Retreat or not retreat?
An exercise in forming a guideline

Hagay Shemesh, DMD, PhD

Department of Endodontology
Gustav Mahlerlaan 3004
1081 LA Amsterdam
The Netherlands
Tel.: +31(0)20 59 80139
E-mail: hshemesh@acta.nl
www.acta.nl
www.shemesh.nl

ACADEMIC CENTRE
FOR DENTISTRY AMSTERDAM
- Introduction:
  - Previous attempts for a guideline

A decision tree for retreatment:
  - Explanations & a few examples

Conclusions
Failure
Reinfection
Persistent infection
Apical scar
VRF
Periapical infection
Cyst
Reinfection
Foreign body
What did we do in the past?

Until 10 years ago, we based our decision mainly on “leakage concepts”
If the coronal restoration was damaged → retreatment!
Previous attempts for a guideline

- Paul Abbott Endodontic topics 2011
Diagnosis and management planning for root-filled teeth with persisting or new apical pathosis

PAUL V. ABBOTT
What about signs and symptoms? (sinus tract, pain?)

What about the quality of the coronal restoration?

Why do you have to follow up so much?
Risk Score Algorithm for Treatment of Persistent Apical Periodontitis
182 patients with Persistent apical periodontitis
Historical data 2002-2008

Significant predictors of deterioration:
1. Time since treatment (every year after 4 years +1 point)
2. Current pain (+13 points)
3. Sinus tract present (+14 points)
4. Lesion size >2 mm (+20 points)

Deterioration Risk Score (DRS) = ?
AP Predictors (risk score)
(a) Time since Treatment: \(\leq 4y\) (0); > 4y (every y +1)
(b) Tooth is painful now: No (0); Yes (+13)
(c) Sinus tract present: No (0); Yes (+14)
(d) Lesion size \(\geq 2\) mm: No (0); Yes (+20)

Low risk
DRS<20
- No further intervention

Moderate risk
DRS=21-30
- Further review
  - Intervention recommended if new restoration is indicated

High risk
DRS>30
- Intervention recommended
Diagnosis of Vertical Root Fractures in Restored Endodontically Treated Teeth: A Time-dependent Retrospective Cohort Study

Angambakkam Rajasekaran Pradeep Kumar, BDS, MDS, FDSRCSEd,*
Hagay Shemesb, DMD, PhD,† Sundaramurthy Jothilatha, BDS, MDS,‡
Rangarajan Vijayabharathi, BDS, MBA,§ Somasundaram Jayalakshmi, BDS, MDS,‖
and Anil Kishen, BDS, MDS, PhD§
Time after root canal treatment for VRF

% teeth presenting VRF

- <1
- 1,1-2
- 2,1-3
- 3,1-4
- 4,1-5
- 5,1-6
- 6,1-7
- 7,1-8
- >8,1
How to make the decision?

1. Complaints
2. Quality of the root canal filling
3. Quality of the coronal restoration
4. Presence of a periapical lesion

Descision tree

Asymptomatic endodontically treated tooth

Root canal filling

Coronal restoration

Periapical lesion

Temporary crown and recall after 6 months

Lesion shrank

Lesion grew

Retreatment

Adapted from Keinan et al. 2011
A “good” root canal filling is...

Density
Length: 0-2 mm
Success of the root canal treatment as a function of the root canal filling’s length

- Petersson et al. 86
- Petersson et al. 90
- Eriksen et al. 88
- Petersson et al. 93
- Odesjo et al. 90
- Bergenholz et al. 73
- Buckley et al. 95
- Ray et al. 95

0-2 mm
Too short
Too long
Clinical outcome studies show a consistent preference for root canal fillings that are 0-2 mm from the radiographic apex

(Ng et al. 2008)
Liang et al. 2012

Clinc Oral investig 2012. The association between complete absence of post-treatment periapical lesion and quality of root canal filling. Liang, Li, Shemesh, Wesselink, Wu
Prevalence studies

• The prevalence of periodontitis apicalis is the number of cases per 1000 people on a specific moment in a population.
Inadequate root canal fillings were frequent (55.8%). Apical radiolucency was significantly higher in these teeth than in adequately root-filled teeth.

The probability of persistent AP was higher if the root filling was either short or long, if there were voids, or if there were radiographic signs of overhang or open margin of the restoration.
200 endodontically treated teeth with a periapical lesion
No treatment was performed
Follow up 4 or more years

Conclusion: inadequate root canal filling or coronal restoration can negatively influence an existing periapical lesion
Asymptomatic endodontically treated tooth

- Root canal filling
  - Coronal restoration
    - Periapical lesion
      - + Periapical lesion
        - Temporary crown + follow up after 6 months
          - Lesion shrank
            - Final restoration
          - Lesion grew
            - Retreatment
        - Old x-ray
          - Lesion shrank
            - Final restoration
          - Lesion grew
            - Retreatment
    - Periapical lesion
      - + Lesion shrank
        - Final restoration
      - - Lesion grew
        - Retreatment
  - + Coronal restoration
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- In vitro leakage models: All root canal fillings leak after a few months (Shemesh et al. 2006)

In other words: Leaking coronal restoration means that the whole root canal systems will be reininfected after a few months.
• Leakage?

Int Endodo J 2003  Bacterial status in root-filled teeth exposed to the oral environment by loss of restoration and fracture or caries--a histobacteriological study of treated cases. Ricucci & Bergenholtz

Conclusion: Well-prepared and filled root canals resist bacterial penetration even upon frank and long-standing oral exposure by caries, fracture or loss of restoration.
Conclusion: Bacterial leakage models are unsuitable for assessing leakage through root filled teeth.
Asymptomatic endodontically treated tooth

- Root canal filling
- Coronal restoration
- Periapical lesion

- Lesion shrank
- Temporary crown + follow up after 6 months

- Lesion grew
- Old x-ray

- Lesion shrank
- Lesion grew

Final restoration

Retreatment

Influence of Ricucci & Bergenholtz On the decision tree
Asymptomatic endodontically treated tooth

Root canal filling

Coronal restoration

Periapical lesion

Lesion shrank

Temporary crown + follow up after 6 months

Old x-ray

Lesion shrank

Lesion grew

Retreatment

Final restoration
How reliable are x-rays in detecting periapical lesions?

“The outcomes of root canal treatment should be re-evaluated in long-term longitudinal studies using CBCT and stricter evaluation criteria.”
Should we treat all periapical lesions?

1. General health?
2. “the accidental finding”
3. Dynamics of the healing process


J Endod. 2011 Association of endodontic infection with detection of an initial lesion to the cardiovascular system. Cotti E et al.

Apical periodontitis as an accidental finding Wesselink P.R 2010

Asymptomatic endodontically treated tooth

- Root canal filling
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              - Retreatment
Critical points and reflection
Alternatives:
1. Surgery
2. Extraction + implant
3. Partial retreatment

Asymptomatic endodontically treated tooth

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  + Coronal restoration
  - Periapical lesion

Temporary crown + follow up after 6 months

Lesion shrank

Lesion grew

Old x-ray

Lesion shrank

Lesion grew

Final restoration

Retreatment

Risks

Surgery

Surgery

Extraction + implant

Partial retreatment

1. Surgery

2. Extraction + implant

3. Partial retreatment
Conclusions

- A guideline/decision tree does not give answers to all situations
- A guideline/decision tree should change constantly according to scientific developments and knowledge
- A guideline makes the decision easier to defend and reproducible (Although not uniform...)
- A guideline/decision tree should always be used together with clinical experience and individual considerations/preferences/expectations of the patient and operator. (And one aspect is not more important than the other)