***Name : waqar Afridi ID : 15169 PAPER : DENTAL MATERIAL BS DT 4TH SEMESTER***

***QUESTION NO : 02***

***ANSWER NO: 02***

***Differentiate***

1. ***Permanent Cement*** 
   * For the long term cementation of cast restorations such as inlays , crown , bridges , laminate veneers , and orthodontic fixed appliances.
2. ***LUTING AGENT***
   * A material that acts as an adhesive to hold together the casting the tooth structure. Luting agents are designed to be either permanent or temporary.
3. ***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.

***QUESTION*** ***NO : 01***

***ANSWER NO : 01***

***Glass ionomer Cement***

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

***Definition***

Glass ionomer is the generic name of a group of material that use silicate glass powder and aqueous solution of polyacrylic period.

***GLASS IONOME CCEMENTS***

1. **SILICATE CEMENT:** Fluoride release tooth color translucency
2. **POLYCARBOXYLATE CEMENT** : adhesive to tooth structure

**CLASSIFICATION**

**TYPE 1 :** FOR LUTING

**TYPE 2 :** For restoration ( **type 2 .1** restorative esthetic **Type 2. 2** Restorative reinforced)

**TUPE 3 :** For liner and bases

**TYPE 4 :** Fissure and sealent

**TYPE 5 :** As orthodontic Cement

**TYPE 6 :** For core build up

***MANIPULATION***

* + **For single component system :** The tooth is etched and bonding agent applied . The material is injected into the cavity and cured by light.
  + **For powder/liquid system:** The powder and liquid is dispensed and mixed according to the manufacture instrument for 30secs .
  + **For the automixing system:** the material comes out mixed when it is forced through special mixing tips.

***COMPOSITION***

* + Resin matrix : Dimethacrylate monomers with two carboxylic group present in their structure.
  + FILLER : Reactive silicate glass containing filler
  + Photoinitiators and stabilizers
  + There iss no water in composition and ion leachable glass is partially silanized to ensure bonding to matrix.

**Modifications**

**1 . Water settable glass ionomer Cement:**

* + Liquid is delivered in a freeze dried form , which is incorporated into the powder.
  + Liquid used is clean water .

**2. Resin modified glass ionomer Cement:**

Powder component consist of ion leachable fluroalumino silicate glass particle and initator for light curing. Liquid components consist of water and poly acrylic acid with methacrylate and hydroxyl ethyl methacrylate monomer.

***PROPERTIES***

**Adhesive:**

* + Glass ionomer Cement bond chemically to the tooth structure.
  + Bonding is due to reaction occur between carboxyl group of poly acid and calcium of hydroxyl apatite .
  + Bonding with enamel is higher than that of dentin due to greater inorganic content .
    1. Primarily chemical (chemical – carboxyl group)
    2. Micromechanical
    3. Bond to enamel better than bond to dentin
    4. Barriers to adhesion
  + Smear layer not removed
  + Contamination (blood , saliva , too much water)

Setting too far advanced before Application (cement must have a glossy surface when applying to tooth.)

***Esthetic***

GIC is tooth coloured material and available in different shades.

Inferior to composites

They lack translucency and rough surface texture .

Potential for discolouration and staining .

**USES**

1. Anterior esthetic restoration material for class 3 and 5 restorations.
2. For luting
3. For core build up
4. For eroded area
5. For atraumatic restorative treatment
6. As in orthodontic bracket teeth
7. As restoration for deciduous teeth
8. Used in lamination/ sandwich technique.

**Indications**

* + Class 1 cavity in primary teeth
  + Core build up material
  + Lining if class 2 amalgam restorations
  + Root caps for teeth under over dentures
  + As a preventive restoration

**Contraindication**

* + **Anterior restoration**
  + In areas of high occlusal loading

**Advantages**

* + Ease for placement
  + Adhesion to tooth structure and anticariogenic potential
  + Crown cutting can be done immediately
  + Increased wear resistance

**Disadvantages**

* + Esthetically poor
  + Tooth discoloration
  + Rough surface
  + Reduced W.L and S.T

***QUESTIONS NO :03***

***ANSWER NO :03***

**ZINX OXIDE EUGENOLCEMENT**

* + Zinc oxide eugenol (ZOE) Cement is introduced in 1858 and widely used in dentistry for temporary luting and permanent luting temporary restoration, base liner.

**Classification**

* + TYPE 1 ZOR : For temporary cementation
  + TYPE 2 ZOE : Permanent cementation
  + TYPE 3 ZOE : Temporary restoration
  + TYPE 4 ZOE : cavity base liners

**MANIPULATION**

* + Powder/ liquid ratio is 0.1 parts of powder to 1 parts 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
  + Can be added to with fresh zinc oxide eugenol
  + Non toxic

**Disadvantages**

* + Can not be used in very deep undercuts
  + Only sets quickly in thin section
  + Eugenol allergy in some patients

***QUESTION NO :04***

***ANSWER NO:04***

***Poly Carboxylic Cement***

* + Zinc polycarboxylate Cement was the first cement that was developed with the property of an adhesive bond 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 oxide 1.4%***

***(***Bismuth trioxide , Calcium oxide)

**LIQUID**

* + Polyacrylicacid or 32 to 48 % copolymer of acrylic acid
  + Other carboxylic acids , 30% to 50% such as itaconic acid maleic acid

**PROPERTIES OF ZINC POLYCARBOXYLATE**

* + PH OF liquid in zinc polycarboxylate : 1.7
  + It is highly bio compitable 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 CEMENT***

* + POWDER / LIQUID ratio 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 because 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
    - * Crown
      * 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

***QUESTION No :05***

***ANSWER NO :05***

**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.

**IN POWDER**

* + **Zinc oxide**
  + **Magnesium oxide**
  + **Other oxide and fluoride**

**IN LIQUID**

* + Phosphate acid
  + 30- 40 % water
  + Zinc oxide and aluminium hydroxide as buffering agent(buffering agents is a week acid or base used to maintain the acidity).

**USES**

* + Final cementation of cast metal restoration

**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.