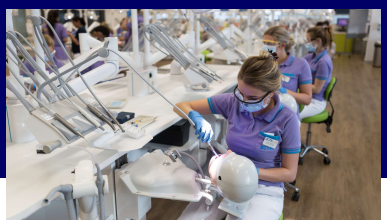
Outcome in endodontology

+ Retreatment

1

ACTA Academic Centre for Dentistry Amsterdam

Download handouts from www.shemesh.nl



University of Amsterdam VU Vrije Universiteit Amsterdam

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Outcome studies in Endodontology

- Importance and general concepts
- Definitions

4

Why are OUTCOME studies so important ?

Which irrigation protocol?
Ultrasonic irrigation necessary?
Pulpotomy or direct pulp capping ?
Which file should I use?
Screening before bone marrow transplantation
Which obturation ?
Use calcium hydroxide?
MTA or Biodentine?
Which sealer?
Which concentration of hypochloride?
Bleaching with which material ?
Microscope necessary?
Follow up period ?
Perforations- what to do?
Pulpotomy or pulpectomy?
CBCT before every treatment?
Full crown of composite ?
To re-treat or not to re-treat?
Broken instruments- what to do ?

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- Outcome studies show us sometimes how careful we must be when making clinical recommendations based on in-vitro studies

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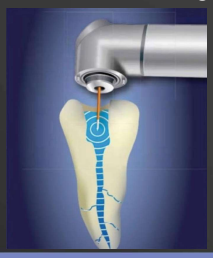
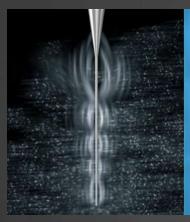
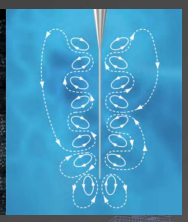
- The most extensively studied
- Surge of enthusiasm in the early '2000s







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Căpută PE et al. J Endod. **2019**

…no strong clinical recommendations could be formulated.

Silva EJNL et al. Br Dent J. **2019**

…there was no evidence of effective improvement on periapical healing …that supports the use of ultrasonic irrigation…

8

Outcome was mostly determined by radiographs.

Evidence shows that radiographs show only half of the truth…

9

- **Radiographic success: half true half false**
  - **Evidence:**
- Absence of AP on radiograph: half true half false or 2/3 true 1/3 false (Brynolf 1967, Barthel et al. 2004)..
- Absence of AP on radiograph: 60% true 40% false (Estrela et al. 2008, Christiansen et al. 2009).

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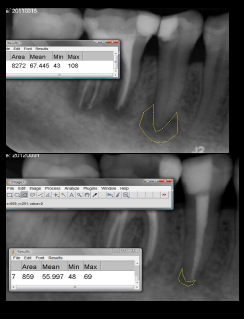
How do we measure/ determine healing?

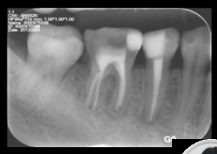


-Qualitative (strict)
-Simple measurements
-Scoring systems
-PAI
-CBCT-PAI
-3D measurements

11

Qualitative assessment

- Healed or not healed ("strict criteria") –
- no measurement of the lesion, just present or absent.



Who used this system ?
Ng et al. 2011

12

Advantages

- Quick and cheap method
- Gives clinically relevant information

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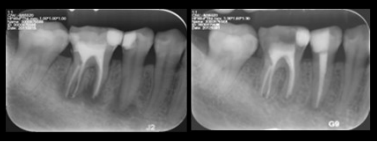
Disdvantages

- Subjective
- No meaning for “shrinkage”
- On CBCT- lower healed rate on teeth with pre-treatment lesions (Liang et al. 2012: less than 50% after 2 years)



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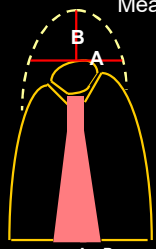
Measurement of periapical lesions



size of each lesion was calculated by taking the average of the lesion's largest dimension and its extent in the direction perpendicular to the largest dimension.

Sjorgen et al. JOE 1990

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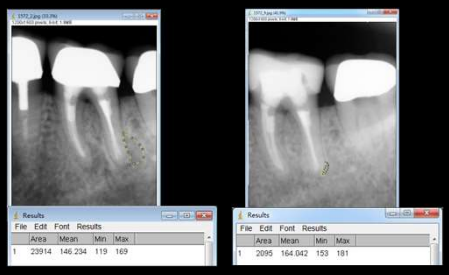
Measurement of periapical lesions



16

Advantages

- Cheap method
- Quantitative

17

Disdvantages

- Time consuming
- Not accurate- difficult to standardize

18

Scoring systems

- Periapical scores for treatment outcome. Periapical destruction:
- 1= definitely NOT present
- 2= probably NOT present
- 3= unsure
- 4= probably present
- 5= definitely present

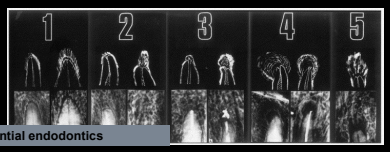
Who used this system ?
Peters & Wesselink 2002

Reit & Gröndahl IEJ 1983

19

PAI Score

- PAI score (Ørstavik et al. 1986)
- "The PAI scoring system offers a visual reference scale for assigning a health status to the periapex. "



Essential endodontics

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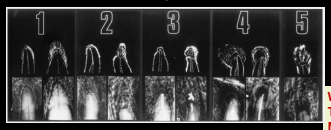
- In order to evaluate periapical section according to the PAI score, you have to compare periapical radiographs with a set of 5 radiographic images derived from Brynolf's histological-radiographic correlation study

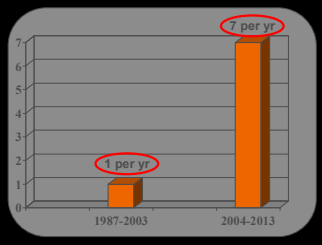


Who used this system ?
The Toronto studies
Marending et al. 2005
And
More than 70 studies !

Brynolf, 1967

21

PAI has been used in more than 70 outcome studies since 1987



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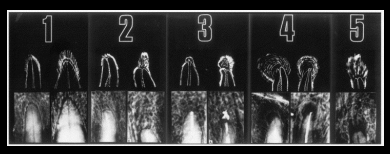
Advantages

- Relatively easy to perform
- Many studies and experience with this method
- Uniformity



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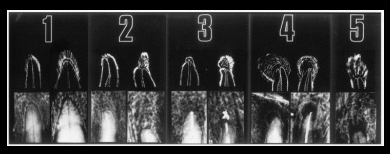
Disadvantages

- Based on findings from maxillary incisors
- Based on 2D information



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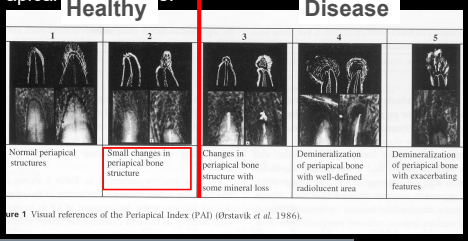
"Scores 2 to 5 represent increasing extent and severity of apical periodontitis."

Toronto studies 2003-2006

Healed: PAI ≤ 3

Healthy

Disease



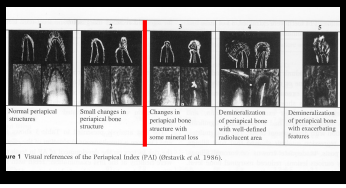
ure 1 Visual references of the Periapical Index (PAI) (Ørstavik *et al.* 1986).

Ørstavik et al. Endod Dent Traumatol 1986

25

Prognostic value of the full-scale Periapical Index. Kirkevang et al. Int Endod J. 2014

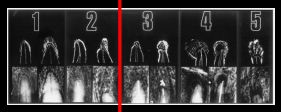
Repeated radiographic assessments of teeth using the full-scale PAI reveal that each of the five scores had distinct prognostic value for the course of periapical disease …



ure 1 Visual references of the Periapical Index (PAI) (Ørstavik *et al.* 1986).

26

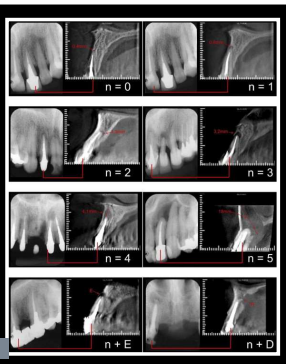
Success=	PAI 1+2	PAI 1
ALL	90	58
NO Pre-op PA	94	70
Pre-op PA	79	26



Ørstavik et al. *Eur J Oral Sci* 2004

27

The CBCT-PAI score



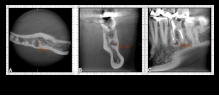
Estrella et al. JOE 2008

28

Estrella et al. JOE 2008

29

The sizes of radiolucent periapical lesions were measured on CBCT scans in 3 dimensions: buccopalatal, mesiodistal, and diagonal . The CBCT-PAI was determined by the largest extension of the lesion. A 6-point (0–5) scoring system was used.

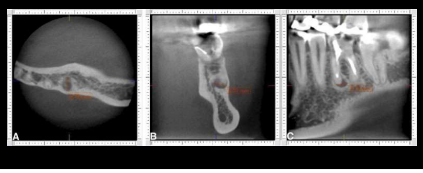


Who used this system ?
Esposito et al. 2011

30

Advantages

- Based on findings from all teeth
- Based on 3D information
- Take 3 planes into consideration



31

Disadvantages

- Measurements are still based on personal interpretation and 2D concepts
- Radiation
- Artifacts like metal posts and radiodense materials
- Time consuming

32

3D volume measurements

1. Threshould technique
2. The expansion technique

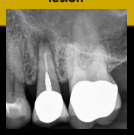
Who used this system ?
Metska et al. 2013
Van der Borden et al. 2013

33

Terminology

Patient-centered outcome: Survival, functionality

Disease-centered outcome: Healing of the periapical lesion



34

Outcome terminology

- Success & failure
  Too general ?
- Healing & healed
  Disease centered
- Effective & ineffective
  Patient centered
- Favourable and unfavourable outcome
  Too general ?
- Survival & Functionality
  Patient centered

35

What is the outcome of root canal treatment ?

- Strict/ loose criteria

	Initial	retreatment
Strict *Volledige genezing*	82,8	80,1
Loose *Kleiner geworden*	89,1	85,6

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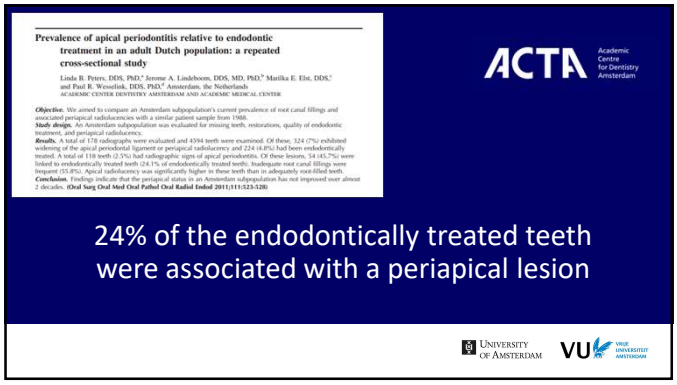

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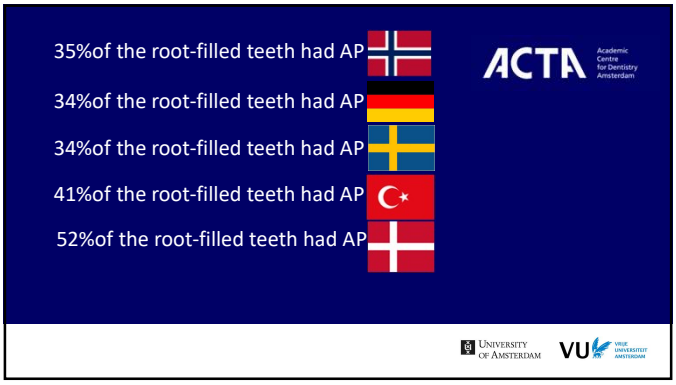

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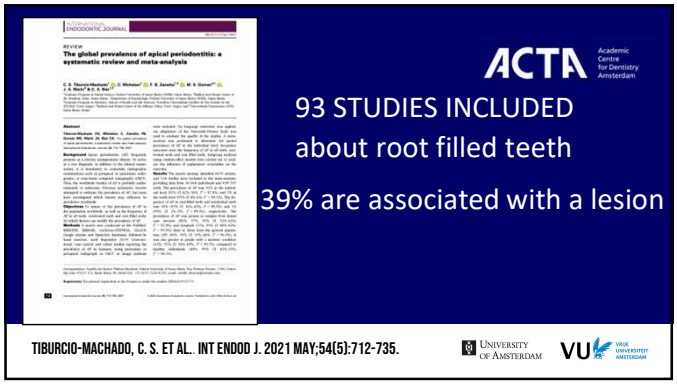

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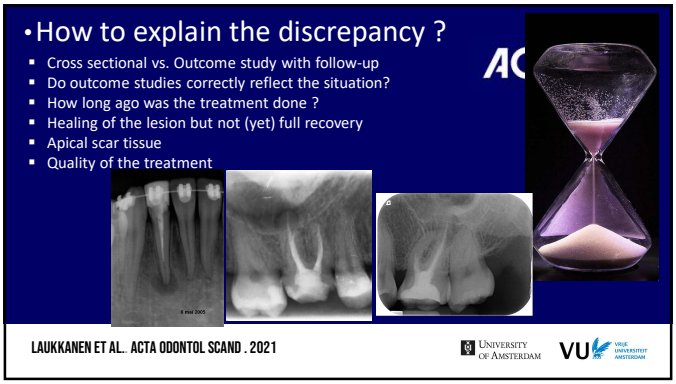

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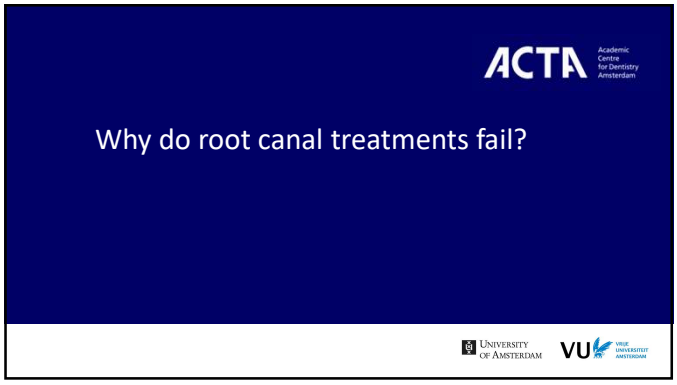

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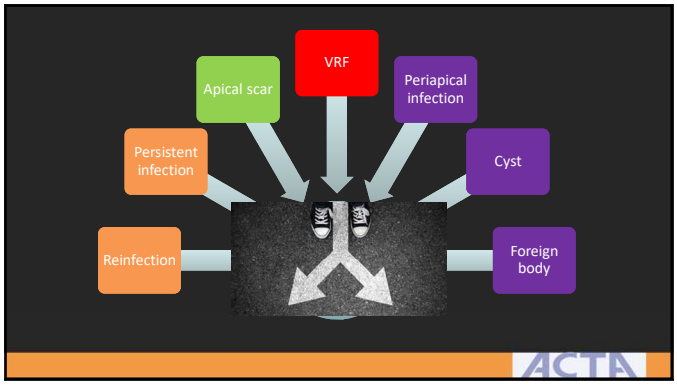

43

How to manage failure of a root canal treatment?

- Monitor
- Retreatment
- Surgical endodontics
- Combination
- Extraction

Reit C, Gröndahl HG. Swed Dent J. 1984;8(1):1-7.

44

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Reit C, Gröndahl HG. Swed Dent J. 1984;8(1):1-7.

45

Monitor

- When there are no complaints (of symptoms…?)
- When the treatment was recently (<4 years?)
- When we see no difference compared to older radiographs

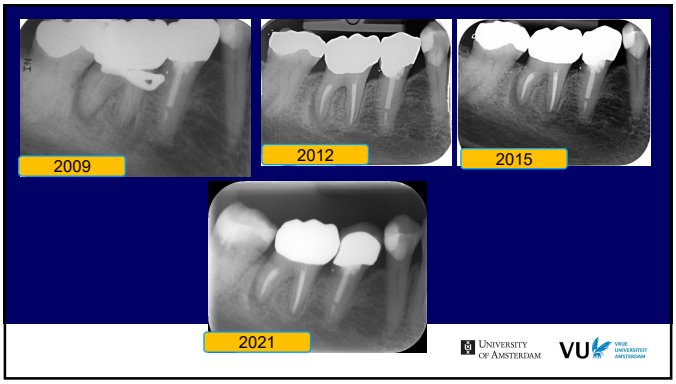
46

Monitor

- When there is no clear diagnosis
- When there is no restorative plan
- When there are no systemic risks

47

Monitor



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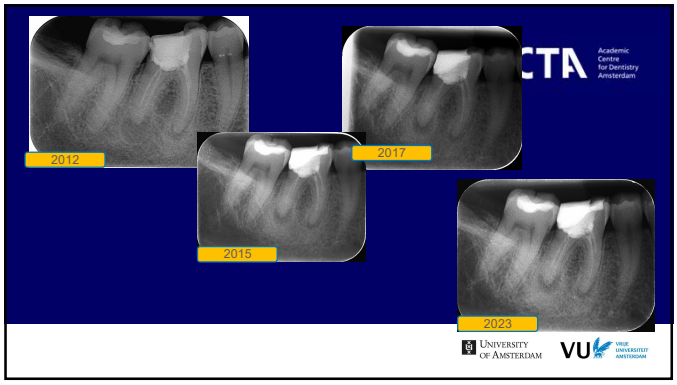

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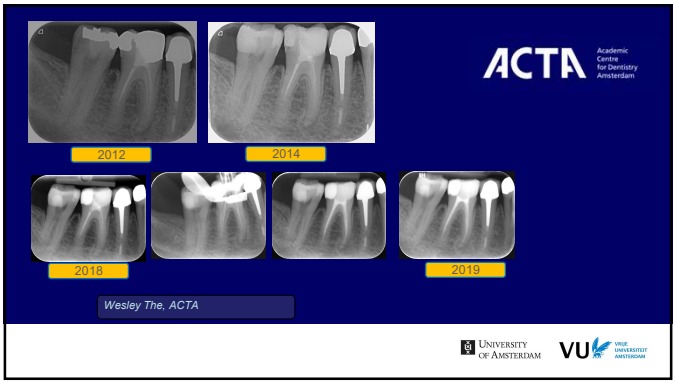

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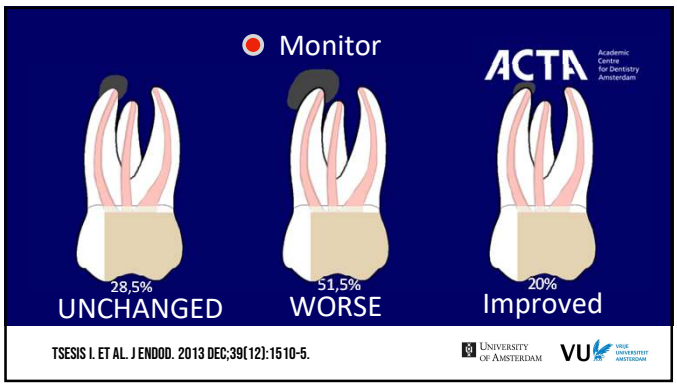

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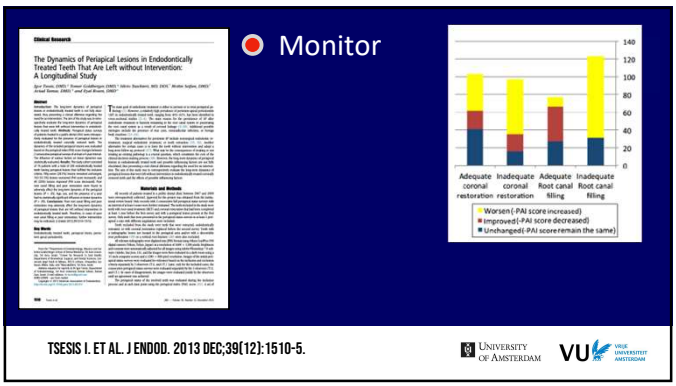

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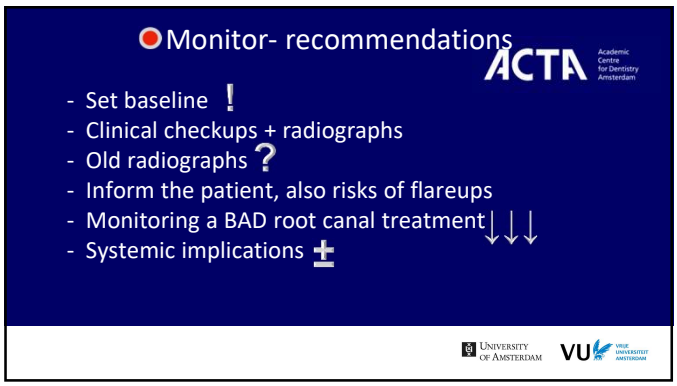

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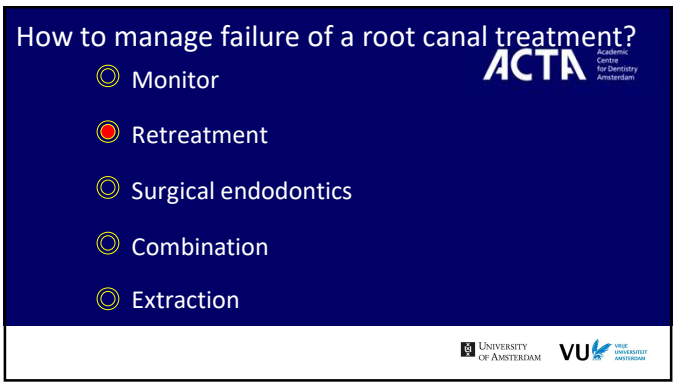

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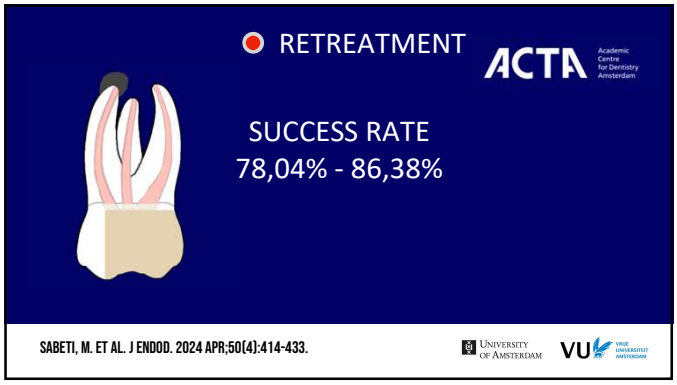

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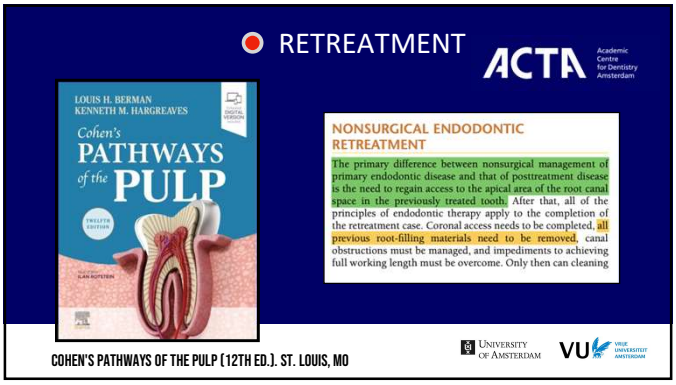

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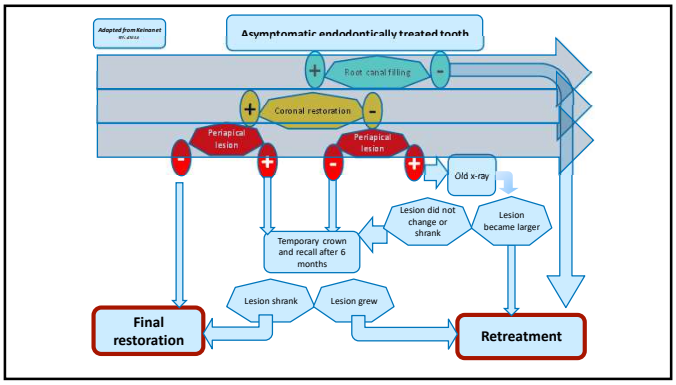

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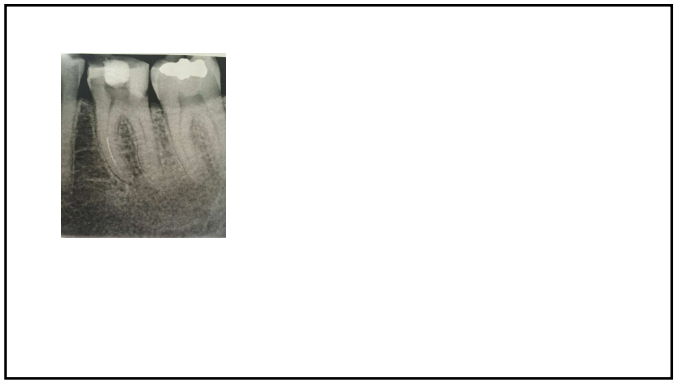

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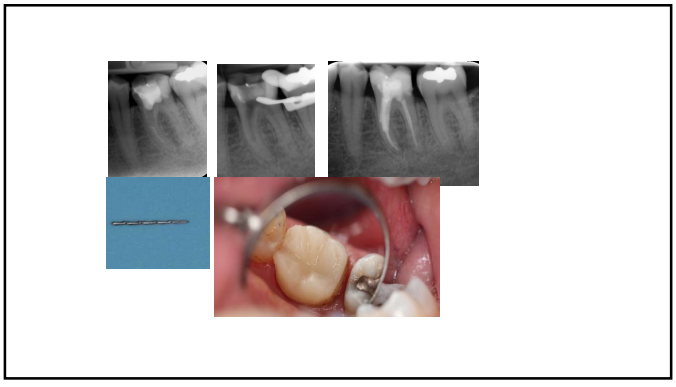

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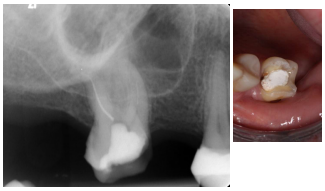

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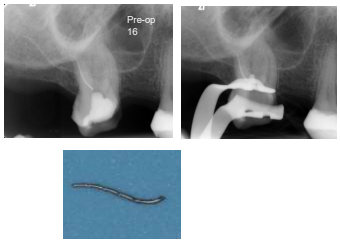

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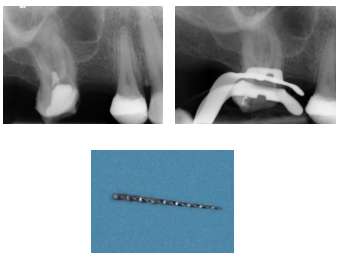

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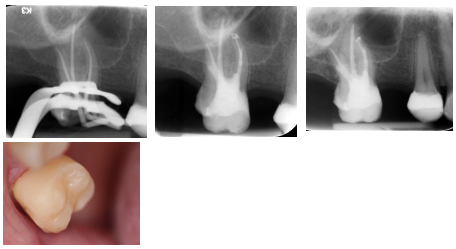

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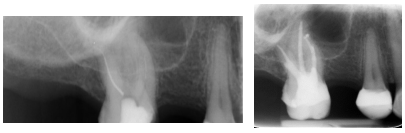

66

How to manage failure of a root canal treatment?

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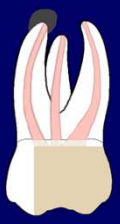
Reit C, Gröndahl HG. Swed Dent J. 1984;8(1):1-7.

67

- Surgical endodontics

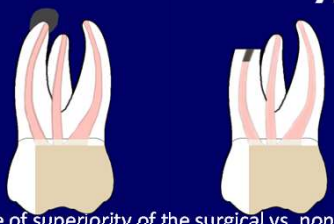


SUCCESS RATE
78.4 - 91.3%

PINTO D, MARQUES A, PEREIRA JF, PALMA PJ, SANTOS JM. MEDICINA (KAUNAS). 2020 SEP 3;56(9):447

68

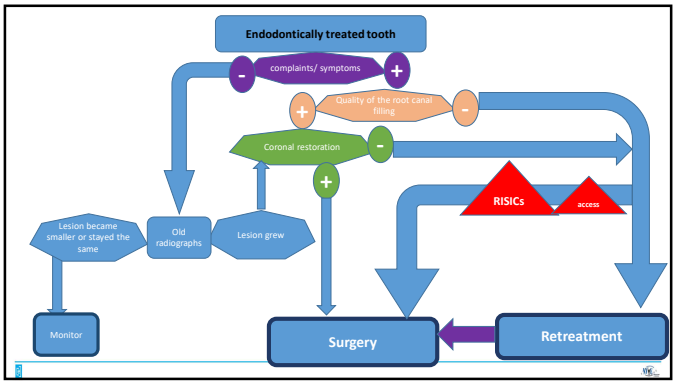
- Surgical endodontics



no clear evidence of superiority of the surgical vs. non-surgical approach

AZIM A. ET AL. INT ENDO J. 2021 MAR;54(3):301-318.

69



70

Review Cochrane Database Syst Rev 2016

Del Fabbro M, Corbella S, Sequeira-Byron P, Tsesis I, Rosen E, Lolato A, Taschieri S

71

How to manage failure of a root canal treatment?

- Monitor
- Retreatment
- Surgical endodontics
- Combination
- Extraction

Reit C, Gröndahl HG. Swed Dent J. 1984;8(1):1-7.

72

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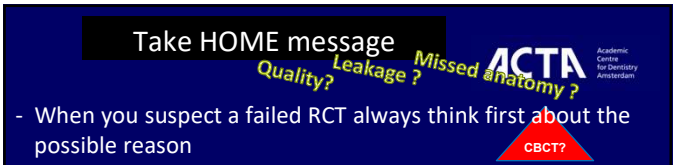
73

Verwijzing naar de endodontoloog

- Verwijsbrief, foto's incl. oude foto's indien beschikbaar
- Behandelplan
- Wat is er met de patient besproken? (verwachting, prognose, alternatieven…)
- Wat is reeds uitgevoerd?
- Relevante medische/ tandheelkunde voorgeschiedenis

74

Take HOME message



- When you suspect a failed RCT always think first about the possible reason
- Can this reason be addressed by a retreatment?
- Can I improve the situation ? Can I preform the treatment?
- Always pose 4 options to the patient : Do nothing, Extraction, Retreatment, surgery

75

76