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Orthodontic concerns of Brazilian children and their parents compared to the normative treatment need

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Abstract: The objective of the present study was to evaluate the interest of both children and parents towards orthodontic treatment and compare it to the normative treatment need as well as to determine the factors related to such an interest. The sample consisted of 407 schoolchildren aged between 9 and 12 years and their parents from Nova Friburgo (Rio de Janeiro), Brazil. The orthodontic concern expressed by children and parents was obtained by means of a questionnaire. The normative need was evaluated using two components of the Index of Orthodontic Treatment Need (IOTN). Data analysis involved multiple logistic regression. Normative treatment need was greater than the children's self-perceived treatment need. The parents expressed more interest towards orthodontic treatment of their children than the children themselves. The orthodontic concern expressed by both groups was greater than the normative need for orthodontic treatment, and such a finding was associated with gender of the children (female) and self-perceived treatment need expressed by them. The lack of a relationship between the normative treatment need and the orthodontic concern of children and parents shows that such assessments should be performed when orthodontic treatment is indicated, particularly in terms of public health, as the demand is greater than the services supplied. (J Oral Sci 52, 101-107, 2010)

Keywords: severity of illness index; orthodontic treatment; public health; demand.

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Introduction

The main goals of orthodontic treatment are to correct aesthetic impairment, improve oral function, and help patients restore their socio-psychological well-being (1). The orthodontic treatment need has been determined only by objective or normative assessments based on different occlusal indices (2,3), whereas the patient's subjective perception is usually ignored (4). The Index of Orthodontic Treatment Need (IOTN) (5,6) has the advantage of consisting of one component related to dental and functional health (DHC – Dental Health Component) and another related to aesthetic impairment of malocclusions (AC – Aesthetic Component), thus reflecting the socio-psychological need for orthodontic treatment (7).

As the perceptions of the dental professional and patient do not always coincide (8), the self-perceived need expressed by the latter or his or her orthodontic concern should be incorporated into the clinical criteria (4,9). When children are being treated, however, it is appropriate to evaluate the parent's interest as well, since they may have different concerns compared to their children, which may thus influence the decision to undertake orthodontic treatment (9,10).

Because of the inherently elective aspect of such a treatment and the influence caused by appearance and other psychosocial factors contributing to treatment-seeking (4,11), these investigations are particularly important for predicting the demand and planning public services. The present study aimed to assess the orthodontic concern of Brazilian children and their parents and compare it to the normative treatment need as well as to determine the possible factors related to such a concern.

Materials and Methods

A total of 407 schoolchildren aged between 9 and 12 years old, with no history of orthodontic treatment, took part in the present study together with their parents. The study was previously approved by the Local Ethics Committees and both parents' informed consent and children's approval were obtained.

The minimum sample size consisting of 308 individuals was selected from a total of 6,684 schoolchildren of the same age group, all enrolled in the Nova Friburgo (Rio de Janeiro, Brazil) public schools. It was calculated according to a prevalence of 30% for great orthodontic treatment need, with a standard error of 5% and a 95% confidence interval. In order to compensate for a possible conglomeration effect, the sample was increased by 30% (design effect = 1.3), thus coming to a total of 400 schoolchildren. The sample was further increased by 25% so that any eventual loss could be offset, and consequently 500 children were grouped and randomly selected according to their age and school location (7 urban and 3 rural schools).

A questionnaire was sent to each parent so that socio-economic and demographic data could be gathered. The questionnaire also contained questions about their satisfaction with the dental appearance of their children and the perception for orthodontic treatment need. The score of the dichotomous variable "orthodontic concern" could be assessed by obtaining individual scores for these two questions (9).

Only one practitioner with experience in using the Index of Orthodontic Treatment Need (excellent intra-examiner reliability: kw = 0.944 for DHC and kw = 0.933 for AC) (12) assessed the treatment need of the children according to DHC and AC components (5,6). The assessment procedures were performed in a reserved room arranged by each school. The children had been interviewed before the examination using the same questionnaire given to their parents so that their orthodontic concern could also be obtained. The self-perception expressed by the children regarding aesthetic treatment need was also assessed according to the AC scale.

Data were entered into and analyzed using SPSS software, version 11.0. Chi-square, Wilcoxon, and McNemar tests were used for testing the relationship between the variables. In order to verify the concordance between the practitioner's assessment and patient's perception, Kappa coefficient was calculated. Multiple logistic regression analysis was employed for testing the association between the orthodontic concerns expressed by both children and parents and the independent variables. Significance was considered at the 5% level.

Results

Seventy three of the 500 children did not return the informed consents signed by their parents, 13 were absent on the day of evaluation, and 7 had already initiated orthodontic treatment. Of the 407 children who were effectively assessed, 53.1% were girls and the age distributions in the age groups of 9, 10, 11, and 12 years were, 24.8, 25.1, 25.5, and 24.6%, respectively. No statistically significant difference was found regarding age distribution and gender (χ^2; $P > 0.05$).

The difference between the normative need for orthodontic treatment (DHC and practitioner AC) and the children's perceived need (children AC) is shown in Fig. 1. The concordance between DHC and children AC (kw = 0.086) as well as between practitioner AC and children

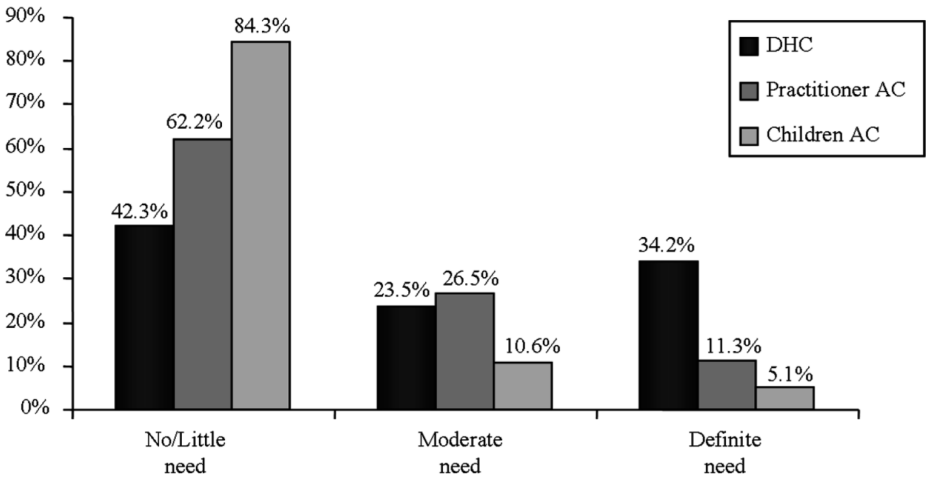

Fig. 1 Normative need for orthodontic treatment according to DHC and AC versus children's perceived need according to AC.

AC (kw = 0.0159) was poor (12). The orthodontic treatment need was found to be greater in 34.2% (DHC) and 11.3% (practitioner AC) of the children assessed by the practitioner, and only 2.9 and 2.0% of them, respectively, showed concordance with the self-perception of the children. Such a self-perception was not influenced by gender, age, or socio-economic level (χ^2; $P > 0.05$).

The parents not only expressed greater dissatisfaction with their children's dental appearance but also greater perception regarding the need for orthodontic treatment than the children themselves. When the answers were dichotomized on "orthodontic concern", 38.1% ($n = 155$) of the children and 67.3% ($n = 274$) of the parents expressed concern (Table 1), whereas in only 33.2% of the cases both groups expressed concern. However, the orthodontic treatment need of the children was found to be greater in only 43.2% ($n = 67$ children) and 37.2% ($n = 102$ parents) of the groups interested.

Significant differences were observed in the relationship between the orthodontic concern of children and parents and some malocclusions. For instance, in the presence of contact point displacement (crowding) ($n = 185$), 46.5% of the children (χ^2; $P = 0.001$) and 79.5% of the parents (χ^2; $P < 0.001$) were interested in orthodontic treatment; presence of increased overjet ($n = 121$) caused 46.3% of the children to be interested (χ^2; $P = 0.027$), whereas partially erupted, tipped or impacted teeth ($n = 49$) caused 83.7% of the parents to be interested (χ^2; $P = 0.009$).

The final results of the multiple logistic regression analysis showed that the orthodontic concern expressed by children and their parents were related to gender of the children (female) and self-perceived treatment need (based on AC) expressed by them (Tables 2 and 3), although no statistically significant interaction between these factors was observed in the final model. Other variables were also associated with the orthodontic concern when a univariate model was employed, but such an isolated effect disappeared using multivariate models, thus indicating some error level resulting from other covariables.

Discussion

The study was based on a representative sample consisting of schoolchildren aged between 9 and 12 years old who had been enrolled in the public schools of Nova Friburgo (Rio de Janeiro, Brazil). However, as the majority of the children evaluated belonged to low socio-economic classes, they were more likely to benefit from public orthodontic service in the region.

The use of a questionnaire already developed and tested by other investigators was thought to be more suitable than developing a new one. In addition, the IOTN was chosen because it allows comparison to other studies and because its Aesthetic Component (AC) yields a good indication of the perception expressed by the children regarding their dental attractiveness. The AC scale, which is based on visual stimuli, seems to be more comprehensible than verbal descriptions in communicating with children because of their level of cognitive development (13,14). Even so, other authors (4,15,16) state that the psychosocial aspect of the children's dental appearance is better observed by measures of quality of life, and this information was not obtained in the present study.

Table 1 Responses of the children and their parents to questions related to satisfaction with dental appearance and perception of the orthodontic treatment need; and the dichotomized result regarding orthodontic concern

	Children	Parents	
Satisfaction with the dental appearance of the children			
Very satisfied	34.2%	4.9%	Wilcoxon test $P < 0.001$
Satisfied	27.0%	23.1%	
Dissatisfied	25.8%	54.3%	
Very dissatisfied	13.0%	17.7%	
Perception of the orthodontic treatment need of the children			
No, definitely not	14.3%	2.9%	Wilcoxon test $P < 0.001$
No, I don't think so	18.2%	19.7%	
Yes, I think so	48.2%	52.3%	
Yes, definitely yes	19.4%	25.1%	
Orthodontic concern			
No concern	61.9%	32.7%	χ^2 of McNemar test $P < 0.001$
Concern	38.1%	67.3%	

Table 2 Logistic regression models for the group of children interested in orthodontic treatment

Variables	Univariated logistic models		Multivariated logistic model 1		Multivariated logistic model 2 †	
	OR	*P*-value	ORaj ‡	*P*-value	ORaj (95% CI) ‡	*P*-value
Sex						
Male	1		1		1	
Female	1.44	0.074	1.80	0.010 *	1.58 (1.03-2.41)	0.036 *
Age		0.439		0.256		
9 years	1		1			
10 years	0.98	0.959	1.13	0.704		
11 years	1.04	0.894	1.29	0.453		
12 years	1.48	0.177	2.05	0.066		
Dentition						
Mixed	1		1			
Permanent	1.09	0.662	0.79	0.392		
Social-economic level						
Low	1		1			
Intermediate	1.37	0.400	1.20	0.650		
Children AC		< 0.001 *		< 0.001 *		< 0.001 *
No/Little need	1		1		1	
Moderate need	4.89	< 0.001 *	4.65	< 0.001 *	5.21 (2.59-10.47)	< 0.001 *
Definite need	5.29	0.001 *	4.40	0.004 *	5.32 (2.00-14.17)	0.001 *
Practitioner AC		0.001 *		0.281		
No/Little need	1		1			
Moderate need	2.05	0.002 *	1.58	0.119		
Definite need	2.40	0.007 *	1.50	0.326		
DHC		0.002 *		0.310		
No/Little need	1		1			
Moderate need	1.72	0.043 *	1.38	0.275		
Definite need	2.34	< 0.001 *	1.60	0.145		

* Statistically significant difference at 5% level.
† Included the covariables with *P*-values lower than 0.05 on the multivariated logistic model 1.
‡ OR_{aj} = *Odds Ratio* adjusted

Table 3 Logistic regression models for the group of parents interested in the orthodontic treatment of their children

Variables	Univariated logistic models		Multivariated logistic model 1		Multivariated logistic model 2 †	
	OR	*P*-value	ORaj ‡	*P*-value	ORaj (95% CI) ‡	*P*-value
Sex						
Male	1		1		1	
Female	1.47	0.070	1.79	0.011 *	1.54 (1.01-2.35)	0.046 *
Age		0.650		0.113		
9 years	1		1			
10 years	1.26	0.431	1.62	0.137		
11 years	1.42	0.237	2.12	0.035 *		
12 years	1.34	0.323	2.51	0.023 *		
Dentition						
Mixed	1		1		1	
Permanent	0.82	0.340	0.48	0.014 *	0.82 (0.53-1.26)	0.361
Social-economic level						
Low	1		1			
Intermediate	0.84	0.545	0.81	0.480		
Children AC		0.005 *		0.011 *		0.004 *
No/Little need	1		1		1	
Moderate need	2.91	0.013 *	2.88	0.017 *	3.02 (1.30-7.03)	0.010 *
Definite need	5.35	0.025 *	4.49	0.052	5.33 (1.22-23.26)	0.026 *
Practitioner AC		0.014 *		0.163		
No/Little need	1		1			
Moderate need	1.40	0.171	1.20	0.559		
Definite need	3.29	0.006 *	2.56	0.057		
DHC		0.060 *		0.589		
No/Little need	1		1			
Moderate need	1.47	0.153	1.26	0.424		
Definite need	1.76	0.023 *	1.36	0.355		

* Statistically significant difference at 5% level.
† Included the covariables with *P*-values lower than 0.05 on the multivariated logistic model 1.
‡ OR_{aj} = *Odds Ratio* adjusted

A few studies (3,9,10,16,17) have analyzed the perceptions expressed by parents regarding the orthodontic treatment need of their children. In countries where orthodontic treatment is not regularly provided by public services, as in the case of Brazil, updated data on the need and demand for orthodontic treatment among children is necessary for planning such a service (11,14,18,19). As the demand for this treatment can be influenced by the parents' opinion (9,10), the present study also assessed this information.

Similar to other studies (2,3,15,17,20,21), it was observed that the normative evaluation is more critically carried out, thus overestimating the occlusal problems in comparison to patient's perception (22). Children evaluate themselves, according to the AC scores, usually lower than those estimated by the practitioners, and even those cases of self-evaluation indicating great need did not coincide with those of the practitioner. Therefore, the concept that the patient's perception should not be underestimated is reinforced, as it is the patient who is the target of treatment and who expresses the need to gain satisfaction from improved aesthetics and function (8). Moreover, certain types of malocclusions are accepted by a given population and this should be taken into account whenever an orthodontic treatment is indicated, particularly in public services (22).

The need for orthodontic treatment was found to be more readily perceived by both children and their parents than the dissatisfaction with dental appearance itself, thus corroborating the findings reported by other authors (8,10,16,23). This probably happens because both patients and caregivers overestimate the perceived need for orthodontic treatment in the hope of receiving such a treatment (3), in addition to the fact that orthodontic appliances have been associated with status or social trends (16). Also, society and media reinforce facial stereotypes on a daily basis, thus creating social patterns and beauty values which serve as important external factors in promoting the interest in orthodontic treatment (14,24).

According to Birkeland et al. (1996) and Chew and Aw (2002), the parents' orthodontic concern was greater than that expressed by their children because adults are much more critical regarding dental appearance (13) and they feel obliged to provide the best care for their children (3). The fact that both parents and their children are found to have great interest in orthodontic treatment despite the normative need only confirms that some individuals, even having an excellent occlusion, may not be entirely satisfied, whereas others presenting severe malocclusion may not express much concern about it (10). Thus, a relationship between orthodontic concern and type of malocclusion might exist as crowding, increased overjet, and partially erupted, tipped or impacted teeth were found to be statistically involved. Also, these malocclusions are in the anterior region of the arches and previous studies showed that they are associated with aesthetic impairment as well (11,14,25,26).

In this context, it is important to remember that the difference observed between DHC and practitioner AC scores regarding the number of children with definite need of orthodontic treatment is due to the fact that both IOTN components evaluate distinctive characteristics. There are malocclusions defined as being harmful to oral health according to DHC, although no aesthetic impairment is involved. On the other hand, there are cases defined only by AC as being of great treatment need because they are considered unaesthetic, which are not evaluated by DHC (1,21,27).

Although the findings from the present study are similar to those found in the literature, there are some variations resulting from cultural and socio-economical differences among countries. For instance, certain types of malocclusion considered aesthetically unacceptable by a population, on the other hand, might be a sign of beauty for another one (11,14,18). In spite of the fact that girls are thought to be more critical regarding their appearance (16,19,23), the significant gender difference in the orthodontic concerns obtained from the logistic regression analysis was an interesting finding since such relationships still raise controversy in the literature.

Clinically, the relationship between malocclusions with greater aesthetic implications and orthodontic concern should be considered as a possible negative influence on the time of treatment-seeking. In general, early orthodontic treatment is performed at a stage when lay persons recognize only a few signs of malocclusion and as a result, there is a risk that the parents' or their children's concern may be manifested later, when not only the malocclusion has worsened with age but also the advantages of an early intervention will have been decreased (25).

In terms of public health, the fact that the orthodontic concerns are steady as the degree of normative treatment need increases (as observed in Tables 2 and 3) emphasizes how important it is to associate orthodontic indices with the patient's subjective assessment, since cooperation and motivation on the part of the patient are crucial factors in indicating such a treatment (23), particularly when demand is greater than the services supplied. On the other hand, both the importance of facial aesthetics and the psychosocial consequences of malocclusion may be more valid than the normative need for indicating orthodontic treatment (28).

Because the demand for orthodontic treatment is

multifactorial and also depends on factors such as aesthetics, health risks, motivation, positive and negative attitudes towards the orthodontic appliances, professional recommendation, costs, duration, and prognosis, it cannot be exclusively based on indices of treatment need (3,10,13,23,26). As the present study found no relationship between normative need for orthodontic treatment and orthodontic concern expressed by both children and parents (Tables 2 and 3), one can conclude that it is important to associate such assessments for determining and indicating any orthodontic treatment. The way by which subjective information is obtained still raises controversy, and consequently further studies comparing different methods and the development of new instruments should be considered. These investigations are particularly important in forecasting the demand and planning public services.

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