# Reasons for and parental satisfaction with children's dental care under general anaesthesia

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**Summary.** *Objectives.* The aim of this study was to describe why healthy children's previous treatment experiences can be reasons for their dental treatment under general anaesthesia (GA), and to describe their parents' experiences and satisfaction with that treatment. *Subjects and methods.* The data cover those children (n = 102) below 16 years of age who, being otherwise healthy, were referred for Public Dental Service GA dental care in Helsinki, Finland, over the course of one year because of serious difficulties in dental treatment. The parents were given a self-administered questionnaire inquiring about their child's previous experiences of dental care, and about their access to and satisfaction with the present GA treatment. Data on the children's dental state were taken from patient records.

*Results.* The children's mean age was 6·4 years (SD = 2·6 years), and the mean number of teeth with untreated caries was 7·7 (SD = 3·0). Of the total sample, 32% had undergone four or more previous unsuccessful dental visits. At the time of their first difficulties in dental care, 39% were below 3 years of age. The older the child, the more serious was her or his parents' ranking of the difficulties met during dental care (P = 0.02). From the parents' point of view, dental fear was the most important reason for treatment failures, followed by pain. Seeking GA treatment had been easy for 93% of parents, and most of them were also satisfied with their child's present GA treatment. *Conclusions.* The most important factors leading to the use of GA, as reported by the parents, are dental fear and repeated unpleasant experiences during dental care, and therefore, these should always be properly diagnosed, prevented and controlled.

#### Introduction

Approximately 5-15% of people feel strong dental fear leading to serious difficulties in care [1–3]. For the worst cases, dental treatments have to been given under general anaesthesia (GA).

The immediate reasons reported for dental care under GA are rampant caries in children under 5 years

for caries, or that there have been failures in the conduct of dental staff [3,6,7]. The experience of pain can have a considerable impact on a patient's growing dental fear and anxiety. In addition, dental fear can be learned from parents and friends, or can follow problems encountered

of age, inability to cooperate when treated under local

anaesthesia for 5- to 8-year-olds, and any caries for

age groups under 16 years [4,5]. Dental caries as a

reason for GA suggests that a child has had earlier

experiences of toothache and pain during treatment

during other medical appointments, even when the child

has no firsthand experience of dental care [3,8–10].

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Dental fear in children may also lead to clinical behaviour management problems, but not for all children.

Comprehensive treatment of early childhood caries under GA can improve both a child's quality of life and also overall health, the greatest benefits being brought about by a reduction in pain, and an improved capacity to eat and sleep [11]. Further benefits are the parents' satisfaction with the outcome and process of care, and with their expectations having been met.

The aim of this study was to describe healthy children's previous treatment experiences as reasons for their dental treatment under GA, and to describe parents' experiences and satisfaction with that treatment. The authors' hypothesis was that dental fear and repeated experiences of unpleasant dental treatments are the major reasons for referral to dental care under GA when a child is otherwise healthy.

## Subjects and methods

#### Background

The entire population of Finland is entitled to access the Public Dental Service (PDS), with nearly all children participating in these. Dental care under GA is provided in hospitals, and larger public and private dental clinics. In the Helsinki PDS, any dentist facing serious difficulties with a child's dental treatment, such that dental treatment does not succeed under local anaesthesia or conscious sedation. can refer that child to the Special Oral Health Care Unit (SOHCU). The SOHCU specialist will assess treatment options individually for every child referred. The indications for GA in paediatric dental care follow the guidelines of the American Academy of Pediatric Dentistry [12]. In the case of parents who definitely want their children to be treated under GA but lack a public dentist's referral, the parents have to seek out such treatment in the private sector.

#### Subjects

Ethical permission for the present study was given by Helsinki City Health Department. The data cover patients below 16 years of age who were referred to dental care under GA in the SOHCU of the Helsinki PDS over a period of one year because of serious difficulties in dental treatment. Only generally healthy patients were included, serious general or mental diseases, or medically compromising conditions being exclusion criteria. The target children (n = 102, 47 boys and 55 girls) were only seen during their dental GA visit. None of the parents of these children refused to respond. The child's age on the day of treatment in GA was determined with an accuracy of one month. Two age groups were used in the analyses: those below 7 years of age and those aged 7–16 years, the latter being the obligatory ages to attend school in Finland.

#### Clinical data

The parents were asked for written consent to allow the authors to extract data from their children's dental records for this study. The numbers of teeth were recorded separately for primary and permanent teeth. The number of teeth with caries (dt + DT) was described as the number of all decayed teeth, primary and permanent, which were filled or removed during treatment under GA.

#### Questionnaire

The parents were asked to fill in a questionnaire during the child's treatment, or the questionnaire was mailed to their home address afterwards to be returned in a prepaid envelope. The multiple-choice and openended questions covered the topics listed below.

Previous experiences of dental care:

- When and where did your child have her or his first difficulties during dental care?
- How many times has your child experienced unsuccessful dental treatments before this dental GA?
- Has your child had emergency appointments?
- How serious did you find the previously experienced difficulties in your child's dental care? Give your opinion using a 0–10 scale with '0' representing 'no serious difficulties'.
- Please indicate, in rank order, the importance of the reasons why your child's previous dental treatments have been unsuccessful. From the list below, mark the most important reason with 1, the second with 2, etc.
- Pain
- The dental staff's poor conduct
- Dental fear
- The child's traumatic experiences of other medical appointments
- What else? (Please define)

Dental state	< 7 years of age		7-16 years of age	
	Boys $(n = 25)$	Girls $(n = 38)$	Boys $(n = 22)$	Girls $(n = 17)$
Number of primary teeth	$18.2 \pm 2.4$	$17.3 \pm 3.3$	$9.2 \pm 6.5$	$11.5 \pm 4.6$
Number of permanent teeth	$0.2 \pm 0.9$	$1.2 \pm 2.5$	$14.4 \pm 7.4$	$11.3 \pm 5.4$
Number of teeth with caries $(dt + DT)$	$7.8 \pm 2.6$	$7 \cdot 3 \pm 3 \cdot 0$	$8.7 \pm 3.5$	$7.4 \pm 2.9$

Table 1. Dental state (mean  $\pm$  SD) of children (n = 102) treated under general anaesthesia by gender and age.\*

\*Statistical evaluation by analysis of variance for difference by gender was done separately for both age groups (P > 0.05). F-values range from 0.62 to 3.34 and from 1.37 to 2.09 for the younger and older age groups, respectively.

In the analyses, the most important reason was given five points and the least important reason one point. The importance score was created by summing these scores for each reason.

• Have you yourself ever undergone dental care under conscious sedation or GA?

Accessibility to and experiences of this dental care under GA:

- How difficult did you find it to get this treatment under GA (very difficult, moderately difficult, moderately easy, very easy)?
- How long has your child had to wait for this GA appointment (< 1, 1–3, 4–6, > 6 months)?
- Did you get enough prior information about GA?
- How satisfied are you with this dental treatment under GA (very satisfied, moderately satisfied, moderately unsatisfied, very unsatisfied)?

Statistical analyses included the chi-square test and an analysis of variance (ANOVA).

#### Results

The subjects' mean age ( $\pm$  SD) was  $6.4 \pm 2.6$  years ( $6.9 \pm 3.1$  years for boys and  $6.0 \pm 2.1$  years for girls), and the mean number ( $\pm$  SD) of dt + DT was  $7.7 \pm 3.0$ . Table 1 shows the numbers of primary and permanent teeth, and dt + DT by age and gender. No gender differences in these figures were found (ANOVA, P > 0.05).

At the time of their first difficulties during dental care, 39% of the children were below 3 years of age; no gender difference was found. Thirty-two per cent of all subjects had experienced four or more unsuccessful dental appointments. Sixteen per cent of all children had had emergency appointments and 21% had parents who had received dental care under conscious sedation or GA.



Bold line = median, x = mean, boxes and whiskers = quartiles, circles = outliers

Fig. 1. Box-and-whisker diagrams showing the distributions of the seriousness scores of the difficulties during the children's previous dental treatments (scale = 0-10).

When ranking the seriousness of the previous difficulties in their child's dental treatments using a 0-10 scale, 25% of parents reported no serious difficulties. Parents assessed these difficulties as very serious (scores = 9-10) for 49% of the 7-16-yearolds and for 31% of those below 7 years of age  $(\chi^2 = 5.74, \text{ d.f.} = 2, P = 0.057)$ . The older the child, the more seriously her or his parents rated the previous difficulties in dental care, the mean scores ( $\pm$  SD) being 6.7  $\pm$  2.9 for the younger and 8.0  $\pm$  2.2 for the older age group (ANOVA, F = 5.68, P = 0.02). Figure 1 shows the distributions of the seriousness scores for each of the four subgroups by age and gender. The upper limit for the lowest quartile was 7, the median being 8. A large variation in these scores by age and gender was seen in every subgroup.

Parents cited dental fear, followed by pain, as the most important reasons for previous treatment failures (Fig. 2). The poor conduct of dental staff or the child's traumatic experiences of other medical appointments remained as less frequently cited reasons for unsuccessful treatments.

Accessibility to GA treatment was reported as easy by 93% of parents (Table 2). The waiting time



Fig. 2. Means of the importance scores of the reasons for unsuccessful dental treatments according to gender and age (scale = 0-5).

had been shorter than one month for 14% of children, the majority (61%) had waited 1–3 months and 25% of children were not treated for over 3 months. A waiting time longer than 3 months was found to be more likely for girls than for boys (38% vs. 9%;  $\chi^2 = 11.88$ , d.f. = 2, P = 0.003).

Most of the parents were satisfied with their child's treatment under GA: 76% were very satisfied and 19% moderately satisfied. Most of the parents (88%) said that they had received enough prior information about dental care under GA. Lack of such information was reported for 18% of children below 7 years of age and for 3% of 7–16-year-olds ( $\chi^2 = 5.09$ , d.f. = 1, P = 0.02).

#### Discussion

In Finland, children are mostly referred for GA when they have enormous amounts of caries. A different practise has been reported for the UK, where GA has been largely used also for oral surgery procedures, especially when related to orthodontic treatments [13]. Similarly, in Northern Ireland and in the North-west of England, general dental practitioners refer most of their paediatric extraction cases for GA [14,15]. However, criticism of such practise has been expressed by showing that 75% of the referred cases could have been treated without GA [16].

The benefits of children's dental care in GA are full-mouth rehabilitation in one single appointment followed by instant relief of pain. In addition, such treatment requires little or no cooperation on the part of the child [17–20]. At the population level, GA is seldom needed in Finland, where the majority of children have no decayed teeth, 84% of 3-year-olds being caries-free in 2000 [21]. From among a total of 42 000 children treated in 1999 in the Helsinki PDS, 84% of those under 6 years of age and 54% of those from 6 to 15 years had no decayed teeth (dt + DT = 0) and only 6-8% belonged to a highcaries group (dt + DT = 3) [22]. Despite the infrequency of serious caries problems, the risk of these should be detected and diagnosed early, which would allow dental care to emphasize preventive measures and arresting caries lesions.

In this study, dental fear was the main reason given by parents for previous treatment failures; this corresponds with results of studies with more detailed reporting by dental staff [23]. In general, most reports agree that reducing unpleasant experiences is important for preventing and treating dental fear. Unfortunately, this seems to be ignored by Finnish dentists. Even when assuming that a dental treatment would be unpleasant to a child, they were less likely than US dentists to use local anaesthesia [24]. When placing a posterior filling for young adults, Finnish PDS dentists used local anaesthesia in only half of the cases [25].

Table 2. Parents' experiences related to their children's (n = 102) dental care under general anaesthesia (GA) by age and gender. Statistical evaluation was done using the chi-square test.

Access to treatment	< 7 years of age		7-16 years of age	
	Boys (%)	Girls (%)	Boys (%)	Girls (%)
Difficulties in getting access	to GA:*			
no	92	89	100	94
yes	8	11	0	6
Waiting time for the treatment	nt (months):†			
< 1	21	13	9	12
1–3	75	47	77	53
> 3	4	40	14	35

 $^{*}\chi^{2} = 2.50, \text{ d.f.} = 3, P = 0.48.$ 

 $\dagger \chi^2 = 13.61, \text{ d.f.} = 6, P = 0.03.$ 

A child's drifting into management problems in dental care can be at least partly attributed to dental fear learned from her or his parents since child dental fear has been reported to be strongly related to parental dental fear [2,3,8–10,26]. In line with those reports, these results reveal the considerable difficulties which were experienced in the previous dental care of children below 3 years of age. This study also suggests that parents have experienced dental fear since 21% had been treated under conscious sedation or GA.

A possible limitation of the present study could be that children's behavioural management problems and dental fear were based on second-hand information by parents. No direct measurement of the children's level of fear was possible since they were only met during the GA visit. On the other hand, when parents are taking their child to a dentist, they are the first to notice their child's dental fear, and thus, their opinion reflects the child's experiences and feelings well.

Following dental fear, dental behaviour management problems often cause referral to specialized paediatric dentistry. Despite its obvious benefits in treating patients with behaviour management problems, GA is seldom used in Finland, where dentists try to treat such patients without GA instead [27]. A selection of alternative methods for avoiding and treating dental fear have been suggested [28]. For the children in this study, however, GA was presumably the best option because of the large scale of the treatments which were needed.

Even if dental care under GA is a very effective treatment modality, it is often a last resort from the dentist's point of view because of the expense and risk-benefit considerations, and also because some parents find it hard to accept [11]. On the other hand, some parents prefer treatment under GA, because this only requires one appointment.

After having been treated under GA, the child still lacks the ability to cooperate in normal dental appointments. To guide the child back to 'normal' patient behaviour in dental care after dental care under GA, Helsinki PDS offers the child, and her or his parents, an appointment with a dental hygienist to introduce a proper home care regime and help the child get used to dental care. This appointment simulates a normal dental situation, but without any treatment that could cause pain. In this way, the child can grow out of her or his dental fear, and the parents can take more responsibility for their child's care. This method, also called a monitoring strategy, has been described as effective in treating dentally anxious children [29].

In general, patient satisfaction improves long-term compliance with treatment and preventive recommendations. The child's oral health is influenced by the parent's knowledge, values and preventive procedures [30,31]. If the parents are satisfied with their child's dental treatment, they will probably give more attention to their child's dental care and better supervise home care as well. In this study, most of the parents were very satisfied with their child's treatment, and therefore, it is hoped that they will take more responsibility for their child's dental care in the future.

When determining treatment modalities which best suit the child and the family, factors which should be considered are the age of the child, the amount and complexity of the dental treatment, the expected quality of treatment in each modality, and the cost and risks of treatment [32]. It is certainly an enormous relief for parents to resolve their child's dental problems, which was probably reflected by their great satisfaction with the treatment received, as reported in this study. Even so, dental treatment under GA should still remain as a last option and be considered as a step to 'normal' patient behaviour in dental care.

What this paper adds

• Difficulties in dental care before 3 years of age were found in 39% of children treated under general anaesthesia.

• Dental fear was the main reason given by parents for referral for treatment under general anaesthesia.

• A proportion of parents of children receiving treatment under general anaesthesia had experienced serious difficulties in their own dental care.

Why this paper is important to paediatric dentists • Dental fear and repeated unpleasant experiences in dental care should always be properly diagnosed, prevented and managed.

• The treatment under general anaesthesia cannot change the child's previous non-cooperation. Therefore, he/she needs to be guided back to normal behaviour using appointments with mainly preventive treatment.

# Conclusion

Since dental fear and repeated unpleasant experiences in dental care were reported as the most important factors leading to a need for GA, these should always be properly diagnosed, prevented and controlled.

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**Résumé.** *Objectifs.* Notre objectif a été de décrire chez l'enfant sain les expériences antérieures de traitements comme causes de leur prise en charge dentaire sous général anesthésie (GA) et décrire les expériences des parents et leur satisfaction avec ce traitement.

*Echantillon et méthodes*. Les données concernent les enfants (n = 102) de moins de 16 ans, sains, adressés pour soins sous GA dans les services dentaires publiques (PDS) d'Helsinki durant un an en raison de difficultés à assurer un traitement dentaire. Les parents ont reçu un questionnaire se rapportant aux expériences dentaires antérieures de leur enfant et sur l'accès au traitement par GA et leur satisfaction s'y rapportant. Les données sur l'état dentaire de l'enfant ont été tirées du dossier du patient.

*Résultats.* L'âge moyen des enfants était de 6,4 (ET = 2,6) ans, le nombre moyens de dents cariées non traitées de 7,7 (ET = 3,0). Sur le total, 32% avaient eu au moins 4 visites dentaires infructueuses. Au moment de leurs premières difficultés, 39% avaient moins de 3 ans. Plus l'enfant était vieux, plus les parents jugeaient importantes les difficultés rencontrées lors des soins dentaires (p = 0,02). D'après les parents, la peur du dentiste était la cause la plus importante d'échec, suivie par la douleur. Après traitement sous GA, le traitement a été facile pour 93% des parents, la plupart d'entre eux étant satisfaits de la prise en charge dentaire sous GA.

*Conclusions*. Facteurs les plus importants cités par les parents comme causes menant au recours aux soins sous GA, la peur du dentiste ainsi que les expériences dentaires non plaisantes répétitives devraient être soigneusement diagnostiqués, prévenues et contrôlées.

**Zusammenfassung.** *Ziele.* Unser Ziel war es, die Behandlungserfahrung von gesunden Kindern vor einer Behandlung in Narkose (ITN) zu beschreiben sowie die elterlichen Erfahrungen und Zufriedenheit mit dieser Behandlung.

Stichprobe und Methoden. Die Daten wurden gewonnen von gesunden Kindern (n = 102) unter 16 Jahren, die innerhalb eines Jahres aufgrund von Behandlungsproblemen zur zahnärztlichen Behandlung in ITN in das kommunale Zahnbehandlungszentrum in Helsinki überwiesen worden waren. Die Eltern bekamen einen Fragenbogen, in dem sie über die bisherigen Erfahrungen des Kindes zur Zahnbehandlung und über den Zugang zu und die Zufriedenheit mit der angebotenen Behandlung in ITN befragt wurden. Daten zum Zahnstatus wurden den Patientenakten entnommen. Die durchschnittliche Zahl unbehandelter kariöser Läsionen war 7.7 (SD = 3). Von allen Kindern hatten 32% vier oder mehr erfolglose Behandlungsversuche hinter sich. Zum Zeitpunkt der ersten Behandlungsschwierigkeiten waren 39% unter 3 Jahre alt. Je älter das Kind, desto schwerwiegender war nach Einschätzung der Eltern die Schwierigkeit der Zahnbehandlung (p = 0.02). Aus Sicht der Eltern war Zahnbehandlungsangst Hauptursache für Behandlungsmisserfolge, gefolgt von Schmerzen. Die Angebot einer Behandlung in ITN war leicht zugänglich für 93% der Eltern, die meisten waren mit der angebotenen Behandlung zufrieden. Schlussfolgerungen. Als (nach Angaben der Eltern) wichtigste Faktoren, die zu einer Zahnbehandlung in ITN führen, sollten Zahnbehandlungsangst und wiederholte unangenehme Erfahrungen sorgfältig diagnostiziert, vermieden und kontrolliert werden.

Resumen. Objetivos. Nuestro objetivo fue describir las experiencias del tratamiento previo de los hijos sanos como argumentos para el tratamiento dental con anestesia general (AG) y describir las experiencias y la satisfacción de los padres con este tratamiento. Muestra y métodos. Los datos abarcan aquellos niños (n = 102) por debajo de 16 años que estando por otra parte sanos, fueron referidos para tratamiento dental con AG en Servicios Públicos Dentales (SPD) en Helsinki durante un año debido a serias dificultades en el tratamiento dental. A los padres se les dio un cuestionario de auto-respuesta con preguntas sobre las experiencias previas de su hijo en el tratamiento dental y sobre el acceso a y la satisfacción con el tratamiento actual con AG. Los datos sobre el estado odontológico de los niños se tomaron de los registros de los pacientes. Resultados. La edad media de los niños fue de 6,4 (DS = 2,6) años, la media del número de dientes con caries sin tratar fue de 7,7 (DS = 3,0). Un 32% del total habían tenido 4 o más visitas dentales precedentes sin éxito. En el momento de las primeras dificultades en el tratamiento dental, el 39% estaba por debajo de los 3 años de edad. Cuanto mayor era el niño, más seria era la posición de sus padres sobre dificultades encontradas en el tratamiento dental (p = 0.02). Desde el punto de vista de los padres, el miedo dental fue la razón más importante de fallos del tratamiento, seguido de dolor. La búsqueda de un tratamiento con AG ha sido fácil para el 93% de los padres, la mayoría de los cuales ha estado satisfecha con el tratamiento de su hijo con AG.

*Conclusiones*. El miedo dental y las experiencias desagradables repetidas en el tratamiento odontológico son los factores más importantes señalados por los padres, que conducen al uso de AG y deben estar siempre bien diagnosticados, prevenidos y controlados.

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