



Missouri Dental
ASSOCIATION



***Diagnosis, Case Selection and
Management of Complex Endodontic Cases***

Joseph Bernier, DDS

• Sponsored by Dentsply Sirona •

Friday, June 21, 2024

9:00a to Noon

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GOOD MORNING MISSOURI!!





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DISCLOSURE

- I **DO NOT** HAVE ANY **RELEVANT RELATIONSHIP** IN THE PRODUCTS OR SERVICES DESCRIBED, REVIEWED, EVALUATED OR COMPARED IN THIS PRESENTATION. I DO NOT OWN STOCK IN DENTSPLY SIRONA.
- **I DO RECEIVE A FEE FOR SPEAKING TO THIS GROUP TODAY.**

**JOSEPH A. BERNIER, DDS, FACD, FICD, FPFA
DIPLOMATE, AMERICAN BOARD OF ENDODONTICS**



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My Educational Background...



• THE UNIVERSITY OF VIRGINIA

- THE U.S. ARMY



- VCU SCHOOL OF DENTISTRY



AEGD-1, FT. CARSON, COLORADO SPRINGS



-
-



ENDODONTIC RESIDENCY, FT. GORDON, AUGUSTA





DIAGNOSIS OBJECTIVES

- SYSTEMATIC PROCESS
- IMPORTANT DIAGNOSTIC TESTS
- BENEFITS AND SHORTCOMINGS OF IMAGERY OPTIONS
- CATEGORIES OF ENDODONTIC ASSESSMENTS
- TREATMENT PLANNING CONSIDERATIONS



- SUBJECTIVE INFORMATION
- OBJECTIVE FINDINGS
- ASSESSMENT
- PLAN OF TREATMENT

S O A P





SUBJECTIVE INFORMATION

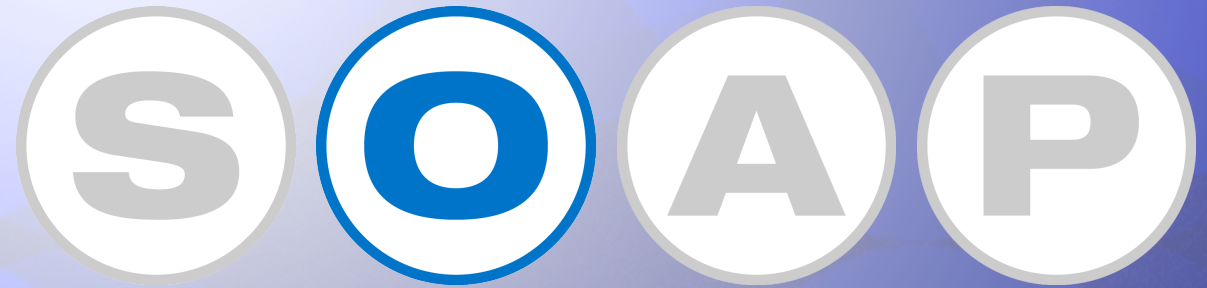
- HISTORY OF PAIN
- STIMULUS OF PAIN
- SEVERITY OF PAIN
- FREQUENCY OF PAIN

- DURATION OF PAIN
- LOCATION OF PAIN
- SPONTANEITY OF PAIN
- NATURE OF PAIN



OBJECTIVE FINDINGS

- CLINICAL EXAMINATION
 - EXTRAORAL
 - INTRAORAL
 - COMPARATIVE TESTING
- RADIOGRAPHIC ASSESSMENT





CLINICAL EXAMINATION

VISUAL EXAM

ORAL CANCER SCREENING

PALPATION



CLINICAL EXAMINATION

PERCUSSION



CLINICAL EXAMINATION

PRESENCE OF A
SINUS TRACT

SWELLING

PAY ATTENTION...THIS GETS INTERESTING



WHAT IS THIS?



GUTTA PERCHA PLACED...



GUTTA PERCHA GOES TO #24...



POST OP PAX #24...



ONE MONTH POST TREATMENT IMAGE...



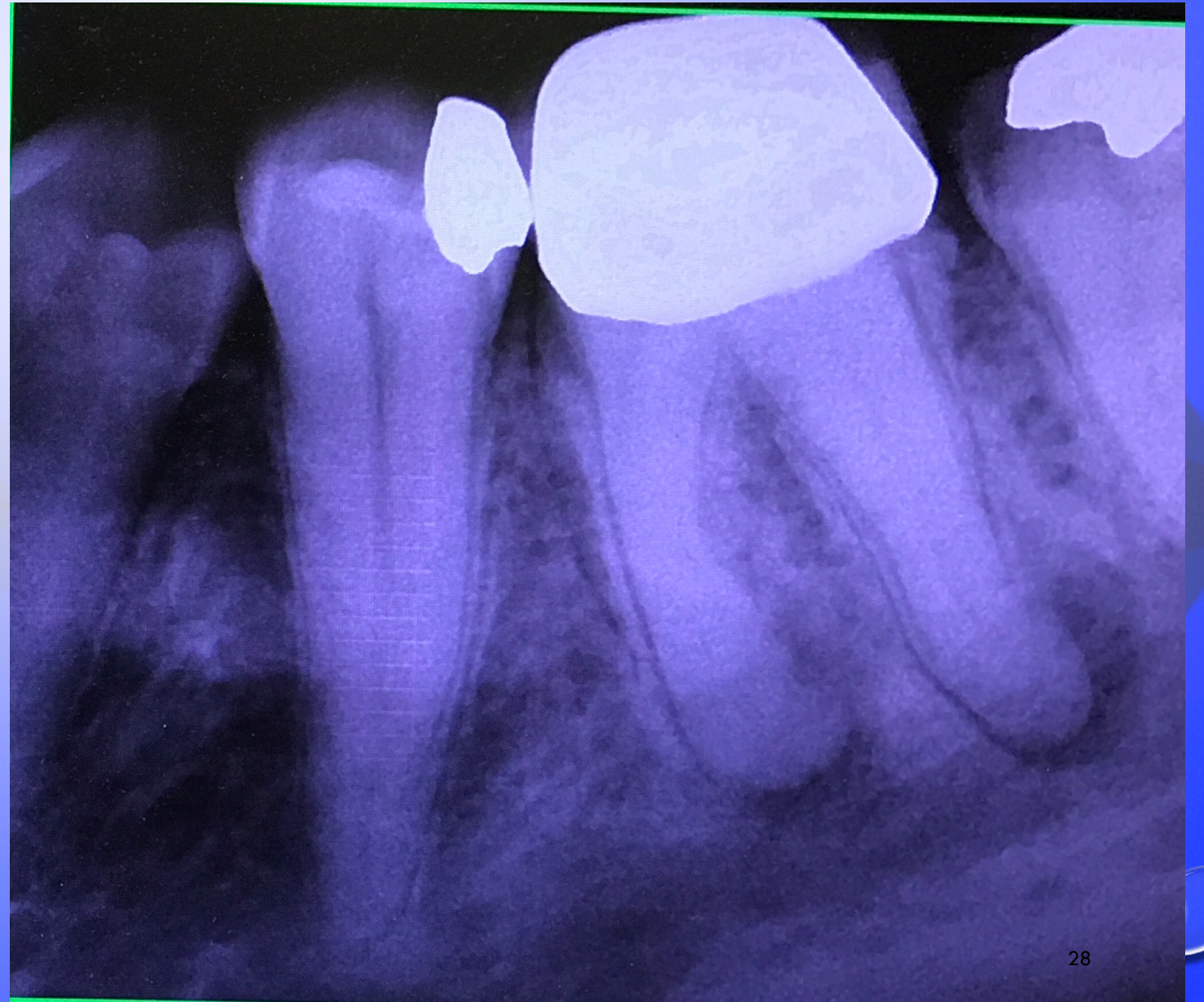
**18 month
"pimple"**



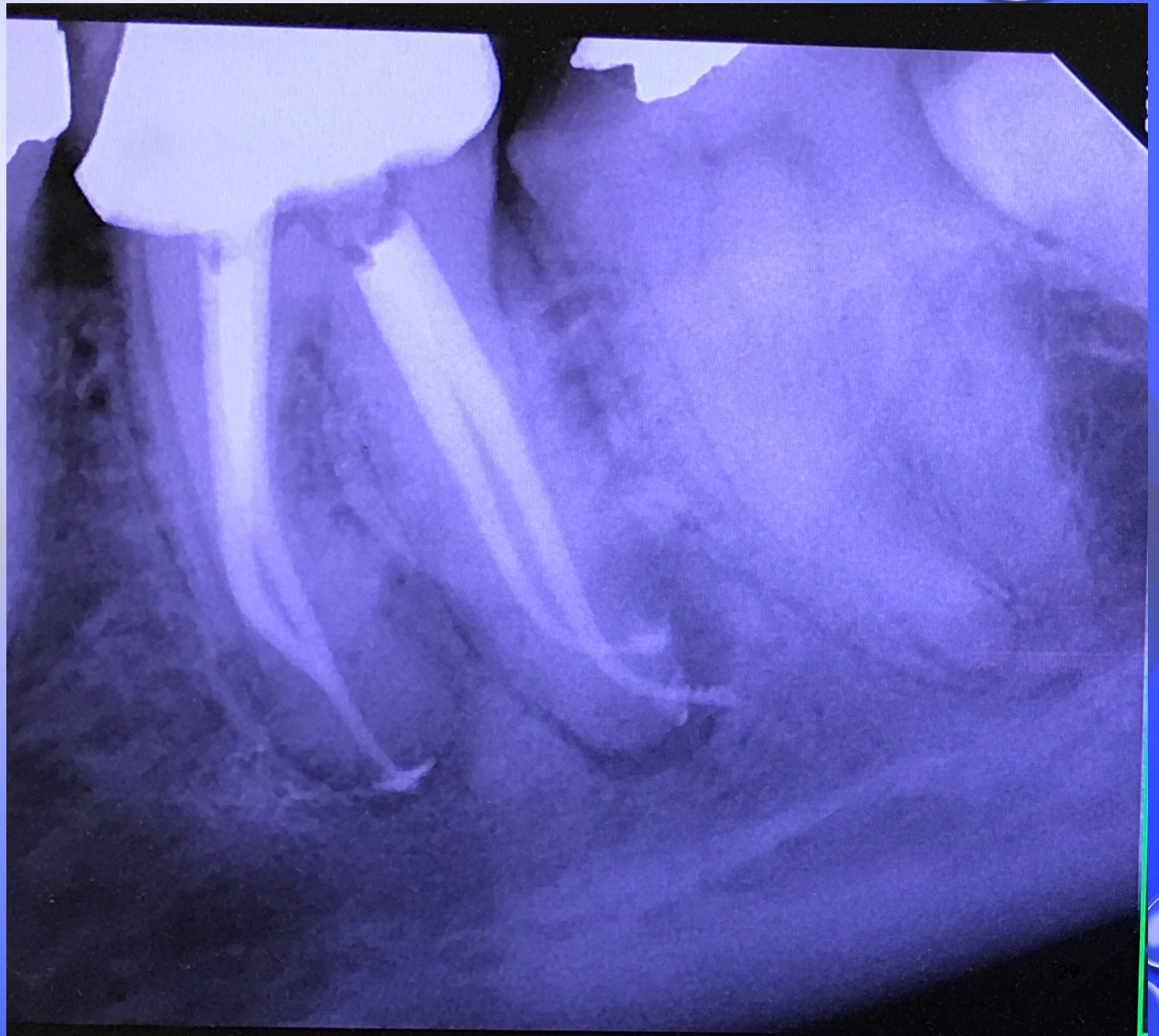
Up close!



PAX of tooth #19



Post op PAX



One month of healing





CLINICAL EXAMINATION

CARIES



CLINICAL EXAMINATION

TOOTH FRACTURES

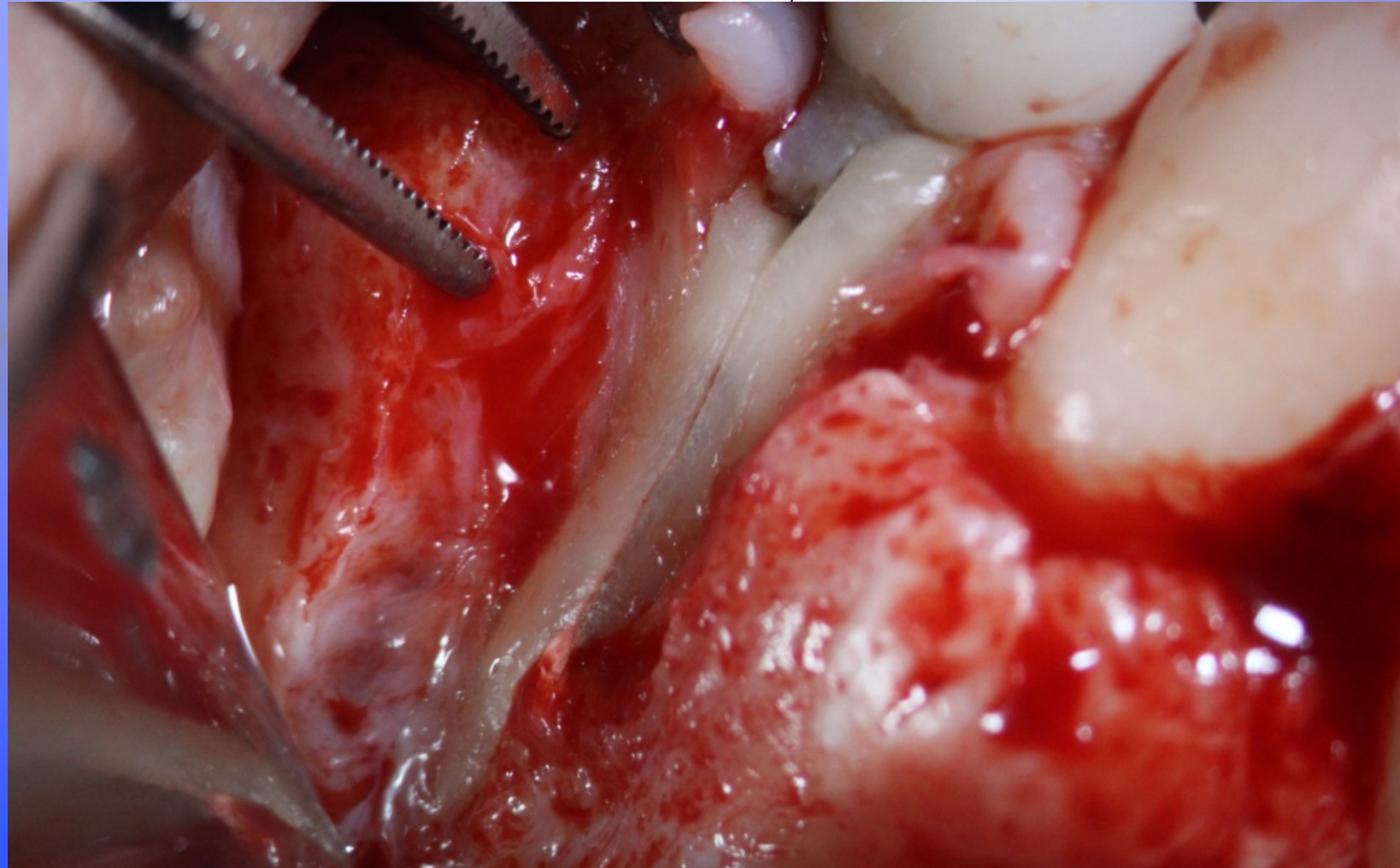
FRACTURES

- CRACKED TOOTH SYNDROME
- FRACTURED CUSPS
- INCOMPLETE FRACTURES
- SPLIT TEETH
- VERTICAL ROOT FRACTURES
- **MOST COMMON TEETH:**
 - LOWER SECOND MOLARS
 - UPPER FIRST BICUSPIDS

Split teeth



A true vertical root fracture...



LITERATURE REFERENCE...

- "FRACTURE NECROSIS: DIAGNOSIS, PROGNOSIS ASSESSMENT, AND TREATMENT RECOMMENDATIONS"
- JOE MARCH 2010
- LOUIS H. BERMAN, DDS AND SERGIO KUTTLER, DDS



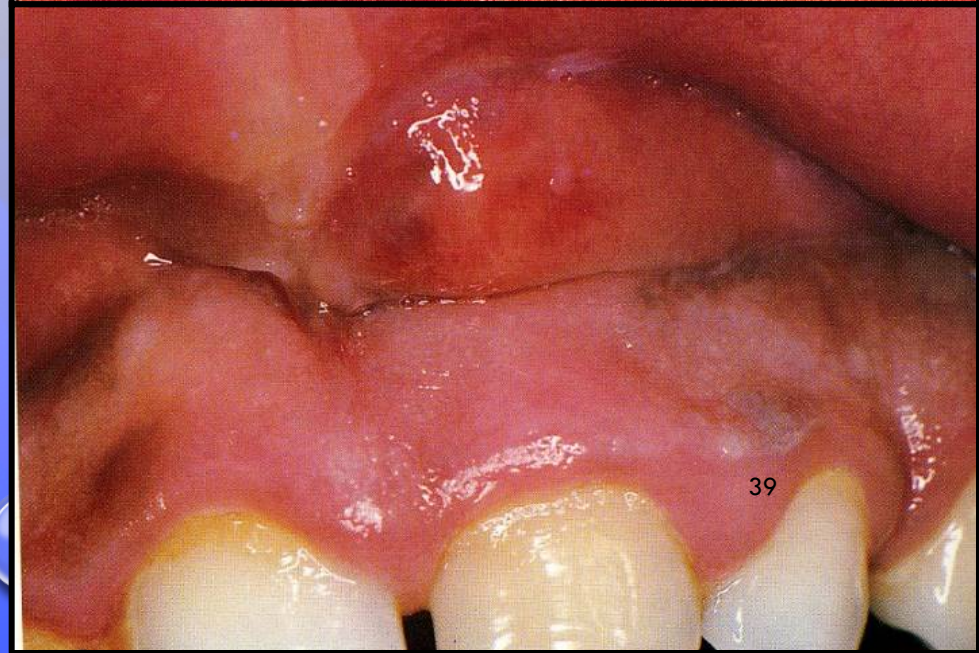
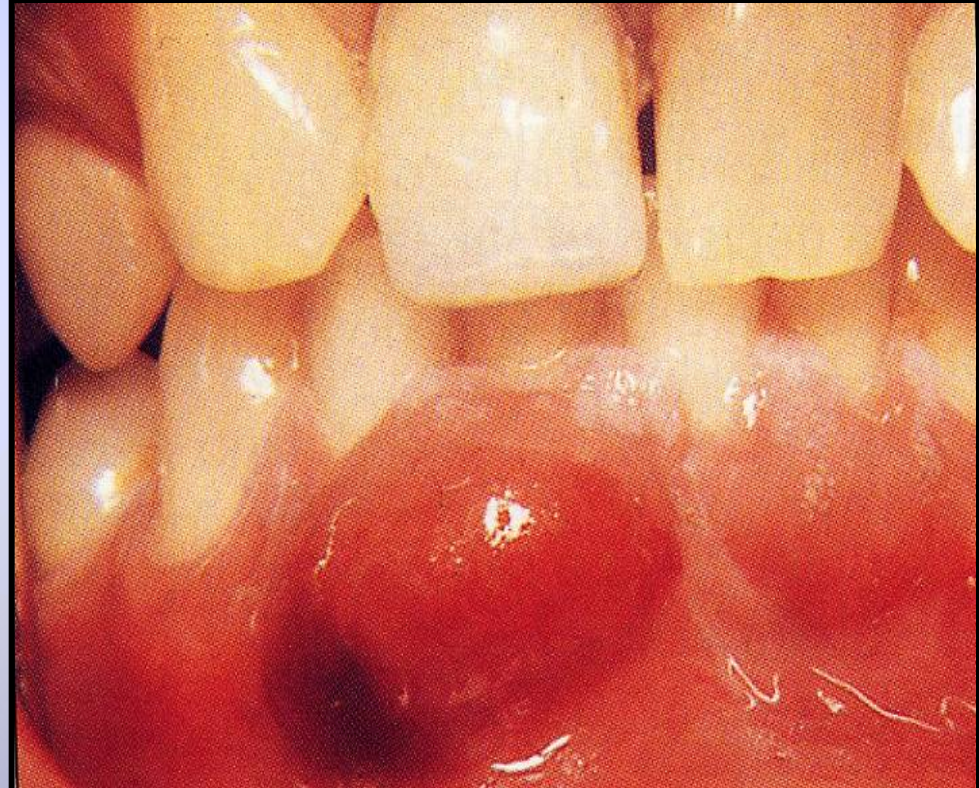
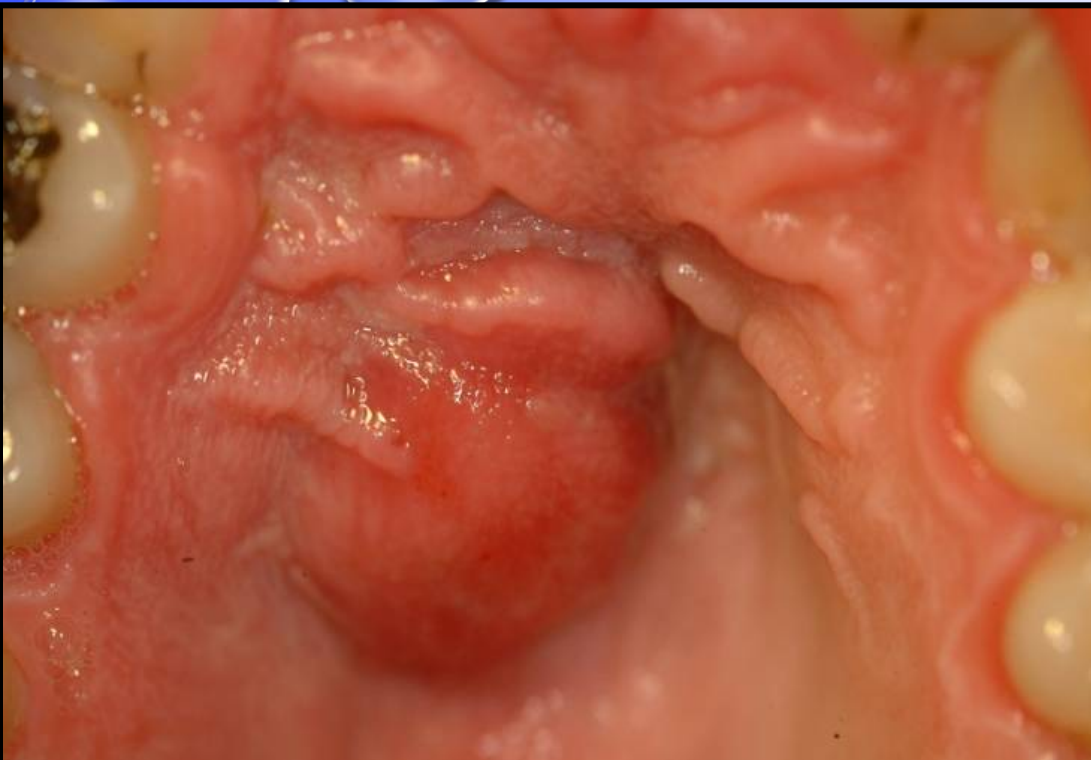
CLINICAL EXAMINATION

EXTENSIVE RESTORATIONS

DISCOLORATION



SWELLINGS





CLINICAL EXAMINATION

PERIODONTAL DISEASE

PROBING

MOBILITY



CLINICAL EXAMINATION

EXPOSED DENTIN



CLINICAL EXAMINATION

WEAR FACETS

ENDODONTIC TESTING

HOLLYWOOD
CAPTURED DISNEY'S
HOLLYWOOD
STUDIOS

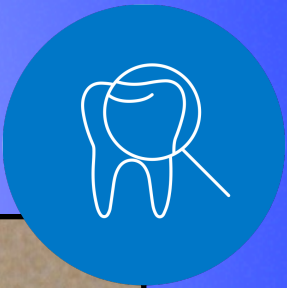


RIDE THIS WAY LIKE THIS!

**FANS GETTING TO CONCERT END UP ON A
"ROCK 'N' ROLLER COASTER" OF A RIDE**

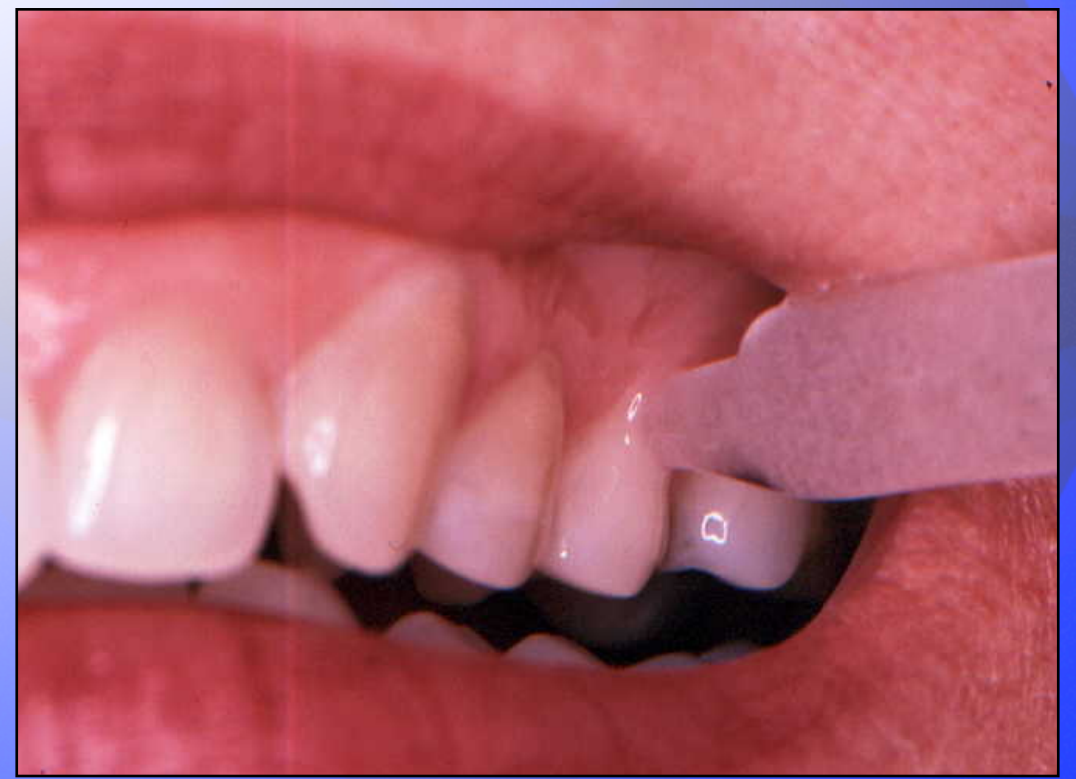
©DISNEY

COMPARATIVE TESTING...HOT VS COLD...



OBJECTIVE FINDINGS - COMPARATIVE TESTING

THERMAL TESTS





ADDITIONAL COMPARATIVE TESTING

BITE TESTS

ELECTRIC PULP TESTING

TRANSILLUMINATION

SELECTIVE ANESTHESIA

TOOTH SLOOTH



ELECTRIC PULP TESTS

- WHAT DOES IT TELL YOU?
- LIMITED USAGE



One way to determine death? Does this apply to non-vital teeth too?

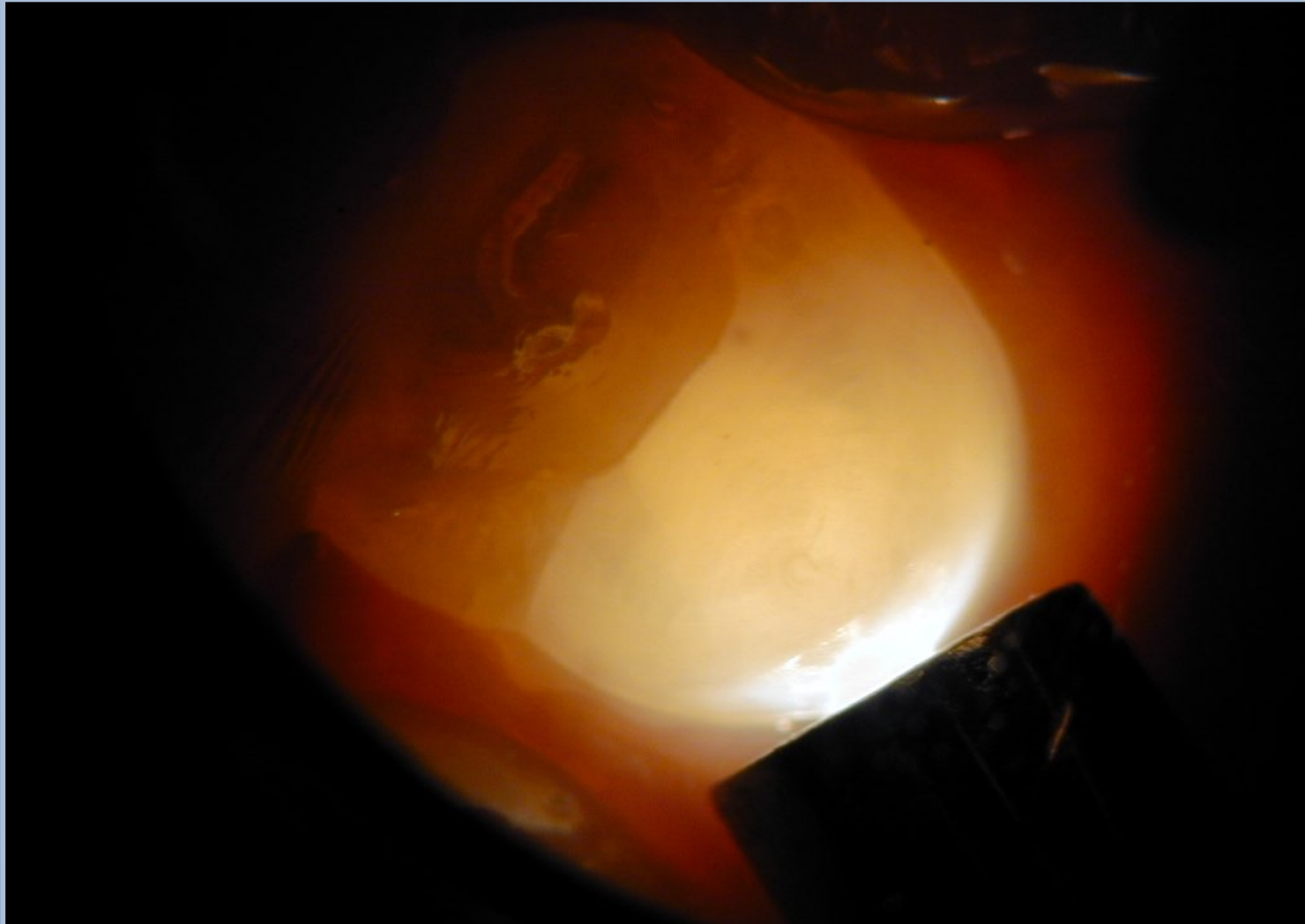
Why We Love CHILDREN!!

A kindergarten pupil told his teacher he'd found a cat, but it was dead. "How do you know that the cat was dead?" she asked him.

"Because I pissed in its ear and it didn't move," answered the child innocently. "You did WHAT?!!" the teacher exclaimed in surprise.

"You know," explained the boy, "I leaned over and went 'Pssst!' and it didn't move."

TRANSILLUMINATION





CLINICAL TIPS

- COLD
 - USE ENDO ICE, ICE STICK, OR CO₂ SNOW
 - BLOWING AIR IS INACCURATE
- HEAT
 - USE PETROLEUM JELLY TO KEEP GUTTA-PERCHA FROM STICKING TO TOOTH
- ANESTHETIC TEST – COULD AFFECT ADJACENT TEETH



CLINICAL TIPS

- PERCUSSION AND PALPATION
 - START WITH UNINVOLVED TEETH
 - GET PATIENT ACCUSTOMED TO “NORMAL”
 - WORK TOWARDS SUSPECTED TEETH



CLINICAL TIPS

- PERIO PROBING – RECORD EXACT DEPTHS
- MOBILITY – RECORD CLASSIFICATIONS
 - SLIGHT, MODERATE, EXTENSIVE
 - GRADE I, II, III (VERTICAL)

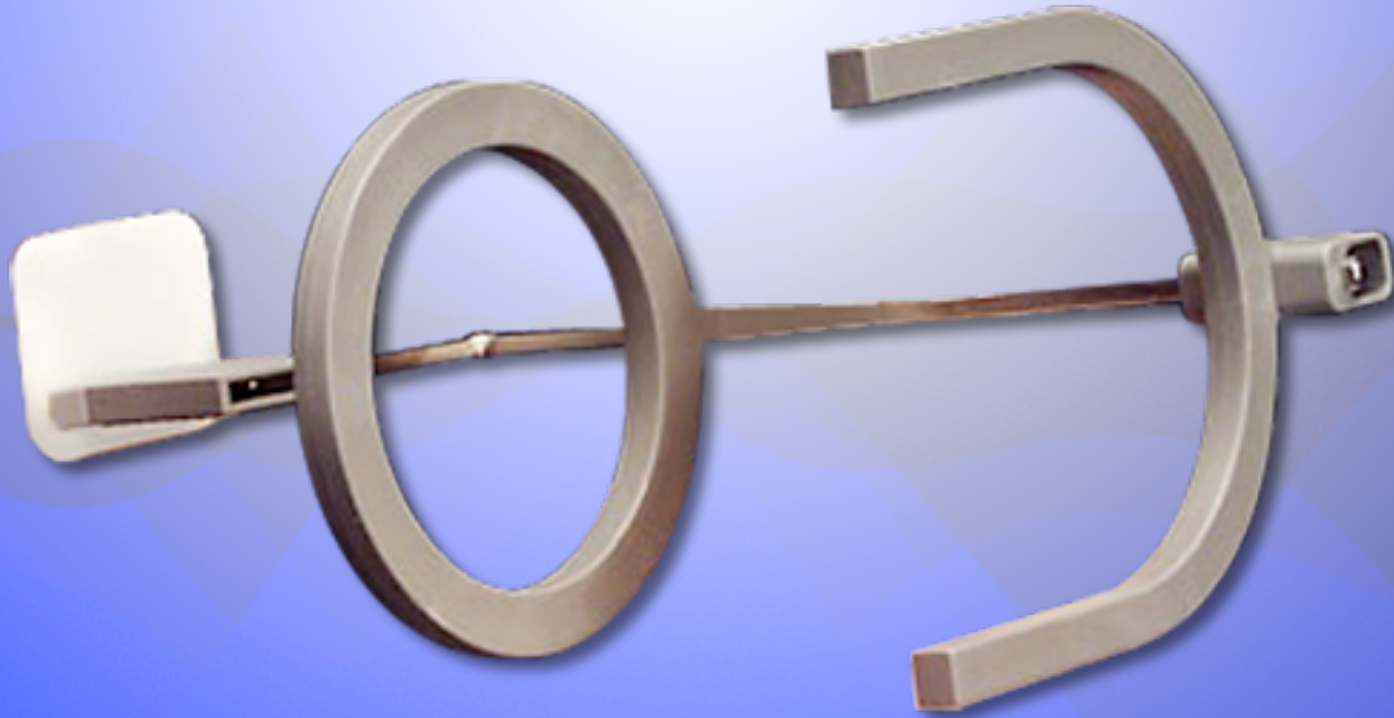


TAKE AWAY MESSAGE:

- REPRODUCE THE PATIENT'S CHIEF COMPLAINT
- HAVE A PULPAL AND PERIAPICAL DIAGNOSIS
- IF IN DOUBT, REFER IT OUT! OR DO NOTHING!
- KNOW WHAT **ENDO ICE** IS AND HOW TO USE IT.
- **“TETRAFLUROETHANE”**



RADIOGRAPHIC ASSESSMENT



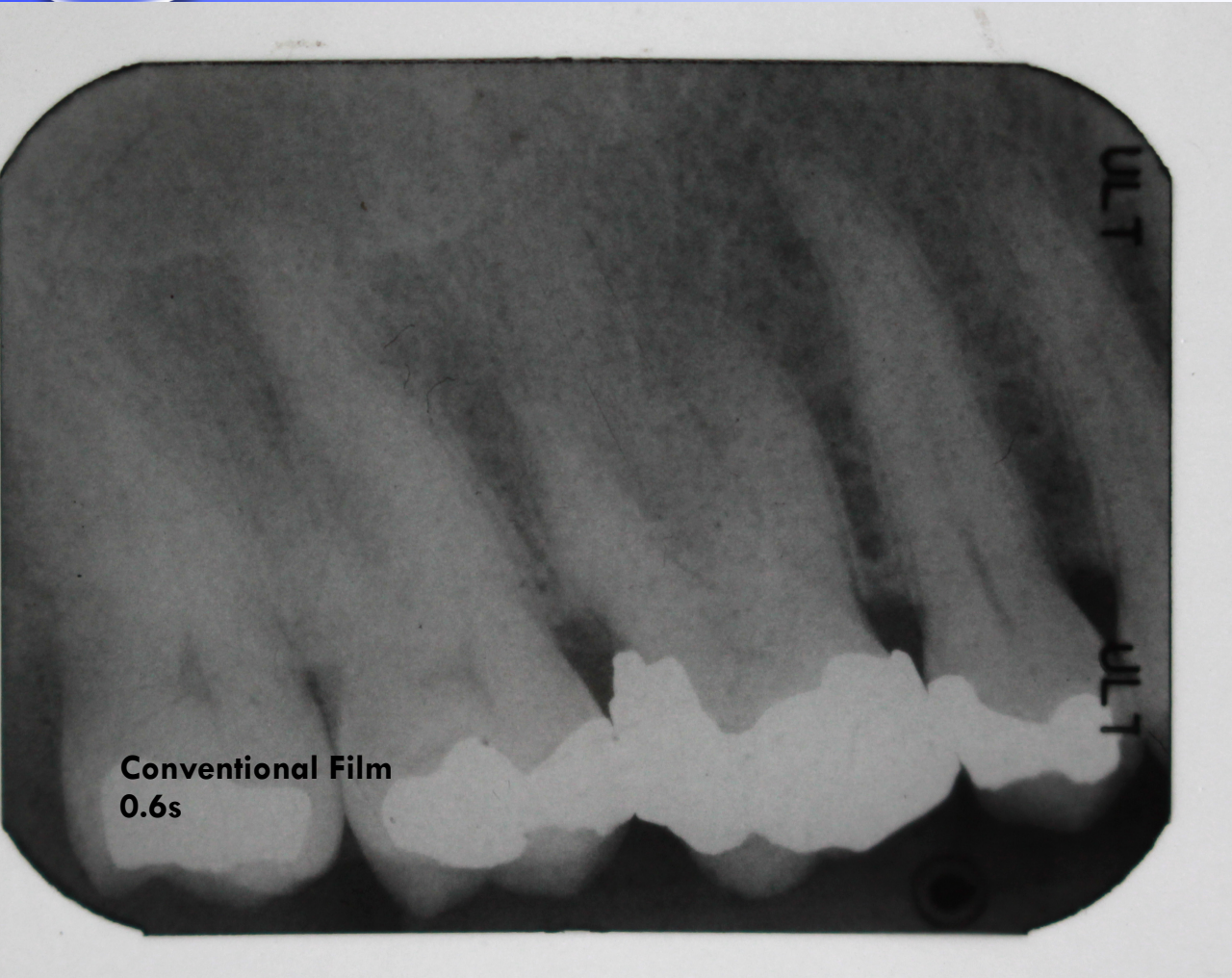
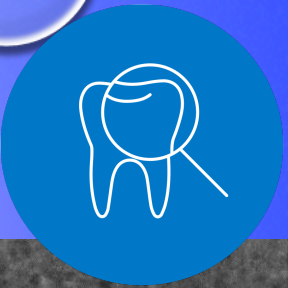
RADIOGRAPHY



IMPROVED TECHNOLOGY

DURABLE

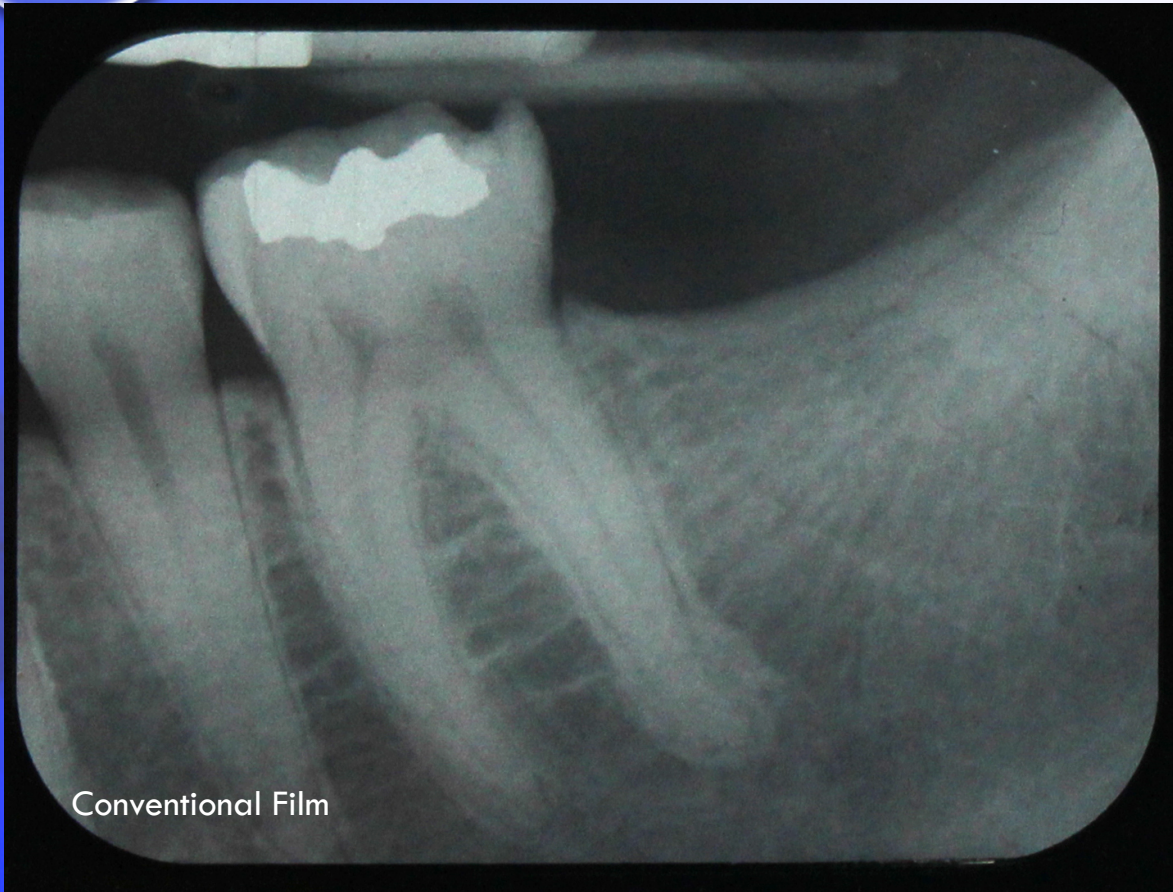
COMFORTABLE



Conventional Film
0.6s



XG Supreme



Conventional Film



XIOS XG Supreme
0.08s



IMAGE QUALITY



OLD SENSOR



NEW SENSOR

Limitations of Conventional Radiography



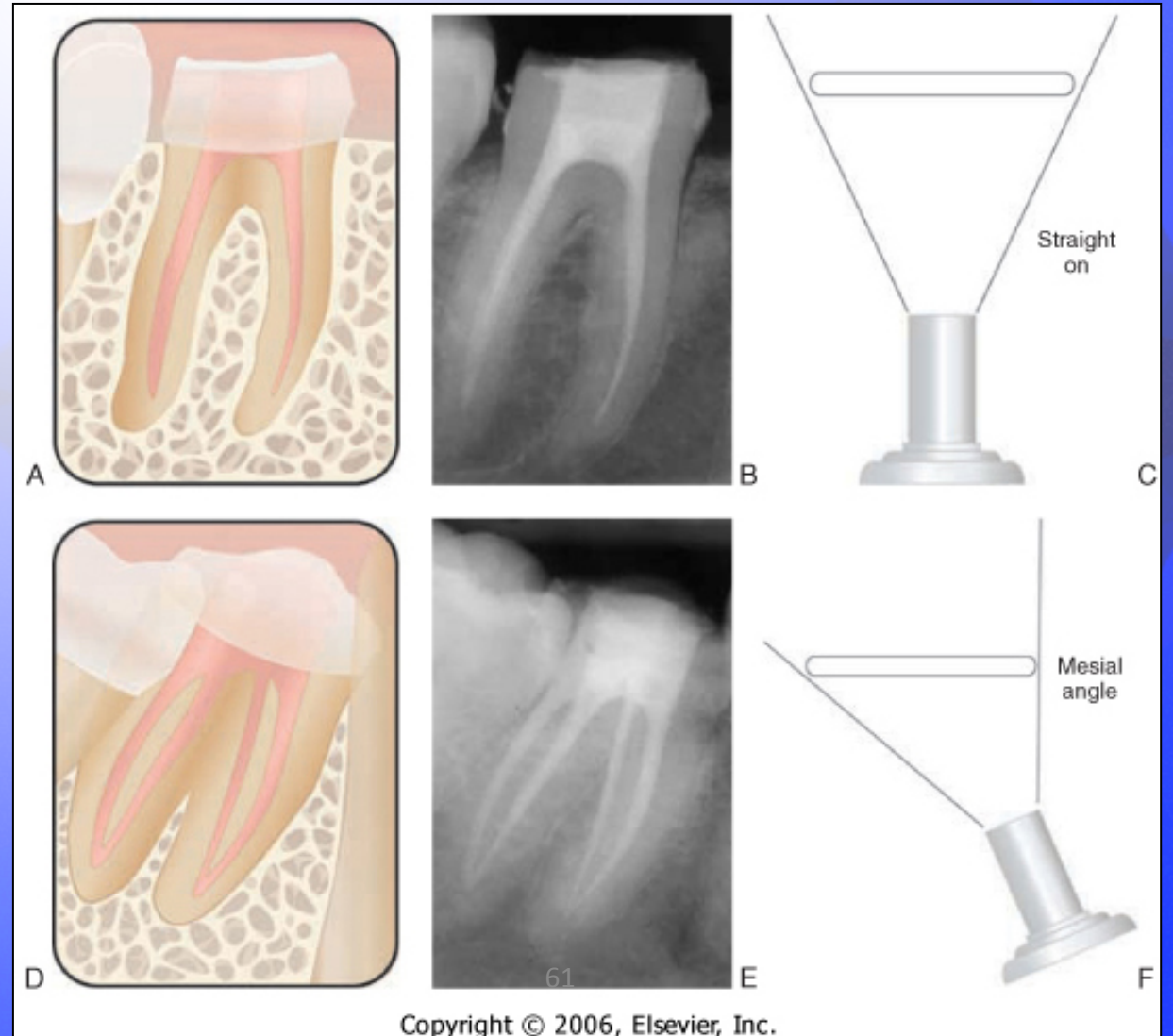
TWO DIMENSIONAL

GEOMETRIC DISTORTION

ANATOMICAL NOISE

RADIOGRAPHIC EVALUATION

- ◎ PARALLEL VIEW
- ◎ MULTIPLE SHIFT VIEWS
- ◎ SYSTEMATIC EVALUATION



APPLICATIONS OF CBCT

- DETECTION OF PERIAPICAL PATHOLOGY
- COMPLEX ANATOMY
- ROOT FRACTURE
- ROOT RESORPTION
- DENTAL TRAUMA
- RETREATMENT
- PERI-APICAL SURGERY



1. DIAGNOSIS & PATHOLOGY

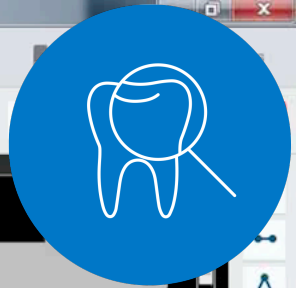
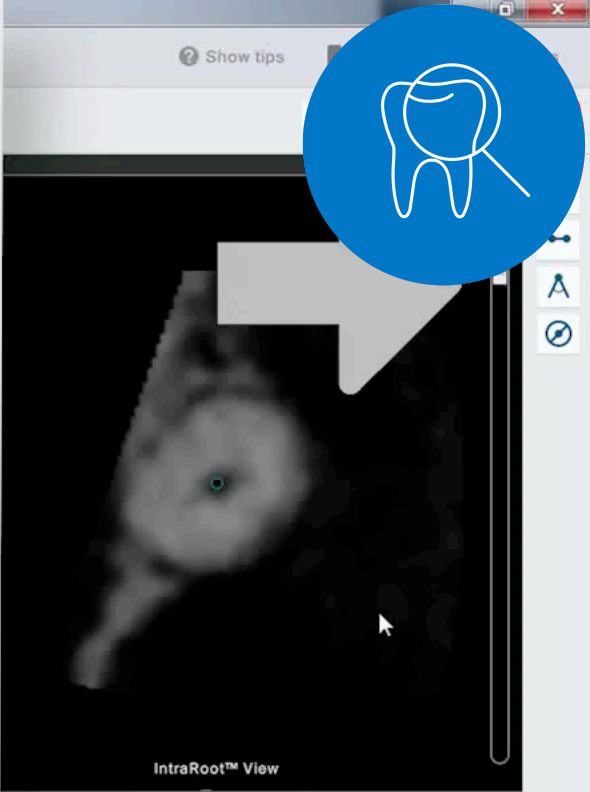
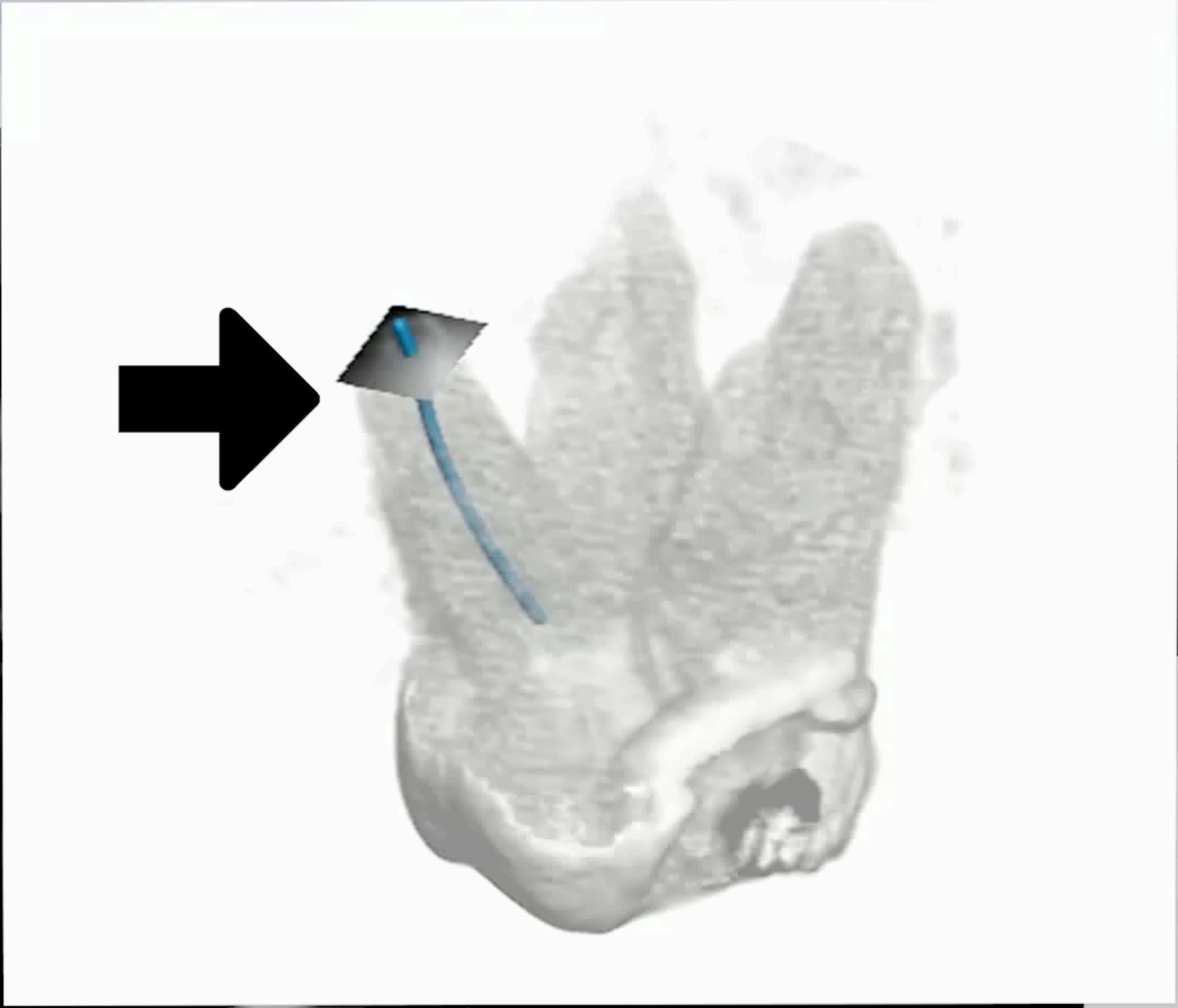
2. 3D TOOTH ANATOMY

3. CANAL SYSTEM

4. 3D CANAL ANATOMY

Indicate the canal midline & review curvature in 3D

- Palatal
- Distobuccal
- Mesiobuccal 1
- Mesiobuccal 2
- Distobuccal 2



5. TREATMENT PLAN

Plan your access cavity, working length & Master file



JUSTIFICATION OF CBCT TO THE PATIENT

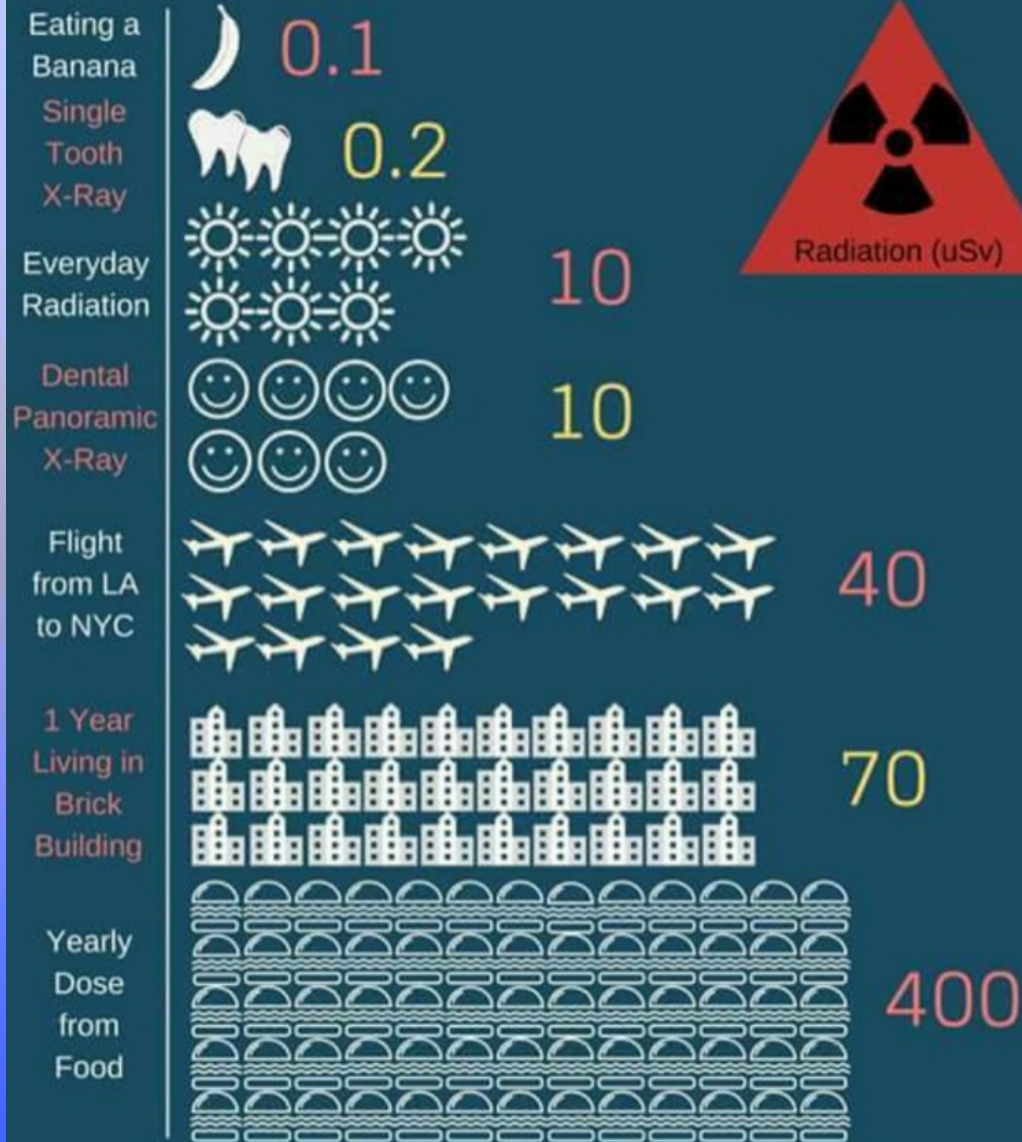
- X-RAYS ARE INCOMPLETE
- CONFIRM TREATMENT PLAN
- NARROW FIELD CBCT
 - RELATIVELY LOW RADIATION

Everyday Radiation

Digital x-rays have revolutionized healthcare.

Now getting dental x-rays is safer than flying from LA to NYC.

Please use this infographic to see how dental x-rays compare!



Note: Figures not to scale and used for illustration purposes only.



DIAGNOSTIC IMAGERY MUSTS

- CURRENT IMAGES
- COMPLETE COVERAGE



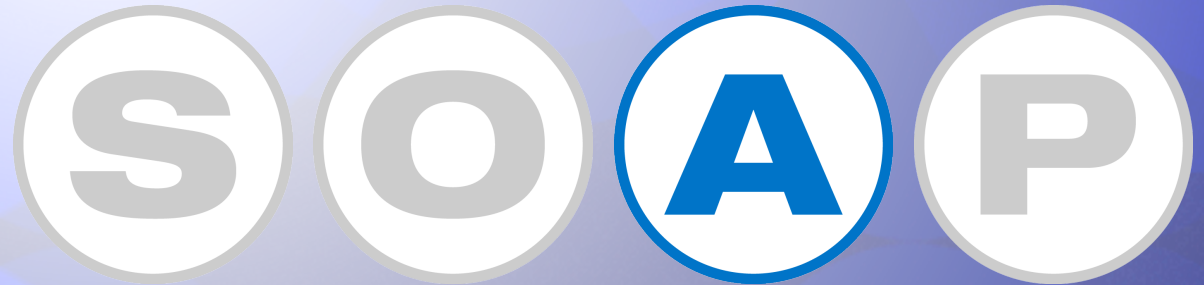
TAKE AWAY MESSAGE:

- ALWAYS USE CURRENT IMAGES
- IMAGES MUST BE OF DIAGNOSTIC QUALITY



ASSESSMENT

- PULPAL DIAGNOSIS
- PERIAPICAL DIAGNOSIS
- NON-ENDODONTIC PATHOLOGY





ASSESSMENT – PULPAL DIAGNOSIS

Reversible Pulpitis

- Non-lingering (Thermal Tests)
- Not Spontaneous

Irreversible Pulpitis (Symptomatic)

- Spontaneous
- Pain Lingers After Stimuli (Thermal Tests)
- Usually Severe

Irreversible Pulpitis (Asymptomatic)

- No Clinical Symptoms
- Inflammation Produced by:
 - Caries
 - Caries Excavation
 - Trauma, Etc.



ASSESSMENT – PULPAL DIAGNOSIS

Pulp Necrosis

No Response To
Thermal Or
Electrical Stimuli

Previous Root Canal Therapy

Canals Are
Obtured

Previously Initiated Therapy

Partial Endodontic
Therapy
(E.G. Pulpotomy,
Pulpectomy)



ASSESSMENT – PERIAPICAL DIAGNOSIS

Normal Apical Tissues

- Asymptomatic, Intact Lamina Dura

Symptomatic Apical Periodontitis

- Pain To Biting And Percussion
- May Or May Not Have Associated PA Radiolucency

Asymptomatic Apical Periodontitis

- Cannot Elicit Pain Or Altered Sensation
- Apical Radiolucent Area



ASSESSMENT – PERIAPICAL DIAGNOSIS

Acute Apical Abscess

- Localized Swelling, Pain, Pus Formation
- Tender to Pressure
- Fever?
Lymphadenopathy?
- Pa Radiolucency?

Chronic Apical Abscess

- Minimal or No Pain
- Pus Drains From a Sinus Tract

Facial Cellulitis

- Extraoral Spread of Infection
- Dangerous –
Treat Aggressively



ASSESSMENT – NON-ENDODONTIC PATHOLOGY

- ACUTE PERIODONTAL ABSCESS
- VERTICAL ROOT FRACTURE
- ACUTE / CHRONIC SINUSITIS
- TMD / MPD
(INCL. OCCLUSAL TRAUMA)
- NEUROPATHIC PAIN
- VASCULAR PAIN
- ATYPICAL FACIAL PAIN

PRIOR TO SEATING A CROWN...

- HOW MANY OF YOU KNOW THE HEALTH OF THE PULP PRIOR TO PLACEMENT OF THE CROWN?
- HOW MANY OF YOU KNOW THE STATUS OF THE PDL PRIOR TO THE PLACEMENT OF THE CROWN?

TAKE AWAY MESSAGE:

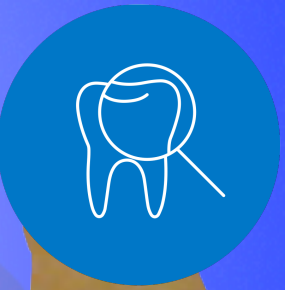
- KNOW THE SIX PULPAL DIAGNOSIS NAMES
- KNOW THE SIX PERIAPICAL DIAGNOSIS NAMES
- INCLUDE A PULPAL AND PERIAPICAL DIAGNOSIS NOTE IN YOUR CHART PRIOR TO ANY TREATMENT



PLAN OF TREATMENT

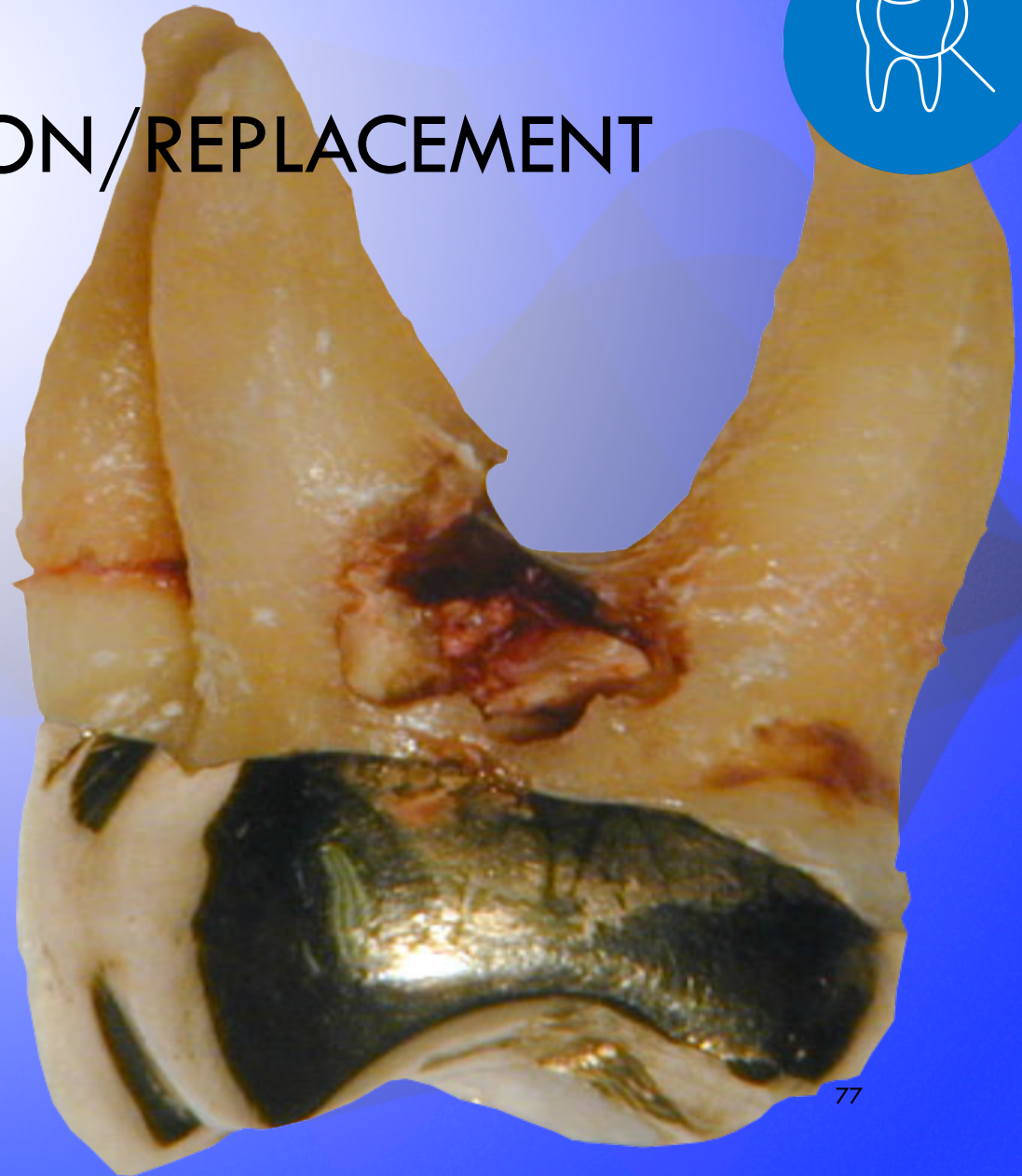
- ENDODONTIC THERAPY
 - EMERGENCY TREATMENT
 - ELECTIVE TREATMENT
- EXTRACTION
- REFERRAL
- RESTORATION
 - DIRECT – CLASS II
 - INDIRECT – CORE & POST FOR EVENTUAL CROWN



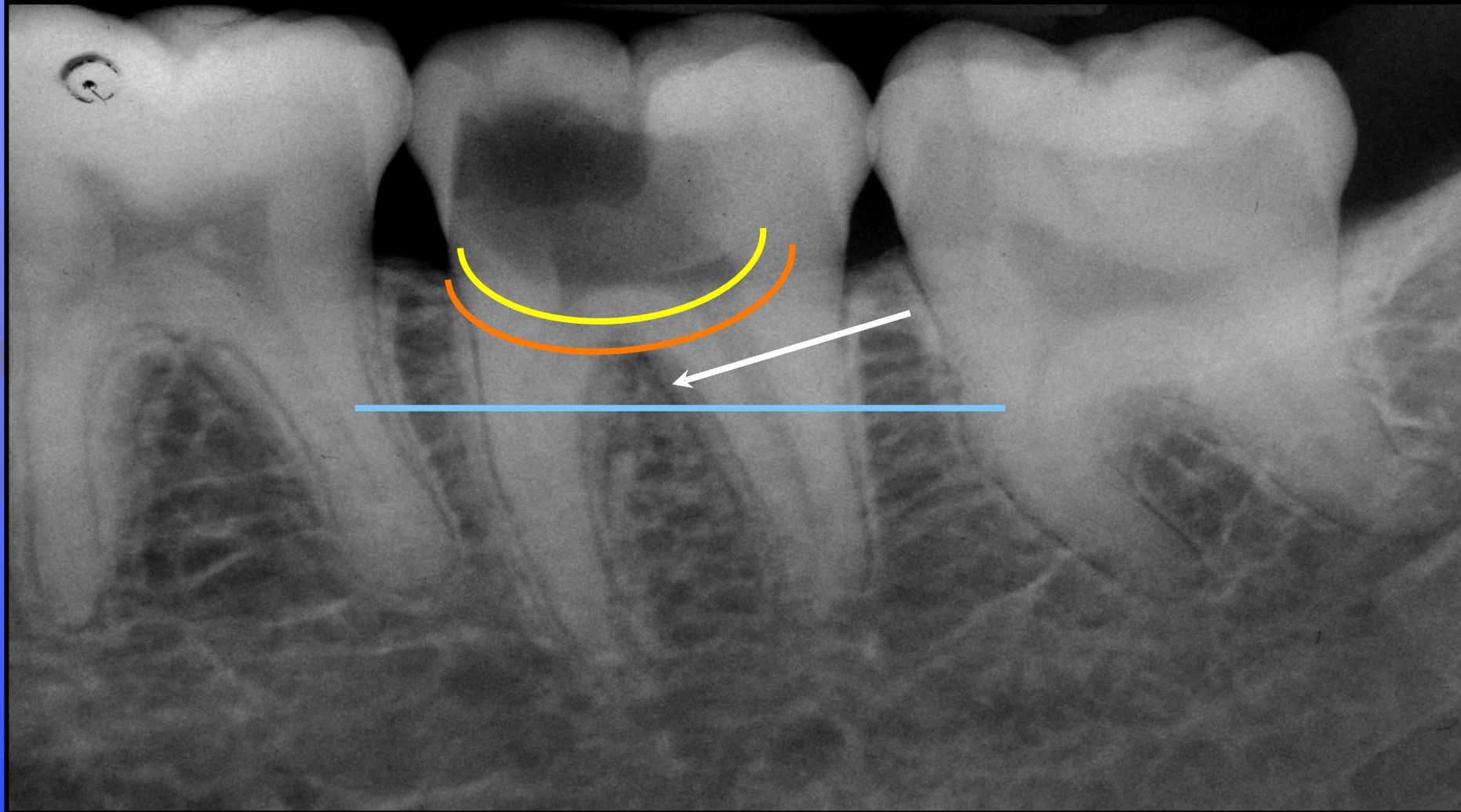


INDICATIONS FOR EXTRACTION/REPLACEMENT

- NON-RESTORABLE TEETH
- UNSALVAGEABLE PERIO
- UNSALVAGEABLE RESORPTION
- POOR CROWN/ROOT RATIO



RESTORABILITY - FURCATION



TREATING EVERY TOOTH...

- RESTORABILITY...WHO DECIDES?
 - CROWN/ROOT RATIO
 - CROWN LENGTHENING SURGERY NEEDED?
 - IS THE TOOTH "IN FUNCTION"
 - OPTIONS...? IMPLANTS AND BRIDGES
- CALCIFICATIONS/DIFFICULTY
 - IMPATIENT DENTISTS?!

NOW... DO YOU TREAT OR REFER?...

- USE THE **GOLDEN RULE**
- CAN YOU ACHIEVE A PREDICTABLE OUTCOME?
- WHAT IS YOUR ENDODONTIC COMFORT ZONE?
- CALCIFIED CANALS? RETREATMENTS?
- PATIENT MANAGEMENT ISSUES.
- WHAT IF IT WAS YOUR TOOTH? WHAT IF IS FAMILY MEMBER?

AAE CASE DIFFICULTY ASSESSMENT FORM

- CASE SELECTION
- CHERRY PICKING
- KNOWING YOUR LIMITATIONS
- SOME CLINICAL EXAMPLES....

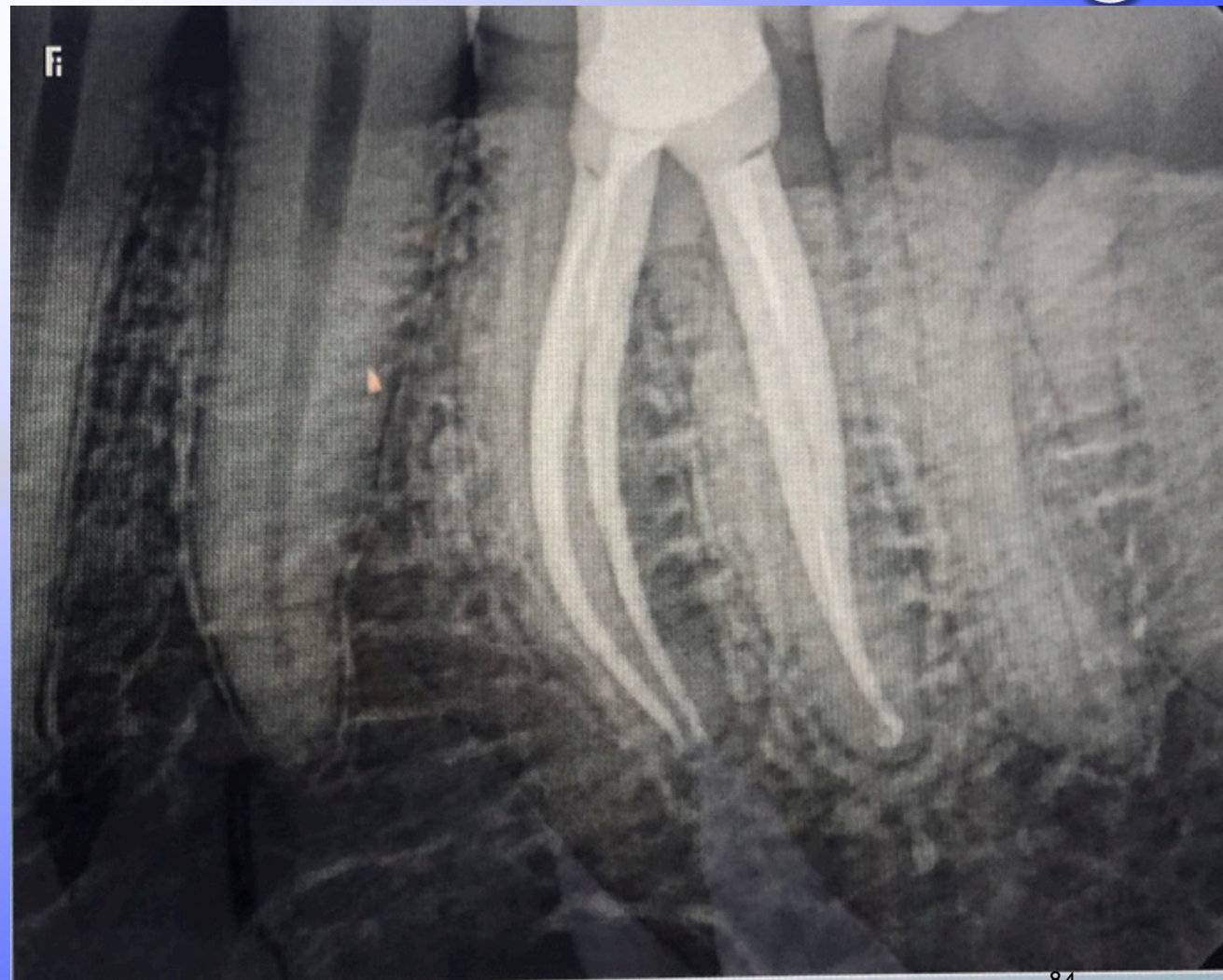
WHAT IS THE PROGNOSIS?



WHAT IS THE PROGNOSIS?

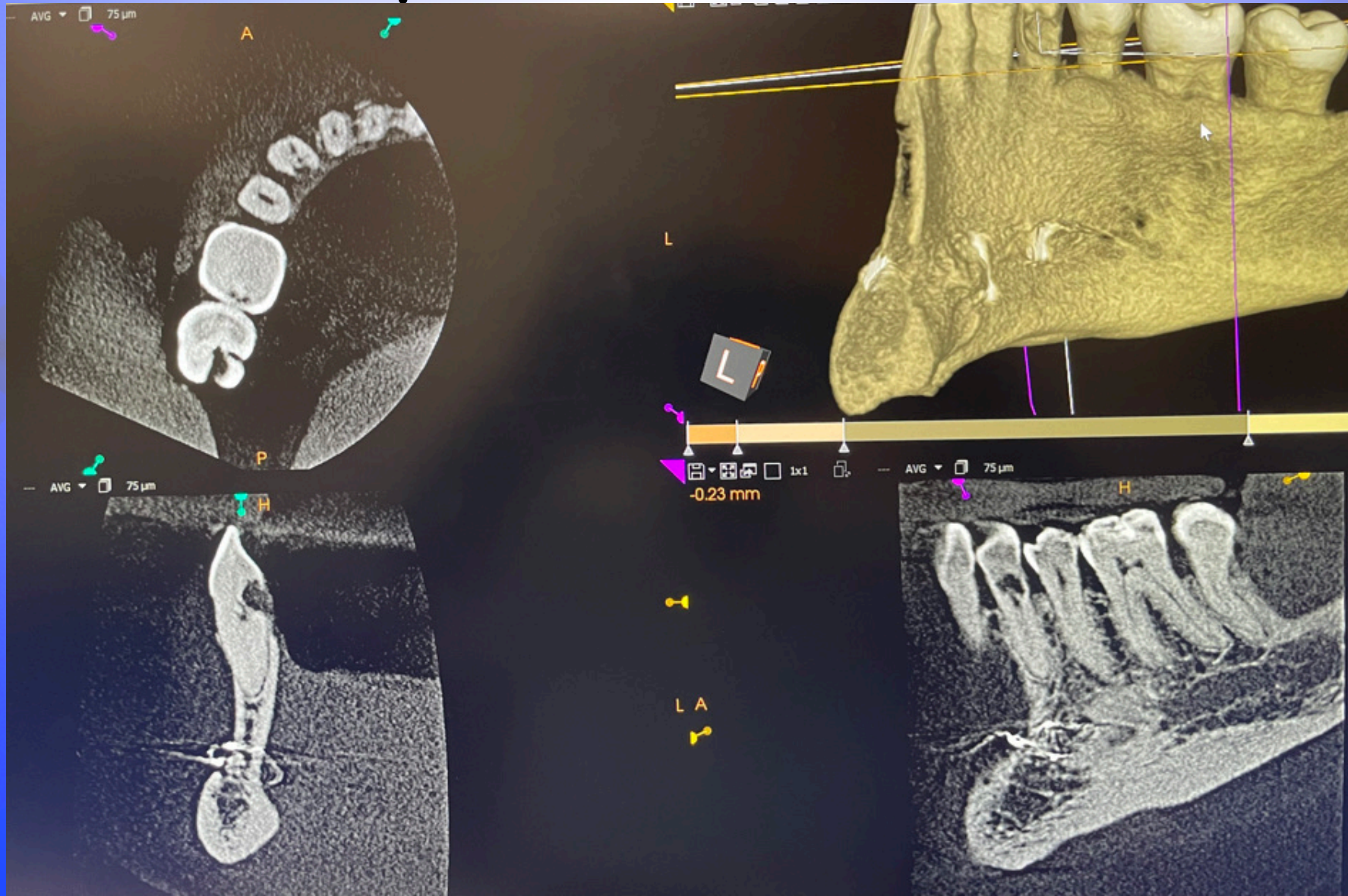


Simple molar. Gently curved and large canals.

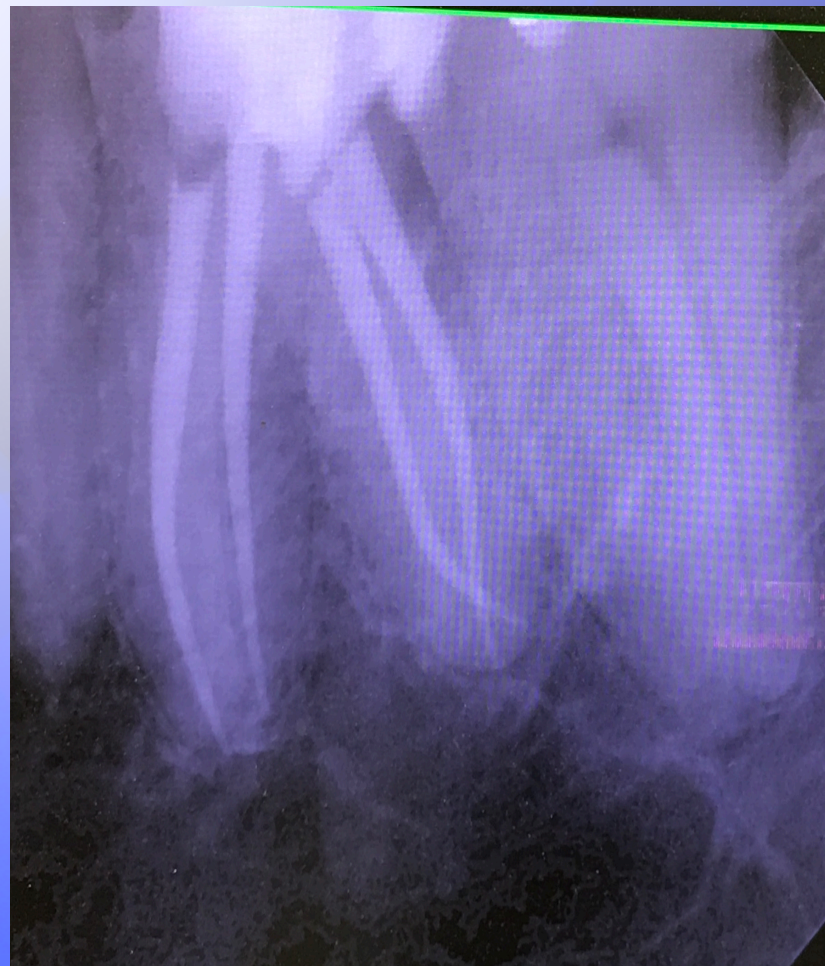
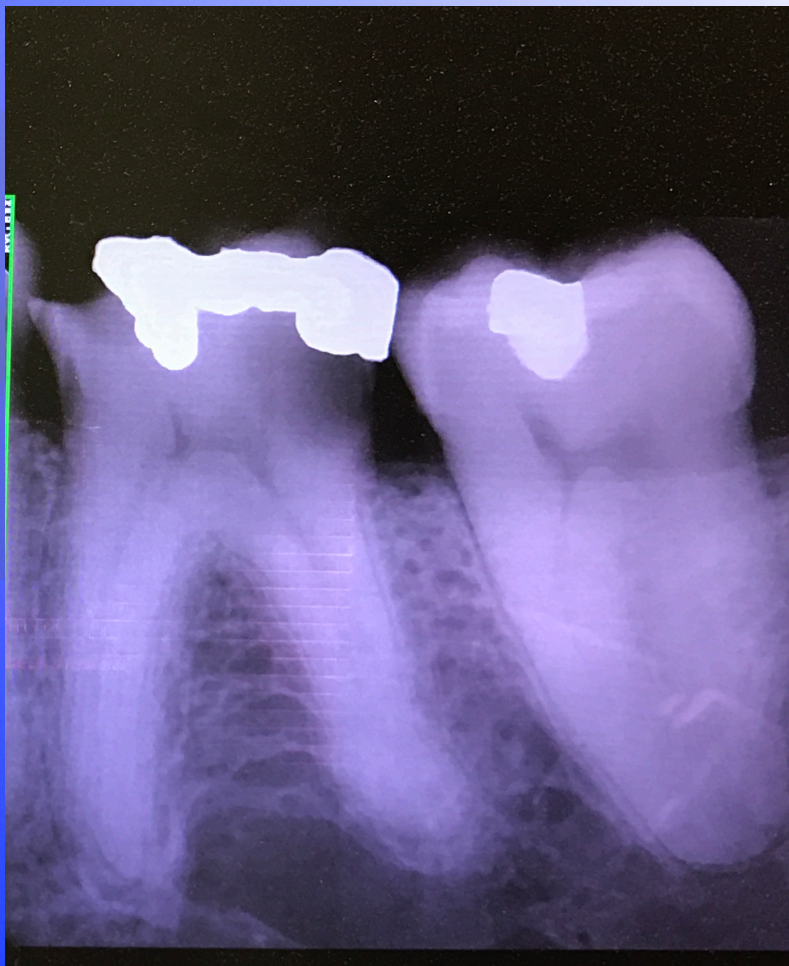




Anterior with resorption. Treat, refer or extract?



Simple first molar? Are any of them simple?



What about this one? "Retreat this mandibular second molar on a professional athlete?"



Anteriors are all simple and easy, right?



Interesting outcome!



WAYS TO IMPROVE YOUR LEVEL OF CARE:

- IMPROVE YOUR DIAGNOSTIC SKILLS
- USE MAGNIFICATION. MICROSCOPE. ILLUMINATION.
- USE ULTRASONICS FOR YOUR PREPARATIONS
- CONSIDER AN "ENDO" DAY. NO INTERRUPTIONS.
- STRIVE FOR PERFECTION TO FIND EXCELLENCE.
 - SELF REVIEW VS PEER REVIEW

ONE VS TWO VISIT ENDODONTICS

IT IS NOT REALLY, WHEN SHOULD WE DO ONE-VISIT ENDODONTIC TREATMENTS? RATHER IT IS, WHEN TO CONSIDER NOT TO DO ONE-VISIT ENDODONTIC TREATMENT.

WHEN TO DO MULTIPLE VISIT ENDODONTIC TREATMENT IN MY HUMBLE OPINION...

- NECROTIC TEETH THAT HAVE BECOME SYMPTOMATIC ESPECIALLY MANDIBULAR POSTERIOR TEETH
- UNSTOPPABLE DRAINAGE
- SYMPTOMATIC SILVER-POINT RETREATMENT CASES
- CASES THAT REQUIRE MORE THAN 90 MINUTES
- NEED FOR HIGH LEVEL DISINFECTION
- ONLY OBTURATE ONCE PATIENT IS ASYMPTOMATIC?

WHY MULTIPLE APPOINTMENTS?

- ***PATIENT MANAGEMENT “ISSUES”***
- ***CASE DIFFICULTY***
- ***SUPPURATION***
- ***EMPIRICAL REASONS***



TAKE AWAY MESSAGE

- SYSTEMATIC SOAP FORMAT
- 2 FINDINGS – PULPAL & PERIAPICAL
- TREATMENT PLAN
 - ACCESS
 - INSTRUMENTATION
 - OBTURATION
 - RESTORATION

Thank you for listening and sharing your time with me. Good luck on your next endodontic case!



Joseph A. Bernier, DDS
josephbernier@yahoo.com



A sunset over the ocean with a title box. The sun is low on the horizon, casting a warm orange glow. The sky is filled with soft, wispy clouds. The ocean is dark with white-capped waves. In the distance, there are silhouettes of rocks or small islands. A large, semi-transparent orange box with a black border is positioned at the top of the image, containing the title text in white.

Endodontic Case Selection and Management of Complex Cases

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My Educational Background...

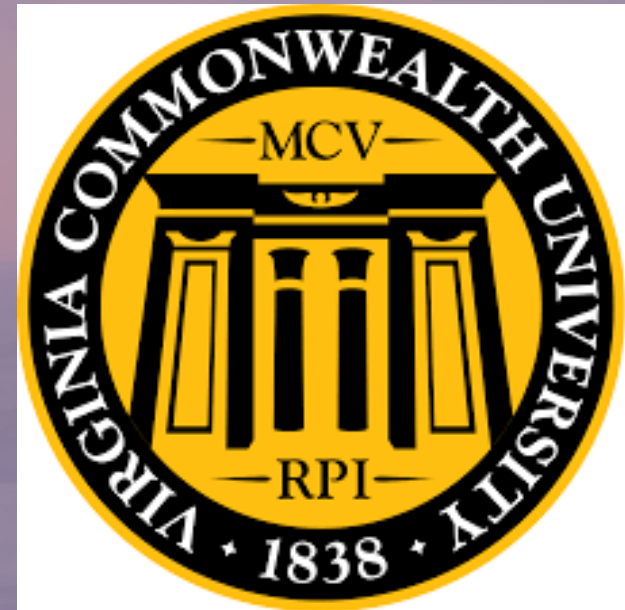


- The University of Virginia

•The U.S. Army



● VCU School of Dentistry



AEGD-1, Ft. Carson, Colorado Springs



Endodontic Residency, Ft. Gordon, Augusta




Introduction

- Properly cultivated partnerships between endodontists and general practitioners can lead to powerful, mutually beneficial relationships that strengthen both practices
- Know your limits
- Practice predictability
- Patients receive the best possible care

Objectives

- Overview of the AAE Endodontic Case Difficulty Assessment Form
 - Patient Considerations
 - Diagnostic and Treatment Considerations
 - Additional Considerations
- Management of Complex Cases

AAE Endodontic Case Difficulty Assessment Form



**american association of
endodontists**

**AAE Endodontic Case Difficulty
Assessment Form and Guidelines**

Patient Information

Full Name _____

Street Address _____ Suite/Apt _____

City _____ State/Country _____ Zip _____

Phone _____

Email _____

Disposition

Treat in Office: Yes No

Refer Patient to: _____

Date _____

Guidelines for Using the AAE Endodontic Case Difficulty Assessment Form

The AAE designed the Endodontic Case Difficulty Assessment Form for use in endodontic curricula. The Assessment Form makes case selection more efficient, more consistent and easier to document. Dentists may also choose to use the Assessment Form to help with referral decision making and record keeping.

Conditions listed in this form should be considered potential risk factors that may complicate treatment and adversely affect the outcome. Levels of difficulty are sets of conditions that may not be controllable by the dentist. Risk factors can influence the ability to provide care at a consistently predictable level and impact the appropriate provision of care and quality assurance.

The Assessment Form enables a practitioner to assign a level of difficulty to a particular case.

Consider using cone beam computed tomography (CBCT) for assessing moderate and high difficulty cases.

Levels of Difficulty

LOW DIFFICULTY
Preoperative condition indicates routine complexity (uncomplicated). These types of cases would exhibit only those factors listed in the LOW DIFFICULTY category. Achieving a favorable treatment outcome should be attainable by a competent practitioner with limited experience.

MODERATE DIFFICULTY
Preoperative condition is complicated, exhibiting one or two factors listed in the MODERATE DIFFICULTY category. Achieving a favorable treatment outcome may be challenging for a competent, experienced practitioner.

HIGH DIFFICULTY
Preoperative condition is exceptionally complicated, exhibiting three or more factors listed in the MODERATE DIFFICULTY category or at least one in the HIGH DIFFICULTY category. Achieving a favorable treatment outcome may be challenging for even the most experienced practitioner with an extensive history of favorable outcomes.

Review your assessment of each case to determine the level of difficulty. If the level of difficulty exceeds your experience and comfort, you might consider referral to an endodontist.

Criteria and Subcriteria	LOW DIFFICULTY	MODERATE DIFFICULTY	HIGH DIFFICULTY
A. PATIENT CONSIDERATIONS			
MEDICAL HISTORY	<input type="checkbox"/> No medical problem (ASA Class 1 or 2*)	<input type="checkbox"/> One or more medical problem (ASA Class 3*)	<input type="checkbox"/> Complex medical history/serious illness/disability (ASA Class 4*)
ANESTHESIA	<input type="checkbox"/> No history of anesthesia problems	<input type="checkbox"/> Vasoconstrictor intolerance	<input type="checkbox"/> Difficulty achieving and/or maintaining anesthesia
PATIENT DISPOSITION	<input type="checkbox"/> Cooperative and compliant	<input type="checkbox"/> Anxious but cooperative	<input type="checkbox"/> Uncooperative
ABILITY TO OPEN MOUTH	<input type="checkbox"/> No limitation	<input type="checkbox"/> Slight limitation in opening	<input type="checkbox"/> Significant limitation in opening
GAG REFLEX	<input type="checkbox"/> None	<input type="checkbox"/> Gags occasionally with radiographs/treatment	<input type="checkbox"/> Extreme gag reflex which has compromised past dental care
EMERGENCY CONDITION	<input type="checkbox"/> Minimum pain or swelling	<input type="checkbox"/> Moderate pain or swelling	<input type="checkbox"/> Severe pain or swelling

Access additional resources at aae.org

Criteria and Subcriteria	LOW DIFFICULTY	MODERATE DIFFICULTY	HIGH DIFFICULTY
B. DIAGNOSTIC AND TREATMENT CONSIDERATIONS			
DIAGNOSIS	<input type="checkbox"/> Signs and symptoms consistent with recognized pulpal and periapical conditions	<input type="checkbox"/> Extensive differential diagnosis of usual signs and symptoms required	<input type="checkbox"/> Confusing and complex signs and symptoms difficult diagnosis <input type="checkbox"/> History of chronic oral/facial pain
RADIOGRAPHIC DIFFICULTIES	<input type="checkbox"/> Minimal difficulty obtaining/interpreting radiographs	<input type="checkbox"/> Moderate difficulty obtaining/interpreting radiographs (e.g. high floor of mouth, narrow or low palatal vault, presence of tort)	<input type="checkbox"/> Extreme difficulty obtaining/interpreting radiographs
POSITION IN THE ARCH – TOOTH TYPE	<input type="checkbox"/> Anterior/premolar	<input type="checkbox"/> 1st molar	<input type="checkbox"/> 2nd or 3rd molar
POSITION IN THE ARCH – INCLINATION	<input type="checkbox"/> Slight inclination (<10°)	<input type="checkbox"/> Moderate inclination (10-30°)	<input type="checkbox"/> Extreme inclination (>30°)
POSITION IN THE ARCH – ROTATION	<input type="checkbox"/> Slight rotation (<10°)	<input type="checkbox"/> Moderate rotation (10-30°)	<input type="checkbox"/> Extreme rotation (>30°)
TOOTH ISOLATION	<input type="checkbox"/> Routine rubber dam placement	<input type="checkbox"/> Simple pretreatment modification required for rubber dam isolation	<input type="checkbox"/> Extensive pretreatment modification required for rubber dam isolation
CROWN MORPHOLOGY	<input type="checkbox"/> Normal original crown morphology	<input type="checkbox"/> Full coverage restoration <input type="checkbox"/> Porcelain restoration <input type="checkbox"/> Bridge abutment <input type="checkbox"/> Moderate deviation from normal tooth/root form (e.g., taurodontism microdens) <input type="checkbox"/> Teeth with extensive coronal destruction	<input type="checkbox"/> Restoration does not reflect original anatomy/alignment <input type="checkbox"/> Significant deviation from normal tooth/root form (e.g., fusion dens in dente)
CANAL MORPHOLOGY	<input type="checkbox"/> Slight or no curvature (<10°) <input type="checkbox"/> Closed apex (<1 mm in diameter)	<input type="checkbox"/> Moderate curvature (10-30°) <input type="checkbox"/> Crown axis differs moderately from root axis. <input type="checkbox"/> Apical opening 1-1.5 mm in diameter	<input type="checkbox"/> C-shaped morphology <input type="checkbox"/> Extreme curvature (>30°) or S-shaped curve <input type="checkbox"/> Mandibular premolar or anterior with 2 roots <input type="checkbox"/> Maxillary premolar with 3 roots <input type="checkbox"/> Canal divides in the middle or apical third <input type="checkbox"/> Very long tooth (>25 mm) <input type="checkbox"/> Other anomalies such as radix ento/para molars <input type="checkbox"/> Open apex (>1.5 mm in diameter)
RADIOGRAPHIC APPEARANCE OF CANAL(S)	<input type="checkbox"/> Canal(s) and chamber visible and not reduced in size	<input type="checkbox"/> Canal(s) and chamber visible but reduced in size <input type="checkbox"/> Pulp stones	<input type="checkbox"/> Indistinct canal path <input type="checkbox"/> Canal(s) and chamber not visible
PROXIMITY OF THE ROOT APICES TO VITAL STRUCTURES SUCH AS THE IAN OR MENTAL FORAMEN	<input type="checkbox"/> Vital structures 5 or more millimeters from apices	<input type="checkbox"/> 3-5 millimeters	<input type="checkbox"/> <3 millimeters
RESORPTION	<input type="checkbox"/> No resorption evident	<input type="checkbox"/> Minimal apical resorption	<input type="checkbox"/> Extensive apical resorption <input type="checkbox"/> Internal resorption <input type="checkbox"/> External resorption
C. ADDITIONAL CONSIDERATIONS			
TRAUMA HISTORY	<input type="checkbox"/> No history of trauma, or <input type="checkbox"/> Uncomplicated crown fracture of mature or immature teeth	<input type="checkbox"/> Complicated crown fracture of mature teeth <input type="checkbox"/> Subluxation	<input type="checkbox"/> Complicated crown fracture of immature teeth <input type="checkbox"/> Horizontal root fracture <input type="checkbox"/> Alveolar fracture <input type="checkbox"/> Intraosseous, extrusive or lateral luxation <input type="checkbox"/> Avulsion
ENDODONTIC TREATMENT HISTORY	<input type="checkbox"/> No previous treatment	<input type="checkbox"/> Previous access without complications	<input type="checkbox"/> Previous access with complications (e.g., perforation, non-negotiated canal, ledge, separated instrument) <input type="checkbox"/> Previous surgical or nonsurgical endodontic treatment completed
PERIODONTAL-ENDODONTIC CONDITION	<input type="checkbox"/> None or mild periodontal disease or concurrent moderate periodontal disease	<input type="checkbox"/> Combined endodontic/periodontic lesion	<input type="checkbox"/> Concurrent severe periodontal disease <input type="checkbox"/> Cracked teeth with periodontal complications <input type="checkbox"/> Root amputation prior to endodontic treatment

The contribution of the Canadian Academy of Endodontics and others to the development of this form is gratefully acknowledged. The AAE Endodontic Case Difficulty Assessment Form is designed to aid the practitioner in determining appropriate case disposition. The American Association of Endodontists neither expressly nor implicitly warrants any positive results associated with the use of this form. This form may be reproduced but may not be amended or altered in any way. © American Association of Endodontists, 180 N. Sibley Ave., Suite 1500, Chicago, IL 60601; Phone: 800-872-3636 or 312-266-7255; Fax: 866-451-9020 or 312-266-9867; E-mail: info@aae.org; Website: aae.org

*American Society of Anesthesiologists (ASA) Classification System Class 1: No systemic illness. Patient healthy. Class 2: Patient with mild degree of systemic illness, but without functional restrictions, e.g., well-controlled hypertension. Class 3: Patient with severe degree of systemic illness which limits activities, but does not immobilize the patient. Class 4: Patient with severe systemic illness that immobilizes and is sometimes life threatening. Class 5: Patient will not survive more than 24 hours whether or not surgical intervention takes place. www.asa.org/illness/29.htm#class

Access additional resources at aae.org

Levels of Difficulty



- Preoperative condition indicates routine complexity
- Exhibit only those factors listed in the LOW DIFFICULTY category.
- A predictable treatment outcome should be attainable by a competent practitioner with limited experience.

Levels of Difficulty



- Preoperative condition is complicated
- Exhibit one or more patient or treatment factors listed in the MODERATE DIFFICULTY category
- A predictable treatment outcome may be challenging for a competent, experienced practitioner.

Levels of Difficulty

● High Difficulty



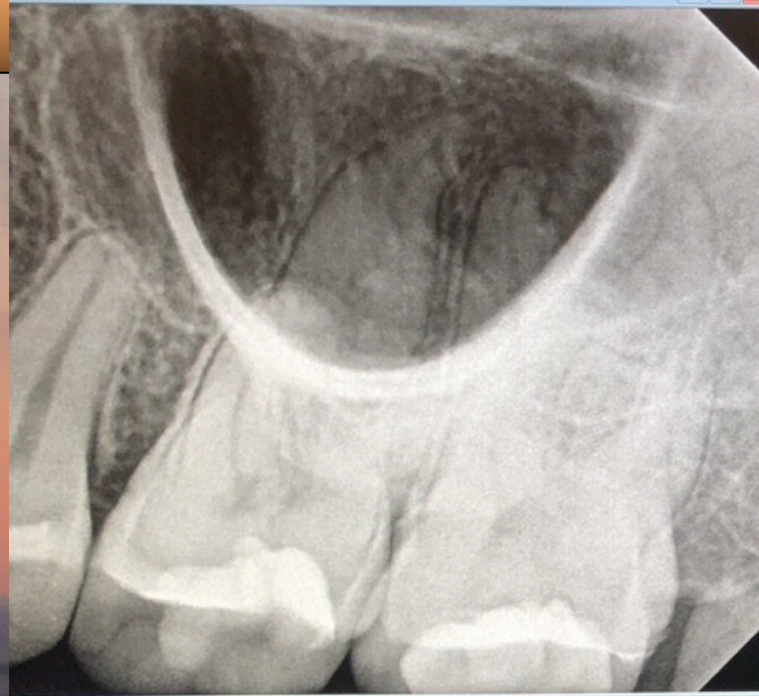
- Preoperative condition is exceptionally complicated
- Exhibit several factors listed in the MODERATE DIFFICULTY category or at least one in the HIGH DIFFICULTY category
- A predictable treatment outcome may be challenging for even the most experienced practitioner

Patient Considerations

- Medical History
- Anesthesia
- Patient Disposition
- Ability to Open Mouth
- Gag Reflex
- Emergency Condition



Case #1



- 32 y/o male, 1 ppd smoker, ASA class III
- Acute pain in posterior left maxilla
- DX #15: Symptomatic Irreversible Pulpitis with Symptomatic Apical Periodontitis
- Suffered a MI two months ago, Documented HX of unsuccessful anesthesia
- Nitrous oxide sedation, pre-op analgesia

Medical History

Moderate difficulty

- One or more medical problems
- ASA class III

- Controlled HTN
- Controlled diabetes
 - Type I
 - Type II
- Asthma
- Patients on oral bisphosphonates
- Smokers

Anesthesia

Moderate difficulty

- Vasoconstrictor intolerance

High difficulty

- Difficulty achieving anesthesia

● Vasoconstrictor contraindications

- BP >200 systolic/115 diastolic
- Hyperthyroidism
- Severe cardiac patients
- Non-selective β -blockers
- MAO's
- TCA's
- Supplemental anesthesia
- IV sedation
- General anesthesia

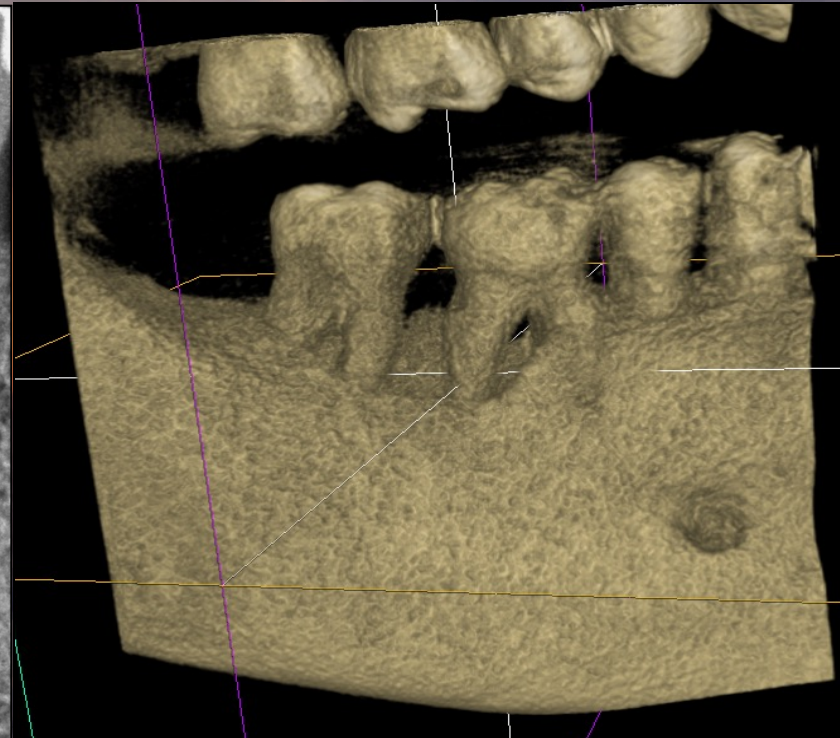
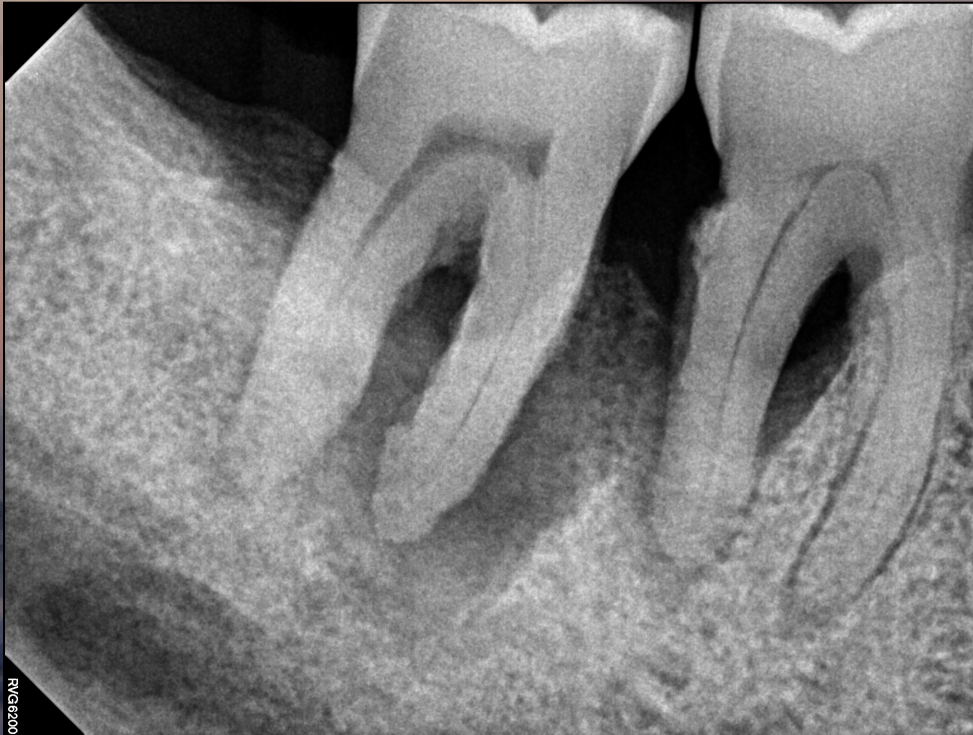
Case #1



Case #2

- 66 year old female
- CC: Pain in the posterior right mandible, referred by her General Dentist for Endodontic Treatment and Coronal Amputation of #30 and 31

Case #2: Clinical Presentation



Medical and Dental History

● Medical History

- Prior smoker, 1 ppd/50 years
- Soft palate cancer removed September 2005, received radiation and chemotherapy
- Patient has taken alendronate in the past
- Current medications: Esomeprazole (nexium), pilocarpine, calcium supplement, multivitamin, lorazepam, and buspirone

● Dental History

- ONJ posterior right mandible
- Xerostomia
- Multiple class V carious lesions on most teeth

AAE Guidelines and Recommendations

ENDODONTICS

*Colleagues for
Excellence*

Winter 2007



*Bisphosphonate-Associated
Osteonecrosis of the Jaw*

Signs and Symptoms of Bisphosphonate-associated ONJ

- An irregular mucosal ulceration with exposed bone in the mandible or maxilla
- Pain or swelling in the affected jaw
- Infection with or without purulence
- An altered sensation (e.g., numbness or heavy sensation)
- The site of occurrence of osteonecrosis is the jaws; presentation occurs more frequently in the mandible than the maxilla
- The mechanism for bisphosphonate-associated ONJ is unknown

Osteonecrosis of the Jaw



Common Risk Factors Associated with the Development of Bisphosphonate-associated ONJ

- History of taking bisphosphonates, especially I.V. formulations. The concurrent use of steroids appears to contribute to this risk
- Previous history of cancer (e.g., multiple myeloma or metastatic disease to bone), osteoporosis, Paget's disease, chronic renal disease on dialysis, etc
- A history of a traumatic dental procedure. Most case reports occur after a tooth extraction

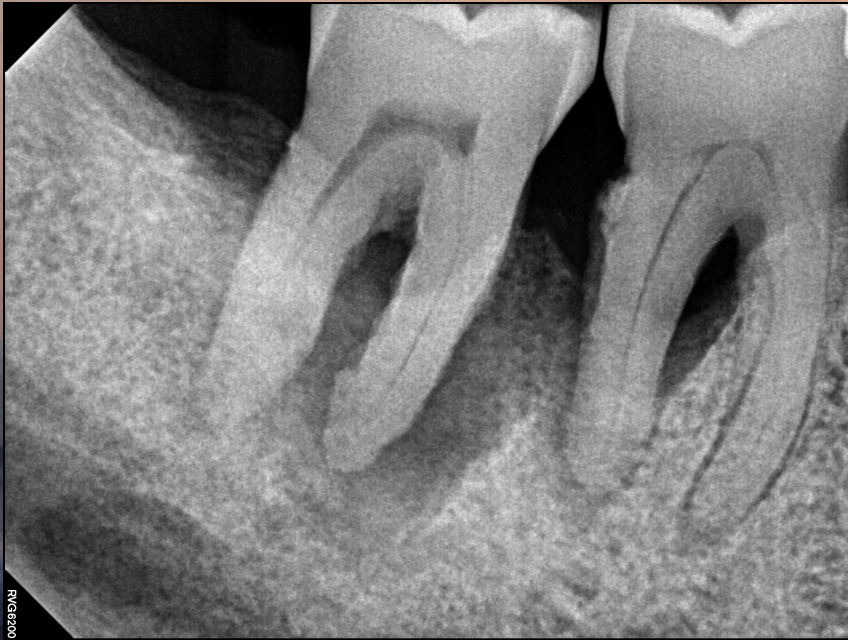
Commonly Prescribed Bisphosphonates

Subclass of Bisphosphonate	Generic Name	Trade Name	Route of Administration	Potency Ratings
Aminobisphosphonate	Zoledronate (Zoledronic acid)	Zometa®	IV	10,000
Aminobisphosphonate	Pamidronate	Aredia®	Oral & IV	100
Aminobisphosphonate	Alendronate	Fosamax®	Oral	500
Aminobisphosphonate	Ibandronate	Boniva®	Oral & IV	1,000
Aminobisphosphonate	Risedronate	Actonel®	Oral	2,000
Non-aminobisphosphonate	Tiludronate	Skelid®	Oral	10
Non-aminobisphosphonate	Clodronate	Bonefos®, Loron®, Ostac®	Oral	10
Non-aminobisphosphonate	Etidronate	Didronel®	Oral	1 (potency relative to that of etidronate)

AAE Recommendations and Guidelines for Patients Taking Bisphosphonates

- Recognize the risk factors of bisphosphonate-associated ONJ
- Endodontic treatment of non-restorable teeth in high risk patients
- Regular examination and education of patients at low risk
- Consider bisphosphonate-associated ONJ when developing a differential diagnosis of nonodontogenic pain
- Cases of bisphosphonate-associated osteonecrosis of the jaws should be reported to the U.S. FDA MedWatch Online at:
<https://www.accessdata.fda.gov/scripts/medwatch/>

Case #2: Endodontic Treatment



Mouth Opening Ability

Minimal difficulty

- No limitation



Medical History

High difficulty

- Complex medical history
- Serious illness/disability
- ASA class IV

- Uncontrolled HTN
- Uncontrolled diabetes
- Bleeding Disorders
- History of ONJ
- Patients with a history of Bisphosphonate use

Case #3



Case #3



Emergency Conditions

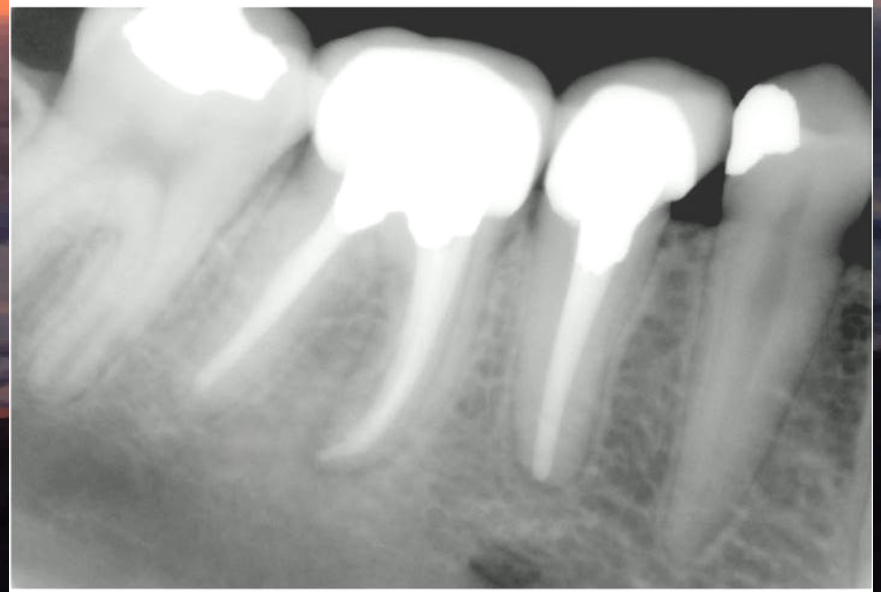
Moderate difficulty

- Moderate pain or swelling



- Pre-operative analgesia
- Incision and drainage

Case #3



Patient Disposition

Minimal difficulty

- Cooperative and compliant



Patient Disposition

Moderate difficulty

- Anxious but cooperative



Patient Disposition

High difficulty

- Uncooperative



Gag Reflex

Minimal difficulty

- No gag reflex

Moderate difficulty

- Gags occasionally with radiographs and/or treatment

High difficulty

- Extreme gag reflex which has compromised past dental care



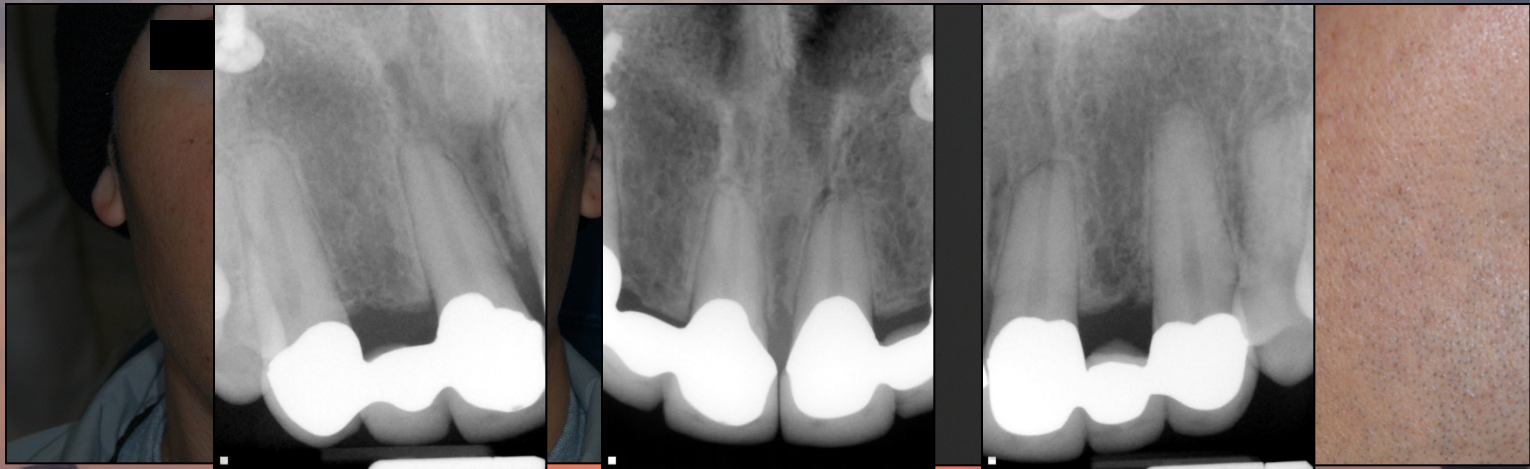


Diagnostic and Treatment Considerations

- Diagnosis
- Radiographic Difficulties
- Position in the Arch
(Tooth Type, Inclination & Rotation)
- Tooth Isolation
- Crown Morphology
- Canal and Root Morphology
- Radiographic Appearance of Canal(s)
- Proximity of Apices to Vital Structures
- Resorption

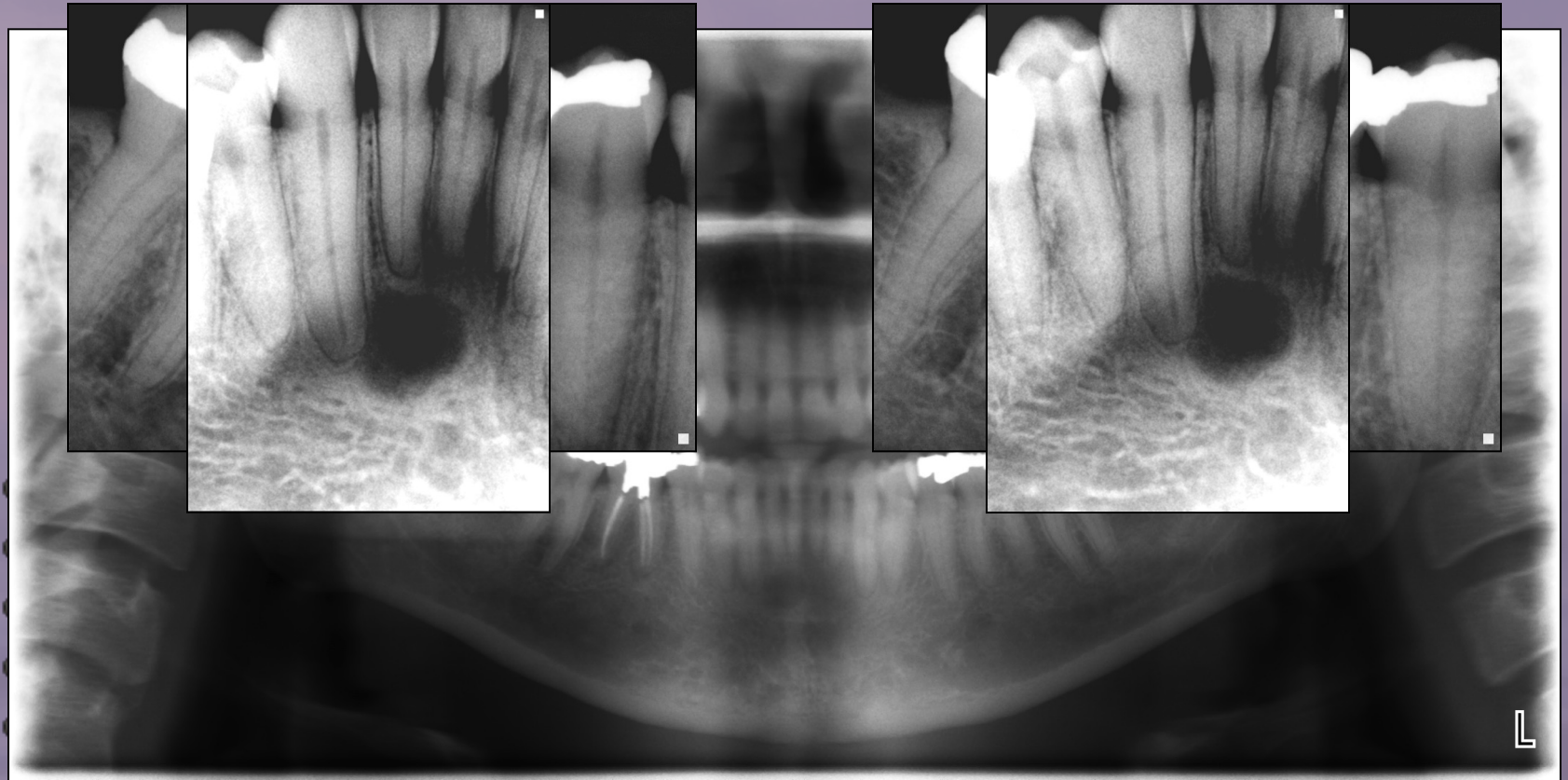


Case #4

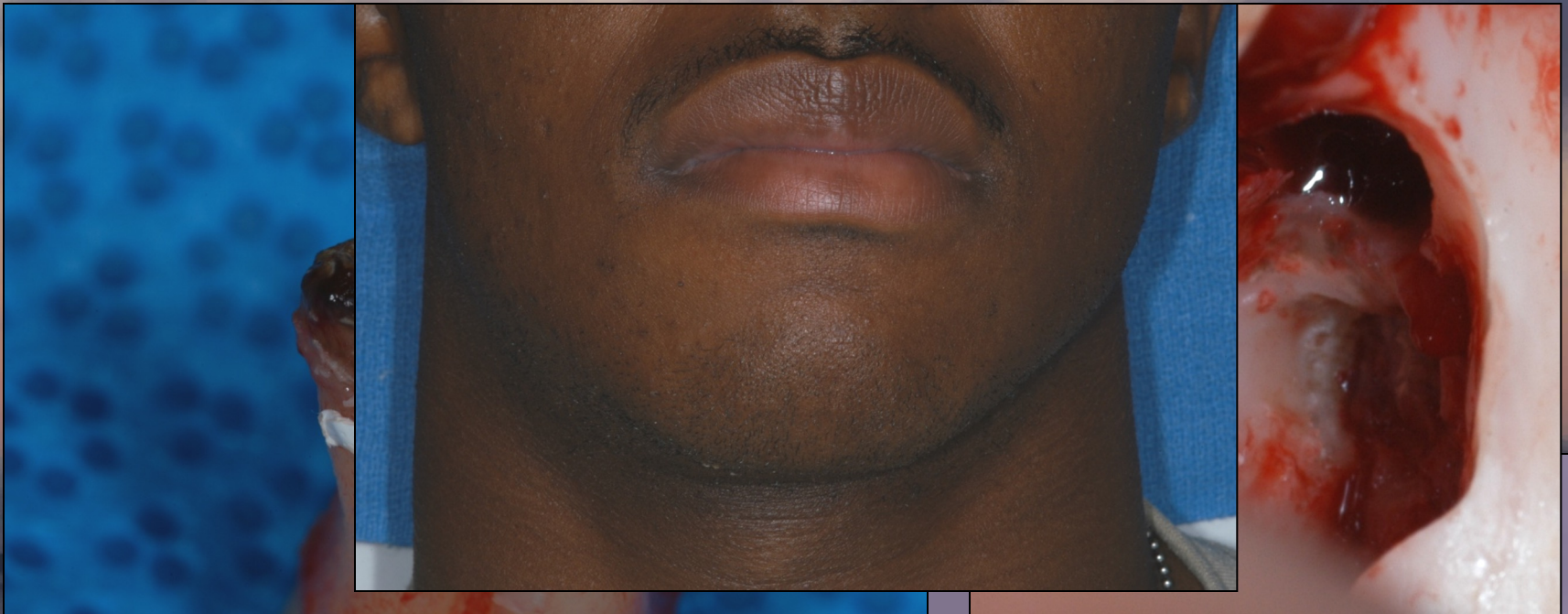


- BP 127/68 P 74, Temp 97.1, no known allergies
- No lymphadenopathy, swelling confined to upper lip
- HX of orthognathic surgery
- Teeth 6,8,9,11 test vital and WNL
- DX: non-odontogenic, angio-neurotic edema

Case #5

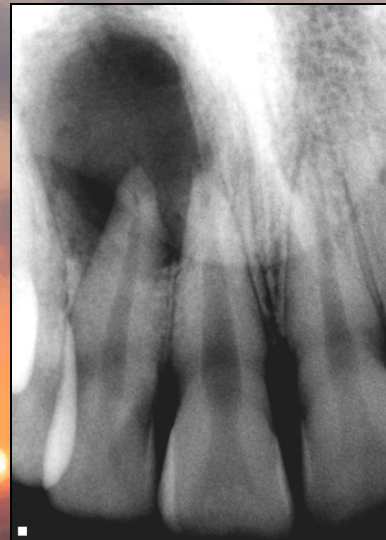


Case #6



- Vestibular swelling, palpation sensitivity, and lymphadenopathy
- Trismus, pain w/excursive movement to the left
- Parasthesia right lip and skin of right ear
- Lingering cold sensitivity #31

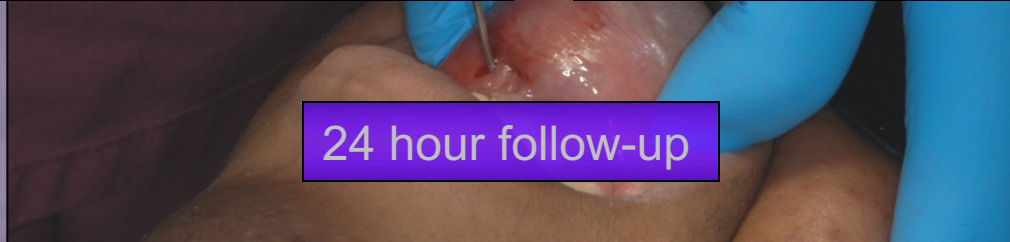
Case #7



- 18 y/o male, asymptomatic
- HX of traumatic tree branch incident, age 11
- Teeth 6,7,9,10,11 test vital and WNL
- DX: Necrotic Pulp with Chronic Apical Abscess

Case #7

- Cyst decompression



24 hour follow-up

Cyst Decompression

- Larger lesions tend to be cysts
- Cysts are less likely to heal with NS-RCT

Natkin et al., Oral Surg 1984



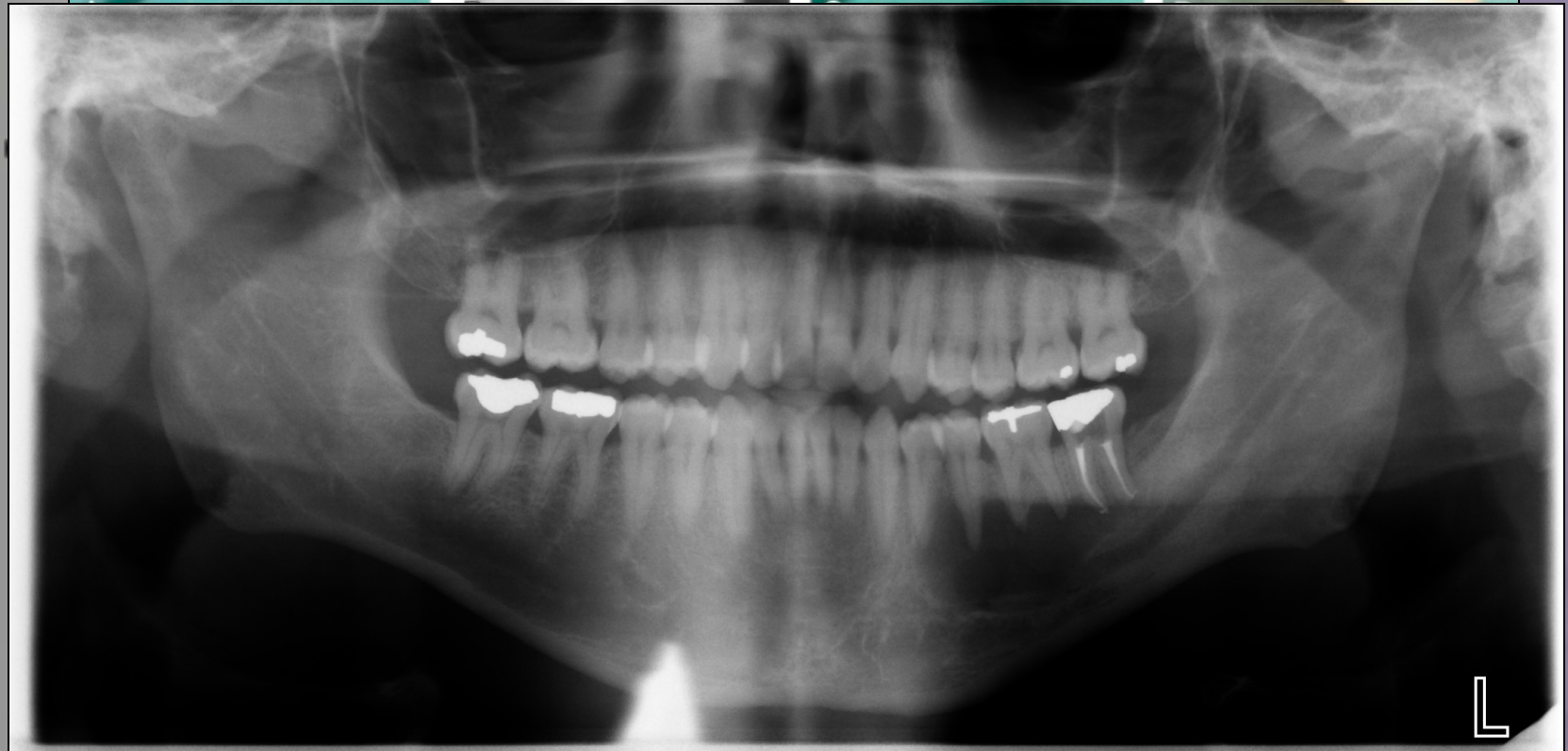
Two-year follow up

Martin, J Endodon 2007

Diagnosis



Diagnosis



*Ricucci and Grosso,
Endodontic Topics 2006*

Courtesy of Dr. Chad Dawson

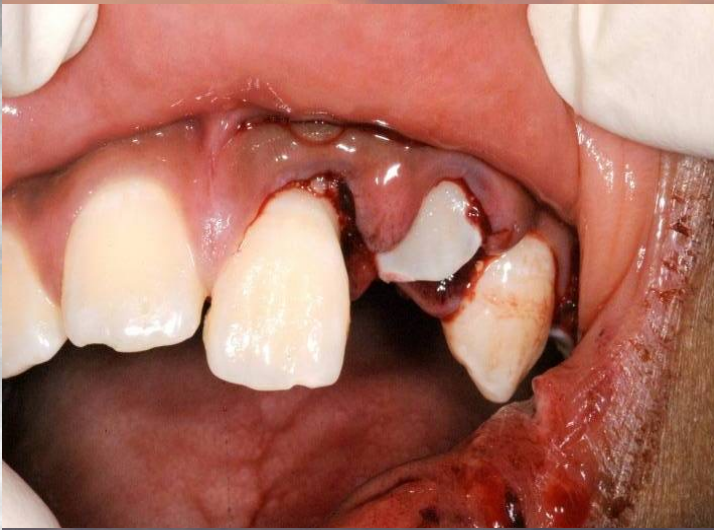
Diagnosis

High difficulty

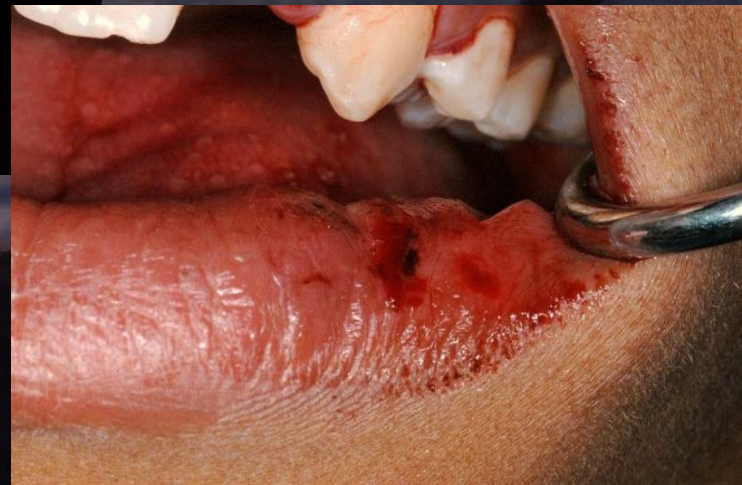
- Confusing and complex signs and symptom: difficult diagnosis.
- History of chronic oral/facial pain.

- Myofascial pain
 - TMD
- Trigeminal neuralgia
- Atypical odontalgia
- Migraine
- Systemic disorders
 - Varicella zoster virus
 - Sickle cell anemia
 - Metastatic carcinoma
- Somatoform pain disorder

Case #8



Case #8



Case #8



Case #8



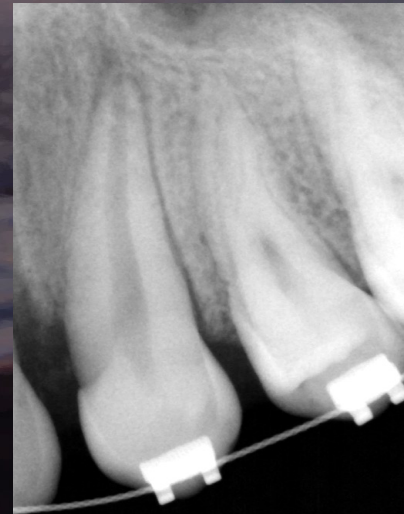
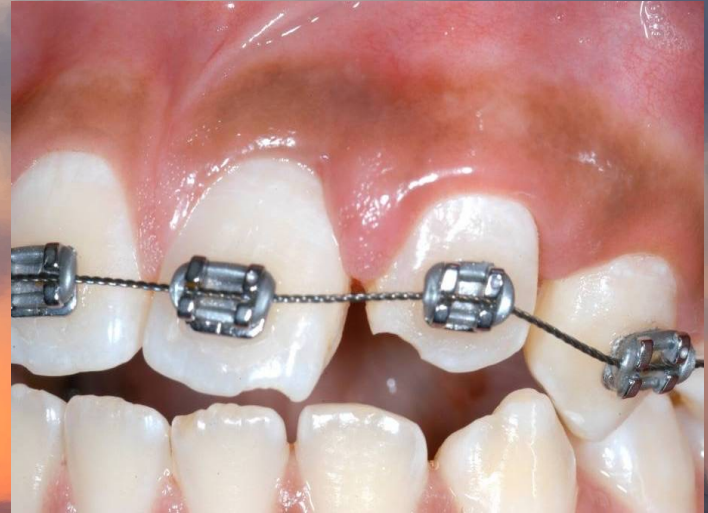
Case #8



Case #8



Case #8



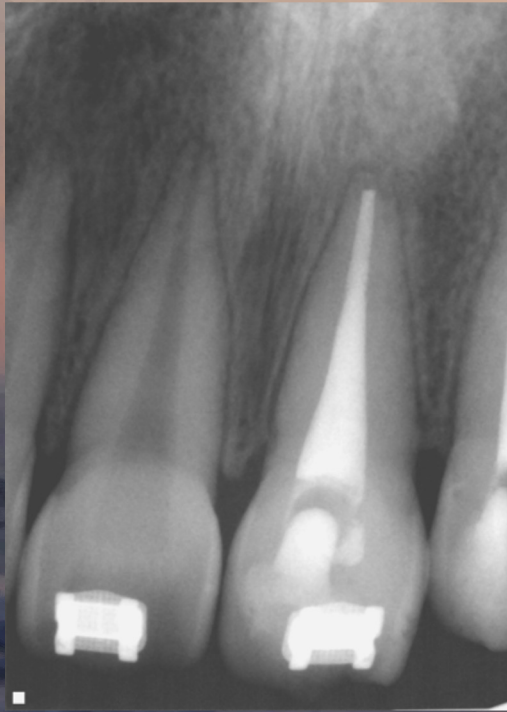
Case #8



Case #8



Case #8



Case #8





WATCH THOSE CHOPPERS!

The Importance of Brushing Your Teeth

Brush your teeth at least twice a day and floss daily to remove plaque that can lead to bad breath, cavity, the health of a tooth, gum disease, gingivitis, periodontitis and chronic halitosis (bad breath). Please do not smoke or drink.

! You can maintain a smile that lasts a lifetime by brushing your teeth twice a day and flossing daily.

Radiographic Difficulties

Extreme difficulty

- Extreme difficulty obtaining/interpreting radiographs (e.g., superimposed anatomical structures)

- Superimposed hardware

- Superimposed anatomical structures



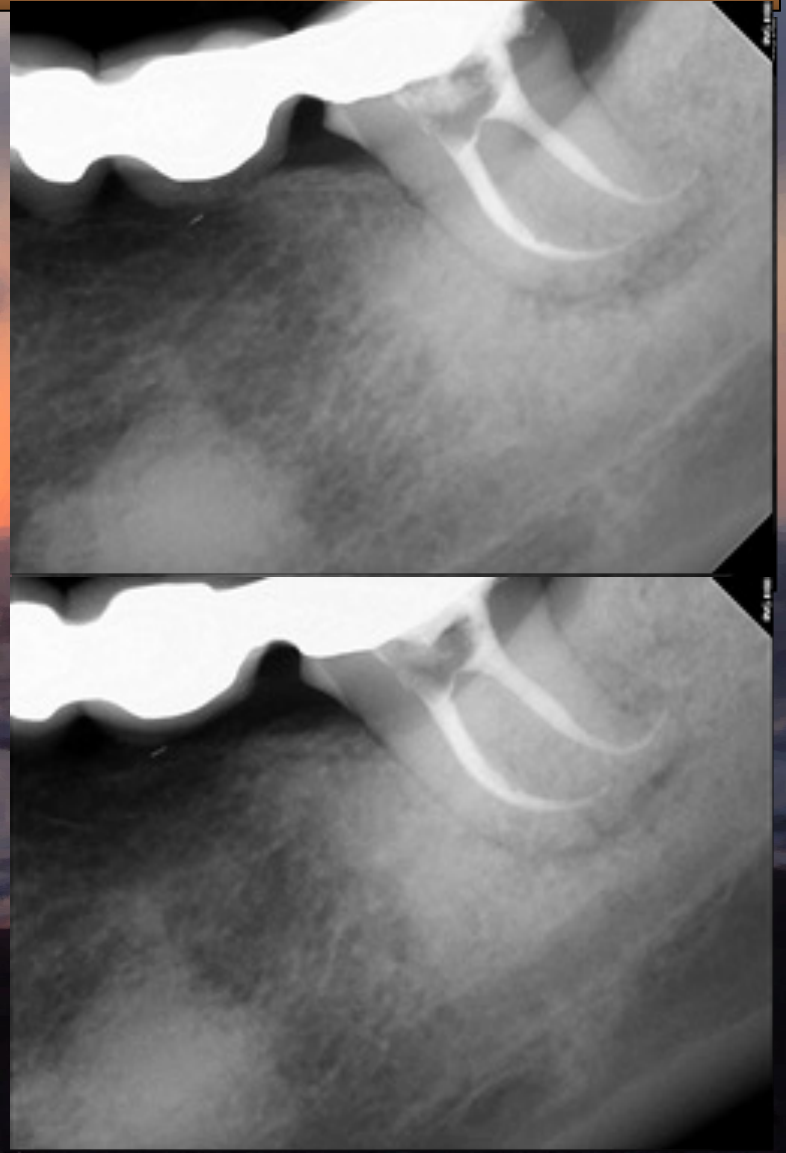
Arch Position

- Moderate difficulty
- 1st molar
- Moderate inclination (10-30°)
- Moderate rotation (10-30°)



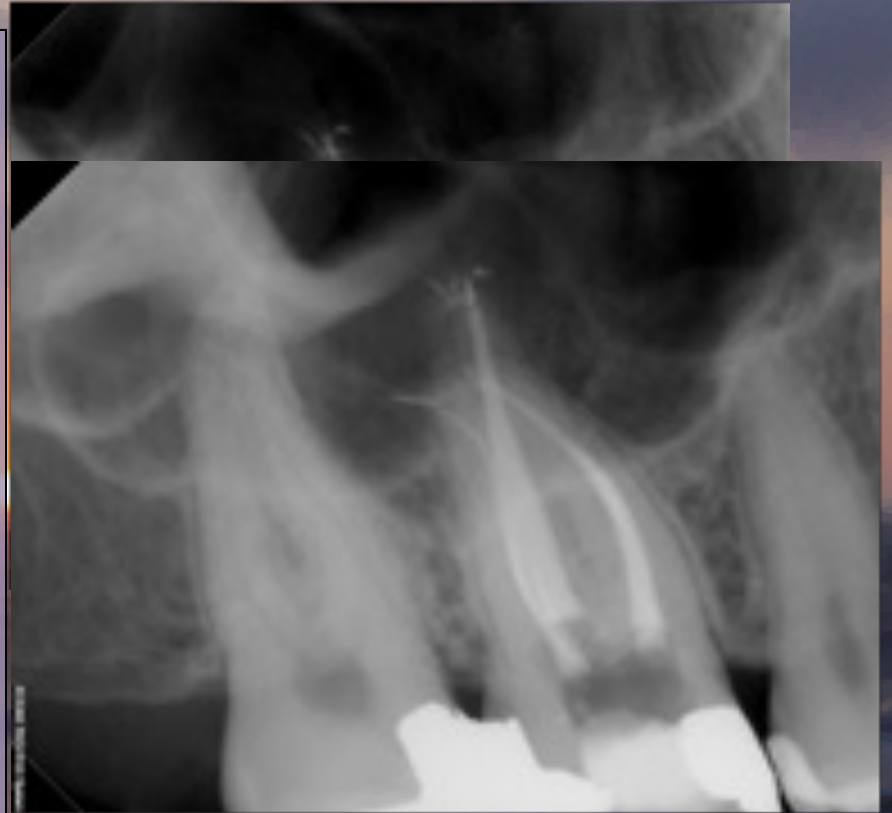
Arch Position

- High difficulty
- 2nd or 3rd molar
- Extreme inclination ($>30^\circ$)
- Extreme rotation ($>30^\circ$)

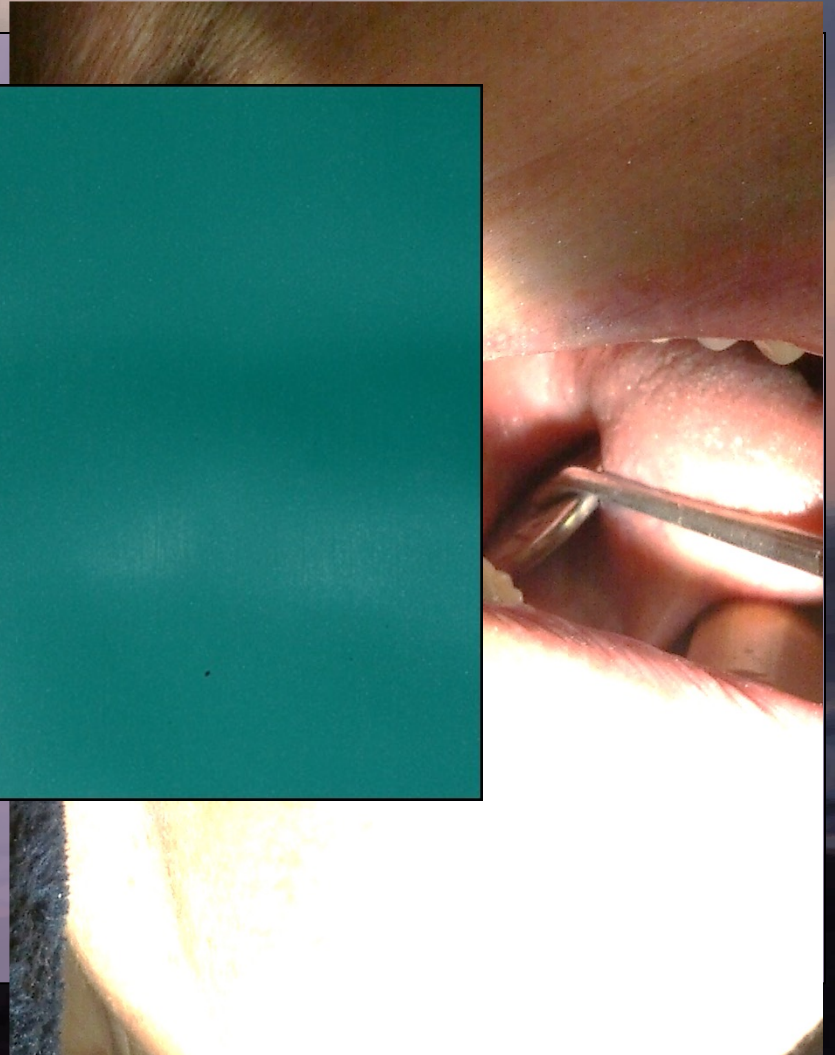
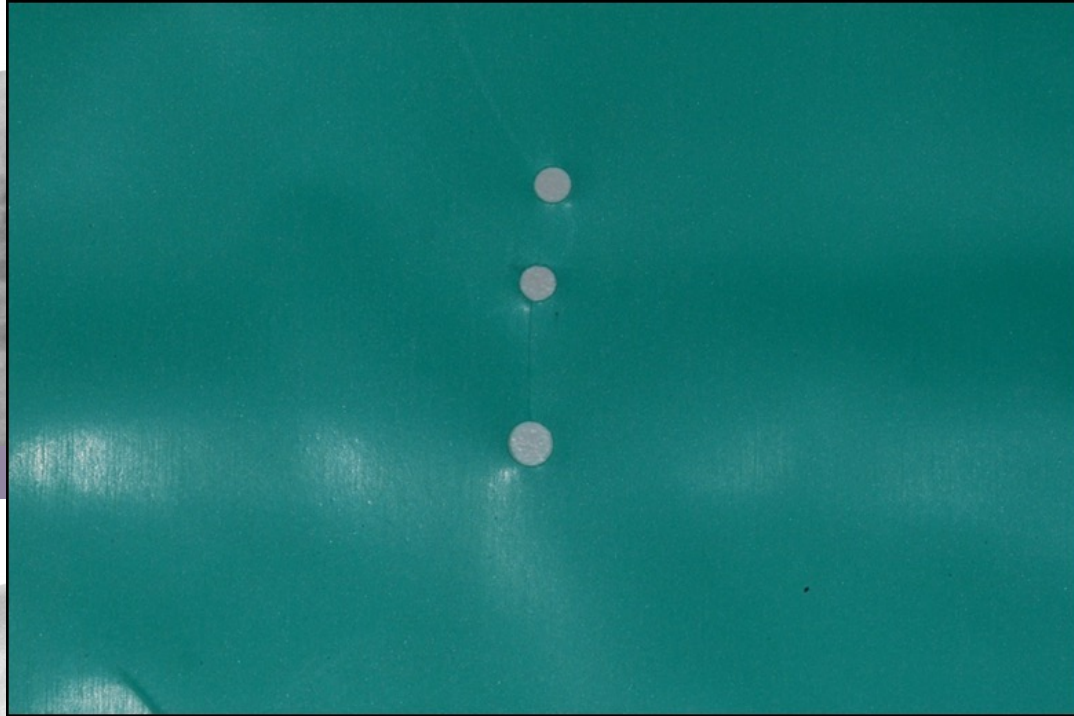
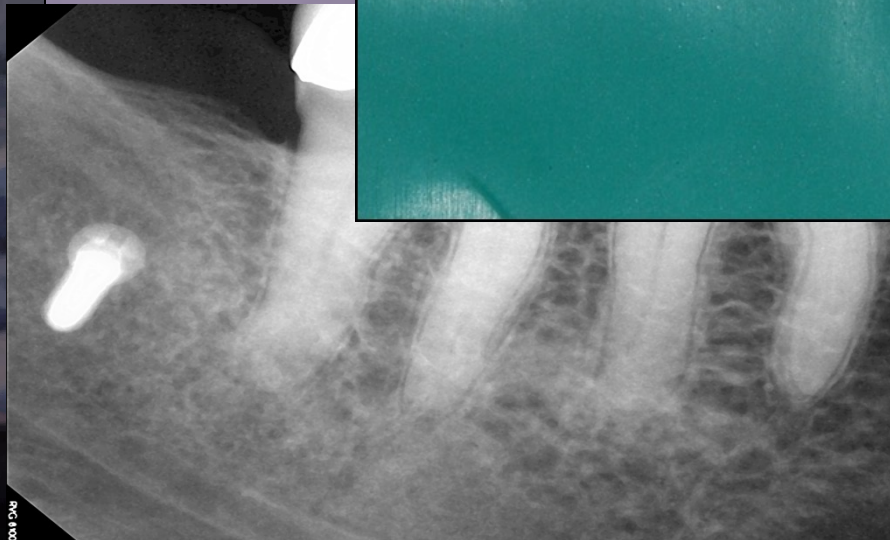
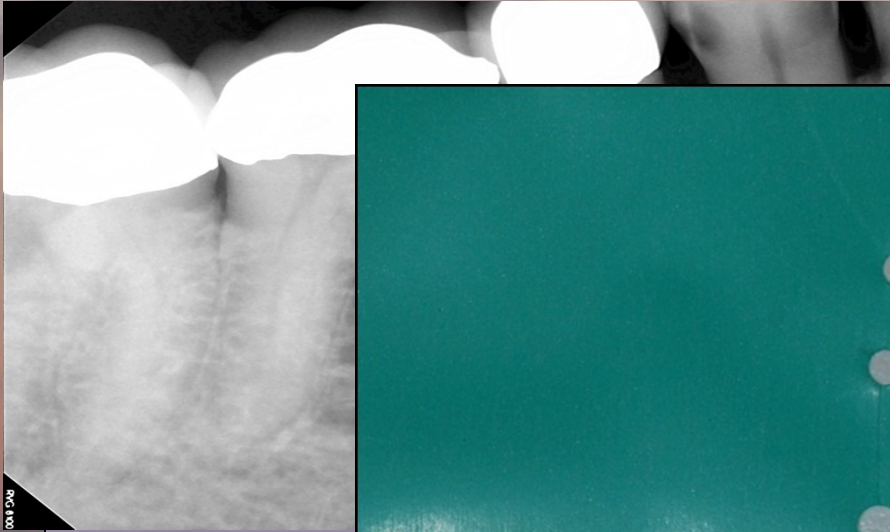


Arch Position

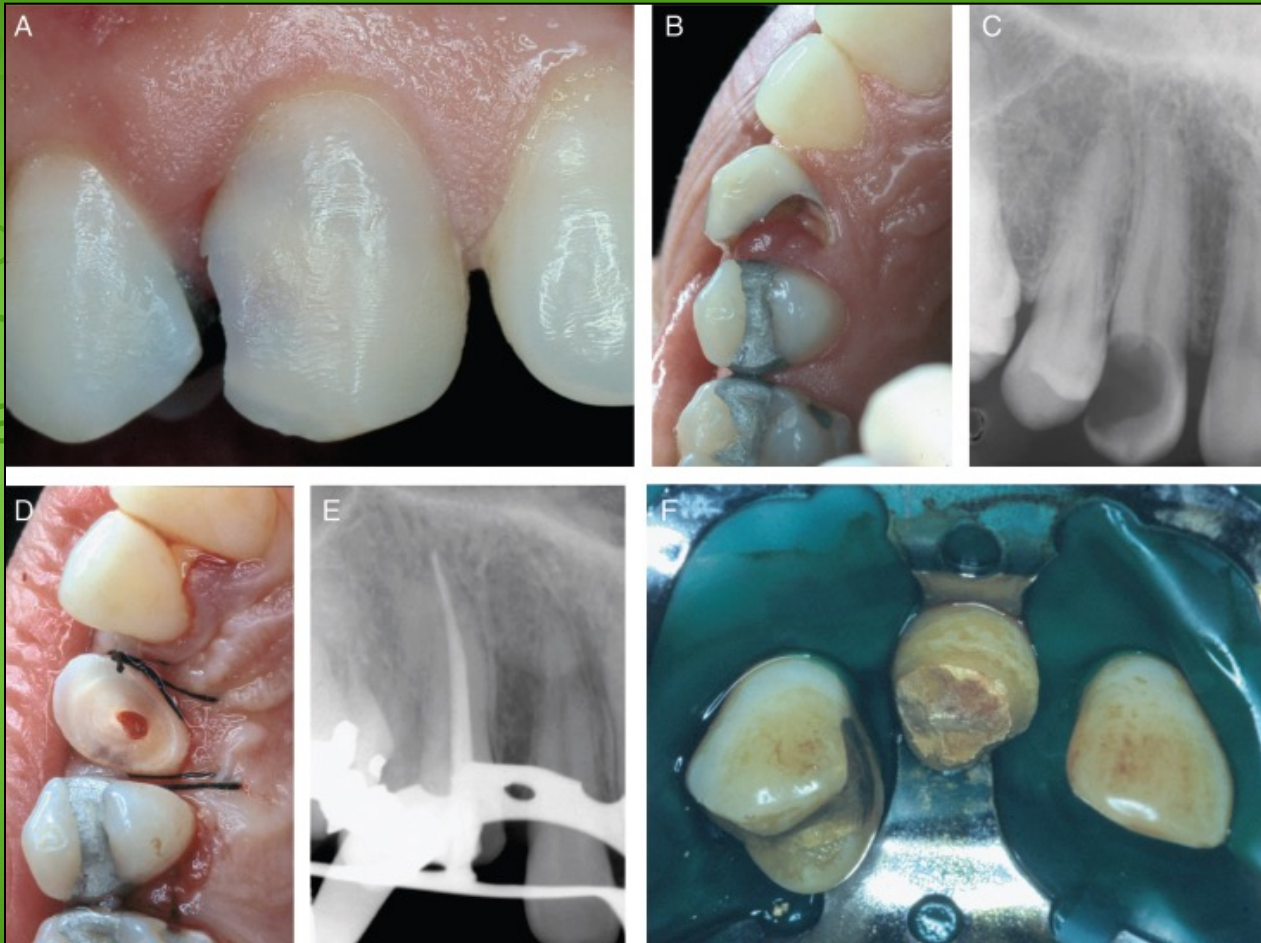
- High difficulty
- 2nd or 3rd molar
- Extreme inclination ($>30^\circ$)
- Extreme rotation ($>30^\circ$)



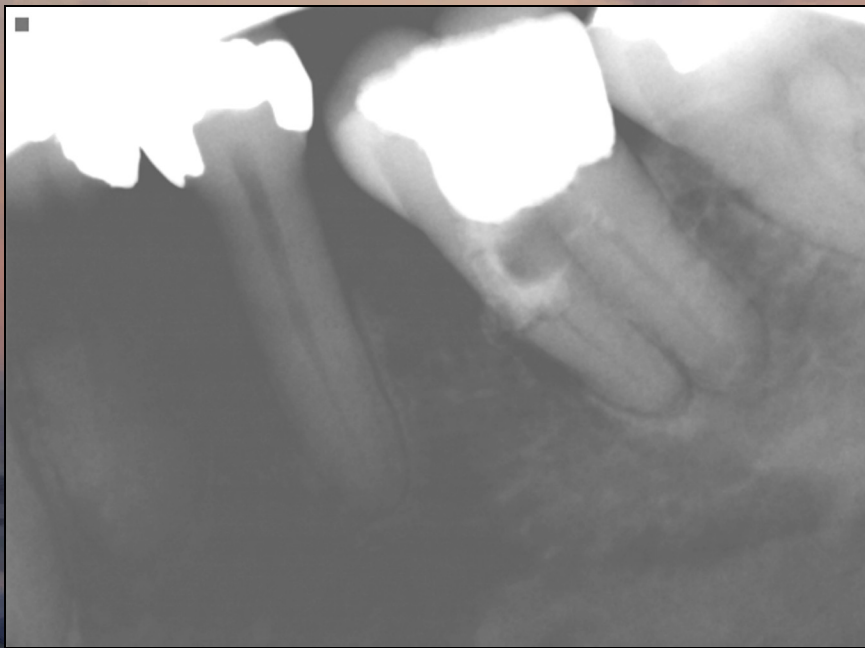
Case #9



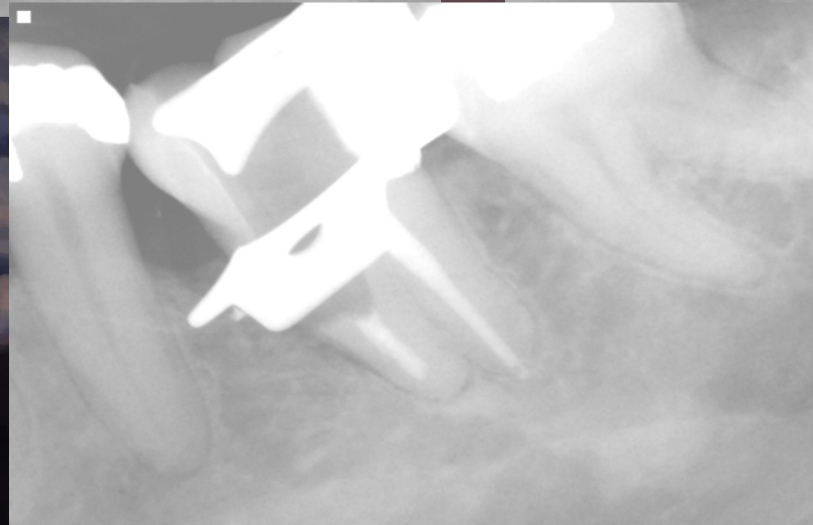
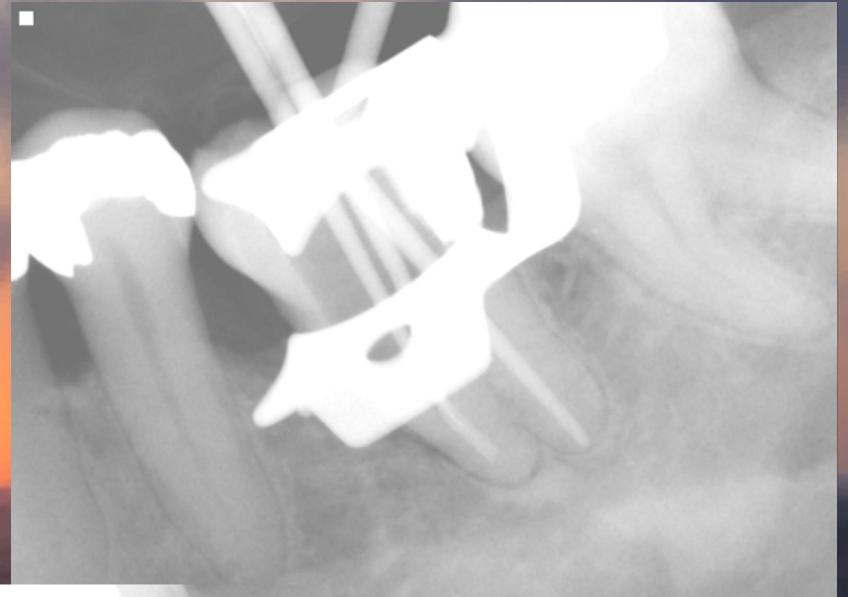
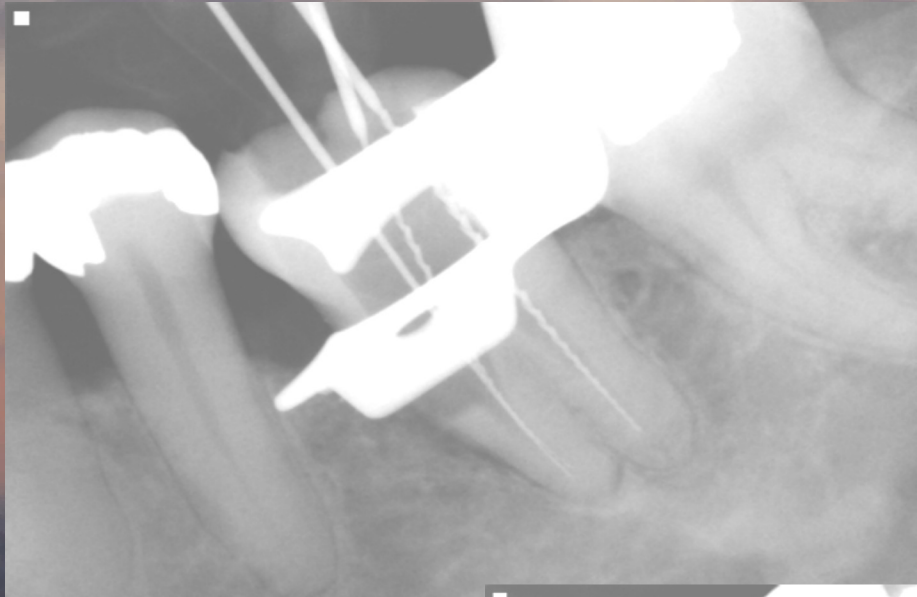
Tooth Isolation



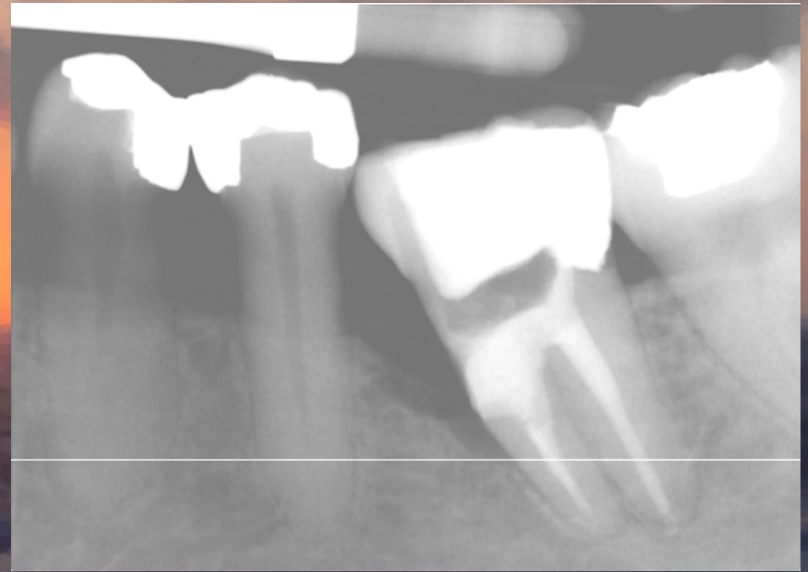
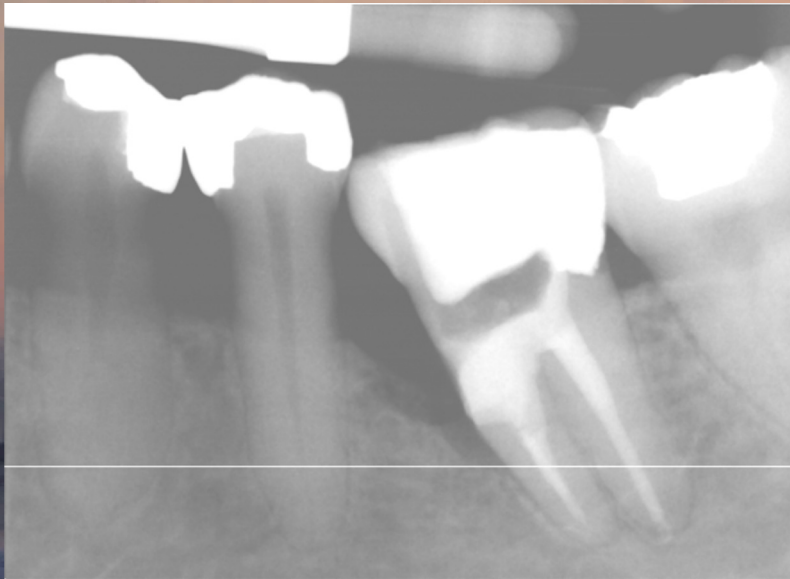
Case #10



Case #10



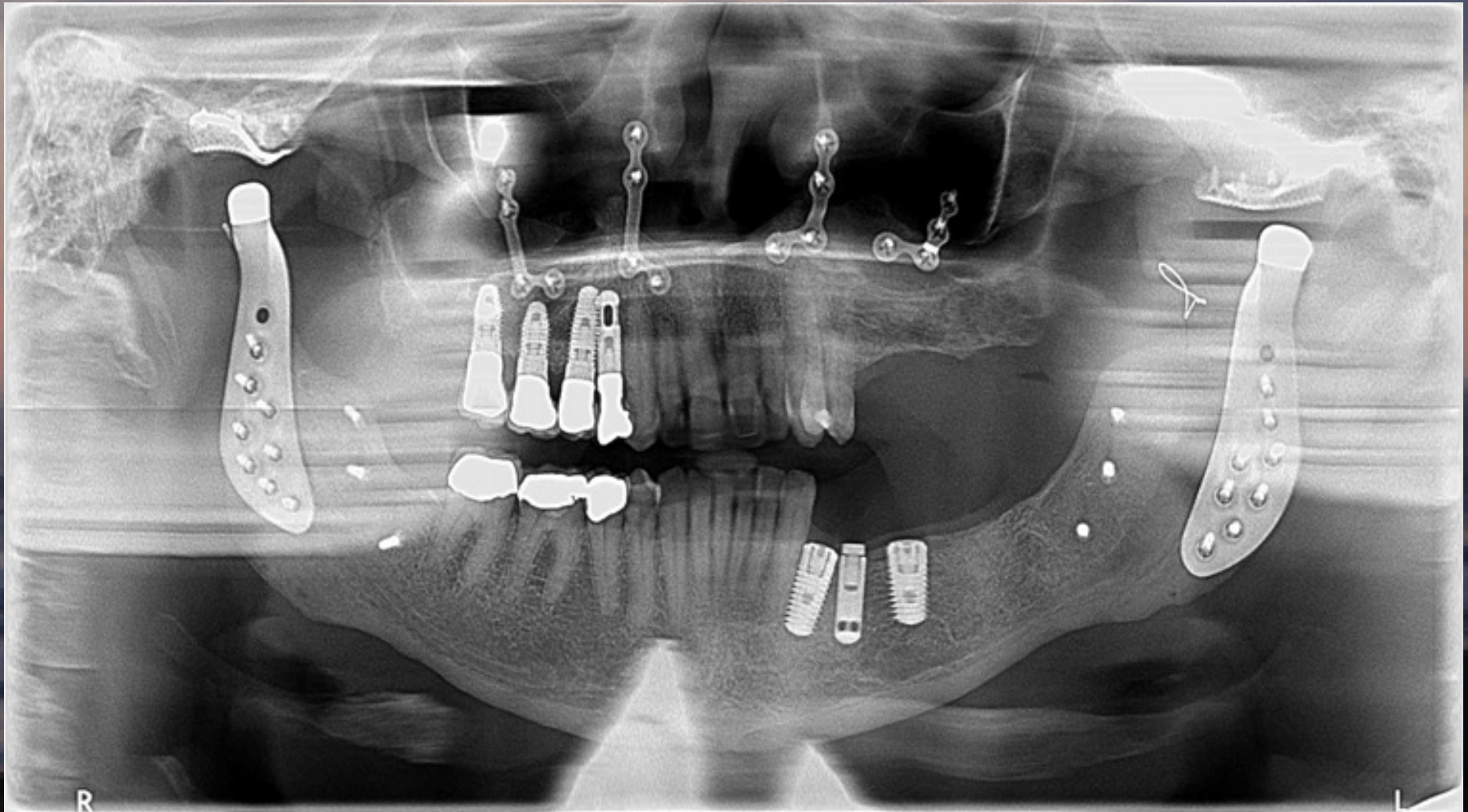
Case #10



Case #10



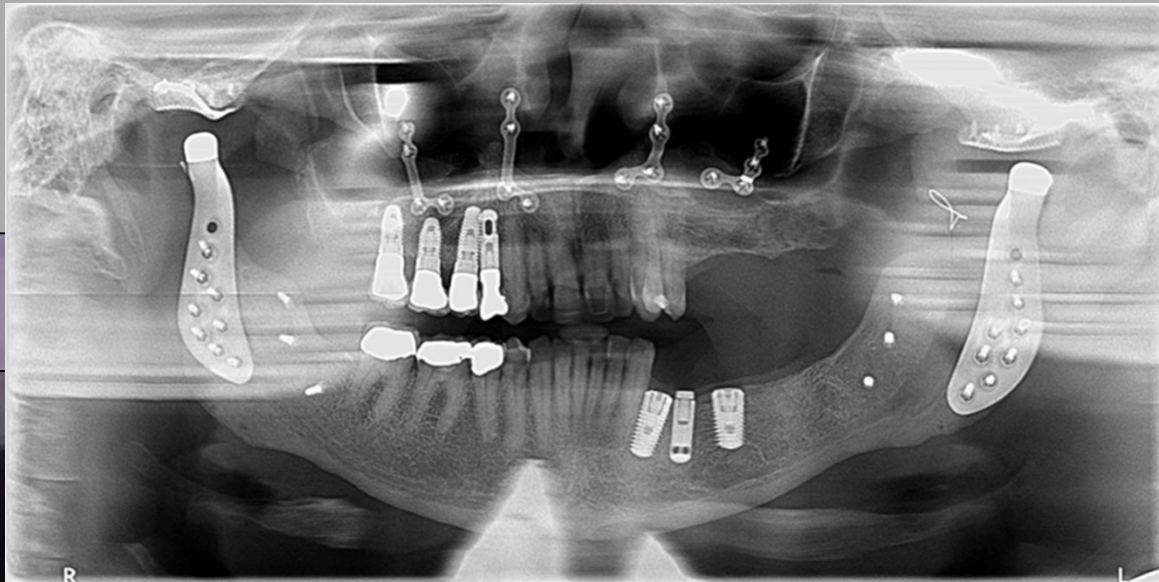
Morphologic Aberrations of the Crown



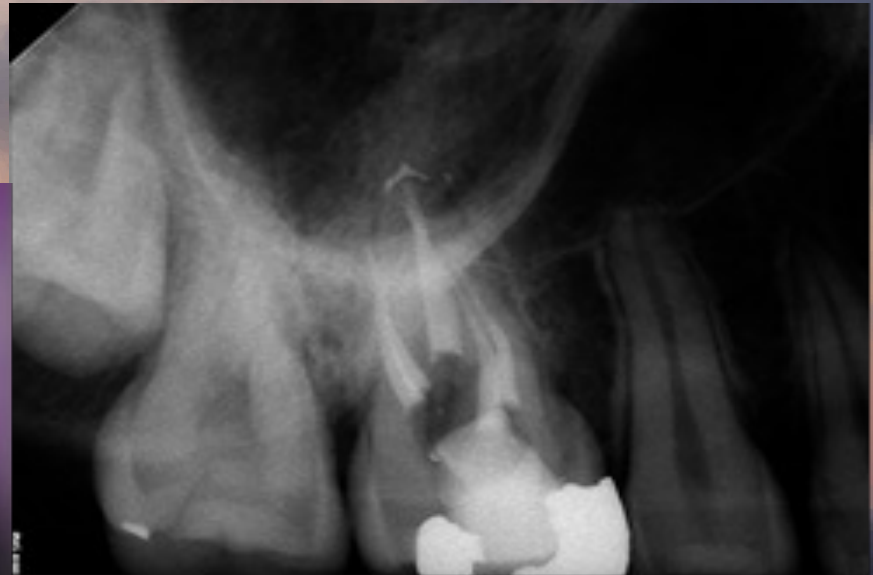
Morphologic Aberrations of the Crown

Moderate & high difficulty

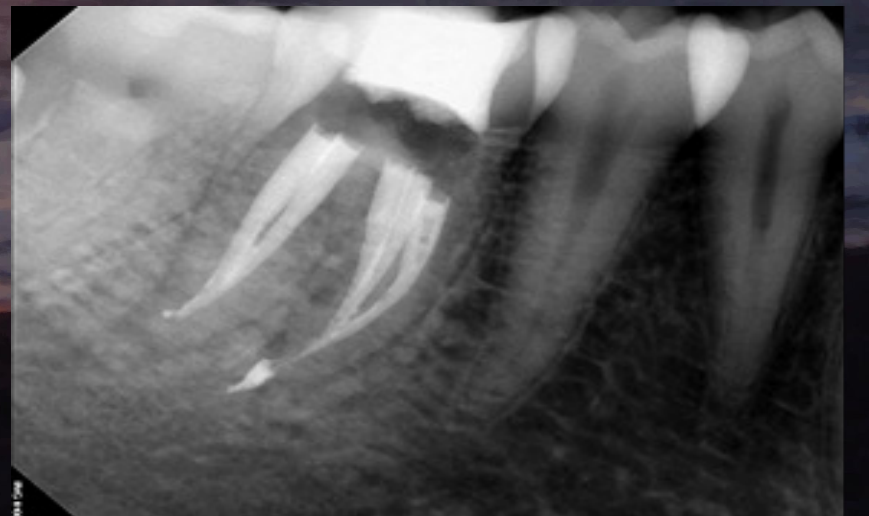
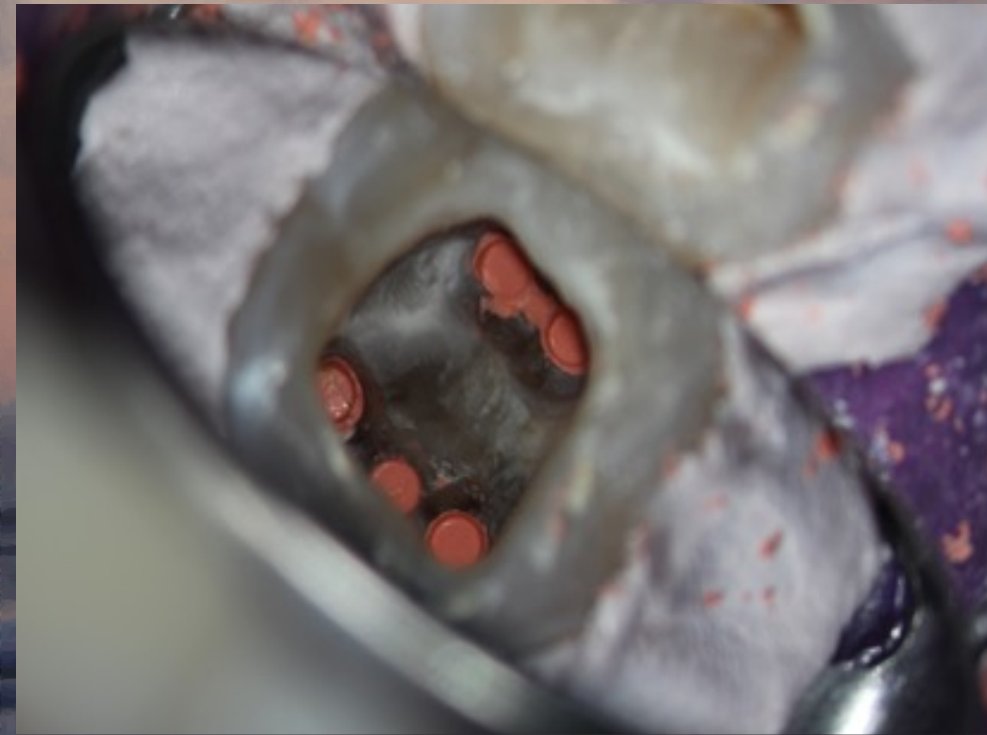
- Full coverage restoration
- Porcelain restoration
- Bridge abutment
- Significant deviation from normal tooth/root form (e.g., taurodontism, microdens, dens in dente, fusion)
- Teeth with extensive coronal destruction



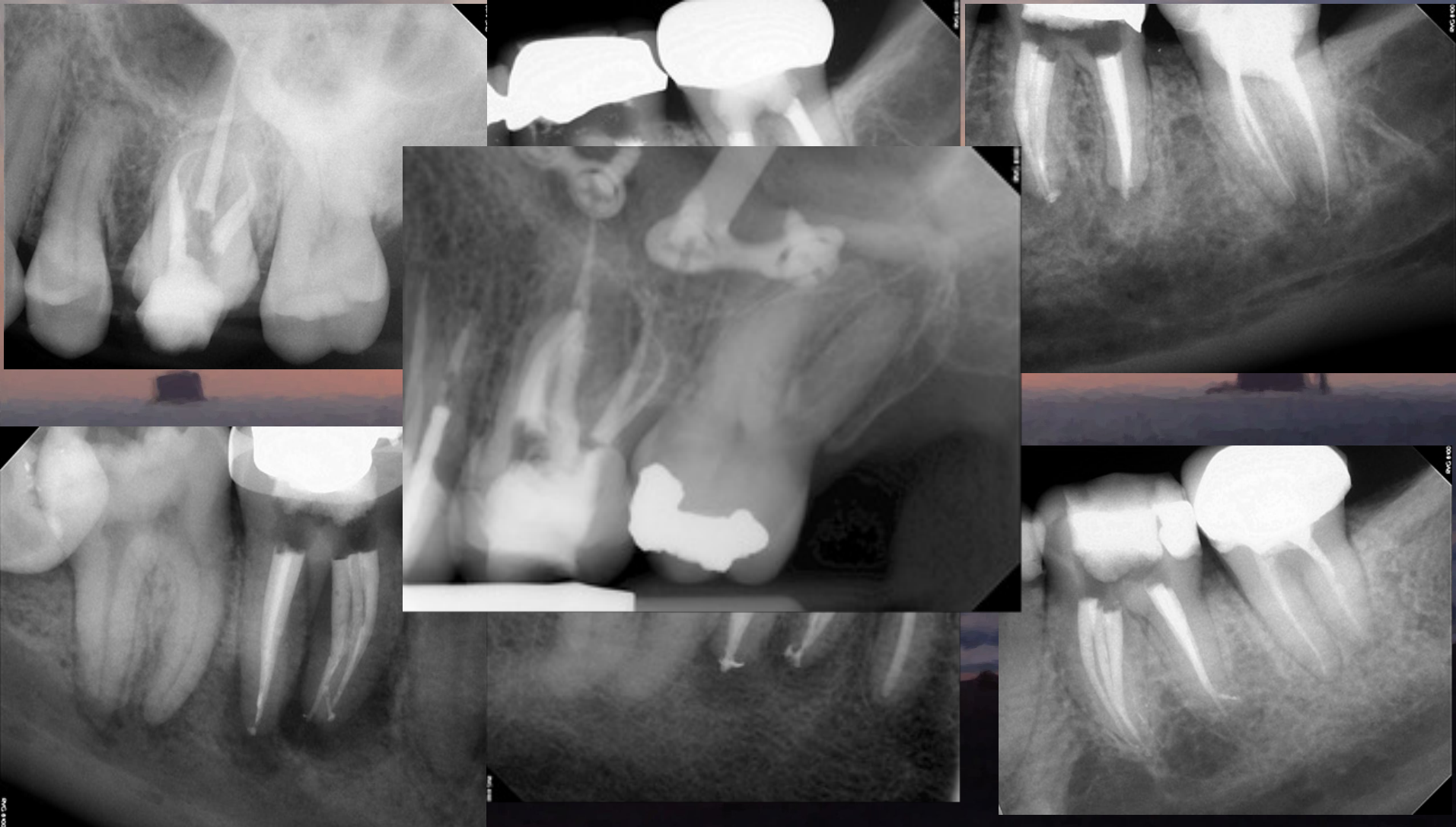
Case #11



Case #12



5 Canal Cases





Canal and Root Morphology

Moderate difficulty

- Moderate curvature (10-30°)
- Crown axis differs moderately from root axis.
- Apical opening 1-1.5 mm in diameter



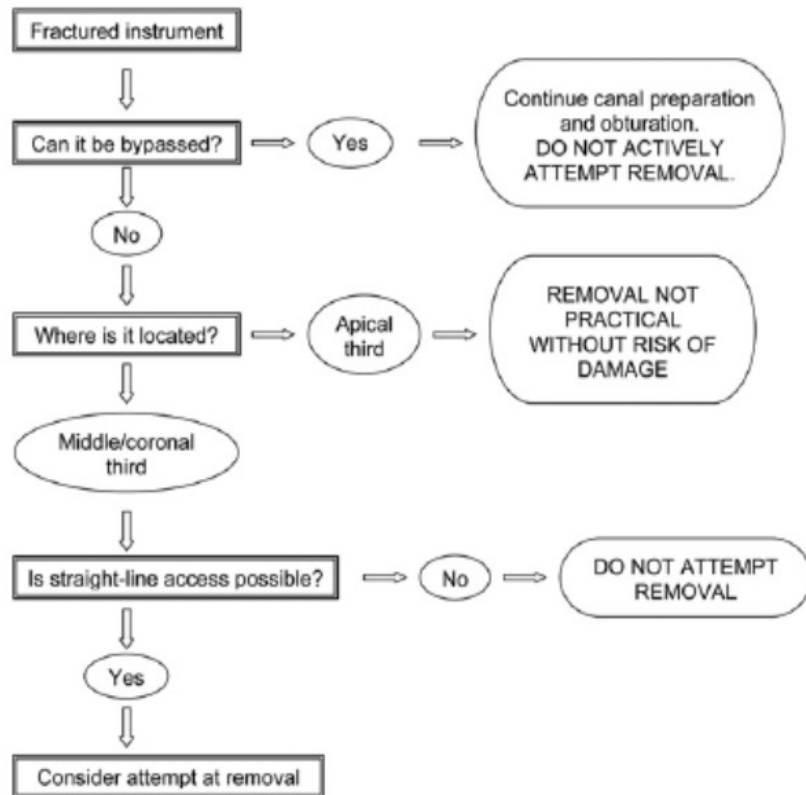
Canal and Root Morphology

- High difficulty
- Extreme curvature ($>30^\circ$) or S-shaped curve
- Mandibular premolar or anterior with 2 roots
- Maxillary premolar with 3 roots
- Canal divides in the middle or apical third
- Very long tooth (>25 mm)
- Open apex (>1.5 mm in diameter)

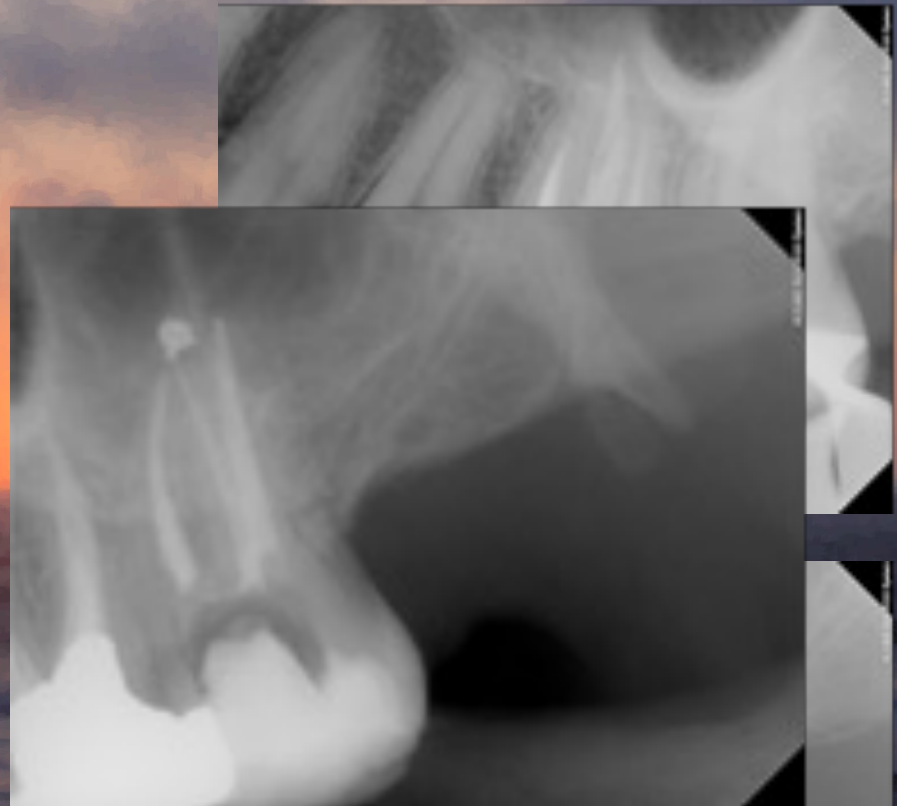


Canal and Root Morphology

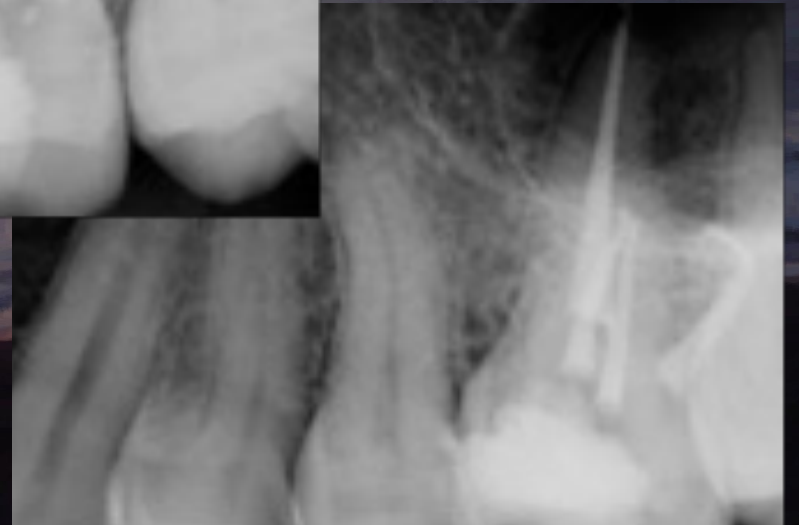
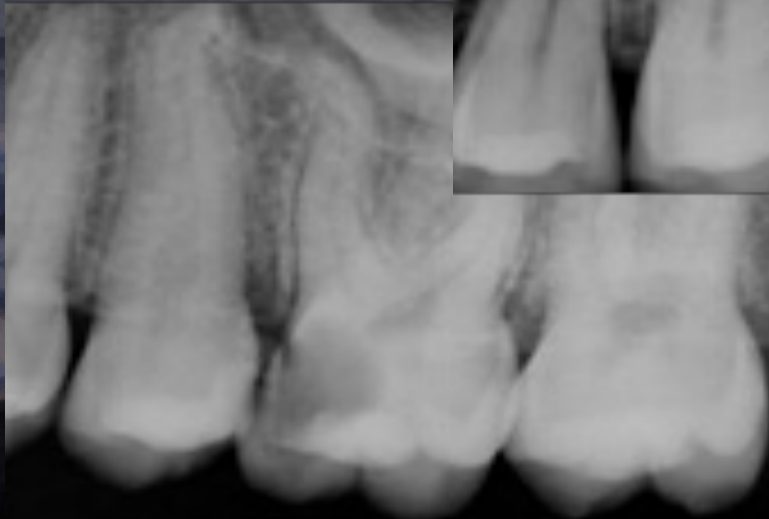
● High Difficulty



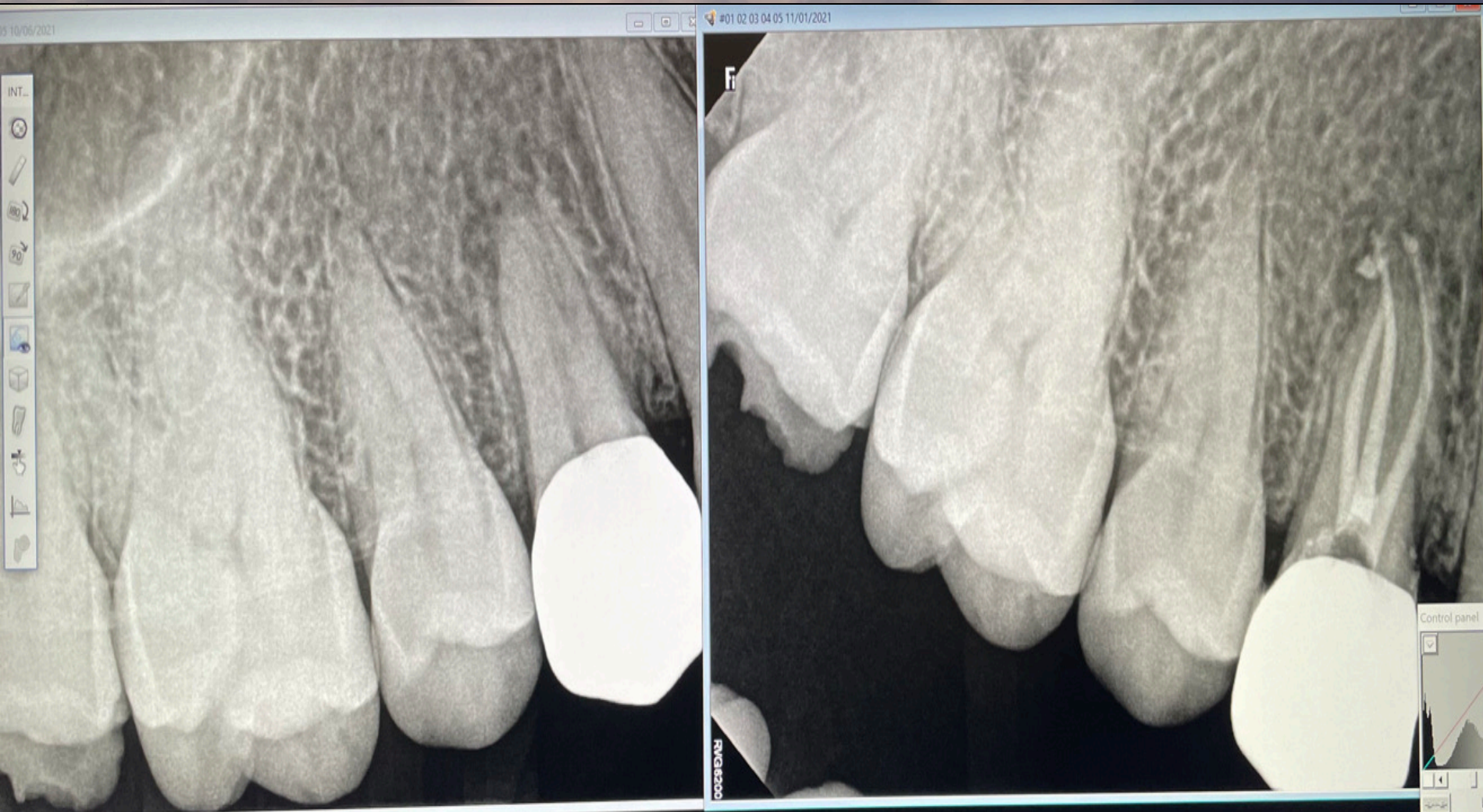
Canal and Root Morphology



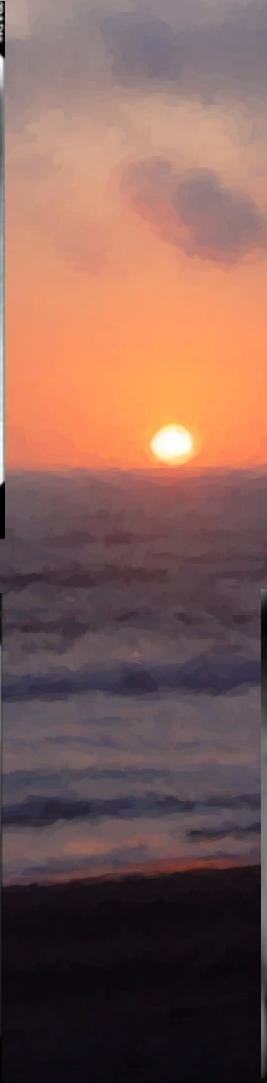
Canal and Root Morphology



Canal and Root Morphology



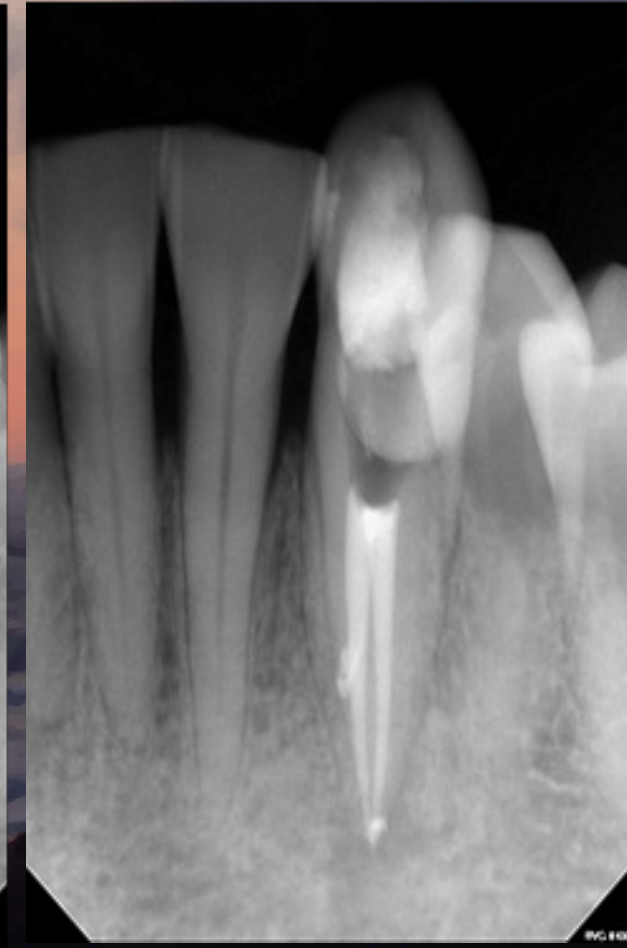
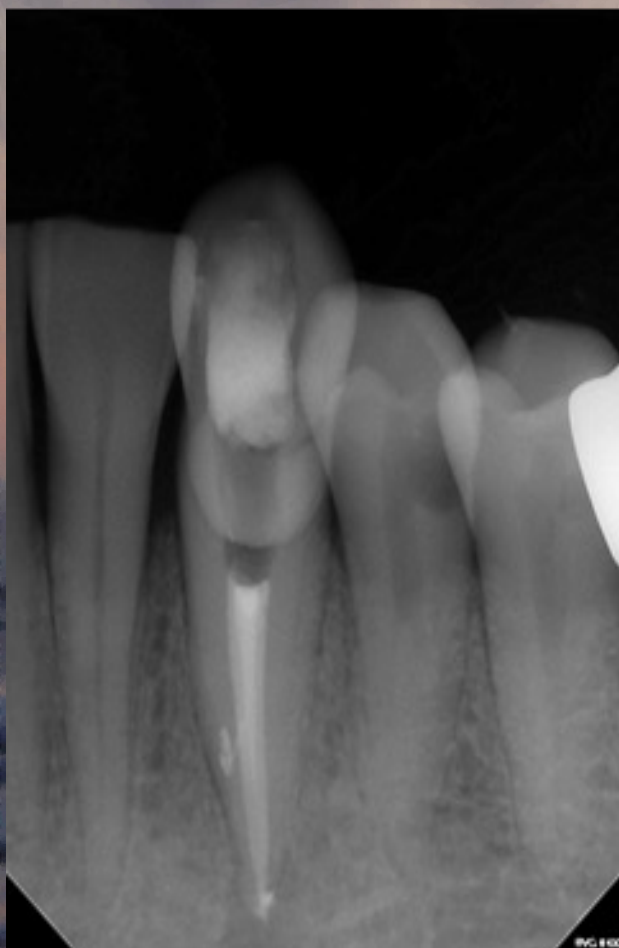
Canal and Root Morphology



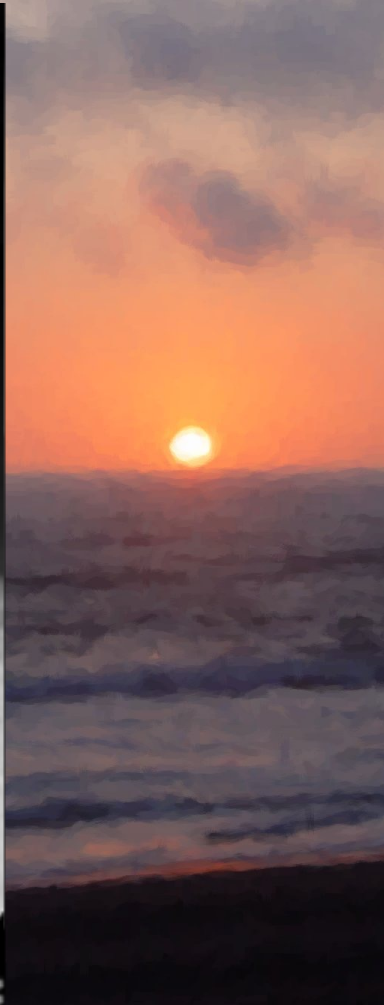
Case #13

- Root canal morphology
- Mandibular canine
 - 2 canals into 1: 10-14%
 - 2 canals, all configurations: 5-25%
- Mandibular 1st premolar
 - >1 canal: 14-34%

Case #13

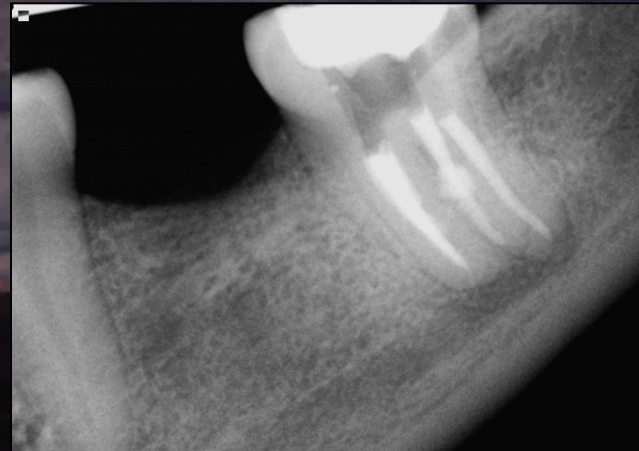
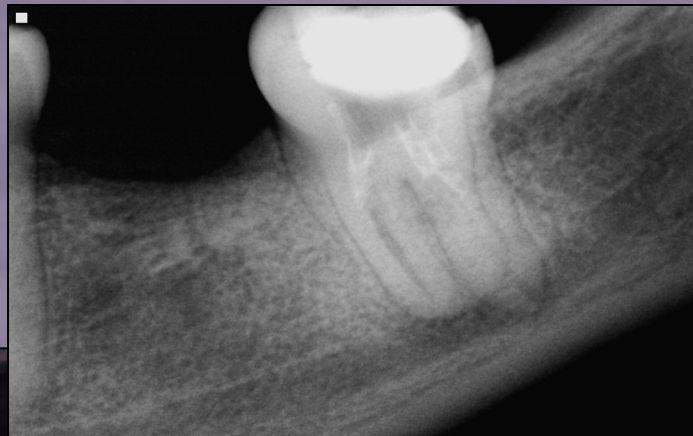
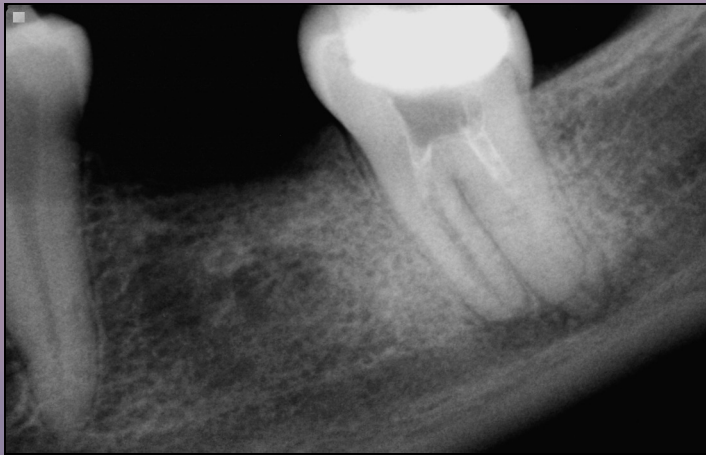


Case #14



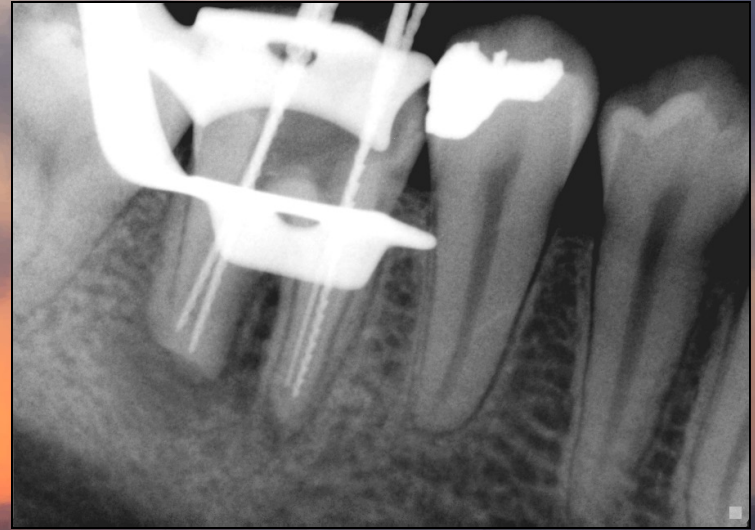
Resorption

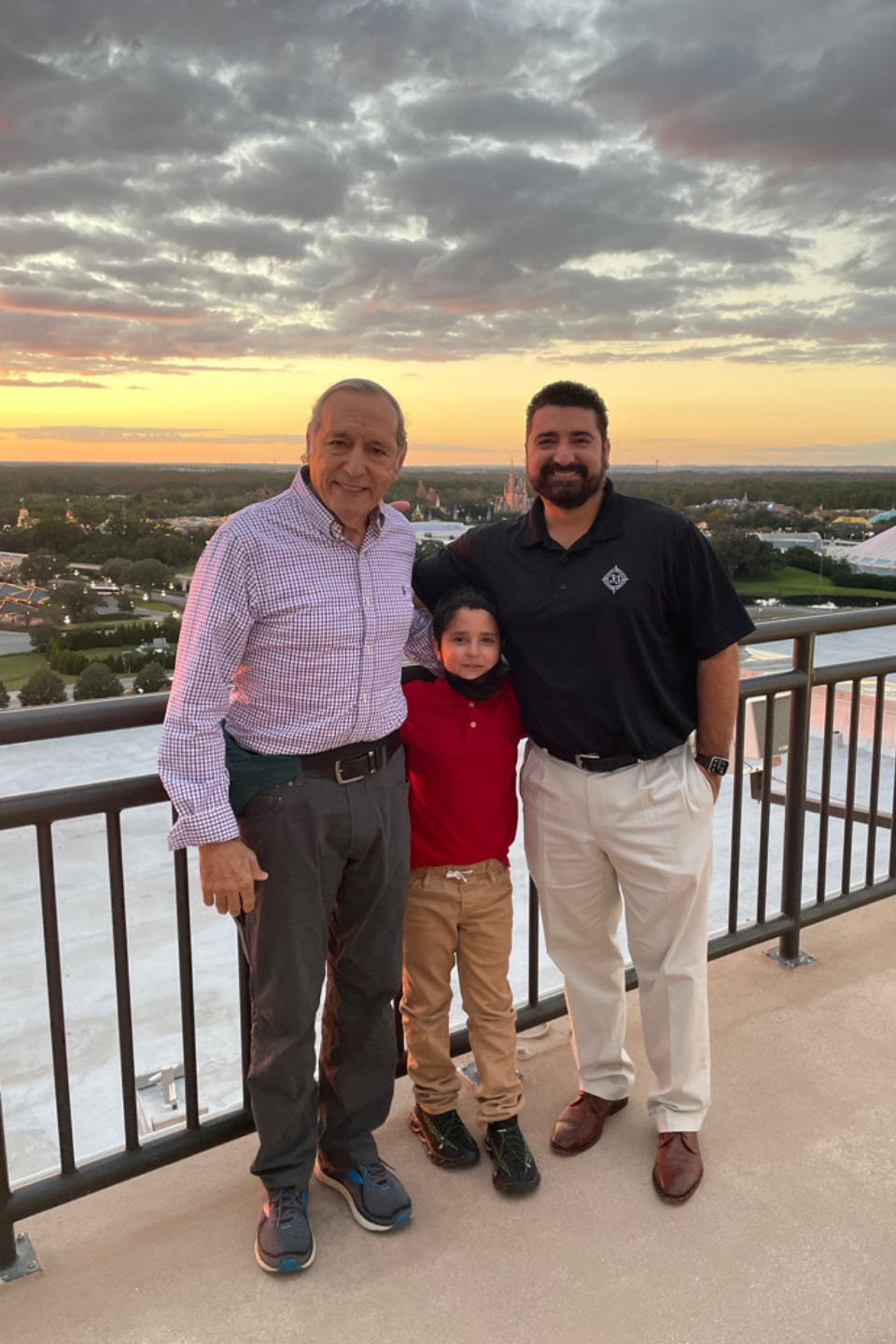
● Internal Resorption



Resorption

- External Resorption





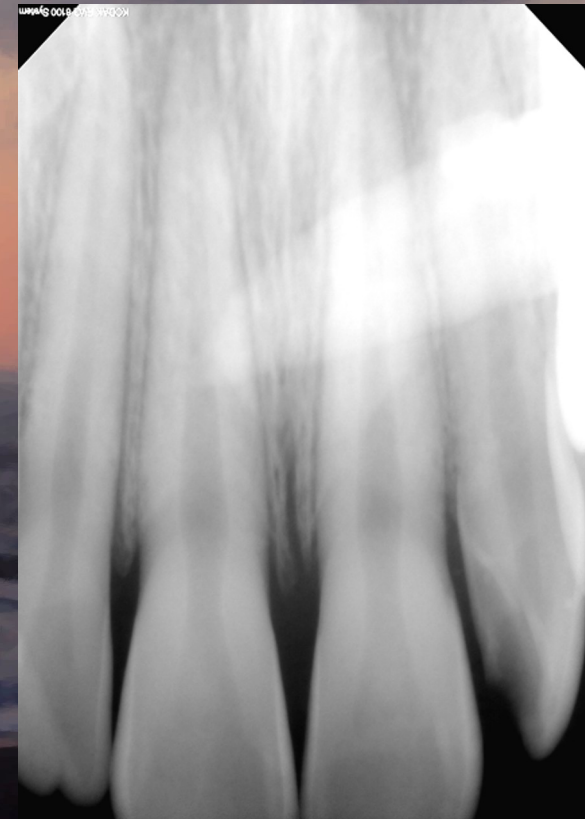
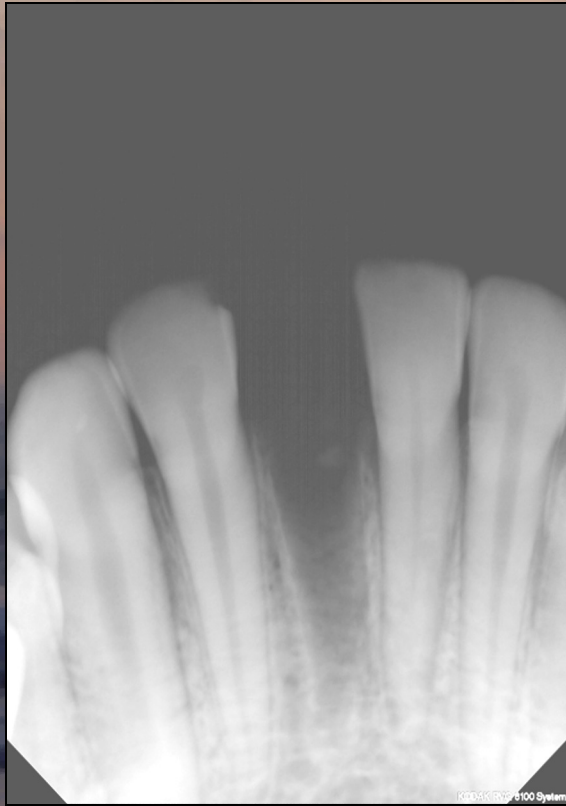
Additional Considerations

- Trauma History
- Endodontic Treatment History
- Periodontal-Endodontic Condition

Case #15



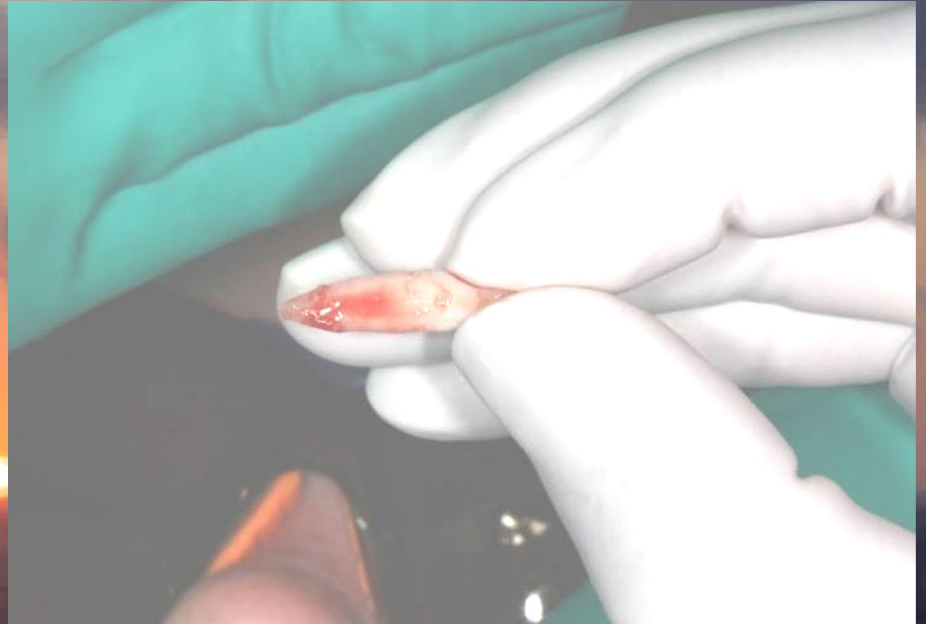
Case #15



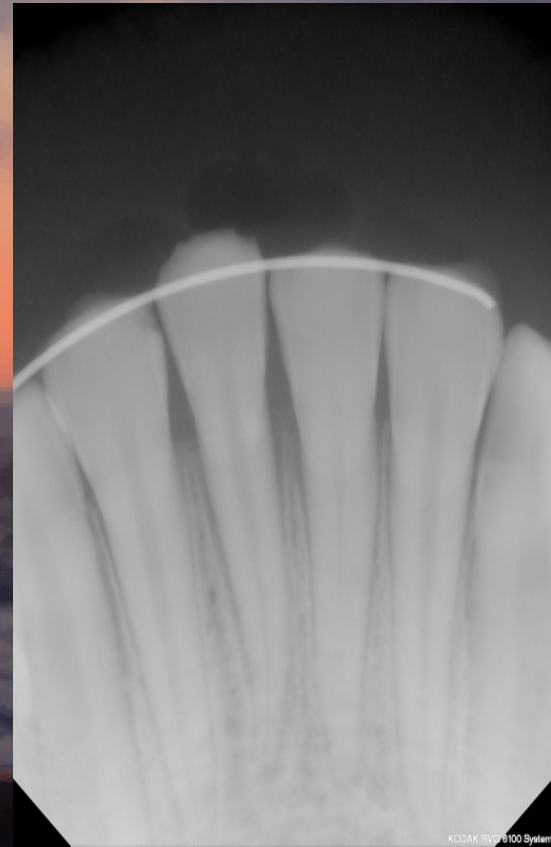
Case #15



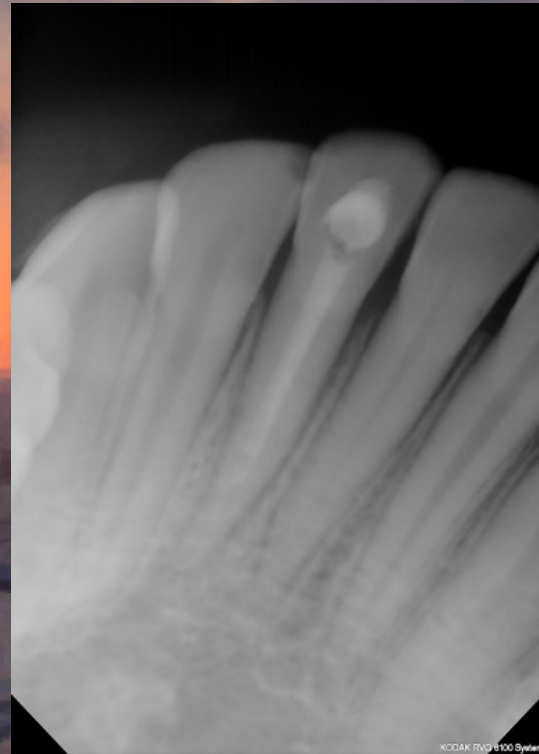
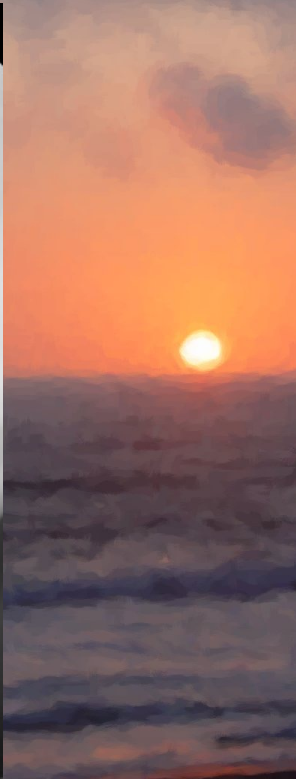
Case #15



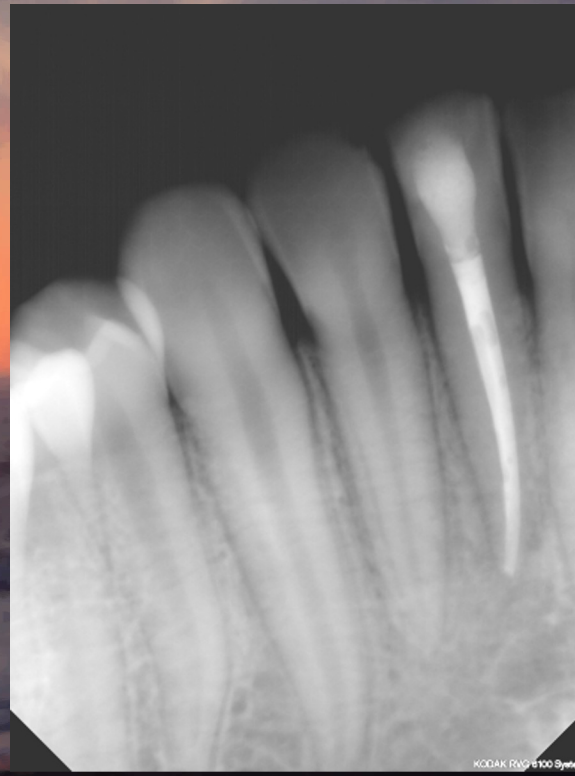
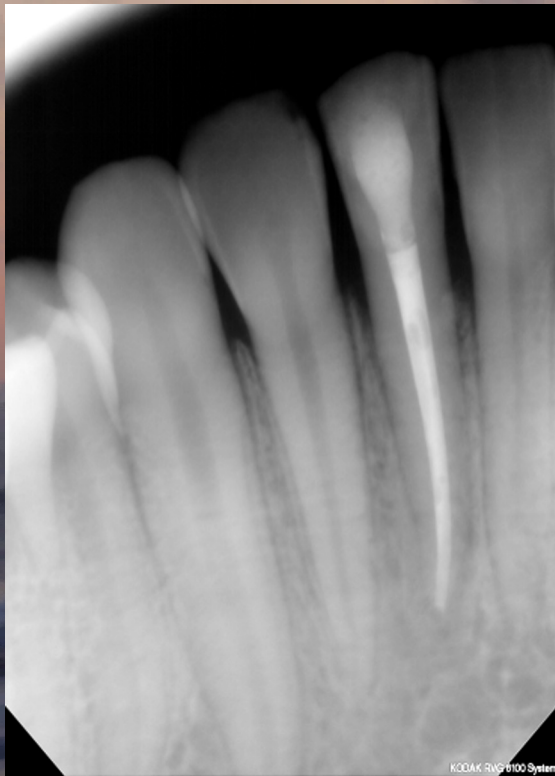
Case 15



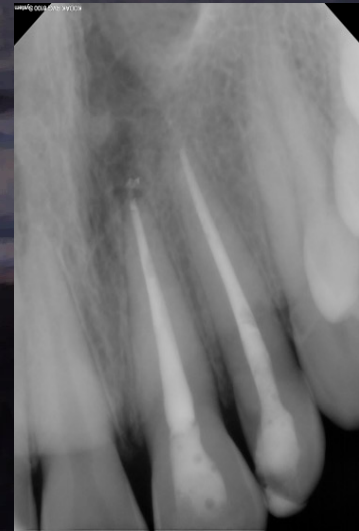
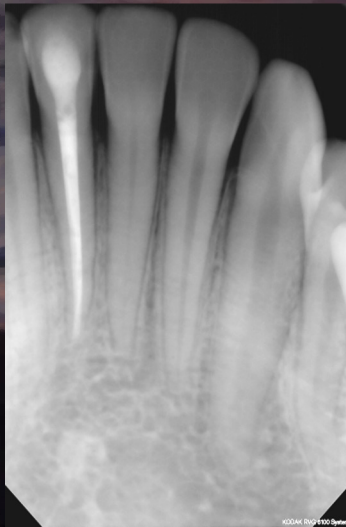
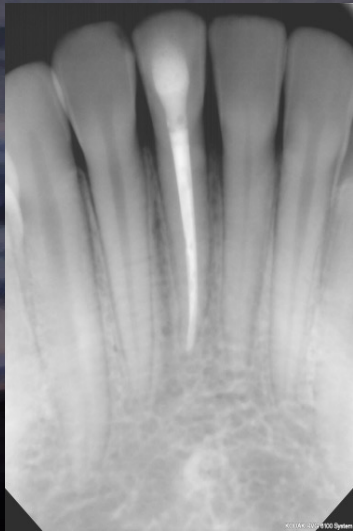
Case #15



Case #15



Case #15



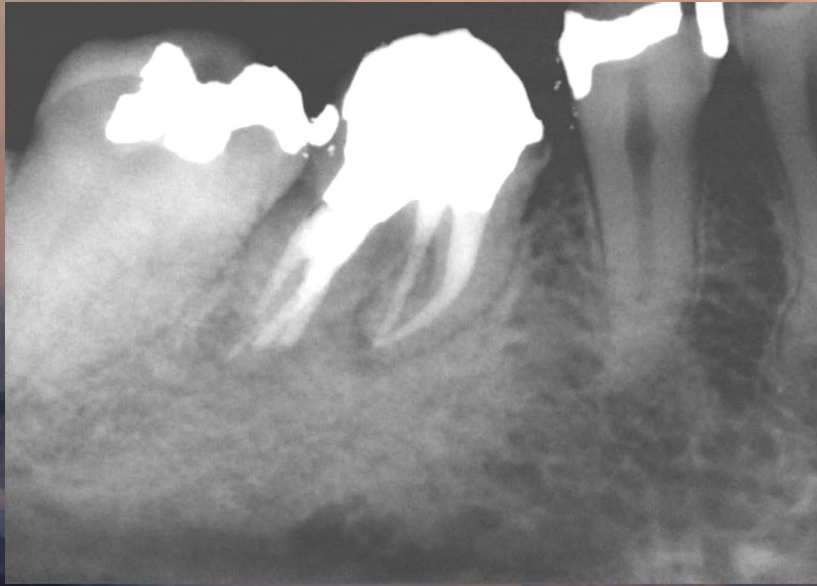
Case #16

High difficulty

- Previous access with complications (e.g., perforation, non-negotiated canal, ledge, separated instrument)
- Previous surgical or nonsurgical endodontic treatment completed



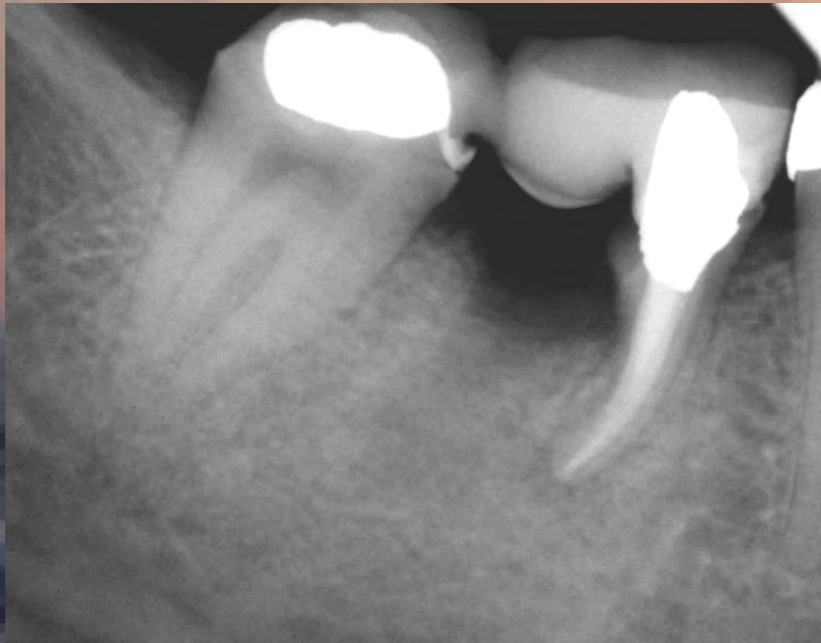
Case #16



Case #16



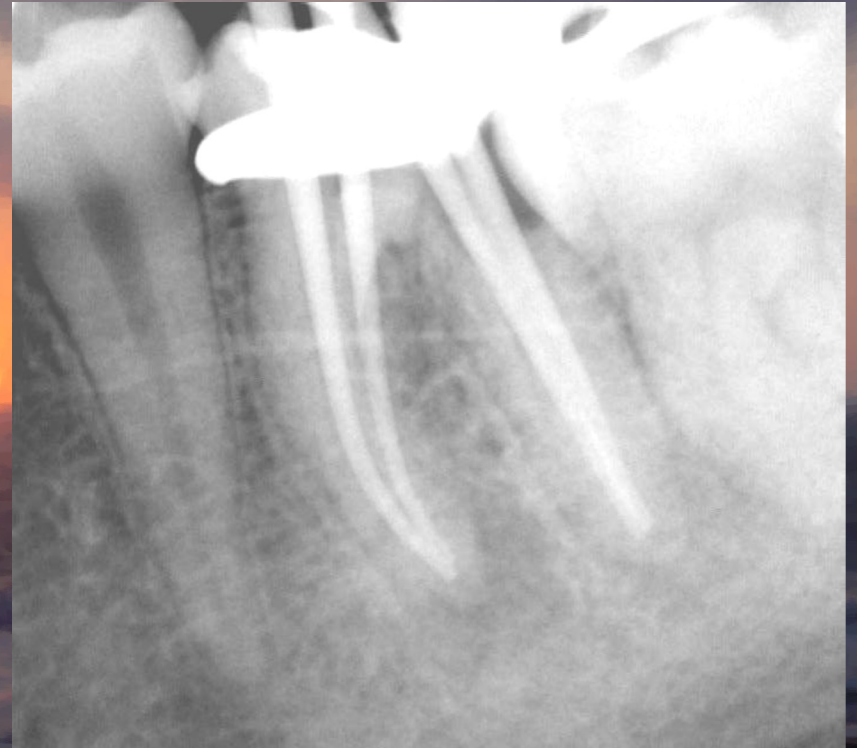
Case #16



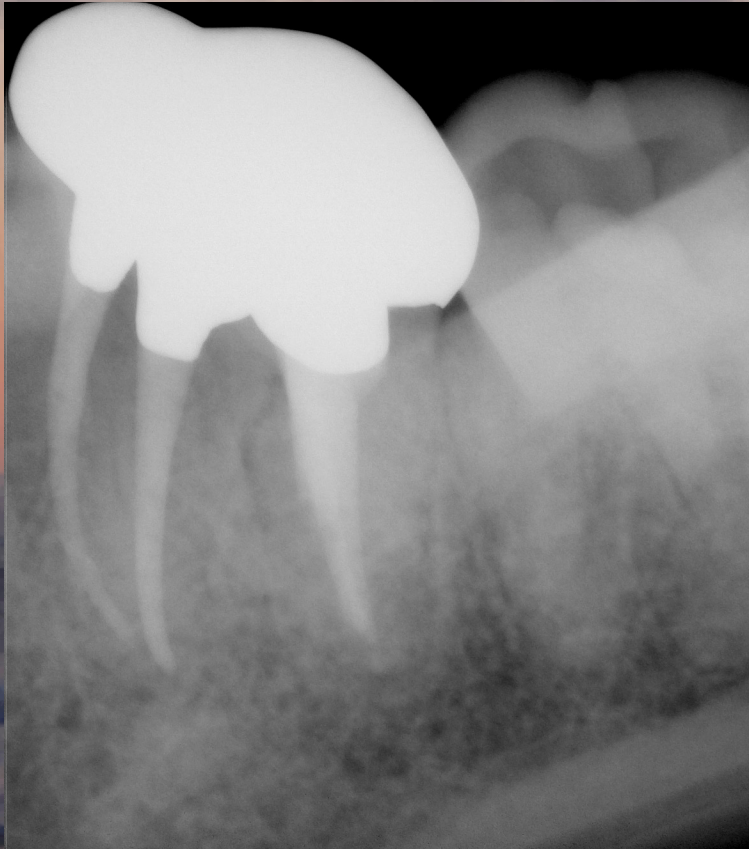
Case #17



Case #17



Case #17



Case #18

D1 (30/.09)
For coronal filling removal



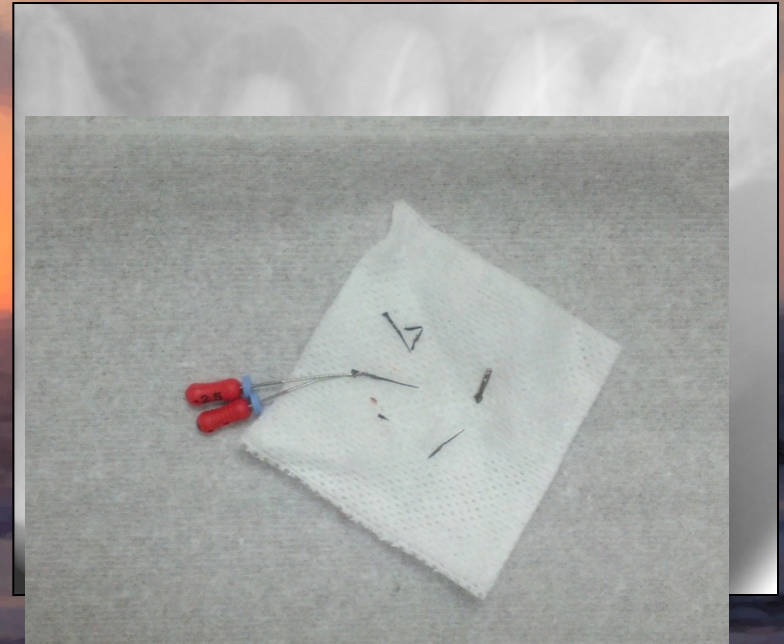
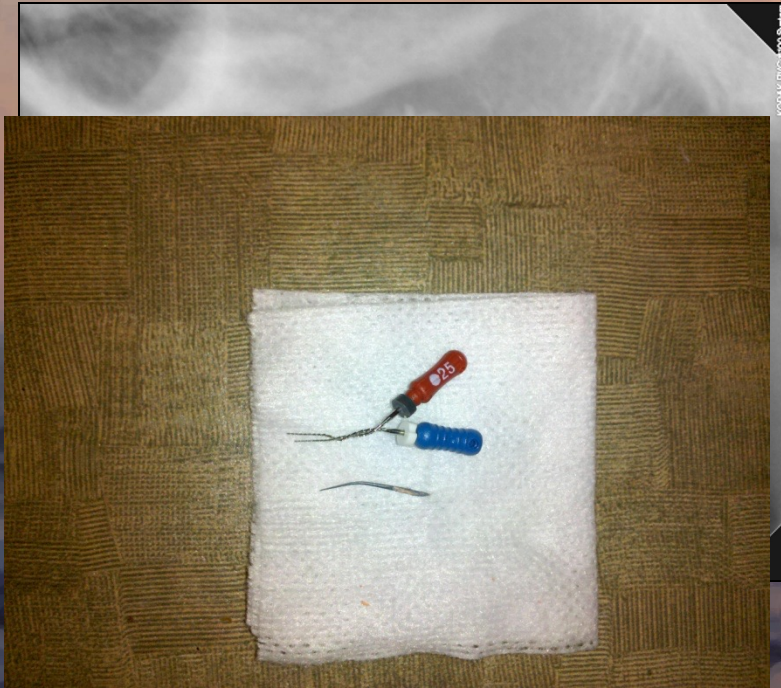
D2 (25/.08)
For mid-root filling removal



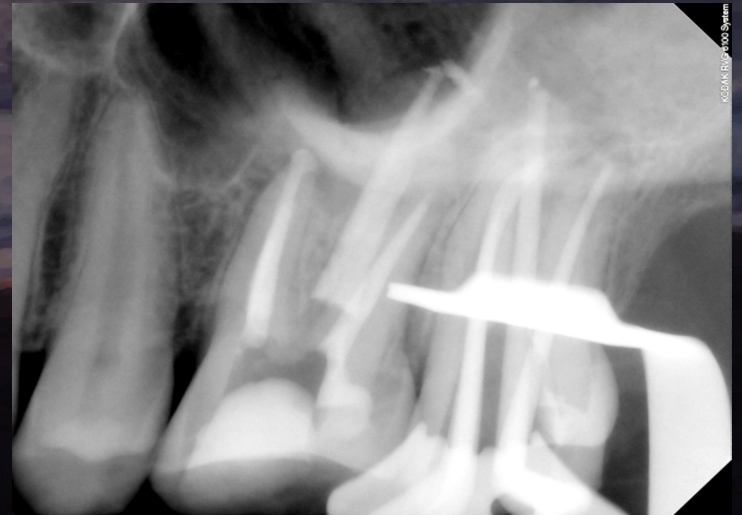
D3 (20/.07)
For apical filling removal



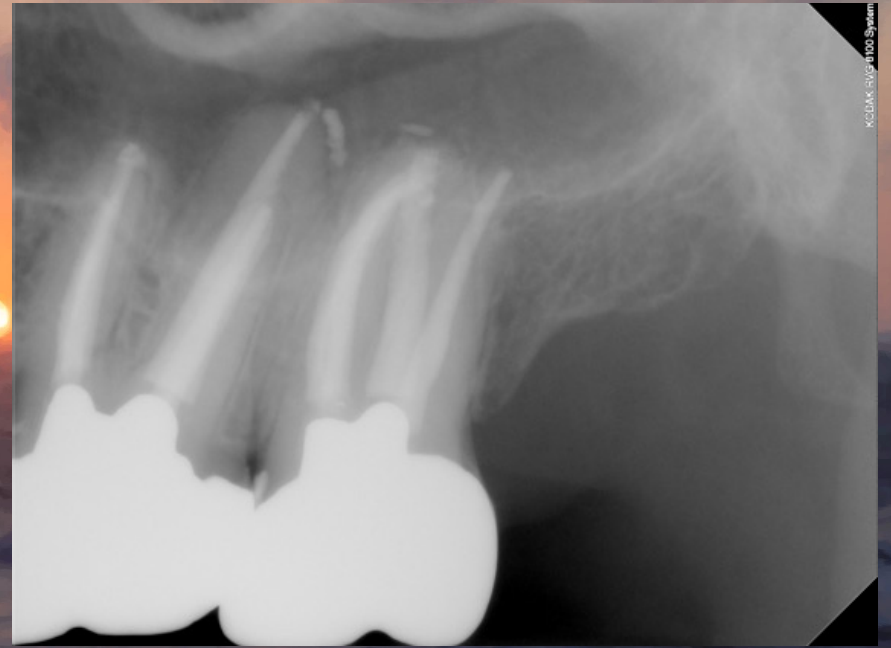
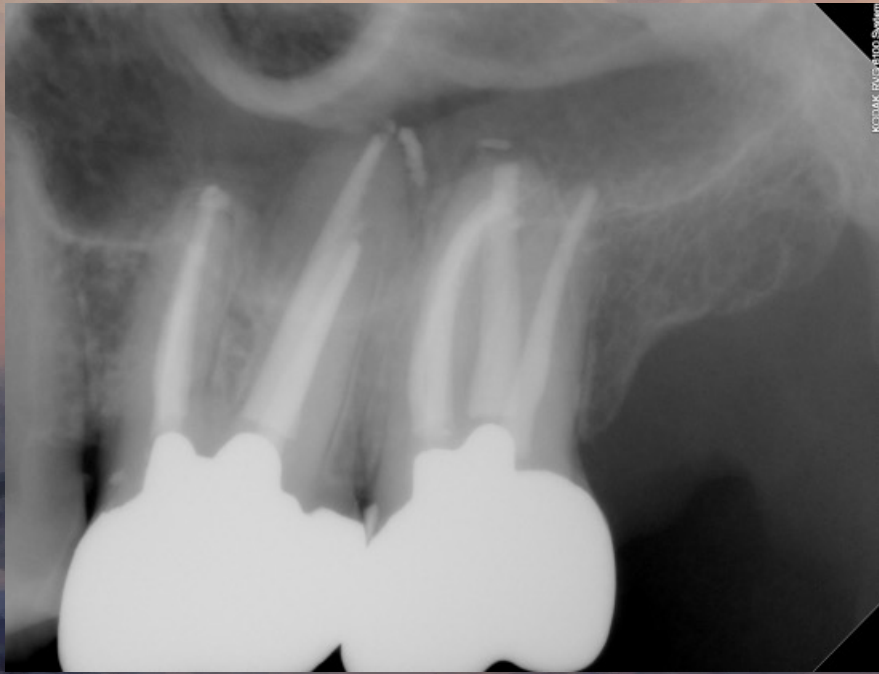
Case #18



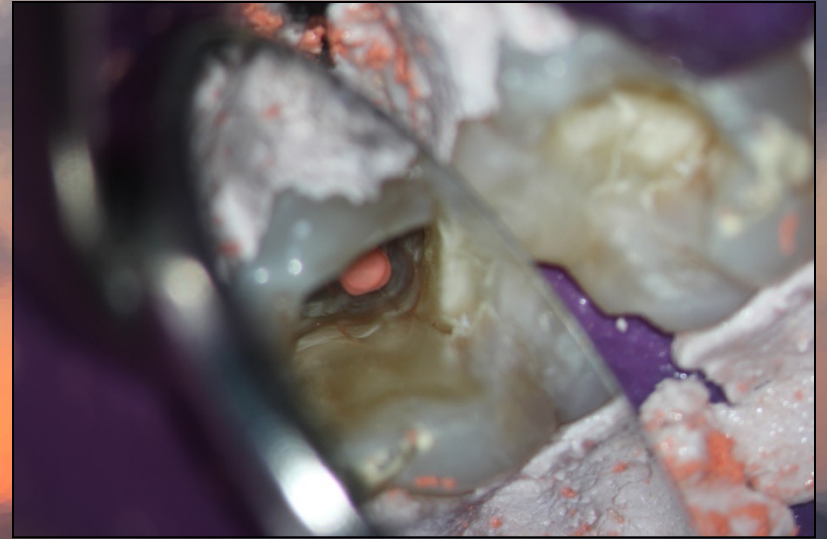
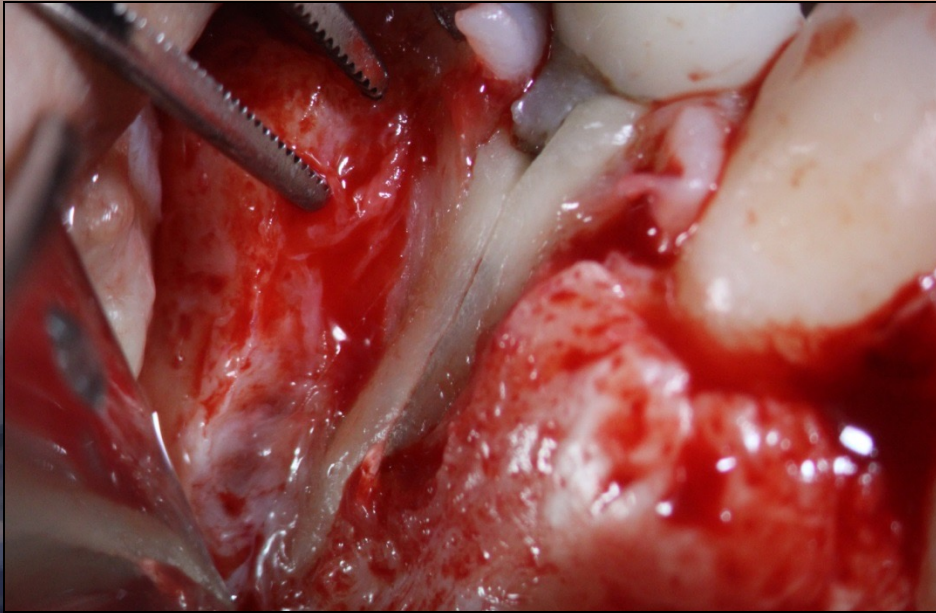
Case #18



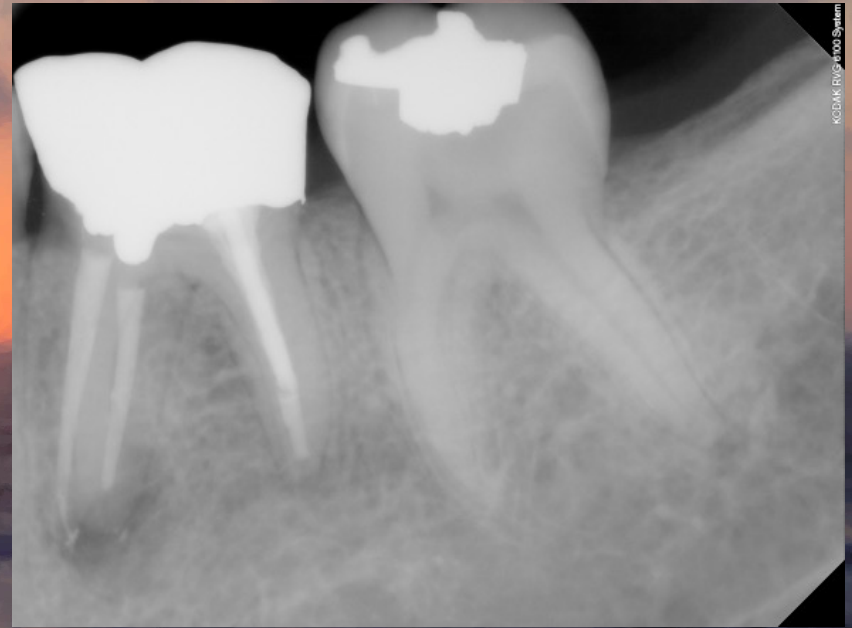
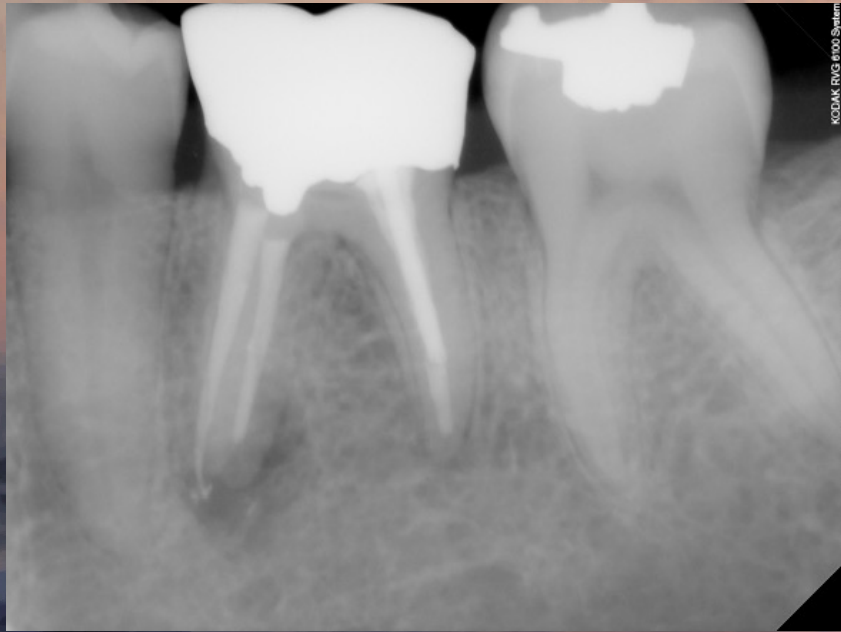
Case #18



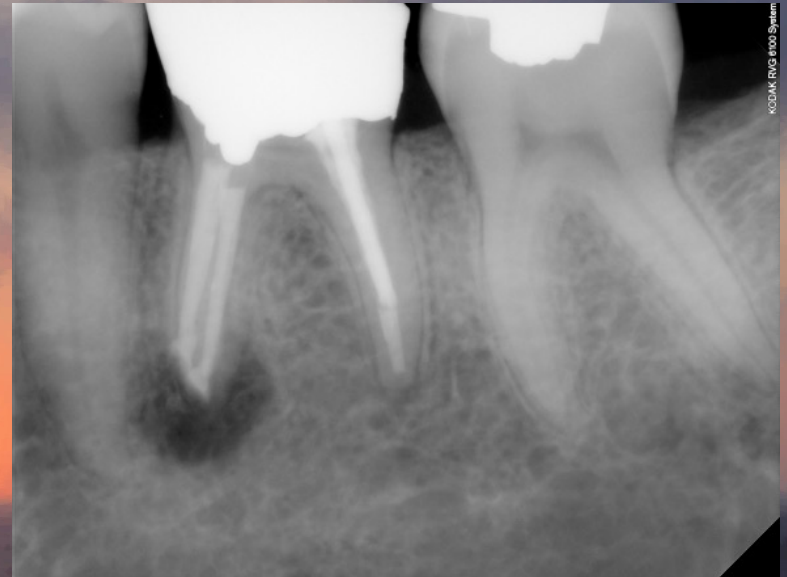
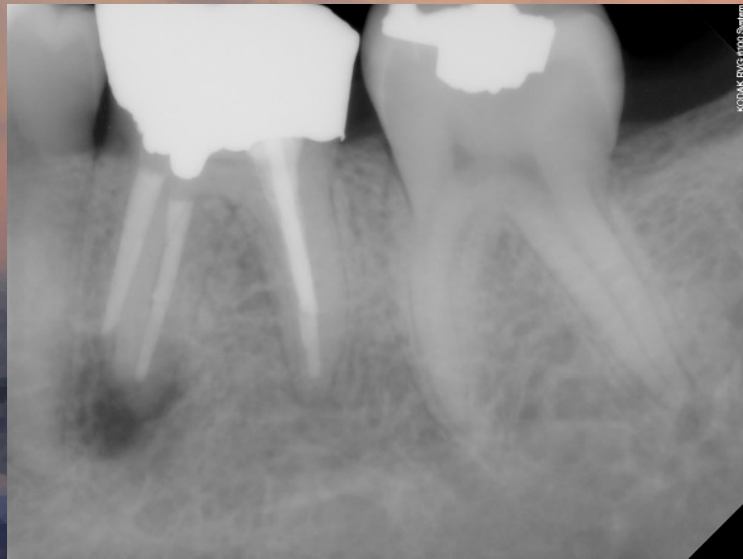
Perio/Endo?



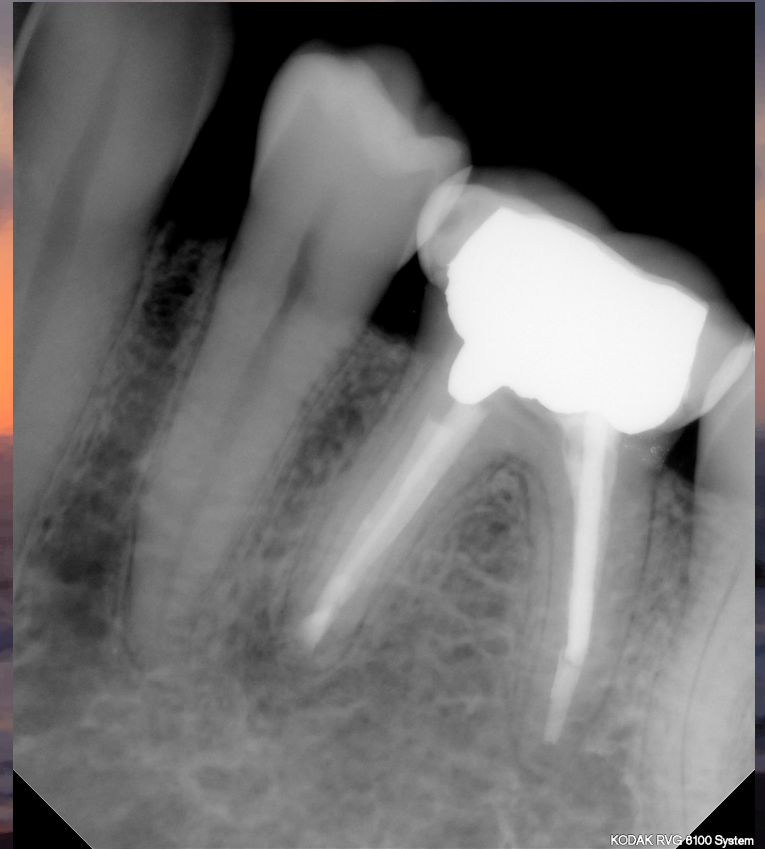
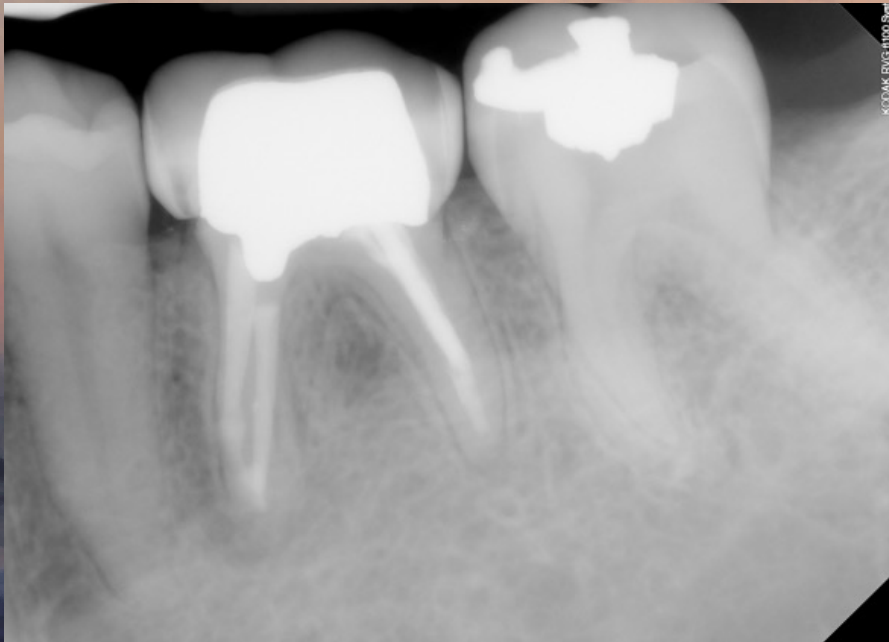
Case #19



Case #19



Case #19



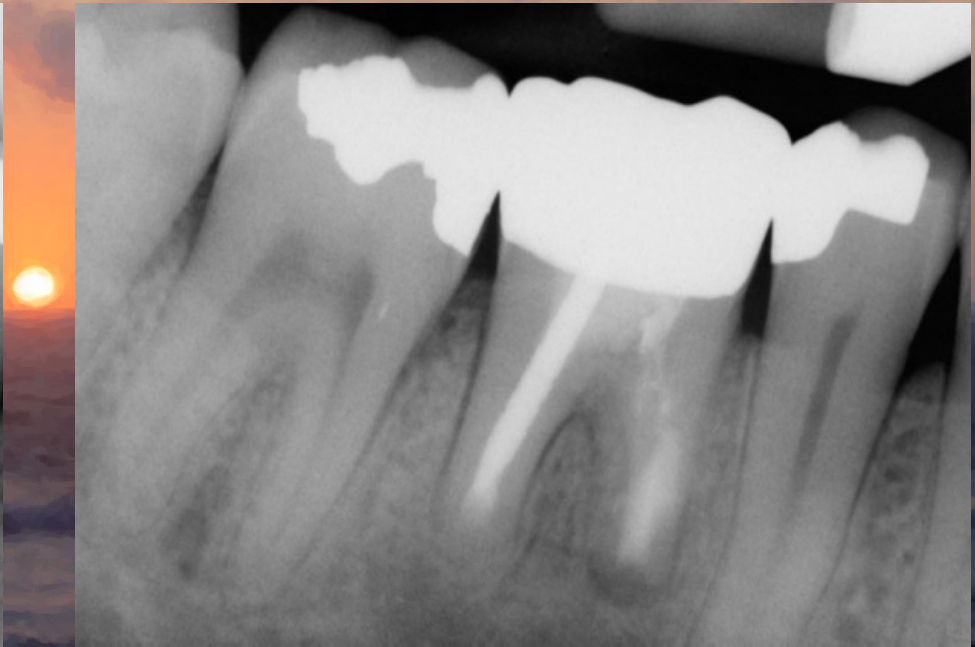
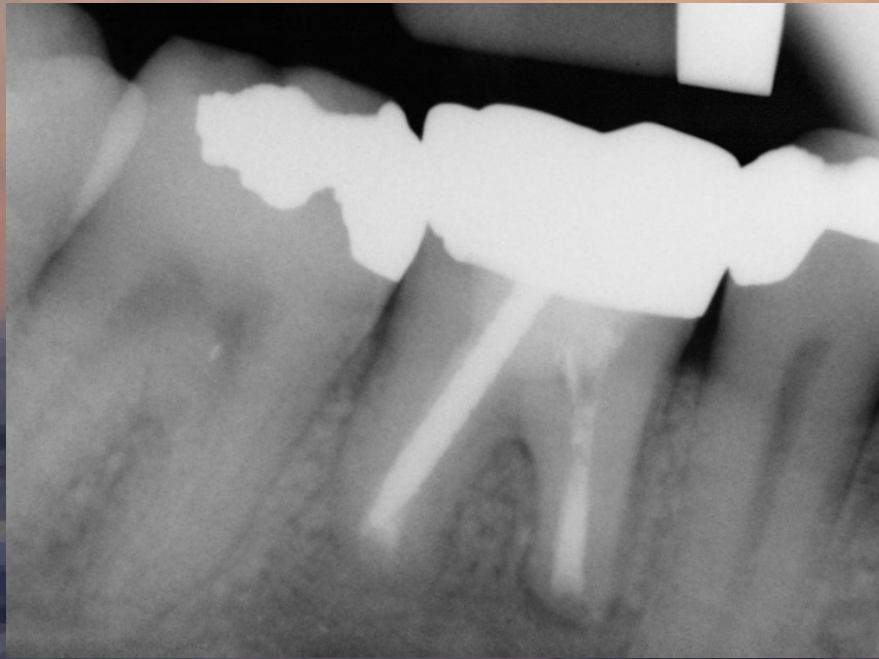
Case #20



Case #20

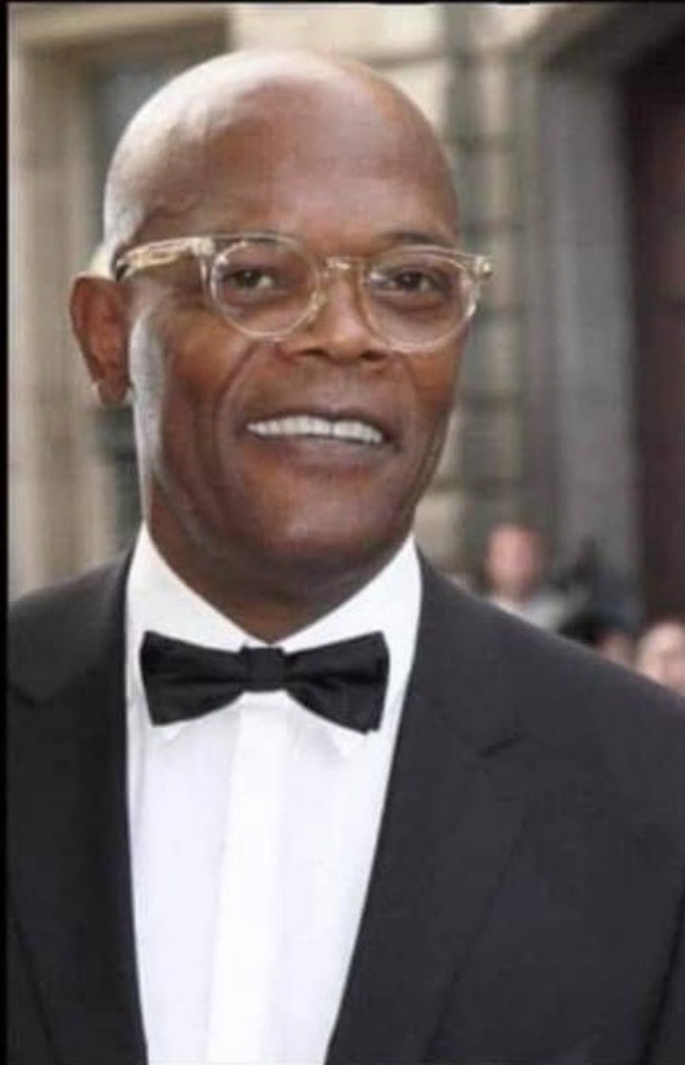


Case #20



ANNOUNCING
A BREEDING

RAISING
THE LITTER.



Thank You for your Time!

