

Finger sucking habit: Prevalence, contributing factors and effect on occlusion

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ABSTRACT

The aims of this study were to find the prevalence of finger sucking habit among primary school children and to detect the effect of some factors like parents' occupation, socioeconomic status of the family, pacifier use, feeding method and child rank on the occurrence of the habit. Effects of finger sucking habit on occlusion were also looked for.

The prevalence of finger sucking habit was looked for in 1780 students (1030 boys and 750 girls) in six primary schools randomly selected in the center of Mosul City. The age of the students ranged between 6-14 years, with a mean of 10.2 years. The habit was noted in 5.56% of the students, with significant female preponderance.

In comparison with a nearly identical control group, finger-sucking habit was significantly higher in those, whose mothers were officials, those who were on bottle-feeding and those who were not using pacifier. No significant influence of father's occupation, children birth rank and economic status of the family on the prevalence of finger sucking habit was noted.

Finger suckers showed a significant increase in overjet, anterior open bite and decrease in deep bite and lower arch spacing. No significant difference was noted between finger suckers and the control group with respect to upper anterior spacing, upper and lower crowding and posterior cross bite.

Key Words: bad oral habit, occlusion, fin-ger sucking.

الخلاصة

كانت أهداف هذه الدراسة هي إيجاد نسبة انتشار عادة مص الأصابع بين طلاب المدارس الابتدائية وكذلك تأثير بعض العوامل مثل مهنة الوالدين والحالة الاجتماعية والمادية للعائلة واستعمال الملهية وتسلسل الطفل في العائلة وطريقة الرضاعة على انتشار هذه الظاهرة. كذلك هدفت الدراسة إلى تحديد تأثير هذه الظاهرة على انطباق الأسنان.

تم البحث عن انتشار عادة مص الأصابع بين ١٧٨٠ طالب (١٠٣٠ ذكر و ٧٥٠ أنثى) في ست مدارس ابتدائية اختيرت عشوائياً في مركز مدينة الموصل. تراوحت أعمار الطلاب بين ٦-١٤ سنة وبمعدل عمري ١٠.٢ سنة. لوحظت هذه العادة بنسبة ٥.٥٦% مع فارق مميز للإناث.

عند المقارنة مع مجموعة من الطلاب الذين لم يمارسوا هذه العادة، وجد أن وظيفة الأم، نوع الرضاعة واستعمال الملهية هي من العوامل التي لها تأثير معنوي على انتشار هذه العادة. لقد تم التوصل إلى أن وظيفة الأب وتسلسل الطفل في الأسرة والحالة المادية للأسرة ليس لها تأثير معنوي على انتشار عادة مص الإصبع.

عند فحص إطباق الأسنان وجد أن الطلاب الذين يمصون إصبعهم لديهم زيادة ملحوظة في البروز الأفقي والعضة المفتوحة الأمامية و نقصان في انتشار العضة العميقة والفراغات بين الأسنان الأمامية السفلية. وكذلك لوحظ عدم وجود فرق معنوي بين الطلاب في كلا المجموعتين في انتشار الفراغات بين الأسنان الأمامية العلوية و تزامم الأسنان العلوية والسفلية والعضة المتصالية الخلفية.

INTRODUCTION

A habit is an action, which by repetition becomes spontaneous.⁽¹⁾ The term digit sucking refers to placing the thumb or finger(s) in the mouth many times every

day and night, exerting a definite sucking pressure.⁽²⁾ It is estimated that approximately 50% of infants at one year of age suck a thumb or a finger. The number decreased rapidly by ages 4-5 years and the

average age for spontaneous cessation of the habit was 3.8 years of age.⁽³⁾

Various theories have been proposed to explain the aetiology of finger sucking habit. However, the psychological theory and learning behaviour theory are the most accepted.⁽⁴⁾ Many factors have been blamed in the initiation and maintenance of the prolonged finger sucking habit such as sex of the suckers, type of feeding (breast versus bottle feeding), the length of infantile feeding time, arrival of another sibling, socioeconomic factors, separation from parents and general health and psychology.⁽⁵⁾

Sucking habits involving digits or dummies are the most tangible environmental factors that play a role in the aetiology of malocclusion.⁽⁶⁾ Prolonged finger and thumb sucking result in a disturbance of the dentofacial development in the anteroposterior, vertical and transverse directions.⁽⁷⁾ Active digit sucking results in reduced vertical growth of the frontal part of alveolar process, which creates an anterior open bite and proclination of the upper incisors as a result of the horizontal force created by the digit.

Finger sucking also causes anterior displacement of the maxilla, anterior rotation of the maxilla resulting in an increased prevalence of posterior cross-bite in the deciduous dentition and proclination or retroclination of lower incisors which seem to be due to the strength of the tightness of the lower lip and tongue activity during sucking.⁽⁸⁾

Although most attention to the harmful effects of finger sucking by infants has been on the potential dental deformation, finger deformities also occurred.⁽⁹⁾ In addition, 21% of children with finger sucking habit were symptom-free carriers of *Enterobius vermicularis*.⁽¹⁰⁾

The aims of the present study were to find out the prevalence and distribution of finger sucking habit among primary school students (aged between 6–14 years) in Mosul City, and whether difference is present between males and females. The other aim was to detect the influence of some factors like: Occupation of the parents, pacifier use, feeding method, child rank within the family and socioeconomic status of the family on the

development of finger suck-ing habit and to clarify the effects of finger sucking habit on occlusion.

MATERIALS AND METHODS

The sample examined in this study was students from six primary schools in the center of Mosul City, selected randomly, three schools for boys and three schools for girls. The total number included in this study was 1780 students, 1030 were boys and 750 were girls. The mean age was 10.2 years with an average of 6–14 years.

Each student was provided with a written questionnaire to be answered by his/her parents. The inquiries included personal data and pointing whether the child has past or a continuous finger sucking habit. Furthermore, those with positive finger sucking habit were instructed to answer additional questions including: Father and mother occupations, rank of the child, socioeconomic status, method of feeding, and pacifier use.

After collection of the questionnaire papers, those with positive answers regarding finger sucking habit were considered for comparison with a control group with no finger sucking habit. The control group was selected from the same original sample. The criteria for selection of the control group include that they had no history of orthodontic treatment and are free from any other oral habits or previous habits. The number of the control group, their age and sex were identical to those with finger sucking habit group.

The occlusion was examined for both groups, looking for abnormal overjet and overbite, buccal cross bite, and anterior spacing and crowding. The overjet and overbite were measured using a modified sliding vernier with measurement sensitivity of 0.1mm.

The normal range of overjet was considered between 1–4 mm. Any measurement greater than 4 mm was considered as an increased overjet.⁽¹¹⁾ The normal value for overbite was considered between 1–3 mm. Measurements greater than 3 mm were considered as deep bite. Open bite was considered if the incisal edges of lower incisors were below those of upper

incisors in the vertical plane with the teeth in centric occlusion.⁽¹²⁾

The buccal cross bite was recorded if the buccal cusps of maxillary teeth occluded lingually to the buccal cusps of the corresponding mandibular teeth.⁽¹³⁾

Anterior crowding or spacing was assessed by measuring the anterior segment perimeter from the distal aspect of the lateral incisor of one side to that of the contralateral lateral incisor by using stainless steel wire of 0.5mm.⁽¹⁴⁾ Width of teeth involved in this segment was measured by using vernier of 0.1 mm sensitivity. The difference between the anterior segment perimeter and the sum of the width of the included teeth in each arch gave us the degree of crowding or spacing. Spacing or crowding was registered with the difference of at least 2 mm per segment.⁽¹⁴⁾

Chi-square test was used to analyze any statistically significant differences between the digit suckers and control groups for the registered variables. Highly significant difference was considered at $p \leq 0.01$

and significant difference was considered at $p \leq 0.05$.

RESULTS

The prevalence of finger sucking habit according to the gender and age, in percentage and number, is shown in Table (1). The total number of students with finger sucking habit was 99 (5.56%). There were 54 girls (7.2%) and 45 boys (4.36%); this difference was highly significant ($\chi^2 = 6.62$, $df= 1$, $p < 0.01$).

Table (2) shows no significant difference between control group and finger suckers group in relation to father occupation ($\chi^2 = 0.82$, $df= 4$, $p > 0.05$). Highly significant increase in the prevalence of finger sucking habit was seen in students whose mothers were officials as compared to those whose mothers were housewives ($\chi^2 = 13.03$, $df= 1$, $p < 0.01$).

Table (1): Prevalence of finger sucking habit according to gender and age in percentage and number

Age	Boys		Girls		Total	
	No	%	No	%	No	%
6-8	24	53.33	22	40.74	46	46.47
9-11	13	28.89	22	40.74	35	35.35
12-14	8	17.78	10	18.52	18	18.18
Total	45	100	54	100	99	100

Female vs male suckers: Highly significant ($\chi^2 = 6.62$, $df= 1$, $p < 0.01$)

Table (2): Distribution of finger suckers and control group according to mother's and father's occupation

Occupation	Finger Sucker Group (No.)	Control Group (No.)
Father Occupation		
Free Function	35	43
Worker	13	11
Retired	9	6
Official	35	33
No Job	7	6
Total	99	99
Mother Occupation		
Housewife	70	90
Official	29	9
Total	99	99

Father's occupation: Not significant ($\chi^2 = 0.82$, $df= 4$, $p > 0.05$)

Mother's occupation: Highly significant ($\chi^2 = 13.03$, $df= 1$, $p < 0.01$)

Table (3) shows no significant difference between the finger suckers group and the control group with regard to the rank of child among his/her brothers and sisters ($\chi^2 = 1.17$, $df = 4$, $p > 0.05$).

Table (3): Distribution of finger suckers and control group according to the rank of children in the family

Child Rank	Sucking Group	Control Group
First	6	13
Second	16	14
Third	17	15
Fourth	20	28
Fifth and More	40	29
Total	99	99

Child rank: Not significant ($\chi^2 = 1.17$, $df = 4$, $p > 0.05$)

Table (4) shows no significant difference between the finger suckers group and the control group concerning the economic status of the families ($\chi^2 = 0.1$, $df = 3$, $p > 0.05$).

Table (4): Distribution of finger sucker and control group according to the economic status of the family

Economic Status	Sucking Group	Control Group
Poor	8	13
Middle	70	63
Good	20	22
Excellent	1	1
Total	99	99

Economic status: Not significant ($\chi^2 = 0.1$, $df = 3$, $p > 0.05$)

Table (5) shows a highly significant decrease in the number of finger sucking habit who were using pacifier during infancy as compared to those who were not pacifier users ($\chi^2 = 64.9$, $df = 1$, $p < 0.01$).

Table (6) reveals a highly significant increase in the prevalence of finger sucking in students who had received bottle feeding during infancy ($\chi^2 = 18.75$, $df = 2$, $p < 0.01$).

Table (5): Distribution of finger suckers and control group according to the use of pacifier during infancy

Pacifier Use	Sucking Group	Control Group
Pacifier Users	10	65
Not Using Pacifiers	89	34
Total	99	99

Pacifier use: Highly significant ($\chi^2 = 64.9$, $df = 1$, $p < 0.01$)

Table (6): Distribution of finger suckers and control group according to the method of feeding during infancy

Feeding Method	Sucking Group	Control Group
Breast Feeding	33	69
Bottle Feeding	56	19
Combined	10	11
Total	99	99

Feeding method: Highly significant ($\chi^2 = 18.75$, $df = 2$, $p < 0.01$)

Table (7) demonstrates a comparison between the control group and finger-sucking group according to the occlusal abnormalities.

No significant difference was noted for upper and lower arch crowding and upper arch spacing between the finger-sucking group and the control group. Significant decrease in the prevalence of lower arch spacing was seen in finger-suckers group ($\chi^2 = 4.034$, $df = 1$, $p < 0.01$).

Very highly significant increase in the prevalence and severity of anterior open bite was observed in the finger-suckers group ($\chi^2 = 25.02$, $df = 1$, $p < 0.01$). Highly significant decrease in the prevalence and severity of deep overbite was recorded in finger-suckers group in comparison with control group ($\chi^2 = 7.044$, $df = 1$, $p < 0.01$).

Highly significant increase in the prevalence and severity of overjet was registered in finger-suckers group in comparison with the control group ($\chi^2 = 9.75$, $df = 1$, $p < 0.01$). No significant difference was present between the finger-suckers group and the control group in the prevalence of posterior cross bite ($\chi^2 = 2.75$, $df = 1$, $p > 0.05$).

Table (7): Comparison of crowding, spacing, increased overjet, posterior cross bite, anterior open bite and deep bite between finger sucker and control groups

Occlusal Abnormalities	Sucker Group	Control Group	Chi-square Test
Upper Crowding	9	8	$\chi^2=0.31, df=1, p > 0.05, NS$
Lower Crowding	17	11	$\chi^2=1.50, df=1, p > 0.05, NS$
	25	20	$\chi^2=0.72, df=1, p > 0.05, NS$
	3	10	$\chi^2=4.03, df=1, p < 0.05, S$
Increased Overjet	39	19	$\chi^2=9.75, df=1, p < 0.01, S$
Deep Bite	4	15	$\chi^2=7.044, df=1, p < 0.01, S$
Anterior Open Bite	29	3	$\chi^2=25.02, df=1, p < 0.001, S$
Posterior Cross Bite	5	1	$\chi^2=2.75, df=1, p > 0.05, NS$

S= Significant, NS= Not significant.

DISCUSSION

When considering the aetiology of malocclusion in general, factors are often cited as having a genetic basis or an environmental basis. An individual malocclusion is likely to be a result of the variable effects of multiple environmental influences, upon an equally variable genetic predisposition. One of the most tangible 'environmental' factors is that of sucking habits involving digits or dummies.

The prevalence of finger sucking habit in the present study was 5.56%. It is in accordance with that of Al-Hadithi⁽¹⁵⁾ and Al-Zuhary⁽¹⁶⁾ on a sample of Iraqi children. They reported that the prevalence of finger sucking habit was 4.3% and 5.5% respectively.

Farsi and Salama,⁽¹⁷⁾ on a sample of Saudi children, reported that the prevalence was 28.36%. Mylharneimi⁽¹⁸⁾ reported a prevalence of 29% in Finnish children. Uwaezuoke *et al.*⁽¹⁹⁾ found that the prevalence of finger sucking in Nigerian children was 23%. The prevalence of this habit in this study, and the other previously mentioned Iraqi studies, is less than that in most of the reported worldwide studies. This may be due to the family ties, embarrassment of the finger sucking related to the passive attitude of the society toward this habit. Furthermore, there could be multi-racial variation of prevalence rates.

Finger sucking habit was higher in girls (7.2%) than boys (4.36%). The difference was highly significant. This observation comes in agreement with those of other studies.^(15, 16, 20) The explanation of this gender difference may be related to

the more attention and care the boys they receive from their parents than girls. In addition, boys are more active while girls are usually calm and tend to reflect their dissatisfaction by sucking fingers.

As shown in Table (2), father's occupation has no significant influence on the prevalence of finger sucking habit, although the highest percent was noted in those whose fathers were officials and free workers. Mother's occupation significantly influences the prevalence of sucking habit. The highest percentage was noted in those whose mothers were officials. The results come in accordance with those of Al-Zuhary.⁽¹⁶⁾ It seems that long time of separation between the child and his/her mother may greatly influence the development of finger sucking habit. The sense of insecurity may be relieved by finger sucking.

The influence of the child rank of birth among the family on the development of finger sucking habit is shown in Table (3). Although fails to reach a significant level, the prevalence of sucking habit was noted to be gradually increased as the child's order of birth was increased. This result was also reported by Johnson and Larsson⁽⁵⁾ and Rani.⁽²¹⁾ The explanation for this observation is that the family level of care and attention may be reduced as the number of children is increased. Financial domestic status of the families had no significant effect on the development of the finger sucking habit (Table 4). However, about 70% of suckers were in the middle class. The results agree with those of Farsi and Salama⁽¹⁷⁾ who pointed that sucking habit was related to parents' educ-

ation without significant effect of family income. The results of this study disagree with those of Calasti *et al.*⁽¹⁾ who found that children from a high socioeconomic group demonstrated oral habits more frequently than children from a middle or low socioeconomic class.

The use of pacifier during infancy tends to greatly influence the tendency toward finger sucking habit (Table 5). Eighty nine suckers present no history of pacifier use as compared to the remaining 10 suckers who had positive history of pacifier use. The result is statistically highly significant. This result is supported by those of Vadiakas *et al.*⁽²²⁾ who found that pacifiers showed a preventive effect against finger sucking, since only 2% of their sample examined practiced both habits. The low incidence of sucking in pacifier use may be attributed to the feeling of security the pacifier provides to the child.

The prevalence of finger sucking habit is found to be low in those who were on breast-feeding. This could be explained by the psychological and nutritional satisfaction the child may get from the breast feeding and maternal contact. The results are supported by those of Al-Zuhary⁽¹⁶⁾ and Farsi and Salama.⁽¹⁷⁾ The results of this study disagree with those of Traisman and Traisman⁽²³⁾ and Hanna,⁽²⁴⁾ who found that no correlation between thumb sucking and mode of feeding was present.

Reduction in the prevalence of upper incisors crowding in finger-suckers associated with increased crowding of the lower incisors was noted, although no significant differences were observed (Table 7). This probably reflects the direction of forces. The upper part of the finger, which is interposed between the maxillary and mandibular incisors, is moved upward and outward during the sucking process. This, in turn, may move the lower part of the finger lingually causing crowding of the lower incisors. The same result was also observed by other studies.^(16, 25, 26)

Although fails to reach a significant level, an increase in the prevalence of spacing in maxillary incisors of finger suckers as compared to non-suckers may be due to more proclination of upper incisors. Proclination and spacing of upper incisors may be attributed to: Firstly, anterior displace-

ment of apical base of the premaxilla by the pressure created by digit on the palatal surface of upper incisors and the anterior part of the premaxilla. Secondly, the labially directed pressures exerted by the hyper-active lower lip interposed between the upper and lower incisors. The results come in agreement with those of other studies.^(15,16,27,28)

A highly significant increase in the overjet was noted among finger suckers in comparison with non-suckers. This may be explained by the labially directed forces, exerted on the upper incisors, and lingually directed forces, exerted on the lower incisors, caused by placing the finger between the upper and lower incisors. The results come in accordance with those of other studies.^(15, 16, 29)

The prevalence of deep bite in the sucker group was about four times less than that in the non-sucker group. The differences were highly significant. This inverse relationship between finger sucking habit and deep bite was also reported by Al-Zuhary⁽¹⁶⁾ and Proffit.⁽³⁰⁾ However, Larsson⁽⁸⁾ reported that an excessive overjet will end up as a deep bite with gingival contact, after giving up or decreasing the intensity or frequency of the habit.

The prevalence of anterior open bite among sucker group was about ten times greater than in non-sucker group. The result was highly significant. This direct relationship between anterior open bite and finger sucking was also reported by other studies^(3, 8, 16) The anterior open bite may be attributed to an inadequate vertical growth of the bone in the anterior segment caused by interpositioning of the finger between the upper and lower incisors. Overeruption of posterior teeth and the natural tendency of the tongue tip to protrude into the open bite area during deglutition also exaggerate the open bite.

The prevalence of posterior cross bite in finger suckers was five times greater than in non-suckers. However, the difference was not significant. These results were also reported by other studies.^(8, 16, 28, 31)

The posterior cross bite may be attributed to unbalanced actions of the cheek and tongue. During active sucking, the tongue has to take a lower position in the mouth; consequently the palatal support of

the upper canines and molars against the excessive inwardly directed cheek forces is reduced.

CONCLUSIONS

The prevalence of finger sucking habit was 5.56%. In girls, the prevalence was 7.2%, while in boys it was 4.3%. The difference was highly significant. Significant correlation was noted between finger sucking habit and mother's occupation, pacifier use, and feeding method. In contrast, no significant correlation was noted between finger sucking habit and father occupation, child rank, and socioeconomic status. In addition, increased overjet and anterior open bite were significantly greater in finger suckers. Also, deep bite and lower arch spacing were significantly less in finger suckers than non-suckers. No significant difference was noticed between finger-suckers and non-suckers for upper and lower crowding, upper arch spacing, and posterior crossbite.

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