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**Subject : Dental Material**

**Assighment Paper**

**Submitted to: Sir Usman**

* **Attempt all questions, all questions carry equal marks.**

**Answer No : 1**

Q1. Discuss glass ionomer cement briefly?

Ans : **Glass ionomer cement:**

Glass ionomer cement is a tooth colored material.

Which is introduced by **Wilson** and **Kent in 1972.**

Material was based on reaction between silicate glass powder and polyacryllic acid .

They bond chemically to tooth structure and release fluoride for relatively long period.

**Classification:**

Following are the type of glass ionomer cement

1) Type I For luting

2) Type II For restoration

3) Type III For liner and bases

4) Type IV For Fissure and sealent

5) Type V as orthodontic cement

6) Type VI for core build up

**Manipulation:**

Powder and liquid ratio is 3.6:1.

Powder and liquid is dispensed just prior to mixing .

First increment is incorporated rapidly to produce a homogenous milky consistency.

Mixing is done in folding method to preserve gel like structure .

Finished mix should have a glossy structure.

**Composition:**

These material are available as powder and liquid

|  |
| --- |
| **Powder:** |
| Silica 41.9% |
| Alumina 28.6% |
| Alumina fluoride 1.6% |
| Calcium fluoride 15.7% |
| Sodium fluride 9.3% |
| **Liquid :** |
| Polyacrylic acid 35% |
| Tartaric acid 5\_15% |
| Water |

**Properties :**

* These material have Low solubility
* They have High compressive strength
* Glass ionomer cement have Low shear strength
* They Bonds to tooth structure

**Advantages:**

1) Low thermal conductivity

2) Low oral solulibilty

3) Low shear strength

4) Decreased in the mixing time

5) Easy delivery of the material

6) Minimal cavity line preparation is required.

7) Good marginal seal

**Disadvantages :**

1)Brittle poor tensile strength

2)Poor strength

3)Low wear strength

4)water sensitive during setting phase.

**Answer No : 2**

Q2. Differentiate permanent cement, luting agent and temporary cement.

Ans : **Cementation:**

Cementation is a process through which we fixed crown , bridge ,inlay and onlay .

**According to the question :**

**Difference among permanent cement, luting agent and temporary cement:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Permenant cement** | **luting agent** | **temporary cement.** |
| 1 | Restore the destructive area for a long period of time. | Cementation and luting are the same thing .  Cementation is a process in which we use agent so the agent are called luting agent. | Restore the destructive area for a short time. |
| 2 | Permenant cementation is a filling for a long time another words we say permanently filling is called permanent cementation. | A material that acts as an adhesive to hold together the casting to the tooth structure. | Temporary cementation utilizes soft materials known as temporary dental cement |
| 3 | It is used for a long term cementation of cast restoration . |  | It is used when the restoration will have to be remove. |
| 4 | Inlay, crown , bridge ,laminate veneers and orthodontic fixed application. |  | Temporary cement is selected for the placement of provisional coverage. |

**Answer No : 3**

Q3. Write a detail note on manipulation, advantages and disadvantages of Zinc Oxide Eugenol cement.

Ans: **Zinc Oxide Eugenol cement:**

Zinc Oxide Eugenol cement are introduce in 1858 and widely used in dentistry for

* Temporary luting
* Permanent luting
* Temporary restoration
* Base liner

**Classification:**

Following are the type of zinc oxide eugenol cement

1) Type I

2) Type II

3) Type III

4) Type IV

**1) Type I :**

Type I ZOE is used for temporary cementation

**2) Type II:**

Type II ZOE is used for permanent cementation

**3) Type III:**

Type III ZOE is used For temporary restoration

**4) Type IV:**

Type IV ZOE is used for cavity based line

**According to the question :**

**Following are the manipulation, advantages and disadvantages of Zinc Oxide Eugenol cement:**

**Manipulation :**

1. Powder and liquid ratio is 1.0 parts of powder to 1 part of liquid.
2. Make incremental line
3. Using a small area of the pad surface .
4. Mixing time 2 to 3 minutes
5. Setting time 20 to 30 minutes
6. Instrument should be cleaned before the cement sets on them.

**Composition:**

They are available as powder and liquid

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| --- |
| **Powder Functions** |
| Zinc oxide 69% principal ingredient |
| White rosin 29.3% to reduce brittleness of set cement |
| Zinc stearate 1.0% use as acelator |
| Zinc acetate 0.7% modifier |
| **Liquid** |
| Eugenol 85% react with zinc oxide |
| Olive oil 15% plasticizer |

**Advantages :**

1. Inexpensive
2. Easy to manipulation
3. Minimal pulp reaction
4. Good surface detail
5. Dimensional stability
6. Good sealing properties
7. Non toxic

**Disadvantages :**

1. Cannot be used in very deep undercuts
2. Only sets quickly in thin section
3. Eugenol allergy in some patients
4. Inflammatory reaction in soft tissue
5. Minimal mechanical properties for luting

**Answer No : 4**

Q4. Briefly explain polycarboxylate cement.

Ans **: Polycarboxylate cement:**

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 :**

These material are available in powder and liquid

**Composition :**

|  |
| --- |
| **Powder** |
| Zinc oxide 89% |
| Magnesium oxide 9% |
| Barium oxide 0.2% |
| Other oxide 1.4% |
| **Liquid** |
| Polyacrylic acid |
| Copolymer of acrylic acid 32 to 48% |
| Carboxylic acids 30% to 50%  Itaconic acid and Maleic acid |

**Properties :**

* It is highly biocompatible to the pulp which is similar to ZOE cements .
* PH of liquid in Zinc polycarboxylate 1.7
* Working time 2.4 minutes
* Setting time 6 to 9 minutes
* Solubility 0.6%

**Manipulation :**

* Powder and liquid ratio is 1.5 parts of a powder to 1 part of liquid .
* Using a small area of the pad surface.
* Mixing time 30 to 60 seconds
* Working time 2.4 minutes
* Setting time 6 to 9 minutes

**Uses of Polycarboxylate cement**

Polycarboxylate cement was used for Crowns , bridge ,inlay and onlay

Orthodontic cementation

**Advantages :**

1. Low irritancy
2. Adhesion to tooth
3. Easy manipulation
4. Strength tensile
5. Disadvantages
6. Poor esthetic
7. High Solubility

**Answer No: 5**

Q5. Distinguish liquid powder ratio of Zinc phosphate cement, also write its uses and advantages

Ans : **Zinc phosphate cement :**

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

Magnesium are used in its composition There fore ,it easily bond with metal.

**According to the question**

**liquid powder ratio of Zinc phosphate cement, also its uses and advantages:**

|  |
| --- |
| **powder** |
| zinc oxide 90% |
| magnesium oxide 10% |
| other oxide and fluride 0.2% |
| **liquid** |
| phosphate acid 38.2% |
| water 36.2% |
| zinc oxide 7.1% |
| aluminum hydroxide 2.5%  aluminum hydroxide as a buffering agent |

**uses :**

These material are used for

1. Final cementation of metal cast restoration
2. Cavity base
3. Temporary filling material
4. Cementation of orthodontic band

**Advantages :**

* Speed and case of usage
* Inconspicuous appearance

(It give lightly appearance patient does not feel irritant.)

* These cement have Low thermal conductivity beneath metallic restoration

**The End**