

We are what we repeatedly do. Excellence, therefore, is not an act, but a habit

ARISTOTLE

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If my mind can conceive it and my heart can believe it, then I can achieve it


MUHAMMAD ALI

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Predictable Endodontics



Innovation & Case Selection

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Madison, Wisconsin



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ENDODONTIC SUCCESS

Restoration

INSTRUMENTATION

IRRIGATION

Diagnosis
OBTURATION

Case Selection



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Bringing new technology to an existing medical field.

Surround Medical Systems is a medical device company that develops cutting edge 3D X-ray imaging systems. Utilizing nanotechnology, we are able to create 3D imaging systems with no motion of the X-ray source.




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Dentsply Sirona Academy

wave•one GOLD



REMEMBER

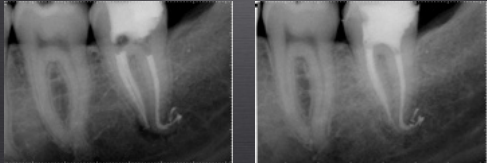
None of the clinical outcomes have been altered in any way


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REMEMBER

None of the clinical outcomes have been altered in any way



6 month



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PLEASE

Be cautious about integrating
new technology into your
practice

ADA C·E·R·P®
Continuing Education Recognition Program

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This is my story !

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BACTERIA, BACTERIA, BACTERIA...



S Kakehashi, HR Stanley, RJ Fitzgerald. The effects of surgical exposures of dental pulps in germ-free and conventional laboratory rats. Oral Surg Oral Med Oral Pathol 1965; 20:340-49.

G Sundqvist. Bacteriological studies of necrotic dental pulps [odontologic dissertation no.7]. 1976 University of Umea Umea, Sweden

AJ Möller, L Fabricius, G Dahlén, et al. Influence on periapical tissues of indigenous oral bacteria and necrotic pulp tissue in monkeys. Scan J Dent Res 1981; 89:475-84.

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GOALS OF TREATMENT

Prevent / resolve apical
periodontitis by:

Removal of all organic
substrate from the canal
system

Prevention of re-infection



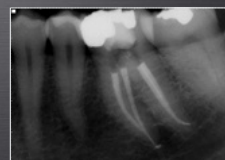
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Schilder, Dent Clin Nor Am 1974

GOALS OF TREATMENT

Safely deliver irrigant to
within 2-3 mm of the
working length

Preserve the natural
anatomy of the tooth



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GOALS OF ROOT CANAL TREATMENT



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CORONAL SEAL



IEJ 1995

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RESTORATION IMPORTANCE

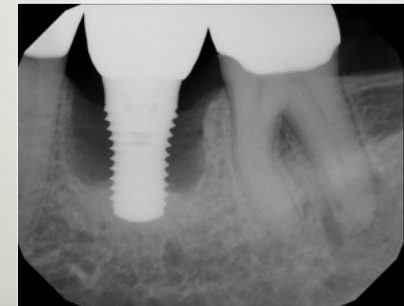
85% of Extracted Teeth Had No Full Coronal Coverage

A Significant Difference Was Found Between Covered and Non-covered Teeth for All Tooth Groups Tested



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SUCCESS VS. RETENTION



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ROOT CANAL SUCCESS

Salehrabi R, Roitstein I. J Endod 2004;30:846-50.

1.4 MILLION, 8 YEAR, 97% SURVIVAL

Chen SC, Chueh LH, Hsiao CK, et al. J Endod 2007;33:226-9.

1.5 MILLION, 5 YEAR, 93% SURVIVAL

Lazarski MP, Walker WA 3rd, Flores CM, et al. J Endod 2001;27:791-6.

44 THOUSAND, 3.5 YEARS, 94% SURVIVAL

CONDITIONS THAT SIGNIFICANTLY IMPROVE SURVIVAL

A **Crown** Restoration After RCT

Having Both Proximal **Contacts**

Not Functioning as an Abutment for Removable or Fixed Prosthesis

Tooth Type or Specifically **Non-molar** Teeth

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ROOT CANAL SUCCESS

Restored endodontically treated teeth and single-tooth implant restorations have similar failure rates

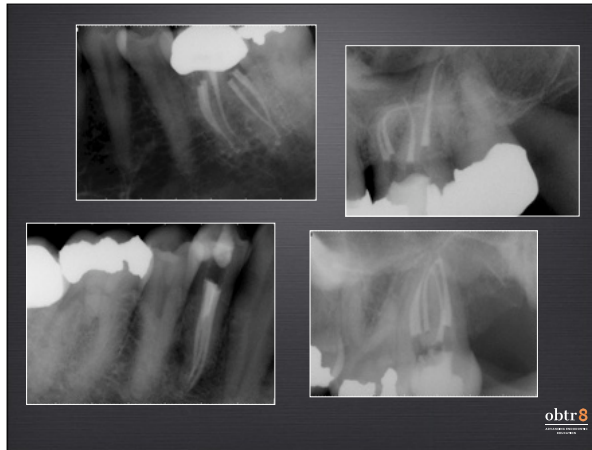
implant group:
longer average **time** to function
higher incidence of postoperative **complications** requiring subsequent treatment intervention



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JOE 2006

CASE EXAMPLES



ENDODONTIC PROCEDURE

- Diagnosis / Case Selection
- Anesthesia
- Rubber Dam
- Access
- Glide Path
- Working Length
- Instrumentation
- Irrigation
- Obturation
- Restoration
- Post Operative Care

ENDODONTIC PROCEDURE

Diagnosis / Case Selection

- Anesthesia
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Dental History

Medical History

Pulp Testing

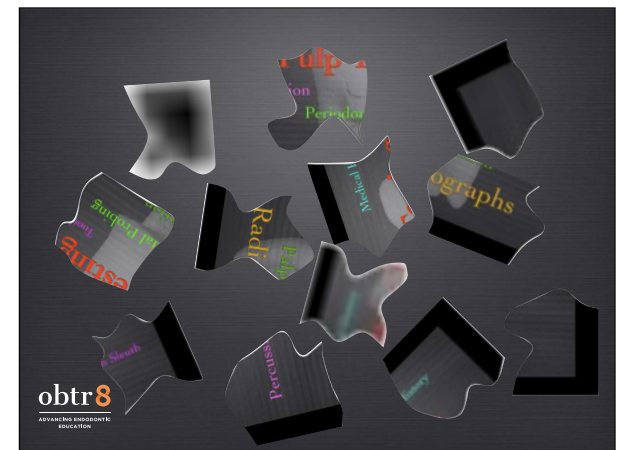
Percussion

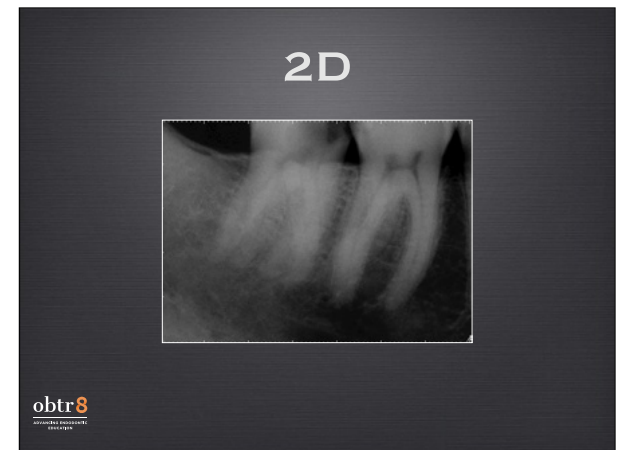
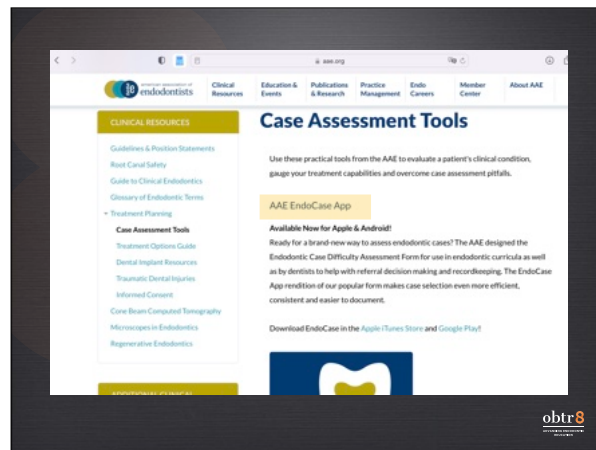
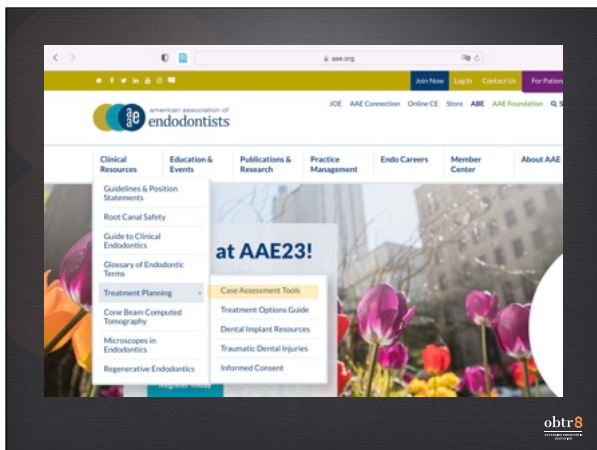
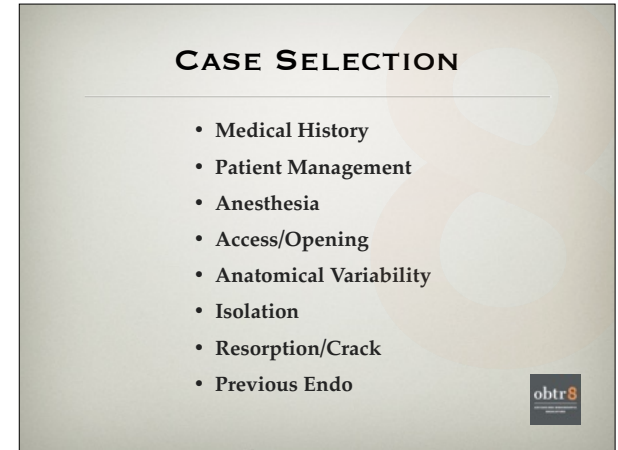
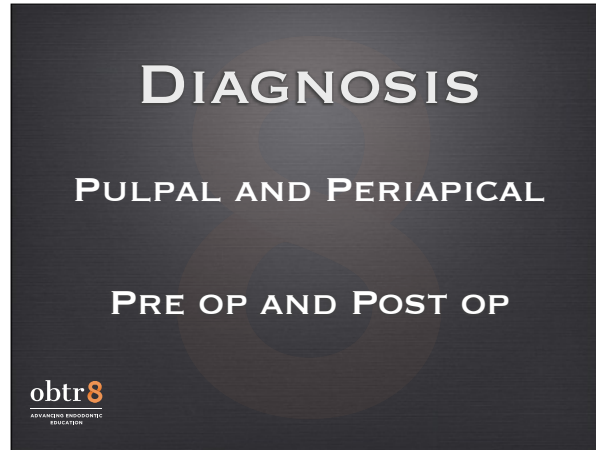
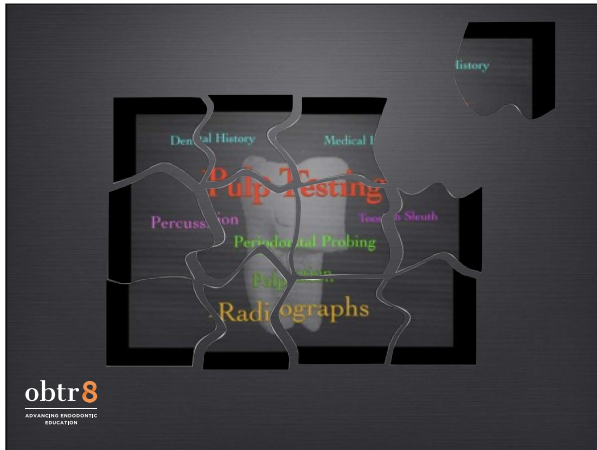
Tooth Sleuth

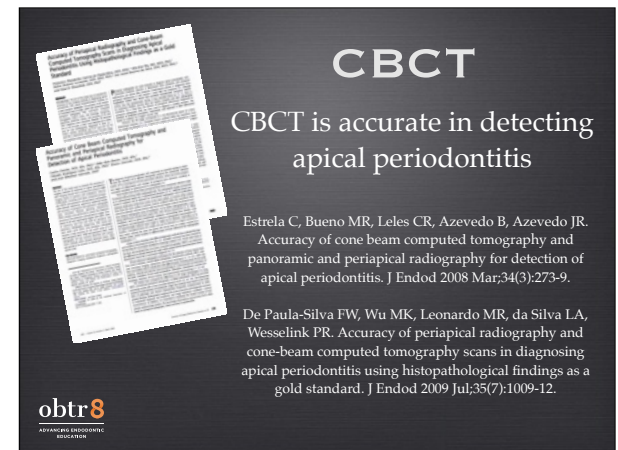
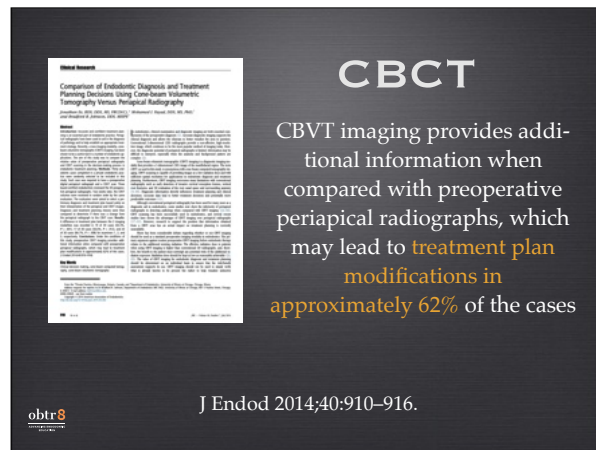
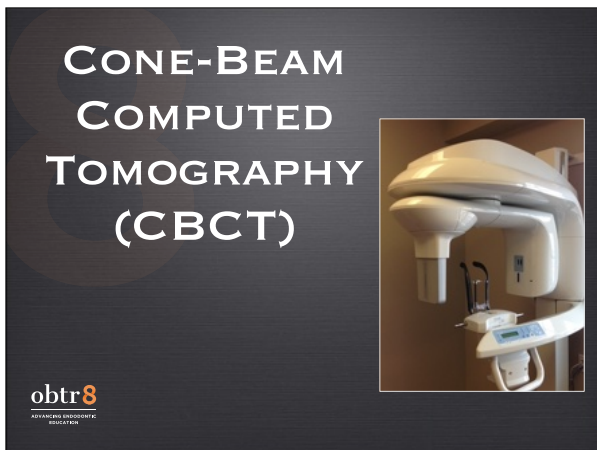
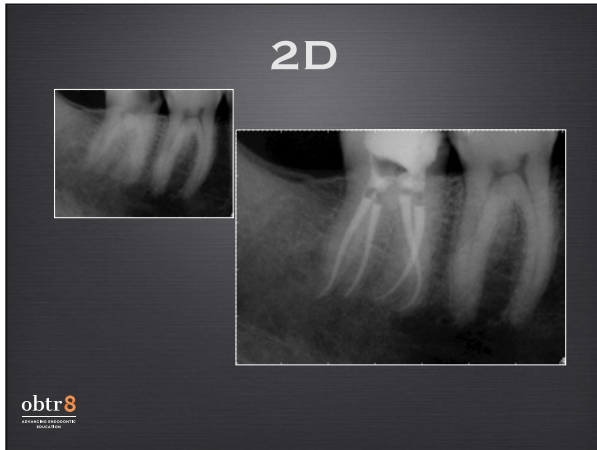
Periodontal Probing

Palpation

Radiographs







CBCT

CBCT devices demonstrated **poor** accuracy in detecting simulated lesions smaller than **0.8 mm** in diameter

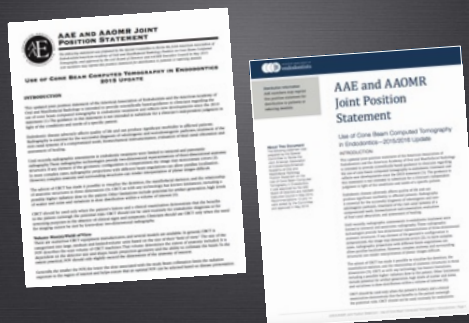
fair to **good** accuracy when simulated lesion diameter was between **0.8–1.4 mm**

excellent accuracy when simulated lesions were larger than **1.4 mm** in diameter



Tsai P, Torabinejad M, Rice D, Azevedo B. Accuracy of cone-beam computed tomography and periapical radiography in detecting small periapical lesions. J Endod 2012 Jul;38(7):965-70.

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Recommendation 2:

Limited FOV CBCT should be considered the imaging modality of choice for diagnosis in patients who present with **contradictory or nonspecific clinical signs and symptoms** associated with untreated or previously endodontically treated teeth

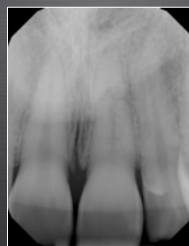
Recommendation 3:

Limited FOV CBCT should be considered the imaging modality of choice for initial treatment of teeth with the **potential for extra canals and suspected complex morphology**, such as mandibular anterior teeth, and maxillary and mandibular premolars and molars, and dental anomalies.



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CBCT TRAUMA



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CBCT TRAUMA



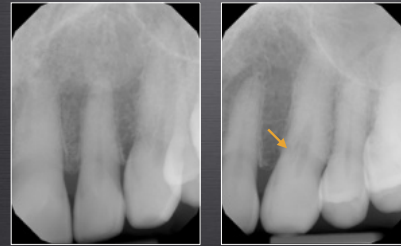
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CBCT RESORPTION



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CBCT RESORPTION



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CBCT RESORPTION



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CBCT & DIAGNOSIS

A moderately deep CNN trained on a limited amount of image data showed satisfying discriminatory ability to detect ALs on **panoramic** radiographs



J Endod 2019;45:917-922.

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CBCT SENSITIVITY



1.3 - 2.9 incidental findings per CBCT

24 - 93 % of scans had incidental findings

Edwards R, Altalibi M, Flores-Mir C. The frequency and nature of incidental findings in cone-beam computed tomographic scans of the head and neck region: a systematic review. J Am Dent Assoc 2013 Feb;144(2):161-70.

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RADIOLOGY LIMITATIONS



"interpreting the lamina dura continuity, shape and density, and the periodontal ligament width and shape proved to be the best radiographic features"

Kaffe I, Gratt BM. Variations in the radiographic interpretation of the periapical dental region. J Endod 1988 Jul;14(7):330-5.

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CBCT LIMITATIONS

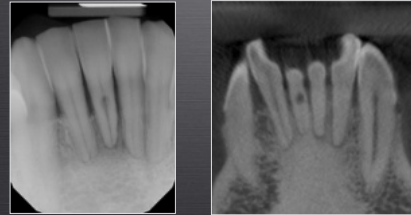


PDL spaces of healthy teeth demonstrated significant variation when examined by CBCT

Pope O, Sathorn C, Parashos P. A comparative investigation of cone-beam computed tomography and periapical radiography in the diagnosis of a healthy periapex. J Endod 2014 Mar;40(3):360-5.



CBCT LIMITATIONS



CBCT LIMITATIONS



Clinicians' experience level appears to be correlated with their ability to correctly diagnose **periapical** disease in CBCT volumes

Parker JM, Mol A, Rivera EM, Tawil PZ. Cone-beam Computed Tomography Uses in Clinical Endodontics: Observer Variability in Detecting Periapical Lesions. J Endod 2017 Feb;43(2):184-187.



LIMITATIONS

Contrast resolution -ability to differentiate between two objects of different density
example: dentin vs osteodentin in resorptions

Spatial resolution - ability to detect two structures close together as separate
example: inability to detect incomplete vertical root fractures



LIMITATIONS

**Unsharpness -
Movement**

- scan times of 5 - 40 seconds



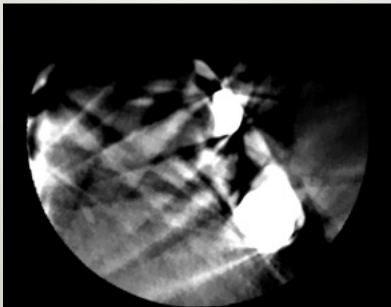
LIMITATIONS

**Beam Hardening Artifact -
Xray Beam has photons of
different energies**

Amalgam will cause a heavily filtered area and streaks



LIMITATIONS



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“pressure and cold sensitivity from the tooth second from back”



36 year old Female

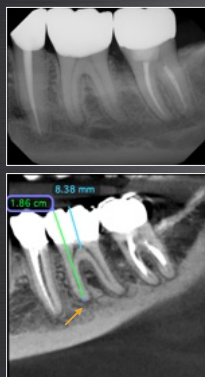
19 slow to respond, but then a lingering ache

19 sensitive to percussion

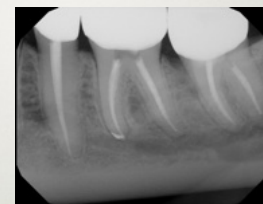
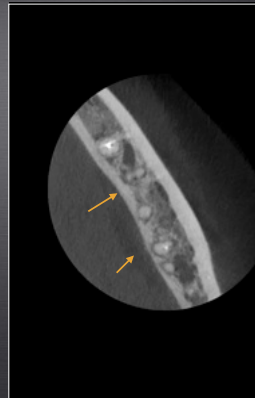
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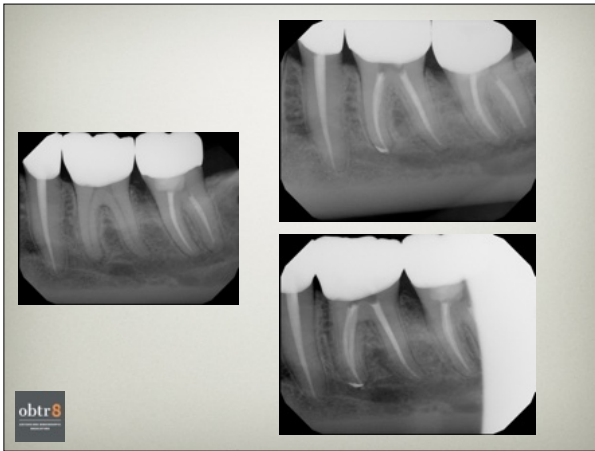
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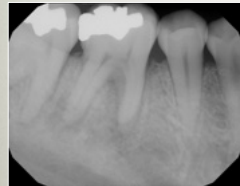
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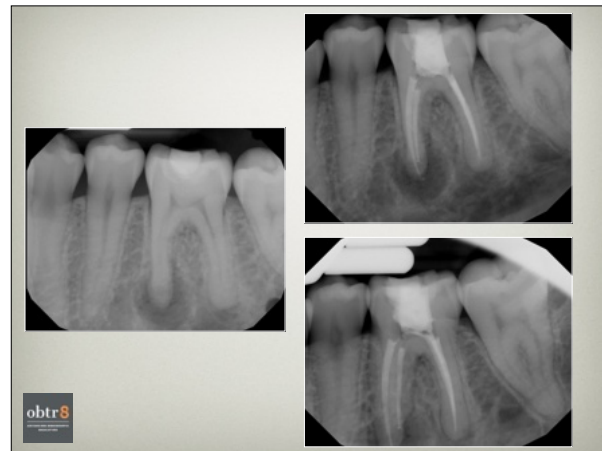
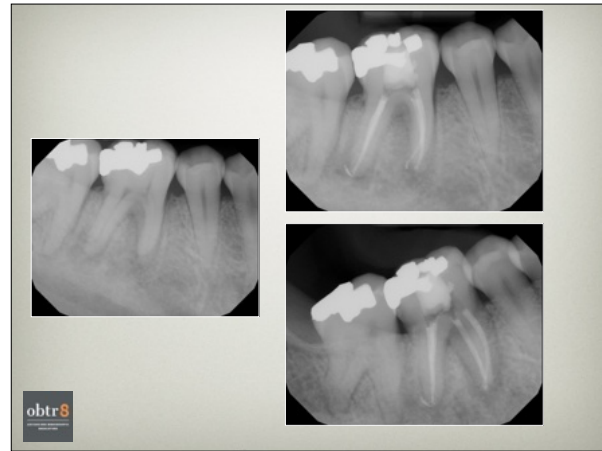
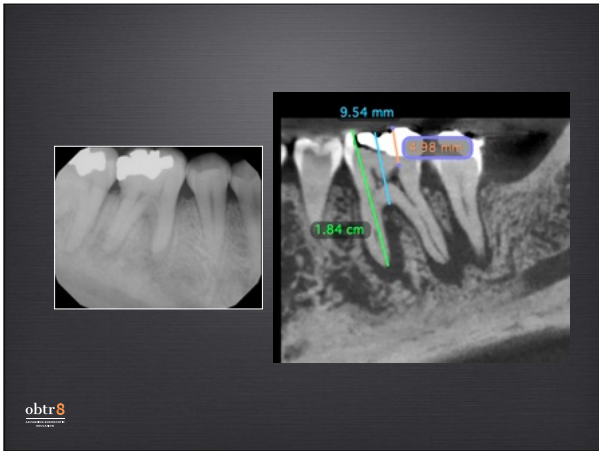


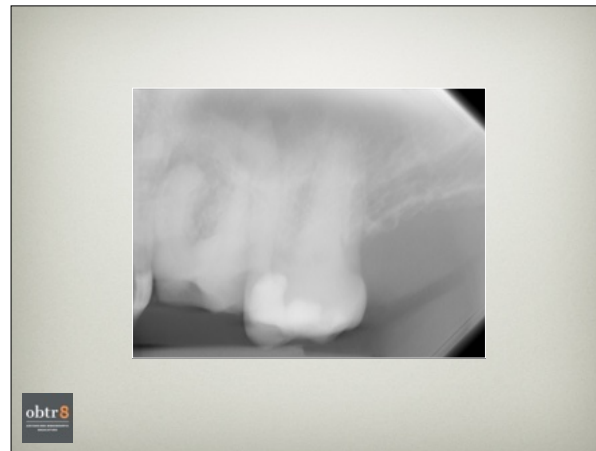
"I have no pain, but my dentist told me I need a root canal"

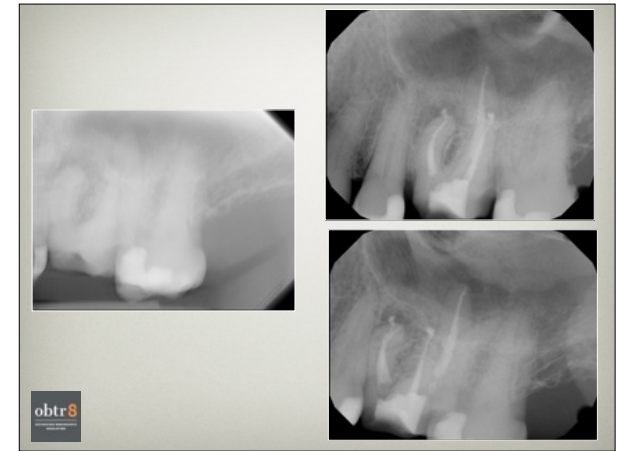
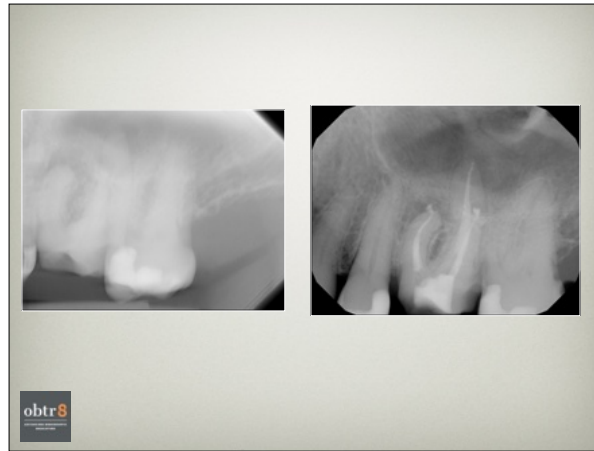
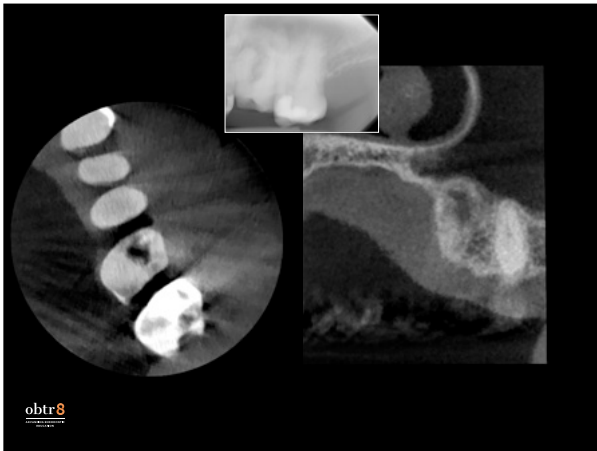


52 year old Female
30 NR to thermal testing
30 + percussion










CRACKS & SPLIT TEETH

Definition:
Crack that incompletely separates the crown into two parts

Propagation will result into a split tooth



CRACKS & SPLIT TEETH

Patient History:

Sharp pain to biting
Longstanding symptoms
Difficult to localize
Pulpitis symptoms



CRACKS & SPLIT TEETH

Clinical Findings: (early)

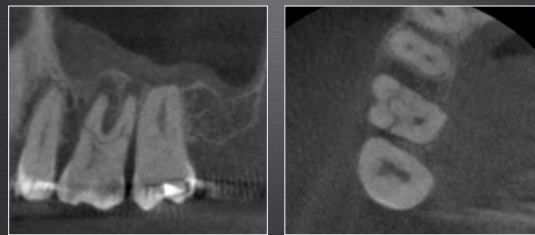
Variable Restorative History
Vital Pulp (pulpitis ?)
Inability To Chew
Referred Pain
Radiographs Normal
Percussion ? / Tooth Sleuth



CRACKS & SPLIT TEETH

Clinical Findings: (late)

Pulp Involvement
Biting symptoms may decrease with loss
of pulp vitality
Apical Radiolucency



CRACKS & SPLIT TEETH

Clinical Findings: (late)

Extensive Radiolucency
Narrow Deep Periodontal Pockets
(mesial / distal location)



CRACKS & SPLIT TEETH

Diagnosis:

Tooth Sleuth
Magnification
Methylene Blue Dye
Transillumination

**First Symptoms: Pressure or
Pulp?**



CRACKS & SPLIT TEETH

Treatment Cracked Tooth:

- Goals : Protect tooth and improve function
- Determine Pulp Status
- Temporary Crown

COMMUNICATION



JOE 2007



JOE 2007

If a marginal ridge crack is identified early enough in teeth with a diagnosis of RP and a crown is placed, root canal treatment will be necessary in about 20% of these cases within a 6-month period

CRACKS & SPLIT TEETH

245 restored teeth

23.3% had preop cracks

60% had visible cracks following removal of restoration

PV Abbott: Assessing restored teeth with pulp and periapical diseases for the presence of cracks, caries and marginal breakdown. Aust Dent J. 49:33 2004



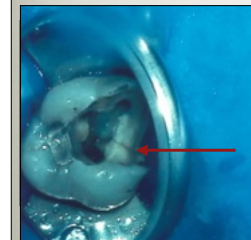
CRACKS & SPLIT TEETH



Treatment Split Tooth:

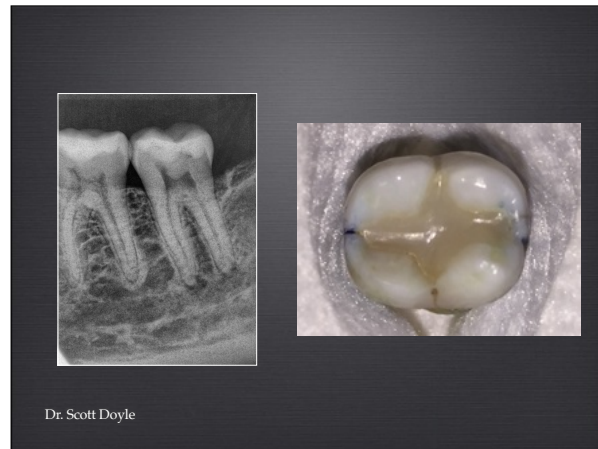
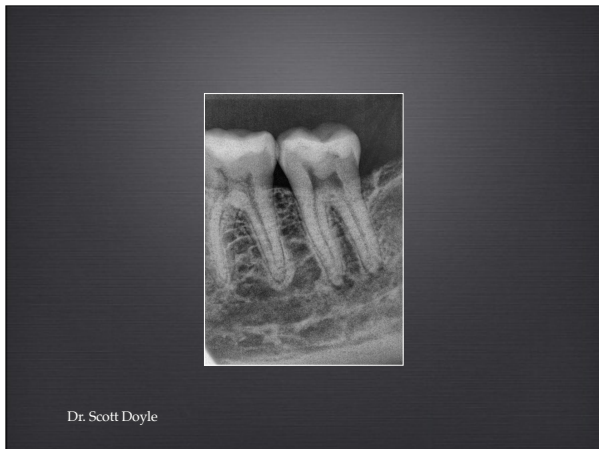
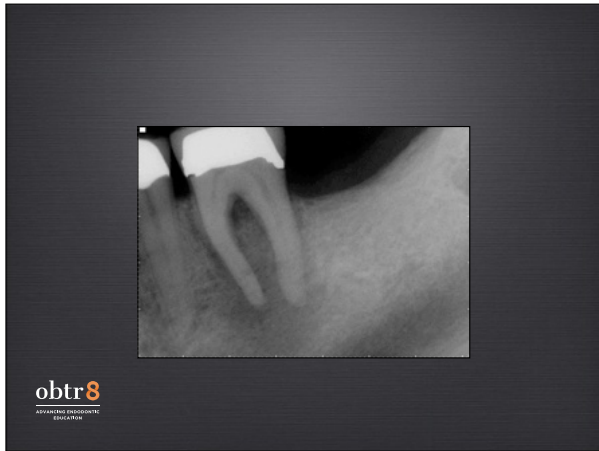


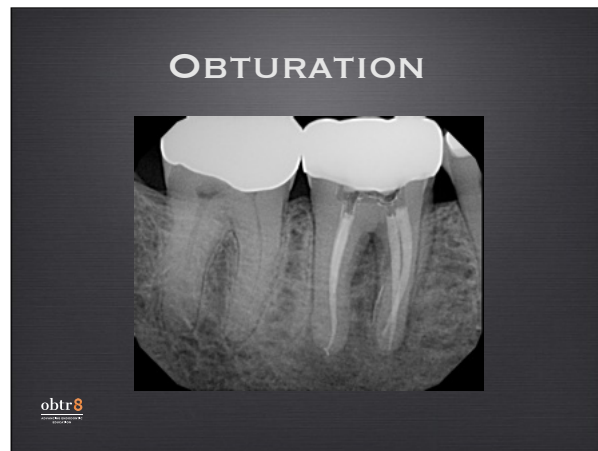
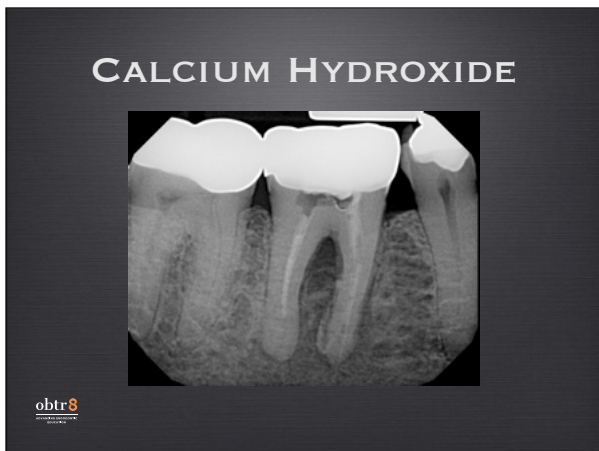
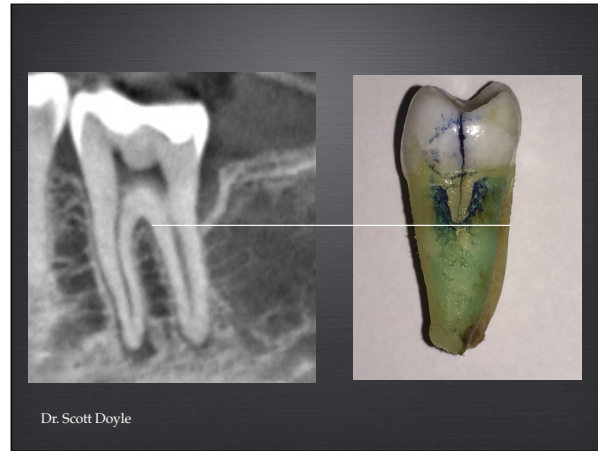
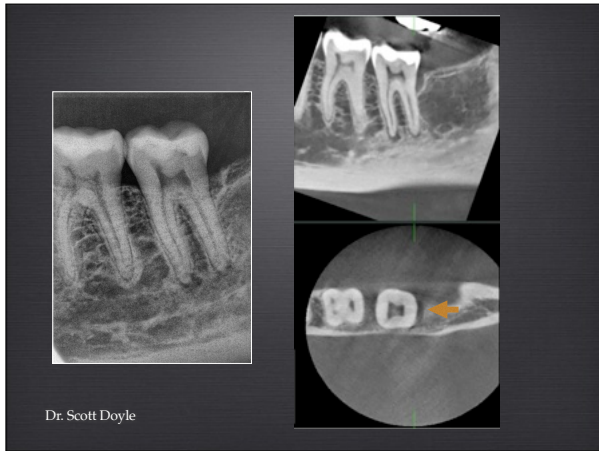
CRACKS & SPLIT TEETH



Treatment Split Tooth:
EXTRACTION





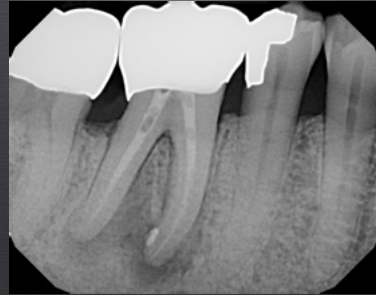


PREOP



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CALCIUM HYDROXIDE



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CONCLUSIONS



Dr. Scott Doyle

Difficult to Diagnose

Predict Future

Preserve Maximum
Tooth Structure

**COMMUNICATE &
DOCUMENT !**

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ENDODONTIC PROCEDURE

Diagnosis / Case Selection

Anesthesia

Rubber Dam

Access

Glide Path

Working Length

Instrumentation

Irrigation

Obturation

Restoration

Post Operative Care

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ANESTHESIA

- Lidocaine 2%
 - 1:100k epi, 1:50k epi formulations
- Articaine 4%
 - 1:100k epi, 1:200k epi formulations
- Priolocaine 4%
 - Plain or 1:200k epi formulation (Citanest Plain and Citanest Forte) – Less potent and toxic than lidocaine
 - Intermediate duration of 40-60 minutes in plain formulation
- Bupivacaine 0.5% w:1:200k epi
- Mepivacaine
 - 2% 1:20k levonordefrin or 3% plain
- Plain is considered short acting (maybe not for IANB!)

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ANESTHESIA

- Lidocaine 2%
 - 1:100k epi, 1:50k epi formulations
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ANESTHESIA RECIPE

1. Pre-medication with ibuprofen >400mg
2. IANB plus Gow Gates with lidocaine or articaine – slow injection, even for the second one!
3. Supplemental infiltration with full cartridge of articaine aimed at the apices of the tooth
4. Intraosseous injection if still cold sensitive (PDL is OK but not as predictable)
5. Access with sharp #2 round bur aimed at the largest pulp horn
– Keep access to the size of the bur
– If pain on entry into the pulp, use intrapulpal



ENDODONTIC PROCEDURE

Diagnosis / Case Selection
Anesthesia
Rubber Dam
Access
Glide Path
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Post Operative Care



RUBBER DAM



AAE POSITION STATEMENT

The following statement was prepared by the AAE Clinical Practice Committee. AAE members may photocopy this position statement for distribution to patients or referring dentists.

DENTAL DAMS

The American Association of Endodontics is dedicated to excellence in the art and science of endodontics and to the highest standards of patient care. The accumulated clinical knowledge and judgment of the practitioner supported by evidence-based scientific research is the basis for endodontic treatment. Tooth isolation using the dental dam is the standard of care; it is integral and essential for any nonsurgical endodontic treatment.

A dental dam is a latex or nonlatex sheet with a hole punched in the material to allow placement around the tooth during the endodontic procedure. One of the primary objectives of endodontic treatment is disinfection of the root canal system. Only dental dam isolation minimizes the risk of contamination of the root canal system by indigenous oral bacteria. The dental dam also offers other benefits, such as aiding in visualization by providing a clean operating field and preventing ingestion or aspiration of dental materials, irrigants and instruments.



RUBBER DAM



The use of a rubber dam during RCT could provide a significantly higher survival rate after initial RCT

This result supports that rubber dam usage improves the outcomes of endodontic treatments

J Endod 2014;40:1733–1737



ISOLATION & VISUALIZATION



ENDODONTIC PROCEDURE

Diagnosis / Case Selection
Anesthesia
Rubber Dam
Access
Glide Path
Working Length
Instrumentation
Irrigation
Obturation
Restoration
Post Operative Care



MAGNIFICATION



MAGNIFICATION

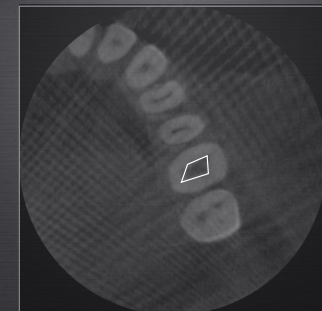


MAGNIFICATION



FINDING CANALS

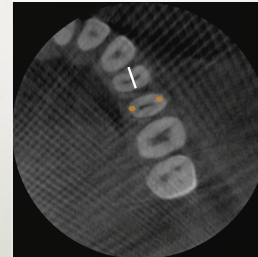
Preoperative Radiograph(s)
Bite wing angle
CBCT
CEJ/Perio Probe
Others....





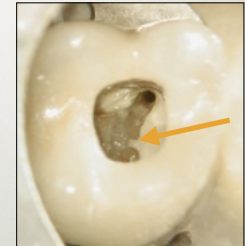
ACCESS CONSIDERATIONS

- **Floor** of chamber is in center of tooth at level of CEJ
- Walls of chamber are concentric to external surface of tooth at CEJ
- Distance from external surface of the clinical crown to the wall of the chamber is the same throughout the circumference of the tooth at the CEJ

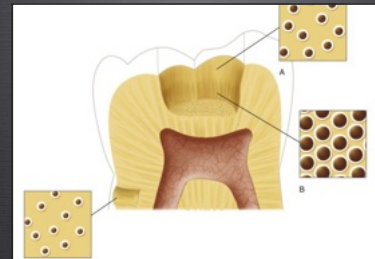


ACCESS CONSIDERATIONS

- Canal orifice is equidistant from a line drawn in a MD direction through the center of the pulp (not for Mx molars)
- Chamber floor is darker (different color than wall)
- Orifice is at junction of wall and floor



MB-2



DENTIN INFECTION



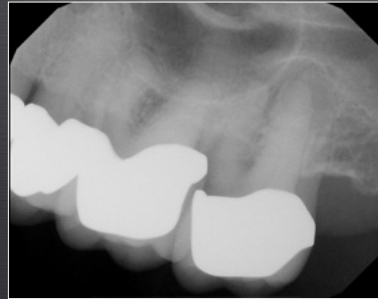
Trowbridge HO, Dentistry 22:22-29, 1982

DENTIN INFECTION

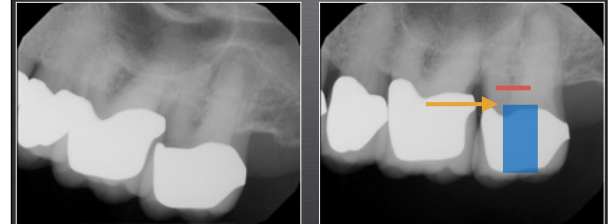
Bacterial infection of the cervical and midroot areas was similar, characterized as a heavy infection with bacteria penetrating as deep as 200 μm



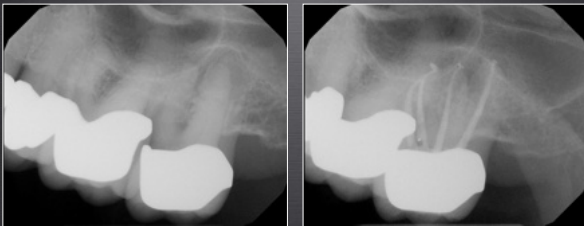
REVIEW

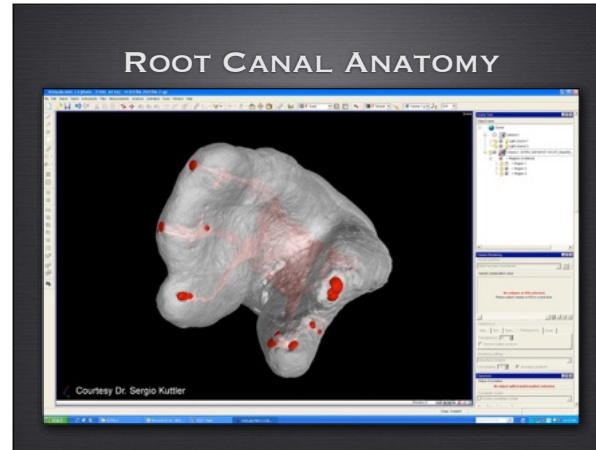


REVIEW



REVIEW





APICAL LOCATION

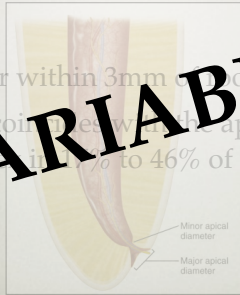
- At or within 3mm of root apex
- AF coincides with the apical root vertex in 17% to 46% of cases

Minor apical diameter
Major apical diameter

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ADVANCED TECHNOLOGY
EDUCATION

APICAL LOCATION

- At or within 3mm of the apex
- AF compared with the apical root
- 10% to 46% of cases



APICAL SIZE

Teeth	Mean (um)
Mx incisors	289.4
Mn incisors	262.5
Mx premolars	210
Mn premolars	268.25
Mx molars	
Palatal	298
Mesiobuccal	235.05
Distobuccal	232.2
Mn Molars	
Mesial	257.5
Distal	392



Morfis et al OOO 1994

APICAL SIZE

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Mn Molars	
Mesial	257.5
Distal	392



Morfis et al OOO 1994

APICAL ANATOMY

Close relationship between the anatomic complexity of the root canal system and the persistence of periradicular pathosis



WADA M, TAKASE T, ET AL. CLINICAL STUDY OF REFRACTORY APICAL PERIODONTITIS TREATED BY APICECTOMY PART 1. ROOT CANAL MORPHOLOGY OF RESECTED APEX. INT ENDOD J 1998; 31:53-56.

APICAL ANATOMY

Approximately 75% of teeth have canal aberrations in the apical 3 mm of the tooth



DE DEUS QD. J ENDOD 1975; 1:361-66.

SELTZER S, SOLTANOFF W, BENDER IB, ZIONTZ M. ORAL SURG ORAL MED ORAL PATHOL 1966; 22:375-85.



LATERAL

74%

11%

15%



VERTUCCI FJ. ROOT CANAL ANATOMY OF THE HUMAN PERMANENT TEETH. ORAL SURG ORAL MED ORAL PATHOL 1984; 58:589-99.



ENDODONTIC PROCEDURE

- Diagnosis / Case Selection
- Anesthesia
- Rubber Dam
- Access
- Glide Path**
- Working Length
- Instrumentation
- Irrigation
- Obturation
- Restoration
- Post Operative Care

Glide path preparation:

1. reduces the risk of debris extrusion
2. no influence on the incidence of dentinal crack formation
3. improves the preservation of the original canal anatomy

Preflaring increases the accuracy of working length determination



J Endod 2020;46:707-729

The glide path with NiTi Rotary PathFiles leads to less postoperative pain and faster symptom resolution

J Endod 2012



GLIDE PATH ARMAMENTARIUM



VORTEX ORIFICE OPENERS



12mm of cutting flutes
Parallel flutes in the last 3-4 mm
16 mm 19 mm lengths



VORTEX ORIFICE OPENERS

Size (Tip/Taper)	Cutting Length	Tapered Length	Parallel Flutes 00 Taper Length	Maximum Fluted Diameter	Handle Color (Tip Size)	Stopper Color (Taper)	Taper Lines
20/.08	12 mm	9.0 mm	3.0 mm	0.92 mm	Yellow	Blue	4
25/.08	12 mm	9.3 mm	2.7 mm	0.99 mm	Red	Blue	4
25/.10	12 mm	9.4 mm	2.6 mm	1.19 mm	Red	Yellow	5
25/.12	12 mm	7.9 mm	4.1 mm	1.19 mm	Red	Black	6
30/.12	12 mm	8.0 mm	4.0 mm	1.26 mm	Blue	Black	6
40/.10	12 mm	7.9 mm	4.1 mm	1.19 mm	Black	Yellow	5



WAVEONE GOLDGLIDER

- Reciprocation
- 0.15 mm tip
- Progressive Taper
- 21, 25, 31 mm lengths



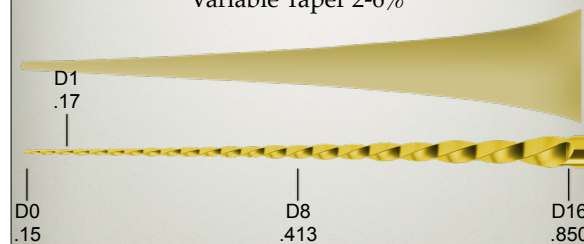
WAVEONE GOLDGLIDER

- Prepackaged
- Single use
- Metallurgy

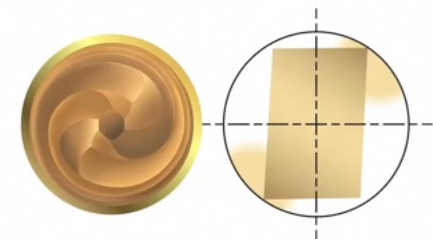


WAVEONE GOLDGLIDER

Variable Taper 2-6%




RECIPROCATING MOTION




GLIDE PATH GOAL

10 OR 15 FILE LOOSE AT THE WORKING LENGTH



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ADVANCED INDEPENDENT EDUCATION

PATENCY



Maintenance of apical patency does not increase the incidence, degree, or duration of post-operative pain

J Endod 2009;35:189-192

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GLIDE PATH MANAGEMENT


Smaller curved canals



obtr8

GLIDE PATH MANAGEMENT

Smaller curved canals




obtr8

GLIDE PATH MANAGEMENT

Smaller curved canals

- Estimate working length
- Straight Line Access
- Orifice Opening
- Instrumentation




obtr8

TECHNIQUE

Smaller curved canals

- Access
- Irrigate canal
- Open orifice/canal ***SHORT*** of WL (coronal to any MD curve)
- 10 file
- Vortex orifice opener



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TECHNIQUE

Smaller curved canals

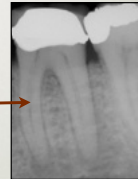
**DO NOT ALLOW
FILE TIP TO
BIND OR HIT
CANAL WALL**



TECHNIQUE

Smaller curved canals

- After orifice is opened
- 10 file coronal to any binding →
- roughly 17-18 mm
- WOG Glider 1mm short of 10 file binding



TECHNIQUE

Smaller curved canals

- 10 file apical to first curve, coronal to 2nd curve
- 20-21 mm →
- WOG Glider 1mm short of 10 file binding



TECHNIQUE

Smaller curved canals

- 10 file apical to est WL (23mm)
- Determine WL (EAL +/- or Xray)
- If not at WL continue to work down canal without binding file tip
- WOG Glider @ working length



IF 10 FILE NOT ADVANCING

- Open to Final Shape,
- (.5 mm short of depth of WaveOne Glider)
- Pre-Bend 10 File
- Smaller file (I don't do this)
- Push 10 File and Engage Tip (I try to never do this)



TECHNIQUE REVIEW

- 10 file into canal (past dentin triangle)
- Orifice open (Vortex orifice opener 20/08, 16mm)
- 10 file tap to resistance (or est WL)
- WaveOne Glider @ 1 mm short of 10 file (or at WL)
- If not at estimated WL repeat sequence of 10 file and WaveOne Glider until estimated WL
- Final instrumentation



ENDODONTIC PROCEDURE

Diagnosis / Case Selection
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Irrigation
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Post Operative Care



WORKING LENGTH



ELECTRONIC APEX LOCATOR



Apex locator reduces the patient radiation exposure and also that the electronic method may perform better for working length determination

J Endod 2014;40:759-777



ELECTRONIC APEX LOCATOR



The data presented in the evaluated studies support the use of apex locators for WL measurements

J Endod 2015;41:1818-1823



EAL CONSIDERATIONS

- Restorations
- Canal Moisture
- Pulpal Status
- File Size
- Apical size
- Perforation/fractures
- Connections (x4)

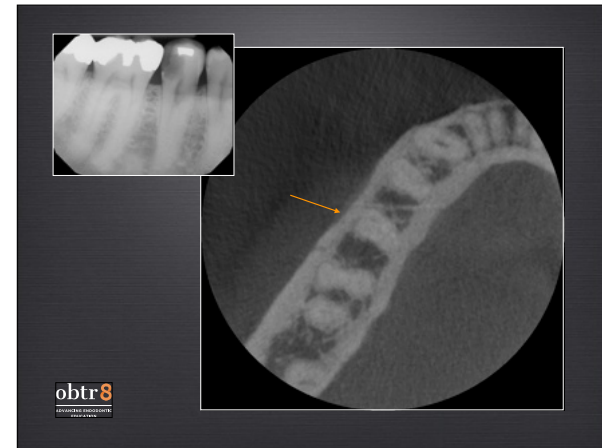
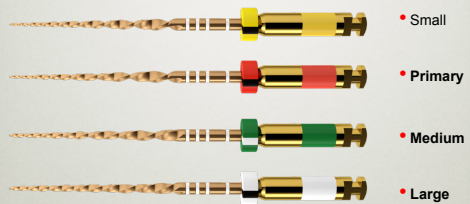


ENDODONTIC PROCEDURE

Diagnosis / Case Selection
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Rubber Dam
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Glide Path
Working Length
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Obturation
Restoration
Post Operative Care



WAVEONE® GOLD RECIPROCATING SYSTEM







wave • one[®]
GOLD

- Glide path
- Flood canals
- Brushing motion away from furcation
- Apical pressure to engage dentin
- Several passes will be required to achieve WL
- Rinse and patency file between each WaveOne™ gold cycle




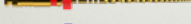
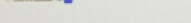
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ADVANCED ENDODONTICS
SOLUTIONS


PROTAPER ULTIMATE

**THE NEWEST
REVOLUTION
IN ROOT
CANAL
TREATMENT**

DIMENSIONS AT A GLANCE

		Tip diameter	Taper at tip
Slider		16	2%
Shaper		20	4%
F1		20	7%
F2		25	8%
F3		30	9%



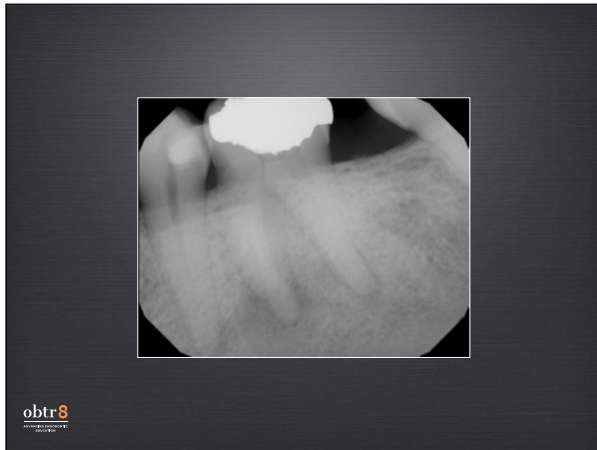
**PROTAPER ULTIMATE
USAGE GUIDELINES**



400 rpm speed
4 – 5.2 Ncm torque
Light or NO Pressure


Irrigate Frequently
Clean Flutes Frequently



ENDODONTIC PROCEDURE

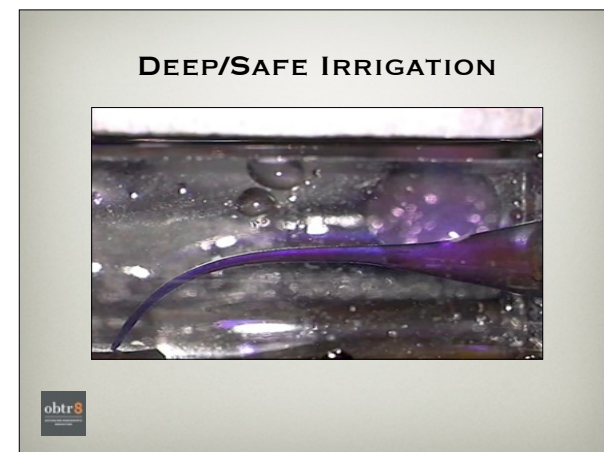
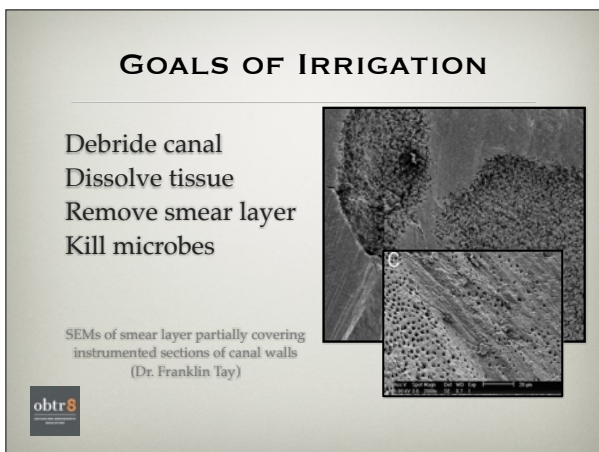
- Diagnosis / Case Selection
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IRRIGATION







APICAL IRRIGATION



Safe delivery of irrigant into the **apical third** of complex endodontic anatomy

IRRIGATION NEEDLE

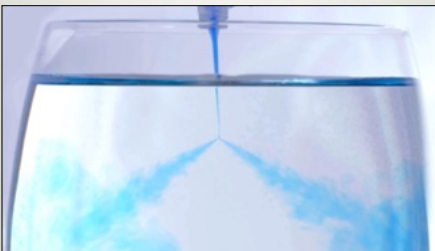
1. The back-to-back **2-sided vent**
2. Balanced volume between the two lateral openings
3. Its **soft polypropylene** allows the needle to curve and flex easily to follow the root canal anatomy
4. No resistance or damage to the dentinal walls
5. Aimed directly at the dentinal wall

IRRIGATION NEEDLE



4% taper polypropylene cannula
30 gauge
60° curvature for difficult access
Easy install

STILL SHOT

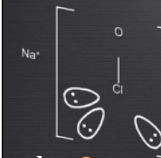


CURRENT IRRIGATION SOLUTIONS AND PROTOCOLS

NaOCl

EDTA

CHX



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ADVANCED ENDODONTIC
TECHNOLOGY

Dissolves organic tissue

Kills microbes fast

No effect on inorganic tissue

Weakens in contact with other materials

Toxic/caustic effect on PA tissue

Harmful effect on dentin structure??

No single final irrigant
does all of the
required tasks

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EDUCATION

QMIX™ 2IN1 CONTENTS

CHX
EDTA
DETERGENT

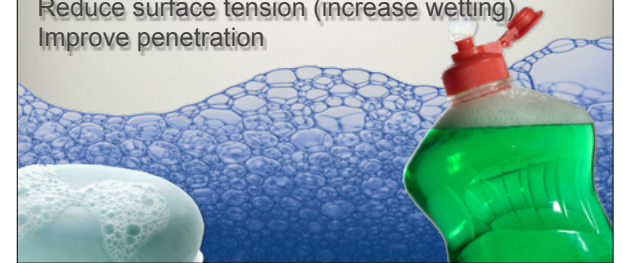


2 Sizes: 60 mL and 480 mL

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EDUCATION

Surfactants

Reduce surface tension (increase wetting)
Improve penetration



QMIX™ 2IN1 BENEFITS

Comparable Smear Layer Removal
To 17% EDTA

Disinfection
Kills 99.99% Bacteria
in 5 seconds

Easy Chair Side Handing
Premixed



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EDUCATION

QMIX AND SMEAR LAYER



QMix was effective as 17%
EDTA in removing canal wall
smear layers after the use of
5.25% NaOCl as the initial
rinse



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ADVANCED ENDODONTIC
EDUCATION
J Endod. 2011 Jan;37(1):80-4

QMIX AND BACTERIA

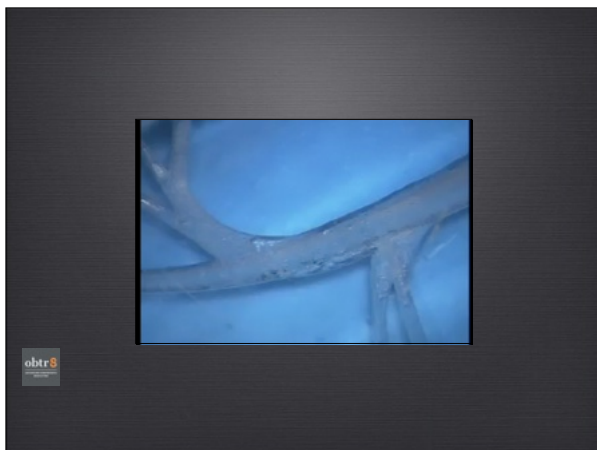
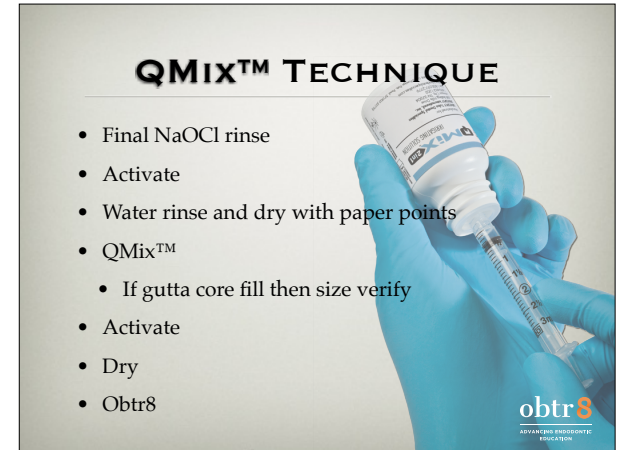
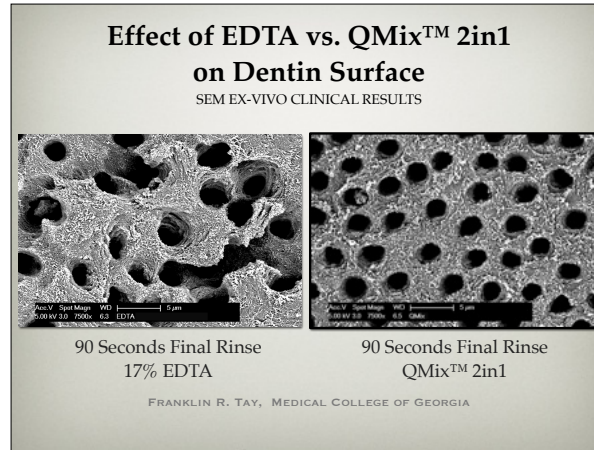
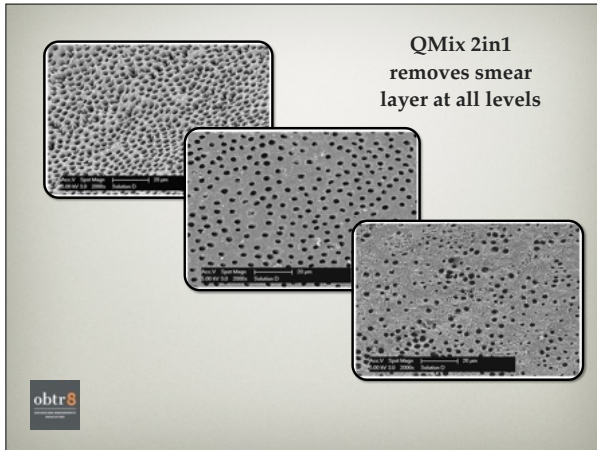


QMix and NaOCl were
superior to CHX and
MTAD in killing *E. faecalis*
and plaque bacteria in
planktonic and biofilm
culture

Ability to remove smear
layer by QMix was
comparable to EDTA

J Endod. 2011 Apr;37(4):363-71

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ADVANCED ENDODONTIC
EDUCATION



THE SMARTLITE PRO ENDOACTIVATOR

18,000 cpm
Ergonomic Contra-angle Design




THE SMARTLITE PRO ENDOACTIVATOR

18,000 cpm
Ergonomic Contra-angle Design
22 and 28 mm lengths




THE SMARTLITE PRO ENDOACTIVATOR

18,000 cpm
Ergonomic Contra-angle Design
22 and 28 mm lengths
Elliptical Motion





THE SMARTLITE PRO ENDOACTIVATOR

18,000 cpm
Ergonomic Contra-angle Design
22 and 28 mm lengths
Elliptical Motion
Quiet




ACTIVATION



THE SMARTLITE PRO ENDOACTIVATOR OPERATION AT A GLANCE



Press

1st press: high power
2nd press: low power
3rd press: off

30s

Turn on (1 or 2 presses)

Device beeps, to signal 30 second cycle



THE SMARTLITE PRO ENDOACTIVATOR



Transillumination: Diagnostic (Carries, Cracks & Canal Access)



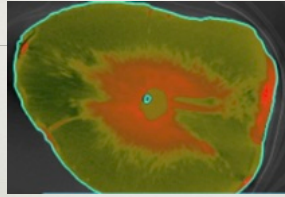
EndoActivator: Endodontic Irrigation (Debris, Smear Layer & Disinfection)



Curing: Restorative (Temp, Buildup & Final Restoration)





ACTIVATION IMPACT




Exchange of activated irrigant deep within the dentinal tubules

Courtesy Roberta Pileggi




ACTIVATION

EndoActivator provided better obturation of lateral and accessory canals and resulted in less remaining debris

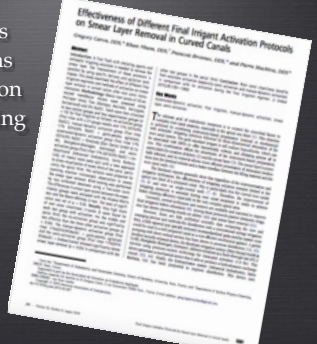



Kanter V, Weldon E, Pileggi R, et al: A Quantitative and Qualitative Analysis of Ultrasonic vs. Sonic Endodontic Systems on Canal Cleanliness and Obturation, Oral Surg, Oral Med, Oral Pathol, Oral Radio, J Endod 112:6, pp. 809-813, 2011



ACTIVATION

Root canal cleanliness benefits from solutions activation in comparison with no activation during the final irrigation regimen

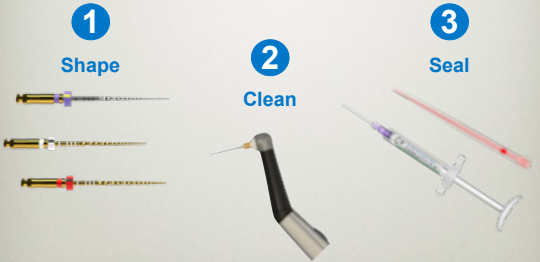

ENDODONTIC PROCEDURE

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SYSTEM BASED TREATMENT

- 1** Shape
- 2** Clean
- 3** Seal

OBTURATION



Deep Shape



Conform Fit



Predictable Seal



OBTURATION

Means nothing
without a clean
canal



OBTURATION



cold lateral



OBTURATION



cold lateral



warm vertical



OBTURATION



cold lateral



carrier



warm vertical



SINGLE CONE OBTURATION

cold lateral

warm vertical

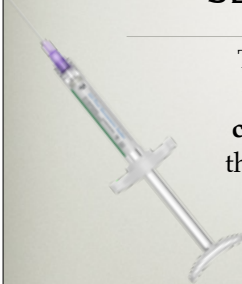
carrier



AH PLUS® SEALER FAMILY



CALCIUM SILICATE-BASED SEALERS



Tricalcium Silicate interacts with body fluids to release **calcium** and **hydroxide** ions that promote Hydroxyapatite formation and support the healing response



AH PLUS® SEALER

AH Plus Bioceramic Sealer has a fast and predictable set time of 2-4 hours



AH PLUS® SEALER



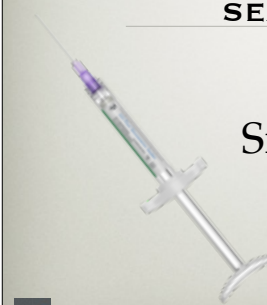
Decreased shrinkage
Better flowability
Good adhesion to dentin with low solubility & film thickness
More radiopaque

AH PLUS® SEALER



Ease of
Use!

AH PLUS® CALCIUM SILICATE-BASED SEALERS



Single Cone is
Popular!

**SEALERS FOR ALL SOLUTIONS AND
OBTURATION TECHNIQUES**



ProTaper Ultimate™
(including all ProTaper brands) WaveOne® Gold TruNatomy™



SYSTEM BASED GUTTA PERCHA

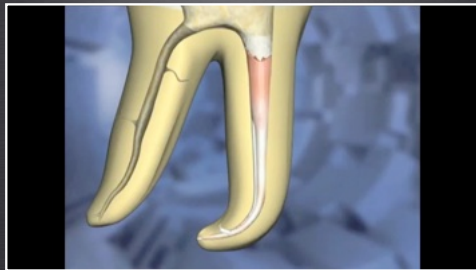
Injection Molded
Tolerance +/- 0.02
Multi-tapered cone/ Flat End
Extended Heat Wave > 6mm



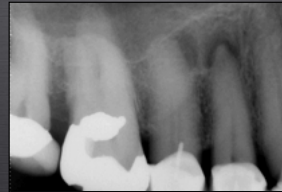
GUTTASMART



1. Cone Fit should be tight and to within .5 mm of WL
2. Prefit pluggers and heat source
3. Sear @ orifice first
4. Downpack to within 5 mm of WL
5. Pack along sidewalls to prevent mounding of GP
6. Heat apical plug prior to placing final fill
7. Fill in stages depending on taper and size of canal
8. Add sealer as needed



GUTTACORE



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ADVANCED ENDODONTIC EDUCATION



obtr8
ADVANCED ENDODONTIC EDUCATION

WHY GUTTACORE®

- Gutta-percha
- Promote improved shaping, irrigation and shape verification
- Easy to create post space and retreat
- Take the most scientifically researched filling technique and make it better
- Solve the problem of gutta-percha melting when heated

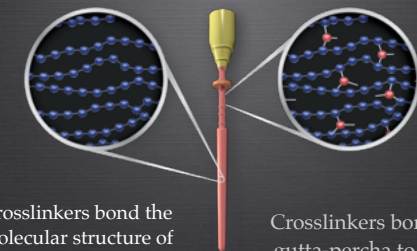
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ADVANCED ENDODONTIC EDUCATION

WHY GUTTACORE®

- Gutta-percha
- **REQUIRES** improved shaping, irrigation and shape verification
- Easy to create post space and retreat
- Take the most scientifically researched filling technique and make it better
- Solve the problem of gutta-percha melting when heated

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ADVANCED ENDODONTIC EDUCATION

GuttaCore® Crosslinking



Crosslinkers bond the molecular structure of gutta-percha together, keeping it from melting when heated

Crosslinkers bond to the gutta-percha to provide subtle strength and flexibility

GUTTACORE[®] INDICATIONS

Long Narrow Canals
Curves
Ledges
Anatomy



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EDUCATION



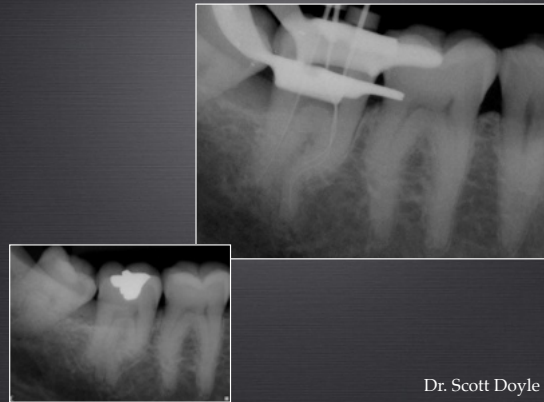
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EDUCATION



Dr. Scott Doyle



Dr. Scott Doyle

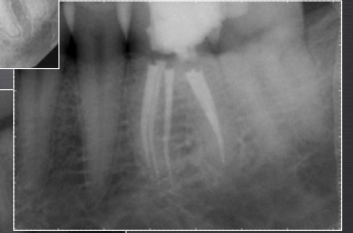
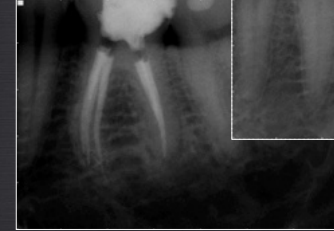


Dr. Scott Doyle



Dr. Scott Hetz

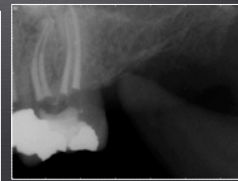
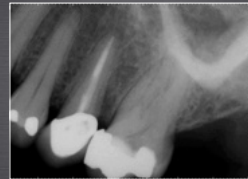
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ADVANCING ENDODONTIC
EDUCATION



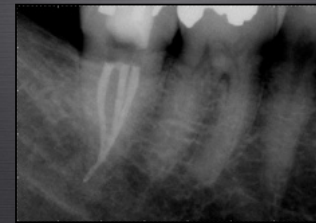
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ADVANCING ENDODONTIC
EDUCATION



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ADVANCING ENDODONTIC
EDUCATION



obtr8
ADVANCING ENDODONTIC
EDUCATION



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ADVANCING ENDODONTIC
EDUCATION

GUTTACORE®

KEYS TO SUCCESS



Great Shape
Size Verify
Minimal Sealer
Slow Placement



ENDODONTIC PROCEDURE

Diagnosis / Case Selection
Anesthesia
Rubber Dam
Access
Glide Path
Working Length
Instrumentation
Irrigation
Obturation
Restoration
Post Operative Care



BULK FILL WITH SDR

Self-Leveling
Applied in Increments
Up to 4mm
Light Cured (20 sec)
Must Place Composite
Cap



SDR APPLICATION



ENDODONTIC PROCEDURE

Diagnosis / Case Selection

Anesthesia

Rubber Dam

Access

Glide Path

Working Length

Instrumentation

Irrigation

Obturation

Restoration

Post Operative Care



PRETREATMENT

NSAIDS

+ /or

Acetaminophen

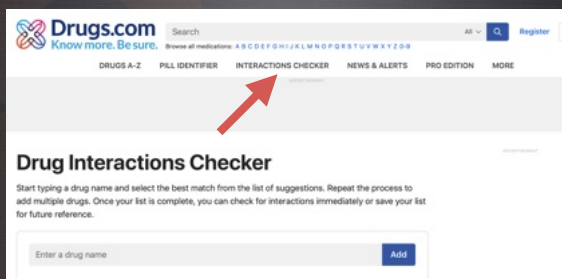


FLEXIBLE PLAN

Mild

Moderate

Severe



ANTIBIOTIC INDICATIONS

Acute Apical Abscess in Immunocompromised

Acute Apical Abscess in Immunocompetent

- If treatment not possible

- Systemic Involvement

Progressive or Persistent Infections



ANTIBIOTIC NOT INDICATED

Symptomatic Irreversible Pulpitis

Symptomatic Apical Periodontitis

Necrotic Pulp with Radiolucency

Chronic Apical Abscess

Acute Apical Abscess in Immunocompetent Patients

-when treatment is an option

Localized Swelling



ANTIBIOTICS

Amoxicillin is THE first-choice drug
Alternative agents: **azithromycin**,
clindamycin

Antibiotic resistance increasing - but limited in
dentistry

EVIDENCE indicates that Pen VK
and Clarithromycin are no longer
on the short list



ANTIBIOTICS CHOICES

DRUG OF CHOICE	INITIAL DOSE <small>***Conditional recommendation</small>	ADULT MAINTENANCE DOSE
Amoxicillin	1000 mg	500 mg q6 h 3-7 days
Amoxicillin w/ clavulanic acid	1000 mg	500/125 mg q6h 7 days
Penicillin VK	1000 mg	500 mg q4-6 h 3-7 days
Azithromycin <small>**Penicillin allergy w/ 1% of HIVs, angiodema, or anaphylaxis</small>	500 mg	250 mg q24h (5 days including loading dose)
Cephalosporins (Cephalexin) <small>**Penicillin allergy w/ 0.1% of HIVs, angiodema, or anaphylaxis</small>	1000 mg	500 mg q6h 3-7 days
Clindamycin <small>**Penicillin allergy w/ 1% of HIVs, angiodema, or anaphylaxis</small>	600 mg	300 mg q6 h 3-7 days
Metronidazole <small>**Complement antibiotic</small>	1000 mg	500 mg q8h 5-7 days
Erythromycin <small>**Historical Antibiotic</small>	500 mg	250 mg q4-6h 7-10 days
Ciprofloxacin	500 mg	250-500 mg q6h x 7-10 days

*Comparative safety and effectiveness of common antibiotics with Penicillin **Provide great gram-negative anaerobic activity
Essentially not effective against anaerobic *Facility specific recommendations



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ADVANCING ENDODONTIC
EDUCATION