Student ID: 14727 Subject: Dental Material 4th Semester

Ans No.1

- Ans: Glass ionomer cement is a tooth colored material, introduced by Wilson & Kent in 1972.Material was based on reaction between silicate glass powder & polyacrylic acid. They bond chemically to tooth structure & release fluoride for relatively long period.

Classification

- Type I. For luting
- Type II. For restoration
- Type III. For liner & bases
- Type IV. Fissure & sealant
- Type V. As Orthodontic cement
- Type VI. For core build up

Composition

- These materials may be supplied as a powder and liquid or as a powder mixed with liquid for clinical used.
- Powder:

- Silica 41.9%
- Alumina 28.6%
- Alumina fluoride 1.6%
- Calcium fluoride 15.7%
- Sodium fluoride 9.3%

Manipulation

- 1. Preparation of tooth surface
- 2. Proportion & mixing
- 3. Protection of cement during setting
- 4. Finishing
- 5. Protection of cement after setting

Advantages

- Good marginal seal.
- Anti-cariogenic property.
- Biocompatibility
- Minimal cavity preparation required
- Easy to manipulation

Disadvantages

- Low fracture resistance.
- Low wear resistance.
- Water sensitive during setting phase.
- Less esthetic compared to composite.

Uses

- Anterior esthetic restoration material for class III & V restorations.
- For luting.
- For core build up.
- For eroded area.
- For atraumatic restorative treatment.
- As an orthodontic bracket adhesive.
- As restoration for deciduous teeth.

Ans No.2

Permanent Cement

For the long-term cementation of cast - restorations such as inlays, crowns, bridges, laminate veneers, and orthodontic fixed appliances.

Luting Agent

A material that acts as an adhesive to hold together the casting to the tooth structure. Luting agents are designed to be either permanent or temporary.

Temporary Cement

Temporary cements are used when the restoration will have to be removed. Most commonly, temporary cement is selected for the placement of provisional coverage

Ans No.3

Manipulation

- Powder/liquid ratio is 1.0 parts of powder to 1 part of liquid.
- Using a small area of the pad surface.
- Instrument should be cleaned before the cement sets on them.
- Powder/liquid ratio is 1.0 parts of powder to 1 part of liquid.
- Using a small area of the pad surface.
- Instrument should be cleaned before the cement sets on them.

Advantages:

- Inexpensive
- Easy to manipulation
- Dimensional stability
- Good surface detail
- Can be added to with fresh zinc oxide eugenol
- Non-toxic

Disadvantages:

- Cannot be used in very deep undercuts
- Only sets quickly in thin section
- Eugenol allergy in some patients

Ans No.4:

Poly Carboxylate Cement

- Zinc polycarboxylate cement was the first cement that was developed with the property of an adhesive bond to tooth structure along with some metallic restoration.

Availability

- Zinc polycarboxylate cement is available as powder and liquid

Composition Powder

- Zinc oxide 89%
- Magnesium oxide 9%
- Barium oxide 0.2%
- Other oxides 1.4%

(Bismuth trioxide, Calcium oxide)

Properties of Zinc Polycarboxylate

- pH of liquid in zinc polycarboxylate:1.7
- It is highly bio compatible to the pulp which is similar to ZOE cements.
- Working time 2.5 minutes
- Setting time is 6 to 9 minutes

- Solubility: 0.6 % (water solubility)
- Film thickness: it is more viscous than zinc phosphate cement.

MANIPULATION OR MIXING OF ZINC POLYCARBOXYLATE CEMENTP

- Powder/liquid ratio is 1.5 parts of powder to 1 part of liquid.
- Using a small area of the pad surface.
- Mixing time is 30 to 60 seconds
- Cement should be used immediately becouse the working time is short
- Working time 2.5 minutes
- Setting time is 6 to 9 minutes
- Instrument should be cleaned before the cement sets on them.

USES OF POLYCARBOXYLATE

- Permanent cementation for
  - Crowns
  - Bridges
  - Inlays
  - Onlays
  - Orthodontic cementation

Advantages

- Low irritancy
- Adhesion to tooth
- Easy manipulation
- Strength tensile
- Solubility (similar to zinc phosphate)
- Film thickness (similar to zinc phosphate)

Disadvantages

- Poor esthetic
- Solubility high

Ans No.5

Zinc Phosphate Cement

- Zinc phosphate cement are the oldest material and widely used in dentistry for luting permanent metal restoration.

Powder:

- Zinc oxide
- Magnesium oxide
- Other oxide and fluoride

Liquid:

- Phosphate acid
- 30 – 40 % water
- Zinc oxide and aluminum hydroxide as buffering agent(buffering agent is a weak acid or base used to maintain the acidity).

Uses:

- Final cementation of cast metal restoration
- Cavity base
- Temporary filling material
- Cementation of orthodontic bands

Advantages:

- Inconspicuous appearance
- Speed and case of usage
- Low thermal conductivity beneath a metallic restoration.

Disadvantages:

- Slight solubility in mouth fluids
- Opaque material not soluble for visible surface