AD CARE
Advanced Dental Care

AD CARE

AD CARE
Advanced Dental Care

LA NUOVA SEQUENZA OGSF PER UNA ENDODONZIA PIÙ SICURA ED EFFICIENTE

COLTENE

Dr Gianluca Fumei

Dr Gianluca Fumei

Professore a contratto e titolare dell'insegnamento di
"Odontoiatria Conservativa ed Endodonzia 2"
CLOPD Università dell'Insubria Varese

Socio Attivo

Socio Attivo

European Society of Endodontology
Certified Member

specialist member

ShapeIT®





PICCOTTI BALOCCO FUMEI SUARDI BUCCI

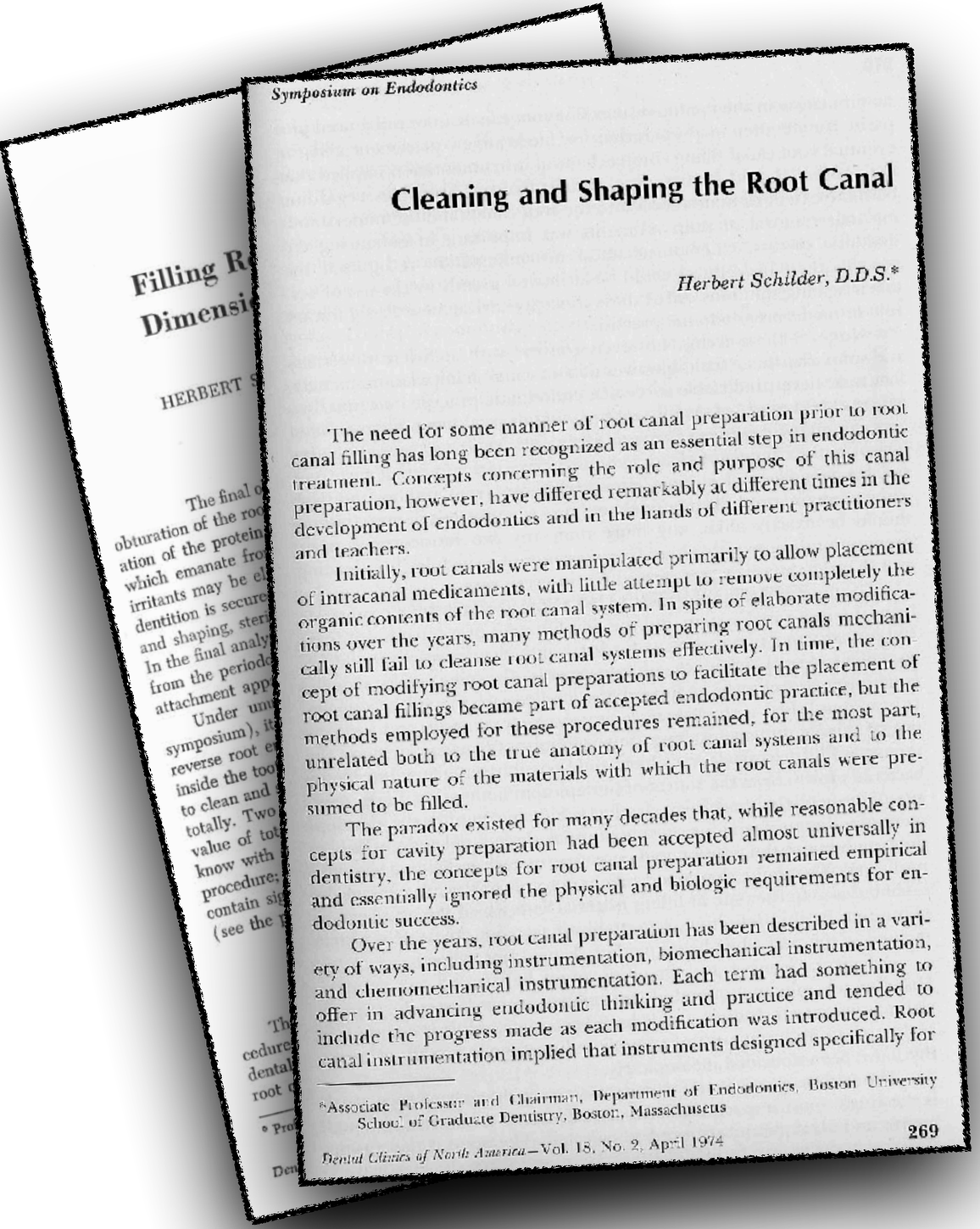
Sharing is the key to success

HYFLEX EDM OGSF

Da dove cominciamo?

...dagli obiettivi del trattamento

LA STRUMENTAZIONE NON MODIFICA I PRINCIPI BASE DELL' ENDODONZIA



Symposium on Endodontics

Cleaning and Shaping the Root Canal

*Herbert Schilder, D.D.S.**

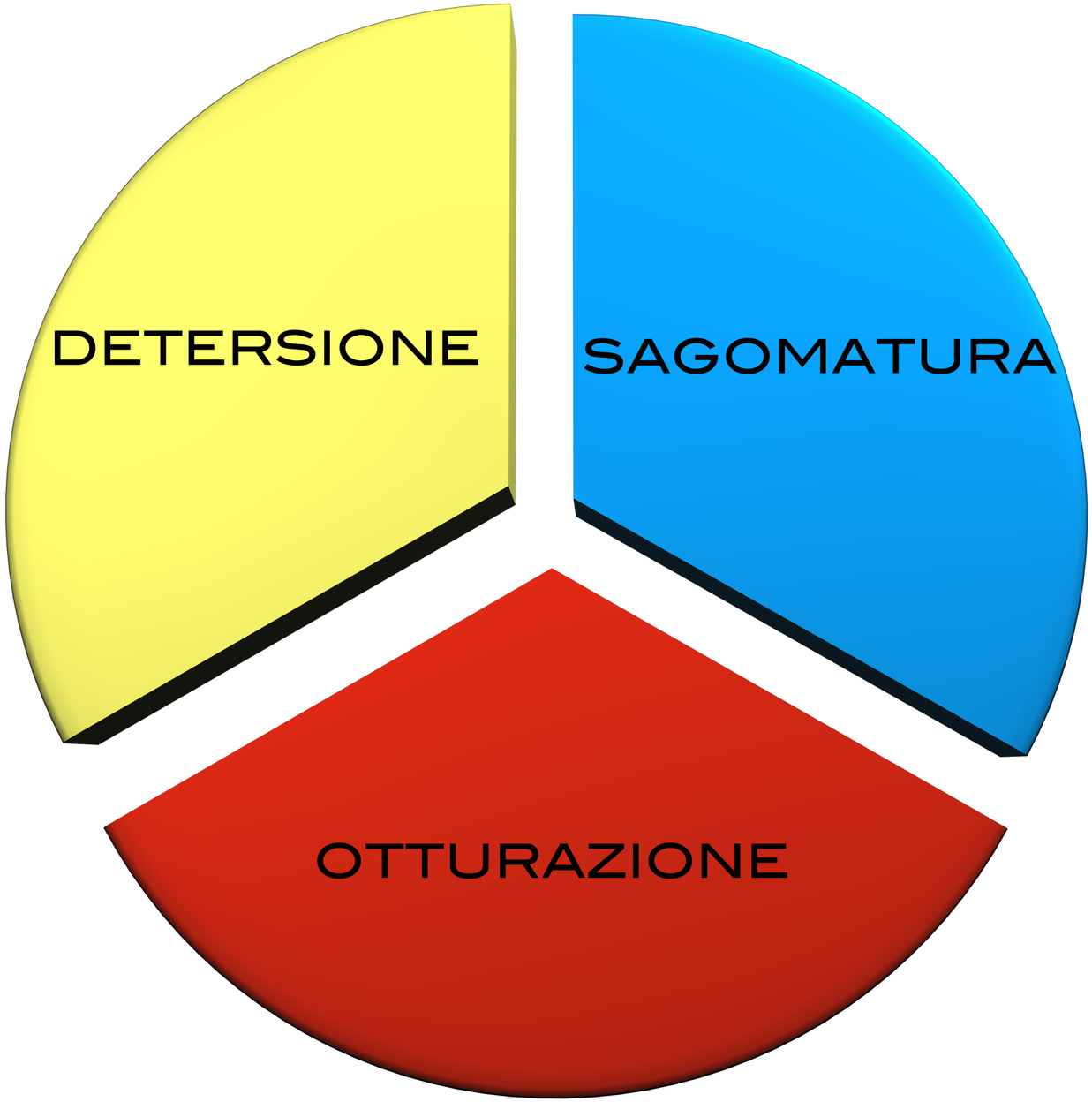
The need for some manner of root canal preparation prior to root canal filling has long been recognized as an essential step in endodontic treatment. Concepts concerning the role and purpose of this canal preparation, however, have differed remarkably at different times in the development of endodontics and in the hands of different practitioners and teachers.

Initially, root canals were manipulated primarily to allow placement of intracanal medicaments, with little attempt to remove completely the organic contents of the root canal system. In spite of elaborate modifications over the years, many methods of preparing root canals mechanically still fail to cleanse root canal systems effectively. In time, the concept of modifying root canal preparations to facilitate the placement of root canal fillings became part of accepted endodontic practice, but the methods employed for these procedures remained, for the most part, unrelated both to the true anatomy of root canal systems and to the physical nature of the materials with which the root canals were presumed to be filled.

The paradox existed for many decades that, while reasonable concepts for cavity preparation had been accepted almost universally in dentistry, the concepts for root canal preparation remained empirical and essentially ignored the physical and biologic requirements for endodontic success.

Over the years, root canal preparation has been described in a variety of ways, including instrumentation, biomechanical instrumentation, and chemomechanical instrumentation. Each term had something to offer in advancing endodontic thinking and practice and tended to include the progress made as each modification was introduced. Root canal instrumentation implied that instruments designed specifically for

*Associate Professor and Chairman, Department of Endodontics, Boston University School of Graduate Dentistry, Boston, Massachuseus



Sagomatura

Detersione

Otturazione

SHILDER 1974


2011
COLTENE CAMBIA IL DNA DEL NITI

HYFLEX CM SEQUENCE

MEMORIA ELASTICA ≃ ∅

MEMORIA DI FORMA CONTROLLATA

MIGLIORE RISPETTO ANATOMIA CANALARE

REVERSIBILITA' DELLA FORMA

NEW ERA IN ENDO

..The use o Ni-ti files made by heat-treated alloy could improve the qualities of root canal shaping rather than conventional Ni-ti instruments...

Minimally Invasive Endodontics

PreServare la dentina

- ACCESSO CAMERALE
- STRUMENTAZIONE CANALARE
- PREPARAZIONE POST-SPACE
- REALIZZAZIONE RESTAURO

J Prosthet Dent. 2008 Apr;99(4):267-73. doi: 10.1016/S0022-3913(08)60059-1.

Residual dentin thickness in bifurcated maxillary first premolars after root canal and post space preparation with parallel-sided drills.

Pilo R, Shapenco E, Lewinstein I.

Int Endod J. 2009 Dec;42(12):1071-6. doi: 10.1111/j.1365-2591.2009.01632.x.

Micro-computed tomography of tooth tissue volume changes following endodontic procedures and post space preparation.

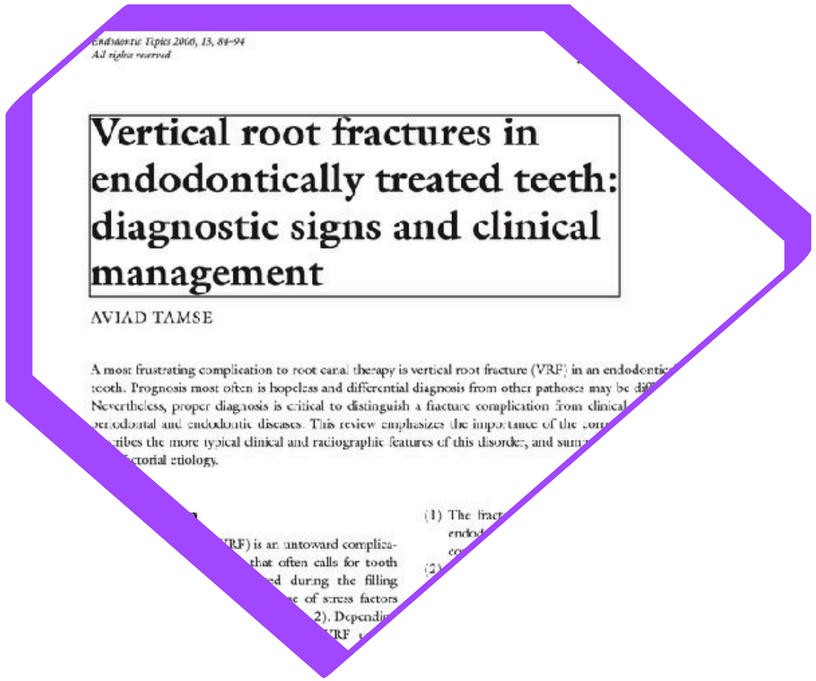
Ikram OH, Patel S, Sauro S, Mannocci F.

J Endod. 2006 Mar;32(3):202-5.

Residual dentin thickness in bifurcated maxillary premolars after root canal and dowel space preparation.

Katz A, Wasenstein-Kohn S, Tamse A, Zuckerman O.

TAMSE 2006



Endodontic Topics 2006, 13, 84–94
All rights reserved

Vertical root fractures in endodontically treated teeth: diagnostic signs and clinical management

AVIAD TAMSE

A most frustrating complication to root canal therapy is vertical root fracture (VRF) in an endodontic
tooth. Prognosis most often is hopeless and differential diagnosis from other pathoses may be dif
Nevertheless, proper diagnosis is critical to distinguish a fracture complication from clinical
periodontal and endodontic diseases. This review emphasizes the importance of the corr
scribes the more typical clinical and radiographic features of this disorder, and sum
torial etiology.

"Predisposing factors include loss of healthy tooth substance, ... which increases the risk for cracks in the body of dentin that can later propagate to fracture "

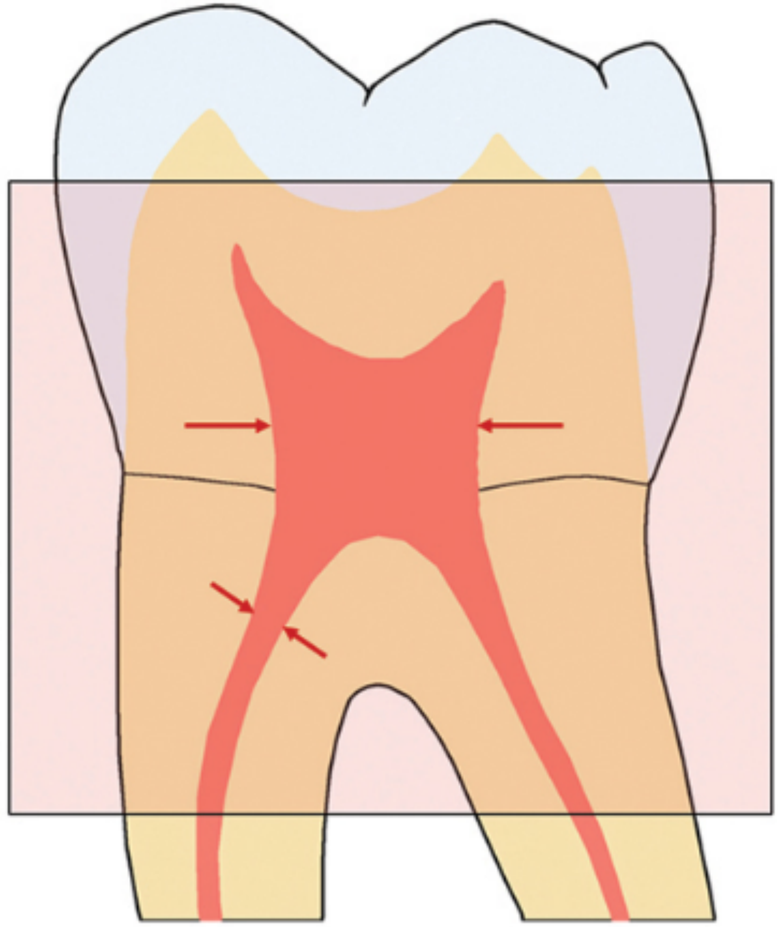
"...cutting dentin to straight lines at curvatures weakens the root structure ...
In the infected root canals especially, a balance between the need to remove infected dentin and maintaining sufficient root thickness to withstand the forces of mastication should therefore be sought. "

"Special attention to securing sufficient remaining dentin should be given to the teeth and roots most susceptible to fracture, i.e., the maxillary and mandibular premolars and the mesial roots of the mandibular molars"

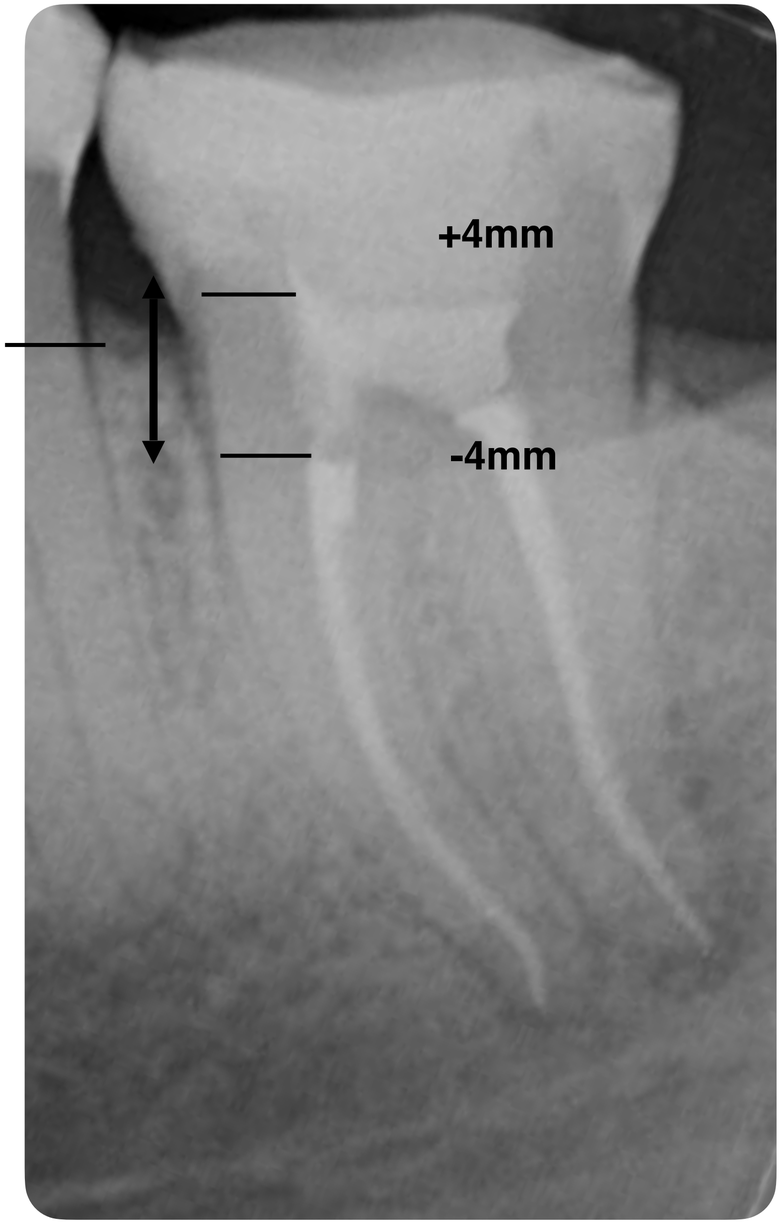
APPROCCIO CONSERVATIVO

CONSERVAZIONE DELLA

DENTINA PERICERVICALE



1. LA DENTINA PERICERVICALE È LOCALIZZATA GENERALMENTE A 4MM CORONALMENTE E APICALMENTE ALLA CRESTA ALVEOLARE
2. LA DENTINA PERICERVICALE È INSOSTITUIBILE



diagnosis

new technologies

Structure

tools

Tips &tricks

Preservation

skills

knowledge

research

new materials

longevity


Treatment Plan
ANATOMY
diagnosis
knowledge
skills
Tips &tricks
Structure Preservation
tools
longevity
new technologies
research

J Endod. 2002 Mar;28(3):211-6.

Roentgenographic investigation of frequency and degree of canal curvatures in human permanent teeth.

Schäfer E[1], Diez C, Hoppe W, Tepel J.

Author information

Abstract

Canal curvatures of 700 permanent human teeth were determined by measuring the angle and the radius of the curvatures and the length of the curved part of the canal. For each type of tooth (except third molars) 50 were selected at random and were investigated. Size 08 silver points were inserted into the canals, and the teeth were radiographed from a facial and proximal view by using a standardized technique. All radiographs were analyzed by a computerized digital image processing system. Of the 1163 root canals examined, 980 (84%) were curved and 65% showed an angle < or = 27 degrees with radii < 40 mm. Thirteen percent displayed angles between 27 degrees and 35 degrees with radii not greater than 15 mm, and 9% of all canals that were investigated had curves > 35 degrees with the greatest radius of 13 mm. The greatest angle of all the teeth was 75 degrees with a radius of 2 mm. To define the canal curvature mathematically and unambiguously, the angle, the radius, and the length of the curve should be given.

J Endod. 2002 Mar;28(3):211-6.

Roentgenographic investigation of frequency and degree of canal curvatures in human permanent teeth.

Schäfer E[1], Diez C, Hoppe W, Tepel J.

Author information

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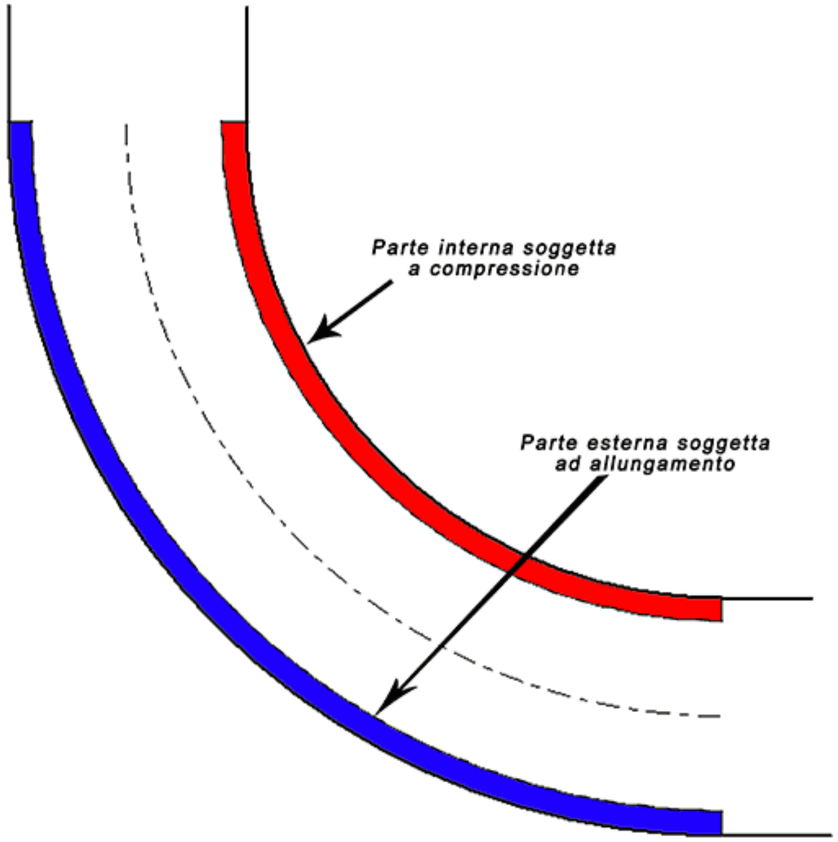
1163 roots examined:
980 (84%) curved

65% angle <27°
30% angle 27-35°
9% angle > 35°

FRATTURA DA TORSIONE

- Si realizza quando una parte dello strumento rotante (solitamente la punta) si blocca e la restante parte continua a ruotare alla velocità preimpostata per azione del torque del motore endodontico.

FRATTURA DA FATICA CICLICA



i tempi cambiano..

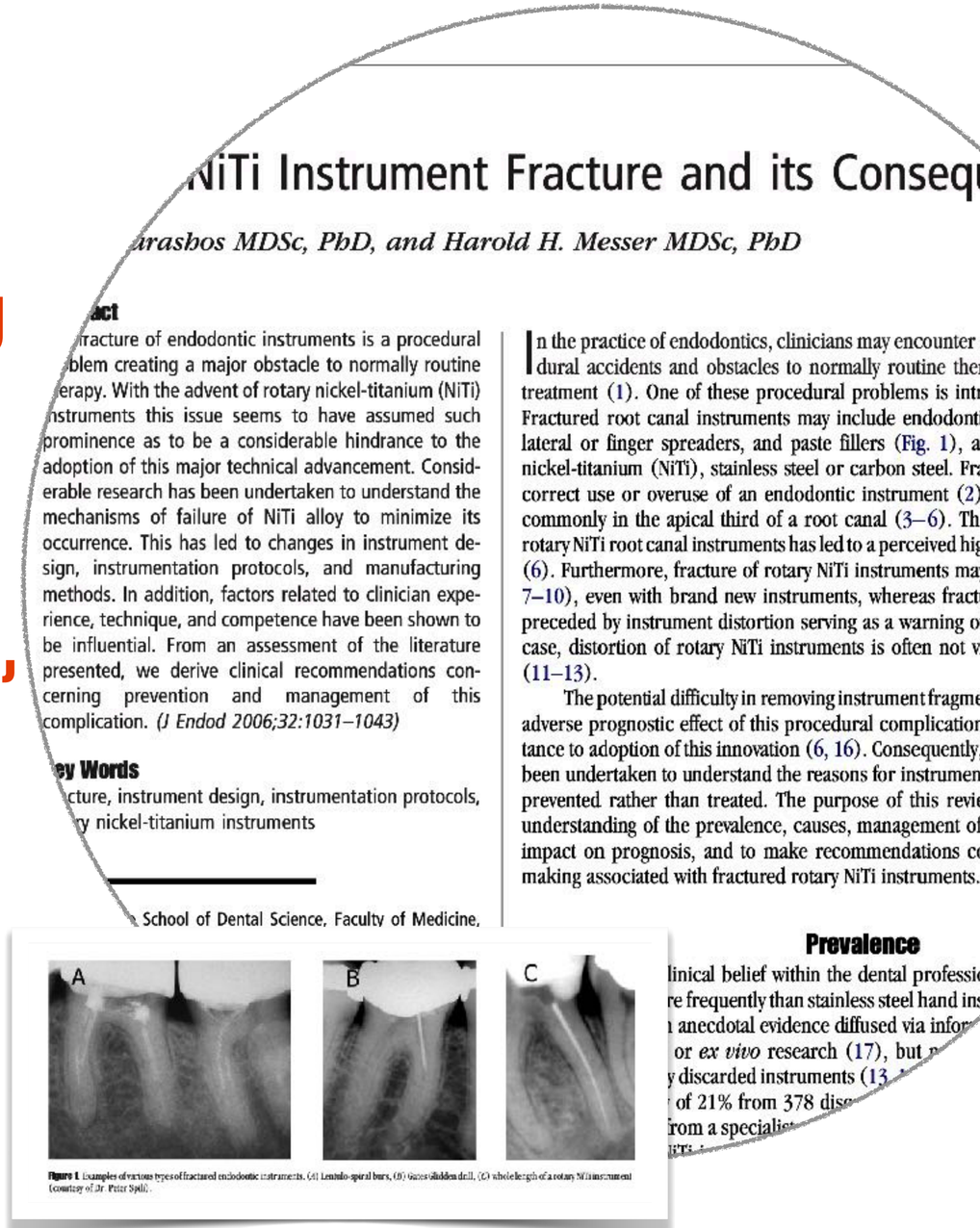
"I denti che presentano canali con curvatura maggiore di 45 gradi, non possono essere trattati con successo senza dover ricorrere alla chirurgia"

GROSSMAN
1967

Rotary NiTi Instrument Fracture and its Consequences

This has led to changes in instrument design, instrumentation protocols, and manufacturing methods. In addition, factors related to clinician experience, technique, and competence have been shown to be influential

Peter Parashos and Harold H. Messer 2006



NiTi Instrument Fracture and its Conseq

arashos MDSc, PhD, and Harold H. Messer MDSc, PhD

act

racture of endodontic instruments is a procedural blem creating a major obstacle to normally routine erapy. With the advent of rotary nickel-titanium (NiTi) nstruments this issue seems to have assumed such prominence as to be a considerable hindrance to the adoption of this major technical advancement. Considerable research has been undertaken to understand the mechanisms of failure of NiTi alloy to minimize its occurrence. This has led to changes in instrument design, instrumentation protocols, and manufacturing methods. In addition, factors related to clinician experience, technique, and competence have been shown to be influential. From an assessment of the literature presented, we derive clinical recommendations concerning prevention and management of this complication. *(J Endod 2006;32:1031–1043)*

ey Words

cture, instrument design, instrumentation protocols, y nickel-titanium instruments

n the practice of endodontics, clinicians may encounter dural accidents and obstacles to normally routine ther treatment (1). One of these procedural problems is intr Fractured root canal instruments may include endodont lateral or finger spreaders, and paste fillers (Fig. 1), a nickel-titanium (NiTi), stainless steel or carbon steel. Fra correct use or overuse of an endodontic instrument (2) commonly in the apical third of a root canal (3–6). Th rotary NiTi root canal instruments has led to a perceived hig (6). Furthermore, fracture of rotary NiTi instruments ma 7–10), even with brand new instruments, whereas fract preceded by instrument distortion serving as a warning o case, distortion of rotary NiTi instruments is often not v (11–13).

The potential difficulty in removing instrument fragme adverse prognostic effect of this procedural complication tance to adoption of this innovation (6, 16). Consequently been undertaken to understand the reasons for instrumen prevented rather than treated. The purpose of this revie understanding of the prevalence, causes, management of impact on prognosis, and to make recommendations co making associated with fractured rotary NiTi instruments.

School of Dental Science, Faculty of Medicine,

Prevalence

linical belief within the dental professio re frequently than stainless steel hand ins anecdotal evidence diffused via infor or *ex vivo* research (17), but y discarded instruments (13 of 21% from 378 disc from a specialist

Figure 1. Examples of various types of fractured endodontic instruments. (A) Lentulo-spiral burs, (B) Gates Glidden drill, (C) whole length of a rotary NiTi instrument (courtesy of Dr. Peter Split).

Niti Trattato termicamente

- Ridotto ritorno elastico (restoring force)
- Memoria di forma attivata dal calore

AVOIDING BREAKAGE

MORE FLEXIBLE

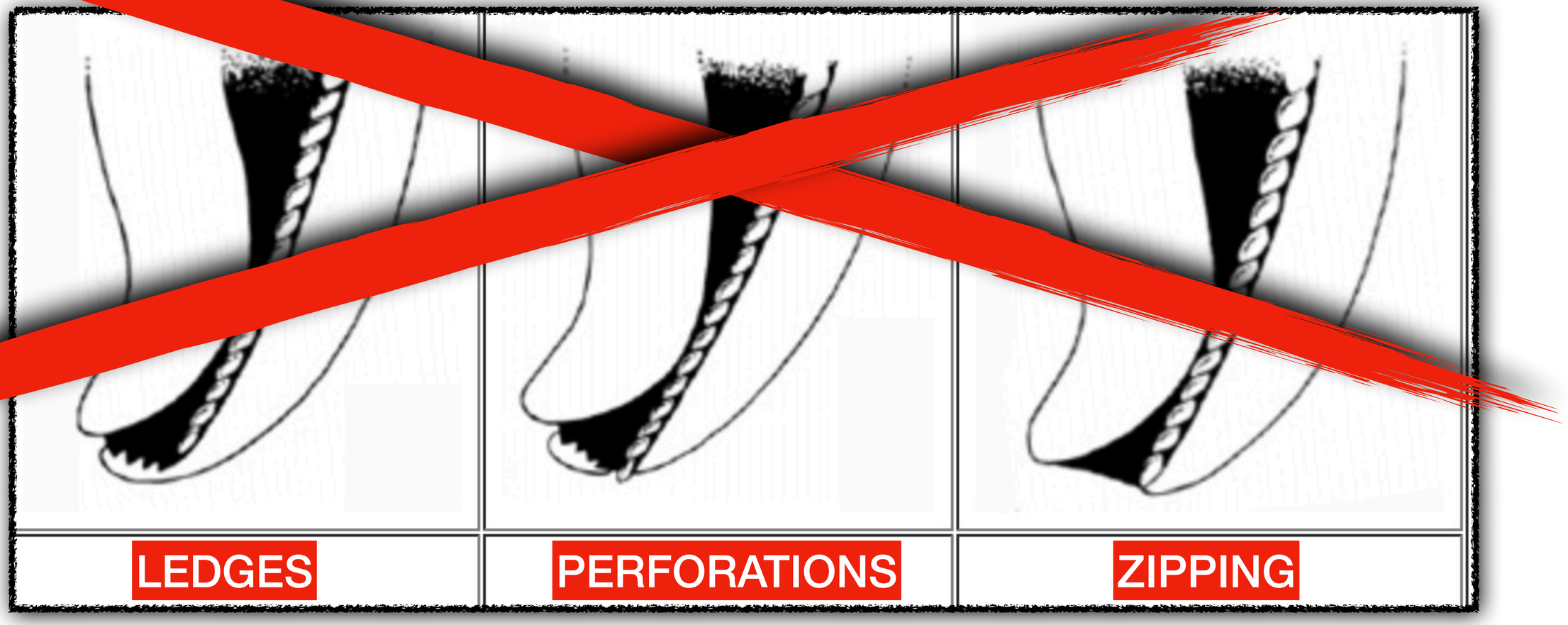
MORE RESISTANT

“Non ci sono curve in cui non si possa passare”

A. SENNA

- PRECURVABILE
- SAGOMARE CURVATURE IMPORTANTI
- CENTRATO NEL CANALE

Less Errors Than Stainless Steel



Shaping ability of two nickel–titanium instruments activated by continuous rotation or adaptive motion: a micro-computed tomography study

E. Pedullà, G. Plotino, N. M. Grande, G. Avarotti, G. Gambarini, E. Rapisarda & F. Mannocci

ONLINE FIRST

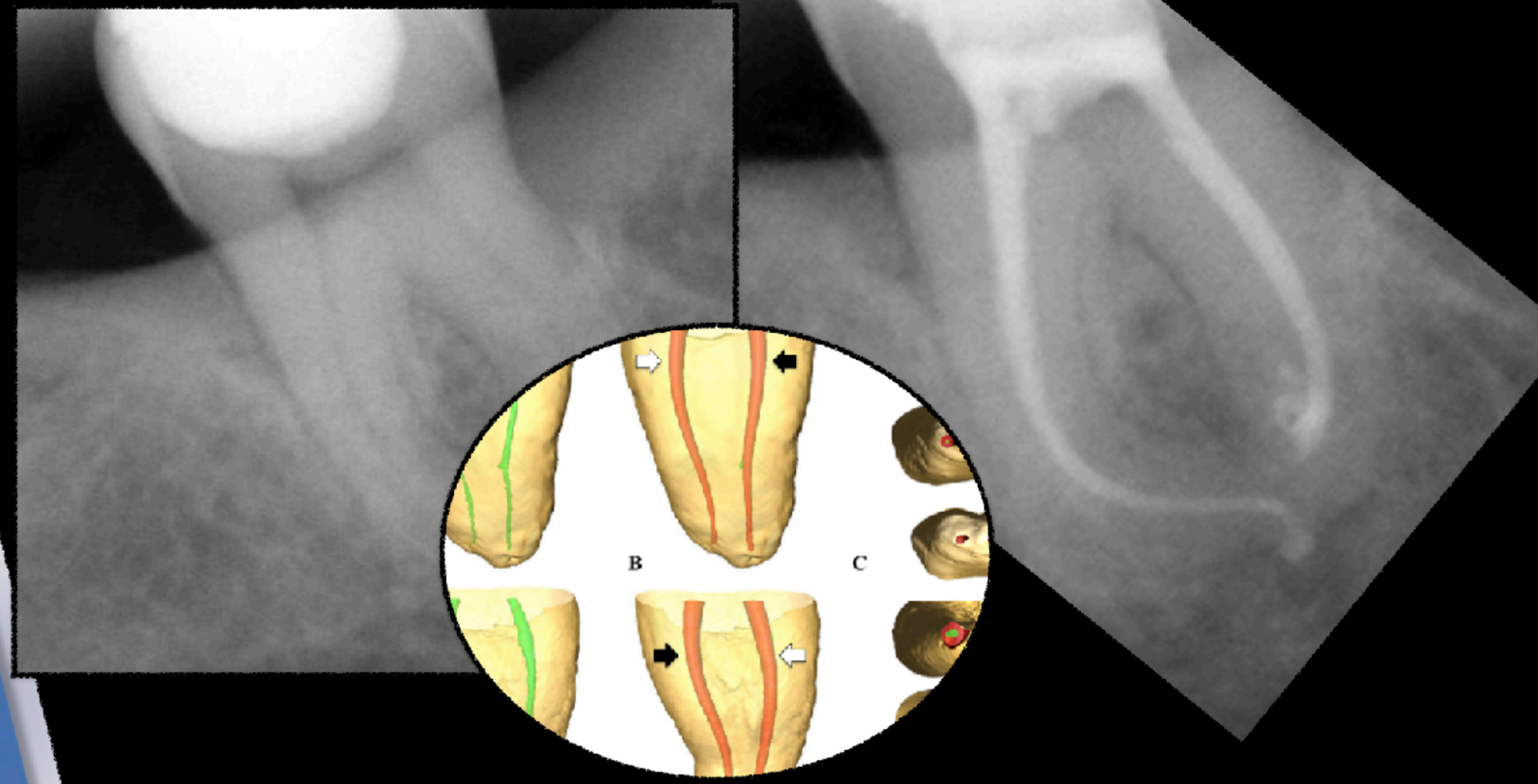
Clinical Oral Investigations

Clinical Oral Investigations

ISSN 1432-6981

Clin Oral Invest

DOI 10.1007/s00784-016-1732-4



..The use of Ni-Ti files made by he-treated alloy could improve the qualities of root canal shaping rather than conventional Ni-Ti instruments

ASDJ
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Official Publication of Ain Shams Dental School
september2022 • Vol. 27

Cyclic Fatigue Resistance of Protaper Gold, HyFlex EDM and K3XF Rotary Instruments

Mohamed M.N El-Tayeb[1], Mohamed Nabeel[2]

Aim: The aim of the present study was to evaluate the resistance to cyclic fatigue of different nickel-titanium (NiTi) rotary ins
Ma
eac
dev
usi
Re
K3
low
Co
a direct influence on their resistance to cyclic fatigue. HyFlex EDM files demonstrated significantly higher cyclic fatigue resistance than Protaper Gold and K3XF. The electrical discharge machining (EDM) technology and the unique cross section of HyFlex EDM may be the main reason for this difference.

Conclusions: The geometrical design features and mode of manufacturing of the tested nickel-titanium rotary systems have a direct influence on their resistance to cyclic fatigue. HyFlex EDM files demonstrated significantly higher cyclic fatigue resistance than Protaper Gold and K3XF. The electrical discharge machining (EDM) technology and the unique cross section of HyFlex EDM may be the main reason for this difference.

Received: 31 May 2023 | Accepted: 7 August 2023

DOI: 10.1111/aej.12789

ORIGINAL RESEARCH

Cyclic fatigue resistance of different nickel-titanium instruments in single and double curvature at room and body temperatures: A laboratory study

Giusy Rita Maria La Rosa DDS, PhD[1] | **Maria Laura Leotta DDS**[1] | **Francesco Saverio Canova DDS**[1] | **Virginia Rosy Romeo DDS**[1] | **Gabriele Cervino DDS, PhD**[2] | **Luigi Generali DDS**[3] | **Eugenio Pedullà DDS, MSc, PhD**[1]

[1]Department of General Surgery and Medical-Surgical Specialties, University of Catania, Catania, Italy

[2]Department of Biomedical and Dental Sciences and Morphological and Functional Imaging, Messina University, Messina, Italy

[3]Department of Surgery, Medicine, Dentistry and Morphological Sciences with Transplant Surgery, Oncology and Regenerative Medicine Relevance (CHIMOMO), University of Modena and Reggio Emilia, Modena, Italy

Correspondence
Giusy Rita Maria La Rosa, Department of General Surgery and Medical-Surgical Specialties, University of Catania, Catania, Italy.
Email: g_larosa92@live.it

Abstract

The aim of this study was to co
instruments inside single and
HyFlex EDM #20.05 (HEDM)
were randomised ($n=10$) for t
vature (i.e. single and double)
fracture (NCF) was analysed b
of all instruments significantly
curvatures, except for HEDM i
in double curvature than singl
ROTATE #20.05 at 35° ± 1°C. W
impaired cyclic fatigue resistar
ture. Similarly, double curvatur
of all files except for VDW.ROT

KEYWORDS

body temperature, cyclic fatigue, dou
ROTATE

TABLE 1 Mean ± standard deviation of number of cycles to fracture (NCF) of the tested instruments at room and body temperatures, in single and double curvatures.

	Number of cycles to fracture (NCF)			
	Temperature			
	20°C ± 1°C		35°C ± 1°C	
Instrument	Single curvature	Double curvature	Single curvature	Double curvature
HEDM #20.05	$4892^{a1} \pm 344$	$1508^{b1} \pm 242$	$4136^{c1} \pm 566$	$1285^{b1} \pm 302$
VDW ROTATE #20.05	$2078^{a2} \pm 262$	$881^{b2} \pm 121$	$821^{bc2} \pm 224$	$651^{cd2} \pm 41$
Mtwo #25.06	$962^{a3} \pm 129$	$430^{b3} \pm 79$	$709^{c2} \pm 57$	$308^{d3} \pm 64$
VDW ROTATE #25.06	$1256^{a3} \pm 174$	$607^{b3} \pm 58$	$847^{c2} \pm 121$	$446^{d3} \pm 71$

Note: Different superscript letters indicant significant differences between instruments in the same row ($p < 0.05$). Different superscript numbers indicant significant differences between instruments in the same column ($p < 0.05$).

PRESERVARE LA MASSIMA QUANTITA DI TESSUTO DENTALE DURANTE LA TERAPIA ENDODONTICA

ED "EVITARE" LA FRATTURA DEGLI STRUMENTI ROTANTI

FLESSIBILITA'E RESISTENZA

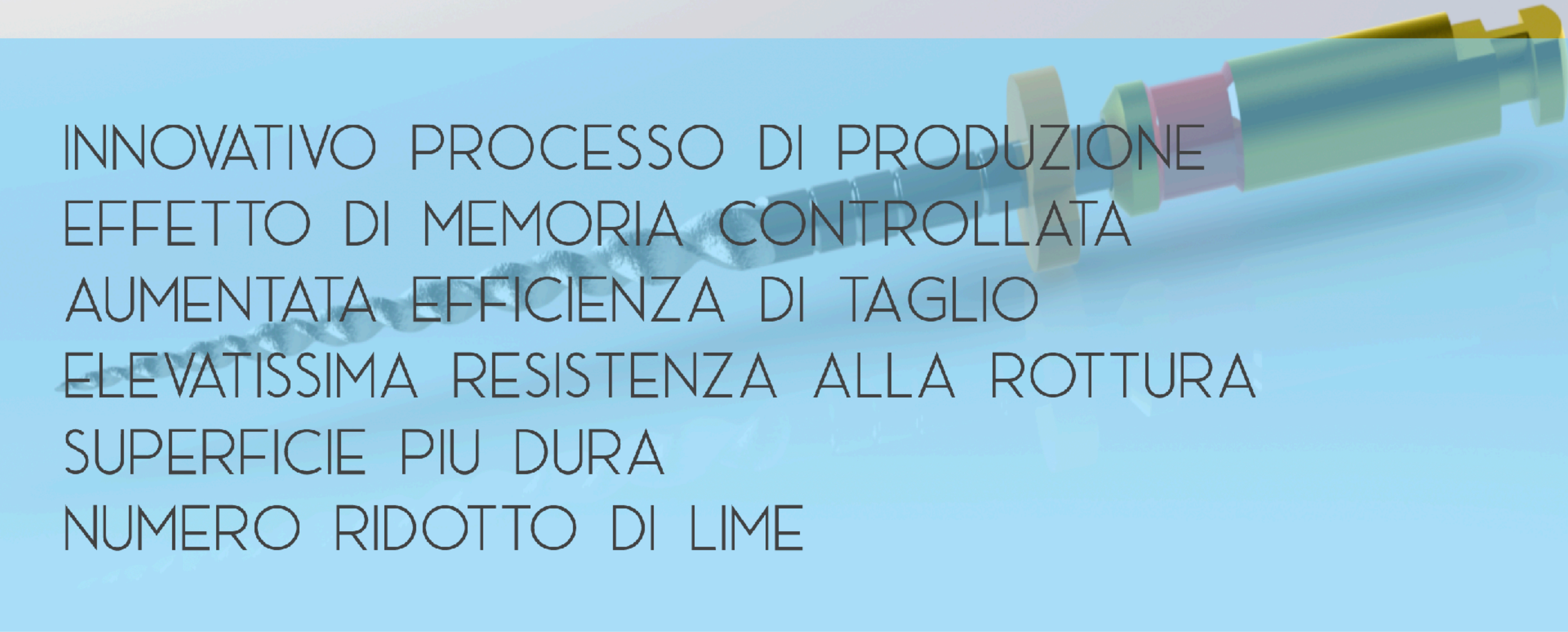
HYFLEX EDM SEQUENCE

EDM

ELECTICAL DISCHARGE
MACHINING

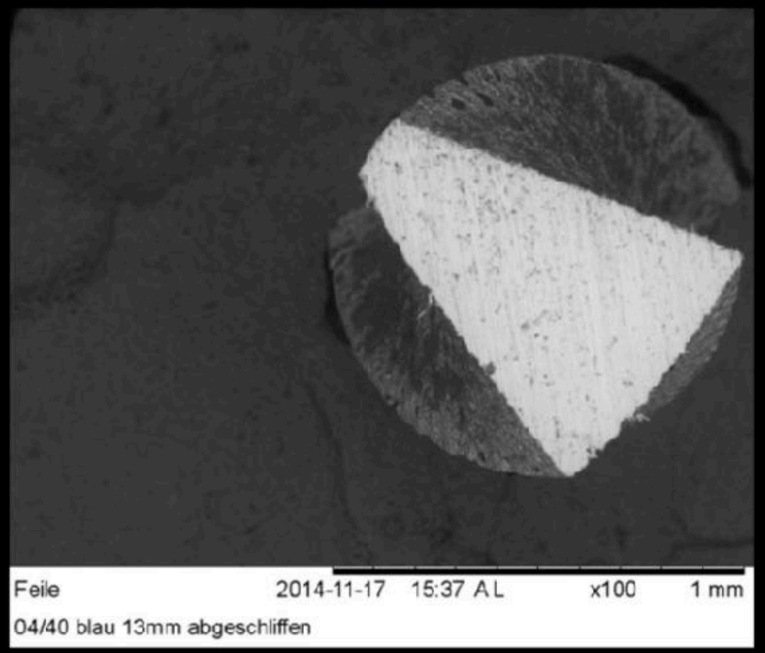
ELETTROEROSIONE

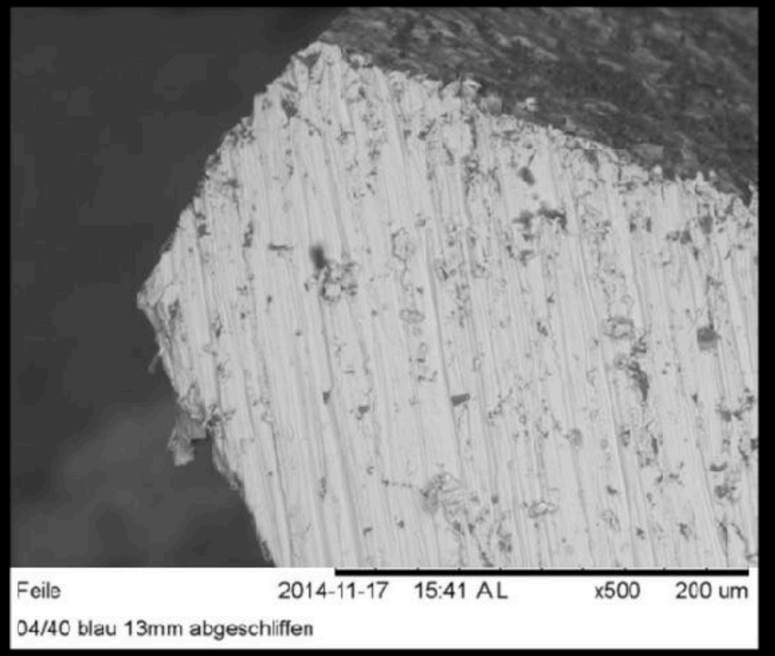
HYFLEX EDM



INNOVATIVO PROCESSO DI PRODUZIONE
EFFETTO DI MEMORIA CONTROLLATA
AUMENTATA EFFICIENZA DI TAGLIO
ELEVATISSIMA RESISTENZA ALLA ROTTURA
SUPERFICIE PIU DURA
NUMERO RIDOTTO DI LIME

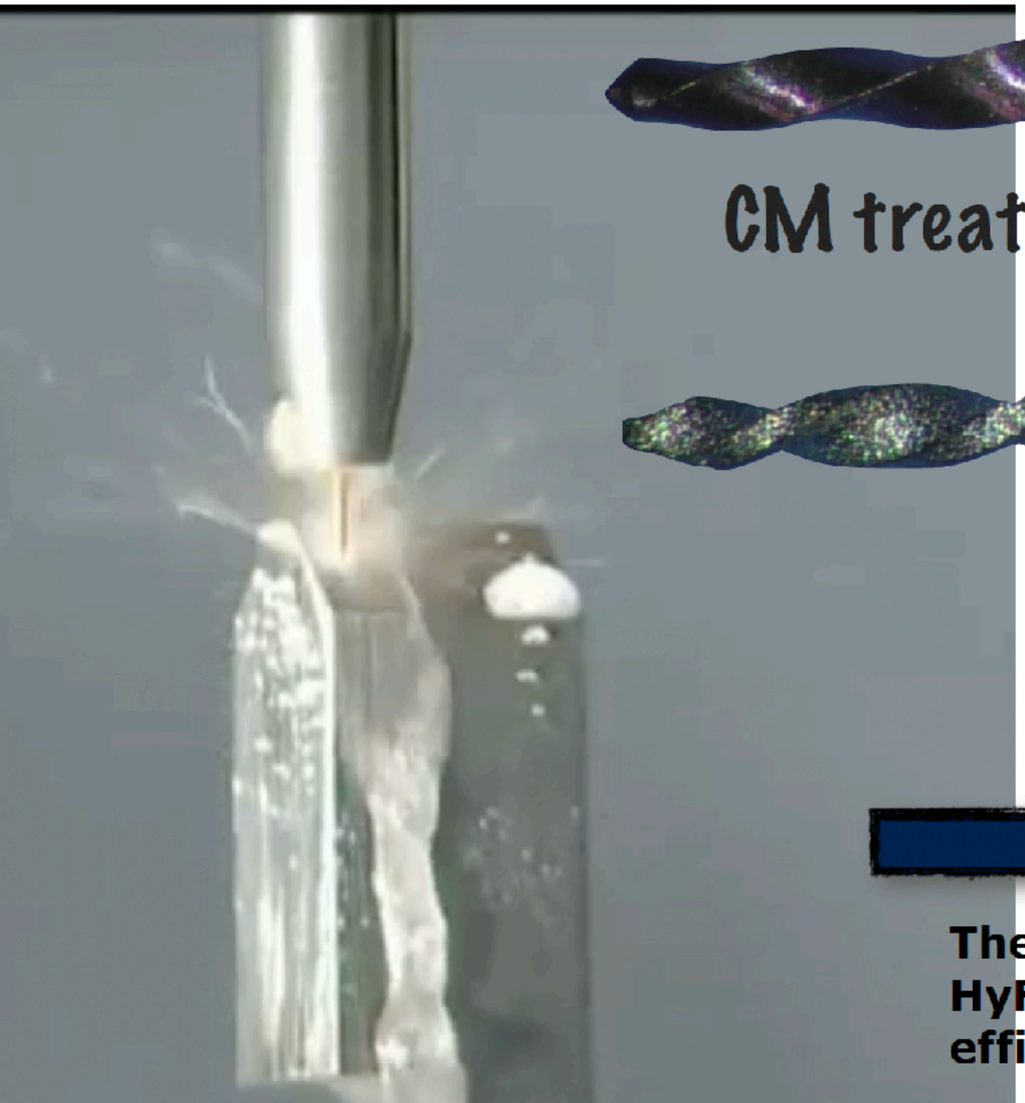
parte lavorante individualizzata





CM-wire machined by Electrical Discharge Machining

HyFlex CM (CM-wire)



CM treatment = Martensite = Deformable at room T°

EDM (CM-wire)

Ni-Ti EDM files

The EDM manufacturing process as well as the CM-wire make the HyFlex EDM files more fracture resistant and improve the cutting efficiency.

CM vs EDM

SURFACE DIFFERENCES

ALTA DUREZZA DI SUPERFICIE

ALTA EFFICENZA DI TAGLIO

Dr Chiara Pirani & Dr Francesco Iacono
Universita' di Bologna

HyFlex EDM

New OGSF sequence on the horizon

2024

O rifice Opener: EDM 18/11

G lider: EDM 15/.03

S haping File: EDM 18/.045

F inishing File: EDM 30/.04

COLTENE HyFlex™

Opener EDM 18/11

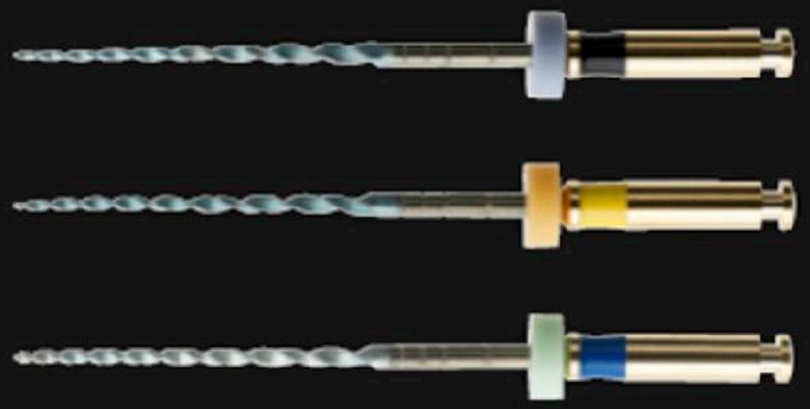
Glider EDM 15/.03

Shaper EDM 18/.045

Finisher EDM 30/.04

Additional finishers

Finishing Files



- Sequenza di 4 file- 1 file per ogni funzione
- Facile da imparare- corrispondenza tra lettera e funzione
- Identificazione tramite i diversi colori
- Utilizzabile nella maggior parte dei casi

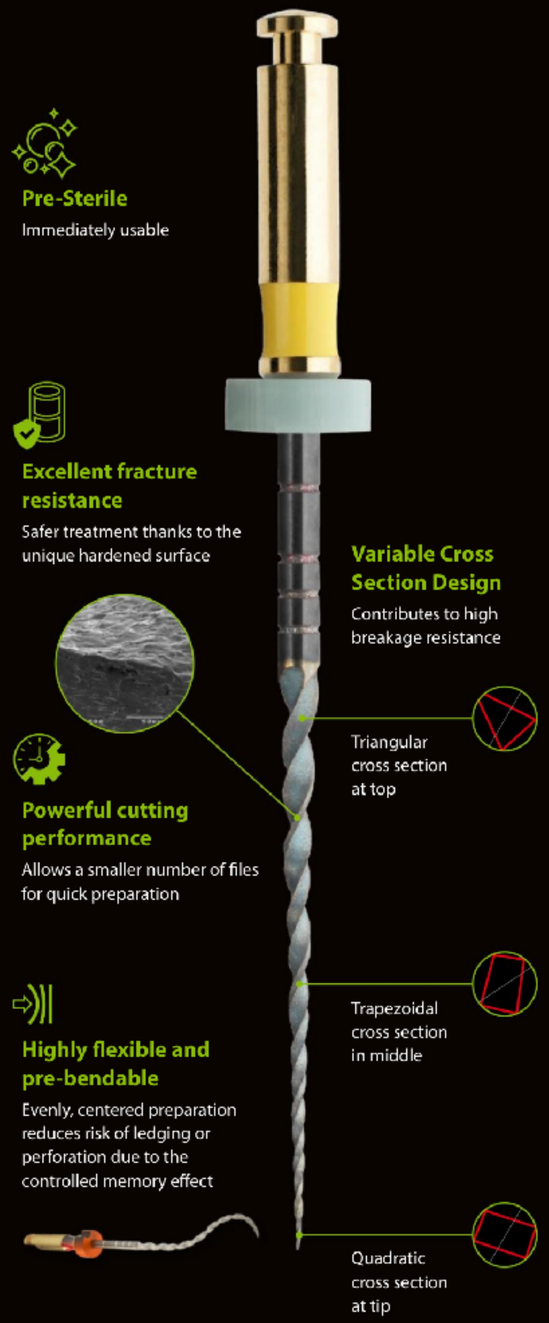
- Sequenza di partenza per ogni caso, indipendentemente dalla difficoltà
- Facilmente gestibile da tutto lo staff

Science behind the developments:

Tip size and tapers → perfect match for smooth reach of working lengths

Software arrows legend:
RED = no work & no stress at all.
Grey = no work Same stress.
Orange = small medium stress.
Green = high stress.

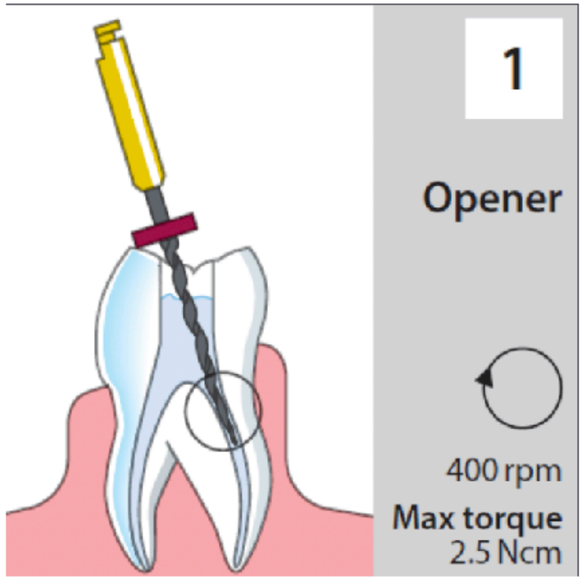
Mm	Strumento 1	Strumento 2	Strumento 3	Strumento 4
Diametro	15	15	18	30
Toll.Minima	4	Toll.Massima	9	
Taper	2	3	4,5	4
16	95	63	90	94
15	84	60	85,5	90
14	73	57	81	86
13	62	54	76,5	82
12	51	51	72	78
11	40	48	67,5	74
10	35	45	63	70
9	33	42	58,5	66
8	31	39	54	62
7	29	36	49,5	58
6	27	33	45	54
5	25	30	40,5	50
4	23	27	36	46
3	21	24	31,5	42
2	19	21	27	38
1	17	18	22,5	34
0	15	15	18	30

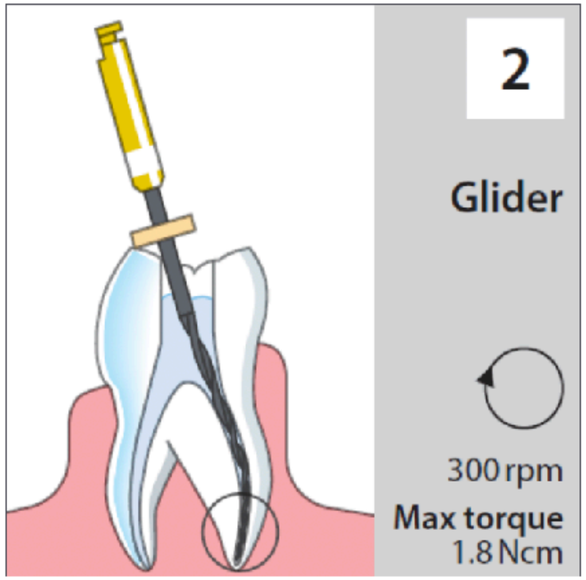


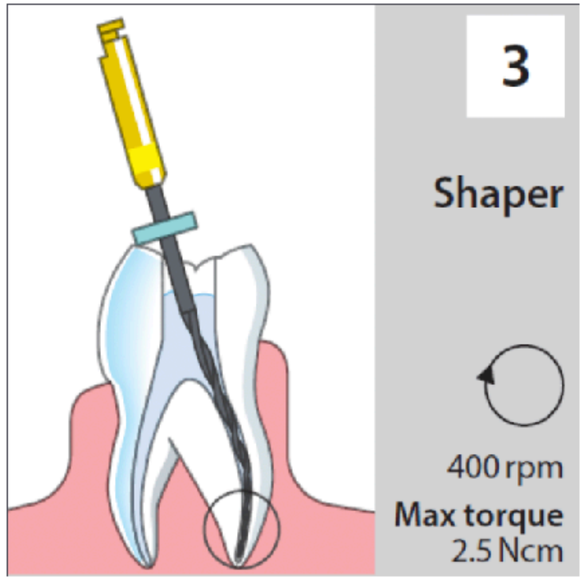
PROF. EUGENIO PEDULLÀ

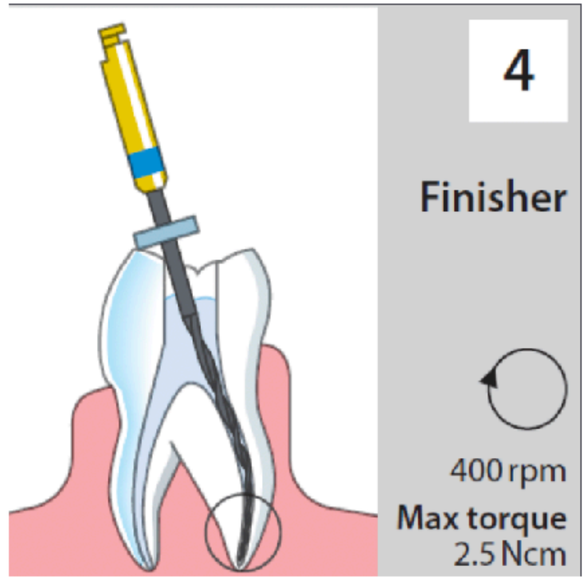
New HyFlex EDM OGSF

Settings for HyFlex EDM OGSF









Opener

EDM 18/11

Glider

EDM 15/.03

Shaper

EDM 18/.045

Finisher

EDM 30/.04

Endodontic Heat Treated Ni-Ti Rotary Files

Cyclic Fatigue

Torsional Stress

250-300
500-800

TORQUE
FORCE

Low
1,5-2,5 N/cm

Science behind the developments:

Orifice opener take out the stress of the other files

18.11

Comparison of the effects from coronal pre-flaring and glide-path preparation on torque generation during root canal shaping procedure

Sang Won Kwak, DDS, MS, PhD[1]; Jung-Hong Ha, DDS, MS, PhD[2]; Ya Shen, DDS, PhD[3]; Markus Haapasalo, DDS, PhD[3]; and Hyeon-Cheol Kim, DDS, MS, PhD[1]

Table 1 The sum and maximum torque generated during the experiment (Ncm) (mean ± SD) (n = 15)

	Group 1 OC	Group 2 OG + OC	Group 3 OF + OC	Group 4 OF + OG + OC
Sum of Torque	14.75 ± 2.98[a]	12.68 ± 2.30[b]	10.79 ± 2.39[c]	10.20 ± 1.91[c]
Maximum Torque	2.63 ± 0.48[a]	2.58 ± 0.54[a]	2.23 ± 0.50[b]	2.06 ± 0.34[b]

Note: [a,b,c]Different lower-case superscripts indicate significant differences amongst the groups in rows (P < 0.05).
Abbreviation: OC, OneCurve; OF, OneFlare; OG, OneG.

BASIC RESEARCH – TECHNOLOGY

Cyclic Fatigue Resistance of Nickel-titanium Rotary Instruments according to the Angle of File Access and Radius of Root Canal

Eugenio Pedullà, DDS, MS, PhD, Giusy Rita Maria La Rosa, DDS,* Chiara Virgillito, DDS,* Ernesto Rapisarda, DDS,* Hyeon-Cheol Kim, DDS, MS, PhD,† and Luigi Generali, DDS‡*

ABSTRACT

Introduction: The aim of this study was to compare the influences from different access angles and curvature radii on cyclic fatigue resistance of nickel-titanium rotary files. **Methods:** Two file systems (2Shape [TS; MicroMega, Besançon, France] and HyFlex CM [HCM; Coltène/Whaledent, Allstätten, Switzerland]) were used. A total of 192 instruments of TS #25/.04 (TS1), TS #25/.06 (TS2), HCM #25/.04, and HCM #25/.06 were evaluated at 3 insertion angles (0°, 10°, and 20°) and 2 radii (5 mm and 3 mm) in 16-mm stainless steel artificial canals with a 60° curvature. Cyclic fatigue resistance was determined by the number of cycles to failure (NCF) using a customized testing device. Data were analyzed statistically with the significance level established at 95%. **Results:** In the 3-mm radius canal, the instruments showed lower cyclic fatigue resistance than in the 5-mm radius canal ($P < .05$). HCM #25/.06 and all .04 taper instruments had a significant NCF reduction at 20° and 10° in the 3-mm radius canal ($P < .05$), whereas TS2 showed no significant differences. In the 5-mm radius of curvature, although .06 taper instruments had no significant NCF reduction for each angle tested, .04 taper files exhibited significant NCF reduction when tested at 20° ($P < .05$). Comparing the same size instruments, HCM had higher NCF than TS ($P < .05$). Instruments with a .04 taper exhibited higher NCF than the .06 ones with the same heat treatment ($P < .05$). **Conclusions:** An inclined insertion into the canals decreased cyclic fatigue resistance of thermal-treated instruments with a .04 taper at all radii of curvature tested. The synergistic effect of a small radius of curvature and access angulation of heat-treated instruments decreases their fatigue resistance. *(J Endod 2020;46:431–436.)*

KEY WORDS

2Shape; angle of file access; canal curvature; canal radius; cyclic fatigue resistance; HyFlex CM

SIGNIFICANCE

The angulated file access and/or severe curved canal curvature with a small radius could influence (reduce) cyclic fatigue resistance of heat-treated nickel-titanium instruments.

Nickel-titanium (NiTi) rotary instruments may exhibit a higher risk of intraoperative fracture within the root canal[1]. Fracture may occur due to torsional failure or cyclic fatigue[2,3]. Cyclic fatigue appears to be the more prevalent cause of "unexpected" breakages[4]. Cyclic fatigue fracture occurs from an incremental crack propagation caused by repeated tensile-compressive stress when the file is placed in a curved canal[5,6].

Several factors influence the fracture of rotary files, such as size, cross-sectional area, design, heat treatment, and metallurgic properties of instruments[7]. One of the most important variables involved in instrument fracture is the radius of curvature[8]. This anatomic variable plays a crucial role, especially in S-shaped curvatures[9,10]. Another parameter is inclined insertion of the file into the canal. It depends on the anatomic access configuration and operator skills[11,12]. In particular, for noninvasive dentistry and endodontics, the recent contracted endodontic cavities could be associated with excessive inclination of NiTi instruments[13].

Heat treatments have been attempted in order to develop a superelastic alloy that improves the characteristics of traditional NiTi instruments[14]. HyFlex CM (HCM; Coltène/Whaledent, Allstätten,

From the *Department of General Surgery and Surgical-Medical Specialties, University of Catania, Catania, Italy; †Department of Conservative Dentistry, School of Dentistry, Dental and Life Science Institute, Dental Research Institute, Pusan National University, Yangsan, Korea; and ‡Department of Surgery, Medicine, Dentistry and Morphological Sciences with Transplant Surgery, Oncology and Regenerative Medicine Relevance (CHIMOMO), University of Modena and Reggio Emilia, Modena, Italy

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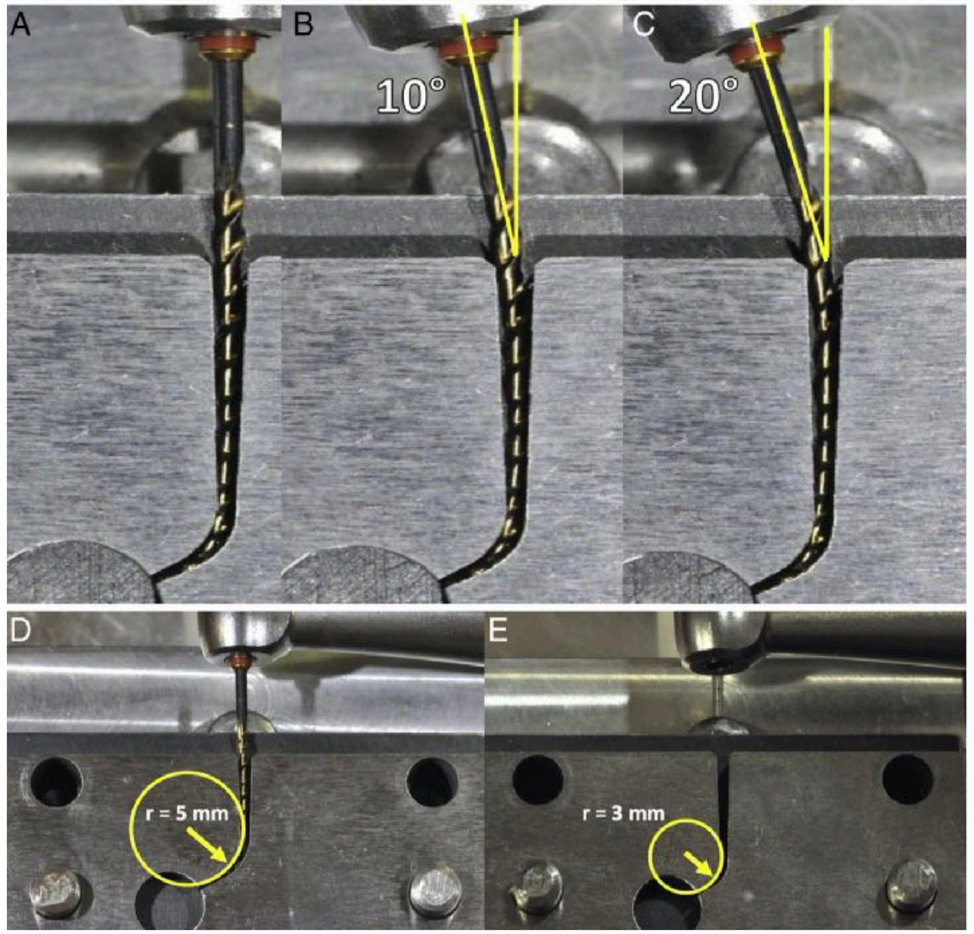
https://doi.org/10.1016/j.joen.2019.11.018



.05). **Conclusions:** An inclined insertion into the canals decreased cyclic fatigue resistance of thermal-treated instruments with a .04 taper at all radii of curvature tested. The synergistic effect of a small radius of curvature and access angulation of heat-treated instruments decreases their fatigue resistance. *(J Endod 2020;46:431–436.)*

BASIC RESEARCH – TECHNOLOGY

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Several factors influence the fracture of rotary files, such as size, cross-sectional area, design, heat treatment, and metallurgic properties of instruments[7]. One of the most important variables involved in instrument fracture is the radius of curvature[8]. This anatomic variable plays a crucial role, especially in S-shaped curvatures[9,10]. Another parameter is inclined insertion of the file into the canal. It depends on the anatomic access configuration and operator skills[11,12]. In particular, for noninvasive dentistry and endodontics, the recent contracted endodontic cavities could be associated with excessive inclination of NiTi instruments[13].

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https://doi.org/10.1016/j.joen.2019.11.016

Artificial canal	Group	Insertion angle	Mean ± SD
5-mm radius 60° angle	TS2 #25/.06	0°	254 ± 31[1a]
		10°	296 ± 96[1a]
		20°	245 ± 42[1a]
	HyFlex CM #25/.06	0°	1390 ± 154[2b]
		10°	1327 ± 145[2b]
		20°	1286 ± 66[2b]
	TS1 #25/.04	0°	697 ± 99[3a]
		10°	647 ± 93[3a]
		20°	564 ± 71[4a]
	HyFlex CM #25/.04	0°	3760 ± 579[5b]
		10°	3487 ± 676[5b]
		20°	2604 ± 146[6b]
3-mm radius 60° angle	TS2 #25/.06	0°	156 ± 35[1a]
		10°	180 ± 64[1a]
		20°	169 ± 47[1a]
	HyFlex CM #25/.06	0°	730 ±17[2b]
		10°	681 ± 64[2b]
		20°	564 ± 56[3b]
	TS1 #25/.04	0°	563 ± 118[3a]
		10°	437 ± 59[4a]
		20°	422 ± 62[4a]
	HyFlex CM #25/.04	0°	2788 ± 326[5b]
		10°	2071 ± 185[6b]
		20°	1777 ± 98[6b]

.05). **Conclusions:** An inclined insertion into the canals decreased cyclic fatigue resistance of thermal-treated instruments with a .04 taper at all radii of curvature tested. The synergistic effect of a small radius of curvature and access angulation of heat-treated instruments decreases their fatigue resistance. *(J Endod 2020;46:431–436.)*

Preflaring and Apical Diameter

Preflaring of the cervical and middle thirds of the root canal improves the determination of the anatomical diameter

Influence of cervical preflaring on apical file size determination

J. D. Pecora[1], A. Capelli[1], D. M. Z. Guerisoli[1], J. C. E. Spanó[1] & C. Estrela[2]
[1]Ribeirão Preto Dental School, University of São Paulo, Ribeirão Preto, SP, Brazil; and [2]Department of Endodontics, Federal University of Goias, Goiânia, GO, Brazil

Abstract

Pecora JD, Capelli A, Guerisoli DMZ, Spanó JCE, Estrela C. Influence of cervical preflaring on apical file size determination. *International Endodontic Journal*, **38**, 430–435, 2005.

Aim To investigate the influence of cervical preflaring with different instruments (Gates-Glidden drills, Quantec Flare series instruments and LA Axxess burs) on the first file that binds at working length (WL) in maxillary central incisors.

Methodology Forty human maxillary central incisors with complete root formation were used. After standard access cavities, a size 06 K-file was inserted into each canal until the apical foramen was reached. The WL was set 1 mm short of the apical foramen. Group 1 received the initial apical instrument without previous preflaring of the cervical and middle thirds of the root canal. Group 2 had the cervical and middle portion of the root canals enlarged with Gates-Glidden drills sizes 90, 110 and 130. Group 3 had the cervical and middle thirds of the root canals enlarged with nickel-titanium Quantec Flare series instruments. Titanium-nitrite treated, stainless steel LA Axxess burs were used for preflaring the cervical and middle portions of root canals from group 4. Each canal was sized using manual K-files, starting with size 08 files with passive movements until the WL was reached. File sizes were increased until a binding sensation was felt at the WL, and the instrument size was recorded for each tooth. The apical region was then observed under a stereoscopic magnifier, images were recorded digitally and the differences between root canal and maximum file diameters were evaluated for each sample.

Results Significant differences were found between experimental groups regarding anatomical diameter at the WL and the first file to bind in the canal ($P < 0.01$, 95% confidence interval). The major discrepancy was found when no preflaring was performed (0.151 mm average). The LA Axxess burs produced the smallest differences between anatomical diameter and first file to bind (0.016 mm average). Gates-Glidden drills and Flare instruments were ranked in an intermediary position, with no statistically significant differences between them (0.093 mm average).

Conclusions The instrument binding technique for determining anatomical diameter at WL is not precise. Preflaring of the cervical and middle thirds of the root canal improved anatomical diameter determination; the instrument used for preflaring played a major role in determining the anatomical diameter at the WL. Canals preflared with LA Axxess burs created a more accurate relationship between file size and anatomical diameter.

Keywords: apical file size determination, coronal flaring, instrument type.

Received 21 May 2003; accepted 10 January 2005

Introduction

Current standards in root canal treatment are based on cleaning and shaping the root canal prior to filling (West & Roane 1998). Some authors suggest that the amount of apical enlargement to be achieved during shaping of the canal should be based on the estimation of initial apical diameter and by three file sizes greater

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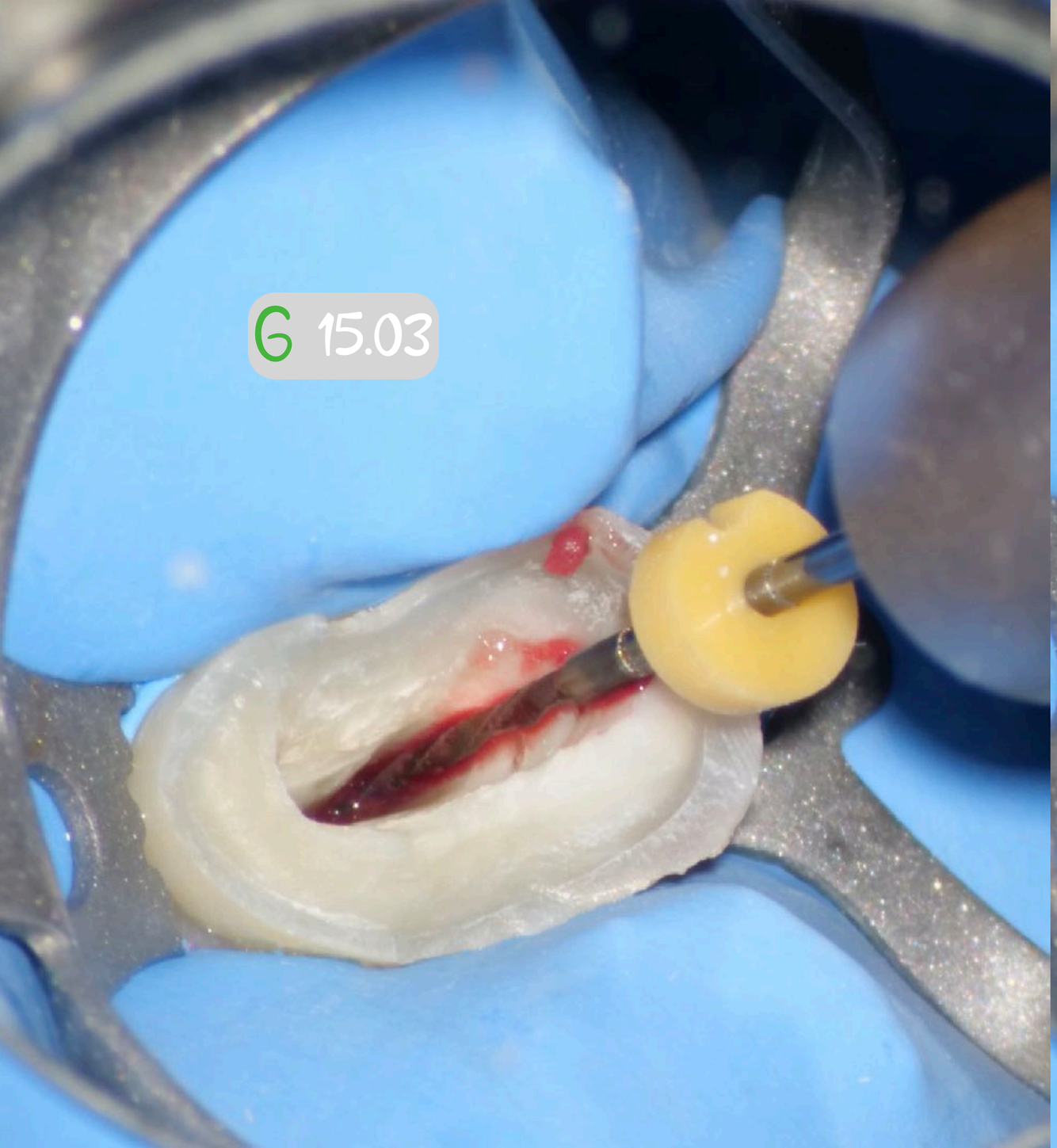
G 15.03


S 18.045

Original Article

Shaping ability of HyFlex EDM and ProTaper Gold files with or without using glide path files: An *in vitro* study

Maryam Gharechahi, Harir Ahmadi[1], Maryam Forghanirad, Melika Hoseinzadeh[2], Anahita Nouri[3]

Departments of Endodontics and [3]Prosthodontics, School of Dentistry, Mashhad University of Medical Science, [2]Dentist, Research Assistant, Dental Research Center, Mashhad Dental School, Mashhad University of Medical Sciences, [1]Dentist, Mashhad, Iran

Abstract

Introduction: The necessity of using a glide path before the canal preparation is inconclusive. Therefore, this study aimed to assess the shaping ability of two rotary systems in the maxillary first molars' first mesiobuccal canal (MB1), with or without employing the glide path files.

Materials and Methods: The MB1 canals of 100 extracted molars were randomly prepared using either HyFlex EDM (HEDM) or ProTaper Gold (PTG) systems (n = 50 each). Half of the samples in each group were prepared using ProGlider (PG) or HyFlex EDM Glide (HEG). The cone-beam computed tomography scanning was conducted before and after the instrumentation. The canal transportation, centering ability,

Conclusions: The HEDM system outperformed PTG regarding centering ability in the sub-furcation areas and canal transportation 2 mm below the furcation. However, HEDM showed more dentin removal in the middle region than PTG, which was resolved when HEG was used. Therefore, using PathFile with the HEDM system might be suggested.

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Keywords: Canal transportation, centering ability, glide path, NiTi file, root canal preparation

International Journal of
Dentistry

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Evaluation of Cyclic Fatigue of Hyflex EDM, Twisted Files, and ProTaper Gold Manufactured with Different Processes: An In Vitro Study

Pooja D Khandagale [1], Prashant P Shetty [2]
[3,4], Anand Marya [5,✉], Pietro Messina [6], Gius

Result

The Hyflex EDM (774.29) exhibited the maximum cyclic fatigue resistance compared to Twisted files (654.875) and ProTaper Gold (375.575). A statistically significant difference was observed between the tested groups.

Conclusion

The Hyflex EDM files showed the highest cyclic fatigue resistance, followed by Twisted files and ProTaper Gold files.

DESPIRALIZZAZIONE

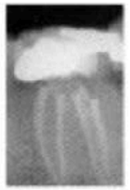
EVITA L'IMPEGNO CANALARE DELLO STRUMENTO

DEFORMAZIONE ELASTICA O PLASTICA?

TCA-TACTILE CONTROLLED ACTIVATION

INTERNATIONAL
ENDODONTIC JOURNAL

doi:10.1111/iej.12610

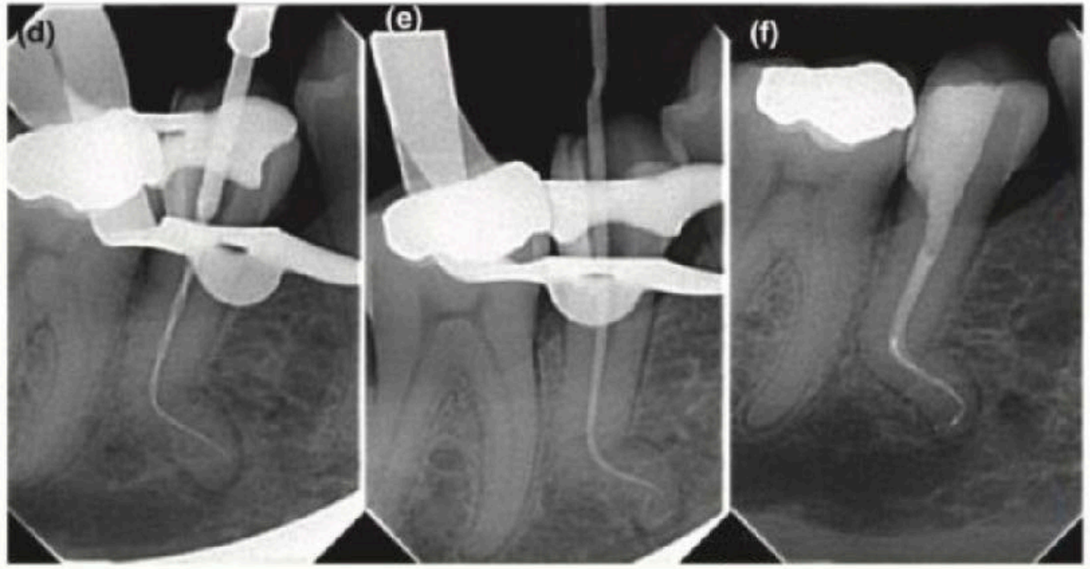


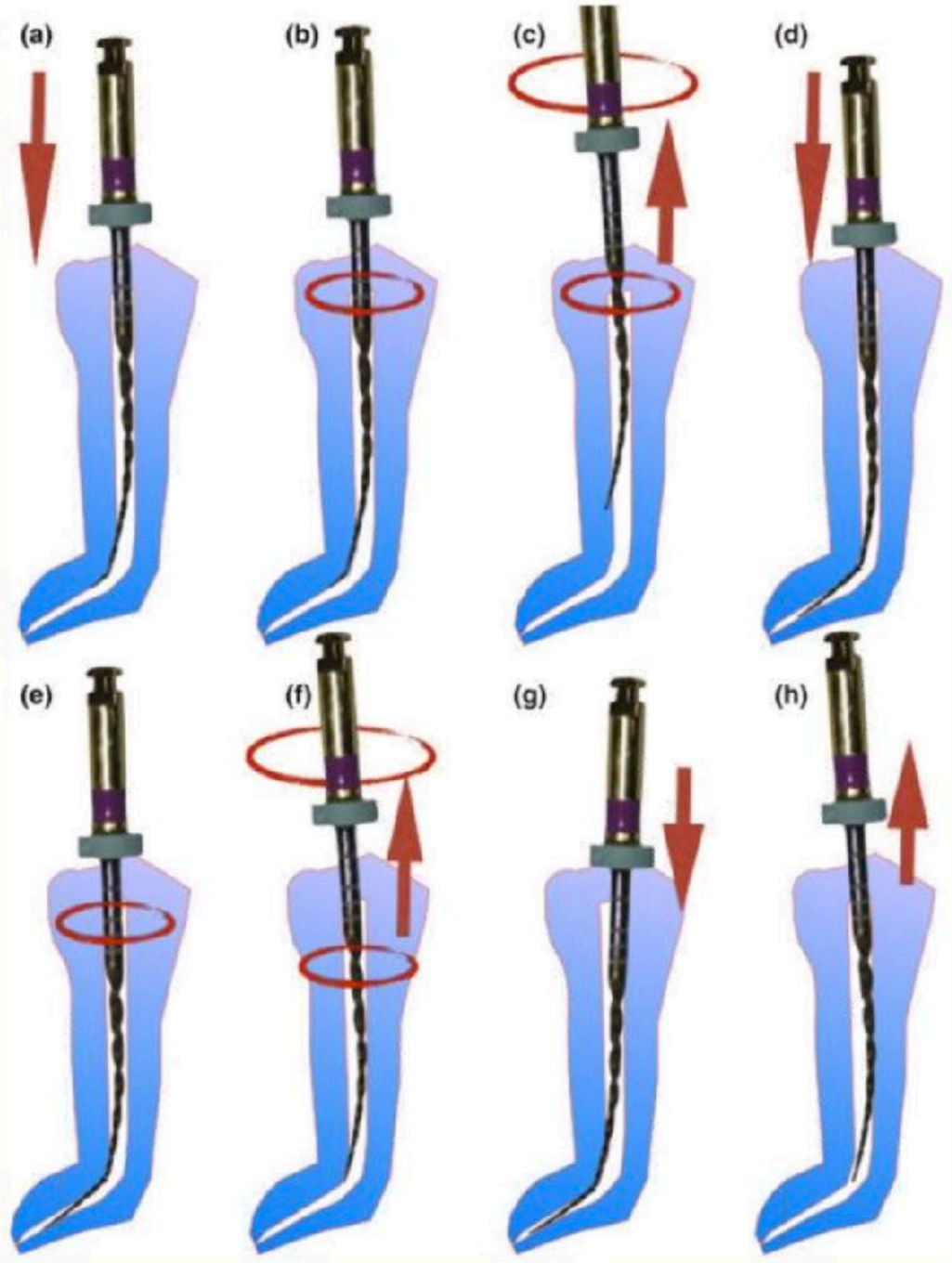
CASE REPORT

Root canal treatment of a dilacerated mandibular premolar using a novel instrumentation approach. A case report

A. Chaniotis[1] & C. Filippatos[2]

[1]Private Practice, Kalithea; and [2]School of Dentistry, National and Kapodistrian University of Athens, Goudi, Athens, Greece





Science behind the developments:

Preparation to size 30 offers minimum requirement for irrigation and obturation

F 30.04

Determination of the Minimum Instrumentation Size for Penetration of Irrigants to the Apical Third of Root Canal Systems

Abbasali Khademi, DDS, MS, Mohammad Yazdizadeh, DDS, MS, and Mahboobe Feizianfard, DDS, MS

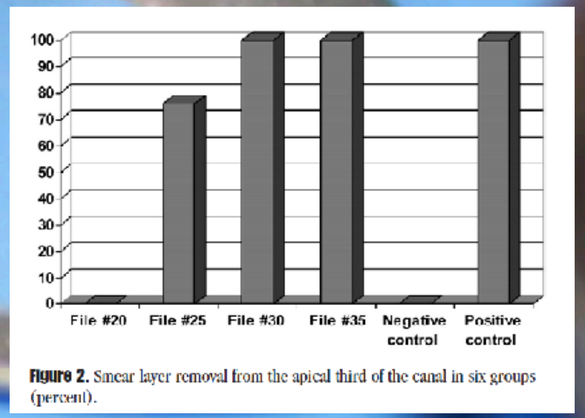


Figure 2. Smear layer removal from the apical third of the canal in six groups (percent).

“BACTERIA ARE RESPONSABILE FOR EVERY ENDODONTIC LESION”

KAKEHASHI 1965

DIAMETRO DELLA PREPARAZIONE

Minimal apical preparation ... Srikanth P et al *Journal of International Oral Health 2015; 7(6):92-96*

Received: 28th January 2015 Accepted: 20th April 2015 Conflicts of Interest: None

Source of Support: Nil

Original Research

Minimal Apical Enlargement for Penetration of Irrigants to the Apical Third of Root Canal System: A Scanning Electron Microscope Study

P Srikanth[1], Amaravadi Gopi Krishna[2], Siva Srinivas[3], E Sujayeendranatha Reddy[4], Someshwar Battu[5], Swathi Aravelli[1]

Conclusion: Minimal apical enlargement for penetration of irrigants to the apical third of root canal system is #30 size.

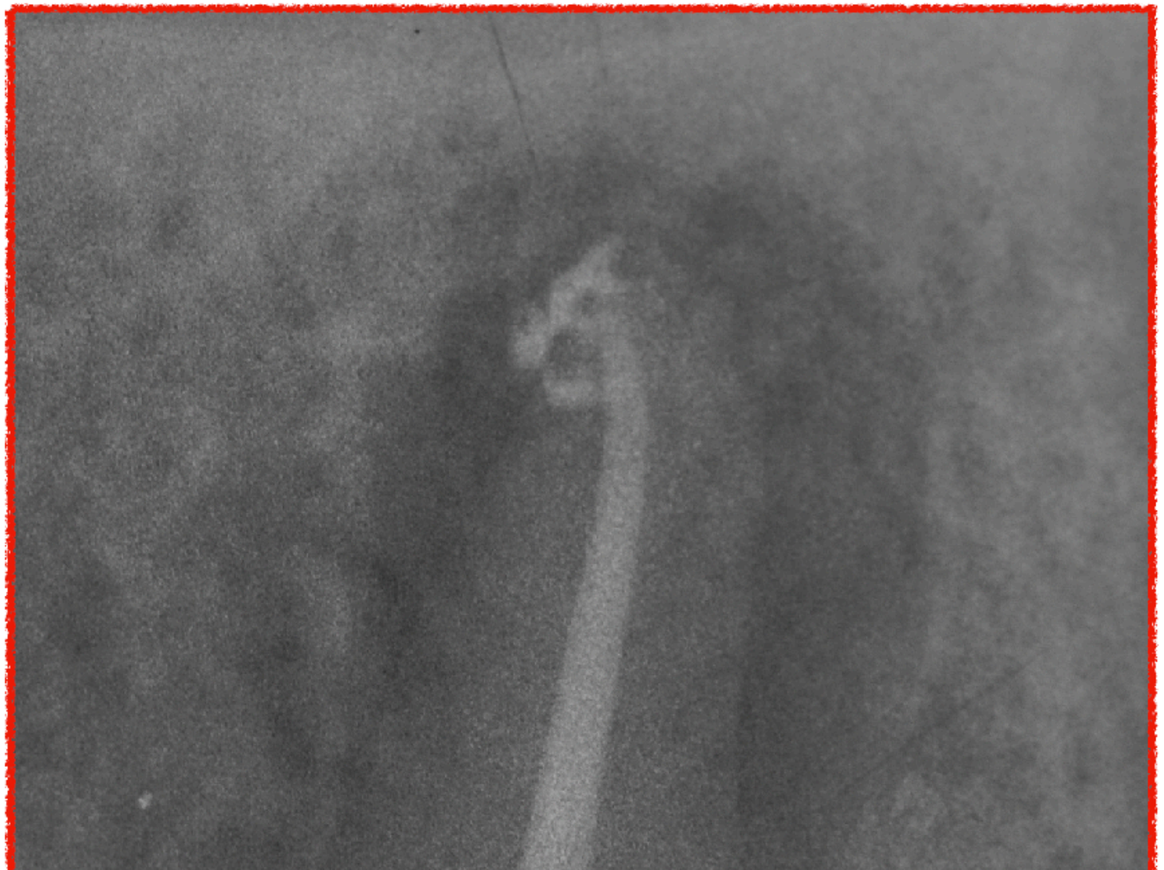
La minima strumentazione necessaria per la penetrazione degli irriganti nel terzo apicale è **#30 - 35.**

DIAMETRO DELLA PREPARAZIONE

ALLARGAMENTO APICALE

MIGLIORA EFFICACIA IRRIGANTI

MIGLIORE DISINFEZIONE MECCANICA



DIAMETRO DELLA PREPARAZIONE

Better microbial removal and more effective irrigation occurs when canals are instrumented to larger apical sizes

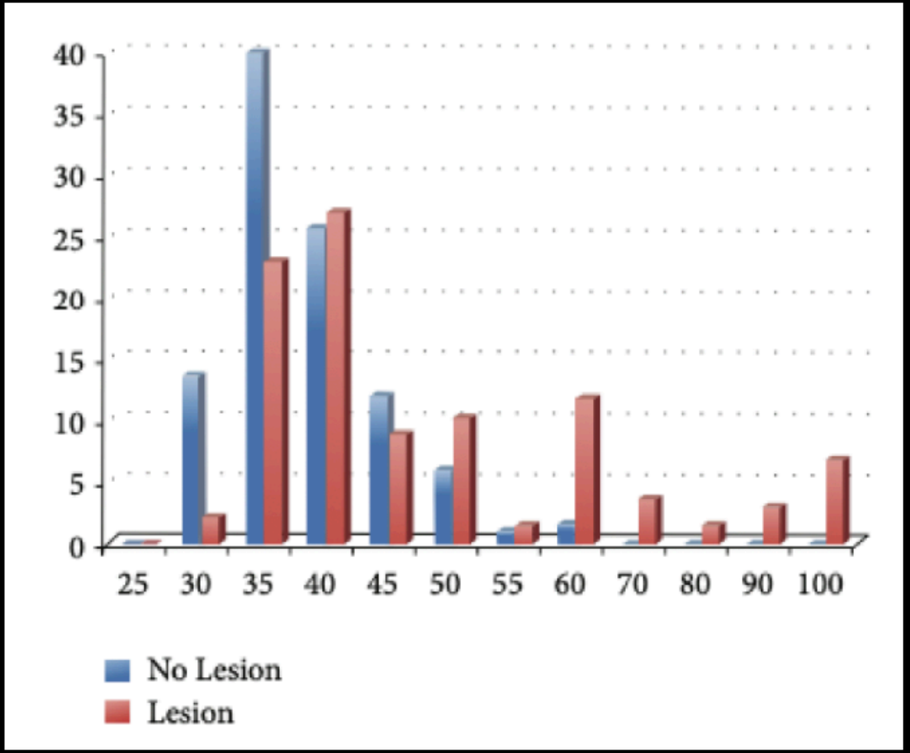
30-35

AMINOSHARIE 2015

BAUGH 2005

Table 1: Ratio of diameters in the apical part of root canal in teeth with and without periapical lesions: all presented as median and interquartile ranges.

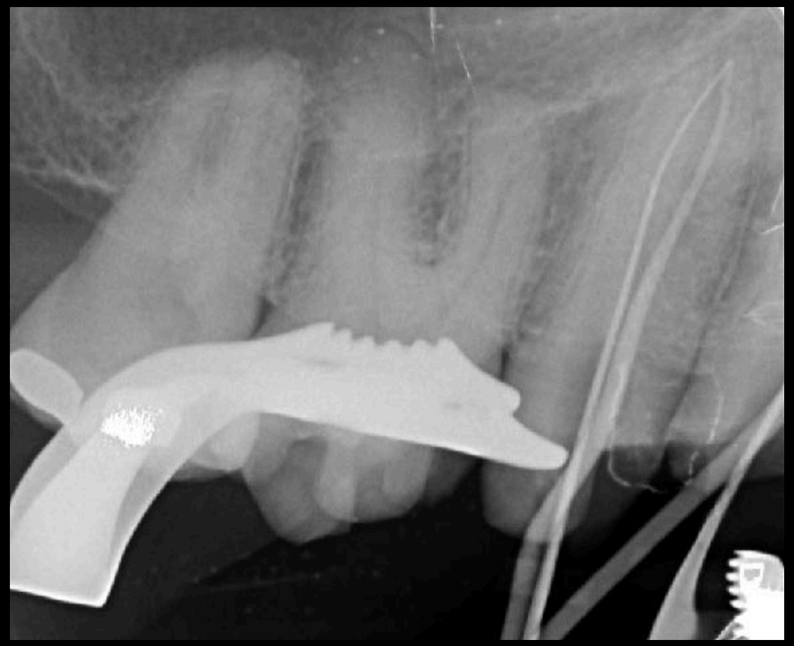
Group	*N*	Median	Interquartile ranges 25%–75%	Significance
Teeth with lesion	135	40	36.25–60	A
Teeth without lesion	257	35	35–40	B

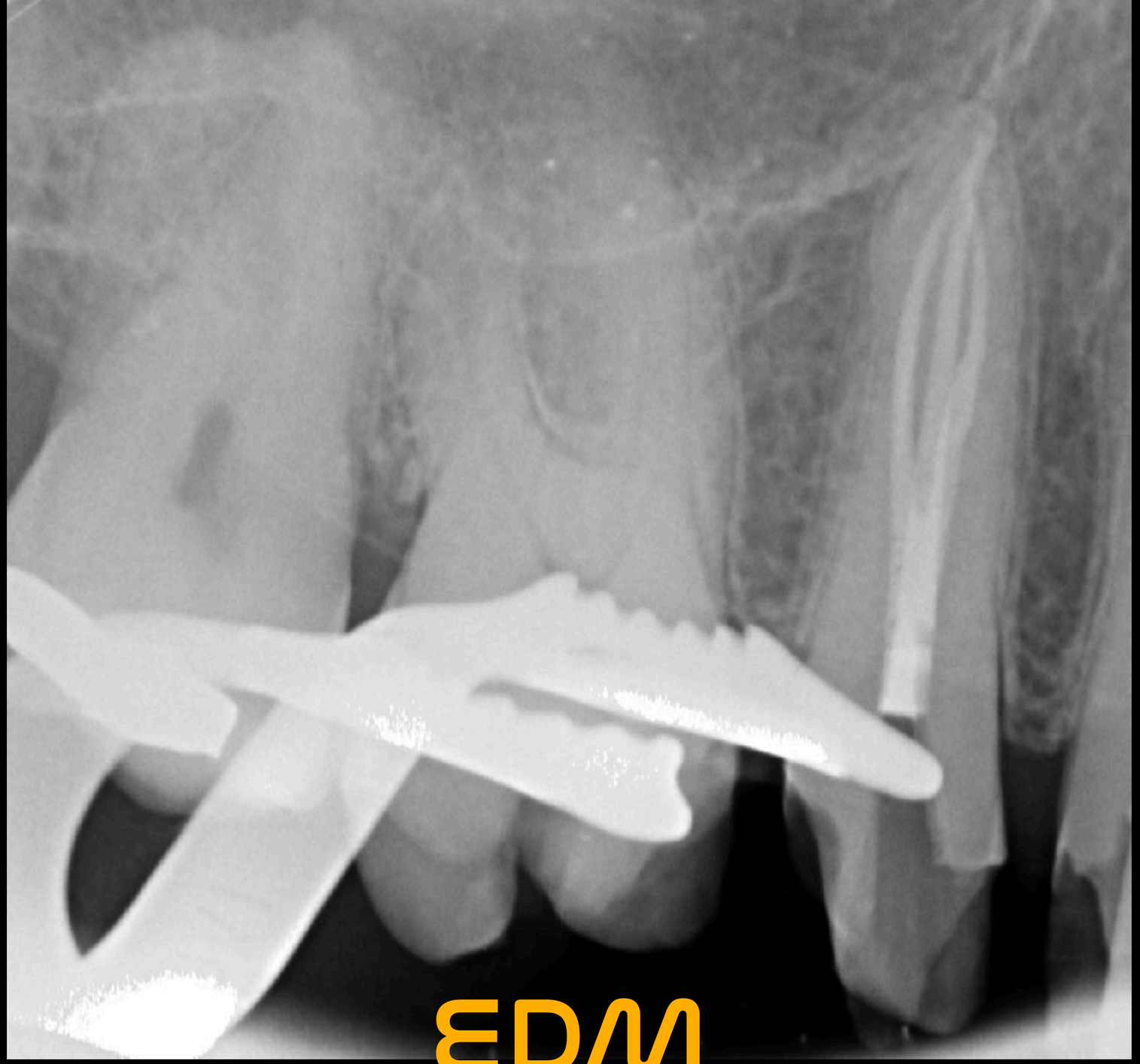


TERMINARE LA SAGOMATURA A 25/06 E' UN COMPROMESSO DETTATA DA LIMITI TECNOLOGICI MA NON DA VALUTAZIONI ANATOMICHE

LA MEDIA DEI DIAMETRI APICALI E' DI 40 NEI DENTI CON LESIONE E 35 NEI DENTI SENZA LESIONE

Gesi 2014





EDM

40.4 **50.3** **60.2**

PERCHÈ I FINISHER SONO IMPORTANTI??

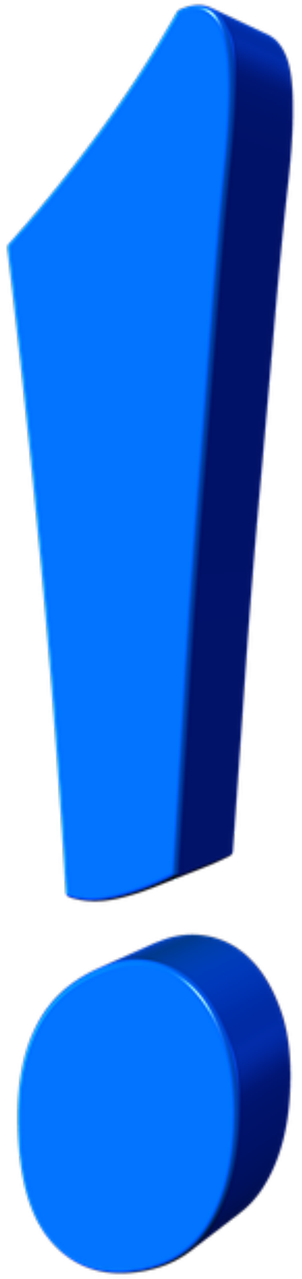
GEOMETRIA PREPARAZIONE CANALARE

DETERSIONE MECCANICA

MIGLIORAMENTO PERMEABILITA' APICALE


DETERSIONE MECCANICA
DETERSIONE CHIMICA
SUCCESSO MICROBIOLOGICO

Usually, the More Severe the Canal Curvature,
The Greater the Risk of Transportation And Unexpected Fracture
...When Larger Apical Preparations Are Targeted



Shafer 2009

DIAMETRO DELLA PREPARAZIONE

una Minor preparazione apicale in canali curvi è più sicura

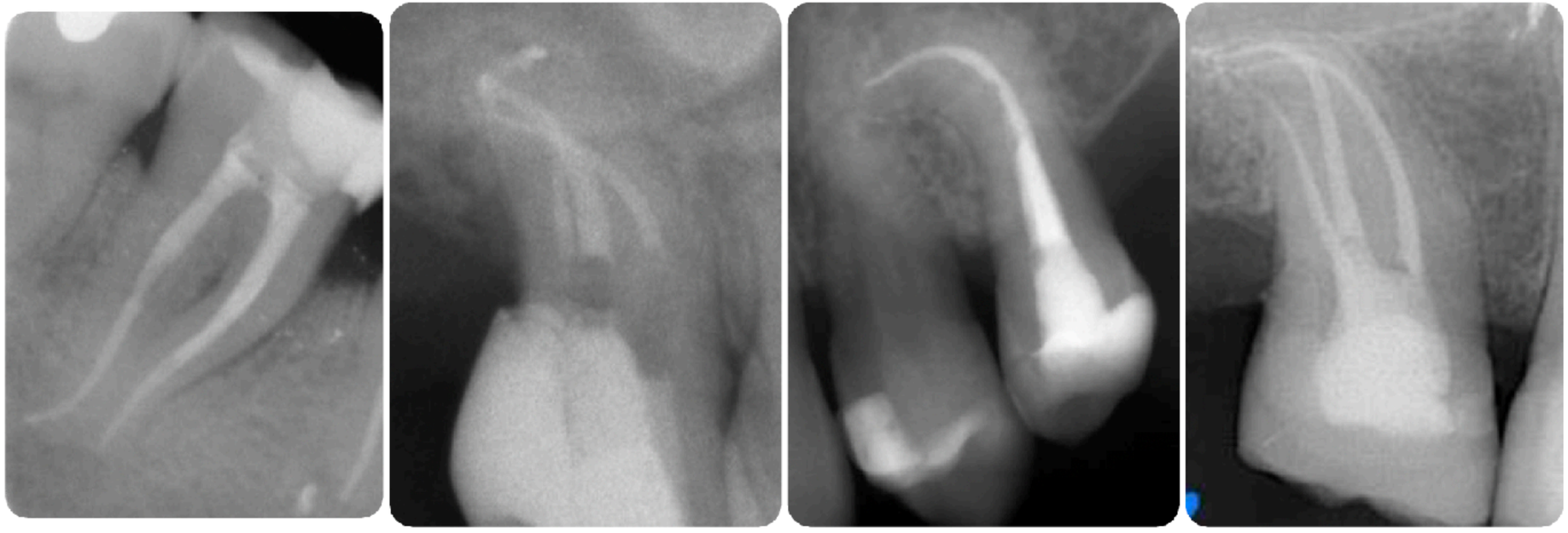
in apici poco preparati il disinfettante arriva meno

Boutsioukis et Al 2010


PROBLEM
SOLVING

Le tecniche di sagomatura stanno cambiando. La nuova evoluzione del NiTi ci consentono conicità ridotte e diametri ampi

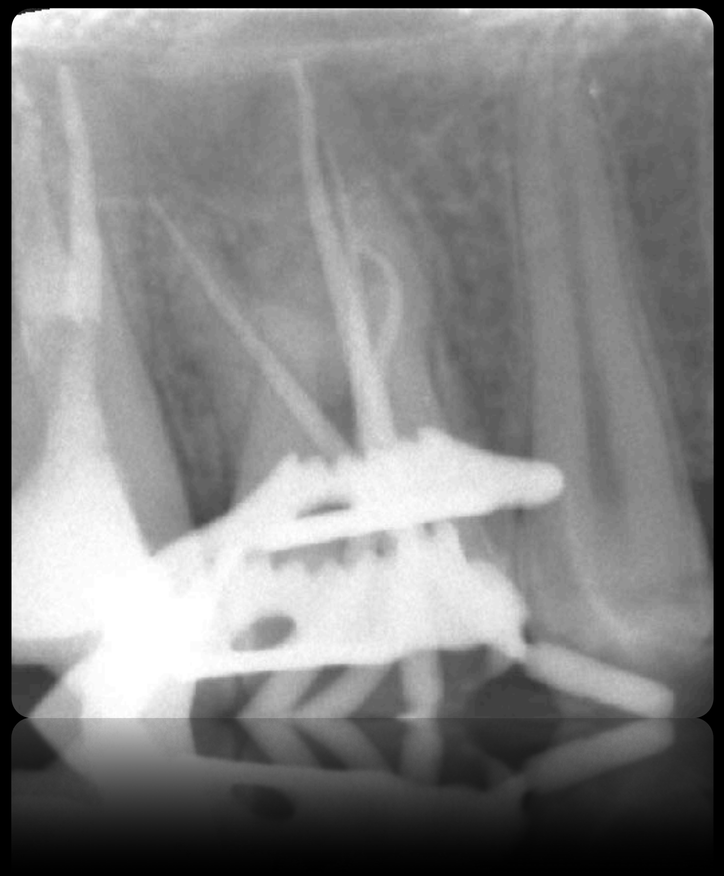
Aumento del diametro apicale



40.4 60.4 30.4 35.4

Diminuzione della conicità

EDM



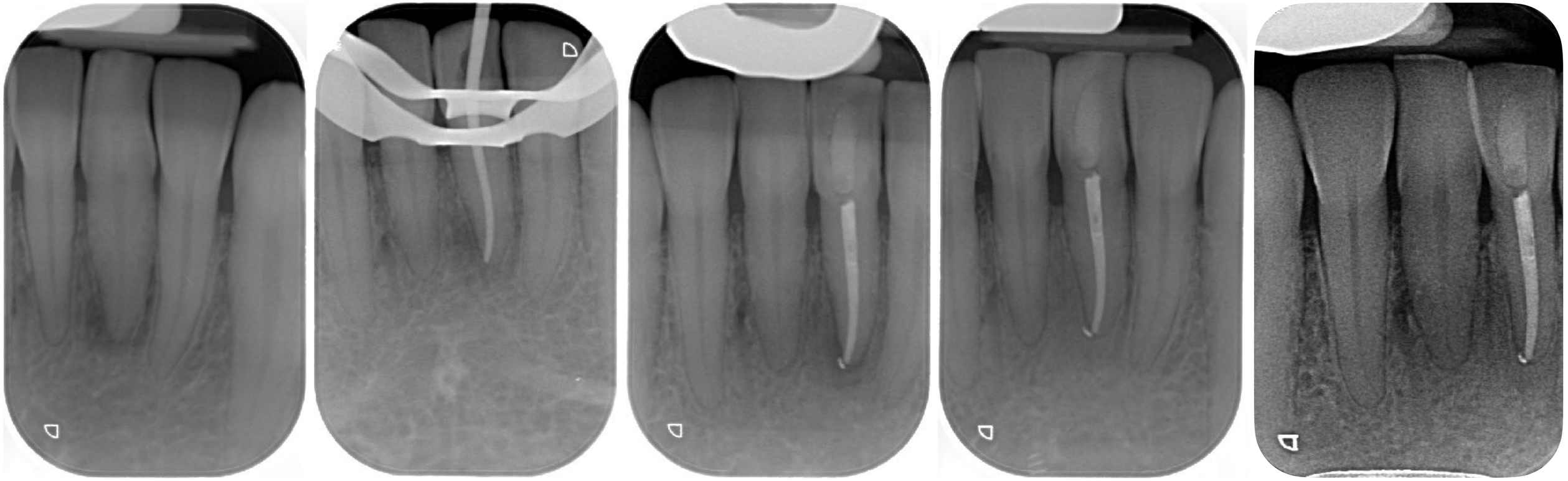
DIST:50.3

PAL:60.2

MB1: 30.4

MB2: 30.4

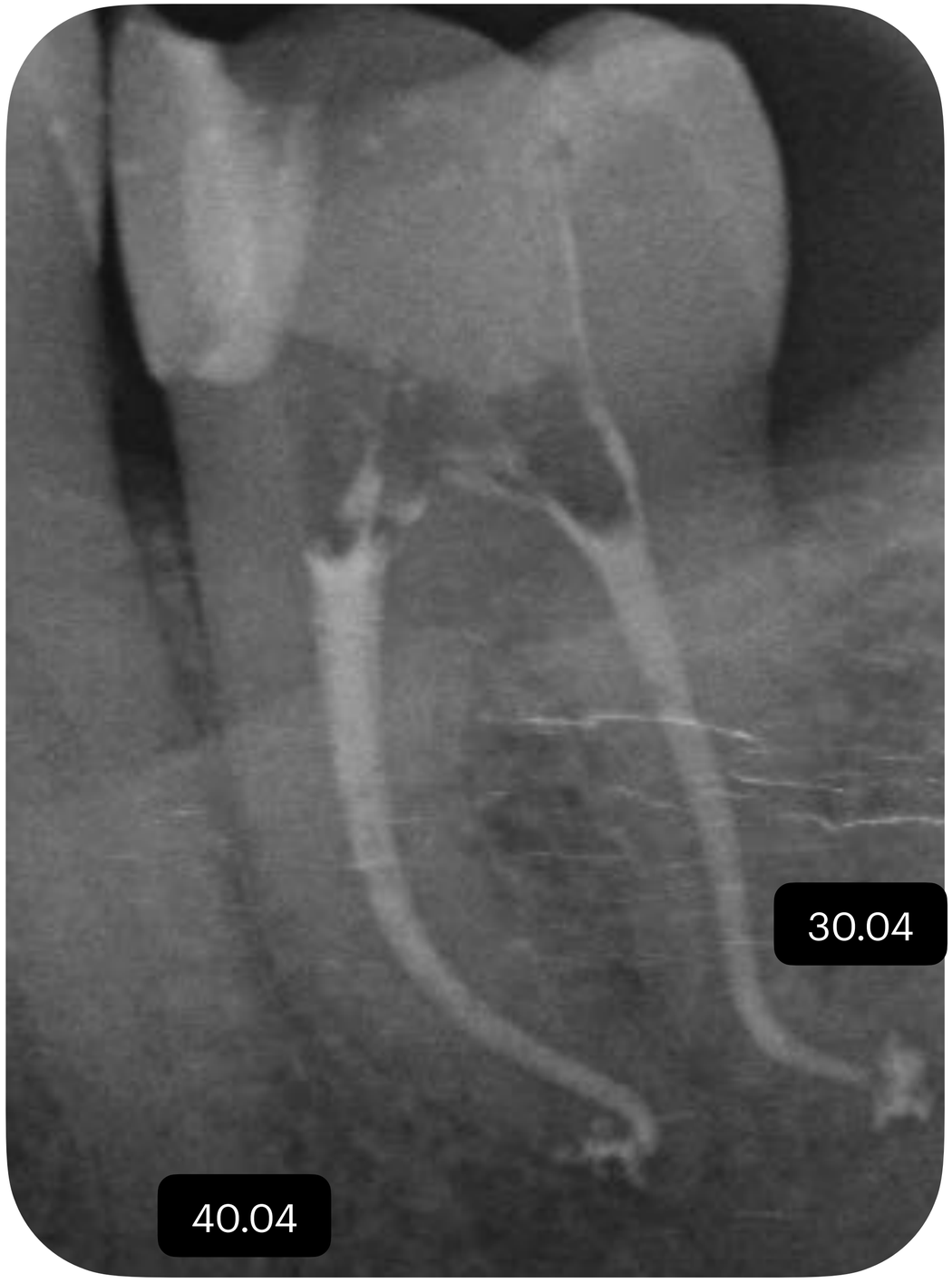
Niti Trattato termicamente EDM



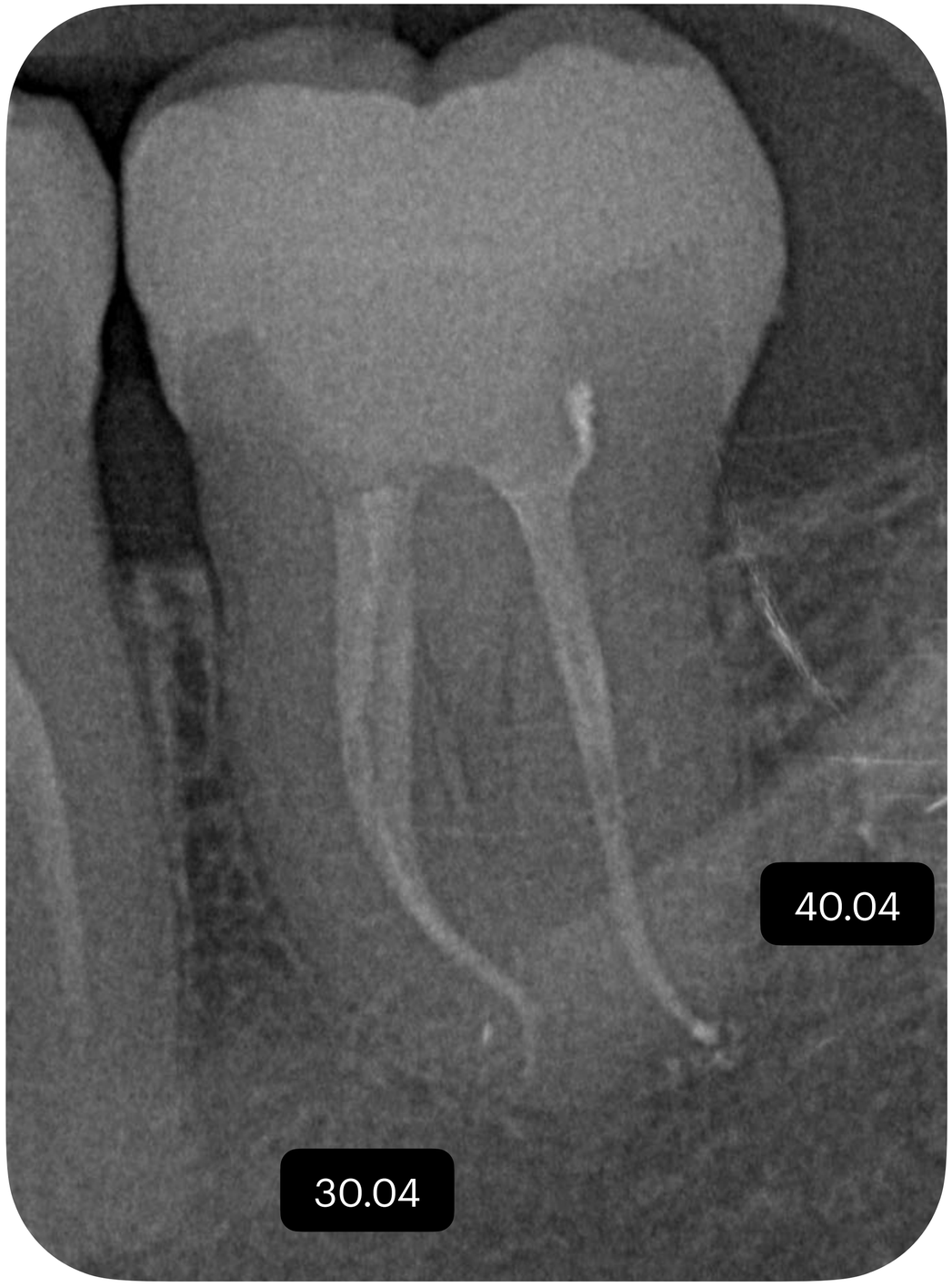
2019

50.3

2025


30.04
40.04


40.04
30.04


40.04
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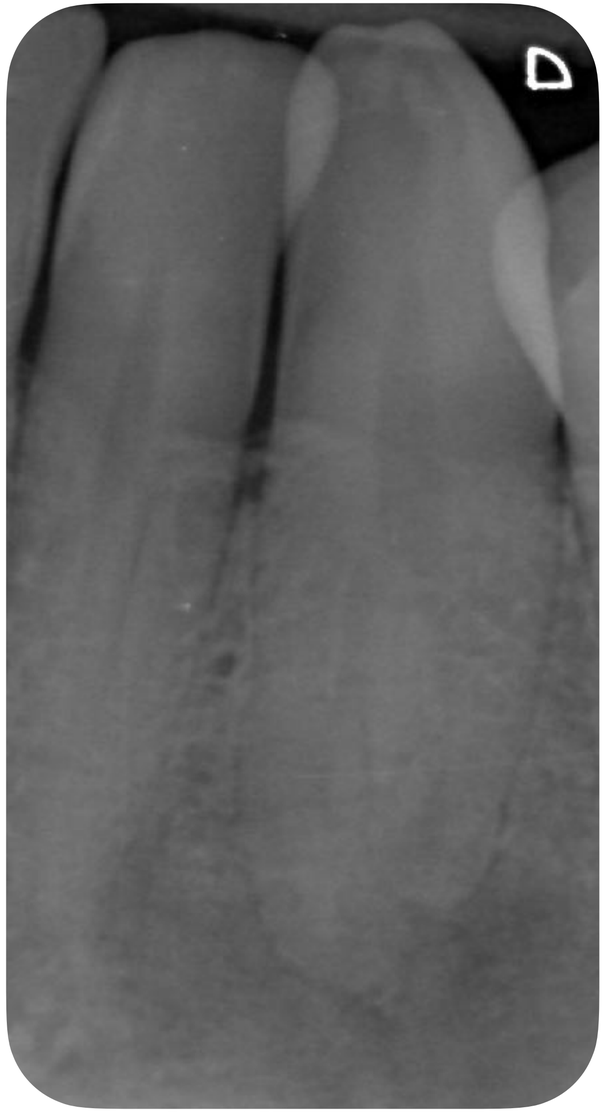
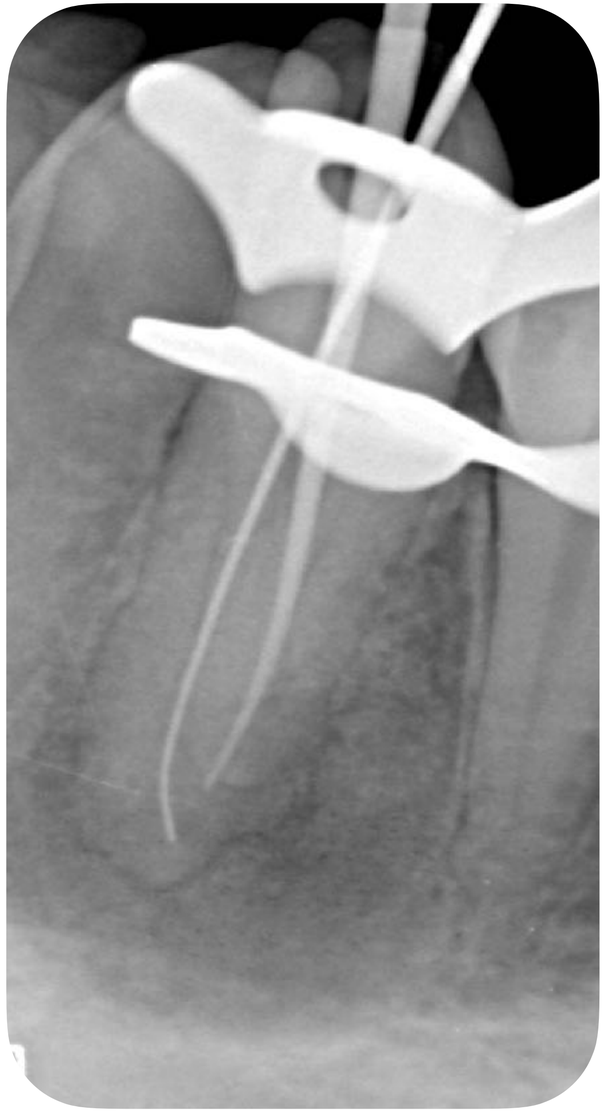
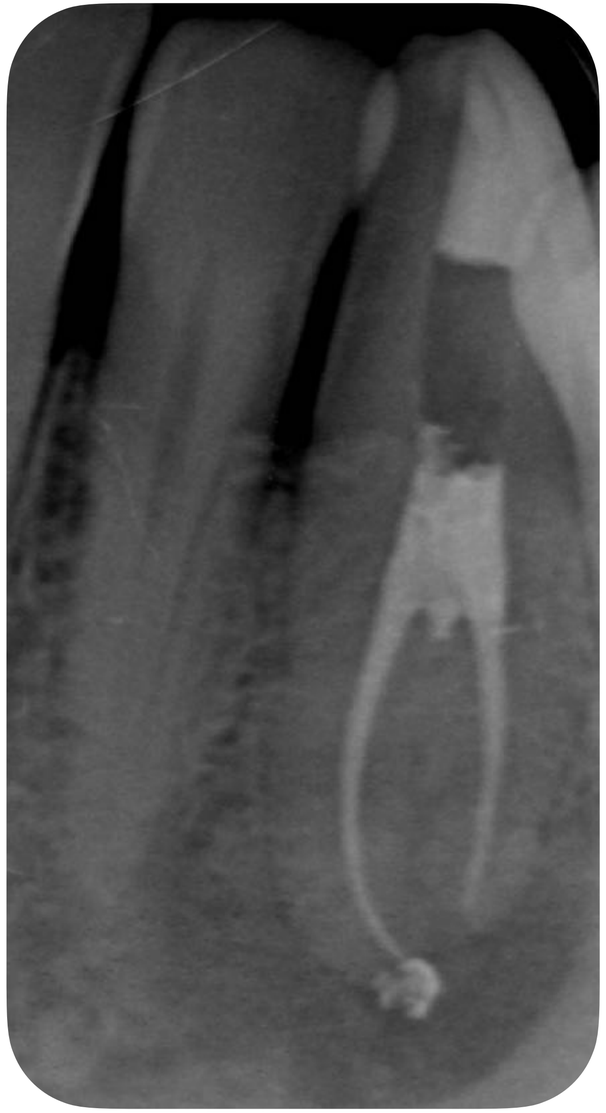
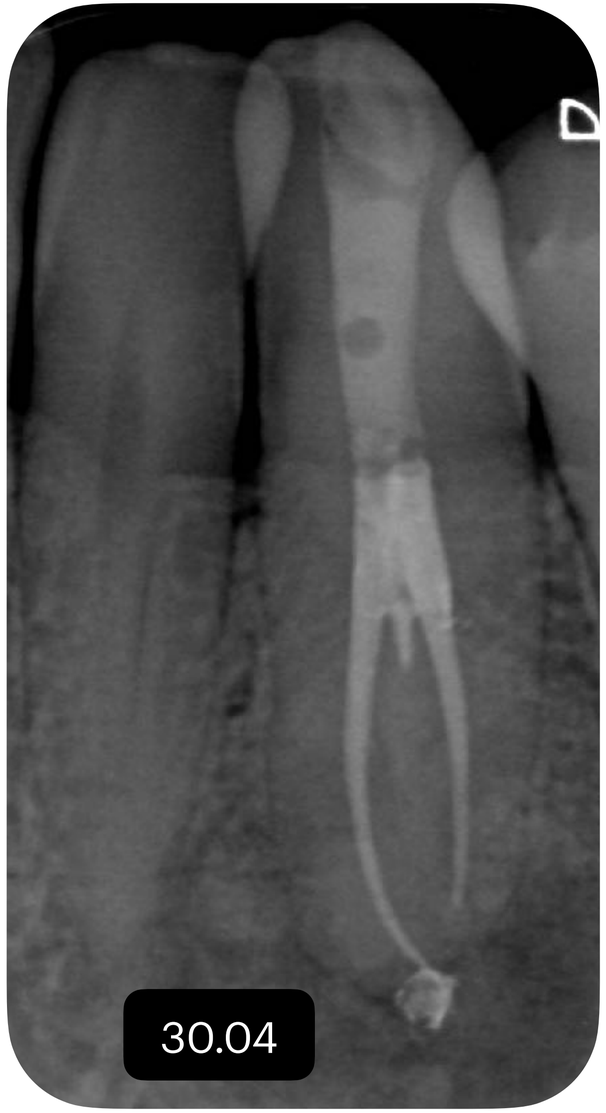







30.04

Obbiettivi del Trattamento

Meccanici

- Conicità continua da corona ad apice
- Preservare le curvature del canale
- Preservare il diametro apicale

Biologici

- Rimuovere la polpa malata
- Ridurre la carica batterica

ONE MORE THING

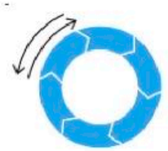
MOTORI ENDODONTICI

- MANTENERE LA VELOCITA’ DI ROTAZIONE COSTANTE
- GESTIONE DEL TORQUE DI AVANZAMENTO DEL FILE
- OTTENERE UN CARICO COSTANTE SUL FILE

CanalPro X-Move

Descrizione del Prodotto

Specifiche

- Wireless
- Rotazione Continua 
- Movimento Reciprocante con preimpostazione de angoli di rotazione del OneReci 
- Localizzatore Apicale Integrato
- Contrangolo Isolato
- Files Coltene preimpostati, per un facile utilizzo

Descrizione del Prodotto

Benefits

- Rilevatore d'apice integrato & Rotazione Continua + Movimento Reciprocante:

  TUTTO IN UN DISPOSITIVO

- Contrangolo isolato con dimensioni ridotte per:
  FACILITA' DI UTILIZZO, FACILE ACCESSO E MIGLIORE VISIBILITA'

- Files Coltene preimpostati:

  RISPARMIO DI TEMPO E FACILITA' DI UTILIZZO

CanalPro X-Move

Contrangolo:

- Trasmissione 6:1
- Rotazione di 360 gradi

Torque range: 0.4 Ncm - 5.0 Ncm（4 mNm – 50 mNm）

Speed range: 100 rpm – 2500 rpm

Regolazione degli angoli di reciprocazione: intervalli di 10°

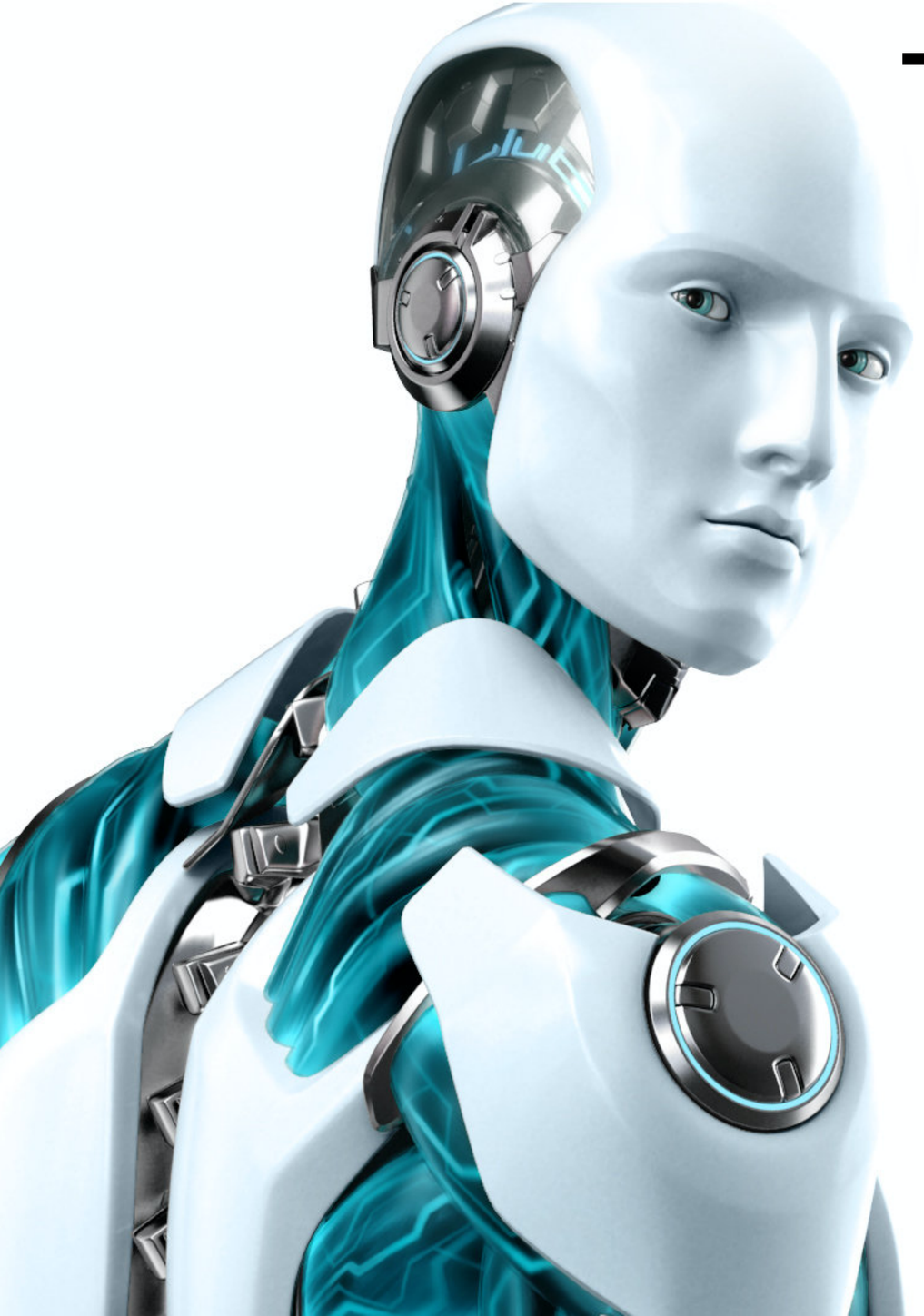
Angoli possibili: 20° - 400°

Contrangolo di dimensioni ridotte:

Diametro di 8 mm ed altezza di 9.7 mm

COLTENE

The future is Now



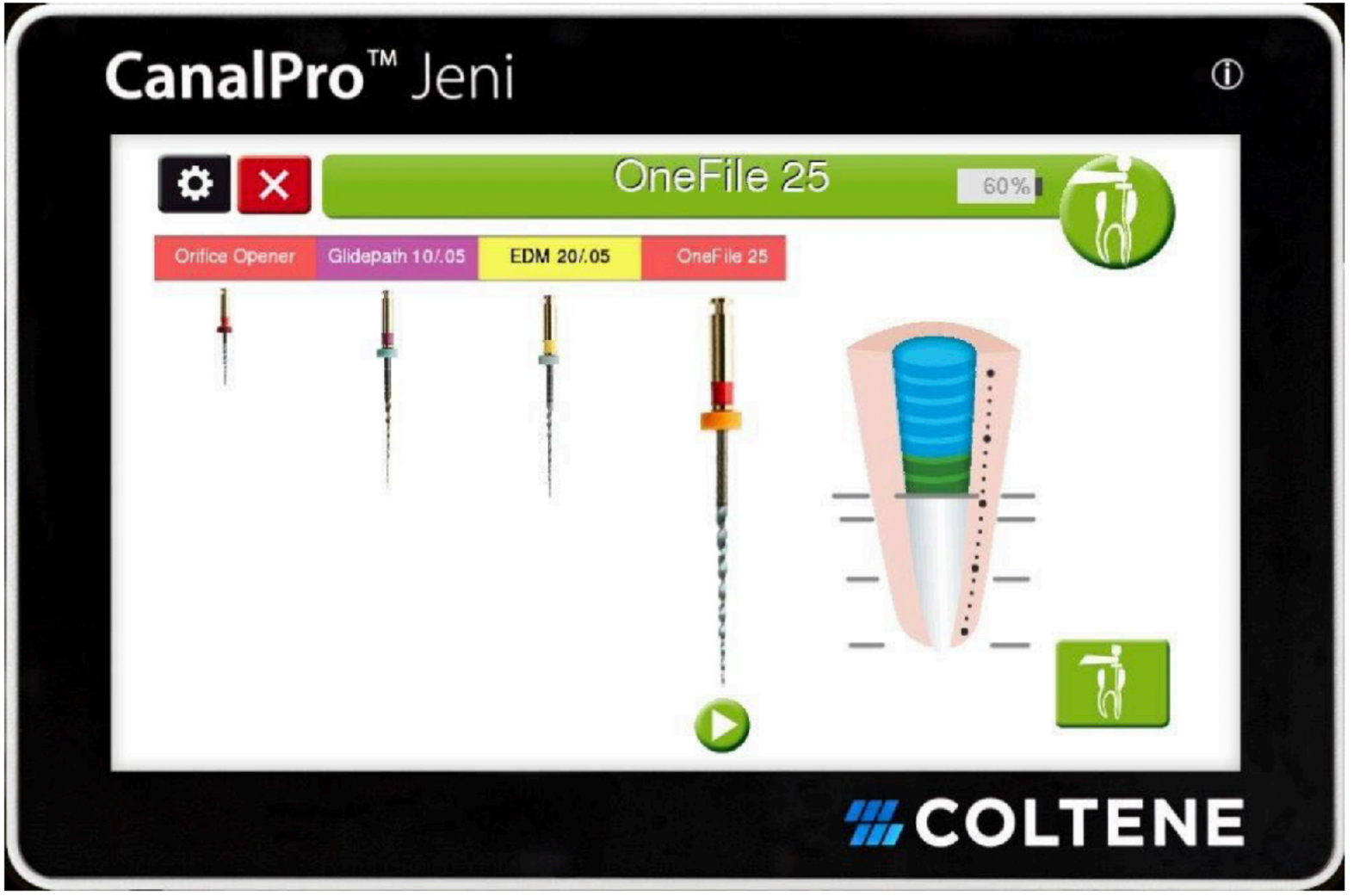
CanalPro™ Jeni

Caratteristiche Tecniche

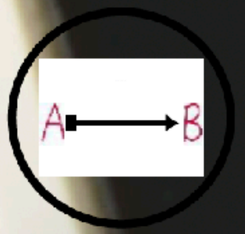
- ☑ Motore da tavolo cordless
- ☑ Monitor touch screen 7“ a colori
- ☑ Scheda SD contenente il software
- ☑ Contrangolo con rilevatore d’apice integrato
- ☑ Pedale Bluetooth

2 in 1

LOCALIZZATORE D'APICE INTEGRATO



caratteristiche software

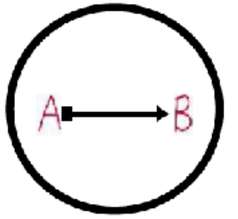


4 PROGRAMMI : HYFLEX EDM, HYFLEX CM, MM ONECURVE, MM 2SHAPE

NOTIFICA DI IRRIGAZIONE AUTOMATICA (BEEP LUNGO)

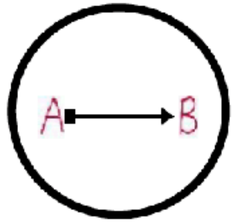
NOTIFICA DI CAMBIO FILE AUTOMATICA (PIU BEEP BREVI)

4 PROGRAMMI : HYFLEX EDM, HYFLEX CM, MM ONECURVE, MM 2SHAPE



APPLICANDO UNA LEGGERA PRESSIONE CONTINUA SUL MANIPOLO, IL MOTORE RILEVA AUTOMATICAMENTE L'INTENSITA ATTUALE DELLO STRESS DEL FILE, L'ANATOMIA DEL CANALE RADICOLARE E LA PRESSIONE APPLICATA E REGOLA DI CONSEGUENZA IL MOVIMENTO DEL FILE.

4 PROGRAMMI : HYFLEX EDM, HYFLEX CM, MM ONECURVE, MM 2SHAPE



LA RISPOSTA DEL MOTORE E DIVERSA PER OGNI STRUMENTO E CIASCUN CANALE RADICOLARE. NON E NECESSARIO IL MOVIMENTO DI PECKING NE DI BRUSHING.

Notifica di Irrigazione automatica (beep lungo)

IL MOTORE EMETTE AUTOMATICAMENTE UN SEGNALE ACUSTICO PER INDICARE IL MOMENTO IN CUI E NECESSARIO ESTRARRE IL FILE DAL CANALE ED IRRIGARE .

Notifica di cambio file automatica (più beep brevi)

IL MOTORE INDICA CHE IL FILE DEVE ESSERE CAMBIATO DOPO UN CERTO NUMERO DI UTILIZZI (PER EVITARE LA ROTTURA)

caratteristiche software

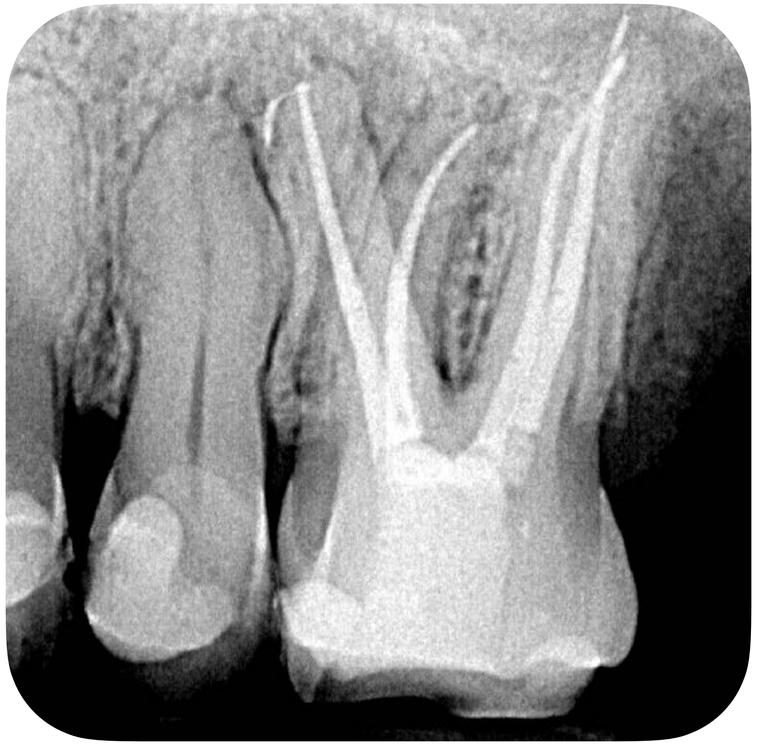
Programma Doctor's choice

CONSENTE DI PROGRAMMARE ALTRI 8 FILES E SALVARLI COME PREFERITI.

E' POSSIBILE AVERE ROTAZIONE CONTINUA CON STRUMENTI CHE AVANZANO IN SENSO ORARIO .
E' POSSIBILE AVERE SOLO RECIPROCAZIONE DALL'INIZIO ALLA FINE, SCEGLIENDO IL VERSO ED I GRADI DI ROTAZIONE CON STRUMENTI A TAGLIO IN SENSO ORARIO E CON STRUMENTI A TAGLIO ANTIORARIO (RECIPROC,WAVEONE GOLD).
IN QUESTA MODALITA NON E POSSIBILE UTILIZZARE IL MOVIMENTO "JENI".

REGOLE

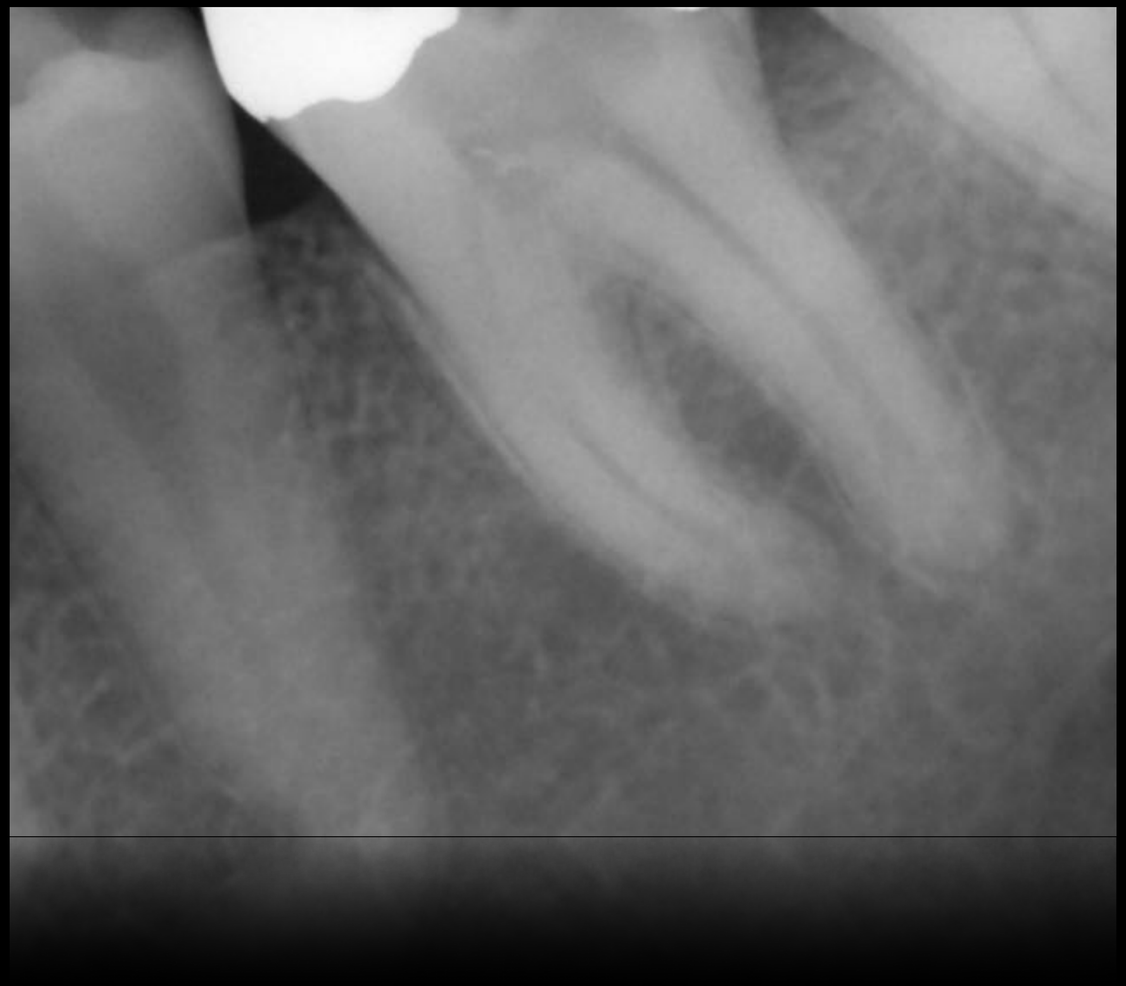
1. Leggera e costante pressione in senso apicale
2. Uscire quando si sente il Beep



EDM

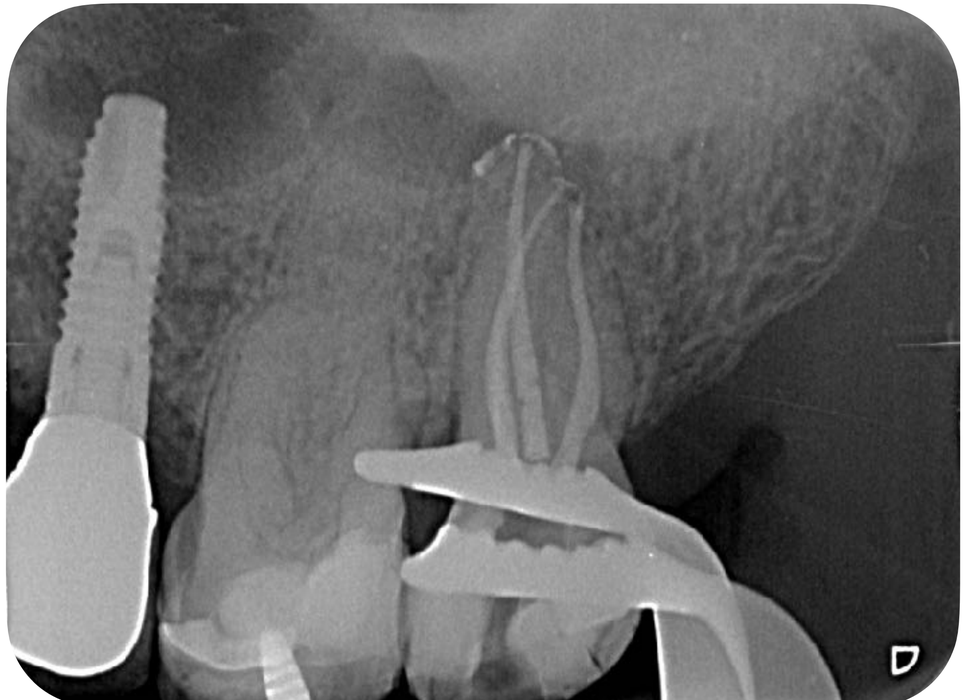
MES: 25.8
DIST: 40.4

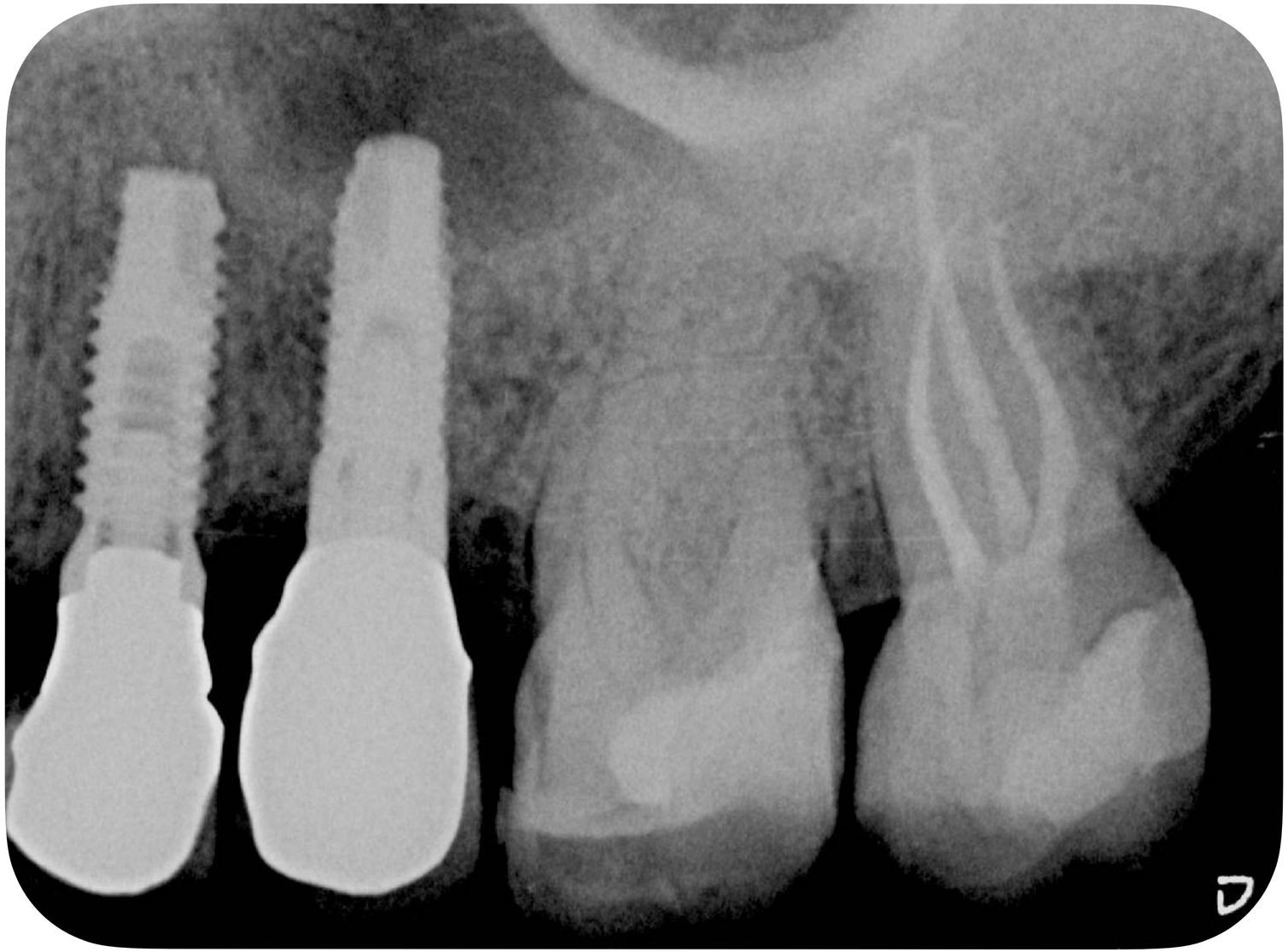
EDM



MES: 30.4

DIST: 40.4





NI-TI ROTARY FILES: TIPS AND TRICKS

- 2-3 Movimenti con leggera pressione apicale, senza forzare
- Movimenti di spazzolamento in uscita (brushing)
- Pulizia dello strumento dopo ogni fase di utilizzo
- Irrigazione, pervietà col K-10, Irrigazione dopo ogni utilizzo di uno strumento rotante.
- In caso di non progressione dello strumento, cambiare strategia di strumentazione, strumento, o sequenza.

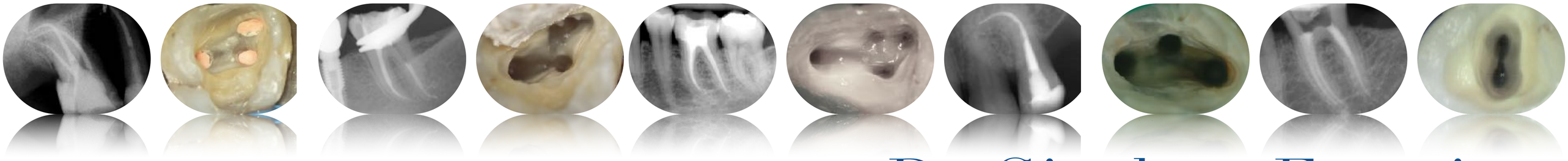
HT Ni-Ti in Retreatment: big files 40.4
Or HYFLEX REMOVER

GFUMEI@TISCALI.IT

DRGFUMEIENDODONTICS

WWW.SHAPE-IT-ENDO.SOCIALACADEMY.COM

The end



Dr Gianluca Fumei


Grazie
Gianluca


HANDS
ON!

I STEP

LUNGHEZZA DI LAVORO

II STEP

Opener EDM 18.11

400 rpm
T 2,5 Ncm

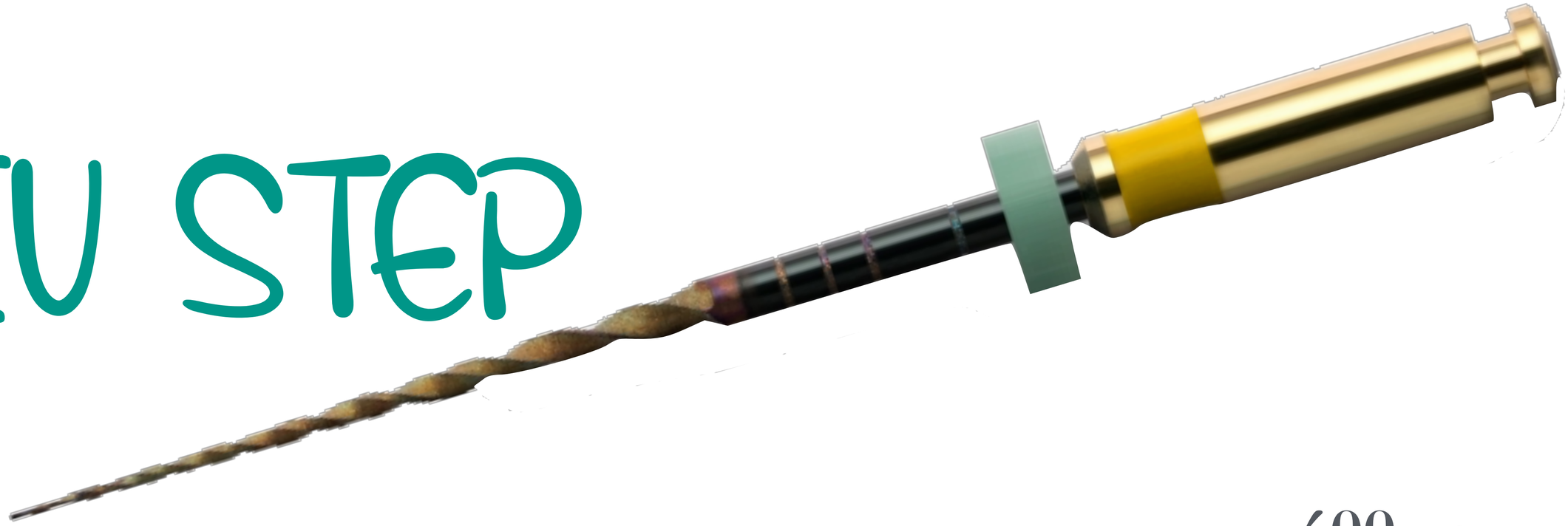
III STEP

EDM GLYDER 15.3

300 rpm

T 1,8 Ncm

IU STEP



EDM SHAPER 18.045

400 rpm

T 2,5 Ncm

U STEP

EDM FINISHER 30.4

400 rpm

T 2,5 Ncm