Kronicle of Dental Science
Jul-Dec 2017. Vol 2 Issue 1. Pages 25-30

An Original Study

Thumb sucking causing callus formation: An indicator for malocclusion

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Keywords: Thumb sucking, Malocclusion, Callus, Children

ABSTRACT

Background and setting: The sucking of digits has been considered to affect the occlusal development and dentition of a child. When a dentist comes across a child with severe malocclusion like over-jet, posterior cross-bite, anterior teeth spacing, etc., it is often difficult for him to decide if a child has developed a digit-sucking habit. The presence of a callus on the finger is indicative of suck ing off that finger and indirectly suggests malocclusion.

Aims and Objectives: To determine the presence of calluses on fingers of 1000 randomly picked school going children of this district; and to co-relate it with the presence of malocclusion in order to counsel or treat the child early and prevent the development of malocclusion in his later years.

Materials and Methods: 1000 school children (250 in each age group) between 2 and 6 years of age, of both sexes, were randomly picked to observe the presence of callus on their fingers. They were then asked about their finger sucking habits and finally checked for alterations in occlusion.

Results: Of the children in the age group 2-3 years, it was found that 24% had calluses and 28% presented with malocclusion. Callus was seen in 26% cases of the 3.1-4 years age group; of which, 94 % had finger sucking habit and 97 % of them had malocclusion. In the 4.1-5 years group, 12% had calluses; off whom, 87% had the habit and 87% presented with malocclusion. Off the 250 children in the age bracket 5-6 years, 8% had callus; 7% had the digit sucking habit, and 7% had malocclusion.

Conclusion: The presence of a callus is a definite indication of the digit sucking; which is an indirect indicator for malocclusion.

INTRODUCTION

The oral habits such as tongue thrusting, thumb sucking, etc., can obstruct the normal development and growth of the jaws, encouraging the commencement of malocclusion together with the alterations in the normal speech patterns and swallowing, depending on criteria such as the intensity, duration, frequency and facial pattern.[1]

There are different phases in the sucking habit:

Phase 1: Normal and subclinical sucking

The thumb sucking from birth to 3 years. Pacifier or medicaments can be used to treat the malocclusion.

Phase 2: Clinically significant sucking

3-7 years. Psychological counselling and appliance therapy is required.

Phase 3: Intractile sucking

After 4 years the habit becomes a psychological problem for the children. [2]

The causes for the sucking habit include

- The rooting reflex
- The lack of sucking satisfaction during eating
- Peer modelling
- Psychological reasons.[3]

Digit and dummy sucking habits are examples of the non-nutritive sucking habits (NNS). There are 2 theories that explain this behaviour– learned and emotional. The emotional theory is based on Freud's principles and relays NNS to the oral phase of child's development. If this habit continues further than the oral phase of development then it has become a addiction and if a child returns to NNS at a later stage this is sign of relapse. The end results, fixation and regression are considered to indicate emotional disturbance.

The learned behaviour theory states that NNS is a channel for an excess sucking urge because of effective feeding and this theory has been proved by ultrasound picture of fetuses in-utero. This theory had gained favour in earlier days. [4], [5]

Finger sucking can lead to problems such as psychological; and malocclusion. The various malocclusions that occur, include, anterior open bite, retruded and crowded mandibular incisors, flaring incisors, posterior cross-bite, increased over-jet, anteriorly displaced maxilla and retruded mandible. The exact age at which the habit should be stopped so as not to affect the permanent dentition, is still controversial. Many of these conditions self-correct, if there are no co-habits such as tongue thrusting, lip biting, etc.; and the habit discontinues before the permanent teeth eruption. The clinician must look out for the digit sucking habit if the child suffers from maxillary over-jet with incisor spacing and with no mandibular incisors for lingual support. The child fails to answer in the affirmative when asked about the habit, and the dentist is forced to observe signs that would indicate finger/ thumb sucking. The signs he would look out for would be an extra clean, wrinkled or red digit, and calluses. [3]

This study aims to identify the presence of calluses on fingers of 1000 school going children, both males and females between the ages 2 and 6 years, and with 250 of them comprising each age group; from various schools of the district, and to correlate it with malocclusion.

Materials and Methods:

1000, otherwise healthy school going children, between ages of 2 and 6 years; of both sexes; were selected for the study.

After abiding by the local and ethical guidelines, the children, in the presence of their parents, who were asked to sign the patient consent form; were examined for calluses on their digits.

Criteria for selection included:

- Only those patients with the chief complaint of malocclusion
- Only those patients in the age range of 2-12 years, verified by their date of birth, as confirmed from the patient and/or parents.

The observations were tabulated on an excel sheet. The children/parents were asked about the digit sucking habits which was also tabulated. Using a mirror and probe, any alterations in occlusion such as open bite, posterior cross-bite etc. was examined in each child and noted in the same excel sheet. Graphs were plotted using the above values.

Results:

The results showed that out of the 250 /1000 children, per 4 age groups, maximum malocclusion (25%) was seen in 3.1-4 years age group and they presented with the maximum sucking habit (24%). Callus formation was seen in 26% of these children indicating the positive co-relation between the 3 factors; namely the callus formation, finger sucking habit and malocclusion.

1000 children	Habit	Callus	Mal Occ
2-3 years	53-	60-	52-
3.1-4 years	61-	65-	63-
4.1-5	26-	30-	26-
5.1-6yrs	18-	20-	17-

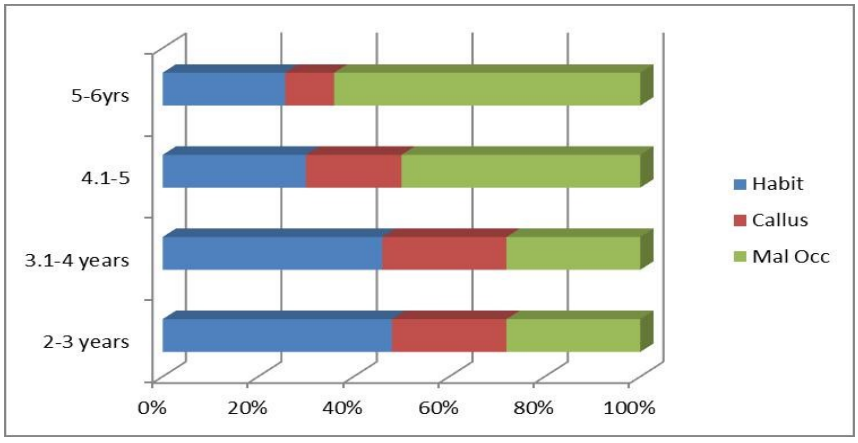
TABLE 1: *Age wise distribution of the children of ages 2 to 6 years, divided into different groups showing the distribution of the presence of callus, digital sucking habit and the malocclusion as a consequence of it.*

TABLE 2 *Age wise distribution of the children of age groups 2 to 6 years, divided into different age groups, showing percentage distribution of the presence of callus, digital sucking habit; and malocclusion as a consequence of it.*

1000 children	Habit	Callus	Mal Occ
2-3 years	(53)21.2%	(60)24%	(52)20.8%
3.1-4 years	(61)24.4%	(65)26%	63(25.2%)
4.1-5	(26)10.4%	(30)12%	(26)10.4%
5.1-6yrs	(18)7.2%	(20)8%	(17)6.8%

FIGURE 1: *Callus on thumb*

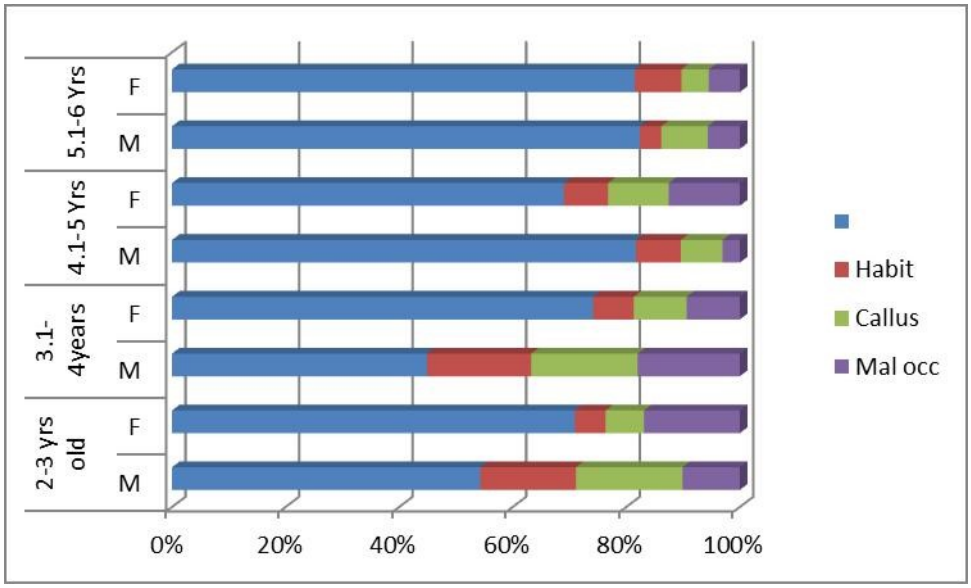
FIGURE 2: *Overjet related to thumb-sucking*



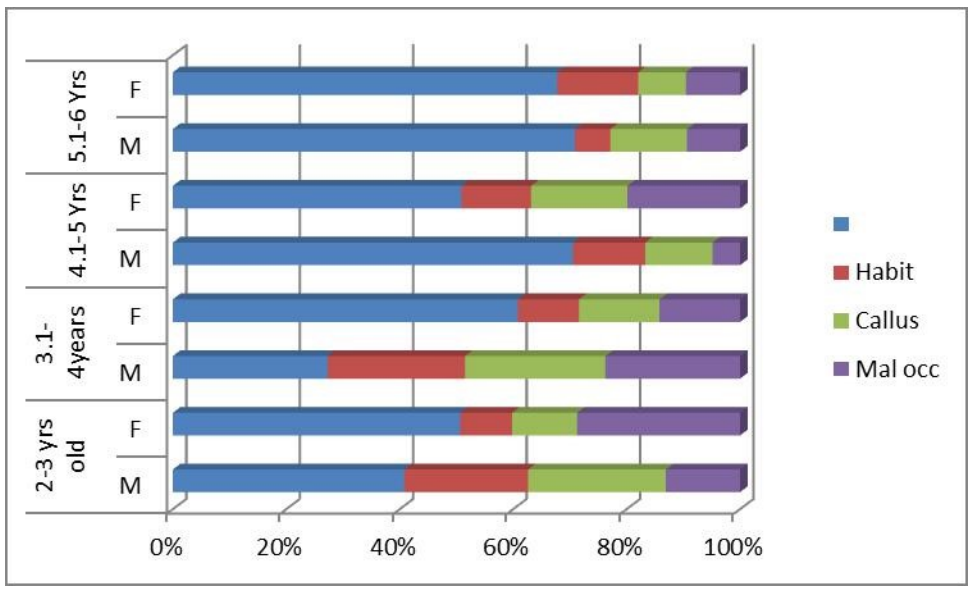
Graph 1: *% age wise distribution of the habit (digit sucking); callus: and malocclusion in various age groups.*

TABLE 3: *%age wise distribution of habit (digit sucking); callus: malocclusion in males and females of various age groups.*

Parameter	2-3 yrs old	Column1	3.1-4years	Column2	4.1-5 Yrs	Column3	5.1-6 Yrs	Column4
Sex	M	F	M	F	M	F	M	F
	145(58%)	**105(42%)**	**115(46%)**	**135(54%)**	**134(53.6%)**	**116(46.4%)**	**131(52.4%)**	**119(47.6%)**
Habit	45(31.0%)	8(7.6%)	47(40.9%)	13(9.6%)	13(9.7%)	13(11.2%)	6(4.6%)	12(10.0%)
Callus	**50(34.5%)**	**10(9.5%)**	**48(41.7%)**	**17(12.6%)**	**12(9%)**	**18(15.5%)**	**13(10%)**	**7(5.9%)**
Mal occ	27(18.6%)	25(23.8%)	46(40%)	17(12.6%)	5(3.7%)	21(18.1%)	9(6.9%)	8(6.7%)



Graph 2: *Distribution of the habit-finger sucking; callous on finger; and malocclusion; out of the 250/1000 children divided into different age groups*



Graph 3: %age wise distribution of habit (digit sucking); callus: malocclusion based on the total number of males and females classified into each age group.

1000 children	Habit	Call Habit	Callus	Mal Occ
2-3 years		88%	100%	87%
3.1-4 years		94%	100%	97%
4.1-5		87%	100%	87%
5-6yrs		90%	100%	85%

Table 4: *The presence of callus on the fingers (100%) is an indication of presence of a digit sucking habit(94% in age group 3.1 to 4 years and 87% in 4.1 to 5 years) and the patients have supporting malocclusion (97% in 3.1 to 4 years and 85% in 5-6years), too. This observation proves that the callus on the fingers of a child could be an indicator for malocclusion.*

94% in the age group 3.1 to 4 years, had the highest presence of a co-existing digit sucking habit, among those who exhibited calluses; and 85% in the 5.1 to 6 years had the least co-relation between the presence of callus and malocclusion.

DISCUSSION

Sucking habits during the primary dentition period are reported to have limited harmful effects. Whereas, when a child engages in non-nutritive, protracted sucking habit, it often causes malocclusion. The ensuing malocclusion is characterised by proclination and spacing of the maxillary anterior teeth and the retrusion of mandibular anterior teeth, narrow and high arched maxilla together with an anterior open bite. Almost all children who have the habit of sucking their thumb, have an anterior open bite but the converse is not true [6] The habit of sucking objects especially the fingers begins at birth and continues till about 3 years of age. Peer pressure at school, then causes the discontinuation of the habit. In some cases, the habit fails to stop, and in such cases, the treatment should be started; between 4-6 years of age. [2] The differences in malocclusion are dependant more on the extent rather than the force of the habit. Thumb sucking causes the direct pressure on the teeth with a shift in the pattern of resting lip and cheek pressure. [6]

The role of digit sucking to malocclusion in 1258 children with an age range of 3-12 years was studied by Thomson and Popovich and they observed that 462 (36.72%) children had sucking habits. Bowden, in his longitudinal study on effects of digit sucking in 116 children between the ages of 2 and 8 years found a higher tendency of malocclusion in cases where the habit persisted. Larsson found in his studies, anteriorly placed maxilla and proclination of upper anteriors in relation to digit sucking. [6] Thumb sucking resulted in a major reduction in mandibular molar arch depth and inter-canine width when compared with finger sucking in a study by Yemitan T A, et. al. (2010). There was no statistically significant association between duration of digit habits and changes in dental arch depths. In addition, some changes in the dental arch parameters persisted well beyond the cessation of the digit habit. [7] After finding a strong association between sucking habits and malocclusion in deciduous dentition, Katz et al. emphasized the need for longitudinal studies to better support the clinical decisions. Few longitudinal studies associating malocclusion and sucking habits in children until 30 months of age were found in the literature.[8] Our study showed a 31% thumb sucking habit among 145/250 males in the age group 2-3 years; and a 7.6% in females among 105/250 of them. Callus was seen in 34.5% males and 9.5% females; malocclusion was observed in

18.6% males and 23.8% females. In the 3.1-4 years age group; 40.9% of the 115/250 males had the habit as 9.6% of 135/250 females; callus was seen in 41.7% males and 12.6% females; malocclusion in 40% males and 12.6% females. In the 4.1-5 years age group 9.7% males out of 134/250 cases and 11.2% out of 116/250 females had the habit, callus was seen in 9% males and 15.4% females, malocclusion in 3.7% males and 18.1% females; in the 5.1-6 years age group 4.6% males had habit and 10% females, 10% males and 5.9% had callus, and 6.9% and 6.7% had malocclusion. Therefore the observation of the callus on the digits was seen in both male and female children with habits and on clinical examination they presented with malocclusion that varied in severity.

CONCLUSION

Most parents are unaware of the harmful oral habits and their consequences. It is the dentists' duty to inform the parents of the detrimental effects of these deleterious habits and the suspected psychological bases that have been implicated in their causation. Malocclusion is difficult to be identified in their initial stages. Hence unearthing of the callus on the children's fingers could be used as a marker for an existing or impending malocclusion.

Competing Interest: The author has no competing interest regarding the article.

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