

HYPOPLASTIC MOLARS

ETIOLOGY

Background Information

We are seeing a dramatic increase in hypoplastic or hypocalcified primary and permanent molars. These teeth must often be treated soon after eruption due to either the severity of the defect or the sensitivity that the child experiences.

Enamel hypoplasia is caused by an interruption in ameloblastic activity because of a local or systemic insult.

Examples of systemic insults:

- ◆ Complications during pregnancy (will affect primary teeth only)
- ◆ Premature birth
- ◆ Nutritional deficiencies, particularly Vitamins A, C and D, calcium and phosphorous
- ◆ High fevers, caused by ear infections, chicken pox, measles, encephalitis and other illnesses
- ◆ Cerebral palsy
- ◆ Radiation to the jaws for cancer
- ◆ Certain syndromes

Examples of localized insults:

- ◆ Local infections such as an abscessed primary molar can cause hypoplastic areas of the bicuspid crown
- ◆ Local trauma
- ◆ Iatrogenic surgery as in cleft palate surgery

The dramatic increase in the incidence of hypoplastic molars is due to:

- ◆ The increase in premature births
- ◆ Young children (infants and toddlers) placed in day care thus contracting ear infections and other diseases at a much younger age than in previous decades.

Since the permanent molars calcify during the first 2 to 3 years of age, they are the most susceptible teeth when these early systemic insults occur.

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DEFINITION OF ENAMEL HYPOPLASIA

Incomplete or defective formation of the organic enamel matrix

WHEN DID THE HYPOPLASIA OCCUR?

Most hypoplastic defects occur during the first 3 years of age. This is when the permanent incisors and first molars are forming. The incisors are seldom affected because they are not fissured; the interruption in ameloblastic activity can resume in a more normal fashion. The molars, however, have multiple calcification sites which must coalesce, thus providing a broader area for disruption of the enamel matrix. In addition, the molars may not begin calcification simultaneously, resulting in a variable pattern of hypoplasia among the four teeth.



TABLE 1

ENAMEL CALCIFICATION OF TEETH

<u>Tooth</u>	<u>Hard Tissue Formation</u>	<u>Enamel Formed at</u>	<u>Enamel Completed</u>
Primary	<u>In Utero:</u>		
• Maxillary			
Central incisor	4 mo.	Five sixths	1 1/2 mo.
Lateral incisor	4 1/2 mo.	Two thirds	2 1/2 mo.
Cuspid	5 mo.	One third	9 mo.
First molar	5 mo.	Cusps united	6 mo.
Second molar	6 mo.	Cusp tips only	11 mo.
• Mandibular			
Central incisor	4 1/2 mo.	Three fifths	2 1/2 mo.
Lateral incisor	4 1/2 mo.	Three fifths	3 mo.
Cuspid	5 mo.	One third	9 mo.
First molar	5 mo.	Cusps united	5 1/2 mo.
Second molar	6 mo.	Cusp tips only	10 mo.
Permanent	<u>After Birth:</u>		
• Maxillary			
Central incisor	3-4 mo.	.....	4-5 yr.
Lateral incisor	10-12 mo.	.....	4-5 yr.
Cuspid	4-5 mo.	.....	6-7 yr.
First bicuspid	1 1/2-1 3/4 yr.	.....	5-6 yr.
Second bicuspid	2-2 1/4 yr.	.....	6-7 yr.
First molar	At birth	Trace	2-3 yr.
Second molar	2 1/2-3 yr.	.....	7-8 yr.
• Mandibular			
Central incisor	3-4 mo.	.....	4-5 yr.
Lateral incisor	3-4 mo.	.....	4-5 yr.
Cuspid	4-5 mo.	.....	6-7 yr.
First bicuspid	1 3/4-2 yr.	.....	5-6 yr.
Second bicuspid	2 1/4-2 1/2 yr.	.....	6-7 yr.
First molar	At birth	Trace	2-3 yr.
Second molar	2 1/2-3 yr.	.....	7-8 yr.

DIFFERENTIAL DIAGNOSIS

- ◆ Environmental Hypoplasia
- ◆ Fluorosis
- ◆ Amelogenesis Imperfecta
- ◆ Dentinogenesis Imperfecta

Which One Is It?

◆ ENVIRONMENTAL HYPOPLASIA

Affects one or more of the teeth but never all the teeth. The teeth most commonly affected are the 2nd primary molars or first permanent molars. The enamel is pitted, discolored and may be sensitive.

◆ FLUOROSIS

Occurs when 3 or more ppm of fluoride is ingested over a period of time. The crown shape is normal, but discolored, is very hard and is not sensitive.

◆ AMELOGENESIS IMPERFECTA

The entire crown of every permanent tooth is affected, discolored, easily abraded and may be sensitive if the condition is severe. It is a genetic disorder of enamel.

◆ DENTINOGENESIS IMPERFECTA

The teeth appear an amber translucent color. The enamel will not bond to the affected dentin and wears away quickly. The pulps are obliterated on the x-rays. All teeth are affected by this inherited condition.

Completed preparation



TREATMENT OF HYPOPLASTIC PRIMARY MOLARS

NO TREATMENT

Not all hypoplastic primary molars require treatment.

1. They may not be sensitive
 2. The affected areas are hard
 3. The affected areas are caries free
- ◆ Instruct the parent on good oral hygiene
 - ◆ Prescribe 0.4% stannous fluoride gel to be applied in a thin layer to the hypoplastic tooth (before bed is the ideal time).
 - ◆ Monitor the areas at periodic exams for a restoration if caries or sensitivity occurs.

COMPOSITE RESTORATION

- ◆ Rubber dam isolation is highly recommended.
- ◆ A bonded restoration is the best choice when the hypoplasia is limited.

1. Etch the enamel for 45 seconds because the prismatic enamel matrix is more acid resistant

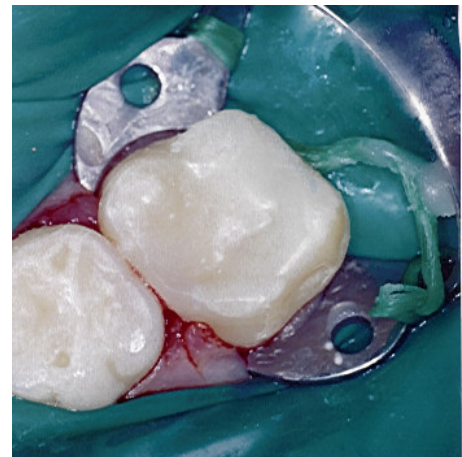
2. Use a filled composite with high wear resistance such as Z-100 or Heliomolar.

We do not recommend amalgam because the unaffected enamel is usually less dense than normal enamel and will wear more easily especially on a functional cusp. Composite will allow you to "patch" the worn areas in the future.

STAINLESS STEEL CROWN

- ◆ If the molar is severely affected.

Completed restoration



TREATMENT OF HYPOPLASTIC PERMANENT MOLARS

NO TREATMENT

- ◆ Hypoplastic permanent molars do not require treatment if they are not sensitive or carious.

COMPOSITE RESTORATION

- ◆ Rubber dam isolation is highly recommended.
- ◆ A bonded, highly filled composite is our choice when the tooth is mildly to moderately **affected**. It allows sound tooth structure to be preserved. If the tooth is **severely affected**, a highly filled composite restoration may be placed until the tooth is erupted sufficiently to place a stainless steel crown. If the composite is compromised because so little enamel is present, an orthodontic band can be cemented to hold the restoration in place.
- ◆ Electrocautery may be necessary if the tooth is partially erupted to expose sound margins.
- ◆ Clamps to try for partially erupted teeth:
 1. Ivory W8 A
 2. Ivory W14 A
 3. Ivory W 14
- ◆ "Oraseal" by Caulk, placed around the clamp, will help control saliva.
- ◆ Acid etch for 45 instead of 15 seconds because the enamel prisms may be irregular and require a longer etch time.
- ◆ Excavate the affected enamel and dentin and base any deep areas. Undermined enamel surfaces are preserved for additional support and retention.
- ◆ Use a filled composite with high wear resistance such as
 1. Heliomolar
 2. Z-100
- ◆ Bevel the surrounding enamel and "shoe" it with composite.
- ◆ Use two coats of primer. Microleakage can be a problem in these teeth. Utmost care must be taken in placing the restoration in a dry field.

AMALGAM RESTORATION

- ◆ Amalgam does not support the remaining enamel as well as composite; it tends to ditch as the affected enamel breaks down over time. Using amalgams will require an entirely new restoration each time there is caries or exposed dentin.

STAINLESS STEEL CROWN

- ◆ We place a crown if the tooth is severely affected.
- ◆ Try to delay crown placement until the tooth is erupted sufficiently to establish good margins at the CEJ.
- ◆ If the tooth must be treated shortly after eruption because of sensitivity or caries, an orthodontic band can be cemented and composite, glass ionomer or IRM placed until it is erupted enough to place a crown.

PERMANENT CROWN

- ◆ Can be placed when the dentition is mature.

EXTRACTION

- ◆ Occasionally, it is necessary to extract a severely hypoplastic permanent molar if the crown is not restorable. We take a panoramic radiograph and assess the presence of a third molar. Sometimes we obtain an orthodontic consult first.
- ◆ We extract maxillary first permanent molars that are severely affected if the maxillary second molar is unerupted. The unerupted maxillary molar will assume the position of the extracted tooth very nicely, although it may rotate slightly on the palatal root.
- ◆ If a third molar is present, and especially if there is some arch inadequacy, we prefer to remove a severely hypoplastic molar rather than subject the patient to multiple future restorations and possible early loss of the tooth.

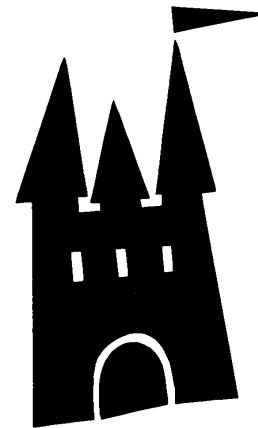
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- ◆ The hypoplastic molar has enamel which is less dense than normal. The enamel which appears intact but is not necessary to restore will tend to wear easily.
 1. The composite may need to be patched periodically.
 2. A crown may need to be placed in the future.
 3. A nightguard may need to be worn to protect against attrition.
- ◆ The tooth may be sensitive even after the restoration is placed.
 1. It may need to have the margins resealed.
 2. It may be necessary to use a tooth paste for sensitive teeth.
 3. It may be necessary to use a prescription fluoride gel such as 0.4% stannous fluoride to decrease the possibility of caries and any sensitivity.
 4. It may be necessary to use a crown if sensitivity cannot be eliminated.

We realize how difficult it is to stay current in all aspects of general dentistry. In pediatric dentistry, the three of us, on a daily basis, consult on cases, share audiocassettes, videos, email colleagues about cases and read journals. We teach in the pediatric dental clinic at the University of Colorado School of Dentistry. We present at our annual session at the American Academy of Pediatric Dentistry. It all takes time. We want to help you keep up to date in pediatric dentistry by producing a quarterly newsletter on various clinical topics. These newsletters are original. We have included our references where applicable. The topics will include scientific data as well as our own clinical experience and impressions. Please call, FAX or email us with any questions or comments. We will send you copies of references at your request. We chose HYPOPLASTIC MOLARS as our first subject because this is the question we are asked most often when you call us. What else would you like presented?

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