ANTERIOR OPEN BITE PREVALENCE ASSOCIATED WITH ORAL HABITS IN 3-5 YEAR OLD CHILDREN FROM VITÓRIA, ES

Prevalência de mordida aberta anterior associada a hábitos orais deletérios em crianças de 3 a 5 anos de Vitória, ES

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ABSTRACT

Purpose: assess the prevalence of anterior open bite and its association with harmful habits in children from three to five years-old. **Methods:** this is a retrospective longitudinal done between July and November, 2010. Anterior open bite was diagnosed at the time of the research and introduction and duration of the habits was declared by parents using a questionnaire. Sample calculus resulted in 920 children. Schools' selection was randomized. Data was collected using a questionnaire and a clinical exam with trained examiners (Kappa 0.86).The association between variables was verified by Chi-square and Fisher exact Test. Odds Ratio was used to assess the strength of the association. **Results:** Open bite prevalence was 20%.Children with finger sucking habit had 3 times the chance of having anterior and for those that used pacifier the risk was five times higher. **Conclusion:** the prevalence of open bite was expressive. Non nutritive sucking habits were associated with malocclusion prevalence. The importance of preventive strategies to improve consciousness related to the correct use of oral habits must be remembered.

KEYWORDS: Open Bite; Malocclusion; Habits

INTRODUCTION

The open bite is defined as a deficiency in the normal vertical contact among antagonist teeth, and it might manifest in a limited region or more rarely throughout the dental arch. It consists in a discrepancy in the vertical direction, which makes it harder to be corrected and its outcomes are less stable[1,2]. If the lack of tooth contact is located in the region of incisors and/or canines, when the occlusion is in centric relation, it is then named anterior open bite (AOB)[2].

The malocclusions may be the result of hereditary and/or environmental problems. Hereditary factors are determined on conception and can only be identified the effects and not the cause[3]. Environmental and local factors are those produced by the environment such as oral habits [3-5]. In order to establish of the occlusion, one must consider all factors that are part of the growth and development of the whole child. Some systemic and genetic factors have higher influence on occlusion, but the constant general health condition is of great importance, as it will allow the sound development of the occlusion[3].

Deleterious oral habits were defined as learned patterns of muscle contraction of complex nature and unconscious character, which can act as deformer factors of bone growth and development,

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tooth positions, respiratory function and speech therefore considered important etiological factors of malocclusions[2] as they introduce strange forces in the stomatognathic system[5]. Those include the habit of biting objects, the prolonged finger and/or pacifier sucking[2, 4-8], oral breathing, abnormal functions of the tongue during swallowing, lip interposition and nail biting [2].

The association between the form of breastfeeding and the installation of oral habits and, from these, the establishment of malocclusions, has been observed in several studies[4,9,10]. Children with shorter breastfeeding have developed more frequently deleterious oral habits which increase the risk of malocclusions[4,5,9,10].

A preventive vision is needed regarding the malocclusions. Studies directed towards an early approach to problems that in case of delaying the diagnosis and treatment can result in future problems for its resolution. The early intervention means a preventive measure and avoids a subsequent complex treatment[3].

The early speech therapy in children with anterior open bite in primary dentition facilitates, in addition to other factors, the harmony of dental and facial growth[3] as they are given conditions for an adequate posture of lips and tongue, which avoids diction problems of certain phonemes with the interposition of the tongue that occurs in most of cases of anterior open bite[11]. Interdisciplinary intervention favors the comprehensive care, especially in the interlocution of orthodontics and speech therapy for the proper treatment of the dysfunction. Epidemiological studies can provide managers the extent of the problem which and allows an early intervention with simple measures possible to the public service.

The aim of this study was to evaluate the prevalence of anterior open bite and its association with deleterious oral habits in three to five year-old children from public schools in Vitoria, ES, Brazil.

METHODS

This research was approved by the Research Ethics Committee of the Federal University of Espírito Santo (642/2010).

A retrospective longitudinal study was carried out in three to five year-old children from public schools of the Vitória, Espírito Santo, Brazil, from July to November 2010. The anterior open bite was diagnosed at the time of the survey and the moment of introduction and duration of oral habits was assessed using a questionnaire.

For sample calculation, the following parameters were used: a prevalence of 35%, 95% confidence level and 5% error margin of a universe of 9,829 children. The calculation resulted in a number of 920 children, already added 20% to compensate for possible losses. The selection of the schools was made randomly. As for the total number of children examined by school, it was proportional in every region in order to ensure the representativeness of the sample.

Inclusion criteria specified were children born in the period between 2005 to 2007 who enrolled in public schools of Vitória city and with complete primary dentition. Syndromic children with manifestations related to dentition/occlusion were excluded.

The person responsible for the child's welfare was invited to participate in the survey and those who agreed signed a consent given by researcher with the semi-structured questionnaire consisting of six open-ended questions and eighteen closed ones. The questions allowed classifying the socioeconomic status (A, B, C, D, E), age, gender, and the deleterious habits – pacifier and finger sucking.

The clinical examination of the children was carried out at the schools by three trained dentists (Kappa = 0.86) and annotators. For the record of anterior open bite, a tactile and visual examination was performed with the child sitting in front of the examiner using wooden spatulas 2mm-thick, under natural light. For the definition of anterior open bite, the child occluding in centric occlusion with no apprehension of the spatula by deciduous teeth.

The detection of anterior open bite was considered to be a dependent variable; potentially explanatory variables considered for analysis were demographic – gender, age, socioeconomic status, maternal education – and also the presence of non-nutritive sucking habits, namely, finger suction and the use of pacifiers.

The analysis of the data involved descriptive statistics through frequency tables with number and percentage. The analytical statistics established percentage comparison between open bite and independent variables through Chi-square and Fisher's exact tests. The strength of the association was verified by *Odds Ratio*. The significance level was set at 5%. The statistical package software SPSS (Social Science Package Statistical) version 15 was used for this analysis.

RESULTS

The analysis of results involved 903 minor participants in the study. As it is a sample calculation of 920 subjects already increased 20% predicting possible losses, the final sample of 903 children was considered adequate.

The sample had a gender distribution close to 50%. Regarding age, the highest percentage

was found in the group of the three years-old (43,3%) and balanced in the groups at the age of four (27,1%) and five (24,9%). In this variable, 42 (4,7%) of the people responsible for the child's welfare did not report the children's age. As for level of schooling, most mothers declared having high school education (40%), 179 (19,8%) have completed elementary school, 239 mothers (26,5%) have not finished elementary school and 83 (9,2%) reported to have higher education.

The sample showed a predominance of class C (57,7%) followed by the classes B (24,4%) and D (13,8). Noteworthy the low frequency of children from classes E (2,0%) and A (2,1%). The sample was a proportional regional distribution around Vitória. In the region of Maruípe, 22,5% of children were enrolled in public schools, and the final sample (22,0%) ensured proportionality. The same was confirmed in the other regions.

The data related to the prevalence of open bite and sociodemographic characteristics of the population are described in Table 1.

The prevalence of anterior open bite was of 20%. There is a decrease in the frequency of AOB with increasing age: children at the age of five showed a much lower prevalence than those who are under three years-old, suggesting the possibility of self-correction (Table 1).

The prevalence of non-nutritive sucking habits-related AOB are described in Table 2.

Table 3 shows the association between AOB and sociodemographic variables and deleterious oral habits.

Children at the age of three presented a higher frequency of OAB compared to the four or five-year-old children. While the risk of having open bite was nearly five times higher for the children who used pacifiers, the ones with finger sucking habit had three times greater chance.

Table 1 – Anterior open bite prevalence considering sociodemographic characteristics in 3 to 5 years old students from Vitoria/ES

Characteristic	Open bite		Normal bite	
	N	%	N	%
Gender				
Female	97	21,5	355	78,5
Male	84	18,6	367	81,4
Age				
3 years old	93	23,8	298	76,2
4 years old	48	19,6	197	80,4
5 years old	31	13,8	194	86,2
Not related	9	21,4	33	78,6
Mothers' Schooling				
Illiterate or up to 3rd grade of ES	5	10,6	42	89,4
From 4th to 7th grade of Junior H S	43	22,4	149	77,6
Complete Junior High School	33	18,4	146	81,6
Complete High School	74	20,2	293	79,8
Superior complete	19	22,9	64	77,1
Not related	7	20,0	28	80,0
Socioeconomic status				
Class A	6	31,6	13	68,4
Class B	42	19,1	178	80,9
Class C	104	20,0	417	80,0
Class D	28	22,4	97	77,6
Class E	1	5,6	17	94,4
Region				
Santo Antonio	36	22,6	123	77,4
Centro	6	12,0	44	88,0
São Pedro	29	18,0	132	82,0
Jardim Camburi/Praia do Canto	24	24,0	76	76,0
Continente	19	16,1	99	83,9
Jucutuquara	21	18,1	95	81,9
Maruipe	46	23,1	153	76,9
Vitória	181	20,0	722	80,0

Legend: ES: Ellementary School; Junior H S: Junior High School

Table 2 – Anterior open bite prevalence considering non-nutritive sucking habits in 3 to 5 years old students from Vitoria/ES

Characteristics	Open bite		Normal bite	
	N	%	N	%
Digital sucking habits				
Yes	44	39,3	68	60,7
No	137	17,3	654	82,7
Pacifier sucking habits				
Yes	123	36,2	217	63,8
No	58	10,3	505	89,7

Table 3 – Association between anterior open bite and sociodemographic characteristics and sucking oral habits in students from Vitoria/ES

Characteristics	Open bite		Normal bite		p value	Odds Ratio CI
	N	%	N	%		
Gender						
Female	97	21,5	355	78,5	0,163	1,194
Male	84	18,6	367	81,4		0,861-1,655
Age						
3 years old	93	23,8	298	76,2	0,007	1,545
4 e 5 years old	79	16,8	391	83,2		1,104-2,161
SES						
A/B	48	20,1	191	79,9	0,527	1,024
C/D/E	133	20	531	80		0,693-1,451
Mothers' schooling						
Till Incomplete Junior HS	48	20,1	191	79,9	0,528	1,003
Complete Junior HS or more	126	20	503	80		0,692-1,455
Digital sucking						
Yes	44	39,3	68	60,7	0,000	3,089
No	137	17,3	654	82,7		2,026-4,708
Pacifier sucking						
Yes	123	36,2	217	63,8	0,000	4,935
No	58	10,3	505	89,7		3,476-7,006

Legend: CI: Confidence Interval 95%; SES: Socioeconomic status; HS: High school; Statistical analyzes: Chi-Square test (p≤0,05).

DISCUSSION

The malocclusions are listed in the third position of the frequency range of oral health problems in Brazil[12], mainly because of their high incidence and early-onset[13]. Among all types of malocclusions, the anterior open bite is of high prevalence in children, mainly in the ones who have deleterious oral habits[14]. The AOB is the most prevalent malocclusion in the deciduous dentition[15].

This study has found a prevalence of anterior open bite of 20%, a result that corroborates a research also carried out in Vitória, in which the prevalence was of 25,8%[16]. Similar outcomes in children of the same age have been found in other regions of the Brazil[15,17]. Other studies have found a prevalence of more than 30%[4,18,19]. A study performed in Rio de Janeiro, with children of the same age group, drew attention as the prevalence was of 63,6%, which is possibly due to the fact that the population was attended in a single health unit and very low sample (44 children)[10].

In this study, the prevalence of open bite was proportional to both genders. The three years-old group was the most affected (23,8%) compared to the groups of four years-old group (19,6%) and five year-old group (13,8%). It is possible to suggest a tendency to abandon the habits only after at the age of four with the socialization of the child. A research carried out in Bento Gonçalves, Rio Grande do Sul, also reported a slight decrease in the prevalence of anterior open bite as the age increases and higher prevalence at the age of three[14].

In agreement with other studies[4,17,20,21] the differences in variables related to gender (p = 0,163), socioeconomic condition (p = 0,527) and degree of education of the person responsible for the child's welfare (p = 0,528) were not statistically significant. An investigation conducted in Bauru has found higher prevalence in female children[19]. In relation to variables such as income and socioeconomic status, a study performed in Natal has found statistically significant differences showing higher prevalence of AOB in children in the most privileged classes[17].

It has been noticed the important role of non-nutritive sucking habits in determining the AOB[4]. The persistence of habits after the age of three is considered to be childish behavior regression and in this phase its potential is observed to cause occlusion anomalies[12].

From the orthodontic point of view, the oral habits should deserve professional attention

when presented in children over three years-old. According to the literature, the effects caused by sucking habits in children up to the age of three undergo a spontaneous correction process in most cases when there is interruption of the habit, which makes the prognosis more favourable[15,22]. With increasing age comes the reduction of habits, and the ceasing of the habit still in deciduous dentition favors self-correction[4,22].

When oral habits remain for prolonged periods, they can cause damage to the muscles and oral structures due to pressures. The earlier removal of the habits, the less likely to arise orofacial alterations[7,18,23]. However, removal of habits alone may not promote full readjustment of the stomatognathic system functions. The orofacial therapy can favor increase of muscle strength, cause positive changes in functional patterns and, therefore prevent deviations in the craniofacial development[18].

The facial imbalance is not a result from a single etiological factor, if the multifactorial in causation in any injury is taken into account. There is a facial predisposition which the deleterious habit only would trigger or intensify. Therefore, it is the interaction of habits with facial patterns that determine their influence on the face, being the habit qualification and the individual characteristics the differential factors[17].

This study has found a three-time higher risk of open bite in infants who have finger sucking habit compared to those who do not present this behavior. Another study has found that digital suction increases twice the chance to present anterior open bite[6]. In Recife, it was verified a chance six times higher to display this type of malocclusion for children with oral habits[22]. The association between persistent non-nutritive sucking habits and the presence of anterior open bite has been well-documented in the scientific literature [4,9,14,16-18,20,22].

Non-nutritive sucking habits can have physiological, emotional or acquired origin and their harms are determined by the frequency, intensity, duration[5,24] and the object used as well as the child's age at the time of the habit development[7].

Some authors claim that exclusive natural breastfeeding for periods over four months should be emphasized because it favors the correct growth and development of the face and a harmonious occlusion. Breastfeeding reduces the chances of non-nutritive sucking habits development [4,9,25-30].

This study found that children who used pacifiers had nearly five times enlarged risk to present open bite when compared to those who did not use them. Similar results have been found in another investigation conducted in the state of Espírito Santo[6] in which children who were pacifier-users were 3,25 times more likely to present anterior open bite[6]. In Natal, it was verified an 11,6 time-higher chance of presenting AOB in children with the pacifier habit[17].

Among the benefits of using the pacifier the report shows that it is primarily related to silencing the cry of the child but also inducing sleep and comfort the child. Even some mothers, who are aware of possible harms to the occlusion resulting from the pacifier use, encouraged the use[9]. The increased use of the pacifier can be attributed to the modern way of life, growing industrialization and socio-cultural aspects[16]. The adoption of non-nutritive sucking habits[4] is favored by the greater placement of women into the labour market and its consequence, the short breastfeeding duration. A study published in 2012 interviewed mothers aged 20 to 45 years-old and found no association between maternal level of education and the use of pacifier by their children. The use of feeding bottle was significantly higher in children whose mothers attended higher education. Aspects related to being a working mother or age did not influence the use of pacifier and feeding bottle by children; working in the health field was not enough to avoid the use of pacifier feeding bottle[8] by children. A study carried out in Manaus has found no difference in prevalence of the use of pacifier, feeding bottle and finger suction between children at the age of 4 to 6 enrolled in public and private schools[7].

Malocclusions are highly prevalent events and may impact the quality of life impairing social interaction and wellbeing. If the habit is not interrupted at an age that enables self-correction, anterior open bite will possibly perpetuate to the mixed dentition. The harm will be even greater to self-esteem and psychological well-being in the adolescence[31] A study has compared the normative and perceived need for orthodontic treatment in a sample of adolescents in Belo Horizonte and has found nearly 90% of young people wished to be undergo orthodontic treatment. The malocclusion can represent a social disadvantage, since facial aesthetics is considered to be a significant determinant for social interaction[31].

The delay in diagnosis and intervention may lead to future difficulties for the resolution of anterior open bite. Early intervention translates into a preventive measure able to prevent a future complex treatment[3,32] which will involve a multidisciplinary team composed of pediatric dentists, orthodontists and speech therapists, at least[7]. The early intervention aimed at eliminating oral habits contemplates the cost reduction in health[31]. In general, access barriers to orthodontic treatment are still numerous to the Brazilian population. The cost appears as the main reason why people do not perform orthodontic treatment[31], as the public

system does not provide this type of service to the population.

A preventive approach of the malocclusions[7] is needed. Exclusive breastfeeding until six months of age should be encouraged as a preventive measure for the installation of deleterious oral habits which is an additional benefit to those provided by natural feeding. Public policies are needed to allow women of all social classes to breastfeed their children until they are at least six-months old.

CONCLUSION

The prevalence of anterior open bite was significant; non-nutritive sucking habits were highly associated with the presence of malocclusions. It is emphasized the importance of preventive actions that can raise awareness about the proper use of oral habits.

RESUMO

Objetivo: avaliar a prevalência de mordida aberta anterior e a possível associação com hábitos deletérios em crianças de três a cinco anos de escolas públicas de Vitória, ES. **Métodos:** estudo longitudinal retrospectivo realizado no período de julho a novembro de 2010. A oclusopatia do tipo mordida aberta anterior foi diagnosticada no momento da pesquisa e a introdução e duração dos hábitos orais foi recuperada por meio de questionário aplicado aos responsáveis. O cálculo amostral resultou em um número de 920 crianças, já acrescido de 20% para compensar possíveis perdas. A seleção das escolas foi feita de forma aleatória. A coleta de dados utilizou um questionário semiestruturado e um exame clínico, com examinadores treinados (Kappa 0,86). A associação entre as variáveis foi verificada pelos testes Qui-quadrado e Exato de Fisher. Para avaliar a força da associação foi utilizado o OddsRatio. **Resultados:** a prevalência de mordida aberta foi de 20%. Crianças que possuem o hábito de sucção digitaltiveram uma chance 3 vezes maior de apresentar mordida aberta, enquanto que para aqueles que usavam chupeta, o risco foi 5 vezes maior **Conclusão:** a prevalência de mordida aberta anterior foi expressiva; hábitos de sucção não-nutritiva foram associados significantemente a presença de oclusopatias. Ressalta-se a importância de ações preventivas que possam conscientizar quanto ao uso correto dos hábitos orais.

DESCRITORES: Mordida Aberta; Má Oclusão; Hábitos

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