

# *Essentials of Oral Health*

## Oral Development

Developing teeth—from the prenatal period through adolescence—benefit from fluoride and good nutrition and are susceptible to the damaging effects of injuries, illness, and certain medications.

**T**eeth begin to develop in utero, early in gestation. The number, size, and quality of teeth are determined primarily by genetic factors, although the quality of teeth is also affected by environmental factors such as nutrition, maternal health, and medications taken by the mother during pregnancy. Good maternal prenatal care can contribute to a healthy environment for the development of sound teeth in the child.

Children are born with most of their primary (baby) teeth and some of their permanent teeth partially formed but not yet erupted. Occasionally, primary teeth have erupted at birth and need observation or extraction. For most infants, the first primary tooth appears around six months of age, though the timing of first eruption can vary widely. Primary teeth erupt every few months, usually in right and left pairs. These pairs alternate between the upper and

*The wind was blowing and the temperature was 10 degrees below zero when the dental team arrived by small plane for their semi-annual trip to the village. The Alaskan Native children in the village were aware that Dr. Thomas Johnson, known to the villagers as "Dr. Tom," would be arriving and they were*



*ready. Two children whom Dr. Tom immediately recognized came running up to him with their greetings. Nina Foxglove, a 6-year-old girl who had just entered the first grade, was proudly displaying her missing two front teeth.*

lower jaws, and eruption proceeds generally from the front of the mouth to back. By age two or three, children usually have all 20 primary teeth.

Teething, the process through which primary teeth emerge, has for centuries been popularly associated with a variety of illnesses, yet there is little objective evidence of a relationship between teething and systemic illness.<sup>1</sup> Today, teething is believed to be a minor problem, treatable with local measures such as topical medication, application of cold, use of a teething ring, or perhaps pain relief medicine approved for infants. Teething causes more difficulties for some children than for others.

Eruption of permanent teeth begins at about five or six years of age, usually with the lower front teeth which replace the baby teeth, or with the first permanent molars, which come in behind the last baby teeth. Permanent teeth may erupt immediately after the loss of the baby teeth or anytime within the next six months. The loss of the last primary tooth occurs around 12 years of age. The last permanent teeth to erupt are the third molars, or "wisdom teeth," which erupt at about 18 years of age. Adolescents should be evaluated to find out whether their jaws have room for the third molars. If there is not enough room, the teeth should be extracted before they erupt.

The space in the jaws occupied by the primary teeth is essentially the same space that will be available for their successors. Premature loss of primary teeth can cause this space to close, leading to crowding of permanent teeth. As the jaws grow bigger and longer, the new space, formed behind the existing teeth, is taken up by the additional permanent molars that erupt behind the primary teeth or their successors.

During dental development, the tooth can be affected by nutritional deficiencies, trauma, systemic disease, and local infection. Failure of a tooth to form or erupt, or malformation or damage to a tooth can be caused by any of these factors. These are significant problems that can be corrected only with intervention by a dentist.

Improper use of medication can also damage developing teeth. Tetracycline, an antibiotic used to treat infections and acne, can discolor teeth during formation, as the drug is deposited in the dentin (the structure underlying the enamel). The resulting stain is gray, green, or black in color and cannot be removed because it is internal to the tooth. Once all permanent teeth have erupted (with the exception of third molars), tetracycline can be used to treat serious infections without causing damage to teeth. Tetracycline should not be used during pregnancy.

## Dental Caries

Since caries is the most common chronic disease among U.S. children, caries prevention is a major focus of oral health supervision.

Dental caries, often referred to as cavities or tooth decay, is the most common chronic disease among children in the United States.<sup>2</sup> Caries, now recognized as an infectious disease of the mouth which is manifest in teeth, can be affected by many factors, especially dietary habits. Dental caries results when bacteria in the mouth use certain carbohydrates to produce acids that destroy the tooth structure.

In terms of prevalence, morbidity, and cost of care, caries is the predominant childhood oral disease. Despite remarkable declines in the prevalence of dental caries in children, over half of all children have caries in their baby teeth by first grade and the overwhelming majority experience caries in their permanent teeth by high school graduation.<sup>3</sup> The personal and public costs of failing to address this preventable disease are high. Dental caries still produces significant morbidity in children, such as dental pain and infection, leading to missed school days. Even toddlers and young children suffer the effects of severe carious lesions, including difficulty eating, speech dysfluency, and both chronic and acute pain. Children and adolescents who are socioeconomically disadvantaged or who are members of certain ethnic groups experience disproportionately higher prevalence and severity of dental caries, and frequently have less access to care.

Caries causes mineral loss from the teeth (demineralization) but this mineral loss results in caries only when the caries attack is prolonged and exceeds the child's resistance and ability to heal (remineralization). Resistance and healing are determined partly by a child's physiology and partly by positive health behaviors. The younger the child's age when caries begins, the greater the risk of future decay. Therefore, delaying the onset of caries holds promise for reducing long-term caries risk. Both the level of caries attack and the child's resistance can be managed through oral health supervision that promotes positive health behaviors including good oral hygiene, use of fluorides and sealants, good dietary habits, and chemical or physical reduction of dental plaque.

*“Look, Dr. Tom, my molar is really loose!” said Nina’s 10-year-old brother, Joseph, who was in the fifth grade.*

*When Dr. Tom first came to the village, dental caries was a big problem. About eight years ago, he sat down with the village council members and informed them that about half of the children in the village had 3–4 decayed teeth. Though many positive changes have occurred since the dental sealant and fluoride program began, dental caries—a preventable disease—continues to affect too many children in the village.*

*Baby bottle tooth decay (BBTD) is also a big problem in the village—about 30 percent of the children have this disease.*

*Immediately after his arrival, Dr. Tom talked with Bernice, the coordinator of the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and stressed how important it is to wean babies from the bottle by about one year of age. Dr. Tom and the WIC coordinator agreed to*

## *Baby Bottle Tooth Decay and Early Childhood Caries*

Putting the baby to bed with a bottle or allowing the baby to suck “at will” can lead to baby bottle tooth decay—a rapidly advancing, severe form of early childhood caries that puts a child at greater risk for future caries.<sup>4</sup>

Baby bottle tooth decay (BBTD) occurs when a child is put to bed with the bottle or allowed to suck from it “at will” for extended periods of time. When a bottle is given to encourage sleep or to quiet a baby, juice or milk “pools” in the child’s mouth around the teeth and remains there for long periods, promoting dental caries. Saliva flow is minimal during sleep, so the sugar-containing liquid is not diluted. Bacteria quickly produce acid; if the process is repeated often, the teeth decay.

In BBTD, the upper front teeth or incisors are most severely affected, followed by the molars, which erupt later. Once the teeth decay significantly, they need to be either restored or removed, often under sedation or general anesthesia because very young children are unable to cooperate with such complex treatment. An estimated 5–10 percent of all children experience some degree of BBTD, and some populations of Native American children are affected to a far greater degree.<sup>5</sup> In addition to the



immediate problems of pain and infection caused by BBTD, the condition puts children at greater risk for caries in the permanent teeth.

Determining whether (or how quickly) a child develops BBTD depends not only on baby bottle use but also on the child's inherent resistance and on the level of the bacteria mutans streptococci in the child's mouth. Since these factors are difficult to measure, the first step in managing BBTD is to reduce the frequency of carbohydrate consumption by eliminating "at will" feeding and use of the bottle at night. Cleaning the child's teeth with a soft toothbrush or cloth with a pea size amount of toothpaste will reduce bacteria concentrations and should be done daily after eruption of the first tooth. To prevent BBTD, parents should encourage the use of a cup starting at six months of age and wean their children from the bottle before 12 months.

Parents and caregivers who have given a bottle at night to help the child sleep or use the bottle as a pacifier during the day should check the child's teeth for BBTD. The condition will appear as flat white, brown or yellow spots or carious lesions on the teeth. In extreme cases, the teeth will be partially broken. Earliest signs of BBTD appear as a general loss of translucency or reflectiveness of the enamel, much like looking at frosted glass or flat paint.

BBTD is completely preventable. Children who need a bottle at night to sleep should have a bottle with water only and should be weaned from the bottle gradually over several weeks. Some parents need guidance concerning more appropriate ways to calm their baby or help their baby sleep, such as patting on the back or giving the baby a transitional object such as a teddy bear or blanket. If a child needs to consume extra calories for nutritional purposes and thus requires frequent feedings with a bottle, parents should seek the help of a dental professional or nutritionist to discuss caloric consumption and prevention of BBTD.

Although breastfeeding has overwhelmingly positive aspects such as higher immunity levels, breastfeeding does not automatically protect babies from caries. Some breastfed babies who feed at will for an extended period of time develop a pattern of caries similar to that found in baby bottle tooth decay.<sup>6</sup> Nevertheless, breastfeeding is recommended for at least one year or more, and breastfed babies can be taught to use a cup for other liquids.

*involve Ella, the community health aide, and Mary, the public health nurse, and also to meet with the pregnant women in the village to encourage them to talk with other young women about baby bottle tooth decay. The health team also acknowledged that the grandparents needed to know more about how to prevent BBTD, since many of them care for the children when the parents are busy.*

*Dr. Tom found that many of the school-age children were not brushing regularly.*

*A number of the children had gingivitis and a small percentage were also developing periodontal problems.*

*Ella told Dr. Tom that many of the younger*



## *Eating Disorders and Dental Caries*

Bulimic behavior can cause caries. The dental professional may be the first to detect symptoms of this hidden eating disorder.

Some children and adolescents experience a specific form of caries as a result of bulimic behavior in which the enamel of teeth is dissolved by repeated vomiting. In this process, the adolescent induces vomiting in an attempt to control weight, and, by doing so, exposes the teeth to very acidic stomach contents, often several times per day. Examining the teeth of a bulimic adolescent may show chalky rather than shiny enamel. In severe cases, the fillings seem to have expanded out of the tooth, when, in fact, the tooth surrounding the filling has dissolved. If an oral exam indicates that bulimia is suspected, the dental professional needs to have a frank discussion with the parents and the child or adolescent, and refer them to an appropriate health professional for treatment.

## Periodontal Disease

Gingivitis is common in childhood, but can be prevented or eliminated with thorough, regular brushing.

Healthy gums contribute to the general health of the teeth by providing support, enhancing the ability of teeth to resist infections and heal from traumas, and contributing to positive self-image and appearance.

The term periodontal disease includes both gingivitis (diseases of the gums) and the more serious periodontitis (diseases of gums and supporting bone). Transient gingivitis is common in children, but periodontitis is unusual in a healthy child. Children tend to have less gingivitis than adults, even with the same accumulation of dental plaque, probably because of immunologic differences and a more resilient response. By late adolescence, inflammatory periodontitis may be evident, but with treatment interventions and efforts, the individual can frequently curtail this otherwise chronic condition. Periodontitis may appear earlier among children with systemic illness.

Both gingivitis and periodontitis result from plaque irritants and thus prevention and control of periodontal disease in children focuses on plaque removal techniques such as brushing and flossing. If plaque buildup is severe, special mouthrinses can be prescribed by a dentist.