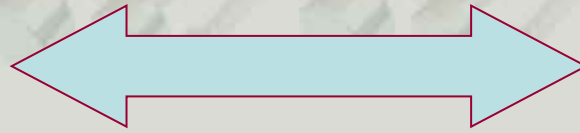


Problem solving and decision making in endodontics

Dr Vág János
Department of Conservative Dentistry
Semmelweis University

General dentist



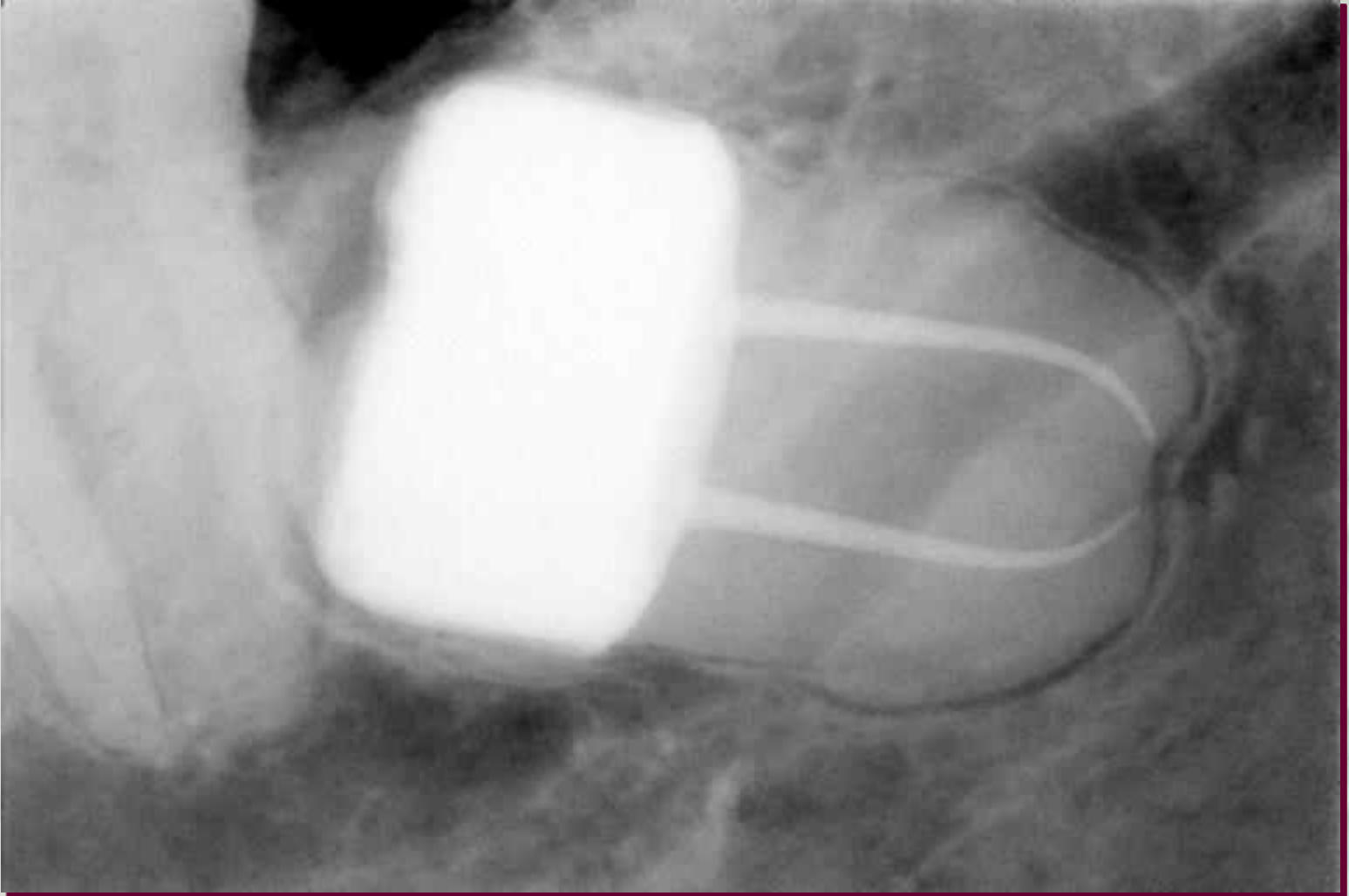
endodontist

Interdisciplinary: biological,
medical, periodontal, prosthetic,
orthodontic etc

technical

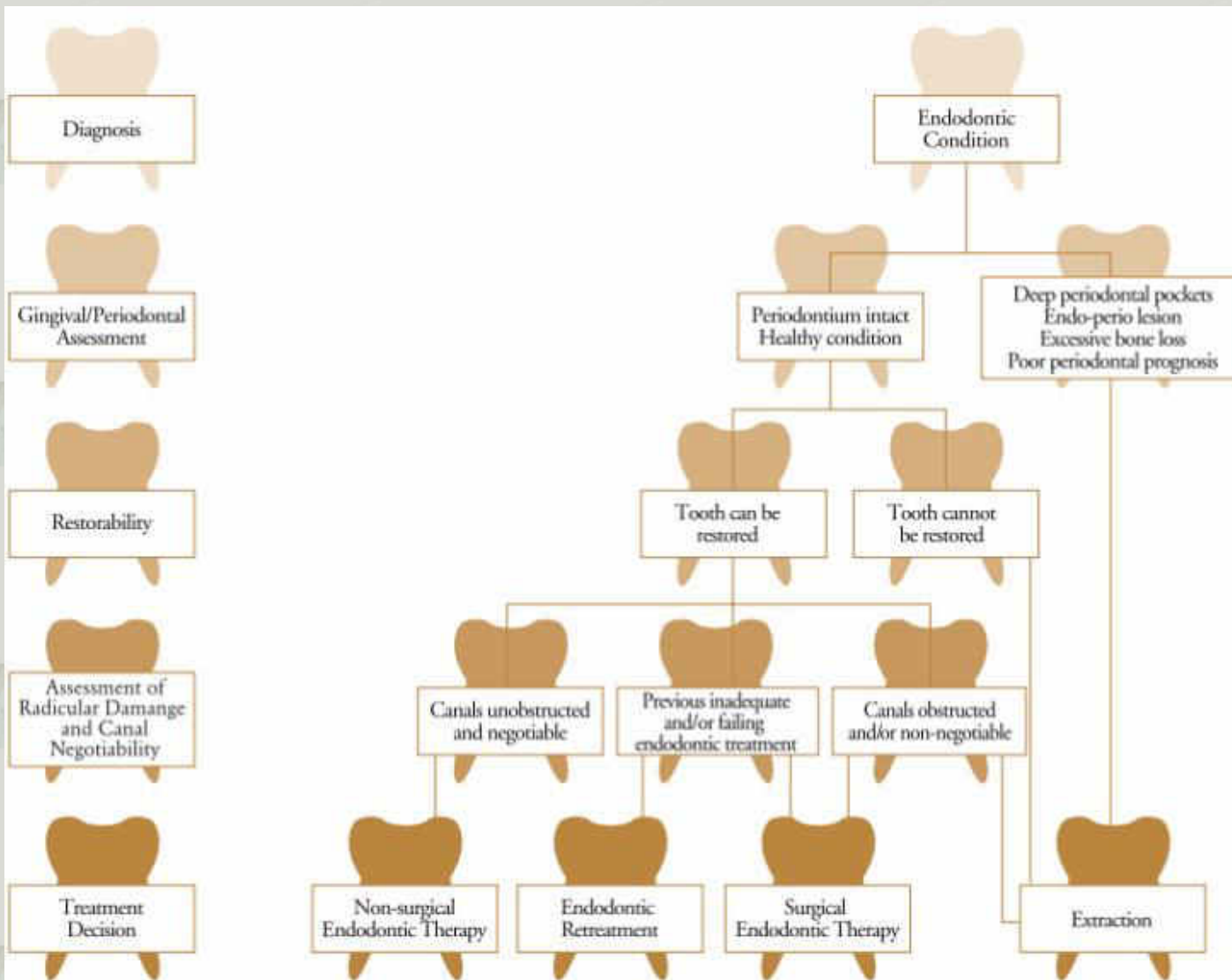


Dr. Ken Serota's slides:





When King Louis XII of France asked the Italian captain **Gian-Giacomo Trivulzio** (1448–1518) what it would take to conquer **Milan**, the reply was: 'It is necessary to prepare three things, Sir, **money, money, and still more money.**' The maxim could stand as an epigraph



Endodontic diagnosis

Periodontal status

Prosthetic rehabilitation

Technique questions

endodontic decision making flow chart



AAE Endodontic Case Difficulty Assessment Form and Guidelines

PATIENT INFORMATION

Name _____
 Address _____
 City/State/Zip _____
 Phone _____

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 ena _____.

LEVELS OF DIFFICULTY

MINIMAL DIFFICULTY

(ed). These types of cases would _____ category. Achieving a predictable _____ practitioner with limited experience.

MODERATE DIFFICULTY

Preoperative condition is complicated, exhibiting one or more patient or treatment factors listed in the MODERATE DIFFICULTY category. Achieving a predictable treatment outcome will be challenging for a competent, experienced practitioner.

HIGH DIFFICULTY

Preoperative condition is exceptionally complicated, exhibiting several factors listed in the MODERATE DIFFICULTY category or at least one in the HIGH DIFFICULTY category. Achieving a predictable treatment outcome will 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.

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, 211 E. Chicago Ave., Suite 1100, Chicago, IL 60611-2691; phone: 800/877-3636 or 312/266-7255; fax: 866/451-9020 or 312/266-9867; E-mail: info@aae.org; Web site: www.aae.org

AAE Endodontic Case Difficulty Assessment Form

CRITERIA AND SUBCRITERIA	MINIMAL DIFFICULTY	MODERATE DIFFICULTY	HIGH DIFFICULTY
A. PATIENT CONSIDERATIONS			
MEDICAL HISTORY	<input type="checkbox"/> No medical problem (ASA Class 1*)	<input type="checkbox"/> One or more medical problems (ASA Class 2*)	<input type="checkbox"/> Complex medical history/serious illness/disability (ASA Classes 3-5*)
ANESTHESIA	<input type="checkbox"/> No history of anesthesia problems	<input type="checkbox"/> Vasoconstrictor intolerance	<input type="checkbox"/> Difficulty achieving 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 radiograph/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
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 tori)	<input type="checkbox"/> Extreme difficulty obtaining/interpreting radiographs (e.g., superimposed anatomical structures)
POSITION IN THE ARCH	<input type="checkbox"/> Anterior/premolar <input type="checkbox"/> Slight inclination (<10°) <input type="checkbox"/> Slight rotation (<10°)	<input type="checkbox"/> 1st molar <input type="checkbox"/> Moderate inclination (10-30°) <input type="checkbox"/> Moderate rotation (10-30°)	<input type="checkbox"/> 2nd or 3rd molar <input type="checkbox"/> Extreme inclination (>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
MORPHOLOGIC ABERRATIONS OF CROWN	<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, megarodons) <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 AND ROOT MORPHOLOGY	<input type="checkbox"/> Slight or closed		<input type="checkbox"/> Extreme curvature (>30°) or shaped curve <input type="checkbox"/> Mandibular premolar or anterior with 2 roots <input type="checkbox"/> Auxiliary premolar with 3 roots <input type="checkbox"/> Small divides in the middle or facial third <input type="checkbox"/> Very long tooth (>25 mm) <input type="checkbox"/> Thin apex (<1.5 mm in diameter) <input type="checkbox"/> Distinct canal path <input type="checkbox"/> Canal(s) not visible
RADIOGRAPHIC APPEARANCE OF CANAL(S)	<input type="checkbox"/> Canal(s) in size	<input type="checkbox"/> Pulp stones	
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"/> 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"/> Intrusive, 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	<input type="checkbox"/> Concurrent moderate periodontal disease	<input type="checkbox"/> Concurrent severe periodontal disease <input type="checkbox"/> Cracked teeth with periodontal complications <input type="checkbox"/> Combined endodontic/periodontic lesion <input type="checkbox"/> Root amputation prior to endodontic treatment

General dentist

endodontist

*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 some 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.asahq.org/clinical/physicahistory.htm

Last but not least: miscellaneous aspects

- Recall
- cost
- time

(National Insurance System, private, dental tourism, treatment by undergraduate student, endodontist)

The career of a tooth determined by our series of decisions

Good decisions



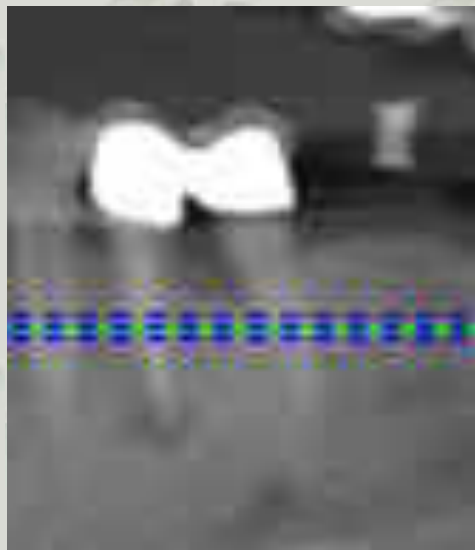
wrong decisions





Negotiation

Do not harm: choose the least conservative method first



Effect of technical factors

Azim et al. Tennessee Study: Treatment outcome and healing time

Table 2 Treatment factors affecting the outcome of root canal treatment

Prognostic factors	N*	Favourable		Unfavourable		Favourable outcome %	95% CI	Cramer's V	χ^2	P- value
		Healed	Healing	Uncertain	Unsatisfactory					
Procedural errors										
Present	17	5	0	4	8	29.4	7.7–51.1 a	0.2776	28.98	<0.001
Absent	405	321	19	45	20	84	80.4–87.6 b			
Voids										
Absent	411	320	18	46	27	82.2	78.5–85.9 a	0.0768	1.39	0.238
Present	11	6	1	3	1	63.6	35.2–92.0 a			
Root filling density										
Poor	8	1	0	1	6	12.5	0.0–35.4 a	0.2493	21.7	<0.001
Good	414	325	19	48	22	83.1	79.6–86.8 b			
Apical extension										
>2 mm	18	6	0	2	10	33.3	11.6–55.1 a	0.3132	41.39	<0.001
1–2 mm	94	63	5	18	8	73.4	63.3–81.4 b			
Within 0.5 mm	284	237	13	26	8	88	84.2–91.8 c			
Over	26	20	1	3	2	80.8	65.7–95.9 b,c			
Total	422	326	19	49	28	81.7				

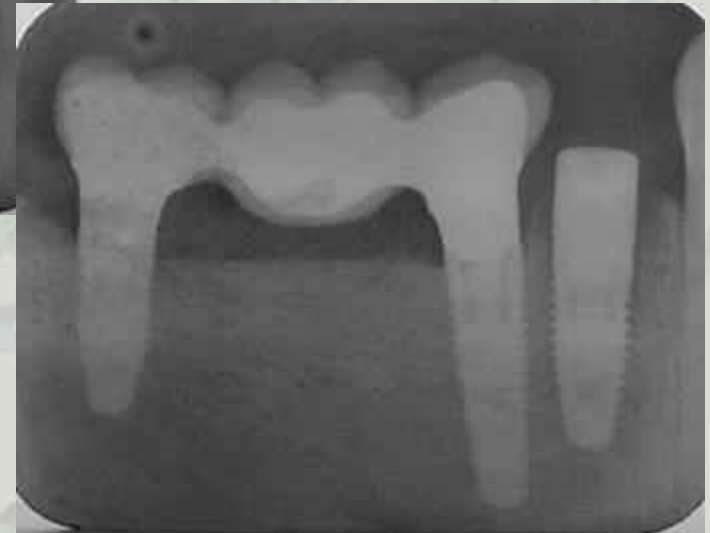
Small letters indicating homogenous subsets.

*Number of roots; Bold P values indicate significance.

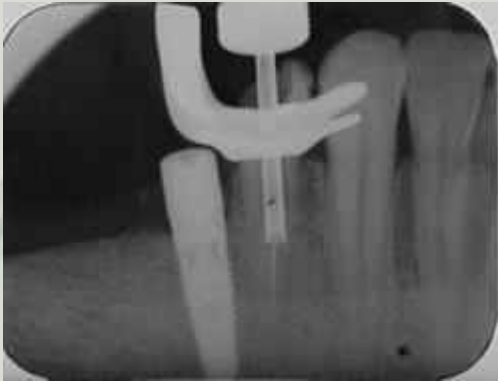
File separation ?=? disaster



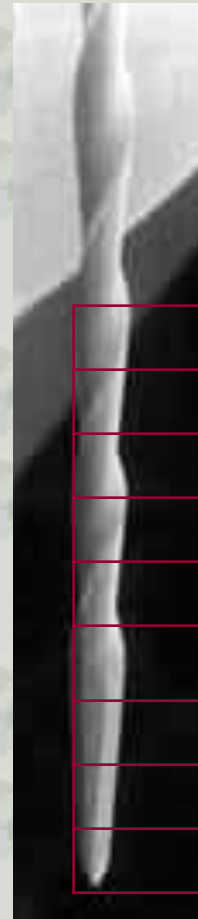
The career of a tooth



MTWO versus Meitrac



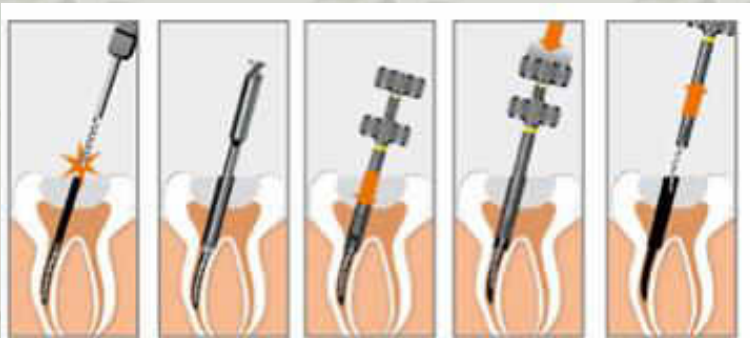
- size 20/.06 taper, 8 mm fragment
- Meitrac I 15-50
- Meitrac II 55-90



-8	0.68
-7	0.62
-6	0.56
-5	0.5
-4	0.44
-3	0.38
-2	0.32
-1	0.26
0	0.2



Trepan bur



1. Bypassing
2. True blockage: „Sealing”
3. Removal
 - Tube-sleeve-fit
 - Sonic/ultrasonic release,
 - Microscopic control

Risk of removal:

- Perforation, root fracture, ledging, pushing fragments into the periapical area

Removal





presents

Removal of a broken instrument with the tube technique.



True blockage-sealing

Monitoring

80.7% periapikális lézió esetén

92.4% ha nincs periapikális lézió ($P < .02$)

Impact of a Retained Instrument on Treatment Outcome: A Systematic Review and Meta-analysis J Endod 2010;36:775–780

Piyanee Panitvisai, DDS, MDSc, Pimnalin Parunnit, Cert in Endodontics,**



3 months



6 months



File separation: prevalence is 0.4%–3.7%

“An expert is a man who has made all the mistakes which can be made, in a narrow field.”

Niels Bohr nuclear physicist

Perforation



diagnosis



needle control



3 months control
perforation -Dycal



15 months control

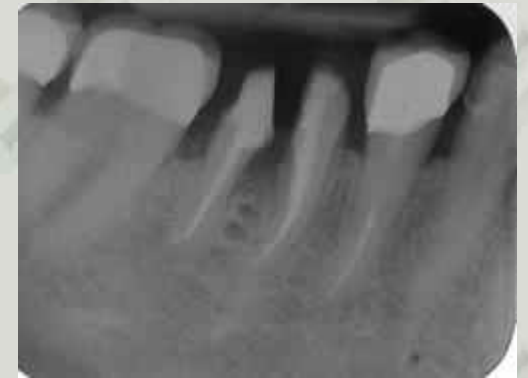


3 years

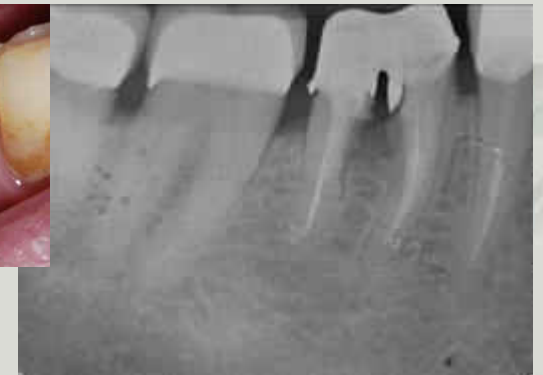
Temporary crown (gradia)
No post



hemisection



2 weeks



Post and core

try-in

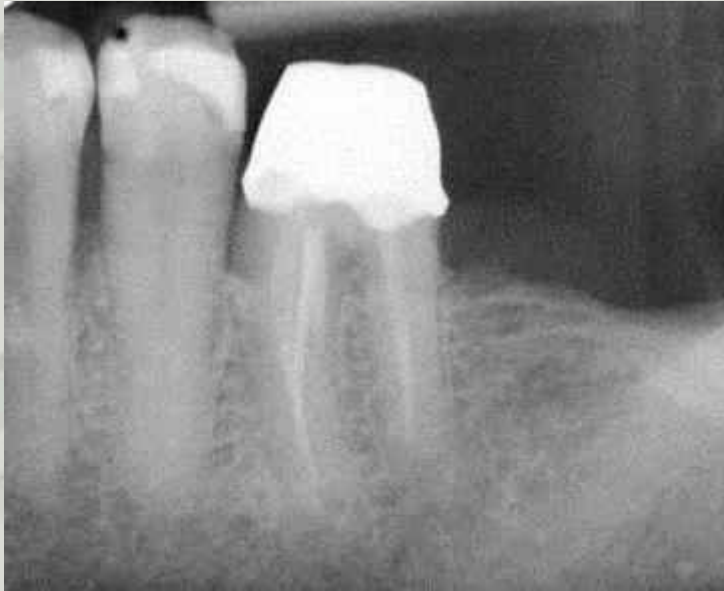
MTA

Mineral trioxid aggregate

Since 1993 (Lee SJ, Monsef M, Torabinejad M.), pulp capping, perforation, apexification, retrograde root filling



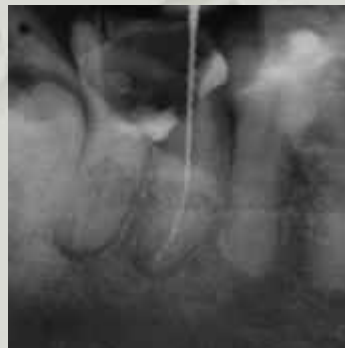
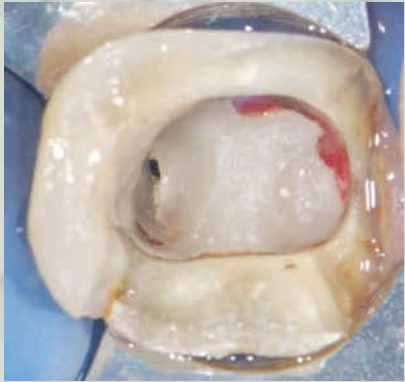
Perforatio



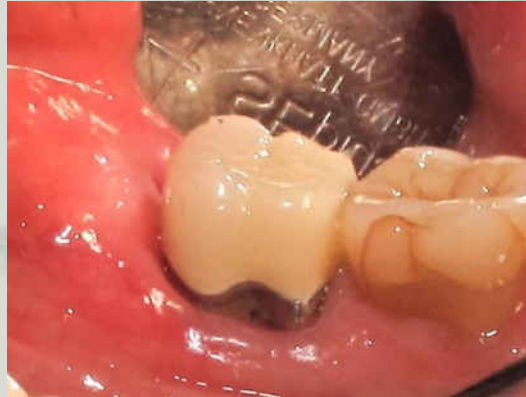
Mesiolingualis, post preparation, MTA

3 months

Súlyos Perforatio



Súlyos Perforatio



Fél éves kontroll

1 éves kontroll

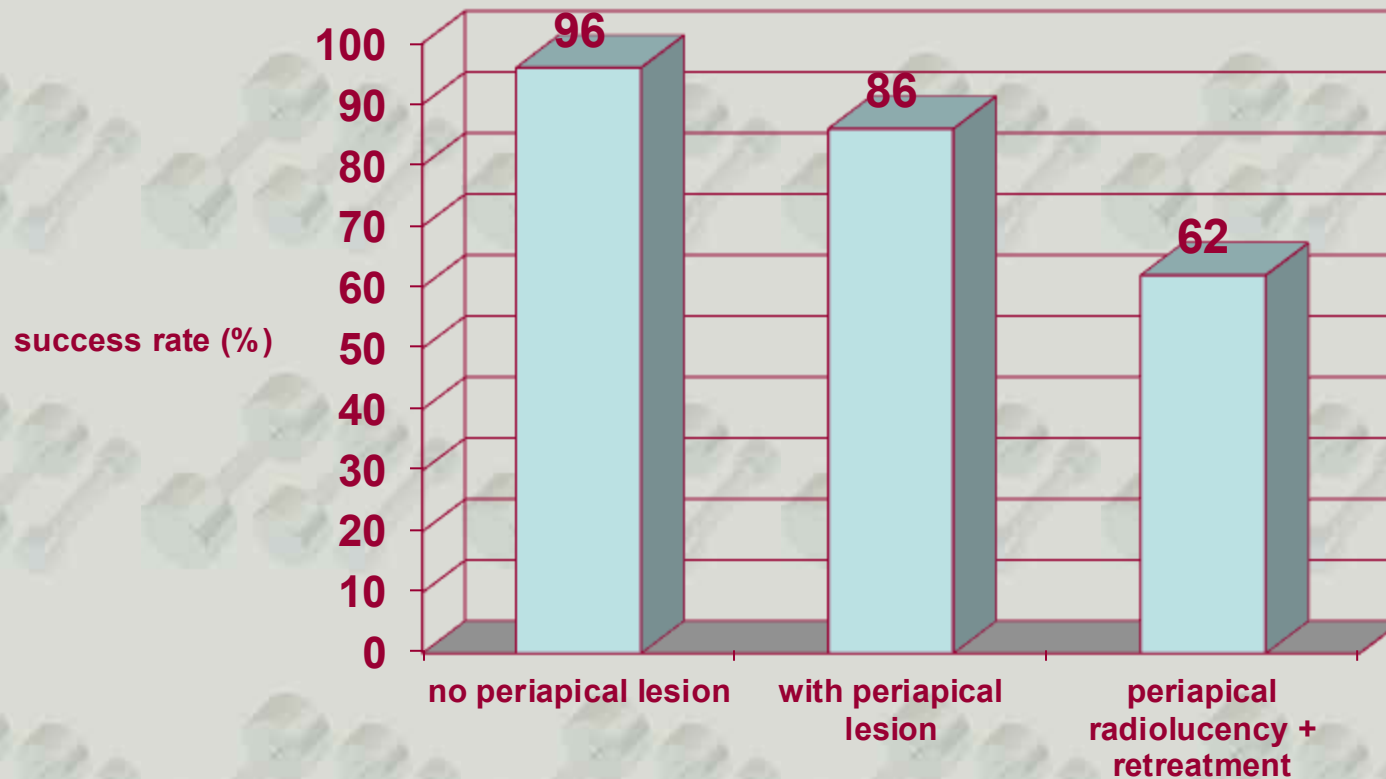
Retreatment

- Weakening of dentin wall – fracture, perforation
- Blockage
- File separation
- Transportation
- Re-infection



Factors affecting the long-term results of endodontic treatment

Journal of Endodontics
Volume 16, Issue 10 , Pages 498-504, October 1990.



- 356 patients 8 to 10 yr after the treatment.
- The predictability from clinical and radiographic signs of the treatment-outcome in individual cases with preoperative periapical lesions cases was found to be low.
- Thus, factors which were not measured or identified may be critical to the outcome of endodontic treatment.

Retreatment

2004.08.23



2009.05.08.



2010.08.04.



2010.11.08



2010.11.08



2011.03.28.

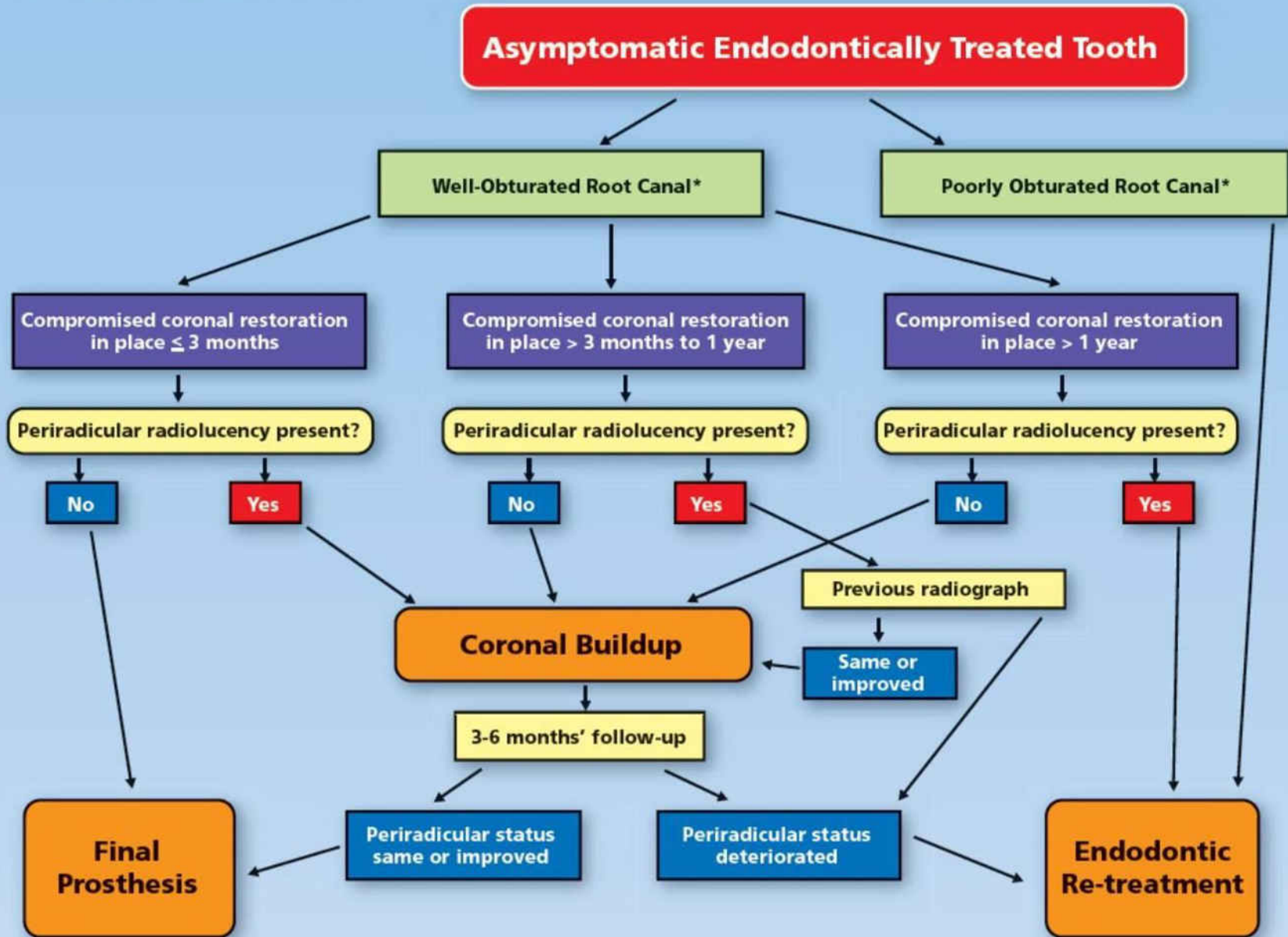
Occlusion



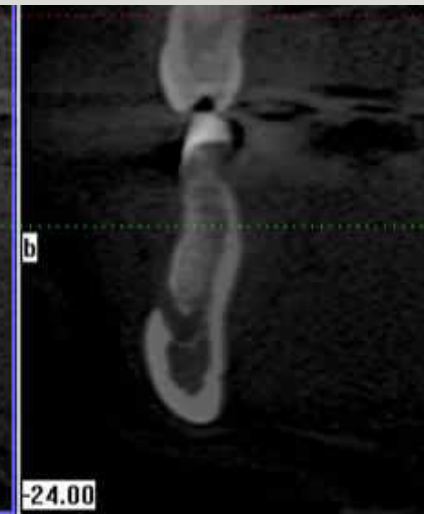
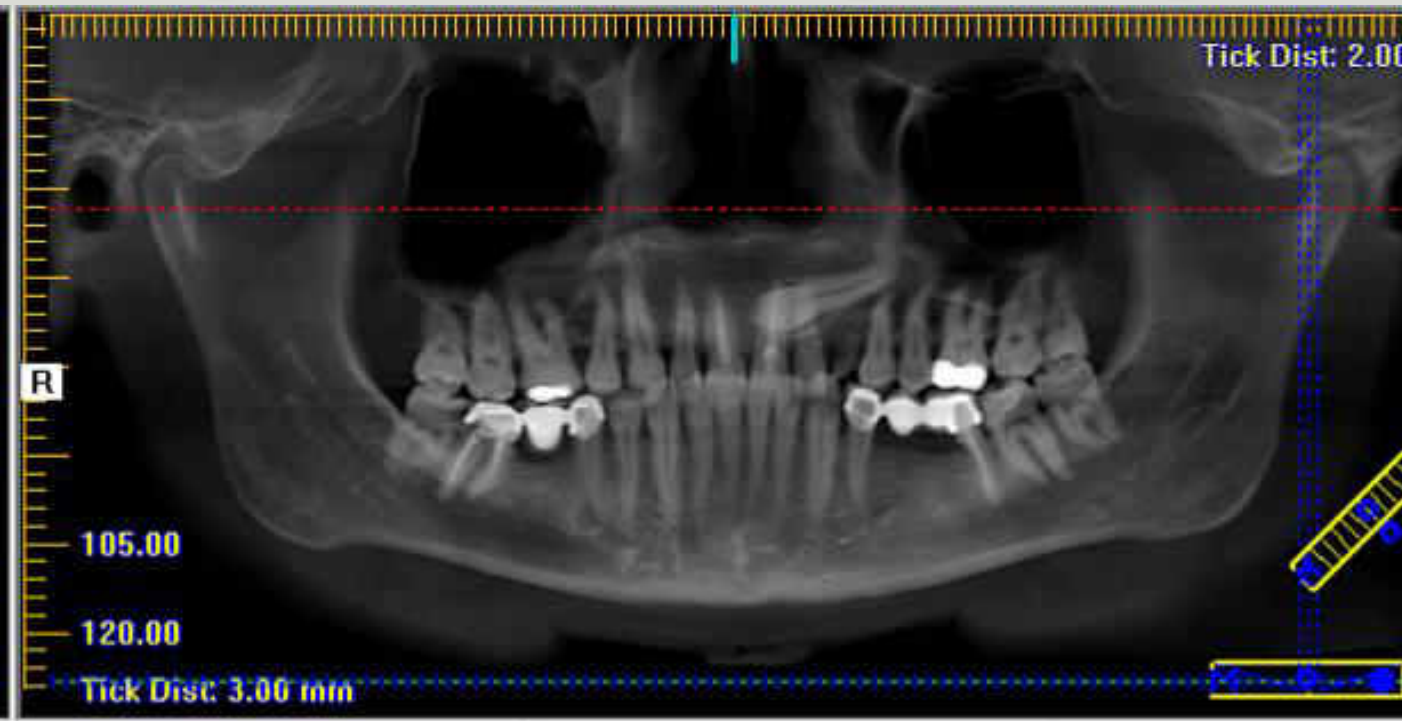
Do we need to remove old root canal feeling?



Decision-Making Flowchart:



Focal infection vs extraction





Preoperative



needle control



4 months



9 months



12 months



14 months

Cyst or not cyst that is NOT the question

Endodontic Treatment of a Large Cyst-Like Periradicular Lesion Using a Combination of Antibiotic Drugs: A Case Report *U" Iku" O" zan, DDS, * and Ku"rs,at Er, DDS, PhD*JOE* — Volume 31, Number 12, December 2005



7 months

(Calskan MK. Prognosis of large cyst-like periapical lesions following nonsurgical root canal treatment: a clinical review. *Int Endod J* 2004;37:408 –16.)

- Large cyst-like peripacial lesion: 74% healed with surgery

Endodontic Predictability: “Are You Making the Right Decisions?”

Written by John D. West, DDS, MSD

Tuesday, 01 June 2010 00:00

TEN ENDODONTIC DECISION MOMENTS

- **Decision No. 1:** Do Your **Clinical Skills** Match the Rules of Endodontic Predictability ?
- **Decision No. 2:** Is Your Endodontics **Illuminating** ?
- **Decision No. 3:** Are You Designing Proper **Access Cavities** ?
- **Decision No. 4:** Are You Willing to Learn How to Simultaneously Use **Intention and Restraint** in Order to Follow the Canal to its Terminus ?
- **Decision No. 5:** Are You Willing to Master the **GlidePath** so You Can Make **Rotary Endodontics** Safe, Predictable, and Efficient ?
- **Decision No. 6:** What **Rotary Shaping System** is the Right One for You ?
- **Decision No. 7:** What **Cleaning Techniques** Should I Choose ?
- **Decision No. 8:** Should I Make a **Conefit** Prior to Obturation ?
- **Decision No. 9:** What **Obturation Method** Is For Me ?
- **Decision No. 10:** What Should You Do About the All-Important **Coronal Seal** ?