

## Infant Oral Health



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This issue of Pediatric Review is intended for pediatricians, family physicians and all other interested medical professionals. For CME purposes, the author has no relevant financial relationships to disclose.

### OBJECTIVES

At the end of this activity the participant should be able to:

1. Describe the incidence and primary risk factors of pediatric caries
2. Discuss the causes of tooth caries and strategies to disrupt tooth decay
3. Describe proper course for parents to ensure their infant's oral health

### INTRODUCTION

According to the 2000 Surgeon General's report on oral health in America, caries is the most common chronic disease in children with five times the prevalence of asthma. Twelve years later, the most recent "Bright Smiles for Bright Futures" screening revealed that 42% of Louisiana's third grade children have untreated decay and two out of every three children have experienced dental caries before entering fourth grade. Possible sequelae of dental caries include pain, infection, parental absence from work and school absences. It is estimated that more than 51 million school hours are missed each year in the United States due to dental-related illness. Poor children and ethnic minorities suffer the burden of dental disease and have the greatest barriers to access to care. Preschoolers in poverty are twice as likely to have tooth decay and half as likely to visit a dentist as their more affluent counterparts due to barriers to education and dental care services. Children of low socioeconomic status experience interference with daily activities due to dental disease at a rate twelve times greater than other children.

Dental caries is not an inevitable part of childhood and the majority of dental caries are fully preventable. As with many of the illnesses that plague our society, dental caries is largely a social disease. Appropriate anticipatory guidance by the pediatri-

cian can help shape behaviors that encourage healthy and happy smiles. Since it has been estimated that 10% of children have dental caries by age two, true prevention can only occur with a focus on infant oral health.

### WHAT IS DENTAL CARIES?

In the past there was a strong association between dental caries and a cavity. Newer models of thinking emphasize dental caries as not just its resultant cavity but as a disease process. Dental caries is a chronic infectious transmissible disease resulting from tooth-adherent specific bacteria, primarily mutans streptococci that metabolize sugars to produce acid which can demineralize tooth structure over time. Early signs of the carious process are decalcified or "white spot" lesions. These lesions are typically present around the cervical margin or the gum line of the tooth as shown in Figure 1. These lesions can quickly progress to cavitated lesions without intervention.

The terminology for dental caries in young children has been called "bottle rot", "nursing bottle caries" and "rampant caries." These terms are limited by their association with a specific causal behavior or because they are vague. As defined in Box 1, "Early Childhood Caries" is the preferred nomenclature with "Severe Early Childhood Caries" to identify children whose disease experience is more.

### CAUSES OF DENTAL CARIES AND STRATEGIES TO DISRUPT THE PROCESS

The four main ingredients for dental caries are susceptible tooth surface, cariogenic bacteria, fermentable carbohydrates and time. The objective of preventive techniques is to disrupt or remove one of the key ingredients for dental caries.

**Bacteria** – The primary bacteria implicated in the carious disease process is mutans streptococci; the primary mode of infection is vertical transmission from the caregiver, typically the mother. This transmission can take place through shared utensils, kissing and blowing on food. The primary teeth, once erupted, provide a non-shedding surface for colonization. Earlier inoculation and a larger bacterial load increase the risk of caries. Although it is impossible to completely stop the transmission of mutans streptococci, decreasing the bacterial count in the mother's mouth can delay and minimize this inoculation. Expecting mothers

# Childhood Caries

**Early Childhood Caries** – The presence of one or more decayed noncavitated or cavitated, missing due to caries, or filled tooth surfaces in a child younger than age 6.

**Severe Early Childhood Caries** – Any sign of smooth-surface caries in a child younger than 3 years. From ages 3 through 5, one or more cavitated, missing (due to caries) or filled smooth surfaces in primary maxillary anterior teeth or a decayed, missing, or filled score of >4 (age 3), >5 (age 4), or > 6 (age 5).

should be encouraged to have all dental caries treated during pregnancy. The second trimester is typically the safest, or as soon as possible postpartum to reduce the bacterial load in their mouth. Expecting women at or below 200% of the poverty level qualify for dental benefits under the Expanded Dental Services for Pregnant Women (EDSPW) program in Louisiana. Mothers should also be encouraged to brush twice a day and floss daily to keep this bacterial load low and should not share utensils with their baby. The infant's gums can be wiped daily but once the teeth erupt tooth brushing should commence.

**Susceptible tooth** – Fluoride is the primary method of reducing the tooth's susceptibility to demineralization by acid produced by mutans streptococci. Parents should be encouraged to use fluoridated drinking water and should be informed that the fluoride levels in bottled water vary widely between brands and bottling facilities. As shown in Figure 2, the American Academy of Pediatric Dentistry guidelines recommend that children brush daily with a smear of fluoridated toothpaste daily when the first teeth erupt. Professionally applied topical fluoride treatments such as 5% sodium fluoride varnish have been shown to effectively reduce caries in primary teeth. The American Dental Association has recommended applications from two to four times per year based on caries risk. Fluoride supplements should be prescribed with caution – concerns associated with the use of fluoride supplements include lack of compliance, inaccurate dosing, risk of fluorosis and prescribers not considering the caries risk or fluoride level of food and beverages consumed. All possible sources of fluoride should be checked as children may receive bottled water, juice and processed food that are fluoridated. Also children may live in a non-fluoridated area with naturally fluoridated water. Topical fluoride modalities such as toothpaste and varnish are preferred over systemic supplementation.

**Fermentable Carbohydrates** – Mutans streptococci break down fermentable carbohydrates and subsequently produce acid that demineralizes tooth structure over time. Because each exposure to fermentable carbohydrates results in a period of time when demineralization can occur thus frequent exposure is the most destructive. Feeding throughout the day with no-spill training

cups and bottle containing a fermentable carbohydrate can create a state of constant demineralization and rapid destruction of tooth structure. This habit is especially harmful when the infant is put to bed at night with a bottle or "sippy" cup of milk, juice, or soda at night — saliva production is reduced at night and without protective saliva the dental caries process can progress more rapidly. Sugar-containing beverages in a baby bottle or no-spill training cup should be avoided and infants should not be put to bed with beverages containing non-fermentable carbohydrates. Parents should also be informed about the possible harms of ad libitum breast feeding — caries may not arise from breast milk alone but breast feeding in combination with other carbohydrates has been found to be highly cariogenic. Nighttime ad libitum breast feeding should be avoided after the first primary tooth erupts and other dietary carbohydrates are introduced. Parents should encourage infants to drink from a cup as they approach their first birthday and they should be weaned from the bottle between 12 and 18 months of age.

## AGE 1 DENTAL VISIT

Dentists rely heavily on physicians for early dental anticipatory guidance during gestation and the first year of life. By one year of age every child should begin seeing a dentist to establish a dental home. A dental home is defined as the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral healthcare delivered in a comprehensive, continuously accessible, coordinated and family-centered way. The age one dental visit should include anticipatory guidance tailored to the individual child and his and her caries risk and should cover the topics of dental and oral development, fluoride status, non-nutritive sucking habits, teething, injury prevention, oral hygiene instruction, and the effects of diet on the dentition. The child's teeth should be carefully examined and fluoride varnish may be applied based on the child's caries risk assessment. Savage et al. found that early preventive visits can reduce the need for restorative and emergency care, therefore reducing dental-related costs among high-risk children. The average dental-related costs per child according to age at the first preventive visit were as follows: before age 1, \$262; age 1 – 2, \$339; age 2 – 3, \$449; age 3 – 5, \$492; age 4 – 5, \$546.



Figure 1 – Primary anterior teeth with incipient caries and cavitated lesions



Figure 2 – Smear of toothpaste

### SUMMARY

Appropriate anticipatory guidance by the pediatrician during the first year of life can help families start down the path of optimal oral health. Pediatricians can specifically recommend the following to parents:

- Minimize saliva-sharing activities (eg., sharing utensils) to decrease transmission of cariogenic bacteria.
- Implement oral hygiene measures no later than the eruption of the first primary tooth. Tooth brushing should be performed for children by a parent twice daily using a “smear” of fluoridated toothpaste.
- Avoid high frequency consumption of liquids and/or solid foods containing sugar. Sugar beverages should be avoided in baby bottles or no-spill training cups and infants should never be put to bed with a bottle filled with milk or liquid containing sugars.
- Assess fluoride use and encourage drinking fluoridated water. Use if prescribing fluoride supplements to avoid excessive fluoride intake.

- A dental home at no later than 12 months of age.

### REFERENCES

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**Editor’s note** - Amy Zeringue, MD, a second year neonatology fellow at Children’s Hospital, co-authored “An Update on Early-onset Group B Streptococcal Disease Prevention” in the April issue of *Pediatric Review*.



# DOCTORS’ NOTES

Promoting Children’s Hospital’s medical advancements & achievements

**Anita Jeyakumar**, MD, has recently been appointed by the American Academy of Otolaryngology – Head & Neck Surgery to the CORE Otolaryngology and Practice Management Education Committee.

**Shreepal Shah**, MD; **Eileen Baez**, MD; **Jim Hempe**, PhD; **Susan LeFevre**, MD; and **Stuart Chalew**, MD, will present “The Precocious AGEing Effect of Type 1 Diabetes In Children” this month at the 72nd American Diabetes Association’s Scientific Sessions in Philadelphia.



Figure 1 – Proliferating Forehead Hemangioma



Figure 2 – Involuting Forehead Hemangioma

# The Vascular Anomalies Center at Children's Hospital of New Orleans

The Vascular Anomalies Center at Children's Hospital, New Orleans (VACNO) was founded by dedicated physicians from various medical subspecialties to provide vascular anomalies patients in Louisiana and Gulf State region outstanding care and treatment options. Co-directors Drs. Ernest Chiu, Jeffrey Poole and Lawrence Simon lead a multidisciplinary team consisting of various specialties such as plastic surgery, dermatology, otorhinolaryngology, interventional radiology, hematology, orthopaedics, nursing, and social work to assist patients and families with evaluating vascular lesions throughout the body. Vascular lesions are a type of birthmark or congenital growth, such as a hemangioma, which is composed of abnormal blood vessels.

## VACNO Subspecialties

- Plastic Surgery
- Dermatology
- Interventional Radiology
- Pediatric Radiology
- Pediatric Hematology
- Pediatric Orthopaedics
- Pediatric Otorhinolaryngology

## What is a hemangioma?

Hemangioma is a common, non-cancerous vascular outgrowth (tumor) from the skin. It may first appear as a red mark on a newborn; however, they often times are discovered in the first

few weeks of life by parents who remember their infant was born without skin blemishes. Other times, hemangiomas may first be noticed in the nursery as a type of birthmark. Their gradual manifestation after birth is due to the tumor growing at a faster rate than the baby is growing. These lesions are also called capillary, strawberry, or cavernous hemangioma.

## What causes hemangioma?

Hemangiomas result from an imbalance in factors that promote and inhibit cell growth in the lining of blood vessels (endothelial cells). In the beginning, the factors that promote growth are abundant, whereas the inhibitory factors are diminished. This is called the proliferative phase (lasting for about 1 year). After this period, the involution phase begins, and the reversal in level of growth factors is seen. Eventually the tissue that overgrew will begin to regress as cell death is activated. This involutional phase continues for a few years.

## Who gets hemangioma?

As of yet, we have not identified the source of the imbalance or any risk factors that may predispose families to having hemangiomas. But studies have shown that up to 10% of Caucasian children have hemangiomas, but prevalence increases up to 25% in small, premature babies. Females are three times more likely to have these tumors than males. Of those children who have hemangiomas, up to 20% have more than one.



## What should parents expect?

For the most part, parents can expect that these benign tumors will not cause major problems because they grow to only a small size. They eventually begin to involute beginning by one year and continue over the next four to six years. A scar may remain at the site of the tumor.

However, there are occasions in which the tumor may require urgent care. Physicians can refer a child to the Vascular Anomalies Center for vascular tumors that can potentially lead to life-threatening conditions. These conditions include hemangiomas that involve critical anatomical locations (i.e. throat or eye region), associated heart failure or bleeding disorders, as seen in systemic hemangiomatosis or Kasselbach-Merritt syndrome. Another potentially life-threatening event is uncontrollable bleeding from an ulcerating vascular lesion.

## What are vascular malformations?

These are another type of birthmark, but are true malformations of arteries, veins, capillaries, or lymphatic vessels. These are present at birth, grow with the child, and do not regress as hemangiomas.

## How is the correct diagnosis made?

Early proper diagnosis is required to determine the appropriate treatment options. This requires detailed clinical history and examinations. MRI imaging remains the gold standard radiologic study for diagnostic confirmation.

## Imaging Studies

We offer state of the art radiological imaging services. At the multidisciplinary conference, all available radiological studies are carefully reviewed by a board-certified radiologist to guide us in making the correct diagnosis.

## Non-Surgical Treatment Options

The most common non-surgical treatment is the use of steroids to inhibit tumor growth. This medication can be given orally, injected locally, or systemically. If this fails, other medications can be administered such as interferon alfa. All non-surgical treatment options should be performed by a qualified physician to follow the treatment progress and possible drug side effects.

## Laser Therapy

Laser treatment is also available. However, in certain techniques, only the surface discoloration will fade because the laser beam penetrates only 0.75 – 1 mm into the skin. The underlying tumor remains, and therefore the discoloration, ulceration and bleeding may recur as the tumor continues to grow. A different laser treatment is available in which a laser fiber is inserted into the tumor. An experienced technician may be able to produce rapid shrinkage, but ulceration is a common complication of this procedure.

## Surgical Treatment Options

If non-surgical treatments fail, surgical removal of the tumor may be pursued. This is also warranted in cases in which:

- The tumor is located in critical areas (e.g. eye, airway)
- The tumor will lead to an obvious deformation
- Deformities can be avoided if treated early (e.g. ear, nose)
- The tumor causes severe pain or ulceration
- The tumor causes social stigma

## Conference Location

The Vascular Anomalies Conference (VACNO) meets monthly at Children's Hospital of New Orleans (200 Henry Clay St.) located on the banks of the Mississippi River adjacent to the beautiful Audubon Park. The multi-disciplinary VACNO conference is held on the fourth Wednesday morning of each calendar month. To be enrolled in our multi-disciplinary VACNO conference, patients must be first seen by a VACNO co-director. Patient medical information, physical examination, and imaging studies are obtained by our physicians on a more personal basis to improve diagnostic accuracy and conference efficiency.

## How do I make an appointment?

All patient candidates should call the Vascular Anomalies Center at 504-896-2058 for initial consultation by a Vascular Anomalies Center clinician. After being examined by the VAC team member, the patient may be a candidate for the multi-disciplinary conference described above.

# VACNO Co-Directors

**Ernest S. Chiu, MD**

**Hugo St. Hilaire, MD**

Plastic and Reconstructive Surgery

**Jeffrey Poole, MD**

Pediatric Dermatology

**Lawrence Simon, MD**

Otolaryngology

# Children's Hospital Specialty Clinics & Therapies

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 Ochoa, Augusto<sup>[M, L]</sup> ..... (504) 896-9589  
 Paris, Ken<sup>[M, L]</sup> ..... (504) 896-9589  
 Sorensen, Ricardo<sup>[M]</sup> ..... (504) 896-9589

## Amputee Clinic

Gonzales, Tony ..... (504) 896-9569

## Cardiology

Ascutto, Robert<sup>[BR]</sup> ..... (504) 896-9751  
 Gajewski, Kelly ..... (504) 896-9751  
 Lilje, Christian ..... (504) 896-9751  
 Ross-Ascutto, Nancy<sup>[BR]</sup> ..... (504) 896-9751  
 Sernich, Steffan ..... (504) 896-9751  
 Siwik, Ernest ..... (504) 896-9571  
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 Dorotan, Jaime ..... (504) 896-3928  
 Pettitt, Timothy ..... (504) 896-3928

## Children at Risk Evaluation (CARE) Center

Jackson, Jamie ..... (504) 896-9237  
 Wetsman, Ellie<sup>[BR]</sup> ..... (504) 896-9237

## Cleft/Craniofacial

McBride, Lori ..... (504) 896-9568  
 Moses, Michael ..... (504) 896-9857  
 St. Hilaire, Hugo ..... (504) 896-9857

## Clinical Trials

..... (504) 894-5377

## Cochlear Implants

Arriaga, Moises ..... (504) 896-2141  
 Marks, Herbert ..... (504) 896-2141

## Craniofacial/Genetics

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 Marble, Michael ..... (504) 896-9857  
 Zambrano, Regina ..... (504) 896-9857

## Cystic Fibrosis

Levine, Stephen ..... (504) 896-9436  
 Pepiak, Derek ..... (504) 896-9436

## Dental

Mobile Dental Program ..... 34-BRUSH  
 Ritwik, Priyanshi ..... (504) 896-9580

## Dermatology

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## Developmental/High Risk

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 Gomez, Ricardo ..... (504) 896-9441  
 Stender, Sara ..... (504) 896-9441  
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## Down Syndrome

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## Endocrinology

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## Genetics

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## Gynecology

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 Prasad, Pinki<sup>[L]</sup> ..... (504) 896-9740  
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 Yu, Lolie<sup>[L]</sup> ..... (504) 896-9740

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## HIV Clinic/FACES

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200 Henry Clay Avenue  
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In addition to Children's Hospital Main Campus, some physicians also hold clinics at other centers.

Children's Hospital (504) 899-9511  
 Ambulatory Care Center (504) 896-9532  
 The Metairie Center<sup>[M]</sup> (504) 832-4033  
 Baton Rouge Center<sup>[BR]</sup> (225) 216-3047  
 Lafayette Center<sup>[L]</sup> (337) 289-8289

## ARTICLE EVALUATION

You must complete the following evaluation in order to receive your CME credit.

I enhanced my knowledge of the topic:

Very much					Very little
5	4	3	2	1	

The author met the stated objectives:

Greatly				Not at all
5	4	3	2	1

The overall evaluation of the article:

Excellent				Poor
5	4	3	2	1

Did you receive any commercial bias in the material presented in this activity?

Yes  No

How long did it take to read the issue and complete the quiz:

30 minutes                      1 hour

## CONTINUING MEDICAL EDUCATION

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Please record your responses to the questions on the form below. Please circle the best possible answer. CME offer is good through May 2012.

1. The most contemporary terminology for dental caries in the primary dentition is:
  - a. Nursing bottle caries
  - b. Early childhood caries
  - c. Bottle rot
  - d. Rampant caries
2. Children should:
  - a. Be weaned off of the bottle by age 3
  - b. Breast fed ad libitum in the presence of carbohydrates
  - c. Be encouraged to drink from a cup by 12 months
  - d. Only have milk in the bottle at night until age 2
3. Inoculation with mutans streptococci:
  - a. Can be delayed with the reduction of saliva sharing activities
  - b. Can be minimized with proper oral care by the caregiver
  - c. Primarily occurs with vertical transmission
  - d. All of the above

**To receive CME credit, participants must score 100%.**

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NICU Conference Room



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