

Artigo Original

Prevalência, Severidade e Necessidade de Tratamento das Maloclusões e seu Impacto Negativo na Qualidade de Vida dos Adolescentes

Prevalence, Severity and Need for Treatment of Malocclusions and their Negative Impact on the Quality of Life of Adolescents



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ABSTRACT

Objective: To investigate the prevalence, severity, and need for treatment of malocclusions and their impact on the oral health-related quality of life (OHRQoL) in 12-year-old teenagers. **Material and methods:** Cross-sectional study performed with 453 adolescents. Malocclusion was evaluated using the Dental Aesthetics Index (DAI), and Child Perception Questionnaire 11-14 (CPQ11-14) was used to assess the OHRQoL. CPQ11-14 scores were compared according to gender and presence of malocclusion using Mann-Whitney test. Analysis according to the severity of malocclusion was performed using Kruskal-Wallis test. **Results:** The prevalence of defined or higher malocclusion was 53.86% while very severe or disabling malocclusion with essential need for treatment was observed in 18.76%. There was a positive correlation ($r=0.7006$; $p<0.0001$) between the DAI and CPQ11-14 scores. Adolescents with malocclusion had higher total CPQ11-14 scores ($p<0.05$) as well as emotional and social well-being domains scores than those without malocclusion. The total CPQ11-14 score was higher ($p=0.0251$) in women ($16.91+10.52$) than in men ($14.61+9.70$). **Conclusion:** The prevalence of malocclusion was high, with a predominance of defined malocclusion requiring elective treatment. Malocclusion had a negative impact on the OHRQoL, especially regarding the emotional and social aspects.

Keywords: Malocclusion; Epidemiology; Public Health; Quality of Life; Adolescent.

RESUMO

Objetivo: Investigar a prevalência, severidade e necessidade de tratamento das maloclusões e seu impacto na qualidade de vida relacionada à saúde bucal (QVRSB) em adolescentes de 12 anos.

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Materiais e métodos: Estudo transversal realizado com 453 adolescentes. A malocclusão foi avaliada pelo Índice de Estética Dentária (DAI) e o Questionário de Percepção da Criança 11-14 (CPQ11-14) foi utilizado para avaliar a QVRSB. Os escores do CPQ11-14 foram comparados segundo o sexo e presença de malocclusão pelo teste de Mann-Whitney. A análise segundo a severidade da malocclusão foi realizada pelo teste de Kruskal-Wallis. **Resultados:** A prevalência de malocclusão definida ou superior foi de 53,86%, enquanto a malocclusão muito grave ou incapacitante com necessidade essencial de tratamento foi observada em 18,76%. Houve correlação positiva ($r=0,7006$; $p<0,0001$) entre os escores DAI e CPQ11-14. Adolescentes com malocclusão apresentaram escores totais do CPQ11-14 mais elevados ($p<0,05$), bem como escores dos domínios de bem-estar emocional e social, do que aqueles sem malocclusão. A pontuação total do CPQ11-14 foi maior ($p=0,0251$) nas mulheres (16,91+10,52) do que nos homens (14,61+9,70). **Conclusão:** A prevalência de malocclusões foi elevada, com predomínio de malocclusões definidas com necessidade de tratamento eletivo. A malocclusão impactou negativamente a QVRSB, principalmente nos aspectos emocionais e sociais.

Palavras-chave: Malocclusão; Epidemiologia; Saúde Pública; Qualidade de Vida; Adolescente.

INTRODUCTION

Malocclusion is considered a public health problem because of its high prevalence, the possibility of its prevention and treatment, and its biological and emotional effects on the individual¹. Such abnormalities are due to changes in dental positions and growth and in the development of the maxillary and mandibular bones that usually manifest during childhood and adolescence and can result in functional, esthetic, and psychosocial damage².

Studies have shown that the prevalence of malocclusions in adolescents is high, reaching approximately 67% in the United States, 79% in China, and 66% in Brazil³⁻⁵. Orthodontists emphasize that reestablishing the stomatognathic system functionality should be the goal for the orthodontic intervention. However, social and psychological factors influence the real reasons for which individuals seek treatment⁶. This fact can be explained by the understanding that health includes physical, mental, and social well-being and is not only the absence of a disease; therefore, it is necessary to establish a link between the clinical diagnosis and the individual's perception^{5,7}.

There is evidence that poor oral health conditions negatively affect the quality of life of children and adolescents, including their social and emotional well-being⁸. Such negative impacts may influence their school performance and absence rates. Studies have shown that oral diseases in children and adolescents may be associated with a 44% reduction in school performance and 57% decrease in school attendance. From the point of view of parents or caregivers, their lack of oral health perception in children and adolescents is associated with a 51% decrease in school performance, while school attendance is negatively affected by 35%⁹. In some countries such as the U.S., the lack of access to dental treatments is one of the main indicators for assessing school absence¹⁰.

The relationship between the mentioned facts can be explained because during adolescence, there are new social integrations, various psychological changes, and bodily transformations. In this context, the body image greatly affects individuals, including in an emphatic way the oral-facial complex. These factors can have negative impacts since this is a period of life in which individuals are morbidly apprehensive about social acceptance and the way they are seen by others is a factor of constant concern¹¹. This phase is accompanied, in several situations, by moral harassment ("bullying"): an event classified as a subtype of violence, marked by repulsive attitudes committed by one or more people to the detriment of others, a fact characterized by unequal and disproportionate power¹²⁻¹⁴. For most adolescents, the concept of oral health is still confusing and there is usually a dissociation from the perspective of general health. Generally, they consider their oral health unsatisfactory, implying that there is a lack of health promotion and prevention policies in the private and governmental sectors. Such an issue can be mitigated with transformative measures aimed at rectifying the role of adolescents in the social context so that they move from indifference to being the propagators of knowledge¹⁵.

Studies emphasize that due to the high frequency of occlusal changes and the psychological and social impact it has on adolescents, epidemiological surveys and evaluations of the oral health-related quality of life (OHRQoL) are of fundamental importance for planning and implementing orthodontic treatments in public and private health settings^{7,16}. Few studies have investigated malocclusions from a behavioral, social, and emotional perspective; however, research suggests that moral harassment among adolescents has dentofacial features, such as the space between the teeth, absence, shape, color, and dental prominence, as considerable factors for its occurrence¹⁷. On the other hand, there are studies carried out with children and adolescents in Canada and Mongolia in which there was no significant association between malocclusion and OHRQoL^{18,19}. This disagreement may be due to differences in the age of the studied group or the local characteristics of the populations, showing the complexity of the relationship between malocclusion and quality of life in young people^{18,19}. Thus, the associations between malocclusion and OHRQoL need to be assessed in specific locations, since the results observed in one population cannot necessarily be extrapolated to another.

Considering the full range of circumstances surrounding malocclusions, the objective of this study was to investigate the presence, severity, and need for treatment of malocclusions and to analyze their impact on the oral health-related quality of life (OHRQoL) in 12-year-olds teenagers.

MATERIAL AND METHODS

This was a cross-sectional epidemiological study. The study population consisted of 12-year-old students of both gender who were regularly enrolled in 14 public schools in a medium-sized municipality in the State of São Paulo, Brazil, in 2019. This age was chosen because it is an index age, recommended by the World Health Organization for evaluation in epidemiological surveys of oral health, making it possible to compare the results with other national and international studies²⁰. In addition, it is likely that at this age all permanent teeth, with the exception of third molars, have already erupted.

Considering that the proportion of individuals in this population with malocclusions was unknown and adopting a margin of error of 5% and reliability of 95%, the minimum sample size was determined to be 400 individuals. In addition, considering the possible loss of sample follow-up, 53 adolescents were added to the sample. Therefore, a total of 453 adolescents were examined in this study. A convenience sampling was carried out, so that all students regularly enrolled in public schools, of both sexes, aged 12 were invited to participate in the study. Students who were undergoing orthodontic treatment at the time of data collection, those whose legal guardians did not sign the informed consent form, those who did not agree to participate in the tests and those who were absent after three attempts to collect data were excluded of the study.

The presence and severity of malocclusions as well as the need for orthodontic treatment were assessed by a single previously calibrated researcher using the Dental Aesthetics Index (DAI)²⁰. The DAI evaluates 10 occlusal characteristics and the final DAI scores are categorized in 4 levels of malocclusion severity: a score lower than or equal to 25 (without abnormality or mild malocclusion), a score between 26 and 30 (defined malocclusion), a score between 31 and 35 (severe malocclusion) and a score greater than 35 (very severe or disabling malocclusion). The criteria used to assess occlusal characteristics are as follows: 1) Absence of incisor, canine and premolar – It was considered the number of permanente incisors, canines and premolars absent in the upper and lower arches. In this index, 10 teeth must be present in each arch, so if there are less than 10, the difference is the number of absences. The absence history of all anterior teeth was verified in order to really know if extractions were made with esthetic purpose. The teeth were not recorded as missing if the spaces were closed; if a primary tooth was in the position of his successor that had not yet erupted; or if an absent incisor, canine or premolar were replaced with fixed prostheses. 2) Crowding in the incisor region - The incisors region of the upper and lower arches were examined for verification of crowding. The crowding in the incisor region is the condition in which the space between the right and left canine is insufficient to accommodate all four incisors in normal alignment. The crowding in the incisor region was recorded as follows: 0 = No

crowding; 1 = Only one region with crowding; 2 = Both regions with crowding. 3) Spacing in the region of incisors - For this condition the upper and lower arches were considered. As determined, when it is measured in the incisor region, spacing represented the condition in which the total available space between the right and left canines exceeds the required space to accommodate all four incisors in normal alignment. If one or more incisors had an interproximal surface without interdental contact, the region was recorded as having spacing. The space created because of a recently exfoliated deciduous tooth was not considered, if it was clear that the replacement by the permanent tooth would happen soon. The record considered: 0 = Without spacing; 1 = One region with space; 2 = Both regions with spaces. 4) Diastema - The space in millimeters between the contact points of the mesial surfaces of maxillary central incisors were considered. 5) Anterior jaw misalignment – It was considered the positions and rotations in relation to normal alignment of teeth for the four incisors in the upper jaw. The misalignment location between adjacent teeth was measured by the WHO periodontal probe. The probe point was placed in contact with the tooth's buccal surface that is positioned more lingually or rotated while the probe is maintained in a direction parallel to the occlusal plane and in a 90 degrees angle to the normal arch line. The misalignment in millimeters was estimated by the probe marks. 6) Anterior mandibular misalignment - The measurement was considered as described for the upper arch. 7) Anterior maxillary overjet - Was measured as the horizontal relationship between the upper and lower incisors with the teeth in centric occlusion. The distance between the labial-incisal edge of most prominent maxillary incisor and the incisor buccal surface was measured with the corresponding periodontal probe parallel to the occlusal plane. For edge to edge incisor occlusion, the score was considered zero. 8) Anterior mandibular overjet - The mandibular overjet was recorded when a lower incisor presented with anterior or buccal protrusion in relation to the opposite upper incisor, or in crossbite. The measurement was performed in the same manner as for the upper arch. 9) Vertical anterior open bite - Was considered as the lack of vertical overlap between any opposing incisor pair with the measurement performed with the periodontal probe. 10) Anteroposterior molar relationship - Evaluation often based on the upper and lower first permanent molar relationship. When the evaluation could not be made based on the first molars, due to the absence of these teeth or other reasons (dental cavity, incomplete eruption), the relationship between canines and premolars was assessed. The right and left sides were evaluated with the teeth in occlusion and only the largest deviation from the normal molar relationship was recorded, considering the indexes: 0 = Normal; 1 = Half cusp: The first molar displaced half cusp mesial or distal to the normal occlusal relationship; 2 = One cusp: The first molar displaced a whole cusp or more to the mesial or distal of normal occlusal relationship. Regression equation to calculate the DAI score: (visible missing teeth x 6) + (crowding) + (space) + (diastema x 3) + (anterior maxillary misalignment) + (anterior mandibular misalignment) + (anterior maxillary overjet x 4) + (anterior mandibular overjet x 4) + (anterior vertical open bite x 4) + (anteroposterior molar relationship x 3) + 13.

The examinations were carried out in the schoolyard, which was adequately ventilated and had natural light, using the WHO periodontal probe and flat mouth mirror. Prior to the collection of research data, a pilot study was conducted with a sample of 20 volunteers not included in the study sample, to assess the need for adjustments to the data collection instrument and the researcher's calibration. The intra-examiner Kappa coefficient obtained through a study composed of theoretical and practical phases of the codes and criteria of the index used was 0.90.

After the clinical examinations were performed individually and confidentially in an isolated room, the reduced and validated version of the Child Perception Questionnaire for young people aged 11 to 14 years (CPQ₁₁₋₁₄), used to assess the OHRQoL was applied²¹. The self-administered questionnaire is composed of 16 questions distributed into 4 domains: oral symptoms, functional limitations, emotional well-being, and social well-being. Each domain had 4 questions with 5 multiple-choice answer options in a Likert scale format, with scores varying from never (0); once or twice (1); sometimes or often (2); almost every day (3); every day (4).

The normality of the CPQ₁₁₋₁₄ questionnaire total score and that of its domains was analyzed using the D'Agostino-Pearson test. Comparisons of the CPQ₁₁₋₁₄ questionnaire score according to gender and the presence of malocclusion were done using the Mann-Whitney test. The comparative analysis of the

total CPQ₁₁₋₁₄ questionnaire score and its domains according to the different degrees of malocclusion severity was performed using the Kruskal-Wallis test. The correlation between the DAI scores and the CPQ₁₁₋₁₄ questionnaire scores was analyzed using the Spearman correlation test. The significance level adopted was 5% and the analysis was performed using Bioestat software version 5.0.

This study was approved by the Committee on Ethics in Research with Human Beings - Brazilian National Health Council (CAAE Protocol No. 11036219.9.0000.5420) and conducted following the Declaration of Helsinki. The term of free and informed consent was obtained from the legal guardians of the students and the adolescents expressed their agreement to participate in the research through the free and informed assent form.

RESULTS

A total of 453 12-year-olds were evaluated, 224 males (49.45%) and 229 females (50.55%). As shown in Table 1, the prevalence of malocclusion, considering the degrees of defined or higher malocclusion severity was 53.86%. The condition of very severe or disabling malocclusion, which required orthodontic treatment, was observed in less than one-fifth of adolescents (18.76%). There was a significant positive correlation ($r=0.7006$; $p<0.0001$) between the scores of the DAI and the CPQ₁₁₋₁₄ questionnaire.

Table 1. Absolute and percentage distribution of adolescents according to the severity of malocclusion and need for orthodontic treatment. Araçatuba, São Paulo, Brazil, 2019.

Severity of malocclusion	Orthodontic treatment need	n	%
Without abnormality or mild malocclusion (DAI score ≤ 25)	No or little need	209	46.14
Defined malocclusion (DAI score 26 to 30)	Elective	93	20.53
Severe malocclusion (DAI score 31 to 35)	Highly desirable	66	14.57
Very severe or disabling malocclusion (DAI score > 35)	Required	85	18.76
Total		453	100.00

Adolescents with malocclusion had significantly higher total CPQ₁₁₋₁₄, emotional and social well-being scores compared to individuals without alterations (Table 2).

Table 2. Scores of the total CPQ₁₁₋₁₄ questionnaire and its domains according to the presence of malocclusion among adolescents in the public school system. Araçatuba, São Paulo, Brazil, 2019.

Variable	Without malocclusion		Present malocclusion	
	Mean	Standard deviation	Mean	Standard deviation
Oral symptoms	4.99	2.97	5.50	2.97
Functional limitations	3.92	3.24	4.27	3.19
Emotional well-being	3.28	3.68	4.63*	4.25
Social well-being	1.77	2.43	3.00*	3.10
Total CPQ 11-14	13.83	9.86	17.58*	10.36

* $p<0.05$ compared to the group without malocclusion. Mann-Whitney test.

Considering the different degrees of malocclusion severity, we observed that regarding total CPQ₁₁₋₁₄ and the emotional well-being domain, only individuals with very severe or disabling

malocclusion had significantly higher scores compared to individuals without malocclusion. Regarding the social well-being domain, individuals with severe and very severe or disabling malocclusion had higher scores compared to individuals without alterations (Table 3).

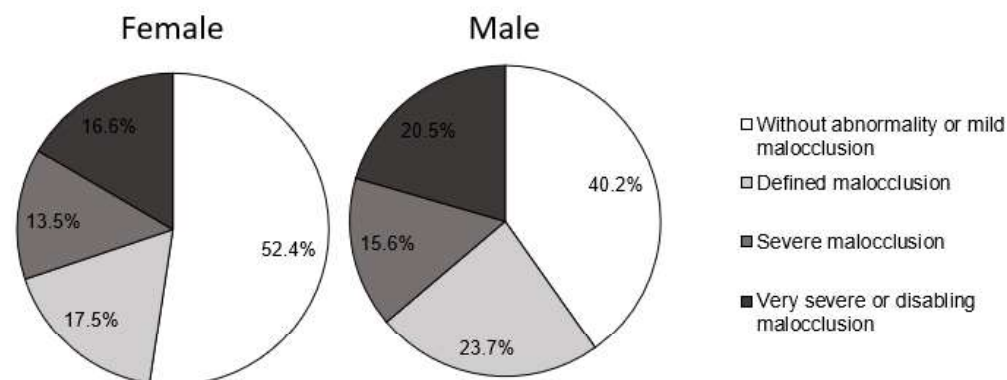
Table 3. Scores of the total CPQ₁₁₋₁₄ questionnaire and its domains according to the severity of malocclusion among adolescents in the public school system. Araçatuba, São Paulo, Brazil, 2019.

Variable	Without abnormality or mild malocclusion		Defined malocclusion		Severe malocclusion		Very severe or disabling malocclusion	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Oral symptoms	4.99	2.97	5.60	2.62	5.11	2.79	5.70	3.44
Functional limitations	3.92	3.24	4.41	3.14	4.26	3.18	4.13	3.29
Emotional well-being	3.28	3.68	3.96	3.99	4.59	4.23	5.38*	4.47
Social well-being	1.77	2.43	2.56	2.91	3.18*	3.20	3.34*	3.22
Total CPQ ₁₁₋₁₄	13.83	9.86	16.46	9.53	17.33	10.75	19.00*	10.91

* $p < 0.05$ compared to the the group without abnormality or mild malocclusion. Kruskal-Wallis test.

It was observed that among the 229 female adolescents, the majority ($n=120$) presented no occlusal abnormality or mild malocclusion, while among the 224 male adolescents, the majority ($n=134$) presented malocclusion of severity classified as defined or higher (Figure 1). However, the total CPQ₁₁₋₁₄ questionnaire score was significantly higher ($p=0.0251$) in female adolescents (mean=16.91; standard deviation=10.52) compared to the males (mean=14.61; standard deviation=9.70).

Figure 1. Percentage distribution of malocclusion severity among adolescents according to gender. Araçatuba, São Paulo, Brazil, 2019.



DISCUSSION

In this study, a high prevalence of malocclusion was observed among adolescents, affecting more than half of the young people examined and harming their quality of life. Considering the whole context involving oral health, the high prevalence and severity of malocclusions and the need for treatment has

fostered scientific discussions on the social and psychological consequences that should be considered in the search and application of the material, human, and technological resources, that aim to offer resolvability and a better quality of life to those affected by the dysfunction.

This study showed that malocclusions had negative consequences on the OHRQoL, mainly on the emotional and social aspects. Interestingly, although there was a higher prevalence of malocclusions among men, it was the young women who presented the highest scores on the CPQ₁₁₋₁₄ questionnaire, suggesting a greater negative impact of this oral problem on the quality of life in this population stratum. This fact may be related to cultural factors in that male individuals are typically directed to contain their emotions more strongly, thus forming individuals with difficulties in expressing their feelings faithfully²². It should also be considered that oral health problems do not necessarily or equally affect the quality of life of the affected individuals, evidencing the dynamic and complex structure of the factors related to the quality of life²³.

The most recent national oral health epidemiological survey conducted in Brazil on 12-year-olds using the same index for evaluating malocclusions found that 37.7% of participants had some type of malocclusion, consisting of 20.0% defined, followed by 11.2% severe, and 6.5 % very severe or incapacitating²⁴. In comparison to these findings, the results of our study showed a higher prevalence of adolescents with malocclusions, highlighting the proportion of 2.6 times higher individuals with very severe or disabling malocclusions. It is possible to suggest that this difference may be due to the fact that the sample of the present study is composed exclusively of students from public schools, who may have a worse socioeconomic condition in relation to students from private schools. A study conducted with children and adolescents in the state of Ceará, Brazil, showed that the prevalence of severe and very severe malocclusion was 20% and that the private school behaved as a protective factor²⁵. Other studies also show the relationship between socioeconomic conditions and the occurrence of malocclusion in adolescents and young adults^{26,27}. Different results were found in another epidemiological study carried out in Brazil using the Angle classification, which found that 91.11% of children aged 12 years had some type of malocclusion, of which 56.83% were class I; 24.08% were class II, and 10.20% were class III²⁸. It should be noted that the use of different malocclusion indices in epidemiological studies makes it difficult to compare the prevalence and severity of the disease. The difficulty in establishing a standard index for analyzing malocclusions can also be noted in the 5th edition of the WHO Manual for Oral Health Surveys, since it does not present an index for evaluating this condition²⁹.

Studies conducted to evaluate the relationship between the severity of malocclusions and OHRQoL using different indexes, such as the Dental Aesthetics Index (DAI), Index of Orthodontic Treatment Need (IOTN), and Index of Complexity Outcome and Need (ICON) have shown that physical, social, and psychological aspects are severely affected in untreated individuals³⁰. These results corroborate the findings of this study that found negative impacts on the OHRQoL of adolescents with malocclusions, especially in the emotional and social domains. The findings of the present study are in agreement with the results of researches carried out on adolescents from different countries, such as Brazil, Lebanon and Mexico, that have shown that young people with malocclusions and dental aesthetic problems have higher CPQ₁₁₋₁₄ scores³¹⁻³³. Thus, CPQ₁₁₋₁₄ has shown satisfactory psychometric properties and the ability to distinguish young people with different oral conditions³¹. However, a study conducted in 389 Brazilian school children found that although a high prevalence of malocclusions was found, there was no impact on the OHRQoL of this population. This divergence of results may be due to the difference in the collection instrument for evaluating OHRQoL because Oral Impacts on Daily Performance (OIDP) was used, while CPQ₁₁₋₁₄ was used in the present study³⁴.

In addition, it is possible to suggest that patterns of facial harmony may vary according to different locations and cultures. Data from SB Brasil 2010 demonstrate the existence of regional differences in the prevalence of very severe malocclusions at 12 years of age, identifying a variation of 5.3% in the Southeast to 9.1% in the Northeast of the country. In the age group 15 to 19 years old, the difference becomes even more evident, with a variation from 6.4% in the South to 12.3% in the North of the country²⁴. In this context, it should be noted that the facial changes resulting from malocclusions may

influence individuals' social acceptance differently, considering that the perception of aesthetics and the need for treatment can be influenced by factors such as sex, age and social factors^{35,36}.

The determination of the need for orthodontic treatment is usually done in a normative manner using objective clinical criteria based on measures such as tooth positioning and bone base relationship. However, the patient's opinion significantly affects the demand for orthodontic treatment by linking malocclusion-related conditions with the esthetic perception of the individual³⁷. Therefore, subjective factors such as the individual's self-perception, in addition to objective factors, are considered fundamental to complement the assessment criteria and treatment priority for occlusal changes³⁸.

The contribution of this study to the understanding of the OHRQoL in the adolescent population is relevant because studies showed that individuals affected by malocclusions and who have suffered from bullying were three times more likely to have an unsatisfactory quality of life, with severe consequences that can generate conditions leading to depression, social isolation, and suicide, in more severe cases¹². Similarly, a study conducted on adolescents in South Korea showed that their OHRQoL was negatively affected by the presence of malocclusions, emphasizing that early orthodontic therapy can play an important role in preventing the consequences of occlusal dysfunction³⁹. It is possible to suggest that the findings of the present study provide relevant evidence in the context of the overestimation of the "perfect image", present in the current era of social networks, which makes the pursuit of facial aesthetics a priority in the lives of many adolescents, affecting the emotional state and being able to trigger emotional disorders and reduced quality of life. Thus, considering the speed of changes in trends that influence aesthetic patterns in the view of adolescents, it is important to carry out continuous studies to assess the relationship between malocclusions and OHRQoL in this population.

Knowledge of the relationship between the negative impact on the quality of life and malocclusions is an important factor in determining the need for orthodontic treatment of different population groups, especially within public health policies⁴⁰. Therefore, it is noted that the psychological and social sufferings observed in individuals affected by the problem deserves to be considered in determining the need for orthodontic treatment. In this study, no significant alteration due to the presence of malocclusions was observed in the CPQ₁₁₋₁₄ scores, referring to the domains of oral symptoms and functional limitations of adolescents, even among those with severe or disabling malocclusions. This may be due to the young age of the adolescents, as it is expected that the stomatognathic and joint symptoms resulting from occlusal changes manifest themselves only after years of skeletal and occlusal imbalance⁴¹.

The findings of this study cannot be generalized to other populations with different physical and cultural characteristics, which may be considered as a limitation of the study. However, it presents important results on the factors that should be considered in the development of orthodontic diagnostic and therapeutic strategies. The convenience sampling and study design can also be considered limitations of the present research, as in a cross-sectional study, exposure and outcome are assessed simultaneously, making it difficult to establish a temporal relationship between exposure and outcome.

The significant outcome observed concerning the presence of malocclusions and their negative impact on the quality of life of those affected is emphasized, which can contribute to optimizing the allocation of scientific, financial, and human resources for the treatment of malocclusions in the public and private spheres.

CONCLUSION

The presence of malocclusions in the group studied was high, with a predominance of the severity category classified as defined malocclusion that required elective treatment. These changes negatively affected the OHRQoL, especially with regards to the emotional and social aspects.

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Contributions

CSG: Substantial contributions to the conception or design of the work; analysis, or interpretation of data for the work; Drafting the work or revising it critically for important intellectual content.

SASM: Substantial contributions to the conception or design of the work; analysis, or interpretation of data for the work; Drafting the work or revising it critically for important intellectual content.

AJIG: Substantial contributions to the conception or design of the work; analysis, or interpretation of data for the work; Drafting the work or revising it critically for important intellectual content.

TAS: Substantial contributions to the conception or design of the work; analysis, or interpretation of data for the work; Drafting the work or revising it critically for important intellectual content.

FYC: Substantial contributions to the conception or design of the work; analysis, or interpretation of data for the work; Drafting the work or revising it critically for important intellectual content.

Declaration of Interest

No conflict of interest.

REFERENCES

1. Petersen PE. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century – the approach of the WHO Global Oral Health Programme. *Community Dentistry and Oral Epidemiology*. 2003 Dec; 31(Suppl 1): 3-23. DOI: [10.1046/j..2003.com122.x](https://doi.org/10.1046/j..2003.com122.x).
2. Jokovic A, Locker D, Stephens M, Kenny D, Tompson B, Guyatt G. Validity and reliability of a questionnaire of measuring child oral health-related quality of life. *Journal of Dental Research*. 2002 Jul; 81(7): 459-463. DOI: [10.1177/154405910208100705](https://doi.org/10.1177/154405910208100705).
3. Asiri SN, Tadlock LP, Buschang PH. The prevalence of clinically meaningful malocclusion among US adults. *Orthodontics & Craniofacial Research*. 2019 Nov; 22(4): 321–328. DOI: [10.1111/ocr.12328](https://doi.org/10.1111/ocr.12328).
4. Xu TT, Zeng LW, Wen JQ, Wan L, Ou XY. Prevalence of malocclusion among 5 387 12- to 14-year-old adolescents in Jiangxi province, China: an epidemiological study. *West China Journal of Stomatology*. 2019 Oct 1; 37(5): 541-546. DOI: [10.7518/hxkq.2019.05.017](https://doi.org/10.7518/hxkq.2019.05.017).
5. Garbin AJI, Perin PCP, Garbin CAS, Lolli LF. Malocclusion prevalence and comparison between the Angle classification and the Dental Aesthetic Index in scholars in the interior of São Paulo state – Brazil. *Dental Press Journal of Orthodontics*. 2010 Aug; 15(4): 94-102. DOI: [10.1590/S2176-94512010000400014](https://doi.org/10.1590/S2176-94512010000400014).
6. AlQuraini N, Shah R, Cunningham SJ. Perceptions of outcomes of orthodontic treatment in adolescent patients: a qualitative study. *European Journal of Orthodontics*. 2019 May 24; 41(3): 294-300. DOI: [10.1093/ejo/cjy071](https://doi.org/10.1093/ejo/cjy071).
7. Bhatia R, Winnier JJ, Mehta N. Impact of malocclusion on oral health-related quality of life in 10-14-year-old children of Mumbai, India. *Contemporary Clinical Dentistry*. 2016 Oct-Dec; 7(4): 445-450. DOI: [10.4103/0976-237X.194105](https://doi.org/10.4103/0976-237X.194105).
8. Smith L, Wong L, Phemister R, Blanch K, Jack H, Fowler P et al. "Why, why, why do I have such big teeth, why?" Low socio-economic status and access to orthodontic treatment. *New Zealand Dental Journal*. 2018 Jun; 114(2): 64-72. Available in: <https://www.nzda.org.nz/about-us/new-zealand-dental-journal-articles/nzdj-2018>.

9. Rebelo MA, Rebelo Vieira JM, Pereira JV, Quadros LN, Vettore MV. Does oral health influence school performance and school attendance? A systematic review and meta-analysis. *International Journal of Paediatric Dentistry*. 2019 Oct 26; 29(2): 138-148. DOI: [10.1111/ipd.12441](https://doi.org/10.1111/ipd.12441).
10. Ruff RR, Senth S, Susser SR, Tsutsui A. Oral health, academic performance, and school absenteeism in children and adolescents: A systematic review and meta-analysis. *Journal of the American Dental Association*. 2019 Feb; 150(2): 111-121.e4. DOI: [10.1016/j.adaj.2018.09.023](https://doi.org/10.1016/j.adaj.2018.09.023).
11. Silva MLA, Taquette, SR, Coutinho ESF. Senses of body image in adolescents in elementary school. *Revista de Saúde Pública*. 2014 Jun; 48(3): 438-444. DOI: [10.1590/S0034-8910.2014048005083](https://doi.org/10.1590/S0034-8910.2014048005083).
12. Gatto RCJ, Garbin AJIG, Coorrente JE, Garbin CAS. The relationship between oral health-related quality of life, the need for orthodontic treatment and bullying, among Brazilian teenagers. *Dental Press Journal of Orthodontics*. 2019 May 20; 24(2): 73-80. doi: [10.1590/2177-6709.24.2.073-080.oar](https://doi.org/10.1590/2177-6709.24.2.073-080.oar).
13. Monteiro BCC, Rizo L. Vítimas de bullying: Proposta de tratamento utilizando técnicas da terapia cognitivo-comportamental. *Revista Saúde e Desenvolvimento Humano*. 2013 Nov 29; 1(2): 59-66. DOI: [10.18316/1183](https://doi.org/10.18316/1183).
14. Muniz RJ. Dor, ansiedade e bullying: a educação física como promoção e prevenção em saúde à adolescentes. *Revista Saúde e Desenvolvimento Humano* 2014 Nov 30; 2(2): 51-60. DOI: [10.18316/1819](https://doi.org/10.18316/1819).
15. Silva Júnior IF, Aguiar NL, Barros WR, Arantes DC, Nascimento LS. Teenager's oral health: literature review. *Adolescência & Saúde*. 2016 Aug/Sep; 13(Suppl 1): 95-103. Available in: http://adolescenciaesaude.com/detalhe_artigo.asp?id=574&idioma=Portugues.
16. Simões RC, Goettems ML, Schuch HS, Torriani DD, Demarco FF. Impact of malocclusion on oral health-related quality of life of 8-12 years old schoolchildren in Southern Brazil. *Brazilian Dental Journal*. 2017 Jan-Feb; 28(1): 105-112. DOI: [10.1590/0103-6440201701278](https://doi.org/10.1590/0103-6440201701278).
17. Elhiny OA, Yazid MA, Radwan E. The relationship between socioeconomic class and malocclusion or poor oral health, and the quality of life: a review. *Current Science International*. 2019 Jul-Sep; 8: 535-539. Available in: <http://www.curreweb.com/csi/csi/2019/535-539.pdf>.
18. Araki M, Yasuda Y, Ogawa T, Tumurkhoo T, Ganburged G, Bazar A, et al. Associations between malocclusion and oral health-related quality of life among mongolian adolescents. *International Journal of Environmental Research and Public Health*. 2017 Aug 10; 14: 902. DOI: [10.3390/ijerph14080902](https://doi.org/10.3390/ijerph14080902).
19. Locker D, Jokovic A, Tompson B, Prakash P. Is the Child Perceptions Questionnaire for 11-14 year olds sensitive to clinical and self-perceived variations in orthodontic status? *Community Dentistry and Oral Epidemiology*. 2007 Jun; 35(3): 179-185. DOI: [10.1111/j.1600-0528.2006.00324.x](https://doi.org/10.1111/j.1600-0528.2006.00324.x).
20. World Health Organization (WHO). *Oral health surveys: basic methods*. 4th ed. Geneva: WHO; 1997.
21. Foster Page LA, Thomson WM, Jokovic A, Locker D. Validation of the Child Perceptions Questionnaire (CPQ 11-14). *Journal of Dental Research*. 2005 Jul; 84(7):649-652. DOI: [10.1177/154405910508400713](https://doi.org/10.1177/154405910508400713).
22. Berke DS, Reidy D, Zeichner A. Masculinity, emotion regulation, and psychopathology: A critical review and integrated model. *Clinical Psychology Review*. 2018 Dec; 66: 106-116. DOI: [10.1016/j.cpr.2018.01.004](https://doi.org/10.1016/j.cpr.2018.01.004).
23. Su N, van Wijk A, Visscher CM. Psychosocial oral health-related quality of life impact: A systematic review. *Journal of Oral Rehabilitation*. 2021 Mar; 48(3): 282-292. DOI: [10.1111/joor.13064](https://doi.org/10.1111/joor.13064).
24. Brasil. SB Brasil 2010: Pesquisa Nacional de Saúde Bucal: resultados principais. Brasília: Ministério da Saúde; 2010.
25. Teixeira AK, Antunes JL, Noro LR. Factors associated with malocclusion in youth in a municipality of Northeastern Brazil. *Revista Brasileira de Epidemiologia*. 2016 Jul/Sep; 19(3): 621-631. DOI: [10.1590/1980-5497201600030012](https://doi.org/10.1590/1980-5497201600030012).
26. Traebert E, Zanini FA, Nunes RD, Traebert J. Nutritional and non-nutritional habits and occurrence of malocclusions in the mixed dentition. *Anais da Academia Brasileira de Ciências*. 2020 Apr 17; 92(1): e20190833. DOI: [10.1590/0001-3765202020190833](https://doi.org/10.1590/0001-3765202020190833).

27. Goettems ML, Ourens M, Cosetti L, Lorenzo S, Álvarez-Vaz R, Celeste RK. Early-life socioeconomic status and malocclusion in adolescents and young adults in Uruguay. *Cadernos de Saúde Pública*. 2018 Mar 5; 34(3): e00051017. DOI: [10.1590/0102-311X00051017](https://doi.org/10.1590/0102-311X00051017).
28. Garbin AJI, Garbin CAS, Chiba FY, Saliba TA, Moimaz SAS, Chiba EK. Malocclusion and the need for orthodontic treatment in 12-year-old adolescents. *Research, Society and Development*. 2021; 10(2): e17610212356. DOI: [10.33448/rsd-v10i2.12356](https://doi.org/10.33448/rsd-v10i2.12356).
29. World Health Organization (WHO). *Oral health surveys: basic methods*. 5th ed. Geneva: World Health Organization; 2013.
30. Sun L, Wong HM, McGrath CP. Relationship between the severity of malocclusion and oral health related quality of life: a systematic review and meta-analysis. *Oral Health & Preventive Dentistry*. 2017; 15(6): 503-517. DOI: [10.3290/j.ohpd.a38994](https://doi.org/10.3290/j.ohpd.a38994).
31. Kassis A, El Osta N, Tubert-Jeannin S, Hennequin M, El Osta L, Ghoubril J. Cross-cultural adaptation and validation of the child perceptions questionnaire (CPQ11-14) among children in Lebanon. *BMC Oral Health*. 2018 Feb 6; 18: 18. DOI: [10.1186/s12903-018-0482-x](https://doi.org/10.1186/s12903-018-0482-x).
32. Sfreddo CS, Moreira CHC, Nicolau B, Ortiz FR, Ardenghi TM. Socioeconomic inequalities in oral health-related quality of life in adolescents: a cohort study. *Quality of Life Research*. 2019 Sep; 28: 2491-500. DOI: [10.1007/s11136-019-02229-2](https://doi.org/10.1007/s11136-019-02229-2).
33. Salinas-Martínez AM, Hernández-Elizondo RT, Núñez-Rocha GM, Ramos Peña EG. Psychometric properties of the Spanish version of the short-form Child Perceptions Questionnaire for 11-14-year-olds for assessing oral health needs of children. *Journal of Public Health Dentistry*. 2014; 74(2): 168-174. DOI: [10.1111/jphd.12043](https://doi.org/10.1111/jphd.12043).
34. Traebert E, Martins LGT, Pereira KCR, Costa SXS, Lunardelli SE, Lunardelli NA, et al. Malocclusion in Brazilian schoolchildren: high prevalence and low impact. *Oral Health & Preventive Dentistry*. 2018; 16(2): 163-167. DOI: [10.3290/j.ohpd.a40324](https://doi.org/10.3290/j.ohpd.a40324).
35. Di Blasi M, Cavani P, Pavia L, Lo Baido R, La Grutta S, Schimmenti A. The relationship between self-image and social anxiety in adolescence. *Child and Adolescent Mental Health*. 2015 May; 20(2): 74-80. DOI: [10.1111/camh.12071](https://doi.org/10.1111/camh.12071).
36. Krisdapong S, Prasertsom P, Rattananangsim K, Sheiham A. Associations between perceived needs for dental treatment, oral health-related quality of life and oral diseases in school-aged Thai children. *Community Dentistry and Oral Epidemiology*. 2014 Aug; 42(4): 323-332. DOI: [10.1111/cdoe.12092](https://doi.org/10.1111/cdoe.12092).
37. Amaral BA, Filgueira ACG, Silva-Neto JP, Lima KC. Relationship between normative and self-perceived criteria for orthodontic treatment need and satisfaction with esthetics and mastication in adolescents. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2020 Jan; 157(1): 42-48. DOI: [10.1016/j.ajodo.2019.01.025](https://doi.org/10.1016/j.ajodo.2019.01.025).
38. Santos PR, Meneghim MD, Ambrosano GM, Vedovello Filho M, Vedovello SA. Influence of quality of life, self-perception, and self-esteem on orthodontic treatment need. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2017 Jan; 151(1): 143-147. DOI: [10.1016/j.ajodo.2016.06.028](https://doi.org/10.1016/j.ajodo.2016.06.028).
39. Choi ES, Ryu JI, Patton LL, Kim HY. Item-level analysis of the relationship between orthodontic treatment need and oral health-related quality of life in Korean schoolchildren. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2019 Mar; 155(3): 355-361. DOI: [10.1016/j.ajodo.2018.04.028](https://doi.org/10.1016/j.ajodo.2018.04.028).
40. Bellot-Arcis C, Montiel-Company JM, Almerich-Silla JM. Psychosocial impact of malocclusion in Spanish adolescents. *Korean Journal of Orthodontics*. 2013 Aug; 43(4): 193-200. DOI: [10.4041/kjod.2013.43.4.193](https://doi.org/10.4041/kjod.2013.43.4.193).
41. Kapos FP, Look JO, Zhang L, Hodges JS, Schiffman EL. Predictors of long-term tmd pain intensity: an 8-year cohort study. *Journal of Oral & Facial Pain and Headache*. 2018; 32(2): 113-22. DOI: [10.11607/ofph.1819](https://doi.org/10.11607/ofph.1819).