A survey to assess the provision of conscious sedation by general dental practitioners in the Republic of Ireland

Abstract
Aim: To quantify and qualify how conscious sedation was used in general dental practice before the introduction of formal sedation teaching in the Republic of Ireland.
Objectives:
1. To determine the extent of use of oral, inhalational and intravenous sedation;
2. to determine the training and experience of general dental practitioners providing conscious sedation;
3. to determine the perceived barriers to the practice of conscious sedation; and,
4. to gauge the level of interest in a postgraduate course in conscious sedation.
Method: Postal questionnaire sent to one general practitioner in seven, selected randomly from the General Dental Council register, in 2007.
Results: Seventy six percent of respondents agreed that the provision of conscious sedation in general dental practice is important. However, the current provision of inhalation and intravenous sedation by respondents is low in comparison to provision in the UK. The main barrier to the use of conscious sedation in general dental practice appears to be lack of availability of training.
Conclusions: The data from this study indicated the need for postgraduate training in conscious sedation in Ireland and a need for increased awareness of the Dental Council Code of Practice on sedation.

Introduction
Guidelines for the practice of conscious sedation in the UK and Ireland
Dentists in Ireland are registered by the Dental Council of Ireland, according to the Dentists Act 1985. Dentists must work under its code of professional behaviour and dental ethics.

The UK guidelines for the use of general anaesthesia and conscious sedation, from the General Dental Council and Standing Dental Advisory Committee, are very comprehensive and specific. The Code of Practice of the Dental Council of Ireland for sedation is less prescriptive but is legally more binding. Any dental surgeon practising outside the Code of Practice is liable to a charge of professional misconduct.
In the UK, the most comprehensive recent set of professional standards relating to the provision of general anaesthesia and sedation for dental treatment derive from the Poswillo report in 1990, which changed the way general anaesthesia in dentistry was administered.\(^2\) The report set out over 50 recommendations covering general anaesthesia, sedation and resuscitation. The Poswillo report gave clear advice on the clinical setting in which dental anaesthesia/sedation can be administered, and the minimum training requirements for practitioners. Five years later, a Clinical Standards Advisory Group (CSAG)\(^3\) drew attention to continuing problems relating to the quality of referral, indications for general anaesthesia and standards of anaesthetic care. In fact, after the publication of the Poswillo Report\(^2\), there was an initial increase in the use of chair case general anaesthesia. The CSAG reasoned that general anaesthesia was being given on demand, rather than meeting clinical need, and additional providers had emerged. These reports raised concerns in the Department of Health in the UK, and a further review of sedation in general anaesthetic services, entitled ‘A Conscious Decision’, was published in 2000.\(^3\) This report recommended that general anaesthesia for dental treatment should only take place in a hospital setting, with access to critical care facilities. In addition, recommendations for conscious sedation included a need for a suitably trained operator-sedationist and assistant, with appropriate equipment, in an appropriate setting.

The UK Standing Dental Advisory Committee (SDAC) produced further guidelines in 2003, with similar but more specific recommendations to all dentists providing conscious sedation in general dental practice, community and hospital settings. In light of these reports, the dental undergraduate curriculum in England has been restructured to include the teaching of conscious sedation as a safer and much cheaper alternative to general anaesthesia in general dental practice. In addition, postgraduate education on the subject has expanded. The Dental Sedation Teaching Group\(^4\) provides the current guidelines on undergraduate and postgraduate training. The development and practice of general anaesthesia and sedation in the Republic of Ireland have been similar to those in the United Kingdom, against a backdrop of EU legislation.

**Sedation in Ireland**

There is a paucity of literature on the use of general anaesthesia or conscious sedation in dentistry in Ireland. Several papers by dentists practising in Ireland were published in the 1980s comparing the use of oral temazepam, oral midazolam and a sublingual preparation of lormetazepam with intravenous diazepam.\(^5,6,7\) All of these techniques were used for outpatient oral surgery. The authors concluded that the rapidly acting oral benzodiazepines provide an effective and safe alternative to intravenous diazepam, for conscious sedation. The Dublin Dental Hospital was one of the first units to use temazepam and midazolam as oral sedative agents.

In 1995 Sleeman et al. published a review of 25 years’ experience with day case oral surgery in the Dublin Dental Hospital.\(^8\) This retrospective study showed that the number of patients treated under general anaesthesia between 1968 and 1992 had fallen. The number of patients treated with local anaesthesia had risen slightly, and the number treated under local anaesthesia and sedation had increased markedly since its introduction in 1980.

Leitch and Girdler (2000) and Leitch and Jauhar (2006) investigated the quality and quantity of dental undergraduate teaching in the 16 dental schools in the United Kingdom and Ireland, by using questionnaires to collect information from teaching staff and final year students.\(^9,10\) The results from the 2006 study showed an increase in the didactic teaching of conscious sedation and an increase in hands-on practical experience, in comparison to the 1998 study.

Undergraduate sedation teaching in the dental schools in Ireland has expanded to attain the recommended levels of sedation experience set by the Dental Sedation Teachers Group and the Dental Council of Ireland. A dedicated lecturer post in conscious sedation has recently been created at the Dublin Dental School, with a view to developing the whole area of conscious sedation for undergraduate and postgraduate training.
In 2006, Quinn et al. published a survey describing the extent of the practice of conscious sedation in the then Health Board Dental Service (now Health Service Executive Dental Service). This study showed that the practice of conscious sedation in this setting was extremely limited, although the level of interest among health board dentists in the use of conscious sedation was high. The main barrier to the provision of conscious sedation was perceived to be the lack of availability of training programmes.

Since this latter study only concerned dentists working in the Public Dental Service in the Republic of Ireland, this study aimed to identify the provision of conscious sedation by general dental practitioners in Ireland, prior to the establishment of a postgraduate training programme. The objectives were:

1. To determine the arrangements already in place for the practice of conscious sedation by general dental practitioners.
2. To assess the training and experience of the dentists practising conscious sedation.
3. To understand the perceived barriers to the provision of conscious sedation in dental practice.
4. To determine the degree of interest in a postgraduate training programme in conscious sedation.

**Method**

Information was obtained by a short postal questionnaire sent to general dental practitioners in the Republic of Ireland. The sample was acquired from the list of dentists registered with the Dental Council of Ireland. All dentists with addresses outside the Republic of Ireland were excluded, as were all those known to be working in the Health Service Executive (HSE) and hospital service. The questionnaire was then sent to 300 dentists, selected randomly from each name in seven appearing on the register (nth name selection technique). The sample size was calculated to obtain at least 60 responses. Tan in 1997 investigated response rates to mailed questionnaires in studies published in the British Dental Journal, the Journal of the American Dental Association and Dental Update. He found that response rates varied from 17-100%. Therefore, the response rate for this study was expected to be at least 20%. A 45% response was achieved. A self-addressed envelope was included and contact information for the author was also printed on the questionnaire. A deadline for the return of the questionnaire was not given, as studies have shown that it does not increase the response rate and may well reduce the number of respondents. Questions relating to practitioner details, the type of sedation offered, referral patterns for those not offering sedation, and details of undergraduate and postgraduate training, were asked. Ethical approval was received from the Trinity College Faculty of Health Services Research ethics committee.

**Results**

One hundred and thirty five questionnaires (45%) were returned. Six were excluded from the data as two of the respondents were hospital based, two were based in the health board, one was based in Northern Ireland and one questionnaire was returned by an orthodontist. These questionnaires were excluded from the data analysis. However, three completed questionnaires by recently retired general dental practitioners were deemed to be usable, as was one completed by a dentist working in private practice and in a hospital. There were thus 129 useable questionnaires to assess. Data were entered on an Excel spreadsheet and are represented graphically for the closed questions. Analysis of responses to the open questions is in a discussion format.

**Figure 1** represents the response to the dentist’s perceived need for sedation in practice. Forty-seven (37%) strongly agreed and 49 (39%) agreed that there was a need for sedation in general practice. Nineteen (15%) were unsure, 11 (8%) disagreed and one (1%) strongly disagreed.

**Figure 2** shows the types of sedation provided by the practitioner to adults. Twenty-seven (21%) offer oral sedation, four (3%) inhalation sedation and eight (6%) provide intravenous sedation. Sedation is not provided by the 92 (70%) remaining dentists.

**Figure 3** illustrates the types of sedation provided to children. For children, seven respondents (7%) use oral sedation, 11 (10%) inhalation sedation and one (1%) intravenous sedation. Eighty-six (82%) do not provide sedation for children.

**Figure 4** shows the management strategies employed by dentists for...
anxious patients. Fifty (34%) refer to specialist sedation practices, 34 (23%) refer to hospital specialists, 38 (26%) refer for general anaesthesia and 24 (16%) stated that they used other methods. Ten practitioners stated that the needs of anxious patients are met using behavioural management techniques. In one practice an anaesthetist is employed to provide intravenous sedation twice a year, and three practices use hypnosis.

Figure 5 shows the country of qualification of respondents. The majority (n=108 or 86%) received their undergraduate training in Ireland. A further 13 (10%) are UK graduates, three (2%) are from EU states and one (1%) received their training in South Africa.

In Figure 6 it can be seen that the largest concentration of practitioners is in the Dublin area (32), followed by Cork (14). While this does not mean that the sample is representative of the general dental practitioner population, it suggests that it may be regarded as a useful sample as a geographical reflection of practitioner distribution. Year of qualification is also evenly distributed (Figure 7).

Details relating to practitioners providing a sedation service

Sedation agents

Thirty-nine (30%) respondents stated that they offered some form of sedation to adults. A total of 18% offered sedation to children, which was mainly inhalation. The practitioners were asked to complete open questions related to the provision of this service. Twenty (51%) respondents stated that they only provided oral sedation. Diazepam was the agent most commonly used for oral sedation by 13 practitioners. Five respondents listed temazepam and the remainder (two) did not state which drug(s) were used. Nine (23%) respondents use intravenous sedation. Midazolam is used by four practitioners, diazepam by two, and a diazepam derivative by one practitioner. There was one questionnaire for which this section was left blank and one whose responses were excluded because they practised intravenous sedation in a hospital setting. Those practising intravenous sedation also provided oral sedation (four) and inhalation sedation (five). Replies from seven (18%) practitioners stated that they practised inhalation sedation alone and three (8%) provide inhalation and oral sedation, using midazolam, diazepam or temazepam.

Monitoring equipment

Oral sedation only (n=20): Twelve respondents had no monitoring equipment when providing oral sedation with diazepam. Two stated that they used a blood pressure monitor and one questionnaire was marked N/A. Four of the five providing oral sedation with temazepam also had no monitoring equipment. One practitioner uses a blood pressure monitor.

Intravenous sedation (n=8): Four respondents have a pulse oximeter, with a further two also making use of a blood pressure monitor and ECG machine. Two stated that they only use a blood pressure monitor and two were left blank.

Inhalation sedation only (n=7): Three stated that they use pulse oximetry to monitor the patient, one stated that no monitoring equipment was used and three left the section blank.

Inhalation and oral sedation (n=3): Two use pulse oximetry and one uses a blood pressure monitor alone.

Emergency drugs for sedation

Oral sedation only (n=20): Five respondents stated that oxygen is available as are the standard emergency drugs. Ten stated that they
have no emergency drugs for sedation and four left the section blank. Intravenous sedation (n=8): Four stated that their emergency drugs for sedation were oxygen and flumazenil. One respondent stated that he had oxygen and intubation equipment and three left this section blank.

Inhalation sedation only (n=7): Oxygen was listed by three practitioners and flumazenil by one. Three respondents left the section blank.

Inhalation and oral sedation (n=3): All three of the respondents listed oxygen as their emergency drug for sedation.

Training and experience of practitioners in relation to sedation

Sixty-one (48%) respondents received training in sedation as undergraduates and 67 (52%) received no training (Figure 8). Fifty-six respondents (62%) received practical and theoretical training, 20 (22%) theoretical only and 14 (16%) practical only (Figure 9).

Figure 10 shows that a combination of oral, intravenous and inhalation sedation techniques were taught to 27 (31%) of those who

![Graph showing training methods](image)

**Figure 7: How long have you been qualified?**

**Figure 8: Was conscious sedation a part of your undergraduate curriculum?**

**Figure 9: What form did the training take?**

**Figure 10: What methods of sedation were you trained in?**

**Figure 11: Have you had postgraduate training in conscious sedation?**
received undergraduate training, followed by 23 (26%) who were taught intravenous sedation only, 12 (14%) taught inhalation and intravenous sedation, and 11 (13%) inhalation only. Only 32 (25%) respondents stated that they had received some form of postgraduate training in sedation (Figure 11).

The majority of dental nurses have no training in sedation (82%) and of those who do have training, only 8% have been formally trained, having obtained certification in dental sedation nursing (Figure 13). When asked about postgraduate training, 86 respondents (69%) expressed an interest (Figure 14). A mentored programme providing comprehensive training and one-to-one coaching was preferred by 86% of practitioners to a dedicated postgraduate programme (64%).

Barriers to the provision of sedation in general dental practice
The greatest perceived barrier to the provision of sedation is lack of training (42%), followed by concerns for patient safety (36%). Fear of litigation (13%), unsuitable patients (5%) and cost (4%) are perceived to be less important. Figure 15 illustrates the number of respondents and their preferences.

Free comments
There were several sections of the questionnaire where comments from practitioners were encouraged. There was positive and negative feedback on the use of conscious sedation in dental practice. The general theme, which was repeated by those providing comments, is best summed up by a comment from one practitioner as follows: “Conscious sedation is routinely provided in the UK/Northern Ireland practices because they have received the necessary training. It should be part of the curriculum here as well”.

Discussion
Current provision of conscious sedation by general dental practitioners
The majority of respondents (76%) either strongly agreed or agreed that the provision of sedation was important in general dental
practice. This concurs with studies showing that the use of conscious sedation is an important method of behaviour management for extremely anxious and phobic dental patients. These results must be interpreted with caution and the possibility of bias has to be considered. A representative sample of dentists was used and those responding may have been more interested in the topic than non-respondents, especially with a response rate of 45%.

Although 30% of respondents stated that they provide some form of sedation to adults, half of them use oral sedation alone, mainly with diazepam. As mentioned in the literature review, diazepam has a slow onset of action, a long half-life, and active metabolites. It is not suitable as an oral sedative agent. However, the standard oral premedicament used in dentistry is often diazepam, which is prescribed the night before and/or the morning of a dental appointment. This may explain why a high number of respondents use diazepam. Oral drugs are easy for the dentist to administer and are universally accepted by patients, hence their popularity. The Dental Council Code of Practice states that the relevant drug should be administered under supervision in the dental surgery. A total of 7% provide intravenous sedation, with over half of these practitioners also providing other forms of conscious sedation. Midazolam is the principal drug used for intravenous sedation and it is administered by half of respondents providing sedation. The two respondents who administer diazepam are recently retired.

A total of 8% provide inhalation sedation, mainly to children. The numbers of respondents providing inhalation sedation is surprisingly low, especially as it is often quoted as the safest form of conscious sedation. If the data for oral sedation are excluded, this study shows that the provision of sedation services in Ireland falls far short of the 15% availability suggested by the National Centre for Continuing Postgraduate Education in Dentistry in the UK.

The requirement for pulse oximetry monitoring during oral, intravenous and inhalation sedation, as recommended in the Dental Council Code of Practice for Sedation (Appendix 4) and in the UK guidelines, is only being met by nine (23%) practitioners. The absence of appropriate equipment in the case of some practitioners may be a result of misunderstanding or ignorance of the guidelines, especially with regard to the use of oral sedation. Dentists often mistakenly believe that oral sedation is the safest way to administer sedation when, in fact, its relatively unpredictable effect makes its use more difficult.

When asked what emergency drugs for sedation were available, 15 (38%) stated oxygen and five had flumazenil available. In the UK, it is mandatory that a dentist be able to administer supplemental oxygen should the need arise. The Dental Council of Ireland does not give any guidelines regarding emergency equipment for conscious sedation. In light of these findings, the availability of emergency drugs may need to be included in the Dental Council guidelines. Referral patterns for those practitioners who do not provide a sedation service show that one-third of anxious patients are referred to a specialist sedation practice, one-quarter are referred for general anaesthesia, one-quarter to hospital specialists, and the remainder are managed using other methods. Unfortunately, there are no figures available in Ireland to show the number of dentally related general anaesthetics that have occurred, except that published by Sleeman (1995) relating to day case oral surgery over 25 years at the Dublin Dental Hospital.

Similarly, there are no data on the number of specialist sedation practices in the country. As would be expected, the majority of respondents (86%) qualified in Ireland. Half (four) of the respondents who are providing intravenous sedation in practice were trained in the UK. This highlights sedation training opportunities in the UK, which until recently were not available in the Republic of Ireland.

**Training in conscious sedation**

Of the respondents providing intravenous sedation, two stated that they had formal postgraduate training, three had attended SAAD courses, two were hospital trained and one had no postgraduate training. The number of respondents who provided oral sedation and had postgraduate training numbered one for a formal course, two for SAAD courses and one for hospital experience. The remaining 15 had no postgraduate training. Of those providing sedation services, three had formal postgraduate training and six had no postgraduate training. These practices do not comply with the Dental Council Code of Practice, which states that intravenous and inhalation sedation must be provided by a practitioner who has successfully completed a Dental Council recognised postgraduate training programme. In comparison, Quinn (2006) found that 38% (19) of senior dental officers in the HSE had attended a postgraduate course and 62% (31) had no postgraduate training.

A total of 69% of respondents expressed an interest in attending a postgraduate training programme. Mentored experience is preferred to a dedicated course as the mode in which sedation training would be delivered. Mentored training would fill the gap between a formal course leading to a diploma and the short, weekend-type SAAD courses.
Barriers to the provision of sedation in practice
A total of 42% of practitioners graded lack of availability of training as the most important barrier to the provision of sedation in general practice. This opinion is backed up by responses in Quinn et al.’s study of health board dentists, and by the fact that there were no recognised Dental Council postgraduate training programmes at the time of this survey.
A total of 36% of respondents stated a concern over safety and 13% feared litigation. As mentioned in the literature review, Roberts stated that there were no recorded mortalities after the administration of inhalation sedation. The most reliable statistics on the safety of intravenous sedation in dentistry are those published by Coplans and Curson. They found that there were no deaths in over two million administered sedations from 1970 to 1979. From 1980 to 1989 there were two deaths, one of which was thought to be secondary to an overdose of midazolam. The patient was receiving treatment for hypothyroidism and was given 13mg midazolam, after which lignocaine 2% with adrenaline one in 1,000 local anaesthetic was used. There was no record of who administered the sedation. Death was said to have occurred from respiratory failure, possibly associated with the large dose of midazolam. Unsuitable patients and cost seemed to be the least important perceived barriers to sedation provision in practice. However, funding for sedation in the UK, initially by the Department of Health (through the NCCPED) and subsequently via healthcare trusts, has helped to increase the number of practitioners providing a sedation service in the National Health Service (NHS).

Conclusion
This study shows that there is a need and desire for sedation training in Ireland, particularly at postgraduate level. A combination of mentored training programmes and more structured diploma courses would be advantageous, in order to facilitate the needs of most dental practitioners with an interest in sedation. Fulfilment of these training needs should then translate to increased service provision.

References