## Growing Healthy Smiles – The Essential Role of the Pediatric Provider

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Oral health is increasingly recognized as an important barometer of health and well being. In 2003, The Centers for Disease Control (CDC) and American Academy of Pediatrics (AAP) acknowledged that appropriate pediatric providers (i.e. pediatricians, pediatric nurse practitioners, physician assistants etc) have an essential role in pediatric oral health promotion. Given their frequent contact with infants and young children, pediatric health professionals have a unique opportunity to significantly impact the health of children and families. As tooth decay is the most common pediatric health chronic illness (CDC/AAP), this intervention also has significance to child growth and development, general health, school attendance and performance and future health care costs. Certain children due their development, compromised health or medical intervention are at a significant risk for poor oral health. Studies show that most children do not have their first dental visit until after three years of age and some children beyond school age. The AAP and American Academy of Pediatric Dentistry (AAPD) both recommend that children have their first dental visit by their first birthday.

The goal of this presentation is to provide pediatric health professionals the means to provide risk assessment, counsel caregivers (i.e. parents and guardians) to oral health activity for their children and observe that an “oral health home” is begun each child. As risk concerns for pediatric tooth decay are predictable and easily identified before age one, timely risk assessment and counseling is critical to health promotion. This presentation will focus on the prevention of Early Childhood Caries, an aggressive dental illness of early childhood that can significant harm children. Case examples are provided at end of this presentation.

Goals and Learning objectives

1. General information, important documents and policy statements

2. Review of dentition development and its importance to general health, growth and child development.

3. Caregiver’s role in pediatric oral health.

4. Risk assessment for pediatric tooth decay (poor oral health).

5. Counseling caregivers to promote oral health for their children.

6. The oral examination for infants and toddlers and oral care training.

7. Fluoride varnish application and fluoride supplementation.

8. Habits affecting the primary child dentition, common malocclusion and trauma.

9. Encouraging caregivers to timely dental visits for their children (and themselves).

Case Examples, Appendix and References (Includes abstracts and websites)

## Goals and Learning objectives

**Goal 1: The pediatric provider can discuss the lack of appropriate pediatric oral health promotion. P 1, 5**

**Learning objectives**: At the end of this session, the pediatric provider will be able to:

1. Discuss the reasons for the lack of oral health promotion for children.
2. Describe why pediatric health professionals can be significant for oral health education to caregivers.
3. Detail the timing and primary goal of the first dental visit for the very young child.
4. Discuss the concerns that influence children to not have their first dental visit during their early childhood.
5. Detail who the primary determinant for good or poor oral health for children?
6. Detail the four primary goals of “Anticipatory Guidance”.

**Goals 2: The pediatric provider can demonstrate an understanding of the primary dentition. P 5-6**

**Learning objectives**: At the end of this session, the pediatric provider will be able to:

1. Summarize dentition development
2. Discuss the primary dentition.
3. Identify the primary teeth.
4. Summarize the eruption chronology of the primary teeth.

**Goal 3: The pediatric provider can discuss counseling caregivers in oral health for their children. P 6-7**

**Learning objectives**: At the end of this session, the pediatric provider will be able to:

1. Discuss how tooth decay and gingivitis happen.
2. Discuss transmission of oral flora between caregivers and children.
3. Discuss counseling strategies for caregivers to reduce their cariogenic flora of caregivers and transmission to their children.
4. Detail primary risk concerns for Early Childhood Caries.
5. Discuss what situations facilitate behaviors that increase risk for Early Childhood Caries.

**Goal 4**: **The pediatric provider can provide the oral examination for infants and toddlers. P 8-17**

**Learning objectives:** At the end of this session the pediatric provider can:

1. Describe the purpose of the caregiver interview. P 7-8
2. Discuss preparation of the caregiver for the child examination. P 7-8
3. Discuss expected child behaviors for the oral examination based upon age. P 7-8
4. Detail what is needed to provide the oral examination for infants and toddles. P 8

5. Detail positioning the child, pediatric provider and caregiver for the oral examination. P 9-10
6. Describe the pediatric provider's hand positioning to gain access to the child's mouth. P 10
7. Describe the benefit of the "gauze test" for the caregiver and provider. P 10
8. Describe the three outcomes of the maxillary incisors and recommendation for remineralization therapy and definitive care based upon the outcomes of early and late infection. P 10
9. Detail caregiver positioning for oral hygiene care before and after the child can stand. P10-12
10. Describe the positioning of two caregivers to provide oral hygiene for an uncooperative child. P 11
11. Describe the benefit of and technique for fluoride varnish to the primary teeth.
12. Discuss the concerns for fluoride intake to the health of the adult dentition.
13. Detail appropriate fluoride supplementation and sources of fluoride that should be discovered in the caregiver interview. P 14-15
14. Describe common malocclusion of the primary dentition and associated risk factors. P 15-16
15. Describe the various safety concerns connected to child oral health. P 15
16. Describe how to evaluate a discolored front tooth and discuss dental trauma. P 15
17. Discuss encouraging caregivers to the importance of timely pediatric dental visits. P 16
18. Discuss encouraging caregivers to the importance of regular dental visits for themselves. P 16

**1. General information, important documents and policy statements have focused attention to pediatric oral health and the role of health professionals.**

- Surgeon General's Oral Health Report (2000).
- Guideline on Caries-Risk Assessment and Management for Infants, Children, and Adolescents, American Academy of Pediatric Dentistry. 2011
- Centers for Disease Control and American Academy of Pediatrics policy statement on pediatric tooth decay and the need for pediatric health pediatric providers to provide "Oral Health Risk Assessment" by 9 months of age (2003).
- National Commission on Quality Assurance: HEDIS policy (i.e. lowers first dental visit for children from 4 to 2 years of age) (2005).

It is uncommon that primary caregivers (usually mothers) of very young children receive timely pediatric oral health information or seek a "well child first dental visit" for their infants or toddlers. This situation results from a number of concerns. In general, people lack understanding or appreciation of oral health, fear dental visits, or lack financial resources. Due to a lack of education and training, general dentists do not encourage early dental visits or encounter very young children. Pediatric oral health is not common in medical education; thus pediatric health professionals do not have a grasp of oral health, are unprepared to provide risk assessment and do not encourage dental visits for very young children. Children may not have their first dental visit until they begin grade school (which may only happen as a requirement for enrollment). Consequently, children often present for their first dental visit with tooth decay.

Research has established that tooth decay (caries) is the most common contagious illness of childhood and caregiver's knowledge and child care is critical to their child's oral health. Specifically, it is the primary caregiver whose oral health status, child rearing behaviors, supervision of their child's feeding, hygiene care and health management in the home each day that determines the risk for poor oral health. Therefore, there is a need for caregivers to receive appropriate oral health information and children to begin dental visits by their first birthday. Caregiver fear and attitude to their personal oral health is a significant and complex obstacle to child dental visits; however, caregivers do want to protect the health, safety and quality of life for their children. Empowering caregivers to oral health is significant to build their autonomy, competence and change their attitude about oral health and hopefully increase dental care for themselves.

The activity of health professionals to promote pediatric oral health during the infant and toddler years is termed "Anticipatory Guidance" and is an important component to establish the "dental home". The dental home is defined by the ADA as the "ongoing relationship between the dentist who is the primary dental care pediatric provider and the patient, which includes comprehensive or health care, beginning not later than age one." The AAP, CDC and AAPD support the first year dental visit. Studies demonstrate that children who have their initial dental visit in their first year experience less tooth decay than children who do not.

Major themes in caregiver education for the early dental visits include:

- Prevention of plaque infections (caries and gingivitis).
- Dentition development and occlusion.
- Understanding common primary dentition problems associated with habits.

- Prevention of traumatic oral and dental injuries.

## 2. Review of dentition development in the growth and development of the child.

A healthy primary dentition is significant to the general growth and development of the child. This includes nutrition, general health, facial and jaw growth, social well being of the child and to the well being of their caregivers. Dentition development begins at the seventh week of fetal development and continues through adolescence with the eruption of the third molars. Dentition development has a specific sequence of embryology (i.e. initiation through calcification of the tissues of the tooth enamel and dentin; development of the crown, pre-eruption root growth, eruption and root completion). The timing of dentition development during gestation is fairly consistent but demonstrates significant variability after birth. Maternal health concerns during gestation (e.g. malnutrition, illness, drug abuse etc) may affect dental development being observed as enamel defects, which may be more susceptible to plaque acids (tooth decay). Congenital absence of primary teeth and supernumerary teeth is uncommon (less than 3%). If these concerns are observed in a child, there is increased risk for lack of development of adult teeth. An unusual dental appearance or lower facial appearance may indicate more global developmental concerns.

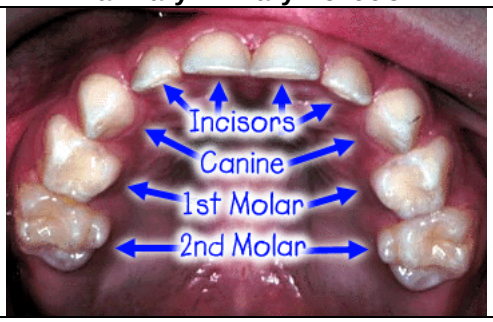
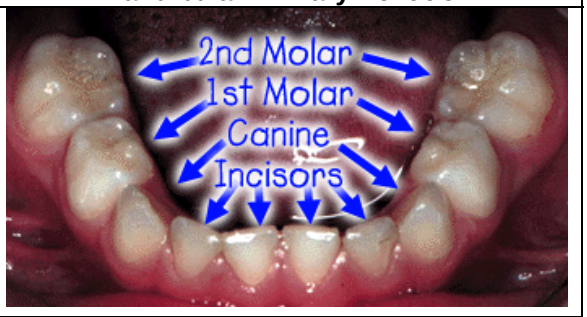
**Importance of the primary dentition**

- Maintain space for the adult dentition
- Nutrition
- Speech
- Jaw growth
- Social competence, confidence and quality of life (child and caregiver)

**Development of the dentition (summary)**

| Dentition | First evidence of calcification | Crown completed | Eruption | Root development completed |
|---|---|---|---|---|
| **Primary** | 14 – 20 weeks in utero | 1.5 -10 months after birth | 8 – 30 months *Eruption starting before and completion after above interval is common.* | 18 – 42 months |
| **Permanent** | 3 – 10 years after birth | 4 – 16 years | 6 – 21 years | 9 – 25 years |

**Primary Dentition:**

| Maxillary Primary Dentition | Mandibular Primary Dentition |
|---|---|
|  |  |

Each primary tooth should be replaced by an adult (succedaneous) tooth. The adult first, second and third molar (non-succedaneous) teeth develop posterior to the primary molars.

**Eruption Chronology of the primary dentition:** timing and pattern of eruption is highly variable.

| | | |
|---|---|---|
| **By 12 months** | **Lower central incisors**<br>**Upper central incisors**<br>**Lower lateral incisors**<br>**Upper lateral incisors** | **2 teeth**<br>**2 teeth**<br>**2 teeth**<br>**2 teeth** |
| **12-16 months** | **Lower first primary molars**<br>**Upper first primary molars** | **2 teeth**<br>**2 teeth** |
| **16-20 months** | **Lower primary canines**<br>**Upper primary canines** | **2 teeth**<br>**2 teeth** |
| **24-36 months** | **Lower second primary molars**<br>**Upper second primary molars** | **2 teeth**<br>**2 teeth** |
| **Total** | **10 upper and 10 lower teeth** | **20 teeth** |

## 3. Caregiver's role in pediatric oral health.

Studies show that caregiver oral health, knowledge and child care as primary determinants for the oral health for their child. Specifically, oral flora is transmitted in saliva from caregiver to infant during common child care activities (e.g. sharing foods). The amount of transmitted flora is directly related to the oral health of the caregiver (i.e. caregivers who have poor oral health will transmit greater numbers of harmful flora to their child). *This is an important concept for caregivers to understand as it may affect a change in their oral self care and desire to seek dental care for themself.* Caregivers who receive dental care and practice preventive activities at home to improve their oral health will reduce their child's risk for poor oral health. Preventive care includes, diet control, increasing the frequency of self care, effective brushing and flossing, using fluoride rinses or gels and elimination of habits that are known to promote poor oral health such as tobacco use and drug use.

Feeding behaviors that provide frequent fermentable carbohydrates (sugars and starches), nutritional supplements, oral medications (sugar added for taste) and lack of timely oral cleansing promote acid attack of the child dentition. Studies demonstrate that caregivers do respond to oral health counseling which can have profound benefit to their ability to provide effective oral health care to their child. Regardless of dental visits, caregiver oral health care is the primary vector for oral health promotion for children.

ECC has profound concerns for pediatric oral health. Children who experience ECC have an increased risk for further caries of their primary teeth and of their future first adult molars than children who do not suffer ECC. Thus, controlling harmful feeding habits, providing good home care and timely dental visits are important for prevention and crucial for controlling illness for children who do suffer tooth decay.

## 4. Risk assessment for pediatric tooth decay (poor oral health).

- **Primary risk factors (i.e. carbohydrates, plaque, time and teeth):** Primary risk factors must be present for tooth decay to happen. This is an important concept for caregivers to understand. There are four primary risk factors for dental caries:

    a. *Carbohydrate foods, nutritional supplements and medicines (syrups)* that provide cariogenic flora energy source to produce acid. This acid lowers saliva ph and demineralizes tooth enamel.

b. *Plaque* (i.e. cariogenic bacteria, food debris etc) on teeth and gingival tissues produces acid from fermentable carbohydrates, which lowers saliva ph. This acid demineralizes enamel. Due to its color (i.e. white, pale yellow), plaque is difficult to see on the teeth.
c. *Time (and most important frequency) of exposure of tooth to acid facilitates demineralization of enamel.*
d. *Tooth (enamel):* Once the teeth begin eruption into the oral cavity and are exposed to plaque acids, the risk for demineralization (caries) begins.

- **Secondary risk factors** – (Situations and conditions that influence caregiver feeding or oral health supervision for their child, which will affect primary risk factors a, b, c above).

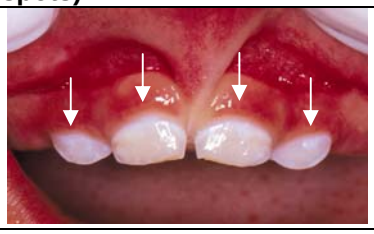
| **Caregiver and family risk factors** | **Child risk factors** |
|---|---|
| • Socioeconomic factors.<br>• Lack of oral health knowledge and habits for self care<br>• Lack of appropriate child care supervision<br>• Oral problems in caregiver<br>• Anxiety about child's condition, health, sleep or behavior.<br>• Anxiety about child's lack of sleep disturbing caregiver or family members.<br>• Depression and other states that may interfere prevent with childcare.<br>• Single parent (overwhelmed)<br>• Separated parents (foods given as rewards or from guilt of caregivers)<br>• Food selection<br>• Cultural beliefs about oral infections.<br>• Cultural and tradition child rearing practices.<br>• Employment or education demands<br>• Older sibs with decay<br>• Caregivers with cognitive impairment. | • Developmental delay (including speech, social etc)<br>• Chronic illness (e.g. significant heart disease or defect)<br>• Congenital deformity (e.g. cleft palate)<br>• Premature birth, growth delay, poor weight gain<br>• Long term oral (syrup) medication(s)<br>• Feeding concerns that delay or interfere with age appropriate diet.<br>• Repeat or long term hospitalization or infirmity<br>• Oral dysfunction: peri-oral sensitivity, poor oral clearance<br>• Behavioral concerns (e.g. difficult sleep, hyperactivity, fussy etc).<br>• Mediations that affect saliva function (asthma inhalers) or stimulate gingival over growth. |

- **Early Childhood Caries (ECC):** ECC is an aggressive infection of the primary dentition observed in children in their infant through preschool years. ECC is also called "bottle rot, nursing bottle caries etc". These terms are inappropriate because they are misleading, pejorative and do not address all of the etiologic concerns that can place children at risk for ECC.

  **The key feature of ECC is decay of the maxillary incisors.** Depending on the frequency and longevity of primary risk concerns, the first molars, canines and second molars will become affected.

**ECC** must be viewed as an illness that is multi-factorial (i.e. caregiver, social, cultural, developmental, nutritional, chronic illness and medication etc of primary and secondary risk concerns). Prevention of ECC requires appreciation of its *predictability*:

**Three possible examination outcomes of the maxillary incisors**

| **Normal**: | **ECC Early infection: Demineralization (white spots)** | **ECC Late infection**: **Demineralization and Cavitation** |
|---|---|---|
|  |  |  |

**Pathogenesis:** The primary problem in ECC is that caregivers do not provide effective oral health supervision for their child. **It is common that the primary caregiver has oral health problems (i.e. tooth decay, gingivitis etc).**

The **primary caregiver** (i.e. the individual(s) who provides the feeding, care and supervision for the child's daily activity) is usually the mother but can be a relative, father or any child care individual. The oral health of primary caregiver is a primary concern for risk of the child developing a cariogenic biofilm. Transmission occurs as a result of behaviors that transfer the caregiver's saliva (cariogenic biofilm) to the child's mouth.

For example:

- Sharing feeding utensils.
- Caregiver wets their finger with their saliva to wipe their child's mouth.
- Kissing the child's mouth or their fingers.
- Sharing toothbrush.
- Blowing on food to reduce temperature before feeding child.

Culture, traditions and challenges of daily living (secondary risk factors) are very significant to child care practice. For example, an elder relative (e.g. grandmother) provides the primary child care as the mother is working. It may be difficult for the mother to direct the feeding and child care habits of the grandparent. A child of separated parents may have frequent access to sugars and snack foods as a result misplaced guilt about the child's comfort or to help the a fussy child sleep.

**Questions to the caregiver about child care practice (i.e. risk assessment) will often predict what you will see in the child's oral examination (i.e. cleanliness and dental health).**

**5. Counseling caregivers to promote oral health for their children.**

**Feeding and child care are strongly determined by the caregiver's needs, beliefs, traditions and the daily challenges of child care.** The strategies below provide caregivers choices in their child's care while at the same time to understand their role to protect their child's oral health. They also serve to slow infection when tooth decay is observed. Providing health counseling related to risk feeding habits discovered in the interview should be discussed before the examination. These strategies focus on infants and toddlers.

- **Bottle use and content.**

"Once your child is six months of age, you can begin diluting whatever you're using (i.e. milk, juice, etc.) in the bottle with water. Start by replacing one ounce of the liquid with water. The next day, use two ounces of water. The third day, use three ounces and by the fourth day an eight ounce bottle will have half water and half the liquid. Then dilute with one-half ounce of water each day until the bottle has only water. This should take 1-2 weeks."

OR: "Replace all the liquid in the bottle with water all at once. If it has only water, it can not cause problems."

By twelve months of age or when the child can grasp a cup, the bottle should be stopped unless directed by the child's physician.

- **Sip cup use and content.**

"Once your child is using a sip cup, you can begin diluting juice etc with water. Start by replacing one ounce of the liquid with water. The next day, use two ounces of water. The third day, use three ounces and by the fourth day an eight ounce bottle will have half water and half the liquid. Then dilute with one-half ounce of water each day until the bottle has only water. This should take 1-2 weeks."

OR: "Replace all the liquid in the sip cup with water all at once. If it has only water, it can not cause problems."

**Comment**: *It is my experience that most caregivers respond best to the gradual dilution method for sip cups and bottles.*

- **On demand breastfeeding once table foods are added to child's diet.**

"At will breast nursing does increase the risk for decay for children. This is especially important if you have your baby sleep with you and thus can nurse on demand. Further, once starches and sugars become part of your child's diet, the chance for tooth decay increases further. If you choose to breastfeed your baby often, clean your baby's mouth more often."

- **Diet frequency of cariogenic foods:**

At will carbohydrates and juices facilitate acid production by oral biofilm. Limiting starch (white flour) foods in between meals and providing water for thirst is essential to reduce caries risk. Fruit juices should be limited or diluted with water.

- **Oral (syrup) Medications**

Frequent/long term oral medications that are sweetened provide additional source for acid production. Follow oral medications with water or after a few minutes provide mouth cleaning.

## 6. The oral examination for infants and toddlers and oral care instruction for caregivers.

- **Preparation:**

  *As their child's oral examination may be an emotional challenge for the caregiver, the pre-examination interview will reduce caregiver anxiety and support your counseling.*

  Very young children (less than three years) do not have the emotional and cognitive development to understand and cooperate with an oral examination. Infant response can range from passive acceptance to crying with some mild struggling. After twelve months as the child gains autonomy and especially as the child approaches two years, children can display significant anxiety and tantrum (screaming, gagging, struggling etc). Acknowledgment and discussion of these behaviors before the examination is important to the confidence of the caregiver and their acceptance of health counseling. The caregiver can provide useful information about their child's behavior with "stressful" situations and express their feelings and expectations of their child's behavior and the examination. Assure the caregiver that their child's behavior is normal and discuss why the examination is beneficial for the caregiver and the child.

  **A simple question to predict the child's response is: "**How does your child behave when you brush their teeth?"

  In the examination of their child, the caregiver will provide the control of their child's movement. The positioning technique is called **Knee to Knee** (see next page picture). This positioning enables the caregiver to critically view the child's oral condition, assures the child's safety and allows the child and caregiver to view each other (eye to eye contact) during your examination. Again, assure the caregiver that their child's response is normal.

  As children approach age three, they want to know what is being done and some will even respond to instruction. For these children, **tell** ("Your mommy and I are going to look at your teeth and I will wipe your teeth with a soft cloth"), **show** (the gauze and gloves for your hands) and **do** (as you stated) should be very helpful. Even if examined in the Knee-Knee position, "tell, show, do" may enable a child to become calm and possibly curious enough to want to hold a "patient" mirror (a good aid to help children learn) watch and listen as you proceed with your examination. It may be useful for the child to bring a favorite blanket or doll to hold for your patient visits.

  This pre-examination activity is essential (bidirectional) for developing the quality of your relationship with the caregiver (and child as they become mature) to gain confidence.

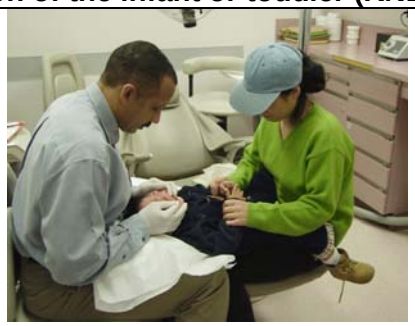
- **Armamentarium:**

  1. Pillow
  2. Non latex gloves
  3. Gauze pads (**slightly moistened**).

- **Examining the infant or toddler**

  The **Knee to Knee** position provides a reliable method to stabilize the child safely for the examination. It enables the caregiver to control their child's movement while at the same time see and understand their child's oral condition as you examination their child and discuss your findings. This technique may also be useful for some preschool aged (i.e. 3 - 5 years) children, especially those with special needs.

**Examining the dentition of the infant or toddler (KNEE-KNEE position)**

| | | |
|---|---|---|
| The caregiver holds the child's knees **behind** their elbows and against their waist to prevent child's feet from pushing against the caregiver. The caregiver holds their child's wrists, not their hands. *Note the caries of the incisors (red arrows).* |  |  |

**For infants**: A pillow is used to support the child's head, shoulders and back. The caregiver provides support for the child's body and controls movement. Because of their small size, lack of strength and limited number of teeth, it should be easy to examine their mouth.

**For toddlers**: Explain what you are doing as you examine their child to help the caregiver's understanding of their child health or illness. This may also keep their attention focused on you rather than their child's behavior.

**Step 1: Extra-oral HEEN**

| | |
|---|---|
| Provide the extra-oral examination (HEEN). As age appropriate, talk to the child as you examine which may help reduce their anxiety. This position also affords good control to examine ear and nasal openings. |  |

**Step 2:** Intra-oral examination of soft tissues and gain impression of oral cleanliness.

You can gain access and maintain the child's mouth in an open position by placing the index finger of your non-working hand (i.e. the left hand if you are right handed) into the area between the child's lower lip and front teeth (see "lower arch" picture below). Exerting a little downward pressure should bring the child's mouth open. If the child does not yet have their second molar teeth, another method is to push the index finger of your non-working hand in between the child's gum pads just *behind the first molars and exert gentle pressure*. For toddlers, count their teeth to gain their attention and use "tell, show, and do" as if possible.

.**Assess dental cleanliness: Wipe front teeth with slightly moistened gauze.**

| | |
|---|---|
| The white/yellow film on the gauze is PLAQUE.<br>Show the gauze to the caregiver. Discuss that plaque (mouth germs and cariogenic foods) produce acid to cause demineralization (white spots) and cavitations and toxins to cause gingival bleeding (inflammation).<br><br>If there is obvious debris on the child's teeth, confirm that the caregiver can see the change in the appearance of their child's teeth and gingival tissues after teeth are wiped with gauze.<br><br>Confirm the caregiver can see plaque on the remaining teeth. |  |

**Examine the front teeth and discuss their appearance with the caregiver**

| Upper arch (index finger between upper and lower arches to keep mouth open) | Lower arch (gentle pressure into the labial vestibule with index finder between lip and front teeth) |
|---|---|
|  |  |

**Three possible examination outcomes of the maxillary incisors after gauze wipe**

| **Normal**: Confirm<br>• Risk assessment is low<br>• Provide diet counseling as needed<br>• Oral hygiene instructions as needed | **Early infection**:<br>**Demineralization (white spots)**<br>• Risk assessment (high)<br>• Diet counseling needed<br>• Oral hygiene instructions<br>• Apply fluoride varnish to white lesions.<br>• Refer to dental provider | **Late infection**:<br>**Demineralization and cavitation**<br>• Risk assessment (high)<br>• Diet counseling needed<br>• Oral hygiene instructions<br>• Apply fluoride varnish to cavitations.<br>• Urgent need for dental provider. |
|---|---|---|
|  |  |  |

- **Oral Hygiene Counseling for Caregivers:**

It is common that caregivers are anxious if their child is uncooperative for oral hygiene or may state that "my child does not let me or doesn't like their teeth brushed". This is an

essential concern to remedy regardless that your examination reveals a healthy dentition or tooth decay. It is essential for the caregiver to become confident about the oral care that they must provide for their child.

The caregiver must understand that any uncooperative behavior with home care will change once the child realizes that the caregiver is in control. Further, the child's health depends on the caregiver.

Depending on the size of the child, their maturity and behavior, presence of developmental delay or physical handicapping conditions, some children may require two caregivers using the knee to knee technique to provide home oral care to their child. This will change as most children adjust to oral care at home. "Elbow stabilizers" can also be very helpful in the home care of developmentally disabled children whose hands (grabing) interfere with their oral care. These aids can be purchased by the caregiver with a prescription (See Appendix).

The proper position for a child who can stand to receive home care is to have the child standing in front and facing away from the caregiver (see next page). In this position, a caregiver can provide better support for the child especially if the child is not cooperative. Support for the child's body movement is provided with the caregivers legs and the caregiver's waist provides support for the child's head. The toilet seat lid provides a good seating position for the caregiver when seated behind their child.

It is my experience that demonstration of this positioning for child care is beneficial to caregiver's understanding.

**Caregiver providing oral cleansing to her infant.**

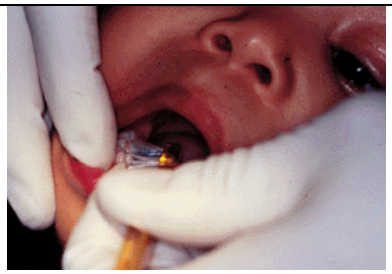
This positioning provides a stable position for the child's head and body, and provides the caregiver a sense of safety and control.

It useful until a child can stand and be supported by the caregiver as shown in the next picture.

**Positioning child who can stand for oral hygiene**

- Effective oral hygiene for children is a skill in which caregivers must gain confidence.
- Proper positioning of hands and fingers can be a challenge for caregivers who are anxious about their children.
- A small mirror, toy, music can be used as a distraction.
- Limit toothpaste to a "pea sized" amount.
- If a child does not like toothpaste, use toothbrush moistened with water.

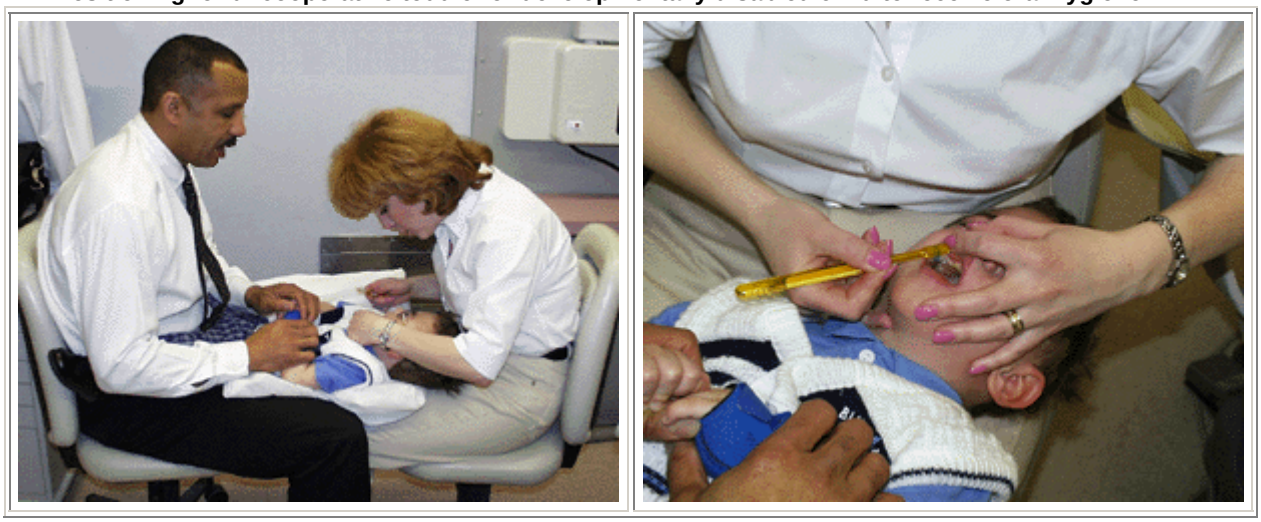
**Hand and finger position to provide effective oral cleansing: Note that the child's jaw is controlled and the pediatric provider's fingers are not in the line of the child's bite.**

| | |
|---|---|
|  |  |
| Upper front | Lower front |
|  |  |
| Upper right side | Lower right lingual (tongue) surfaces |

These pictures show only certain areas. It is important for the toothbrush to contact the gingival tissues of all tooth surfaces and in addition to the chewing surfaces of the posterior teeth. The caregiver should be seated or standing behind the child as shown above.

**It is important that the caregiver whose child "doesn't let me brush his/her teeth" understands that their child will adjust once the child knows that their caregiver will not "back down". Oral health care is an essential "daily" health exercise.**

**Positioning for uncooperative toddler or developmentally disabled child to receive oral hygiene**



## 7. Fluoride Supplementation, dentifrice and dietary sources

Our goal is to provide the beneficial affects of fluoride (increase enamel resistance to acid attack) while at the same time to minimize disturbance of the developing dentition (i.e. fluorosis). Children should receive fluoride supplementation according to the level of fluoride in the community resource. Dietary sources of fluoride include formula, bottled water and fresh fruits etc and must be considered if fluoride

supplementation is provided. If well water is consumed in the home, it must be checked for fluoride levels. The use of fluoride dentifrice must be supervised by the child's caregiver and limited to "pea sized" amount. A chart for the current recommended fluoride supplementation is provided below.

**Fluoride supplementation schedule: AAP and AAPD recommendations.**

| Level of Fluoride | Child's age | Daily fluoride dosage |
|---|---|---|
| 0 - .3 ppm | Birth – 3 yrs<br>3 – 6 yrs<br>6 – 18 yrs | .25 mg starting at 6 mos of age<br>.5 mg<br>1 mg |
| .3 - .6 ppm | Birth – 3 yrs<br>3 – 6 yrs<br>6 – 18 yrs | None<br>.25 mg<br>.5 mg |
| .6 – 1 ppm | No fluoride suppliment | |

*The author recommends that for the child and caregiver who present with good oral health, low risk assessment outcome and the child is receiving appropriate fluoride supplementation or resides in local with appropriate community fluoridation, fluoride dentifrice is not started until the first primary molar begins eruption.*

- **Fluoride varnish:**

Fluoride varnish is meant for direct application to affected tooth surfaces. Studies demonstrate that application of fluoride varnish to children identified to be at high risk (*teeth show white spots or cavitations*) is affective at preventing cavitations and can slow the progression of cavitations. This intervention can be provided by pediatric medical providers.

*The best outcome is possible only when daily oral health care by caregivers and diet counseling are also provided.*

**The best sign of slowing or arresting caries (cavitations) is the cavitations appear darker over time and the child tolerates chewing foods (e.g. meats and fresh vegetables)..**

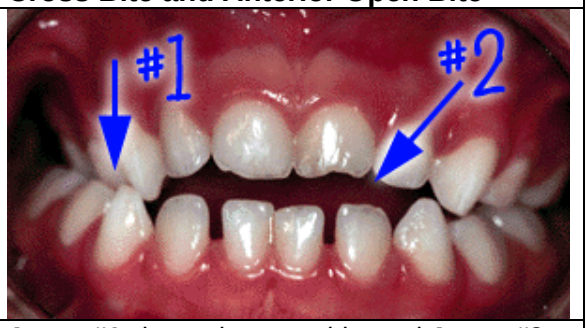
**8. Habits affecting primary dentition, common bite problems and dental trauma:**

Common habits that affect the primary occlusion are digit habits, pacifiers and feeding containers (e.g. bottles and sippy cups). Intensity (oral muscular activity), duration (how early did the habit start and when did it stop) and the frequency (how often) will determine the presence and severity of a bite problem. The question of familial jaw growth patterns must also be considered. For example, there may be a history of overjet or underbite and dental crowding in one or both caregivers.

The most common bite problems observed are anterior open bite with or without posterior crossbite and posterior crossbite alone. A posterior cross bite can be unilateral (one sided) or biliateral (upper jaw constriction). The risk for theses concerns begins as teeth erupt, thus problems can be seen before the child's second birthday.

Anterior cross bite is usually related to upper and/or lower jaw growth concerns and not related to habits. Although unusual, a traumatic injury (luxation of upper front teeth to a lingual position) can result in an anterior cross bite. Counseling about digit habits should include concerns for transmission of harmful germs to the mouth of the child; caregivers must also be aware to keep their child's hands must be as clean as possible.

If the contributing habit can be stopped before three years of age and best by two years, anterior open bites can reduce spontaneously. Anterior and posterior cross bite that cause jaw shift will require interceptive orthodontic therapy. Therapy for any child that presents with an anterior or posterior cross bite should be considered toward the end of the primary dentition (age 5-6) or in the early transitional dentition (age 6-8).

| **Cross bite with jaw shift (right)** | **Cross Bite and Anterior Open Bite** |
|---|---|
|  |  |
| **Arrow #1** shows the upper back teeth bite inside the lower back teeth. **Arrow #2** The upper midline and the lower midline do not match due to lower jaw shift to the right side. | **Arrow #1** shows the cross bite and **Arrow #2** shows an open bite of a four year old child who uses a pacifier. |

| | |
|---|---|
|  | This picture shows crossbite of the four maxillary incisors. The lower incisors completely cover the upper teeth. The occlusion of the canine and molar teeth is normal. |

- **Traumatic dental injury, dental neglect and child safety:**

An important part oral health is to remind caregivers of the dangers that exist in the home, yard, pets etc, especially when children are beginning to crawl, walk and run. I ask caregivers to actually crawl around their home to get some idea to what children can reach. Cabinets and closets that hold tools or cleaning materials, stairs, small toys, the crib or bed, and feeding places for pets must be protected from a child's natural curiosity. There are many internet sources and reading materials on child safety. Injuries to the upper primary incisors are common especially as children begin to walk (and run). The most common indication of a recent or past dental injury is a discolored upper incisor.

| | |
|---|---|
|  | The discoloration results from bleeding from the pulp into the dentin tubules, which cannot be removed by wound repair. Discoloration does not indicate that the tooth is or is not vital.<br>• Ask the caregiver about behavioral changes related to food choices, sleep and mood.<br>• Look at the gingival tissues above the tooth for redness, swelling or draining abscess.<br>• Check the tooth for mobility that is different than the adjacent teeth.<br>These signs and symptoms usually indicate infection in the bone surrounding the tooth. The primary concern is the health of the developing adult incisor. |

**Under no circumstances should an avulsed primary tooth be replanted into its boney socket.**

It is important to recognize that physical signs of child abuse will often include oral facial tissues. It is rare that these injuries recur or can be simply explained as "accidents" without a logical and plausible description of the incident. A caregiver may not fully understand the significance of extensive tooth decay for their child's general health and well being, especially if the child has no obvious complaints or symptoms. However, after observing a child with obvious tooth decay (see examples below) and discussion with the caregiver, a caregiver's failure to seek dental care for their child is at least neglect of their child's health. The frequency of pediatric visits provides a unique opportunity for observation and questioning about the child's dental visits and care. It is important for the caregiver to be aware of, and comply with, the specific laws of the state in which the practice is located and of the health professional's responsibility to report suspected cases of abuse and neglect.

## 9. Encouraging caregivers to timely dental visits for their children (and themselves).

As infants and toddlers return often for routine visits (immunizations) and complaints (URI), pediatric providers can easily assess how caregivers are doing in the oral health or their children.

| **Simple questions to ask:** | **Their response should be:** |
|---|---|
| How are you doing with your child's daily hygiene? | I feel that I am doing better. My child is accepting my care better. |
| When are you doing mouth care for them? | Morning and before bed, every day. *More often depending on their child's risk* |
| Have you stopped giving bottles and sip cups with juice:<br>• In the bed or naptime?<br>• When you are out with your child? | Yes<br>• No bottles or sip cups in the bed.<br>• Only water in the bottle or sip cup (in bed etc).<br>• I have watered down the juice to almost all water. |
| How often do you look at your child's teeth and gums | Every day. |
| Has your child had their first dental visit? *Ask the caregiver to talk about their child's visit.* | Yes |

| | |
|---|---|
| Have you (the caregiver) had a dental visit lately | • I do see my dentist regularly and my dental health is good.<br>• I am getting dental care.<br>• I am taking good care of teeth and gums every day. |

- **How often should children have dental visits?**

  - Children in good general health (low risk) presenting with caregivers who are confident about their care of their children should have a dental visit at least once each year.

  - Children who present with risk concerns or with caregivers who are not confident in their child care (see Secondary Factors) must have return dental visits to assure reliable oral health outcomes. The interval for the return visit must be determined specific to each situation (i.e. weeks or months) until the dentist and caregivers are confident about the child's "dental health home".

  - Children with "special needs" may need more frequent dental visits.

    All children should continue dental visits at least annually. During the ages of 6-8 years of age, there is need for children to have dental visits more often to assure health of the new adult teeth and to observe for bite problems and look for bite problems. Some problems with the occlusion (bite) can be treated in this age group. The American Association of Orthodontics recommends that children 6-8 years have an orthodontic examination by a specialist.

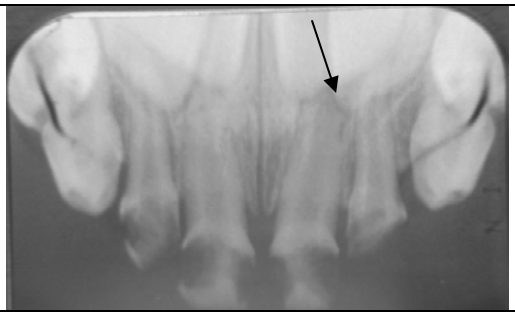
    An important question is the need for "sealants" for the new adult molar teeth. For school age children, most new decay is of these teeth.

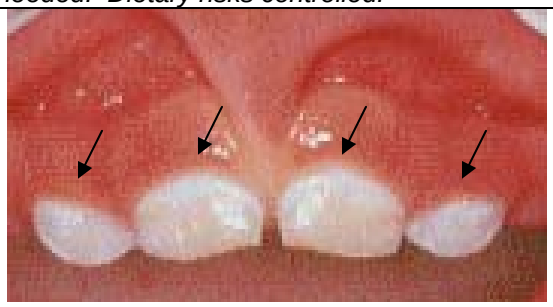
By providing early risk assessment, connecting to general dentists and pediatric (dental) specialists in your community and empowering caregivers to oral health, pediatric health professionals can greatly enhance the health potential of their community.

You should have a list of family dental practitioners and pediatric dentists in your community for referrals. Further, hospitals may have departments of dentistry and dental schools are also resources for pediatric care.

**Case Examples:** These situations are presented to give guidance for pediatric health providers. It is common that caregivers of very young children cannot locate appropriate dental care providers for their children. Thus, pediatric providers can provide effective counseling to prevent illness and intervention so that caregivers can control their child's illness until dental care can be secured.

| **Case 1** | **Case 2** |
|---|---|
| 30 month old child, bottle habit stopped at 15 months. Caregiver presented due to concern of child's appearance. Lesions are clean and hard. Child has no symptoms and tolerates normal diet. No other teeth have cavitations. Note that teeth and gums reflect light (sign of cleanliness).<br><br>**What to do:** Confirm good home care and diet control to keep these lesions chronic and reduce future risk. Although, these lesions are stable, this child is at higher risk for new decay of baby and adult teeth. Encourage caregiver to seek dental visit. | 22 month old child (uncooperative). There is healthy enamel gingival to cavitations. Caregiver has made good progress with child's supervision. Child was asymptomatic and tolerates a normal diet.<br><br>**What to do:** Apply fluoride varnish, confirm good home care and diet habits to control infection. Refer child as high need for dental evaluation.<br><br>At future visits, ask caregiver about dental visits and home care. If home concerns are being addressed, these lesions should appear darker with time. Check to see that teeth are clean (gauze wipe) and child should be asymptomatic. |
|  |  |

| **Case 3** | **Case 3** |
|---|---|
| Four year child with extensive caries of anterior dentition.<br><br>Note fistula above left central incisor. These teeth should be removed. Often caregivers have poor judgment about treatment of anterior teeth due to concerns about appearance, eating and speech. These outcomes are temporary as this child will eat well and speech may be only minimally affected until eruption of adult teeth. | Radiograph of child (left picture).<br><br>Note periapical infection (dark area above left incisor). X-ray confirms that incisors should be removed. Adult teeth are visible above the primary teeth<br><br>The primary concern is that alveolar infection can cause pain, swelling and potentially harm the developing adult teeth. Thus, dental care is an immediate need. |
|  |  |

| Case 4 | Case 5 |
|---|---|
| 33 month child with extensive decay that also affects child's lower posterior teeth. Child was referred to dental care her treatment was provided under general anesthesia due to behavioral obstacles and treatment extent.<br><br>**What to do:** Continue to ask about caregivers attention to child's diet and oral care supervision. | **13 month old sibling of Case 4** who presented with his bottle (non-diluted juice) at sister's initial visit. Note white (early infection) demineralization of incisors.<br><br>**What to do:** Apply fluoride varnish. Counsel caregivers regarding bottle habit (bottle ½ diluted with water at visit and the remainder over two weeks to all water) and given fluoride gel to brush on child's teeth.<br><br>*Return visit at 3 months: lesions were clean, hard and reflected light. Restoration is not needed. Dietary risks controlled.* |
|  |  |

| Case 5 | Case 6 |
|---|---|
| 22 month-old at six month recall. Note asymmetric pattern (i.e. left >> right). Only anterior teeth have decay. Caregivers have provided excellent risk control and lesions are arrested. Lesions are hard (arrested) and do not require restoration.<br><br>**Note that healthy enamel is gingival to the caries which shows that habits have been controlled as teeth were erupting.**<br><br>Observe as child matures and restorations are an option. | Six year old child. Fortunately, these lesions have not presented a problem for this child.<br><br>Note cleanliness of the teeth, the embrasures are open to saliva and can be easily cleansed, which has contributed to the chronic state of illness. Radiograph demonstrated no pathology and initial root resorption of the central incisors. Lower adult tooth is erupting.<br><br>TX: As these teeth are mobile due to impending eruption of adult incisors, there is no need to extract as long as child remains asymptomatic. |
|  |  |

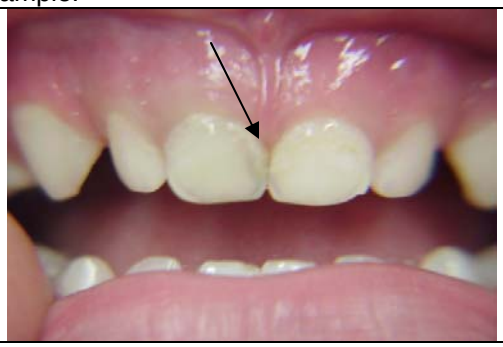
**Case 7**

This four year old child was first seen at 28 months of age. These lesions were firm but could be penetrated by the explorer and there was no other decay. Her behavior was not cooperative. Given the limited nature of infection and the caregiver's stated commitment to provide diet and hygiene control, it was felt that observation was the best option.

After two years, these lesions remain hard to the explorer (i.e. arrested). The caregiver has provided effective oral health and restoration is not needed.

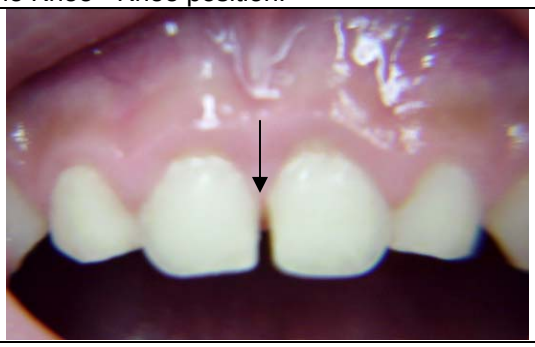
**Case 8**

Note shadow in between teeth (decay). The mesial surfaces of both centrals are decayed and no other teeth had decay. See next case example.



**Case 9**

In this example, the lesions were completely removed with the use of a dental hand piece (drill). The child's movement was controlled in the Knee - Knee position.



**Case 10**

The interdental space between the maxillary central incisors has been widened and the incisal corners of the lateral of the laterals have been rounded to allow better plaque removal and saliva contact.
With proper diet control, and caregiver supervision for oral hygiene and use of a daily topical fluoride gel, these lesions can become chronic and be observed in this state until their exfoliation.

**Regardless of professional dental care and timely dental visits, oral health and controlling illness for children with tooth decaycan only be achieved through appropriate caregiver daily supervision for child oral hygiene and feeding habits.**

**Appendix: Common considerations in professional oral health care for children.**

**Treatment or replacement of maxillary incisors:** By the time a child with ECC presents for the initial dental visit, the four maxillary incisors may be extensively decayed and require operative/pulp therapy or removal due to insufficient structure for restoration, pulp or alveolar pathology. Restoration of maxillary incisors requires technique sensitive therapy (i.e. pulp therapy and bonding techniques). Treatment is further complicated by the presence of chronic pulp inflammation even in the absence of symptoms. Treatment failure is common due to these concerns and the continuation of risk behaviors in the home. Often, removal of these teeth maybe the only predictable care.

Caregivers are often anxious about removal of the maxillary incisors primarily for esthetic concerns or concerns about peer group reaction. Unlike the primary canines and molar teeth, the incisors have no space management responsibility and their premature loss does not affect nutrition. There may be some temporary speech (articulation) effects until the eruption of the adult teeth. Appliance therapy to replace these teeth is possible but may present technical obstacles, harm to the child's remaining dentition, gingival tissues and present concerns for repair or potential for loss of the prosthesis. These concerns make use of esthetic appliances questionable. There are no studies that demonstrate a significant or long term psychosocial sequelae for children who experience early loss of the maxillary incisors alone.

**Medical Necessity of General Anesthesia for Dental Care:** As discussed, children can present with extensive oral problems and because of their young age (immaturity), chronic illness, or developmental delay may not be able to tolerate dental care. Often, providing care in one visit managed through "ambulatory general anesthesia" provides the safest and most reliable outcome. It is common for a child with extensive oral problems to initially present with acute symptoms and long standing dental illness. Timely medical consultation and clearance is required for pediatric or adults with "special needs" to receive care. Often, insurance payers require a statement of "medical necessity" to approve general anesthesia. It is not uncommon that a family's insurance does not regard oral problems as "medically necessary" or does not include dental care as coverable under ambulatory general anesthesia. This problem is slowly being resolved. Your assistance (a letter of support) may be helpful in to have such care reviewed and approved by a third party payer.

**Aids to control movement (assist oral examination and aid caregivers providing oral health for their children with special needs):**

Specialized Care Company manufactures oral health management aids. Elbow stabilizers are now available to the public through a doctor's prescription. These aids prevent the child's hands from interfering with oral cleansing. These aids are inexpensive and are especially helpful for caregivers who provide oral cleansing for children with special needs. Specialized Care: 800-722-7375 and on the web: wwwSpecializedCare.com

## References and pertinent literature (abstracts)

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### Web sites resources to locate pediatric dentists and orthodontists

1. www.AAPD.org: American Academy of Pediatric Dentistry

2. www.AAO.org: American Academy of Orthodontics.  s

### Web sites (oral health)

1. www.AAPD.org:  American Association of Pediatric Dentistry provides recommendations for the oral health and care of children and a geographic locator program for pediatric providers.

2. www.MySmileGuide.com:  An interactive oral health risk assessment health education and guidance record for caregivers and individuals. My SmileGuide provides caregivers the means to provide a risk assessment and oral examination to their child and creates a report that can be brought to the child's medical and dental visits.

**References:**

The following abstracts represent a sample of the literature regarding pediatric oral health. These citations will show overlap in the outline presented. These selections emphasize the need for a more intensive oral health movement that emphasizes prevention through caregivers receiving timely information and direction.

1. Parental education leads to preventative dental treatment for patients under the age of four. Schneider HS. ASDC J Dent Child. 1993 Jan-Feb; 60(1):33-7.

   A parental education system that stressed the benefits of a home-care program and early dental visits resulted in a 36.7 percent increase in children under the age of four seen for preventive services. Special note was taken of the influence of this program on the parents' decision to seek early preventive care for younger siblings of patients already in the practice.

2. Infant Oral Health Education: Parental Knowledge and Reported Behavior. Wandera A, Finazzo J., Pediatric Dentistry 22:3, 2000.

   Written and verbal IOH education via pamphlets and one-on-one counseling has a positive effect on reported dental health behavior of parents of infants. Written and verbal IOH education is more effective that written IOH education alone.

3. The role of early dietary habits in dental caries development. Ismail AI., Spec Care Dentist.1998 Jan-Feb; 18(1):40-5.

   Early childhood caries (ECC) is a serious dental condition that occurs during the first three years of life and is associated with the early intake of sugary foods, drinks, or snacks. There is a need for development of educational, nutritional, and prevention programs targeting mothers and infants and for research on effective methods to prevent Early Childhood Caries.

4. Using an Oral Health Intake Record to compare Caregivers Oral Health and IQ to Child's Clinical Appearance, Scialabba M., Ferguson F., ADEA annual meeting, San Diego California March 2002.

   A pilot study of 89 caregivers of children below 6 years of age demonstrated there is a very significant relationship between a self-assessment of oral health knowledge by the primary caregiver (about 98% women) and the oral health of children. Further, the caregiver's awareness of child oral health was a significant predictor of their child's oral health regardless of the rating of their own oral health status (i.e. good, fair, or poor). The mean decayed caries surface for caregiver's rating of the oral health awareness (i.e. good, fair, or poor) was 1-2, 7-8, and greater than 14 per child respectively.

5. Motivating parents to prevent caries in their young children: one-year findings. Weinstein, P. Rosamund Harrison, Benton, T., JADA, 135, June 2004, 731-738.

   Study of parents of 240 infants aged 6-18 months randomly assigned to either a motivational interviewing or traditional (pamphlet and video) education group to

receive oral health information. After one year the motivational group showed less new caries than the traditional group (i.e. mean .71 and SD 2.8 surfaces versus 1.91 and 4.8 respectively. These results suggest that personal intervention through a trained oral health educator is more effective in the prevention of Early Childhood Caries.

6. Al-Shalan TA; Erickson RP; Hardie NA. Primary incisor decay before age 4 as a risk factor for future dental caries. Pediat Dent: 19:1 1997 37-41.

   The purpose of this investigation was to determine whether early childhood caries (ECC) is a risk factor for future dental caries. One hundred fifteen dental charts of children younger than 4 years of age when initially treated were reviewed and abstracted for primary incisor caries and age at the initial examination, gender, recall dental visits, sealants, and age at the last dental examination. In addition, the number of carious, extracted, and restored teeth (cert/CERT: primary/secondary) at the last examination was determined. Children with ECC at their initial examination (N=58) had a 93.0% cert rate, a 67.2% CERT rate, and a 60.3% CERT in first molars rate by their last dental examination. Non-ECC children at their initial examination (N=57) had less than half the rate each cert/CERT parameter (43.9%, 22.8%, and 26.3%, respectively) at their last dental visit. The odds ratios for each cert/CERT parameter posed by ECC status were 17.3 for cert, 7.0 for CERT, and 4.3 for CERT in first molars. When these odds were adjusted for other study parameters by a forward step-wise logistic regression analysis, ECC status continued to be a risk factor for each cert/CERT parameter. We conclude that 1) early childhood caries is risk factor for future caries, 2) increased age is a risk factor for CERT, and 3) recalls and sealants are protective factors. (*Pediatr Dent.* 1997;19:37-41)

7. Future Caries Susceptibility in Children with Early Childhood Caries Following Treatment under General Anesthesia. Anna Galganny Almeida, Mark M. Roseman, Michael Sheff, Noelle Huntington, Christopher V. Hughes.

   Purpose: The purpose of this study was to assess the susceptibility of children to the future development of caries following comprehensive treatment for early childhood caries (ECC) under general anesthesia.

   Methods: The patients selected for this retrospective study were identified by analyzing dental records of children receiving treatment at the Franciscan Children's Hospital & Rehabilitation Center, Boston, MA (FCH & RC). In total, 4,143 records were reviewed. Of these, ECC was diagnosed in 42 patients before their admission to the operating room. Thirty-one control children were selected randomly from the dental records reviewed at FCH & RC. The control group was initially caries-free. The caries status of the children diagnosed with ECC was evaluated and compared with the control group. Children in both groups were seen for recall at intervals of six to nine months over a 2-year period. The carious lesions were recorded in 2 categories; new smooth surface caries (NSSC) and new pit and fissure caries (NPFC).

   Results: Thirty-three of 42 (79%) ECC children compared to 9 of 31 (29%) control children had detectable carious lesions at subsequent recall visits. Children with ECC demonstrated a mean number of 3.2±3.3 new carious lesions compared to a

mean of only 0.8±1.6 carious lesions in the control group. These differences were statistically significant (t71=3.8; *P*<0.001). In addition, of the 42 patients treated for ECC under general anesthesia, seven (17%) required retreatment under general anesthesia within two years following their initial full-mouth rehabilitation. The prevalence of NSSC in the ECC group was significantly higher than the control group (t71=3.5; *P*<0.001).

Conclusions: Despite increased preventive measures implemented for children who experienced ECC; this study concluded that this group of children is still highly predisposed to greater caries incidence in later years. These findings strongly suggest that more aggressive preventive therapies may be required to prevent the future development of carious lesions in children who experienced ECC. (*Pediatr Dent*. 2000; 22:302-306)

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**Acknowledgements:**

Laurence Pfeiffer (class of 2007): scanning of slide materials and literature search.