



# Endodontics: access preparation working length determination

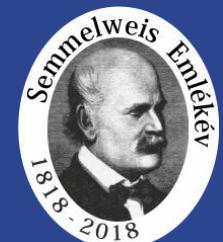
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# Intention of endodontics

Healthy periapical region

- to heal if there is a lesion or
- to save it in healthy condition



# Endodontic therapeutics

- Anamnesis – medical and dental history
- Correct clinical diagnosis (clear symptoms –safe conclusion investigations, tests, X-ray etc)
- Treatment plan
- Indication – contraindications of root canal treatment
- Disinfection, asepsis
- Local anesthesia
- Removal of caries and of all old restorations
- Rubber dam isolation
- Access preparation



# Root canal treatment: sequence

- **correct diagnosis**
- **treatment plan**
- **periapical X-ray**
- **local anesthesia**
- **rubberdam isolation**
- **removing of all old restoration**
- **caries ex**
- **exposing of pulp chamber**
- **preparation of access cavity**



# Endodontic therapeutics

- Anamnese
- Klinische Diagnostik
- Behandlungsplan
- Indikation –Kontraindikation der endodontischen Behandlung
- Desinfektion, Sterilisation
- Anästhesie
- Anlegen des Kofferdamms
- **Preparation of access**
- **Lokalisierung der Kanaleingänge**
- **Determining Working Lengths**
- Aufbereitung und Desinfektion des Wurzelkanals
- Medikamentöse Behandlung des Wurzelkanals
- Provisorische Füllung
- Wurzelkanalfüllung
- Endgültige Restauration



# Access is the most important phase of nonsurgical root canal treatment

1. To achieve straight-line access to the apical foramen or to the initial curvature of the canal
2. To locate all root canal orifices
3. To conserve sound tooth structure

**Ricardo Caicedo; Dr. Odon; Stephen Clark, DMD; Liliana Rozo, DDS and Joseph Fullmer, BA:  
Guidelines for Access Cavity Preparation in Endodontics**



# Access is the most important phase of nonsurgical root canal treatment

Optimal access results in

- straight entry into the canal orifice, with the line angles forming a funnel that drops smoothly into the canal(s)

When prepared correctly, the access cavity allows

- complete irrigation,
- shaping, cleaning, and
- quality obturation

**Ricardo Caicedo; Dr. Odon; Stephen Clark, DMD; Liliana Rozo, DDS and Joseph Fullmer, BA:  
Guidelines for Access Cavity Preparation in Endodontics**



# Root canal treatment: sequence

## preparation of access cavity

- Removal of both caries lesion and old restorations
- Removal of the top of pulp chamber and the coronal pulp
- Straight introduction of the preparations instruments into the root canal



# Root canal treatment: sequence

## Cleaning and shaping of the root canal

**Chemo-mechanical preparation before the obturation (three dimensional hermetic sealing!)**

**1-5.25 % NaOCl (min 20-30'-ig)**

**2 % Chlorhexidin**

**17 % EDTA**

**10 % citric acid**



**Access cavity of a lower first molar; note the three canal orifices are connected by developmental (dark) lines.**

**These lines are sometimes referred to as the 'dentine map'**

**S. Patel & J. Rhodes : A practical guide to endodontic access cavity preparation in molar teeth**  
**BDJ volume203, pages133–140 (11 August 2007)**



**Inadequate  
straight line access  
resulting in the tip  
of the file  
attempting to  
straighten itself  
(red arrow)**



**S. Patel & J. Rhodes** : A practical guide to endodontic access cavity preparation in molar teeth  
*BDJ volume 203, pages 133–140 (11 August 2007)*



**Refining the shape of the access cavity results in unimpeded, straight line access into the root canal**

**S. Patel & J. Rhodes : A practical guide to endodontic access cavity preparation in molar teeth  
BDJ volume 203, pages 133–140 (11 August 2007)**

The mesio-buccal corner of the access cavity has been modified (red arrow) to ensure straight line access into the mesiobuccal canal of this lower molar



**S. Patel & J. Rhodes** : A practical guide to endodontic access cavity preparation in molar teeth  
*BDJ volume 203, pages 133–140 (11 August 2007)*

# **Good access cavity design results in identification and subsequent disinfection and obturation of the entire root canal system**

**S. Patel & J. Rhodes : A practical guide to endodontic access cavity preparation in molar teeth**  
**BDJ volume 203, pages 133–140 (11 August 2007)**



# Endodontic therapeutics

- Canal locations
- Determination of working length
- Shaping, cleaning, disinfection
- Intracanal medication
- Temporization
- Obturation
- Restoration



# Endodontic therapeutics

Diagnostic radiograph – pre-operative  
parallel projection  
periapical X-ray (initial diagnostic picture)

(OP ?)



*Access preparation is the most important phase of the technical aspects of root canal treatment!*

- *Straight-Line Access*
- Removal of pulpa
- Minimal removal of healthy hart tissue



# Preparation of access cavity

**Minimal removal of healthy tissue**

- knowledge of the internal tooth morphology
- X-ray pre-operative
  - Opening the pulp chamber
  - Localise canal entrances
  - Rootcanal - axis
    - curved canal
    - narrow canal



# Preparation of access cavity

Destroyed tissue – ex (minimal-invasive)

- Knowledge of the internal morphology !!!
- X-ray



# Preparation of access

Knowledge of the internal morphology!!!



# Preparation of access

Knowledge of the internal morphology!!!



# Preparation of access

Knowledge of the internal morphology!!!

MicroCT (microcomputed tomographic imaging)

A. bucco-lingual   B. mesio-distal

Plotino et al.: JA DA 137:1555-1561. 2006

# Preparation of access

## Instruments

Diamond bur for the enamel



# Preparation of access Instruments

- Dentinpreparation



# Preparation of access Instruments



# Preparation of access Instruments



# Lokalisierung der Kanaleingänge

- 7 mm to the base of pulp chamber
- 3 mm to bifurcation

Micro opener



Peeso Reamer



Gates-Glidden Bohrer

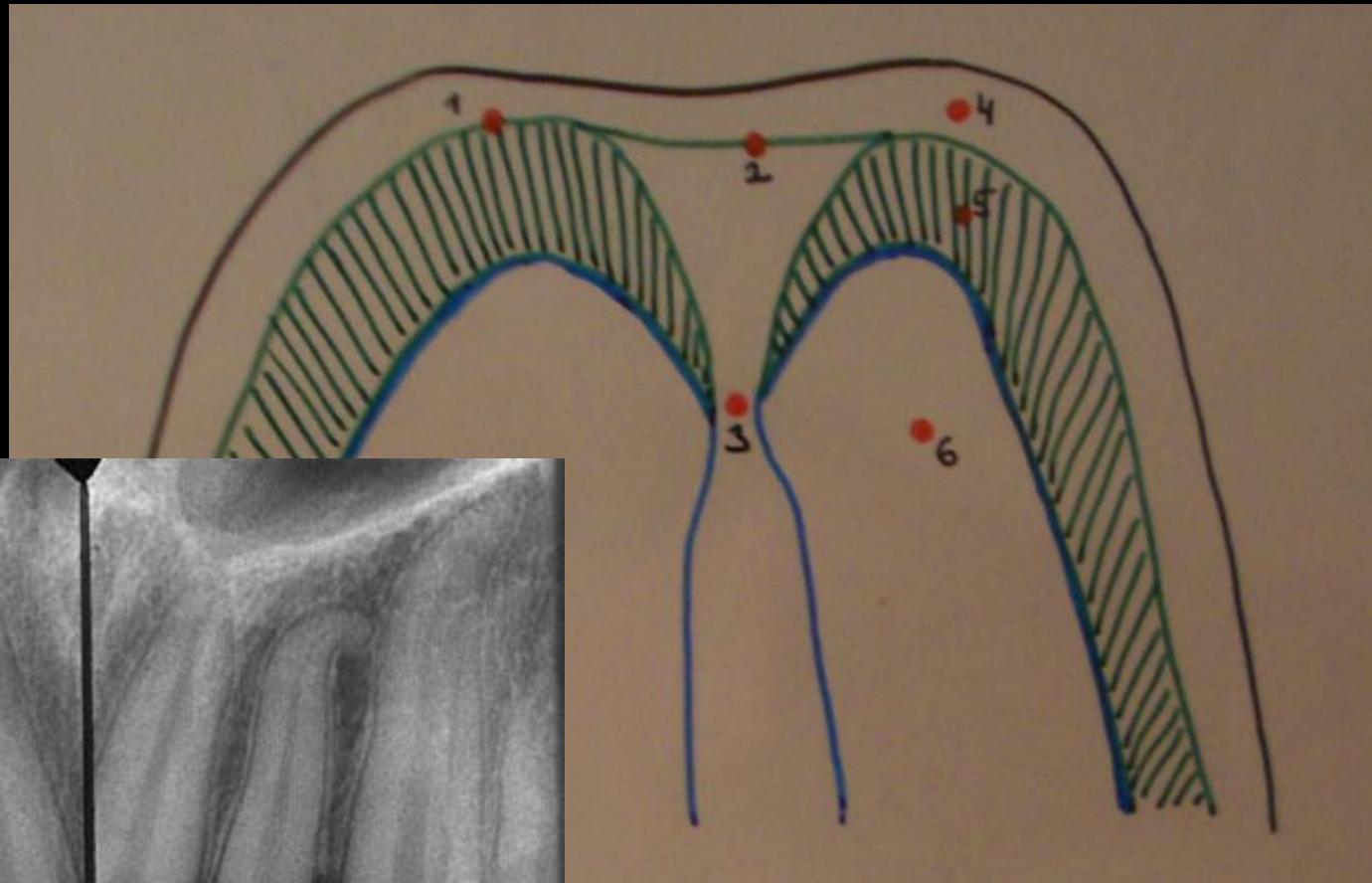
In 6 sizes

50 - 70 - 90 -  
110 - 130 - 150

# Working length determination

- **Estimation in preoperative periapical X-ray - picture**
- **Electronic determination – apex locator**
- **Radiological – paralel projection**
  
- **Tactile feeling**
- **Patient's feed-back**





This case was submitted by Dr. David Hatcher