IMPORTANCE OF THE RADIOGRAPH IN ENDODONTICS

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THE OBJECTIVE OF OBTURATION:

is to create a **complete seal** along the length of the root canal, from coronal opening to the apical determination.

Radiograph
THE RADIOGRAPH IN ENDODONTICS

1. Why is it recommended to make radiograph during the root canal treatment?

2. What kind of radiographs recommended?

3. When is it recommended to make radiographs?
ANATOMIE OF THE APICAL THIRD OF ROOT CANAL THE LENGTH OF THE OBTURATION

Requirement:

- foramen physiologicum (3)
  (physiological apex)

Apical third of root canal
- apical constriction (3)
- foramen apicale (2)
  (foramen anatomicum)
- radiological apex (1)

There is a different distance between 1-3.
THE ROLE OF THE RADIOGRAPH IN ENDODONTICS

1. Why it is recommended to make radiograph during the root canal treatment?

2. What kind of radiographs recommended?

3. When it is recommended to make radiographs?
What kind of radiograph?

Periapical radiograph, with paralleling technique with longtube

- film and tooth axel is parallel (filmholder)
- longtube technique X-ray parallel
X-ray arrives the film/sensor at about 90°
CONE (TUBE)-IMAGE SHIFT

Can be:

- Orthoradiale (facial) projection (basic!)

- Excentric (20-30°)
  - mesial-excentric
  - distal-excentric

(mesial, or distal projection)

Reveals the third dimension!
The lingual root moves in the same direction as the cone, and the buccal root moves in the opposite direction.

**SLOB rule**: same lingual, opposite buccal (tube movement)
ORTORADIALE and EXCENTRIC RADIOGRAPH
Facial and mesial or distal projection

SLOB rule

Facial projection
Other technic

**BISECTING** technique

**MODIFIED PARALLELING** technique: neither parallel, nor bisecting

Film and tooth are not parallel!
Earlier Conical tube was used, in this case the direction of the X-ray was not parallel.
ROLE OF THE RADIOGRAPH IN ENDODONTICS

Why is it recommended to make radiograph during the root canal treatment?

What kind of radiograph recommended?

3. When it is recommended to make radiograph?
   - before the treatment (diagnostic radiograph)
   - during the treatment (working length determination)
   - after the treatment (control radiograph)
PREOPERATIVE, WORKING LENGTH DETERMINATION, CONTROLL RadioGraph

Apex locator
Needle control
1. PREOPERATIVE or DIAGNOSTIC RADIOGRAPH

AIM:

- Anatomic structures
  extension of pulp chamber, curved or not curved root

- Diagnostic information
  (periapical process)

- Estimated working length determination
1. PREOPERATIVE or DIAGNOSTIC RADIOGRAPH

- **Estimated working length** determination
  - reference point
  - measuring the distance between the reference point and radiologic apex
  - ? mm will be removed from this distance? Depends on:
    - digital technic or film are used
    - film: magnification 10% (at about 2 mm)
    - radiologicum-physiologicum: 1 mm

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Film</th>
</tr>
</thead>
<tbody>
<tr>
<td>digital technic: only 1 mm</td>
<td>18 mm</td>
</tr>
<tr>
<td>- 1 mm</td>
<td>- 3 mm</td>
</tr>
<tr>
<td>17 mm</td>
<td>15 mm</td>
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</tbody>
</table>
Aim:

to check the estimated working length

PRECONDITION

- Reference point
- Silicon stop
- Stable file in canal
  (mindestens ISO 15)
- Endoblock or ruler
2. WORKING LENGTH DETERMINATION with Apex-locator

- **Apex-Lokator**: measures resistance
  - Development: direct current, alternating current, and impedance-equotient (in either a wet/dry canal can be used)

- Two electrode:
  - one is in tooth, the other is in contact with the lip.

When tip of the file touches the foramen anatomicum, current begins to flow.

Foramen anatomicum
Different apex-lokators
At the clinic with students the most frequently used apex-locator is:

- Red: foramen anatomicum
- Yellow: the field of physiologicum
- Green: we haven’t arrived the foramen physiologicum

The light shows, how deep we are. *Light + Sound*
EVALUATION OF WORKING LENGTH DETERMINATION (needle-control or apex locator)

- The working length is good. There is 1-2 mm distance between the end of the needle and the radiological apex.

Apex-locator: (sound, color, mm)
(Foramatron: for.anat. = red, above yellow, green)

- The working length is too short.
- The working length is too long.

If the distance more than 3 mm, in this case has to make a second radiograph with the corrected working length.
**CALCULATION**

\[ LT = \frac{LTR \times LIT}{LIR} \]

- **LT** length of the tooth?
- **LIT** length of the instrument
- **LTR** length of the tooth on RTG
- **LIR** length of the instrument on RTG
3. EVALUATION OF OBTURATION

- The **length** of the root canal filling
  - (good, short, long)

- The **density** of the root canal filling
  - Uniform density from coronal to apical
  - (voids, bubble)
- **Shape**: It should be tapered from coronal to apical region.

- **Coronal removal**: material remains or not remain in the chamber
PREOPERATIV or DIAGNOSTIC RADIOGRAPH

- diagnosis
- anatomic information
- **estimated working length** determination
WORKING LENGTH DETERMINATION or NEEDEL CONTROLL

- rubber dam
- silicon stop
- reference point
- Stable file in canal (at least ISO 15)
- endoblock or ruler
CONTROLL, AFTER THE OBTURATION

- the length
  (good, short, or long)

- density
  (bubble, homogene)

- The shape
  (taper)
UPPER FIRST PREMOLARE
UPPER FIRST PREMOLAR
UPPER FIRST MOLAR
LOWER SECOND MOLAR

Pulp chamber?
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