



IQRA NATIONAL UNIVERSITY
DEPARTMENT OF ALLIED HEALTH SCIENCES
Final-Term Examination (Spring-20)

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Q NO 1: Explain the uses of calcium hydroxide cement.

ANS NO :4

Introduction of calcium hydroxide:

- ❖ Calcium hydroxide is a dental material
- ❖ It is an inorganic compound with chemical formula Ca(OH)_2
- ❖ It is introduced by dental professional Hermann in 1921
- ❖ It is supplied in several forms
- ❖ supplied in **powder form** powder
- ❖ can be mixed with distilled water, saline solution to form a thick paste and applied.
- ❖ supplied as two paste system,
- ❖ one base paste another catalyst paste.
- ❖ supplied as single paste

USES OF Calcium hydroxide

Intracranial medicament:

- ❖ 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.
- ❖ It 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,
- ❖ It also reduces the effect of the remaining cell wall material lipopolysaccharide.
- ❖ 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.

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Q no 2:write detail note on properties of MTA and also explain manipulation and setting reaction of MTA.

Introduction of MTA

- ❖ Quest for newer material are never ending especially in the field of dental science.
- ❖ Various material have been formulated, tested and standard to obtain maximum benefit for good clinical performance

- ❖ One such new material is Mineral Trioxide Aggregate (MTA),
- ❖ which was introduced by Dr.Mahmoud Torabinejad at Loma Linda University, California, US and the first literature about the material appeared in 1993

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

- ❖ 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 1 parts of water to obtain putty like consistency (distilled water,local anthesisia,normal saline)mixing can be done on paper or on a glass slap using a plastic or matel spatula .

- ❖ This mix is then placed in the desired location in condense lightly with a moistened cotton pellet
- ❖ .MTA powder should be stored carefully in closed sealed containers away from moisture.
- ❖ The mixing time of MTA is crucial .If the mixing of MTA is prolonged,it results in dehydration
- ❖ .sluyk et al in 1998 reported that the mixing time should be less than 4 minutes .
- ❖ MTA take longer time to set compared to any other material.The exat time taken to set varies between different studies.
- ❖ According to TORABINEJAD and colleagues in 1995,the setting time of grey MTA is about 2 hours and 45 minutes(+5minutes) VHEREAS ISLAM ET AL in 2006 reported 2 hours and 45 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 investigators that the incorporation of accelerators such as sodiun phosphate dibasic (Na_2HPO_4),in calicum chloride(CaCl_2) may reduce the setting time .
- ❖ MTA being hydrophilic requires moisture to set, making absulate dryness contrandecated.Presence of moisture during setting improves flexural strength of the set cement .

Q no 3:Discus manipulation of amalgam,write indication and contraindication of amalgam.

Introduction of amalgam

- ❖ 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
- ❖ Dental amalgams were first documented in a Tang Dynasty medical text written by Su Gong (苏恭) in 659, and appeared in Germany in 1528.
- ❖ In the 1800s, amalgam became the dental restorative material of choice due to its low cost, ease of application, strength, and durability.
- ❖ In July 2018 the EU prohibited amalgam for dental treatment of children under 15 years and of pregnant or breastfeeding women

Indication

- ❖ In July 2018 the EU prohibited amalgam for dental treatment of children under 15 years and of pregnant or breastfeeding women
- ❖ Class I and class II cavities-moderate to large restoration.
- ❖ As a core build up materials
- ❖ Can be used for cuspal restoration (with pins usually)
- ❖ As a die of material.
- ❖ Restoration that cannot be isolated.
- ❖ Restoration that have occlusal contact.

Contraindication

- ❖ When esthetics is important (e.g. anterior teeth)
- ❖ Esthetically prominent areas of posterior teeth.
- ❖ Small to moderate class I and II restoration
- ❖ Can be isolated.
- ❖ Small VI restoration.
- ❖ 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.

- ❖ High pH stimulates fibroblasts
- ❖ Neutralizes low pH of acid
- ❖ Stops internal resorption.
- ❖ Inexpensive and easy to use

Disadvantage

- ❖ Does not exclusively stimulate dentinogenesis.
- ❖ Does exclusively stimulate reparative dentin.
- ❖ 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



Q no 5: write component of composite resin and also discuss uses of cr

Introduction

- ❖ In the late 1960s, composite resins were introduced as an alternative to silicates and unfulfilled resins, which were frequently used by clinicians at the time.
- ❖ Composite resins displayed superior qualities, in that they had better mechanical properties than silicates and unfulfilled resins
- ❖ Composite resins were also seen to be beneficial in that the resin would be presented in paste
- ❖ Dental composite resin is a tooth colored restorative material used to replace a decayed portion of tooth structure

Component

- ❖ Matrix
- ❖ Filler
- ❖ Coupling Agent
- ❖ Initiators and accelerators
- ❖ Pigments

Resin Matrix

- ❖ Bis-GMA (bisphenol-A glyceril methacrylate)
- ❖ UDMA (urethane dimethacrylate)
- ❖ TEGDMA (triethylene glycol)

Classification of resin on basis of composites:

category	ave particle size
conventiona/macrofilled	8-12
Small	1-5
Microfilled	0.04-0.4
Hybrid	1

Macrofilled composites

- ❖ Conventional composites,
- ❖ Traditional composites

Properties:

- ❖ Filler used: finely ground amorphous silica and quartz
- ❖ Filler loading: 70-80 wt%
- ❖ used as a restoration in stress bearing areas such as Class IV and II sites

Clinical Considerations:

- ❖ Produces a rough surface during abrasive wear
- ❖ Finishing of the restoration also produces a roughened surface
- ❖ Tend to discolor over time

- ❖ Poor resistance to occlusal wear

Hybrid composit

❖ Properties:

- ❖ Filler used: colloidal silica AND glass containing heavy metals
- ❖ Filler size: 0.4- 1um
- ❖ Filler loading: 75-80 wt%

Clinical considerations

- ❖ Indicated for Class III and IV cases
- ❖ Indicated for Class I and II cases
- ❖ Indicated for Class V cases

Small Partical

- ❖ To improve surface smoothness and retain
- ❖ High filler loading than traditional
- ❖ Compressive strength > macro and micro
- ❖ **INDICATIONS:**
- ❖ high stress and abrasion prone (cl IV)

Microfilled Composites

❖ Properties:

- ❖ Filler used: colloidal silica
- ❖ Filler size: 0.04 um colloidal silica(200-300 times smaller than the particle size of traditional composites)
- ❖ Filler loading: 80 wt%,
- ❖ Polish very smooth
- ❖ **Appearance like enamel**

Clinical considerations:

- ❖ Bond between the composite particles and the matrix is relatively weak, making it not suitable for use as stress bearing restoration
- ❖ Produces the smoothest finish
- ❖ Indicated for: Class III and Class V cavities
- ❖
- ❖

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
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