Original Article

Oral habits and its related malocclusion among 3-12 years rural and urban school children: An OPD Survey

Singhal Parul[1], Namdev Ritu[2], Dutta Samir[3], Malhotra Kamal[4]

[1,4]MDS, Department of Pedodontics and Preventive Dentistry
[2]Associate Professor, Department of Pedodontics and Preventive Dentistry
[3]Senior professor & Head, Department of Pedodontics and Preventive Dentistry

[1,2,3,4] Post Graduate Institute Of Dental sciences, Rohtak

ABSTRACT

Aim: This study evaluated the prevalence of oral habits, effects of socio-demographic variables on prevalence and their association with malocclusion.
Design: A total of 1813 students were randomly selected from rural and urban schools of Kurukshetra district of Haryana. They were examined clinically and a specifically designed proforma was filled to assess the prevalence of habits and the resultant malocclusion. The tabulated data was statistically analysed using chi square test at a significance level of 5%.
Results: Of 1813 children, males were 1052 (58.03%) and females were 761 (41.97%). A total of 307(16.93%) children had oral habits with females having higher prevalence in comparison to the males ($p<0.05$). Tongue thrusting was commonest habit (8.38%) followed by thumb sucking (2.64%), bruxism (2.09%), mouth breathing (1.99%), nail biting (0.99%) and lip biting (0.84%). Maxillary proclination and open bite were significantly associated with tongue thrusting and thumb sucking habits ($p<0.05$) whereas posterior crossbite with thumb sucking ($p<0.05$).
Conclusion: Tongue thrusting was the most prevalent habit (8.38%) and lip biting the least (0.84%). A statistically significant correlation was found between oral habits and malocclusion which increased with increase in age of children.

Keywords: habits, malocclusion, open bite, tongue thrusting,

INTRODUCTION

Habit is an automatic response to a specific situation acquired as the result of repetition and learning. At each repetition the act becomes less conscious and enters the realm of unconscious habit that serves to calm the emotional need of the child.

The sucking habit is considered normal upto three or/and four years. Most children discontinue the habit by 3-4 years of age and if continues beyond, there are chances of dento-facial changes. It is believed that the effect of the sucking habit on the dental arches and occlusion depends on several factors. The factors include- frequency and duration of habit, osteogenic development, genetic endowment, and the child state of health.[1] If the habit continues beyond a particular age they influence the facial growth, oral functions, occlusal relationships and facial aesthetics.

Adverse oral habits such as thumb sucking, tongue thrusting, mouth breathing, lip and cheek biting may produce harmful effects on the development of maxillofacial complex, facial hyper divergency resulting in anterior open bites and posterior cross bites in children.[2,3] The

Correspondence: ***Dr. Parul Singhal****; e-mail:* ***psinghal3035@gmail.com***

effects of habitual nail biting include oral carriage of enterobacteriaceae[4], small fractures at the edges of incisors, gingivitis and orthodontic complications.[5]

These abnormal habits if detected at an early stage by pedodontists or child physician, bad effects on dentition, perioral structures and craniofacial complex of developing child can be prevented. So study on these habits is important to prevent their deleterious effects on orofacial structures.

The present study is a part of an epidemiological study, carried out with an aim to investigate the prevalence of various habits, various factors affecting prevalence and its correlation with malocclusion in rural and urban school going children of 3- 12 years of age.

MATERIALS AND METHODS

The cross sectional study was carried out with 1813 sample children aged range 3-12 years; selected randomly from various schools in rural and urban areas in Kurukshetra district, Haryana, India. Prior to being finalized, a pilot study was done on 100 children where prevalence of approximately 16% was noted. At 99% significance level, 2.58 standard deviation and 20% margin of error, sample size was calculated to be 880. This study used the cluster sampling technique, hence a design effect of 2 was used to obtain the sample of approximately 1800 children. The sample was calculated using formula- z^2pq/l^2 where Z= standard deviation, p= prevalence, q=(1-p), l=margin of error.

Permission to carry out the study was obtained from the relevant schools authorities. The examination was done in well-ventilated rooms with adequate daylight in their school compounds. Detailed information regarding their name, age, sex, area of residence, number of siblings was recorded on a specifically designed proforma. The assessment of oral habits was done by asking the pretested closed ended questionnaire. Each child was seated on an ordinary table chair facing the examiner while biting in centric occlusion. Dental mirrors and probes, plastic rulers, dividers and cotton wool rolls (where necessary) were used during the examination. The interviewer himself recorded answers of questionnaire in order to minimise misinterpretation of questions & to ensure uniformity in data.

Examination-

Digit Sucking: This habit was examined first by asking the students about which finger was sucked and the manner in which it was sucked. The second step was to examine the index finger to find if there is a callus formation, cleaner fingernail or reddish color.[6]

Tongue thrust: This habit was examined by asking the students to swallow and during their swallowing their lips were pulled apart to observe his tongue position whether it protruded forward against the anterior teeth or not, and whether the teeth are at centric occlusion during swallowing or not.[7,8]

Mouth breathing: This habit was investigated according to Melsen et al [9] by a questionnaire about the cause of their mouth breathing and to observe the habit after asking the student to sit in rest position. Mirror test was used to diagnose mouth breathing There was also an extra oral examination to diagnose if there was any increase in lower facial height, incompetent lip.

Nail biting: This habit was examined according to Odenrick and Brattstrom[10] by asking whether the students bite their nail often or infrequently. They were also asked whether it was possible to see from their nails that they were nail biters. Those who were considered as nail biter bite most of their finger nails often in a sever manner.

Lip habits: These habits were investigated by examining the lips whether they were inflamed, dry and capped or not those with sound lips, which means that they did not use the habit frequently were not considered as having the habits .

Bruxism- Report of tooth grinding or tapping, presence of tooth wear seen within normal range of jaw movements or at eccentric position, presence of masseter muscle hypertrophy on voluntary contraction, complain of masticatory muscles discomfort, fatigue or stiffness in the morning, tooth or teeth hypersensitive to cold air or liquid and clicking or locking of

temporomandibular joint were considered for bruxism.

Horizontal overjet and vertical ovebite, anterior open bite, anterior and posterior crossbite were observed to check malocclusion present if any.

Children with any systemic condition that might influence the results were excluded from the study. Open bite resulting from the erupting anterior teeth was not considered in malocclusion and spacing was considered malocclusion only in permanent dentition as it is a common feature of primary dentition.

All the readings were statistically analysed for results and chi square test was done to compare the prevalence of oral habits and malocclusions.

RESULTS

The studied sample consisted of 1813 children with 1052 (58.03%) males and 761 (41.97%) females. Out of total children, 307 (16.93%) had oral habits where females (22.08%) had a major share over males (13.21%) and this association was found to be statistically significant (χ^2=24.66, p<0.05) as depicted in table 1.

The sample was divided into 3 age groups. Group I: Subjects aged 3-5 years [n=572(31.55%)], Group II: subjects aged 6-8 years [n=538 (29.67%)] and Group III with 9-12 years [n=703(38.78%)]. On comparing the different age groups, prevalence of oral habits was found to be maximum in 3-5 years age group and decreased with increase in age and these values were found to be non significant (χ^2=4.815, p>0.05). Similarly the prevalence of oral habits increased with increase in number of siblings but the results were statistically non significant (χ^2= 6.843, p>0.05).

Urban children had more oral habits (21.50%) compared to rural children (11.65%) and the results were statistically significant (χ^2= 40.12, p<0.05)(Table 1).

Tongue thrusting was found in 8.38% ; thumb sucking 2.64%; bruxism 2.09%; mouth breathing 1.99% followed by nail biting 0.99% and lip biting 0.84%. On comparing the prevalence according to sex, all the habits except bruxism had female predominance but the results were statistically non significant. On the contrary association of males with bruxism habit was significant. (p<0.05) (Table 2)

Prevalence of malocclusion in children having oral habits is depicted in table 3 and the malocclusion increased with increase in age of children but there was no significant association between the two.

Table 4 shows the relationship of oral habits with different types of malocclusions. The maxillary proclination was higher in tongue thrusting and thumb sucking when compared to nail biting (p<0.05), however, comparison with other habits gave no significant results. Retroclination of mandibular anterior teeth was found to be higher in lip biting as compared to thumb sucking but was not significant. Open bite was significantly higher in tongue thrusting and thumb sucking habit when compared to mouth breathing habit (p<0.05) while comparison of tongue thrusting with thumb sucking habit gave no significant results.

Posterior crossbite was higher in thumb sucking habit in comparison to tongue thrusting and mouth breathing habit but the difference was statistically significant only in case when thumb sucking habit was compared with tongue thrusting habit (p<0.05). V-shaped maxillary arch was significantly higher in thumb sucking as compared to mouth breathing habit (p<0.05).

Table 1: Characterstics of sample with regard to sociodemographic variables and habits

	Variable		No. of children	Percentage	Habits	No habits
1.	Age	3-5 years	572	31.55	113(19.75%)	459(80.25%)
		6-8 years	538	29.67	86(15.98%)	452(84.02%)
		9-12 years	703	38.78	108(15.36%)	595(84.64%)
2.	Sex	Male	1052	58.03	139(13.21%)	913(86.79%)
		Female	761	41.97	168(22.08%)	593(77.92%)
3.	Area	Rural	841	46.38	98(11.65%)	913(86.79%)
		Urban	972	53.62	209(21.50%)	763(78.50%)
4.	No. of siblings	0	19	1.05	3 (15.79%)	16(84.21%)
		1	438	24.16	65 (14.84%)	373(85.16%)
		2	750	41.37	121(16.72%)	629(83.87%)
		3	329	18.14	55 (16.72%)	27 (83.28%)
		4	145	7.99	25 (17.24%)	120(80.76%)
		5	132	7.29	38(28.79%)	94(71.21%)

Table 2: Prevalence of various oral habits

Habits	Total	Male	Female	χ^2
	N	n	N	
Tongue thrusting	152 (8.38%)	68 (44.74%)	84 (55.26%)	0.035
Thumb sucking	48 (2.64%)	19 (40%)	29 (60%)	1.064
Mouth breathing	36 (1.99%)	16 (44.44%)	20 (55.56%)	0.011
Lip biting	15 (0.84%)	5 (33.33%)	10 (66.66%)	0.177
Nail biting	18 (0.99%)	5 (27.78%)	13 (72.22%)	2.363
Bruxism	38 (2.09%)	26 (68%)	12 (32%)	5.14*
Total	**307**	**139**	**168**	

Table 3- Incidence of oral habits and malocclusion in different age groups.

Age	Total	Oral Habit	Malocclusion
3- 5 years	572	113	62 (54.86%)
6-8 years	538	86	61 (70.93%)
9-12 years	703	108	81 (75%)
Total	**1813**	**307**	**204 (66.44%)**

Table 4: Relationship of oral habits with different types of malocclusion:

Condition	Tongue thrusting n=152	Thumb sucking n=48	Mouth breathing n=36	Lip biting n=15	Nail biting n=18	Bruxism n=38
Anterior proclination	99*(65.13%)	34*(70.83%)	19(52.77%)	7(46.66%)	7(38.88%)	-
Retroclination of mandibular anterior teeth	-	11 (22.91%)	-	5 (33.33%)	-	-
Anterior open bite	84*(55.26%)	14*(45.83%)	8*(22.22%)	-	-	-
Posterior crossbite	3*(1.97%)	4*(8.33%)	2(5.55%)	-	-	-
V-shaped maxillary arch	-	16*(33.33%)	6(16.66%)	-	-	-
Wear facets	-	-	-	-	-	21 (55.26%)

***p<0.05 when compared between different variables**

DISCUSSION

The present study was undertaken to investigate the prevalence of various oral habits and their effects on the orofacial structures along with various factors affecting the prevalence of oral habits. Several studies[11,12,13,14,15] have proclaimed that the oral habits are considered normal in infancy and early childhood. But when these habits are carried beyond the age of 4 years they start producing harmful effects on the development of orofacial complex and this is why the age group selected in this study was 3-12 years.

Multitudinal studies have been reported in literature in relation to prevalence of oral habits. Bosnjak A et al (2002)[16] reported prevalence of 33.37% in Croatian children. However, Shetty SR and collegues (1998)[17] and Kharbanda OP et al (2003)[18] reported prevalence of 29.7% and 25.5% in South and North Indian children respectively.

The findings of this study showed that 16.93% of the children examined had oral habits of some or other kind. Oral habits among urban children (21.50%) was significantly higher ($p<0.05$) as compared to rural children (11.65%). This is in accordance with study by Kharbanda OP et al.[18] This result may be due to difference in the lifestyle of urban and rural areas, more educational pressure among school children in urban areas in comparison to rural areas. Moreover in urban areas there are nuclear families and both parents may be working, so such children brought up in hands of care takers may have feeling of insecurity and they may attempt to compensate this feeling by means of some habit.

On comparing the difference in the oral habits among boys and girls, it was found that 22.08% girls exhibited oral habits compared to 13.21% boys and this was statistically significant. Most research[12,18,19,20,21] supports the findings of our study that girls demonstrate a higher level of oral habits as compared to boys. As reported by Bayardo RE et al[22] girls show greater susceptibility towards the development of oral habits, because of the difference in the emotional level of girls as well as greater social pressures. Moreover there is disparity among boys and girls in Indian society.

Baalack & Frisk[23], Dan Zadik et al[24] showed that the habits gradually decrease with increase in age. Our study showed a similar decrease in the prevalence of oral habits with advancing age. The habits decreased from 19.75% in 3-5 years age group to 15.36% in 9-12 years age group. However this finding was not significant.

In this study, out of 19 parents who had single child, 3 children showed habits however as the number of siblings increased from 1 to 5, the prevalence of oral habits also increased but the results were statistically non significant. The development of habit can be related to the number of siblings because with increase in the number of children, the attention meted out by parents to the child divides. A child neglected by the parents may attempt to compensate his feelings of insecurity by means of a habit.

In the present study, the prevalence of oral habits was 16.93%, with tongue thrusting as the dominant habit (8.38%) and lip biting the least prevalent (0.84%). Thumb sucking constituted around (2.64%), mouth breathing (1.99%), nail biting (0.99%) and bruxism (2.09%).

The other major objective of this study was to investigate the association if any between the oral habits and the malocclusion status. In this context it was observed that a strong relationship existed between the two. Out of 307 children who had oral habits, 204 (66.44%) had malocclusion and also malocclusion increased in children with increase in age i.e from 54.86% in 3-5 years age group to 75% in 9-12 years age group.

Prevalence of malocclusion with sucking habits is positively correlated with duration and intensity of habits. Association of the sucking habit with anterior open bite and increased overjet has been shown in many studies.[11,25,26,27] An anterior open bite is the most common malocclusion associated with thumb sucking as well as tongue thrusting.

In our study prevalence of open bite was maximum in tongue thrusting (55.26%) followed by thumb sucking (45.83%) and mouth breathing (22.22%) as depicted in (table 4) but a significant

association was found with thumb sucking and tongue thrusting habits in comparison to nail biting ($p<0.05$) and this in agreement with recent reports.[28] Open bite may be the result of interference in normal eruption of incisors due to interposed thumb or tongue. Moreover separation of the jaws leads to supraeruption of posterior teeth which alters the vertical equilibrium on the posterior teeth.

Similarly, thumb sucking and tongue thrusting were significantly associated with anterior proclination of teeth when compared with nail biting habit ($p<0.05$). Anterior proclination was most prevalent in thumb sucking (70.83%) and least in nail biting (38.88%). This may be the result of pressure created by thumb and tongue against the anterior teeth in thumb sucking and tongue thrusting habits respectively. Such findings are not surprising, as numerous studies[29,30,31] have linked thumb sucking habits to malocclusion.

In the present study posterior crossbite was significantly associated with thumb sucking as compared to tongue thrusting habit ($p<0.05$) with the incidence of 8.33% and 1.97% respectively. The unbalanced forces on maxilla exerted by cheek muscles are unmet by the pressure from the lingual musculature which are normally present resulting in constricted maxillary arch. Warren JJ et al[29] supported the finding that the posterior cross bite is associated with sucking habit of 3 years or more.

Maxillary arch constriction was seen in 16.66% of mouth breathing cases and 33.33% of thumb sucking cases and the association was significant with thumb sucking ($p<0.05$). This may be because of the fact that there is lack of palatal support from the tongue as the position of the tongue is lowered down and since cheek pressure is greatest at the corners of the mouth, maxillary arch often becomes V- shaped.

The incidence of retroclination was 33.33% in case of lip biting and 23% in thumb suckers. Wear facets were seen in 55.26% of children with bruxism habits.

CONCLUSION-

The overall prevalence rate of oral habits in the present group of children was 16.93%. This data provides the base for planning the preventive strategies in eradicating the oral habits and thus reduce the occurrence of malocclusion traits, further contributing in the rise of national level of oral health.

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