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Barriers for dental treatment of primary teeth in East and West Germany

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Background. In many countries, restorative treatment in primary teeth is suboptimal.
Aim. Thus, this study tried to detect barriers for dentists to restore primary teeth in kindergarten children (3–6 years).
Design. For a representative survey, 320 dentists (184 West, 136 East Germany) were randomly selected from the dental associations' registers and asked to answer a questionnaire on their profile, their view of the National Health System, and possible barriers for restoring primary teeth.
Results. The analysis (response rate 57.7%) showed that the parents were no barrier and the dentists felt the need of restoring primary teeth. In addition to the children's anxiety, the inadequate reimbursement for fillings were perceived as clear barrier. The comparison of West and East German dentists detected statistically significantly higher barriers in West Germany, where – in contrast to the German Democratic Republic – no structured training in paediatric dentistry was compulsory before unification. Only 35% of the East German dentists rated restorative treatment in 3- to 6-year-olds as stressful in contrast to 65% in West Germany, where especially male dentists found no time to treat children.
Conclusion. This study reveals that dentists can also be a considerable barrier to restorative treatment in small children, especially without adequate training in dental schools.

Introduction

Representative surveys on caries prevalence in many countries including Germany show an impressive caries decline for the permanent dentition below 1 DMFT in 12-year-olds[1,2], but the situation in the primary dentition is less satisfying[3]. For instance, the mean dmft values in 6- to 7-year-olds range from 1.58 to 2.91 in the different German federal states with only about half of the carious lesions being filled[4].

The prevalence of Early Childhood Caries (ECC) is even increasing[5]. Thus, a clear difference in the development of caries between the permanent and primary dentition can be observed in several countries[3,6]. Even if the primary teeth comprise a transient dentition, healthy, or at least restored primary teeth are of great importance for the function of the permanent dentition and quality of life in children[7].

In contrast to this, other countries such as Sweden and Denmark, have much lower caries prevalence and better treatment rates in primary teeth[3,8].

Very few studies concentrate on the reasons for these differences, and they focus mostly on the children and their parents[9]. For instance, Bolin *et al.*[3] detected an association between oral health, social status, and markers such as maternal smoking, which explains the variation within one country, but not the enormous differences in treatment need between countries. Besides the patient parameters, the dentists' attitudes and skills as well as the health system vary considerably between countries and seem to play an important role in restorative treatment in kindergarten children[10].

The aim of this study was to detect barriers for restorative treatment in East and West Germany where the training in paediatric

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dentistry differed considerably before unification in 1990. In the German Democratic Republic (GDR) (East Germany), paediatric dentistry was taught in structured courses and lectures, including clinical training, whereas the West German curriculum did not require any training in paediatric dentistry until unification

The questionnaire was analogue to the inventory of an international collaborative study assessing the view of dentists on children's coping abilities, parents' expectations, their own attitudes, and the restorative treatment need in primary teeth[10].

Materials and methods

Sample

For this representative survey, 320 addresses were randomly drawn from the registers of the German Dental Association[11]. In order to reach statistical power for a comparison, East Germany was slightly overrepresented (West $n = 184$; East $n = 136$). The response rate of the questionnaires was 57.7% ($n = 184$, 94 female; 90 male), and no reminders were sent. Besides a clear majority of female dentists in East Germany and male dentists in the West, the characteristics of the dentists were almost identical for West and East Germany (Table 1).

Questionnaire

For the intercultural adaptation of the English questionnaire[10] according to the guidelines by Beaton *et al.*[12], a translation was performed by two native speakers (specialist and lay person), synthesized, retranslated by two other native speakers (specialist and lay person), synthesized again, and this new and the original version were compared. Differences were traced in the process of translation and synthesized in order to adapt the German version more closely to the English original.

Besides 11 items on gender, years of practice, weekly working hours, % of paediatric dentistry, and the region in Germany, the questionnaire consisted mostly of closed questions to which the dentists could state their agreement (1 = 'strongly agree' to 5 = 'strongly disagree') with statements regarding the restorative treatment in 3- to 6-year-old children. In 53 items, potential barriers perceived by the dentists such as the children, parents, dental practice, and the health system were analysed. Five additional items dealt with the dentists' view on the National Health System (NHS).

The dentist also received an accompanying letter which explained the purpose of the study, gave instructions for completing the questionnaire, and asked them to return it anonymously in the enclosed, pre-stamped envelope.

Statistical methods

The statistical analyses were performed with SPSS 11.0 (Chicago, IL, USA). As some questions were constructed as negation, the degree of agreement was converted. Thus,

Table 1. Sociodemographic characteristics of West and East German dentists.

	East		West	
	n	(%)	*n*	(%)
Gender				
Male	32	36.4	58	60.4
Female	56	63.6	38	39.6
Years of dental practice				
Up to 10 years	19	21.6	31	32.3
11 to 20 years	26	29.5	28	29.2
21 to 30 years	26	29.5	30	31.3
31 to 40 years	16	18.2	7	7.3
41 year and longer	1	1.1	0	0.0
Position				
Self-employed	85	96.6	94	97.9
Employed	3	3.4	2	2.1

all values > 3 indicate a barrier for restorative treatment in children as perceived by the dentists.

Initially, the group of respondents was compared to dentist in West/East Germany regarding gender and age in order to assess the representativity of the sample. In the descriptive statistical analysis, distributions and mean values were calculated and compared in two subgroup analyses regarding gender and West/East Germany. After testing for normal distribution, differences in mean values between these groups were analysed with the *t*-test and differences in the categorized data with the Mann–Whitney test. In an additional multivariate analysis (linear regression), the influence of gender and region (West/East Germany) on the barriers to treat children was tested. The level of statistical significance was 0.05.

Results

Dentists' profile

The structural differences between dental practices in West and East Germany are very small (Table 2). Only the mean years of practice were slightly higher in the East German dentists.

The profile of the responders was equivalent to the dentist population in West and East Germany regarding gender and years of practice/age[11].

General practitioners treat predominately adults, the minimally higher percentage for paediatric treatment in East Germany (21%) was on the verge of statistical significance (West 18%, $P = 0.095$).

As 64% of the dentists in East Germany were female, but only 40% in the West (Table 3), the gender-specific profiles were of great importance. Female dentists worked statistically significantly less (40 min) and saw fewer patients (4.3) than male dentists, but they tended to treat slightly more children (22.5%) than their male colleagues (16.3%, $P = 0.001$). As differences between West and East Germany were much more pronounced, these findings will be reported primarily and only relevant gender differences will be highlighted.

Barriers to restorative treatment

The parents and the perceived need to restore primary teeth were no barrier to actual treatment of 3- to 6-year-old children (ratings < 3, Table 4). More than 90% of the dentists did not agree that carious primary teeth without other symptoms

Table 2. Profiles of dental practices in East and West Germany (*t*-test).

Item	East Mean ± SD	West Mean ± SD	*P* value
Years of dental practice	20.4 ± 10.1	17.4 ± 9.2	0.04
Mean number of patients/day	20.9 ± 6.0	22.2 ± 9.2	0.23
Mean number of working hours/day	8.1 ± 1.2	8.0 ± 1.5	0.87
Mean percentage of paediatric dentistry	21.1 ± 13.5	18.0 ± 11.6	0.10
Mean percentage of adult dentistry	78.9 ± 13.5	81.9 ± 11.6	0.11
Mean treatment time/day	7.0 ± 1.1	6.9 ± 1.4	0.48
Mean office time/day	1.4 ± 0.7	1.5 ± 0.8	0.61

Table 3. Gender-specific profiles in German dentists (*t*-test).

Item	Male Mean ± SD	Female Mean ± SD	*P* value
Years of dental practice	20.0 ± 9.4	17.7 ± 9.9	0.12
Mean number of patients/day	23.7 ± 8.6	19.4 ± 6.3	0.01
Mean number of working hours/day	8.4 ± 1.3	7.7 ± 1.3	0.01
Mean percentage of paediatric dentistry	16.3 ± 11.0	22.5 ± 13.4	0.01
Mean percentage of adult dentistry	83.6 ± 11.0	77.5 ± 13.4	0.01
Mean treatment time/day	7.1 ± 1.3	6.7 ± 1.2	0.04
Mean office time/day	1.5 ± 0.7	1.4 ± 0.7	0.17

Table 4. Agreement to statements in questionnaire which describes barriers for restorative treatment in 3- to 6-year-old children in East and West Germany (1–5 from strongly disagree to strongly agree) values > 3 are a barrier perceived by dentists, the *P* values refers to the comparison between East and West Germany (Mann-Whitney test).

Factor	Item	East	West	*P* value
Child	Children (aged 3–6 years) get upset easily.	2.8	2.9	0.492
	Children cannot cope very well with dental treatment.	2.6	2.7	0.295
	Children do not like sitting in the dental chair.	3.3	3.2	0.311
	Children cannot accept dental treatment.	2.3	2.1	0.013
	Most children are fearful of dental treatment.	3.5	3.3	0.120
	Children do not like the sound of the dental drill.	4.2	4.0	0.031
Dentist I (attitude towards offering restorative treatment for 3- to 6-year-olds)	Dentists do not like giving local anaesthetics to children.	3.2	2.9	0.055
	Dentists prefer to refer children to be treated by other colleagues.	1.8	2.3	0.000
	Dentists find filling children's teeth stressful.	3.0	3.5	0.000
	Dentists rarely have enough time to spend with child patients.	2.5	3.0	0.004
	Dentists enjoy filling children's teeth.	3.1	3.4	0.035
	Dentists feel apprehensive if they have to do a filling in a child.	2.1	2.7	0.000
	Providing dental treatment for children is troublesome.	1.6	2.0	0.000
Dentist II (necessity of restoring primary teeth)	Dentists feel there is no reason to fill primary teeth.	1.3	1.6	0.053
	If decayed primary molars are not causing any symptoms, they are best left untreated.	1.4	1.4	0.588
	Dentists do not fill cavities in children who attend regularly.	1.7	1.9	0.045
	The time it would take to fill primary teeth would be better spent with other patients.	1.4	1.5	0.599
	On the whole, decayed primary teeth are best left untreated, rather than filled.	1.5	1.5	0.228
	Dentists do not fill cavities in children who are not good attenders.	1.6	1.9	0.002
	Dentists feel there is little point in filling primary teeth.	1.7	1.8	0.322
Parents	If a child has toothache, parents are more likely to ask for extractions.	2.3	2.0	0.004
	If their child had a decayed molar, their parents would expect it to be extracted.	2.3	2.4	0.642
	Parents do not want dentists to fill their children's decayed teeth.	1.7	1.7	0.786
	Parents expect dentists to fill their children's decayed teeth.	1.9	1.9	0.894
	Parents do not see the need for filling primary teeth.	2.0	2.0	0.620
National Health System	The payment dentists would receive for putting a filling in a primary tooth is inadequate.	3.8	4.0	0.094
	The payment dentists receive for providing preventive care to children is inadequate.	3.8	3.8	0.747
	The dental care system puts more emphasis on fillings rather than prevention.	3.6	3.8	0.095
	Most dentists feel that the dental care system in this area provides a good service for young children.	3.4	3.6	0.205

should be untreated, that there are few reasons for restoring primary teeth, or that time should be spent on other dental treatment.

In contrast to this, the NHS was considered a clear barrier to restorative treatment in children (ratings 3.4–4.0). The vast majority of dentists were not satisfied with national health reimbursement, independent of gender or years of practice. Besides low fees for preventive and restorative treatment, 77.9% in East and 87.4% in West Germany felt that prevention was not stressed enough.

Another distinct barrier to fillings was the children's fear and anxiety of the dental chair,

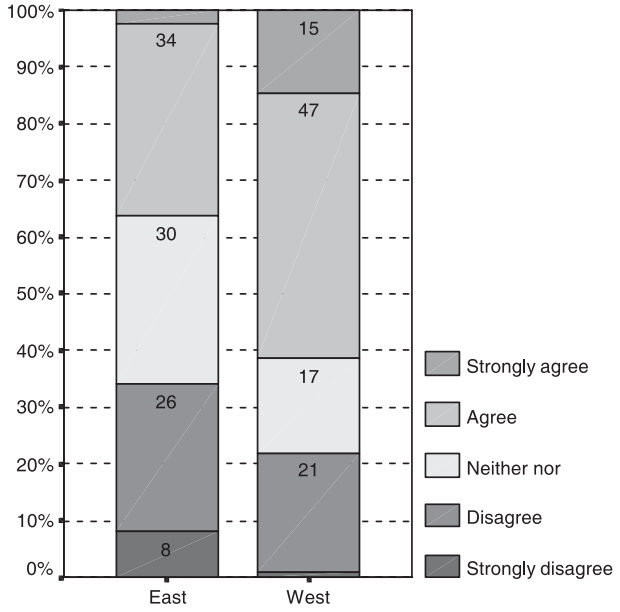

Fig. 1. Agreement with 'dentists find filling children's teeth stressful' ($P < 0.001$).

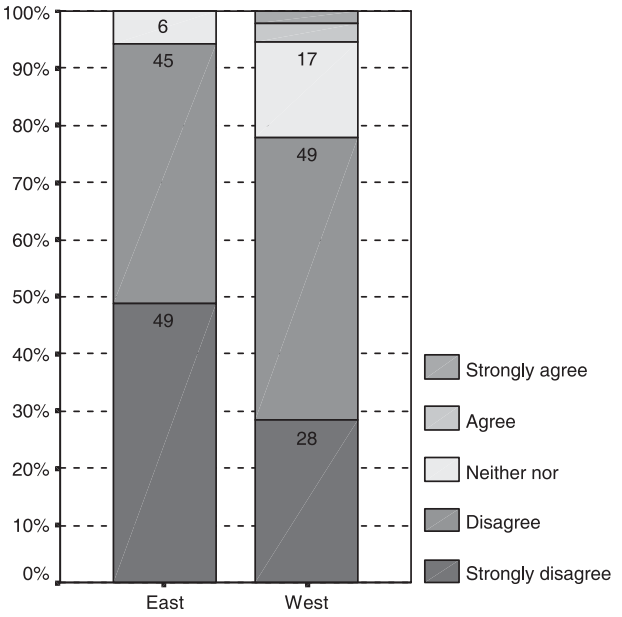

Fig. 2. Agreement with 'providing dental treatment for children is troublesome' ($P < 0.001$).

treatments, and especially the noise of the drill (ratings 3.2–4.2, Table 4).

The attitude toward restorative treatment in 3- to 6-year-olds and its perception by the dentist showed the most pronounced differences between West and East Germany, while the variation between male and female dentists was much lower.

In contrast to the clear majority in West Germany (61.5%, Fig. 1), only a minority of the dentists (35.4%) in East Germany found restorative treatment in children stressful ($P < 0.001$). Thus, it was a pronounced barrier in the West (rating 3.5), but not in the East (3.0). This cannot be explained by the higher percentage of female dentists (rating in East Germany 3.1, West 3.3), which was also confirmed by the multivariate analysis. The major difference was detected between male dentists in East Germany who did not perceive restorations in 3- to 6-year-olds as stressful (rating 2.8) and in West Germany where stressfulness seemed to be a clear barrier (3.7).

Hence, the only agreement with the statement 'Restorative treatment in children is troublesome' was found in West Germany (Fig. 2), in spite of a vast majority of disagreement (East 95%; West 78%; $P < 0.001$).

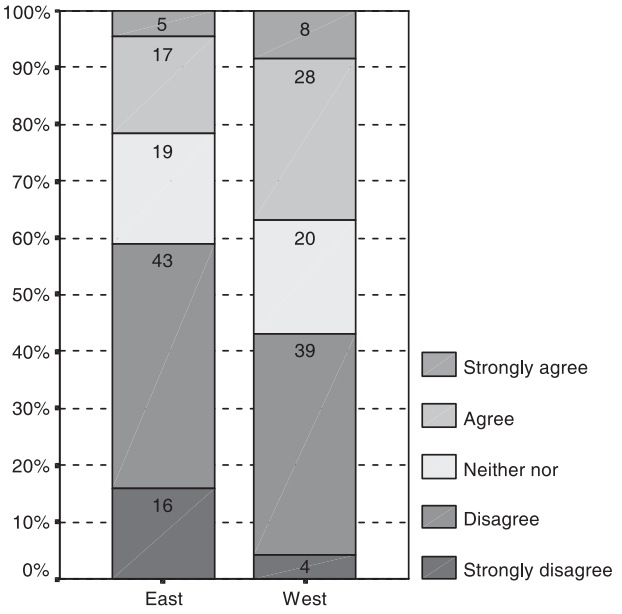

Fig. 3. Agreement with 'dentists rarely have enough time to spend with child patients' ($P = 0.004$).

The difference between West and East Germany was also underlined by statistically significantly less time for paediatric dentistry in the West ($P = 0.004$, Fig. 3), while is no barrier in the East (rating 2.5).

Another pronounced difference between male and female dentists was 'Feeling apprehensive

if they have to do a filling in a child' (5.3% and 21.4%, respectively).

In spite of the stressfulness of paediatric dentistry, the majority thought that dentists would not prefer referring children to other dentists (< 70%).

Discussion

Randomized surveys are a robust instrument for the assessment of professional practice, as the outcome is hardy biased by non-response[13–15]. Thus, the representative sample and a response rate of almost 60% in this study allow a valid assessment of dentists' attitudes toward restorative treatment in 3- to 6-year-old children in Germany[16], although all self-reports contain the risk of a report bias, as the respondents do not have insight into the full determinants of their behaviour.

The dentists' dissatisfaction with the NHS in 2002 was pronounced and not unjustified, as preventive treatment was not reimbursed up to 2 years of age and annual intervals until age 6 cannot be considered as sufficient in the light of a rising prevalence of ECC[5]. In addition, the reimbursement for fillings was too low according to time studies[17], which was corrected in 2004 with a 23% increase.

In general, German dentists who mostly work in private practices with strict NHS reimbursement regulations feel the highest discontent (66%), while purely public (Denmark 5%) or private systems (US 6%) seem to create less problems[10]. Thus, the low reimbursement for fillings by the NHS is perceived by dentists as one barrier for restorations in 3- to 6-year-olds.

The second barrier is the child him- or herself, especially her/his fear of the dental chair and of drilling, which indicates that many dentists find it difficult to manage behaviour in small children[18]. This might be due to treating predominantly adults (80%), especially by male dentists in West Germany (14%).

The difficulties in treating small children might be caused by the training of dentists, especially in West Germany. As the mean time of dental practice had been 17–20 years, most of the dentists had received their education before unification in 1990. At the universities in the GDR (East Germany), paediatric dentistry was taught by specialized departments at all universities in structured courses and lectures, including clinical training[19]. In West Germany, the dental curriculum required no lectures, courses, or exams in paediatric dentistry until unification[20], and out of 20 universities, only two have a department for paediatric dentistry.

These differences in the development of paediatric dentistry are also reflected in the variation of treatment need in primary teeth. In Bremen, West Germany, 6- to 7-year-olds have only 37% filled defects (ft/dft), but in Thüringia, East Germany, 51% do. The mean value for the West is 47% in comparison with 52% in the East[4]. The more stressful perception of paediatric dentistry, considering it even unpleasant and finding less time for restoring primary teeth, resulted in a higher treatment need in West Germany. These data indicate that the considerable variation between West and East Germany in this study was not random, but rather that they reflect different attitudes and competence in paediatric dentistry, which are based on the different training during dental school. Therefore, male dentists seem to profit most from a structured training in paediatric dentistry, which was compulsory in East, but not in West Germany, as only 35% of the East German male dentists considered restorative treatment in 3- to 6-year-olds as stressful, but a majority of their Western counterparts (65%) did so. Thus, treating children was no barrier for male dentists in East Germany (mean rating 2.8), in contrast to West Germany (3.7).

In summary, West and East German dentists agreed that carious primary teeth should be restored and that the parents' expectations were no barrier, but East German dentists perceived it as less stressful or unpleasant to do so than West German dentists, who find less time to fill primary teeth. These results supported the findings that the problems of dentists regarding paediatric dentistry derive from insufficient training in dental schools[21]. After unification, paediatric dentistry was included in the final examinations, but the extent of teaching was not regulated. The routine treatment of small children without behaviour management problems should be included in the undergraduate curriculum

to require departments for or lectures in paediatric dentistry at all universities[22]. In addition, a postgraduate curriculum is needed for qualifying specialized paediatric dentists who can cope with the increasing need of oral rehabilitation (e.g. in children with severe ECC, developmental abnormalities, or behaviour management problems). Finally, changes are necessary in the German NHS to create incentives to strengthen caries prevention in small children, and also to restore decayed teeth in small or special-needs children. It would be worthwhile to analyse the Scandinavian systems, which achieve low caries prevalence in the primary dentition, have the highest treatment rates, and also a high degree of acceptance by the dentists[3,10].

What this paper adds

- Knowledge on the attitude of dentists towards treating kindergarten children
- Knowledge on barriers to restorative treatment in kindergarten children
- Knowledge on patterns of dental services in Germany

Why this paper is important to paediatric dentists

- Shortcomings in the treatment of kindergarten children are highlighted.
- Concepts for improving restorative treatment in kindergarten children can be developed.

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