

Influence of periodontal health on the quality of life of children treated at a pediatric dentistry clinic

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• **Conflicts of interest:** none declared.

ABSTRACT

Objective: the aim of this study was to evaluate the relationship between the periodontal condition and the quality of life of pediatric patients, using as reference the supragingival biofilm and gingival bleeding indexes. **Material and Methods:** the study included systemically healthy children from 5 to 11 years of age, treated at the Pediatric Dentistry Clinic of Salgado de Oliveira University. Quality of life questionnaires CPQ 11-14 and 8-10 and ECOHIS were applied and periodontal clinical examinations were performed to obtain the O'Leary index and gingival bleeding index scores. The questionnaires were answered by the patient, or if unable, by the legal guardians. Quality of life was dichotomized as low (G1 score<15) and high (G2 score>15). The t-test and the chi-square test ($p<0.05$) were applied. **Results:** the sample consisted of 15 children. In G1, the O'Leary index mean was 34.69 (± 19.71) and the gingival bleeding index mean was 13.80 (± 5.79). In G2, the O'Leary mean was 40.31 (± 7.78) and the gingival bleeding index mean was 18.66 (± 18.21). The quality of life did not present statistically significant difference for the O'Leary ($p=0.16$; t-test) and gingival bleeding indexes ($p=0.15$; t-test). **Conclusion:** the outcomes demonstrated that the indexes related to dental biofilm and presence of gingivitis did not impact the self-perception of life quality of the children under study.

Keywords: Gingivitis; Pediatric Dentistry; Quality of life; Biofilm.

Introduction

The relationship between quality of life and oral health condition has been discussed with a wider perspective in recent years, since oral alterations have a direct impact on the daily life of patients.¹ According to Nobre (1995),² the quality of life should be defined as something inherent to the individuals, to their most personal characteristics, related both to the constitutional aspects of hereditary nature and to those acquired along their life.

Considering these concepts, several indexes have been created to measure the individual's level of life quality, correlating it with his/her health condition. In dentistry this relationship has been greatly emphasized by the fact that oral health impacts a person's life in its physical and psychosocial aspects.³ Several epidemiological research instruments have also been developed to assess the relationship between health and self-perception of its impact on quality of life.

In order to evaluate the oral health-related quality of life (OHRQoL) of the youngsters, Jokovic *et al.*⁴ created the *Child Perceptions Questionnaire* 11-14 (CPQ 11-14) for Canadian adolescents aged 11-14 years. This questionnaire is self-fulfilling and assesses the perception of the young individuals on the impacts of oral disorders on their well being. It is also applicable to children aged 8-10 years, in CPQ version 8-10.⁵ For preschool children, the *Early Childhood Oral Health Impact Scale* (ECOHIS) instrument was developed to evaluate the quality of life related to oral health.⁶ This is a question-

naire answered by the parent/caregiver, which brings divergent answers from parents and children. The *Scale of Oral Health Outcomes* for 5-year-old Children (SOHO-5) is also a questionnaire aimed at preschoolers, but developed so that the child is able to reliably inform his/her perception of oral health related to quality of life. This instrument is composed by seven questions in two versions: for the adult and for the child.⁷

During childhood, several diseases can be prevented or healed before they become irreversible, as for example the evolution of gingivitis to periodontitis and a possible worsening of pre-existing systemic conditions.⁵ It may influence the children's quality of life from the onset of the disease to its most advanced stage. In this context, biofilm and gingival bleeding indexes may influence the self-image, socialization and functional performance of oral structures. Thus, the aim of the present study was to evaluate the relationship between the periodontal condition and the quality of life of pediatric patients, using as reference the supragingival biofilm and gingival bleeding indexes.

Material and Methods

The research was carried out by a convenience sample children treated at the Pediatric Dentistry Clinic of Salgado de Oliveira University, Niterói campus, RJ, between May and September 2017. The project was approved by the university's Ethics Committee (Approval No. 2,114,238).

Sample Selection

Brazilian 5-11-year-old children from the metropolitan area of Rio de Janeiro under dental treatment at the university were randomly selected for the study, provided they presented cognitive capacity to independently follow the research instructions. All those who reported some type of systemic impairment, use of medication and CPO-D or ceo-d higher than 5 were excluded from the analysis to avoid any confounding factors.

Clinical Examination and Questionnaire Application

The study was divided into two stages: periodontal clinical analysis and application of questionnaires on OHRQoL. The clinical stage was also divided into two moments: evaluation of the presence and distribution of the supragingival biofilm with the use of plaque disclosing agents (Biodinâmica Química e Farmacêutica Ltda, Ibioporã, PR, Brazil) to obtain the O'Leary index. The gingival bleeding index was established after careful examination of the gingival sulcus of all teeth at the four probing sites with a millimeter periodontal probe (Millennium; Golgran Indústria e Comércio de Instrumentos Ltda, São Paulo, SP, Brazil).

The periodontal clinical examination occurred after the examiner was trained by a gold-standard professional until obtaining Kappa index >90%. The examiner applied the questionnaire.

Initially, CPO-D/ceo-d index was assessed followed by the periodontal bleeding index. The examination was done by quadrants and the results were written down on a clinical chart 1 for sites with gingival bleeding and 0 for sites without gingival bleeding. The index was obtained according to the exposed formula after probing and evaluation of all teeth with a clinical mirror (Golgran).

Next, the examiner evaluated the supragingival biofilm index using plaque-disclosing tablets. The tablet was placed in the child's mouth and the child was instructed to keep it for 3 min, performing circular movements with the tongue and cheeks so that the disclosing agent came in contact with all dental surfaces. A dental mirror was used to observe the teeth and all tooth surfaces on which the disclosing agent reacted were marked on the clinical chart in order to obtain the O'Leary index.

After the clinical stage, the children answered the questionnaires corresponding to their age group. The validated Brazilian versions of CPQ 8-10 and CPQ 11-14 were applied to the children in 8-10 and 11-14-year-old age groups. The EOHIS was applied to preschool children younger than 7 years.

The CPQ is a self-applicable questionnaire with five possible answers for each question, ranging from never to every day, where never corresponds to 0 score and every day corresponds to score 4. The EOHIS is answered by the parent/

legal guardian with scores 0 to 5, where 0 means 'never', 1 means 'almost never', 2 means 'sometimes', 3 means 'frequently', 4 means 'very often' and 5 'do not know'. The sum obtained from the answers determines the OHRQoL index. The higher the result, the worse the OHRQoL perception, which means having a perceived lower quality of life.

Data Analysis

The obtained periodontal and quality of life indexes were compared using the statistical analysis software SPSS Statistics 20.0 (Statistical Package for the Social Sciences). The scores of the life quality questionnaires were transformed into percentages for data analysis. The 'quality of life' variable was dichotomized in low (G1; score<15%) and high (G2; score>15%). The scores were also transformed into percentages in order to assess the quality of life according to the age. The sample presented a normal distribution as determined by the Shapiro-Wilk test ($p=0.61$ for the O'Leary index and $p=0.62$ for the bleeding index) and thus parametric tests were used for statistical analysis. The chi-square test was applied for comparison between sexes and quality of life ($p<0.05$) and the Student's *t*-test was applied for the O'Leary index. A significance of 5% set for all analyses.

Results

Fifteen children were evaluated, with a mean age of 8.6 ±2.3 years. The sample included 53.3% boys (mean age 8.0±2.6 years) and 46.7% girls (mean age 9.3±1.9 years). Gingival bleeding and biofilm occurred in 100% of the cases.

The dichotomized quality of life did not present statistical significance for periodontal health indexes and no statistically significant difference was found for the O'Leary index ($p=0.16$; *t*-test) or for the gingival bleeding index ($p=0.15$; *t*-test). Table 1 shows that in G1 (low quality of life) the O'Leary index mean was 34.69 (±19.71) and the gingival bleeding index mean was 13.80 (±5.79). In G2 (high quality of life), the O'Leary mean was 40.31 (±7.78) and the gingival bleeding index mean was 18.66 (±18.21). Figure 1 shows the percentage of quality of life, bleeding index and O'Leary index distributed by age, demonstrating similarity between bleeding and O'Leary indexes as well as a higher quality of life (15.6%) in children older than 5 years compared to the younger (6.20%).

Table 1. O'Leary index and gingival bleeding index according to dichotomous quality of life

Dichotomous Quality of Life	O'Leary index Mean (% ±SD)	Gingival Bleeding index Mean (% ±SD)
Low (<15)	34.69 (±19.71)	13,80 (±5.79)
High (> 15)	40.31 (±7.78)	18.21 (±8.66)
* <i>p</i> value	0.16	0.15

**t*-test ($p<0.05$)

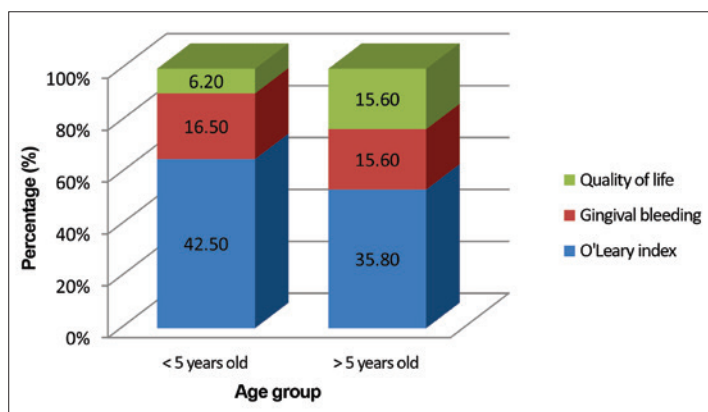


Figure 1. Distribution by age of the percentage of quality of life, Gingival bleeding index and O'Leary index

The correlation between quality of life and periodontal indexes did not show statistical significance ($p > 0.05$). There were no significant differences between sexes regarding quality of life ($p = 0.41$, chi square test).

Discussion

Quality of life is considered a factor of major social and scientific relevance, although it presents some inaccuracies as to its definition.⁸ Its concept is related to the individual's self-esteem and well-being, his emotional state, ethical and cultural values, occupation and health condition.⁹ It emerges from the social, alimentary, environmental aspects among others, in which the individual is inserted.

While the quality of life arising from economic condition, schooling and cultural habits impact the periodontal condition, it is also true that the periodontal condition has an impact on the patient's quality of life related to aspects such as interpersonal relations, self-esteem and professional life. Ng and Leung¹⁰ observed in their studies that there is a relationship between periodontal clinical attachment level (CAL) and the quality of life level; individuals with CAL above three millimeters had a more negative impact on OHRQoL.

The region affected by periodontal disease influences how much oral health impacts on the quality of life. The anterior region of the mouth, particularly the mandibular anterior sextant area, plays an important role in affecting OHRQoL.¹¹ Physical aspects are the most reported as negatively influencing the quality of life in patients with periodontal disease.⁹

Gingival disease is considered to be the most common among children and adolescents and a strong relation to the family's socioeconomic condition has been observed.¹² Gingivitis may interfere in the psychosocial aspects and affect the relationship with the self-image. The younger patients are usually more affected by body changes and their health perceptions change with their personal development.^{13,14}

A cross-sectional study by Tomazoni *et al.*,¹² with random sampling of 12-year-old children enrolled in public schools in the city of Santa Maria, RS, Brazil, evaluated the gingival bleeding index of the volunteers according to the criteria of the community periodontal index and application of the Brazilian version of CPQ11-14. Data on the socioeconomic status of the children were also collected. The authors reported that children with a bleeding index $\geq 15\%$ had higher scores of CPQ11-14, which is a worse perception about their OHRQoL. The presence and extent of gingival bleeding were mainly associated with the emotional limitation domains of CPQ11-14; those with higher levels of gingivitis had 1.20 times higher scores on CPQ11-14 than those with low gingival bleeding. Therefore, the study indicates that the presence of high levels of gingivitis may be negatively associated to how children perceive oral health and their daily lives.

The child's OHRQoL associated with the periodontal condition has varying results according to the patient age, time of diagnosis or extent of the disease.¹² Krisdapong *et al.*¹⁴ observed in a study with 12- and 15-year-old Thai children that gingivitis was the most common oral disease (79.3% at 12 years of age, 81.5% in 15-year-old children). Gingivitis and calculus were significantly associated with impacts on smiling in 15-year-olds, on studying and making social contact for 12-year-olds. In this study was used the *Child-Oral Impacts on Daily Performances* (Child-OIDP) questionnaire for 12-year-old children and the *Oral Impacts on Daily Performances* (OIDP) questionnaire for the 15-years-old children. Oral disease and OHRQoL associations and perceived dental needs were investigated using logistic regression models.

Understanding the relationship between oral health and quality of life may contribute to assess treatment options and define risk groups.¹² In addition, studies on OHRQoL facilitate the perception and the need to treat health not only as the absence of diseases but also as a complete state of physical, mental and social well-being, as the World Health Organization (WHO) defines it so well.

In the present study, the relationship between periodontal conditions was evaluated using biofilm index, gingival bleeding index and quality of life as parameters. In the literature, dental caries and socioeconomic status are the most reported variables with an impact on OHRQoL.¹² However, periodontal conditions also show a strong relationship as an influencing factor in quality of life perception, especially in patients with more severe periodontal disease.⁹

Gingivitis is also presented in the literature as an influencing factor in the perception of OHRQoL, especially in children with excessive bleeding. It has been reported that smiling is the most impacted by the periodontal conditions, which may progress to a disease when biofilm is present on dental surfaces for an extended time. However, few studies

have evaluated the quality of life with this initial condition, associating with the plaque index.

The present study used methodologies similar to those employed in previous investigations. No significant differences in OHRQoL perception were found between sexes or age groups, and the relationship between periodontal index and quality of life was weak. Cimões *et al.*¹⁵ found no influence of periodontal conditions with OHRQoL either. Those authors selected patients under periodontal treatment and used the OIDP questionnaire to measure this relationship and the result did not show statistically significant associations, different from the findings of Tomazoni *et al.*¹² and Krisdapong *et al.*¹⁴

This outcome may be justified by the small sample size of this study. Furthermore, as there is no previous epidemiological study addressing the periodontal condition of the studied population, our patients were randomly selected and could either present or not periodontal disease in its mild or aggressive form. The sample had a homogeneous behavior regarding its oral condition. There were no children

with severe periodontitis in the study (a rare condition in youngsters).

Another relevant finding of this study is that all children presented dental biofilm and gingivitis, which are predisposing conditions to periodontal disease. It is well known that lack of control can progress to an irreversible periodontal breakdown. Therefore, the pediatric dentist must be aware of the clinical signs and adopt measures to stop their progressions because, as demonstrated in the present study, they do not affect the children's perception of quality of life while their initial stages.

Conclusion

The present study demonstrated that the indexes related to dental biofilm and gingivitis did not influence the self-perception of the quality of life of the children in the studied sample. However, presence of both biofilm and gingivitis should be parameters that the pediatric dentist should be aware of in order to avoid an evolution to more serious and even irreversible forms of the disease, such as periodontitis.

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Mini Curriculum and Author's Contribution

- Mariana Farias da Cruz - Undergraduated Student. Contribution: study design, data tabulation, article writing and final review.
- José Mocarzel Filho - DDS, MSD. Contribution: writing of the article and final review.
- Rackel Gonçalves - DDS, MSD. Contribution: study design, data interpretation, article writing and final review.
- Tatiana Kelly da Silva Fidalgo - DDS, MSD, PhD. Contribution: study design, statistical analysis, data interpretation, article writing and final review.

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