Relationship between children's first dental visit and their dental anxiety in the Veneto Region of Italy

Kari Rantavuori, Nicoletta Zerman, Roberto Ferro and Satu Lahti

Department of Community Dentistry, University of Oulu, Oulu, Finland; Department of Discipline Medico-Chirurgiche della Comunicazione e del Comportamento, Sezione di Clinica Odontoiatrica, Ferrara, Italy; Dental Clinic, Cittadella Hospital, Cittadella, Italy

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The aim of this study was to explore the association between negative experiences during children's first dental visit and any subsequent dental anxiety and related factors in three dental clinics in the Veneto Region of Italy. For this purpose, parents of 378 children filled out a questionnaire. Factors related to child dental anxiety (none–some/fairly much–very much) were explored by means of logistic regression analysis. The independent variables were: problems with the first dental visit (no/yes), parental dental anxiety (none–some/fairly much–very much), number of previous visits (0–3/4≤), site visited (public/private) and age of the child (<10 years/10 ≤ years). Parental anxiety was associated with child's anxiety (OR = 2.3, 95% CI = 1.1–4.9). A problematic first visit was a strong predictor of dental anxiety. However, this effect was modified by the number of subsequent visits. Children with 4 or more visits after the first visit were less likely to be anxious after a problematic first visit (OR = 4.6, 95% CI = 1.5–14.1) than children with 3 visits or less after the first visit (OR = 19.8, 95% CI = 7.2–54.5). Thus, the negative effect of a problematic first visit may fade during subsequent dental visits. □ *Child; dental anxiety*

Satu Lahti, Department of Community Dentistry, P.O. Box 5281, FI-90014, University of Oulu, Finland. Tel: +358 8 537 5584, fax: +358 8 537 5560, e-mail: satu.lahti@oulu.fi

The first dental visit may be important in the subsequent development of children's attitudes or beliefs about dentists and treatment. If the dentist–patient relationship develops positively, this can have a positive effect on patient satisfaction, compliance and use of oral health care services, even leading to improved home care and oral health (1–3). An unpleasant first visit, however, may influence further treatment negatively, leading to dental anxiety (4–7).

The etiology of dental anxiety has been described using various terms (4–14). It has been classified as being of either internal or external origin. Other terms used in the former context are personality trait or endogenous anxiety (11, 12, 14), indicating that factors related to the person rather than directly associated with dental care are involved. Dental anxiety of external origin has been described as a simple conditioned phobia emerging from direct or indirect negative dental experiences (4–10, 13, 14). A majority of patients have reported that their dental anxiety was caused by direct conditioning (8). Both direct and indirect conditioning have been revealed to be important, especially in relation to dental anxiety developed in childhood (13).

First negative dental experiences have been reported to affect subsequent dental anxiety (6, 7, 10, 15). The following factors have been reported to predict childhood onset of dental anxiety: frightening, painful and embarrassing dental experiences, and family history of dental anxiety (5). The content of negative experiences contributed more to the development of dental anxiety than did the age at which the negative experiences occurred (5). Alwin et al. (7) revealed that of non-cooperating children 23% had had an unpleasant first dental visit, while the corresponding percentage for cooperating children was 10%. However, recollection of the experiences might have affected the results of previous studies (16). Maternal anxiety has been reported to be associated with young children's behavior during the first dental visit (17) and many studies have supported the finding of a positive relationship between the anxiety of mother, father, or siblings and that of the child (13, 16, 18, 19).

Despite the obvious association between negative experiences and dental anxiety, the specific role of first dental experiences requires further attention. Thus, our aim was to explore the association between the dental anxiety of children and their first dental experiences, parental dental anxiety, age, and number of dental visits as perceived by their parents.

Materials and methods

This study was conducted in the Veneto Region of northern Italy in 1999–2000. To cover both public and private sectors as well as urban and rural areas, three different study locations where dental care is provided for children were selected: the Dental Clinic of the University of Verona (Public 1) (urban), the Dental Clinic of Cittadella Hospital (Public 2) (rural) and a clinic operated by a pediatric dentist (author NZ) in Verona (Private) (urban). As children in Italy are not routinely invited to check-ups, but seek care based mainly on need, they may

Table 1. Distribution of children according to study site and age group

Age group (years)	Public 1 ($n = 143$) %	Private ($n = 121$) %	Public 2 ($n = 105$) %	Total ($n = 369$) %
3–5	29	31	23	28
6–9	30	33	55	38
10–12	25	16	17	20
13 or more	15	20	5	14
Total	39	33	28	100

Table 2. Dental anxiety of the children and their parents according to study site

	Public 1		Private		Public 2		Total	
Dental anxiety	Children % ($n = 147$)	Parents % ($n = 147$)	Children % ($n = 121$)	Parents % ($n = 121$)	Children % ($n = 109$)	Parents % ($n = 108$)	Children % ($n = 377$)	Parents % ($n = 376$)
Not afraid at all	52	53	73	43	63	52	62	50
Just a bit afraid	14	21	11	12	6	4	11	13
Afraid to some degree	25	12	5	18	15	15	15	15
Fairly afraid	6	11	5	15	10	12	7	12
Very much afraid	3	3	6	12	6	17	5	10

Table 3. Number of earlier visits to a dentist according to study site

No. of earlier visits to a dentist	Public 1 ($n = 144$) %	Private ($n = 121$) %	Public 2 ($n = 109$) %	Total ($n = 374$) %
None	5	0	35	12
Once	19	15	10	15
2–3 times	27	21	25	25
4–5 times	14	28	14	18
6 times or more	35	36	16	30
Total	39	32	29	100

have their first visit when they are older. We therefore included age groups from 3 to 13 years in the study. All child patients attending the clinics were invited to participate in the study. Data collection aiming to reach at least 100 patients from each site started in July 1999 and was finished by the end of the year 2000. Finally, 378 participants had volunteered and filled out the questionnaires. The long period of data collection was due to differences in patient volumes and service designs in different clinics. The distribution of the children according to study site and age group is presented in Table 1.

The parents of the participants were asked to fill out a questionnaire given to them on their arrival at the dental clinic. There were eight multiple-choice and open-ended questions. Child and parental dental anxiety were measured with five alternatives ranging from "not afraid at all" to "very much afraid". The number of the child's previous dental visits was recorded as none, one, 2–3 times, 4–5 times, or 6 times or more. Occurrence of problems during the first dental visit was asked with "yes" or "no" alternatives for answering and the types of problem were asked in an open-ended question. The child's age was recorded as 3–5 years, 6–9 years, 10–12 years, or 13 years or more.

The data were analyzed with the SPSS for Windows 9.0 program. Chi-square tests were used to evaluate the statistically significant differences in the distributions of dental anxiety and other variables between the private and public sectors. Factors associated with children's dental anxiety were analyzed by logistic regression analysis.

Results

The dental anxiety of the children and their parents according to study site is presented in Table 2. There were no statistically significant differences between levels of dental anxiety in the public or private practice or between study sites. The only statistically significant difference between these two sectors was in the number of earlier visits to a dentist. In the private sector, children had more often (64%) visited a dentist more than three times than in the public sector (41%) ($\chi^2 = 17.231$, $P < 0.0001$). The number of earlier visits to a dentist according to study site is presented in Table 3.

Of all children, 14% had had problems during their first visit to a dentist. The corresponding percentages at different study sites were 12% at Verona University,

Table 4. Relationship between child dental anxiety (0 = not afraid to afraid to some degree, 1 = fairly afraid to very much afraid) and related factors in the final model of logistic regression analysis (including their first-order interaction terms)

Variables and their dichotomization	OR	95% CI lower	95% CI upper
Problems with the first dental visit *0 = no, 1 = yes*			
Among children with 0 to 3 previous dental visits	19.84	7.21	54.54
Among children with 4 or more previous dental visits	4.55	1.46	14.12
Parents' dental anxiety *0 = not afraid to afraid to some degree, 1 = fairly afraid to very much afraid*	2.30	1.07	4.93

Goodness-of-fit test. $\chi^2 = 0.333$ df = 3. $P = 0.954$ Nagelkerke $R^2 = 0.297$.

20% at Verona private clinic, and 11% in Cittadella. More children had had problems during the first visit in the private (20%) than in the public (12%) sector ($\chi^2 = 4.345$, $P = 0.037$). Because few answers were received to the open-ended questions (32 answers), these were not included in the quantitative analyses. The most frequently reported problem was that the child had shown fear or cried during the first dental visit.

Results of the logistic regression analysis concerning factors related to children's dental anxiety are presented in Table 4. A problematic first visit was the best predictor of child dental anxiety, followed by parental dental anxiety. The statistically significant regression coefficient of the interaction term revealed that the effect of a problematic first dental visit on child's dental anxiety was modified by the number of subsequent visits. Those children who had more than three visits to a dentist were less likely to be anxious than those who had three or fewer visits.

Discussion

To obtain information from different organizations providing services, this study was conducted in both private and public sectors as well as rural and urban areas. With this design, we also aimed to reach families from different social backgrounds, as parents from lower socio-economic groups were assumed to use the public sector more often than the private one. However, the results drawn from this study group cannot be generalized to the Italian child population as the service set-ups and economical issues vary across the country. To increase attractiveness and feasibility, the questionnaire was kept short and simple, and personal background information was not included. As parents have been reported to assess their child's dental anxiety reliably (7) and as the study group also consisted of young children, we decided to ask the parents to fill out the questionnaires. A single question filled out by parents was also used by Bolin (20) in her study for measuring dental anxiety among 5- and 12-year-olds in Sassari, Italy.

Over time it becomes harder to recall events that happened much earlier in life (16). We therefore assumed that in this study the parents could report anxiety and problems during the first dental visit more reliably than the children could. The children in this study were relatively young and had not, in general, visited a dentist many times, which might have made it easier for the parents to recall the preceding visits.

The percentage of children reported to have dental anxiety corresponds to the results of studies of Bolin and Desiate et al. in Italy (20, 21) and figures reported previously in the literature elsewhere (22, 23). The percentage of dentally anxious parents is also similar to the previous results (13, 20, 23, 24). There was no statistically significant difference between the levels of dental anxiety of children obtaining treatment in the public sector and in the private sector. We assumed that different social classes obtained treatment from different sectors. However, the results of this study do suggest that dental anxiety is not, as has been reported in the literature, more prevalent in the lower social class (25). However, the fact that the private office was operated by a pediatric dentist might have led to bias. Possibly, more child patients with dental anxiety had sought treatment from a specialist, thus masking the relationship between social class and dental anxiety.

The best predictor of children's dental anxiety was problems experienced during the first dental visit. The relationship was stronger than that reported in previous studies (6, 7, 10, 15), but this might have been affected by the young age and few dental visits of the children in our study group. As reported in previous studies, parental dental anxiety was also associated with the children's dental anxiety (13, 16, 18–20).

The observed effect modification of the number of subsequent visits after a problematic first dental visit on the child's dental anxiety has not been reported previously. These results suggest that despite negative experiences during the first dental visit, subsequent dental visits, preferably with positive experiences, might help a child to cope with dental anxiety later. Another explanation could be that children with very negative dental experiences have developed an avoidance pattern and later will visit the dentist only when in pain. The results support the theory that dental anxiety is often a conditioned specific phobia developed through negative dental experiences. It can also be suggested, based on these results, that as far as possible negative experiences during the first dental visit should be avoided. If problems occur nevertheless, for example due to acute need for treatment, during the following treatment sessions, special emphasis should be

placed on taking care of possible dental anxiety. The child should learn, possibly with the help of behavioral management techniques, that dental treatment is not necessarily always frightening or painful. If treatment is sought only irregularly and mainly in the case of pain, efforts should be made to ensure that a follow-up visit is made rather soon to reduce the risk of further avoidance of treatment. Further studies are required to evaluate what the mechanisms are behind the observed effect modification between a problematic first visit and the number of subsequent dental visits.

There were certain shortcomings in our study design that need to be considered when interpreting the results. We used a single question filled out by parents to measure dental anxiety. By combining different measures, such as use of scales, assessment by dentist or by independent observers or even physiological measures, the validity could have been increased, as suggested by Locker et al. (26). The use of a single item measure seemed to result in greater prevalence than when using multi-item scales (26). It must also be noted that for example behavioral management problems that are easily observed by dentists do not always relate to fear, and vice versa (27). As our concern was not the prevalence but the association between dental anxiety and problems during the first visit, we used a single item and focused on parents' perceptions.

Another shortcoming was the cross-sectional design, which might have affected, especially, the recollection of experiences, as in the previous studies (16). Thus, in future research, better designs using different measures for dental anxiety and follow-up cohorts of the present children are needed to examine the development and changes of dental anxiety over time.

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References

1. Francis V, Korsch B, Morris M. Gaps in doctor–patient communication. N Engl J Med 1969;280:535–40.
2. Wooley FR, Kane RE, Hughes CC, Wright DD. The effects of doctor–patient communication on satisfaction and outcome of care. Soc Sci Med 1978;12:123–8.
3. Zimmerman R. The dental appointment and patient behaviour. Differences in patient and practitioner preferences, patient satisfaction and adherence. Med Care 1988;26:403–14.
4. Milgrom P, Weinstein P, Getz T. Treating fearful dental patients. A patients' management handbook. 2nd ed. Reston VA: Reston Publishing Co; 1995.
5. Locker D, Shapiro D, Liddell A. Negative dental experiences and their relationship to dental anxiety. Community Dent Health 1996;13:86–92.
6. Milgrom P, Mancl L, King B, Weinstein P. Origins of childhood dental fear. Behav Res Ther 1995;33:313–9.
7. Alwin NP, Murray J, Britton P. An assessment of dental anxiety in children. Br Dent J 1991;171:7:201–7.
8. Berggren U, Carlsson SG, Hägglin C, Hakeberg M, Samsonowitz V. Assessment of patients with direct conditioned and indirect cognitive reported origin of dental fear. Eur J Oral Sci 1997;105:213–20.
9. Moore R, Brodsgaard I, Birn H. Manifestations, acquisition and diagnostic categories of dental fear in a self-referred population. Behav Res Ther 1991;29:51–60.
10. Ost L, Hugdahl K. Acquisition of blood and dental phobia and anxiety response patterns in clinical patients. Behav Res Ther 1985;23:27–34.
11. McNeil D, Berryman M. Components of dental fear in adults. Behav Res Ther 1989;27:233–6.
12. Berggren U, Meynert G. General and specific fears in referred and self-referred adult patients with extreme dental fear. Behav Res Ther 1992;30:395–401.
13. Locker D, Liddell A, Dempster L, Shapiro D. Age onset of dental anxiety. J Dent Res 1999;78:790–6.
14. Weiner A, Sheehan D. Etiology of dental anxiety: psychological trauma or CNS chemical imbalance? Gen Dent 1990;38:39–43.
15. Liddell A, Gosse V. Characteristics of early unpleasant dental experiences. J Behav Ther Exp Psychiatry 1998;29:227–37.
16. Kent G. Memory of dental pain. Pain 1985;21:187–94.
17. Wright G, Alpern G, Leake J. A cross-validation of variables affecting children's cooperative behaviour. J Can Dent Assoc 1973;39:268–73.
18. Johnson R, Baldwin DC Jr. Maternal anxiety and child behaviour. J Dent Child 1969;36:87–92.
19. Tuutti H, Lahti S. Oral health status of children in relation to the dental anxiety of their parents. J Pedod 1987;11:146–50.
20. Bolin A-K. Children's dental health in Europe. An epidemiological investigation of 5- and 12-year-old children from eight EU countries. Swed Dent J 1997; Suppl 122.
21. Desiate A, Fanelli M, Milano V. Odontogenic anxiety. A study of a population of 1500 students from the public schools in Bari area. Minerva Stomatol 1997; 4:165–73.
22. Klingberg G. Dental fear and behaviour management problems in children. A study of measurement, prevalence, concomitant factors, and clinical effects. Swed Dent J 1995; Suppl 103.
23. Skaret E, Raadal M, Berg E, Kvale G. Dental anxiety among 18-yr-olds in Norway. Eur J Oral Sci 1998;106:835–43.
24. Marlies E, Stouthard A, Hoogstraten J. Prevalence of dental anxiety in the Netherlands. Community Dent Oral Epidemiol 1990;18:139–42.
25. MacCormack C, Kinirons M. Characteristics of children referred to a general anaesthetic service in Northern Ireland. J Ir Dent Assoc 1999;45:119–23.
26. Locker D, Shapiro D, Liddell A. Who is dentally anxious? Concordance between measures of dental anxiety. Community Dent Oral Epidemiol 1996;24:346–50.
27. Klingberg G, Berggren U, Carlsson SG, Noren JG. Child dental fear: cause-related factors and clinical effects. Eur J Oral Sci 1995;6:405–12.

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