***In the name of allah , Most gracious, Most merciful***

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**Subject Dental Material**

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**finalterm Assignment 50 Marks**

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# Answer the following questions.

**Q1.** Explain uses of calcium hydroxide cement.

* **ANS. Intracanal medicament:**
* It is the most commonly used dressing for treatment of the vital pulp. It also plays a major role as an inter-visit dressing in the disinfection of the root canal system. Calcium hydroxide cannot be categorized as a conventional antiseptic, but it kills bacteria in root canal space. Calcium hydroxide is a slowly working antiseptic. Direct contact experiments in vitro require a 24 hour contact period for complete kill of entero-cocci. Calcium hydroxide not only kills bacteria, but it also reduces the effect of the remaining cell wall material lipo-polysaccharide. It has a wide range of antimicrobial activity against common endodontic pathogens, but is less effective against Enterococcus faecalis and Candida albicans.
* **Endodontic sealer:**
* To be therapeutically effective calcium hydroxide must be dissociated into Ca++ and OH-. Therefore to be effective, an endodontic sealer based on calcium hydroxide must dissolve and the solid consequently lose content.
* **Pulp capping Agent:**
* Calcium hydroxide is generally accepted as the material of choice for pulp capping. Histologically there is a complete dentinal bridging with healthy radicular pulp under calcium hydroxide dressings. When calcium hydroxide is applied directly to pulp tissue there is necrosis of adjacent pulp tissue and an inflammation of contiguous tissue.
* **Apexification:**
* In apexification technique canal is cleaned and disinfected, when tooth is free of signs and symptoms of infection, the canal is dried and filled with stiff mix of calcium hydroxide and MTA. Histologically there is formation of osteodentin after placement of calcium hydroxide paste. There appears to be a differentiation of adjacent connective tissue cells; there is also deposition of calcified tissue adjacent to the filling material
* **Pulpotomy:**
* It is the most recommended pulpotomy medicament for pulpally involved vital young permanent tooth with incomplete apices. A pulpotomy is the removal of a portion of the pulp, including the diseased aspect, with the intent of maintaining the vitality of the remaining pulpal tissue by means of a therapeutic dressing
* **Weeping canals:**
* For such teeth dry the canals with sterile absorbent paper points and place calcium hydroxide in canal. Calcium hydroxide converts the acidic pH of periapical tissue in the weeping canal to basic pH

**Q2.** Write a detail note on properties of Mineral trioxide aggregate and also explain Manipulation and setting reaction of MTA.

**ANS. Properties of MTA**

PH

initial pH of 10.2 which rises to 12.5 (similar to calcium hydroxide) following setting The high pH is theorized to be responsible for the antimicrobial action and biological activity of the material

* ***Working time*** 5minutes
* ***Setting time*** 3-4hours(old one) 20minutes
* ***Solubility*** MTA displays low or nearly no solubility, which is attributable to addition of the bismuth oxide
* ***Compressive strength***
* The compressive strength of set MTA is about 70 mpa
* ***Biocompatible***
* ***good Sealing Ability (resist Micro leakage)***
* Usually a thickness of 3 mm to 5 mm is sufficient to provide a good seal.
* ***Retentive strength*** : MTA is not suitable as luting agent
* ***Marginal adaptation*** is better than intermediate Restorative Material (IRM)
* Ethoxy Benzoic Acid (super EBA)
* amalgam and GIC

**Manipulation and setting reaction of MTA**

The MTA paste is obtained by mixing 3 parts of powder with one part of water to obtain putty like consistency (distilled water , local anesthesia , normal saline ). Maxing can be done by glass slab or paper by using plastic or metal spatula. This mix is then placed in desired location and condensed lightly with a moistened cotton pellet.

MTA has PH of 10.2 immediately after mixing it increases to 12.5 after 3 hours of sitting which is almost similar to calcium hydroxide .

MTA powder should be stored carefully in closed sealed containers away from moisture. The mixing time of TMA is crucial. If the mixing of MTA prolonged, it results in dehydration of the mix

Sluyk et al in 1998 reported that the mixing thime should be less then 4 minutes.

MTA takes longer time to set compared to any other material. The exact time taken to set varies between different studies.

According to torabinejad and colleagues in (1995) the setting time of grey MTA is about two hours and 45 minutes (+5 minutes ) whereas Islam et al in (2006) reported 2 hours and 55 minutes for grey MTA and 2 hours and 20 minutes for white MTA

 Extended setting period of MTA is one of its main drawbacks. It is suggested by many investigator that the incorporation of accelerators such as sodium phosphate dibasic (Na2HPO4) and calcium chloride (CaCl2) may reduce setting time ,

MTA being hydrophilic requires moisture to set making absolute dryness contraindicated. Presence of moisture during setting improves the flexural strength of the cement

**Q3.** Discus manipulation of amalgam, write indication and contraindication of amalgam.

**Ans  Introduction:**

 Dental amalgam is a liquid mercury and metal alloy mixture used in dentistry to fill cavities caused by tooth decay.

It is used for the majority of direct posterior restorations

Indication:

Restoration of posterior teeth (Class I & II) (Moderate to large preparations)

In some cases restoration distal surface of the canine

Class V preparations (some cases)

Class VI preparation

Core build up for badly broken down teeth in the posterior teeth

Contraindications:

  When esthetics is important (e.g. anterior teeth)

Patients have a history of allergy to mercury or other amalgam components

Remaining tooth structure requires support.

Treatment of incipient or early, primary fissure caries.

Manipulation of Amalgam:

    Trituration:

Trituration is the process by which mercury is allowed to react with the alloy powder. This procedure allows the rubbing of the surface oxide on amalgam particles, exposing an active surface to react with mercury.

Trituration: 1) hand trituration        2) mechanical trituration

     Hand Mixing

A glass mortar and pestle is used. The mortar has its inner surface roughened to increase the friction between amalgam and glass surface with carborundum paste. A pestle is a glass road with a round end.

Mechanical Mixing:

 The disposable capsule serves as a mortar. Some capsules have a cylindrical metal or plastic piece in the capsule which serves as the pestle.

Reusable capsules are available with friction fit or screw.

Amalgamators have automatic timer and speed control device. The speed ranges from 3200 to 4400 cycles per minute. High copper alloys require higher mixing speed.

 Mechanical amalgamator for proportioned capsules (left) Close-up the mechanical arm that grips and vibrates the capsules.

**Q4.** Discus composition of calcium hydroxide with advantage and disadvantages

**Ans4:**

**Introduction:**

  Calcium hydroxide is a dental material

It is an inorganic compound with chemical formula Ca(OH)2

It is introduce by dental professional hermann in 1921

Composition:

     Accelerator Paste

Alkyl salicylate 36 – 42 %

Inert fillers – titanium oxide 12 – 14 %

Barium sulphate 32 – 35 %

Calcium sulphate 14 – 15 %

    Base paste

Calcium hydroxide 50-60%

Zinc oxide 10%

Zinc stearate 0.5%

Ethylene toluene sulphonamides and paraffin oil 39.5%

Advantages:

   Initially bactericidal then bacteriostatic.

Promotes healing and repair.

High pH stimulates fibroblasts

Neutralizes low pH of acids.

Stops internal resorption.

Inexpensive and easy to use

Disadvantages:

    Does not exclusively stimulate dentinogenesis.

Does exclusively stimulate reparativedentin.

Associated with primary tooth resorption.

May degrade during acid etching.

Degrades upon tooth flexure.

Marginal failure with amalgam condensation.

Does not adhere to dentin or resin restoration.

**Q5.** Write component of composite resin and also discus uses of composite resin.

**Ans5:**

**Component of composite:**

 Matrix

Filler

Coupling Agent

Initiators and accelerators

pigments

Resin Matrix:

    Bis-GMA (bisphenol-A glyceril methacrylate)

UDMA (urethane dimethacrylate)

TEGDMA (triethylene glycol dimethacrylate)

Color determination:

       Should be as close to that of the natural tooth as possible

Special Use Composite Materials:

    Flowable

Condensable / Packable

Flowable Composites:

     Has a reduced filler content to make the material “flowable”

Indicated for Class I restorations in the gingival areas

Used as a cavity base or liner especially for Class II preparations wherein access is difficult to achieve

Used as a pit and fissure sealant

Condensable composite:

   Has a filler particle that inhibits the filler particles by sliding to one another

Stiffer, thicker feel

***The end***