Restorative Dentistry I: Posterior Restoration.

1. Why do we place restoration in primary teeth?

2. Morphological differences between primary and permanent teeth as related to cavity design.

3. Restoration of primary molars.


5. Class I amalgam restoration

6. Common errors with class I amalgam restorations.

7. Class II amalgam restoration.

8. Common errors with class II amalgam restoration.

9. Restoration with amalgam.

10. Finishing of amalgam restorations.

11. Resin material in primary molars.

12. General principles for restoring primary posterior teeth with composite resins.

13. Sealants and preventive resin restorations for primary teeth.

14. Class I and II preparation and restoration of primary molars with resin.

15. Alternatives to class I amalgam cavity preparation.

Introduction:

- Many aspects of restoring primary teeth have not changed for decades.
- Restorative techniques for the primary teeth that use amalgam and stainless steel crowns have remained relatively consistent for many years.
- With an increased use of composite resins and bonding systems, however, there has been a shift toward more conservative preparations and restorations.
- Glass ionomers, resin ionomer products, and amalgam bonding systems have been developed.
Although use of composite resin for restoring posterior teeth is increasing in frequency, amalgam remains the restorative material of choice for many clinicians.

1. Why do we place restorations in primary teeth?
   - To preserve the form of tooth in order to function in the mouth and also to maintain vitality of the pulp.
   - To prevent pain from the carious tooth while eating or drinking.
   - To reduce the risk of caries attacks in the permanent dentition by preventing a newly erupted tooth from contact with the carious primary tooth.
   - To preserve space in the dental arch for correct alignment and eruption of the permanent teeth.
   - For esthetics and psychological reasons.

2. Morphological differences between primary and permanent teeth as related to cavity design.
   - Primary teeth have thinner enamel and dentine, relatively large pulp chamber and long pointed pulp horns.
   - Primary teeth have broad, flat molar contact areas that are more gingivally located than permanent teeth.
   - Primary teeth have more bulbous crowns with marked cervical constriction.
   - The occlusal table is narrower in the primary teeth [especially first molar] than permanent teeth.
   - In primary teeth, the cervical enamel rods are inclined in an occlusal direction from the DEJ while they are in cervical direction in the permanent.

3. Restoration of primary molars
   - Stainless steel crowns
   - Amalgam
   - Composite resins
   - Glass ionomers
   - Resin-ionomers-

   - Risk of pulp exposure especially pulp horns or when gingival seat is placed too far gingivally.
• Buccal and lingual walls should converge occlusally approximately parallel to the outer surface of the tooth.

• the width of the isthmus must be one-third intercuspal distance, if wider, it would weaken the cusps and very narrow isthmus will easily fracture.

• No beveling of enamel rods in the gingival seat unlike in the permanent teeth.

5. **Class I – Amalgam Restoration or Primary Molars**

   • External Outline:
     1. Include all areas of decay and retentive pits and fissures but be as conservative as possible.

     1. Smooth flowing curves so as to minimize stress and permit easier condensation of amalgam.

     1. Maintain a width of about one-third the intercuspal width.

   • Internal Outline:
     1. Depth - Determined by the carious lesion but ideal pulpal floor depth is 0.5 mm into dentine.
     2. Pulpal floor - Slightly concave to avoid pulp horn exposure.
     3. Internal line angles - Rounded so as to reduce stress within the restoration and the tooth and also to ensure that amalgam is easily condensed into these areas.
     3. Cavo-surface angle - Must be sharp. This facilitates carving, polishing and reduces marginal failure.
     3. The walls - Should be parallel or occlusally convergent so as to render the cavity self-retentive

6. **Common Errors with Class I Amalgam Restorations**

   • Not including all susceptible fissures.
   • Preparing the cavity too shallow or too deep.
   • Undercutting the marginal ridges.
   • Carving the anatomy of the amalgam too deep.
   • Not removing amalgam flash from cavo-surface margin

7. **Class II – Amalgam Restoration**

   The cavity consists of two parts – the occlusal and the proximal. Both meet at the narrowest part of the preparation known as the ISTHMUS.
   2. Proximal Part:

      - Buccal, lingual and gingival walls should all break contact with the
adjacent tooth, just enough to allow the tip of an explorer to pass.
- The buccal and lingual walls should be occlusally covergent (i.e. the box should be broader at the cervical than occlusal).
- Axio-pulpal line angle should be rounded so as to reduce concentration of stresses and provide greater bulk of restorative material in this area.
- The gingival seat should be flat, not beveled and about 1 mm mesiodistally.
- Buccogingivally and linguogingival line angles are rounded.

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8. Common Errors With Class II Cavity Preparations.

- Failure to extend occlusal outline into all susceptible pits and fissures.
- Failure to follow the outline of the cusps.
- Isthmus cut too wide.
- Flare of proximal box too wide.
- Axio-buccal and anxiolingual angles too wide.
- Gingival contact with adjacent tooth not broken.
- Axial wall not parallel to surface of the tooth.
- Mesiodistal width of gingival floor is greater than 1 mm.

9. Restoration with Amalgam

- Rinse and dry the preparation. Inspect for (a) caries removal (b) sharp cavo-surface margin, (c) removal of all unsupported enamel, (d) rounding of line angles.
- Place calcium hydroxide in the deep area of the cavity (if indicated).
- Apply cavity varnish, air dry then apply a second layer.
- Apply matrix-band (T-band) if indicated and wedge. The wedge should hold the band tightly against the tooth but should not push the band into the proximal box.
- Condense amalgam in single increments, beginning in the proximal box until the entire cavity is filled.
- Remove excess and carve the margins. Establish grooves and occlusal contour. Develop the marginal ridge with tip of an explorer or Hollenback carver.
- Remove wedge and matrix band.
- Carve margins of the proximal box. Use dental floss to check the tightness of the contact, to check for gingival overhang and to remove any loose amalgam particles from the interproximal area.
- Burnish the restoration.
- Remove RD and check the occlusion for high spots and adjust as needed.
- Finish and polish at the next visit.
10. Finishing of Amalgam Restorations

Polishing of amalgam has been advocated to:
• Eliminate surfaces scratches and blemishes, which act as centers of corrosion.
• Remove any remaining amalgam flash not carved away.
• Refine the anatomy and occlusion.

11. Resin Materials in Primary Molars

• Historically
• Occlusal wear
• Poorer marginal integrity for the amalgam
• Improve esthetics
• Elimination of mercury
• Low thermal conductivity
• More conservation of tooth structure and
• Bonding of the restorative material to the tooth

11. Resin Materials in Primary Molars

Disadvantages:

• An exacting technique
• Increased operator time
• Potential marginal leakage
• Postoperative sensitivity
• Tendency toward open or loose

12. General principles for restoring primary posterior teeth with composite reins.

Some general principles must be remembered when using composite resins for posterior teeth.

1. If a dry field cannot be maintained composite resin is probably the worst choice.

1. Composite resin does not required “extension for prevention”.

1. The need for mechanical retention in preparation is lessened.

1. Wear will be minimized if the preparation can be kept small and out of heavy occlusion.

1. The dental materials being used dictate final cavity
13. Sealants and preventive resin restoration for primary teeth.

Pit and fissure sealant are defined as the application and mechanical bonding of a resin material to an acid-etched enamel surface.

• Indications for sealing a primary and permanent teeth:

1. Deep, retentive pits and fissures that may cause wedging of the explorer.
2. Stained pits and fissures with minimal decalcified or opacified appearances.
3. Pit and fissure caries or restorations in other primary teeth.
4. No radiographic or clinical evidence of interproximal decay.
5. A patient who is receiving other preventive treatment such as systemic or fluoride.
6. Situations in which adequate isolation from salivary contamination is

13. Sealants and preventive resin restoration for primary teeth.

There are three types of PRRs:

1. Type I PRR
   • Is used when pit and fissure decay is minimal or when the operator is in doubt about the presence of decay and does not want to simply place a pit and fissure sealant.

2. Type II PRR
   • Technique involves a similar intra-conservative preparation with a small round bur in the area of decay but is used when the preparation extends into dentin.

3. Type III PRR
   • Technique is similar to the type II PRR except that a sealant layer forms an integral part of the restoration.

14. Class I and II preparation and restoration of primary molars with resin.

15. Alternatives to Class I – Amalgam Cavity Preparation

1. Preventive Resin Restoration: Used for conservative treatment of caries in isolated pits and fissures and simultaneous caries prevention in the remaining, unaffected pits and fissures.

   • Technique:
- Using a small round bur remove caries from isolated pits and fissures. No attempt should be made to incorporate retention into the preparation.
- Perform prophylaxis of the occlusal surface with pumice followed by rinsing and drying.
- If dentine is exposed, place calcium hydroxide before etching. Wash and dry.
- Place a thin layer of dentine bonding agent or resin bonding agent followed by posterior composite material.
- Apply sealant (if indicated) over restored area or adjacent fissures.

15. Alternatives to Class I – Amalgam Cavity Preparation

*Advantages:*
- Esthetics
- Conservative: only decayed tooth tissue is removed.
- Restorations are adhesively bonded to natural tooth.
- Repair easily by simple addition of resin as the need arises.

*Disadvantages:*
- Wears faster than silver amalgam
- Sometimes require more time to place.