

# Integration of Breastfeeding Consultation and Practices in the Scope of Pediatric Dentistry: Collaboration with Lactation Specialists

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## ABSTRACT

**Background:** In recent years, breastfeeding has been largely promoted due to health benefits for the children and the mothers and social, economic, and environmental advantages. World Health Organization (WHO) recommends breastfeeding for at least 2 years and to be continued for as long as this is desired by the mother–child dyad.

Despite its advantages, including protection against caries in the 1st year of life, prevention of malocclusions, and development of more normal breathing patterns, there is a great controversy in the literature regarding breastfeeding involvement in elevated risk for early childhood caries (ECC).

Breastfeeding and oral health are strongly related. Breastfeeding can influence oral health and development, but oral findings, such as tethered tissues and natal/neonatal teeth, may negatively affect lactation.

**Conclusion:** A healthy collaboration between the oral health care provider and the lactation specialist is important in order to identify those oral findings and prevent breastfeeding implications, but also in order to facilitate uneventful breastfeeding by emphasizing oral health care prevention strategies.

**Clinical significance:** Information on the advantages of certain lactation aspects and the potential risks for ECC is important for the pediatric dentist to be able to form an individualized treatment/prevention plan that will benefit and promote the oral and general health of young patients.

**Keywords:** Breastfeeding, Early childhood caries, Lactation, Oral health, Pediatric dentist.

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## INTRODUCTION

Promoting general health in collaboration with other specialists is a major part of contemporary pediatric dentistry.

Current guidelines support the need for a first visit to the dentist as soon as the 1st tooth erupts.<sup>1</sup> Consequently, this first session will normally occur at the time of infancy, or at least during preschool years, when the person's nutritive habits influence not only oral but also general health and development.

Human and nonhuman (formula) milk are the only options for nutrition during the first 6 months of life. Studies have demonstrated the major benefits of breastfeeding in health, nutrition, development, psychology, environment, and economy.<sup>2</sup>

World Health Organization (WHO) recommends exclusive breastfeeding for the first 6 months of life, at which period they recommend the introduction of solid foods and continued breastfeeding for up to 2 years or more. Nevertheless, <50% of infants 0–6 months old are exclusively breastfed.<sup>3</sup> In Greece, only 25% of mothers continue exclusive breastfeeding for >4 months, with a rapid decrease to 0.8% by the end of the first semester. About half of the neonates receive milk in formula by the end of their 1st week of life.<sup>4</sup> Latching difficulties, nipple trauma and pain that may occur as sequelae to oral implications can be reasons for a mother to discontinue breastfeeding or seek professional lactation specialist counselling.<sup>4,5</sup>

Lactation care providers are professionals educated and specialized in the field of human lactation. They use evidence-based studies to support their practices in promoting breastfeeding, and they are educated in all aspects of human

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lactation, including the anatomy of lactation, assisting neonates and infants in latching properly and dealing with possible problems during lactation. Their main aim is to assist mothers in achieving successful breastfeeding. Studies have shown that lactation consultants and counselors improve rates of initiation and duration of breastfeeding.<sup>6</sup>

In Greece, there are two main groups of lactation care providers: the International Board Certified Lactation Consultants and the La Leche League Greece lactation counselors. The latter consists of volunteer mothers who are interested in promoting breastfeeding through empirical knowledge and practices. Mothers often also refer to midwives for information and assistance either prior to giving birth or after. Many hospitals organize scheduled courses

for pregnant women regarding breastfeeding practices. Finally, the national breastfeeding initiatives program "ALKYONI" offers professional advice regarding lactation through an open telephone line (10525).

The role of the pediatric dentist is to follow recent recommendations, promote breastfeeding practices and cooperate with mothers and lactation specialists when necessary to ensure a safe continuation of breastfeeding for as long as this is desired by the parent and the child, provided that there will be no implications to the child's oral health.

In order to do so, the oral health care provider needs to be informed of the advantages of human milk and the role of breastfeeding in oral development, as well as the controversial issues that arise from prolonged breastfeeding, nocturnal breastfeeding, and breastfeeding on-demand, in association with the development of early childhood caries (ECC). In addition, it is important for lactation specialists to be educated on oral health conditions that could negatively influence breastfeeding and be able to consult and refer parents accordingly.

### Benefits of Breastfeeding to the General Health of the Child and the Mother

Maternal milk changes its consistency during the lactation period, each time adapting to the infant's needs. Mature human milk contains proteins, fats, growth factors (epidermal growth factor, insulin-like growth factor), carbohydrates, Fe, electrolytes, white blood cells, hormones, and other molecules that have a protective role against infection and inflammation and enhance organ development and healthy microbial colonization.

Formula milk, on the other hand, lacks this differentiation dynamic and is associated with increased risk for infections, particularly during the 1st year of life (compared to human milk), increased weight gain and long-term risk of diabetes. In addition, there have been cases in the literature of formula-milk bacterial contamination or contamination with other harmful substances, such as dioxins, bisphenols, and melamine. In 2008, 300,000 infants consumed milk containing melamine, which resulted in six associated deaths and various renal problems in Chinese infants.<sup>7</sup>

Breastfeeding also reduces the risk of acute otitis media. A meta-analysis by Ip et al. reported that children exclusively breastfed for 3–6 months had half the risk of developing acute otitis media compared to formula-fed infants.<sup>8</sup>

Human milk protects the gastrointestinal system from diseases such as gastroenteritis, diarrhea and necrotizing enterocolitis. Specifically, its components create a coating in the intestinal lining and attack potentially harmful pathogens. A meta-analysis has shown that exclusively breastfed preterm children had a 5% less chance of developing necrotizing enterocolitis (a high fatality risk disease) compared to children who were not breastfed.<sup>8</sup>

Bachrach et al. reported that infants who had been breastfed exclusively for at least 4 months had a lower risk of acquiring a respiratory tract infection (RTI), such as pneumonia. This result may suggest an important secondary protective effect since severe lower RTIs are related to increased risk for asthma.<sup>9</sup>

Different meta-analyses have shown that breastfeeding children have a lower risk for sudden infant death syndrome (SIDS). Hauck et al. reported that this is mostly evident in cases of a minimum of 2 months of exclusive breastfeeding.<sup>10</sup> However, Thompson et al., in their more recent meta-analysis, concluded that any breastfeeding (not particularly exclusive) for at least 2 months can reduce the risk of SIDS by 50%.<sup>11</sup>

A very recent meta-analysis concerning breastfeeding and the risk for childhood cancer concluded that maternal milk has a protective effect against leukemia. The most protective effect was observed at a duration of 9.6 months. Specifically, the average breastfeeding duration of 6–12 months reduced 20–27% of the risk for childhood leukemia, respectively.<sup>12</sup>

Results from the WHO European Childhood Obesity Surveillance Initiative–COSI 2015/2017, regarding 22 countries, confirmed the positive effect of breastfeeding against the odds of a child becoming obese at 6–9 years of age. This was significantly evident in children breastfed for at least 6 months.<sup>13</sup>

In addition to all the aforementioned benefits to the children's health, breastfeeding also has certain advantages for the mother. There is high evidence that exclusive breastfeeding reduces the risk of breast, ovarian and endometrial cancer in women.<sup>14–16</sup> Other potential rewards of breastfeeding in women include lactational amenorrhea, reduced adiposity, and weight, reduced postpartum depression, reduced risk of endometriosis, diabetes, osteoporosis, blood pressure and cardiovascular diseases, metabolic syndrome, rheumatoid arthritis, Alzheimer's disease, and multiple sclerosis.<sup>17</sup>

### Benefits of Breastfeeding in Oral Development and Breathing Patterns

There is a complex background in the development of malocclusion. Factors such as genetics, environment and function are all involved in the process of oral cavity configuration.

The sucking mechanism of breastfeeding differs significantly from that of bottle feeding or nonnutritive sucking and appears to play a role in the developing occlusion during primary dentition.<sup>18</sup>

The process of breastfeeding can be described as a peristaltic action and is often referred to as suckling. The infant will pull the nipple and part of the areola into the mouth as far back as the junction of the hard and soft palates and suck rhythmically. The tongue protrudes to keep constant contact with the lower lip, while the floor of the mouth facilitates the squeezing action of the nipple. The masseter and medial pterygoid muscles facilitate the movement of the mandible, creating a low or negative pressure in the oral cavity. The airway is maintained during this process.<sup>19</sup> On the other hand, the bottle-fed child "uses the tongue with piston-like motion in order to compress the artificial nipple against the palate." These different sucking mechanisms have the potential to predispose a bottle-fed infant to the development of malocclusion, such as open-bite, increased overjet, and posterior cross-bite.<sup>20,21</sup>

Studies have shown that exclusively breastfed infants have a lower risk of developing dysfunctional muscular activity that may be related to malocclusions.<sup>22</sup>

Peres et al., in 2015, conducted a systematic review and meta-analysis regarding the effect of breastfeeding on malocclusions. The review, which included 48 studies in total, concluded that children who were breastfed were 70% less likely to develop a malocclusion (anterior open bite, posterior cross-bite) compared to those who were not breastfed or were breastfed for shorter periods.<sup>23</sup> These results support the idea that prolonged breastfeeding has a positive impact on preventing malocclusions.

In addition to the protection that breastfeeding offers against malocclusions per se, infants who breastfeed (>6 months) are four times less likely to develop nonnutritive sucking behaviors such as a pacifier or digit sucking.<sup>24</sup> With nonnutritive sucking behaviors, there is a higher risk for increased overjet, anterior open bite and crowding in the lower arch.<sup>25</sup> The tongue thrusting action which takes place during bottle feeding, pacifier sucking, or digit sucking

could be a possible explanation. Since artificial nipples and pacifiers are less compressible and much harder than the breast, the infant's mouth must change to accommodate them. The sucking action contracts the buccinator muscle causing the maxilla to narrow. During digit sucking, the digit is pressed against the palate, causing it to narrow.<sup>26</sup>

The aforementioned malocclusions related to bottle-feeding and nonnutritive sucking can increase the risk of oral breathing and sleep apnea. One explanation could be the insufficient space created, which forces the tongue to compress toward the laryngeal area, thus obstructing nasal breathing.<sup>27</sup>

Longer durations of breastfeeding facilitate more normal oral development, allowing a correct nasal breathing pattern and thus improving the quality of sleep and performance during the day.<sup>28</sup>

### Oral Implications that may Influence Breastfeeding

The national breastfeeding survey in Greece documents that 21.2% of women report difficulties in breastfeeding initiation due to nipple trauma/pain. Certain oral findings, such as tethered oral tissues (TOTs) and natal/neonatal teeth, have been associated with nipple trauma/pain and latching difficulties, often resulting in seeking professional advice or breastfeeding cessation.<sup>29,30</sup>

Tethered oral tissues (TOTs) can be buccal, labial, or lingual (ankyloglossia). Apart from breastfeeding problems, they have also been related to speech difficulties and dental issues.<sup>31</sup> Their existence in the oral cavity and their relation to breastfeeding problems is a matter of controversy between specialists, as reported by Messner and Lalakea. In their survey, 69% of lactation consultants but a minority of physicians' respondents believed that ankyloglossia is frequently associated with feeding problems, with the pediatricians being the least convinced from the physicians' group (23%).<sup>32</sup>

Many studies have tried to investigate the effect of surgical resection interventions of TOTs in breastfeeding. The majority of these studies report a positive outcome immediately and a few days after treatment but rely highly on subjective maternal opinions and observations and are short-term, resulting in conclusions that cannot be recommended as guidelines due to the low quality of evidence. In addition, the methods of categorization of TOTs and their indications for surgical resections are largely heterogeneous between studies, meaning that further research is needed in this field.<sup>29</sup> Nevertheless, the guidelines issued by the National Child's Health Institute in Greece state that when ankyloglossia is related to functional lactation problems, the intervention of choice is frenulum resection.<sup>33</sup>

Tongue-tie has also been associated with speech articulation problems and increased caries risk. Tsousoglou et al. report that the division of the frenulum is essential when issues of impaired oral hygiene are raised due to the inability of the tongue to sweep away the food debris and difficulties in cleaning.<sup>31</sup>

Natal and neonatal teeth, which erupt prior to or soon after birth, can cause suckling problems, soft tissue injuries, and even choking in the baby, as well as nipple pain in the mother.<sup>34</sup> Basavanthappa et al. reported that all 15 neonates with natal/neonatal teeth, included in a retrospective study from the Department of Pedodontics and Preventive Dentistry, were referred with complaints regarding feeding difficulties.<sup>35</sup>

These teeth usually erupt in the anterior mandibular area, and in 90% of the cases, they are the actual primary teeth of the child rather than supernumerary. Depending on their mobility, risk of aspiration and breastfeeding difficulties, the options vary from no

intervention to smoothing of the incisal edges or extraction.<sup>30</sup> There are reported cases in the literature documenting the facilitation of breastfeeding due to interventions regarding natal/neonatal teeth.<sup>5</sup>

Mothers often seek help for breastfeeding from a lactation care provider when they experience difficulties. It is also becoming more common for the mother/child dyad to meet with a lactation care provider after delivery to establish a proper latch and assist in breastfeeding. The lactation care provider may be the first person to detect the TOT (s) and/or the natal/neonatal tooth/teeth and refer to a specialist as needed.

The decision on any intervention should be made considering the child's and mother's benefits and potential risks, and they should be driven ideally through a collaboration between lactation specialists and primary health care providers, including pediatricians, oral surgeons, orthodontists, and pediatric dentists.

### Breastfeeding and Early Childhood Caries

Kirthiga et al. reported that ECC was related to >100 types of risk factors (sociodemographic, diet, oral health-related, oral microflora-related, bottle feeding-related, and others). Their systematic review and meta-analysis identified 10 factors related to breastfeeding, including the total length of breastfeeding (<6 months, >1 year, >2 years), time (day vs night feeding) and frequency and duration of nocturnal feedings (>2 feedings, >15 minutes per feeding). The same meta-analysis reported that there was low to moderate quality of evidence regarding breastfeeding and concluded that the strongest risk factors associated with ECC are the presence of enamel defects, the presence of dentinal caries and high levels of mutans streptococci.<sup>36</sup>

The existence of so many risk factors associated with ECC poses certain limitations to researchers who wish to investigate the role of breastfeeding in their attempt to account for all possible confounding parameters. This could explain the controversial evidence in the literature regarding breastfeeding and the risk of caries. There are studies and meta-analyses concluding that there is no association between long-term breastfeeding and ECC,<sup>37-40</sup> and others reporting that breastfeeding for >2 years increases the risk for caries in children, especially in cases of nocturnal and/or more frequent (at demand) breastfeeding.<sup>21,41-43</sup> Some reasons for this heterogeneity include; (1) the different categorization of the types of breastfeeding (exclusive, mixed, etc.); (2) the heterogeneity of the duration periods of breastfeeding (<6, >6, 6-18, >18 months, etc.), (3) the different follow-up periods; and (4) the types of studies (mostly observational based on interviews, with the risk of information bias). This controversial evidence poses limitations for the various academies and institutes to issue guidelines on the field.

However, the majority of the studies agree on the protective role of breastfeeding during the first year of life.<sup>21,43</sup> This can be explained by the fact that human and cow's milk are less cariogenic than formula milk, and since bovine milk is not recommended for children <12 months old, the only alternative milk is formula. In addition, breastfeeding has been associated with less sugar consumption and delayed use of the bottle within the 1st year.<sup>21</sup> The American Academy of Pediatric Dentistry, in the most recent dietary recommendations, highlights the importance of breastfeeding prior to 12 months of age, not only due to the reduced caries risk but also due to the general health benefits that it offers.<sup>44</sup>

Current International Association of Pediatric Dentistry (IAPD) recommendations regarding the prevention of ECC include—avoiding nocturnal bottling or breastfeeding; cases of bottle or

breastfeeding after the 1st year of life; optimizing the use of fluoride in diet (water, salt, and milk); brushing the child's teeth twice a day with fluoridated toothpaste, of at least 1000 ppm fluoride and in the amount indicated for the age of the child; having a dental visit within the first year of life; applications of 5% fluoride varnish at regular intervals for any child at caries risk.<sup>45</sup> The emphasis on oral hygiene habits, the use of fluoride and dental visits seems to reflect an effort to minimize most of the risk factors for ECC, given that socioeconomic factors cannot be altered at that level. Regarding long-term breastfeeding (>1 year), nocturnal breastfeeding and/or highly frequent breastfeeding, certain recommendations cannot be made due to lack of evidence.<sup>46</sup> As a result, the decision on the continuation, limitation or cessation of breastfeeding must be made on an individual level following the pediatric dentist's advice, parental wishes, and the lactation specialist's guidance.

## DISCUSSION

At the moment, the education regarding breastfeeding provided to oral health care providers is very limited or nonexistent. In the United Kingdom, early career dentists reported limited knowledge and a lack of confidence in the delivery of breastfeeding advice.<sup>47</sup>

On the other hand, in the United States of America, a small survey among members of the United States Lactation Consultant Association revealed that they felt knowledgeable in subjects associated with breastfeeding and oral health and comfortable discussing oral development with the parents. In addition, only 50% of the time, they referred to dental professionals. The survey could not conclude if their knowledge on these matters originated from initial training when earning their credentials or from later attendance to seminars/lectures.<sup>48</sup>

All the above facts raise concerns (1) regarding the need for incorporating training about breastfeeding in dental education programs and (2) regarding the need for lactation health care providers to collaborate more efficiently with dental professionals and be able to refer their patients not only regarding "breastfeeding and oral health" as a dyad but also as a general necessity for an infant's better care.

World Health Organization (WHO) and AAP recommend breastfeeding for at least 2 years and continuation for as long as this is desired by the mother-child dyad. Contrary to that, current recommendations from the IAPD emphasizing the risk for ECC and advice on weaning after the 1st year of life.<sup>45</sup> If or when this is not possible (either due to parental wishes OR due to socioeconomic factors), then great care must be given to preventive options, fluoride applications, oral hygiene, controlled diet, and regular visits to the dentist.

## CONCLUSION

Thinking of all the benefits of human milk for the general health of the children and the mothers, and also given the difficulties that, in many cases, mothers have to overcome in order to establish a successful lactation process, there is a professional and ethical dilemma for the pediatric dentist in advising pro-weaning. Thus, the advice concerning possible breastfeeding cessation due to the potential possibility of ECC or, in cases of already established ECC problems, should be given as an individualized part of the general treatment plan of the patient and in collaboration with a lactation specialist and a pediatrician. This collaboration is significant for the mother-child dyad to proceed with a normal and uneventful

breastfeeding cessation, avoiding the negative psychological implications of a sudden pause.

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