



# Introduction to Endodontics

*Presented by*

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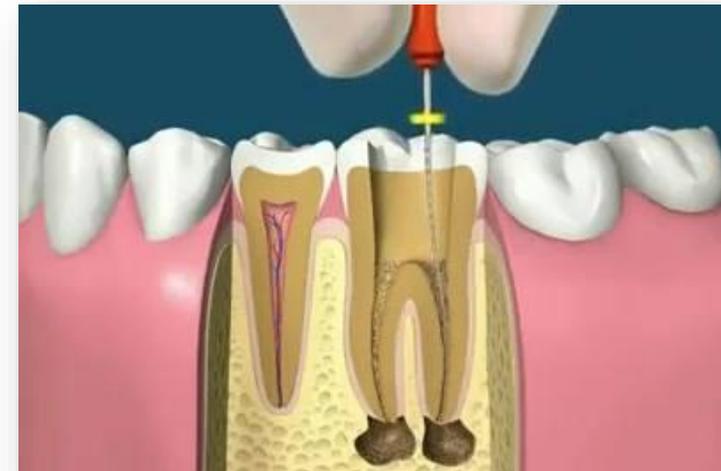
Prof. of Dental Biomaterials

Faculty of dentistry

# OBJECTIVES

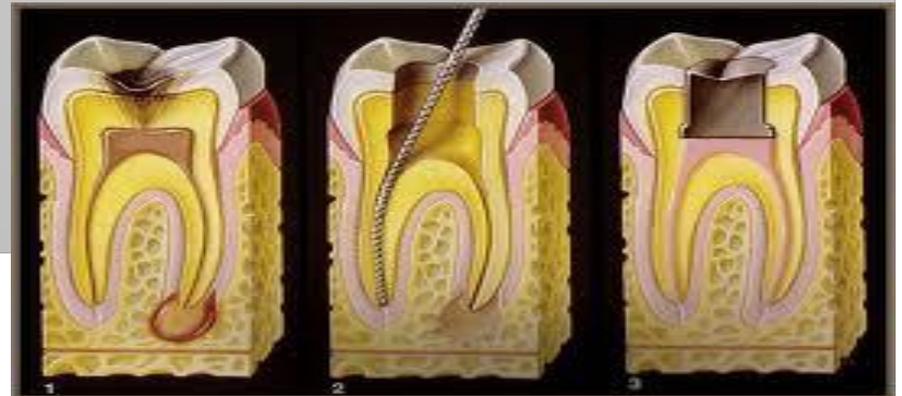
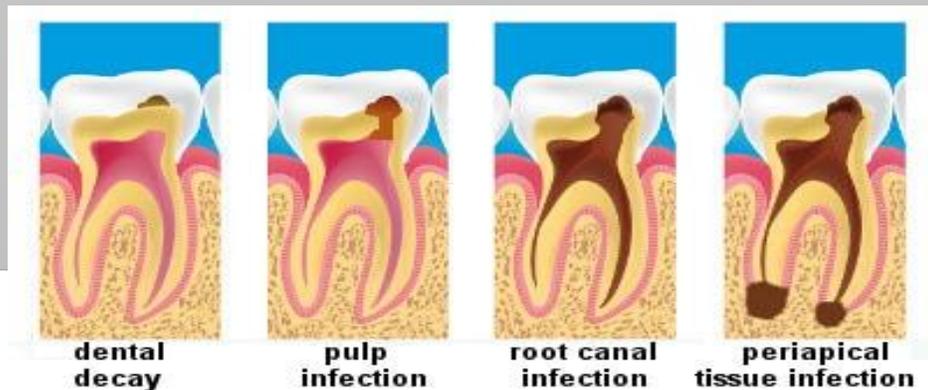


- To know the diagnosis in pulp testing, aims, indication and contraindication of root canal treatment
- To know the different steps of root canal treatment



# DEFINITION

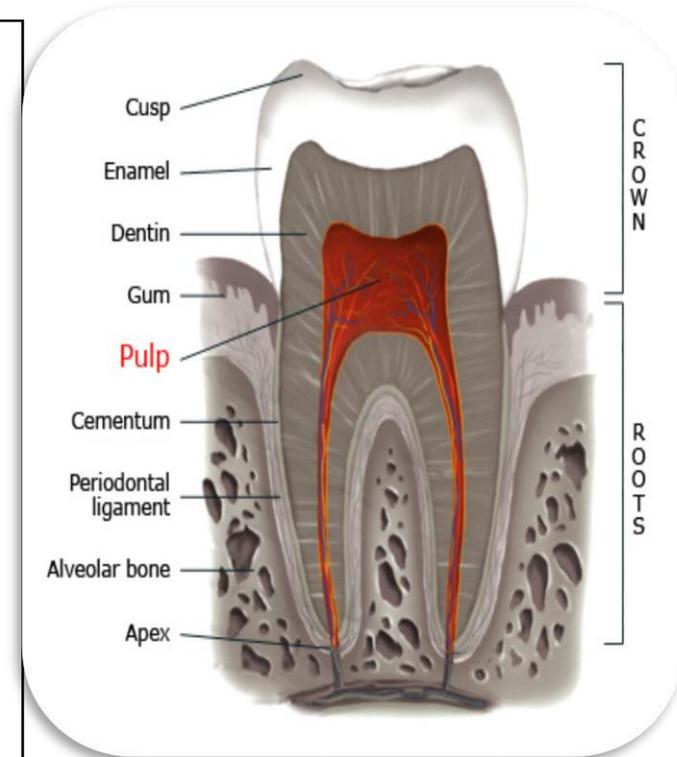
- **Endodontics** is the specialty of dentistry that manages the prevention, diagnosis, and treatment of the dental pulp and the periradicular tissues that surround the root of the tooth.
- **Endodontology** is the branch of dentistry concerned with the study of form(anatomy), function and health of (Physiology), injury to and diseases of(pathology) the dental pulp and periradicular region and their treatment



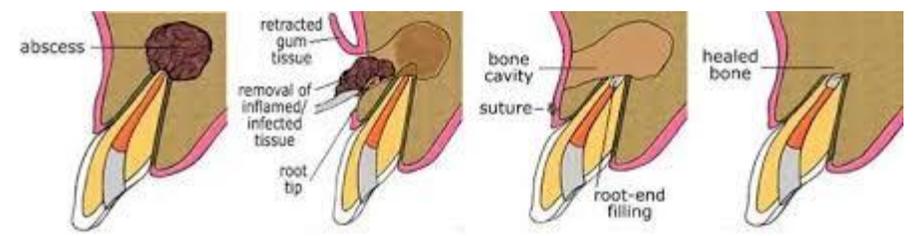
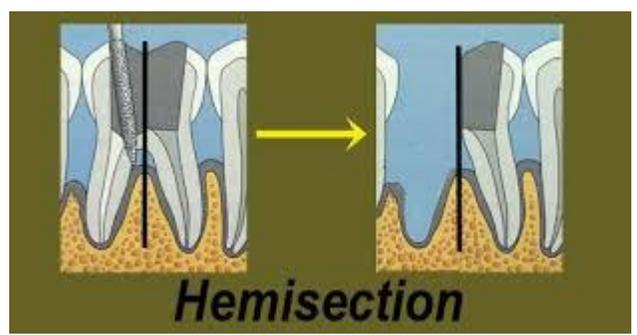
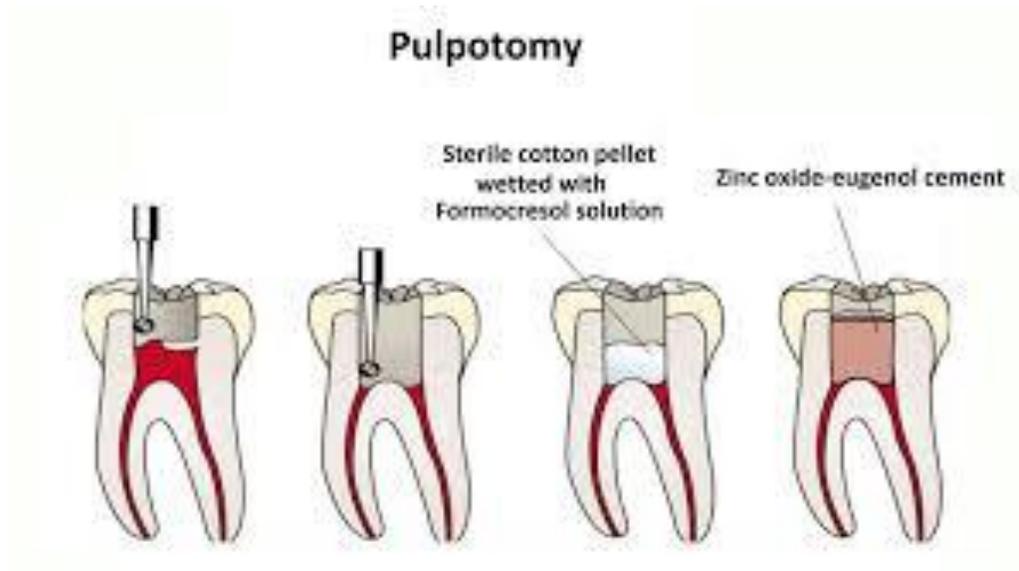
# Endodontic treatment

Endodontic treatment encompasses any procedure designed to maintain **all, or part of the pulp**, such as,

1. Diagnosis of **oral pain**,
2. Protection of **healthy pulp** from disease or injury,
3. **Pulp capping** (both direct and indirect),



4. Pulpotomy,
5. Pulpectomy,
6. Root canal treatment of infected root canals,
7. Surgical endodontics (Apicectomy, hemisection, root amputation, replantation )



# Aims Of Endodontic Treatment



- ***Biologic aims***

a) To **remove** all the **debris** support to bacterial growth

b) To **destroy** all micro-organisms from the root canal

- ***Mechanical aims***

\* **Prepare** root canal space for **three dimensional filling**

# Dental pulp testing

- ❖ Electric pulp tester
- ❖ Thermal pulp test :
  - Heat guttapercha sticks
  - Cold ethyl- chloride
  - Ice sticks



Electric pulp tester

HOT Gutta-percha stick placed



Chilled cotton pellet is placed



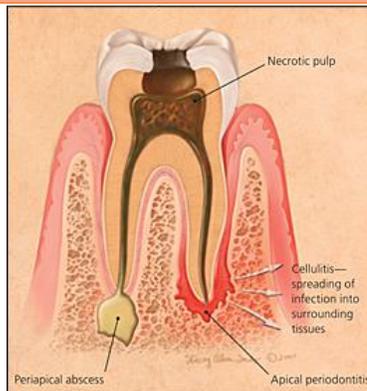
# Diagnosis of pulpitis

- **Palpation**

- ✓ Palpation the **sight** and **size** of any **soft** or **hard swelling** – examine for **fluctuation** and **crepitus**

- **Percussion**

- ✓ **gentle tapping** with finger – both lateral and vertical



- **Mobility**

Mobility (slight, moderate, and extensive – lateral and vertical

- **Pocket depth**

- **Biting on individual cusp**

- **Mouth opening** : Restricted mouth opening

Bite test



**Mobility**



depth  
Measurement  
of pocket

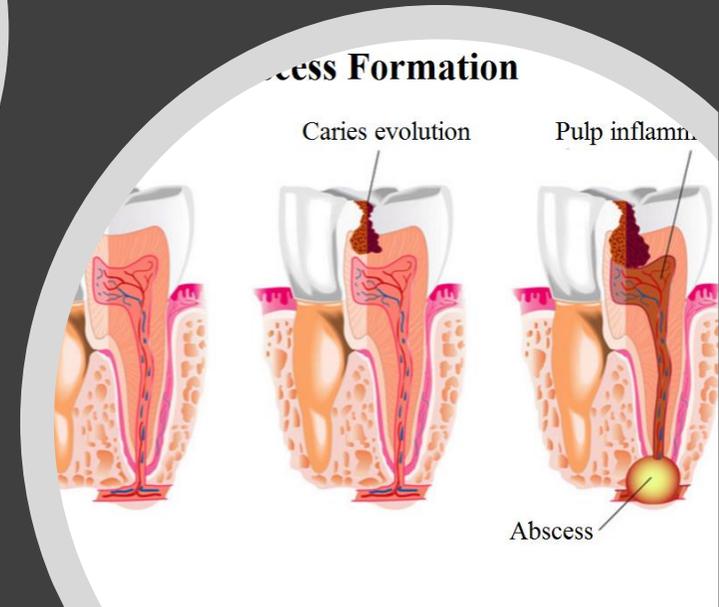
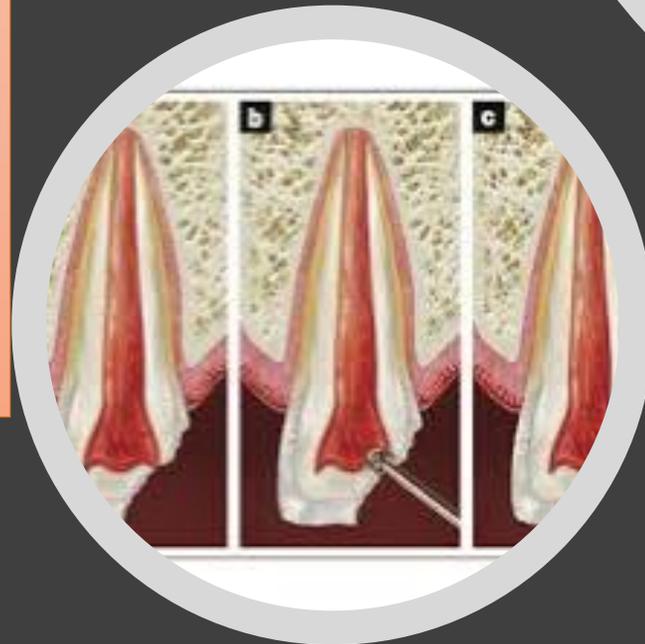
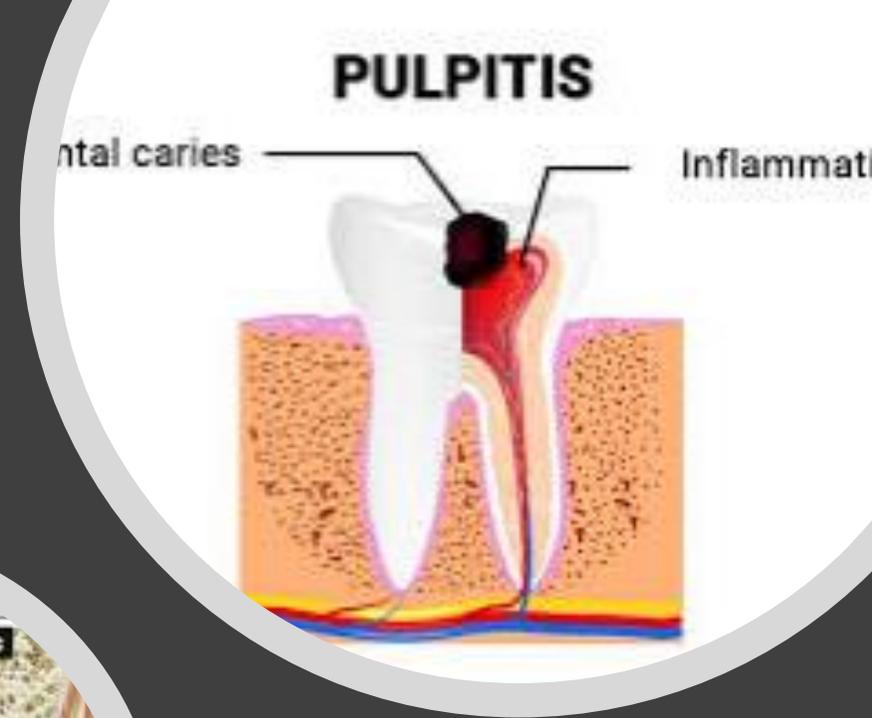


Restricted  
mouth opening



# Indication for root canal treatment

1. Severe pulpitis or irreversible pulpitis
2. Acute peri-apical lesion
3. Teeth with peri-radicular lesion or apical cyst
4. Teeth with chronic peri-apical lesion
5. Traumatic or carious exposure



6. Elective pulpotomy.

7. Preparation of Bridge.

8. Preparation of post space.

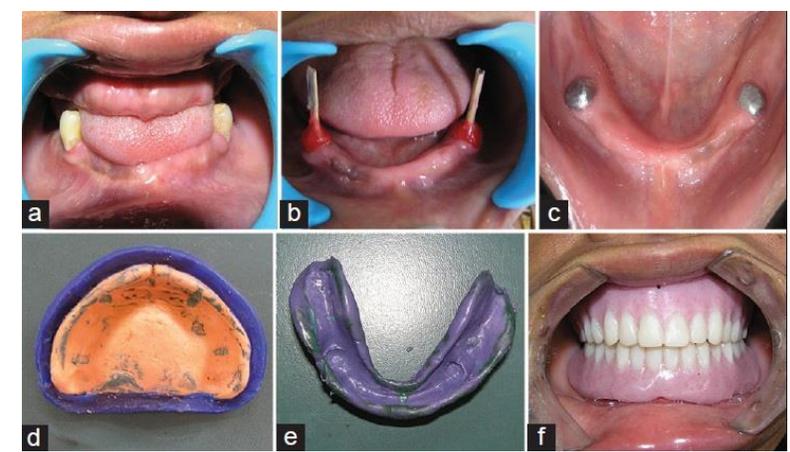
9. Preparation of overdenture.

10. Periodontal disease.

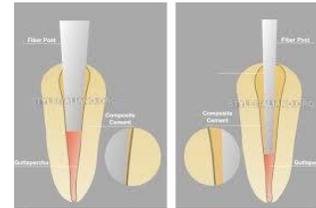
11. Hypereruption or Supra-eruption.

12. Malformed or deformed teeth

13. Discolored teeth



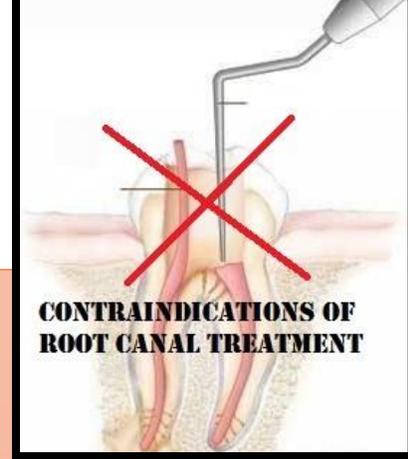
Overdenture case



Bridges



# Contra indication (general)

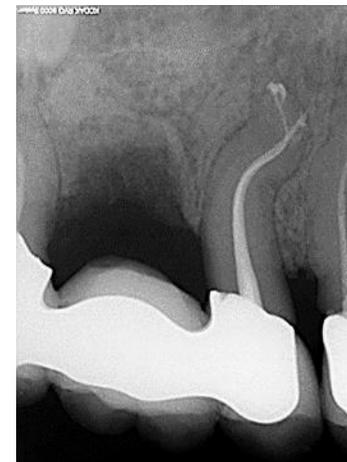
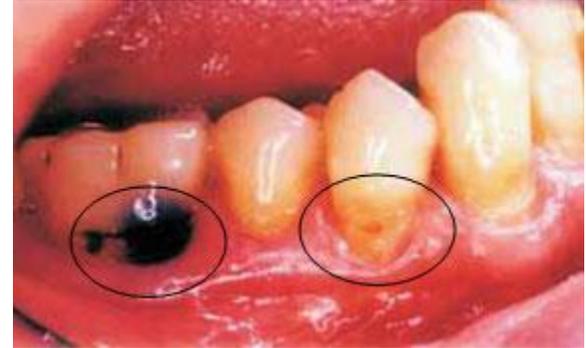
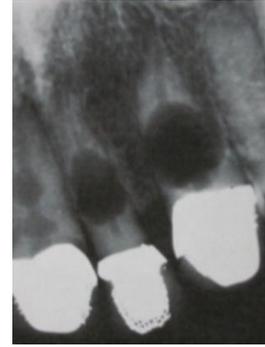


CONTRAINDICATIONS OF  
ROOT CANAL TREATMENT

1. **Inadequate access** – Restricted mouth opening
2. **Poor oral hygiene** – patient should be able to maintain a healthy mouth
3. **Patients general medical condition** – Chronic debilitating disease or very old age
4. **Patients attitude** – Patient should be sufficiently educated and motivated

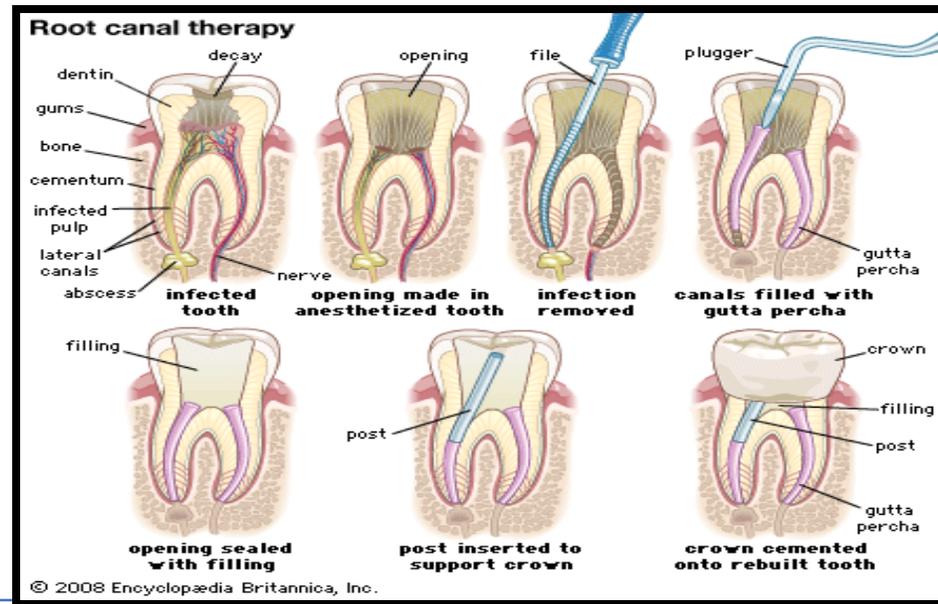
# Contra indication (Local)

- 1.Short crown.
- 2.Root caries.
- 3.Caries to bifurcation point.
- 4.Fracture below the gingival margin.
- 5.Insufficient periodontal support
- 6.Root fracture
- 7.Internal or external resorption
- 9.Bizarre anatomy – exceptionally curved tooth



# Root canal treatment

- The **purpose** of root canal treatment is either to **maintain asepsis of the root canal system** or to **disinfect it adequately**.



# Preoperative radiograph

A preoperative radiograph showing at least the full root(s) and approximately **2–3 mm of periapical region**, must be examined prior to treatment.



# Local anaesthesia

The need for local anaesthesia should be considered and given as appropriate.



# Preparation of tooth

- ✓ All caries and defective restorations should be removed and, if necessary, the occlusion adjusted and the tooth protected against fracture.
- ✓ The tooth should be capable of being restored and isolated and the periodontal status should be sound or capable of resolution.

Defective restorations



# Isolation of tooth

Root canal treatment procedures should be carried out

only when the tooth is isolated by rubber dam to:

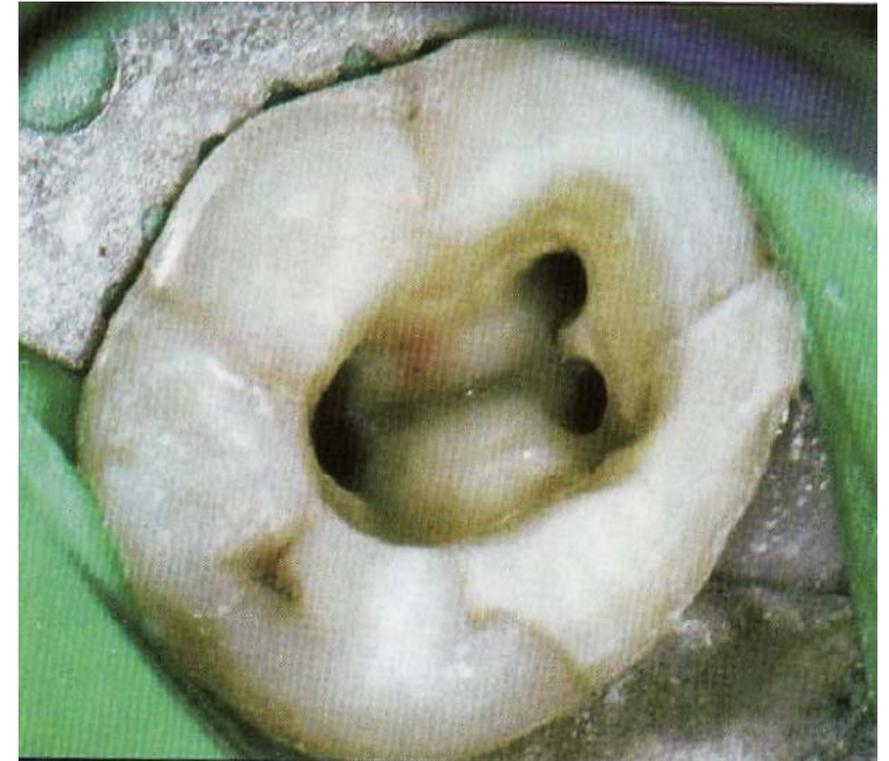
- ✓ prevent salivary and bacterial contamination,
- ✓ prevent inhalation and ingestion of instruments and
- ✓ prevent irrigating solutions escaping into the oral cavity.



# Access cavity preparation

The **objectives** of the access cavity preparation are to:

- ✓ remove the roof of the pulp chamber so that this chamber can be cleaned and good visibility of **the canal orifices** can be obtained,
- ✓ enable root canal instruments to be introduced into the **root canal(s)** without undue **bending**,
- ✓ offer sufficient retention for a temporary restoration and
- ✓ **conserve as much sound tooth tissue** as possible that is compatible with the above.

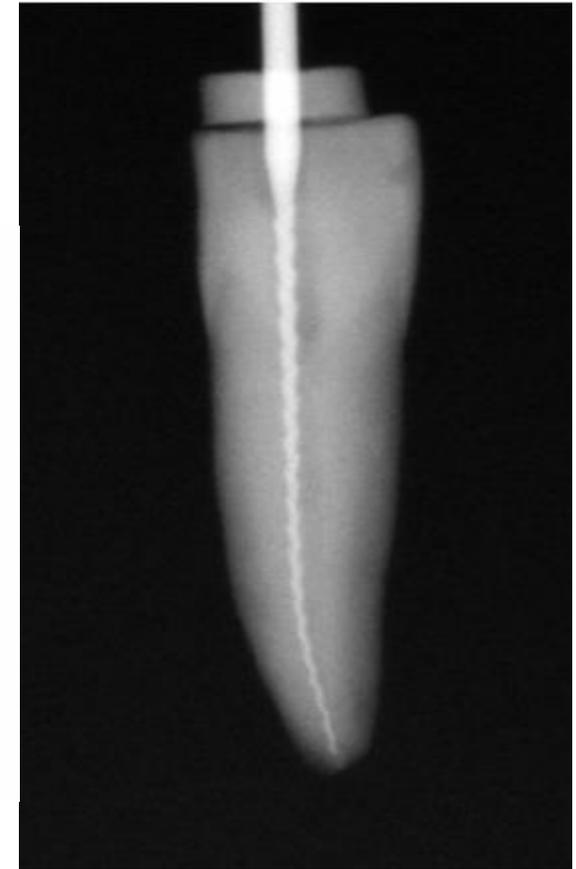
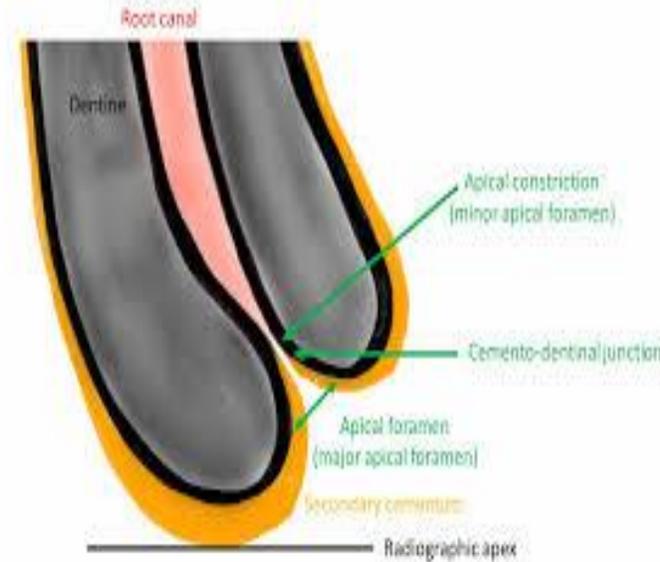


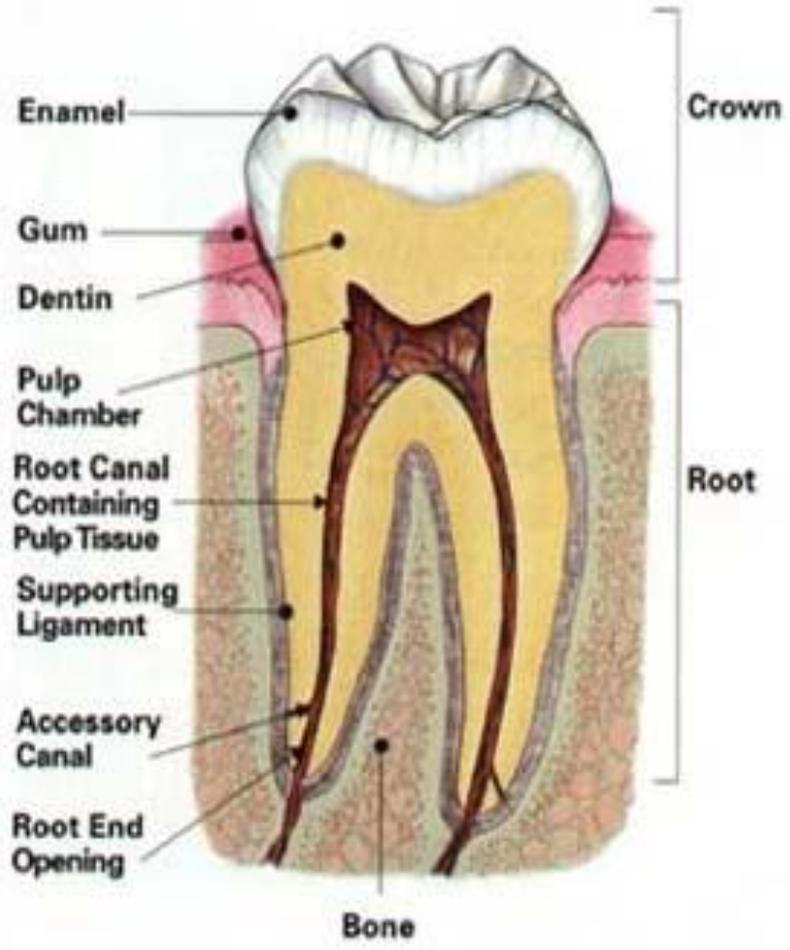
# Determination of working length

-The **objective** of determining the working length is to enable the root canal to be prepared as close to the apical constriction as possible.

-The location of the apical constriction normally varies between **0.5 and 2 mm from the radiographic apex.**

-Recommended methods are **electronic** and **radiographic**.

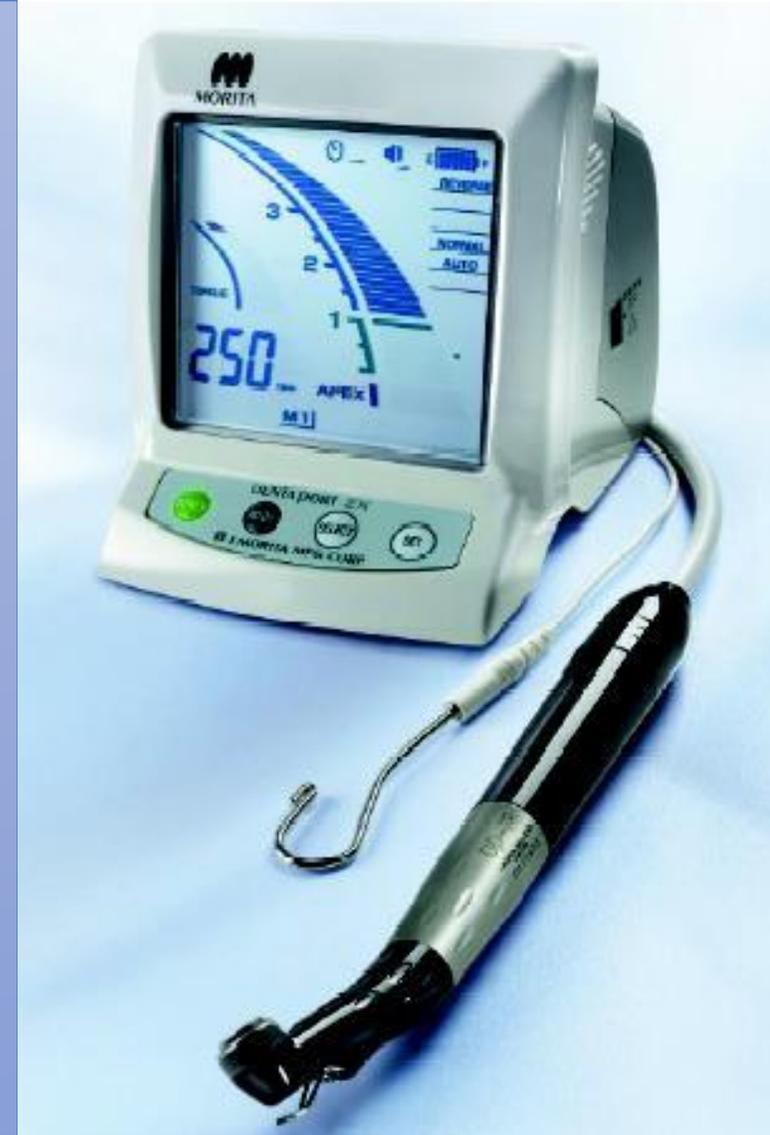




# Electronic

-Electronic devices measure the length of the root canal **accurately** in most cases.

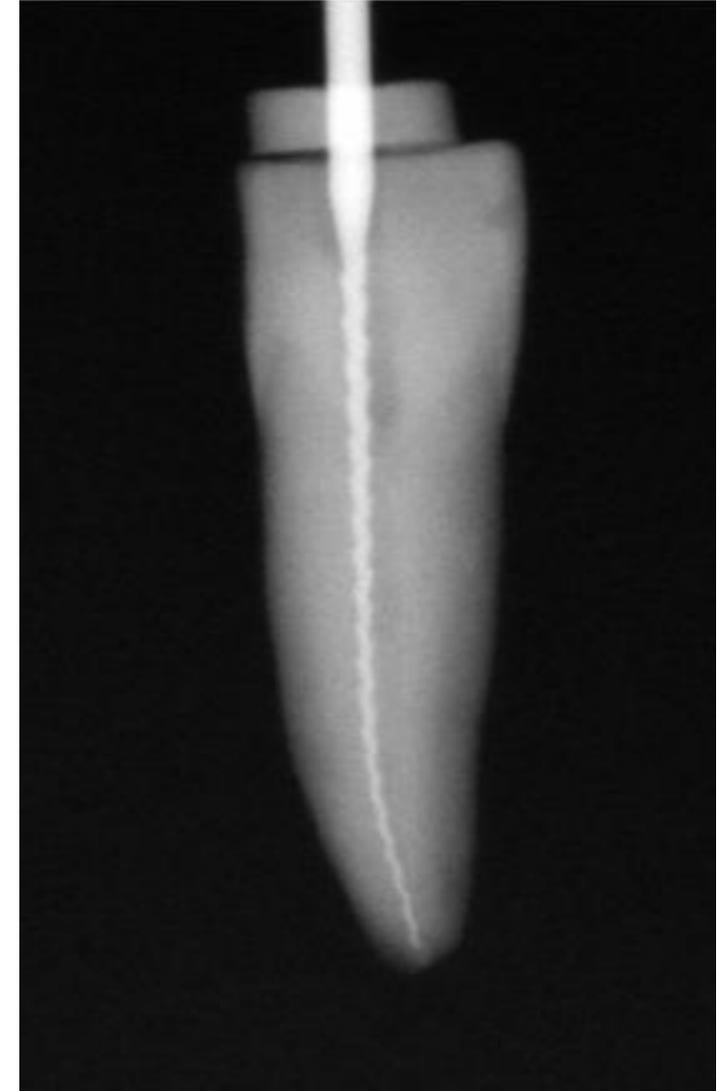
-The working length should normally be **confirmed radiographically**.



# Radiographic

--The **instrument** should be equipped with some form of length indicator and be of **sufficient size** so that **its tip** can be clearly **identified** on the **radiograph**.

--A radiograph is then taken which should show the instrument and the apex with minimal distortion.

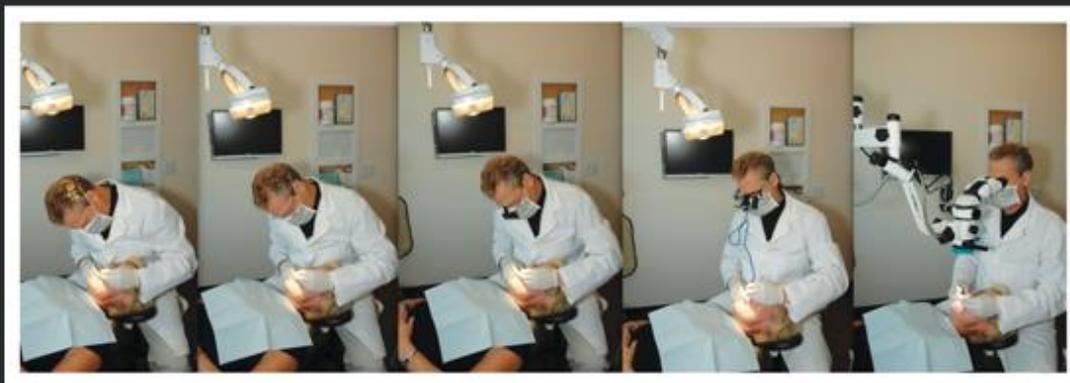


# Preparation of the root canal system

The **objectives** of preparation are to:

- remove remaining pulp tissue,
- eliminate microorganisms,
- remove debris and shape the root canal(s) so that the root canal system can be cleaned and filled.

The use of **magnification** and **additional sources of light** facilitate identification of root canal anatomy.



Naked Eye

Reading Glasses

2.5x Loupes

4.8x Loupes With Headlight

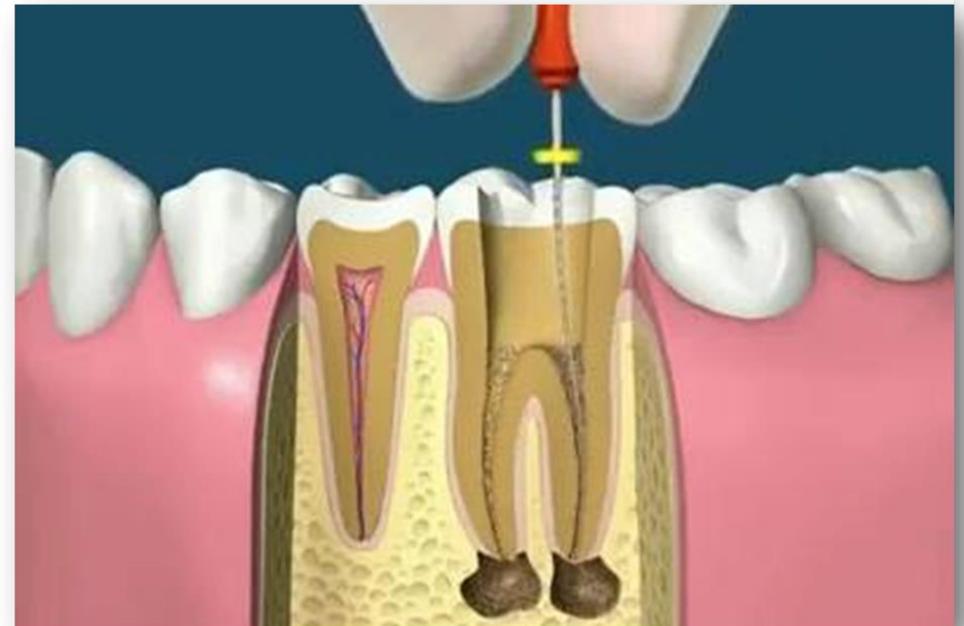
Operating Microscope



# Preparation of the root canal system

The requirements should be:

- the prepared canal should include the original canal,
- the apical constriction should be maintained,
- the canal should end in an apical narrowing and the canal should be tapered from crown to apex.
- Preparation should be undertaken with copious irrigation.
- The final length of the preparation should not be reduced by treatment.



# Inter-appointment medication

The objectives of inter-appointment medication are to prevent growth and multiplication between visits of microorganisms left in the canal system despite cleaning.

They should be used following proper cleaning and irrigation and to support the tissue-dissolving effects of irrigating solutions.

This stage is rarely necessary after pulpectomy and root canal preparation of a tooth with a vital pulp



# Inter-appointment medication

An effective temporary restoration is essential to prevent contamination of the canal system between visits.

The requirements of an **inter-appointment disinfectant** are:

- have long-lasting disinfectant action,
- be biocompatible,
- be removable and
- be non-damaging to tooth structure or the restorative material.

# Filling of the root canal system (**Obturation**)

The **objectives** are:

to prevent the passage of microorganisms and fluid along the root canal and to fill the whole canal system, not only to block the apical foramina but also the dentinal tubules and accessory canals.

**Materials** used to fill the root canal system should be: **biocompatible, dimensionally stable, able to seal, unaffected by tissue fluids and insoluble, nonsupportive of bacterial growth, radiopaque, and removable from the canal if retreatment needed.**

Gutta percha



## ROOT CANAL TREATMENT



Before Treatment



After Treatment