

# *Pacifier Sucking Habit and its Relation to Oral Health of Children Aged 1-5 Years (comparative study)*

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## **ABSTRACT**

**Background:** For many infants and children non-nutritive sucking habits are very common and one of those habits is pacifier sucking, however, if this habit persist beyond the age of 3 years it may cause esthetic, occlusal and psychological changes. This study was conducted to determine the effect of pacifier sucking habit on the oral health of children aged 1-5 years old in Baghdad city and to assess its role in the modification of the oral microflora.

**Materials and methods:** The study was carried out among children aged 1-5 years old with no history of any systemic diseases nor taking any medical treatment for the past two weeks prior to the examination, 50 children with continuous pacifier sucking habit were chosen to be the study group, compared to 50 children without any sucking habit (control group) matching the study group in age and gender. Information sheet filled by the parents concerning general health and frequency of oral infections of their children was taken. Oral microorganisms samples were obtained from children and cultured aerobically using blood agar, MacConkey agar, chocolate agar and sabouraud, s dextrose agar.

**Results:** Children with pacifier sucking habit showed higher frequency of having continuous oral infections (44%) whereas in non pacifier sucking group it was zero. Concerning the oral infections, a statistical difference was found by which the pacifier sucking children oral infections exceed significantly that of the non pacifier sucking children ( $P<0.01$ ). Regarding the oral microorganisms, more types were found among pacifier sucking children. *Candida*, *Strep.pyogenes*, *strep.faecalis*, *E.coli*, *Acinetobacter* and *strep. pneumonia* were more common among pacifier sucking children.

**Conclusion:** Pacifier use affect types and frequency of microorganisms found in the oral cavity which may affect the frequency of oral infections. Health programs should be constructed to improve parents' knowledge concerning the effect of pacifier use in the oral health of their children and how to clean it if it used to reduce its contamination.

## **KEY WORDS**

Pacifier sucking habit, candidal infection, oral microflora.

## **INTRODUCTION**

Two types of sucking habit are found, nutritive sucking habit by which the child sucks for nutrition and non nutritive sucking habit and that is when the child sucks to satisfy psychological need<sup>(1,2)</sup>. Both are considered sucking habits as they involve frequent conscious and unconscious neuromuscular activities<sup>(3,4)</sup>.

Pacifier sucking habit is considered as a nonnutritive sucking habit<sup>(5)</sup>. It is a nursing device shaped for a baby's mouth with imperforated teat that is attached to a shield designed in a way to prevent the child from putting the entire pacifier in his mouth. It also has rings attached to the flange for easy removal if aspirated<sup>(6)</sup>.

The use of pacifier may be initiated by the parents or the caregiver of the child for many reasons and the most common one is that, as its name indicate, soothing and comforting a baby<sup>(7,8)</sup>, however, adverse health effects have been associated with its use including inverse relation to breast feeding duration which increas the risk of early weaning<sup>(9,10)</sup>, otitis

media<sup>(11)</sup>, thrush and candidal infection<sup>(12)</sup>. It could also associated with wheezing, respiratory illness, vomiting, fever, diarrhea and colic<sup>(13)</sup>.

In Iraq, there is no available data or study concerning the effect of the pacifier in the oral health of children, so this study was conducted to determine its role in the oral infections and to assess its effect on the oral microflora among Iraqi children 1-5 years.

## **MATERIALS AND METHOD**

Approval from the ministries of work and social affairs, education and health to carry out this study was taken. A contact with school authorities was made to explain the purpose of the study. For including children in this study permission was obtained from the parents and questionnaires were designed to obtain information from them including general health and the sucking habits of their children. The study group was consisted of fifty healthy children with continuous pacifier sucking habit aged 1-5 years, they were selected from thirty kindergarten and nursery schools in both sides of Baghdad city. While the control group were 50 children matching the age and gender selected from the same school of the study

group. They were without any sucking habit. All children in both groups had not taken antibiotic and/or antimycotic treatment during at least the previous three months and without any chronic disease.

Microbiological samples were collected from children by swabbing their oral mucosal surface (cheek, hard palate, dorsum of the tongue and floor of the mouth) by sterile cotton swap (14). Each swab was streaked on blood agar, MacConkey agar, chocolate agar and sabouraud's dextrose agar and then incubated aerobically for 24 hours at 37°C. The morphology of different types of colonies was recorded and smears of these different colonies were done to study the Gram's reaction and microscopical characteristic (15).

Different types of colonies were sub cultured and stored for further biochemical tests to reach complete identification of each isolate. These tests include: Hemolysis on blood and chocolate agar plates, catalase test, oxidase test, slide coagulase test, Imvic, urease test, Kliger iron agar (KIA) test, bacitracin differentiation test, optochin sensitivity test and API 20 E system (16,17).

## RESULTS

Concerning oral infections, continuous oral infections occurred only among pacifier sucking group (44%), however, children affected by oral infections at few and distant times among non pacifier sucking group were 46 (92%) whereas among pacifier sucking group was 9 (18%). A statistical difference was found by which the pacifier sucking group exceed significantly that of non pacifier sucking group ( $P < 0.01$ ), Table (1).

There are 17 different types of microorganisms in pacifier sucking group, while in non pacifier sucking group there are only 14 types of microorganisms, Table(2). In the pacifier sucking group the highest percentage appear to be found for *Strep. viridans*, *Candida* and *Moraxella* which are 100%, 96% and 94% respectively, however, in non pacifier sucking group the highest percentage appear to be found for *Strep.viridance* 100% followed by *Moraxella* 96% and then *Candida* 60%.

Table (3) and (4) demonstrated the distribution of microorganisms by age group in the pacifier and non pacifier sucking children respectively.

## DISCUSSION

The results of the present study revealed that there was a significant relation between the occurrence of oral infection and the pacifier use as it is shown in

Table (1), this finding is in accordance with that found by other studies (12,14,18).

The association between pacifier sucking habit and the occurrence of oral infection may be related to the presence of a foreign body in the mouth which may be contaminated in a way or another like its contamination when it's dropped down or its use by another child.

In this study the presence of candida in the pacifier sucking children was 36% higher than that of the non pacifier sucking children ( Table 2) which suggests that the use of pacifier may be a local factor that influences and enhances the colonization and proliferation of candida in the oral cavity (14).

The microorganisms identified according to the systematic manner which comprises the colony morphology and the selective media in addition to the biochemical tests, the microbiological study of pacifier and non – pacifier sucking groups demonstrates the differences in the types and frequency of microorganisms. Table (2) shows the number of microbial isolates in pacifier sucking group were 17 different types of microorganisms whereas in non pacifier sucking group they were 14. In general the number and frequency of microbial isolates in pacifier sucking group were higher than in the non pacifier sucking group.

Like any other removable appliance used orally, a pacifier after a period of time will itself become colonized with microorganisms and may modify the oral flora (8, 19), also the horizontal transmission of microorganisms could be occurred by a pacifier as a cross infectional factor, facilitating for example yeast and *strep mutans* infections (14). Also the continuous use of pacifier would favor the growth of aciduric microorganisms like the yeast and lactobacilli as a result of the drop of saliva pH due to the stagnation of saliva that is contributed to the use of pacifier (14, 19).

The predominance bacterial isolates which had been found in this study in both pacifier and non – pacifier sucking group were *Strep.viridans* (100% for both groups) and *Moraxella* (94% and 96% respectively). These two microorganisms are normal flora in the mouth and the presence of *Moraxella* in this high percentage is in agreement with Nolte (20).

The next most predominance microbial isolates in the pacifier sucking group was *Candida albicans* 96% compared to 60% in non pacifier sucking group, which mean that pacifier sucking group exceed by 36% the non pacifier group. This finding is in accordance with the results presented by other studies (14, 19, 22), however, it is near that found in Jordan in

1995 by Darwazeh and AL – Bashir <sup>(22)</sup> which was 30%, and that found in Brazil in 2001 by Mattos-Graner et al.<sup>(14)</sup> which was 32%.

Staph. epidermidis is higher in pacifier sucking group (86%) compared to the non pacifier sucking group(24%). This may be due to the transmission of this microorganisms by the pacifier from another area of the body such as the skin or by fomites as cloths.

*Strep. pyogenes* is a β-haemolytic microorganism, it is one of the commonest bacterial pathogens that cause pharyngotonsillitis all over the world <sup>(23)</sup>. In the present study, *Strep.pyogenes* represent 6% in non pacifier sucking group compared to 78% in pacifier sucking group, this high percentage may be due to seasonal variation as the sample were collected in winter in which tonsillitis and other related infections are known to be common and so pacifier may act as a source of transmission of these microorganisms either directly (from other infected children as an example),

or indirectly (contaminated hands).

## CONCLUSIONS

Oral infections were higher among pacifier sucking children than the non pacifier sucking children which were ensured by that aerobic microbial isolates in pacifier sucking group was (17) isolates compared with (14) isolates in non pacifier sucking group, and the presence of candida and coliform bacteria (*E-coli*, *Klebsiella*, *Enterobacter*) was higher in pacifier sucking group.

If there is no way other than give the child a pacifier certain precautions and strict hygiene rules should be kept in mind, in which the pacifier should be efficiently cleaned or rinsed before and after each use to decrease exposure to germs, also never coating a pacifier with any sweet fluid that may increase the risk of developing dental caries.

**Table (1): Occurrence of oral infection among pacifier and non pacifier sucking children.**

Occurrence of oral infection	Pacifier sucking		Non pacifier sucking		Sig.
Continuously	22	(44%)	0	-	H.S**
Occasionally	19	(38%)	4	(8%)	H.S
Few and distant times	9	(18%)	46	(92%)	H.S
Total	50	100%	50	100%	

\*\* Highly significant, P<0.01\

**Table (2): Distribution of M.O. by frequency and percentage in the pacifier and non pacifier sucking children.**

Type of M.O	Pacifier sucking		Non pacifier sucking	
	Frequency	%	Frequency	%
Strep. viridans	50	100	50	100
Strep. faecalis	31	62	15	30
Strep. pneumonia	10	20	1	2
Strep. pyogenes	39	78	3	6
Moraxella	47	94	48	96
Staph.epi.	43	86	12	24
Staph.aureus	7	14	2	4
Sarcinae	8	16	5	10
Lactobacilli	11	22	8	16
corynebacterium	2	4	1	2
Candida	48	96	30	60
E-coli	16	32	1	2
Acinetobacter	15	30	1	2
Enterobacter	3	6	-	-
Pseudomonas	3	6	-	-
Pantoea	3	6	-	-
Klesbsiella	10	20	5	10

**Table (3): Distribution of M.O among pacifier sucking children**

M.O	Age Group							
	1-2 years n=21		2-3 years n=15		3-4 years n=8		4-5 years n=6	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Moraxella	20	95.2	14	93.3	8	100	5	83.3
Candida	19	90.5	15	100	8	100	6	100
Staph. epi.	17	80.9	14	93.3	6	75	6	100
Stap. aureus	2	16.7	2	13.3	2	25	1	16.7
Sterp.pyogenes	14	66.7	12	80	7	87.5	6	100
Sterp.faecalis	11	52.4	9	60	6	75	5	83.3
Sterp.pneumonia	5	23.8	4	26.6	1	12.5	0	-
Sterp.viridans	21	100	15	100	8	100	6	100
Lactobacilli	1	4.8	1	6.7	4	50	5	83.3
Corynebacterium	0	-	0	-	1	12.5	1	16.7
Sarcinae	4	19.1	3	20	1	12.5	0	-
E.coli	5	23.8	4	26.6	4	50	3	50
Enterobacter	2	16.7	0	-	2	12.5	0	-
Acinetobacter	8	80.1	3	20	2	25	3	50
Pantoea	2	9.5	1	6.7	0	-	0	-
Pseudomonas	2	9.5	0	-	1	12.5	0	-
Klebsiella	5	23.8	5	33.3	0	-	0	-

**Table (4): Distribution of M.O among non pacifier sucking children.**

M.O	Age Group							
	1-2 years n=21		2-3 years n=15		3-4 years n=8		4-5 years n=6	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Moraxella	19	90.5	15	100	8	100	6	100
Staph. epi.	7	33.3	5	33.3	0	-	0	-
Strep. viridans	21	100	15	100	8	100	6	100
Strep. faecalis	6	28.6	7	46.7	1	12.5	1	16.7
Strep. Pneumonia	1	4.8	0	-	0	-	0	-
Strep. Pyogenes	0	-	0	-	1	12.5	2	33.3
Staph. aureus	0	-	0	-	1	12.5	1	16.7
Lactobacilli	0	-	1	6.7	4	50	3	50
Corynebacterium	0	-	0	-	0	-	1	16.7
Sarcinea	0	-	1	6.7	2	25	2	33.3
Candida	21	57.1	9	60	5	62.5	4	66.7
E. coli	-	-	-	-	1	12.5	-	-
Acinetobacter	-	-	-	-	1	12.5	-	-
Klebsiella	0	-	0	-	2	25	3	50

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