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Oral-health-related quality of life among children with and without dental fear

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Objectives. This study aims to determine whether the oral-health-related quality of life (ORHQoL) and its dimensions differed among children with and without dental fear when different characteristics of fear were measured.

Material and methods. The participants were 11- to 14-year-old Finnish child volunteers from the Oulu University Hospital cleft lip and/or palate (CLP) treatment register ($n = 51$) and schoolchildren ($n = 82$). Dental fear was measured with 'Treatment of dental decay' and 'Attending dentist' dimensions of the modified Children's Fear Survey Schedule–Dental Subscale and a single question. ORHQoL was measured with $CPQ_{11–14}$. Background variables were gender and the dental care experienced.

Results. The response rates were 87% and 51% in the schoolchildren's and CLP groups, respectively. Those who were afraid of 'Treatment of dental decay' had higher mean $CPQ_{11–14}$ total scores (33.2) and higher scores for social (8.8) and emotional well-being (9.0) than those who were not fearful (24.0, 6.2, and 5.8, respectively, $P < 0.05$), indicating poorer ORHQoL. Among those with experience of orthodontics, the association between dental fear and social and emotional well-being was weaker than among those with no experience of orthodontics.

Conclusion. Dental fear may have a negative effect on a child's ORHQoL, especially on social and emotional well-being. Positive minor treatment experiences might weaken this effect.

Introduction

Although the dental fear of Finnish children has decreased, probably because of improved oral health, dental fear is still common[1,2]. In 1998, 27% of 12-year-old Finns were 'quite' or 'very' afraid of dental treatment in general or of any treatment procedures and 55% were 'slightly' or 'to some degree' afraid[1]. Rantavuori *et al*. showed among Finnish children that the prevalence of different characteristics of children's dental fear varied with age[1]. From these characteristics, the fear of 'Treatment of dental decay' was more common in older children than in younger ones, among whom the fear of 'Attending a dentist' was more common.

Previous studies have reported a relationship between children's dental fear and the treatment procedures they have experienced[3–5]. In these studies, extractions that nowadays are often related to orthodontics were associated with dental anxiety, but no such relationship was found for fillings[3–5]. Children with signs of caries experience (dmft/DMFT > 0) have, however, been reported to be more anxious than children without such experience[1,3–12].

Oral health (and problems related to it) and dental treatment may have an effect on quality of life and its different dimensions, such as speaking, eating, and appearance, and through these on social intercourse[13]. Previous findings suggest that, among children, oral health affects the quality of life as a multidimensional concept[13,14]. Dental fear may also affect quality of life. Research revealed that adults suffering from dental fear more often have poorer quality of life than those who do not have dental fear[15–18]. Dental fear might also be associated with ORHQoL and thereby might impair children's everyday life. However, we found no reports on this association. Thus, our aim here was to determine whether ORHQoL and

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its dimensions differ among children with and without dental fear when different characteristics of fear are measured. We assumed that children's ORHQoL was lower among the children with dental fear than among children without such fear.

Materials and methods

Study group

This study was a cross-sectional questionnaire survey. The participants were 11- to 14-year-old volunteers ($N = 133$) from two different study sites in Finland. They were chosen from the Oulu University Hospital cleft lip and/or palate (CLP) treatment register ($N = 51$) and from 5th to 7th grade pupils attending two schools in the Oulu region ($N = 82$). The CLP children were assumed to represent the poor quality-of-life group and the Oulu region schoolchildren the normal population. The CLP children received the questionnaire by mail to be filled out at home with the help of their parents, if needed. The 5th to 7th grade pupils filled out the questionnaire at their schools during class.

The study was approved by the Ethics Committee of the Northern Ostrobothnia Hospital District, and written consent was obtained from the parents.

Questionnaires

The children's ORHQoL was measured with a Finnish version of the Child Perceptions Questionnaire ($CPQ_{11–14}$). This test measures quality of life in four subscales: oral symptoms (6 questions), functional limitations (9 questions), emotional well-being (9 questions), and social well-being (13 questions). The reply alternatives were: never = 0, once/twice = 1, sometimes = 2, often = 3, and every day/almost every day = 4. The dental fear of the children was measured with a modified Children's Fear Survey Schedule –Dental Subscale (CFSS-DS) consisting of 11 questions[19]. It has been found to be reliable among Finnish children and can be used to measure different aspects of dental fear. The children were also asked about their own experience of previous dental care procedures (fillings, orthodontics, extractions). The reply alternatives for the dental anxiety items were: not afraid (= 1), slightly afraid (= 2), afraid to some degree (= 3), quite afraid (= 4), and very afraid (= 5). The reply alternatives for dental care were: 'had had in the previous 3 months', 'had not had in the previous 3 months, but had had sometime earlier', and 'had never had'. The age and sex of the children were also asked.

Statistical analyses

The total sum and the sums of the four subscales were calculated from the $CPQ_{11–14}$. Three different measures of dental fear revealed in an earlier study were used in the analyses: (i) treatment of dental decay (TDD), (ii) attending the dentist (AD); and (iii) general dental fear (GF)[19]. The first two were revealed by factor analyses in a previous study and consisted of the summary mean values of the items that loaded high on each factor[19]. The TDD and AD were calculated as the sum of single anxiety questions related to these situations: TDD as invasive treatment of decay, for example, drilling, hearing the sound of drilling, local anaesthesia, and pain; and AD as less invasive situations related to dental visits in general, for example, fear of the dentist, keeping the mouth open, teeth being cleaned by a dentist or nurse, and suction used in the mouth. The GF was taken as the value of the single question: 'Are you afraid of dental treatment in general?' All three fear measures were dichotomized into dental fear and no dental fear as follows: GF values from 1 to 2 were classified as no dental fear, and values from 3 to 5 as dental fear. For TDD and AD the no-dental-fear group comprised those children with mean values from 1 to 1.99, and the dental fear group comprised those with values from 2 to 5. Self-reported treatment experience was categorized into four treatment experience groups: no treatment experience of fillings ever and orthodontics, experience of fillings, experience of orthodontics, experience of both fillings, and orthodontics some time in life.

The distributions of the children were compared according to sex, age, study group (school/CLP), and self-reported treatment experience between those with and without dental fear. Differences in the mean and median

values of the total and subscales of $CPQ_{11–14}$ were evaluated by comparing children with and without dental fear on all three dental fear measures. The statistical significances of the differences were evaluated by chi-squared and Mann–Whitney tests. To evaluate also the strength of the observed relationships, effect sizes were calculated using non-parametric estimation described by Hedges and Olkin[20]. In addition, logistic regression analyses using median cut-off points for $CPQ_{11–14}$ total and dimension scores (0 = good ORHQoL, 1 = poor ORHQoL) were applied, taking into account the effects of gender and treatment experienced during last 3 months.

Results

The response rates were 87% for the school-children groups and 51% for the CLP group. Of the children, 45% were girls and 55% were boys. The highest percentage of fear was found for TDD (Table 1). For every measure of dental fear, fear was more common among girls than among boys. AD was associated with self-reported treatment experience: those who had had experience of orthodontics least often reported fear, and those who had had experience only of fillings most often reported dental fear. Children without any experience of treatment reported dental fear more often than children with experience of orthodontics.

Of the three fear measures, only TDD was statistically significantly associated with $CPQ_{11–14}$ (Table 2). Those who were afraid had higher $CPQ_{11–14}$ total scores and also higher scores for social well-being and emotional well-being than those who were not fearful, indicating poorer ORHQoL. Experiences of orthodontic treatment modified the association between $CPQ_{11–14}$ and TDD. Among those who had not experienced orthodontic treatment, those who were afraid of 'Treatment of dental decay' had higher scores for mean $CPQ_{11–14}$ total, social well-being, and oral symptoms than those children who were not afraid (21.8, 5.5, 5.2 vs. 11.4, 1.6, 4.2, respectively, $P < 0.05$). In the logistic regression analyses, a rather strong – although not statistically significant – modifying effect was also observed. Among the children with dental fear, the odds ratio for poor social well-being was 8.3 for those without experience of orthodontic treatment and 4.3 for those with experience of orthodontic treatment ($P = 0.51$ for the interaction term). A similar effect was also observed in the odds ratio for emotional

Table 1. Percentage of fearful children according to three fear measures and gender, study group, treatment experience, and age.

		GF		TDD		AD	
	n	Fear (%)	*P*	Fear (%)	*P*	Fear (%)	*P*
All	97	11		20		7	
Gender							
Girls	44	20	0.010	30	0.024	14	0.026
Boys	53	4		11		2	
Study group							
School	71	10	0.447	17	0.271	6	0.320
CLP	26	15		30		12	
Treatments							
No treatments	12	17	0.234	25	0.726	8	0.017
Fillings, no orthodontics	23	22		26		22	
Orthodontics, no fillings	21	5		14		0	
Orthodontics and fillings	40	8		18		3	
Age (year)							
11	15	7	0.638	13	0.078	7	0.870
12	28	7		11		7	
13	37	16		19		5	
14	17	12		41		12	

AD, fear of attending the dentist; CLP, cleft lip and/or palate children; GF, general dental fear; TDD, fear of treatment for dental decay. *P*-values for the chi-squared tests.

Table 2. Mean and median scores of CPQ_{11-14} and subscales according to different measures of fear among children.

		GF				TDD			AD		
		n	Mean	Median	*P* (ES)	*n*	Mean	Median	*P* (ES)	*n*	Mean	Median	*P* (ES)
CPQ_{11-14}	Fear	11	25.3	17	0.657 (0.117)	19	33.2	25	0.039 (0.327)	7	35.4	40	0.250 (0.657)
	No fear	86	29.9	20		78	24.0	15.5		90	25.0	17	
Social well-being	Fear	11	8	3	0.675 (0.029)	19	8.8	7	0.040 (0.431)	7	9.9	8	0.253 (0.461)
	No fear	86	6.5	4		78	6.2	3		90	6.4	3	
Functional limitations	Fear	11	6.5	5	0.672 (0.088)	19	8.0	5	0.087 (0.129)	7	7.3	8	0.341 (0.589)
	No fear	86	5.7	4		78	5.2	3		90	5.6	4	
Oral symptoms	Fear	11	6.8	5	0.806 (–0.452)	19	7.4	6	0.443 (–0.129)	7	8.0	7	0.429 (0.253)
	No fear	86	6.9	6		78	6.8	6		90	6.8	6	
Emotional well-being	Fear	11	8.6	8	0.294 (0.296)	19	9.0	8	0.036 (0.327)	7	10.3	9	0.156 (0.370)
	No fear	86	6.1	5		78	5.8	4		90	6.1	5	

AD, fear of attending the dentist; ES, effect size (non-parametric estimation); GF, general dental fear; TDD, fear of treatment for dental decay; *P*-values for the Mann–Whitney test.

well-being. Among the children with dental fear, the odds ratio was 4.4 for those without experience of orthodontic treatment and 2.6 for those with experience of orthodontic treatment ($P = 0.73$ for the interaction term).

Discussion

Quality of life was associated only with dental fear related to treatment procedures. Of the domains of ORHQoL, social well-being and emotional well-being were associated with this type of dental fear. However, experience of orthodontic treatment modified the associations.

The response rate was good among the school-children group and adequate among the CLP children. The lower response rate among the CLP children may be due to the fact that the questionnaires were sent by mail, which were filled out at home, compared to the children in the Oulu region, who filled out their questionnaires at school. It is also possible that the children in the CLP group had other problems and, thus, did not answer the questionnaire. Most of the *P*-values for the associations between CPQ_{11-14} and dental fear were not statistically significant, even though there were notable differences between mean and median CPQ_{11-14} scores as well as considerable effects sizes and odds ratios. However, because some statistically significant *P*-values could be found even with a study group of this size, we can assume that with a larger study group the differences between those with high and low dental fear would be greater, possibly also in the fear related to less invasive treatment.

The fact that ORHQoL was associated only with dental fear related to treatment procedures, while among adults ORHQoL was associated with trait anxiety, might be due to the age of the children[18]. Among children of this age, fear of treatment procedures has been shown to be more common than other characteristics of dental fear[19], probably due to the fact that they have been exposed to more treatment procedures associated with dental fear[3–5]. The fact that the social and emotional well-being domains of ORHQoL were associated with this type of dental fear might indicate that those who are afraid of treatment procedures may feel inferior to their peers or ashamed

because they cannot cope with dental treatment. This might later in life lead to the vicious circle described by Berggren[21]. On the other hand, children who are emotionally sensitive to dental fear might also be more likely to respond to emotional aspects related to ORHQoL. Dental anxiety has been shown to have various impacts on daily living of adults, such as social and cognitive ones[22], that might also be reflected in the association between dental fear and ORHQoL observed in this study.

The result that the association between $CPQ_{11–14}$ scores and the fear of 'Treatment of dental decay' was weaker among those with experience of orthodontics compared to those with no experience could be due to latent inhibition[3]. Those children who have had experience of orthodontics often get used to treatments that are less invasive and painful. These experiences may thus prevent dental fear and increase their positive feelings of coping and control in dental situations even when more invasive treatments are needed. It remains unclear whether quality of life affects dental fear or vice versa; for example, is the child's success in social relationships and school also reflected in situations where self-esteem is needed (dental care) or does the dental fear have a negative effect on social skills (quality of life)?

As the study sample was rather small and experienced treatment was self-reported, the results must be interpreted with caution. However, the present study provides an interesting basis for further research on the association between these multidimensional concepts.

What this paper adds

- Dental fear may have a negative effect on a child's ORHQoL, especially on social and emotional well-being.
- Minor positive treatment experiences, such as orthodontic treatment, may weaken this effect.

Why this paper is important to paediatric dentists

- Dentists should understand that dental anxiety may also affect aspects of the child's life other than oral health.

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