Feeding practices and sucking habits in Istanbul children: a clinical study of prevalance and effects on dentition

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Summary
The purpose of this study was to determine the prevalence of feeding practices and sucking habits and their effect on dentition in Istanbul children. 173 children, aged 5 yr participated in this study. The previous breast-feeding, bottle-feeding, pacifier sucking, finger sucking habits were examined. Paired Sample Student t test and ANOVA were used for analysis. In the present study, breast-fed children exhibited bottle-feeding for mean 25.3 ± 22.4 months, pacifier sucking for mean 19.1 ± 13.3 months and finger sucking for mean 28.4 ± 16.1 months respectively. Nonbreast-fed children exhibited bottle-feeding for mean 29.4 ± 20.5 months, pacifier sucking for mean 30.1 ± 12.7 months. Nonbreast-fed children did not exhibit finger sucking. Breast-feeding, bottle-feeding, pacifier and finger sucking did not have any effect on dentition (p>0.05).
Key words: dentition, feeding practices, pacifier, sucking habits.

Introduction

The examination of a pediatric dental patient with a sucking habit requires the practitioner to make a series of relatively complex evaluations before arriving at a diagnosis or making any recommendations for care [1]. As much as any, these clinical presentations demand consideration of the traditional pediatric triad of relationships between child, parent and clinician. Sucking habits can manifest themselves in a variety of ways and these activities may or may not be a concern for parents. The sucking response emerges approximately in the 29th wk of embryonic life [2]. Survival of the newborn depends upon instictive oral sucking, which allows for nutritional satisfaction [2, 3]. The habit of sucking is a reflex occuring in the oral stage of development and disappears during normal growth between the ages of 1 and 3½ years. The presence of sucking habit may or may not have a marked effect on the child's developing facial structures and dentition [1]. According to recent data, prolonged sucking habits that continue after the age of 3 are the most harmful to a child's dental health and can sometimes lead to irreversible malocclusion [4]. The feeding practices (nutritive sucking) are breast-feeding and bottle-feeding which provide essential nutrients.

Sucking habits (nonnutritive sucking) are pacifier, finger, thumb and object sucking, which ensure a feeling of well-being, warmth, and a sense of security [5]. Many nutritional, immunologic, and developmental benefits of breast-feeding are well documented [6]. Breast-feeding promotes a better orofacial development, a more rapid mandibular protrusion movement. It does protect against malocclusions and supply more oxygen to the infant than bottle feeding [5, 7]. It has been suggested that breastfeeding is superior to bottle-feeding as far as development of the occlusion is concerned [7]. The effect of bottle-feeding vary according to the type of nipples used (physiological / nonphysiological). The etiology of sucking habits has been researched extensively and basically there are some theories that attempt to explain the prolongation of these.

Children who do not have access to restricted breast- or bottle-feeding may satisfy their instinctive sucking urge with a pacifier or finger. In recent studies, this has been stated as a sign of insufficient satisfaction of sucking needs in infancy, a simple learned habit from which pleasure is derived, boredom, hunger, hyperactivity, a neurotic symptom, a sign of disharmony and a long list of other physical and emotional stimuli [1, 7-8]. It is known that reference to sucking objects appeared in German medical literature in late 15th and early 16th centuries [9]. Association between finger sucking and malocclusion were reported as early as the 1870's. As reviewed by Larsson, numerous studies published before the mid-1960s found that finger sucking leads to reduced overbite, as well as increased overjet, protrusion of the maxillary incisors and a narrowing of maxillary arch width. More recently, a directed study examined the effects of sucking habits on dental arch measurements and occlusal characteristics [10]. The pur-

pose of the present study was to determine the prevalance of feeding practices and sucking habits among 5 yr old children and to examine the effects of pacifier sucking, breast feeding, finger sucking and bottle feeding might have on dentition.

Methods

This cross-sectional study was conducted through a questionnaire and clinical examination. The ethical clearance for the study was obtained from the Marmara University Dental School, Pediatric Dentistry Department Review Board. The study population, consisting of 173 Istanbul children aged 5 yr, was recruited from the Department of Pediatric Dentistry, School of Dentistry, Marmara University, Istanbul, using a simple random sampling technique. The study was based on the following criteria:

1. Informed parental consent for the child's participation;
2. Five yr old children;
3. Good general health and age appropriate cognitive development;
4. Primary dentition with no tooth loss;
5. Parental ability to recall the child's oral habits by completion of a questionnaire written and orallly.

Written informed consent was obtained from the parents. A questionnaire was prepared consisting child's age, gender, method and duration of feeding practices, type of nipple and pacifier if used, sucking habits, mouth breathing, history of pre-orthodontic treatment (ex: space maintaining), present state of medical health *(Table 1)*. The parents were asked to complete the questionaire written and orally.

All examinations were performed by one examiner (EÇ) using mouth mirror, with appropriate dental lighting. Examiner was blind to the child questionaire data. In the registration of occlusion characteristics, the intraexaminer reliability was tested by having the same examiner (EÇ) examine 30 children on two occasions seperated by one week prior to the beginning of the study. There was complete agreement (Kappa = 1.0) in the repeated recording of occlusal relationships. Occlusion was assessed with the jaws in centric occlusion. The following parameters were recorded by consensus with published definition.

Table 1. Questionnaire

Child's name	Date & Place of birth	Gender
Adress & Tel		
How long did you breast your child? From birth or--? Times in a day?		
Was he/she bottle fed, if yes how long? From birth or--? Type of nipple? Times in a day?		
Did he/she sucked a pacifier? How long? Type of pacifier? How many hours a day?		
Did he/she suck fingers? How long? How many hours a day? Which finger?		
Does he/she breast fed, bottle fed, suck an object, pacifier or finger now?		
Medical History		
Did he/she have a pre-orthodontic treatment?		

1. Presence of posterior crossbite, recorded as unilateral or bilateral. Unilateral posterior crossbites were diagnosed as reverse buccal overjet on one side of the mouth with or without a midline shift. Bilateral posterior crossbite was diagnosed as reverse buccal overjet in both posterior segments.
2. Presence of anterior openbite, recorded as the vertical distance between the incisal edges of the maxillary and mandibular central incisors.

All data report forms and questionnaires were collected and data were transferred to computers. Statistical analysis were made by SPSS 10.0 for Windows programme. Data are presented as means ± S.D. Statistical analysis was performed by using Student *t* test and ANOVA at a p value < 0.05 (two-tailed).

Results

The study population consisted of 85 girls, 88 boys. The prevalance of feeding practices and sucking habits according to gender are demon-

strated in *Table 2*. There were no children having a sucking habit without a feeding practice. There was no significant difference of gender in feeding and sucking habits except that girls exhibited finger sucking more frequently ($p<0.05$). The children who have sucked a pacifier, continued this habit 3.2 ± 2.7 hours per day. Regarding the awareness of the mothers about pacifier consumption, only 13 parents (%18 of pacifier sucking children) were able to recognize the type and the manufacturer's name of the pacifier they used frequently. Chicco® (Italy), MAM® (Austria) and NUK® (Germany) were the expressed trade marks. Four parents expressed that thay used silicon pacifiers while, no one expressed latex pacifiers. The children who had sucked finger, continued this habit 2.6 ± 2.2 hours per day. There were only 4 children currently practicing finger sucking. In the present study , breast-fed children exhibited bottle feeding for mean 25.3 ± 22.4 months, pacifier sucking for mean 19.1 ± 13.3 months and finger sucking for mean 28.4 ± 16.1 months respectively. Nonbreast-fed children exhibited bottle-feeding for mean 29.4 ± 20.5 months, pacifier sucking for mean 30.1 ± 12.7 months and finger sucking was not demonstrated respectively. Breast-feeding, bottle-feeding, pacifier and finger sucking had no effect on the dentition ($p>0.05$). Distribution of different signs of malocclusion in different feeding and sucking groups *(Table 3)*.

Table 2. Distribution of feeding practices and sucking habits in girls and boys

Type of feeding and sucking habits	No. of children with feeding and sucking habits					
	Boys (n=88)		Girls (n=85)		Total (n=173)	
N	%	N	%	N	%	
Breast-fed	82	93	83	97	165	95
Breast-fed only	19	21	20	23	39	22
Bottle-fed	60	68	61	72	121	70
Bottle-fed only	2	2	0	0	2	1
Breast- & bottle-fed	56	63	58	68	114	66
Pacifier	32	36	38	44	70	40
Finger	3	3	8*	9*	11	6

* $p<0.05$ (Student *t* test)

Table 3. Distribution of different signs of malocclusion in different feeding and sucking groups

Type of malocclusion	Breast		Bottle		Pacifier		Finger	
	N	%	N	%	N	%	N	%
Posterior unilateral cross	6	3	4	3	3	4	1	9
Posterior bilateral cross	2	1	2	1	2	3	0	0
Anterior openbite	12	7	10	8	9	13	3	27

$P > 0.05$ (ANOVA)

Discussion

Several studies have reported on the prevalence of feeding practices and sucking habits among infants and young children in different populations. As discussed previously, sucking is regarded as a normal part of development, and early studies of its prevalence generally found that 70-90% of children had some history of a sucking habit. Theories on the etiology of malocclusion have been reviewed in the dental literature [6]. Both genetic and enviromental factors have been emphasized, and there is evidence to support both.

Sucking habits could be identified as the backbone of these enviromental factors. Prevalence of sucking habits seems to be influenced by many factors such as gender and previous feeding method. In recent studies, prevalence of sucking habits were evaluated *(Table 4)*. According to recent literature the urge to suck is strongest in the first three months and ceases by 6 to 7 months [2, 8]. In the present study, feeding practices and sucking habits had been mostly demonstrated at mean 12 months of infancy. In recent papers, authors contribute that girls showed greater susceptibility toward the development of oral habits [3, 11]. The present study

demonstrated that breast-fed children had shorter habit duration of bottle-feeding and pacifier sucking, and prolonged finger sucking than bottle-fed children. Some authors had similar data in their study demonstrating that breast-fed children had significantly shorter habit duration than bottle-fed children [8, 12]. Results of the present study contradicts of *Farsi et al* that finger sucking seems to be more correlated with early cessation of breast-feeding [12]. There is recent data available about the utilization prevalence of pacifiers [13-25]. It should be noted that it is difficult to compare different methods and criteria of studies. These studies also found that, in general, finger-sucking habits were more likely to be prolonged to 3-4 years of age or older than were pacifier habits.

Table 4. The studies in the literature concerning feeding and/or sucking habits

Author(s)	Year	Site	Age	N	Breast%	Bottle%	Pacifier%	Finger%	Occlusion
Bliss	1945	New Zealand	2-4	300	_	_	_	17	_
Traisman et al	1958	US	0- 4	2650	11	_	_	46	_
Bowden	1966	Australia	0-8	116	_	_	37	27	_
Nanda et al	1972	India	2-6	2500	_	_	_	8	_
Ravn	1974	Denmark	3	248	_	_	36	7	+
Ravn	1976	Denmark	3	310	_	_	35	7	_
Zadik et al	1977	Israel	0-7	333	_	_	70	23	_
Melsen et al	1979	Denmark	10-11	723	_	_	78	8	+
Svedmyr	1979	Sweden	3-5	462	_	_	24	18	+
Shoaf	1979	US	_	486	40	59	_	24	_
Cerney	1981	Australia	0-3	600	_	_	62	18	_
Modeer et al	1982	Sweden	4	588	_	_	31	13	+
Larsson	1985	Zimbabwe	1-2	415	_	_	0	2	_
Meyers et al	1988	US	10-12	487	12	50	_	_	+
Larsson	1992	NorwaySweden	33	245171	__	__	3770	1218	__
Adair et al	1995	US	2-4	218	_	_	55	_	_
Bayardo et al	1996	Mexico	2-15	1600	_	_	_	11	_
Farsi et al	1997	Saudi Arabia	3-5	583	_	_	38	11	+
Warren et al	1999	US	4	221			5	12	_

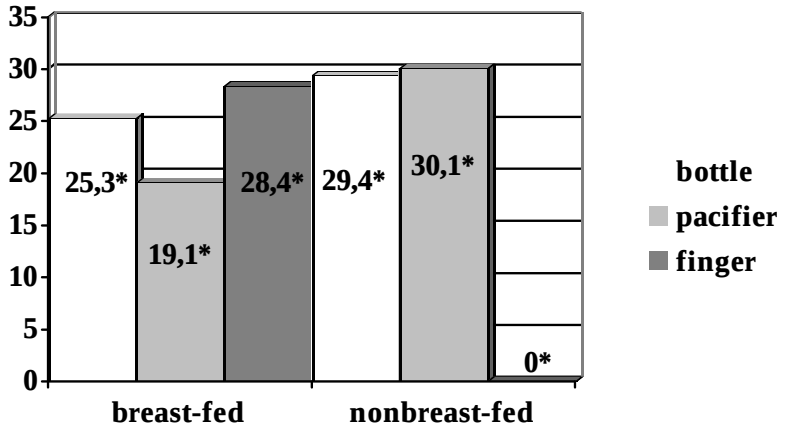
It should be noted that finger sucking might have been less openly and been difficult to observe. It is because sometimes the attitude of parents to this habit is remarkably negative and should not be stated to somebody else. In addition, although there is evidence that prolonged nonnutritive sucking habits can adversely affect orofacial development, few studies have attempted to identify those children most at risk for having prolonged habits. An increased prevalence of posterior crossbite in children, who wear pacifiers compared with those who did not, has been reported [7]. The development of unilateral cross-bite seems to be especially influenced by the intensity and duration of the sucking habit. Unilateral crossbite is often described as being dental or functional in nature. The dental cross-bite has been described as a local asymmetry of the maxillary dental arch without midline shift. On the other hand, the functional crossbite, often associated with a sucking habit, is characterized by a symmetrical constriction of

the maxillary arch [26]. In the present study, breast or bottle-feeding recorded in Istanbul children may have an influence on the development of posterior crossbite. But the present study did not find any significant relationship between breast-feeding, bottle-feeding, pacifier usage and finger sucking with malocclusions ($p>0.05$). 5% of children exhibited posterior crossbites, 70% of posterior cross-bites were unilateral. According to some authors the frequency of posterior cross-bite among children varies between 11-17% with unilateral cross-bite dominating [26]. In the literature, it has been stated that prolonged sucking habits were associated with changes in several dental arch measurements, such as decreased maxillary arch widths, increased overjet and decreased overbite. In addition, those with prolonged habits were more likely to have anterior openbites and posterior crossbites [10]. Notably, even when habits were ceased between 24 and 36 months of age, there was increased risk of developing posterior crossbite and increased mandibular canine arch width, compared with those who ceased sucking habits by 12 months of age. In addition to these differences, those who ceased habits between 36 and 48 months also had greater prevalence of excessive overjet, greater maxillary canine arch depth, greater mean overjet and slightly increased prevalence of openbite in comparison with those who ceased sucking habits at a younger age. In the present study, children breast-fed who had only finger sucking habit did not show any sign of malocclusion whereas children who were breast fed or not with bottle, pacifier and finger sucking habits had different signs of malocclusions.

Clearly, a key question is whether any of these changes brought by sucking habits observed in the primary dentition persist into the mixed or permanent dentitions, or whether they resolve. The limited literature in this area suggests that some of the changes resulting from sucking habits do persist to some extent. In an early longitudinal study of 116 Australian children from age 2 to 8 years, *Bowden* found that increased overjet, decreased overbite and decreased arch widths persisted for two to five years after the habit was stopped [15]. *Larsson* investigated the effects of different patterns of pacifier sucking habits on a number of dental arch and cephalometric variables in 9 year olds. He found slight effects on the occlusion when pacifier sucking habits were discontinued before they reached 3 years of age, with more pronounced effects in children with pacifier sucking habits of four years or longer [10, 13].

In conclusion, breast-feeding, bottle-feeding, pacifier and finger sucking did not have any effect on the dentition.

Figure 1. Time distribution (months) of sucking habits of children breast-fed against children who were not breast fed



* $p<0.001$ (ANOVA)

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