


# Pediatric dentistry principles of cavity preparation of primary teeth

## Lecture 7

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# MORPHOLOGIC CONSIDERATIONS

The crowns of the primary teeth are smaller but more bulbous than the corresponding permanent teeth, and the molars are bell-shaped, with a definite constriction in the cervical region.



The sharp constriction at the neck of the primary molar necessitates special care in the formation of the gingival floor during class II cavity preparation. The buccal and lingual surfaces of the molars converging sharply occlusally form a narrow occlusal surface or food table; this is especially true of the first primary molar.

The pulpal outline of the primary teeth follows the dentoenamel junction more closely than that of the permanent teeth. The pulpal horns are longer and more pointed than the cusps would indicate. The dentin also has less bulk or thickness, and so the pulp is proportionately larger than that of the permanent teeth. The enamel of the primary teeth is thin but of uniform thickness. The enamel surface tends to be parallel to the dentinoenamel junction.

# BASIC PRINCIPLES IN THE PREPARATION OF CAVITIES IN PRIMARY TEETH

Traditional cavity preparations for class I and class II lesions include areas that have carious involvement and, in addition, those areas that retain food and plaque material and may be considered areas of potential carious involvement. **A flat pulpal floor is generally advocated.** However, a **sharp angle** between the pulpal floor and the axial wall of a two surface preparation should be **avoided.** **Rounded** angles throughout the preparation will result in less concentration of stresses and will permit better adaptation of the restorative material into the extremities of the preparation.

Although the traditional **class I** cavity preparation and restoration may occasionally be the **most practical treatment** for a tooth in certain circumstances, such treatment is **currently** obsolete for most class I lesions. The traditional treatment has been **replaced**, for the most part, by **conservative caries excavation** and **restoration** using a combination of **bonding restorative** and **sealant materials**.

In the traditional **class II** cavity preparation for amalgam, the **buccal** and **lingual extensions** should be carried to **self-cleansing** areas. The cavity **design** should have **greater buccal and lingual extension** at the **cervical** area of the preparation to **clear contact** with the adjacent tooth. This **divergent** pattern is **necessary** because of the **broad, flat contact** areas of the primary molars and because of the distinct buccal bulge in the gingival third. Ideally, the **width** of the preparation at the isthmus should be approximately **one-third** the intercuspal dimension.





The axiopulpal line angle should be beveled or grooved to **reduce** the concentration of stresses and to **provide** greater bulk of material in this area, which is vulnerable to fracture. Because many **occlusal fractures of amalgam** restorations are caused by **sharp opposing cusps**, it is advisable to identify these potentially damaging cusps with articulating paper before cavity preparation. The **slight reduction** and **rounding** of a sharp opposing cusp will reduce the number of such fractures.

# CAVITY PREPARATION IN PRIMARY TEETH

The steps in the preparation of a cavity in a primary tooth are not difficult but do require precise operator control. Many authorities **advocate** the use of **small, rounded-end carbide** burs in the high-speed handpiece to establish the cavity outline and perform the gross preparation.


Therefore the dentist should select the bur that is best designed to accomplish all the high-speed cutting required for the procedure being planned. The following figure illustrates four high-speed carbide burs designed to cut efficiently and yet allow conservative cavity preparations with rounded line angles and point angles. **Alternatively**, cavity preparations may be made with aluminum oxide **air abrasion** systems or with **laser** systems approved for hard-tissue procedures, when indications allow.



# INCIPIENT CLASS I CAVITY IN A VERY YOUNG CHILD

During the routine examination of a child younger than 2 years of age, the dentist may occasionally discover a small but definite carious lesion in the central fossa of one or two first primary molars, with all other teeth being sound. Thus restorative needs are present but minimal.

Because of the **child's psychological immaturity** and because it is usually **impossible** to establish **effective communication** with the child, the **parent** should **hold** the child on his or her lap in the dental chair. This helps the **child feel** more **secure** and provides a better opportunity to **restrain** the **child's movement** during the operative procedure.




Restoring the tooth with amalgam or a resin modified glass ionomer **arrests** the **decay** and at **least temporarily prevents further** tooth destruction **without** a **lengthy** or involved dental **appointment** for the child. **If** the child is **cooperative**, a preventive resin restoration, preceded by application of a dentin-bonding agent, may be used.

# DEEP-SEATED CLASS I CAVITY

If an amalgam restoration is planned, the first step in the preparation of an extensive class I cavity is to plane back the enamel that overhangs the extensive carious lesion. Then the cavity preparation should be extended throughout the remaining grooves and anatomic occlusal defects. The carious dentin should next be removed with large, round burs or spoon excavators.






With deep carious lesions and **near pulp exposures**, the depth of the cavity should be **covered** with a **biocompatible base material** to provide adequate **thermal protection** for the pulp.

# CLASS II CAVITY

Proximal lesions in a **preschool** child indicate excessive **caries activity**; a preventive and restorative program should be undertaken immediately.

# Small Lesions

Very small incipient proximal lesions may be chemically restored with topical fluoride therapy provided by the dentist, along with the judicious use of fluoride products designed for topical application at home. If this treatment regimen is accompanied by improved diet and improved oral hygiene, some incipient proximal lesions may remineralize or remain in an arrested state indefinitely. However, the parents should be informed of the incipient lesions and emphasis should be placed on the need to continue practicing the recommended procedures and to bring the child back for periodic examinations.



If the parents and the patient do not follow the instructions properly, subsequent bitewing radiographs will reveal growth of the lesion, and restorative procedures should be initiated before the defects become extensive carious lesions.

As **bonded restorations** have improved, especially those restorations **capable of fluoride release**, more **conservative** cavity preparation **designs** have also been advocated. In otherwise sound teeth free of susceptible pits and fissures, **accessing small class II** carious lesions via small openings in the marginal ridges or in the facial surfaces of the teeth is becoming a **popular technique**.




## Lesions with Greater Dentin Involvement

The first step in the traditional preparation of a class II cavity in a primary tooth for an amalgam or an esthetic restoration involves opening the marginal ridge area. **Extreme care must** be taken when **breaking** through the **marginal ridge** to **prevent** damage to the **adjacent proximal surface**.

# Amalgam

The gingival seat and proximal walls should **break contact** with the adjacent tooth. The **angle** formed by the axial wall and the buccal and lingual walls of the proximal box should approach a **right** angle. The buccal and lingual walls necessarily **diverge** toward the **cervical** region, following the general contour of the tooth.





If the occlusal surface is sound and not caries susceptible, then a minimal **occlusal dovetail** is still often needed to enhance the **cavity retention form**.


# Esthetic Materials

Because of the improvements in the properties of composite resins, many dentists use them routinely for posterior restorations. More recently the use of glass ionomer restoratives (or other materials on the glass ionomer–composite resin continuum) has also been advocated.



# CLASS III CAVITY

Cariious lesions on the proximal surfaces of **anterior** primary **teeth** sometimes occur in children whose teeth are in **contact** and in children who have evidence of arch inadequacy or **crowding**. Cariious involvement of the anterior primary teeth, however, may be interpreted as evidence of excessive caries activity **requiring a comprehensive preventive program.**



If the carious **lesion** has **not advanced** appreciably into the **dentin** and removal of the caries will **not involve** or **weaken** the **incisal angle**, a small **conventional** class III cavity may be prepared and the tooth may be restored with the dentist's choice of bonding materials.

Mandibular primary incisors with small proximal carious lesions may not require conventional restorations at all. Enameloplasty of the affected proximal surface to open the proximal contact and to remove most, if not all, of the cavitation, followed by topical treatments with fluoride varnish, will often suffice until the teeth exfoliate naturally. Extraction is usually indicated when mandibular primary incisors have extensive caries.

# MODIFIED CLASS III CAVITY PREPARATION

The **distal surface** of the primary canine is a frequent **site of caries attack** in patients at **high risk** for caries if the canine is in **proximal contact** with the **first molar**. The position of the tooth in the arch, the characteristically **broad contact between** the **distal** surface of the canine and the **mesial** surface of the primary molar, and the height of the **gingival tissue** sometimes make it **difficult** to **prepare** a typical class III cavity and restore it adequately. The **modified** class III preparation uses a **dovetail** on the lingual or occasionally on the labial surfaces of the tooth. A **lingual lock** is normally considered for the **maxillary** canine, whereas a **labial lock** may be more conveniently prepared on the **mandibular** teeth for which the esthetic requirement is not so important.

# RESTORATION OF PROXIMAL INCISAL CARIES IN PRIMARY ANTERIOR TEETH

The preparation includes a **proximal reduction** through the **incisal angle** and the carious lesion, and ends at the established **cervical seat**. **Labial** and **lingual locks** are then prepared in the cervical third of the tooth. The remaining caries is removed, the tooth is etched, and a bonding agent is applied.