Breastfeeding and the risk of early childhood caries

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Clinical scenario
A new mum attends her general dental practitioner for a routine checkup. Mum is very concerned because she has heard that if she continues to breastfeed her baby beyond 6 months of age, as she has been advised by her public health nurse, the baby will develop tooth decay. She asks the dentist if this is true. The dentist admits that he is not sure what the correct answer to this is, but advises that he will find out and let her know. To find the answer he decides to undertake a bibliographic search.

Clinical question

The PICO (population–intervention–comparison–outcome) question developed was: does continuation of breastfeeding (intervention) increase the risk of early childhood caries (ECC; outcome) in infants of over 6 months of age (population), compared with other methods of infant feeding (comparison)?

Search strategy

The databases Medline (1996–2008), Embase (1996–2008) and CINAHL (1982–2008) were searched using OVID, along with all evidence-based medicine journals within OVID, PubMed and Trip Database (www.tripdatabase.com). The OVID search (see Table 1) used the following search terms: "breastfeeding" or "infant feeding" and "dental caries" or "oral health". Studies were limited to human subjects and English language and review articles (where possible). The OVID search identified 30 studies of which four were considered relevant. The PubMed and Trip database searches used similar search terms with only the PubMed search identifying an additional study. Details of the papers are summarised in Table 2.

Discussion

There have been reports in the literature that prolonged and on-demand breastfeeding is a potential risk factor for the development of ECC.[5] Reliance on this evidence has, in some cases, led to dental professionals issuing advice regarding cessation of breastfeeding at 6 months. This bibliographic search identified five relevant articles on this topic, all of which failed to find an association between breastfeeding and development of ECC. Both review articles, however, highlight the poor quality of studies available on this topic.[1,2] In particular, studies lack clarity and consistency in the definitions of breastfeeding patterns, ie, whether it is exclusive, on-demand, or at night. Inconsistency in the definitions of ECC also creates problems in comparability of studies. The review by Valaitis *et al*.[1] which undertook systematic quality assessments of articles and would therefore be considered the more robust of the two reviews, concludes that, "the available evidence does not support a consistent and strong association between breastfeeding and development of ECC". The review does not include any randomised controlled trials (RCT), but it could be argued that a RCT is neither appropriate or ethical in this area. The RCT reported by Vitolo *et al*.[3] and Kramer and colleagues[5] are in fact secondary analyses of RCT of the promotion of healthy infant feeding interventions. This, together with other methodological issues highlighted in Table 2, suggests that the results and conclusions of these studies should be interpreted with caution.

The study undertaken by Iida *et al*.[5] does appear to take us a step further forward in answering the question of duration of breastfeeding and increased risk of ECC. Although this study's initial analysis suggested that children breastfed for >1 year in total were more likely to experience ECC than children who were breastfed for <1 year, the subsequent analysis (which controlled for confounding factors such as poverty, ethnicity and maternal smoking) demonstrated that there was no evidence that breastfeeding or its duration was associated with increased ECC. Unfortunately, the study was not able to explore the implications of other potential confounding factors such as oral hygiene practices and exposure to fluoride, but it does highlight that there are several other —and possibly more important — factors affecting development of ECC besides breastfeeding.

Breastfeeding has been found to have many health benefits for both the child, including protection against gastrointestinal infection, otitis media and necrotising enterocolitis,[7] and mother, including delayed return of

Table 1. Search strategy

Search	Search term	Result (N)
1	breastfeeding.mp. [mp=ti, ot, ab, nm, hw, tx, kw, ct, sh, it, tn, dm, mf]	13 207
2	infant feeding.mp. [mp=ti, ot, ab, nm, hw, tx, kw, ct, sh, it, tn, dm, mf]	5836
3	dental caries.mp. [mp=ti, ot, ab, nm, hw, tx, kw, ct, sh, it, tn, dm, mf]	16 011
4	oral health.mp. [mp=ti, ot, ab, nm, hw, tx, kw, ct, sh, it, tn, dm, mf]	10 398
5	1 or 2	17 490
6	3 or 4	23 666
7	5 and 6	109
8	Limit to English and human and review articles	30

Table 2. Summary or relevant papers

Paper	Study details	Key results	Conclusion	Study weaknesses
Valaitis et al. (2000)[1]	Systematic review of relationship between breast feeding and ECC. Modified Cochrane Collaboration review methodology: robust systematic quality assessment undertaken	28 relevant articles identified (86% case–control; 11% case series approach; 4% cross-sectional). Quality assessed as strong = 0; moderate = 11%; weak = 32%; very weak = 57%. Overall quality of studies poor with conflicting results	Available evidence does not support consistent and strong association between breastfeeding and ECC development. Breastfeeding should be continued as long as mother and child wish	No meta-analysis could be undertaken
Ribeiro and Ribeiro (2004)[2]	Review article exploring association between breastfeeding and ECC	Inconsistent results found in studies reviewed. Studies reviewed of low quality	No scientific evidence to confirm breast milk is associated with ECC development	Limited information given regarding search strategy and inclusion/ exclusion criteria. No details provided of quality-assessment process for articles included in review
Vitolo et al. (2005)[3]	Setting: Brazil. RCT to assess impact of a nutritional intervention on infant health. Only abstract written in English	Based on the abstract, intervention group had higher proportion of exclusive breastfeeding at 4 and 6 months and also of breastfeeding at 12 months. Study reported a lower proportion of children receiving the intervention experiencing dental caries (RR, 0.56; 95% CI, 0.32–0.96) at 12–16 months	The nutritional programmes may lead to positive changes in infant feeding behaviour and thus improvements in health	Detailed analysis of study not possible as written in Portuguese. Second paper[4] from this study published in English provides more detail on the feeding practices promoted with regard to breastfeeding, namely: avoiding using bottles or breastfeeding as pacifiers and to gradually restrict either bottle feeding or breastfeeding during the night. Data from this study therefore cannot be extrapolated to make statements regarding effects of on-demand and at-night breastfeeding beyond 6 months on development of ECC
Iida et al. (2007)[5]	Setting: US. Secondary analysis of cross-sectional data obtained from 1999–2002 National Health and Nutrition Examination Survey (n=1576 children of 2–5 years old). Aim was to investigate potential association between breastfeeding and other risk factors on development of ECC	Initial bivariate analysis demonstrated that children breastfed for >1 year in total were more likely to experience ECC than children who were breastfed for <1 year (P<0.01). Subsequent Poisson regression demonstrated that history of breastfeeding or breastfeeding duration of any time was not significantly associated with dfs counts. Further regression analysis demonstrated that after controlling for confounding factors, breastfeeding was associated with a 40% reduced risk for ECC	There is no evidence from this analysis that breastfeeding or its duration are independently associated with an increased risk for ECC	Cross-sectional data being used to examine potential associations. Data collected about feeding history may be subject to recall bias. Confounding variables such as patterns of breastfeeding, dietary and oral hygiene habits not adjusted for because of lack of available data
Kramer et al. (2007)[6]	Setting: Belarus. Cluster RCT investigating effect of an intervention to promote breastfeeding (n=17 046). Children followed up at 6.5 years to determine effects of breast feeding on dental caries	Intervention arm of RCT had substantially increased rates of any breastfeeding at 3, 6, 9 and 12 months. 81.5% of children had a dental examination at 6.5 years. No significant difference found in DMFT between experimental and control groups	No reduction in caries risk with prolonged and exclusive breast feeding	Studies used experimental group as a proxy for higher breastfeeding rates so duration of breastfeeding not known for those individuals who developed caries and those who did not. Data on differences between breastfeeding rates for groups are only given for 12 months, so inferences on effects of breastfeeding beyond this age cannot be made. Dentists recording caries were not trained and calibrated. Children were examined at 6.5 years of age, when a significant proportion had lost their deciduous incisors which may lead to underestimate of effects

ECC, Early childhood caries; RCT, randomised controlled trial; RR, relative risk; CI, confidence interval; dfs, decayed or filled surfaces; DMFT, decayed, missing or filled teeth.

fertility and postpregnancy weight loss.[8] Current UK guidance recommends exclusive breastfeeding for the first 6 months of an infant's life and that breastfeeding should continue beyond this, along with appropriate types and amounts of solid foods. No upper age limit for cessation of breastfeeding is given (www.dh.gov.uk/en/Healthcare/Maternity/Maternalandinfantnutrition/index.htm)

The World Health Organization also advises exclusive breastfeeding for the first 6 months of life and recommends that it continue in addition to other suitable sources of nutrition for up to 2 years or beyond (www.who.int/features/qa/57/en/index.html) although it is of note that the health benefits of continuation of breastfeeding for periods greater than 6 months in industrialised countries remain unclear.[9]

The incidence of breastfeeding has increased in all regions of the UK in recent years,[10] but there has been change in the duration of women breastfeeding, with declines in duration seen in Scotland.[10] The prevalence of infants being breastfed at 6 months of age in the UK was still only 25% in 2005,[10] but with national and international policies emphasising breastfeeding, it is likely that this figure will increase. It may, therefore, be appropriate for further high-quality research to be undertaken to explore the relationship between prolonged breastfeeding and ECC.

Clinical bottom line

Given the proven health benefits of breastfeeding and the lack of consistent evidence linking breastfeeding to the development of ECC, dental professionals should support current recommendations for breastfeeding. Emphasis should be placed on promoting good oral hygiene practice from the time of eruption of the first tooth and advice to reduce the frequency and consumption of sugar-containing foods and drinks.

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