

Malocclusion: Social, Functional and Emotional Influence on Children

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Objectives: To determine the association between types of malocclusion and quality of life in children between 8-10 years of age and establish correlations between the severity of the malocclusion and particular bio-psychosocial variables. **Study design:** The sample was made up of 102 schoolchildren aged 8-10 years. Clinical exams were performed using the criteria of the Dental Aesthetic Index (DAI) to determine the presence and severity of malocclusions. The impact on quality of life was assessed using the Child Perceptions Questionnaire (CPQ₈₋₁₀). Statistical analysis involved the chi-square test, Fisher's exact test and Spearman's correlation analysis. **Results:** Malocclusions affected 61% of the children examined. There was a positive correlation between total CPQ₈₋₁₀ and DAI scores ($P = 0.034$). The following types of malocclusion had a significant effect on the quality of life of the children: upper anterior irregularity ≥ 2 mm, anterior open bite ≥ 2 mm and diastema ≥ 2 mm. Children with malocclusion experienced a greater negative impact on quality of life in comparison to those without malocclusion. **Conclusions:** Malocclusions had a negative influence over the quality of life of children between 8-10 years of age. More severe malocclusions had a greater impact with regard to social, emotional and functional aspects.

Keywords: Oral health-related quality of life; malocclusion; children

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INTRODUCTION

Quality of life refers to an individual's perceptions regarding his/her objectives in life, expectations, standards and concerns.¹ This concept encompasses aspects of physical, psychological and emotional wellbeing.² With regard to oral health, there has been a significant increase in publications that establish associations between quality of life and malocclusions.³⁻⁸ In a recent review, Liu et al. state that there is only a modest association between the two.¹⁴ However, evidence supports the hypothesis that compromised aesthetics has a negative influence over psychological and emotional wellbeing and social interactions.^{9-13,6-8} Regarding the psychological aspects of children, self-

awareness and abstract thought develop at about six years of age, when comparisons begin to emerge regarding a child's physical characteristics and personality.^{15,16} At eight years of age, a child's judgment regarding his/her appearance is similar to that of an adult.¹⁷ Progressively through to ten years of age, children have the ability to judge the quality of their friendships, emotions and behavior as well as the thoughts of others regarding their physical appearance.^{18,19} Thus, a number of authors suggest that the self-image formed in childhood may influence behavior and personality in adolescence and adulthood.^{16,17}

A critical evaluation of the literature reveals that most studies addressing the impact of malocclusions in quality of life are carried out on adults and adolescents.^{3,8} The influence of malocclusion on younger patients is largely unexplored.²⁰ The reasons for this partially involve a lack of appropriate measures that contemplate all psychosocial characteristics and assess the impact of oral health status on the quality of life of children.⁷ Moreover, a large portion of studies on this topic have methodological limitations (heterogeneous samples, insufficient representativity, lack of a control group and different study designs), which compromises the quality of the evidence presented.

The aim of the present study was to determine the association between particular types of malocclusion and quality of life in children between eight and ten years of age and establish correlations between the severity of the malocclusion and particular bio-psychosocial variables.

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MATERIALS AND METHOD

A cross-sectional study was carried out involving children selected randomly from public schools. Children aged 8 to 10 years and with no history of orthodontic treatment were included. None of these children had previously undergone interceptive orthodontics or was in active treatment. Children with serious systemic problems or psychological disorders and those who did not cooperate during the physical exam or administration of the questionnaire were excluded. The participants were from families with low socioeconomic status (mean monthly income: \$230)²¹. This condition denoted a greater need for orthodontic treatment. Thus, these children were more prone to the manifestation of alterations or experiencing the effects of malocclusion on their quality of life. A 95% confidence interval (CI), 80% power, 20% expected outcome (negative self-rated health) in the without malocclusion group, 40% expected outcome (negative self-rated health) in the with malocclusion group. The required minimal sample size for the analysis of these associations was 81 individuals.²² The Epi Info program (version 6.04) was used to calculate the sample size. A total of 102 children were selected.

The Child Perceptions Questionnaire (CPQ₈₋₁₀) was used to determine the impact of malocclusion on the daily lives of the children.²³ This measure is composed of 29 items addressing the impact on quality of life on four subscales: oral symptoms, functional limitations, emotional wellbeing and social wellbeing. Each child answered the CPQ₈₋₁₀ individually in interview form. General questions on the oral health were asked and extended to the degree to which the condition affected the child's wellbeing. The questions were enunciated in the following manner: "How would you describe the condition of your teeth and mouth?", to which the response items were "very good" = 0, "good" = 1, "fair" = 2 or "bad" = 3. Next, "How much do your teeth and mouth bother you?", to which the response options were "not at all" = 0, "very little/almost never" = 1, "a little" = 2 or "a lot" = 3. The children also responded to questions addressing the frequency of events in the previous month, to which the response options were "never" = 0, "once or twice" = 1, "sometimes" = 2, "often" = 3 or "every day or almost every day" = 4; for the purposes of statistical analysis, the response options were dichotomized as "never" = 0 and "one or more times" = 1. The CPQ₈₋₁₀ scores were computed for each of the four subscales as well as the total of all scores, for which higher scores denoted a greater impact on quality of life.

The criteria of the Dental Aesthetic Index (DAI) were used for the analysis of specific types of malocclusion: missing teeth, diastema, crowding of anterior teeth, greater upper anterior irregularity, greater lower anterior irregularity, upper anterior overbite, lower anterior overbite, anterior open bite and anterior-posterior molar relation.²⁹ Following the measurements, an equation was applied for the calculation of the values. The presence or absence of posterior crossbite was also considered. The DAI furnishes four outcome possibilities: normality or mild malocclusion, for which treatment is not necessary (DAI ≤ 25); definite mal-

occlusion, for which treatment is elective (26 ≤ DAI ≤ 30); severe malocclusion, for which treatment is highly desirable (31 ≤ DAI ≤ 35); and very severe or debilitating malocclusion, for which treatment is fundamental (DAI ≥ 36). The clinical exam was performed at the school. The researchers employed tongue depressors to aid in the diagnosis.¹ All children were examined while seated under natural light. The procedures complied with biosafety norms.

Prior to the study, a work team made up of two examiners and one assistant participated in a training procedure, which included intra-examiner and inter-examiner calibration exercises. In this phase, the applicability of the measure and agreement between the examiners (minimal Kappa value = 0.87 and maximal Kappa value = 1.00) were determined. A pilot study was carried out on nine children who did not participate in the main study to determine the efficacy of the application method for the clinical data and interviews.

Associations between the dependent variable and independent variables were tested using univariate analysis (chi-square test and Fisher's exact test). A lack of an association between variables was considered the null hypothesis (significance value greater than 0.05). Spearman's correlation analysis was used to determine the correlation between the total CPQ₈₋₁₀ and DAI scores. The presence of dental caries, dental trauma and tooth discoloration were considered confounding variables; individuals with these conditions were not included in the statistical analysis.

The characteristics and objectives of the study were explained to the school authorities and parents, who read and signed terms of informed consent. The study received approval from the Ethics Committee of the Federal University of Vales do Jequitinhonha e Mucuri – UFVJM, Diamantina-MG, Brazil.

RESULTS

One hundred two children between eight and ten years of age participated in the study. Mean age was 8.9 years (SD=0.8). Fifty-three children (52%) were male and 49 (48%) were female. Malocclusions were found in 61% of the children.

On the oral symptoms subscale, significant associations were found between toothache and the following variables: diastema ≥ 2 mm (P=0.022), upper anterior irregularity ≥ 2 mm (P=0.015), posterior crossbite (P=0.031) and anterior open bite ≥ 2 mm (P=0.048). Difficulty eating was associated to upper anterior irregularity ≥ 2 mm (P=0.039) and posterior crossbite (P=0.028). Difficulty speaking was associated with diastema ≥ 2 mm (P=0.043) (Table 1).

On the emotional wellbeing subscale, most children with upper anterior irregularity ≥ 2 mm were bothered by the appearance of the teeth or oral health status (78.6%) (P = 0.003). Among those with lower anterior irregularity ≥ 2 mm, 18.8% felt sad (P = 0.039). On the social wellbeing subscale, upper anterior irregularity ≥ 2 mm was associated to difficulty paying attention in class (42.9%) (P = 0.047) (Table 2).

The children with malocclusion had greater difficulty

reading aloud ($P=0.048$) and participating in games ($P = 0.032$) and felt more ashamed due to the appearance of their teeth ($P=0.039$) in comparison to those without malocclusion. A positive correlation was found between the total CPQ₈₋₁₀ and DAI sores ($P = 0.034$).

DISCUSSION

Few studies were published addressing the aesthetic and functional impact of malocclusion on the quality of life of children between eight and ten years of age.^{20,4} These studies have methodological and structural differences from the present study, which means that any comparisons should be made with caution.

Children with malocclusions experienced greater physical and psychosocial impact on daily life than those with no abnormalities in the position of the teeth. These results corroborate those of previous studies that report an association between malocclusion and quality of life.^{25,3,9,11,5,8} However,

possibly due to differences in the sample size, age of the participants, populations analyzed and study designs, controversies remain regarding the extent of the negative effects of malocclusion.⁶

The present study employed the CPQ₈₋₁₀, which is a reliable measure designed for use on children in the eight-to-ten-year-old age group that has been validated for use on Brazilian children.^{23,26} Moreover, the DAI was used to assess the types of malocclusion. This measure has a series of 11 items that address aspects related to both aesthetics and function. The presence or absence of crossbite was also considered in the present investigation. These aspects lend credibility to the study, as they enable the inclusion of a substantial number of variables and allow a broad-scoped perspective regarding the possible effects of malocclusion on the quality of life of children within this age range.

Comparing the total CPQ₈₋₁₀ and DAI scores, a positive correlation was found between the two measures ($P =$

Table 1. Associations between independent variables and CPQ₈₋₁₀ subscales oral symptoms and functional limitations

DAI	Oral Symptoms					Functional Limitations				
	Toothache n (%)	Mouth sores n (%)	Pain upon ingesting cold food n (%)	Tooth trapped in teeth n (%)	Bad smell in mouth n (%)	Time for eating n (%)	Biting and/or chewing n (%)	Difficulty eating n (%)	Trouble talking n (%)	Difficulty sleeping n (%)
Crowding	*	*	*	*	*	*	*	*	*	*
Absent	27 (62.9)	23 (53.5)	28 (65.1)	31 (72.1)	30 (69.8)	17 (39.5)	20 (46.5)	21 (48.8)	13 (30.2)	19 (44.2)
One arch	30 (76.9)	20 (51.3)	28 (71.8)	35 (89.7)	28 (71.8)	22 (56.4)	23 (59.0)	23 (59.0)	9 (23.1)	18 (46.2)
Both arches	16 (80.0)	11 (55.0)	15 (75.0)	13 (65.0)	15 (75.0)	10 (50.0)	56 (54.9)	12 (60.0)	4 (20.0)	4 (20.0)
Spacing	*	*	*	*	*	*	*	*	*	*
Absent	46 (68.7)	35 (52.2)	47 (70.1)	50 (74.6)	47 (70.1)	33 (49.3)	41 (61.2)	38 (56.7)	13 (19.4)	22 (32.8)
One arch	21 (75.0)	17 (60.7)	20 (71.4)	23 (82.1)	21 (75.0)	13 (46.4)	13 (46.4)	15 (53.6)	11 (39.3)	16 (57.1)
Both arches	6 (85.7)	2 (28.6)	4 (57.1)	6 (85.7)	5 (71.4)	3 (42.9)	2 (28.6)	3 (42.9)	2 (28.6)	3 (42.9)
Diastema	**	*	*	*	*	*	*	*	**	**
< 2 mm	46 (64.8)	36 (50.7)	46 (64.8)	56 (78.9)	50 (70.4)	34 (47.9)	42 (59.2)	36 (50.7)	14 (19.7)	23 (32.4)
≥ 2 mm	27 (87.1)	18 (58.1)	25 (80.6)	23 (74.2)	23 (74.2)	15 (48.4)	14 (45.2)	20 (64.5)	12 (38.7)	18 (58.1)
Upper Irregularity	**	*	*	*	*	*	*	**	*	*
< 2 mm	48 (64.9)	40 (54.1)	49 (66.2)	59 (79.7)	52 (70.3)	34 (45.9)	39 (52.7)	36 (48.6)	22 (29.7)	33 (44.6)
≥ 2 mm	25 (89.3)	14 (50.0)	22 (78.6)	20 (71.4)	21 (75.0)	15 (53.6)	17 (60.7)	20 (71.4)	4 (14.3)	8 (28.6)
Lower Irregularity	*	*	*	*	*	*	*	*	*	*
< 2 mm	62 (72.1)	48 (55.8)	61 (70.9)	69 (80.2)	64 (74.4)	43 (50.0)	47 (54.7)	48 (55.8)	25 (29.1)	38 (44.2)
≥ 2 mm	11 (68.8)	6 (37.5)	10 (62.5)	10 (62.5)	9 (53.6)	6 (37.5)	9 (53.6)	8 (50.0)	1 (6.3)	3 (18.8)
Overjet	*	*	*	*	*	*	*	*	*	*
< 4 mm	60 (71.4)	42 (50.0)	57 (67.9)	65 (77.4)	57 (67.9)	38 (45.2)	47 (56.0)	45 (53.6)	23 (27.4)	34 (40.5)
≥ 4 mm	13 (72.2)	12 (66.7)	14 (77.8)	14 (77.8)	16 (88.9)	11 (61.1)	9 (50.0)	11 (61.1)	3 (16.7)	7 (38.9)
Mandibular Overbite	*	*	*	*	*	*	*	*	*	**
No	70 (71.4)	53 (54.1)	68 (69.4)	75 (76.5)	69 (70.4)	48 (49.0)	55 (56.1)	53 (54.1)	24 (24.5)	37 (37.8)
Yes	3 (75.0)	1 (25.0)	3 (75.0)	79 (77.5)	4 (100.0)	1 (25.0)	1 (25.0)	3 (75.0)	2 (50.0)	4 (100.0)
Open Bite	**	*	*	*	*	*	**	*	*	*
< 2 mm	64 (68.8)	49 (52.7)	63 (67.7)	71 (76.3)	64 (68.8)	42 (45.2)	48 (51.6)	49 (52.7)	23 (24.7)	37 (39.8)
≥ 2 mm	9 (100.0)	5 (55.6)	8 (88.9)	8 (88.9)	9 (100.0)	7 (77.8)	8 (88.9)	7 (77.8)	3 (33.3)	4 (44.4)
Molar Relation	*	*	*	*	*	*	*	*	*	*
Class I	38 (70.4)	30 (55.6)	33 (61.1)	41 (75.9)	37 (68.5)	23 (42.6)	26 (48.1)	29 (53.7)	18 (33.3)	17 (31.5)
Class II	23 (76.7)	16 (53.3)	25 (83.3)	23 (76.7)	22 (73.3)	14 (46.7)	19 (63.3)	17 (56.7)	3 (10.0)	13 (43.3)
Class III	12 (66.7)	8 (44.4)	13 (72.2)	15 (83.3)	14 (77.8)	12 (66.7)	11 (61.1)	10 (55.6)	5 (27.8)	11 (61.1)
Posterior Crossbite	**	*	*	*	*	*	*	**	*	*
Absent	54 (66.7)	43 (53.1)	54 (66.7)	61 (75.3)	57 (70.4)	36 (44.4)	41 (50.6)	40 (49.4)	18 (22.2)	29 (35.8)
Present	19 (90.5)	11 (52.4)	17 (81.0)	18 (85.7)	16 (76.2)	13 (61.9)	15 (71.4)	16 (76.2)	8 (38.1)	12 (57.1)
Dichotomized DAI	*	*	*	*	*	*	*	*	*	*
No malocclusion	28 (68.3)	18 (43.9)	29 (70.7)	31 (75.6)	32 (78.0)	19 (46.3)	25 (61.0)	23 (56.1)	11 (26.8)	14 (34.1)
Malocclusion	45 (73.8)	36 (59.0)	42 (68.9)	48 (78.7)	42 (67.2)	30 (49.2)	31 (50.8)	33 (54.1)	15 (24.6)	27 (44.3)

* $P > 0.05$; ** $P \leq 0.05$

Chi-square test

Table 2. Associations between independent variables and CPQ₈₋₁₀ subscales social wellbeing and emotional wellbeing

DAI	Emotional Wellbeing					Social Wellbeing				
	Bothered n (%)	Sad n (%)	Ashamed n (%)	Worried n (%)	Nice n (%)	Trouble paying attention in class n (%)	Smiling or laughing n (%)	Stay out of games n (%)	Victim of name-calling n (%)	Questions about teeth n (%)
Crowding	*	*	*	*	*	*	*	*	*	*
Absent	25 (58.1)	18 (41.9)	18 (41.9)	24 (57.1)	18 (41.9)	11 (25.6)	18 (41.9)	11 (25.6)	9 (20.9)	13 (30.2)
One arch	19 (48.7)	18 (46.2)	22 (56.4)	27 (69.2)	23 (59.0)	10 (25.6)	18 (46.2)	11 (28.2)	12 (30.8)	15 (38.5)
Both arches	12 (60.0)	7 (35.0)	7 (35.0)	9 (45.0)	10 (50.0)	8 (40.0)	7 (35.0)	6 (30.0)	4 (20.0)	6 (30.0)
Spacing	*	*	*	*	*	*	*	*	*	*
Absent	34 (50.7)	26 (38.8)	30 (44.8)	42 (62.1)	32 (47.8)	19 (28.4)	30 (44.8)	21 (31.3)	15 (22.4)	25 (37.3)
One arch	16 (57.1)	15 (53.6)	14 (50.0)	13 (46.4)	16 (57.1)	7 (25.0)	9 (32.1)	5 (17.9)	7 (25.0)	5 (17.9)
Both arches	6 (85.7)	2 (28.6)	3 (42.9)	6 (85.7)	3 (42.9)	3 (42.9)	4 (57.1)	2 (28.6)	3 (42.9) *	4 (57.1)
Diastema	*	*	*	*	*	*	*	*	*	*
< 2 mm	37 (52.1)	26 (36.6)	31 (43.7)	40 (57.1)	34 (47.9)	20 (28.2)	31 (47.3)	20 (28.2)	17 (23.9)	22 (31.0)
≥ 2 mm	19 (61.3)	17 (54.8)	16 (51.6)	20 (64.5)	17 (54.8)	9 (29.0)	12 (38.7)	8 (25.8) *	8 (25.8)	12 (38.7)
Upper Irregularity	**	*	*	*	*	**	*	*	*	*
< 2 mm	34 (45.9)	29 (39.2)	32 (43.2)	40 (54.8)	34 (45.9)	17 (23.0)	30 (40.5)	20 (27.0)	17 (23.0)	22 (29.7)
≥ 2 mm	22 (78.6)	14 (50.0)	15 (53.6)	20 (71.4)	17 (60.7)	12 (42.9)	13 (46.4)	8 (26.8)	8 (26.8)	12 (42.9)
Lower Irregularity	*	**	*	**	*	*	*	*	*	*
< 2 mm	50 (58.1)	40 (46.5)	42 (48.8)	56 (65.9)	45 (52.3)	24 (27.9)	39 (45.3)	24 (27.9)	20 (23.3)	29 (33.7)
≥ 2 mm	6 (37.5)	3 (18.8)	5 (31.3)	4 (25.0)	6 (37.5)	5 (31.3)	4 (25.0)	4 (25.0)	5 (31.3)	5 (31.3)
Overjet	*	*	*	*	*	*	*	*	*	*
< 4 mm	47 (56.0)	35 (41.7)	37 (44.0)	46 (55.4)	42 (50.0)	24 (28.6)	35 (41.7)	25 (29.8)	18 (21.4)	30 (35.7)
≥ 4 mm	9 (50.0)	8 (44.4)	10 (55.6)	14 (77.8)	9 (50.0)	5 (27.8)	8 (44.4)	3 (16.7)	7 (38.9)	4 (22.2)
Mandibular Overbite	*	*	*	*	*	*	*	*	*	*
No	55 (56.1)	43 (43.9)	45 (45.9)	57 (58.8)	50 (51.0)	28 (28.6)	42 (42.9)	28 (28.6)	24 (24.5)	32 (32.7)
Yes	1 (25.0)	0 (0.0)	2 (50.0)	3 (75.0)	1 (25.0)	1 (25.0)	1 (25.0)	0 (0.0)	1 (25.0)	2 (50.0)
Open Bite	*	*	*	*	*	*	*	**	*	*
< 2 mm	49 (52.7)	38 (40.9)	43 (46.2)	53 (57.6)	45 (48.4)	26 (28.0)	39 (41.9)	23 (24.7)	22 (23.7)	29 (31.2)
≥ 2 mm	7 (77.8)	5 (55.6)	4 (44.4)	7 (77.8)	6 (66.7)	3 (33.3)	4 (44.4)	5 (55.6)	3 (33.3)	5 (55.6)
Molar Relation	*	*	*	*	*	*	*	*	*	*
Class I	27 (50.0)	24 (44.4)	26 (48.1)	30 (56.6)	26 (48.1)	12 (22.2)	20 (37.0)	15 (27.8)	16 (29.6)	14 (25.9)
Class II	19 (63.3)	11 (36.7)	13 (43.3)	20 (66.7)	16 (53.3)	12 (40.0)	15 (50.0)	8 (26.7)	6 (20.0)	11 (36.7)
Class III	10 (55.6)	8 (44.4)	8 (44.4)	10 (55.6)	9 (50.0)	5 (27.8)	8 (44.4)	5 (27.8)	3 (16.7)	9 (50.0)
Posterior Crossbite	*	*	**	*	*	*	*	*	*	*
Absent	44 (54.3)	35 (43.2)	33 (40.7)	48 (60.0)	37 (45.7)	22 (27.2)	35 (43.2)	19 (23.5)	19 (23.5)	29 (35.8)
Present	12 (57.1)	8 (38.1)	14 (66.7)	12 (57.1)	14 (66.7)	7 (33.3)	8 (38.1)	9 (42.9)	6 (28.6)	5 (23.8)
Dichotomized DAI	*	*	**	*	*	*	*	**	*	*
No malocclusion	26 (63.4)	16 (39.0)	24 (58.5)	25 (61.0)	20 (48.8)	11 (26.8)	21 (51.2)	16 (39.0)	9 (22.0)	17 (41.5)
Malocclusion	30 (49.2)	27 (44.3)	23 (37.7)	35 (58.3)	31 (50.8)	18 (29.5)	22 (36.1)	12 (19.7)	16 (26.2)	17 (29.7)

*P > 0.05; **P ≤ 0.05
Chi-square test

0.034), indicating that malocclusions of greater severity had a greater impact on quality of life. These results are unique and reveal the importance of the early correction of particular types of malocclusion. Pediatric dentists and orthodontists should be aware of the clinical meaning of this condition, as the ideal age for orthodontic treatment remains a subject of debate in the literature. It is therefore important to make normative criteria compatible with subjective criteria in the assessment of the need for orthodontic treatment. Moreover, there was an association between malocclusion and variables on all the subscales of the CPQ₈₋₁₀, thereby further strengthening the hypothesis that malocclusion has negative physical and psychosocial effects on the quality of life of children.

The analysis of the results revealed that diastema ≥ 2 mm affected speech. Occlusal problems may lead to difficulties in pronouncing certain consonants and sounds, such as “s, z, sh, ch, g (soft) and dz”, as the tongue may remain distant

from the incisors, forcing the airflow to disperse.²⁷ Individuals with some types of malocclusion, such as accentuated upper anterior overbite, anterior open bite and crossbite, may also experience problems speaking.²⁸ However, the results of the present study and those of investigations conducted by other authors do not corroborate these findings.^{25,6} The discrepant results may be explained by the measures used to assess the impact of malocclusion on oral health, sample size and age of the participants.

Anterior open bite ≥ 2 mm and upper irregularity ≥ 2 mm had a significant effect on the eating habits of the participants. This result underscores the importance of a correct diagnosis on the part of pediatric dentists and orthodontists, as it may affect the choice of food and balance of the child’s diet, leading to nutritional problems.^{6,12} Moreover, malocclusion may limit the ability bite down on foods, thereby diminishing masticatory ability and efficiency.^{13,6,7}

Children with abnormalities in the positioning of their

teeth feel ashamed due to the appearance of their teeth and mouth, as also reported in a previous study.⁶ However, comparisons of the results should be performed with caution, as the study cited was conducted on individuals over 20 years of age. The children felt upset, sad and worried due to their oral health status. Anterior irregularity ≥ 2 mm was the type of malocclusion responsible for affecting the emotional wellbeing of the children, which is in agreement with the findings of previous studies.^{3,13,2} However, no associations were found between malocclusion and difficulty smiling. These results suggest that, even when feeling worried about the appearance of their teeth, the children did not employ artifices to hide their smile or avoid smiling and laughing. In contrast, adolescents tend to be more concerned with body image, as there is an increase in interest in relationships and dating after puberty as well as a greater seeking of approval from others of the same age group.²⁹ Children between eight and ten years of age, on the other hand, are more concerned with the approval of adults, such as their parents and health care professionals, and may not yet have become interested in relationships.¹⁶

According to Shaw *et al*, children with aligned teeth are considered better looking, more attractive as friends and are also seen as more intelligent.³⁰ In contrast, poor tooth positioning is seen as a reason for teasing and name calling.³¹ The findings of the present study support evidence that individuals are sensitive to aesthetic alterations, demonstrating the importance of incorporating subjective aspects to the orthodontic diagnosis.

Although the measure employed was specifically designed for administration on children between eight and ten years of age, it addresses several variables for which the association with malocclusion is difficult to establish. These variables are related to extremely subjective situations, such as trouble sleeping at night, problems doing homework and trouble speaking or reading aloud in class. Thus, only results judged plausible for the practical establishment of associations were discussed here.

Although the present study offers originality and provides important evidence regarding the influence of malocclusion on the quality of life of children between eight and ten years of age, it is a cross-sectional study. Therefore, longitudinal studies are needed to assess the long-term effect of malocclusion on quality of life of children.

CONCLUSIONS

Malocclusions had a negative influence over the quality of life of children between eight and ten years of age.

More severe malocclusions had a greater impact with regard to social, emotional and functional aspects.

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REFERENCES

1. World Health Organization. Basic oral health surveys. Ed. Santos, São Paulo; p. 65, 1999.
2. Marques LS, Pordeus IA, Ramos-Jorge ML, Filogônio CA, Filogônio CB, Pereira LJ, Paiva SM. Factors associated with the desire for orthodontic treatment among Brazilian adolescents and their parents. *BMC Oral Health*, 9: 34, 2009.
3. Marques LS, Ramos-Jorge ML, Paiva SM, Pordeus IA. Malocclusion: Esthetic impact and quality of life among Brazilian schoolchildren. *Am J Orthod Dentofacial Orthop*, 129: 424–7, 2006.
4. Christopherson, EA, Briskie D, Ingleharte MR. Preadolescent orthodontic treatment need: Objective and subjective provider assessments and patient self-reports. *Am J Orthod Dentofacial Orthop*, 135: S80–6, 2009.
5. Marques LS, Filogônio CA, Filogônio CB, Pereira LJ, Pordeus IA, Paiva SM, Ramos-Jorge ML. Aesthetic impact of malocclusion in the daily living of Brazilian adolescents. *J Orthod*, 36: 152–9, 2009.
6. Hassan AH, Amin HES. Association of orthodontic treatment needs and oral health-related quality of life in young adults. *Am J Orthod Dentofacial Orthop*, 137: 42–7, 2010.
7. Laing E, Cunningham SJ, Jones S, Moles D, Gille D. Psychosocial impact of hypodontia in children. *Am J Orthod Dentofacial Orthop*, 137: 35–41, 2010.
8. Locker D, Jokovic A, Prakash P, Tompson B. Oral health-related quality of life of children with oligodontia. *Int J Paediatr Dent*, 20: 8–14, 2010.
9. Bernabé E, de Oliveira CM, Sheiham A. Condition-specific sociodental impacts attributed to different anterior occlusal traits in Brazilian adolescents. *Eur J Oral Sci*, 115: 473–8, 2007.
10. Bernabé E, Sheiham A, Tsakos G, de Oliveira CM. The impact of orthodontic treatment on the quality of life in adolescents: a case – control study. *Eur J Orthod*, 30: 515–20, 2008.
11. Bernabé E, Sheiham A, de Oliveira CM. Condition-specific impacts on quality of life attributed to malocclusion by adolescents with normal occlusion and class I, II and III malocclusion. *Angle Orthod*, 78: 977–82, 2008.
12. de Paula-Junior DF, Santos NCM, Silva ET, Nunes MF, Leles CR. Psychosocial impact of dental esthetics on quality of life in adolescents. *Angle Orthod*, 79: 1188–93, 2009.
13. Mtaya M, Astrom AN, Brudvik P. Malocclusion, psycho-social impacts and treatment need: A cross-sectional study of Tanzanian primary school-children. *BMC Oral Health*, 8: 14, 2008.
14. Liu Z, McGrath C, Hägg U. The impact of malocclusion/orthodontic treatment need on the quality of life: systematic review. *Angle Orthod*, 79: 585–91, 2009.
15. Tung AW, Kiyak HA. Psychological influences on the timing of orthodontic treatment. *Am J Orthod Dentofacial Orthop*, 113: 29–39, 1998.
16. Phillips C, Beal KNE. Self-concept and the perception of facial appearance in children and adolescents seeking orthodontic treatment. *Angle Orthod*, 79: 12–16, 2009.
17. Carvior N, Lombardi DA. Developmental aspects of judgment of physical attractiveness in children. *Dev Psychol*, 8: 67–71, 1973.
18. Bee H. *Lifespan Development*. Ed. NY Addison Wesley Longman, New York, 1998.
19. Hetherington EM, Parke RD, Locke VO. *Child Psychology: A Contemporary Viewpoint*. Ed. The McGraw-Hill Companies New York, 1999.
20. Barbosa TS, Tureli MC, Gavião MB. Validity and reliability of the Child Perceptions Questionnaires applied in Brazilian children. *BMC Oral Health*, 9: 13, 2009.
21. The Brazilian Economic Classification Criterion [<http://www.abep.org>]
22. Kirkwood BR, Stern J. *Essentials of medical statistics*. Ed. Blackwell, London, 2003.

23. Jokovic A, Locker D, Tompson B, Guyatt G. Questionnaire for measuring oral health-related quality of life in eight- to ten-year-old children. *Pediatr Dent*, 26: 512–8, 2004.
24. Jenny J, Cons NC. Guidelines for Using the DAI: A Supplement to DAI—The Dental Aesthetic Index. Iowa City, Iowa: College of Dentistry, University of Iowa; 1988.
25. de Oliveira CM, Sheiham A. Orthodontic treatment and its impact on oral health-related quality of life in Brazilian adolescents. *J Orthod*, 31: 20–7, 2004.
26. Martins MT, Ferreira FM, Oliveira AC, Paiva SM, Vale MP, Allison PJ, et al. Preliminary validation of the Brazilian version of the Child Perceptions Questionnaire 8-10. *Eur J Paediatr Dent*, 10: 135–40, 2009.
27. Vallino LD, Tompson B. Perceptual characteristics of consonant errors associated with malocclusion. *J Oral Maxillofac Surg*, 51: 850–6, 1993.
28. Pahkala R, Laine T, Närhi M. Associations among different orofacial dysfunctions in 9-11-year-olds. *Eur J Orthod*, 17: 497–503, 1995.
29. Peres KG, Barros AJ, Anselmi L, Peres MA, Barros FC. Does malocclusion influence the adolescent's satisfaction with appearance? A cross-sectional study nested in a Brazilian birth cohort. *Community Dent Oral Epidemiol*, 36: 137–43, 2008.
30. Shaw WC. The influence of children's dentofacial appearance on their social attractiveness as judged by peers and lay adults. *Am J Orthod*, 79: 399–415, 1981.
31. Shaw WC, Meek SC, Jones DS. Nicknames, teasing, harassment and the salience of dental features among school children. *Br J Orthod*, 7: 75–80, 1980.