

# Dental fear in children and adolescents: a comparison of forms of anxiety management practised by general and paediatric dentists

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**Background.** About 11% of children and adolescents suffer from dental fear. These young people run an increasing risk of undergoing more invasive treatments.

**Aim.** We researched the management of dental anxiety in young patients by general and paediatric dentists as well as by trained and untrained dentists.

**Design.** Eight hundred dentists in Germany were interviewed via e-mail regarding their experience, treatment techniques, information material and complications during the treatment of fearful children. We also examined how difficult dentists judge the treatment of anxious children and how often they participate in continuing education courses.

**Results.** Paediatric dentists applied a greater spectrum of management techniques than general dentists. They used more often psychotherapeutic interventions and anxiety assessment questionnaires. Dentists who frequently attend in continuing education courses judged the treatment to be less difficult and also used psychotherapeutic interventions more often.

**Conclusions.** German paediatric dentists and dentists who take continuing education courses utilise a broader range of techniques to manage dental anxiety. They may be eminently suited to treat children with severe forms of anxiety. Therefore, dentists who treat young patients should participate in education programmes so as to reduce both the anxiety of their patients and their own anxiety.

## Introduction

Fear of dental treatment is a common phenomenon. Its prevalence varies from 6 to 20% for children and adolescents with a mean of 11%.<sup>1</sup>

Dental fear is described as a normal emotional reaction to one or more specific threatening stimuli in the dental situation whereas dental anxiety denotes a state of apprehension that something dreadful is going to be consequent on dental treatment, and it is coupled with a sense of losing control.<sup>1</sup> Such dental phobia is characterised by consistent fear or anxiety related to specific situations/objects, and the fear leads to functional impairment in terms of avoiding dental treatment in general or specific parts of it.<sup>2</sup> The

terms 'dental fear', 'dental anxiety', and 'dental phobia' are often used indiscriminately; however, we use the terms 'dental fear' and 'dental anxiety' for strong negative feelings associated with dental treatment among children and adolescents as recommended by Klingberg *et al.*<sup>1</sup>

Anxiety consists of somatic, cognitive and emotional elements. The origin of fear in the dental setting is multifactorial. Several aetiological factors are to be taken into account. They can be divided into child-related, dentist-related as well as environmental factors. Child-related factors include age, gender, general fear, temperament, general behaviour, attention, pain and negative experiences undergone in dental treatment.<sup>1,3</sup> Environmental aspects are parents' dental fear, child rearing, family background, culture and socio-economic factors.<sup>4,5</sup> Moreover, it is not only the dentist's behaviour but also the conduct of the dental staff that affect.<sup>6,7</sup>

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The German Society of Dentistry and Oral Medicine outlines different available treatment options for adult patients suffering from dental fear. Depending on their primary effect on fearful patients they are part of the different techniques in either anxiolytic or pain reducing approaches. A primary anxiolytic effect can either be achieved pharmacologically (pre-medication, sedation, analgosedation) or nonpharmacologically (psychotherapeutic interventions, hypnosis). Primary pain reducing methods are pharmacological approaches, like general or local anaesthesia and non-pharmacological interventions such as audio-analgesie, transcutaneous electrical nerve stimulation (TENS) and acupuncture.<sup>8</sup> Non-pharmacological anxiolytic techniques are recommended for treating dental anxiety in the long term, e.g. psychotherapeutic interventions such as relaxation technique, systematic desensitisation, *in vivo* exposure therapy and cognitive coping strategies.<sup>9,10</sup>

These recommendations are suitable mainly for adults, but some of them are also applicable to treat fearful children and adolescents. General recommendations for the dental treatment of uncooperative children are rare. The American Academy of Paediatric Dentistry (AAPD) regularly publishes for treatment of children the 'Guidelines on Behaviour Guidance for the Pediatric Dental Patient'. These recommendations include basic and advanced behaviour guidance techniques. Basic behaviour guidance consists of communication and communicative guidance (tell-show-do, voice control, nonverbal communication), positive reinforcement, distraction, parental presence/absence as well as nitrous oxide/oxygen inhalation. Tell-show-do, as defined by the AAPD, involves first the verbal explanation of the treatment procedures using a wording appropriate to the patient (tell). Then the dentist demonstrates the visual, olfactory and tactile aspects of the procedure in a nonthreatening setting (show) followed by the completion of the procedure without deviating from the explanation and demonstration (do). Advanced behaviour guidance implies protective stabilisation, sedation and general anaesthesia.<sup>11</sup>

Most studies focused on patients' views of dental anxiety and assessed epidemiological data or a comparison of different treatment methods; however, little is known about the current knowledge of dentists and their favourite techniques regarding the treatment of children and adolescents experiencing dental fear. The objective of this trial was to investigate the management of dental anxiety in children and adolescents by general and paediatric dentists.

## Material and methods

### Questionnaire

A questionnaire was developed and sent via e-mail nationwide to dentists in Germany with a covering letter explaining the purpose of the study. E-mail addresses were randomly selected by an internet research. The completed questionnaires returned anonymously via e-mail. No reminder was sent. A translation of the questionnaire is provided in the Data S1.

The online questionnaire started with demographical characteristics (age, gender, federal state) and the kind of specialisation in dentistry. Afterwards, the questionnaire asked dentists about their experience, treatment techniques, information material and complications arising from treatment of fearful children. Dentists evaluated these questions on a five point rating scale. The questionnaire was piloted in a group of 10 dentists and was improved according to their feedback concerning comprehensibility.

In Germany, there are two ways dental graduates become specialists in paediatric dentistry: either they are trained full-time at university in 3 years (master programme) or they join a part-time education programme 'curriculum' organised by the German Dental Association. In this study, paediatric dentists were defined as graduates who affirmed that they had successfully completed one of these two programmes, whereas general dentists did not take part in any official programme on paediatric dentistry.

Trained dentists were defined as dentists who claimed to frequently take continuing

education courses on dental fear irrespective their specialisation in paediatric dentistry.

### Statistical analyses

Chi-squared and Mann–Whitney tests were used to compare responses to management techniques and information material used by general and paediatric dentists. Spearman's correlation coefficient was taken as a basis to quantify the correlation between reported participation in continuing education courses and with the degree of estimated difficulty in the treatment of anxious children. Probability values lower than 0.05 were considered statistically significant. Statistical analyses were carried out on the basis of SPSS software version 14.0.

## Results

### Participants

We received 230 of 800 questionnaires sent out, representing a response rate of 28.8%. Regarding the federal state, the distribution of dentists who answered was similar to the distribution of dental practices in Germany as provided by the German Dental Association in 2008.<sup>12</sup> Responders were somewhat younger and the proportion of women participating in the study was comparatively high (Table 1). The response population consisted

**Table 1. Sociodemographical characteristics of the study population in comparison with the distribution of German dentists reported by the German Dental Association in 2008 (GDA, 2008).**

	Relative frequency of returned e-mails (n = 230) (%)	Relative frequency of dentists in Germany (n = 67157) (%)
Age group		
Younger than 30 years	3.5	5
30–39 years old	26	21
40–49	42	33
50–59	25	28
Older than 59 years	3.5	13
Gender		
Female	65	41
Male	34	59
Not answered	1	

of 150 male and 79 female dentists. One participant made no gender statement. The age distribution of the responding collective is shown in Table 1. One hundred and eighty dentists affirmed they were not specialised in paediatric dentistry whereas 50 dentists claimed to be paediatric dentists. Sixteen of 50 paediatric dentists worked in a dental practice specialised in the treatment of children, whereas 34 dentists worked in general practices as paediatric dentists. Sixteen of 180 dentists did not work in general dental practices and were either orthodontists or oral surgeons.

### Favoured treatment techniques

Almost every paediatric dentist claimed to employ one of the following methods: reducing waiting times (100%), describing the instruments appropriately to children (100%), making treatment easier to control (98%), using cuddly toys (96%), resorting to distraction (96%), making use of local anaesthesia (94%) and splitting up the treatment into several short sessions (94%). Conversations about fear (82%), relaxation technique (72%) and general anaesthesia (62%) belonged to the well-established techniques of specialised dentists, too. Musical distraction (52%) and hypnosis (48%) were used by half of the paediatric dentists. Less common management techniques were medication (28%), video distraction (26%) and acupuncture (20%) (Table 2).

The most commonly used techniques were the same in general practices but were less frequently used here than in paediatric practices. Significant differences were found regarding the use of cuddly toys ( $P < 0.001$ ), hypnosis ( $P < 0.001$ ), general anaesthesia ( $P < 0.001$ ), video distraction ( $P < 0.001$ ), relaxation techniques ( $P = 0.002$ ) and general distraction ( $P = 0.005$ ) (Table 2).

The statistical analysis also revealed that paediatric dentists stated that they applied a wider range of techniques than general dentists ( $P < 0.001$ ).

*Techniques applied to give children some control over the treatment.* When asked about tech-

**Table 2.** Distribution of reported treatment techniques in paediatric and general dental practices.

Treatment technique	Absolute (relative) frequency		P value
	Paediatric dentists (n = 50) (%)	General dentists (n = 180) (%)	
Cuddly toys	48 (96)	121 (67)	<0.001
Hypnosis	24 (48)	22 (12)	<0.001
General anaesthesia	31 (62)	50 (28)	<0.001
Video distraction	13 (26)	13 (7)	<0.001
Distraction	48 (96)	135 (75)	0.002
Technique of relaxation	36 (72)	89 (49)	0.005
Acupuncture	10 (20)	20 (11)	0.11
Describing instruments suitably for children	50 (100)	165 (92)	0.18
Reducing waiting times	50 (100)	167 (93)	0.22
Making treatment easier to control	49 (98)	160 (89)	0.57
Splitting the treatment up into several short sessions	47 (94)	160 (89)	0.63
Conversations about fear with children	41 (82)	138 (77)	0.64
Musical distraction	26 (52)	92 (51)	0.64
Medication	14 (28)	54 (30)	0.71
Local anaesthesia	47 (94)	161 (89)	0.85

niques apt to give children some control over the treatment, the majority of paediatric dentists listed the following ones: 'Tell-Show-Do' (94%), agreeing on a sign for interrupting treatment (90%) and explaining treatment procedure (76%). Fewer dentists said they repeated short breaks (64%) and informed their patients about the estimated treatment duration (48%).

Of the general dentists, 94% agreed on a sign for interrupting dental treatment, 91% of the dentists routinely adopted the 'Tell-Show-Do' approach, 80% explained all treatment procedures, 62% took recurrent short breaks, and 56% informed the children regularly about the estimated duration of the treatment. Differences regarding the use of these techniques did not reach statistical significance.

*Information provided to patients.* Paediatric and general dentists rarely informed their patients about dental fear and coping strategies. Less than 10% in both groups routinely provided information videos in their waiting areas or had arranged frequent special consultation hours for anxious children; 22% of paediatric

**Table 3.** Distribution of reported information materials supplied to patients in paediatric and in general dental practices.

Treatment technique	Absolute (relative) frequency		P value
	Paediatric dentists (%)	General dentists (%)	
Flyers available in the waiting area	15 (30)	40 (22)	0.23
Anxiety assessment questionnaires	30 (61)	45 (25)	<0.001
Videos of dental fear	1 (2)	5 (3)	0.74
Special consultations	6 (13)	12 (7)	0.37

and 14% of general dentists made flyers available in their waiting areas with information about dental fear. Significantly more paediatric (58%) than general dentists (21%) have their patients complete an anxiety assessment questionnaire before treatment ( $P < 0.001$ ) (Table 3).

*Difficulties in the treatment of anxious children and adolescents.* Paediatric dentists considered the treatment of anxious children to be less difficult than general dentists ( $P = 0.002$ ). Ten per cent of the paediatric dentists reported no difficulties in the dental treatment of fearful patients. The majority (73%) of paediatric dentists had infrequent problems during dental treatment, 17% regarded treatment as quite difficult and no paediatric dentist described treatment as very difficult. By contrast, 24% of the general dentists viewed the treatment of this special group of patients as quite difficult and 5% as very difficult. Additionally, the more frequently dentists attended in continuing education courses, the more they downgraded the difficulty of the treatment of anxious children, although the estimated correlation was weak ( $r = 0.18$ ,  $P = 0.007$ ).

#### *Effect of participation on continuing education courses*

Forty per cent of all dentists had never and 7% regularly participated in continuing education courses on the topic of the dental treatment of anxious patients.

**Table 4. Use of treatment techniques by dentists according to participation in continuing education courses on dental fear.**

Treatment technique	Relative frequency		P value
	Untrained (n = 200) (%)	Trained (n = 25) (%)	
Hypnosis	16	71	<0.001
Technique of relaxation	53	95	<0.001
Cuddly toys	73	100	0.005
Distraction	81	100	0.03
Acupuncture	13	26	0.10
Musical distraction	53	71	0.11
Video distraction	11	20	0.25
Splitting the treatment up into several short sessions	94	100	0.26
Local anaesthesia	95	100	0.30
Medication	30	40	0.36
Making treatment easier to control	96	100	0.39
Reducing waiting times	98	100	0.45
Describing instruments suitably for children	98	96	0.58
General anaesthesia	37	40	0.79
Conversations about fear with children	81	81	0.97

Dentists that frequently took continuing education courses had a wider range of treatment techniques than dentists that had never participated in continuing education courses ( $12.09 \pm 2.18$  vs  $8.99 \pm 2.78$ ). Especially psychotherapeutic interventions like relaxation ( $P < 0.001$ ), distraction ( $P = 0.03$ ) and hypnosis ( $P < 0.001$ ) were more often used by trained dentists. Further differences with statistical significance were found in the use of cuddly toys ( $P = 0.005$ ) (Table 4). With the exception of videos in the waiting area, the supply of information about dental fear also correlated with the participation in continuing education courses ( $P < 0.001$ ) (Table 5).

## Discussion

### Participants

This study focused on self-reported management techniques of German dentists and compared paediatric and general dental practices. The response rate of the online survey is in the range expected for online questionnaires. Compared with postal questionnaires, e-mail surveys show about 18% fewer responders.<sup>13</sup> Other limitations were the higher proportion of women evaluated, the inclusion of only German dentists with an e-mail address, and a possible bias because dentists especially interested in dental fear might be overrepresented in the study sample. Furthermore, the results reflect the subjective information given by the dentists questioned and might not be identical with the real situation in the practices.

### Favoured treatment techniques

Our data showed that the most liked techniques such as reducing waiting times, describing dental instruments appropriately for children, using cuddly toys, dividing up the treatment into several sessions and making dental treatment easier to control are well established techniques of paediatric and general dentists. They are cost saving, time saving and easy to integrate into the daily organisational procedures of dental practice. 'Tell-Show-Do' and agreeing on a sign to interrupt treatment were also widely-used behavioural techniques in both groups of dentists. Previous investigations also showed that 'Tell-Show-Do' was the preferred technique of dentists and children.<sup>14,15</sup>

Methods that require further education such as relaxation, distraction, hypnosis and

**Table 5. Correlation between stated participation in continuing education courses and reported provision of information materials.**

	Brochures and flyers	Questionnaires	Information videos	Special consultations
Correlation coefficient	-0.32	-0.41	-0.126	-0.272
P value	<0.001	<0.001	0.06	<0.001

acupuncture were used by fewer dentists. These treatments had proved successful in reducing dental fear in the long term. Particularly psychotherapeutic interventions, such as relaxation and systematic desensitisation, decrease the dental anxiety level very effectively.<sup>16,17</sup> For hypnosis with children undergoing dental treatment, there are some hints that it reduces dental fear.<sup>18</sup>

Pre-medication, general and local forms of anaesthesia have the disadvantage of possible side-effects, nor do they reduce dental fear in the long term.<sup>10,19</sup> Therefore, pharmacological behaviour guidance techniques such as general anaesthesia and pre-medication are not recommended for mild forms of dental fear while mostly local anaesthesia is essential for reducing the pain during dental treatment.<sup>11</sup> General anaesthesia was used by twice as many paediatric dentists as general practitioners. This might be a result of the presumably higher percentage of patients afflicted by acute dental fear in paediatric practices. In these cases, dental treatment with general anaesthesia is a necessary option to improve their oral health-related quality of life, but their dental fear will not subside. Hence, a behavioural therapy of children should ensue.<sup>20</sup> Because of these facts, after the first treatment attempt, the child should be referred to the most suitable dental care provider.

The majority of general and paediatric dentists were able to use different nonpharmacological methods to improve children's cooperation. As expected, paediatric dentists had a broader spectrum of treatment techniques and preferred anxiolytic psychotherapeutic interventions, such as relaxation, distraction and hypnosis. This enables paediatric dentists, in a more comprehensive way, to adapt their treatment to the individuality of their patients. Kvale *et al.* observed in their investigation that patients with severe dental anxiety treated by dentists who received supervised training saw the dentist at follow-up significantly more often. Moreover, distraction, a very effective technique recommended by the AAPD, was more frequently used by paediatric dentists in our study. Clearly then, it is advisable for general practi-

tioners to refer children with severe dental fear to paediatric dentists before treating them with general anaesthesia or pre-medication.

Interventions that give children some control over treatment were frequently used by both groups of dentists. These treatment techniques are also easy to integrate during the treatment and without any further costs, but they might be effective only in mildly anxious children and adolescents, as previously mentioned.<sup>14</sup>

Paediatric dentists considered it more important to inform themselves about their patients' dental fear before treatment. Questionnaires were rarely used by general dentists. The rare use made of dental anxiety assessment questionnaires is consistent with the findings of Dailey *et al.*<sup>21</sup>

#### *Effect of participation on continuing education courses*

The majority of respondents did not regularly attend further continuing education courses on the issue of dental fear. This might be a consequence of the limited availability of continuing education courses and/or of a lack of interest in dental fear on the part of dentists. In the UK, Hill *et al.*<sup>22</sup> found that most dentists would like to learn more about the dental treatment of anxious children. They concluded that more relevant lectures are required at university that teach coping strategies with anxious children and adolescents.

Given the fact that more than 90% of the dentists questioned in our study regarded the treatment of anxious children as difficult, dentists should be interested in seminars on how to facilitate the treatment of dentally anxious patients. A survey by Kahn *et al.*<sup>23</sup> revealed that patients that are difficult to manage were the main stress factor of every second dentist. Dentally anxious patients mean a raised stress level and increased restrictions for 71% of dental practitioners.<sup>24</sup> This study demonstrated that continuing education courses could help to ease treatment from the perspective of dentists and thus reducing the stress level experienced.

More education in fear-reducing methods also has a positive effect on fearful children. Adequate training in dental schools will decrease the barrier to restorative treatment in children. Insufficient education results in stronger treatment needs in children because dentists tend to avoid the vital treatment of primary teeth. In view of that fact, it seems to be important to provide more adequate lectures on how to treat anxious children.<sup>25</sup> Learning more techniques of anxiety management might increase the self-esteem and assertiveness of dentists. Zhou *et al.*<sup>7</sup> revealed in their survey that dentists can encourage children's cooperation by showing a professional level of control and a sense of assertiveness.

In conclusion, children with mild forms of anxiety seem to be managed adequately in German general dental practices; however, children with severe forms of anxiety and a correspondingly urgent treatment need should be referred to paediatric dentists. Dentists that have an increased percentage of anxious patients are recommended to embark on further education programmes to take steps forward in the treatment of fearful children, both for themselves and their patients.

#### What this paper adds

- This study focused on management techniques of dental fear in children and adolescents and compared general dentists with paediatric ones as well as untrained with trained dentists.

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

- Paediatric and general dentists that undertake further education programmes have a broader range of treatment techniques for children and adolescents troubled with dental fear and are able to facilitate and improve the treatment of fearful children for their own benefit as well as the one of their patients.
- Children with severe forms of anxiety and a pressing treatment need should be referred to paediatric dentists because of the fact that these dentists are capable of choosing between numerous treatment techniques and, therefore, of adapting dental treatment to the individuality of fearful children in a more appropriate way.

#### Conflict of interest

The authors declare no conflict of interest.

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### Supporting Information

Additional supporting information may be found in the online version of this article.

#### Data S1 Questionnaire.

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