Subject: Dental Material II instructor: Mr. Usman

Final term Assignment 50 Marks

Department AHS DT 4th Semester

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# Answer the following questions.

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

Ans. **Uses of Calcium Hydroxide Cement:**

**Intracanal medicament:**

* It is used as dressing treatment for the vital pulp.
* It also plays an important role in the inter-visit dressing in the disinfection of root canal system.
* It is not a conventional antiseptic, but it kills bacteria that is present in the root canal space.
* It is a slow working antiseptic
* It complete its process of killing bacteria (entero-cocci) in about 24 hours of time.
* It also reduce the effect of remaining cells wall material lipopolysaccharides.
* It also act as wide range antimicrobial activist against endodonic pathogens.
* It is less effective against Enterococcus facalis and Candida albicans.

**Endodontic sealer:**

* To be effective the calcium hydroxide must breakdown into Ca++ and OH-.
* To be effective, an endodontic sealer based on calcium hydroxide must dissolve in it and the solid consequently lose content.

**Pulp capping agent:**

* It is generally a pulp capping agent.
* Histologically there is a complete dentinal bridging with healthy radicular pulp under calcium hydroxide dressing.
* When calcium hydroxide is applied to a pulp tissue there the death of adjacent pulp tissue and an inflammation of contiguous tissue occurs.

**Apexification:**

* Apexification means the canal is cleaned and disinfected.
* When the tooth is free of infection, the canal is dried and fill with the mixture of calcium hydroxide and MTA.
* After the placement of calcium hydroxide paste there osteodentin forms.
* There will be a difference between the adjacent connective tissue and the filling material.

**Pulpotomy:**

* It means the removal of the portion of pulp, including the disease aspect, but the remaining pulp tissue are left and treated by the means of therapeutic dressing.
* It is most recommended Pulpotomy medicament of pulpally involve in vital young permanent tooth with incomplete apices.

**Weeping canals:**

* For weeping teeth, dry the canals with sterile absorbent paper points and place calcium hydroxide in the canals.
* Calcium hydroxide converts the acidic pH of the periapical tissue in the weeping canal to basic pH.

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

Ans. **Properties of Mineral Trioxide Aggregate:**

* The initial pH is 10.2 which rises to 12.5 just like calcium hydroxide.
* Due to the high pH this material is capable of doing the anti-microbial activities and other biological activities in the tooth.
* Working time = 5 minutes
* Setting time = 3-4 hours (old one) 20 minutes
* Solubility = MTA have low or nearly no solubility, which is the cause to the addition of the bismuth oxide.
* Compressive strength = 70 mpa
* Biocompatible
* Good sealing ability (resist micro leakage)
* Usually have a thickness of 3-5 mm which is enough to provide a good seal.
* Retentive strength = it is not suitable as luting agent.
* Marginal adaptation are better as compare to Intermediate Restorative Material (IRM), Ethoxy Benzonic Acid (EBA), Amalgam and GIC.

**Manipulation and setting reaction of MTA:**

* It is made up by mixing three parts of powder and one part of water, and a putty like consistency is made up.
* Mixing could be done on paper or on a glass using a plastic or spatula.
* The mix is then placed in the desired location and condensed lightly with a moistened cotton pellet.
* Its powder should be stored in a fully sealed container to keep it away from moisture.
* The mixing time of MTA is crucial, if the mixing is prolonged it results in dehydration of the mix.
* According to Sluyk et al in 1998 mixing time should be less than 4 minutes.
* It takes more time to set as compared to other materials. The exact time is shown in different studies;

According to torabinejad and colleagues in 1995 it shoul be 2 hours and 45 minutes.

While islam et al in 2006 says that it should be 2 hours 55 minutes for grey MTA and 2 hours 20 minutes for white MTA.

* The long setting period of MTA is its disadvantage.
* Some researchers says that the incorporation of some accelerators such as sodium phosphate dibasic(Na2HPO4) and calcium chloride (CaCl2) may reduce the setting time.
* It is hydrophilic so it requires moisture to set. Presence of moisture increases its strength.

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

Ans. **Manipulation of Amalgam:**

**Tituration:**

* Tituration is a process in which the mercury is allowed to mix with alloy powder. This procedure allows the rubbing of the surface oxide on amalgam particles, exposing an active surface to react with mercury.

The Tituration is done in two ways;

1. Hand Tituration
2. Mechanical Tituration

**Hand Tituration:**

* A glass motor and pestle is used.
* The mortar has 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 Tituration:**

* 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 capsule 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.

**Indication of amalgam:**

* Restoration of posterior teeth (Class I & II) (Moderate to large preparation)
* In some cases the restoration of distal surface of canine is also done
* Class V preparation ( some cases)
* Class VI preparations
* Core build up for badly broken down teeth in the posterior teeth.

**Contraindications of amalgam:**

* 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.

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

Ans. **Composition of calcium hydroxide:**

**Accelerator paste:**

* Alkyl salicylate 36-42%
* Inerf filler-titanium oxide 12-14%
* Barium sulphate 32-35%
* Calcium sulphate 14-15%

**Base paste:**

* Calcium hydroxide 50-60%
* Zinc oxide 10%
* Zinc sterate 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.
* Associate 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.

Ans. **Component of Composite Resin:**

* Matrix
* Filler
* Coulpling agent
* Initiators and accelerators
* Pigments

The material consists of three components: resin matrix (organic content), fillers (inorganic part) and coupling agents. The resin matrix consists mostly of Bis-GMA (bisphenol-A- glycidyldimethacrylate). And others are UDMA ( urethane dimethacrylate) and TEGDMA ( triethylene glycol dimethacrylate).

**Uses of composite resin:**

* Restoration for anterior and posterior teeth
* Pits and fissure sealents
* Bonding of ceramic veneers
* Cementation of fixed prosthesis.
* Esthetic tooth-colored restoration in the anterior region
* Diastema closure
* Improving/modifying tooth size and shape
* Masking discolored teeth via composite veneering
* For luting and core build-up
* Orthodontic bracket adhesive

They are used specially because they are flow able and condensable or packable.

THE END