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Original Article

## Malocclusion Diagnosis: Normative Criteria and Self-Perception of Adolescents

Lilian Rigo Mail<sup>1</sup>, Sandrina Henn Donassollo<sup>2</sup>, Tiago Aurélio Donassollo<sup>2</sup>

<sup>1</sup>School of Dentistry, Meridional Faculty, Passo Fundo, RS, Brazil.

<sup>2</sup>Associate Professor, School of Dentistry, FASURGS, Passo Fundo, RS, Brazil.

Author to whom correspondence should be addressed: Sandrina Henn Donassollo, Rua Angélica Otto, 160, Boqueirão, Passo Fundo, RS, Brasil. 99025-270. Phone: 543335-8900. E-mail: [sandrinahenn@hotmail.com](mailto:sandrinahenn@hotmail.com).

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### Abstract

**Objective:** To estimate malocclusion prevalence, severity, treatment needs and self-perception in a group of students. **Material and Methods:** This cross-sectional study was carried out with 50 students aged 12 years who attended a public school in the municipality of Tapejara, Brazil in 2012. Oral exam concerning malocclusion was performed by a single dentist (Dental Aesthetic Index) and a questionnaire about self-perception was applied. Data were presented in the form of descriptive analysis. **Results:** Prevalence of malocclusion was observed in 98% of students, and maxillary overjet was the most frequent malocclusion. According to the DAI index, 52% of students had indication for orthodontic treatment, and of these, 22% were considered severe or disabling malocclusion. Regarding the self-perception of adolescents about their oral health status, 86% of respondents reported the desire to use orthodontic appliance. **Conclusion:** The results demonstrated that malocclusion prevailed over normal occlusion. However, the perception of adolescents was higher compared to normative criteria. This suggests that small malocclusion problems are quickly perceived by adolescents.

**Keywords:** Epidemiology; Malocclusion; Prevalence; Orthodontics.

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## Introduction

Malocclusion is understood as a change in the growth and development of the craniofacial complex that affects the occlusion of teeth and therefore should be considered a public health problem due to the high prevalence and possibility to negatively effect on quality of life of patients, impairing social interaction and the psychological welfare of individuals [1].

Studies have shown the high prevalence of malocclusion and need for orthodontic treatment in children and adolescents in different regions of Brazil [2-5].

Numerous criteria are established in literature to assess the severity and the need for treatment related to malocclusion. The Dental Aesthetic Index (DAI) is an instrument recommended by the World Health Organization [6]. The DAI is a numeric index that evaluates the prevalence of malocclusion allowing an assessment of the social acceptance of appearance based on the individual's perception. The Dental Aesthetic Index has demonstrated validity and reliability in studies worldwide [7].

The indication of orthodontic treatment need is usually based on clinical criteria through technical professional decision; however, the impact that malocclusion can generate in the quality of life of affected individuals is often not taken into consideration. Factors such as self-perception, society, parents, spouses, among others, could influence in the decision and need for orthodontic treatment. Moreover, in some cases, the same criteria that do not assess the social impact in the disorder may overestimate the problems when compared to the self-perception of the individual involved [1].

This study aimed to estimate the prevalence of malocclusion, the severity and the need for treatment and self-perception in a group of adolescents.

## Material and Methods

This cross-sectional study was carried out with 50 students aged 12 years who attended a public school in the municipality of Tapejara, Brazil in 2012. A letter of clarification and an informed consent form were sent to parents explaining the objectives of the project. Thus, 50 students were included (25% female and 25% male). Students were examined for the presence of malocclusion and answered a questionnaire about self perception and the reasons they wish to perform orthodontic treatment.

For clinical evaluation, the criteria established by the Dental Aesthetic Index (DAI) were used. Malocclusions verified were: incisal crowding, spacing in the anterior region, diastema, upper jaw misalignment, lower jaw misalignment, maxillary overjet, mandibular overjet and open bite.

Regarding malocclusion, patients were classified according to the severity as: no abnormality or mild abnormality, moderate, severe, very severe and disabling abnormality. Treatment need was classified as without or mild necessity, elective and highly desirable.

The survey was conducted by a single examiner previously trained and calibrated and the intra-examiner concordance rate was 0.9 (Kappa), demonstrating good degree of reproducibility to

ensure uniform and consistent interpretation of standardized criteria for data collection. Approximately 20% of children were re-examined in order to assess the intra-examiner error.

Students were examined in classrooms, sitting in front of the examiner, close the window for better use of ambient light. The test used dental mirror and periodontal probes (Community Periodontal Index CPI). A previously trained recorder held notes and applied questionnaires.

Data were statistically analyzed using the SPSS 18.0 for Windows software. Statistical analysis followed descriptive analysis of data.

## Results

Some type of malocclusion was observed in 98% of students, and maxillary overjet was the most prevalent malocclusion (Table 1).

**Table 1. Malocclusion of students aged 12 years from municipal schools in the municipality of Tapejara - RS, 2012 (n = 50).**

Malocclusion Data	n (50)	% (100)
<b>Incisal crowding</b>		
No incisal crowding	16	32
Crowding in one arch	21	42
Crowding in both arches	13	26
<b>Spacing in anterior region</b>		
No spacing	32	64
Spacing in one arch	14	28
Spacing in both arches	4	8
<b>Diastema</b>		
No	36	72
Yes	14	28
<b>Anterior jaw misalignment</b>		
No	17	34
Yes	33	66
<b>Lower jaw misalignment</b>		
No	26	52
Yes	24	48
<b>Maxillary overjet</b>		
No	1	2
Yes	49	98
<b>Mandibular Overjet</b>		
No	47	94
Yes	3	6
<b>Vertical open bite</b>		
No	48	96
Yes	2	4

\* Malocclusion data suggested by the authors based on the DAI (Dental Aesthetic Index).

According to the DAI standard, 52% of individuals with some type of malocclusion had orthodontic treatment indication (Table 2). Of these, 22% had severe or disabling malocclusion.

**Table 2. DAI standard related to malocclusion severity and treatment needs of students aged 12 years enrolled in municipal schools of Tapejara-RS - 2012 (n = 50).**

Malocclusion severity	Treatment indication	DAI standard value	DAI value obtained n (%)
No abnormality or mild abnormality	No need or slight need for treatment	≤ 25	24 (48%)
Defined malocclusion	Elective	26-30	9 (18%)
Severe malocclusion	Highly desirable	31-35	6 (12%)
Very severe or disabling malocclusion	Critical	≥ 36	11 (22%)

Regarding the self-perception of adolescents of their oral condition, when asked about the desire to use orthodontic appliance, 86% (n = 43) of respondents wanted to use it. The reasons why 43 participants would like to undergo orthodontic treatment are shown in Table 3.

**Table 3. Self-perception of malocclusion in students aged 12 years from municipal schools of Tapejara-RS - 2012 (n = 50).**

Initial Question	Response	
	n (50)	100 (%)
Do you want orthodontic treatment?		
No	7	14
Yes	43	86
<b>Questions directed to those who want orthodontic treatment</b>	<b>n (43)</b>	<b>100 (%)</b>
Because I believe that orthodontic treatment can improve my life		
No	2	4,7
Yes	41	95,3
Because I think it is nice to wear braces		
No	15	34,9
Yes	28	65,1
Because my friends wear braces		
No	36	83,7
Yes	7	16,3
Because I think if I make orthodontic treatment, I will have an easier time finding work		
No	17	39,5
Yes	26	60,5
Because it will be easier to find a boy/girlfriend		
No	18	41,9
Yes	25	58,1
Because I think I will be more respected by friends		
No	28	65,1
Yes	15	34,9
Because my parents think it is important		
No	8	18,6
Yes	35	81,4
Because my parents have used braces		
No	35	81,4
Yes	8	18,6
Because orthodontic treatment will improve my self-esteem		
No	3	7
Yes	40	93
Because I feel embarrassed to smile		
No	23	53,5
Yes	20	46,5
Because I feel that I am discriminated due to the appearance of my teeth		
No	39	90,7
Yes	4	9,3
Because I think braces is fashionable and wearing them is nice		
No	28	65,1
Yes	15	34,9

## Discussion

The Dental Aesthetic Index (DAI) is a numeric index that evaluates the prevalence of malocclusion, allowing the assessment of social acceptance of appearance based on the individual's self-perception. The Dental Aesthetic Index has demonstrated validity and reliability in studies worldwide [7].

However, DAI should not be the only determining factor to define the treatment need of the individual, as the existence of discrepancy between the normative needs of treatment and the perception of individuals with regard to malocclusion has been demonstrated in this and other studies [1,8]. Not only normative needs for the indication of treatment need but also the patient's opinion should be taken into account. The demand for orthodontic treatment in Western society is a cultural phenomenon partially mediated by payment capacity and the decision for intervention cannot ignore the cultural and social significance of the dental-facial aspect [1].

Although DAI is a well-established evaluation tool, this study has limitations due to its cross-sectional design, since there is a difficulty in these studies to establish a relationship based on a cross section of time. Longitudinal studies allow a better understanding between presence of malocclusion and triggering factors in order to plan actions that might as well treat and prevent the onset of the disease, since the determining factors of malocclusion are well known in literature [9].

The high prevalence of malocclusion demonstrated in this study is also well-established in literature among adolescents. In a study carried out with 237 schoolchildren from the city of Santo Expedito do Sul, RS, the results showed a prevalence of malocclusion of 63.8% [10]. In another study involving 274 adolescents aged 12-17 years in Nigeria, the DAI index showed that 8% of the sample presented disabling malocclusions [11]. In addition, in children with primary dentition, the prevalence was high, as in a study carried out in a municipality of Minas Gerais with 499 preschoolers, which resulted in a prevalence of malocclusion of 28.4%, and posterior cross bite was the most frequent (20.4%) (12).

The most important factor to be discussed, however, is the perception of adolescents on these changes and their impact on daily activities and also the orthodontic treatment need. In this study, the prevalence of malocclusions requiring treatment was 52%. However, when students were asked about their assessment regarding the treatment need, 86% said they wanted to carry out the treatment, and only 52% had actual need according to the DAI criteria. This data corroborate another study in literature, in which 87.7% of students reported the desire to receive orthodontic treatment [8]. In this study, the difference between prevalence of some type of malocclusion and the desire to use braces was also demonstrated [6]. This suggests the existence of a discrepancy between normative criteria for determining malocclusions and the individual's self-perception. The perceived need for treatment by adolescents is associated with previous occlusal problems usually related to aesthetics and with dissatisfaction with appearance.

In another study, a difference of perception between patients and orthodontists was observed, and the level of agreement between them was considered satisfactory. Unlike this study,

which showed a sharp perception to mild problems, the authors are concerned about the inability of patients to understand the clinical severity of their dental conditions [13].

According to DAI, the results demonstrated that 48% of students had no abnormalities or mild malocclusions, for which there would be no need or slight need for orthodontic treatment. However, when questioned, most students (86%) wanted to perform orthodontic treatment and believed that using braces could improve their lives (95.3%) or because using braces is fashionable (65.1%), or they would have an easier time finding work (60.5%) and boyfriend / girlfriend (58.1%). A significant portion of the sample would use braces because parents think it is important (81.4%). This perception may be due to the influence of "fads" or because of the use of braces is associated with "status" [8]. Therefore, it may be suggested that only normative clinical criteria are not sufficient to determine the actual need for treatment indication, suggesting that psychosocial factors should be incorporated into clinical criteria when deciding to perform orthodontic treatment.

On the other hand, the use of clinical criteria for defining orthodontic problems can overestimate orthodontic treatment needs. There are degrees of technically defined occlusal problems that are acceptable to the population and should be considered in the decision of orthodontic treatment indication and vice versa. Subjective measures should be incorporated into clinical criteria currently used [1].

The presence of malocclusion can have an impact on the quality of life of children and adolescents and also their families. Dissatisfaction with appearance, dentist's recommendation, interests and concerns of parents and influence of people who use braces are among the main motivating factors of those seeking treatment reported in literature [12,14].

## Conclusion

The presence of malocclusion prevailed over normal occlusion, and maxillary overjet was the most prevalent malocclusion. However, the perception of adolescents was higher compared to normative criteria, which suggests that small occlusal problems are quickly perceived by adolescents.

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