

Temporary filling material

- 1- It should be non-toxic, and non-irritant to pulp and tissue.
- 2- It should be insoluble in saliva and liquid.
- 3- Mechanical properties must meet the requirements for their particular application.
- 4- Protection of the pulp:
 - Thermal insulation.
 - Chemical protection.
 - Electrical insulation.
- 5- Optical properties.
- 6- Cements should be adhesive to tooth structures and restorations, but not to dental instruments.
- 7- Should be bacteriostatic.
- 8- Should have soothing effect on the pulp.
- 9- The luting cement should have low viscosity to give a low film thickness.

ZINC OXIDE EUGENOL

PROPERTIES

- 1 - It has a sedative effect on exposed dentin. It is the least irritating of all dental cements.
- 2- It has reasonable sealing of the cavity.
- ~- It is the cement of low strength, low abrasive resistance, and low flow after setting, so placement of zinc oxide eugenol temporary filling should not be more than few days, maximum few weeks. The strength and abrasive resistance could be improved by adding 20-40 % weight of fine polymer particles and treating the surface of zinc oxide particles with carboxylic acid (reinforced zinc oxide eugenol type).
- 4- Sufficient powder should be added to the liquid to achieve putty consistency.
- 5- It is the material of choice as temporary filling.

~COMPOSITION

POWDER

- ., Zinc oxide (principal ingredient).
- ~' Zinc stearate (accelerator, plasticizer).
- ~' Zinc acetate (accelerator, improve strength).
- ., White rosin (to reduce brittleness of set cement). **LIQUID**
- ., Eugenol (react with zinc oxide). ,. Olive oil (plasticizer).

- *Setting time* 4-10 minutes (zinc oxide eugenol cement sets quickly in the mouth due to moisture and heat).
- *Powder/liquid ratio* (4/1 to 6/1 by weight).

FACTORS AFFECTING THE REACTION

- 1- Particle size: smaller particles set faster.
- 2- Heat: cool the glass slab slows the reaction.
- 3- Powder /liquid ratio: higher the ratio, faster the setting reaction.
- 4- Water acts as accelerator.
- 5- Glycerin acts as retarder.

ZINC-PHOSPHATE CEMENTS

APPLICATION

- 1- Luting of restorations (cementation).
- 2- High strength bases.
- 3- Temporary restoration.
- 4- Luting of orthodontic bands.

PROPERTIES

- 1- Has higher strength and abrasive resistance than zinc oxide eugenol, and has a relatively low solubility in oral fluids, but still has low abrasive resistance in area subjected to high load of mastication.
- 2- Higher powder/ liquid ratio is required for low acidity and high strength.
- 3- Reinforced zinc phosphate is more durable and could be used when longer time for temporary filling is required.

COMPOSITIO~

Powder

Zinc oxide (principal constituent).

Magnesium oxide (aids in sintering).

Calcium oxide (improves smoothness of mix).

Silica (filler).

liquid

Phosphoric acid (react with zinc oxide).

Water (control rate of reaction).

Aluminum phosphate (buffers, to reduce rate of reaction).

Aluminum (cohesive).

- **Mixing time** 15 seconds (maximum **1** minute).
- **Setting time** 5-9 minutes.

Factors affecting the reaction

Temperature: higher temperature will accelerate the reaction. Powder/liquid ratio: **(1.4 g/0.5 ml)** more the liquid, slower the reaction.

Rate of addition of powder is incorporated slowly.

Mixing time: the longer mixing time (within practical limits), the slower is

the rate of reaction.



They are adhesive teeth colored anticariogenic cements. It was named **glass ionomer** because, the powder is glass and the setting reaction and adhesive bonding to tooth structure is due to ionic bond.

APPLICATION

- 1-** Anterior esthetic restorative material for class III cavities.
- 2-** For eroded areas and class V restorations.
- 3-** As luting agent.

4- As liners and bases.

It is not recommended for class II and class IV restorations, since they lack fracture toughness and are susceptible to wear.

COMPOSITIO

powder

Silica.

Alumina

Aluminum florid (AlF_3). ~

Calcium florid (CaF_2). } Act as ceramic flux.

Sodium florid (NaF).

Aluminum phosphate (AlPO_4). **Barium** (provide radiopacity).

Liquid

Polyacrylic acid (increase reaction, decrease viscosity). ,.

Tartaric acid (increase working time).

Water (it is the medium of reaction and it hydrates the reaction products). • **Setting**

time 5-7 minutes.

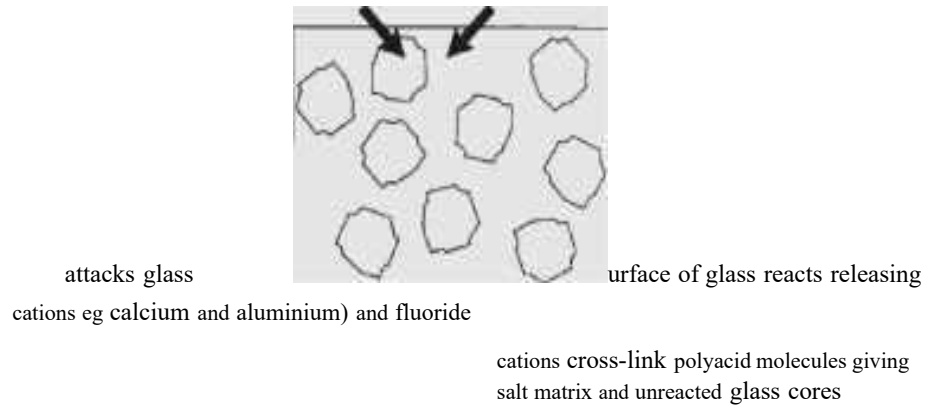
MANPULATION

- 1-** Conditioning of the tooth surface.
- 2-** Proper manipulation.
- 3_** Protection of cement during setting.
- 4-** Finishing.

acid from liquid component

glass core

matrix



POLYCARBOXYLATE CEMENT~

This cement contains two main reactive ingredients, **zinc oxide** and **polyacrylic acid** and both are in the powder; the bottle is filled with water by the dentist. Powder and water are dispensed onto the mixing pad and mixed

with a spatula.

In other products the powder contains only the **zinc oxide** and the liquid is an aqueous solution of **polyacid**.

Figure (7-3):

Polycarboxylate cement.

APPLICATION

- 1-** Primary for luting permanent restorations.
- 2-** As liners and bases.
- 3-** Used in cementation of orthodontic bands.
- 4-** Also used as root canal fillings in endodontics.

COMPOSITION

POWDER

Zinc oxide (basic ingredient). ,.



Magnesium oxide (modifier).

Stannous fluoride (increase strength; anticariogenic).

LIQUID

Polyacrylic acid.

Unsaturated carboxylic acid (iticonic acid, maleic acid).

- **Mixing time** 30-40 seconds.
- **Settling time** 7-9 minutes (can be increased by cooling the glass slab).
- **Powder/ Uquid ratio** 1 .5 powder: 1 liquid by weight.



A chemically active resin luting cement which is used to bond laboratory
made dental appliances and restorations to teeth.

APPLICATION

- 1** - Cementation of crowns and bridges (etched cast restorations).
- 2**- Cementation of porcelain veneers and inlay.
- 3**- For bonding of orthodontic brackets to acid etched enamel.



COMPOSITION

POWDER

Resin matrix.

Inorganic fillers.

Coupling agent.

.,. Chemical or photo initiators and activators.

LIQUID

Chemically by peroxide-amine system.

By light activation.

Dual cure (by both chemical and light activation).

MANIPULATION

- 1- Etching the restoration.
- 2- Etching the tooth surface.
- 3- Cementing the restoration.

CALCIUM HYDROXIDE CEMENT (DYCAL)

This material is provided as two pastes. Approximately equal amounts of each paste are dispensed onto the mixing pad and mixed with a spatula. One of the active ingredients is a **salicylate compound** which has a very

distinctive 'medicated' odor.



APPLICATION

- 1- Direct and indirect pulp capping.
- 2- As bases beneath composite restoration for pulp protection.
- 3_ Apexification procedure in young permanent teeth where root formation is incomplete.

COMPOSITION BASE

Glycol salicylate (react with CaOH_2).

Titanium dioxide (inert filler, pigment).

Barium sulfate (radiopacity).

Calcium sulfate. **CATALYST**

Zinc oxide.

Zinc stearate (accelerator).

Sulfonamide (oily compound act as carrier). ,.

Ethylene toluene.

- o *Settling time* 2.5-5.5 minutes.

Factors affecting settling time: The reaction is accelerated by moisture and accelerators. It therefore sets fast in the oral cavity.

- o *Effect on pulp:* The cement is alkaline in nature. The high pH is due to the

presence of free CaOH_2 in the set cement. The pH ranges from (9.2 to 11.7). o *Formation of secondary dentin:* The high alkaline and antibacterial and protein lysing effect helps in the formation of reparative dentin.

MANIPULATION

Equal length of the two pastes are dispensed on a paper and mixed to a uniform color, then use dycal applicator (a ball ended instrument) to carry the mixed material and apply to deep area of the cavity or directly over mildly exposed pulp (contraindicated if there is active bleeding).

CAVITY LINER AND VARNISH

A cavity liner and cavity varnish is used to provide a barrier against the passage of irritants from cements or other restorative materials and to reduce the sensitivity of freshly cut dentin, and to reduce microleakage.

It is a suspension of calcium hydroxide in a volatile solvent upon the evaporation of the solvent, the liner form a thin film on the prepared tooth surface.

A variety of formulation e.g. glass ionomer cement liner, zinc oxide eugenol liner.

Supplied as solution, powder and liquid, or light cured paste in tube.

CAVITY VARNISH

It is a solution of one or more resins which applied onto the cavity wall, evaporates leaving a thin resin film, that serve as a barrier between the restoration and the dentinal tubules.

Supplied as liquid in dark colored tightly capped bottles.

المصادر:

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