

Endodontic Microsurgery Decision Making & Treatment Planning

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EVIDENCE BASED DENTISTRY



ADA Policy on Evidence-Based Dentistry

Evidence-based dentistry (EBD) is an approach to oral health care that requires the judicious integration of systematic assessments of clinically relevant scientific evidence, relating to the patient's oral and medical condition and history, with the dentist's clinical expertise and the patient's treatment needs and preferences.

EVIDENCE

OPERATOR

PATIENT

EVIDENCE BASED PRACTICE

EVIDENCE



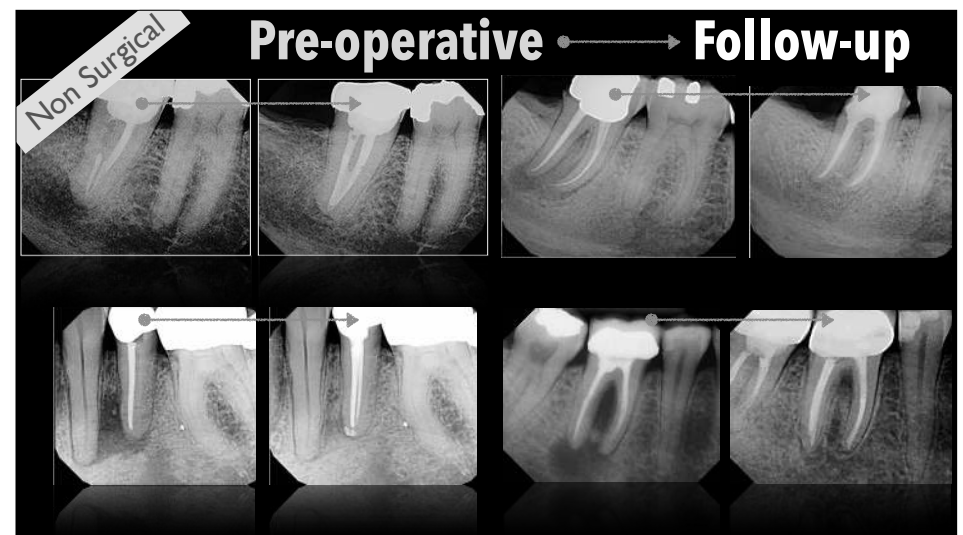
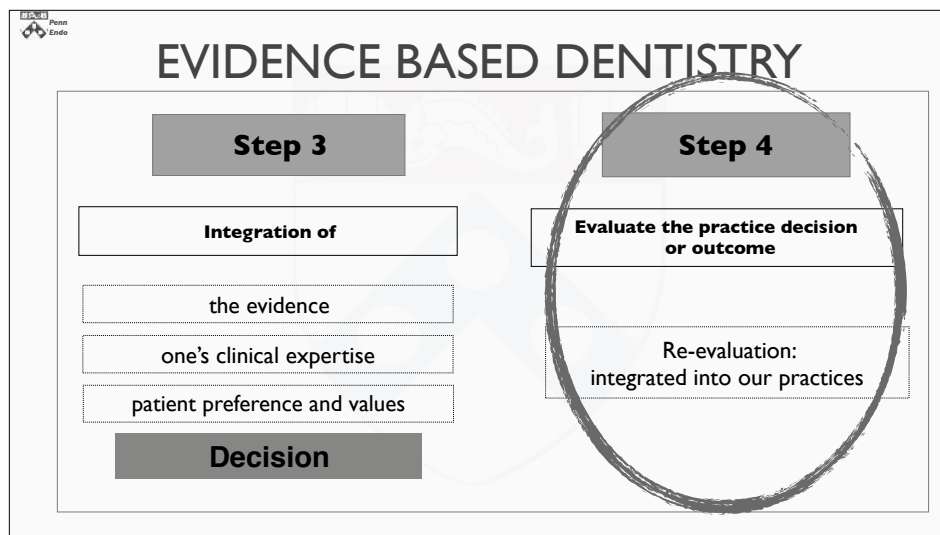
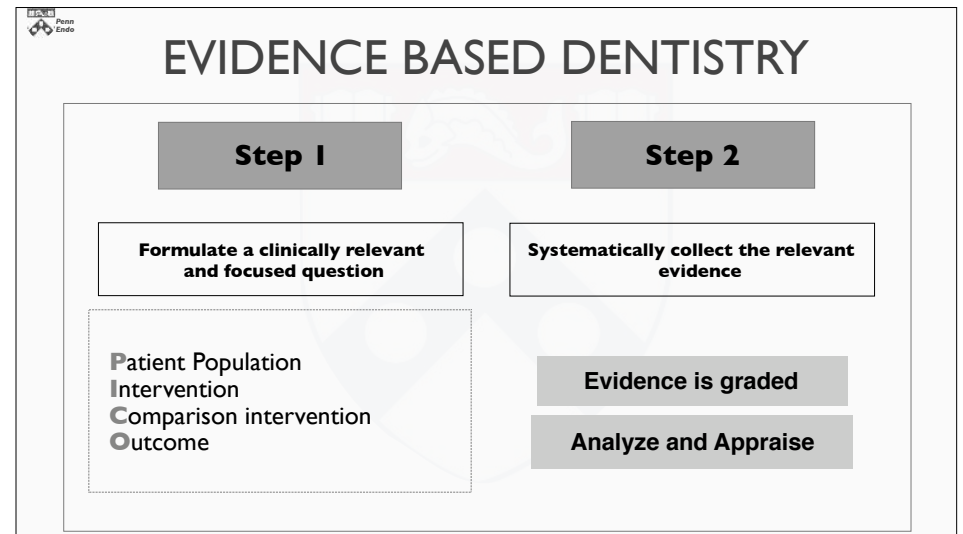
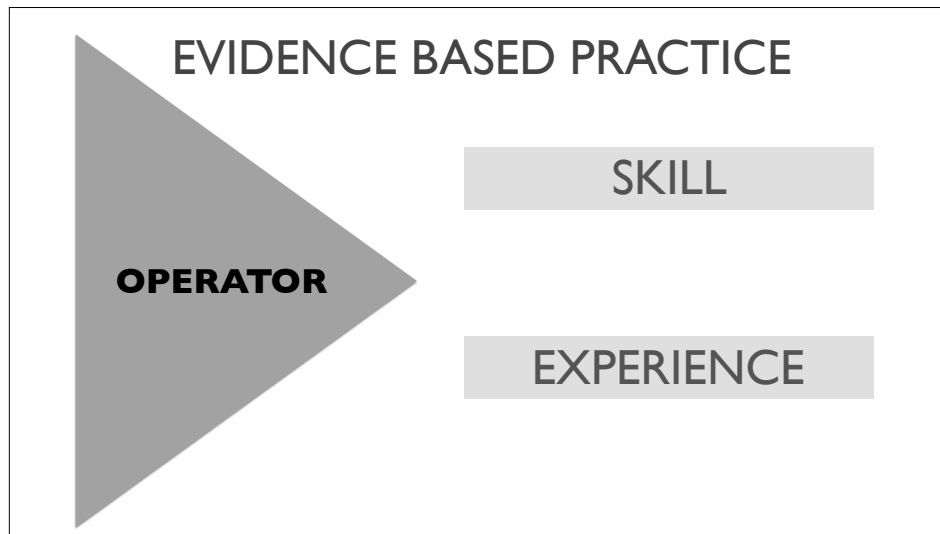
Non Surgical

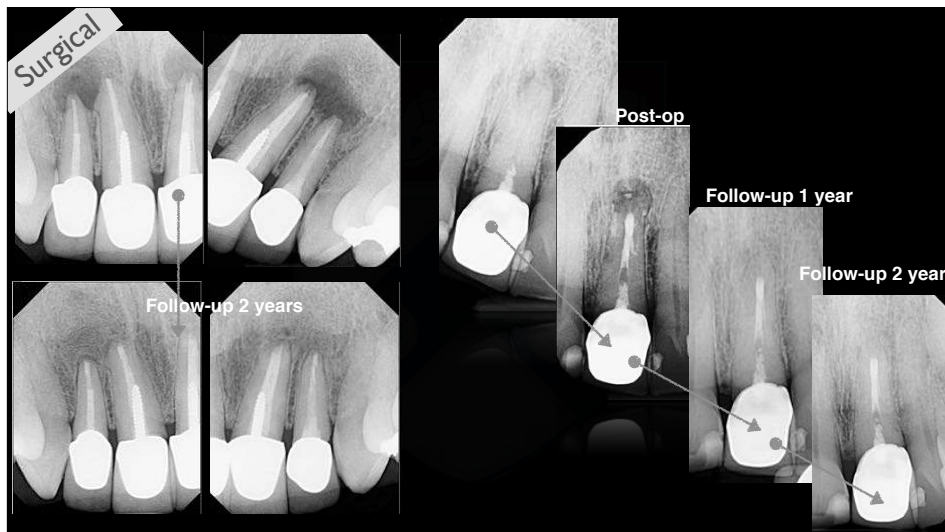
vs



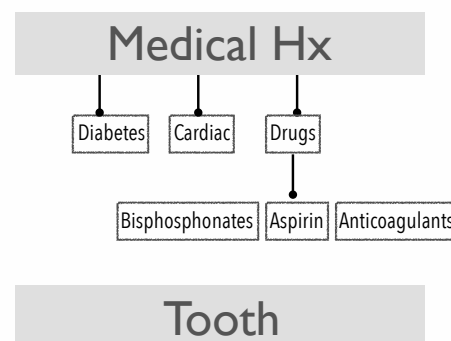
Surgical

EVIDENCE BASED PRACTICE





EVIDENCE BASED PRACTICE



Diabetes

- Well-controlled: fasting blood glucose between **70 mg/dL and 200 mg/dL**
- **HbA1C**: Average level of blood sugar over the previous 3 months
- poor control: **Greater than 7%**

Cardiac

	Maximum Dose (mg)	Carpules 1:50k Epinephrine
Healthy Patient	0.2	5.5
Cardiac Patient	<0.2 0.04	<5.5 1

Absolute Contraindications:

- Hyperthyroidism
- Pheochromocytoma
- high blood pressure >200/115 mmHg
- cardiac dysrhythmias
- unstable angina
- < 6mos myocardial infarction/ cerebrovascular accident/ cardiovascular disease

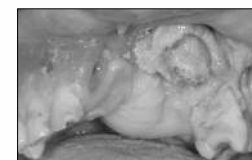
PATIENT

Drugs

Bisphosphonates

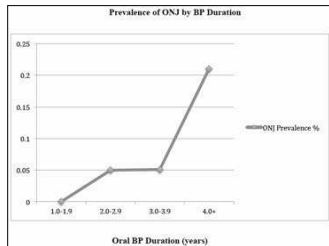
BRONJ - Bisphosphonates related Osteonecrosis of the jaw

MRONJ - **Medication** related Osteonecrosis of the jaw



BisPhosphonates
Anti-resorptive drugs
Anti-angiogenic drugs

PATIENT



Medication-Related Osteonecrosis of the Jaw—2014 Update

PATIENT

- Low risk: < 4 years oral BP with no clinical risk factors
- Medium risk < 4 years oral BP with corticosteroids/antiangiogenic medication
- Medium risk > 4years
 - Drug holiday 2 months prior and 3 months following

Medication-Related Osteonecrosis of the Jaw—2014 Update



- High risk - IV Drugs

Refer to an Endodontist

"Nonsurgical endodontic treatment should be favored"

CHX 1 minute rinse

Necrotic pulp - single-dose amoxicillin prophylaxis (*Actinomyces* common in BRONJ)

Avoid anesthesia with vasoconstrictors, patency, overfill and overextension of filling material,

Use wedges instead of rubber dam clamp on bone



Moinzadeh et al, IEJ 2012
Smith et al, 2005

PATIENT

Drugs Aspirin Anticoagulants

DOES LOW-DOSE ASPIRIN THERAPY COMPLICATE ORAL SURGICAL PROCEDURES?

LEON ARDEKIAN, D.D.S., RONEN GASPAR, D.M.D., MICHA PELED, M.D., D.M.D., BENJAMIN BRENER, M.D., DOV LAUFER, D.M.D.

Aspirin - Anti platelet effect.
Platelet life span is 10 days.
5 - 7 days cessation

"Dental extractions even the more complex procedures did not result in uncontrolled intraoperative or postoperative hemorrhage in patients receiving low-dose aspirin therapy on a long-term basis"

Normal INR 1

Therapeutic INR with anticoagulants can be as high as 3.5

Surgical INR 1.5

Heparine (6-12hrs) Warfarin (5 days)

PATIENT

EVIDENCE BASED PRACTICE

Tooth

PATIENT

Prognosis of initial endodontic therapy

SHIMON FRIEDMAN

Success ≠ survival

strict

loose

	Case observed	Follow up years	Healed	Healing	Functional	
Grossman et al. 1964	98	1-5	62	25	86	*asymptomatic, lesion size unchanged or reduced
Storms 1969	102	1	81		93	
Adenubi & Rule 1976	271	0.5-7	82	8	90	
Jokinen et al. 1978	2459	2-7	38	20	58	
Barbakow et al. 1981	124	1-9	59	29	88	
Bystrom et al. 1987	79					
Eriksen et al. 1988	121					
Murphy et al. 1991	89					
Friedman et al. 1995	113					
Caliskan & Sen 1996	172	2-5	81	8	89	
Orstavik 1996	126	4	75	13	88	
Weiger et al. 2000	67	1-5	78	16	94	
Abitbol 2001	72	4-6	74	4	96	
Peters & Wesselink	38	1-4.5	76	21	97	

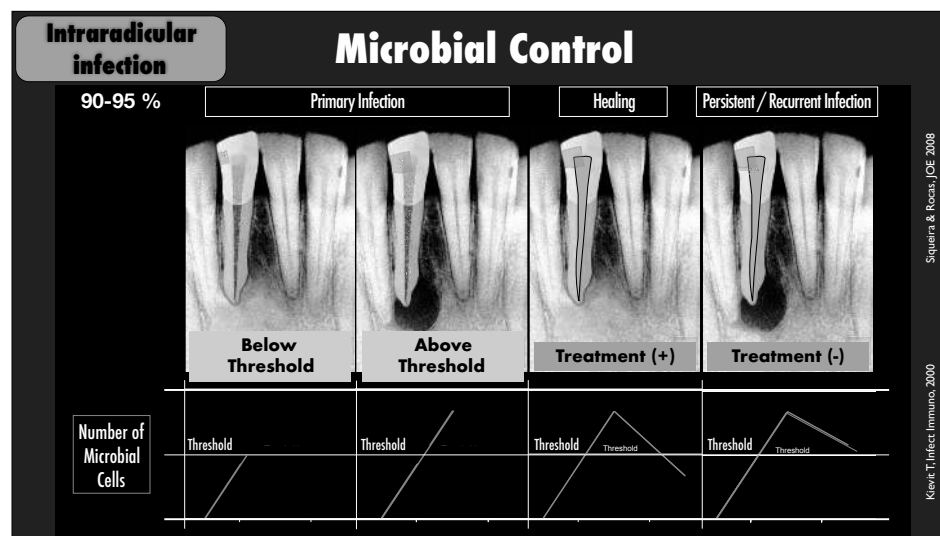
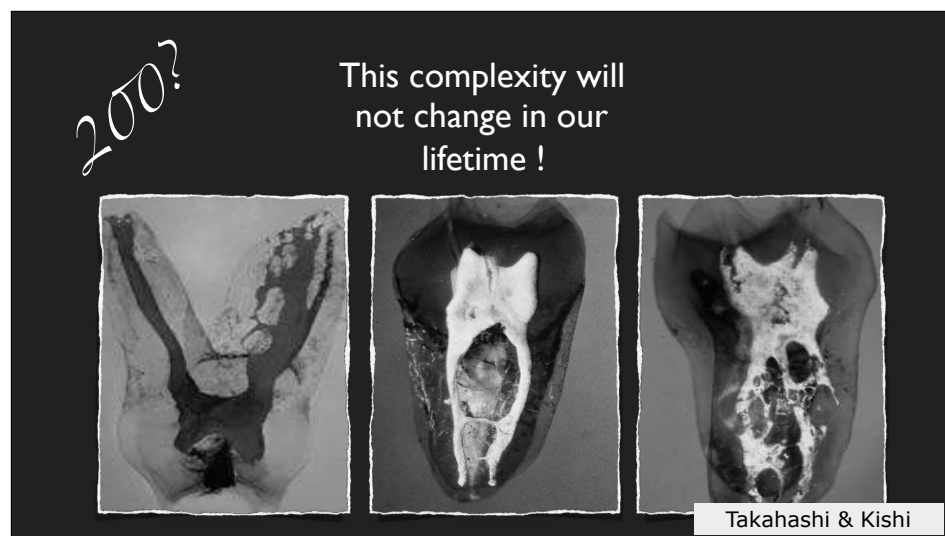
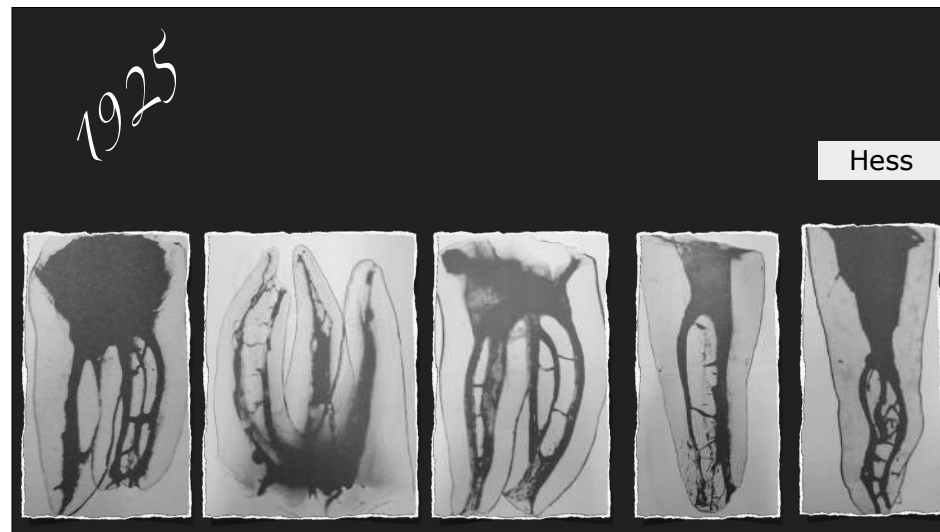
97% (1,126,288 / 1,462,936) of the teeth were retained in the oral cavity 8 years after initial non-surgical root canal treatment.

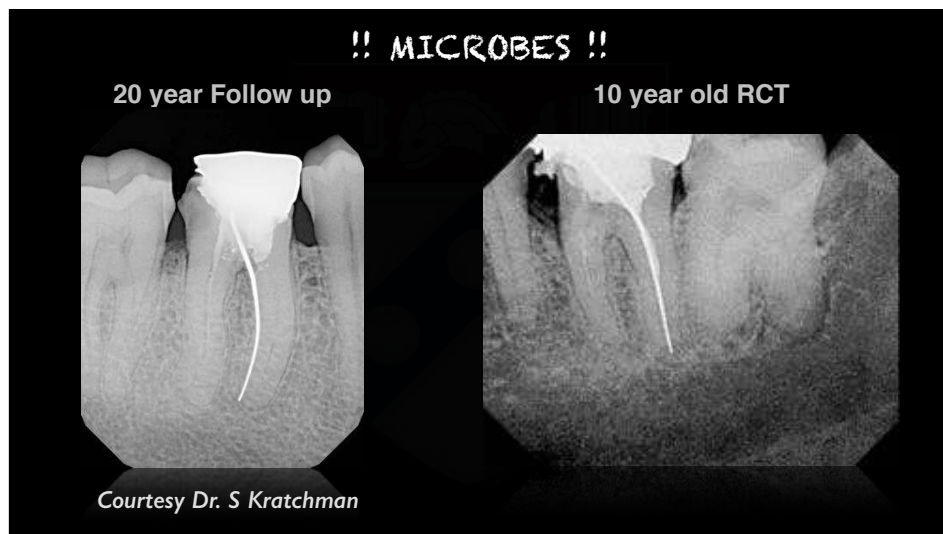
— Salehrabi & Rotstein 2004 J Endod

... to name a few

Friedman 2002 Endodontic Topics

Courtesy Dr. Stephanie Chen





Apical periodontitis is an **inflammatory lesion** caused mostly by **bacterial elements** derived from the infected root canal system

Intraradicular infection - 90-95%

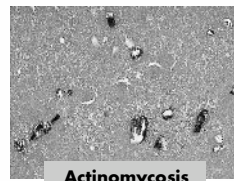
Cyst - 5%

Extraradicular infection - 2-5%

Foreign body reaction - very few

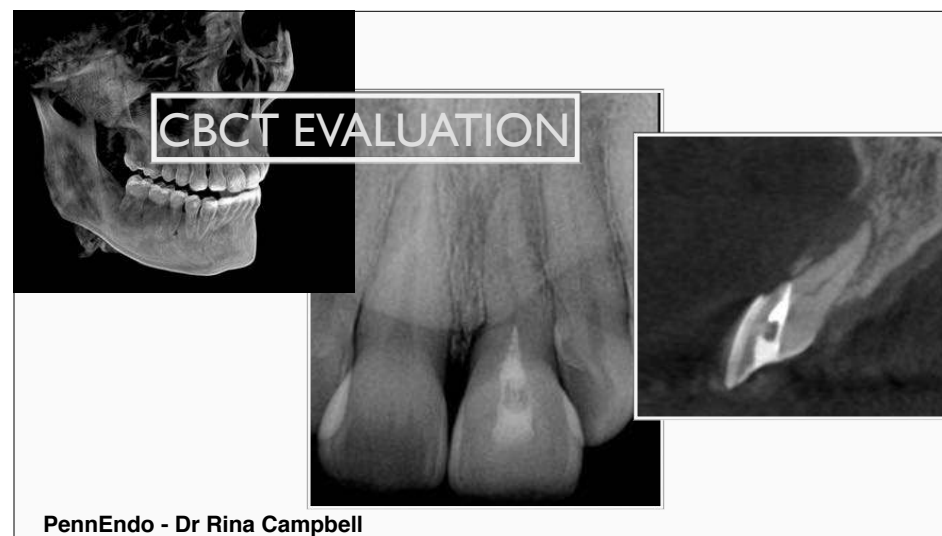
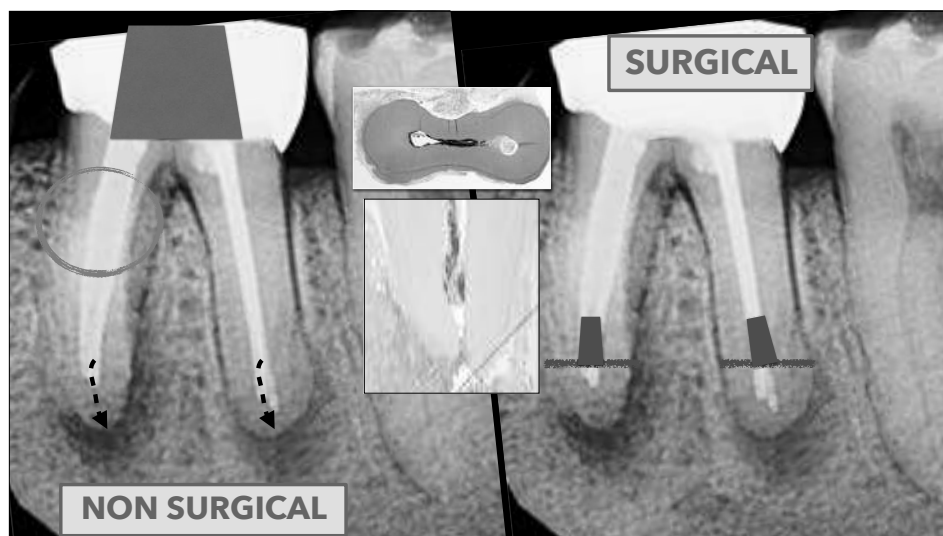
Apical Periodontitis	
Abscess	12%
Granuloma	73%
True Cyst	9%
Pocket Cyst	6%

Nair PNR, Periodontol 2000, 1997



Actinomycosis

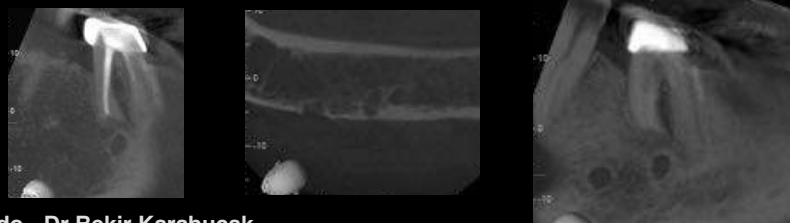
Propionibacterium propionica



CBCT EVALUATION



Paresthesia: Surg in UK



PennEndo - Dr Bekir Karabucak

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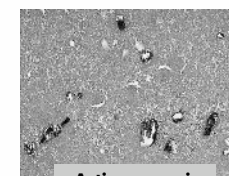
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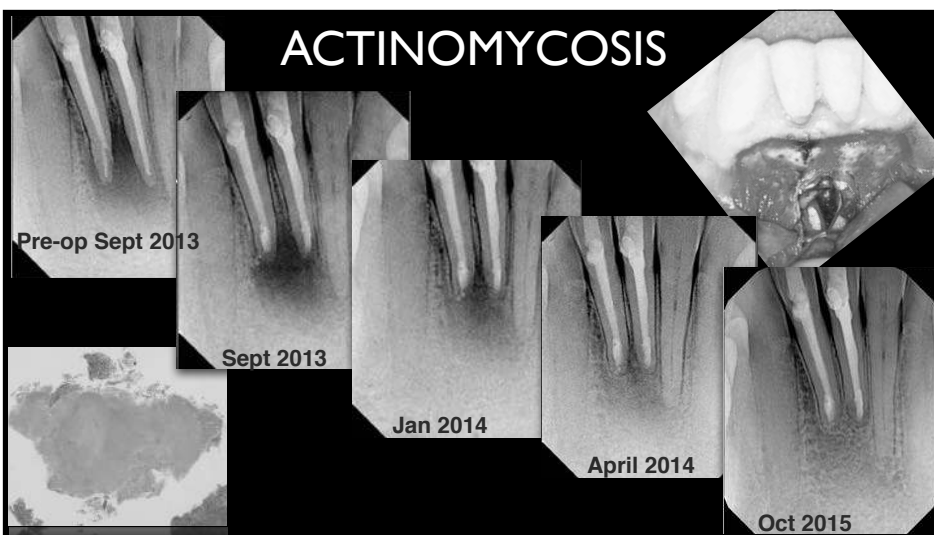
Nair PNR, Periodontol 2000, 1997



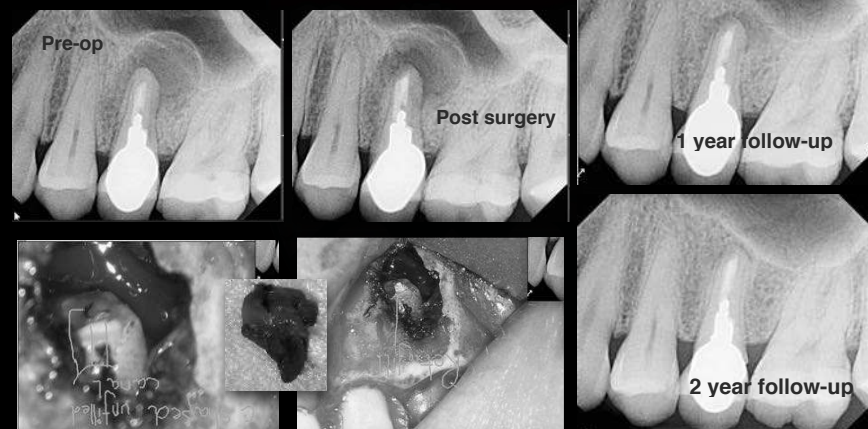
Actinomyces

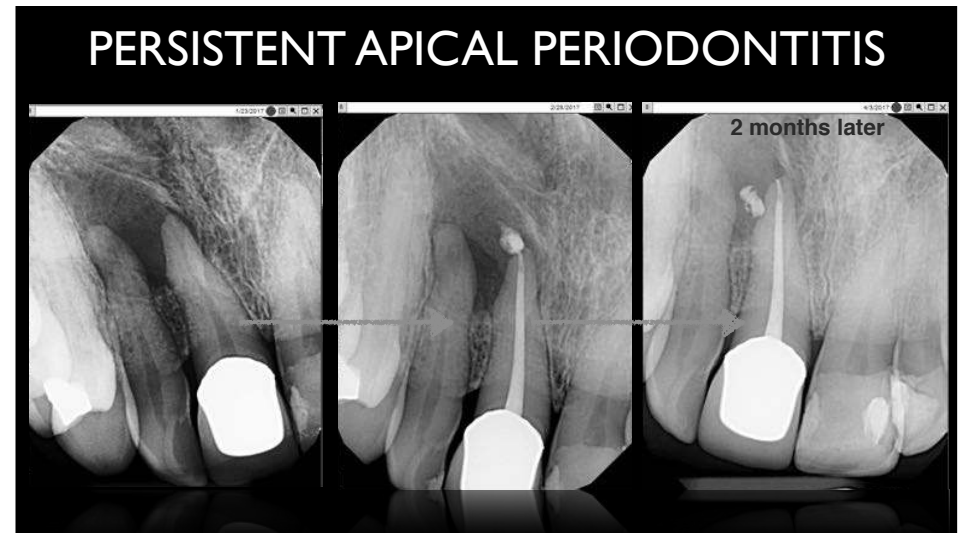
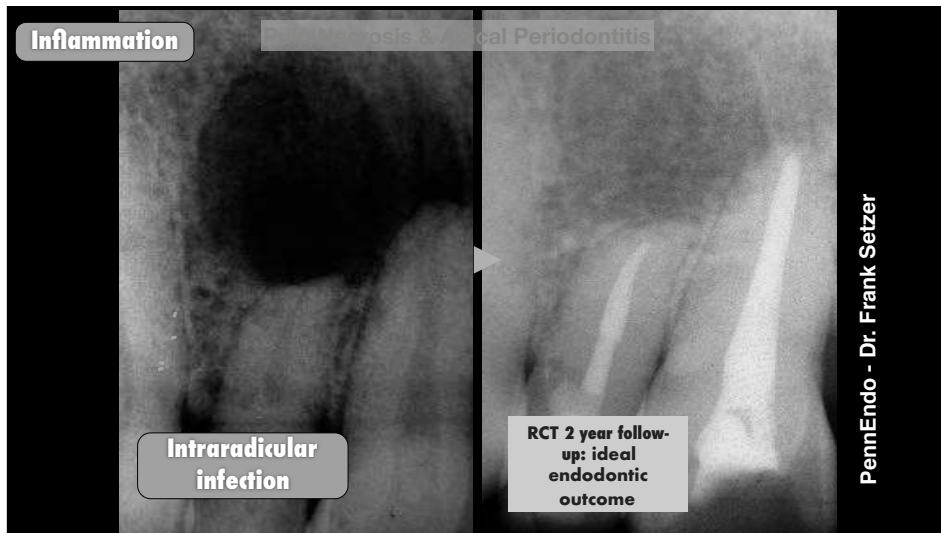
Propionibacterium propionica

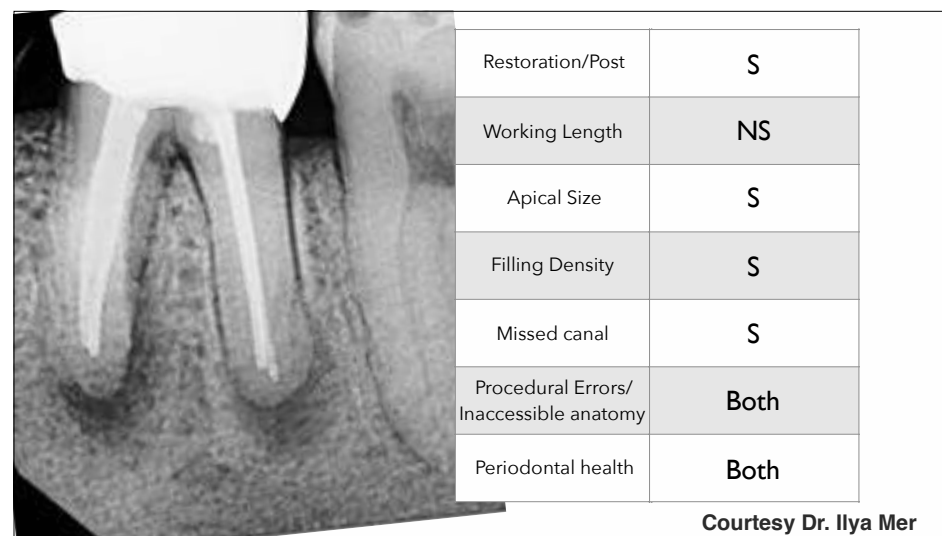
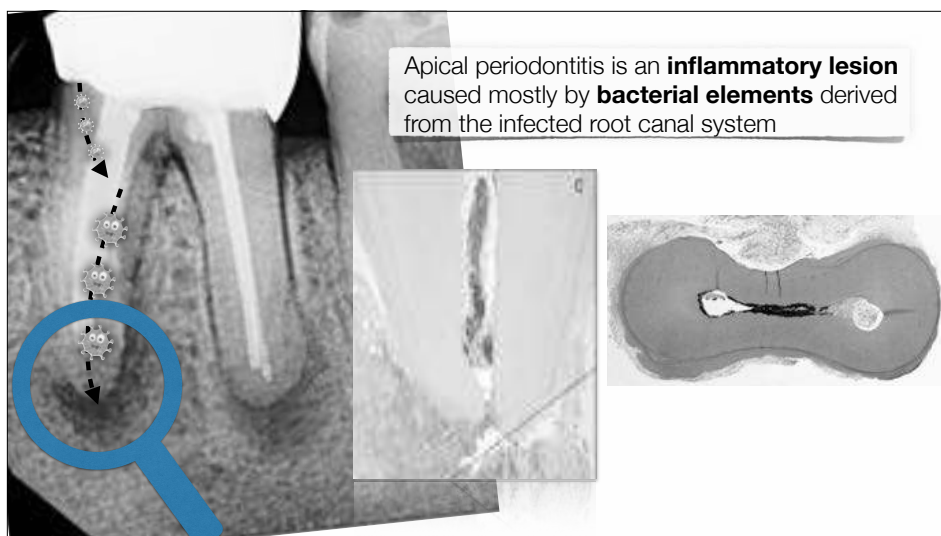
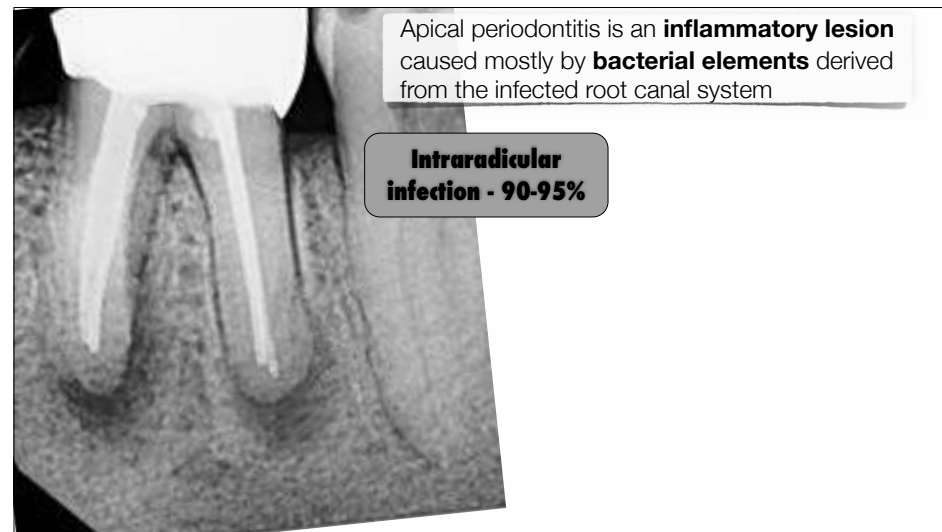
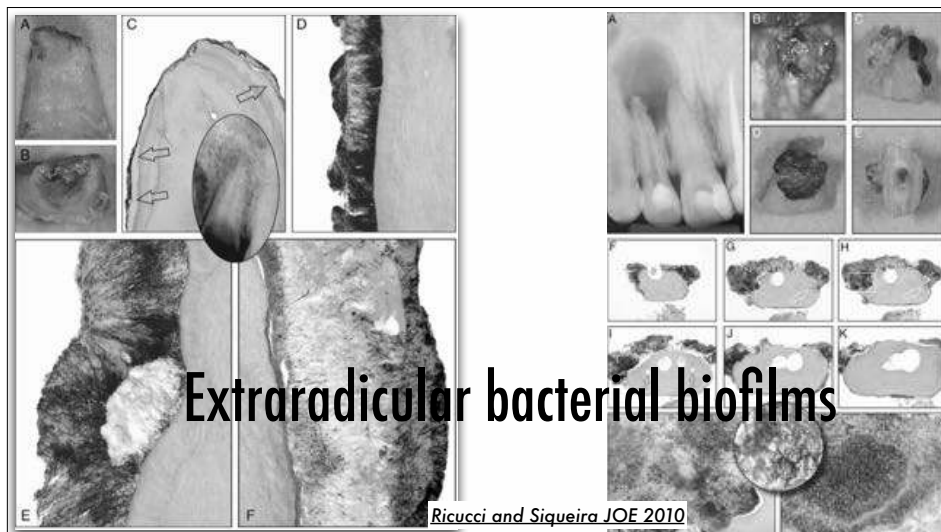
ACTINOMYCOSIS



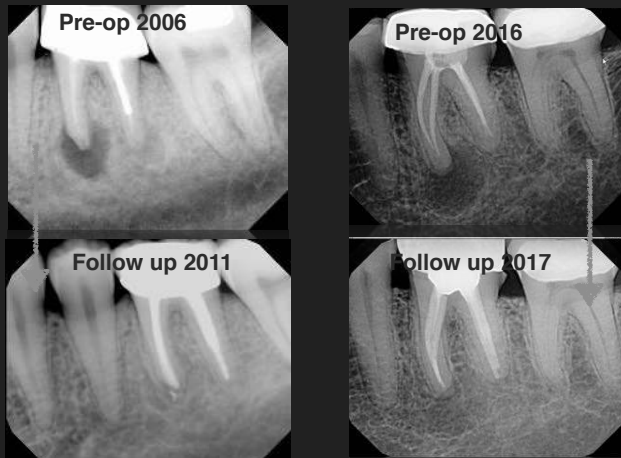
HISTOLOGICAL DX - CYST







DEFICIENT CROWN



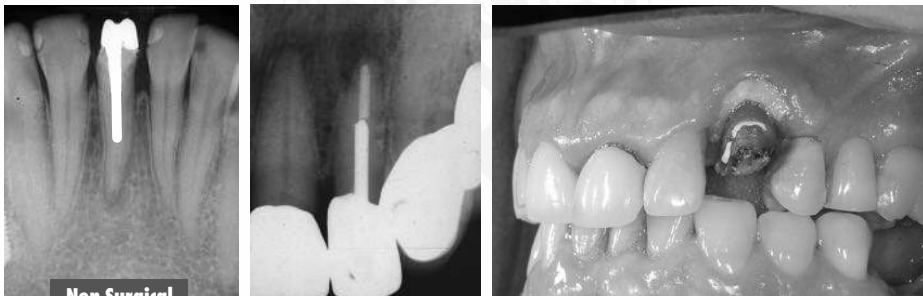
ADEQUATE RESTORATION



Post Removal - Ultrasonics

Photoshop

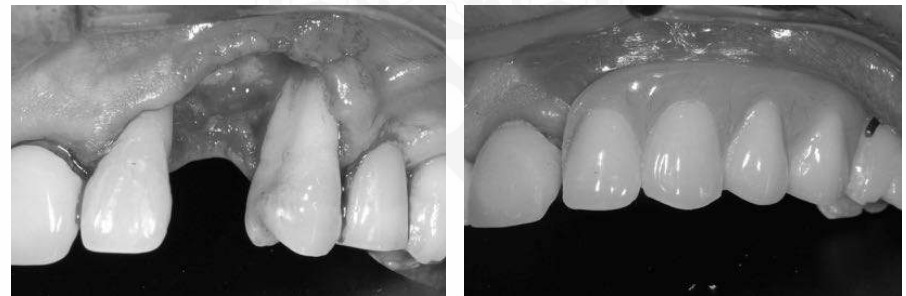
Reality




Non-Surgical
Retreatment?

Post Removal - Ultrasonics

Reality







Restoration/Post	S
Working Length	NS
Apical Size	S
Filling Density	S
Missed canal	S
Procedural Errors/ Inaccessible anatomy	Both
Periodontal health	Both

Courtesy Dr. Ilya Mer

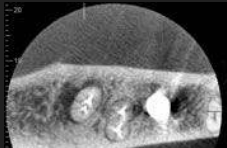





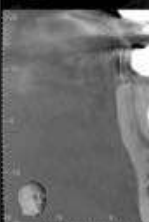

CASE EVALUATION



Restoration/Post
Working Length
Apical Size
Filling Density
Missed canal
Procedural Errors/ Inaccessible anatomy
Periodontal health



CBCT EVALUATION











TREATMENT DECISION

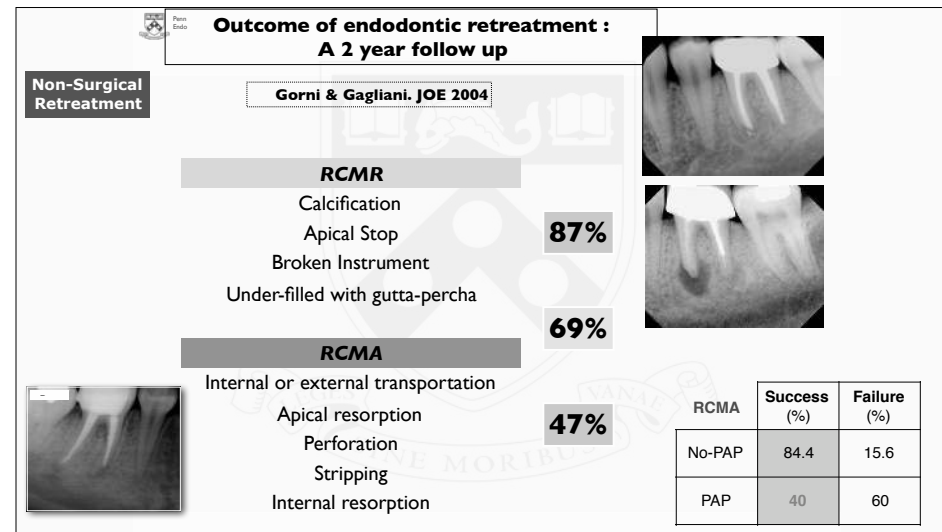






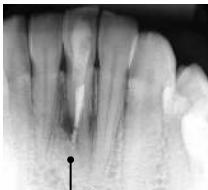
	Restoration/Post	S
	Working Length	NS
	Apical Size	S
	Filling Density	S
	Missed canal	S
	Procedural Errors/ Inaccessible anatomy	Both
	Periodontal health	Both

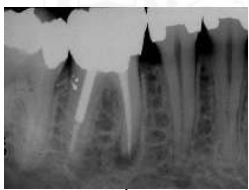
Courtesy Dr. Ilya Mer





Accessibility of Root Canal System for Non-Surgical Retreatment

Type of Restoration

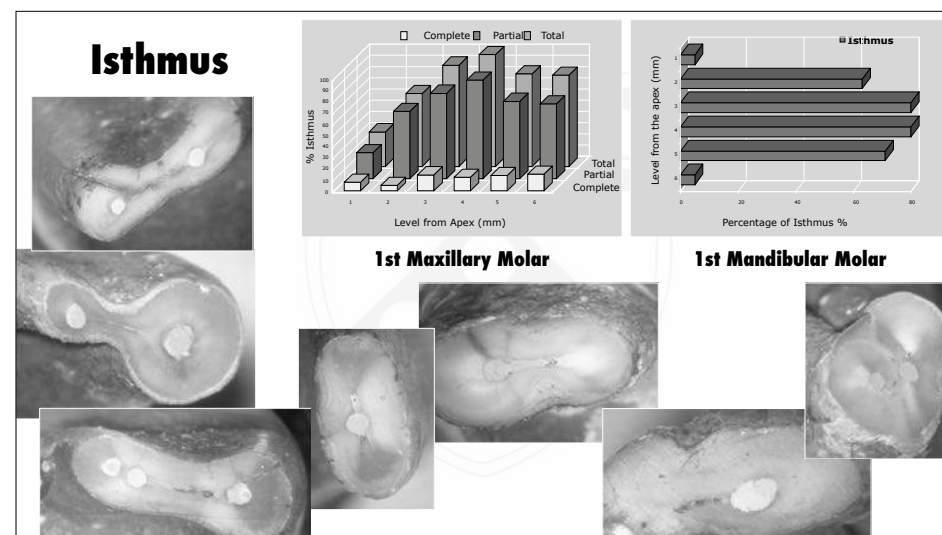
 **Perforation**

 **Transportation**

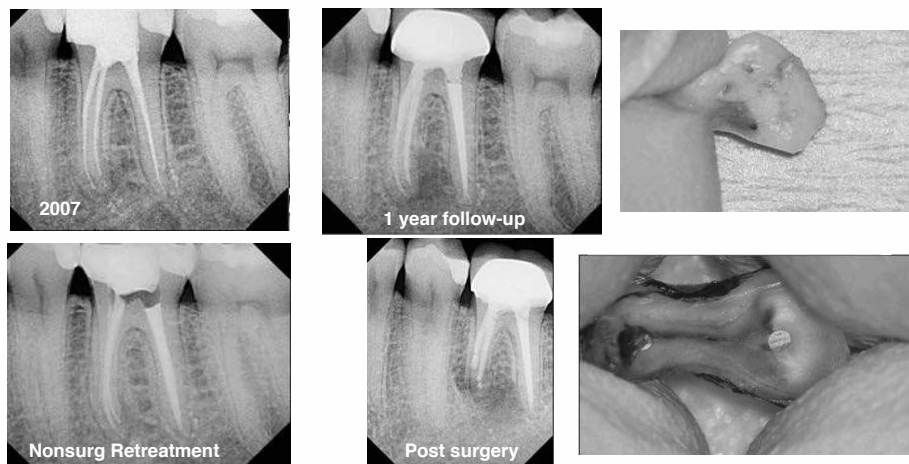
 **Large Post**

 **Weakened Root Structure**

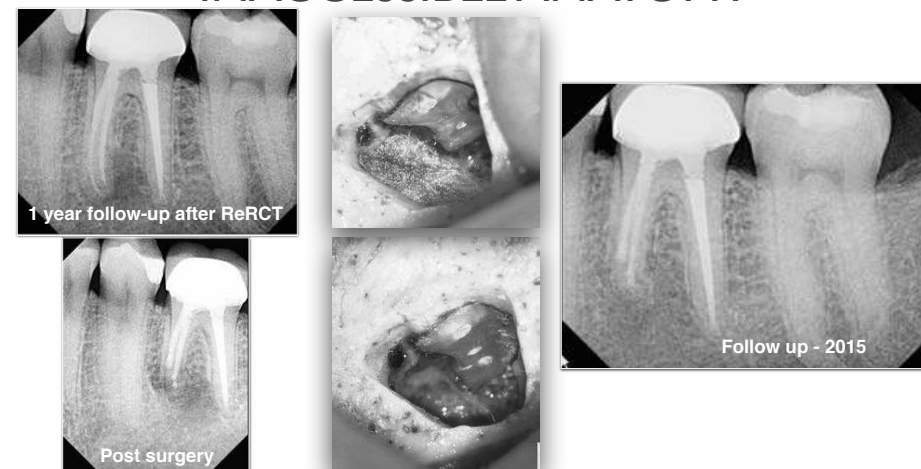
**Apical PA & Root Canals non-negotiable:
60%!!!** Four different groups PAP/Access 7%-60% failure
Gorni & Gagliani, JOE, 2004



INACCESSIBLE ANATOMY



INACCESSIBLE ANATOMY



INACCESSIBLE ANATOMY



FAILURES



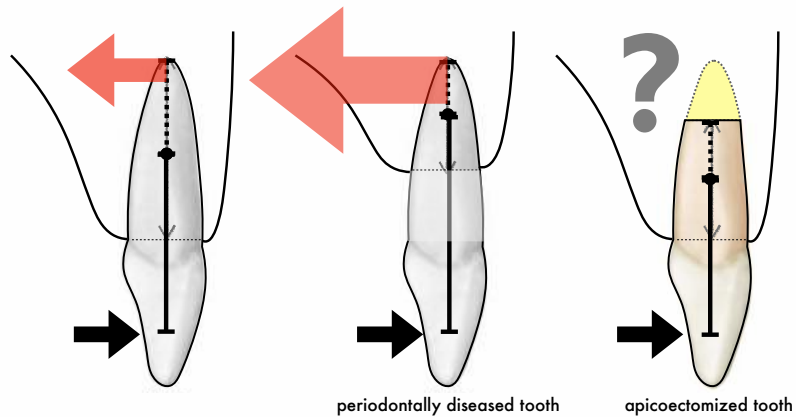
INACCESSIBLE ANATOMY



INACCESSIBLE ANATOMY

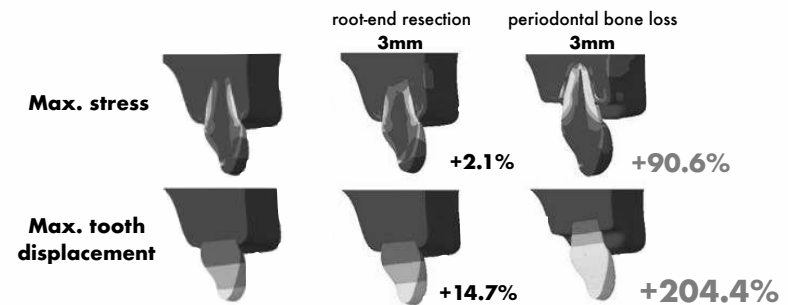


Crown root ratio (CRR)



Influence of Apical Root Resection on the Biomechanical Response of a Single-rooted Tooth: A 3-dimensional Finite Element Analysis

Jang et al. 2014 J Endod



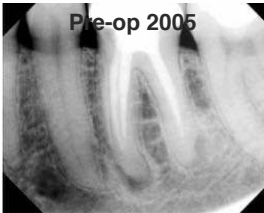
→ 4 mm of root-end resection = 1 mm of marginal bone loss
Apical root resection does NOT significantly affect the biomechanical parameters until it reaches 6mm



Every case is unique
and should be
evaluated individually!!

Restoration/Post	S
Working Length	NS
Apical Size	S
Filling Density	S
Missed canal	S
Procedural Errors/ Inaccessible anatomy	Both
Periodontal health	Both

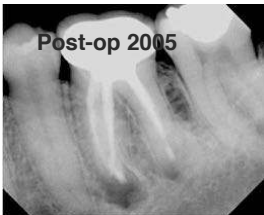
MY FIRST MOLAR SURGERY



Pre-op 2005



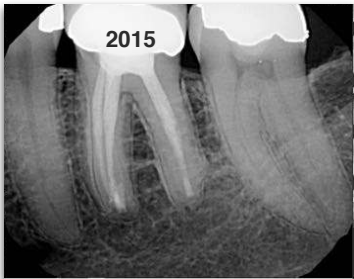
2007



Post-op 2005



2010



2015

**THANK
YOU**



mkohli@upenn.edu