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**Submitted to sir Usman**

**Dental material**

**Q1.Discuss glass ionomer cement briefly?**

Ans**. Introduction**

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

**Classification**

Type 1 for luting

Type 2 for restoration

Type 3 for liner and bases

Type4 fissure and sealent

Type5 as orthodontic cement

Type6 for core build up

**Composition**

The material 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 fluride 1.6%

Calcium fluride 15.7%

Sodium fluride 9.3%

**Liquid**

Polyarylic acid

Tartaric acid

Water

**Solubility And Disinfection**

Initial solubility is high due to leaching of intermediate products.They complete setting reaction takes place in 24hrs,cement shouldby protected from saliva during this period.

**Manipulation**

1. Preparation of tooth surface

2. Proportion and mixing

3. Protection of cement during setting

4. Finishing

5. Protection of cement after setting

**Protection of cement during setting.**

Glass ionomer cement is extremely sensitive to air and water during setting. Immediately after placement into cavity pre shaped matrix is applied to it.

**Finishing**

Excess material should by trimmed from margins. Hand instruments are preferred to rotary tools to avoid ditching. Further finishing is done after 24hrs.

**Protection of cement after setting**

Before dismissing the patient restoration is again coated with the protective again to protect trimmed area. Failure to protect for first 24hrs results in weak cement.

**Advantages**

Inherent adhesion to the tooth surface.

Good marginal seal.

Anti cariogenic property

Biocompatibility

Minimal cavity preparation required

Easy to manipulation

Permanent restoration material

Permanent cementation material

**Disadvantages**

Low fracture resistance

Low wear resistance

Water sensitive during setting phase

Less esthetics compared to composite

**Uses**

For 3 and 5 restoration . For luting . For core builup . For eroded area. For atraumatic restoration treatment . As orthodontic bracket. As restoration for deciduous teeth.

**Q2.Differentiate permanent cement, luting , and tempory cement?**

Ans .**Permanent cement**

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

**Luting agent**

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

**Temporary cement**

Used when the restoration will have to be removed most commonly temporary cement is selated for the placement of provisional coverage.

**Q3.Zinc oxide Eugenol cement?**

**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.

**Advantages**

Inexpensive

Easy manipulation

Dimentional stability

Good surface detail

Can be added with fresh ZOE

Non toxic

**Disadvantages**

Cannot be used in deep undercuts

Only sets quickly in thin section

Allergy in some patient

**Q4.write note on polycarboxylic cement?**

**PolyCarboxylic cement**

Zinc polyoxide cement was the first cement that was develop with the property of an adhesive bonds to tooth structure along with some metallic restoration.

**Availability**

Powder ….. liquid

**Composition powder liquid**

Zinc oxide 89% polyarylicacid or copolymer of arylicacid

Magnesium oxide 9% 32 to 48 %

Barium oxide 0.2% Other carboxylic acids such as itaconic acid

Other oxide1.4% or maleic acids 30 to 35 %

[Bismuth trioxide, calcium oxide]

**Properties**

PH of liquid in zinc polyoxide 1.7

It is highly bio compatible to the pulp which is similar to cements ZOE .

Working time 2.5 minutes

Setting time 6to 9 mint

Solubility 0.6%

Film thickness. more viscous than zinc phosphate cement

**Manipulation**

Powder\liquid ratio is 1.5 parts of powder to 1 part of liquid. using small area of pad surface. Instrument should be cleaned before the cement sets on them.

**Uses**

Permanent cementation for bridges, crowns, inlays, onlays, orthodontic cementation.

**Advantages Disadvantages**

Low irritancy poor esthetic

Adhesion to tooth solubility highs

Easy manipulation

Strength tensile

Solubility [similar to zinc phosphate]

Film thickness [ similar to zinc phosphate]

**Q5.Distinguish liquid powder ratio of zinc phosphate cement also write its uses and advantages?**

**Ans.. powder ratio**

Zinc oxide

Magnesium oxide

Other oxide and fluride

**Liquid ratio**

Phosphate acid

Water 30 to 40 %

Zinc oxide and aluminum hydroxide as a buffering agent.

**Uses**

Final cementation of metal cast restoration

Cavity base

Temporary filling material [for short duration we fill cavity]

Cementation of orthodontic bands [braces]

**Advantages**

Inconspicuous appearance [lightly appearance. patient does not feel irritant]

Low thermal conductivity beneath metal restoration.