International Journal of Paediatric Dentistry 2003; **13:** 320–326

Relative analgesia and general dental practitioners: attitudes and intentions to provide conscious sedation for paediatric dental extractions

R. FREEMAN[1] & P. CARSON[1,2]

[1]*Dental Public Health, School of Dentistry, Queen's University and* [2]*Community Dental Services, Ulster Community and Hospitals Trust, Belfast*

Summary. *Aim.* To examine the attitudes and intentions of general dental practitioners (GDPs) who work within the remit of the National Health Service (NHS) to provide relative analgesia (RA) for paediatric extractions.

Methods. All 45 GDPs working within the boundaries of one Trust were asked to complete a questionnaire to assess demography, etc., intention and attitudes to provide RA for paediatric extractions.

Results. Ninety-eight per cent of GDPs took part. All GDPs worked within the NHS. Twenty-nine per cent of GDPs stated that they had RA equipment available in their practices and 68% stated that they discussed RA as treatment alternative. Eighty-seven per cent referred their paediatric extraction cases for dental general anaesthesia. The behavioural intention was predicted by total attitude score and the availability of RA equipment in the practice ($R^2 = 0{\cdot}97$, $F(37,5) = 260{\cdot}11$, $P < 0{\cdot}001$). Total attitude was predicted by clinical competency, few financial worries or time concerns and the availability of RA equipment ($R^2 = 0{\cdot}91$, $F(38,4) = 106{\cdot}21$, $P < 0{\cdot}001$).

Conclusions. This study suggests that GDPs' concerns of clinical competence and costs have an inhibiting effect upon their intention to provide RA for paediatric extractions. These concerns must be addressed by planners and policy makers if there is to be a shift from hospital-based DGA to surgery-based RA services for paediatric extractions.

Introduction

In their 1997 document 'Maintaining Standards: Guidance to Dentists on Professional and Personal Conduct' [1] the General Dental Council stated that:

'Dentists have a duty to provide and patients have a right to expect adequate and appropriate pain and anxiety control' and that 'Pharmacological methods of pain and anxiety control (*included*) local anaesthesia and conscious sedation techniques'.

With the emphasis on the avoidance of dental general anaesthesia (DGA), the general dental practitioner needs to provide conscious sedation alternatives for dentally anxious patients or those who present in pain and who require treatment. This clinical conundrum is all the more acute when a child patient presents in pain. While recognizing that behavioural management is the cornerstone of helping children cope with their fears these procedures may not be sufficient to allay anxieties for the child attending in pain [2]. DGA had been used in such clinical situations previously [3,4]. However, with changes in legislation and improved standards of primary dental care the move to use local anaesthesia with conscious sedation as an adjunct to treatment has been proposed as the most appropriate form of management [4,5].

Nitrous oxide when combined with oxygen as inhalation sedation (relative analgesia (RA)) is

Correspondence: R. Freeman, Dental Public Health, Division of Paediatric, Preventive and Public Health Dentistry, School of Dentistry, Queen's University, Grosvenor Road, Belfast BT12 6BP.

recognized as being the most controllable and safest technique of conscious sedation currently available to the dental profession [6,7]. The main advantages of RA are well known: these include its ease of administration, titratability, reversibility, rapid induction and rapid recovery. In addition, RA has been shown to be effective and successful in reducing anxieties [8], acceptable to child patients [9] and cost-effective for children requiring extractions.

Despite changing legislation and standards and the advantages of RA, many dentists favour other forms of sedation [3,5]. The reasons for the reliance upon DGA have been related to clinical knowledge and skills, the patients' preferences, clinical time and financial constraints [10]. Could an examination of dentists' attitudes and intentions assist in understanding the reasons why GDPs do not readily accept RA as the treatment of choice for paediatric extractions?

The aim of this study was to examine the attitudes and intentions of general dental practitioners who work within the remit of the National Health Service (NHS) to provide RA for paediatric extractions. In order to achieve this aim there was a need to combine decision-making influences within a clinical intention framework in which the decision to provide RA for paediatric extractions could be studied. Hence it was important to use a methodology which united personal and practice attitudes together with external factors (e.g., demography) to examine dentists' intention to provide RA in their surgeries. The Theory of Reasoned Action [11] was used to study the intention of dentists working within the boundaries of the Ulster Community and Hospitals Trust (UCHT) to provide RA services for child patients requiring extractions.

The Theory of Reasoned Action [11] states that individuals act in a rational manner making choices based upon available information. The intention to act in a particular way is determined by the individual's own attitudes and by the attitudes of those important to them, which is known as the subjective norm. In this framework attitudes are conceptualized as the subject's positive or negative evaluations about a specific and well-defined behaviour [11]. Attitudes are derived from beliefs about providing RA together with the outcome evaluations of those beliefs. The subjective norm refers to the degree to which the subject will comply with the wishes of important others. The subjective norm is derived from the individual's belief that others wish them to act or behave in a particular way (normative beliefs) together with their motivation to comply with the wishes of those important to them. Attitudes and subjective norms are the predictors of the behavioural intention to provide RA.

Method

The sample

There were 28 general dental practices within the UCHT. Working within these practices were 45 dentists who were either part-time or full-time, working as assistants, associates or in partnership. All 45 dentists were invited to take part in the study.

The questionnaire

In accordance with Ajzen and Fishbein's [11] method of questionnaire design, a series of in-depth interviews took place with 10 GDPs who practised in a neighbouring Trust. From these interviews, four salient beliefs (being clinically competent; having all the necessary equipment; financial and time concerns) and two salient referents (the accompanying parent and child patient) were identified in relation to the intention to provide RA for paediatric extractions.

The questionnaire [11] used the four salient beliefs and the two salient referents to assess attitude and subjective norm, respectively. Attitude is composed of a belief (assessed on a 5-point Likert scale from not at all to definitely agree) together with the outcome evaluation of the belief (also assessed on a 5-point Likert scale from very important to definitely not important). Therefore there were four belief questions: (i) being clinically competent, (ii) having all the necessary equipment, (iii) financial concerns, and (iv) time concerns. There were four outcome evaluation questions which assessed the practitioners' personal evaluation of how important they felt the above beliefs were for the intention of providing RA for paediatric extractions.

The subjective norm is composed of a normative belief (assessed on a Likert 5-point scale from very important to definitely not important) with the motivation to comply variable (also assessed on a 5-point scale from very much to definitely not at all). Therefore there were two normative belief questions which assessed the degree of importance that the GDPs held the treatment wishes of the accompanying parents and child patients. There were two motivation

to comply questions which assessed how much the dentists wished to comply with the treatment wishes of the accompanying parents and their child patients.

The GDPs' intention to provide RA for paediatric extractions was assessed on a 5-point Likert scale which ranged from definitely not to very likely.

The questionnaire assessed a number of additional external factors or variables related to the dentists. These included demographic factors, years since qualification, position in the practice (principal or associate), attendance at postgraduate meetings, the availability of RA equipment on the practice premises, NHS or private practice and the discussion of RA as a treatment option with child patients and their accompanying parent.

The administration of the questionnaires

The questionnaires were personally delivered to the 28 general dental practices. Their delivery followed a telephone call to each principal practitioner to explain the research. A contact number was enclosed with each questionnaire in case any problems were encountered. It was envisaged that the questionnaire would take the general dental practitioner (GDPs) approximately 10 min to complete.

Scoring of the questionnaires

The questionnaires were scored in accordance with the Ajzen-Fishbein [11] method using the 5-point Likert scales. Scores for the normative and attitudinal components of the behavioural intention were calculated for each GDP. Intention was assessed using a Likert scale ranging from 1 (definitely not) to 5 (very likely). Individual attitude scores were the product of the salient belief (scored 1 definitely not to 5 very likely) with the outcome evaluation (scored +2 very important to −2 definitely not important). Total attitude score was the sum of all of the four individual attitudinal scores. The individual subjective norm score was calculated from the product of the normative belief (scoring 1 from not at all to 5 definitely agree) with the score from the motivation to comply variable (scoring +2 very much to −2 definitely not at all). The total subjective norm score was the sum of the two individual subjective norm variables. Hence the total scores for the attitudinal and subjective norm components of the behavioural intention were calculated for each GDP.

Coding and analysis of the data

The data were entered into a computer using the package SPSS V11 (SPSS Inc., Chicago, IC, USA) and analysed in accordance with the Ajzen and Fishbein method [11]. Statistical analysis included frequency distributions, Mann–Whitney *U*-tests and multiple regression analysis. Multiple regression analysis of the transformed data allowed prediction of the dependent variable (the behavioural intention to provide RA) by the independent variables, attitudes, subjective norms and the external variables.

Results

The sample

Forty-four of a possible 45 GDPs took part, giving a valid response rate of 98%.

All of the GDPs worked within the remit of the NHS with 16 supplementing their income with some private practice. Thirty-four (77%) were male. The mean number of years since qualification was 17·5 with the numbers of years ranging from 3 to 36 years. Twenty-nine (66%) of the GDPs held the position of principal, 15 (34%) were associates. There were no assistants or vocational trainees. Twenty-seven of the general practitioners were single-handed practitioners. Fifty-nine per cent of the GDPs attended five or more postgraduate meetings per year.

Treatment and referral profile of the practices

Less than a third of the GDPs (29%) stated that they had RA equipment available in their practices. Sixty-eight per cent (30) of GDPs stated that they discussed RA as treatment alternative for the extraction of teeth with their child patients and accompanying adults. The majority (87%), however, referred their paediatric extraction cases for dental general anaesthesia.

Comparisons of general dental practitioners' scores for the behavioural intention to provide RA, total attitude and total subjective norms by external variables

The sample was divided into those who had been qualified less than 15 years and 15–36 years using a median split. This gave 23 subjects in the more recently qualified group and 21 in the 15–36 years

Table 1. Comparisons of means of total attitude scores to provide RA for paediatric extractions between external variables.

Total attitude to provide RA	Rank mean scores	Z	*P*
Gender			
Male ($n = 34$)	20·45		
		−1·48	0·14
Female ($n = 10$)	27·10		
Years qualified			
1–15 years ($n = 23$)	26·09		
		−2·32	0·02
16–36 years ($n = 21$)	17·30		
Position in practice			
Principal ($n = 29$)	19·79		
		−1·97	0·04
Associate ($n = 15$)	27·73		
Type of practice			
Single-handed practitioner ($n = 27$)	21·75	−0·16	0·87
Group practice ($n = 17$)	22·38		
Postgraduate meetings attended			
≤ 4 meeting/year ($n = 18$)	19·86		
		−0·96	0·34
> 5 meetings/year ($n = 26$)	23·54		
RA equipment available in the practice			
Yes (13)	36·04		
		−4·89	< 0·001
No (31)	15·92		
Discuss with parent and child LA/RA as treatment option			
Yes ($n = 30$)	23·75		
		−1·41	0·17
No ($n = 14$)	17·96		

Table 2. Comparisons of means for total subjective norm scores to provide RA for paediatric extractions between external variables.

Total attitude to provide RA	Rank mean scores	Z	*P*
Gender			
Male ($n = 34$)	20·45		
		0·14	0·15
Female ($n = 10$)	27·10		
Years qualified			
1–15 years ($n = 23$)	25·76		
		−2·12	0·03
16–36 years ($n = 21$)	17·67		
Position in practice			
Principal ($n = 29$)	21·38		
		−0·45	0·65
Associate ($n = 15$)	23·17		
Type of practice			
Single-handed practitioner ($n = 27$)	22·63	−0.41	0·68
Group practice ($n = 17$)	21·03		
Postgraduate meetings attended			
≤ 4 meeting/year ($n = 18$)	17·81		
		−1·87	0·06
> 5 meetings/year ($n = 26$)	25·02		
RA equipment available in the practice			
Yes (13)	31·69		
		−3·36	0·001
No (31)	17·80		
Discuss with parent and child LA/RA as treatment option			
Yes ($n = 30$)	24·37		
		−1·89	0·05
No ($n = 14$)	16·54		

group. A similar procedure was used to divide the subjects by the number of postgraduate meetings attended on a yearly basis. Using a median split allowed the group to be divided into those who attended 4 or less meetings per year (18) and those who attended 5 or more per year (26).

The mean score for total attitude in relation to providing RA was 2·02 (CI 95% −1·57, 5·61). Dentists who were more recently qualified, who were associates and worked in practices which had RA equipment had significantly higher rank mean scores for total attitude to provide RA compared with others (Table 1).

The mean score for total subjective norm was 10·06 (CI 95% 7·94, 12·20). Dentists who were more recently qualified, who worked in practices where RA equipment was available and discussed RA as a treatment alternative had significantly higher rank mean scores for total subjective norm compared with others (Table 2).

The mean score for the intention to provided RA for paediatric extractions was 2·22 (CI 95% 1·71, 2·74). Dentists who stated that they discussed RA as an alternative treatment option for DGA and had RA equipment in their practices had significantly higher rank mean scores for the intention compared with others. No other significant differences were shown (Table 3).

Prediction of the behavioural intention to provide RA, total attitude and total subjective norms

Multiple regression analysis was adopted to explain the variance in total attitude, total subjective norm and behavioural intention. The independent variables were introduced in one block. The external variables (see Tables 1–3) which had been shown to demonstrate significant differences in total attitude, total subjective norm and behavioural intention scores, were included as independent variables in the multiple regression analysis.

Total attitude was predicted by the component attitudes: (i) being clinically competent to administer RA, (ii) having few financial constraints, (iii) having

Table 3. Comparisons of means for the intention to provide RA for paediatric extractions between external variables.

Total attitude to provide RA	Rank mean scores	Z	*P*
Gender			
Male ($n = 34$)	20·85		
		−1·77	0·15
Female ($n = 10$)	28·10		
Years qualified			
1–15 years ($n = 23$)	25·67		
		−1·94	0·03
16–36 years ($n = 21$)	19·02		
Position in practice			
Principal ($n = 29$)	21·22		
		−1·04	0·65
Associate ($n = 15$)	24·97		
Type of practice			
Single-handed practitioner ($n = 27$)	24·17	−1·23	0·22
Group practice ($n = 17$)	19·85		
Postgraduate meetings attended			
≤ 4 meeting/year ($n = 18$)	20·33		
		−1·05	0·29
> 5 meetings/year ($n = 26$)	24·00		
RA equipment available in the practice			
Yes (13)	37·96		
		−5·85	< 0·001
No (31)	16·02		
Discuss with parent and child LA/RA as treatment option			
Yes ($n = 30$)	25·33		
		−2·42	0·02
No ($n = 14$)	16·43		

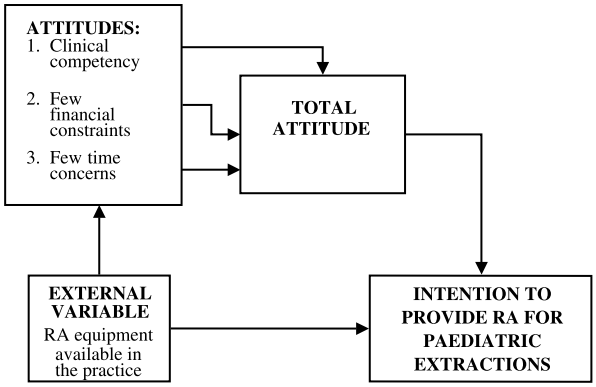

Fig. 1. Prediction of the intention to provide RA for paediatric extractions by general dental practitioners.

few time concerns and by the availability of RA equipment in the practice. This relationship explained 97% of the variance ($R^2 = 0{\cdot}97$, F[37,5] = 260·11, $P < 0{\cdot}001$) (Table 4).

The total subjective norm was predicted by the dentists' wish to comply with parental requests and by the availability of RA equipment in the practice. This explained 78% of the variance ($R^2 = 0{\cdot}78$, F[37,5] = 26·68, $P < 0{\cdot}001$) (Table 4).

The behavioural intention to provide RA for paediatric extractions was predicted by total attitude score and the availability of RA equipment in the practice ($R^2 = 0{\cdot}91$, F[38,4] = 106·21, $P < 0{\cdot}001$) (Table 4, Fig. 1).

Discussion

The aim of this work was to investigate the attitudes and intentions of GDPs working within the NHS to provide RA for paediatric extractions. The chosen GDPs worked predominately within the remit of the NHS. The finding that 86% continued to refer their paediatric extraction cases for DGA suggested that despite the 'Maintaining standards' legislation of 1997 [1], GDPs still relied upon DGA services for this patient group [4]. If GDPs are to comply with GDC [1] requirements then there is a need to study their attitudes and intentions in order to understand the role of any potential enablers and/or inhibitors with regard to the provision RA for paediatric extractions.

In general the GDPs had low scores for total attitude and the intention to provide RA for paediatric extractions. Although they had higher scores for the subjective norm, indicating that they wished to comply with parental and child needs, the scores for attitude and behavioural intention suggested that they were unlikely to provide RA for the children in their care. Conversely, those who were recent graduates and/or working as associates discussed RA as a treatment option with parents and children. GDPs who had RA facilities in their practices had higher scores for the behavioural intention, total attitude and subjective norm. This indicated that they were more likely to provide RA for paediatric extractions.

The prediction of attitude showed that over 90% of the variance was described by the importance of clinical competency, concerns about financial costs, time pressures and the need for RA facilities to be readily available on the practice premises. Similar findings were found with the prediction of the subjective norm suggesting that although the wish to comply with parental needs was important, the availability of RA equipment had increased salience. Over 90% of variance in the prediction of the behavioural intention to provide RA for paediatric extractions was explained by total attitude and the availability of RA equipment in the practice.

Table 4. Predictors of the intention; total attitude and total subjective norm scores to provide RA for paediatric extractions between external variables.

Significant predictor variables	B (SE)	t	*P*
Total attitude			
Component attitudes:			
1. Clinical competency for RA provision	1·33 (0·20)	6·56	< 0·001
2. Financial concerns	0·95 (0·08)	12·42	< 0·001
3. Time concerns	0·87 (0·11)	8·03	< 0·001
External variables:			
4. RA equipment available in practice	7·82 (1·84)	4·24	< 0·001
	R^2 = 0·97, F[37,5] = 260·11, $P \leq 0{\cdot}001$		
Total subjective norm			
Component subjective norms:			
1. Comply with parental requests	1·78 (0·77)	2·30	0·03
External variables:			
1. RA equipment available in practice	15·36 (2·51)	6·11	< 0·001
	R^2 = 0·78, F[37,5] = 26·68, $P \leq 0{\cdot}001$		
Intention to provide RA			
Total attitude	0·02 (0·01)	2·27	< 0·02
External variable:			
1. RA equipment available in practice	2·89 (0·32)	9·16	< 0·001
	R^2 = 0·91, F[38,4] = 106·21, $P \leq 0{\cdot}001$		

These findings suggest that if GDPs are to provide RA as an alternative to referring their paediatric extraction cases for DGA then they need to have the clinical skills and RA equipment, readily available in their practices. The authors acknowledge that the call for continuing professional development and the need for in-service training in the area of conscious sedation is not new [5]. However this study suggests that GDPs' attitudes with regard to their lack of clinical competency and concerns about financial and time costs may ameliorate their wish to comply with the felt and expressed needs of their child and adult patients.

In this scenario it is the lack of RA equipment, readily available in the practice setting, together with the need for in-service training [5] that acts as a disincentive when considering alternatives. This reinforces older and inappropriate sedation choices. There is a need to consider a joint approach in which in-service training [5] and GDPs' financial concerns [4] are acknowledged. Planners and policy makers must consider how they can take advantage of such information in policy decisions if they wish dentists in general practice to shift and comply with new and improved standards of paediatric patient care [1].

This study was limited by its sample size although the sample collected was virtually complete thus ensuring a full range of options. This work points to the inhibiting effect of GDPs' fears about clinical competence and the costs of providing RA for the extraction of children's teeth. These concerns must be acknowledged and addressed by planners and policy makers if there is to be a shift from hospital-based DGA to surgery-based inhalation sedation services for the child patient requiring extractions.

Résumé. *Objectif.* examiner les attitudes et intentions des ominpraticiens (GDPs) travaillant au National Health Service (NHS) pour obtenir une analgésie relative (RA) lors d'extractions dentaires chez l'enfant.

Méthode. Il a été demandé aux 45 GDPs travaillant dans les limites d'une circonscription de remplir un questionnaire évaluant la démographie etc…, les intention et attitudes pour obtenir une RA lors d'extractions dentaires chez l'enfant.

Résultats. 98% des GDPs y ont pris part. Tous travaillaient au sein du NHS. 29% des GDPs ont déclaré avoir un équipement de RA dans leur cabinet et 68% qu'ils discutaient du RA comme traitement alternatif. 87% adressaient leurs cas d'extractions chez l'enfant en anesthésie générale. L'évaluation du comportement était fonction de l'attitude générale et du fait d'avoir un équipement de RA dans le cabinet (R^2 = 0,97: F[37,5] = 260,11: $P < 0{,}001$). L'attitude générale était déduite des compétences cliniques, quelques rares considérations financières ou de temps et du fait d'avoir un équipement de RA dans le cabinet (R^2 = 0,91: F[38,4] = 106,21: $P < 0{,}001$).

Conclusions. Cette étude suggère que les considérations des GDPs en matière de compétence clinique et de coûts ont un effet inhibiteur sur leur intention d'utiliser la RA lors d'extractions dentaires chez

l'enfant. Ces considérations doivent être pris en compte par les plannificateurs et les décideurs s'il doit y avoir une dérive des DGA de l'hôpital vers des services de RA basés sur la chirurgie pour des extractions dentaires chez l'enfant.

Zusammenfassung. *Ziel.* Untersuchung der Einstellungen und Einbindung von Hauszahnärzten, die im Rahmen des National Health Service tätig sind, in das Angebot von relativer Analgesie bei der Zahnextraktion bei Kindern.
Methode. Alle 45 Zahnärzte in einem Bezirk wurden gebeten, einen Fragebogen auszufüllen zu Demographie, Indikationsstellung und Einstellung im Hinblick auf die relative Analgesie bei Zahnextraktionen bei Kindern.
Ergebnisse. 98 Prozent der Hauszahnärzte antwortete. 29% gaben an, die erforderlichen Einrichtungen für relative Analgesie in der Praxis vozuhalten, 68% gaben an, die relative analgese als Therapieoption zu diskutieren. 87% überwiesen ihre kindlichen Patienten für Extraktionen zur Behandlung in Narkose.
Die Indikationsstellung konnte durch die zugrundeliegende Einstellung und die Verfügbarkeit der relativen Analgesie vorausgesagt werden (R^2 = 0.97: F [38,4]} 106,21: $p < 0.001$). Die Grundeinstellung konnte aus der klinischen Kompetenz, dem Fehlen finanzieller Sorgen sowie zeitbedingter Überlegungen und der Verfügbarkeit von relativer Analgesie vorausgesagt werden.
Schlussfolgerungen. In dieser Studie zeigten sich Hinweise darauf, dass Fragen hinsichtlich der Kompetenz und finanzielle Erwägungen eine hemmende Wirkung auf die Entscheidung von Hauszahnärten haben, die relative Analgesie für Zahnextraktionen bei Kindern anzubieten. Wenn die Extraktionen bei Kindern weg von Behandlungen in Vollnarkose hin zu dezentralen Behandlungsangeboten in relativer Analgesie gehen sollen, müssen die darin Verantwortlichen für ihre Planungen solche Gesichtspunkte berücksichtigen.

Resumen. *Objetivo.* examinar las actitudes e intenciones de los odontólogos generales (OG) que trabajan en el Servicio Nacional de Salud (SNS) para administrar analgesia relativa (AR) en extracciones pediátricas.
Método. A los 45 OG que trabajan bajo esta responsabilidad se les pidió que completasen un cuestionario para valorar demografía, etc., intención y actitudes para administrar AR en las extracciones pediátricas.
Resultados. Participaron el 98% de los OG. Todos los OG trabajaban en el SNS. El 29% de los OG señalaron que tenían equipo de AR disponible para su práctica y un 68% comentó que ellos consideraban la AR como un tratamiento alternativo. El 87% refería los casos de extracción pediátrica para anestesia general dental. La intención del comportamiento se predijo por un índice de actitud total y la disponibilidad de equipamiento de AR para la práctica (R^2 = 0,97: F[37,5] = 260,11: $P < 0,001$). La actitud total se predijo por la competencia clínica, pocas preocupaciones financieras o de tiempo y la disponibilidad de equipamiento de AR (R^2 = 0,91: F[38,4] = 106,21: $P < 0,001$).
Conclusiones. este estudio sugiere que las preocupaciones de los OG sobre competencia clínica y costes tienen un efecto inhibitorio sobre la intención de administrar AR para las extracciones pediátricas. Estas inquietudes deben ser orientadas por planificadores y ejecutores en política, ha de haber un desplazamiento del hospital basado en DGA a la cirugía basada en los servicios de AR para extracciones pediátricas.

References

1 General Dental Council. *Maintaining Standards: Guidance to Dentists on Professional and Personal Conduct*. London: GDC, 1997.
2 Freud A. *Anna Freud. Selected Writings*. Introductions by R Ekins and R Freeman. London: Penguin Books, 1998.
3 Carson P, Freeman R. Dental caries, age and anxiety: factors influencing sedation choice in the treatment of children attending for emergency dental care. *Community Dentistry and Oral Epidemiology* 2001; **29**: 30–36.
4 Blain KM, Hill FJ. The use of inhalation sedation and local anaesthesia as an alternative for dental extractions in children. *British Dental Journal* 1998; **184**: 608–611.
5 Foley J. The way forward for dental sedation and primary care? *British Dental Journal* 2002; **193**: 161–164.
6 Luhmann JD, Kennedy RM, Jaffe DM, McAllister JD. Continuous-flow delivery of nitrous oxide and oxygen: a safe and cost-effective technique of inhalation analgesia and sedation of paediatric patients. *Pediatric Emergency Care* 1999; **15**: 388–392.
7 Malamed SF. Pain and anxiety control in dentistry. *Journal of the Californian Dental Association* 1993; **21**: 35–41.
8 Shaw AJ, Meechan JG, Kilpatrick NM, Welbury RR. The use of inhalation sedation and local anaesthesia for extractions and minor oral surgery in children: a prospective study. *International Journal of Paediatric Dentistry* 1996; **6**: 7–11.
9 Hosey M. Anxious children: coping in dental practice. *Dental Update* 1995; **22**: 210–215.
10 Kay E, Nuttall N. *Clinical Decision Making – an Art or Science?* London: BDJ Books, 1995.
11 Ajzen I, Fishbein M. *Understanding Attitudes and Predicting Social Behaviour*. Prentice Hall: Englewood-Cliff, 1980.