

Breastfeeding, bottle feeding and risk of malocclusion in mixed and permanent dentitions: a systematic review

Lucas Guimarães ABREU
Saul Martins PAIVA
Isabela Almeida PORDEUS
Carolina Castro MARTINS

Universidade Federal de Minas
Gerais - UFMG, School of Dentistry,
Department of Pediatric Dentistry and
Orthodontics, Belo Horizonte, MG, Brazil.

Declaration of Interests: The authors certify that they have no commercial or associative interest that represents a conflict of interest in connection with the manuscript.

Corresponding Author:
Lucas Guimarães Abreu
E-mail: lucasgabreu@bol.com.br

DOI: 10.1590/1807-3107BOR-2016.vol30.0022

Submitted: Jun 11, 2015
Accepted for publication: Oct 14, 2015
Last revision: Nov 24, 2015

Abstract: The aim of the present study was to search for scientific evidence concerning the association between breastfeeding and bottle feeding and risk of malocclusion in mixed and permanent dentitions. An electronic search was performed in eight databases up to February 2015. Additionally, a gray literature search and hand searches of the reference lists of the selected studies were also carried out. There were no restrictions on language or on year of publication. The methodology of the included articles was evaluated using the Newcastle Ottawa scale. Out of the 817 identified citations, six studies fulfilled the eligibility criteria and were included in the systematic review. One study showed that children with mixed and permanent dentitions breastfed for more than 6 months presented greater mean protrusion of mandibular incisors and inclination of maxillary incisors compared with those breastfed for less than 6 months or those who were bottle-fed ($p < 0.05$). One study revealed that breastfeeding and bruxism were associated with Class II [OR = 3.14 (1.28 - 7.66)] and Class III [OR = 2.78 (1.21 - 6.36)] malocclusion in children with permanent dentition, while another study showed that an increase in breastfeeding duration was associated with a lower risk of malocclusion in children with both mixed and permanent dentitions ($p < 0.001$). Three studies did not report any significant association. Risk of bias was high in most selected articles. These findings do not support an association between breastfeeding and bottle feeding and the occurrence of malocclusion in mixed and permanent dentitions.

Keywords: Malocclusion; Breast Feeding; Bottle Feeding; Dentition, Mixed; Dentition, Permanent.

Introduction

Exclusive breastfeeding for at least six months has been highly recommended for preventing gastrointestinal infections and growth deficits in the first months of life.^{1,2} However, the findings of some studies have confirmed the association between feeding habits and the occurrence of malocclusion in the primary dentition.^{3,4} Indeed, both breastfeeding and bottle feeding have been associated with a greater chance of cross-bite development when preschool children are evaluated.^{5,6} Moreover, a recent systematic review has shown that the scientific evidence that breastfeeding



could protect against malocclusion in the deciduous dentition could not be confirmed.⁷

Non-nutritive sucking habits have been suggested to be a cause for malocclusion in mixed⁸ and permanent⁹ dentitions. There is also some evidence that bottle feeding,⁸ nail biting, object biting, cheek or lip biting and tooth grinding¹⁰ during the first years of life may be associated with pacifier use or finger sucking habits in children, which, in turn, can increase the risk of malocclusion. Nevertheless, the association between feeding habits history and malocclusion in mixed and permanent dentitions has been poorly discussed thus far.¹¹ In addition, there has been no systematic attempt to review and summarize the existing information on this topic.

Therefore, the aim of the present systematic review was to search for scientific evidence of the association between breastfeeding *versus* bottle feeding and malocclusion in mixed and permanent dentitions. The PICO elements were as follows: children in the mixed and/or permanent dentition stage (patient), bottle feeding (intervention), breastfeeding (comparison), and malocclusion (outcome).

Methodology

Protocol and registration

This systematic review was carried out using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) checklist as a template.¹² Neither a protocol nor a systematic review registration was considered.

Eligibility criteria

The inclusion criteria for this systematic review were epidemiological studies (cross-sectional, case-control, cohort studies and clinical trials) addressing breastfeeding, bottle feeding and mixed feeding (bottle and breastfeeding) and risk of malocclusion in mixed or/and permanent dentitions. Studies on primary dentition conducted with children younger than 7 years; epidemiological studies evaluating outcomes other than malocclusion (dental caries, trauma, temporomandibular disorders); and studies reporting risk factors unrelated to feeding or infancy and the treatment, diagnosis or prevention of malocclusion

were excluded. So were literature reviews; letters to the editor; case reports; case series; laboratory studies; studies on food intake; and studies addressing parents'/dentists' knowledge about oral health.

Information sources

A systematic computerized search was performed up to February 2015 in eight electronic databases: Pubmed (<http://www.pubmed.gov>), Medline via Ovid (<http://gateway.ovid.com>), Web of Science (<http://www.isiknowledge.com>), the Cochrane Library (<http://www.cochrane.org/index.htm>), Clinical Trials (<http://controlled-trial.com>), UK National Institute for Health and Care Excellence (<http://www.nice.org.uk>), US National Institutes of Health (<http://www.clinicaltrials.gov>) and Lilacs and the Brazilian Library of Dentistry (BBO) through the Virtual Health Library (Bireme, Latin America) (www.bireme.br). There were no restrictions on language or on year of publication. The reference lists of the selected articles were also hand-searched for applicable studies that might have been missed in the computerized searches. Additionally, a partial gray literature search was conducted with OpenGrey and Google Scholar limiting the search to the first 100 most relevant hits. The Reference Manager Software® (Reference Manager, Thomson Reuters, version 12.0.3) was used to organize the list of studies. Duplicate results were removed upon identification.

Search strategy

The following strategy was used in Medline, Pubmed, Web of Science and Cochrane databases: ((malocclusion* OR malocclusion[Mesh] OR dental occlusion[Mesh] OR Maxillofacial Development[Mesh]) AND (bottlefeed* OR bottle feed* OR bottle-feed* OR bottlefed OR bottle fed OR bottle-fed OR "bottle feeding"[Mesh] OR "breast feeding"[Mesh] OR breastfeed* OR breast feed* OR breast-feed* OR breastfed OR breast fed OR breast-fed OR weaning OR "Sucking behavior"[Mesh] OR "Feeding Behavior"[Mesh] OR "risk factors"[Mesh])) NOT ("animals"[Mesh] NOT "humans"[Mesh]). Medline and Pubmed were limited by "humans." Bireme, Clinical Trials, UK National Institute for Health and Care Excellence and US National Institutes of

Health were searched using combined keywords: “bottle feeding”, “breast feeding”, “sucking behavior”, “weaning” and “malocclusion.”

Study selection

The review process was carried out in two phases. In phase 1, two researchers (CCM and LGA) independently reviewed the list of titles and abstracts for inclusion. Once potentially adequate abstracts were selected, full articles were retrieved for a second selection process. If the abstract was judged to contain insufficient information for a decision of inclusion or exclusion, the full text was obtained and reviewed before a final decision was made. In phase 2, the eligibility criteria were applied to the full articles by the same two researchers (CCM and LGA). In both phases, any discrepancies in the inclusion of the articles between researchers were addressed through discussion until consensus was reached.

Data collection process

Two researchers (CCM and LGA) independently extracted data from the articles that met the inclusion criteria and compared their findings for accuracy. They discussed and re-examined any discrepancies until an agreement was reached. When additional or missing information was required, the authors of the articles were contacted.

Data items

Data on the following items were collected: country, study design, initial and final sample, data collection setting, child’s age at the time of the dental examination, how data on feeding habits were collected, how malocclusion was evaluated, statistical analyses, adjustment for confounders, overall result and direction of the effect (statistically significant or not).

The main outcome was malocclusion, which was considered the endpoint of disease (present/absent). Feeding habits were extracted as categorical or numerical variables based on the duration of breastfeeding and bottle feeding, as reported by the authors. Confounders and interactions were extracted and described when evaluated in the multivariate analyses.

Risk of bias in individual studies

The methodological quality was assessed by two researchers (CCM and LGA) using the Newcastle-Ottawa scale for case-control studies and the modified Newcastle-Ottawa scale for cross-sectional ones.¹³ For the case-control studies, a quality score was calculated based on three major categories: group selection (four items), comparability between groups (one item), and outcome and exposure assessment (three items). A maximum of one point was allocated to each item in the group selection and outcome and exposure assessment categories and a maximum of two points was awarded for comparability. Therefore, the maximum score was nine points and represented the highest methodological quality. For the cross-sectional studies, the score was calculated based on the same three categories. However, those categories had a different number of items: group selection (two items), comparability (one item), and outcome and exposure assessment (two items). Thus, the maximum score was six points and also indicated the highest methodological quality. Any disagreement between researchers was resolved by means of discussion.

Summary measures

Any outcome measure that evaluated the association between breastfeeding and bottle feeding and malocclusion in mixed and permanent dentitions was considered and included odds ratio (OR) and confidence intervals (CI). For the studies in which CI were not provided, p-values were presented.

Synthesis of the results and risk of bias across studies

The heterogeneity among the included studies was evaluated through the examination of various characteristics of the finally selected reports, such as dissimilarity between study participants and outcomes.¹⁴ If the data were homogeneous and appropriate for pooling, then a meta-analysis would be considered. If the data were heterogeneous and inappropriate for a meta-analysis, a qualitative synthesis would be performed instead.

Additional analysis

Publication bias was considered as an additional analysis.

Results

Study selection

The computerized search yielded 958 references across the eight electronic databases. After removal of duplicate references, 817 titles and abstracts were read and analyzed in phase 1, of which 615 were excluded. Therefore, a total of 202 studies were selected for the analysis of the full texts in phase 2. After reading of the full texts, only six articles^{15,16,17,18,19,20} met the eligibility criteria and were included in the present systematic review. A list of the articles excluded in phase 2 along with the reasons for their exclusion is displayed in Appendix 1 and is available upon request. One report was identified through the hand-search of the reference lists. No article was identified through the gray literature search. A flowchart depicting

the selection process of the articles at each stage of the systematic review is provided in Figure.

Study characteristics

Among the six articles included in the present systematic review, one was a case-control¹⁶ study and five were cross-sectional studies.^{15,17,18,19,20} Table 1 provides a summary of their characteristics, including methodological data and relevant findings.

All articles were published in English. One study was a population-based study with data collected from the US National Health Interview Survey (NHIS), representing the American population aged 9 to 17 years.¹⁵ One study provided sample size calculation and was representative of a Brazilian city.²⁰ The other four papers involved convenience samples.^{16,17,18,19} One included participants from a private office,¹⁶ one included individuals from a university setting,¹⁹ one included adolescents from schools of an Italian city,¹⁸ and one included individuals from three public schools of a Brazilian city.¹⁷

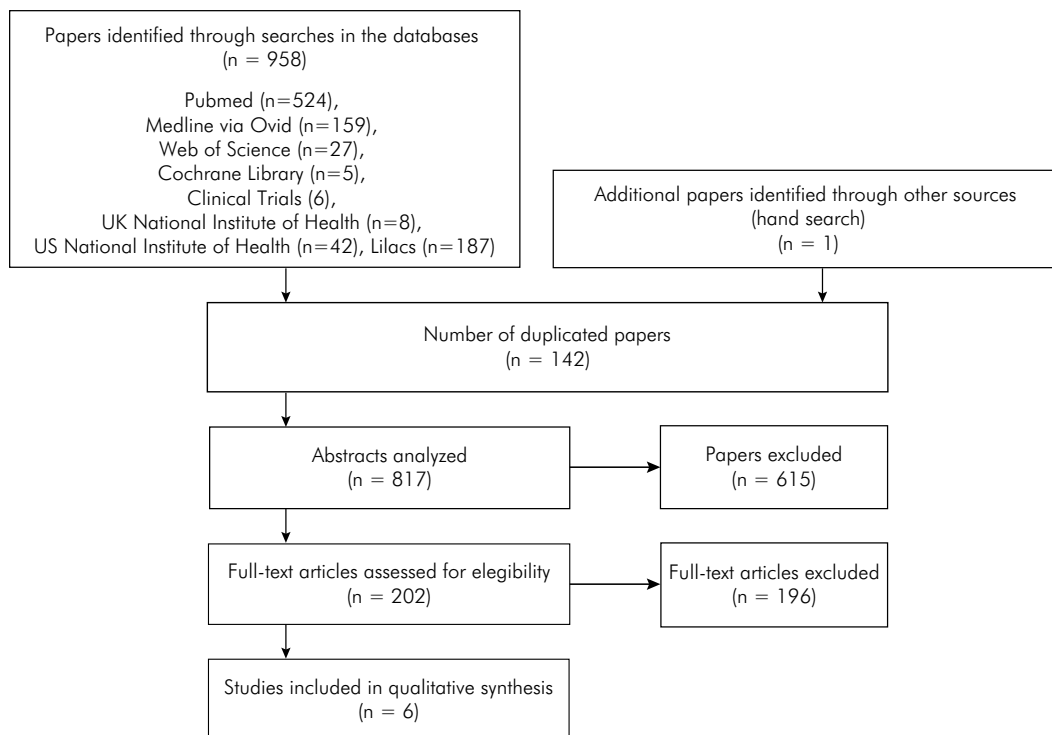


Figure. Flowchart showing the results of the search process.

Table 1. Characteristics of studies included in the systematic review.

Authors	Country, studydesign	Setting	Initial sample (Final sample)	Children's age at dental examination	Dental examination criteria/index (calibration)	Type of malocclusion analyzed	Feeding habit evaluation	Statistics (adjusted for confounders)	Outcomes (OR; 95%CI) or (p-value)
Meyers and Hertzberg, 1988 ⁶	USA, Case-control	Participants' home	737 (454)	10-12 years	Questionnaire applied to parents. Malocclusion determined by parental report. Does not report a criterion/index (no)	Presence or absence of malocclusion based on a questionnaire with the following queries: "Has your child been treated with braces?" and "Has your child's dentist or orthodontist recommended orthodontic treatment (braces) to straighten his or her teeth?" A case referred to a child for whom the parent responded "yes" to one or both questions. If the answers to both questions were "no", the child was considered to be a control.	Questionnaire applied to parents	Logistic regression and p-value (no adjustment for confounders)	No significant association was found between degree of exposure to bottle feeding and need for orthodontic treatment (OR = 1.73. 95%CI = 0.82 - 2.1, p = 0.058)
Labbok and Hendershot, 1987 ¹⁵	USA, cross-sectional	Participants' home (data from National Health Interview Survey - NHIS)	9700 (6097 aged 9-17 years)	9-17 years	Questionnaire applied to parents. Malocclusion determined by parental report. Does not report a criterion/index (no)	Presence or absence of malocclusion based on a questionnaire with the following queries: "Has the child ever had his/her teeth straightened or braces or bands on the teeth?", "Would you say his/her teeth need to be straightened?" and "Has a doctor or dentist ever said that his/her teeth need to be straightened?" In this study a "yes" answer to any of the three questions indicated malocclusion.	Questionnaire applied to parents	Z value (no adjustment for confounders)	An increase in duration of breastfeeding duration was associated with lower risk of malocclusion (p < 0.001)
Luz et al., 2006 ¹⁷	Brazil, cross-sectional	Public schools	249 (NR) [†]	5-11 years	Examination by two dentists using Angle classification (Calibrated examiners. Kappa > 0.78)	Canine relationship (Class I, Class II, Class III)	(NR) [†]	Chi-square test (no adjustment for confounders)	No association between breastfeeding and malocclusion (p > 0.05)

Continue

Continuation												
Nobile et al., 2007 ¹⁸	Italy, cross-sectional	Schools	1000 (546)	11-15 years	Examination by one dentist using Angle classification and Index of Orthodontic Treatment Need (Calibrated Examiner. Kappa > 0.70)	Molar relationship (Class I, Class II, Class III). Treatment need (no need, borderline, treatment required)	Questionnaire applied to parents	Multiple logistic regression (age, gender, father's highest education level, caries in deciduous teeth, deciduous teeth extractions)	No association between breastfeeding and orthodontic treatment need (p > 0.05)			
Sánchez-Molins et al., ¹⁹ 2010	Spain, cross-sectional	University clinic	197 (NR) [†]	6-11 years	Does not report a criterion/index. Measures based on cephalometric analysis (Steiner, Ricketts and McNamara)	Molar relationship, canine relationship, overjet, overbite, interincisal angle, extrusion of the lower incisors, protrusion of the upper incisors, inclination of the lower incisors, inclination of the upper incisors	NR [†]	Student's t test α = 5% (no adjustment for confounders)	Greater mean protrusion of mandibular incisors (2.2174 degrees) and inclination of maxillary incisors (22.0913) in infants who were breastfed for more than 6 months compared with those breastfed for < 6 months (1.1566 and 19.5181, respectively) and those who were bottle fed (1.8824 and 20.4473, respectively) (p < 0.05)			
Thomaz et al., ²⁰ 2012	Brazil, cross-sectional	Public and private schools	2060 (NR) [†]	12-15 years	Examination by dentists using Angle classification (Calibrated examiners. Kappa ≥ 0.85)	Molar relationship (Class I, Class II, Class III)	Parents' report	Chi-square and multinomial logistic regression (sex, age, household income, level of education of household head, bottle use, digit sucking, mouth-breathing pattern)	Multivariate analysis revealed an association between the interaction of breastfeeding and bruxism and an increased risk of Angle Class II malocclusion (OR = 3.14, 95%CI: 1.28 - 7.66) and Angle Class III malocclusion (OR = 2.78, 95%CI: 1.21 - 6.36).			

[†]NR = not reported.

Two studies revealed the existence of malocclusion through parents' reports,^{15,16} in which parents were asked if a dentist had ever said that their children needed braces or if the parents had perceived that their children needed braces or orthodontic treatment. In three studies, the diagnosis of malocclusion was established in a clinical evaluation performed by calibrated dentists.^{17,18,20} In another study, malocclusion was evaluated based on cephalometric data.¹⁹ In four studies,^{15,16,18,20} feeding habits were determined from a questionnaire administered to parents and two studies^{17,19} failed to report how data on feeding habits were collected.

In general, the studies lacked details, in the Methods section, of approval by the institutional ethics committee.^{15,16,17,18,19} Nonetheless, all papers had sufficient information for data collection for the systematic review.^{15,16,17,18,19,20}

Risk of bias in individual studies

The methodological quality evaluation using the Newcastle-Ottawa scale is shown in Tables 2 and 3. The case-control study¹⁶ scored three points (Table 2). The scores for the cross-sectional studies^{15,17,18,19,20} ranged from one to four points (Table 3).

Results of individual studies

One study showed no significant association between the duration of bottle feeding and the need for orthodontic treatment [OR = 1.73 (CI = 0.82 - 2.10), $p = 0.058$].¹⁶ Another study reported that a longer breastfeeding period was associated with a decreased risk of malocclusion ($p < 0.001$)¹⁵ Only one study adjusted the statistical analysis for confounders and found an interaction between the history of breastfeeding and bruxism, with a synergistic effect on significantly increasing the risk of Angle Class II [OR = 3.14 (CI = 1.28 - 7.66), $p < 0.05$] and Class III malocclusion [OR = 2.78 (CI = 1.21 - 6.36), $p < 0.05$].²⁰ Based on cephalometric data, children breastfed for more than 6 months had greater mean protrusion of mandibular incisors ($p = 0.023$) and inclination of maxillary incisors ($p = 0.047$) in comparison with children who were breastfed for 6 months or less. Children breastfed for more than 6 months also presented a greater

mean protrusion of mandibular incisors and inclination of maxillary incisors when compared with bottle-fed children ($p < 0.05$).¹⁹ Two studies did not report any significant association ($p > 0.05$).^{17,18}

Synthesis of the results and risk of bias across studies

A meta-analysis was not possible. The six studies included in this systematic review described different types of malocclusion and used different cut-off times to evaluate feeding practices. Therefore, the pooled data from those studies were deemed not suitable because of the differences in the study designs and in the collected information.

Additional analysis

Publication bias was not assessed as there were not enough studies to be entered into a funnel plot.

Discussion

This systematic review attempted to evaluate the association between feeding habits and malocclusion in mixed and permanent dentitions. Oral and craniofacial development may be a health issue on which feeding practices may have a measurable and relevant impact.²¹ Although the first study addressing this topic in schoolchildren and adolescents dates back to more than 25 years, the question remains unanswered and conclusions are yet to be fully confirmed.

One study showed an association between breastfeeding duration and an increased risk of malocclusion,¹⁵ while another one did not reveal any statistical significance between feeding habits and malocclusion.¹⁶ However, those studies lacked a clinical evaluation of malocclusion, which was determined through parents' reports. The clinical data collected from parents' reports may be subjective and prone to information bias and, therefore, unreliable.²²

One study revealed an interaction between breastfeeding and bruxism, which increased the risk of Class II and Class III malocclusion. This study conducted a multinomial regression analysis, considering gender, age, household income, education level, bottle use, bruxism, digit sucking habit and mouth breathing pattern as confounding variables.²⁰

Table 2. Quality assessment of the case-control study based on the Newcastle-Ottawa scale.

Author	Selection*	Comparability**	Outcome***	Score****
Meyers and Hertzberg, ¹⁶ 1988	Representativeness of the cases ² \diamond Selection of controls ³ \diamond	Definition of controls ⁴ Comparability of cases and controls on the basis of the design or analysis ⁵	Same method of ascertainment for cases and controls ⁷ Non-response rate ⁸ \diamond	3

¹ a) yes, with independent validation \diamond , b) yes, e.g., record linkage or based on self reports, c) no description.
² a) consecutive or obviously representative series of cases \diamond , b) potential for selection biases or not stated.
³ a) community controls \diamond , b) hospital controls, c) no description.
⁴ a) no history of disease \diamond , b) no description of source.
⁵ a) study control for one confounding variable \diamond , b) study control for 2 or more confounding variables $\diamond\diamond$.
⁶ a) secure record (e.g., surgical records) \diamond , b) structured interview blinded to case/control status \diamond , c) interview not blinded to case/control status, d) written self-report or medical record only, e) no description.
⁷ a) yes \diamond , b) no.
⁸ a) same rate for both groups \diamond , b) non-respondents described, c) different rate and no designation.
 * a maximum of 1 point for each item; ** a maximum of 2 points for each item; *** a maximum of 1 point for each item.
 **** a maximum of 9 points.
 \diamond 1 point.

Table 3. Quality assessment of the cross-sectional studies based on the Newcastle-Ottawa scale.

Author	Selection*	Comparability**	Outcome***	Score****
Labbok and Hendershot, ¹⁵ 1987	Diagnosis of feeding habits ¹ Representativeness and selection of individuals with feeding habits ² \diamond	Control for confounders ³	Diagnosis of malocclusion ⁴ Response rate ⁵ \diamond	2
Luz et al., ¹⁷ 2006				1
Nobile et al., ¹⁸ 2007		$\diamond\diamond$		3
Sánchez-Molins et al., ¹⁹ 2010		\diamond		1
Thomaz et al., ²⁰ 2012		$\diamond\diamond$		4

¹ a) clinical examination with independent validation \diamond , b) without clinical examination or based on self reports, c) no description.
² a) individuals with malocclusion in a defined catchment area or community, random sample, sample calculation \diamond , b) not satisfying requirements in part (a) fully, c) not stated.
³ a) adjustment for one confounder \diamond , b) adjustment for two confounders $\diamond\diamond$, c) no description related to the adjustment analysis for confounding variables.
⁴ a) clinical examination reporting the use of malocclusion index or report of observer agreement (kappa) \diamond , b) based on self-reports or not satisfying requirements in part (a) fully, c) no description.
⁵ a) rate of sample loss \leq 20% \diamond , b) rate of sample loss $>$ 20%, c) not stated.
 * a maximum of 1 point for each item; ** a maximum of 2 points for each item; *** a maximum of 1 point for each item.
 **** a maximum of 6 points.
 \diamond 1 point.

Adjustment for confounders is very important in epidemiological studies, since an outcome, such as malocclusion, may be associated with multiple risk factors, including gender, genetics, income, feeding practice, non-nutritive sucking habit and other harmful oral habits.²³ Failure to evaluate demographic and clinical factors as potential confounders can bias study results and lead to erroneous conclusions.²⁴ Also, the methodology of this study was strengthened by the adoption of a representative sample of Brazilian adolescents, allowing the authors to perform a meaningful statistical analysis and to generalize the results for that population.²⁵

When malocclusion was determined based on cephalometric data, greater mean protrusion of the mandibular incisors and inclination of the maxillary incisors seem to occur among children breastfed for more than 6 months in comparison with those breastfed for less than 6 months and those who were bottle-fed.¹⁹ Notwithstanding, this study presented the lowest methodology quality and shortcomings with respect to response rate, sample representativeness, control for confounding variables, and selection of individuals with feeding habits.

Some limitations of the present systematic review should be acknowledged. The first one regards the lack of homogeneous data for a meta-analysis. The included studies had different methodologies and different measures for malocclusion, thus hindering the pooling of data.¹⁴ The second flaw noted during data compilation was the limited number of articles that met our eligibility criteria. Additionally, most evidence found was cross-sectional and no high quality study addressing the association between feeding habits and the occurrence of malocclusion in mixed and permanent dentitions was identified.

Finally, the authors of the included articles were unable to group, separately, children who had exclusive breastfeeding or bottle feeding and mixed feeding, making the comparison between those groups impossible. Therefore, breastfeeding and bottle feeding could not be confirmed as risk factors for malocclusion in children and adolescents.

Further research with stronger methodological strategies should be conducted to examine the association between feeding habits and malocclusion in mixed and permanent dentitions. Future studies should also consider the longitudinal design to assess such association more accurately. In cohort evaluations, participants are disease-free at the onset of the study and data regarding exposure to risk factors are collected at distinct points in time before the outcome. Thus, this design enables the assessment of causal hypothesis.²⁶

Conclusion

The findings presented herein do not support an association between breastfeeding and bottle feeding and the occurrence of malocclusion in mixed and permanent dentitions.

The association between feeding practices and this outcome of concern requires additional investigation through prospective cohort studies.

Acknowledgments

This study was supported by the *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES*, *Fundação de Amparo à Pesquisa do estado de Minas Gerais - FAPEMIG*, *Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq*, and *Pró-Reitoria de Pesquisa/Universidade Federal de Minas Gerais - PRPq/UFMG*.

References

- Kramer MS, Kakuma R. Optimal duration of exclusive breastfeeding. *Cochrane Database Syst Rev*. 2012 Aug;15:8:CD003517. doi:10.1002/14651858.CD003517.pub2
- World Health Organization. Exclusive breastfeeding for six months best for babies everywhere. 2011. [cited 2013 Jan 27]. Geneva: HOW; 2011. Available from: http://www.who.int/mediacentre/news/statements/2011/breastfeeding_20110115/en/
- Vázquez-Nava F, Quezada-Castillo JA, Oviedo-Trevino S, Saldivar-González AH, Sánchez-Nuncio HR, Beltrán-Guzmán FJ, et al. Association between allergic rhinitis, bottle feeding, non-nutritive sucking habits, and malocclusion in the primary dentition. *Arch Dis Child*. 2006;91(10):836-40. doi:10.1136/adc.2005.088484
- Peres KG, Barros AJ, Peres MA, Victora CG. Effects of breastfeeding and sucking habits on malocclusion in a birth cohort study. *Rev Saude Publica*. 2007;41(3):343-50. doi:10.1590/S0034-89102007000300004
- Karjalainen S, Ronning O, Lapinleimu H, Simell O. Association between early weaning, non-nutritive sucking habits and occlusal anomalies in 3-year-old Finnish children. *Int J Paediatr Dent*. 1999;9(3):169-73. doi:10.1046/j.1365-263x.1999.00133.x
- Viggiano D, Fasano D, Monaco G, Strohmer L. Breast feeding, bottle feeding, and non-nutritive sucking; effects on occlusion in deciduous dentition. *Arch Dis Child*. 2004;89(12):1121-3. doi:10.1136/adc.2003.029728
- Hermont AP, Martins CC, Zina LG, Auad SM, Paiva SM, Pordeus IA. Breastfeeding, bottle feeding practices and malocclusion in the primary dentition: a systematic review of cohort studies. *Int J Environ Res Public Health*. 2015;12(3):3133-51. doi:10.3390/ijerph120303133
- Montaldo L, Montaldo P, Cuccaro P, Caramico N, Minervini G. Effects of feeding on non-nutritive sucking habits and implications on occlusion in mixed dentition. *Int J Paediatr Dent*. 2011;21(1):68-73. doi:10.1111/j.1365-263X.2010.01092.x
- Mistry P, Moles DR, O'Neill J, Noar J. The occlusal effects of digit sucking habits amongst school children in Northamptonshire (UK). *J Orthod*. 2010;37(2):87-92. doi:10.1179/14653121042939
- Thomaz EBAF, Cangussu MCT, Assis AMO. Malocclusion and deleterious oral habits among adolescents in a developing area in northeastern Brazil. *Braz Oral Res* 2013;27(1):62-9. doi:10.1590/S1806-83242012005000027
- Narbutyte I, Narbutyte A, Linkeviciene L. Relationship between breastfeeding, bottle-feeding and development of malocclusion. *Stomatologija*. 2013;15(3):67-72.
- Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA Group. Preferred reporting items for systematic reviews and meta-analysis: the PRISMA statement. *J Clin Epidemiol*. 2009;62(10):1006-12. doi:10.1016/j.jclinepi.2009.06.005
- Wells GA, Shea B, O'Connell D, Peterson J, Welch V, Losos M, et al. The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomized studies in meta-analyses [Internet]; Ottawa: Ottawa Hospital Research Institute; 2009 [cited 2013 Dec 15]. Available from: www.ohri.ca/programs/clinical_epidemiology/oxford.htm
- Higgins JP, Thompson SG. Quantifying heterogeneity in meta-analysis. *Stat Med*. 2002 Jun;21(11):1539-58. doi:10.1002/sim.1186
- Labbok MH, Hendershot GE. Does breast-feeding protect against malocclusion? An analysis of the 1981 Child Health Supplement to the National Health Interview Survey. *Am J Prev Med*. 1987;3(4):227-32. doi:10.1016/j.earlhumdev.2007.12.008
- Meyers A, Hertzberg J. Bottle-feeding and malocclusion: is there an association? *Am J Orthod Dentofacial Orthop*. 1988;93(2):149-52. doi:10.1016/0889-5406(88)90293-4
- Luz CL, Garib DG, Arouca R. Association between breastfeeding duration and mandibular retrusion: a cross-sectional study of children in the mixed dentition. *Am J Orthod Dentofacial Orthop*. 2006;130(4):531-4. doi:10.1016/j.ajodo.2006.06.011
- Nobile CG, Pavia M, Fortunato L, Angelillo IF. Prevalence and factors related to malocclusion and orthodontic treatment need in children and adolescents in Italy. *Eur J Public Health*. 2007;17(6):637-41.
- Sánchez-Molins M, Grau Carbó J, Lischeid Graig C, Ustrell Torrent JM. Comparative study of the craniofacial growth depending on the type of lactation received. *Eur J Paediatr Dent*. 2010;11(2):87-92.
- Thomaz EB, Cangussu MC, Assis AM. Maternal breastfeeding, parafunctional oral habits and malocclusion in adolescents: a multivariate analysis. *Int J Pediatr Otorhinolaryngol*. 2012;76(4):500-6. doi:10.1016/j.ijporl.2012.01.005
- Davis DW, Bell PA. Infant feeding practices and occlusal outcomes: a longitudinal study. *J Can Dent Assoc*. 1991;57(7):593-4.
- Choi BCK, Pak AWP. A catalog of biases in questionnaires. *Prev Chronic Dis* [Internet]. 2005 Jan [cited 2008 Mar 13];2(1) A13. Available from: www.cdc.gov/pcd/issues/2005/jan/04_0050.htm
- McKeever A. Genetics versus environment in the aetiology of malocclusion. *Br Dent J*. 2012;212(11):527-28. doi:10.1038/sj.bdj.2012.465
- Skelly AC, Dettori JR, Brodt ED. Assessing bias: the importance of considering confounding. *Evid Based Spine Care J*. 2012;3(1):9-12. doi:10.1055/s-0031-1298595
- Suresh K, Chandrashekhara S. Sample size estimation and Power analysis for clinical research studies. *J Hum Reprod Sci*. 2012;5(1):7-13. doi:10.4103/0974-1208.97779
- Levin KA. Study design IV. Cohort studies. *Evid Based Dent*. 2006;7(2):51-2. doi:10.1038/sj.ebd.6400407

Appendix 1: Articles excluded after full text evaluation and reasons for exclusion

Reference	Classification
1. Backlund E. Facial growth, and the significance of oral habits, mouthbreathing and soft tissues for malocclusion. A study on children around the age of 10. <i>Acta Odontol Scand</i> 1963; 21:9-139.	Not selected – The study reports breathing.
2. Paunio P, Rautava P, Sillanpaa M. The Finnish Family Competence Study: the effects of living conditions on sucking habits in 3-year-old Finnish children and the association between these habits and dental occlusion. <i>Acta Odontol Scand</i> 1993; 51(1):23-29.	Not selected – Breast feeding and bottle feeding are not associated to malocclusion, are only associated to sucking habits.
3. Carrero dH, Valls dW, Arenas dG. [Functions of the stomatognathic system and occlusopathics]. <i>Acta Odontol Venez</i> 1988; 26(3):41-47.	Not selected – Review
4. Saenz RB, Sánchez O. Breast-feeding and infant oral health. <i>Am Fam Physician</i> 2000; 62(3):506-507.	Not selected – Letters to the Editor
5. Baume LJ. Uniform methods for the epidemiologic assessment of malocclusion. Results obtained with the World Health Organization standard methods (1962 and 1971) in South Pacific populations. <i>Am J Orthod</i> 1974; 66(3):251-272.	Not selected – Study describes the prevalence of malocclusion and dental eruption pattern in Polynesian population. Risk factors are not reported.
6. Larsson EF, Dahlin KG. The prevalence and the etiology of the initial dummy- and finger-sucking habit. <i>Am J Orthod</i> 1985; 87(5):432-435.	Not selected – The study describes prevalence of sucking habits, and does not report association of breast feeding or bottle feeding with malocclusion.
7. Hannuksela A, Vaananen A. Predisposing factors for malocclusion in 7-year-old children with special reference to atopic diseases. <i>Am J Orthod Dentofacial Orthop</i> 1987; 92(4):299-303.	Not selected – The study does not report breast feeding or bottle feeding, only associates malocclusion to other risk factors.
8. Ogaard B, Larsson E, Lindsten R. The effect of sucking habits, cohort, sex, intercanine arch widths, and breast or bottle feeding on posterior crossbite in Norwegian and Swedish 3-year-old children. <i>Am J Orthod Dentofacial Orthop</i> 1994; 106(2):161-166.	Not selected – Data could not be extracted for meta-analysis.
9. Warren JJ, Bishara SE. Duration of nutritive and nonnutritive sucking behaviors and their effects on the dental arches in the primary dentition. <i>Am J Orthod Dentofacial Orthop</i> 2002; 121(4):347-356.	Not selected – the study is conducted with children under primary dentition
10. Katz CR, Rosenblatt A, Gondim PP. Nonnutritive sucking habits in Brazilian children: effects on deciduous dentition and relationship with facial morphology. <i>Am J Orthod Dentofacial Orthop</i> 2004; 126(1):53-57.	Not selected – The study does not report breast feeding or bottle feeding, but other risk factors.
11. Cozza P, Baccetti T, Franchi L, Mucedero M, Polimeni A. Sucking habits and facial hyperdivergency as risk factors for anterior open bite in the mixed dentition. <i>Am J Orthod Dentofacial Orthop</i> 2005; 128(4):517-519.	Not selected – The study does not report breast feeding or bottle feeding.
12. Frazao P, Narvai PC. Socio-environmental factors associated with dental occlusion in adolescents. <i>Am J Orthod Dentofacial Orthop</i> 2006; 129(6):809-816.	Not selected – The study analyses epidemiological survey of the Brazilian Health Authority. No risk factors are reported.
13. Bishara SE, Warren JJ, Broffitt B, Levy SM. Changes in the prevalence of nonnutritive sucking patterns in the first 8 years of life. <i>Am J Orthod Dentofacial Orthop</i> 2006; 130(1):31-36.	Selected- The study is from Iowa Fluoride Study. However did not enter meta-analysis.
14. Ovsenik M. Incorrect orofacial functions until 5 years of age and their association with posterior crossbite. <i>Am J Orthod Dentofacial Orthop</i> 2009; 136(3):375-381.	Not selected – breast feeding is not reported. Bottle feeding is reported along years, and there is no frequency data or OR that could be extracted.
15. Kobayashi HM, Scavone H, Jr., Ferreira RI, Garib DG. Relationship between breastfeeding duration and prevalence of posterior crossbite in the deciduous dentition. <i>Am J Orthod Dentofacial Orthop</i> 2010; 137(1):54-58.	Not selected – the study is conducted with children under primary dentition
16. Larsson E. Sucking, chewing, and feeding habits and the development of crossbite: a longitudinal study of girls from birth to 3 years of age. <i>Angle Orthod</i> 2001; 71(2):116-119.	Not selected – The study does not associates breast feeding or bottle feeding to malocclusion. Breast feeding is only associated to sucking habits.

17. Antonini A, Marinelli A, Baroni G, Franchi L, Defraia E. Class II malocclusion with maxillary protrusion from the deciduous through the mixed dentition: a longitudinal study. <i>Angle Orthod</i> 2005; 75(6):980-986.	Not selected – The study associates malocclusion to skeletal characteristics based on cephalograms. No breast feeding or bottle feeding is reported.
18. Gois EG, Ribeiro-Junior HC, Vale MP, Paiva SM, Serra-Negra JM, Ramos-Jorge ML et al. Influence of nonnutritive sucking habits, breathing pattern and adenoid size on the development of malocclusion. <i>Angle Orthod</i> 2008; 78(4):647-654.	Not selected – The study does not report breast feeding or bottle feeding. It associates malocclusion to other risk factors.
19. Aznar T, Galan AF, Marin I, Dominguez A. Dental arch diameters and relationships to oral habits 15. <i>Angle Orthodontist</i> 2006; 76(3):441-445.	Not selected – Data could not be extracted for meta-analysis.
20. Popovich F. The prevalence of sucking habit and its relationship to oral malformations. <i>Appl Ther</i> 1966; 8(8):689-691.	Not selected – The study does not associates malocclusion to bottle or breast feeding.
21. Eskes PW. Aetiology of malocclusion of the teeth. <i>Arch Dis Child</i> 1992; 67(3):352.	Not selected – Letter to the Editor
22. Winter GB. Problems involved with the use of comforters. <i>Arch Dis Child</i> 2002; 87(2):170.	Not selected – Letter to the Editor
23. Viggiano D, Fasano D, Monaco G, Strohmenger L. Breast feeding, bottle feeding, and non-nutritive sucking; effects on occlusion in deciduous dentition. <i>Arch Dis Child</i> 2004; 89(12):1121-1123.	Not selected – the study is conducted with children under primary dentition
24. Vazquez-Nava F, Quezada-Castillo JA, Oviedo-Trevino S, Saldivar-Gonzalez AH, Sanchez-Nuncio HR, Beltran-Guzman FJ et al. Association between allergic rhinitis, bottle feeding, non-nutritive sucking habits, and malocclusion in the primary dentition. <i>Arch Dis Child</i> 2006; 91(10):836-840.	Not selected – the study is conducted with children under primary dentition
25. Courson F. [Dental facial orthopedics in young children]. <i>Arch Pediatr</i> 2006; 13(6):679-682.	Not selected – Review
26. Ferro A, Cefariello S. [Prevention of malocclusion]. <i>Arch Stomatol (Napoli)</i> 1979; 20(3):387-410.	Not selected – The study does not associates malocclusion to bottle or breast feeding.
27. Legovic M, Ostric L. The effects of feeding methods on the growth of the jaws in infants. <i>ASDC J Dent Child</i> 1991; 58(3):253-255.	Not selected – the study is conducted with children under primary dentition
28. Turgeon-O'Brien H, Lachapelle D, Gagnon PF, Larocque I, Maheu-Robert LF. Nutritive and nonnutritive sucking habits: a review. <i>ASDC J Dent Child</i> 1996; 63(5):321-327.	Not selected – Review
29. Bowden BD. The effects of digital and dummy sucking on arch widths, overbite, and overjet: a longitudinal study. <i>Aust Dent J</i> 1966; 11(6):396-404.	Not selected –The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits.
30. Homan BT, Davies GN. An oral health survey of Aborigines and Torres Strait Islanders in far North Queensland. <i>Aust Dent J</i> 1973; 18(2):75-87.	Not Selected – The study is a survey of oral disease in Aborigines population. No risk factors are reported.
31. Solano RE, Martin de Agar Valverde MC, Mendoza MA. [Study of etiopathogenic factors in Class II malocclusion]. <i>Av Odontostomatol</i> 1988; 4(2):69-79.	Not selected – The study does not associates malocclusion to bottle or breast feeding.
32. Kieser JJ. Occlusal misconceptions. <i>Br Dent J</i> 2002; 192(4):183.	Not selected – Letter to the Editor
33. Scavone H, Jr., Ferreira RI, Mendes TE, Ferreira FV. Prevalence of posterior crossbite among pacifier users: a study in the deciduous dentition. <i>Braz Oral Res</i> 2007; 21(2):153-158.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits.
34. Gariner D. Abnormal muscle function and the dentition. <i>Bull N J Soc Dent Child</i> 1970; 17(3):6-10.	Not selecte – The study is a review.
35. Emmerich A, Fonseca L, Elias AM, de Medeiros UV. [The relationship between oral habits, oronasopharyngeal alterations, and malocclusion in preschool children in Vitoria, Espirito Santo, Brazil]. <i>Cad Saude Publica</i> 2004; 20(3):689-697.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits and oronasopharyngeal alterations.
36. Bertrand FR. The relationship of prolonged breast feeding to facial features. <i>Cent Afr J Med</i> 1968; 14(10):226-227.	Not selected – The study does not report epidemiological and quantitative data on breast feeding.
37. Kisling E, Krebs G. Patterns of occlusion in 3-year-old Danish children. <i>Community Dent Oral Epidemiol</i> 1976; 4(4):152-159.	Not selected – The study is a survey of patterns of occlusion in 3 year-old children. Oral habits are seldom reported as non-nutritive sucking habits associated to malocclusion.

38. Scavone H, Guimaraes CH, Ferreira RI, Nahas ACR, Vellini-Ferreira F. Association between breastfeeding duration and non-nutritive sucking habits 7. <i>Community Dental Health</i> 2008; 25(3):161-165.	Not selected – The study does not associates breast feeding or bottle feeding to malocclusion; breast feeding is associated to non-nutritive sucking habits.
39. Adamiak E. [Prevalence of occlusal disorders in preschool children in rural areas in relation to various individual factors]. <i>Czas Stomatol</i> 1981; 34(5):551-555.	Not selected – The study does not associates malocclusion to bottle or breast feeding.
40. Baragona PM, Cohen HV. Long-term orthopedic appliance therapy. <i>Dent Clin North Am</i> 1991; 35(1):109-121.	Not selected- Review
41. Sanger RG, Bystrom EB. Breast feeding: does it affect oral facial growth? <i>Dent Hyg (Chic)</i> 1982; 56(6):44-47.	Not selected – The study is not original paper.
42. Simpson WJ, Cheung DK. Developing infant occlusion, related feeding methods and oral habits. Part I: methodology and results at 4 and 8 months. <i>Dent J</i> 1976; 42(3):124-132.	Not selected – there is no statistical data, only frequency is reported. It was not possible to extract data.
43. Simpson WJ, Cheung DK. Developing infant occlusion, related feeding methods and oral habits. Part II: discussion and conclusions. <i>Dent J</i> 1976; 42(3):135-7,142.	Not selected – there is no statistical data, only frequency is reported. It was not possible to extract data.
44. Leighton BC. Symposium on aspects of the dental development of the child. 2. The early development of cross-bites. <i>Dent Pract Dent Rec</i> 1966; 17(4):145-152.	Not selected – Risk factors are seldom reported as non-nutritive sucking habits. Breast feeding or bottle feeding are not reported.
45. Moss JP, Picton DC. The problems of dental development among the children on a Greek island. <i>Dent Pract Dent Rec</i> 1968; 18(12):442-448.	Not selected – the study described data of breast feeding in children with primary dentition.
46. Castillo B. [Pacifier use in early infancy in relation to breast feeding, sudden infant death syndrome and poor dental occlusion]. <i>Enferm Clin</i> 2008; 18(4):223-225.	Not selected – Review
47. Melsen B, Stensgaard K, Pedersen J. Sucking habits and their influence on swallowing pattern and prevalence of malocclusion. <i>Eur J Orthod</i> 1979; 1(4):271-280.	Not selected- The study does not report breast feeding or bottle feeding; it associates malocclusion to non-nutritive sucking habits and swallowing pattern.
48. Larsson E. The effect of dummy-sucking on the occlusion: a review. <i>Eur J Orthod</i> 1986; 8(2):127-130.	Not selected – Review
49. Tschill P, Bacon W, Sonko A. Malocclusion in the deciduous dentition of Caucasian children. <i>Eur J Orthod</i> 1997; 19(4):361-367.	Not selected – The study reports prevalence of malocclusion in children; it does not report risk factors.
50. Ovsenik M, Farcnik FM, Korpar M, Verdenik I. Follow-up study of functional and morphological malocclusion trait changes from 3 to 12 years of age. <i>Eur J Orthod</i> 2007; 29(5):523-529.	Not selected – The study longitudinally follows up children to evaluate changes of malocclusion pattern during years. Bottle feeding of children with malocclusion is reported along the years, but there is no information of bottle feeding in children without malocclusion. OR is not reported and it was not possible to obtain this data from the paper.
51. Michelotti A, Farella M, Buonocore G, Pellegrino G, Piergentili C, Martina R. Is unilateral posterior crossbite associated with leg length inequality? <i>Eur J Orthod</i> 2007; 29(6):622-626.	Not selected – The study associates malocclusion to leg length inequality in adolescents; no breast feeding or bottle feeding is reported.
52. Heimer MV, Tornisiello Katz CR, Rosenblatt A. Non-nutritive sucking habits, dental malocclusions, and facial morphology in Brazilian children: a longitudinal study. <i>Eur J Orthod</i> 2008; 30(6):580-585.	Not selected – The study associates malocclusion to non-nutritive sucking habits and facial morphology; no breast feeding or bottle feeding is reported.
53. Macena MC, Katz CR, Rosenblatt A. Prevalence of a posterior crossbite and sucking habits in Brazilian children aged 18-59 months. <i>Eur J Orthod</i> 2009; 31(4):357-361.	Not selected – The study associates malocclusion to socioeconomic factors and to non-nutritive sucking habits; no breast feeding or bottle feeding is reported.
54. Peres KG, Barros AJD, Victora CG, Peres MA. Breastfeeding and non-nutritive sucking habits effects on malocclusion in primary dentition 13. <i>European Journal of Epidemiology</i> 2006; 21:36.	Not selected – Abstract
55. Gyorgy I. [Prevention of occlusion anomalies]. <i>Fogorv Sz</i> 1970; 63(1):24-26.	Not selected – The study does not associates malocclusion to bottle or breast feeding.
56. Pal A. [Observations on the dynamics and etiology of vertical anomalies of the dentition]. <i>Fogorv Sz</i> 1976; 69(5):129-133.	Not selected – The study does not associates malocclusion to bottle or breast feeding.
57. Bigenzahn W, Fischman L, Mayrhoferkrammel U. Myofunctional Therapy in Patients with Orofacial Dysfunctions Affecting Speech 25. <i>Folia Phoniatrica</i> 1992; 44(5):238-244.	Not selected – The study describes the effect of myofunctional therapy on speech and disorders of articulation.

58. Fabac E, Legouvic M, Zupan M. [The linkage between breast feeding and the growth of the orofacial area]. <i>Fortschr Kieferorthop</i> 1992; 53(4):187-191.	Not selected – the study is conducted with children under primary dentition
59. Page DC. Breastfeeding is early functional jaw orthopedics (an introduction). <i>Funct Orthod</i> 2001; 18(3):24-27.	Not selected – Review
60. Baume LJ. The pattern of dental disease in French Polynesia. <i>Int Dent J</i> 1973; 23(4):579-584.	Not selected – The study reports frequency of oral problems in French Polynesian population; no risk factors are reported.
61. Larsson E. Artificial sucking habits: etiology, prevalence and effect on occlusion. <i>Int J Orofacial Myology</i> 1994; 20:10-21.	Not selected – Review
62. Verrastro AP, Stefani FM, Rodrigues CR, Wanderley MT. Occlusal and orofacial myofunctional evaluation in children with primary dentition, anterior open bite and pacifier sucking habit. <i>Int J Orofacial Myology</i> 2006; 32:7-21.	Not selected – The study associates malocclusion to orofacial myofunctional characteristics; breast feeding or bottle feeding are not reported.
63. Garliner D. Facts that every mother should know when choosing an artificial nursing system for her child. <i>Int J Orthod</i> 1984; 22(4):18-20.	Not selected – The study does not associates malocclusion to bottle or breast feeding.
64. Stecksén-Blicks C, Holm AK. Dental caries, tooth trauma, malocclusion, fluoride usage, toothbrushing and dietary habits in 4-year-old Swedish children: changes between 1967 and 1992. <i>Int J Paediatr Dent</i> 1995; 5(3):143-148.	Not selected – The study reports frequency of dental caries, dental trauma and malocclusion in Swedish children. There is no association with risk factors.
65. Karjalainen S, Ronning O, Lapinleimu H, Simell O. Association between early weaning, non-nutritive sucking habits and occlusal anomalies in 3-year-old Finnish children. <i>Int J Paediatr Dent</i> 1999; 9(3):169-173.	Not selected – Data could not be extracted for meta-analysis.
66. Peres KG, Oliveira Latorre MR, Sheiham A, Peres MA, Victora CG, Barros FC. Social and biological early life influences on the prevalence of open bite in Brazilian 6-year-olds. <i>Int J Paediatr Dent</i> 2007; 17(1):41-49.	Not selected – the study is conducted with children under primary dentition
67. Duncan K, McNamara C, Ireland AJ, Sandy JR. Sucking habits in childhood and the effects on the primary dentition: findings of the Avon Longitudinal Study of Pregnancy and Childhood. <i>Int J Paediatr Dent</i> 2008; 18(3):178-188.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits.
68. Sorensen HB, Artmann L, Larsen HJ, Kjaer I. Radiographic assessment of dental anomalies in patients with ectopic maxillary canines. <i>Int J Paediatr Dent</i> 2009; 19(2):108-114.	Not selected – The study associates ectopic canines to their location in the maxilla; no malocclusion or risk factors are related.
69. Heimer MV, Katz CR, Rosenblatt A. Anterior open bite: a case-control study. <i>Int J Paediatr Dent</i> 2010; 20(1):59-64.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits and growth pattern are reported.
70. Warren JJ, Bishara SE, Steinbock KL, Yonezu T, Nowak AJ. Effects of oral habits' duration on dental characteristics in the primary dentition. <i>J Am Dent Assoc</i> 2001; 132(12):1685-1693.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits.
71. Harrel SK. More about occlusion. <i>J Am Dent Assoc</i> 2005; 136(7):854, 856.	Not selected – Letters to the Editor
72. Davis DW, Bell PA. Infant feeding practices and occlusal outcomes: a longitudinal study. <i>J Can Dent Assoc</i> 1991; 57(7):593-594.	Not selected – the study is conducted with children under primary dentition
73. Chevitaresh AB, Della VD, Moreira TC. Prevalence of malocclusion in 4-6 year old Brazilian children. <i>J Clin Pediatr Dent</i> 2002; 27(1):81-85.	Not selected – The study does not associates malocclusion to bottle or breast feeding; only oral habits are reported.
74. Tsai HH, Sun KT. Growth changes of general and dental health status in Taiwanese children from mixed to early permanent dentition. <i>J Clin Pediatr Dent</i> 2004; 28(4):309-314.	Not selected – The study does not associates malocclusion to bottle or breast feeding.
75. Hebling SR, Cortellazzi KL, Tagliaferro EP, Hebling E, Ambrosano GM, Meneghim MC et al. Relationship between malocclusion and behavioral, demographic and socioeconomic variables: a cross-sectional study of 5-year-olds. <i>J Clin Pediatr Dent</i> 2008; 33(1):75-79.	Not selected – the study is conducted with children under primary dentition
76. Charchut SW, Allred EN, Needleman HL. The effects of infant feeding patterns on the occlusion of the primary dentition. <i>J Dent Child (Chic)</i> 2003; 70(3):197-203.	Not selected – the study is conducted with children under primary dentition

77. Caglar E, Larsson E, Andersson EM, Hauge MS, Ogaard B, Bishara S et al. Feeding, artificial sucking habits, and malocclusions in 3-year-old girls in different regions of the world. <i>J Dent Child (Chic)</i> 2005; 72(1):25-30.	Not selected – The study reports prevalence data.
78. Nowak AJ. Feeding and dentofacial development. <i>J Dent Res</i> 1991; 70(2):159-160.	Not selected – Report
79. Shendurnikar N. Thumb sucking: practitioners' guidelines. <i>J Indian Med Assoc</i> 1993; 91(1):24.	Not selected – Review
80. Alexander S, Hegde S, Sudha P. Prevalence of malocclusion and periodontal status in Tibetan school children of Kushalnagar, Mysore district. <i>J Indian Soc Pedod Prev Dent</i> 1997; 15(4):114-117.	Not selected – The study reports malocclusion and periodontal status. No bottle or breast feeding are reported.
81. Alexander LG. The thumb, the child, and the dentition or ignore the thumb, the tongue is worse. <i>J Mass Dent Soc</i> 1981; 30(3):146, 148-146, 150.	Not selected – The study does not associates malocclusion to bottle or breast feeding.
82. On B, Thilander & B. Lennartsson: A study of children with unilateral posterior crossbite, treated and untreated, in the deciduous dentition. Occlusal and skeletal characteristics of significance in prediction the long-term outcome. (<i>J Orofac Orthop</i> 2002;63:371-85-3[No. 5].	Not selected – Treatment study.
83. Stahl F, Grabowski R. Orthodontic findings in the deciduous and early mixed dentition--inferences for a preventive strategy. <i>J Orofac Orthop</i> 2003; 64(6):401-416.	Not selected – The study does not associate malocclusion to bottle or breast feeding.
84. Grabowski R, Kundt G, Stahl F. Interrelation between occlusal findings and orofacial myofunctional status in primary and mixed dentition: Part III: Interrelation between malocclusions and orofacial dysfunctions. <i>J Orofac Orthop</i> 2007; 68(6):462-476.	Not selected – The study does not report breast feeding or bottle feeding.
85. Robke FJ. Effects of nursing bottle misuse on oral health. Prevalence of caries, tooth malalignments and malocclusions in North-German preschool children. <i>J Orofac Orthop</i> 2008; 69(1):5-19.	Not selected – The stud correlates nursing bottle to its consequences such as nursing bottle caries and malocclusion. Types of malocclusion reported are crowding and premature loss of teeth and space in consequence to nursing bottle caries; not malocclusion caused by bottle feeding.
86. Neiva FC, Cattoni DM, Ramos JL, Issler H. [Early weaning: implications to oral motor development]. <i>J Pediatr (Rio J)</i> 2003; 79(1):7-12.	Not selected – Review
87. Carrascoza KC, Possobon RF, Tomita LM, Moraes AB. Consequences of bottle-feeding to the oral facial development of initially breastfed children. <i>J Pediatr</i> 2006; 82(5):395-397.	Not selected – Comparison group to bottle feeding was children that used glass (instead of bottle). Data of malocclusion are not described in the paper.
88. Starr NB, Poland C, III, Dean JA. Malocclusion: how important is that bite? <i>J Pediatr Health Care</i> 1999; 13(5):245-247.	Not selected – The study does not report breast feeding or bottle feeding.
89. Massler M. Oral habits: development and management. <i>J Pedod</i> 1983; 7(2):109-119.	Not selected – The study does not associate malocclusion to breast feeding or bottle feeding.
90. Gimenez CMM, Moraes ABA, Ambrosano G, Castro FM. First childhood malocclusion's prevalence and its correlation with breast feeding and oral habits 19. <i>Journal of Dental Research</i> 2001; 80(4):1027.	Not selected – Abstract
91. Mendes ACR, Nobrega CBC, Pessoa CN, Souza ROA, Valenca AMG. Relation between breast-feeding types and duration, deleterious habits and malocclusions in children at joao pessoa city. <i>Journal of Dental Research</i> 2003; 82:238.	Not selected – Abstract
92. Masaracchia R. [Mother's breast or pacifier? Original or substitute?]. <i>Kinderkrankenschwester</i> 2009; 28(11):454-456.	Not selected – Review
93. Castellani G, Bertele GP, Zeman N. [Epidemiologic study in nursery schools of the Verona Commune on the occurrence of dental caries, malocclusion and bad habits that can influence the normal development of facial bone structure in children]. <i>Minerva Stomatol</i> 1987; 36(3):121-125.	Not selected – The study does not report breast feeding or bottle feeding; only non nutritive sucking habits.
94. Piras V, Tuveri F, Dessi C, Pittau R, Origa R, Basile R et al. [Relation between hypogonadism and malocclusion in beta-thalassemia major patients: analysis of 122 subjects]. <i>Minerva Stomatol</i> 2003; 52(5):241-246.	Not selected – The study is comprised of a selected group of patients with beta-thalassemia and its association with malocclusion.

95. GEDICKE K. [On the predevelopment of the mandible in breast- and bottle-fed children from the standpoint of its function and the prevention of later distalization.]. <i>Monatsschr Kinderheilkd</i> 1961; 109:361-369.	Not selected – The study does not associate malocclusion to breast feeding or bottle feeding.
96. Malagola C, Mandraffino AG, De Paolis M. [Role of feeding methods in the etiology of malocclusions]. <i>Mondo Ortod</i> 1986; 11(5):39-44.	Not selected – The study does not associate malocclusion to breast feeding or bottle feeding.
97. Gandini P, Schiavi A, Camassa D, Manuelli M. [Statistical survey of malocclusion in school age children]. <i>Mondo Ortod</i> 1989; 14(1):73-78.	Not selected – The study describes only frequency data.
98. Degano MP, Degano RA. Breastfeeding and oral health. A primer for the dental practitioner. <i>N Y State Dent J</i> 1993; 59(2):30-32.	Not selected – Review
99. Koev ZH. [Significance of breast feeding and bottle feeding in the development of the dentition]. <i>Nauchni Tr Nauchnoizsled Stomatol Inst (Sofia)</i> 1969; 12:135-140.	Not selected – Review
100. Kuijpers-Jagtman AM. [Effects of sucking habits on the dentofacial development]. <i>Ned Tijdschr Tandheelkd</i> 1989; 96(6):256-258.	Not selected – Review
101. Salma S. Dentition and dental health. <i>Nurs J India</i> 2000; 91(5):102-104.	Not selected – Review
102. Early childhood pacifier use in relation to breastfeeding, SIDS, infection and dental malocclusion. <i>Nurs Stand</i> 2006; 20(38):52-55.	Not selected – Review
103. Djaha K, Adiko EF, Ly R, Egnankou KJ, Brou E, Vilasco J. [Harmful oral habits of African children]. <i>Odontostomatol Trop</i> 1986; 9(1):51-55.	Not selected – The study does not associate malocclusion to breast feeding or bottle feeding.
104. Onyiaso CO. Need for preventive/interceptive orthodontic treatment among 7-10-year-old children in Ibadan, Nigeria: an epidemiological survey. <i>Odontostomatol Trop</i> 2004; 27(107):15-19.	Not selected – The study does not associate malocclusion to breast feeding or bottle feeding.
105. Stirling DL. Conditions contributing to stability and instability of dental alignment. <i>Ont Dent</i> 1994; 71(9):48-50.	Not selected – Review
106. Onyiaso CO, Isiekwe MC. Oral habits in the primary and mixed dentitions of some Nigerian children: a longitudinal study. <i>Oral Health Prev Dent</i> 2008; 6(3):185-190.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits.
107. Raymond JL, Bacon W. [Influence of feeding method on maxillofacial development]. <i>Orthod Fr</i> 2006; 77(1):101-103.	Not selected – Review
108. Hashida S, Mihara J, Hashida K, Sumi N, Rakugi M, Ooshima T et al. [Clinical and statistical survey of the children at the Pedodontic Clinic of the Osaka University Dental Hospital]. <i>Osaka Daigaku Shigaku Zasshi</i> 1985; 30(2):336-344.	Not selected – The study does not associate malocclusion to breast feeding or bottle feeding.
109. Lopez D, V, Singh GD, Feliciano N, Machuca MC. Associations between a history of breast feeding, malocclusion and parafunctional habits in Puerto Rican children. <i>P R Health Sci J</i> 2006; 25(1):31-34.	Not selected – the study is conducted with children under primary dentition
110. Adair SM, Milano M, Dushku JC. Evaluation of the effects of orthodontic pacifiers on the primary dentitions of 24- to 59-month-old children: preliminary study. <i>Pediatr Dent</i> 1992; 14(1):13-18.	Not selected – The study correlates malocclusion with the use of orthodontic pacifiers. No feeding habits are reported.
111. Farsi NM, Salama FS. Sucking habits in Saudi children: prevalence, contributing factors and effects on the primary dentition. <i>Pediatr Dent</i> 1997; 19(1):28-33.	Not selected – The study does not correlate breast feeding or bottle feeding to malocclusion; it is related only to non-nutritive sucking habits.
112. Watase S, Mourino AP, Tipton GA. An analysis of malocclusion in children with otitis media. <i>Pediatr Dent</i> 1998; 20(5):327-330.	Not selected – The study is comprised of a high selected group of patients with otitis media. Other variables are associated to otitis media, but not malocclusion and feeding habits directly.
113. Katz CR, Rosenblatt A. Nonnutritive sucking habits and anterior open bite in Brazilian children: a longitudinal study. <i>Pediatr Dent</i> 2005; 27(5):369-373.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits.
114. Warren JJ, Slayton RL, Bishara SE, Levy SM, Yonezu T, Kanellis MJ. Effects of nonnutritive sucking habits on occlusal characteristics in the mixed dentition. <i>Pediatr Dent</i> 2005; 27(6):445-450.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits.
115. Costantino A. [Class II malocclusion and bottle feeding]. <i>Prev Assist Dent</i> 1986; 12(2):19-22.	Not selected – The study has no statistical data.

116. Bertoldi PM, Felficio CM, Matsumoto MA. [Effect of the early intervention of oral habits on the development of dental occlusion]. <i>Pro Fono</i> 2005; 17(1):37-44.	Not selected – The study reports the effect of counseling on interruption of oral habits.
117. Maciel CT, Leite IC. [Etiological aspects of anterior open bite and its implications to the oral functions]. <i>Pro Fono</i> 2005; 17(3):293-302.	Not selected – The study does not associates feeding habits to malocclusion.
118. Myllarniemi S. Oral and dental state in Helsinki preschool children. V. Oral habits and occlusion. <i>Proc Finn Dent Soc</i> 1973; 69(4):157-163.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits
119. Helle A, Haavikko K. Prevalence of earlier sucking habits revealed by anamnestic data and their consequences for occlusion at the age of eleven. <i>Proc Finn Dent Soc</i> 1974; 70(5):191-196.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits
120. Nystrom M. Occlusal changes in the deciduous dentition of a series of Finnish children. <i>Proc Finn Dent Soc</i> 1981; 77(5):288-295.	Not selected – The study reports changes of malocclusion during years; no risk factors are reported.
121. Usadel W. Duration of nursing and condition of bite. An evaluation of 1000 histories of patients from an orthodontics practice. <i>Quintessence Int (Berl)</i> 1970; 1(7):61-62.	Not selected – The study does not have sufficient quantitative data for data's extraction.
122. Usadel W. [Breast feeding time and bite position. An analysis of 1000 anamneses of patients in an orthodontic practice]. <i>Quintessenz</i> 1967; 18(2):95-96.	Not selected – The study is comprised of a selected group of patients from clinical practice.
123. Luff R. [Preventive measures for the prevention of malocclusion in infants]. <i>Quintessenz</i> 1977; 28(4):81-88.	Not selected – The study does not associate malocclusion to breast feeding or bottle feeding.
124. Peters S. [Influence of early nursing on jaw and facial growth]. <i>Quintessenz J</i> 1988; 18(9):865-869.	Not selected – Review
125. Kimmel K. ["With growth" nipple size--important aid to jaw development]. <i>Quintessenz J</i> 1990; 20(11):1013-1017.	Not selected – The study does not associate malocclusion to breast feeding or bottle feeding.
126. Calo FA. [Physiology and pathology resulting from sucking]. <i>Rev Circ Argent Odontol</i> 1968; 31(1):23-26.	Not selected – Review
127. Lescano dF, Varela d, V. [Effect of the suction-swallowing action on orofacial development and growth]. <i>Rev Fac Cien Med Univ Nac Cordoba</i> 2006; 63(2 Suppl):33-37.	Not selected – the study is conducted with children under primary dentition
128. Gudin RG, Khalef M. [Abnormalities in behavior in the oral and cervical area: reassurance breast-feeding. Considerations on sudden infant death]. <i>Rev Laryngol Otol Rhinol</i> 1993; 114(4):297-303.	Not selected – Review
129. Leite-Cavalcanti A, Medeiros-Bezerra PK, Moura C. [Breast-feeding, bottle-feeding, sucking habits and malocclusion in Brazilian preschool children]. <i>Rev Salud Publica (Bogota)</i> 2007; 9(2):194-204.	Not selected – the study is conducted with children under primary dentition
130. Tomita NE, Bijella VT, Franco LJ. [The relationship between oral habits and malocclusion in preschool children]. <i>Rev Saude Publica</i> 2000; 34(3):299-303.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits.
131. Peres KG, Barros AJ, Peres MA, Victora CG. Effects of breastfeeding and sucking habits on malocclusion in a birth cohort study. <i>Rev Saude Publica</i> 2007; 41(3):343-350.	Selected – The study is part of Pelota's cohort study. Did not enter meta-analysis.
132. Tollaro I, Casini RG. [Bad sucking habits and their repercussions on the structure of the face, mouth and jaws]. <i>Riv Clin Pediatr</i> 1968; 81(6):1117-1124.	Not selected- The study reports sucking habits.
133. Maggioni A. [Bad habits that cause oral malocclusions]. <i>Riv Odontostomatol Implantoprotesi</i> 1984;(8):104-106.	Not selected – Review
134. Linder A, Modeer T. Relation between sucking habits and dental characteristics in preschoolchildren with unilateral cross-bite. <i>Scand J Dent Res</i> 1989; 97(3):278-283.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits.
135. Ito G. [Skeletal and discrepancy factors in malocclusion]. <i>Shikai Tenbo</i> 1984; 63(7):1463-1470.	Not selected – The study describes skeletal traits.
136. Oikawa K. [Malocclusion in maternal and child health]. <i>Shikai Tenbo</i> 1984; 63(7):1431-1440.	Not selected – Review

137. Takanashi N, Naya K, Masumori M, Nakano J, Ohama A, Hirata J et al. [Survey on nutrition of infants in the Tokyo metropolitan area. 1. Carious dentitions, anomalies of occlusion and ways of eating]. <i>Shoni Shikagaku Zasshi</i> 1989; 27(3):708-715.	Not selected – The study reports prevalence data.
138. Callaghan A, Kendall G, Lock C, Mahony A, Payne J, Verrier L. Association between pacifier use and breast-feeding, sudden infant death syndrome, infection and dental malocclusion (Provisional abstract). <i>SO: International Journal of Evidence-Based Healthcare</i> 2005; 3(6):147-167.	Not selected – Pacifier use is the main outcome.
139. Rakosi T. [Prevention of malocclusions and preventive orthodontics]. <i>SSO Schweiz Monatsschr Zahnheilkd</i> 1969; 79(10):1169-1188.	Not selected – The study reports prevention methods.
140. Taatz H. [Orthodontic prophylaxis]. <i>Stomatol DDR</i> 1978; 28(5):342-351.	Not selected – Review
141. Obraztsov I. [A clinico-statistical analysis of the risk factors for the occurrence of maxillo-dental anomalies in children]. <i>Stomatologiya (Mosk)</i> 1991; 70(1):66-69.	Not selected – The study does not associate malocclusion to breast feeding or bottle feeding.
142. Larsson E, Jarvheden B. Dummy- and finger-sucking habits with special attention to their significance for facial growth and occlusion. 2. Background variables. <i>Sven Tandlak Tidskr</i> 1971; 64(11):781-788.	Not selected – Non-nutritive sucking habits is the main outcome.
143. Larsson E. Dummy- and finger-sucking habits with special attention to their significance for facial growth and occlusion. 1. Incidence study. <i>Sven Tandlak Tidskr</i> 1971; 64(10):667-672.	Not selected – Non-nutritive sucking habits is the main outcome.
144. Larsson E. Dummy- and finger-sucking habits with special attention to their significance for facial growth and occlusion. 3. Weaning. <i>Sven Tandlak Tidskr</i> 1972; 65(1):1-5.	Not selected – Non-nutritive sucking habits is the main outcome.
145. Larsson E. Dummy- and finger-sucking habits in 4-year-olds. <i>Sven Tandlak Tidskr</i> 1975; 68(6):219-224.	Not selected – Non-nutritive sucking habits is the main outcome.
146. Larsson E. Effect of dummy-sucking on the prevalence of posterior cross-bite in the permanent dentition. <i>Swed Dent J</i> 1986; 10(3):97-101.	Not selected – The study does not report breast feeding or bottle feeding; only non-nutritive sucking habits.
147. Ahlgren J. EMG studies of lip and cheek activity in sucking habits. <i>Swed Dent J</i> 1995; 19(3):95-101.	Not selected – The study evaluated lip and cheek activity; no risk factors or malocclusion were evaluated.
148. Westling L, Mohlin B. Palatal dimensions and some inherited factors (body height and metacarpal index). <i>Swed Dent J</i> 1996; 20(4):141-149.	Not selected – The study does not report breast feeding or bottle feeding.
149. Larsson E. Orthodontic aspects on feeding of young children. 1. A comparison between Swedish and Norwegian-Sami children. <i>Swed Dent J</i> 1998; 22(3):117-121.	Not selected – The study does not evaluate malocclusion; only feeding practices.
150. Schneider HG, Hierse P, Hierse H, Deichsel E. [Effect of the parental home on the oral health status of children]. <i>Z Gesamte Hyg</i> 1989; 35(9):523-526.	Not selected – The study does not report malocclusion as main outcome.
151. Rakosi T. [Significance of early infancy in the development of malocclusion]. <i>Zahnartzl Prax</i> 1972; 23(12):321-322.	Not selected – Review
152. Milicic A. [Prevention of orthodontic anomalies in infants]. <i>Zobozdrav Vestn</i> 1972; 27(1):41-44.	Not selected – The study reports prevention and orthodontics.
153. Paunio P, Rautava P, Sillanpaa M. The Finnish Family Competence Study: the effects of living conditions on sucking habits in 3-year-old Finnish children and the association between these habits and dental occlusion. <i>Acta Odontol Scand</i> 1993; 51(1):23-29.	Not selected – Non-nutritive sucking habits is the main outcome.
154. Kimmel K. [What became of them? I. A bottle nipple and a jaw-shaper, 25 years after their invention]. <i>ZWR</i> 1980; 89(2):62-67.	Not selected – Review
155. Melink S, Vagner MV, Hocevar-Boltezar I, Ovsenik M. Posterior crossbite in the deciduous dentition period, its relation with sucking habits, irregular orofacial functions, and otolaryngological findings. 1. <i>Am J Orthod Dentofacial Orthopedics</i> 138, 32-40. 2010.	Not selected – the study is conducted with children under primary dentition

156. Mendes ACR, Valença AMG, Lima CCMd. [Association between breast-feed, non-nutritive habits and malocclusions among children between 3 and 5 years old]. <i>Ciencia Odontologica Brasileira</i> 11[1], 67-75. 2008.	Not selected – The study does not report outcome of breast feeding. Breast feeding is only associated to non-nutritive sucking habits.
157. Dolci GS, Ferreira EJB, Mello ALSF. [Relations between sucking habits and malocclusions]. <i>J Bras Odontol Ortop Facial</i> 6[35], 379-385. 2001.	Not selected – The study does not report breast feeding or bottle feeding; only associated non-nutritive sucking habits.
158. Almeida SPTdMA, Paixão RdF, Vieira GO. [Influence of milk-feeding type, suction and malocclusion habits: systemic review of literature]. <i>J Bras Odontol Ortop Facial</i> 10[57], 275-289. 2005.	Not selected – Review
159. Boni RC, Veiga MCFdA, Almeida RCd. [Comportment of anterior open bite, after, the retreat the habit of sucking]. <i>J Bras Orthod Ortop Maxilar</i> 2[12], 35-40. 11997.	Not selected – The study reports the effects of counseling on malocclusion.
160. Mahalski PA, Stanton WR. The relationship between digit sucking and behaviour problems: a longitudinal study over 10 years. <i>J Child Psychol Psychiatry</i> 33[5], 913-923. 1992.	Not selected – The study is about digit sucking habits associated to behavior problems; no breast feeding or bottle feeding is reported.
161. Shetty SR, Munshi AK. Oral habits in children-a prevalence study. <i>J Indian Soc.Pedod.Prev.Dent.</i> 61-66. 1998.	Not selected – Is a prevalence study.
162. Zuanon ACC, Oliveira MdF, Giro EMA, Maia JP. [Relationship between oral habits and malocclusion in the primary teeth]. <i>JBP – Rev iberoamericana odontop odontol bebe</i> 3[12], 104-108. 2000.	Not selected – The study reports oral habits.
163. Thomazine GDPA, Imparato JCP. [Prevalence of open bite and cross bite in the students of public schools of Campinas]. <i>JBP – Rev iberoamericana odontop odontol bebe</i> 3[11], 29-37. 2000.	Not selected – the study describes prevalence data of open bite; breast feeding or bottle feeding were not evaluated.
164. Ferreira SH, Ruschel HC, De Bacco G, Ulian J. [Prevalence of anterior open bite in 0-5 year-old children attended at day nurseries in Bento Gonçalves – RS]. <i>JBP – Rev iberoamericana odontop odontol bebe</i> 4[17], 74-79. 2001.	Not selected – the study describes prevalence data of open bite; breast feeding or bottle feeding were not evaluated.
165. Gallarreta FWdM, Silva AMTd, Toniolo IMF. [Duration of breastfeeding and use of the bottle related to pacifier sucking habit and dental occlusion]. <i>JBP – Rev iberoamericana odontop odontol bebe</i> 7[40], 552-448. 2004.	Not selected – The study associates breast feeding to sucking habits.
166. Borghoff MJ, Mombelli ML, Murakami RM, Goldenberg FC, Bommarito S. [Breast feeding and the relationship with oral habits and malocclusions on mixture denture]. <i>Odonto (São Bernardo do Campo)</i> 13[26], 95-104. 2005.	Not selected – only patients with malocclusion are described, patients without malocclusion are not described. Sample from a orthodontic clinic (university).
167. Onyeaso CO, Isiekwe MC. Oral habits in the primary and mixed dentitions of some Nigerian children: a longitudinal study. 3. <i>Oral Health Prev.Dent.</i> 6, 185-190. 2008.	Not selected – The study reports non-nutritive sucking habits and malocclusion.
168. Kobayashi HM, Scavone Junior H, Ferreira RI, Garib DG. [Relanshionbetween non-nutritive sucking habits and posterior crossbite in the deciduous dentition]. <i>Ortodontia</i> 41[4], 367-372. 2008.	Not selected – The study reports sucking habits and malocclusion.
169. Aravena A. P, Alvarez J. F, Roizen G. S. [Effect of bad sucking habit in the dentition of children]. <i>Pediatr día</i> 14[5], 269-272. 1998.	Not selected – The study is a review.
170. Sousa JM, Fracasso MLC. [Maternal behavior versus child temper: influence on the oral health pattern]. <i>Comportamento materno versus temperamento da criança: influência no padrão de saúde bucal. Pesquisa brasileira em odontopediatria e Clínica Integrada</i> 10[1]. 2010. :47-54	Not selected – The study does not associates breast feeding or bottle feeding to malloclusion; only prevalence data is reported.
171. Moraes ESd, Lira CC, Ely MR, Thomaz EBAF, Valença AMG. [Prevalence of openbite and crossbite in deciduous dentition]. <i>Rev Bras Ciênc Saúde</i> 5[1], 23-30. 2001.	Not selected – The study does not report breast feeding or bottle feeding; only associated non-nutritive sucking habits.
172. Silva LPMd, Souza Júnior MA, Bastos EPdS. [Posterior cross-bite in deciduous dentintion. Relationship with oral habits]. <i>Rev Bras Odontologia</i> 62[1/2], 49-51. 2005.	Not selected – the study is conducted with children under primary dentition

173. Oliveira ABd, Souza FPd, Chiappetta ALdML. [The relationship between non-nutritive sucking habits, infant feeding methods and malocclusion in children with primary dentition]. Rev CEFAC 8[3], 352-359. 2006.	Not selected – the study is conducted with children under primary dentition
174. Fote FD, Bosco VL. [Prevalence of habits of non nutritive suction in Florianópolis-SC's children]. Rev Fac Odontol Univ Fed Bahia 20, 25-28. 2000.	Not selected – The study does not report outcomes of malocclusion, breast feeding or bottle feeding.
175. Tomita LM, Carrascoza KC, Possobon RdF, Ambrosano GMB, Moraes ABA. [The relationship between breastfeeding duration, oral habits introduction and malocclusion occurrence]. Rev Fac Odontologia da Univ Passo Fundo 9(2), 101-104. 2004.	Not selected – The study does not associate feeding habits and malocclusion.
176. Martins RJ, Forte FDS, Garbin CAS, Saliba NA. [Relationship between non-nutritive sucking habits and anterior open bite]. Rev Inst Ciên Saúde 21[4], 401-404. 2003.	Not selected – The study does not report breast feeding or bottle feeding; only associated non-nutritive sucking habits.
177. Thomaz EBAF, Valença AMG. [Prevalence of malocclusions and factors related to its occurrence in preschool children in São Luís – MA – Brazil]. Rev Pós-Graduação 12[2], 212-221. 2005.	Not selected – The study does not report breast feeding or bottle feeding as risk factors.
178. Furtado ANdM, Vedovello Filho M. [The outcomes of the breast-feeding period in the settlement of nonnutritive sucking habits and in the occurrence of malocclusion in primary dentition]. RGO 55[4], 337-341. 2007.	Not selected – the study is conducted with children under primary dentition
179. Dimberg L, Bondemark L, Soderfeldt B, Lennartsson B. Prevalence of malocclusion traits and sucking habits among 3-year-old children. Swed.Dent.J 34[1], 35-42. 2010.	Not selected – The study does not report breast feeding or bottle feeding; the study evaluated non-nutritive sucking habits, breathing pattern and snoring.
180. Souza Júnior MA. [Contribution to the study of the posterior cross-bite effect in complete primary dentition]. Contribuição ao estudo da mordida cruzada posterior em dentição decídua completa. THESIS/ RIO DE JANEIRO . 1998.	Not selected – The published study was identified and selected. The thesis was excluded in order to avoid duplicate data.
181. Soviero VLM. [Study of the influence of feeding methods and duration in the no nutrition sucking habits development and dental occlusion in the primary dentition]. Estudo da influência do tipo e duração do aleitamento no desenvolvimento de hábitos de sucção não nutritivos e no relacionamento entre as arcadas decíduas. THESIS/ RIO DE JANEIRO. 1999.	Not found
182. Verrastro AP. [Association between nutritive and non nutritive sucking habits and occlusal and oral myofunctional characteristics in children with primary dentition]. Associação entre os hábitos de sucção nutritiva e não nutritiva e as características oclusais e miofuncionais orais em crianças com dentição decídua. THESIS/MONOGRAPH, 150p. 2008.	Not selected
183. Castro LAd. [Cross-section study of the evolution of primary dentition]. Estudo transversal da evolução da dentição decídua. THESIS/RIO DE JANEIRO. 2001.	Not selected –The study evaluates the primary dentition and its development.
184. Ribeiro-Jr, H. [Influence of nutritive and non-nutritive sucking habits on primary occlusion of brazilian children: a case-control study]. Influence of nutritive and non-nutritive sucking habits on primary occlusion of brazilian children: a case-control study. THESIS.	Not selected
185. Katz CRT. [Relationship among nonnutritive sucking habits, anterior open bite, posterior crossbite and facial morphology in children preschool in the city of Recife/PE, Brazil: a longitudinal study]. Relação entre hábitos de sucção, mordida aberta anterior, mordida cruzada posterior e morfologia facial em pré-escolares do Recife/PE: um estudo longitudinal. THESIS. 2003.	Not selected – The study is a thesis and it was published in scientific periodicals. Papers published were not read and not selected. The study is about non-nutritive sucking habits.
186. Gimenez CMM, Moraes ABA, Bertoz AP, Bertoz FA, Ambrosano GB. Prevalência de más oclusões na primeira infância e sua relação com as formas de aleitamento e hábitos infantis, R Dental Press Ortodon Ortop Facial 13[2]:70-83, 2008.	Not selected – The study describes p-value of the statistics between malocclusion and feeding habits, but it was not possible to extract data.

187. Jabbar NS, Bueno AB, Silva PE, Scavone-Junior H, Ines FR. Bottle feeding, increased overjet and Class 2 primary canine relationship: is there any association? <i>Braz Oral Res</i> 2011 Jul;25(4):331-7.	Not selected – the study is conducted with children under primary dentition
188. Romero CC, Scavone-Junior H, Garib DG, Cotrim-Ferreira FA, Ferreira RI. Breastfeeding and non-nutritive sucking patterns related to the prevalence of anterior open bite in primary dentition. <i>J Appl Oral Sci</i> 2011 Apr;19(2):161-8.	Not selected – the study is conducted with children under primary dentition
189. Vasconcelos FM, Massoni AC, Heimer MV, Ferreira AM, Katz CR, Rosenblatt A. Non-nutritive sucking habits, anterior open bite and associated factors in Brazilian children aged 30-59 months. <i>Braz Dent J</i> 2011;22(2):140-5.	Not selected – the study is conducted with children under primary dentition
190. Diouf JS, Ngom PI, Badiane A, Cisse B, Ndoeye C, Diop-Ba K, et al. Influence of the mode of nutritive and non-nutritive sucking on the dimensions of primary dental arches. <i>Int Orthod</i> 2010 Dec;8(4):372-85.	Not selected
191. Montaldo L, Montaldo P, Cuccaro P, Caramico N, Minervini G. Effects of feeding on non-nutritive sucking habits and implications on occlusion in mixed dentition. <i>Int J Paediatr Dent</i> 2011; 21:68-73.	No selected – The study only associates feeding habits to non-nutritive sucking habits.
192. Castelo PM, Gaviao MB, Pereira LJ, Bonjardim LR. Maximal bite force, facial morphology and sucking habits in young children with functional posterior crossbite. <i>J Appl Oral Sci</i> 2010 Mar;18(2):143-8.	Not selected – the study is conducted with children under primary dentition
193. Gimenez CMM, Moraes ABA, Bertoz AD, Bertoz FA, Ambrosano GB. Prevalence of malocclusion in primary dentition and relation with feeding habits. <i>R Dental Press Ortodon Ortop Facial</i> 2008; 13:70-83. Manual search	Selected – The study includes children with special needs what can be a confounder, since this population are more prompt to malocclusions. Not possible data extraction.
194. Narbutyte I, Narbutyte A, Linkeviciene L. Relationship between breastfeeding, bottle-feeding and development of malocclusion. <i>Stomatologija</i> 2013;15:67-72.	Not selected – Review
195. Thomaz EB, Cangussu MC, Assis AM. Malocclusion and deleterious oral habits among adolescents in a developing area in northeastern Brazil. <i>Braz Oral Res.</i> 2013;27:62-69.	Not selected – The study does not report breast feeding or bottle feeding; only associated non-nutritive sucking habits
196. Carames da SF, Justo Giugliani ER, Capsi PS. Duration of breastfeeding and distocclusion in the deciduous dentition. <i>Breastfeed Med.</i> 2012;7:464-468.	Not selected – the study is conducted with children under primary dentition