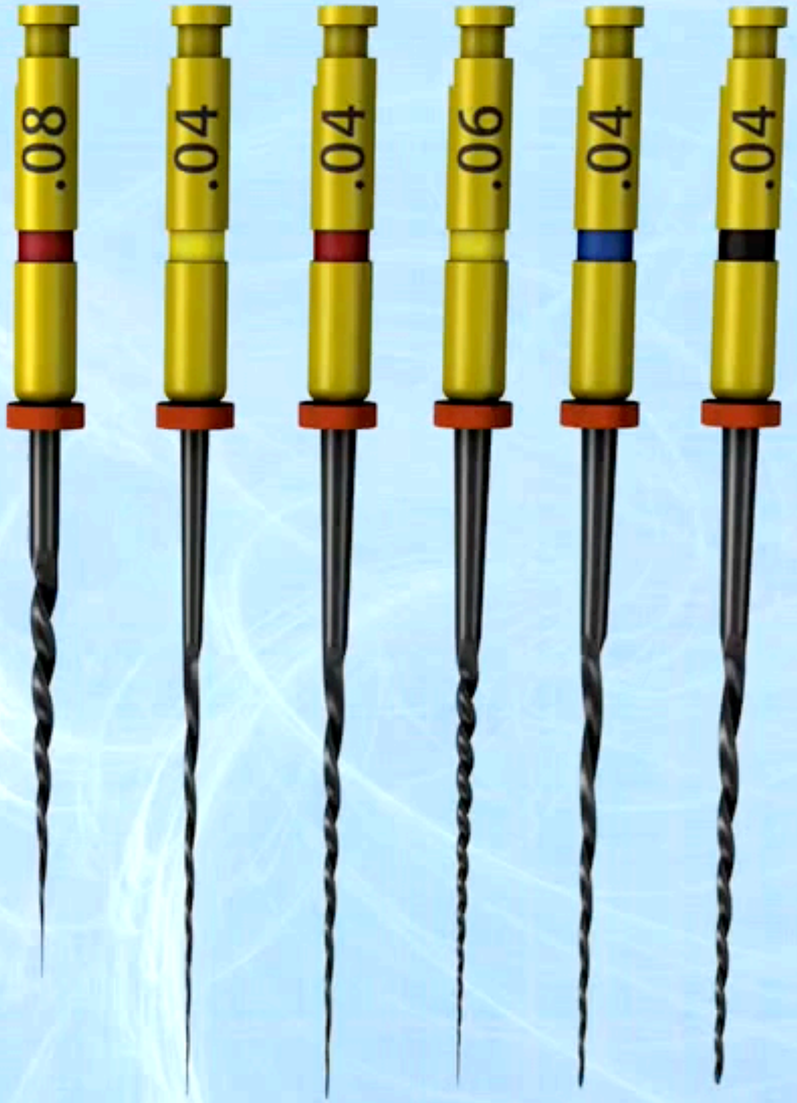

ProTaper Next (DentslySirona) File Shapes
0.0 0.5 1.0 1.5
16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
PTN X1 17/v.04
PTN X2 25/v.06
PTN X3 30/v.08
© 2019 William N H
BDSc PhD


ExactTaper H DC vs DC Taper H (V Taper 2H)
0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6
16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
ET DCF2 25/v.06
DCTH 25/v.06
DCTH 25/v.08
© 2022 EndoPrepApp

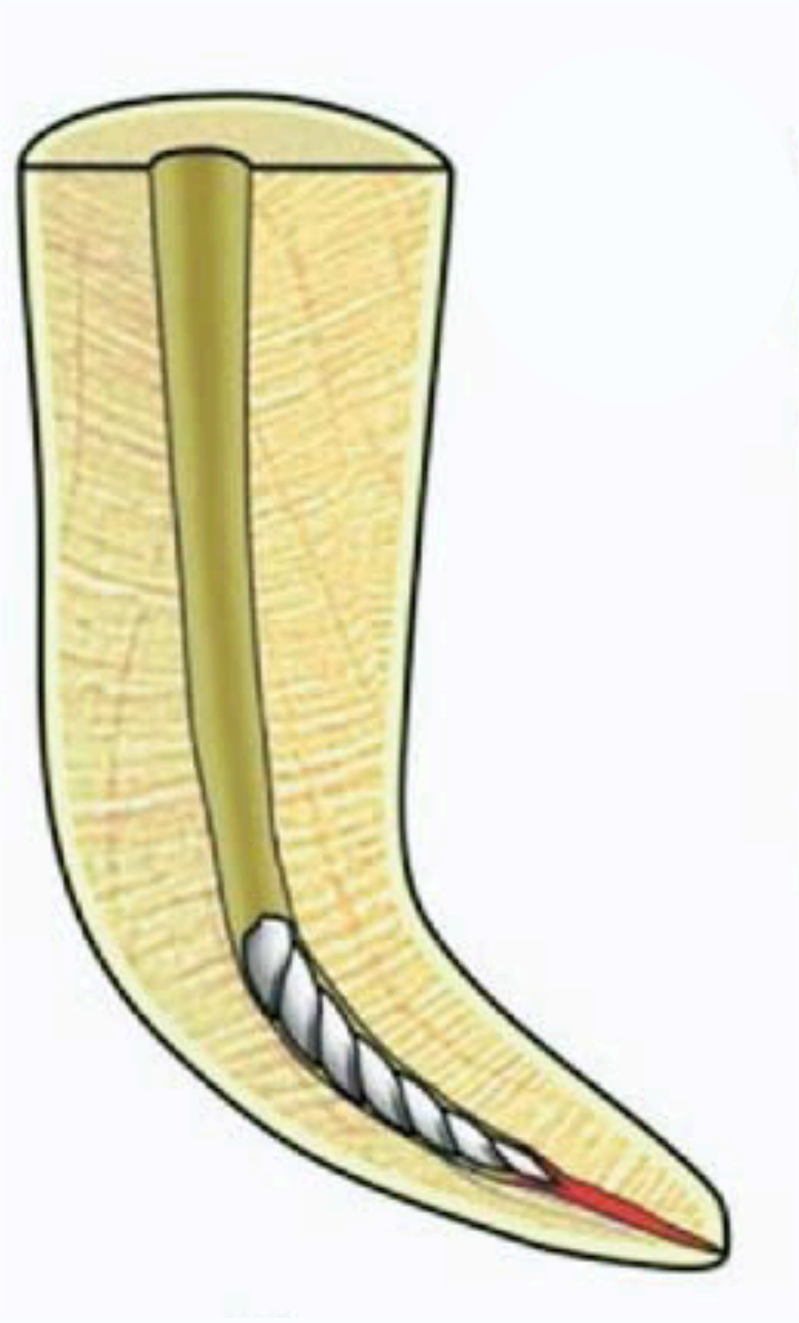

0 0.5 1 1.5 2
16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
© 2021 EndoPrepApp

Parametres

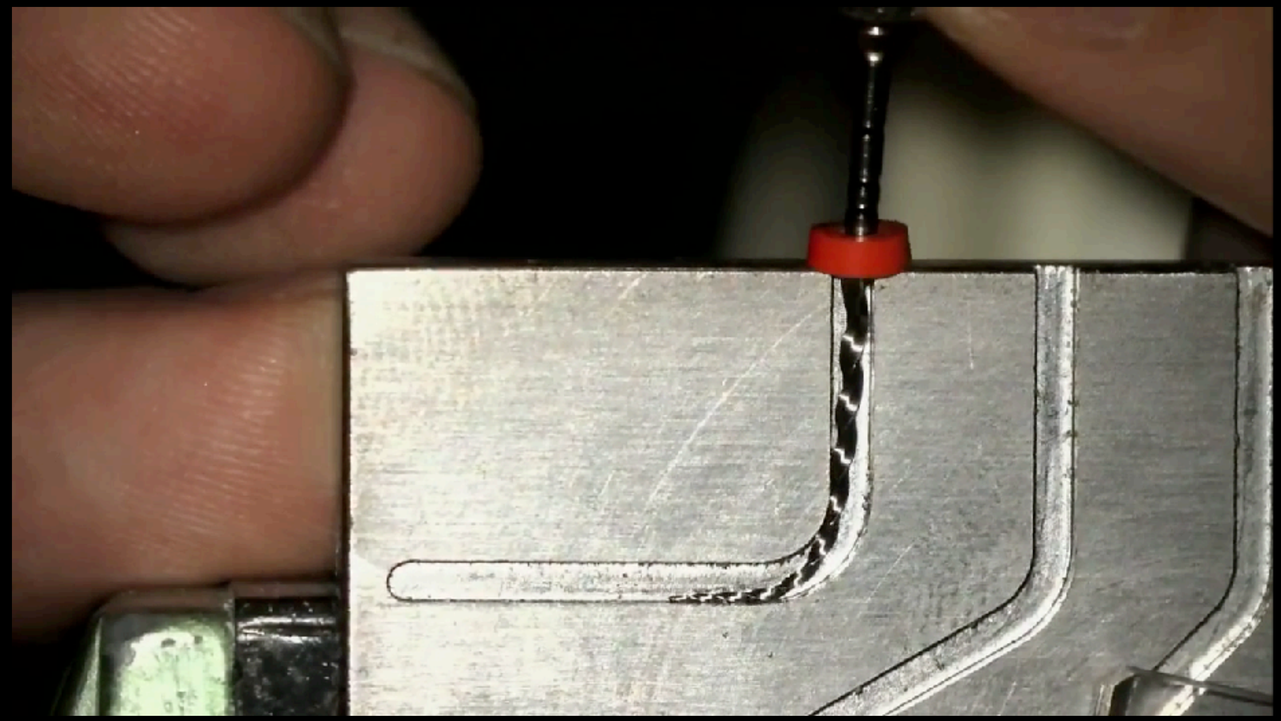
Alloy


.08
.04
.04
.06
.04
.04

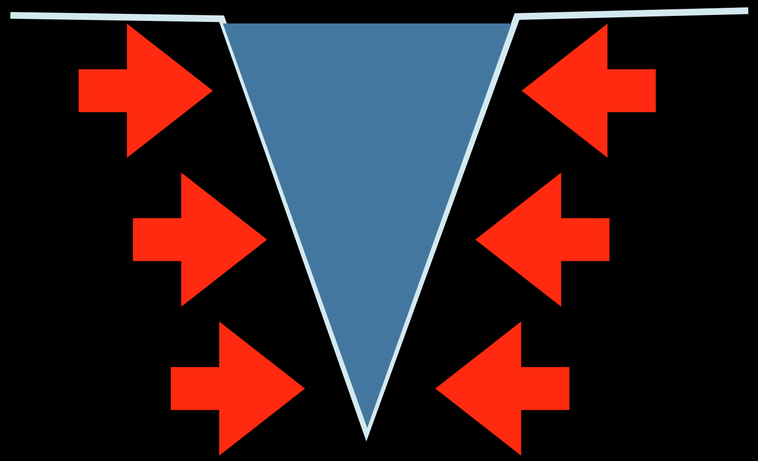
THE RULES of NiTi INSTRUMENTATION




Cyclic fatigue

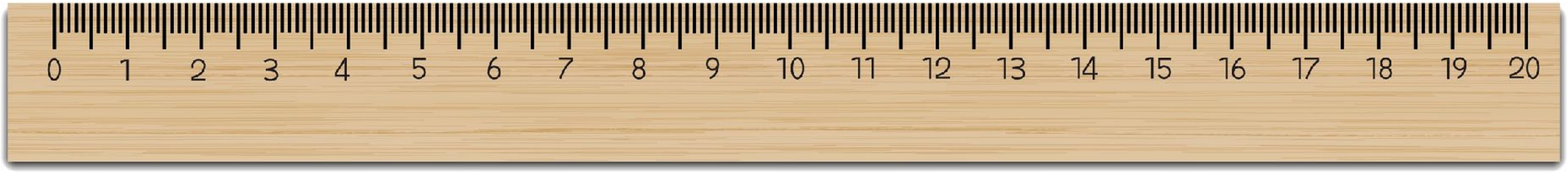


Cyclic Fatigue



Torsional stresses

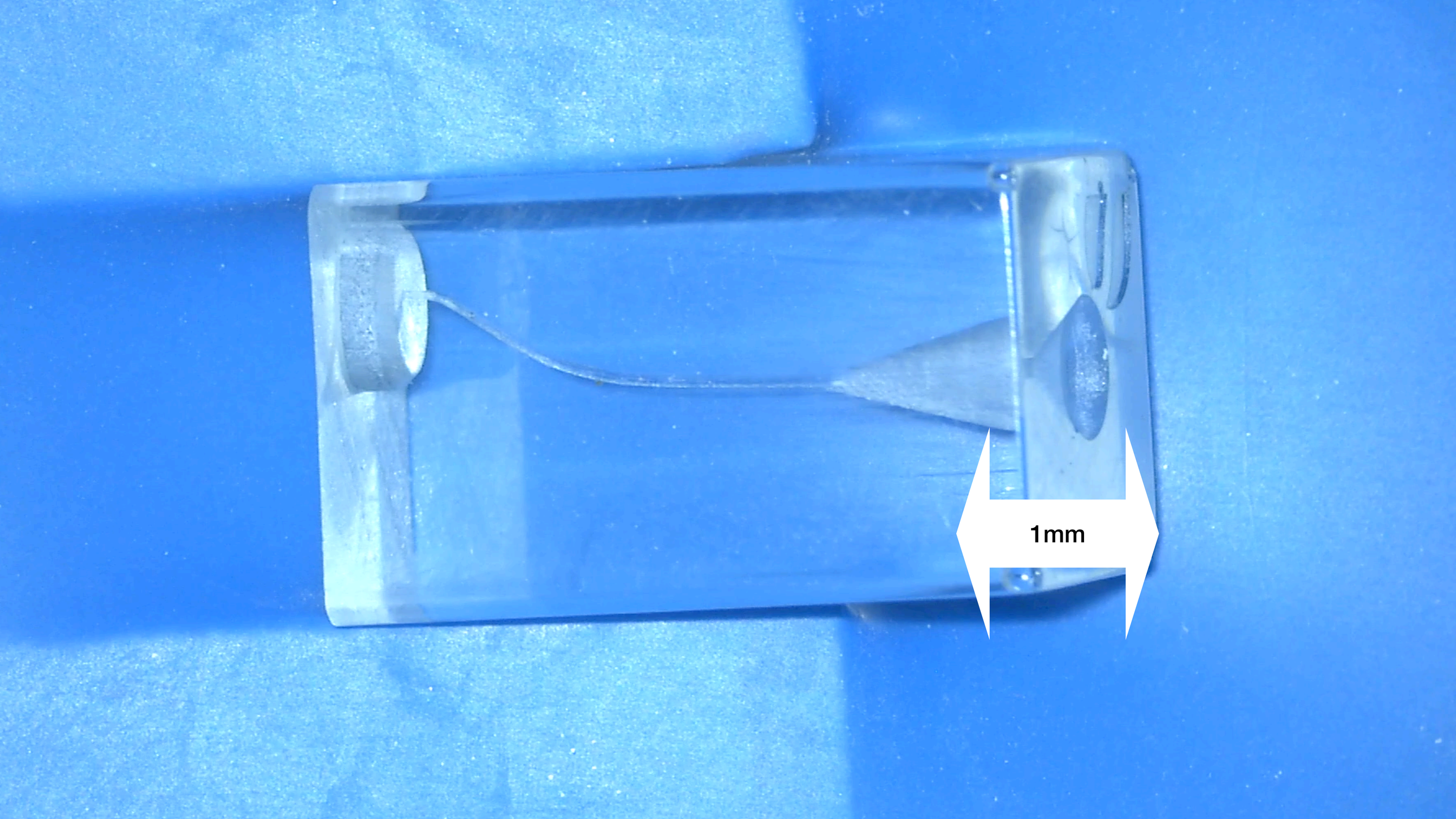
How?



Advance a file into the canal with no more than **1 mm increments** with insert/ withdraw motions.

Canal wall engagement

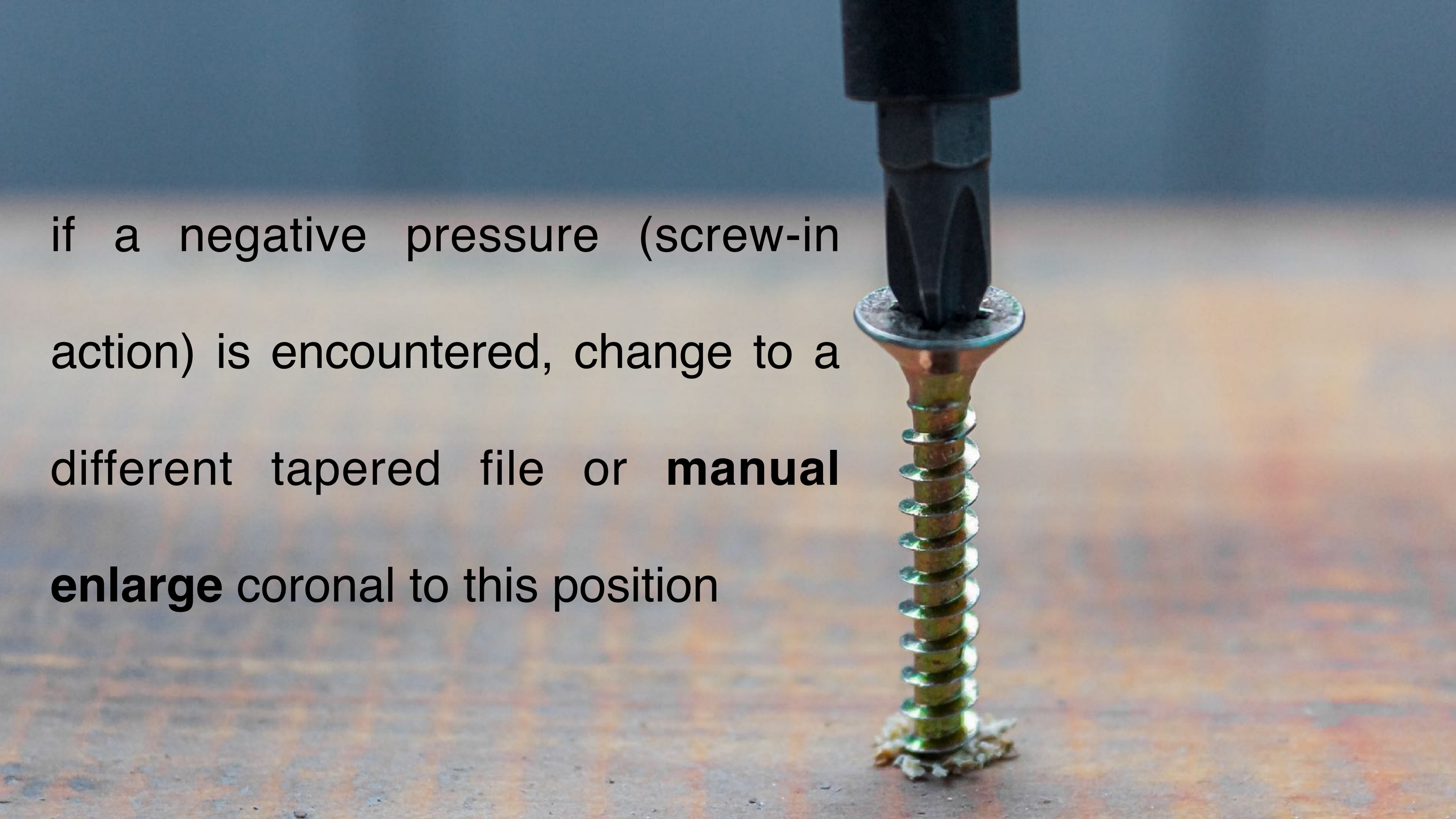
Torsional stresses


1mm

A minimal **specific pressure** needs to be applied.

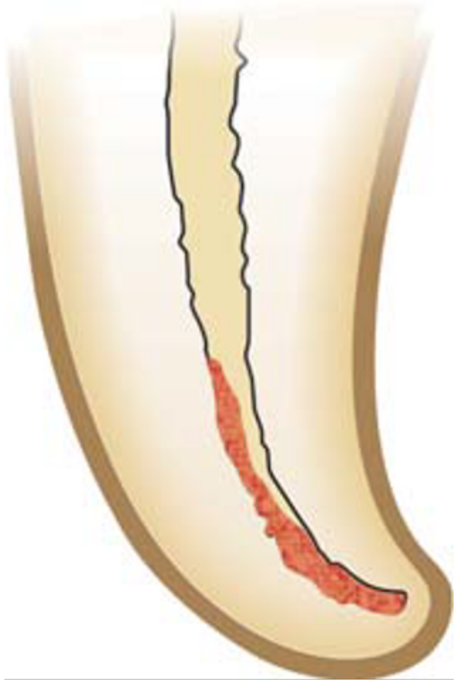
Tip of the fingers as close as possible to the tip of the file

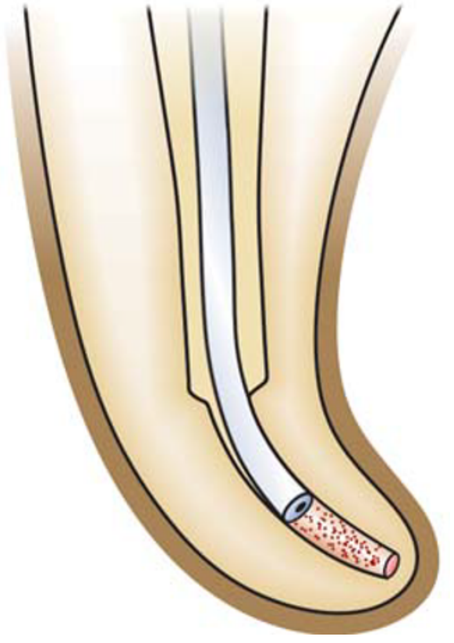
If that pressure needs to be increased in order for additional advancement change to a different tapered file or **manual enlarge** coronal to this position

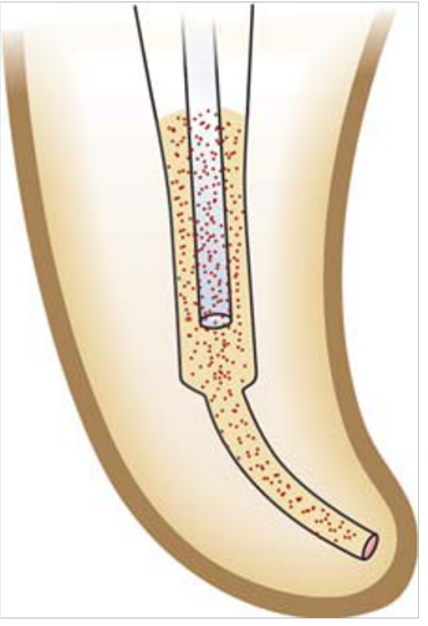


if a negative pressure (screw-in action) is encountered, change to a different tapered file or **manual enlarge** coronal to this position

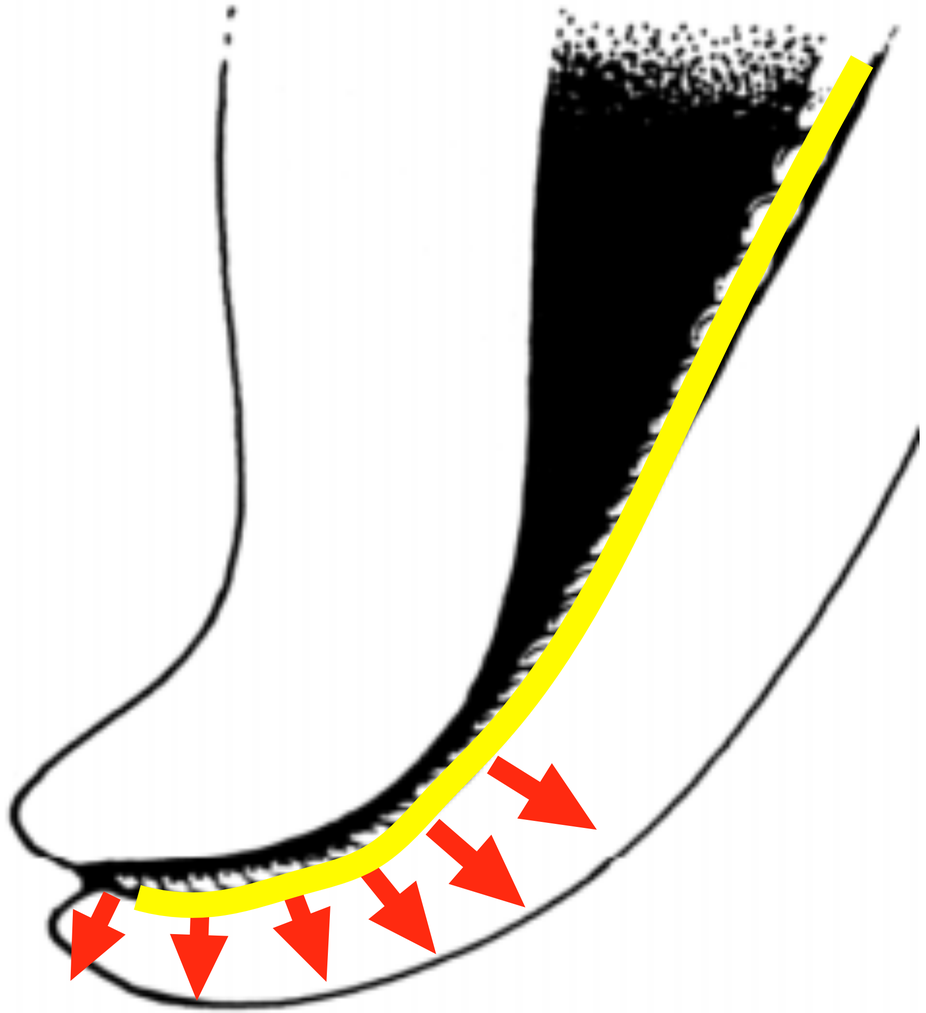

Always instrument in **WET CONDITIONS**

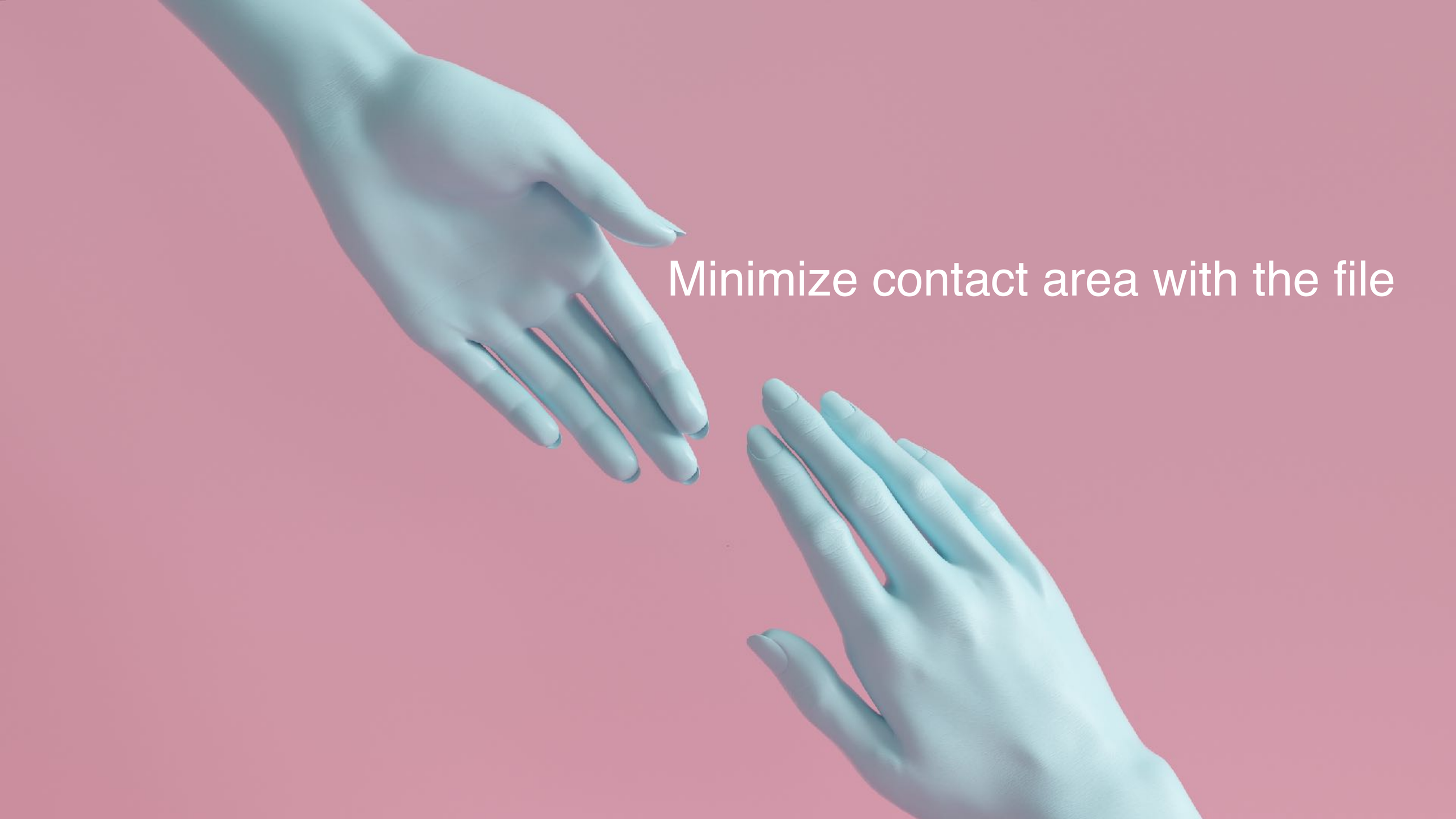


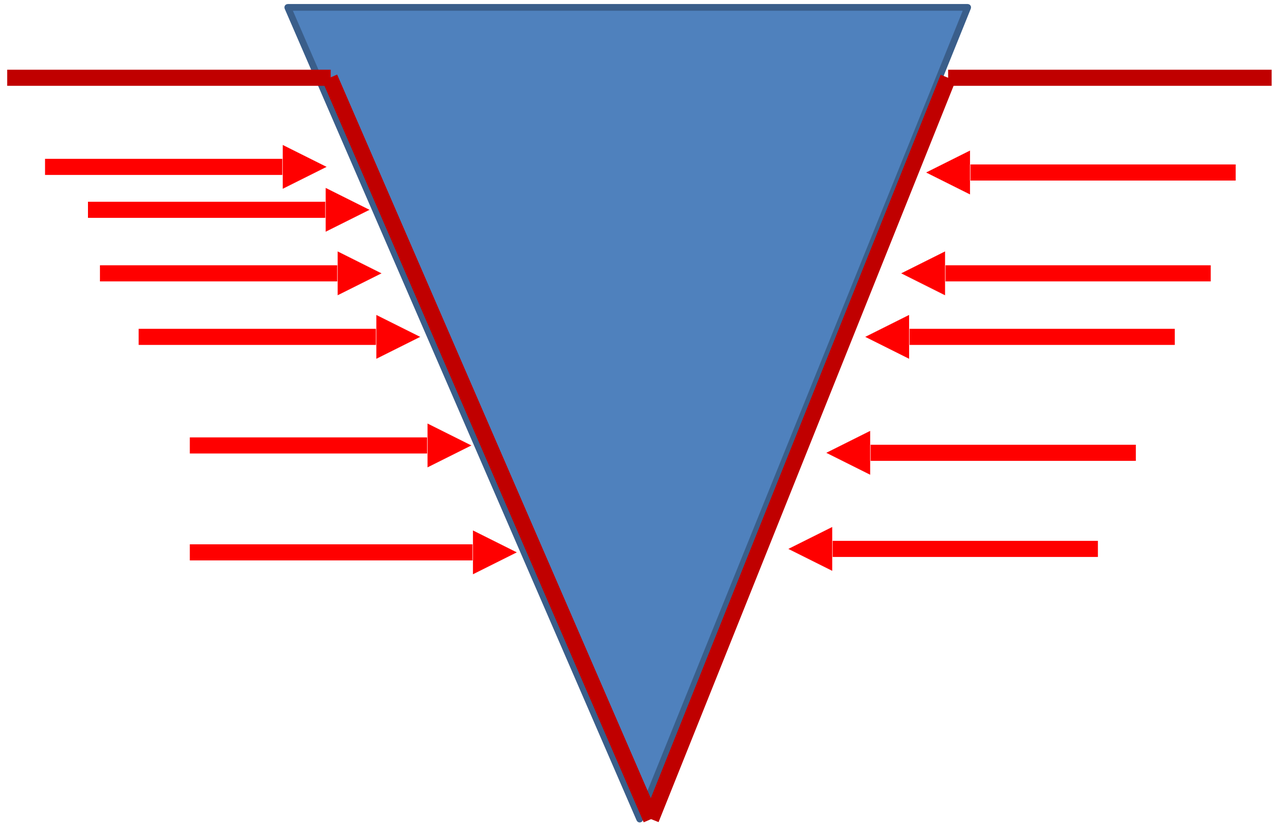


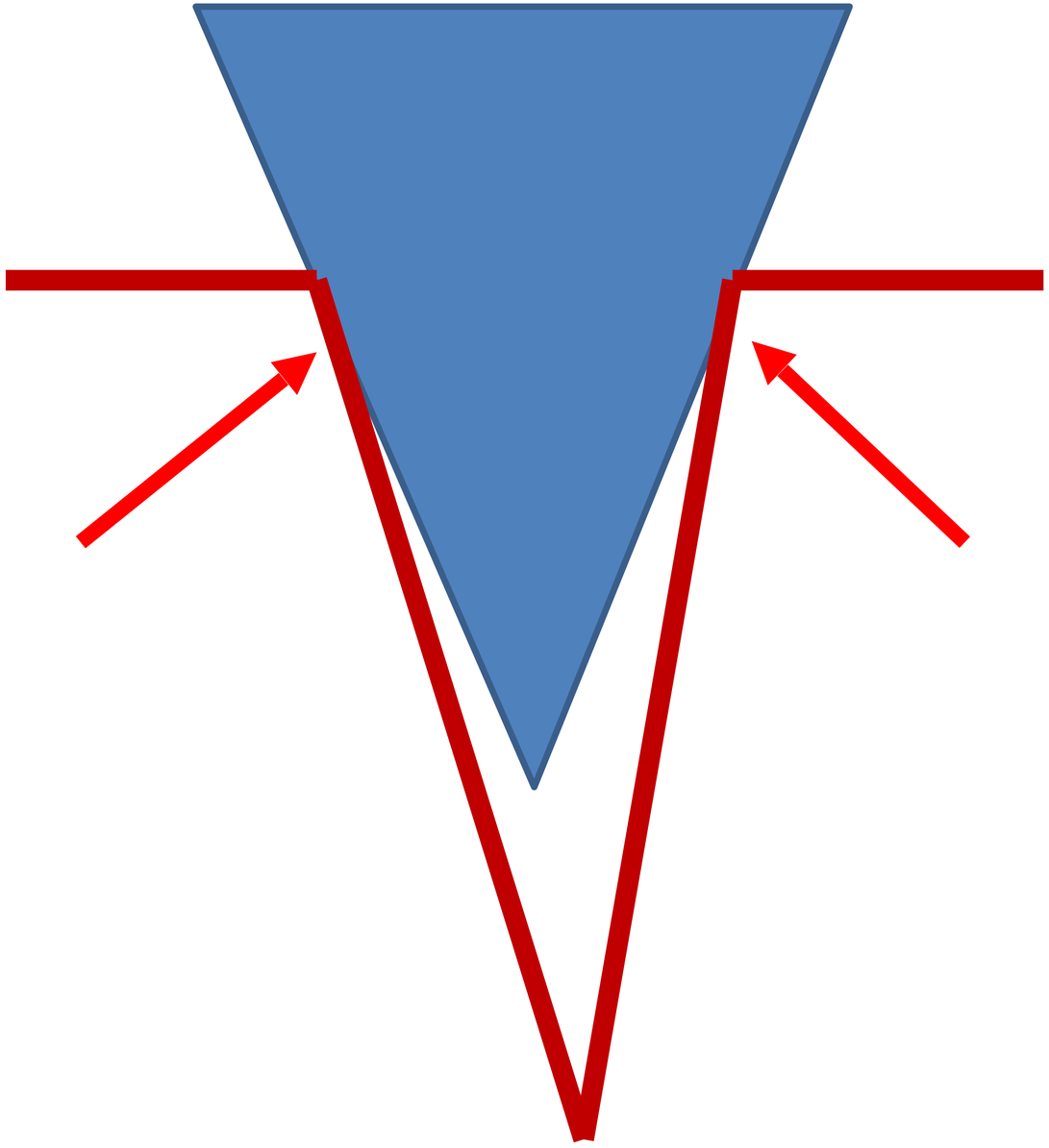


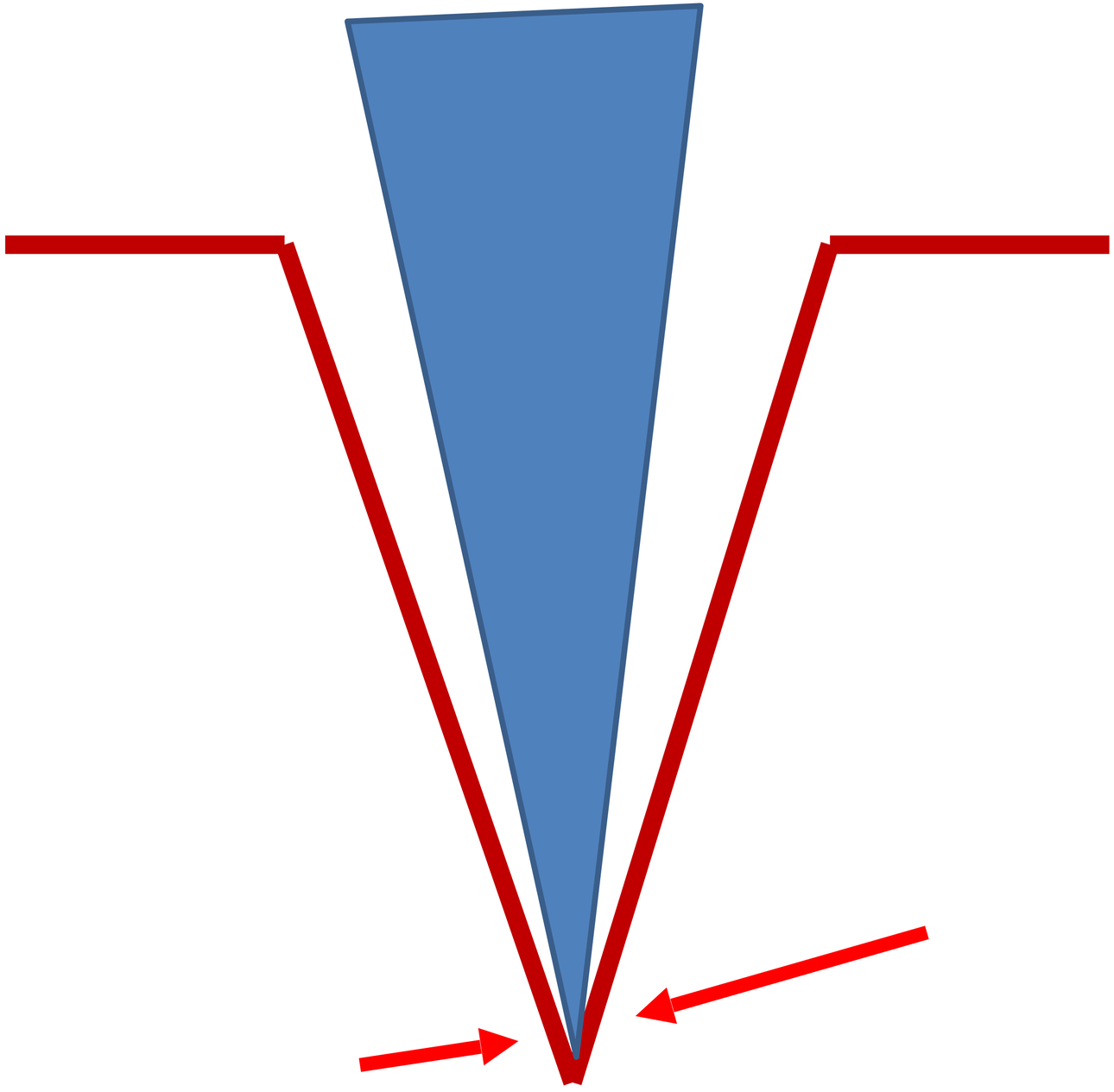

Just **kiss** the apex




Minimize contact area with the file







Root Canal Shaping

Scouting

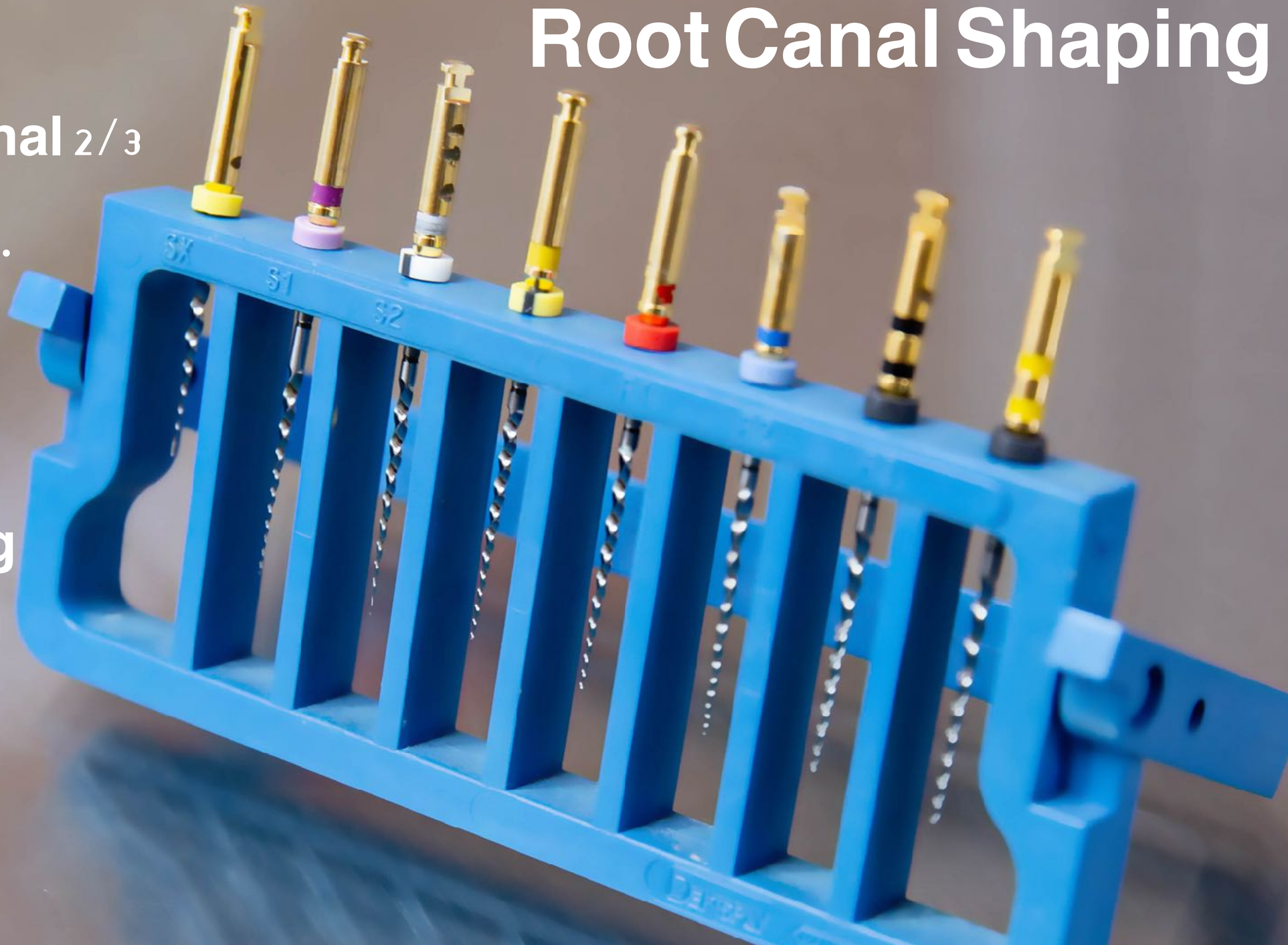
Shaping of coronal 2/3

Patency & W.L.D.

Glide Path

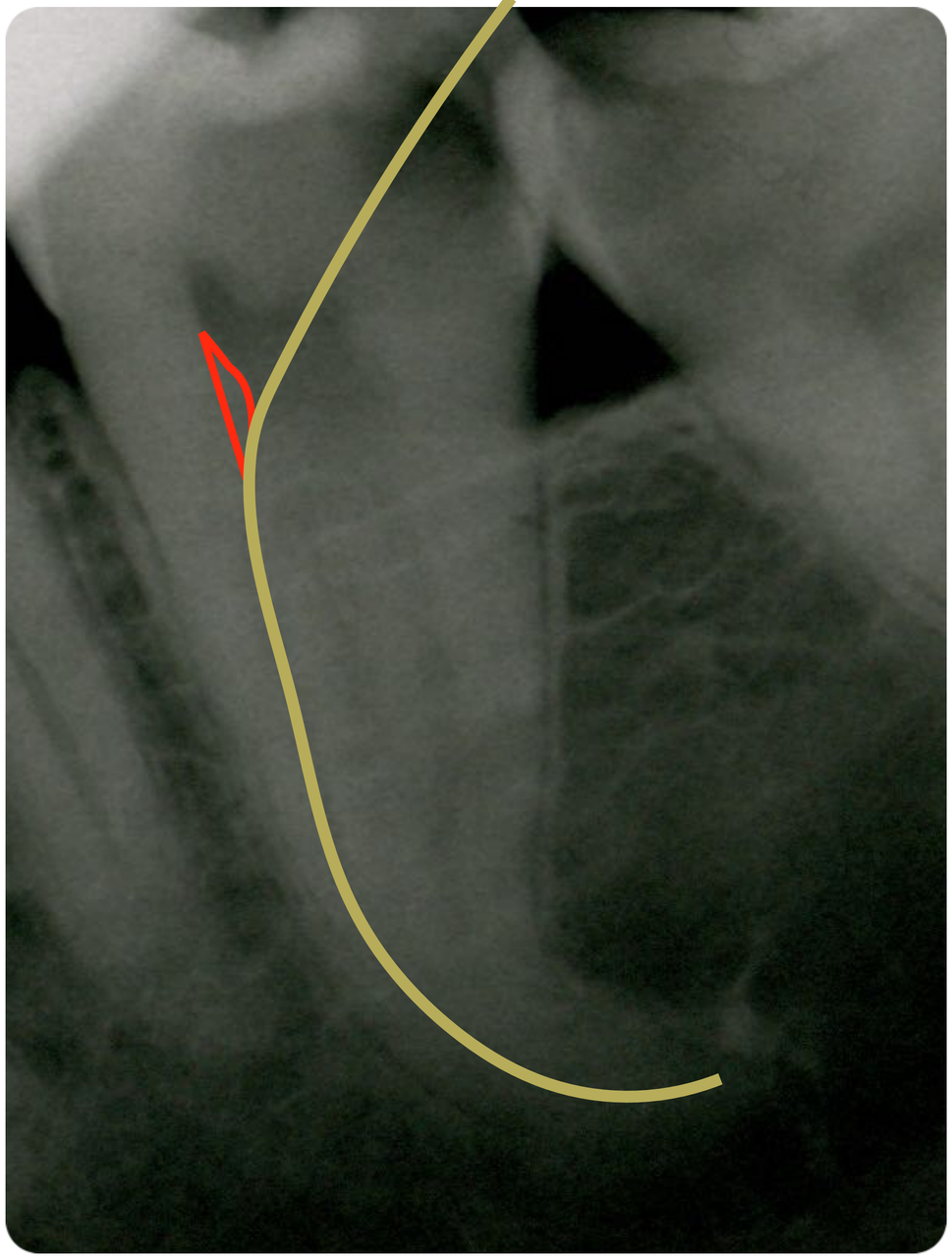
Shape the canal

Gauge &finishing



Scouting the coronal 2/3

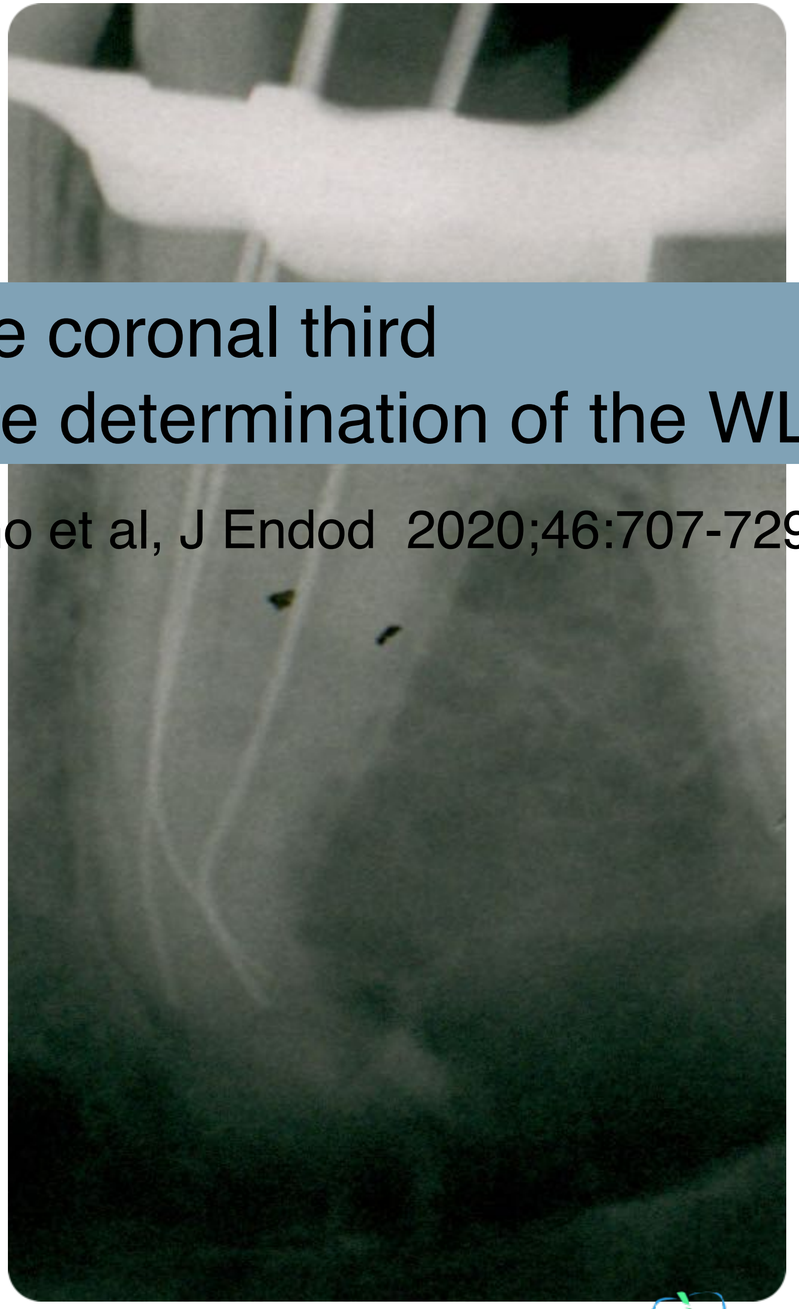

Scouting the coronal 2/3

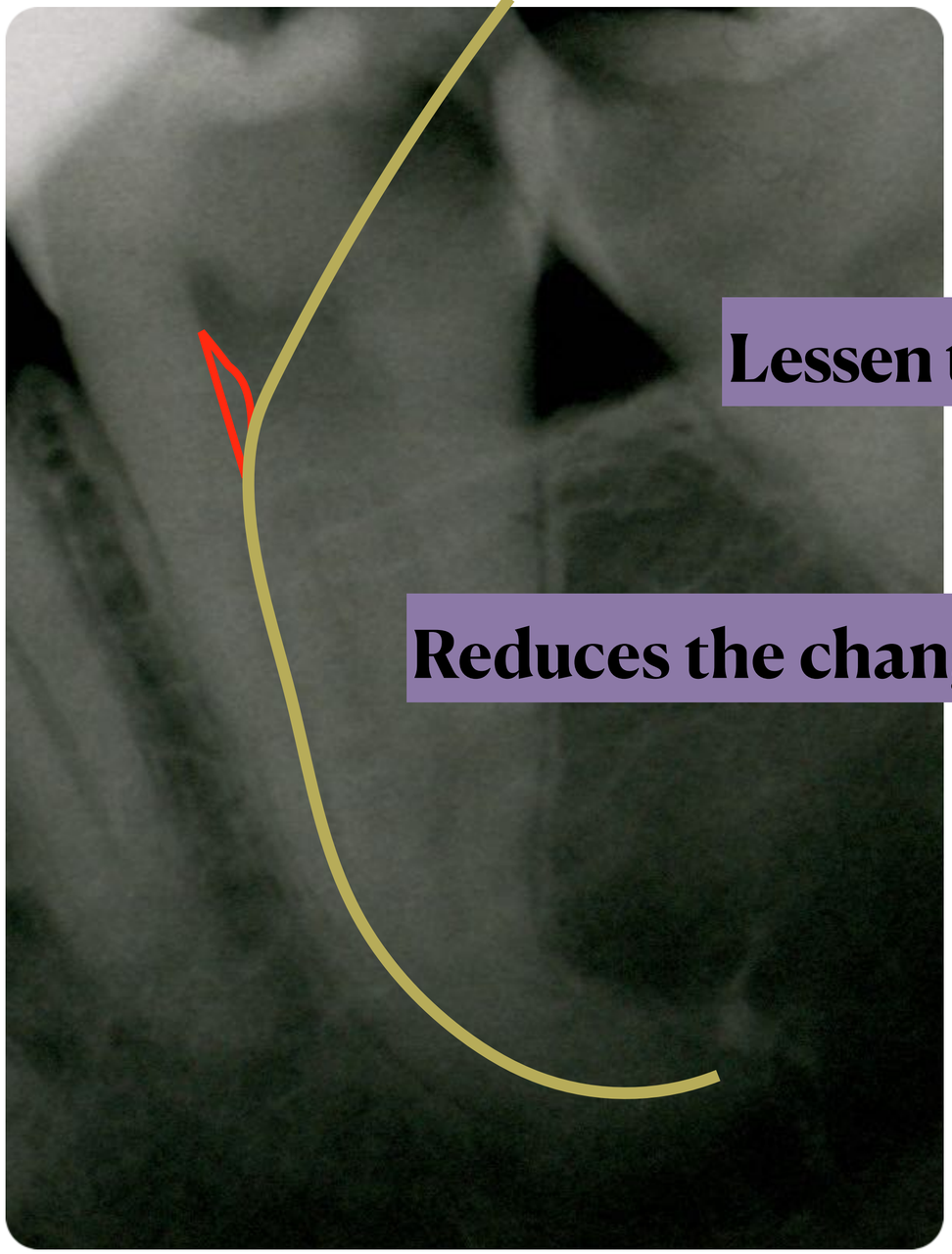


Preflaring

pre-enlargement of the coronal third
of the root canal before determination of the WL

Plotino et al, J Endod 2020;46:707-729





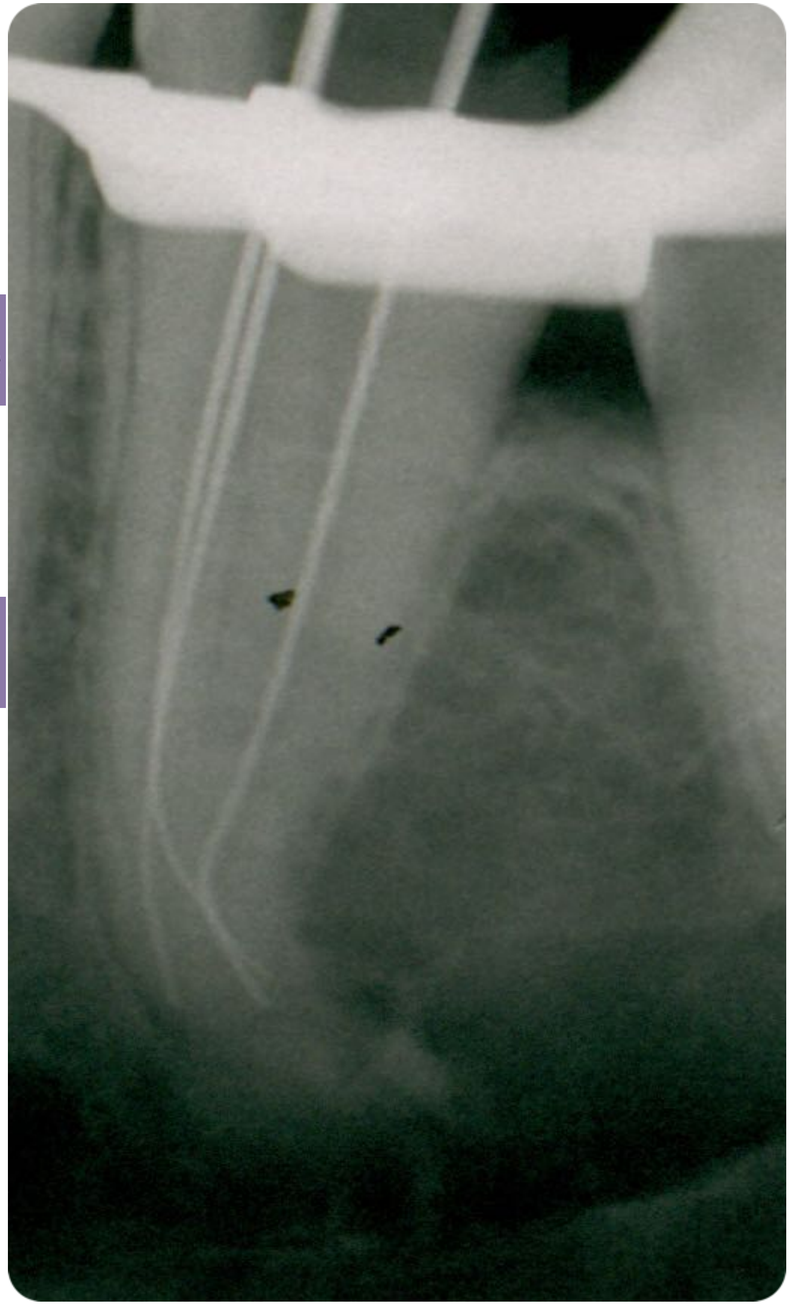
Preflaring

Lessen the initial canal curvature

Kimura et al, J Endod 2020;46:232–7.

Reduces the change of the working length

Vasconcelos et al. J Endod 2016;42:1683–6.



Preflaring

Better penetration depth of the irritant at early shaping stages

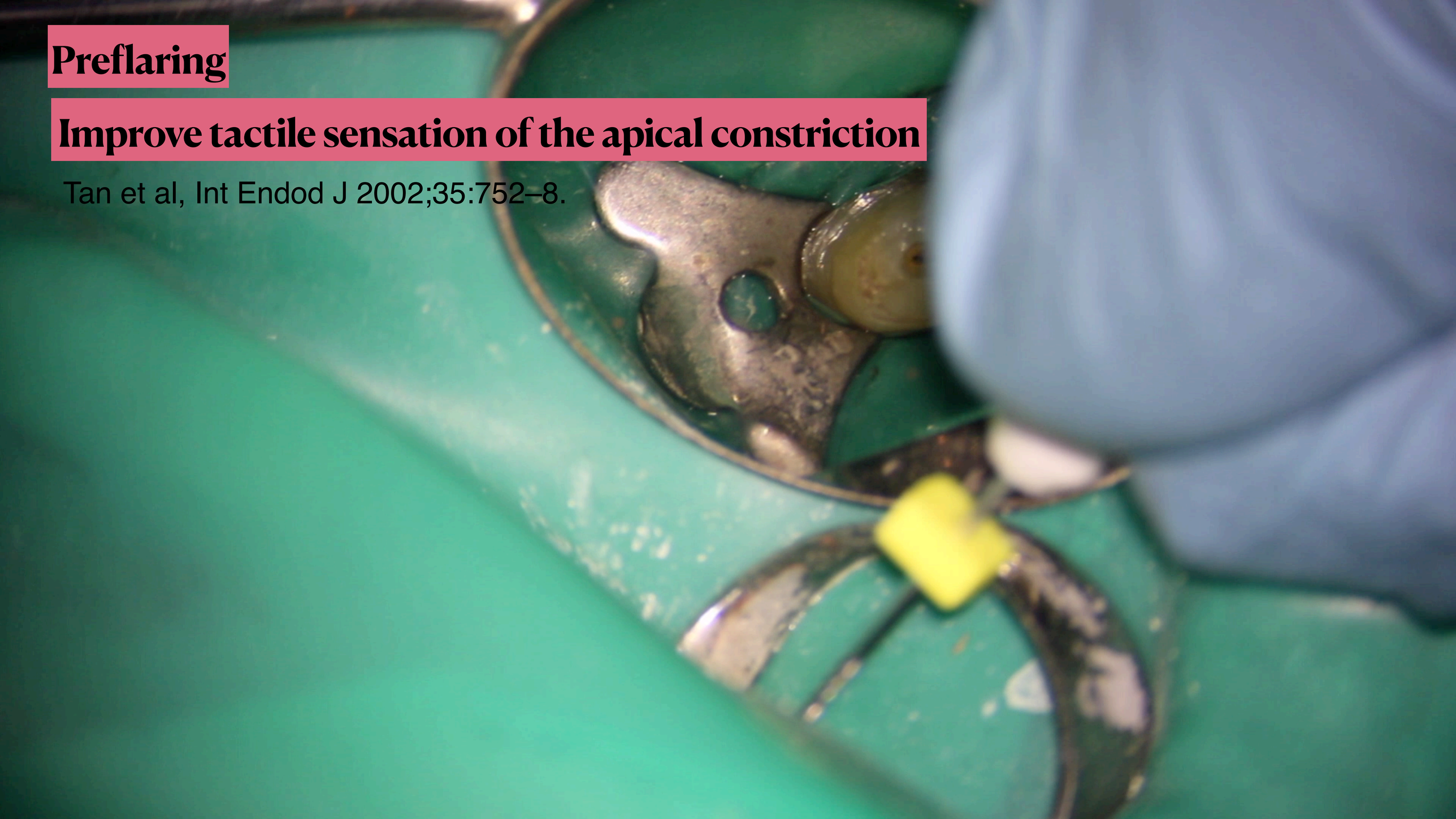
And less apical debris extrusion

Ferraz et al, Int Endod J 2001;34:354–8

Preflaring

Improve tactile sensation of the apical constriction

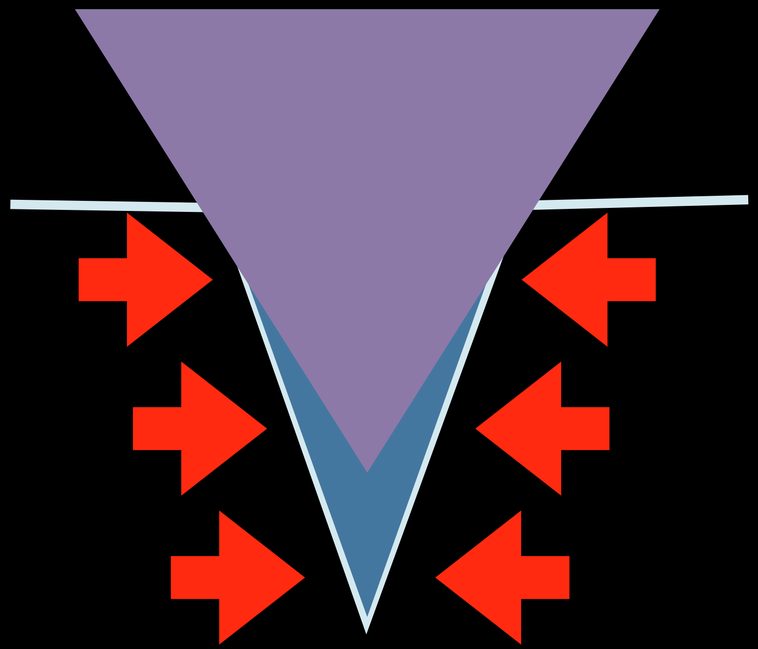
Tan et al, Int Endod J 2002;35:752–8.



Preflaring

Reduce the torsional stresses due to taper lock

Blum et al, Int Endod J 1999;32:24–31 .



Advantages of the preflaring

- Lessen the initial canal curvature
- Reduce change of W.L.
- Better tactile sensation
- Better penetration of irritant
- Reduce torsional stresses
- Reduce instrument breakage

Root Canal Shaping

Scouting

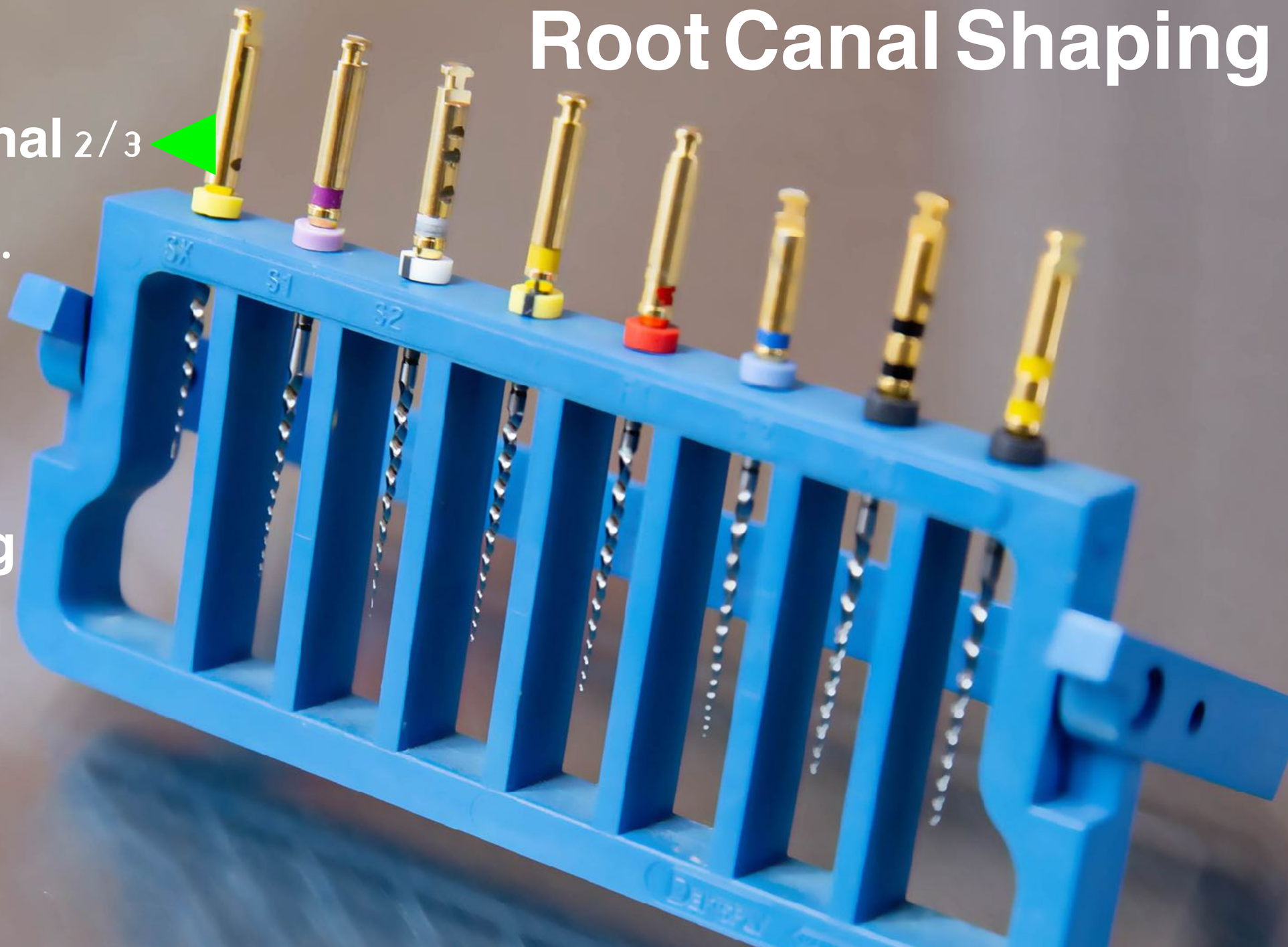
Shaping of coronal 2/3

Patency & W.L.D.

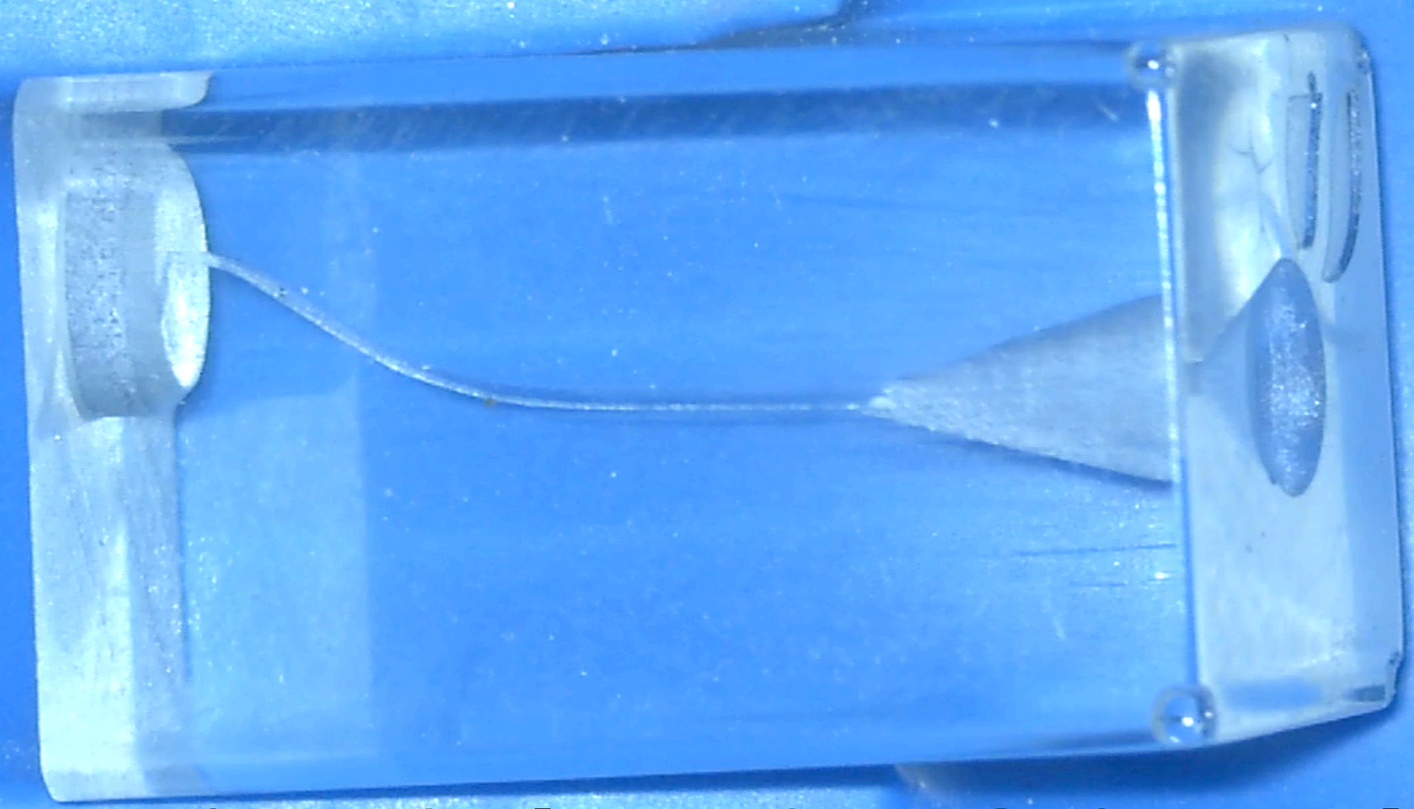
Glide Path

Shape the canal

Gauge &finishing



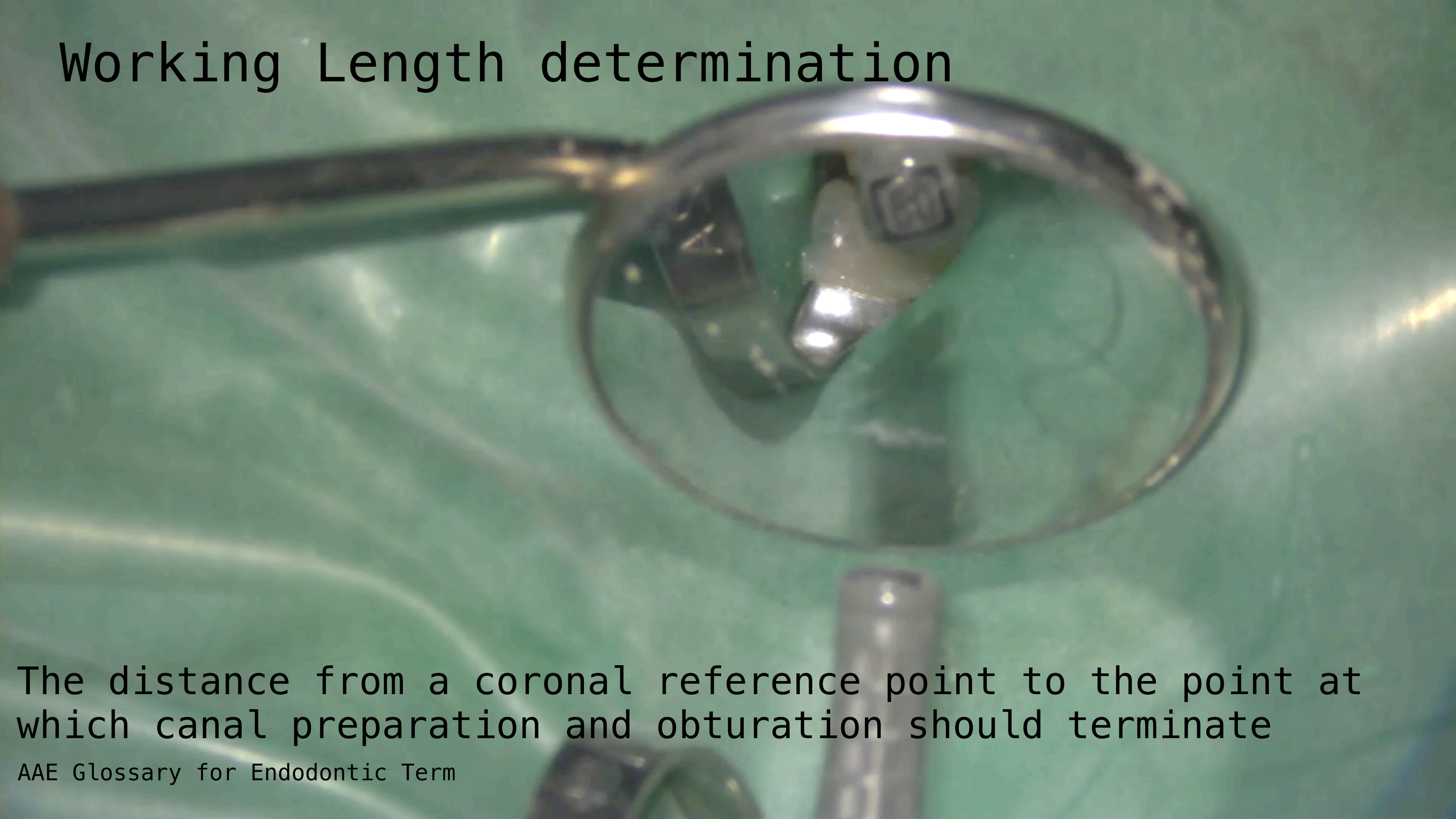
Apical Patency



A technique where the apical portion of the canal is maintained free of debris by recapitulation with a small file through the apical foramen.

AAE Glossary for Endodontic Term

Working Length determination



The distance from a coronal reference point to the point at which canal preparation and obturation should terminate

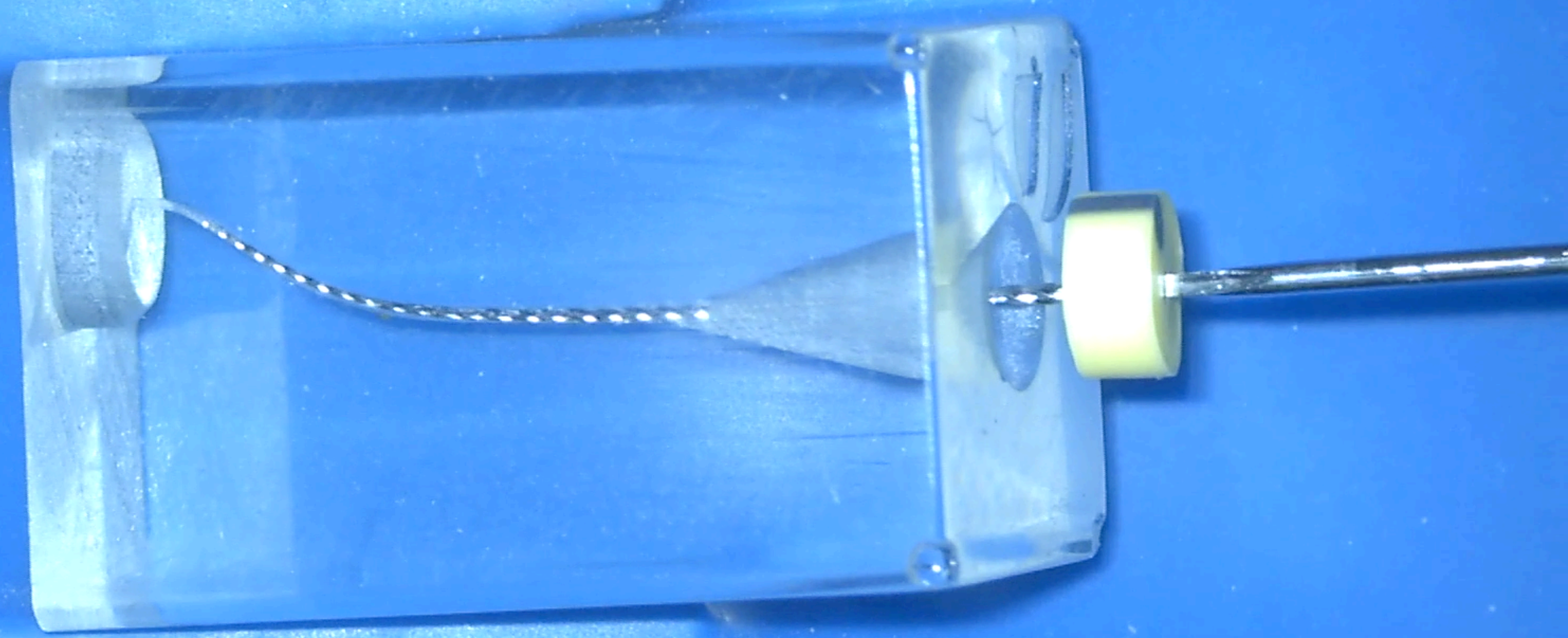
AAE Glossary for Endodontic Term

Clinical Efficacy of Electronic Apex Locators: Systematic Review

Jorge N.R. Martins, DDS, MSc,[*†‡] *Duarte Marques, DDS, PhD,*[*§‖] *António Mata, DMD, PhD, FICD,*[*§¶] *and João Caramês, DDS, PhD, FICD*[*‖]

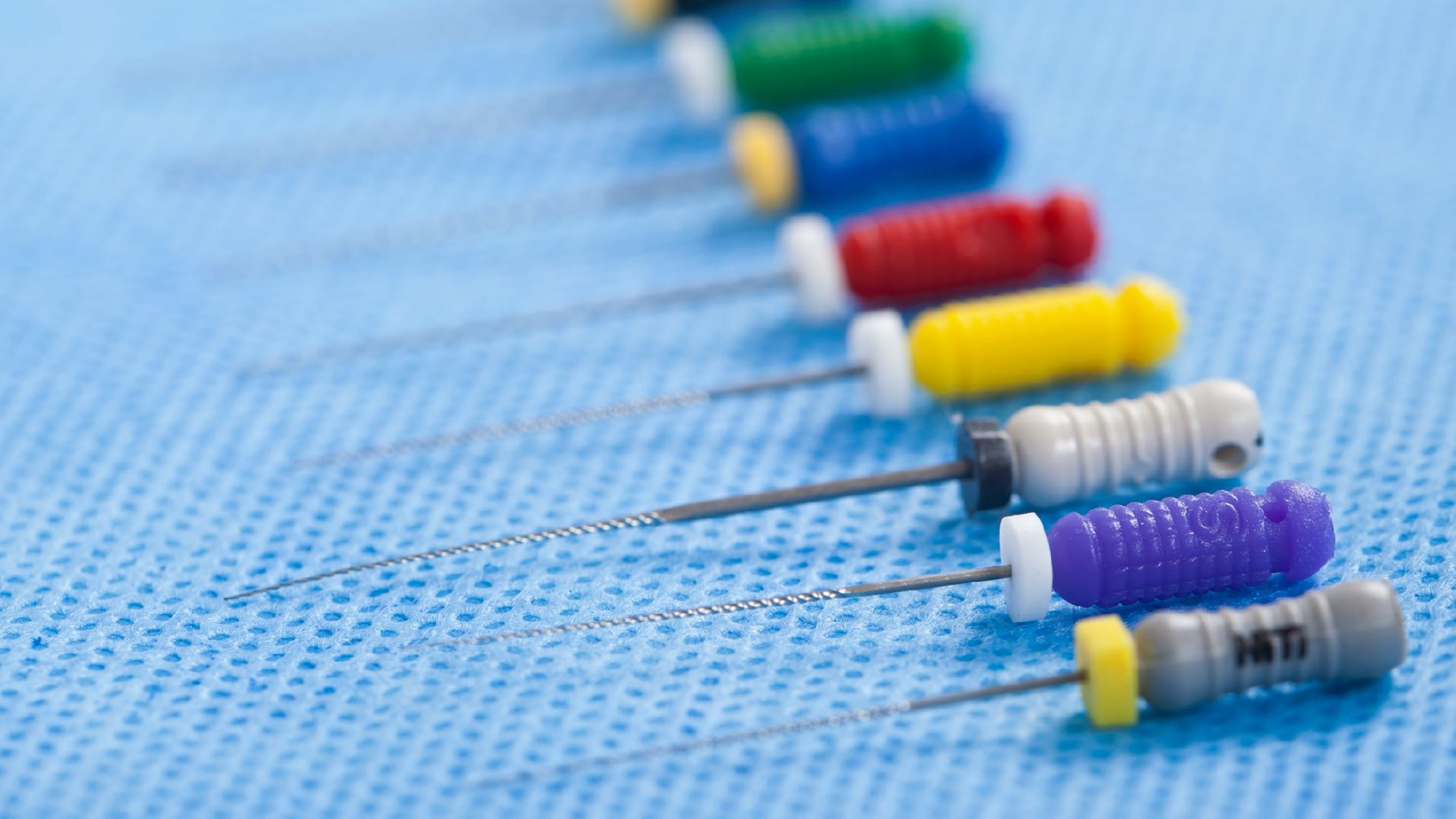
in this review. **Conclusions:** Although the available scientific evidence base is short and at considerable risk of bias, it is still possible to conclude that the apical locator reduces the patient radiation exposure and also that the electronic method may perform better on the working length determination. At least one radiographic control should be performed to detect possible errors of the electronic devices. *(J Endod 2014;40:759–777)*

Glide Path



A file can enter from the canal orifice passing smoothly along the canal walls to the apical terminus in a simple, repeatable, and predictable manner, resulting in a “super-loose” SS file size 10

Yared, Int Endod J 2008; 41:339–44

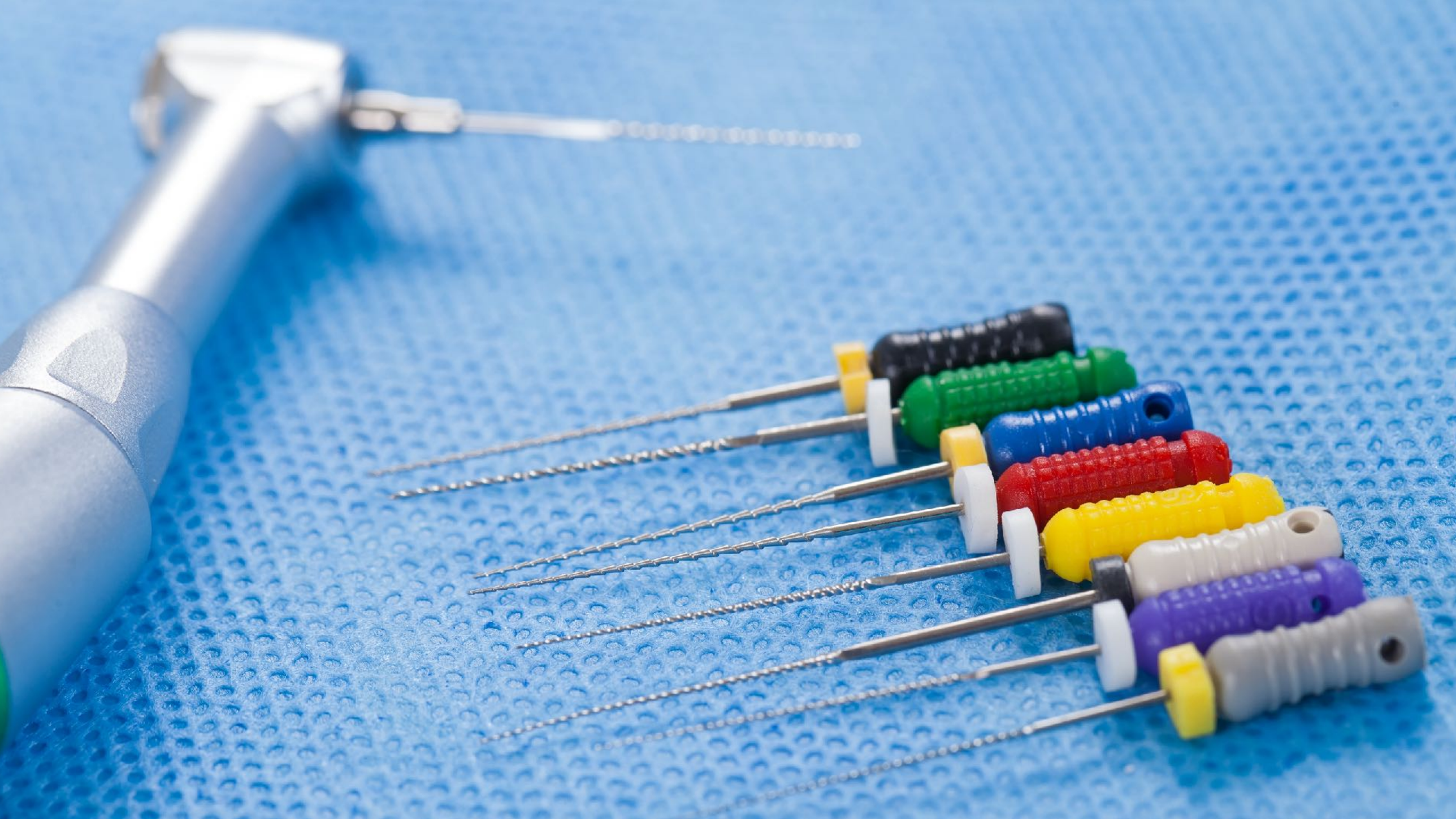


PathFile™

ProGlider®

WaveOne® Gold Glider

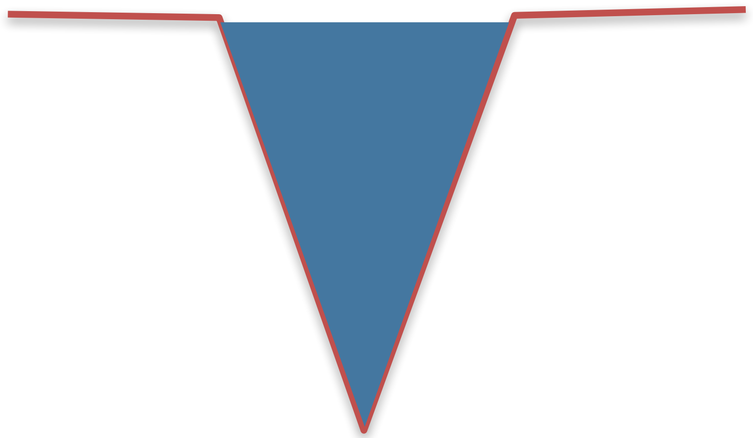
TruNatomy Glider



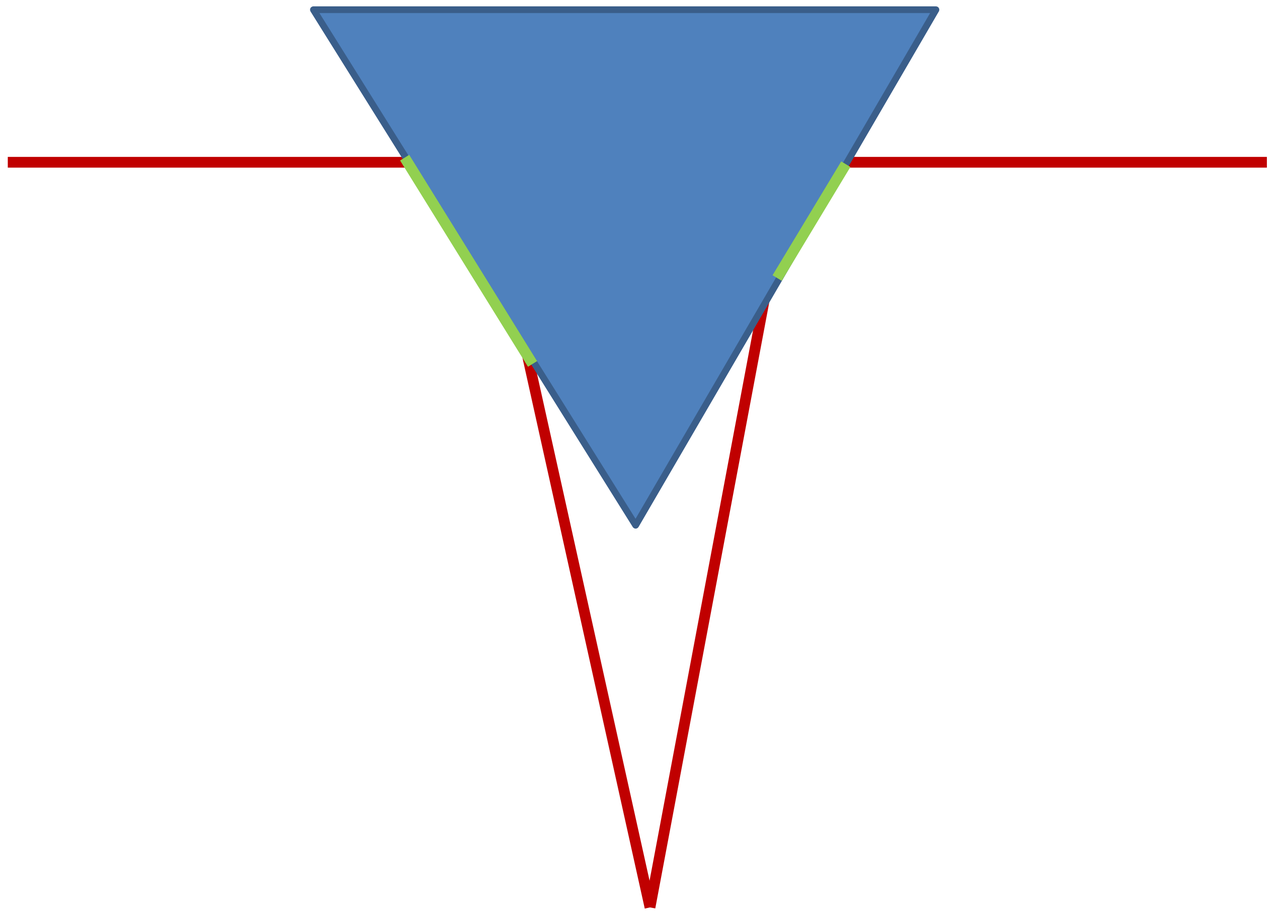
Techniques of shaping

Single length technique

Crown down technique

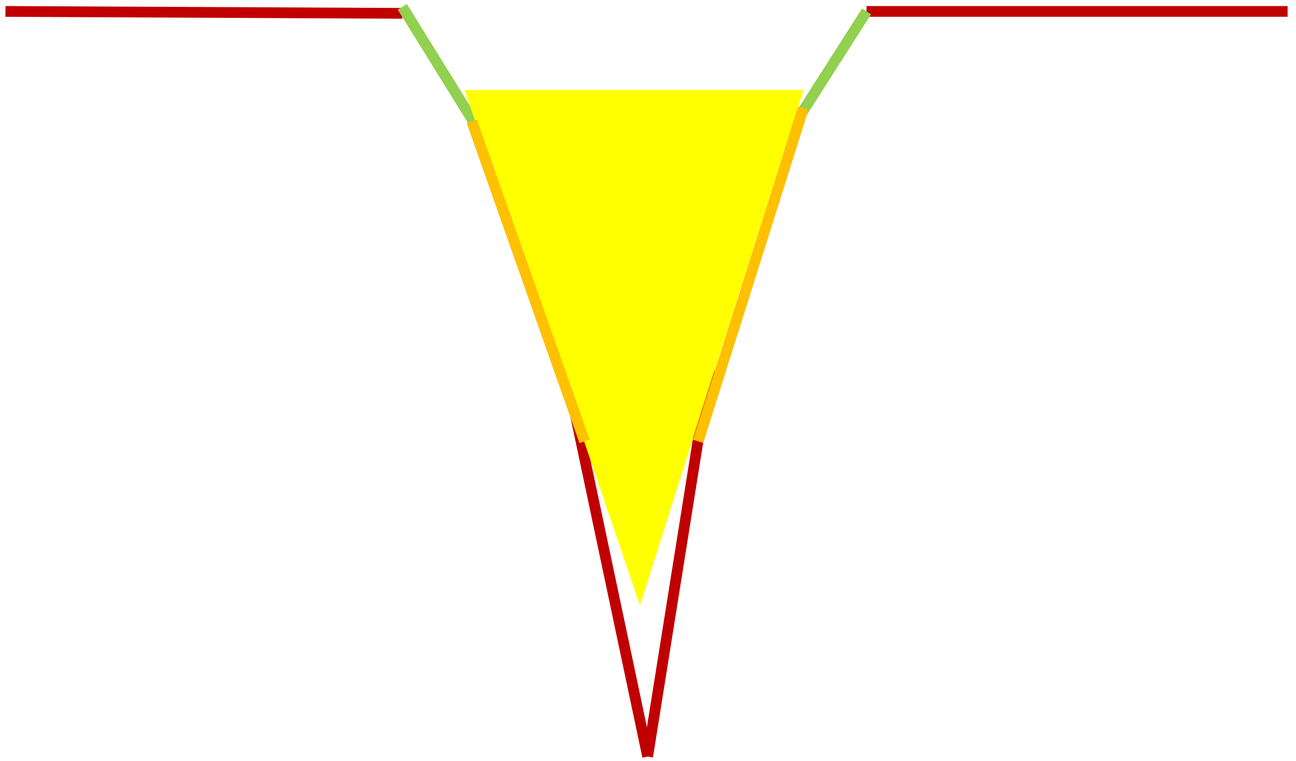


Crown down technique

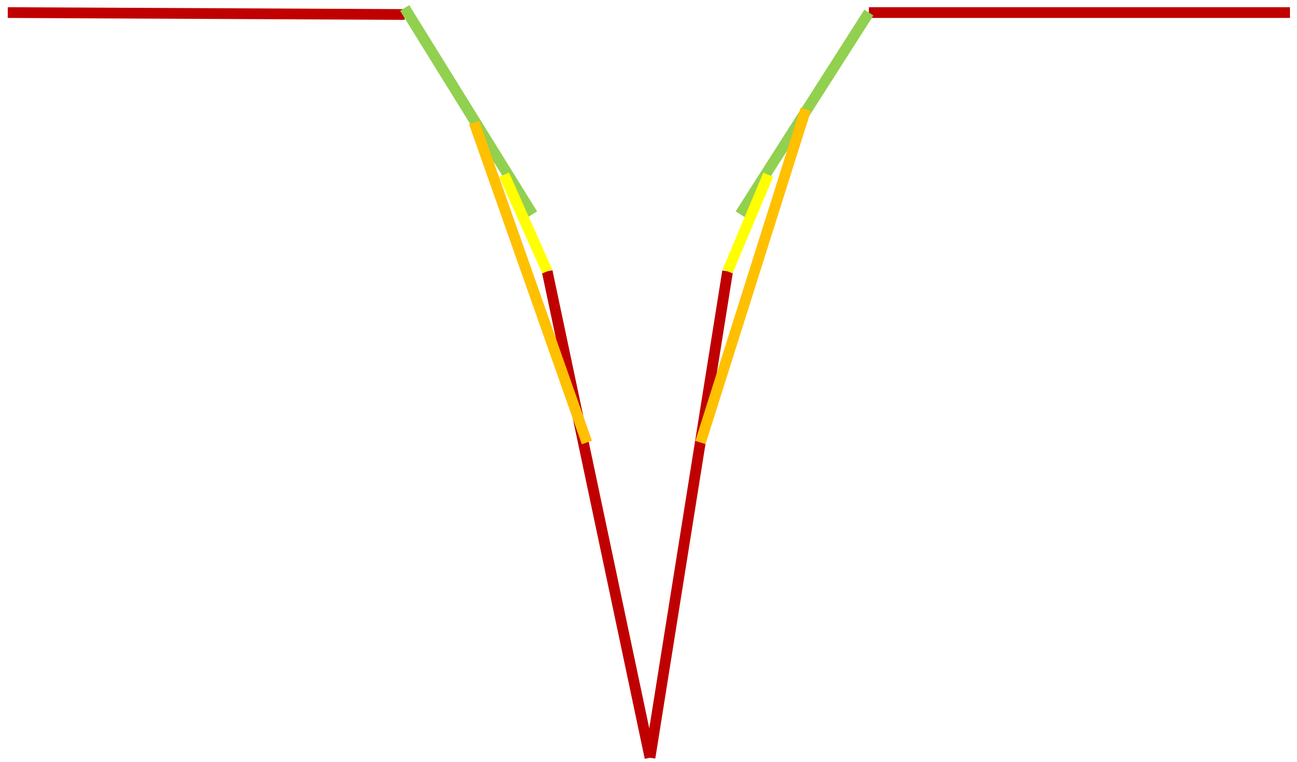


Crown down technique

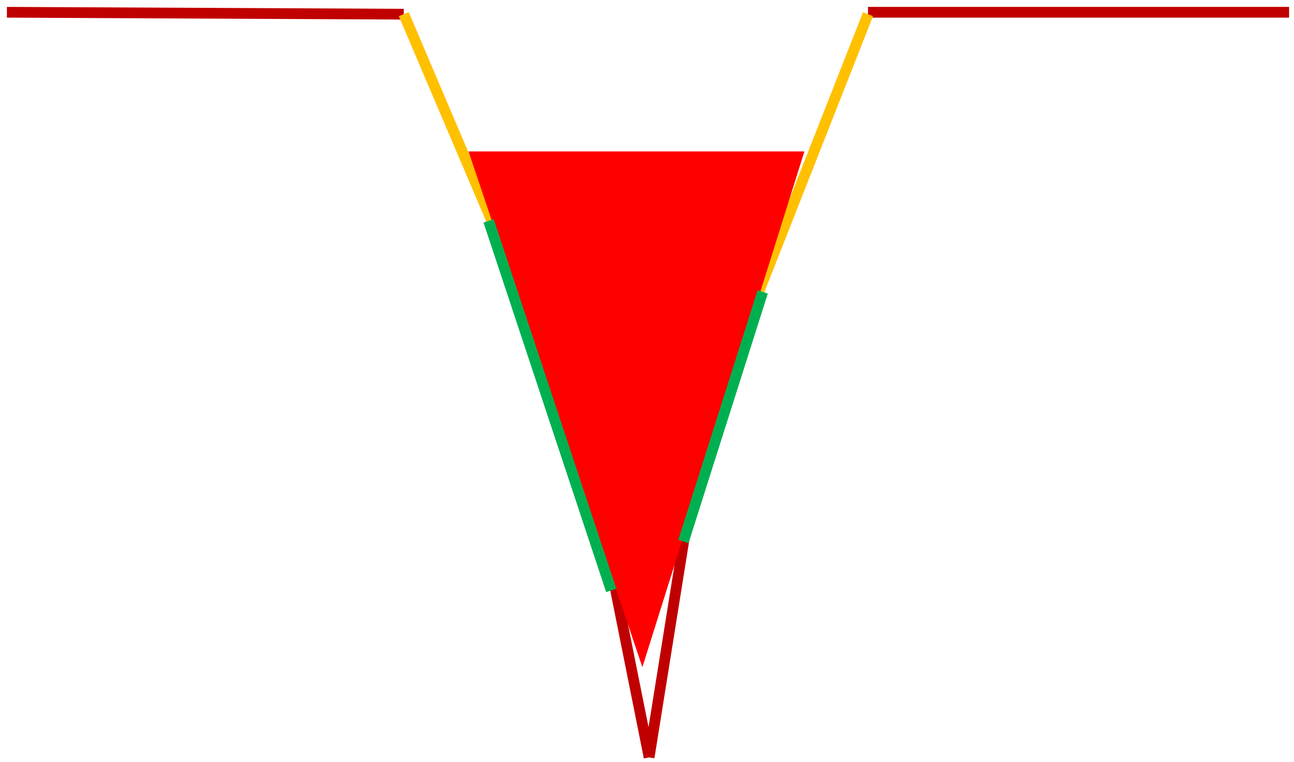
Crown down technique



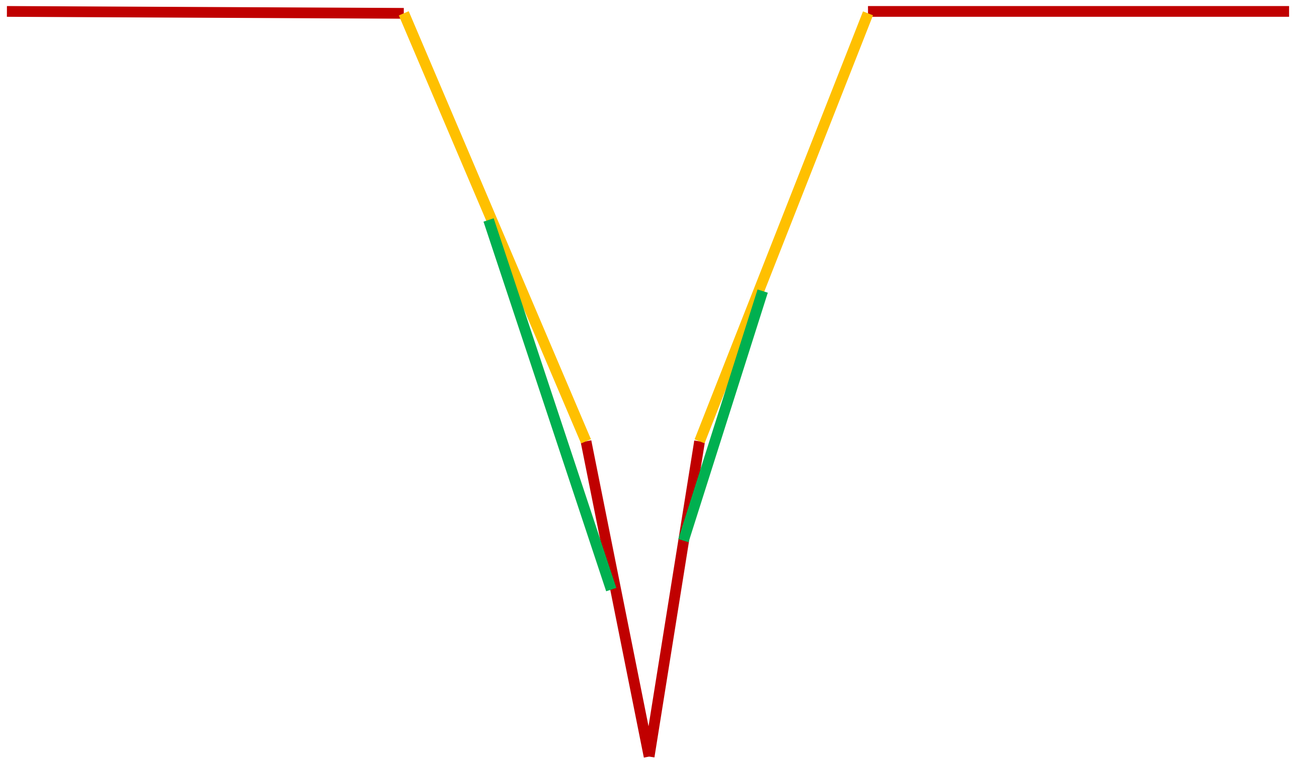
Crown down technique



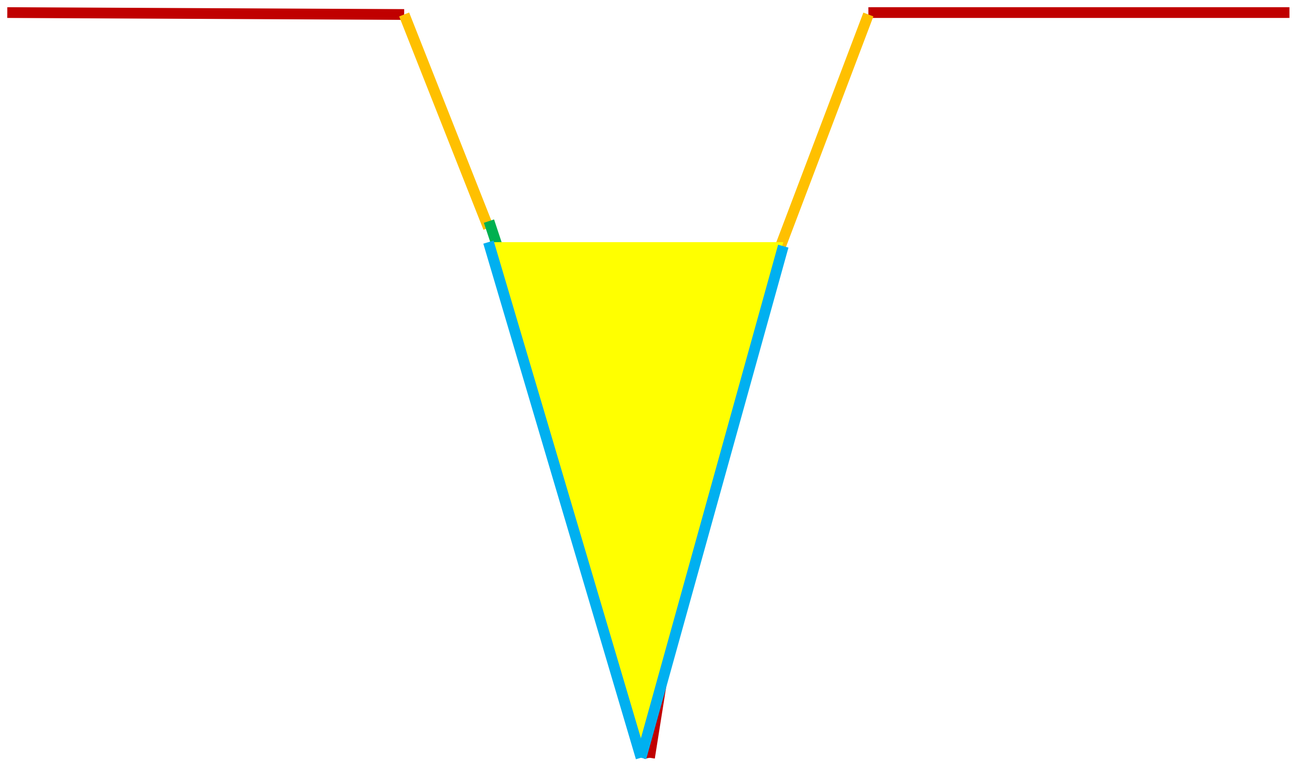
Crown down technique



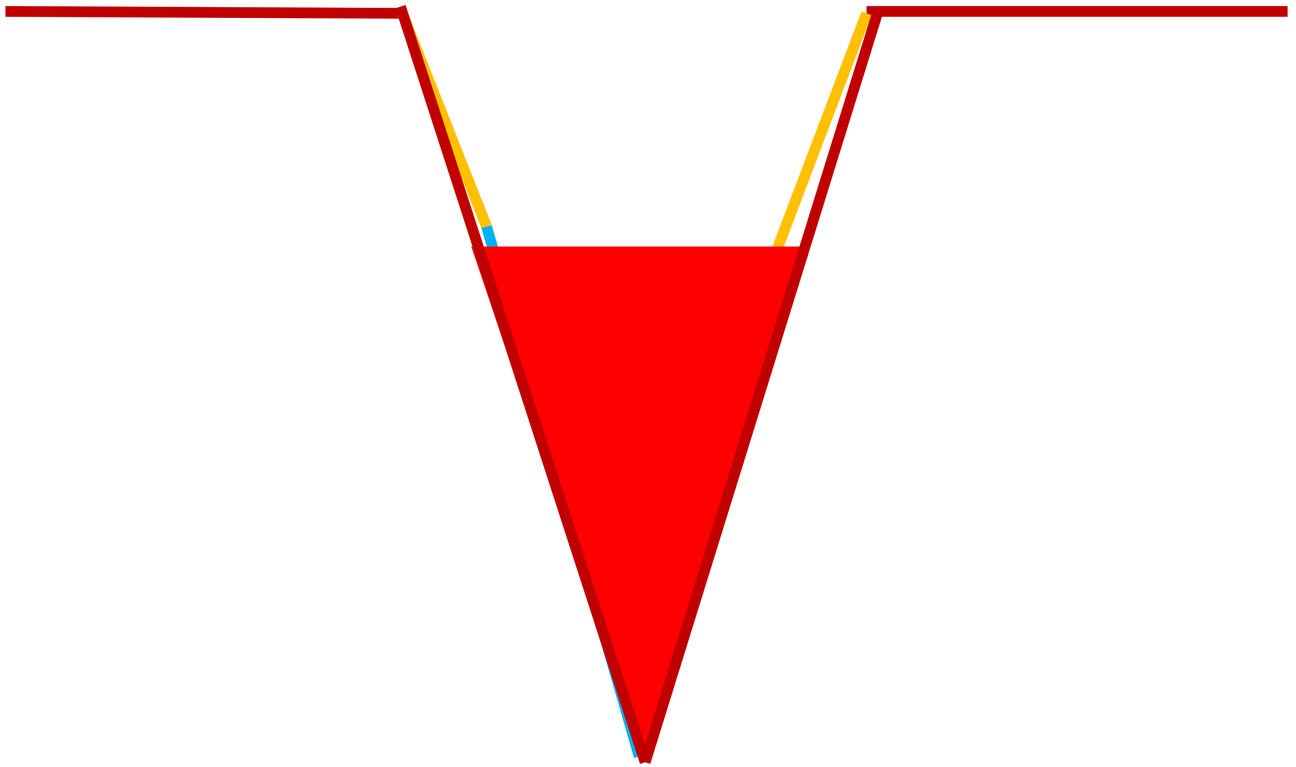
Crown down technique



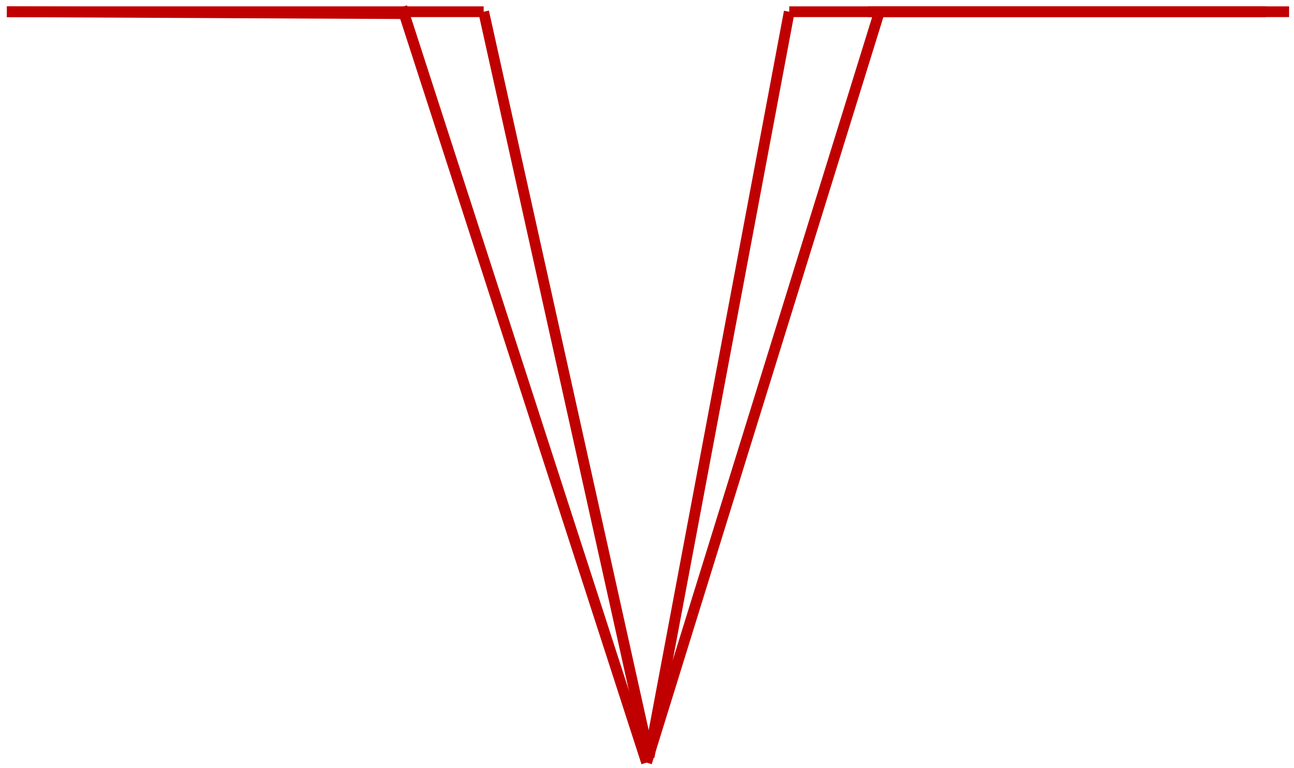
Crown down technique



Crown down technique

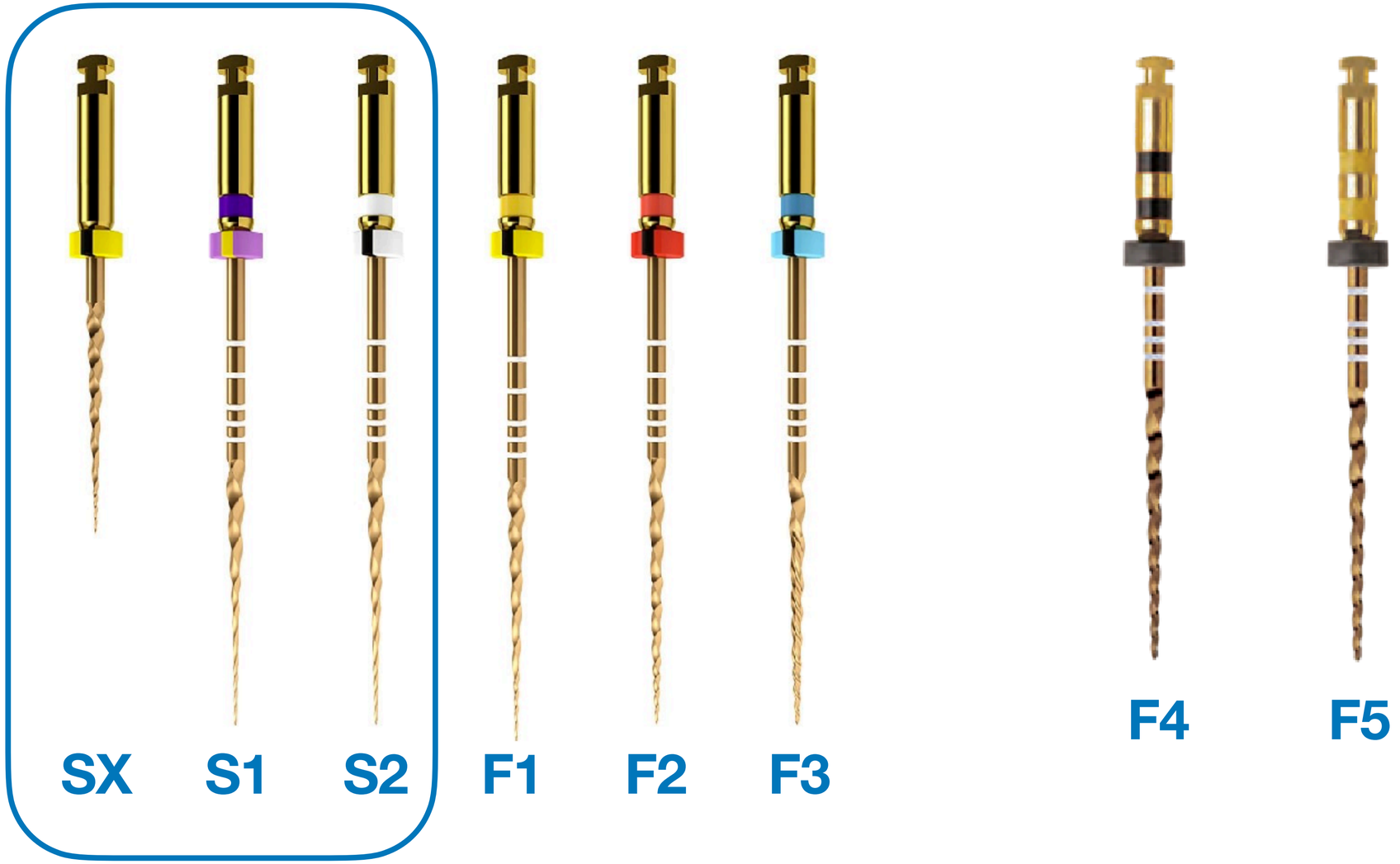


Crown down technique



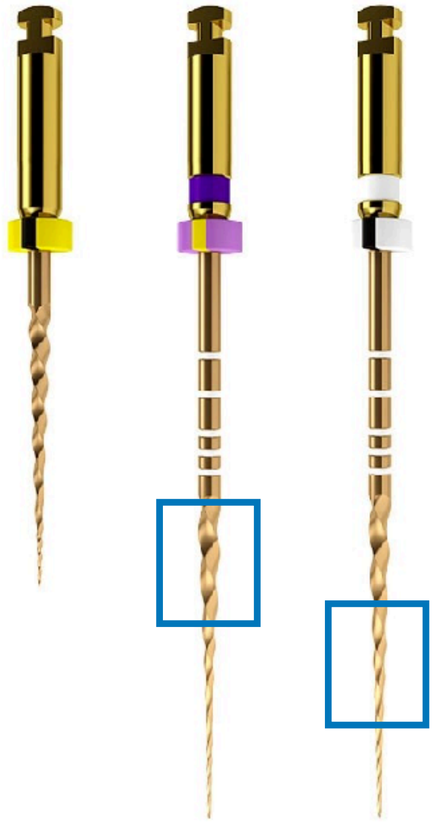
30/08 25/06 30/04

ProTaper Gold®



ProTaper Gold®

0.19 / .04v 0.18 / .02v 0.20 / .04v



SX S1 S2

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ProTaper Gold®

0.20 / .07v 0.25 / .08v 0.30 / .09v

F1 F2 F3

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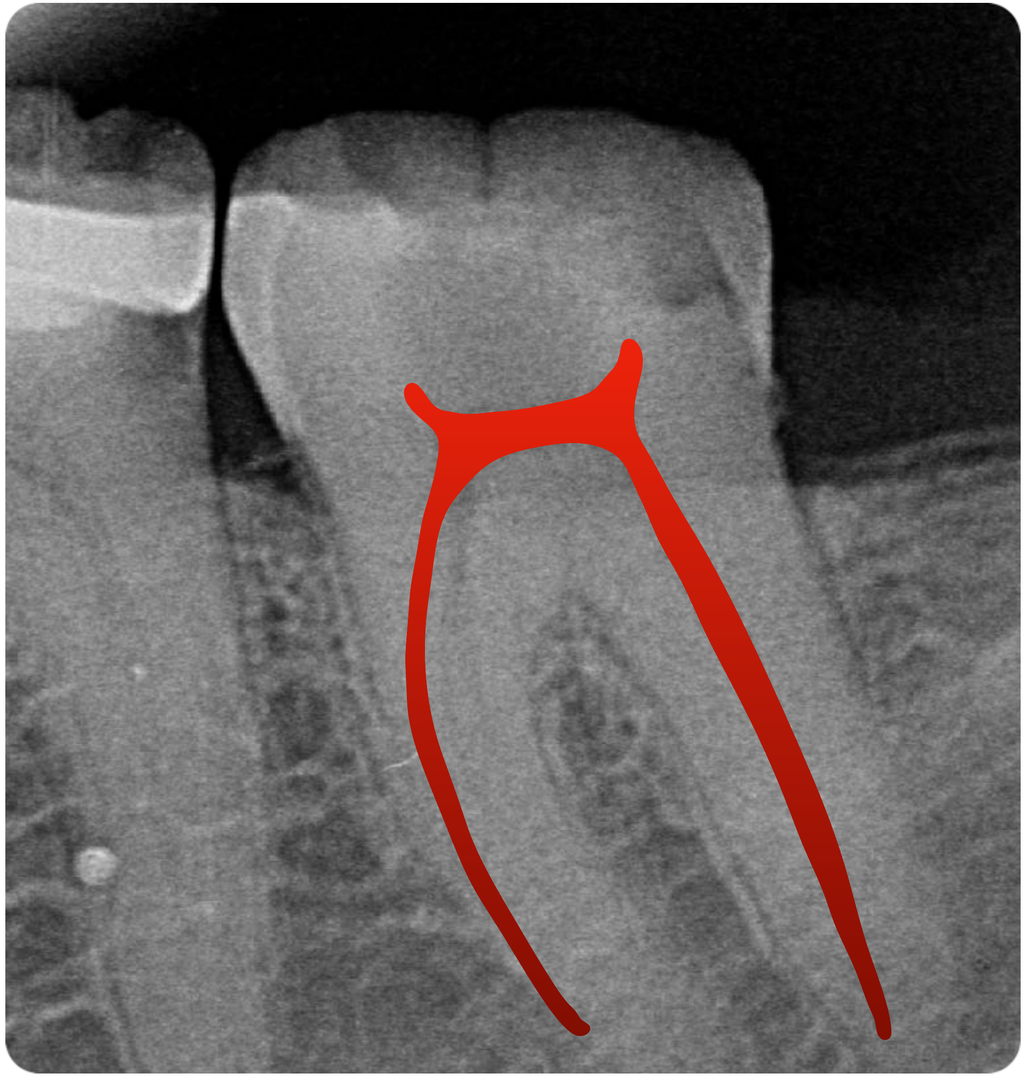
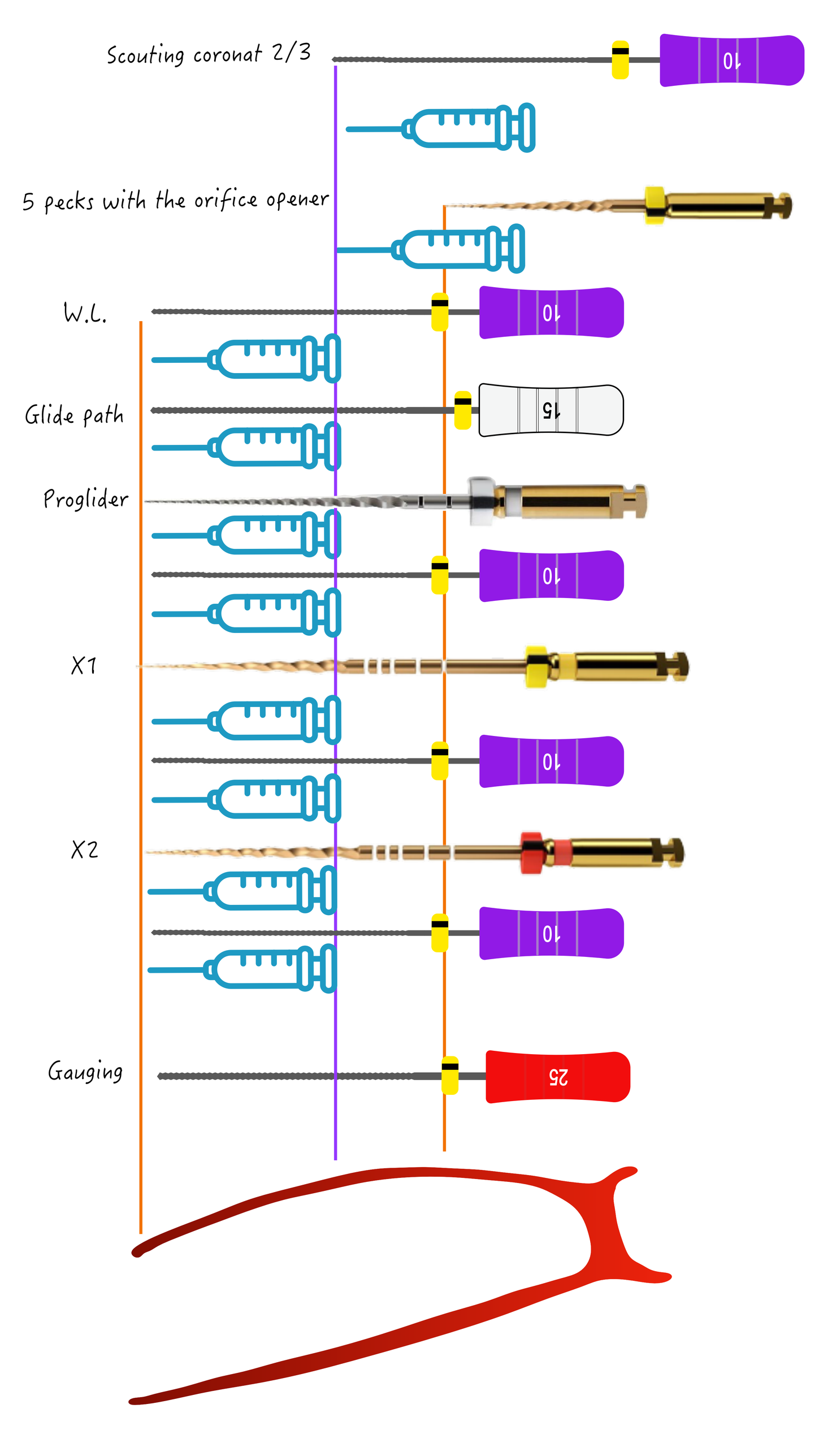
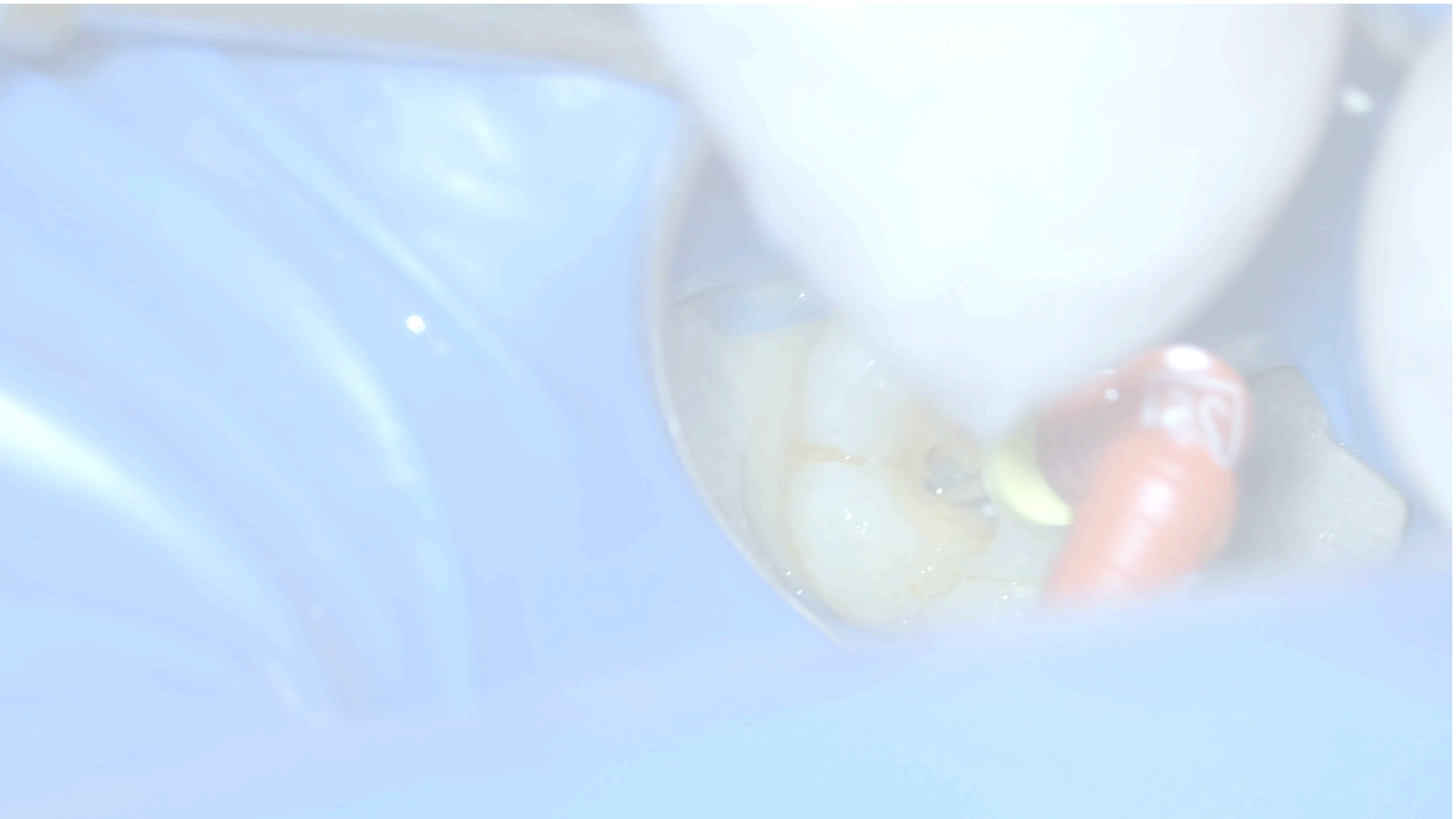
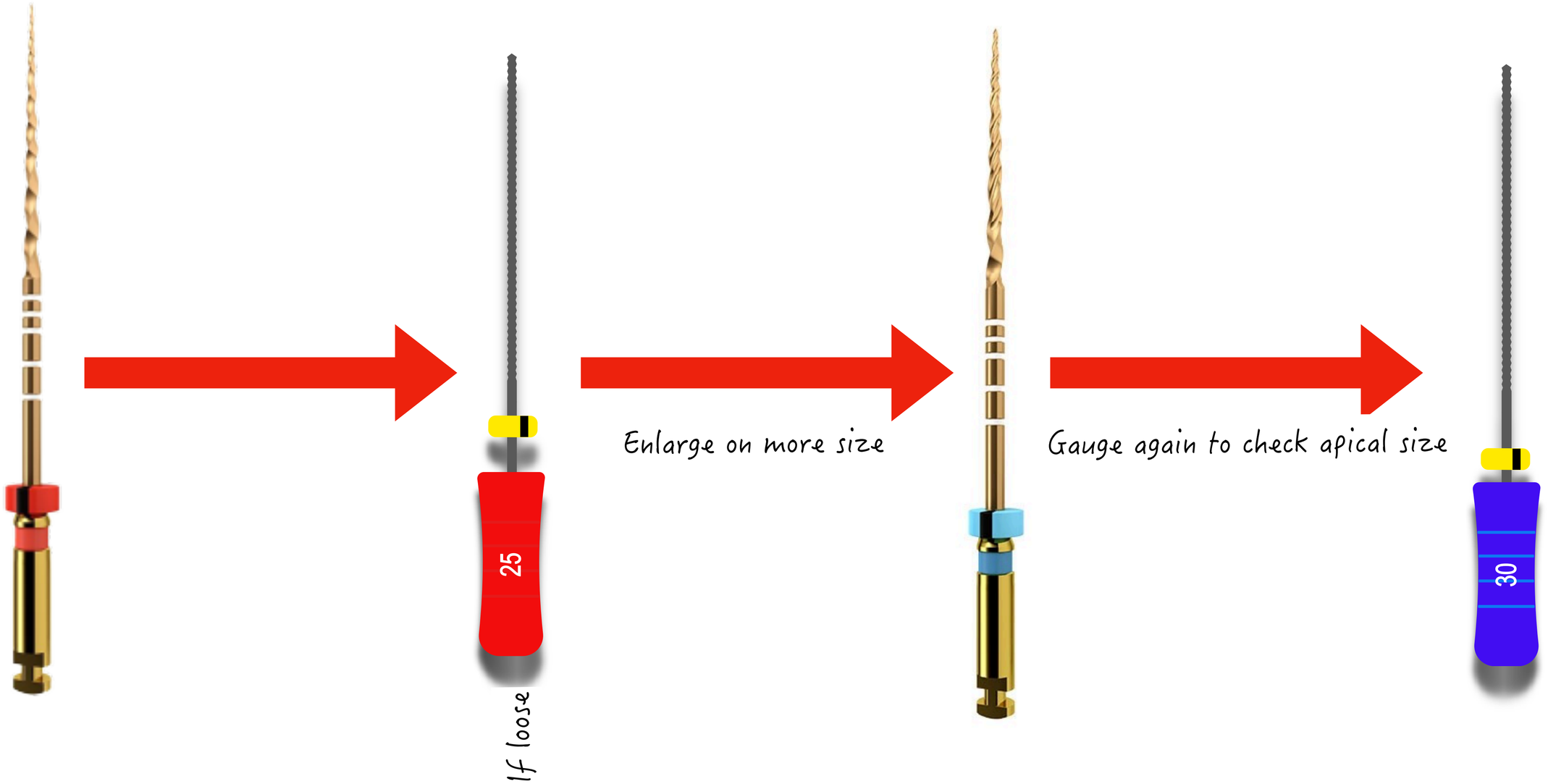
ENDODONTICS




Scouting coronat 2/3
10
5 pecks with the orifice opener
W.L.
10
Glide path
15
Proglider
10
X1
10
X2
10
Gauging
25



Apical gauging



How?

Rules of NiTi instrumentation

Techniques of shaping

Steps of shaping

Sample protocol