Cavity Liner and Cement Base part1

Reasons for use of base and lining materials:

1. Insulation against temperature changes and electrical stimuli under metallic restorations such as amalgam.
2. Mechanical protection provides by distributing local stresses from restoration across the underlying dentin surface.
3. To reduce the risk of microleakage.
4. Cementation of cast or ceramic restorations.
5. As a pulp capping.
6. Some have bactericidal or bacteriostatic properties.
7. Prevention of the risk of a long-term damage to the pulp-dentin organ from operative treatment.
8. Cementation of orthodontic bands.

The ideal lining material should have these properties:

1. Be compatible with the restorative materials.
2. It should not irritant to the pulp.
3. Prevent injuries of the pulp-dentin from restorative materials.
4. Be insoluble in the oral fluids.
5. Possess sufficient physical strength during insertion of the restoration.
6. Prevent heat/cold conduction from metallic restorations.
7. It should have a bacteriostatic effect e.g.: zinc oxide eugenol.
8. It should improve the marginal seal and have sealing ability e.g.: zinc oxide eugenol, so we use it as a temporary restorative material.
9. It should be easy to manipulation and apply.
10. It should be radiopaque in the X-ray.

Two groups of pulp protection materials are available:

- Varnishes and liners
- Cement bases.

The materials may be used alone or in combination, depend on:

- The extent and location of the preparation.
- The restoration material to be used.

Liners: are materials that are placed as thin coating or layer.

Function: -

1. To provide a barrier against chemical irritation. (They do not function as thermal isolators).
2. Reduce marginal leakage around most filling materials (amalgam) so reduce the inflammatory reaction and post-operative sensitivity caused by marginal leakage.
3. Electrical insulation (treatment of galvanic shock).

The need for liners is greatest with metallic restorations that are not well bonded to tooth structure. e.g.: Varnish, Ca (OH)2.

Bases:

Function:

1. Provide thermal insulation.
2. Mechanical protection by resist forces applied during condensation of the restorative materials.
3. A barrier against chemical irritation

The cement materials include:

1- Zinc phosphate cement: It is hard and strong but irritating to the pulp.

Advantages:

1. Easy to manipulate.
2. High strength necessary for a base.
3. Withstand mechanical trauma.

4. Provide good protection against thermal shock.

Uses:

1. As a base material when high compressive strength is required.
2. To lute cast restorations to the teeth.
3. Cementation of orthodontic bands.
4. Rarely may be used as a temporary cement dressing.

2- Zinc oxide-eugenol cements (ZOE):

Uses:

1. As temporary restorations.
2. The modified type used as a crown and bridge cementation and as a cement base.
3. As an endodontic sealer.

Zinc oxide eugenol Cement is unaccepted as base material under composite restorations because it impaired the setting reaction of composite resin.

3- Zinc polycarboxylate cement:

Properties

1- The large sizes of the polyacrylic acid molecule, which can't penetrate through dentinal tubules, make this cement low irritant to the pulp, so this cement is used as a base or for cementation with sensitive teeth.

2- This cement is sensitive to disintegration and solubility more than zinc phosphate cement.

Uses: -

1- As a luting agent.
2- As a base material.
3- In orthodontics for cementation of bands.

4- Glass ionomer cement: -

Uses: -

1- As a base material. 2- Luting agent.

3- Also, can be used as filling material specially of the modified types of glass ionomer cements (Cl I, Cl III, Cl V).

4- Fissure sealants.

Properties:

Glass ionomer cement bond to tooth structure chemically by ionic interaction with calcium and/or phosphate ions from the surface of the enamel or dentin. In addition, when the enamel surface is conditioned (etched with 37% phosphoric acid), the bond strength of glass ionomer cement become greater, because acid etching of enamel surface will produce micro porosities on the etched surface that will improve the mechanical retention.

Classification of glass ionomer cement:

The most practical classification of the Glass ionomer cements is on their clinical usage into:

Type I Glass ionomer cements are the **luting cements**, characterized by low film thickness and rapid set.

Type II Glass ionomer cements are **restorative cements**, with sub- types into two types.

1. Glass ionomer cements are **aesthetic cements** (available in both conventional and resin-modified presentations)

2. Glass ionomer cements are '**reinforced**' cement which are more wear-resistant.

Type III Glass ionomer cements are the **lining cements** and **fissure sealants**, characterized by low viscosity and rapid set.

5- Resin cements: -

The bonding of the cement to enamel be attained by the acid-etch technique. Then bonding agent is used to provide mechanical adhesion of the cement to

etched surface of the tooth.

Polymerization of resin cement is achieved either by chemical reaction (self-cure), light activation (light cure), or both (dual cure).

Uses:

1. As a luting material either for cast or for tooth-colored restorations such as esthetic ceramic and laboratory processed composite restoration.
2. Also resin cement with high filler range can be used as a base material.