

## Agreement between adolescents and parents/caregivers in rating the impact of malocclusion on adolescents' quality of life

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### ABSTRACT

**Objective:** To assess the agreement between adolescents and their parents/caregivers regarding the impact of malocclusion on adolescents' oral health-related quality of life (OHRQoL).

**Materials and Methods:** A consecutive sample of 141 adolescent and parent/caregiver pairs was selected. Adolescents answered the short version of the Child Perceptions Questionnaire (CPQ<sub>11-14</sub>), while parents answered the Parental-Caregiver Perceptions Questionnaire (P-CPQ). The CPQ<sub>11-14</sub> and the P-CPQ have 14 items in common that are organized through four subscales: oral symptoms (OS), functional limitations (FL), emotional well-being (EW), and social well-being (SW). Agreement on the overall score and agreement on the subscales were determined using comparison and correlation analysis. The comparison analysis was carried out by comparing the mean directional and absolute differences, and the correlation analysis was performed using the intraclass correlation coefficient (ICC).

**Results:** A total of 135 pairs of adolescents and parents/caregivers agreed to answer the questionnaires, providing a response rate of 95.7%. The mean age of the adolescents was 11.50 years. The mean directional difference was significant for the OS ( $P < .001$ ) and FL ( $P = .040$ ) subscales as well as for the overall score ( $P = .007$ ). Adolescents' reports were higher than parents/caregivers' reports. The mean absolute difference for the overall score was 7.26, representing 12.9% of the maximum possible overall score. The ICC was 0.16 for the overall score, indicating poor agreement.

**Conclusion:** Poor agreement was observed between adolescents and their parents/caregivers in rating the impact of malocclusion on adolescents' OHRQoL. (*Angle Orthod.* 2015;85:806–811.)

**KEY WORDS:** Adolescent; Malocclusion; Parents; Caregivers; Proxy; Quality of life

### INTRODUCTION

Oral health-related quality of life (OHRQoL) is defined as the assessment of how oral outcomes

affect a person's overall health and well-being.<sup>1</sup> Over the past 20 years, increasing attention has been given to the evaluation of OHRQoL in dental research.<sup>2</sup> When quality-of-life measures are used alongside traditional clinical methods of evaluating oral health status, a more comprehensive assessment of the impact of oral outcomes on several dimensions of subjective well-being becomes feasible.<sup>3</sup>

Many studies have reported that malocclusion has a negative impact on adolescents' OHRQoL.<sup>4,5</sup> For esthetic reasons, malocclusion can play an important role in adolescents' psychological well-being and in their social acceptance and interaction.<sup>6</sup> In more severe cases, it can also result in functional limitations for the affected persons.<sup>7</sup> Indeed, adolescents with malocclusion can experience poor masticatory efficiency and ability.<sup>8</sup>

Parents/caregivers are often the main decision makers regarding their children's health, and their perceptions have a major influence on treatment choices.<sup>9</sup> Therefore, even when adolescents are able

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to provide self-reports, parents/caregivers' proxy reports should be obtained to provide additional and complementary information about the impact of different oral outcomes on adolescents' OHRQoL.<sup>10</sup> Both views may offer a more comprehensive basis for professional clinical decisions. This information may also be useful for health authorities in planning oral health services.<sup>11</sup>

Though important, the perceptions of parents/caregivers and the agreement between them and their sons/daughters in rating the impact of malocclusion on adolescents' quality of life has been poorly documented so far.<sup>12</sup> To the best of our knowledge, only two studies have evaluated such an agreement, and they have provided conflicting results.<sup>12,13</sup> Studies on this type of agreement should be encouraged, given that the validity of parents/caregivers' reports and, therefore, whether or not parents/caregivers can serve as proxies for their children, depends on this understanding.<sup>10</sup> Moreover, both previous reports evaluated persons with different cultural characteristics from those of the Brazilian population. Ethnicity is a marker for oral health status. It is important to consider that among different cultural groups there are differences in health beliefs and oral behaviors, and, consequently, the study of oral health outcomes in different populations should be encouraged.<sup>14</sup> Thus, the aim of this study was to assess the agreement between reports of Brazilian adolescents and their parents/caregivers regarding the impact of malocclusion on adolescents' OHRQoL. We hypothesized that parents/caregivers' reports on their adolescents' quality of life would be in agreement with reports presented by their children.

## MATERIALS AND METHODS

### Subjects, Setting, Period of Recruitment, and Eligibility Criteria

A sample of consecutive persons was identified through the dental screening program of the Department of Pediatric Dentistry and Orthodontics at the Federal University of Minas Gerais in September 2013. This program consists of the oral examination of adolescents to determine whether or not they needed orthodontic treatment. Adolescents, along with their parents/caregivers, were invited to participate. For inclusion in the sample, adolescents and their parents/caregivers needed to be literate and fluent in Portuguese. The exclusion criteria adolescents with dental caries, history of dental trauma, poor gingival health, craniofacial anomalies, and cognitive disorders. In addition, those who had undergone any dental treatment within the past 3 months were also excluded.

### Sample-Size Calculation

The sample size was calculated adopting the intraclass correlation coefficient (ICC) as a reference. An ICC of 0.7, which represents a substantial agreement, was deemed acceptable; however, an ICC of 0.8, indicative of excellent agreement, was preferred.<sup>15</sup> Considering an  $\alpha$  of 0.05 and  $\beta$  of 0.2,<sup>16</sup> 117 was the minimum number of pairs of adolescents and parents/caregivers required to complete this study. This number was increased by 20% to compensate for possible losses. Therefore, the sample consisted of 141 pairs of adolescents and parents/caregivers.

### Ethical Issues

This study received approval from the Ethics Committee on Human Research of the Federal University of Minas Gerais. Adolescents and their parents/caregivers were informed that their participation was entirely voluntary, and if they chose not to participate, their decision would not affect the services they were about to receive at the university in any way. It was also ensured that their names would not be revealed in any report from this study. Once they agreed to participate, the adolescents and their parents/caregivers signed an informed consent form.

### OHRQoL Assessment Tool

The outcomes examined were the impact of malocclusion on adolescents' OHRQoL and the perceptions of their parents/caregivers. Data were collected through OHRQoL tools. Adolescents answered the short version of the Child Perceptions Questionnaire (CPQ<sub>11-14</sub>),<sup>17</sup> and parents/caregivers answered the Parental-Caregiver Perceptions Questionnaire (P-CPQ).<sup>18</sup> Both instruments were developed in Canada and have been translated and verified for use in the Portuguese language.<sup>19,20</sup> The CPQ<sub>11-14</sub> consists of 16 questions distributed among four subscales: oral symptoms (OS), functional limitations (FL), emotional well-being (EW), and social well-being (SW). Each question has five response options: never = 0; once or twice = 1; sometimes = 2; often = 3; and every day or almost every day = 4.<sup>17</sup> The P-CPQ has 31 questions distributed among the same four subscales with the same five response options.<sup>18</sup> The two measures have 14 items in common: four items on the OS subscale, four on the FL subscale, three on the EW subscale, and three on the SW subscale.<sup>11</sup> The overall score is computed by adding up the scores for all questions. Scores for each of the four subscales can also be computed separately.<sup>17,18</sup> The overall score on both questionnaires ranges from 0 to 56.<sup>11</sup> For the

CPQ<sub>11-14</sub>, a higher score is indicative of a greater negative impact on adolescents' quality of life.<sup>17</sup> For the P-CPQ, a higher score denotes a greater negative perception on the part of parents/caregivers with regard to their adolescents' OHRQoL.<sup>18</sup>

### Adolescents' Orthodontic Treatment Needs Assessment

The Dental Aesthetic Index was used to determine orthodontic treatment needs.<sup>21</sup> This index provides four outcome possibilities: slight treatment need ( $\leq 25$ ), elective treatment (26 to 30), highly desirable treatment (31 to 35), and mandatory treatment ( $\geq 36$ ).

### Statistical Analysis

Statistical analysis was carried out using the Statistical Package for the Social Sciences (SPSS for Windows, version 17.0, SPSS Inc, Chicago, Ill). Descriptive statistics was performed. The directional differences were determined by subtracting the adolescents' CPQ<sub>11-14</sub> scores from the parents/caregivers P-CPQ scores. The overall and subscale directional differences were then compared to zero using paired *t*-tests to assess statistical significance.

To evaluate the magnitude of systematic bias, mean directional differences were divided by their respective standard deviations. To interpret the difference magnitude, a standardized difference of 0.2 was considered small, 0.5 was considered moderate, and 0.8 was considered large.<sup>22</sup> The mean absolute differences for the overall and subscale scores were calculated by ignoring the positive and the negative signs of the directional differences, which provide an indicator of agreement. This was then expressed as a percentage of the maximum score to assess the size of the absolute differences.

The ICC values were also calculated for the overall and subscale scores. The level of agreement presented by the ICC was categorized as follows:  $<0.2$  (poor), 0.2–0.4 (fair), 0.41–0.60 (moderate), 0.61–0.80 (substantial), and 0.81–1.0 (excellent).<sup>15</sup>

### RESULTS

Among the 141 pairs of adolescents and parents/caregivers assessed for eligibility, five pairs were excluded because the adolescents had a history of dental treatment within the previous 3 months. Of the 136 eligible participants, one adult was not able to answer the questionnaire, as she was not the parent/caregiver of the adolescent. Therefore, a total of 135 pairs of adolescents and parents/caregivers participated in the present study, providing a response rate of 95.7%. Mean age of the adolescents was  $11.50 \pm$

**Table 1.** Adolescents' Demographic Characteristics and Orthodontic Treatment Need

	No. (%)
Sex	
Male	62 (45.9)
Female	73 (54.1)
Age, years	
11	67 (49.6)
12	68 (50.4)
Orthodontic need	
Slight	49 (36.3)
Elective	39 (28.9)
Highly desirable	30 (22.2)
Mandatory	17 (12.6)

0.50 years. Table 1 displays the sociodemographic characteristics of the sample and the adolescents' orthodontic treatment needs.

Adolescents presented worse subscale and overall OHRQoL mean scores than did their parents/caregivers (Table 2). The mean directional differences for OS ( $P < .001$ ) and FL ( $P = .040$ ) subscales, as well as for the overall scores ( $P = .007$ ) showed statistical significance. When the mean directional differences were standardized, the magnitude of the directional difference for the overall score was 0.23. The mean absolute differences between the overall CPQ<sub>11-14</sub> and P-CPQ scores was  $7.26 \pm 6.17$ , which represents 12.9% of the maximum possible score of 56 (Table 3).

The ICC for the overall score was 0.16, which is considered a poor agreement between adolescents and their parents/caregivers in rating the impact of malocclusion on adolescents' OHRQoL. Among the subscales, the ICC ranged from 0.01 to 0.32, values indicative of poor and fair agreement (Table 4).

### DISCUSSION

To date, the extent to which parents/caregivers understand the effects of illness and health on their children's life remains unanswered.<sup>10</sup> Previous assessments of the agreement between adolescents and their parents/caregivers in rating the impact of malocclusion on adolescents' OHRQoL showed that parents/caregivers presented higher subscale and overall scores than did their children and thus overestimated the impact of malocclusion on their adolescents' quality of life.<sup>12,13</sup> Conversely, the results of the present study showed that Brazilian adolescents rated their OHRQoL as more compromised by their malocclusion than did their parents/caregivers. In our study, adolescents and parents/caregivers answered the questionnaire separately to ensure that one did not influence the answer of the other. The

**Table 2.** Mean Subscale and Overall Scores for Adolescents and Parents/Caregivers<sup>a</sup>

	CPQ <sub>11-14</sub> Range	Adolescents CPQ <sub>11-14</sub> Mean (SD)	P-CPQ Range	Parents/Caregivers P-CPQ Mean (SD)
Oral symptoms	0-16	4.16 (2.45)	0-16	3.10 (1.95)
Functional limitations	0-16	3.33 (2.76)	0-16	2.70 (2.33)
Emotional well-being	0-12	2.35 (2.17)	0-12	2.15 (1.81)
Social well-being	0-12	2.09 (2.38)	0-12	1.80 (1.91)
Overall	0-56	11.93 (7.45)	0-56	9.76 (6.26)

<sup>a</sup> CPQ indicates Child Perceptions Questionnaire; P-CPQ, Parental-Caregiver Perceptions Questionnaire; SD, standard deviation.

information was provided in a quiet area of the university clinic with a researcher available to clarify any question. The questions on both tools address the frequency of events regarding problems with adolescents' teeth, lips, jaws, or mouth, considering a self-reported recall of the previous 3 months.<sup>17,18</sup> Thus, the administration of the questionnaires was limited to adolescents with no dental disease other than malocclusion and no dental treatment in a period of time shorter than this interval, thereby avoiding any bias that could have occurred if the 3-month time-frame had not been considered.

The level of agreement between adolescents and parents/caregivers in rating adolescents' quality of life seems to be subscale dependent. Although a good agreement has been reported for symptoms and functions, a poor agreement has been found for emotional and social aspects.<sup>23</sup> Interestingly enough, in the present study, the mean directional differences were statistically significant for the overall as well as for the OS and FL subscale scores. Similar results were found in two previous studies that examined the level of agreement between adolescents and parents/caregivers in rating the impact of malocclusion on adolescents' OHRQoL.<sup>12,13</sup> In those studies, a disagreement was reported for the OS<sup>12</sup> and FL<sup>13</sup> subscales as well as for the overall score.<sup>12,13</sup>

The standardized difference reflects systematic bias, and its values of reference are similar to those

of an effect size calculation.<sup>12</sup> The standardized difference between adolescents and parents/caregivers in the present study could be interpreted as moderate for the OS subscale and small for the FL, EW, and SW subscales as well as for the overall score. Those results were also found in a study evaluating the agreement between children and their mothers concerning the impact of oral disorders in children's OHRQoL.<sup>24</sup> The interpretation of absolute differences between the scores of adolescents and those of their parents/caregivers has been considered a difficult task, as no statistical test has been designed for this type of data. However, such an interpretation can be carried out by comparing the absolute difference to the maximum obtainable score.<sup>25</sup> The findings of this study, which concur with those of a previous study,<sup>12</sup> suggest that when the impact of malocclusion on adolescents' OHRQoL is evaluated, the absolute difference in overall scores between adolescents and their parents/caregivers was slightly greater than 10% of the maximum obtainable score and ranged from 14.7% to 17.6% among the subscales.

The ICC values for overall scores showed that the agreement between adolescents and their parents/caregivers was poor. The ICC for the subscales ranged from poor to fair agreement, with the latter being observed for the EW subscale. The low values of ICC may well reflect a true disagreement between adolescents and their parents/caregivers with respect

**Table 3.** Mean Directional<sup>a</sup> and Absolute<sup>b</sup> Differences for Subscale and Overall Scores<sup>c</sup>

	Directional Differences				Absolute Differences		
	Mean (SD)	CI (95%)	P Value*	D	Mean	SD	S (%)
Oral symptoms	1.06 (2.93)	0.56, 1.56	<.001	0.36	2.36	2.03	14.7
Functional limitations	0.63 (3.46)	0.03, 1.20	.040	0.18	2.66	2.30	16.6
Emotional well-being	0.20 (2.54)	-0.23, 0.64	.354	0.08	1.87	1.73	15.5
Social well-being	0.29 (2.97)	-0.21, 0.80	.253	0.10	2.09	2.12	17.6
Overall	2.17 (9.29)	0.59, 3.75	.007	0.23	7.26	6.17	12.9

<sup>a</sup> Directional differences are the difference between adolescent and parent scores (adolescent's score minus parent's score) accounting for the direction of differences (indicator of bias).

<sup>b</sup> Absolute differences are the difference between adolescent and parent scores irrespective of the direction of differences (indicator of agreement).

<sup>c</sup> SD indicates standard deviation; CI, confidence interval; D, standardized difference (mean directional difference / standard deviation of directional differences); S, size of the absolute difference.

Level of significance \*  $P < .05$ .



**Table 4.** Correlations Between Adolescents and Parents/Caregivers for Subscale and Overall Scores<sup>a</sup>

	ICC	CI (95%)	P Value*
Oral symptoms	0.20	−0.09, 0.41	.082
Functional limitations	0.15	−0.18, 0.39	.170
Emotional well-being	0.32	0.04, 0.51	.014
Social well-being	0.01	−0.26, 0.36	.273
Overall	0.16	−0.17, 0.39	.155

<sup>a</sup> ICC indicates intraclass correlation coefficient; CI, confidence interval.

Level of significance \*  $P < .05$ .

to these evaluations. However, it has been recognized that this low level of agreement may also be due to the complexity of the constructs addressed and the difficulties that adolescents may have with concepts involving oral health and well-being.<sup>24</sup>

Some potential shortcomings in the methodology of the present assessment should be considered. The first limitation is the cross-sectional design of the study. There are very few evaluations of changes in adolescent-parent/caregiver agreement about quality of life over time. The magnitude and direction of those changes could be clearly appreciated through longitudinal studies, as they allow for the identification of factors associated with changes over time and dimensions with marked changes in the degree of agreement.<sup>26</sup> The second regards the presence of adolescents with a slight need for orthodontic treatment. This may be one of the reasons why parents/caregivers underestimated the impact of malocclusion on their adolescents OHRQoL. This study would have benefited from a more balanced distribution of the patients' orthodontic need. The third is the use of the CPQ<sub>11–14</sub> and the P-CPQ. These OHRQoL instruments are generic. However, in the present study, they were used to detect specific impacts linked to the presence of malocclusion. A disadvantage of adopting generic measures is that they may be less sensitive or responsive to small but relevant changes related to disease status.<sup>27</sup> Finally, although this study was based on a sample-size calculation as well as on a high response rate, the subjects were not randomly selected. Thus, participants are not fully representative of the overall population, and conclusions should be interpreted with caution.<sup>28</sup> The findings from this study cannot be generalized beyond the actual study sample. Therefore, further studies are strongly encouraged in different settings and populations in an attempt to corroborate the present results.<sup>29</sup>

The results of this study have implications for clinical practice. Parents/caregivers may have limited knowledge regarding the impact of malocclusion on their children's quality of life. The low ICC values suggest that parents/caregivers cannot be used as proxies for assessments in clinical scenarios.<sup>24</sup> However, this

does not lessen the value of parental reports in research concerning pediatric health outcomes. Parents/caregivers' knowledge is necessary in some circumstances to supplement or complement adolescents' reports. Although parents/caregivers' reports may be incomplete because of their lack of knowledge regarding certain experiences, they still provide useful information. Hence, their perceptions should be measured regardless of the extent to which they agree or not with those of their adolescents.<sup>10,24</sup> To achieve informed consent as well as optimal outcomes for adolescents receiving health therapy, the healthcare team must actively involve parents/caregivers in the decision-making process and in providing understandable and ongoing information support throughout the treatment.<sup>30</sup>

## CONCLUSION

- Poor agreement was observed between reports provided by adolescents and those provided by their parents/caregivers in rating the impact of malocclusion on adolescents' quality of life.

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