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Endodontic malpractice claims in Denmark 1995–2004

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Abstract

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Aim To study the reasons for and outcome of malpractice claims handled by the regional and national Danish Dental Complaint Boards (DCB) from 1995 to 2004. Specific attention was paid to endodontic claims. Three hypotheses were explored: endodontic malpractice claims are frequent, they are mostly due to technical shortcomings and male dentists are overrepresented.

Methodology The reasons for the claims were classified and assigned to at least one of 14 categories. Cases assigned to the 'endodontic treatment' category were further sub-categorized, and reasons for malpractice were examined. An age and gender analysis of dentists and complaining patients was performed only on data obtained from the endodontic cases.

Results Overall, 3611 malpractice claims were registered. In 43% of the cases the dentist was judged to be guilty of malpractice. In the majority of the appealed cases the original verdict was affirmed (62.2%) by the national DCB. After crown & bridge treatment (23%) endodontic treatment was the next frequent malpractice claim (13.7%), in which 'technical complications or incorrect treatment' was the most frequent sub-categorization (28.4%). Reasons for endodontic malpractice verdicts were related to root filling quality, the use of a paraformaldehyde product and instrument fracture. Male dentists were most often involved in an endodontic claim, and the majority of complainants were females.

Conclusions Endodontic malpractice claims were relatively common in Denmark. Perceived technical shortcomings dominated the patients' complaints concerning root canal treatment. Male dentists and female patients were overrepresented indicating a gender influence on aspects of the doctor-patient communication important for liability claims.

Keywords: complaints, endodontic malpractice, endodontics, gender, root canal treatment.

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Introduction

The technical quality of endodontic treatment provided by general dental practitioners (GDP) has received much attention from investigators, and in epidemiological surveys substandard root fillings have been reported in more than 50% of treated cases (Kirkevang *et al.* 2000, Eriksen *et al.* 2002, Segura-Egea *et al.* 2004, Loftus *et al.* 2005, Ridell *et al.* 2006). Since a strong correlation has been found between root filling quality and treatment outcome (in terms of periapical healing) there is an obvious need to understand the reasons why and also to influence the behaviour of GDPs. However, factors that shape the quality of root canal treatment performed in general dental practice are, at present, not well understood.

In a series of investigations the potential influence on treatment quality of the utilization of new technology (Bjørndal & Reit 2005), treatment indications (Bjørndal *et al.* 2006) and the level of theoretical knowledge (Bjørndal *et al.* 2007) have been studied amongst Danish GDPs. However, endodontic treatment quality

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from the patient's point of view as, for example, reflected in dental malpractice cases, has been dealt with only by a few authors. Dental malpractice claims have been reported to most frequently be associated with prosthodontic treatment (René & Öwall 1991, Hapcook 2006) but claims related to root canal procedures were very common and reached 14% in a Swedish sample (René & Öwall 1991) and 17% in a material from the US (Hapcook 2006). However, detailed information about the character of endodontic claims is sparse.

The present study was established to study reasons for and verdicts of dental malpractice claims in Denmark during a 10-year period (1995–2004). The study focussed on cases involving endodontic treatment and three hypotheses were explored.

(H1) Since the frequency of root canal treatment in Denmark has not decreased over the last decades (Bjørndal & Reit 2004) the number of endodontically related malpractice claims should be relatively high.

(H2) In Denmark root fillings are often of substandard technical quality (Kirkevang *et al.* 2000) and rarely performed with the use of rubber dam (Bjørndal & Reit 2005), resulting in a high frequency of persistent periapical inflammatory lesions. Furthermore, treatment of molars predominates (Kirkevang *et al.* 2000, Bjørndal *et al.* 2006) and there are few endodontic specialists to refer complicated cases to. Malpractice claims are expected to reflect this situation and to a substantial part be associated with the results of defective root fillings and technical treatment complications.

(H3) A malpractice claim might be perceived as a criticism of the dentist's competence and a sign of a break down in the communication with the patient. Levinson *et al.* (1997) found that physicians accused of malpractice practiced less so called patient-centred communication than physicians not involved in such situations. In a meta-analytic review Roter *et al.* (2002) focused on gender effects in the doctor-patient communication, and found that female primary care physicians were more frequently involved in communication that was considered patient-centred and allowed more time for the visits than their male colleagues did. It was assumed that this situation also should be reflected in dental practice, and therefore an overrepresentation of male dentists claimed for malpractice would be expected.

Materials and methods

Since 1983 dental malpractice cases in Denmark have been handled by 16 regional Dental Complaint Boards (DCB), each consisting of three dentists appointed by the Danish Dental Association and three laypeople appointed by the county National Health Insurance (NHI). The system has previously been described in detail by Schwarz (1988). Following a complaint from the patient and an explanation from the dentist the DCB gives a written statement, which includes a verdict of malpractice or no malpractice. If the board finds the dentist guilty of malpractice he or she must return the fee for the treatment to the patient. The DCB might also propose a settlement between the complainant and the dentist. In such a settlement the dentist in question accepts to cover the patients' expenses for additional dental treatment provided by another practitioner. Complaints might be rejected by the DCB, most often because of a time limitation rule (5 years). The dentist or the patient may appeal to a national board (NDCB). Besides three dentists and three laypeople the NDCB also includes a civil court judge. The NDCB might temper, affirm, intensify or reject the regional DCB judgment. If one of the parties still is dissatisfied the case can be brought to civil court. Permission to obtain access to the files of complaints was obtained from the NHI and the official data register system in Denmark. The files were investigated for a 10-year period (1995–2004) and all cases handled by the 16 regional as well as the national DCB were included. In 1999 the Danish dental insurance remuneration system was changed (Bjørndal & Reit 2005), which hypothetically could have an influence on the number and character of malpractice claims. Therefore, comparisons were made between the two 5-year periods 1995–1999 and 2000–2004.

The authors classified the complaints and assigned each case to at least one of the following categories: aesthetic dentistry, cariology, diagnostics, endodontic treatment, financial costs, implantology, informed consent, office records, oral surgery, pain (not endodontically related), periodontal treatment, preventive care, prosthodontics (crown & bridge and dentures). More than one category could be used in a single case.

Endodontic claims

Detailed information was only available for cases registrered between 1995 and 2002 (n = 517). Analysis and subcategorization was possible to conduct in 482 claims (93%). The subcategorization was done according to the following.

(1) *Technical complications or incorrect treatment.* 'Technical complications' occurred in the course of

treatment, *e.g.* perforation of the root, instrument fracture, side effects of medicaments or defective root filling quality. A case was assigned to the 'incorrect treatment' category when a problem was, as experienced by the patient, a direct result of the treatment, such as, symptoms of infection, tooth fracture, or postoperative pain.

(2) *Persistent pain*: Following treatment the patient was in pain for a subjectively unacceptable period of time.

(3) *Wrong treatment*: The patient believed that the wrong tooth has been treated or thought that a tooth has been treated for the wrong reason.

(4) *Prolonged treatment*: The treatment was extended over a long period of time, including several appointments, often leading to complications or extraction of a tooth.

(5) *Lack of information*: The patient was not informed of crucial steps in the diagnosis or the treatment.

(6) *Other reasons*: The main reason for complaint was not endodontic, but an 'unnecessary' root canal treatment was the result of a diagnostic or a nonendodontic treatment problem.

The sub-categorization procedure was carried out blind to the DCB decisions. For cases assigned to the 'technical complications/incorrect treatment' group the written motives of the DCB decisions were studied in detail with the intention of finding explicit or implicit verdict policies.

Age and gender analysis of dentists and complaining patients was performed only on data obtained from the endodontic cases. Such data could be collected from the 482 cases. Two local DCBs refused to reveal age data referring to ethical problems. According to age dentists were grouped into 'younger' and 'older', defined as below and above the mean age, respectively. The general distribution of number and gender of Danish GDPs was provided by the Danish Dental Association.

Statistical analysis

Summary statistics was carried out and comparisons were performed using χ^2 - or *t*-test. Level of significance was set to 0.05.

Results

For the 10-year period a total number of 3611 complaint cases were registered by the local DCBs. Forty-three percent of the claims resulted in a conviction of malpractice. About one third of the cases were referred to the NDCB. In a majority of these claims (62.2%) the verdict of the regional DCB was affirmed. No systematic difference was found between decisions made before and after the change in the dental remuneration system. Over the years only small variations in the annual number of registered claims were found; from a minimum of 11.1 per 100 000 patients to a maximum of 15.2 (Table 1). However, Copenhagen, the only big city area in Denmark, differed from the country as a whole with a mean of 24.7 reported cases per 100 000 patients.

Table 1 Annual number of dental malpractice complaints in Denmark and the county of Copenhagen

	Denmark		Copenhagen county	
Year	Total number	Complaints per 100 000 patients	Total number	Complaints per 100 000 patients
1995	331	12.1	71	24.8
1996	408	14.9	84	29.5
1997	340	12.3	50	17.2
1998	362	12.9	85	29.1
1999	308	11.1	39	13.4
2000	345	12.5	64	22.2
2001	372	13.5	72	25.0
2002	378	13.8	88	30.9
2003	412	15.2	86	30.3
2004	355	12.9	71	24.9
Total/mean	3611	13.1	710	24.7

Complaints were most frequently (23%) associated with crown & bridge therapy (Table 2). Claims concerning root canal treatment were the third most

Table 2 Number of malpractice complaints for different categories. More than one category could be used in a single case

	1995–1999		2000–2004	
Categories	Number	%	Number	%
Crown & Bridge	559	23.0	678	22.8
Dentures	372	15.3	302	10.2
Endodontic treatment	354	14.5	388	13.1
Diagnostics	308	12.7	355	11.9
Caries	237	9.7	380	12.8
Periodontal treatment	171	7.0	168	5.7
Implantology	109	4.5	51	1.2
Oral surgery	108	4.4	120	4.0
Informed consent	75	3.1	122	4.1
Other	61	2.5	110	3.7
Pain	33	1.4	166	5.6
Office records	19	0.8	91	3.1
Aesthetic dentistry	14	0.6	22	0.7
Preventive care	13	0.5	19	0.6
Financial cost	1	0.0	1	0.0
Total	2434	100.0	2973	100.0

frequent (14.5%) in the 1995–1999 period and the second most frequent (13.1%) in the 2000–2004 period.

Endodontic claims

In 50% of the 482 analysed endodontic cases the complaint were only limited to an endodontic problem, while the rest showed a combination of one or more further dental problems (data not shown). The 482 endodontic claims were most often classified as due to technical complications or incorrect treatment (28.4%) (Table 3). Table 4 displays a further elaboration of these 137 cases. In the 'technical complication' group problems related to the root filling quality predominated and in the 'incorrect treatment' group symptoms of persisting infection were the most common. In 108 cases (22.4%) an endodontic sub-categorization was not possible.

When the root filling quality was judged not to be optimal the dentist most often was found guilty of malpractice (Table 4). However, if the dentist had explained why it was not possible to reach the very best technical result, for example due to difficult root canal anatomy, he or she was not found guilty of malpractice.

Multi-rooted teeth were involved in 12 of 16 claims concerned with fractured instruments. The DCBs considered the dentist as guilty of malpractice if the canal anatomy was simple, the root filling around the instrument was defective, apical pathology was persistent or the patient was not informed. Some DCBs stated

Table 3 Endodontic complaints and the DCB decisions 1995–2002

	DCB decisions				
	Verdict of malpractice	No verdict of malpractice	Settlement	Rejection	Total *n* (%)
Technical complications or incorrect treatment	55	74	5	3	137 (28.4)
Other reasons	56	26	3	1	86 (17.8)
Persistent pain	24	39	1	–	64 (13.3)
Wrong treatment	11	37	2	–	50 (10.4)
Lack of information	11	10	–	–	21 (4.4)
Prolonged treatment	10	6	–	–	16 (3.3)
No data	12	21	69	6	108 (22.4)
Total	179	213	80	10	482 (100)

Table 4 Sub-categorization of 'technical complications' and 'incorrect treatments' and the DCB decisions (1995–2002)

	DCB decisions				
	Verdict of malpractice	No verdict of malpractice	Settlement	Rejection	Total *n* (%)
Technical complications					
Defective root filling (short, long, leaking, not all root canals root filled)	31	11	–	2	44 (32.1)
Separated instrument	5	10	–	1	16 (11.7)
Root perforation (following instrumentation or post-preparation)	8	1	–	–	9 (6.6)
Medicament related (all events after use of a paraform- aldehyde product)	4	–	–	–	4 (2.9)
Other complications (e.g. a foreign body in maxillary sinus, nerve damage)	–	10	2	–	12 (8.8)
Incorrect treatment					
Symptoms of infection	3	18	2	–	23 (16.8)
Tooth was weakened/fractured/extracted	1	10	1	–	12 (8.8)
Treatment related persistent pain	2	12	–	–	14 (10.2)
Incorrect treatment is stated but not further detailed	1	2	–	–	3 (2.2)
Total	55	74	5	3	137 (100.1)

that an instrument left in the canal could serve equally well as a conventional root filling and thus gave non malpractice verdicts. In no case was the presence or absence of rubber dam commented upon by the DCBs.

A significant ($P < 0.0005$; $\chi^2 = 22.911$) difference in malpractice verdicts was found between cases assigned to the '*technical complications*' group (malpractice frequency = 56%) and cases in the *'incorrect treatment'* group (malpractice frequency = 13.5%).

Age and gender of patients and dentists did seem to exert influence on the pattern of complaints. Male dentists were involved in 69% ($n = 331$) of the endodontically related complaints, which significantly differed ($P < 0.0005$; $\chi^2 = 15.189$) from the general proportion of male GDPs (57.8%) during the period. In contrast, the majority of complainants were women (71.0%, $n = 342$), which significantly differed ($P < 0.0001$; $\chi^2 = 77.543$) from the general proportion of females (50.8%) among patients who received root canal treatment within the same time period (Bjørndal & Reit 2004). The age (mean ± SD) of the female complainants (44.3 ± 14.3 year) was significantly lower ($P = 0.0327$; t = 2.147) than that of the male complainants (48.0 ± 12.4 year). Furthermore, the mean age of the female dentists involved in an endodontic complaint (47.6 ± 10.4 year) was significantly lower than that of the male dentists (53.0 ± 8.5 year) ($P < 0.0001$; t = 5.598). Female patients most often complained about treatments provided by older male dentists ($P = 0.0189$; $\chi^2 = 5.675$). The frequency of 'young' female dentists who received a malpractice claim was significantly higher than seen in the male dentist group ($P = 0.0098$; $\chi^2 = 6.672$). A borderline statistical significance indicated that younger female patients had a tendency to make complaints about older male dentists ($P = 0.043$; $\chi^2 = 4.172$).

Discussion

The present study includes all dental malpractice claims registered in Denmark between 1995 and 2004. However, the authors had no access to original material such as letters, office records and radiographs, but only the formal reports issued by the DCBs and the NDCB. The reports varied in quality and fullness, thus interpretation and categorization of the claims was sometimes difficult, a situation that might have biased the results of the investigation. In cases that concluded with a settlement between the patient and the dentist detailed information was often not found. In 77.6% ($n = 374$) of the 482 claims focused on root canal treatment (Table 3) the information was sufficient enough to make further categorization possible.

The annual number of dental malpractice claims as calculated per 100 000 patients was subjected to a very small variation over the investigated period in question. However, in the city area of Copenhagen the frequency of claims was well over the mean of Denmark taken as a whole (24.7 vs. 13.1, respectively). A similar difference between urban and rural areas was reported by René & Öwall (1991) in a study of Swedish malpractice cases.

In the first five years (1995–1999) of the investigated period 725 claims resulted in verdicts of malpractice, which corresponds to 4.2 annual malpractice cases per 1000 GDPs. In the second period there was an increase to 4.9 cases. In the US Milgrom *et al.* (1994) compared the years 1988 and 1992 and found an increase from 11 to 27 malpractice cases per 1000 dental practitioners. In Sweden René & Öwall (1991) studied the period from 1977 to 1983 and found no increase and only less than one malpractice case per 1000 dentists. However, the medico-legal systems vary between countries and direct comparisons are difficult to make.

In agreement with the findings of René & Öwall (1991) and Hapcook (2006) the dental malpractice claims most often concerned crown & bridge treatment (22.9%). However, as was proposed in H1, claims of endodontic malpractice were frequently received by the Danish DCBs. The proportion found in the present investigation (13.8%) corresponded to the Swedish and US samples.

In support of H2 a substantial part of the claims (28%) were associated with substandard root filling quality or technical treatment problems (Table 4). By comparing the verdicts and the written judgments of the DCBs in the 137 cases assigned to the 'technical complications/incorrect treatment' category, an attempt was made to find explicit or implicit verdict policies. The dentist was found to be guilty of malpractice in all claims when a paraformaldehyde product was used in the root canal, a situation which often resulted in severe bone and soft tissue damage. In eight of the nine cases in which a root was perforated, the dentist was also judged to be guilty. Malpractice was stated in 70.5% of the cases ($n = 31$) concerned with the root filling quality (Table 4). In the DCB reports reasons for malpractice verdicts were often that the root fillings were too short, had defective quality of seal, the canal was over filled as a result of over instrumentation and that not all canals were filled. However, if

the dentist had documented the reasons for being short of the canal terminus, for example, due to a complicated anatomic situation, the treatment result was accepted.

When claims concerned symptoms of infection or persistent pain, dentists were not convicted of malpractice if no objective sign of pathology was observed. A typical motive was that endodontic treatment, even if correctly performed, was not always successful. Comments on the use or nonuse of rubber dam were not found in a single DCB statement. The DCBs obviously did not regard the use of rubber dam as a necessity for *lege artis* endodontic treatment. Such a policy differs from what is taught at the Danish dental schools.

In five of the 16 cases in which part of a fractured instrument was left in the root canal the DCBs found the dentist to be guilty of malpractice (Table 4). Typical reasons were that the fracture occurred in a canal with uncomplicated anatomy, that the instrument prevented periapical healing, and, that the patient was not informed about the situation. When dentists were found not to be guilty the reasons were that it was an obvious accident (even if the patient was not informed), that no pathology was observed or that the patient had received information about possible future complications. Some DCBs made explicit policy statements saying that a fractured instrument should not be regarded as an incorrect treatment *per se* since it could be caused by instrument fragility and that a root canal instrument could seal the canal as well as a conventional root filling material. If complications occurred additional costs should be covered by an insurance and not by the individual dentist.

In 17% the patients reported persistent pain to be the reason for the claim (Table 3). Endodontically derived pain often is the result of a root canal infection and it is likely that the infrequent use of rubber dam [only 4% of Danish GDPs use rubber dam on a regular basis (Bjørndal & Reit 2005)] might increase the risk of long-standing pain problems.

In 4% of the endodontic cases the treatment was extended for, in the patients' opinion, an unacceptable period of time including multiple visits. In some cases the treatment ended with the extraction of the tooth. The use of multiple visits might reflect the persistence amongst GDPs of outdated treatment strategies with focus on frequent application of intra canal dressings (Strindberg 1956) as opposed to contemporary endodontics, which try to complete treatment in as few visits as possible (Trope & Bergenholtz 2002).

As was proposed in H3 the present study found, in accordance with René & Öwall (1991), an overrepresentation of male dentists but also an overrepresentation of female complainants. These data support the body of work presented by the Roter group (Hall *et al.* 1994, 2002, Levinson *et al.* 1997, Roter *et al.* 2002), demonstrating the importance of patient-doctor communication in a potential malpractice case and indicating that the professional communication behaviour has gender aspects. The more patient-centred communication found amongst female doctors (Levinson *et al.* 1997) might decrease the risk of being involved in liability claims. In a questionnaire study of 289 English general dental practitioners Mellor & Milgrom (1995) found that scores of lack of communication were significantly greater for dentists who had official malpractice complaints. Also, Milgrom *et al.* (1996) suggested a 22-item instrument that might be of value in detecting problems in the patient-dentist communication that could be the precursor to malpractice claims.

The present study indicated that besides gender, the age of the dentist and the complainant might also be of importance. However, although statistically significant correlations were found the age differences were rather small and no definite conclusions were drawn.

Conclusions

Endodontic malpractice claims were frequently found in Denmark and were exceeded only by problems related to crown & bridge treatment. Perceived technical shortcomings dominated the endodontic complaints. Male dentists and female patients were overrepresented in the material indicating a gender influence on aspects of the patient-doctor communication important for liability claims.

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