

# A qualitative look at parents' experience of their child's dental general anaesthesia

M. S. AMIN<sup>1</sup>, R. L. HARRISON<sup>1</sup> & P. WEINSTEIN<sup>2</sup>

<sup>1</sup>Department of Oral Health Sciences, University of British Columbia, Vancouver, British Columbia, Canada and

<sup>2</sup>Department of Dental Public Health Sciences, University of Washington, Seattle, Washington, USA

**Summary.** *Objectives.* Caries relapse after treatment of early childhood caries (ECC) under general anaesthesia (GA) has been frequently reported. This research used a qualitative method of inquiry to explore parents' experience of their child's treatment under GA, and their perception of the impact of this treatment on their child.

*Methods.* The participants were parents whose children had recently undergone dental rehabilitation under GA. Data was collected by semistructured, open-ended interviews scheduled at the postoperative appointment. Interviews were audio-taped, transcribed, checked and coded into a qualitative computer software program for analysis. Data collection and analysis were done simultaneously, and the interview guide was modified based on responses.

*Results.* Parents were troubled that their child needed a GA and appeared aware of the complications. While some parents felt 'guilty' and struggled to accept this mode of treatment for their child, others felt 'blameless', and were convinced that the GA was 'preferable' for their child and superior to conventional treatment. Nonetheless, all parents reported some levels of anxiety during the GA; they expressed their emotions with 'fear', 'worry' and 'concern'. After the GA, improvement was reported by most parents in their child's amount of dental pain, sleeping pattern, eating habits and acceptance of parental toothbrushing. The most common changes in their child's behaviour mentioned by parents were increased toothbrushing and decreased consumption of sugary foods. Several children who had had primary teeth extracted were distressed as a result of this 'loss'.

*Conclusion.* The general anaesthetic experience was troubling in a variety of ways for both parents and children. However, an 'early' and positive outcome of the GA was a reported improvement in dental health practices. Parents were more positive about maintaining the health of primary teeth and now knew how to take care of their child's teeth. Future exploration is required to reveal if and how the GA experience will affect long-term preventive behaviours.

## Introduction

Extensive dental decay in preschool children, or early childhood caries (ECC), is a troubling health problem that can have a profound effect on a child. The effects of painful teeth on a child's eating, sleeping, disposition and healthy development are well known [1]. Despite the general reduction in the prevalence of dental caries in industrialized countries, children from disadvantaged communities and minority ethnic groups continue to experience high levels of disease [2,3]. The prevalence of ECC

in British Columbia (BC), Canada, ranges from 10% to 27% of children entering kindergarten [4]. Each year, about 5000 BC children under 4 years of age are treated under general anaesthesia (GA) for ECC at an annual cost of \$10 million [5]. Even more alarming is the fact that, soon after such costly and risky treatment, many children develop more decay, i.e. suffer caries relapse, and need additional extensive treatment, and in many cases, a second surgery [6,7].

Dental care under GA for preschool children has been reported to be well-accepted by parents and is perceived to have a positive social impact on their child [8–10]. Parents have reported more smiling, improved school performance, and increased social interaction after the procedures [10]. Even though parents often express concern about morbidity related to dental treatment under GA, the most common

Correspondence: M. S. Amin, Department of Oral Health Sciences, Faculty of Dentistry, University of British Columbia, 2199 Wesbrook Mall, Vancouver, BC, Canada V6T 1Z3. E-mail: msharifz@interchange.ubc.ca

complaint reported by parents is postoperative pain as a result of the dental treatment itself [11,12]. In a survey of 98 children who had dental treatment under GA, parents were asked whether they would like their child to be treated under GA again; 81% of the parents replied positively. No parent responded completely negatively, but 18.4% of parents indicated that they would only choose this treatment modality again if no other solutions were available [13]. Therefore, the event of general anaesthetic surgery to complete a child's dental work does not appear to be as traumatic for both parent and child as might be expected.

Many investigators have attempted to identify the factors associated with caries relapse after GA dental treatment [6,14–16]. One group of investigators determined the factors associated with the event of a second dental GA to be 'child factors', including extensive incisor caries at the time of the GA, a history of bottle feeding and poor cooperation for dental appointments, and 'parent factors', including not brushing their child's teeth, a dysfunctional social situation, and failure to return for follow-ups. As a result of these findings, the strategies recommended to improve the long-term dental health of high-risk children were aggressive treatment of existing caries at the time of the GA, active postoperative follow-up and education of the caregivers [16]. In contrast, other investigators concluded that aggressive dental surgery for ECC did not result in decreased caries relapse [17]. None of these investigators explored whether the GA dental treatment itself had any effect on modifying parental attitudes, changing their behaviours related to their child's oral health, and as a result, diminishing their child's risk of relapse.

Understanding the dental GA experience from the parent's point of view, and also understanding the parent's perception of their child's response and feelings about the GA, may help us to understand why this invasive event is not the cue to action that one would expect. An exploratory, qualitative approach will provide a more in-depth understanding of the parents' experience than is possible from a purely quantitative approach [18]. In past decades, qualitative research has provided healthcare researchers with rich descriptions of parents' everyday experiences of their child's health struggles [19,20]. This methodology is slowly beginning to appear in the dental literature as well [21,22].

This study was a qualitative exploration of parents' experiences of their child's dental treatment under

**Table 1.** Original interview questions.

- 
1. How would you describe a healthy mouth?
  2. What do you know about baby teeth?
  3. What were you thinking and feeling when your child was asleep and being worked on by the dentist?
  4. How is your child doing after the dental work?
  5. What did you learn from your experience?
- 

GA and their impressions of the impact of this treatment on the daily life of their child.

### Subjects and methods

Approval for the study was received from the Behavioural Research Ethics Board of University of British Columbia, Vancouver, BC, Canada. One-to-one, semistructured interviews were conducted by the first author (M.A.) using an interview guide (Table 1). In addition, information on demographics, the child's feeding pattern and the child's dental history was recorded in a short questionnaire. Following each interview, the interview guide was modified as necessary in an iterative fashion, based on responses.

The subjects were English-speaking parents from a variety of ethnic backgrounds whose children had recently been treated under GA at Monarch Paediatric Dental Centre, a paediatric dental practice in Burnaby, BC. This private practice has an on-site general anaesthetic suite. Although the dental centre is a private practice, the costs of treatment of many of the children, either with or without GA, are supported by publicly funded programmes. All referrals to this specialty practice by general dental practitioners were because of the child's behaviour management issues and need for extensive dental rehabilitation, which included the extraction of teeth and restorative dentistry. Only the parents of children under 6 years of age were recruited for the study. Of the parents approached to participate, a small number refused because of time constraints. Interested parents were interviewed individually at their child's scheduled follow-up appointment, 7–14 days after the surgery. All interviews were conducted either in a quiet area of the dental office or in the child's home. The interviews lasted between 25 and 50 min.

Interviews were audio-taped, transcribed, checked and coded into the Nvivo software program. The approach to data analysis was grounded theory [23]. The transcripts were read and reread carefully, and codes were identified. A listing was made of all codes. Similar codes were grouped together to create

**Table 2.** Demographics of participants.

Variable	Sample statistic
Inclusion criteria	English-speaking parents of children under 6 years of age in need of general anaesthetic
Number of participants	11
<i>Child</i>	
Age range (years)	2.5–6.0
Gender ( <i>n</i> ):	
female	4
male	7
Birth order ( <i>n</i> ):	
first child	5
second or later child	6
dmfs range	6–50
<i>Parents</i>	
Gender ( <i>n</i> ):	
mother	8
father	3
Mother's age range (years)	26–45

clusters. Clusters were then reduced into meta-clusters with labels and the labels became concepts. Similar concepts were grouped together to develop categories and subcategories [24]. Linkages were made among categories. Data collection and analysis were done simultaneously. Saturation of categories was attempted using a constant comparative approach to look for examples which represented the category. Each category that was reasonably full was considered to be a saturated category. Interviewing continued until new information did not provide further insight into the category. Eleven participants were interviewed before the data were determined to be saturated.

## Results

The demographic information of the children and parents participating in the study is summarized in Table 2. Six major categories were identified from the transcripts (Fig. 1).

### *Parents' concept of oral health*

Parents' different concepts of oral health will affect the health behaviours which they initiate for their child. The general concept of oral health for this group of parents was 'not having any sign of dental diseases' (Fig. 2). This group of parents appeared to have an 'absence of disease' approach to both their oral health and their children's oral health. It also appeared that their concerns were limited to 'cavities' rather than a more holistic view

of oral health in general. When asked, 'How do you describe a healthy mouth?' a 29-year-old mother replied, 'That's no cavities at all.' Parents also expressed differing levels of satisfaction with their own oral health. Another mother seemed to normalize the presence of dental cavities because they are such a common occurrence: 'I think having a cavity is OK, because I don't think there is anybody out there without a cavity.' She also expressed doubt about the effectiveness of prevention and perceived the disease to be 'inevitable'; '... even if it is preventable, but it happens'. A 53-year-old father of a 3-year-old girl suggested that genetic factors enhance the inevitability of dental decay: 'Cleaning the teeth may help to save them, but genetics is also an important factor.'

### *Dental treatment experiences of parents*

Parents were also asked about their own experience as dental patients. Most parents referred to their childhood dental care in either a positive or a negative way. A 29-year-old mother of two boys explained:

My own teeth have been fine; we have been in regular check-ups in the health units; my mom took us every 3 months or 6 months, so we were OK.

However, another mother complained about her childhood dental care:

When I was little, my teeth were very bad. Most of the teeth were pulled out by the dentists, because we didn't brush, nobody taught you to brush ...

Almost all the respondents described some problems with their teeth as children and later as adults. However, most parents did their best to be regular dental attenders:

We used to go every 6 months, but now the dental plan covers only once a year.

Dental fear and anxiety as a result of past negative dental experiences were not reported by this group of parents. In the words of another mother:

I have excellent dentists; they've always been very skilled, very gentle, I have never had any fear of the dentist.

### *Child's dental health*

Parents were asked about their views on primary teeth. The contribution of 'baby' teeth to eating,

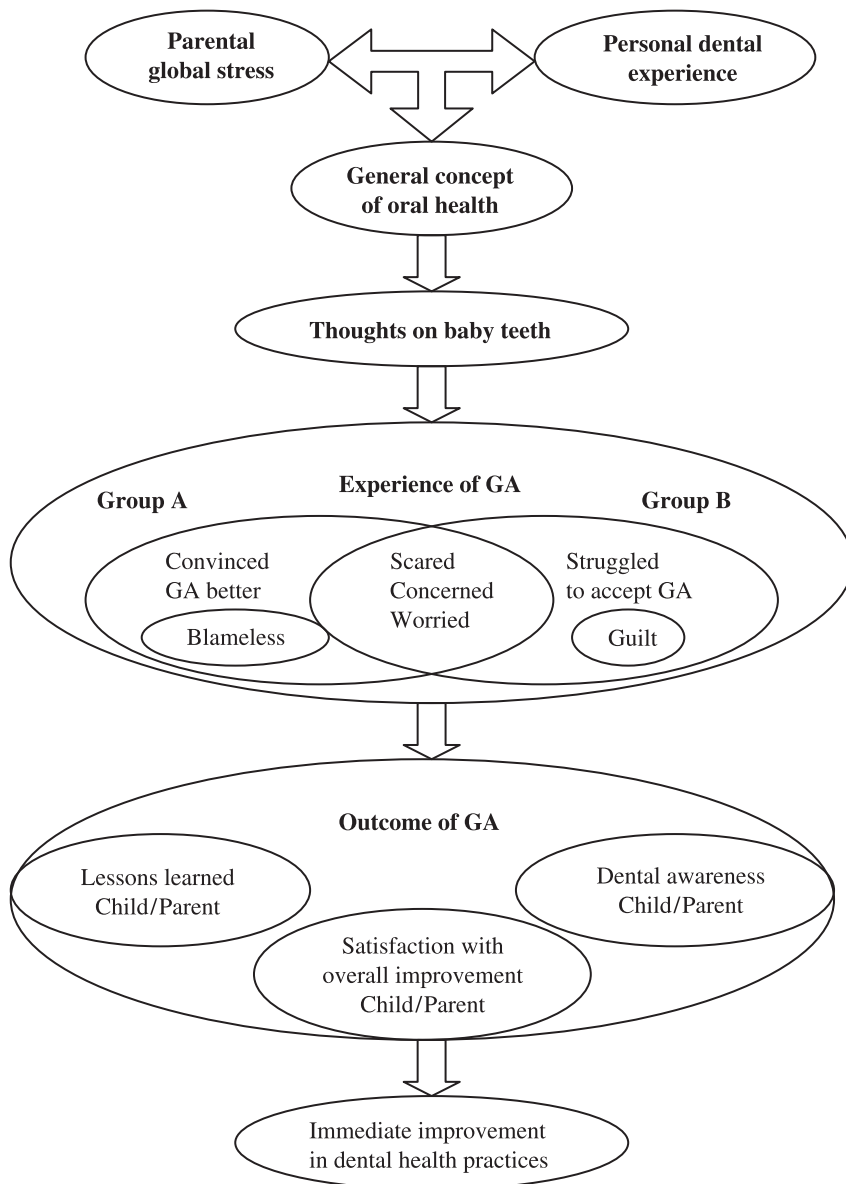


Fig. 1. Overview of categories and subcategories: (GA) general anaesthetic.

speaking, appearance, and healthy adult teeth was acknowledged by the parents:

I know baby teeth are very important; if they get 'rot' they would destroy the second set; it's also related to their digestion and nutrition.

The comment of a 34-year-old mother of three children, all of whom had had dental treatment under GA, about the importance of primary teeth was:

Because of their appearance, a lot of people see them. If they don't look nice, the kids get teased and bugged.

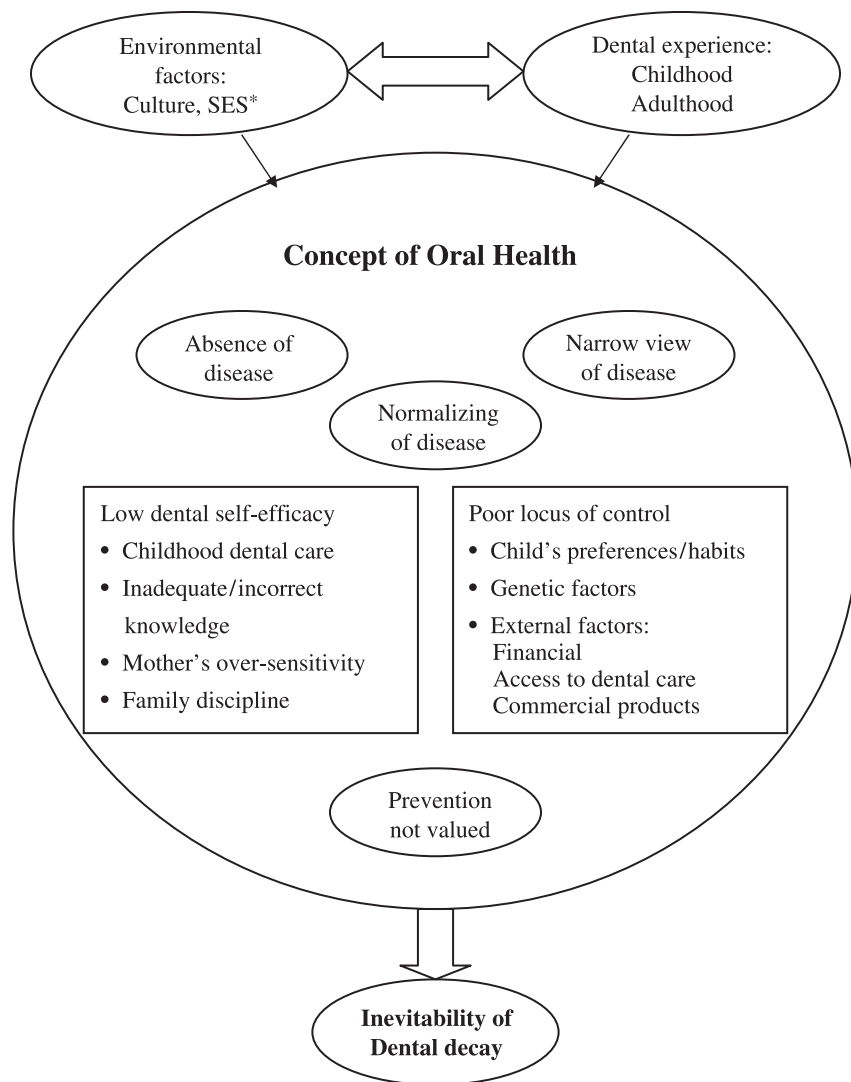
When asked about the cause of dental decay in primary teeth she remarked:

From breast-feeding so much, even though we brushed, I guess we were not brushing as best as we should have been, and from eating things that they shouldn't eat like candies, pop ...

Some parents simply linked tooth decay to hereditary factors:

I think we have to blame genetics, some people are born with strong teeth and some not.

Others described 'baby' teeth as being more likely to get dental decay than adult teeth because of



**Fig. 2.** Parents' overview of oral health:  
 \*(SES) socio-economic status.

children's feeding habits and poor cooperation with home-care practices. A 29-year-old mother of two boys said:

I guess it's because of the bottle, and the way that children eat and brush the teeth.

A 45-year-old mother of a 5.5-year-old girl similarly commented:

I would say it is preventable, but it is very difficult, because you cannot control what your kids eat when you send them somewhere.

While parents were unhappy about their child having cavities, losing a tooth was seen as a more serious problem. A single mother with two children explained her feelings about her son's tooth loss:

A cavity here and there is okay, but like, five teeth pulled out, it was just ridiculous; it hurt him, and it's more or less my fault.

Another mother similarly blamed herself for her child's tooth loss:

I feel bad, because I feel that I've done something wrong that his tooth has to go ...

*Stress of life*

Most parents in this study reported that the stress of daily life was a barrier to caring for their child's teeth. The types of stress experienced by parents in this study could be classified as: economic (financial concerns); sociodemographic (employment issues, marital discord and number of other children);

maternal psychological (daily tasks of parenting, worries about a child's well-being and satisfaction with the parenting role); and child-related (behaviour, eating habits and dental health care). One 45-year-old mother admitted:

If I had a chance, I would have stopped the bottle earlier. I would have stopped her eating candies ... better diet. Because of the family pressure, I didn't have much time for my children.

Most parents did report additional stress around the time that their child had the GA. However, the association between day-to-day stress and the anxiety experienced by these parents during the GA was reported differently by different parents. A 26-year-old single mother of two children, aged 3.5 and 2 years, was asked to rate, between 1 and 10, her level of stress as a result of the GA. She said:

Probably 5, the only problem was getting him to a dentist.

Of her day-to-day stress level, she said:

I'm a single mom, probably the same, roughly in between; it's not, like, a very stressful life

A father of an only child, a 3-year-old girl, described his overall level of stress:

It's 5; usually we do quite well.

However, he mentioned an additional stress in the month before the GA:

I probably would say 7; I have felt more pressure in the past few months because of my daughter's surgery.

#### *Experience of general anaesthetic*

Overall, most parents responded with emotion (fear, worry, concern) when they first found about the need for a GA, and again during the time that their child was in the 'operating room'. Mothers seemed to report greater levels of anxiety compared to the fathers who were interviewed. A 33-year-old mother of an only child described her feelings about the GA:

I've never known kids had surgery for teeth; I really panicked, felt like a moron, for bringing a child at this age through surgery because of neglect of the teeth.

While some parents blamed themselves for their child's need for dental GA and described their feeling as 'guilt', demonstrated in the above quote, others felt 'blameless' and were convinced that a GA procedure was the only way to treat a young child. In the words of a father of a 3-year-old daughter:

I felt just normal because I knew this is the way it should be. She is very young.

Nonetheless, emotions like fear and worry were common in both groups of parents (groups A and B in Fig. 1):

I knew it was safe, and better than taking them in and doing everything when they are awake, but I was scared because he was my son.

The child going to sleep 'so fast' was described as a particularly negative part of the experience. A mother of the three children said:

I don't mind them going under GA, but the things that scare me the most is they go to sleep so fast, like they die!

In the words of another mother:

They asked me to hold him and suddenly he dropped off my shoulder; I am telling you, no mother wants to see that, and then like he died ...

Parents appeared to be aware of the complications of GA and most considered it a serious procedure with known risks. In the words of a 44-year-old mother of a 2.5-year-old:

I was scared. I was thinking, what if he wouldn't wake up, and when he wakes up, what if something is wrong with his brain.

Experiencing a previous GA with other siblings did not seem to reduce parents' emotions:

I had similar experience for my daughter, for her tear ducts, they put her to sleep and did the surgery, I knew, but still I was worried because he was a different child in a different situation, really worried about what would happen.

Even the mother whose two other children had a dental GA experience divulged the following:

I think I was more scared than she was; she didn't really understand what she had to do, I have been there with my other children, so I knew.

### *Outcome of general anaesthetic*

After the procedure, parents reported overall improvement in their child's well-being. Episodes of tooth pain decreased and sleeping patterns, eating habits and toothbrushing improved. A mother of a 3-year-old girl described the outcome:

She has no pain any more and she never wakes up during the night at all. She brushes her teeth a lot better now than she used to ...

Improvement in brushing habits was reported by other parents as well:

He has more awareness of his teeth. I think he cares more about his teeth.

A mother of a 6-year-old child excitedly described her daughter's oral hygiene behaviours after the GA:

I was very surprised this morning that she actually wanted me to floss for her.

However, no matter how pleasing the outcome, it appeared that the GA dental treatment itself was a difficult experience for most children. Some parents even speculated that their child might avoid future dental visits as a result of long-term trauma after the GA. Parents repeatedly expressed this opinion:

She/he doesn't want to come back to the dentist.

Losing teeth was also an issue for many children, and not only in relation to loss of function – the psychological impact was mentioned to be a concern as well. The first reaction of some children who lost their front teeth was tears and crying. Some children immediately tolerated the loss, while others struggled to get over it:

He was hurt and he is still hurt from it, that's why he doesn't let anyone open his mouth, it bothers him a lot.

Some parents complained about their child having eating troubles:

Her eating is not back to where it was before the surgery, because she is still learning how to eat without the teeth she had before.

Reports varied on the child's social interactions after the GA. Some children had challenges related to their new condition:

She was complaining that her friends think she is talking funny. I guess she is not very happy about losing the teeth.

Conversely, others got pleasure from their dental treatment:

He thinks he is very cool now that he's got steel things on his teeth.

### **Discussion**

The results reported in this paper are part of a larger study in which the authors explore oral health behaviour change in the parents of young children. Their long-term goal is to develop acceptable and effective interventions to prevent caries relapse after oral rehabilitation under GA. To achieve this goal, they are developing a model to describe the process of behaviour change in these high-risk families. The authors hope their model will provide better insights into the motivators for behaviour change and also into the barriers to it. While there are many theories of behaviour change, there is no theoretical model particularly applicable to parental oral health behaviours.

A qualitative method of inquiry was undertaken to help the authors to better understand parents' experience of their child's dental GA. The one-to-one interview provided a safe environment for parents from differing backgrounds to express, in their own words, how they felt about the GA and their child's immediate response to this aggressive treatment. The dental GA is just one event in the life of a child. Parents' beliefs about oral health, and their own dental experiences and other aspects of daily life, may influence the parents' and child's responses to the GA, and these also need to be explored.

No agreement exists about sample size in qualitative studies. Sample sizes have ranged from as few as one or two subjects [25,26] to closer to 30 [27]. For the purposes of this study, the 11 in-depth interviews provided the authors with a detailed, coherent and rich description. Similar to other qualitative studies [27,28], this sample size resulted from saturation of the data, as reflected by repeating themes. Data saturation is reached when no new information is forthcoming and nothing new is heard in the interviews [23].

### *Parents' concept of oral health*

People with different beliefs about oral health may experience an event like their child's dental GA

differently. To better understand parents' experience of their child's dental GA, the authors initially explored their general thoughts on oral health as well as their attitude towards the health of primary teeth.

Parents' perceptions of oral health in general may serve as a barrier to their child's optimal oral health. Families 'practice health' in two different ways either with a 'health promotion' focus or with an 'illness prevention' focus. The 'health promotion' families have a broader concept of health compared to the 'illness prevention' families [28]. They are more sophisticated in their educational strategies and use approaches associated with developing their child's health behaviours [28]. The socio-economic status and cultural background of families may also influence their perception of oral health and their subsequent oral health behaviours [29]. In this study, most families appeared to be engaged in 'illness prevention' rather than 'health promotion'. They were more concerned about immediate oral health threats like dental pain. Before the GA, they had not been involved in thinking about or planning for their children's oral health.

Furthermore, parental beliefs about their abilities to control their own and their child's oral health are one of the most important motivators to pursue health promoting behaviours [30]. In this study, while most parents expressed doubt about their ability to control dental decay, i.e. dental self-efficacy, there were some who viewed themselves capable of avoiding dental decay. However, most parents from both groups, i.e. those with either high or low dental self-efficacy, appeared to have low 'parental self-efficacy' related to controlling their child's oral health, including their eating habits and oral hygiene (Fig. 2). They believed 'it is difficult to prevent dental decay in young children'. The perception of their limited control over their child's oral health by these parents appeared to be related to factors like their own poor childhood dental care, their inadequate or incorrect knowledge, limited family income, and external influences (e.g. access to dental care and commercial products).

A clear model of regular dental care acquired in childhood has been related to better dental self-efficacy, while an unclear model – or the lack of any model – has been related to poorer self-efficacy [31]. In addition, the amount and quality of parental knowledge about the cause of dental disease may lead to an overestimation or underestimation of their

abilities to control dental diseases [32]. For instance, many parents mentioned heredity as the main factor responsible for dental caries. However, the association between genetic inheritance and dental caries has been demonstrated to be weak and does not provide a predictable basis for predicting future dental decay [33]. In addition, families with adequate financial resources express higher self-efficacy towards maintaining their child's oral health. These families have the greatest probability of having a regular pattern of preventive care [31,34].

Overall, parents with higher levels of dental self-efficacy had more of a struggle to accept GA for their child's oral rehabilitation and blamed themselves for placing their child at such a risk. On the other hand, parents with lower levels of dental self-efficacy felt more comfortable and blameless (Fig. 3).

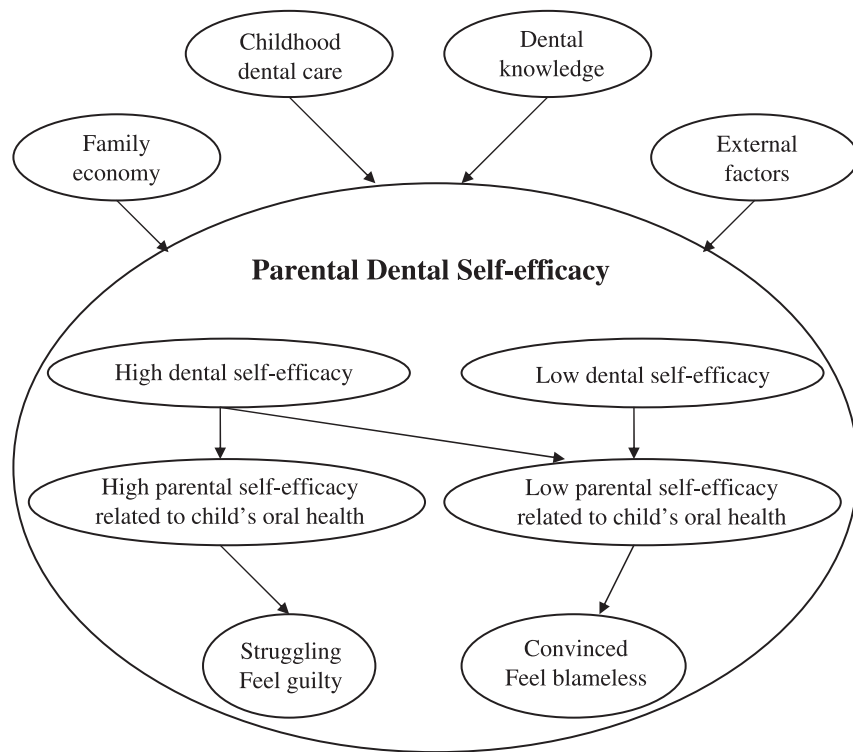
#### *Dental treatment experiences of parents*

Parents' negative treatment experiences have been identified as important determinants of their health beliefs and subsequent behaviours which may hinder them seeking professional dental care for their child [29,35,36]. However, adverse dental experiences related to pain or discomfort at the dentist, or anxiety or fear about going to the dentist were not reported by parents in this study. The newer generation of parents do not appear to be burdened by previous negative dental experiences as their own parents were.

#### *Child's dental health*

Superficial dental health knowledge and an equivocal attitude towards the health of primary teeth have been previously reported for parents of at-risk preschool children [37]. However, parents in this study appeared to know how to keep their child's teeth healthy and expressed an even more positive attitude towards maintaining the health of primary teeth as a result of the GA experience. Parents feared being blamed for their child having extensive dental decay at such a young age. Consequently, a few mothers felt 'guilty' and blamed themselves. In fact, some mothers admitted that they might have been able to prevent their child's dental troubles. Parental guilt might be a cue for parents to re-examine their responsibilities for their child's oral health, to take action and to change their behaviours related to their child's oral health.





**Fig. 3.** Parental dental self-efficacy and their feelings about their child's general anaesthetic.

*Stress of life*

Parenting stress is conceptualized as a condition where the different demands of parenthood result in a perceived discrepancy between situational demands and personal resources [38]. Parenting stress has been found to be associated with a number of negative consequences, both for parents and for their children [39–41]. Some parents in this study discussed the negative influence of daily stress on their parenting practices and their child's dental health. However, other parents seemed to accept stress as an expected consequence of being a parent. In addition, different parents reported different levels of anxiety during the GA. Those parents who, presumably, preoccupied with more immediate and pressing family issues, like being a 'single mom', seemed less likely to be influenced by the stress of the GA. In contrast, parents who had a more peaceful life reported an additional stress related to their child's GA dental experience.

The psychological effect of anaesthetic induction on children and their parents has been explored previously [42], but the association between GA-related parental anxiety and day-to-day stress was not examined. Parental distress during the anaesthetic induction was found to be related to variables such

as discord between mothers and fathers, mothers of an only child, and mothers or fathers who were healthcare workers [42]. As in this study, mothers reported a higher level of anxiety compared with fathers [42]. Perhaps the difficulty of the experience for both parent and child helps explain the poor return for recall assessment that has been repeatedly observed [43]. The trauma does not seem to encourage follow-up, and in some cases, may be a discouragement.

*Experience of general anaesthetic*

The parents' preparation for, attitudes and emotions about, and experiences with being present for their child's anaesthetic were explored in this study. Some parents felt well prepared and were satisfied with their amount of preparation. In some cases, they thought the GA was preferable for their child and superior to local anaesthesia. They perceived GA as the only possible way to successfully treat their young child. However, in contrast to a previous report [44], most parents did realize that GA was potentially hazardous for their child's health. While some parents were more concerned about the dental outcome of the procedures, other parents experienced increased anxiety and worry during the GA.

### Outcome of general anaesthetic

Parents have frequently reported a positive impression of dental outcomes after their child's GA [10,45]. Similarly, almost all parents in this study reported improvements in their own and their child's oral health behaviours. Most children were pleased about their new clean mouth and wanted to keep it that way. The most common changes in child's behaviour mentioned by parents were increased tooth brushing and decreased consumption of sugary foods. However, these reports were given within 2 weeks of the GA. The question is, will these dentally healthy behaviours endure?

It was an interesting, and not previously reported, finding that some children had difficulties coping with the consequences of the extraction of their teeth. Most parents reported their child having immediate trouble with eating because of the tooth loss. They also talked the emotional reaction of their child to tooth loss. Losing a number of teeth was a shock to many children. Perhaps, if children were better prepared in advance, both by parents and dental staff, the loss would not be such a surprise for them. All dental professionals involved with GA dentistry should consider how to advise parents on counselling their child about planned extractions prior to the appointment. However, overall, most parents described their children as generally happier after oral rehabilitation because of general improvement in well-being.

#### What this paper adds

This paper provides an in-depth analysis of

- a child's general anaesthetic dental treatment from the parents' point of view.
- the impact of general anaesthetic dental treatment on a child's daily life.

#### Why this paper is important to paediatric dentists

Understanding the "GA experience" from parents' perspective will help us to

- better understand parental oral health behaviours after GA treatment and the relationship of these behaviours to caries relapse.
- provide more appropriate "pre-GA" counseling to parents which will ensure the experience is more positive for parent and child.

### Conclusion

Parents reported varying levels of anxiety during the GA. They expressed their emotions as fear, worry and concern. While some parents felt guilty and

struggled to accept this mode of treatment for their child, others felt blameless and were convinced that a GA is preferable and superior to conventional treatment. Overall, the GA dental experience had enough of an emotional impact to immediately motivate parents to consider changing their behaviours related to their child's dental health. In fact, an early outcome of the GA was a reported improvement in the parents' and child's dental health practices, but at the same time, parents appeared to be overwhelmed by difficulties in applying new healthy behaviours.

Further understanding of the barriers and the challenges which parents face to maintaining dentally healthy behaviours in the long term is needed. Follow-up interviews are required to explore parents' long-term success with preventive behaviours. Only by enhancing our knowledge and gaining a better understanding of a parent's ongoing struggle to 'do the right thing' in relation to her/his child's dental health can more meaningful, and thus, more successful, interventions be developed. This research is ongoing as the authors endeavour to follow up these parents over time.

### Acknowledgements

We gratefully acknowledge the dental and medical staff of Monarch Paediatric Dental Centre for their collaboration on this study. This study was supported by BCMSF Fellowship and NIDCR Grant DE1306.

### References

- 1 Low W, Tan S, Schwartz S. The effect of severe caries on the quality of life in young children. *Pediatric Dentistry* 1999; **21**: 325–326.
- 2 Milnes AR. Description and epidemiology of nursing caries. *Journal of Public Health Dentistry* 1996; **56**: 38–50.
- 3 Pitts NB, Boyles J, Nugent ZJ, Thomas N, Pine CM. The dental caries experience of 5-year-old children in England and Wales. Surveys co-ordinated by the British Association for the Study of Community Dentistry in 2001/2002. *Community Dental Health* 2003; **20**: 45–54.
- 4 Bassett S, MacDonald H, Woods S. *Assessing Risk for Early Childhood Caries in Infants: Projects in British Columbia as of July 1999*. Victoria, BC: Ministry of Health, 1999.
- 5 Association of Dental Surgeons of British Columbia. *Children's Dentistry Task Force Report*. Vancouver, BC: Association of Dental Surgeons of British Columbia, 2001.
- 6 Almeida AG, Roseman MM, Sheff M, Huntington N, Hughes CV. Future caries susceptibility in children with early childhood caries following treatment under general anesthesia. *Pediatric Dentistry* 2000; **22**: 302–306.
- 7 Amin MS, Harrison RL, Benton TS, Roberts M, Weinstein P. Effect of povidone-iodine on Streptococcus mutans in children with extensive dental caries. *Pediatric Dentistry* 2004; **26**: 5–10.

- 8 Fung DE, Cooper DJ, Barnard KM, Smith PB. Pain reported by children after dental extractions under general anaesthesia: a pilot study. *International Journal of Paediatric Dentistry* 1993; **3**: 23–28.
- 9 Mason C, Holt RD, Rule DC. The changing pattern of day-care treatment for children in a London dental teaching hospital. *British Dental Journal* 1995; **179**: 136–140.
- 10 White H, Lee JY, Vann WF, Jr. Parental evaluation of quality of life measures following pediatric dental treatment using general anesthesia. *Anesthesia Progress* 2003; **50**: 105–110.
- 11 Podesta JR, Watt RG. A quality assurance review of the patient referral process and user satisfaction of outpatient general anaesthesia services for dental treatment. *Community Dental Health* 1996; **13**: 228–231.
- 12 Atan S, Ashley P, Gilthorpe MS, Scheer B, Mason C, Roberts G. Morbidity following dental treatment of children under intubation general anaesthesia in a day-stay unit. *International Journal of Paediatric Dentistry* 2004; **14**: 9–16.
- 13 Vinckier F, Gizani S, Declerck D. Comprehensive dental care for children with rampant caries under general anaesthesia. *International Journal of Paediatric Dentistry* 2001; **11**: 25–32.
- 14 Eidelman E, Faibis S, Peretz B. A comparison of restorations for children with early childhood caries treated under general anesthesia or conscious sedation. *Pediatric Dentistry* 2000; **22**: 33–37.
- 15 Berkowitz RJ, Moss M, Billings RJ, Weinstein P. Clinical outcomes for nursing caries treated using general anesthesia. *ASDC Journal of Dentistry for Children* 1997; **64**: 210–211, 228.
- 16 Sheller B, Williams BJ, Hays K, Mancl L. Reasons for repeat dental treatment under general anesthesia for the healthy child. *Pediatric Dentistry* 2003; **25**: 546–552.
- 17 Graves CE, Berkowitz RJ, Proskin HM, Chase I, Weinstein P, Billings R. Clinical outcomes for early childhood caries: influence of aggressive dental surgery. *Journal of Dentistry for Children* 2004; **71**: 114–117.
- 18 Denzin NK, Lincoln YS. *Handbook of Qualitative Research*. Thousand Oaks, CA: Sage Publications, 1994.
- 19 Borra ST, Kelly L, Shirreffs MB, Neville K, Geiger CJ. Developing health messages: qualitative studies with children, parents, and teachers help identify communications opportunities for healthful lifestyles and the prevention of obesity. *Journal of the American Dietetic Association* 2003; **103**: 721–728.
- 20 Peterson-Sweeney K, McMullen A, Yoos HL, Kitzman H. Parental perceptions of their child's asthma: management and medication use. *Journal of Pediatric Health Care* 2003; **17**: 118–125.
- 21 Meadows LM, Verdi AJ, Crabtree BF. Keeping up appearance: using qualitative research to enhance knowledge of dental practice. *Journal of Dental Education* 2003; **67**: 981–990.
- 22 Newton T. Qualitative research and evidence-based dentistry: linking evidence to practice. *Evidence-Based Dentistry* 2000; **2**: 104–106.
- 23 Glaser BG, Strauss A. *The Discovery of Grounded Theory*. Chicago, IL: Aldine, 1967.
- 24 Strauss A, Corbin J. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Newbury Park, CA: Sage Publications, 1990.
- 25 Spear HJ. Teenage pregnancy: 'having a baby won't affect me that much'. *Pediatric Nursing* 2001; **27**: 574–580.
- 26 Hurd RC. A teenager revisits her father's death during childhood: a study in resilience and healthy mourning. *Adolescence* 2004; **39**: 337–354.
- 27 Stevens A, Freeman R. The role of the mother-child interaction as a factor in nursing caries (ECC): a preliminary communication. *European Journal of Paediatric Dentistry* 2004; **5**: 81–85.
- 28 Roden J. Capturing parents' understanding about the health behaviors they practice with their preschool-aged children. *Issues in Comprehensive Pediatric Nursing* 2003; **26**: 23–44.
- 29 Riedy CA, Weinstein P, Milgrom P, Bruss M. An ethnographic study for understanding children's oral health in a multicultural community. *International Dental Journal* 2001; **51**: 305–312.
- 30 Åström AN, Blay D. Multidimensional health locus of control scales: applicability among Ghanaian adolescents. *East African Medical Journal* 2002; **79**: 128–133.
- 31 Syrjälä AM, Knuutila ML, Syrjala LK. Self-efficacy perceptions in oral health behavior. *Acta Odontologica Scandinavica* 2001; **59**: 1–6.
- 32 Knecht MC, Syrjala AM, Knuutila ML. Locus of control beliefs predicting oral and diabetes health behavior and health status. *Acta Odontologica Scandinavica* 1999; **57**: 127–131.
- 33 Shuler CF. Inherited risks for susceptibility to dental caries. *Journal of Dental Education* 2001; **65**: 1038–1045.
- 34 Newman JF, Gift HC. Regular pattern of preventive dental services – a measure of access. *Social Science and Medicine* 1992; **35**: 997–1001.
- 35 Weinstein P, Troyer R, Jacobi D, Moccasin M. Dental experiences and parenting practices of Native American mothers and caretakers: what we can learn for the prevention of baby bottle tooth decay. *ASDC Journal of Dentistry for Children* 1999; **66**: 120–126, 85.
- 36 Skaret E, Milgrom P, Raadal M, Grembowski D. Factors influencing whether low-income mothers have a usual source of dental care. *ASDC Journal of Dentistry for Children* 2001; **68**: 136–139, 142.
- 37 Blinkhorn AS, Wainwright-Stringer YM, Holloway PJ. Dental health knowledge and attitudes of regularly attending mothers of high-risk, pre-school children. *International Dental Journal* 2001; **51**: 435–438.
- 38 Östberg M. *Parenting Stress. Conceptual and Methodological Issues*. PhD Thesis. Uppsala: Faculty of Social Sciences, Uppsala University, 1999.
- 39 Östberg M. Parental stress, psychosocial problems and responsiveness in help-seeking parents with small (2–45 months old) children. *Acta Paediatrica* 1998; **87**: 69–76.
- 40 Sepa A, Wahlberg J, Vaarala O, Frodi A, Ludvigsson J. Psychological stress may induce diabetes-related autoimmunity in infancy. *Diabetes Care* 2005; **28**: 290–295.
- 41 Quinonez RB, Keels MA, Vann WF, Jr, McIver FT, Heller K, Whitt JK. Early childhood caries: analysis of psychosocial and biological factors in a high-risk population. *Caries Research* 2001; **35**: 376–383.
- 42 Messeri A, Caprilli S, Busoni P. Anaesthesia induction in children: a psychological evaluation of the efficiency of parents' presence. *Paediatric Anaesthesia* 2004; **14**: 551–556.
- 43 Primosch RE, Balsewich CM, Thomas CW. Outcomes assessment an intervention strategy to improve parental compliance to follow-up evaluations after treatment of early childhood caries using general anesthesia in a Medicaid population. *ASDC Journal of Dentistry for Children* 2001; **68**: 102–108.
- 44 Mohamed Tahir MA, Mason C, Hind V. Informed consent: optimism versus reality. *British Dental Journal* 2002; **193**: 221–224.
- 45 Acs G, Pretzer S, Foley M, Ng MW. Perceived outcomes and parental satisfaction following dental rehabilitation under general anesthesia. *Pediatric Dentistry* 2001; **23**: 419–423.