Oral Health-related Quality of Life and Dental Esthetics in Amsterdam Schoolchildren

Esmé M. Calis, DDS Lot M. Geels, MSc Birte Prahl-Andersen, DDS, PhD Andrej Zentner, BDS, PhD, FDSRCS

ABSTRACT

Purpose: The purpose of this study was to examine the oral health-related quality of life (OHRQoL) of schoolchildren in Amsterdam, the Netherlands, and to assess the relationship between OHRQoL and self-reported dental esthetics.

Methods: The Child Oral Health Impact Profile (COHIP) was completed by 510 seventh and eighth graders of public primary schools. Subjects also assessed their own dentition with the Esthetic Component of the Index of Orthodontic Treatment Need (AC-IOTN). Gender differences on COHIP subscales and the AC-IOTN were examined using Mann-Whitney U tests. Correlations between the COHIP subscales and the AC-IOTN were assessed with Spearman's rank correlation coefficient.

Results: Boys scored significantly lower on the subscales "oral symptoms" and "emotional well-being" than girls. Correlations between OHRQoL and the AC-IOTN were low but significant for boys for the domains "oral symptoms" (0.137) and "emotional well-being" (0.186) and for girls for the domains "functional well-being" (0.148), "emotional well-being" (0.195), and "peer interaction" (0.215).

Conclusions: Dutch schoolchildren in Amsterdam generally reported good oral healthrelated quality of life. Boys seemed to experience a slightly lower impact of oral symptoms and better emotional well-being than girls. Children's self-perceived dental esthetics did not seem to constitute a relevant variable to explain their level of OHRQoL. (J Dent Child 2009;76:130-5)

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In the field of orthodontics, oral health-related quality of life (**OHRQoL**), defined as "a standard of health of the oral and related tissues which enables an individual to eat, speak, and socialize without active disease, discomfort, or embarrassment and which contributes to general well-being,"¹ has only recently become a topic of interest.

The aim of general orthodontic treatment is to correct variation from an arbitrary norm ² and is carried out mainly to improve esthetics and enhance psychosocial well-being.³ Little research has been done, however, to support this premise. Scientific publications in the orthodontic field often concern matters such as sleep apnea, orthognathic surgery, and temporomandibular disorders. Fewer articles describe studies on quality of life (**QoL**) in relationship to orthodontic treatment. Some of these studies discuss the importance of QoL in orthodontics,^{2,4,5} others describe the impact of orthodontic treatment on QoL^{6,7} and other studies describe the effects of orthodontic

Dr. Calis is orthodontist, Dr. Geels is PhD student, and Drs. Prahl-Andersen and Zentner are professors, all in the Department of Orthodontics, Academic Centre for Dentistry Amsterdam, Amsterdam, the Netherlands. Correspond with Dr. Geels at Im.geels@psy.vu.nl

Table 1. Item Descriptive Statistics and Subscales of the Child Oral Health Impact Profile

Item	Mean±(SD)	Minimum	Maximum
Oral symptoms			
Had pain in your teeth/toothache	1.98±0.95	1	5
Been breathing through your mouth or snoring	1.66±1.03	1	5
Had discolored teeth or spots on your teeth	1.86±0.97	1	5
Had crooked teeth or spaces between your teeth	2.20±1.30	1	5
Had sores or sore spots in or around your mouth	2.08±1.11	1	5
Had bad breath	1.86±0.92	1	5
Had bleeding gums	2.35±1.09	1	5
Had food sticking in or between your teeth	2.29±1.14	1	5
Had pain or sensitivity in your teeth with hot or cold things	2.62±1.24	1	5
Had dry mouth or lips	2.76±1.16	1	5
Functional well-being (8 items)			
Had trouble biting off or chewing foods such as apple, carrot, or firm meat	1.58±0.90	1	5
Had difficulty eating foods you would like to eat because of your teeth, mouth, or face	1.50±0.82	1	5
Had no trouble keeping teeth clean	3.01±1.45	1	5
Had trouble sleeping because of your teeth, mouth, or face	1.35±0.72	1	5
Had difficulty saying certain words because of your teeth, mouth, or face	1.28±0.66	1	5
Been able to eat foods you like to eat	3.55±1.45	1	5
People had difficulty understanding what you were saying because of your teeth, mouth, or face	1.30±0.78	1	5
Had difficulty keeping teeth clean because of your teeth, mouth, or face	1.80±1.03	1	5
Emotional well-being (10 items)			
Post unbertra en est berrure ef unun terthe mouth es fore	1 // .0 80	ï	5
Been unnappy or sad because of your teeth, mouth, or face	1.44 ± 0.80	1) E
E la confident because or your teeth, mouth, or race	2.35±1.34	1	5
Feit worried or anxious because of your teeth, mouth, or face	2.01±1.10	1) E
Felt sny or withdrawn because of your teeth, mouth, or face	1.50±0.86	1	2
Felt unattractive because of your teeth, mouth, or face	1.45±0.84	1	2
Been angry because of your teeth, mouth, or face	1.31±0.74	1	5
Felt that you look different because of your teeth, mouth, or face	1.34±0./1	1)
Felt that you were attractive (good looking) because of your teeth, mouth, or face	2.49±1.34	1)
Been worried about what other people think about your teeth, mouth, or face	1.55±0.91	1)
Been upset of uncomfortable with being asked questions about your teeth, mouth, or face	1.25±0.66	1	2
School (4 items)			
Missed school for any reason because of your teeth, mouth, or face	1.38±0.71	1	4
Had difficulty paying attention in school because of your teeth, mouth, or face	1.24±0.67	1	5
Not wanted to speak/read out loud in class because of your teeth, mouth, or face	1.34±0.71	1	5
Not wanted to go to school because of your teeth, mouth, or face	1.07±0.34	1	4
Peer interaction (6 items)			
Avoided smiling or laughing with other children because of your teeth, mouth, or face	1.35±0.78	1	5
Been teased, bullied or called names by other children because of your teeth, mouth, or face	1.23±0.66	1	5
Felt left out by peers because of your teeth, mouth, or face	1.14±0.50	1	5
Been asked questions because of your teeth, mouth, or face	1.73±0.92	1	5
Not wanted to meet new people because of your teeth, mouth, or face	1.09±0.35	1	4
Been fighting or arguing with other children or family members because of your teeth, mouth, or face	1.11±0.43	1	4

 Table 2. Distribution of Mean Subscale and Child Oral Health Impact Profile (COHIP) Scores, for Boys and Girls, and accompanying P-values

	Male			Female				
_	25%	Median	75%	25%	Median	75%	P-value	
Dral symptoms	1.70	2.10	2.50	1.80	2.22	2.60	0.009	
unctional well-being	1.00	1.33	1.67	1.00	1.33	1.80	0.482	
Emotional well-being	1.00	1.25	1.50	1.13	1.38	1.88	0.001	
School	1.00	1.00	1.25	1.00	1.00	1.25	0.968	
Peer interaction	1.00	1.17	1.33	1.00	1.17	1.40	0.071	
COHIP	1.00	1.37	1.87	1.00	1.43	2.00	0.287	

retention on QoL.^{8,9} Only 3 articles were found that describe the relationship between QoL and dental esthetics.¹⁰⁻¹²

Klages et al. stated in 2005 that favorable dental esthetics might be an important variable in explaining individual differences in oral health attitudes and behaviors,¹² but low correlations between OHRQoL and dental esthe-tics were found by Kok et al.¹¹ Klages et al, however, did find that dental esthetics had a direct effect on all OHRQoL scale values.¹⁰ These studies were carried out on 18- to 30-year-old young adults. The literature lacks studies examining this relationship in children, who are, in fact, the main recipients of orthodontic treatment.

A further reason to pay tribute to the measurement of OHRQoL is that it can be used to assess treatment outcome. Bennett and Phillips¹³ advocate that traditional indices and measurements, for example Peer Assessment Rating scores or cephalometric measures, should be supplemented with QoL assessments because patients' opinions about treatment outcome do not necessarily correspond to those of clinicians.

Based on these considerations, the purpose of this cross-sectional study was to determine the oral healthrelated quality of life of schoolchildren in Amsterdam, the Netherlands, and to examine possible differences between boys and girls. Furthermore, the relationship between OHRQoL and self-reported dental esthetics was assessed. Finally, possible differences between ethnic groups were investigated exploratively.

METHODS

PARTICIPANTS

Subjects were 10- to 12-year-old schoolchildren who were not undergoing orthodontic treatment during this inves-tigation and who had not been treated orthodontically in the past. Sample size calculation was undertaken using Altman's nomogram,¹⁴ based on a power of 90 percent and a significance level of .01, which showed that a minimum number of 350 children was needed to detect significant differences between boys and girls. Based on 1 seventh grade and 1 eighth grade per school and 25 children per class, 7 schools were needed to reach this number. Subsequently, all 68 public primary schools in Amsterdam were pinpointed on a map and 8 schools were chosen at random. These schools were contacted and asked to cooperate. If a school refused, the school nearest to that location was selected. After that, the participating schools were visited and the children of the seventh and eighth grades filled in the questionnaires in the classroom after a brief instruction. After participating, all children received a letter for their parents to read that explained the study's aim and containing an answer form which they could use if they objected to the use of their child's data. In total, 514 children filled in the questionnaire.

MEASURES

To determine the OHRQoL, the Child Oral Health Impact Profile (**COHIP**), developed by Broder et al,¹⁵ was used. This questionnaire has been validated and tested for reliability both internationally¹⁶ and in the Netherlands.¹⁷ The COHIP contains 38 questions, both positively and negatively formulated. The items are divided over 5 domains: "oral symptoms," "functional well-being," "emotional well-being," "school," and "peer interaction." Items are answered on a Likert-type scale, ranging from 1 ("never") to 5 ("constantly"). A low score indicates good OHRQoL. Subscale scores and the total COHIP score were calculated by totalling the item scores.

To assess dental esthetics, the Esthetic Component of the Index of Orthodontic Treatment Need (**AC-IOTN**)¹⁸ was used. After a brief instruction was given, each child was given a card with the 10 photographs of the AC-IOTN and asked to mark the photograph that best matched their own dentition. As indicated by Richmond,^{19,20} AC-IOTN scores 1 to 4 indicate little or no need for orthodontic treatment, scores 5, 6, and 7 indicate "borderline need," and scores 8, 9, and 10 represent a clear need for treatment on esthetic grounds.

Finally, demographic data (age, gender, and ethnicity) of the children was collected.

Table 3. Spearman Correlations between Child Oral Health Impact Profile (COHIP) Subscales and Esthetic Component of the Index of Orthodontic Treatment Need Scores by Gender

	Male	Female
	Rho*	Rho
Oral symptoms	0.14^{\dagger}	0.07
Functional well-being	0.07	0.15^{\dagger}
Emotional well-being	0.19 [§]	0.20 [§]
School	0.04	0.12
Peer interaction	0.02	0.22 [§]
COHIP	0.06	0.17^{\dagger}

* Spearman's rho is the coefficient's name

† Significant with P<0.05

§ Significant with P<0.01

DATA ANALYSIS

Analyses were carried out using SPSS 11.0.1.²¹ Descriptive statistics showed that the data did not demonstrate a Gaussian distribution. Therefore, subsequent analyses were performed with nonparametric tests. Mann-Whitney U tests were used to examine differences between boys and girls and Spearman Rank correlation coefficients were used to calculate the correlations between the COHIP- and the AC-IOTN scores.

The internal consistency of the subscales was determined using Cronbach's alpha.

RESULTS

The COHIP was administered to 514 children. The parents of 4 children objected to participation, 41 children were undergoing orthodontic treatment at the time, and 9 children had been treated orthodontically in the past. The remaining 460 children—241 boys (mean age 11±0.8 years) and 219 girls (mean age 10.9±0.8 years) were included for further analysis.

A total number of 33 different ethnicities was stated. Of the participating children, 29% was of Moroccan origin, comprising the largest group within this sample. The second largest group (23%) had a Dutch background, 21% originally came from Turkey, and 12% had a Surinam background. For each ethnicity, the number of girls and boys was equal. The remaining children were from Curacao (>1%), Iraq (>1%), Indonesia (>1%), Egypt (<1%), Ghana (<1%), India (<1%), Afghanistan (<1%), and Portugal (<1%). The number of children with these ethnicities was too small for further statistical analysis.

The mean scores on the COHIP subscales were generally low, indicating good OHRQoL. Table 1 presents the descriptive statistics of the items. Cronbach's alphas were moderate to high (0.62-0.84) for all subscales, except for the subscale "school" (0.43), which consists of only 4 questions. Results regarding this domain should, therefore, be interpreted with caution.

Mann-Whitney U tests revealed significant differences between boys and girls for the domains "oral symptoms" and "emotional wellbeing," as can be seen in Table 2. No significant differences in COHIP scores were detected between the various ethnic groups. The AC-IOTN scores ranged from 1 to 10, with a mean of 2.90±2.10(SD). The skewness of the scores indicated that, in general, dental esthetics were satisfactory for these children. No significant differences were found between the AC-IOTN scores of boys and girls.

Correlations between the AC-IOTN scores and the different OHRQoL domains were low (see Table 3).

Significant correlations were found for boys for the domains "oral symptoms" (0.137) and "emotional well-being" (0.186) and for girls for the domains "functional well-being" (0.148), "emotional well-being" (0.195), and "peer interaction" (0.215).

DISCUSSION

In this study, the scores on the COHIP indicated that the children had good OHRQoL. Other publications on this topic have reported higher and more divergent scores.^{7,10-12,23} These studies have used other questionnaires to determine the OHRQoL (ie, the Child Perceptions Questionnaires or the Child Oral Impact on Daily Performances index). Perhaps scores from these questionnaires can not easily be compared to the scores found in this study. Furthermore, those studies were all carried out in older age groups. Awareness of OHRQoL may develop with age and not be an important issue for orally healthy children. Most children who are referred for orthodontic treatment, at least in the Netherlands, are in the 10- to 12year-old age range,²² which would imply more variation in OHRQoL scores.

AC-IOTN scores were generally low as well. As 10- to 12-year olds are usually in the late mixed dentition and the AC-IOTN is based on the complete permanent dentition, some children had difficulties in identifying with one of the photographs. This could explain the relatively high occurrence of scores 1 to 4, as children may have chosen the photograph which matched the ideal rather than their own dental appearance. No objective measure of malocclusion was included and the ratings were not repeated, but research has shown that agreement between the rating by the child and by a calibrated examiner is moderate to high, with correlations of 0.41, 0.55, 0.75, and 0.85.^{11,24-27} Furthermore, several studies have shown that race, socioeconomic status, and gender had no influence on the AC-IOTN score.^{25,28,29}

Intuitively, a significant relationship between dental esthetics and OHRQoL makes sense. This was not established, however, in the present study. For some domains of the COHIP, this actually seems logical, as there is no reason to assume a significant correlation between dental esthetics and oral symptoms. Yet, for other domains such as emotional well-being, a positive relationship would be expected. A possible explanation for the low correlations could be the skewed distribution and lack of variance in both measures. This may have restricted the range of the correlation coefficients. Furthermore, the study's cross-sectional design, along with the self report measures, may not be powerful enough to detect these relationships.

For future research, it would also be interesting to assess QoL as a dependent variable in intervention studies, for instance to assess the impact of treatment on patients with craniofacial malformations.

CONCLUSIONS

Based on this study's results, it can be concluded that Amsterdam schoolchildren:

- 1. seem to have good oral health-related quality of life; and
- 2. generally do not perceive themselves as needing orthodontic treatment.

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