

Occlusal Characteristics of Children with Class I Malocclusion in Northeastern Brazil

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Abstract:

Introduction: Malocclusion is an oral health condition defined as an important health problem that may lead to aesthetic dissatisfaction as well as changes in speech, breathing, posture, chewing, swallowing, disorders of the temporomandibular joint and orofacial pain.

Objective: To assess the prevalence of occlusal characteristics of schoolchildren aged 10 to 12 years with Class I malocclusion.

Methodology: Quantitative cross-sectional study with a sample of 125 schoolchildren from the city of Fortaleza, located in the state of Ceará, Northeastern Brazil. Children's parents and grandparents should also be from the same state. Children were examined by a dentist-surgeon in a dental office after prior authorization from parents/legal guardians.

Results: The most prevalent occlusal characteristics were crowding (34.4%), biprotrusion (22.4%) and anterior open bite (16.8%).

Conclusion: Occlusal characteristics such as crowding, biprotrusion and anterior open bite were far more expressive than the others analyzed in the present study. The presence of malocclusion did not necessarily indicate the need for surgical intervention. However, it points out the need for preventive care by a dentist-surgeon.

Keywords: Angle Class I Malocclusion; Occlusal Characteristics; Children; Oral Health.

1. INTRODUCTION

Malocclusion is an oral health condition defined as an important health problem by the World Health Organization (WHO)¹ and that has been known in recent times as the disease of modern civilization². It is a set of significant variations in growth and morphology of the dental arches that may lead to aesthetic dissatisfaction as well as changes in speech, breathing, posture, chewing, swallowing, disorders of the temporomandibular joint and orofacial pain³.

According to Angle (1899)⁴, in Class I malocclusion there is a harmony between jaw bones, with the molars in normal occlusion position and anterior teeth in a bad position; therefore, it is common to observe the presence of alterations such as crowding, overjet, anterior open bite, biprotrusion, among others.

The literature shows prevalence rates of malocclusion between 80 and 89% in mixed dentition, where Class I was the most frequent followed by Class II (19-42%) and Class III (3- 14.6%)⁵. In Class II and Class III malocclusion there is maxillary retraction or hypoplasia, which may or may not be associated with prognathism⁶.

In this context, studies have analyzed^{7,8} and classified^{9,10} malocclusions, obtaining data and providing important rates for understanding them within the oral health context.

Furthermore, it is known that malocclusion ranks third in priority among dental problems of global public health after dental caries and periodontal disease respectively¹¹.

In this perspective, the present study aimed to assess the prevalence of occlusal characteristics of schoolchildren aged 10 to 12 years with Class I malocclusion in Northeastern Brazil.

2. METHODOLOGY

This quantitative cross-sectional study originated from a research that carried out a clinical analysis of 264 schoolchildren aged 10 to 12 years from the city of Fortaleza, Ceará, Northeastern Brazil.

The clinical examination of schoolchildren was performed by a single examiner. According to Angle's classification, a total of 125 children had Class I malocclusion.

Inclusion criteria were schoolchildren born and raised in the state of Ceará whose parents and grandparents were also from the same state. Additionally, they should present Angle's Class I Molar Relationship. Patients without history of orofacial surgery or orthodontic treatment.

Clinical examination was carried out with each child after obtaining written consent from their parents/legal guardians who authorized the examination. In addition, schools also had to accept to participate in the study.

Examinations were carried out at the schools by a dentist-surgeon under natural light using a wooden tongue depressor. All schoolchildren underwent clinical examination sitting in their own chair outside the classroom.

The dental characteristics analyzed were crowding, biprotrusion, lack of space, deep bite, edge-to-edge bite, overjet, spacing, anterior open bite, right side posterior crossbite, left side posterior crossbite, anterior crossbite and posterior crossbite.

The following variables were defined according to the literature¹²: crowding (when there is disharmony between the size of the teeth and the space available for them); bi-protrusion (when there is proclination in the anterior region of both arches); anterior open bite (when there is no vertical overlap); spacing (when there is a lack of contact between the teeth – occurrence of localized or generalized diastema); lack of space (when the teeth in occlusion are aligned but there is not enough space for the teeth that will erupt); edge-to-edge bite (when there is no overlap between the upper and lower incisors); deep bite (when the vertical overlap between the incisors is greater than one-third of the tooth crown); maxillary protrusion (when the upper central incisors are proclined in relation to their bony base); posterior crossbite (when buccal cusps of one or more upper teeth occlude in the central fossa of one or more lower teeth; it is classified into unilateral (only one side) and bilateral (both sides)).

The research that originated the present study was approved by the Research Ethics Committee of the University of Fortaleza under Opinion No. 272/2004.

3. RESULTS

The data collected during the clinical examination of patients are described in Table 1, which shows the prevalence of occlusal characteristics of the study population. The results demonstrated that the most prevalent occlusal characteristics were – in descending order – crowding, bi-protrusion, anterior open bite and lack of space, with significant rates compared to the other characteristics listed.

Table1. *Distribution of occlusal characteristics in schoolchildren with Class I malocclusion*

Intra-arch Malocclusion Relationship	n	%
Crowding	43	34.4%
Biprotrusion	28	22.4%
Anterior Open Bite	21	16.8%
Lack of space	7	5.6%
Right Side Posterior Crossbite	5	4%
Left Side Posterior Crossbite	4	3.2%
Overjet	4	3.2%
Spacing	4	3.2%
Anterior Crossbite	3	2.4%
Posterior Crossbite	3	2.4%
Deep bite	2	1.6%
Edge-to-edge bite	1	0.8%
Total	125	100%

Source: *Research data*

4. DISCUSSION

Of the 264 schoolchildren who participated in the present study, 125 had malocclusion. Although it is a significant rate, a high percentage is expected in this age group given the intense dental changes occurring in this period. Epidemiological studies indicate that the majority of children with mixed dentition have some kind of morphological deviation in occlusion, with rates ranging from 66 to 96.8%¹³⁻¹⁷. Such morphological deviations are defined as malocclusion.

In the current sample, the most frequent malocclusion was crowding, which was found in 34.4% of the cases and is within the range reported by other studies – 18.05% to 87%¹⁸⁻²¹. This prevalence was already expected because, according to Peres⁹, such malocclusion is most often associated with Class I molar relationship. However, recent studies conducted in Nigeria by Costa²² and in India by Narayanan²³ demonstrated a low occurrence of this problem – 5% and 3.2 %, respectively.

Biprotusion was the second most prevalent problem in the present research occurring in 22.4% of the sample and the third highest prevalence found in the sample of another study¹⁹. Ramos²⁴ points out that the incidence of this type of malocclusion is more common among black people. This may be due to the considerable ethnic variability between different parts of the country, which is one of the factors that may explain the findings in the aforementioned studies.

The present study presented a significant rate of 16.8% of anterior open bite. Such rate is similar to those found in the literature: 12.1%²⁵, 14.8%²², 22.6%²⁶ and 26%¹⁹. However, other studies have presented lower rates of 6.1%¹⁸ and 6.98%²³. Thus, the identification of the etiologic factors in this group would be necessary for the control of this problem given the high rates found in the present research.

Of all children examined, 5.6% presented lack of space, which was the fourth most prevalent malocclusion and made this group more susceptible to crowding because primary teeth are natural dental space maintainers²⁷. Thilander²⁸ reports that the lack of space can be explained by the high incidence of dental caries and extraction of primary molars, which favored migration of the first permanent molar, tooth inclinations and rotations.

In the sagittal plane, the alteration found was the protrusion of the upper teeth ("overjet"), which appeared in 3.2% of the study population. However, contradictory results were found by Almeida¹³, Mansur²⁹ and Martins³⁰, whose results may have been different because they included people with Class I, II and III malocclusion. Garbien¹⁸ reports that overjet is induced by external factors such as habits, posture of the lips, mouth breathing, among others; therefore, the absence of these characteristics may have influenced the results of the present study.

The presence of anterior crossbite occurred in 2.4% of the sample. Prevalence rates of anterior crossbite range from 2.2% to 12% in some studies^{5,17,32} depending on the age and ethnicity of the children studied and the inclusion of edge-to-edge incisor relationship.

In the transverse plane, right side and left side posterior crossbite and posterior crossbite (bilateral) occurred in a small percentage: 4%, 3.2% and 2.4%, respectively. Authors^{32,33,35} have pointed out higher rates of posterior crossbite in primary and mixed dentition ranging from 8% to 16%. A study has demonstrated that the large ethnic variability between different parts of the country coupled with environmental influences can change the facial profile³⁵.

Spacing was prevalent in 3.2% of the sample. This prevalence was different in other studies that pointed out rates ranging from 35.05%³⁶ to 88.68%¹⁹. Borges³⁷ mentions that excessive spacing between teeth is not commonly found in mixed dentition, except when there is a protrusion of incisors, which confirms the analysis of the present research.

Deep bite was less frequent in the study sample; it was found in only 1.6% of the children examined and is in line with the findings of another study³⁸. The low percentage of 0.8% of edge-to-edge bite was expected as these occlusal characteristics are more commonly found in patients with class II and III malocclusion, respectively.

The assessment of oral abnormalities presented in the present study is a constant challenge given the aesthetic dissatisfaction and/or compromised function of the stomatognathic system^{3,4,7,8}. Therefore, the dentist-surgeon plays a key role in the detection and early diagnosis of these oral abnormalities and therefore should take an active approach focused on the prevention and rehabilitation of such factors that have an impact on the daily lives of patients.

5. CONCLUSION

Occlusal characteristics such as crowding, biprotrusion and anterior open bite were far more expressive than the others analyzed in the present study.

Despite the significant number of children affected by some type of malocclusion, it is important to note that these anomalies did not necessarily indicate a need for some intervention. However, the detection and early diagnosis of these oral conditions are crucial and the dentist-surgeon must take an active approach focused on the prevention of such factors that may have an impact on the daily lives of patients.

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