



Keeping caries at bay in breastfeeding babies

As an infant grows, human milk may become the substrate for cariogenic bacteria. Here's what to watch for and how to counsel parents.

PRACTICE RECOMMENDATIONS

➤ *Promote breastfeeding as the preferred method of feeding infants.* **A**

➤ *Optimize pediatric oral health by reducing risk factors for dental disease and by providing parents with anticipatory guidance to prevent early childhood caries.* **B**

Strength of recommendation (SOR)

- A** Good-quality patient-oriented evidence
- B** Inconsistent or limited-quality patient-oriented evidence
- C** Consensus, usual practice, opinion, disease-oriented evidence, case series

Early childhood caries (ECCs) are a preventable public health challenge. Breastfeeding may provide early protection from ECCs. In addition, oral hygiene that begins in infancy, regular dental care visits, and a healthy diet can minimize ECC risk.

In this article we review the critical role of the family physician (FP) in reducing ECCs by promoting breastfeeding and infant oral health and addressing dental health concerns.

How ECCs develop

ECCs represent decayed, missing, or filled areas in the primary dentition of the tooth surface. The bacteria that cause them (most often *Streptococcus mutans*¹) strongly adhere to teeth and produce acids as waste products of fermentable carbohydrate metabolism that demineralize tooth enamel and progress into the dentin. Weakened enamel and dentin can result in cavitation (ie, a dental cavity). Left untreated, caries can extend to the pulp and destroy the entire tooth. ECCs are a risk factor not only for dental caries in primary teeth, but in permanent dentition as well.

ECCs are the most common chronic disease affecting young children.¹ Dental disease may begin soon after tooth eruption with detrimental effects on oral development. Almost half of children have dental caries by 5 years of age.²

ECCs represent a complex and multifactorial disease that is impacted by biomedical factors and unmet social needs. Children who are most at risk include those with low socioeconomic status, a high-sugar diet, exposure to household smoke, and limited dental care access.³ In addition, women with low education, poor oral health, and/or a lack of fluoride exposure are more likely to have children with ECCs.³ This is partly because of vertical transmission of cariogenic bacteria from caregiver to child. Horizontal transmission in daycare settings can also occur. Paternal and child oral health have not been linked.

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Jonathan P. Wong, BMBS; Isvarya Venu, MSc; Rosemary G. Moodie, MD, MBA; Vidya Cuddalore Arivudainambi, BDS; Hazel Stewart, DDS; Robert J. Schroth, DMD, PhD; Alexandra Nicolae, DDS, MSc; Khai-Nhu Zweig, DDS; Meta van den Heuvel, MD, PhD; Elizabeth L. Ford-Jones, MD; Peter D. Wong, MBBS, PhD

Department of Paediatrics, University of Toronto, Canada (Drs. JP Wong, Moodie, van den Heuvel, Ford-Jones, and PD Wong); Trinity College Dublin, University of Dublin, Ireland (Ms. Venu); School of Dental Medicine, University at Buffalo (Dr. Arivudainambi); Toronto Public Health, Canada (Drs. Stewart, Nicolae, and Zweig); Department of Preventive Dental Science, College of Dentistry, University of Manitoba, Winnipeg, Canada (Dr. Schroth); Department of Pediatrics and Child Health, Max Rady College of Medicine, University of Manitoba, Winnipeg, Canada (Dr. Schroth); Social Paediatrics, Department of Paediatrics, Hospital for Sick Children, Toronto, Canada (Dr. Ford-Jones); SickKids Research Institute, Toronto, Canada (Dr. PD Wong)

peter.wong@sickkids.ca

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➤ **Early childhood caries are the most common chronic disease affecting young children.**

Support breastfeeding; keep oral microbiome changes in mind

The American Academy of Pediatrics (AAP) recommends exclusive breastfeeding for the first 6 months of life, a combination of breastfeeding and complementary foods until 12 months of age, and continued breastfeeding for as long as mutually desired by mother and baby.⁴ The World Health Organization (WHO) recommends continued breastfeeding until 2 years of age or beyond.⁵ In fact, the WHO global nutrition targets for 2025 include increasing the rate of exclusive breastfeeding in the first 6 months of life to at least 50%.⁶

In addition to maternal, financial, and societal benefits, human milk offers nutritional and other health-related advantages for children that optimize growth and development into adulthood.⁴ Breastfed infants may benefit from reduction in infections and diseases, including asthma, diabetes mellitus, childhood cancer, and obesity.⁷ Improved neurocognitive development, intelligence, and education attainment in adulthood have also been described.⁸ And the rich microbiome of human milk helps to establish oral and intestinal floras⁹ and may mediate protection from ECCs.³

■ **However, as a child's oral microbiome changes** with the emergence of primary teeth and exposure to more and varied bacteria and dietary sugars, the natural sugars in human milk may become the substrate for cariogenic bacteria.³ ECCs can develop and progress rapidly. Importantly, both the practice of breastfeeding and ECC risk are modified by socioeconomic status, maternal oral health and education, and exposure to household smoking.^{3,7} Understanding these relationships may help you better target risk assessment and counseling efforts.

What the research tells us about breastfeeding and ECCs

Breastfeeding is hypothesized to be one of many factors that influence ECC development. However, studies on this association have had conflicting results and have not adequately controlled for major confounders, such as dietary composition, maternal and infant oral hygiene, and maternal oral health status.

So here is what we know.

■ **Breastfeeding during the first year.**

In one meta-analysis involving children who breastfed for up to 12 months, those who breastfed longer within the 12-month period had a reduced risk of ECCs compared with those who breastfed for a shorter period of time,³ which implies that breast milk may be protective in the first year of life.³

Further, a 2014 study with about 500 participants found that children were more likely to have caries by 5 years of age if they breastfed for <6 months than if they breastfed for at least 6 months.¹⁰

■ **After the first year.** A Canadian study found an increased risk of ECCs associated with breastfeeding for longer periods of time. The study of healthy urban children reported that breastfeeding for >24 months was associated with a 2- to 3-fold increased odds of ECCs compared with shorter breastfeeding duration.¹¹

■ **No relationship?** Lastly, a US study using National Health and Nutrition Examination Survey data found there was no evidence to suggest that breastfeeding duration was an independent risk factor for ECCs.¹²

A possible explanation for a link

An initial protective effect of breastfeeding against ECCs may be related to breast milk's immunomodulatory factors and rich microbiome. Breast milk contains *Lactobacilli* and substances, including human casein and secretory IgA, that inhibit growth and attachment of bacteria,⁹ particularly the caries pathogen *S mutans*. Early defense against ECCs may be mediated through the establishment of a healthy oral and gut microbiome that results from exposure to breastfeeding and contact with skin, gut, and breast milk microbiomes. Later on, the child's oral microbiome changes with the emergence of teeth and the introduction of complementary foods and other drinks.

A look at the role vitamin D plays

Vitamin D status may influence childhood dental health.¹³ Low maternal vitamin D levels have been associated with ECCs,¹⁴ and

mothers with higher prenatal vitamin D intakes were more likely to report that their children were caries-free compared with women who had lower vitamin D intake.¹⁵ Additionally, children with severe ECCs were found to have lower vitamin D levels than cavity-free children.¹⁶ Unfortunately, only a minority of infants who are predominantly breastfed for >6 months receive vitamin D supplementation.¹⁷

Other factors at work: Carbohydrate exposure, nocturnal feedings

Exposure to carbohydrates—the essential substrate for cariogenic bacteria—is a key factor in ECC development. Refined sugars contribute considerably to tooth decay. Frequency of feeding and feeding practices, such as prolonged nocturnal feeding (either breast or bottle) may increase ECC risk.³ Further, a major determinant of ECC risk is colonization of the infant's mouth by cariogenic bacteria. Finally, ECC risk depends on socioeconomic status, oral hygiene, exposure to fluoride, and the mother's oral health, education, and smoking status.³ Even birth order plays a role, with those born first having lower risk than subsequent children.¹⁸

Breastfeeding and another area of oral health: Malocclusion

In addition to its relationship with ECCs, breastfeeding promotes adequate development of craniofacial structures (comprising the tongue, facial muscles, and jaw), which are important for smiling, emotion, and social contact. Breastfeeding may prevent the development of malocclusion (ie, a misalignment of the teeth) in primary dentition, which is a risk factor for malocclusion in adulthood.⁷ Although previous studies had conflicting results, a large prospective study found that breastfeeding significantly reduced the risk of moderate and severe malocclusion; however, this effect was nullified by nonnutritive sucking and pacifier use.¹⁹

Oral health recommendations: The FP's role

ECCs are theoretically preventable. To optimize the benefits of breastfeeding and minimize ECC risk, parents should follow

TABLE 1

Oral health strategies that can reduce ECCs²⁰

- Tooth brushing with fluoridated toothpaste twice daily^a
- Systemic fluoride supplements^b
- Fluoride varnish
- Counseling by a physician to reduce the high frequency of sugar exposure
- Dental home by first birthday

^a"Smear" of toothpaste for children < 2 years; "pea-size" amount of toothpaste for children ≥ 2 years.

^bConsider patient's age, parent's compliance, and fluoride levels in tap water.

Adapted from: Tinanoff N, Reisine S. *Acad Pediatr*.²⁰

recommendations for their children regarding proper oral hygiene, appropriate fluoride exposure, regular dental visits, and a healthy diet.¹

Be sure to advise parents to:

- avoid saliva-sharing behaviors (eg, sharing utensils with their children or cleaning a pacifier with their mouth), as these may increase early colonization of *S mutans* in infants;
- seek regular preventive dental care and attend to caries—both for their children and themselves; and
- use antimicrobial oral care products including xylitol-containing chewing gum to lower levels of cariogenic microorganisms in themselves and, in turn, reduce mother-child vertical transmission of *S mutans*.¹

In addition, make sure your prenatal counseling includes a discussion of the importance of good maternal oral health and diet—including an adequate vitamin D intake—to prevent ECCs in their children.

It's never too early to start

Providing guidance on children's oral health can start with the first well-infant visit. FPs should perform an oral health risk assessment by 6 months of age (see the AAP's Oral Health Risk Assessment Tool at https://www.aap.org/en-us/Documents/oralhealth_RiskAssessmentTool.pdf) and evaluate fluoride exposure. Advise parents to establish a dental home by the time the child is 12 months of age; to clean their chil-



The rich microbiome of human milk helps to establish oral and intestinal floras and may mediate protection from early childhood caries.

TABLE 2

Children are at high risk for ECCs if they²¹...

... live in an area with a nonfluoridated water supply or low (< 0.3 parts per million) natural fluoride levels
... have a visible defect, notch, cavity, or white chalky area on a front baby tooth
... regularly consume sugar between meals, use a bottle or sippy cup with any liquid other than water, and/or consume sweetened medications
... have special health care needs that limit the ability to brush the child's teeth
... have their teeth brushed less than once per day
... are born prematurely
... have a parent or caregiver who has tooth decay
... have visible plaques, such as white or yellow deposits, on teeth

ECCs, early childhood caries.

Adapted from: The Canadian Dental Association. CDA Position on Use of Fluorides in Caries Prevention. 2012.²¹

dren's mouths after feedings (before teeth arrive) with a clean, wet, soft washcloth; and to brush their children's teeth, once they erupt, twice daily using a soft toothbrush (TABLE 1²⁰).

Talk to parents about how to provide optimal exposure to fluoride, which is known to be safe and effective for the prevention of ECCs.¹ Use of fluoridated toothpaste in small amounts provides the benefits of fluoride without increasing the risk of fluorosis, especially for children at risk for caries (see TABLE 2²¹).

The US Preventive Services Task Force recommends that primary care practitioners apply fluoride varnish biannually for at least 2 years to the primary teeth of all children up to 5 years of age (Grade B evidence).²² This is particularly important for high-risk children, such as those with low-income or minority status. However, practitioners should also take into account that high cumulative fluoride intake can lead to dental fluorosis.¹ Finally, tell parents to avoid giving their children sugar-containing snacks and drinks to reduce ECC risk. JFP

CORRESPONDENCE

Peter D. Wong, MD, 303-89 Humber College Boulevard, Toronto, Ontario, Canada M9V 4B8; peter.wong@sickkids.ca.

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