

Root canal filling materials



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What is meaning of root canal filling?



Endodontic instruments

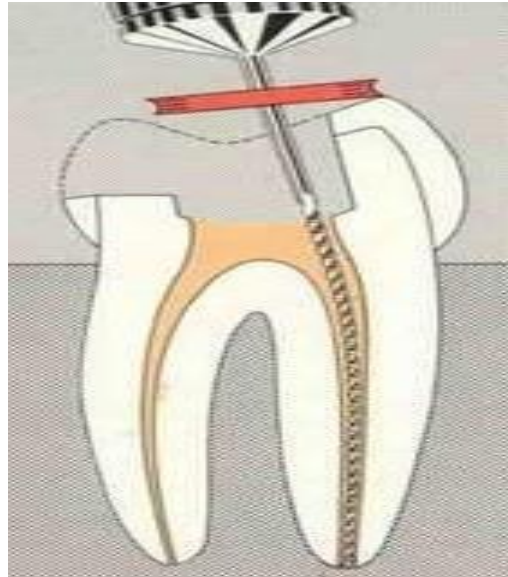
Endodontic instruments

These are instruments used to remove the pulp tissue during root canal treatments

.1**Stainless steel:** They are either hand use or motor driven , they are either reamers or files

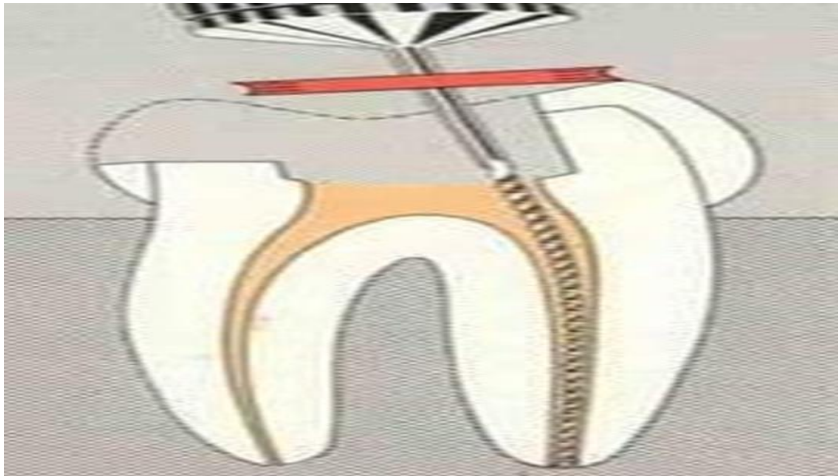
Properties

- a. High torsion strength
- b. High bending strength
- c. Corrosion resistant
- d. Good cutting ability
- e. Sterilization should not have bad effect on the cutting ability or on corrosion resistance.

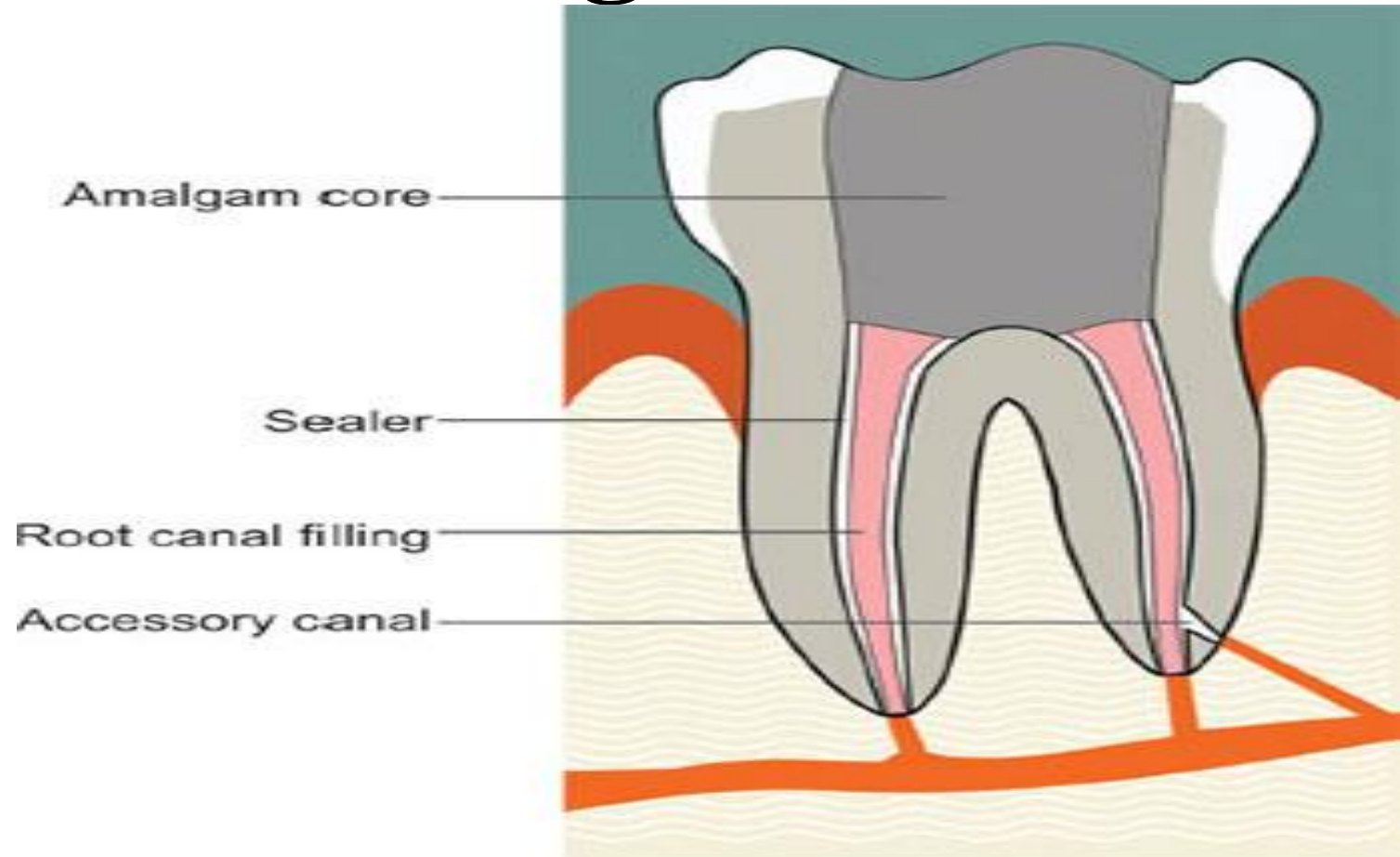


Endodontic instruments

.2Nickel-titanium: These have higher strength and lower modulus of elasticity and are super elastic than stainless steel instruments.



Obturating materials



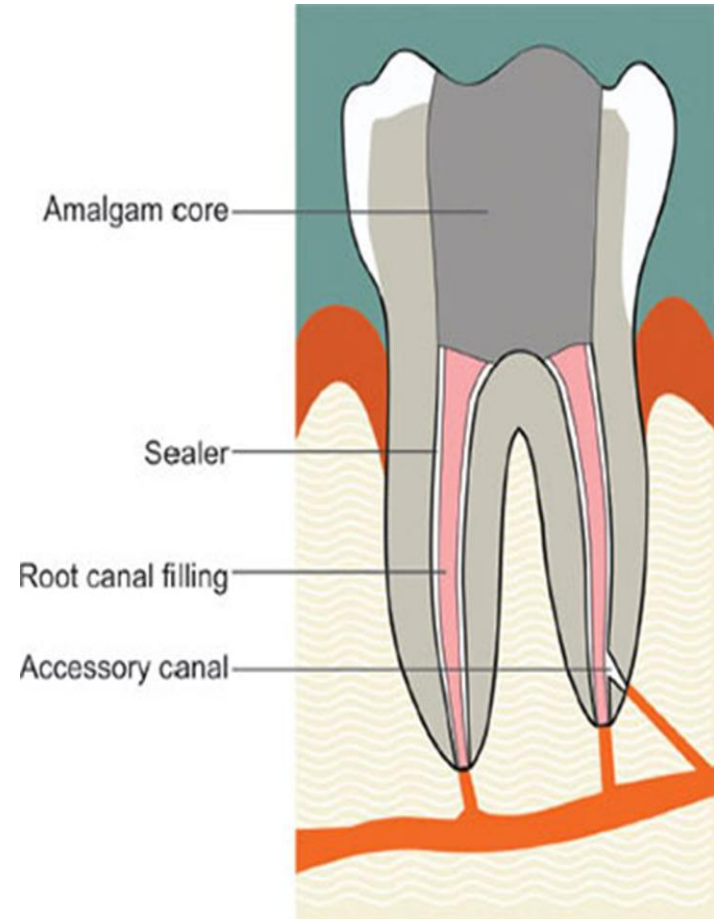
Obturating materials: material that will fill the canal space

Obturating materials can be classified as:

1. Solid materials.
2. Semisolid (paste or softened form)

Desirable properties of obturating materials:

1. Easily introduced into the canal.
2. Seal the canal laterally and apically.
3. Not shrink after being inserted.
4. Should be bactericidal or reduced bacterial growth.



Desirable properties of obturating materials:

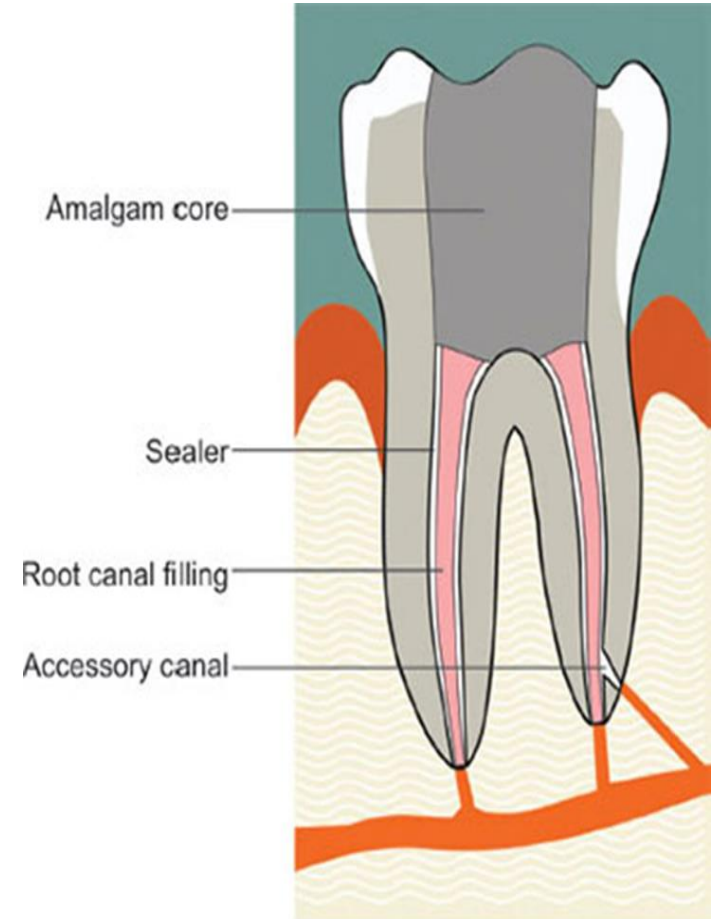
6- Radiopaque.

7- Not stain tooth structure.

8- Not irritant to periapical tissue or affect tooth structure.

9- Easily sterilized.

10- Easily removed from the root canal.



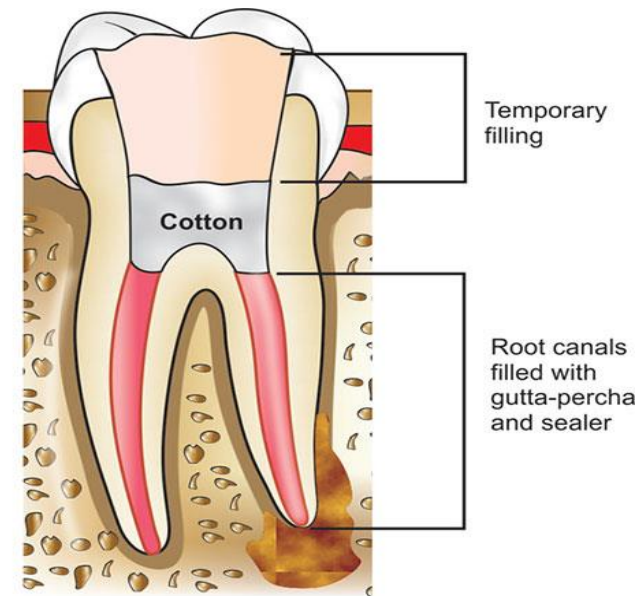
Solid Obturating materials:

The most common type of these materials is :

Gutta- Percha and Synthetic resin- based core material.

The major advantages of these materials is the

- ability to control length ,
- reasonable ability to adapt to irregularities
- to create an adequate seal.

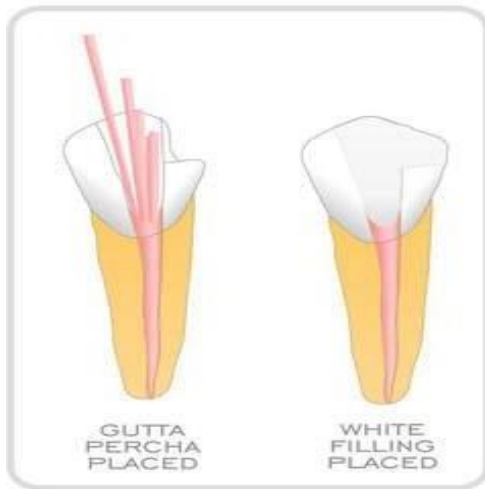


Gutta- Percha: It is the standard to which other materials are compared because of its advantages like:

- Plasticity (it adapts with compaction to irregularities in prepared canal.)
- Easy to manipulate.
- Easy to remove either partially or totally.
- It has relatively little toxicity.



- It tends to be self sterilizing
- if there is a possibility to be contaminated they can be sterilized by immersion in 1% sodium hypochlorite for 1 minute.



Disadvantages:

1. It lacks adhesion to dentine and a slight elasticity, which causes a rebound and pulling away from the canal wall.
2. Warmed gutta-percha shrinks during cooling, also after evaporation of a solvent when immersed for sterilizing.



Composition:

1. Zinc oxide (\pm).(75%
2. Gutta- perch (20% give plasticity.(
3. Binders.
4. Opaque material.
5. Coloring agents.



1Pack/60Pcs



Resin obturating material: As a potential replacement for Gutta- Percha ,

Advantages

1. Noncytotoxic material.
2. Biocompatible.
3. No mutagenic.



Silver points: Silver points are pure silver, were designed to correspond to the last file size used in preparation and fill the root canal in all dimensions .

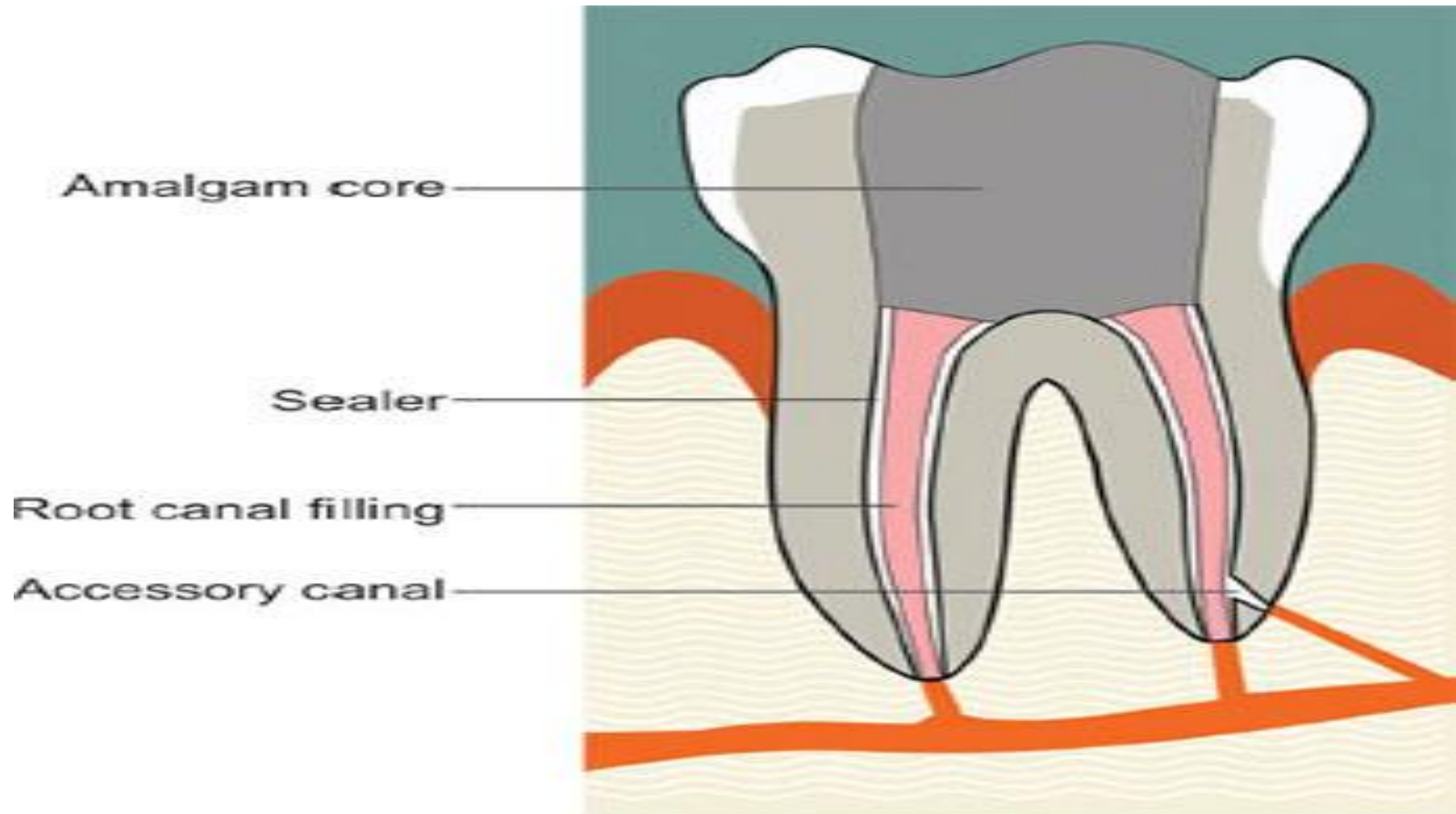
Disadvantages:

- 1.No adaptability.
- 2.Toxicity from corrosion.
- 3.Tight frictional fit and hardness
- 4.Silver cones difficult to remove partially or totally.



Rest for 5 min. only

Endodontic sealers:



Endodontic sealers: Sealer is more important than the core obturating material ;

The objective for using a sealer to provide a fluid-tight seal .

Sealer must be used in conjunction with the obturating material, regardless to technique or material used



Requirements

1. High flow to penetrate into irregularities and accessory canals of the root
2. Low film thickness & low solubility
3. Radiopacity & dimensional stability
4. The sealer and its component should neither cause tissue destruction nor cell death.
5. Sealer should provide adequate working time for placement and manipulation of an obturating material.

Requirements

- 6- Adhesiveness (a truly adhesive material would form an absolute bond between the core obturating material and dentine)
- 7- Remnants should not cause future stain of the crown.
- 8- Sealer should be soluble in a solvent (retreatment may be necessary)
- 9- Sealer should be insoluble to oral and tissue fluids.
- 10- Sealer should be bactericidal.

Types of sealers:

Zinc Oxide Eugenol

Zinc oxide–eugenol sealers have been used for many years .



Zinc Oxide Eugenol

They have certain properties as:

1. Exhibit a slow setting time .
2. Shrinkage on setting.
3. Solubility especially when extruded outside the root canal.
4. Stain tooth structure.
5. It has antimicrobial activity.



Calcium Hydroxide Sealers.

They were developed for their antimicrobial activity and osteogenic–cementogenic potential .



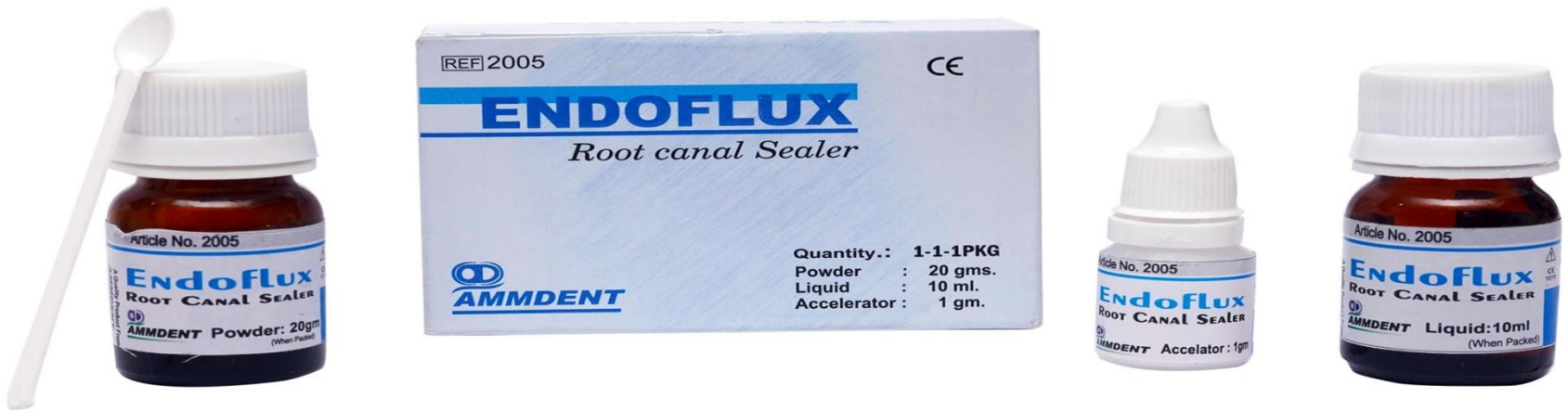
Noneugenol Sealers.

They are root canal sealers without the irritating effects of eugenol.



Glass Ionomer Sealers.

The glass ionomers have been developed in root canal obturation because of their dentin- bonding properties .



Properties of this group:

- 1- It enables adhesion between the material and the canal wall.
- 2- It is difficult to properly treat the dentinal walls in the apical and middle thirds with modifying agents to receive the glass ionomer sealer.
- 3- It has minimal antimicrobial activity.

Resin sealers.

These sealers provide adhesion, and do not contain eugenol.



Silicone Sealers.

RoekoSeal is a polyvinylsiloxane that is supposed to expand slightly on setting.



Bioceramic sealers.

It is composed of zirconium oxide, calcium silicates, calcium phosphate monobasic, calcium hydroxide, and various filling and thickening agents.



Properties of this group:

1. It is a hydrophilic sealer it utilizes moisture within the canal to complete the setting reaction.
2. It does not shrink on setting.
3. It is biocompatible.
4. It exhibits antimicrobial properties during the setting reaction.

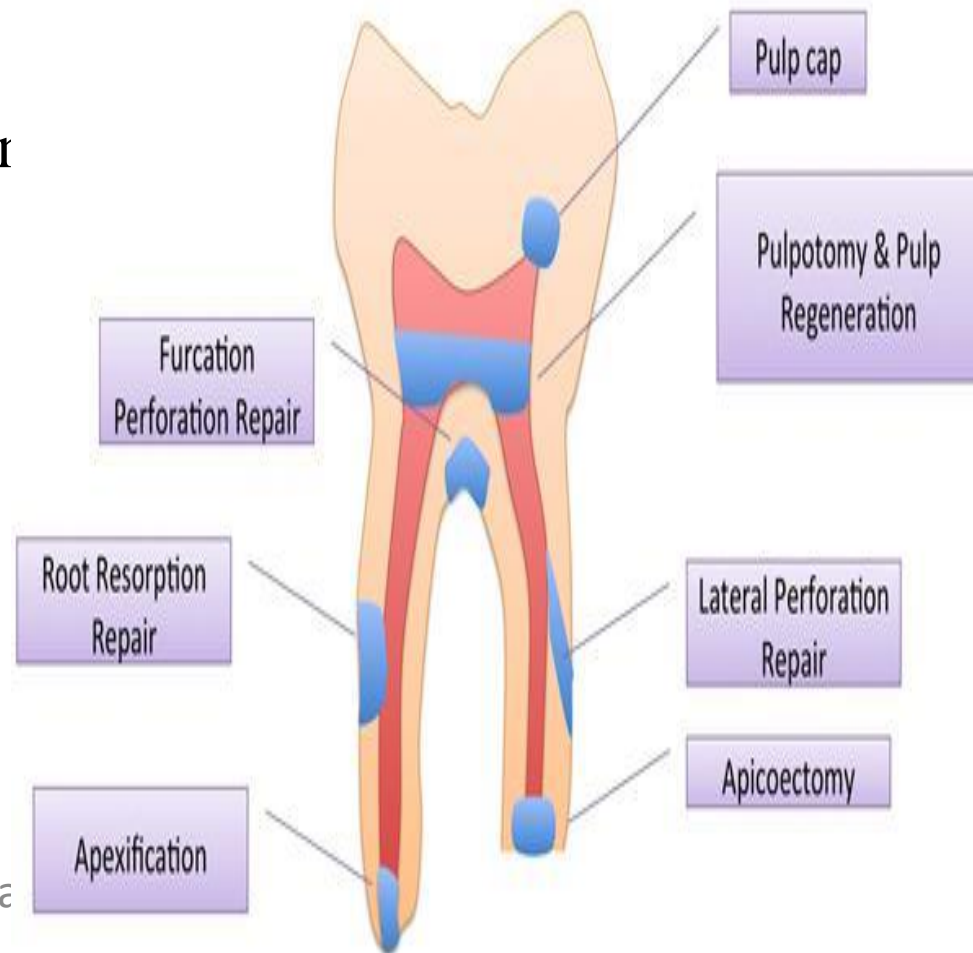
Mineral trioxide aggregate (MTA)

It was developed for use as a dental *root repair material* and was formulated from commercial Portland cement combined with bismuth oxide powder for radiopacity.



MTA is used for:

1. Creating an apical plug during apexification.
2. Repairing root perforations during [root canal therapy](#).
3. Treating internal root resorption
4. Root-end filling material .
5. Pulp capping material.



Characteristics and products

1. Biocompatible with periradicular tissues
2. Non cytotoxic to cells, but antimicrobial to bacteria
3. Non-resorbable
4. Minimal leakage around the margins.
5. Very basic alkaline (high pH when mixed with water).



Characteristics and products

6- As a root-end filling material MTA shows less leakage than other root-end filling materials, which means bacterial migration to the apex is diminished.

7- Treated area needs to be infection free when applying MTA, because an acidic environment will prevent MTA from setting.

8- Compressive strength develops over a period of 28 days, similar to [Portland cement](#) .



Characteristics and products

- Strengths of more than 50 MPa are achieved when mixed in a powder-to-liquid ratio of more than 3 to .1
- Originally, MTA products required a few hours for the initial and final setting but newer materials are available that set more quickly and have added characteristics.



Thank
you