Shape Less, Seal Better

A Modern Minimally Invasive Endodontic Concept

Esthetic Dental Story Vol. 3 | Hotel Mövenpick, Sarajevo

06-07. februar 2026.

Shape Less, Seal Better

A Modern Minimally Invasive Endodontic Concept

ENDODONTIC GOALS

Structure Preservation Shaping
Biologically Driven Irrigation
Bioactive Obturation

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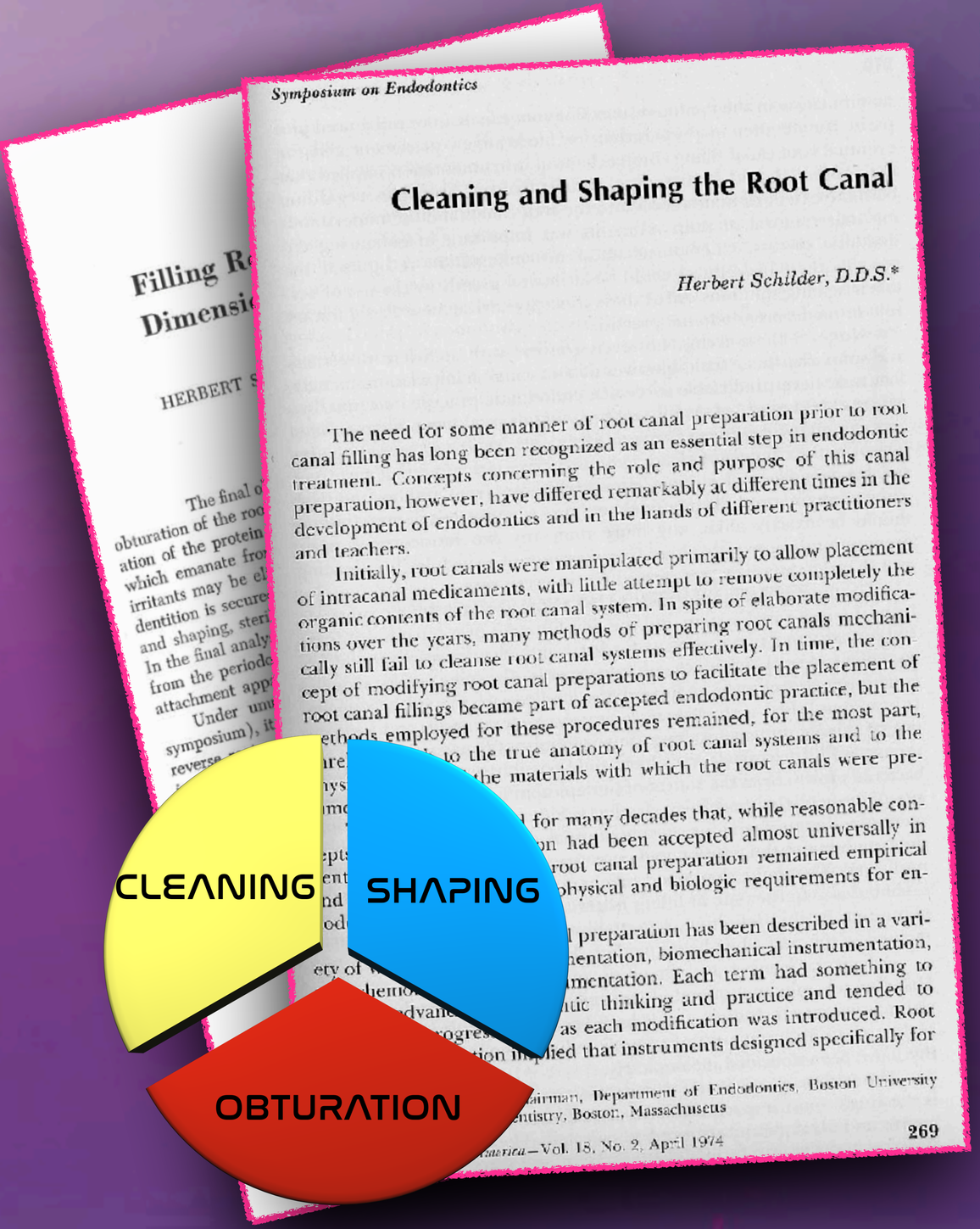
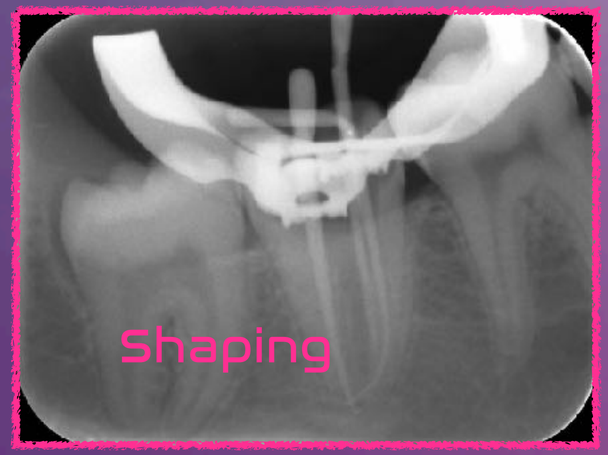
06-07. februar 2026.

GO BACK TO THE BASICS





Shilder 1974

MINIMALLY INVASIVE

CHANGE OF PERSPECTIVE

Minimally Invasive Endodontics

Minimally invasive endodontics: challenging prevailing paradigms

A. H. Gluskin,*[1] C. I. Peters[1] and O. A. Peters[1]

VERIFIABLE CPD PAPER

The primary goal of endodontic therapy is the long-term retention of a functional tooth
apical periodontitis. However, there are many other factors that impact endodontic outc
restoration and structural integrity of the tooth after root canal preparation. Contempo
directed to better understanding dentin behaviour and structure during aging and funct
minimise structural changes during root canal therapy, which may result in a new strat
invasive endodontics'. This review addresses current clinical and laboratory data to provi
endodontic paradigm.

IN BRIEF

- Explains the structural weakening that occurs as a result of endodontic and restorative procedures.
- Recognises fracture susceptibility in all endodontically treated teeth and the predisposition for damage in functioning roots.
- Reflects upon the principles of cervical dentin preservation in stabilising load transfer to roots after endodontic procedures.

PRACTICE

Bürklein S, Schäfer E. Minimally invasive endodontics. Quintessence Int. 2015 Feb;46(2):119-24

"Minimally Invasive Endodontics aims to preserve the maximum of tooth structure during root canal therapy "

2015

Endodontic Topics 2006, 13, 84–94

ENDODONTIC TOPICS 2006
1601-1538

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

"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"

TAMSE 2006

WARNING

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 h… …e curvatures and the length of the curved part of the canal. For each type of toe… …ed. Size 08 silver points were inserted into the canals, and the teeth were ra… …nique. All radiographs were analyzed by a computerized digital image processin… …d 65% showed an angle < or = 27 degrees with radii < 40 mm. Thirteen percent … …ter than 15 mm, and 9% of all canals that were investigated had curves > 35 de… …eth was 75 degrees with a radius of 2 mm. To define the canal curvature mather… …curve should be given.

1163 roots examined:
980 (84%) curved

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

Minimally Invasive

Better Respect of root canal anatomy

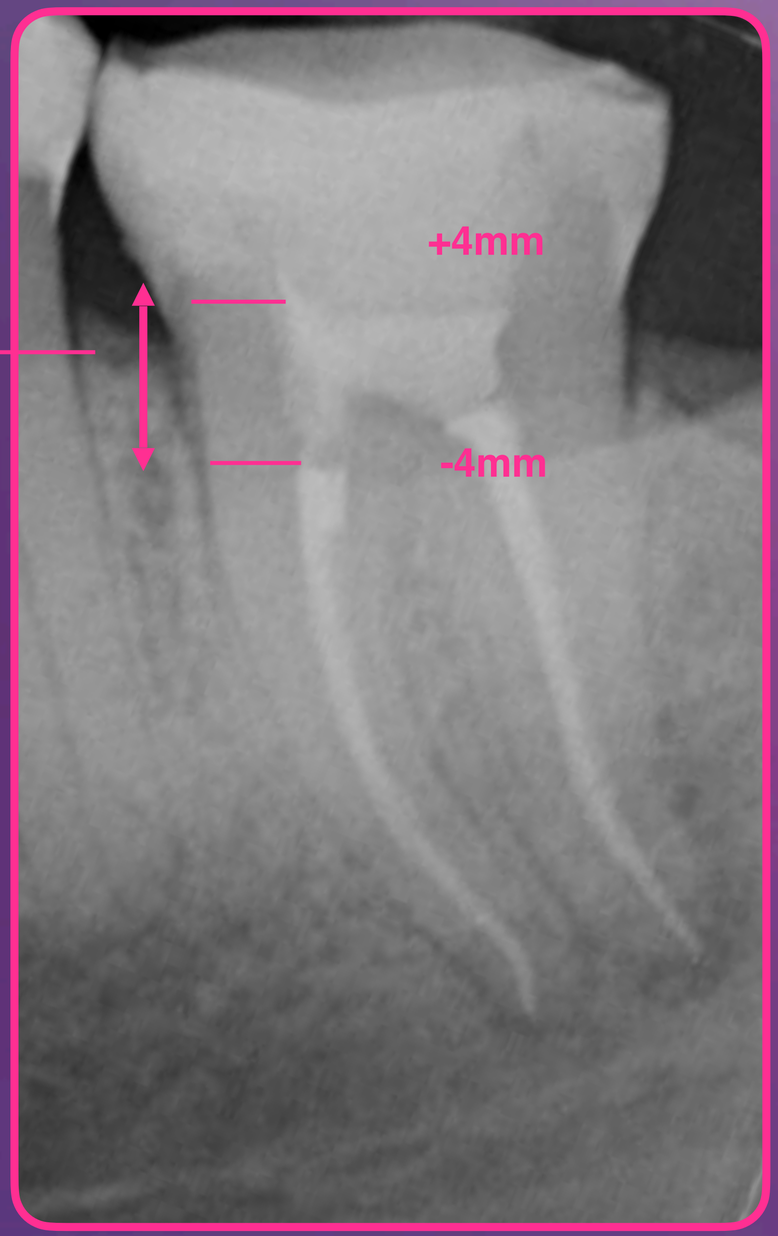
Preservation of dentin

Functional, not aggressive shaping

PERICERVICAL DENTIN

Pericervical dentin is generally located 4mm coronal and apically to the alveolar crest

Pericervical dentine is irreplaceable



Minimally Invasive Endodontics

Ferrule

REVIEW

The ferrule effect: a literature review

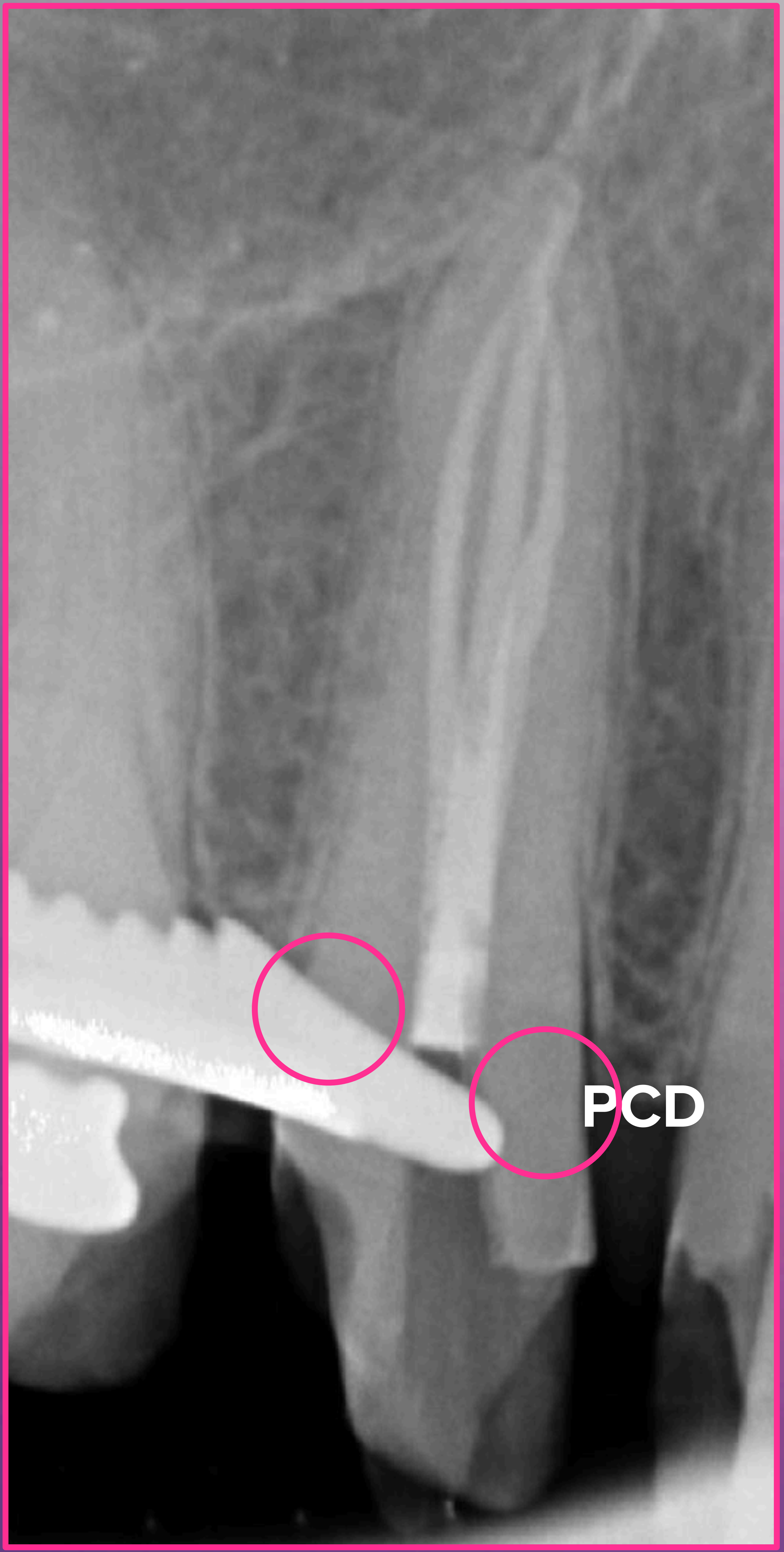
Literature review A ferrule is a metal ring or cap used to strengthen the end of a stick or tube. It has

can be concluded that a ferrule is desirable, but should not be provided at the expense of the remaining tooth/root structure.

Conclusions

Laboratory evidence shows in some circumstances that a ferrule effect occurs owing to the crown bracing against the dentine extending coronal to the crown margin. Furthermore, a significant increase in resistance to failure in single rooted teeth is observed where this dentine extends at least 1.5 mm. However, the cost of getting this support in teeth with no coronal dentine is loss of tooth tissue. When assessing a tooth prior to root treatment and subsequent restoration with a crown (if needed), a ferrule would be desirable but not at the expense of the remaining tooth/root structure.

Stankiewicz & P. R. Wilson. 2002



DAILY PRACTICE

Dentine Preservation

CAVITY ACCESS

SHAPING

POST-SPACE

RESTORATION

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.

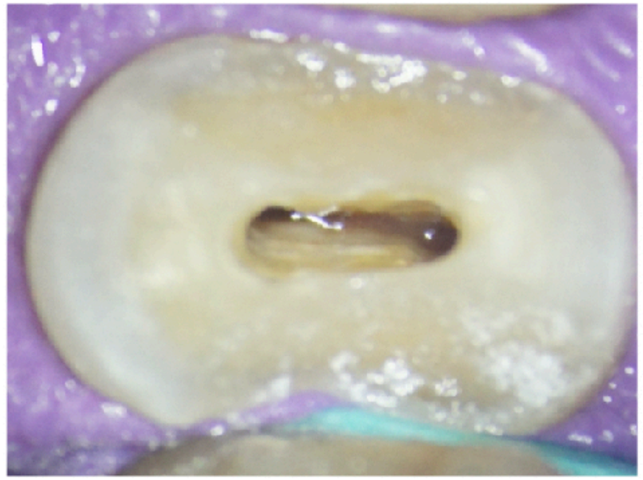
Dentine Preservation

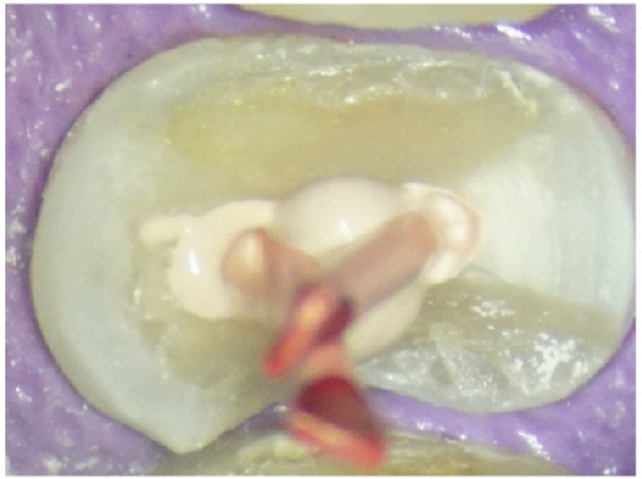
CAV

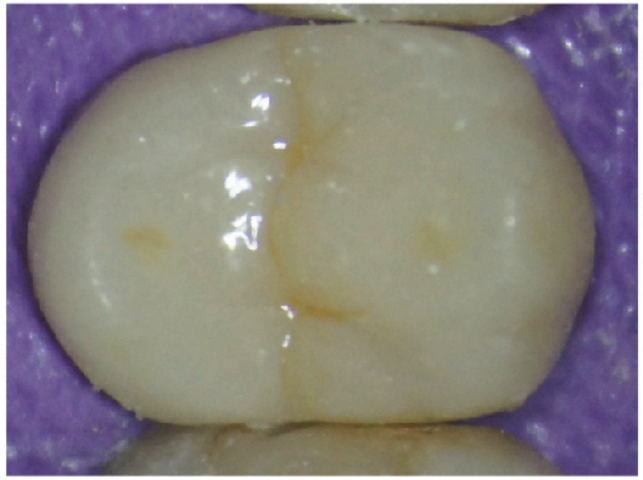
SHA

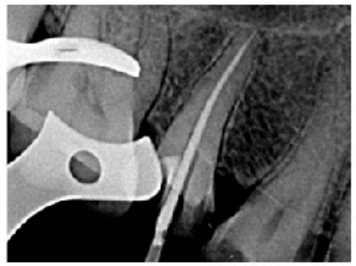
POS

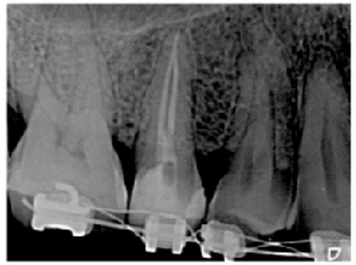
RES











space preparation

cedures and post

pace preparation.

Minimally Invasive Endodontics

Modern Molar Endodontic Access and Directed Dentin Conservation

David Clark, DDS[a,*], John Khademi, DDS, MS[b]

KEYWORDS

• Molar • Endodontic • Access • Dentin

During patient treatment, the clinician needs to consider many factors that will affect the ultimate outcome. In simple terms, these factors can be grouped into 3 categories: the operator needs, the restoration needs, and the tooth needs. The operator needs are the conditions the clinician needs to treat the tooth. The restoration needs are the prep dimensions and tooth conditions for optimal strength and longevity. The tooth needs are the biologic and structural limitations for a treated tooth to remain predictably functional. This article discusses molar access and failures of endodontically treated teeth that occur not because of chronic or acute apical lesions but because of structural compromises to the teeth that ultimately renders them useless. What both authors have discovered in their respective practices through careful observations of failing cases and modes of failure, and observation of the truly long-term (decades) successful cases, is that the current models of endodontic treatment do not lead to long-term success. The authors want to coronally shift the focus to the cervical area of the tooth and create awareness for an endorestorative interface. This article introduces a set of criteria that will guide the clinician in treatment decisions to maintain optimal functionality of the tooth and help in deciding whether the treatment prognosis is poor and alternatives should be considered. This article is not an update on traditional endodontic access, as the authors believe the traditional approach to endodontic access is fundamentally flawed. Traditional endodontic access has been endodontic centric, primarily focused on operator needs, and has been decoupled from the restorative needs and tooth needs. Central to our philosophy is that balance needs to be restored to these 3 needs, which are almost always in conflict when performing complete cusp-tip to root-tip treatment.

Disclosure: Drs Clark and Khademi will receive a royalty from the sales of CK Endodontic Access burs. http://www.sswhiteburs.com.

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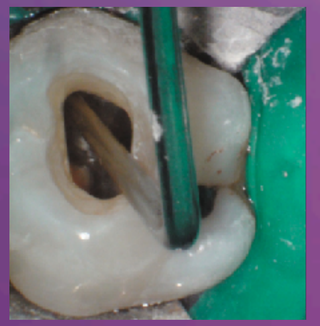
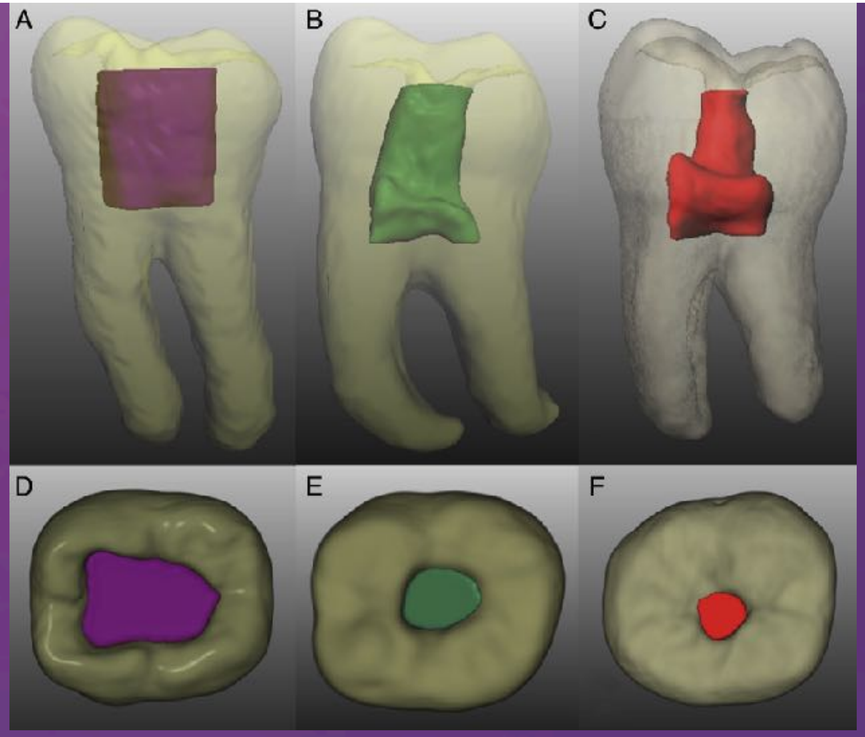
Dent Clin N Am 54 (2010) 249–273
doi:10.1016/j.cden.2010.01.001 dental.theclinics.com



Conservative vs Ninja Access

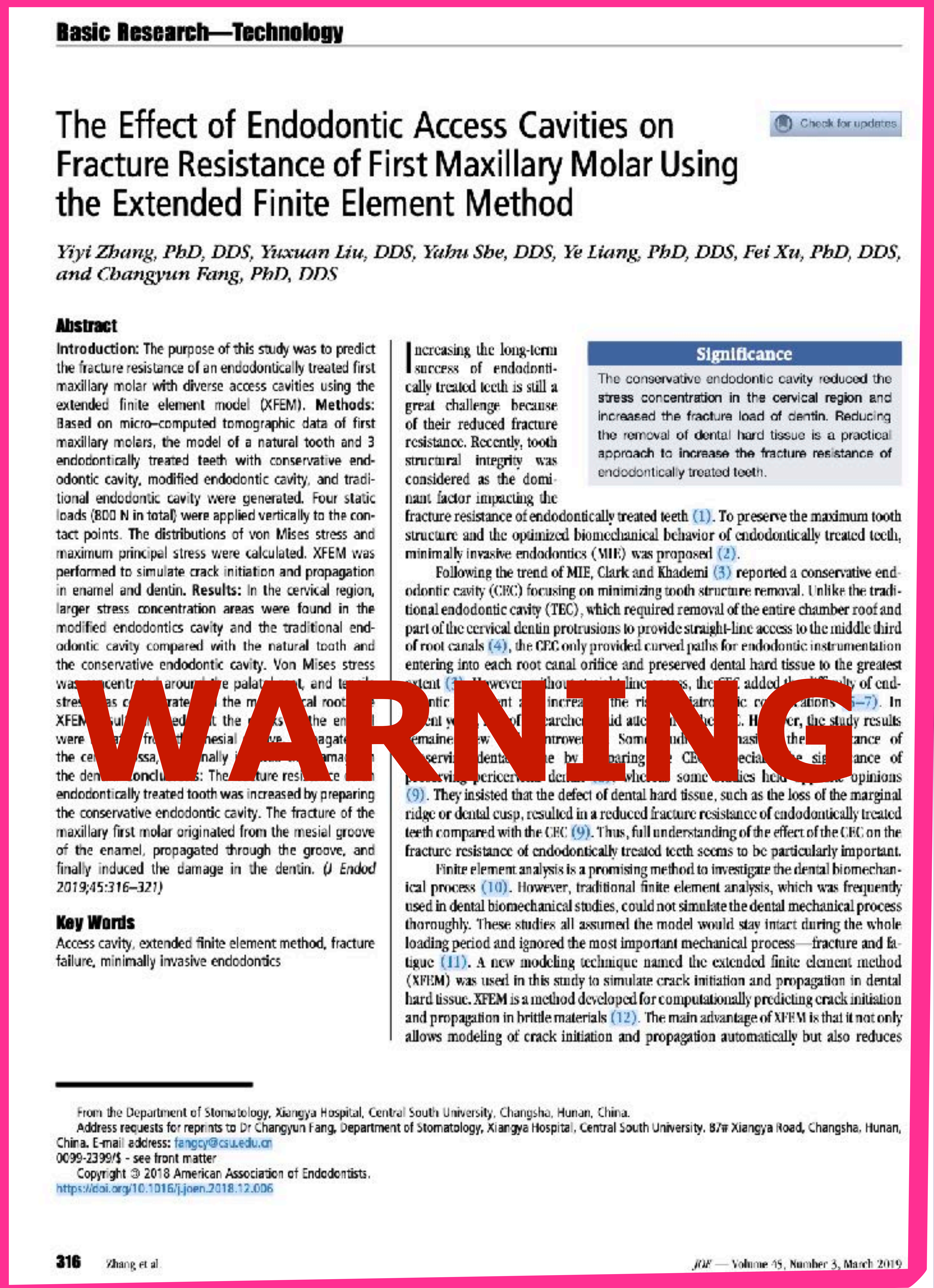
WARNING

Fracture Strength of Endodontically Treated Teeth with Different Access Cavity Designs



NINJA ACCESS CAVITY DOES NOT IMPROVE BIO-MECHANICAL RESISTANCE TO FRACTURE MORE THAN CONSERVATIVE ACCESS CAVITY

Plotino G, Grande NM, Isufi A, Pecci R, Pedullà E, Bedini R, Testarelli L, Gambarini G. JOE 2017;43: 995-1000



Basic Research—Technology

The Effect of Endodontic Access Cavities on Fracture Resistance of First Maxillary Molar Using the Extended Finite Element Method

Check for updates

Yiyi Zhang, PhD, DDS, Yuxuan Liu, DDS, Yuhu She, DDS, Ye Liang, PhD, DDS, Fei Xu, PhD, DDS, and Changyun Fang, PhD, DDS

Abstract

Introduction: The purpose of this study was to predict the fracture resistance of an endodontically treated first maxillary molar with diverse access cavities using the extended finite element model (XFEM). **Methods:** Based on micro–computed tomographic data of first maxillary molars, the model of a natural tooth and 3 endodontically treated teeth with conservative endodontic cavity, modified endodontic cavity, and traditional endodontic cavity were generated. Four static loads (800 N in total) were applied vertically to the contact points. The distributions of von Mises stress and maximum principal stress were calculated. XFEM was performed to simulate crack initiation and propagation in enamel and dentin. **Results:** In the cervical region, larger stress concentration areas were found in the modified endodontics cavity and the traditional endodontic cavity compared with the natural tooth and the conservative endodontic cavity. Von Mises stress was [illegible] around [illegible] palatal [illegible], and te[illegible] stres[illegible] as c[illegible] rate[illegible] the m[illegible] cal root[illegible] XFEM [illegible] the [illegible] he en[illegible] were [illegible] fr[illegible] mesial [illegible] ve [illegible] agate[illegible] the ce[illegible] ssa, [illegible] nally i[illegible] ma[illegible] the den[illegible] onclu[illegible]: The [illegible] ture resi[illegible] endodontically treated tooth was increased by preparing the conservative endodontic cavity. The fracture of the maxillary first molar originated from the mesial groove of the enamel, propagated through the groove, and finally induced the damage in the dentin. *(J Endod 2019;45:316–321)*

Key Words

Access cavity, extended finite element method, fracture failure, minimally invasive endodontics

Significance

The conservative endodontic cavity reduced the stress concentration in the cervical region and increased the fracture load of dentin. Reducing the removal of dental hard tissue is a practical approach to increase the fracture resistance of endodontically treated teeth.

Increasing the long-term success of endodontically treated teeth is still a great challenge because of their reduced fracture resistance. Recently, tooth structural integrity was considered as the dominant factor impacting the fracture resistance of endodontically treated teeth (1). To preserve the maximum tooth structure and the optimized biomechanical behavior of endodontically treated teeth, minimally invasive endodontics (MIE) was proposed (2).

Following the trend of MIE, Clark and Khademi (3) reported a conservative endodontic cavity (CEC) focusing on minimizing tooth structure removal. Unlike the traditional endodontic cavity (TEC), which required removal of the entire chamber roof and part of the cervical dentin protrusions to provide straight-line access to the middle third of root canals (4), the CEC only provided curved paths for endodontic instrumentation entering into each root canal orifice and preserved dental hard tissue to the greatest extent [illegible] However [illegible] line [illegible]s, the [illegible] added [illegible] of endo[illegible]ntic [illegible] increa[illegible] the ri[illegible] iatro[illegible] c[illegible] ations (5–7). In [illegible] cent y[illegible] of [illegible] archer[illegible] id atte[illegible] he[illegible]. H[illegible] er, the study results remaine[illegible] ew [illegible] ntrover[illegible] Some[illegible] udi[illegible] nasi[illegible] the [illegible] ance of [illegible] servi[illegible] denta[illegible] e by [illegible] paring [illegible] CE[illegible] ecia[illegible] sig[illegible] ance of [illegible] pericer[illegible] den[illegible] wherea[illegible] some [illegible] ies held [illegible] opinions (9). They insisted that the defect of dental hard tissue, such as the loss of the marginal ridge or dental cusp, resulted in a reduced fracture resistance of endodontically treated teeth compared with the CEC (9). Thus, full understanding of the effect of the CEC on the fracture resistance of endodontically treated teeth seems to be particularly important.

Finite element analysis is a promising method to investigate the dental biomechanical process (10). However, traditional finite element analysis, which was frequently used in dental biomechanical studies, could not simulate the dental mechanical process thoroughly. These studies all assumed the model would stay intact during the whole loading period and ignored the most important mechanical process—fracture and fatigue (11). A new modeling technique named the extended finite element method (XFEM) was used in this study to simulate crack initiation and propagation in dental hard tissue. XFEM is a method developed for computationally predicting crack initiation and propagation in brittle materials (12). The main advantage of XFEM is that it not only allows modeling of crack initiation and propagation automatically but also reduces

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Address requests for reprints to Dr Changyun Fang, Department of Stomatology, Xiangya Hospital, Central South University, 87# Xiangya Road, Changsha, Hunan, China. E-mail address: fangcy@csu.edu.cn
0099-2399/$ - see front matter

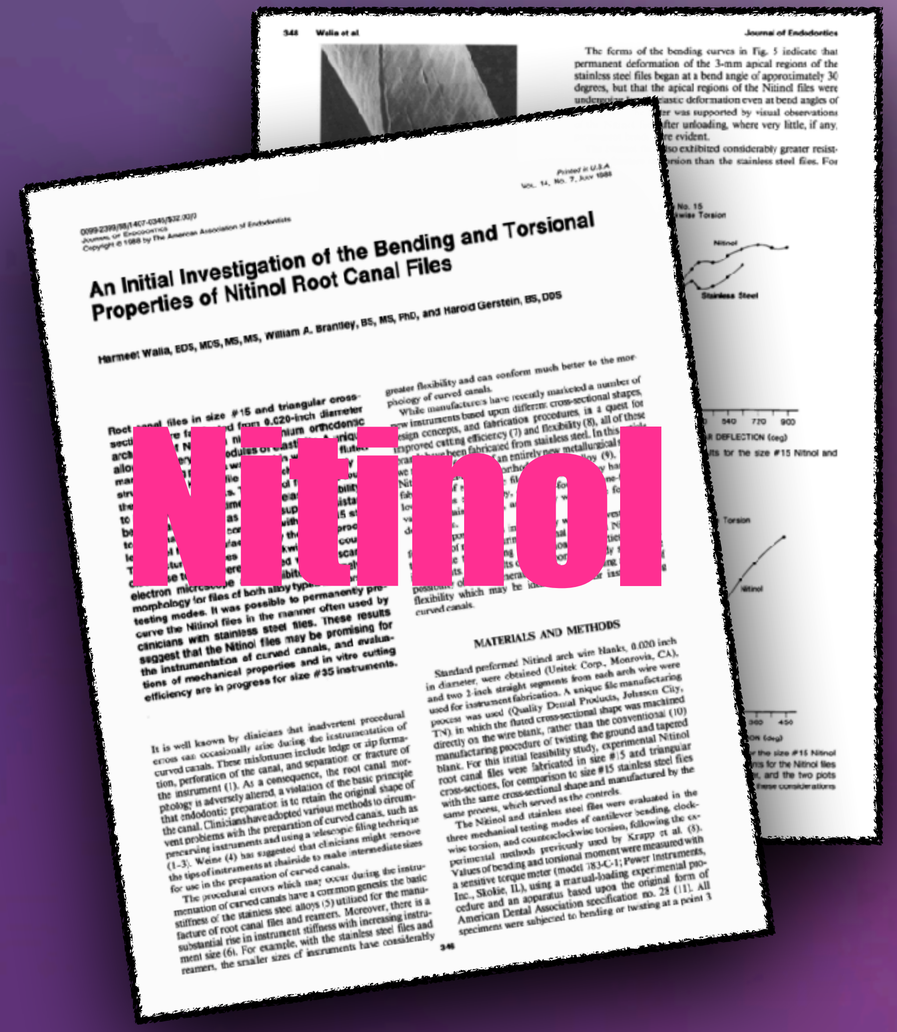
https://doi.org/10.1016/j.joen.2018.12.006

316 Zhang et al

JOE — Volume 45, Number 3, March 2019

CEC is a double-edged sword. It preserves dental hard tissue at the expense of increasing the curvature of endodontic instruments. When root canal angles are wide, CEC should be reconsidered.

STAINLESS STEELE



An Initial Investigation of the Bending and Torsional Properties of Nitinol Root Canal Files

Harmeet Walia, EDS, MDS, MS, MS, William A. Brantley, BS, MS, PhD, and Harold Gerstein, BS, DDS

Nitinol

1988

WALIA ET AL JOE

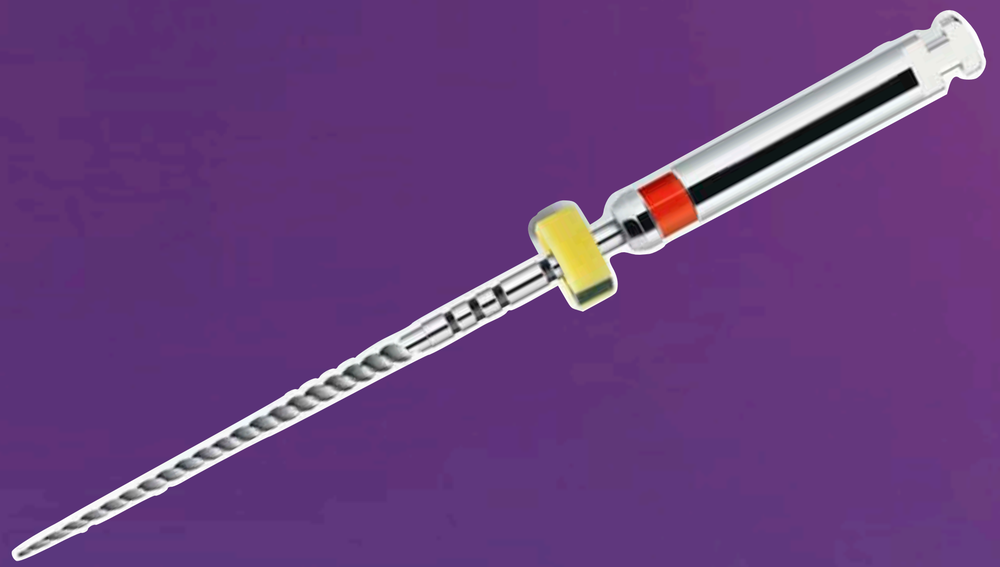
Nitinol

More Flexibile

More Resistant

vs

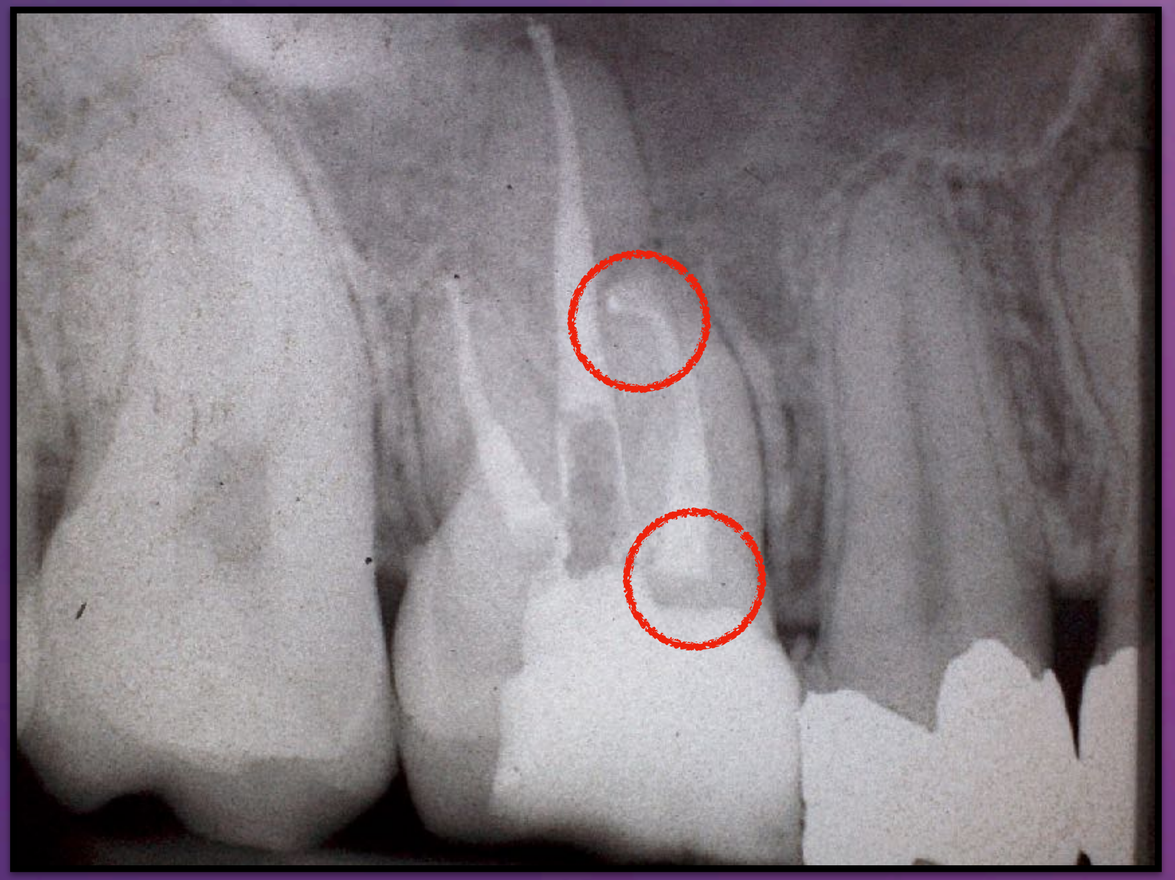
Stainless Steels



TORSIONAL FRACTURE

CYCLIC FATIGUE FRACTURE

Superelastic Ni-Ti Rotary Files

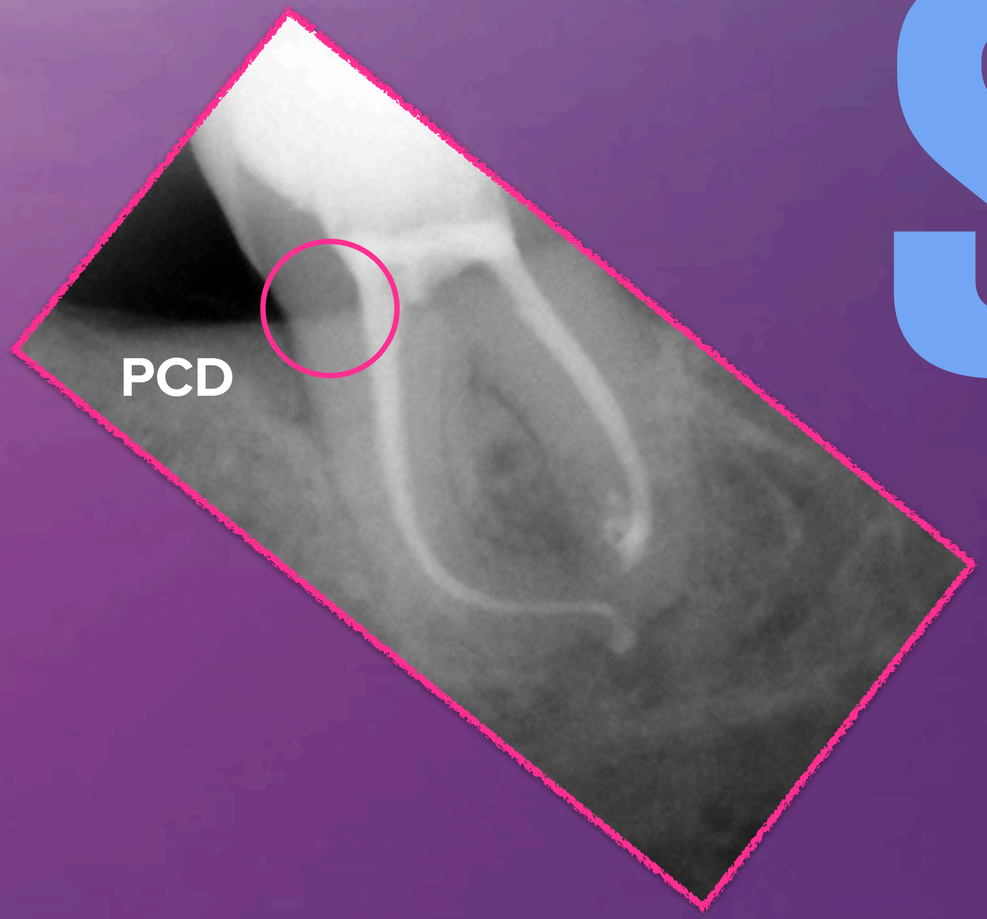


ACCESS CAVITY

SAFETY

What We Need ?

SAFETY



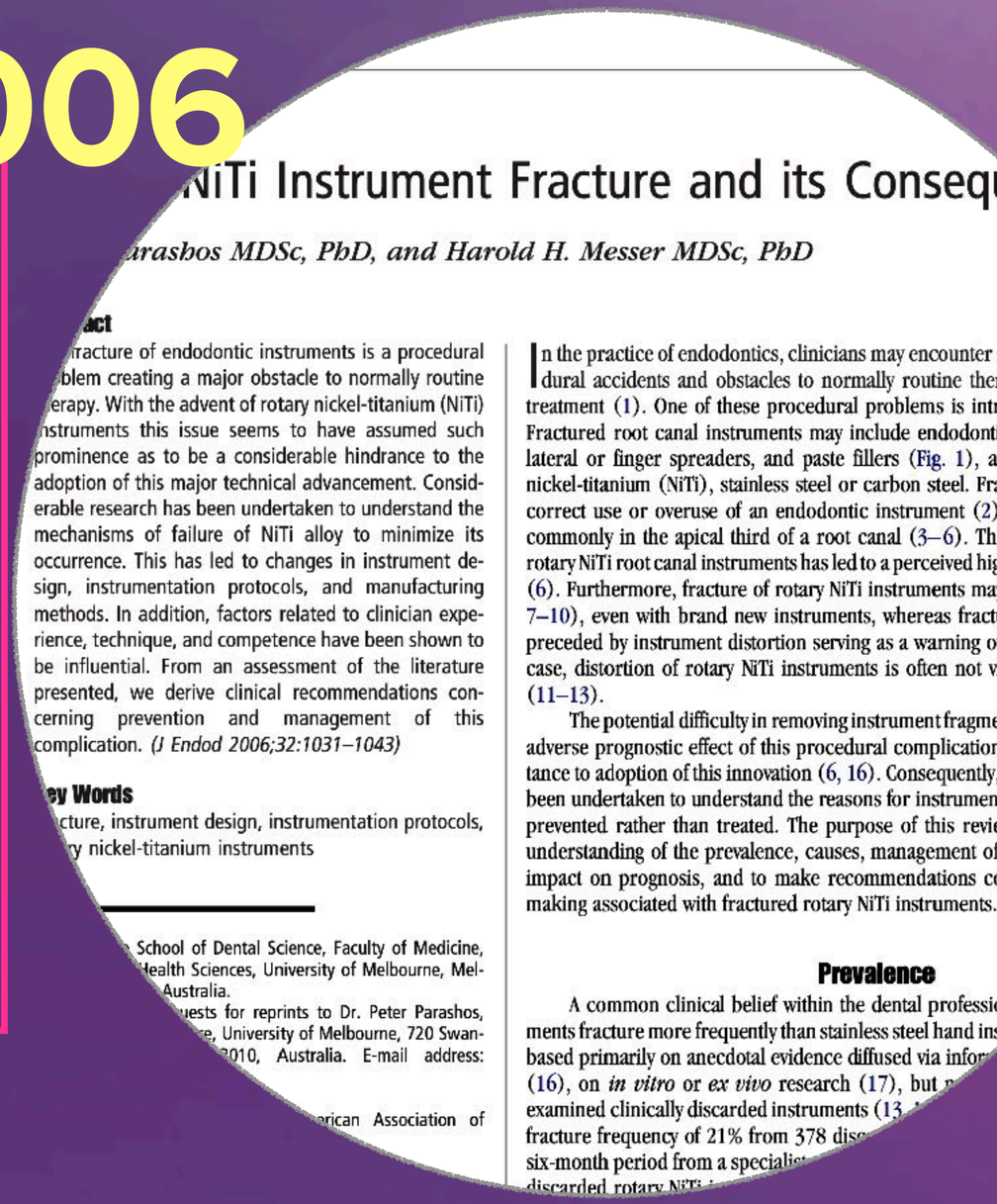
Bending...not breaking

Rotary NiTi Instrument Fracture and its Consequences

2006

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



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

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uests for reprints to Dr. Peter Parashos, e, University of Melbourne, 720 Swan- 3010, Australia. E-mail address:

erican Association of

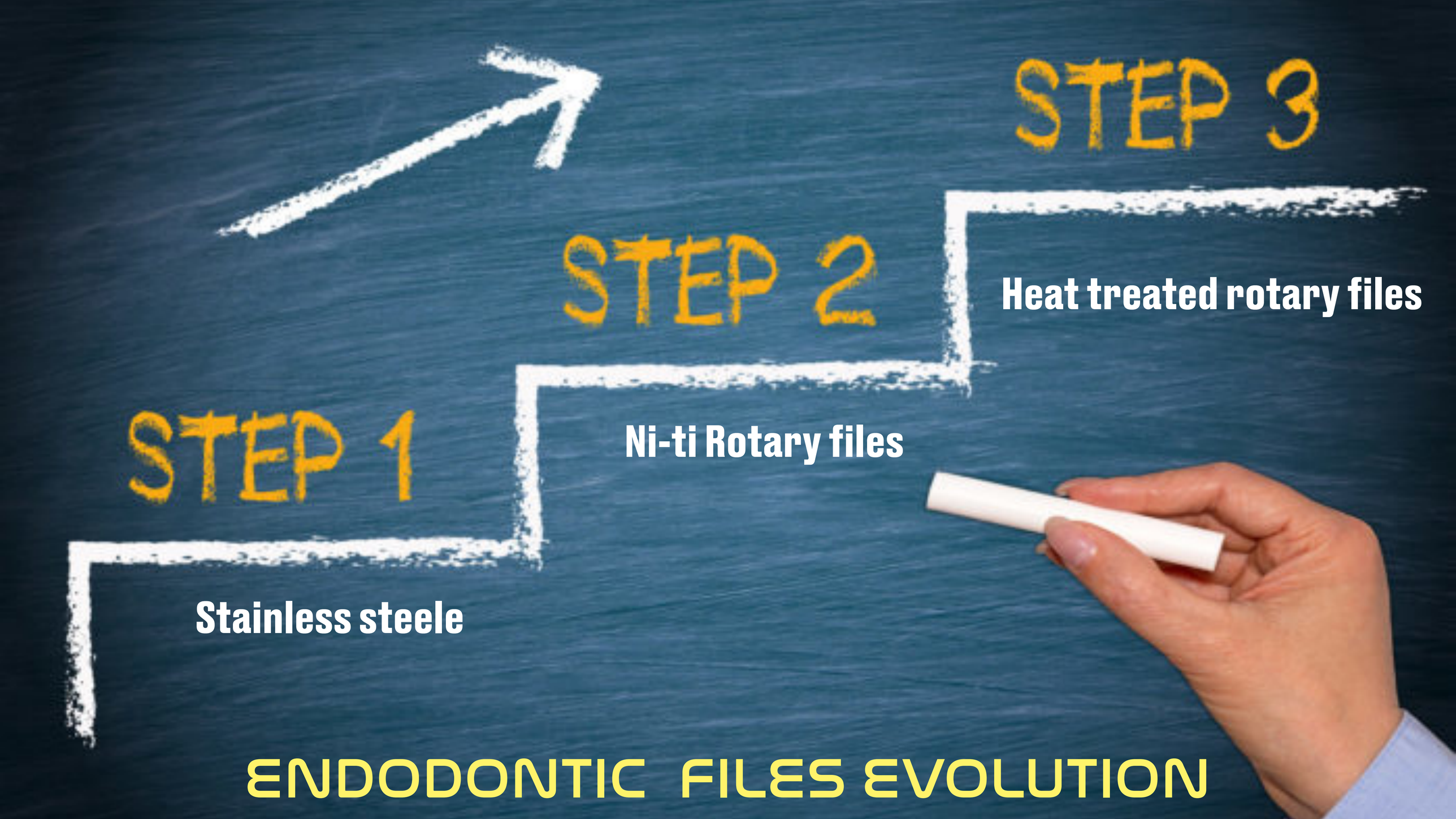
In the practice of endodontics, clinicians may encounter dural accidents and obstacles to normally routine the treatment (1). One of these procedural problems is intr Fractured root canal instruments may include endodont lateral or finger spreaders, and paste fillers (Fig. 1), a nickel-titanium (NiTi), 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.

Prevalence

A common clinical belief within the dental professio ments fracture more frequently than stainless steel hand ins based primarily on anecdotal evidence diffused via infor (16), on *in vitro* or *ex vivo* research (17), but n examined clinically discarded instruments (13 fracture frequency of 21% from 378 disc six-month period from a specialist discarded rotary NiTi i

Peter Parashos and Harold H. Messer


STEP 3
Heat treated rotary files
STEP 2
Ni-ti Rotary files
STEP 1
Stainless steele
ENDODONTIC FILES EVOLUTION

2013

Current Challenges and Concepts of the Thermomechanical Treatment of Nickel-Titanium Instruments

Ya Shen, DDS, PhD, Hui-min Zhou, DDS, PhD,† Yu-feng Zheng, PhD,‡ Bin Peng, DDS, PhD,§ and Markus Haapasalo, DDS, PhD**

Abstract

Introduction: The performance and mechanical prop-

Key Words

Controlled memory wire, endodontic instrument, fatigue, heat treatment, M-wire, nickel-titanium, R-phase, torque

Over the past 2 decades, nickel-titanium (NiTi) instruments have become an impor-
tant part of the armamentarium for root canal treatment. They are increasingly
used by dentists and specialists to facilitate the cleaning and shaping of root canals.
Due to favorable qualities, there is a potential risk of "unexpected"
[illegible] Even though there have been considerable
[illegible] methods on endodontic rotary
[illegible] curvatures
[illegible] the relative
[illegible] treatment
[illegible] toward adjusting
[illegible] the fatigue
[illegible] thermomechanical
[illegible] to optimize the
[illegible] cessed endodontic
[illegible] yahoga Falls, OH),
[illegible] tsply Tulsa Dental
[illegible] Blue (Dentsply Tulsa
[illegible] YPHOON Infinite Flex
[illegible] ford, CT), Twisted Files
[illegible] Maillefer, Ballaigues,
[illegible] different raw materials
[illegible] even more imperative
[illegible] rument and achieving the

TABLE 1. A List of Literature on the Mechanical Properties of Thermomechanically Treated NiTi Instruments with Continuous Rotation

	Phase transformation	Flexible property	Cyclic fatigue	Torsional fracture
CM Wire (HyFlex CM, TYPHOON Infinite Flex NiTi)	Shen et al, 2011 (44)	Testarelli et al, 2011 (105); Zhou et al, 2012 (42)	Shen et al, 2011 (39); Shen et al, 2012 (40); Peters et al, 2012 (92)	Casper et al, 2011 (95); Peters et al, 2012 (92)
M-Wire (ProFile GT Series X, ProFile Vortex, Vortex Blue)	Alapati et al, 2009 (47); Shen et al, 2011 (44); Ye and Gao, 2012 (45)	Gao et al, 2012 (41)	Gambarini et al, 2008 (66); Johnson et al, 2008 (68); Larsen et al, 2009 (69); Kramkowski and Bahcall, 2009 (90); Gao et al, 2010 (38); Al-Hadlaq et al, 2010 (67); Hilfer et al, 2011 (84); Gao et al, 2012 (41); Plotino et al, 2012 (86)	Johnson et al, 2008 (68); Kramkowski and Bahcall, 2009 (90); Casper et al, 2011 (95); Bardsley et al, 2011 (100); King et al, 2012 (96); Gao et al, 2012 (41)
R-phase wire (K3XF, TFs)	Hou et al, 2011 (43); Shen et al, 2011 (44)	Gambarini et al, 2008 (48); Hou et al, 2011 (43)	Gambarini et al, 2008 (66); Larsen et al, 2009 (69); Kim et al, 2010 (70); Bhagabati et al, 2011 (71); Rodrigues et al, 2011 (72); Pedulla et al, 2011 (73); Hilfer et al, 2011 (84)	Gambarini et al, 2009 (98); Park et al, 2010 (93); Gambarini et al, 2010 (97); Casper et al, 2011 (95); King et al, 2012 (96)

into a single process. The newly developed thermomechanical treatment of NiTi files gives them better flexural fatigue resistance than files of similar design and size made from conventional NiTi alloy. The unique material properties make them particularly suited for endodontic treatment. Although the details of the thermomechanical

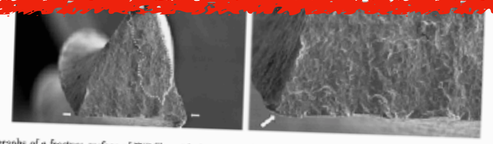
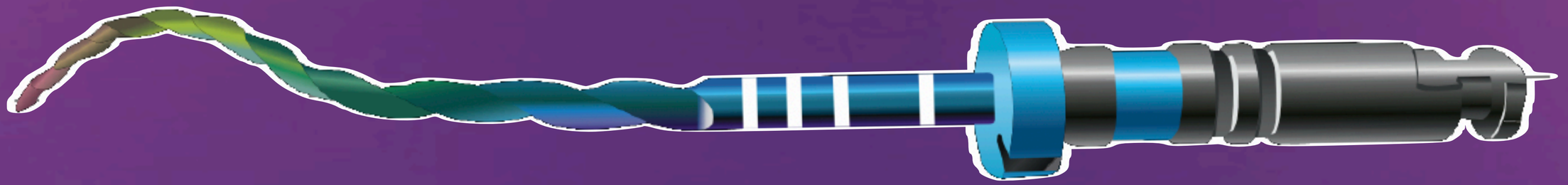


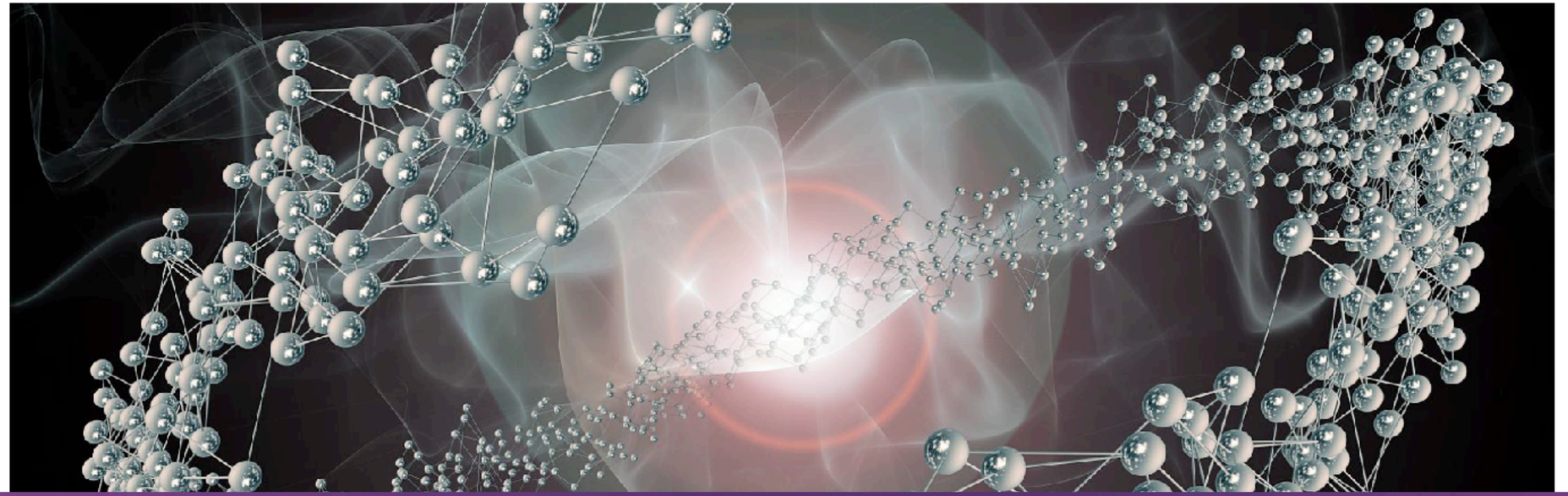
Figure 2. Photomicrographs of a fracture surface of TYP files with the region of fatigue crack propagation and dimple area outlined (*dotted line*) with crack origins (*arrows*). (*A*) The overall view of the TYP file (N_f = 315, dimple area is 69%). (*B*) A high-magnification view of the crack origin (*arrow*). (*C*) An overall view of the TYP CM file with 2 crack origins (*arrows*) (N_f = 1280, dimple area is 56%). (*D*) A high-magnification view of 1 crack origin (*arrow*).

YA SHEN et AL

MARTENSITIC FILES ARE MORE RESISTANT TO CYCLIC FATIGUE... IN CURVED CANALS

ONE MORE STEP





Nano-coated NiTi instruments

Journal of Baghdad College of Dentistry, Vol. 37 No. 4 (2025), ISSN (P): 1817-1869, ISSN (E): 2311-5270

Nanoparticle coatings of Ni-Ti alloy and possibilities in Endodontics: A narrative review

Ali Imad Abdulkareem [1], Ahmed Hamid Ali [1*], Francesco

PDF of Nanoparticle coatings of Ni-Ti alloy and possibilities in Endodontics: A narrative review

Table 2: Classification types of Nanoparticles.

Origin	Size	Structure	Composition	Shape
Natural	-Zero-dimensional	- Carbon-based	- Inorganic	- Particles
Artificial	-One-dimensional nanorods	- Metal	- Metals	- Spheres
	-Two-dimensional thin films	- Dendrimers	- Polymeric	- Rods
	-Three-dimensional nanocones	- Composites	- Quantum dots	- Plates
			- Modified	

FUTURE POSSIBILITIES AND CHALLENGES NANOPARTICLES' COATINGS HAVE REMARKABLE OPPORTUNITIES FOR ENHANCEMENT OF THE MECHANICAL QUALITIES,

UNIVERSITÀ DEGLI STUDI DI CATANIA

DIPARTIMENTO DI CHIRURGIA GENERALE E SPECIALITÀ MEDICO-CHIRURGICHE

CORSO DI LAUREA MAGISTRALE IN ODONTOIATRIA E PROTESI DENTARIA

RANDISI SALVATORE

EFFICIENZA DI TAGLIO DOPO USO MULTIPLO DI STRUMENTI ENDODONTICI REALIZZATI CON DIVERSI TRATTAMENTI

TESI DI LAUREA

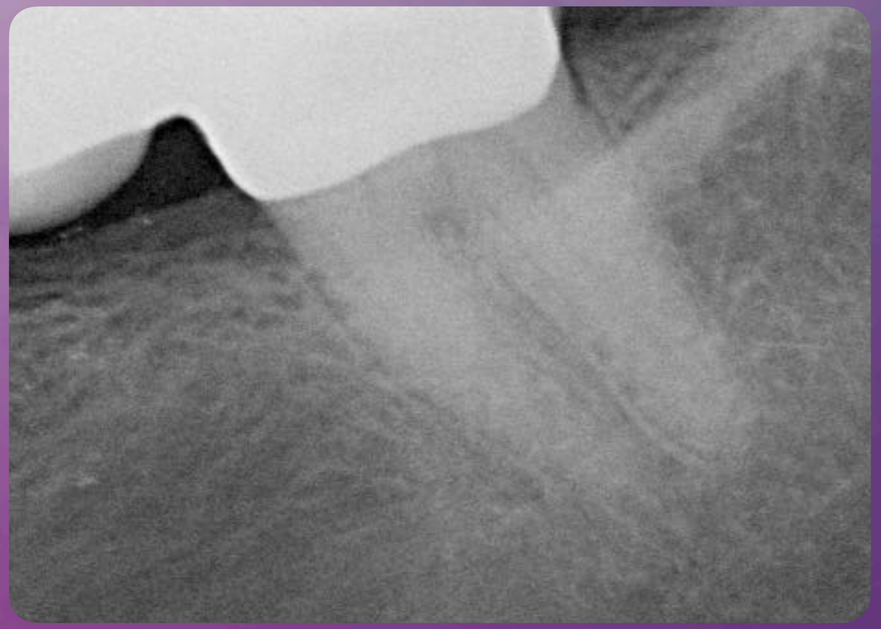
RELATORE

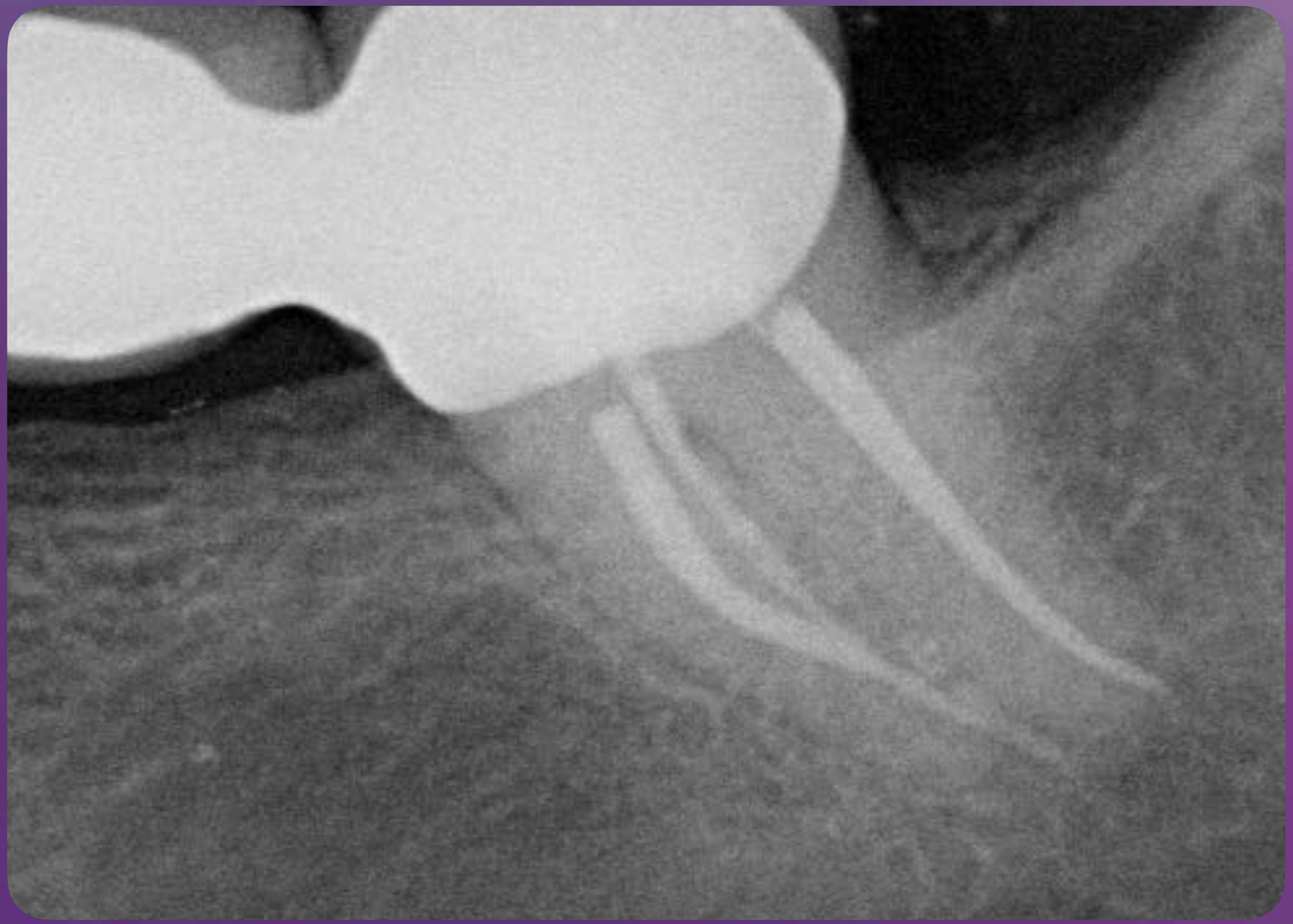
Prof. Eugenio Pedullà

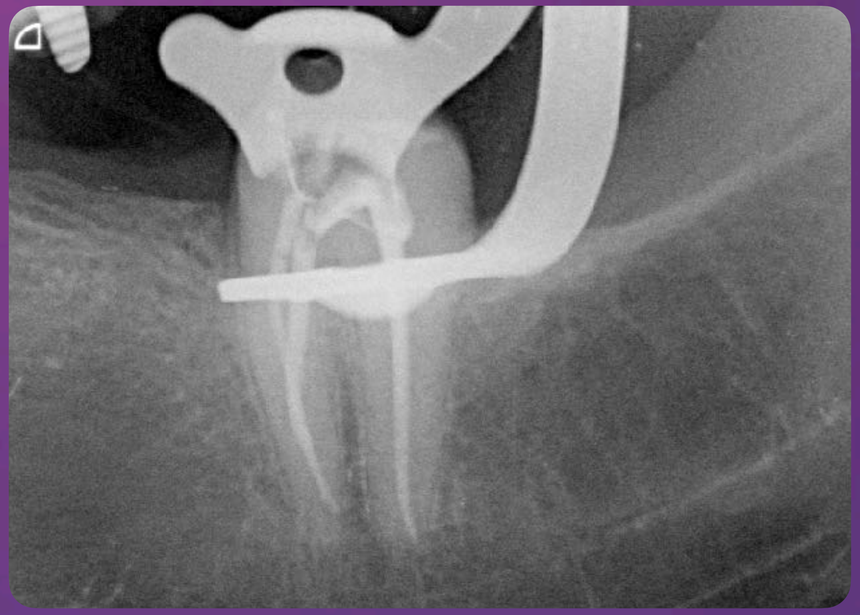
Proflex N.H.A. appears to offer a clear advantage in terms of durability and consistent cutting performance, particularly when the tools are reused multiple times

UP TO 10 TIME INCREASED RESISTANCE

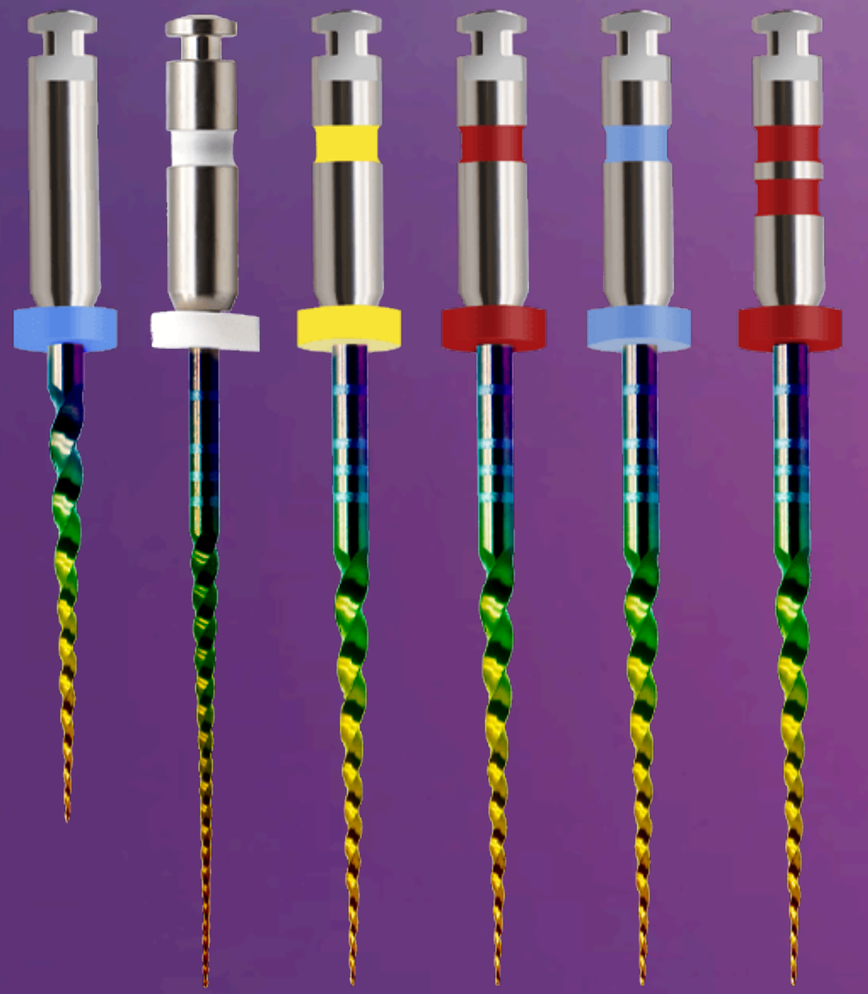
NANO-COATING CREATES BETTER SURFACE-LESS DEFECTS







- MORE UNIFORM SURFACE
- FLEXIBILITY (CURVATURES)
- CONSERVATIVE APPROACH (0.4 SHAPING)
- MORE RESISTANT TO FRACTURE
- IMPROVED CUTTING EFFICENCY
- DEEP SHAPE (30.4…)



THE GAME CHANGER STEP

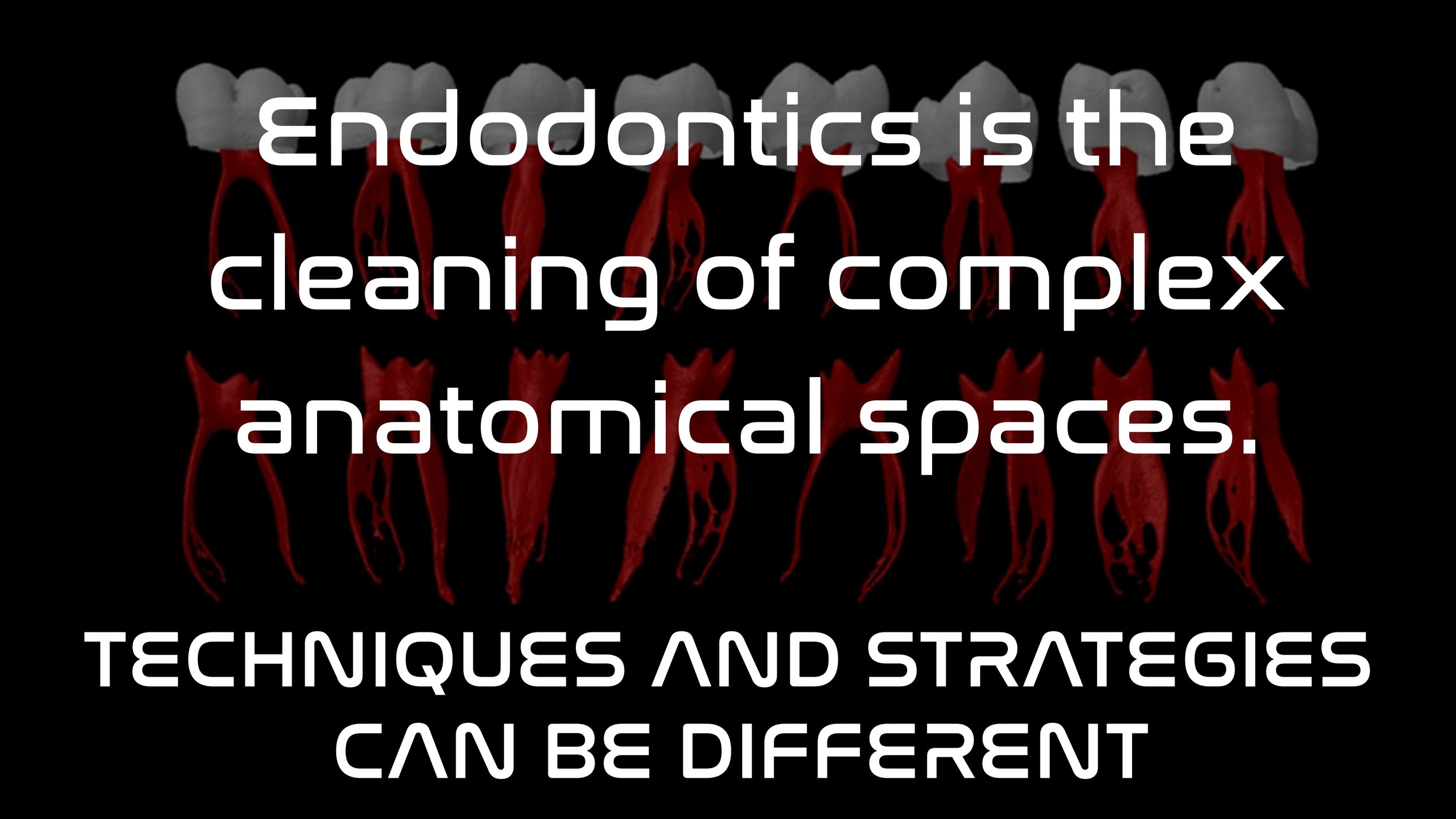
WARNING

Root canal instrumentation alone is unable to contact the entire canal surface; a significant portion of the canal walls remains untouched, regardless of the instrumentation system used.”

Peters OA.

Versiani et Al

“Studies report that approximately 35–50% of the root canal walls are not contacted by endodontic instruments during mechanical preparation.”

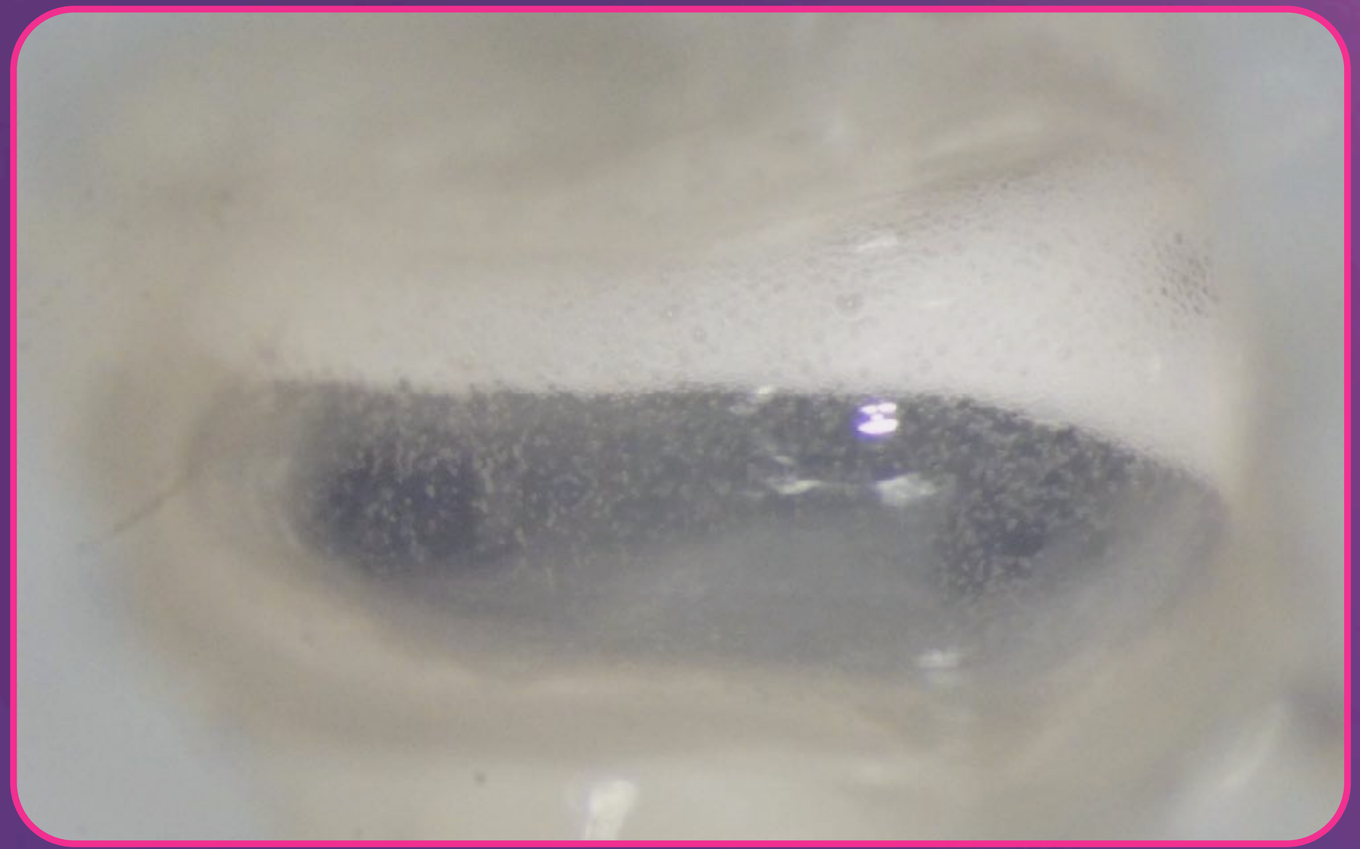


Endodontics is the cleaning of complex anatomical spaces.

TECHNIQUES AND STRATEGIES CAN BE DIFFERENT

Disinfection Protocol to Reduce the bacterial Load Beneath A Subcritical threshold

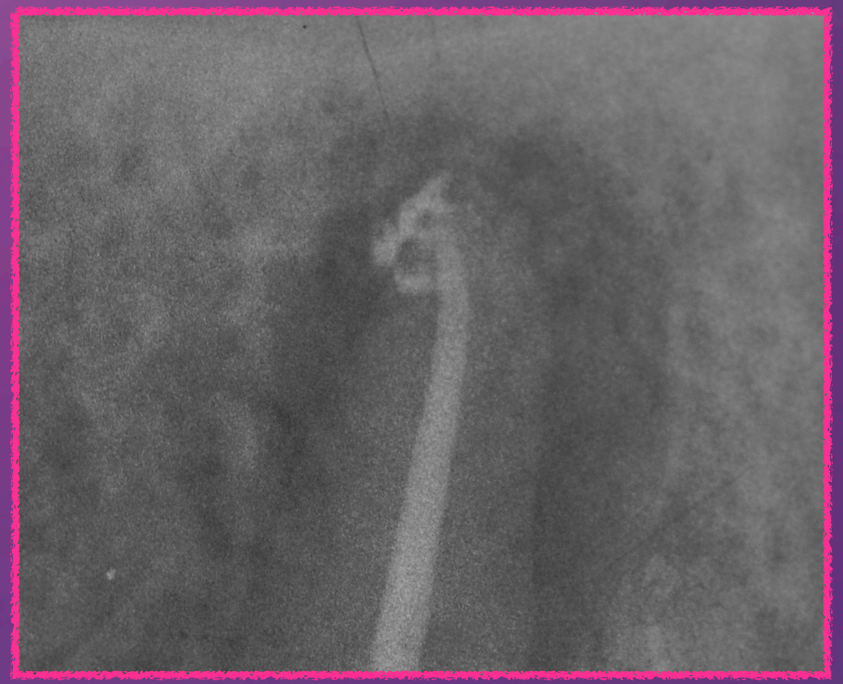
If We Shape Less...We Must Irrigate Better



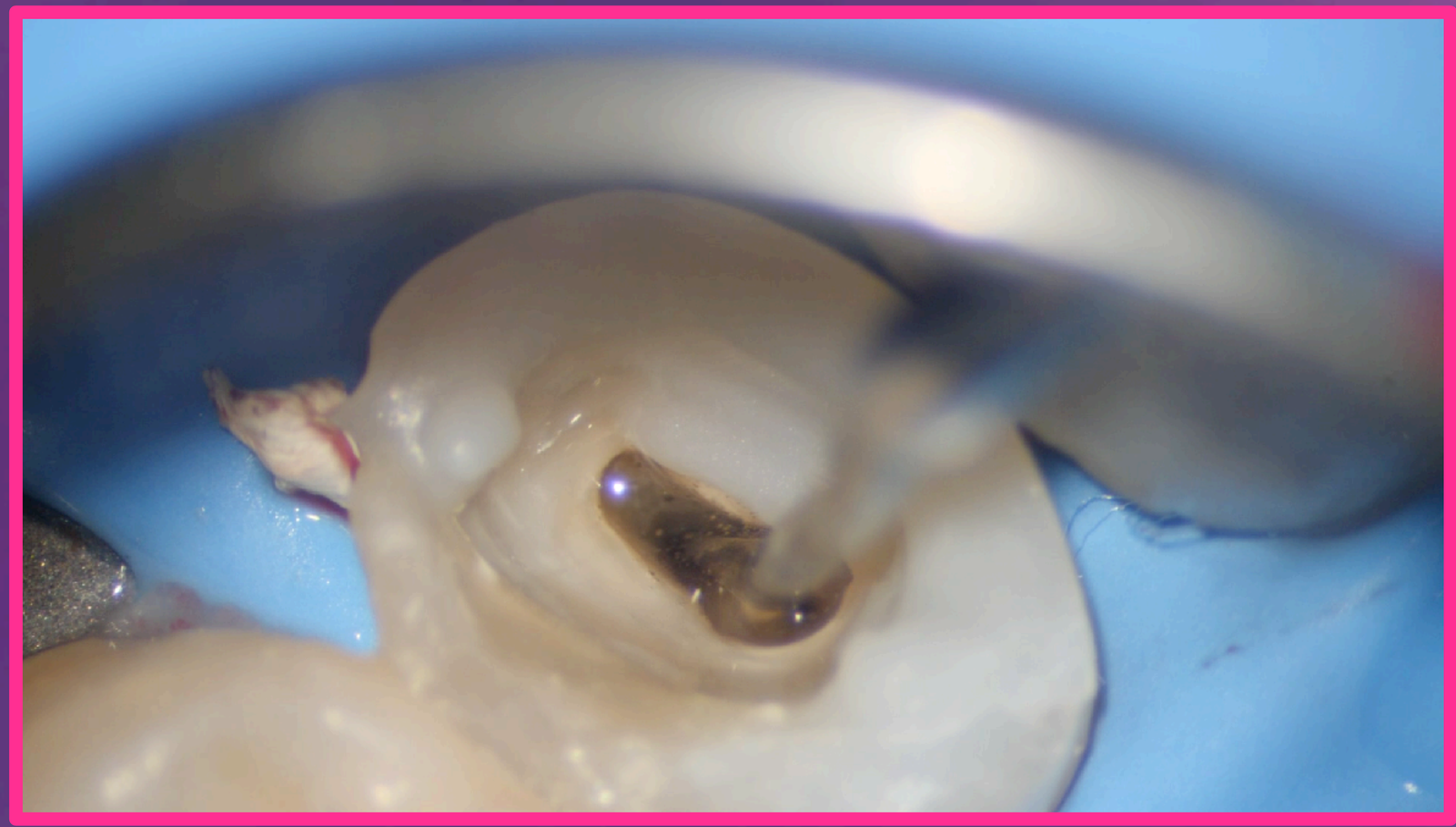
Siqueira et AL. Braz Dent Journ. 2007

Disinfection Protocol to Reduce the bacterial Load Depends on Volume-Time-Activation

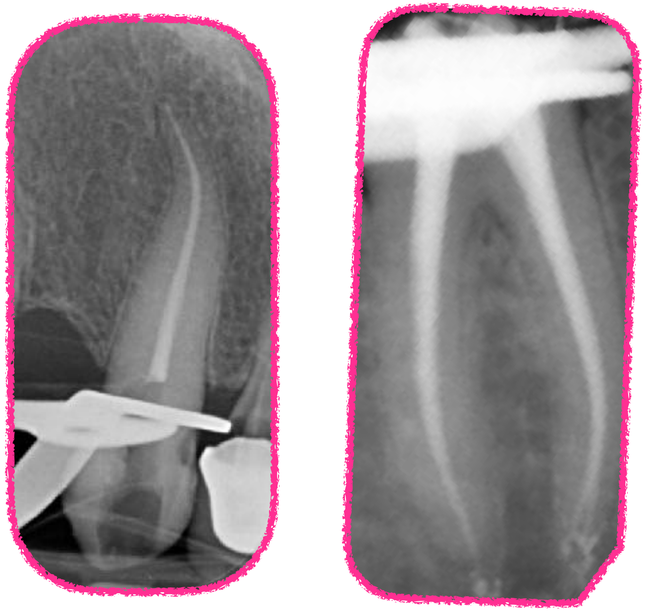
We must activate irrigants



Siqueira et AL. Braz Dent Journ. 2007



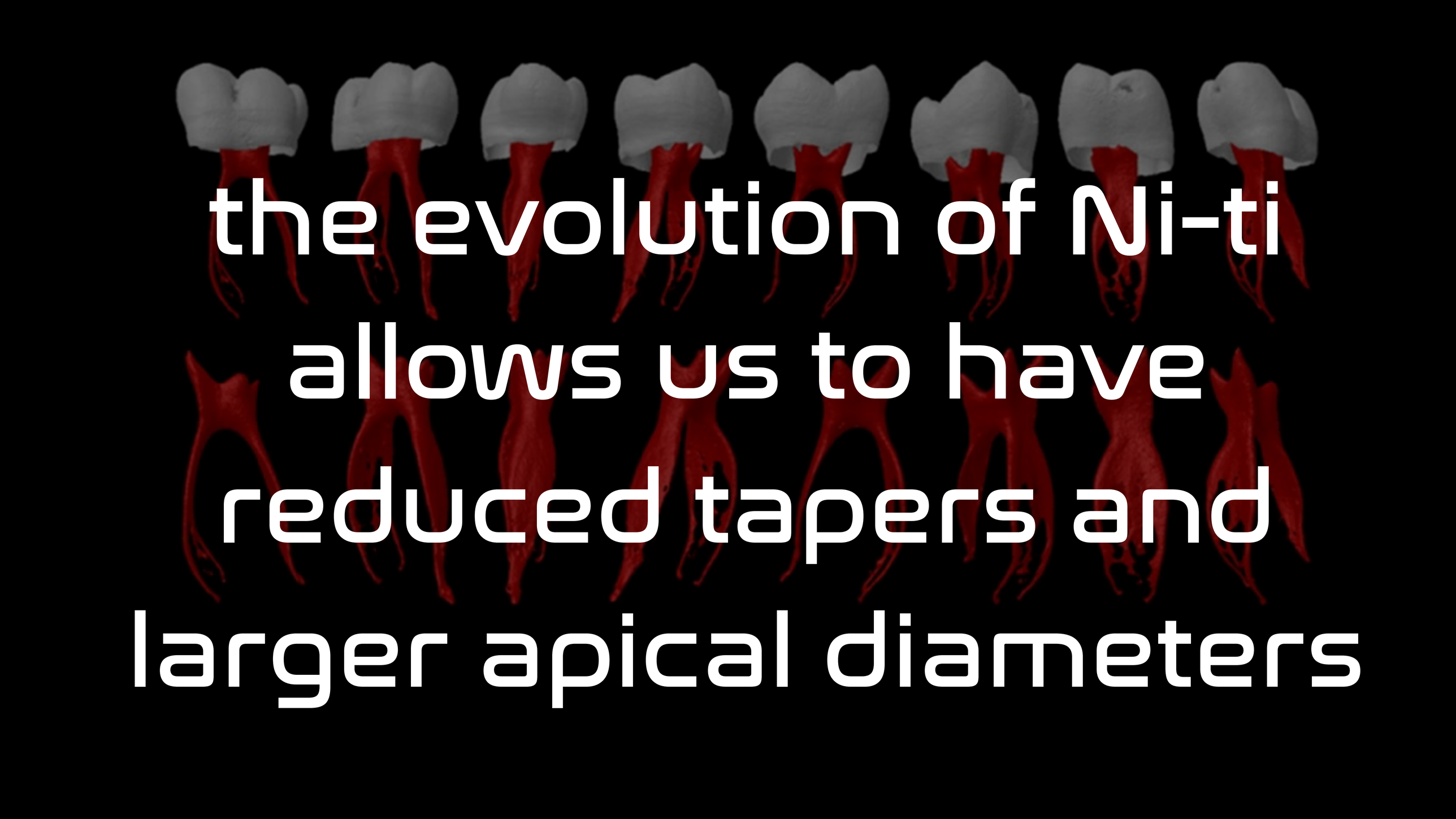
Better microbial removal and more effective irrigation occurs when canals are instrumented to larger apical sizes



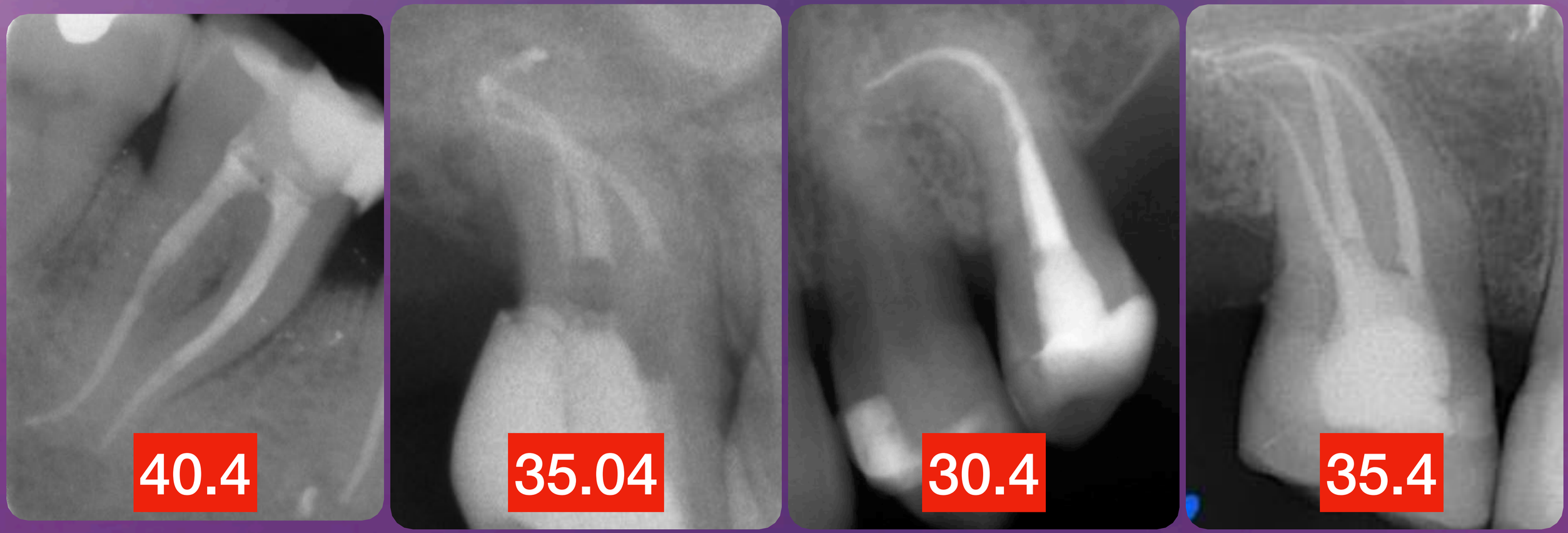
30-35

AMINOSHARIE 2015

BAUGH 2005

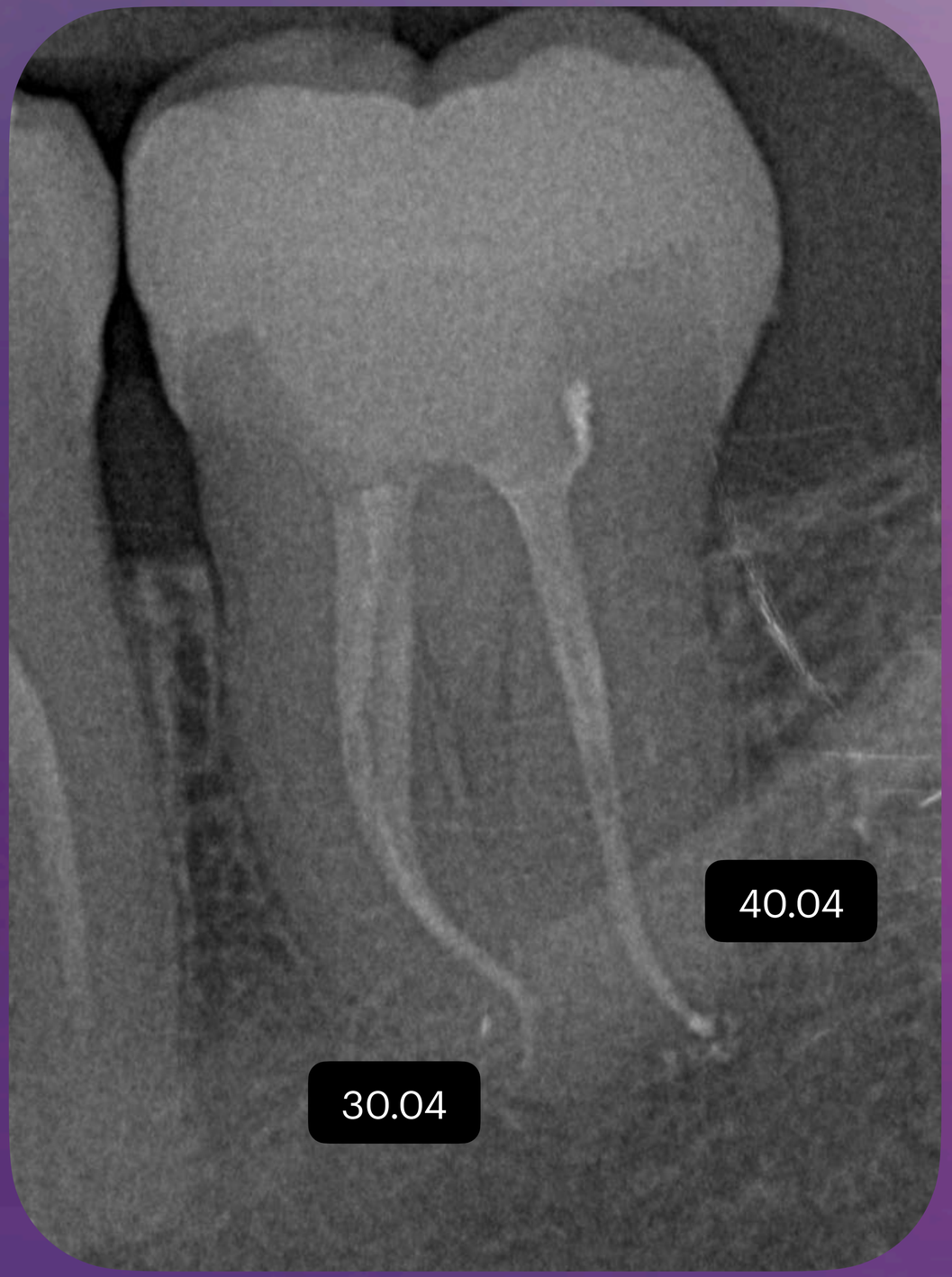

the evolution of Ni-ti
allows us to have
reduced tapers and
larger apical diameters

Increasing diameter



Decreasing taper


30.04
40.04


40.04
30.04

INTERNATIONAL ENDODONTIC JOURNAL
The official journal of the British Endodontic Society and the European Society of Endodontology

REVIEW | Open Access

Present status and future directions: Canal shaping

Ana Arias, Ove A. Peters

First published: 04 February 2022 | https://doi.org/10.1111/iej.13698

There are currently more than 250 brands of instrument systems marketed for root canal preparation.

Adapting The Anatomy to the File|Sequence ?

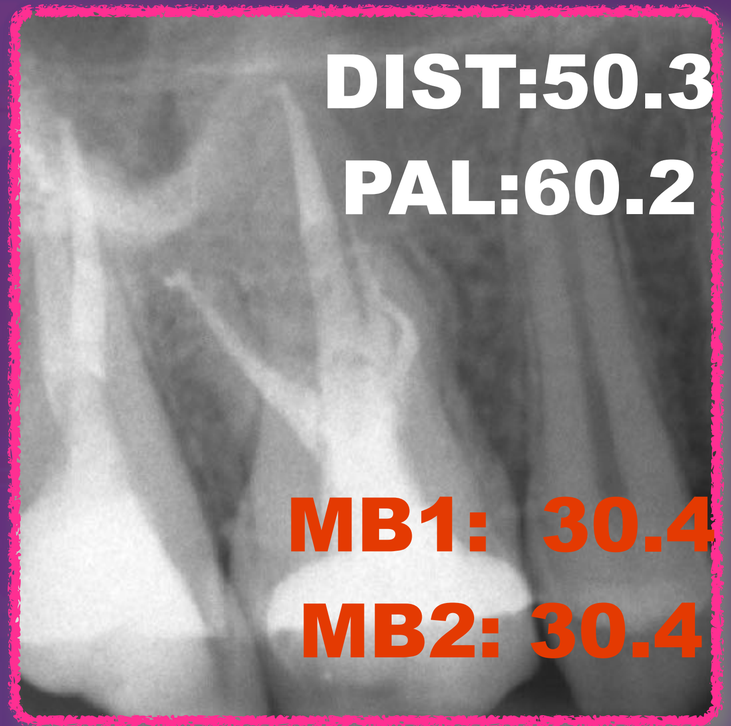
Or

Adapting The FileSequence to the Anatomy ?

WARNING

"Tailored"

Endodontics

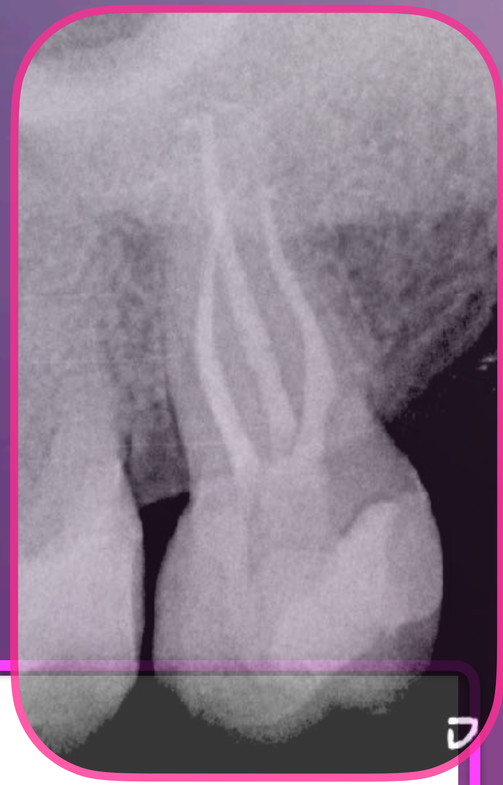


THE FINAL STEP

IDRAULIC
CONDENSATION
-0,4 TAPER-

ADVANTAGES

High Biocompatibility
Non-toxic
Hydrophilic
Radiopacity
Adhesion to dentin
Dimensionally stable
Bioactive and Osteoinductive
Low inflammatory response
Hydroxyapatite formation
Antibacterial (basic pH)
Easy to use and handle



IDRATATION

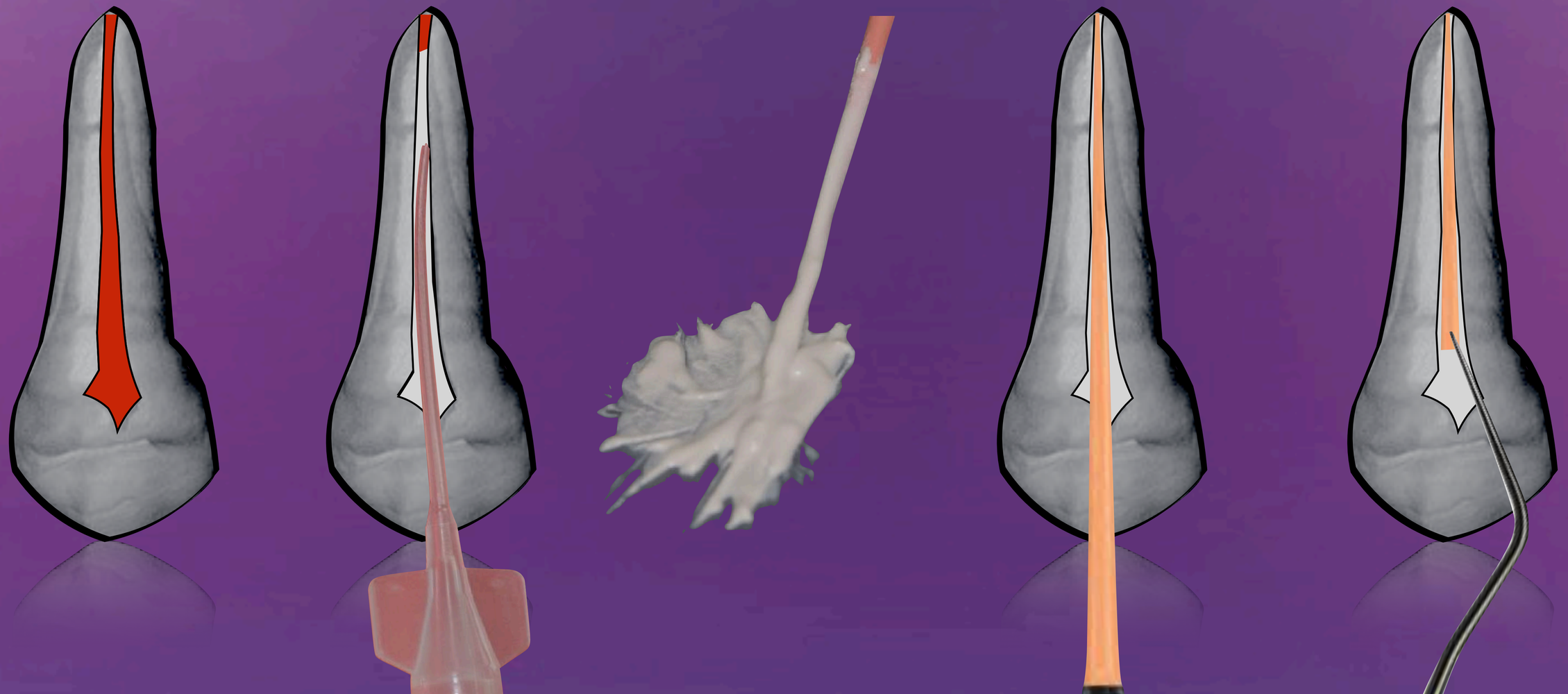
$2\,(3CaO.SiO_2) + 6H_2O. \rightarrow 3CaO.2SiO_2 + 3H_2O + 3Ca(OH)_2$

$2\,(2CaO.SiO_2) + 4H_2O. \rightarrow 3CaO.2SiO_2 + 3H_2O + Ca(OH)_2$

PRECIPITATION

$7Ca(OH)_2 + 3Ca(H_2PO_4)_2 \rightarrow Ca_{10}(PO_4)_6(OH)_2 + 12H_2O$

Single cone technic:
Coherent Endodontic Strategy



- Reduced mechanical stress
- Simplified and controlled obturation
- Sealer-centered concept
- Flow into irregularities

Idraulic condensation

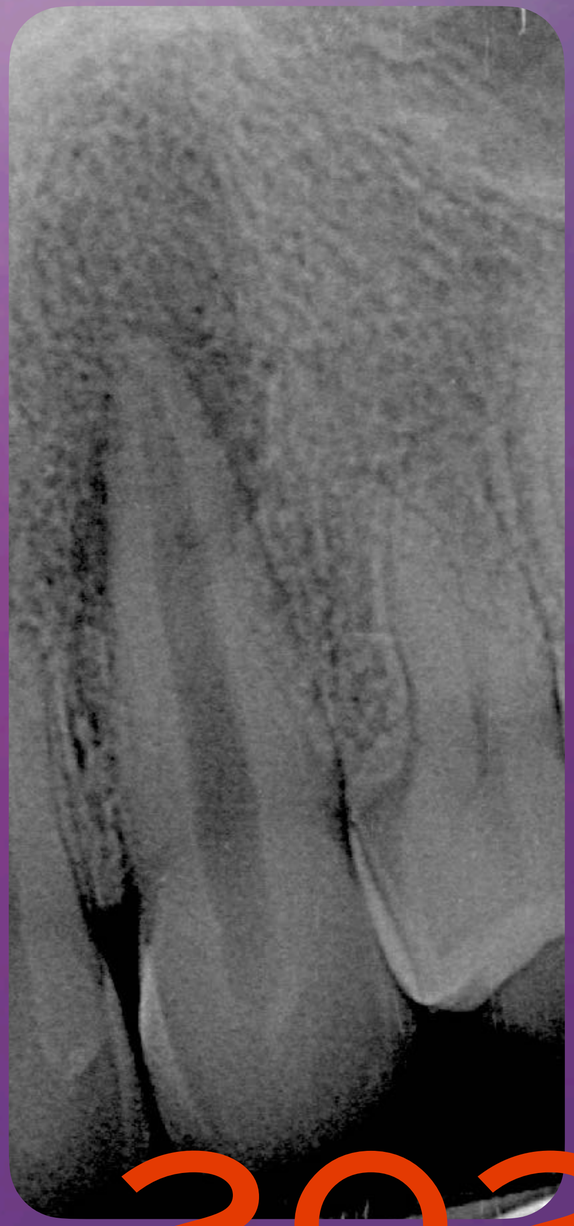
April 2022

September 2025

2022

2025

Idraulic condensation



2021

2024

WARNING

INTERNATIONAL ENDODONTIC JOURNAL
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EDITORIAL | Open Access

The Paradox of Calcium Silicate-Based Sealers: A Reflection on Bioactivity, Solubility and Clinical Meaning

Emmanuel João Nogueira Leal da Silva, Marco A. Versiani

Limitations of Current Standards

The Paradox—Bioactivity Versus Stability

Idraulic condensation

2019

50.3

2025

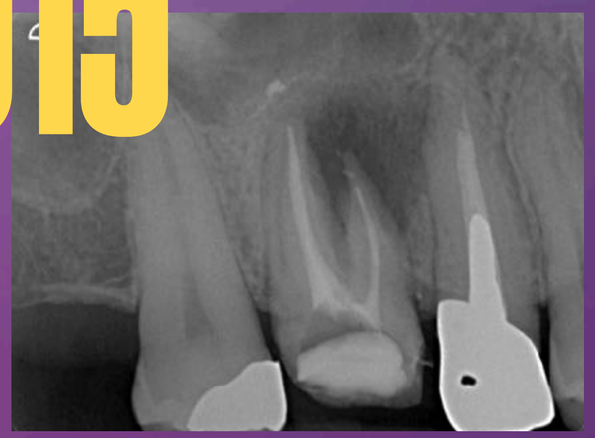
2015

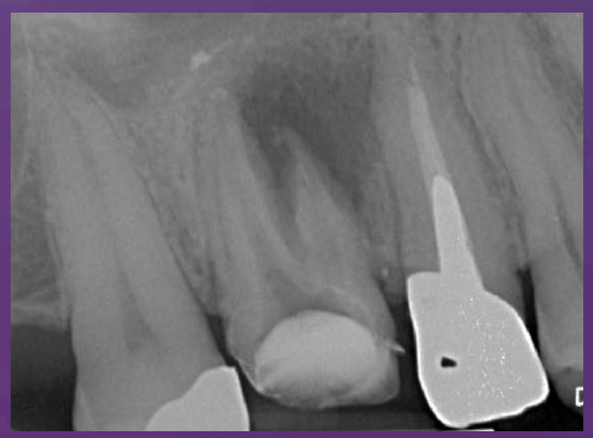
2025

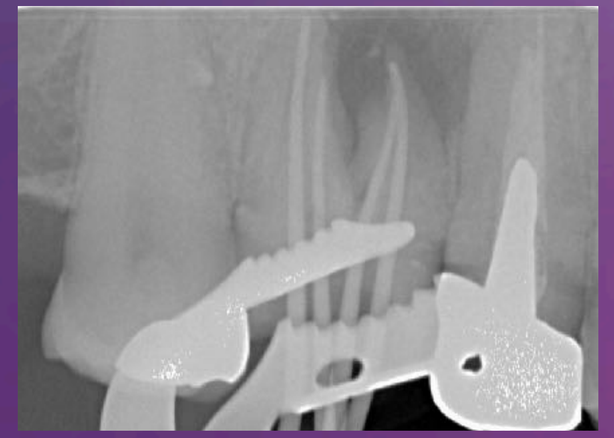
Idraulic condensation

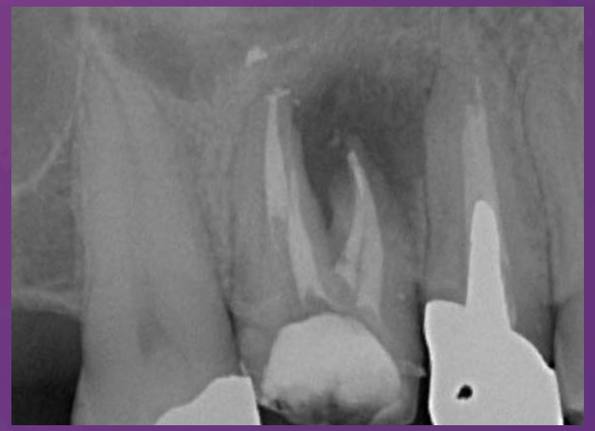
IDRAULIC CONDENSATION

2015









2025


RGFUMEIENDODONTIC

Key points

Shape less to increase Tooth Survival

Safe Shaping and customized apex

Irrigate better.”

Easyer and smarter Filling

AIE ACCADEMIA ITALIANA ENDODONZIA

SIE

SIDOC

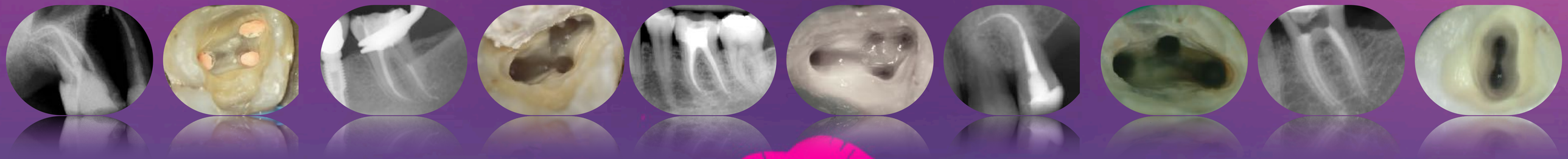
UNIVERSITAS STUDIORUM INSUBRIAE

ShapeIT®

ese

aae

The end



Esthetic Dental Story Vol. 3 | Hotel Mövenpick, Sarajevo

06-07. februar 2026.

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Sharing is the key to success

ShapeIT

Shape IT endo

Shape IT

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Shape IT


THANK YOU
Gianluca