BEHAVIORAL OBJECTIVES

AFTER READING THIS NEWSLETTER THE LEARNER WILL BE ABLE TO:

1. Discuss primary dentition and bacterial colonization of the infant’s mouth.

2. Describe diet and feeding practices contributing to ECC, as well as implications for the healthcare provider.

Dental caries, tooth decay, is the single most common chronic childhood disease in America occurring in children; 5 to 8 times as frequently as asthma, 4 times more commonly than early childhood obesity, and 20 times more often than diabetes. More than one-half of all children have caries by the second grade.

What has been considered the traditional cause of early dental caries in childhood, nighttime feedings of milk or juice, is no longer considered the only cause. The term, early childhood caries (ECC), encompasses more factors related to dental caries than traditional terminology, including nursing bottle mouth syndrome or nursing caries. ECC is defined as the presence of one or more decayed teeth, missing teeth (resulting from caries), or filled tooth surface in any primary tooth in a child 6 years old or younger. Children most at risk for ECC include young children who are frequently drink sugary liquids, such as milk, including breast milk and formula, fruit juice, and other sweet liquids, including soft drinks, for long periods of time. Additionally, those who have caregivers with dental caries, are from low-incomes, are breast-feed or bottle-feed longer than 12 – 14 months, have prolonged use of a training (sippy) cup throughout the day, as well as those with insufficient fluoride exposure and use of liquid medication for longer than 3 weeks, are also at greater risk.

This newsletter will discuss primary dentition and bacterial colonization of the infant’s mouth. Diet and feeding practices contributing to ECC will also be described, as well as implications for the healthcare provider. An upcoming newsletter will discuss parental education related to oral care, including care of the teeth and fluoride supplementation.

EARLY CHILDHOOD CARIES

ECC is an infectious disease that can begin as early as the teeth begin to emerge (around six months or so), often progresses rapidly, and can cause great pain to the child. The top incisors are typically affected by dental caries first. ECC goes beyond pain and infection, affecting the child’s growth and development. Speech is commonly affected if ECC is severe enough to cause tooth loss, as the teeth work with the lips, and with the tongue and palette to form sounds. Eating and sleeping are also commonly affected because of pain, as well as the child’s self-esteem, learning, playing and quality of life, even into adulthood.

FOR ECC TO OCCUR several factors need to combine to cause caries. The child must have deciduous teeth, bacteria must be present, a substrate (food for the bacteria) must be present, and the bacteria must have time to cause decay. Following are the major factors involved in the caries process. The combination of the factors leads to disease. If one or more factors are missing, disease may not develop.

TEETH MUST BE PRESENT: Dental development proceeds from approximately the sixth week in utero through late adolescence. It involves the formation, eruption, and shedding of the 20 primary (baby, deciduous or shedding) teeth, as well as the formation and eruption of the 32 permanent teeth.

At about the sixth week of fetal life a thickening of the epithelium along the line of the future jaw occurs. At approximately the 8th week after conception, oval-shaped tooth buds start to form and harden in the embryo’s mouth. The baby teeth aren’t visible, but both the primary and permanent teeth are partially formed below the gums. However, in rare cases (1 every 2,000) infants are born with one or more teeth (called natal teeth) or may have teeth emerge within the first month (called neonatal teeth).

Between six months and 1 year old, the deciduous teeth begin to push through the gums. The tooth crown develops first. After it is fully grown, the root begins to develop. The eruption of teeth typically is bilaterally symmetric, with the left and right teeth appearing at similar times. The mandibular (lower jaw) central incisors are the first primary teeth to erupt, usually between 6 and 10 months of age. The maxillary, upper central incisors erupt next, followed by the upper lateral incisors, and then the lower lateral incisors. At 12 months usually all lower and upper incisors are erupted and it is at this time the child should see a dentist. Early visits provide a dentist the opportunity to see potential problems such as early childhood caries, educate the parent on proper oral hygiene for the child, and give the toddler a positive experience in a dental setting. Following the incisors, the first molars, canines, and second molars, erupt in sequential order.
In general, the primary dentition is fully completed by 30 months of age. Variations in the timing and sequence of tooth eruption is normal for both primary and permanent teeth. Gender and race/ethnicity affect the timing of tooth eruption; girls tend to develop their teeth earlier than boys, and black children earlier than white children. Some infants may have their first primary tooth (usually one of the bottom middle teeth) erupted as early as 3 months. Others may reach their first birthday or more without getting their first deciduous tooth. Late development of primary teeth is more common in premature babies.

**Prevention of Caries**

Numerous studies indicate that Mutans Streptococcus (S. mutans) is the main bacteria implicated in causing dental caries. S. mutans can break down the carbohydrates, producing acids that cause mineral loss from teeth, a process that often results in cavities. S. mutans does not appear in the oral cavity of infants until after tooth eruption and is passed to the infant from the mother, but possibly also from other adult caregivers, siblings, or playmates. This usually occurs when the child is between 6 and 31 months old, generally the period of primary dentition. This period is called the “window of infectivity.” The danger of the child’s mouth becoming infected is increased when the mother or other person has dental caries. When adults or children share food or eating utensils with the baby, or put the baby’s pacifiers in their mouths, bacteria may be transmitted to the infant. The same is true when babies put their fingers into the mouths of others and then into their own. To help prevent transfer of MS to the baby, parents should avoid any saliva to saliva contact such as sharing spoons and cups, chewing food for the baby, or putting the baby's pacifier in your mouth.

**Presence of Cariogenic (Cavity Causing) Bacteria**

A substrate (food for the bacteria) needs to be present. The normal, neutral pH in the mouth is 6.4 to 7.0, tending toward acidity. The lower (or more acidic) the pH becomes, the more likely it is that dental caries will develop. Certain foods or beverages may contribute to an acidic environment, such as sugars or fermentable carbohydrates such as starches. Fruit juices and carbonated beverages are especially high in acid as well as sugar. Pacifiers that have been dipped in sweet solutions, juices, or other sweetened drinks, and liquid medications in sugar syrups are other precursors to acid production. Elixirs contain 80% sucrose. Children on liquid medications for greater than three weeks are at particular risk for ECC and close attention should be given to care of the teeth. Dietary protein is not used by oral bacteria and helps to protect against the development of caries by acting as a buffer and reducing demineralization. Giving the child protein, such as dairy foods, with sweet or starchy foods (products made with flour, such as crackers and biscuits, as well as starchy vegetables, such as peas, beets, corn, carrots and potatoes) is important to oral health. For example, for the infant, giving rice cereal followed by formula, strained meat with peaches, and strained carrots with cottage cheese is helpful.

For the toddler, age-appropriate foods, such as yogurt and peaches; apple slices and cheese; and cheese and crackers, would be appropriate.

**Bacteria Must Have Time to Cause Decay.** Foods that promote acid production that are kept for long periods in the mouth or on the teeth, or are consumed with high frequency within a time period, are more likely to cause dental caries than foods that are eliminated quickly from the mouth. The American Academy of Pediatrics advises infants be weaned from the bottle and breast, in consultation with the child’s pediatrician, at 12 to 14 months old. Before weaning, babies who suck on bottles containing anything but water throughout the day or night, and toddlers who carry around sippy (training) cups of juice, milk, or other beverages are continually creating acidic conditions. Sippy cups filled with milk or juice should be reserved for snack and mealtimes when increased salivary activity will help clean teeth. Increased salivary flow during meals helps wash away food and bacteria from the teeth and gum tissues.

**Implications**

Pediatric healthcare providers are often the first professionals to identify children at high risk for ECC. Assessing oral health, including a visual exam and risk factor assessment, should be a routine part of care.

**Visual Screening:** Lift the child’s lip and look at the teeth. Healthy teeth are shiny and smooth. The earliest signs of decay may appear as white spot or general loss of reflectiveness of the enamel, much like looking at frosted glass or flat paint. Later, brown or yellow spots on the teeth may be evident. The top incisors are typically first affected by dental caries. The top teeth in the back of the mouth are affected next, then the bottom back teeth. The lower incisors usually do not become involved because the tongue lies over them and keeps the liquid away from the bacteria on these teeth.

**Risk Assessment**

- Family history: Ask about the mother’s last dental visit, as well as that of other immediate family members. Active decay indicates a high level of transmissible cariogenic flora, as may multiple dental fillings.
- Socioeconomic status: Children of lower-income families, often on Medicaid, are at greater risk for dental disease.
- Diet: Children with high sugar diets, children who drink a lot of juices, or are given colas or sweet tea, are at greater risk of caries.
- After dentition begins, infants and children who drink from a bottle or sippy cup for prolonged periods, day or night, are at great risk for ECC. According to the American Academy of Pediatric Dentistry, children who are not weaned from the bottle or breast by 12-14 months are at risk.

ECC is a national health concern. Assessment of early signs of ECC, as well as parental teaching related to prevention, is essential.
1. The most common chronic childhood disease is:
   a. diabetes.
   b. asthma.
   c. obesity.
   d. dental caries.

2. ECC is a term related to the presence of dental caries in children at which of the following ages or younger?
   a. 12 months
   b. 2 ½ years
   c. 6 years
   d. 12 years

3. Which child is NOT at imminent risk for ECC?
   a. Sam, 15 months old, who has a diet high in simple sugars and starches.
   b. Julie, 10 months old, who drinks juice from a sippy cup throughout the day.
   c. Bobby, 7 months old, whose mother has numerous untreated dental caries.
   d. Martha, 4 months old, who has no visible teeth.

4. Which of the following accurately describes primary dentition?
   a. At 6-12 months, the teeth begin to push through the gums.
   b. The first teeth to erupt are the upper central incisors.
   c. At 30 months usually all lower and central incisors are erupted.
   d. It is complete by 6 years of age.
5. ECC can begin as soon as the teeth begin to erupt.
   a. True
   b. False

6. The bacteria implicated in causing dental caries is:
   a. Porphyromonas gingivalis.
   b. Streptococcus mutans.
   c. Lactobacillus.
   d. Streptococcus salivarius.

7. All of the following can increase the child’s risk of becoming infected with bacteria, causing dental caries, EXCEPT when:
   a. a mother puts her baby’s spoon in her mouth, then feeds the child.
   b. an infant puts her fingers in her father’s mouth, then into her own.
   c. an infant has a pacifier clipped to her jacket.
   d. a sibling gives her sister a wet kiss on the mouth.

8. When the mouth is alkaline, the more likely it is that dental caries will develop.
   a. True
   b. False

9. When inspecting the mouth of an 8 month old, which of the following findings would be suspicious of ECC?
   a. No teeth have erupted.
   b. Gums are inflamed and red.
   c. White spots are noted on the top incisors.
   d. Lower central incisors are shiny and smooth.

10. Which of the following food combinations may help prevent dental caries in the 2 year and should be included in parent education?
   a. Crackers and peaches
   b. Banana and dry cereal
   c. Corn and mashed potatoes
   d. Apple slices and cheese