Envisioning a Cavity Free Generation

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In May 2000, the US Surgeon General David Satcher released a report entitled *Oral Health in America* which identified the silent epidemic of dental and oral disease that burdened some population groups and called for a national effort to improve oral health among all Americans. Tooth decay was called one of the most common chronic diseases in childhood, 5 times more common the asthma, and 7 times as common as hay fever. More than half of children aged 5-9 had had at least one cavity or filling, and by age 17, 78% percent of children had experienced tooth decay, with more than 7 percent having lost at least on permanent tooth to decay.

Over a decade has passed. A press release from the American Academy of Pediatric Dentistry (AAPD) dated March 2006 was quoted as saying that although fluoridation and improved oral hygiene has resulted in fewer cavities overall among Americans in recent years, cavities in younger children are on the rise. According to an August 2005 report by the CDC, the incidence of cavities in children ages two to five increased 15.2 percent from 1988-1994 to 1999-2002, the only child and adolescent age group to exhibit increased tooth decay. It's not surprising that this correlates to the population of patients that may not be seeing a dentist for regular dental visits due to their parent's perceived lack of need, or access to care issues where there are not enough dentists capable or available to see kids so young.

Meanwhile, the topic of pediatric dental sedation has been in the headlines recently. Sedation for a child's dental needs would not be necessary if there were not children with extensive dental needs who were too young to cooperate in a conventional setting. Unfortunately, most of these children with rampant disease do not get to a dentist until they have multiple involved teeth, or are already in pain. There are many children who grow up cavity free, but it is not due to dumb luck or good genes. Parents who learn about caries prevention while their children are still infants and take steps to implement certain behaviors in their children stand the best chance to help the child obtain a cavity free dentition.

How can this be accomplished? By introducing cavity prevention information to parents before their children have teeth. The Tiny Smiles Clinic at our local Give Kids A Smile Event not only screens infants and toddlers for dental disease, but also assesses the child's future dental caries risk by interviewing the parent and providing anticipatory guidance and caries prevention information at the same time. The tool we use is the **Tiny Smiles Assessment and Chart** questionnaire. (Attachment 1)

It allows us to inform parents that dental decay for the most part is a preventable disease. Since the dental profession knows what behaviors are most likely to put kids at risk for developing dental disease, we just need to get that message effectively across to the parents while their children are still young, before cavities have had a chance to develop.

Assessing Caries Risk: The Infant Oral Health Questionnaire

The caregiver of an infant or toddler will be asked the following questions, and the child's risk assessment for develop dental decay can be determined depending on how the caregiver answers the question. The interviewer can then discuss how a habit can be modified if it is putting the child at risk for developing cavities.

In the following section, I have the question in bold, and the reason why we ask the question following it.

Prenatal, Natal, Neonatal History

High Risk Pregnancy: A high risk pregnancy can lead to stress on the unborn child, which in turn can lead to improper development of some of the early forming developing teeth. Nausea and vomiting can damage the mom's teeth and cause her to develop tooth decay. The mom can rinse her mouth, but teeth should not be brushed for at least twenty minutes after vomiting, because the stomach acid can soften the teeth and the toothbrush bristles can wear the enamel away.

Tetracycline Ingestion During Pregnancy: The use of tetracycline during pregnancy is generally not recommended during tooth development (second and third trimesters) because it can result in permanent discoloration of the teeth and poor enamel development (hypoplasias).

Pre-term or Low Birth Weight: Studies have shown that a link between gum disease and premature births and babies with low birth weight. These two conditions have been shown to cause enamel hypoplasias of the developing primary teeth. It is for this reason that pregnant women should be encouraged to maintain routine dental health care, for herself and her child.

Developmental History

Age First Tooth Erupted: The earlier the teeth erupt, the sooner a child will lose their teeth. The later the teeth erupt, the later the baby teeth will fall out.
The average age for the first primary tooth to erupt is six months. The average age for the first tooth to fall out is between six and seven years of age.

Medical History

Number of Otitis Media Episodes: Ear infections are caused by viruses or bacteria that infect the lining of the eustacian tube in the middle ear. A few studies have found that children with dental cavities tended to have more ear infections than children without cavities. Bottle feeding while in a supine position can force fluid into the middle

ear. Bacteria can then back up into the middle ear and create an infection. Children who nurse from a bottle while sleeping are also more prone to develop cavities. Therefore, drinking from a bottle when lying down can cause both ear infections and dental cavities.

Frequency of Antibiotics Prescribed: Like Mary Poppins said, “A spoonful of sugar helps the medicine go down.” Chronic antibiotic usage can disrupt the enamel development of erupted teeth, and the sugar in these medications can stick to erupted teeth causing damage to them as well. Some kids may have multiple ear infections in a given year, requiring an increase amount of antibiotics they are taking. Other conditions like asthma can put a child at risk for cavities as well. Not only do they chronically ingest sugar-sweetened medication, but the steroids and breathing treatments required can dry the mouth out. Children should be encouraged to drink water after a medication dose, or have the teeth wiped or cleaned afterwards.

Multiple Fevers Early in Life: There have been some studies which have associated high fevers with enamel hypoplasias of developing teeth. The age the hypoplasia took place can be determined by which teeth are affected. High fevers during the first six months of life would affect the earliest developing teeth which would be the four front ones. Hypoplasias of the back molars would generally have taken place after nine months of age.

Family History

Parent’s Frequency of Decay: Bad teeth CAN run in the family. If a parent has tight teeth or deep grooves, they can be more at risk for developing cavities. These traits can be passed on to their child. Likewise, a parent who has developed cavities due to poor brushing and eating habits may pass these behaviors to their child as well. If a parent has unrestored teeth, they will have higher levels of the cavity producing bacteria called strep *Mutans*. This “bad” bacteria can be transmitted to their child by tasting and blowing on food or cleaning a pacifier with saliva. Parents need to make sure their mouths are healthy in order to help keep their child’s mouth healthy. Strep Mutans has been shown to be passed on to infants as early as nine months of age.

Sibling Rate of Decay: Are poor brushing and eating habits similar in the siblings? Households with older children may have more junk foods and sodas that the younger kids will want.

Dental History

Previous Dental Trauma: Questions asked should include: How long ago did the trauma occur? What happened? Which tooth or teeth were involved? Were there any symptoms at the time of the accident or recently? The dentist will need to determine if a radiographic film of the area will be needed.

Bruxism: Most kids outgrow grinding before their teenage years. Adolescents and adults who grind can get a mouthguard but it does not stop grinding. They just chew on plastic instead. Children with gastric reflux (GERD) may have teeth that wear down faster if they grind their teeth as well.

Teething Difficulties: A bluish swelling over an erupting tooth is normal and is called an eruption hematoma. These are usually asymptomatic and will go away as soon as the tooth breaks through the gums. No treatment is required unless there is pain Parents should avoid numbing agents like because it is dangerous if swallowed, and it can numb the tongue and cause complications if the infant rubs their numb tongue against the new teeth that are coming in. In order to reduce teeth symptoms palliative care is recommended. The lancing of tissues is not indicated. The infant should have increased fluid consumption since excess drooling occurs during teething. Non-aspirin analgesics like acetaminophen or ibuprofen can be given. If symptoms are worse at night, the analgesic should be given an hour before bedtime so it is already working when the baby is ready to go to sleep. Cold washcloths or teething rings can also be used.

Symptoms that occur during teething can include fussiness, irritability, and sleeplessness. Babies may have sore and tender gums when teeth begin to erupt, but there has been no evidence that teething is associated with URI, high fevers, ear infections or diarrhea. Before attributing any signs or symptoms of potentially serious illness to teething, clinicians and parents must rule out other possible causes.

Oral Habits:

Pacifier: It is natural and normal for an infant or toddler to be comforted by a pacifier, but only until age two years of age. Distortions of the jaws can occur after this age because the child has to suck harder to get the same satisfaction they once did. The caregiver should not clean the pacifier with her mouth in order to avoid the transfer of *strep Mutans* bacteria. The pacifier should never be dipped in sugary substances before giving it to the child.

Thumb or Finger Sucking: Thumb and finger sucking is also normal at this age and can be allowed. If the digit sucking habit continues past the age of four, the dentist can discuss behavior modification techniques. The important thing to note is that a child will not quit until they want to quit.

Home Care: An infant and toddler will never be as good as a brusher as the parent is. The child can be encouraged to brush their own teeth first, but the caregiver will need to then go back over the teeth in order to make sure they have been cleaned properly. A washcloth should be used after feedings in children before their first birthday. Even if there are no teeth erupted yet, it gets the parents in the habit of wiping the mouth.

Once the child is a year of age and starts getting their molars in, a soft-bristled toothbrush is recommended. Tooth brushing should occur at least twice a day, with nighttime being the most important time since the mouth dries out when one sleeps, and any plaque left on the teeth at night will harden (becomes tarter or calculus) and be difficult to remove in the morning. A wet toothbrush or one with a training toothpaste without fluoride can be used before the age of two. Once the child reaches his/her second birthday, a smear of toothpaste with fluoride is recommended by the American Academy of Pediatric Dentistry in order to introduce the texture of the fluoridated toothpaste and increase the fluoride exposure to the teeth. The child will not be able to spit at this age, so the amount of toothpaste in a smear will not be harmful if swallowed. A pea-sized amount of toothpaste can be used once the child turns three years of age. Ingestion of excess fluoride can result in fluorosis, a splotchy white discoloration of the developing permanent teeth, so parents should be in charge of putting the proper amount of toothpaste on the toothbrush for the child.

Water and Fluoride Sources

Where does drinking water used for drinking and cooking come from?
This question is designed to investigate the various sources of fluoride a child may be exposed. Perhaps the family lives in a fluoridated community, but the family only drinks bottled water without fluoride. The family may live in a non-fluoridated community and drink from the well, yet the family purchases bottled nursery water that has fluoride added to it. The interviewer will need to find out if the child has had fluoride supplements prescribed by another health care provider before deciding that the child is not exposed to the proper amount of systemic fluoride. The child may also be in different households or schools which may have a different fluoride status than the home. The bottom of this questionnaire page has a chart to help decide if fluoride supplementation is needed, but only after a thorough fluoride history is provided from the caregiver. Too much fluoride ingestion can result in a discoloration or fluorosis of the developing permanent teeth.

Feeding History

Breast Feeding: The American Academy of Pediatrics (AAP) and the American Academy of Pediatric Dentistry (AAPD) both strongly endorse breastfeeding. Although breast milk is known to be non-cariogenic, it can come into contact with plaque left on the teeth, resulting in dental decay. Infants who breast feed should have their teeth and gums wiped afterwards, in order to avoid the initiation of acid production during sleep. Parents who decide to allow the child to breast feed at will while sleeping need to be aware that cavities can form if the teeth are not clean from plaque before the child lies down at night. The longer breast milk is in contact with the teeth (duration and or duration of feeding) the higher the risk of developing dental decay.

Bottle: An infant who has a bottle full of a fermentable liquid with them when laying down for sleep is at the highest risk for developing early childhood caries. In fact, this is the number one reason for kids under age 3 to develop dental decay. It doesn't matter if it is milk, juice, or Kool-Aid, any beverage (even if it is diluted) other than water can cause cavities. The Frequency and duration of time that the child drinks from the bottle will determine the caries risk assessment. Parents need to be aware that it is not the bottle that causes cavities, but the beverage in it, so switching to a sippy cup or drinking from a juice box for long periods of time can cause cavities as well. The AAP recommends only 4-6 ounces of juice per day, so I recommend that juice and milk to be given with meals rather than during the day when the kids may be taking sip intermittently for long periods of time. The longer the time that the fermentable beverage is in contact with the teeth, the higher the risk for developing dental caries.

Oral Examination

This part of the questionnaire is to be filled out during the dental screening. The best indicator of a child's risk for developing dental caries in the future is if they have plaque on the teeth at the time of the dental examination. It shows that oral hygiene is not being done well enough at home. The dental screener will be able to show the parent the areas that plaque is present, and provide tooth brushing instructions on how they can make sure the teeth are clean at home. Many parents attempt to brush their child's teeth with the child standing in front of them, or sitting on the bathroom counter. The parent is most likely using one hand to stabilize the child, which leaves only one hand free to retract the lips, brush the teeth, etc. I like to have the parent sitting on the bathroom floor, and then have the toddler lying down with their head in the parent's lap. This puts the parent in the same position a dentist is in and they would be able to look in the mouth a little easier. It also allows the child's head to be stabilized so that the parent can have one hand to retract the cheek or lip, and the other hand can be used to brush the teeth and make sure the bristle are cleaning along the gumlines.

Caries Risk Exposure

The following list describes some guidelines for reducing caries risk in young children:

A child with past caries experience is at risk for future cavities. The best chance of avoiding cavities in the future is to not develop them as an infant or toddler.

The consumption of fluoridated water and the use of a fluoridated toothpaste will increase the chance that cavities will not develop.

A child is not old enough to brush their own teeth until the parent feels confident that the child could brush the parent's teeth effectively. Flossing should be initiated once teeth are touching each other. Many times the only teeth that will be touching in a toddler are the primary molars. These areas are difficult to reach. A child won't be able

to floss their own teeth until they have the dexterity to tie their own shoes. Even then the child may not be reaching all the way back. Parents need to help.

Bottles do not cause cavities. It's the liquid that is in it that promotes tooth decay development.

Cavities occur when plaque on the teeth interact with fermentable carbohydrates and create acid. Acid production occurs for twenty minutes after a person eats. Kids who graze throughout the day are more likely to develop cavities because their mouth is constantly creating acid and does not get a chance to clear out before the next acid exposure.

Parents know not to allow their child to eat a lot of candy. Parents don't always know that fruit snacks, fruit roll-ups and raisins have the type of consistency that gets stuck in pit and fissures and in between the teeth. Jell-O, pudding, and yogurt may have as much sugar as fruit snacks, but these products won't stay stuck on the teeth for long. Even children who brush twice a day are still at risk for cavities because sticky snacks at lunchtime won't be brushed off the teeth for several hours afterwards.

Encourage parents to look at the ingredients on the packages of the groceries they are buying. Sugar and high fructose corn syrup are many times at the top of the list.

Gummy vitamins may be healthy for the body, but they can be bad for the teeth. Sugar and high fructose corn syrup are added to many gummy vitamin products. Parents need to brush a child's teeth right after consuming a gummy vitamins. If a child chews their gummy vitamin on the way to school, it will be stuck on the teeth all morning. It may make sense to give the vitamin with dinner, and then brush the teeth shortly after.

Parents need to be role models for their children. Parents who avoid soda will have children who avoid soda. Parents who have brushing and flossing part of their daily routine will have children who brush and floss regularly. Let the child brush at the same time as the parent.

Parents don't know how to prevent cavities in their children unless they are taught.

You can be the person who teaches parents how to prevent cavities in their children.

You can be the person who can help create a cavity free generation.