IN BRIEF

- This paper shows the number, length of qualification and involvement in dental work of anaesthetists in Scotland.
- It gives an interesting insight into drugs commonly used in dental sedation.
- Safety aspects of sedation are considered.
- The attitudes of consultant anaesthetists to sedation provided by dentists are varied and interesting.
- Inconsistencies in sedation training are highlighted.

A survey of the opinions of consultant anaesthetists in Scotland of sedation carried out by dentists

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Objectives To elicit the attitudes and opinions of consultant anaesthetists working in Scotland, with regard to conscious sedation carried out by dental practitioners.

Method A questionnaire was designed to gauge opinion of consultant anaesthetists in Scotland on the practice of conscious sedation by dentists. The questionnaire was sent to 353 consultant anaesthetists working in 49 hospitals within the 15 health boards in Scotland.

Results Of the 366 questionnaires sent, 249 were returned of which 235 were valid. This gave a response rate of 64%. In general, those questioned felt that the provision of sedation in a hospital setting was more appropriate than in general dental practice. A majority (65%) thought that it was unrealistic for anaesthetists to provide all sedation for dental treatment, although many (58%) felt that anaesthetists should take more responsibility in this area. Again, a majority (60%) agreed that dentists should be trained to use sedation techniques for their patients but a significant number (63%) disagreed with the practice of operator/sedationist.

Conclusion It is of concern to the dental profession that a significant number of anaesthetists do not feel that it is appropriate for dentists to be administering even the most simple methods of sedation. At present there are no clear, recognised guidelines as to the level of formal training required for the practice of conscious sedation by dentists. It is in the interests of the dental profession and the public to ensure that those choosing to practice sedation do so safely by following recognised guidelines in the training and practice of sedation.

At present there are two main types of sedation used by dentists for providing conscious sedation. The first is inhalational sedation, commonly nitrous oxide/oxygen, often used in the treatment of children as well as adults.[1] Nitrous oxide sedation is rapidly reversible and provides a level of sedation that allows both restorative treatment and extractions to be carried out in nervous children and adults. Intravenous sedation is used in adults and the drug of choice is midazolam. Midazolam is given by slow titration over a number of minutes, with verbal contact maintained with the patient at all times. This technique is useful for treatment of nervous adults and in complicated procedures such as the removal of third molars.

For many years there has been increasing debate regarding the provision of general anaesthesia and sedation for pain and anxiety control in dentistry. Following the Poswillo report in 1990,[2] it was widely anticipated that the use of general anaesthesia in dentistry would decline and be replaced with conscious sedation. Recommendations made by the General Dental Council in November 1998,[3] supported by the Royal College of Anaesthetists in February 1999,[4] clearly define the standards required for the administration of general anaesthesia in dental practice. Correspondingly a rise in the need for conscious sedation for pain and anxiety control in dentistry was predicted. Despite this, there are at present no national regulations with regard to the level of training required for dental practitioners to practise conscious sedation. Three main levels of training are currently available for the postgraduate dentist wishing to practice sedation. The first is a two-day course run by the Society for the Advancement of Anaesthesia in Dentistry (SAAD) which is mainly theoretical, providing little hands-on experience. The next level is a 'core' course, run only in London and Newcastle at present, consisting of two days didactic teaching, along with six compulsory sessions in hands-on sedation. The third level involves the year long diploma course, again available only in London and Newcastle, which involves ten didactic teaching days as well as significant hands-on experience and a research project. As well as the diploma there is also an MSc available in London. The level of experience gained on each course varies widely and the courses are not comparable. In view of a recent study carried out into undergraduate sedation teaching in the UK,[5] which demonstrated wide variation in the standard of teaching of conscious sedation at different dental schools, it is clear that more consistency is required to achieve a standard level of training throughout the UK for the provision of conscious sedation in dental practice.

A report was published in July 2000 by the Department of Health entitled, *A Conscious Decision – a review of the use of general anaesthesia and conscious sedation in primary dental care*.[6] This report states that 'dentists and doctors intending to practice sedation must demonstrate adequate theoretical and clinical training in conscious sedation before providing this service.' This report goes on to suggest various methods of acquiring knowledge in sedation,

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Refereed paper
Received 03.09.01; Accepted 29.04.03
doi:10.1038/sj.bdj.4810901

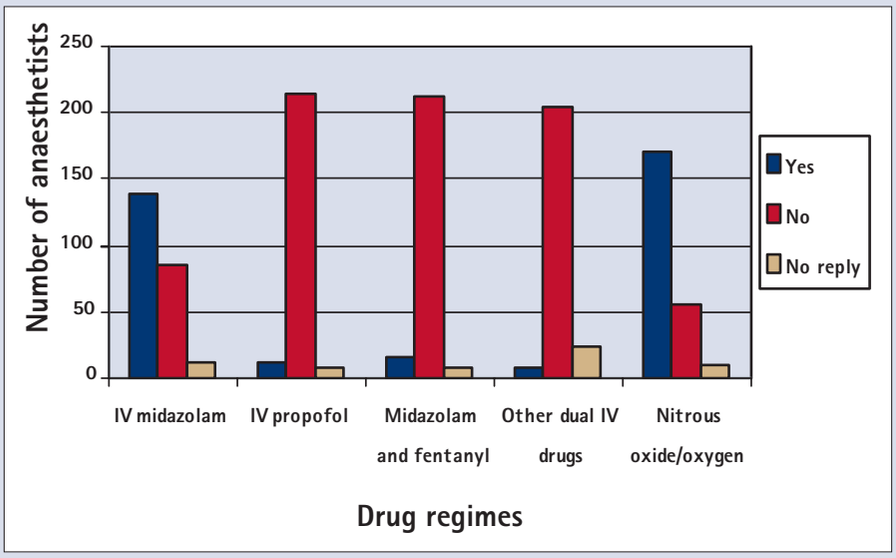


Figure 1 Appropriateness of the use of various sedation agents in general dental practice. The results are shown as the number of anaesthetists agreeing to the use of intravenous midazolam, intravenous propofol, intravenous midazolam and fentanyl, other dual intravenous drugs and nitrous oxide and oxygen.

Table 1 Use of sedation in dental practice

Drugs used	IV midazolam	IV propofol	Midazolam and fentanyl	Other dual IV drugs	Nitrous oxide/oxygen
Yes	138	12	15	7	170
No	85	215	213	204	55
No reply	11	8	7	24	10

including computer-aided distance learning. No consensus is reached in this report on the standard of training required.

Within the anaesthetic profession it is apparent that many anaesthetists do not have confidence in the ability of dental practitioners to provide safe sedation, indeed some believe it should only be provided by those qualified in anaesthetics.[7] This is of concern to the dental profession who strive to provide safe and effective patient care and with the increasing demand for conscious sedation in dentistry, it is not practical for it to be provided solely by anaesthetists. It is therefore important that we have the support of our medical colleagues in the provision of conscious sedation and that the public are confident in our delivery of care.

The aim of the study was to establish, by means of a questionnaire, where the opinions of consultant anaesthetists lay with regard to the practice of conscious sedation by dentists and to use this information to help in proposing standards for training and the practice of conscious sedation in dental practice.

MATERIALS AND METHOD

The study was designed as a prospective questionnaire-based survey.

A list of the consultant anaesthetists employed in Scotland was obtained from the *Directory of Operating Theatres and Departments of Surgery*. A questionnaire and covering letter were sent to 353 consultant anaesthetists working in 49 hospitals within the 15 health boards in Scotland. A stamped addressed envelope was enclosed for return. No follow up was used in order to protect the anonymity of those surveyed.

A questionnaire was designed (Appendix 1) to collect information of a subjective nature from consultant anaesthetists. The questionnaire opens with a series of simple yes/no options with reference

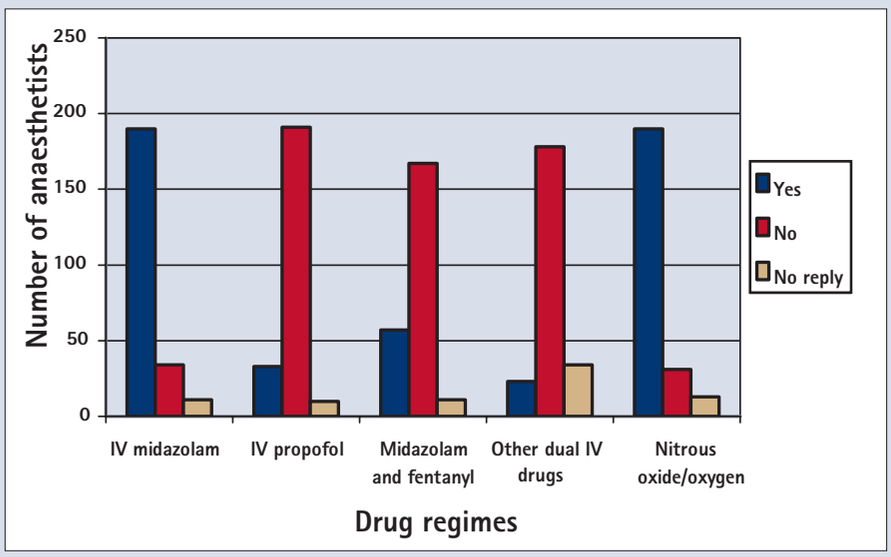


Figure 2 Appropriateness of the use of various sedation agents in hospital practice. The results are shown as the number of anaesthetists agreeing to the use of intravenous midazolam, intravenous propofol, intravenous midazolam and fentanyl, other dual intravenous drugs and nitrous oxide and oxygen.

Table 2 Use of sedation in hospital practice

Drugs used	IV midazolam	IV propofol	Midazolam and fentanyl	Other dual IV drugs	Nitrous oxide/oxygen
Yes	190	33	57	23	190
No	34	191	167	178	31
No reply	11	10	11	34	13

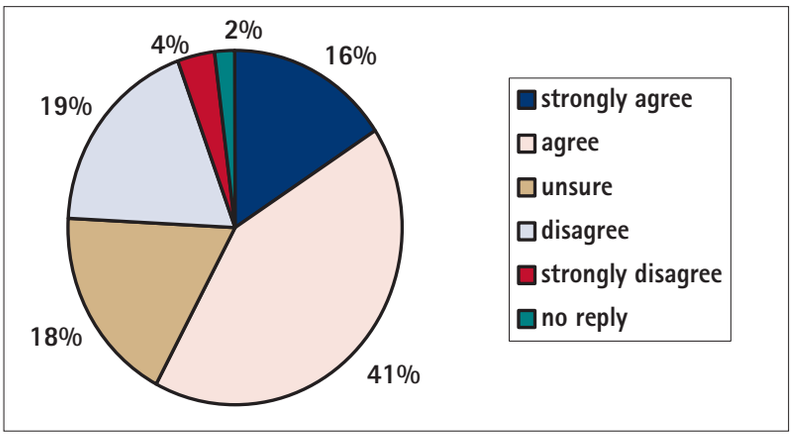


Figure 3 Ilustrates the results of the question 'Should anaesthetists be taking on more responsibility for providing sedation in dentistry?' in pie chart form. Results are expressed as the proportion of anaesthetists answering as follows: strongly agree, agree, unsure, disagree, strongly disagree.

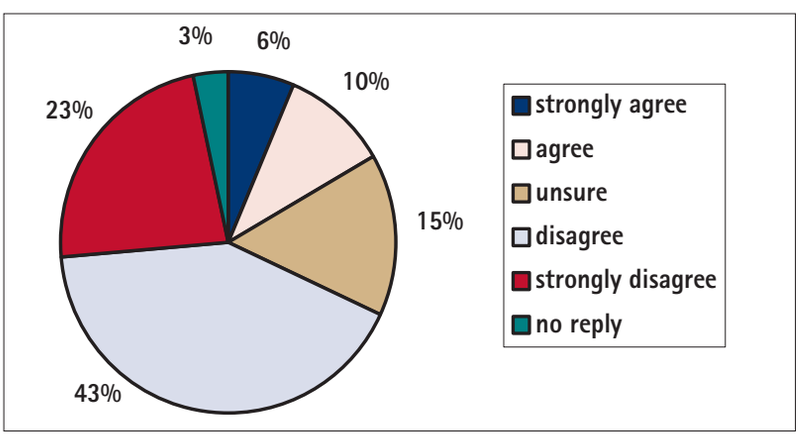


Figure 4 Shows the results of the question 'Is it realistic for anaesthetists to provide all sedation in dentistry?' in pie chart form. Results are shown as the proportions of respondents answering strongly agree, agree, unsure, disagree, strongly disagree.

to the various drugs commonly used by dentists practising sedation. This section was designed to compare the attitudes of anaesthetists towards dentists working in a hospital setting and those based in general practice. The next section of the questionnaire focused on sedation more generally, without referring to specific drugs and was designed to elicit opinions concerning who should be providing sedation. It offers five possible responses ranging from strongly agree to strongly disagree. The final section of the questionnaire was concerned with the anaesthetists' experience of providing conscious sedation in dentistry and included a section for general comments.

The data from the returned questionnaires was entered into a database using Microsoft Access. Statistical analysis was used where appropriate.

RESULTS

Of the 366 questionnaires sent, 235 were returned, giving a response rate of 64%. The average time spent as consultant anaesthetist was 13 years with a range of 3 months to 30 years. Of these, 26% were involved in providing chairside dental general anaesthetics, 36% provided intubated general anaesthesia for dental or oral surgery cases and 12% were involved in the provision of intravenous sedation for dental cases. The majority of those involved in the treatment of dental cases carried out only one session per week and 115 of the 224 were not involved in treatment of dental cases at all.

The anaesthetists were asked if they felt that the use of various drugs for the provision of sedation by dentists in practice and in hospitals was appropriate. The results are displayed in Figure 1 (Table 1) for dental practice and Figure 2 (Table 2) for hospital. These show that the majority of anaesthetists approve the use of both IV midazolam (81%, 59%) and inhalational nitrous oxide/oxygen (81%, 72%), in hospital and in dental practice respectively.

Statistical analysis was applied to this part of the questionnaire, comparing the opinions of those anaesthetists who had been qualified for a short time with those who had been in practice longer. The correlation coefficient test was applied and found that in practice those anaesthetists who had been in practice longer were more likely to disagree with the use of nitrous oxide inhalation sedation than those with less experience. In hospital practice those with more experience were more likely to agree with the use of IV propofol than those who had been in practice for a short time. None of the other results were statistically significant. Analysis also showed that those who answered 'yes' to the use of a drug in practice were more likely to give the same answer for the use of the same drug in hospital regardless of the length of time practising.

The use of dual IV drugs and of IV propofol is widely disagreed with. It is notable that IV propofol is not licensed for use as an IV sedative agent in dentistry, although several recent studies[8-15] have outlined the benefits of propofol sedation which include rapid recovery with few side effects. The main disadvantage of propofol is that it has a much narrower margin of safety between sedation and anaesthesia than midazolam, making it dangerous for use in untrained hands.

Question 2 asked whether anaesthetists felt they should be taking more responsibility for providing sedation for dental treatment. The majority (58%) felt that they should, with 23% against, 17% unsure and 2% failing to answer (Figure 3).

Question 3 asked whether it was realistic for anaesthetists to provide all sedation for dental treatment. Here the majority (65%) either disagreed or strongly disagreed, with 17% agreeing or strongly agreeing, 15% unsure and 3% failing to answer (Figure 4).

Given the recommended reduction in the use of general anaesthesia in dentistry, in question 4, subjects were asked whether they felt that dentists should be trained to use sedation techniques instead of relying on general anaesthetic for their patients. On this point the majority agreed (60%) with 16% disagreeing, 11% unsure and 3% failing to reply (Figure 5).

It is common practice in dentistry for the dentist to act as operator/sedationist. Question 5 asked if the consultant anaesthetists felt that this practice should be permitted. This question seemed to provoke the strongest feelings among subjects with 41% strongly agree-

Figure 5 Shows the results of the question 'Should dentists be trained to use sedation techniques' in pie chart form. Results shown as proportions of respondents answering strongly agree, agree, unsure, disagree, and strongly disagree.

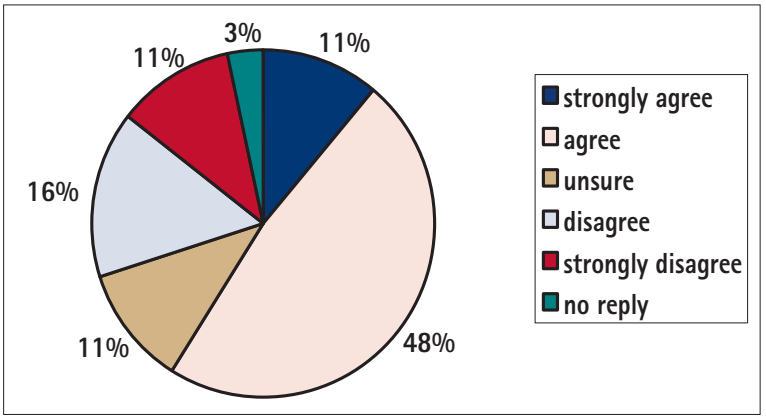
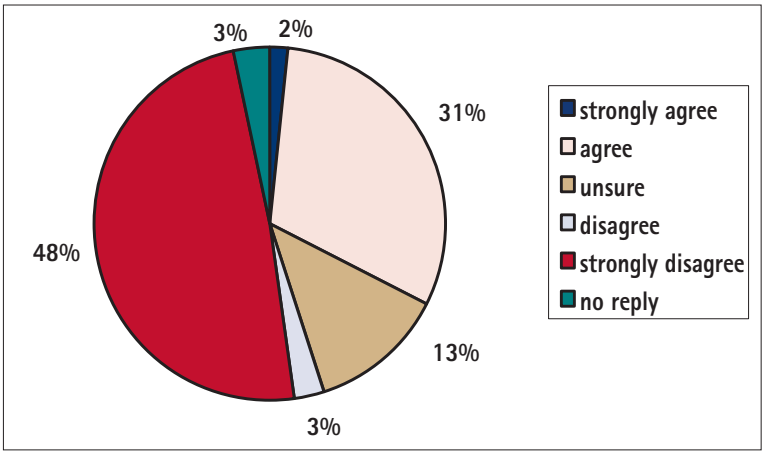


Figure 6 Shows the results of the question 'Should dentists be permitted to act as single operator/sedationist assuming they have the assistance of a second appropriate person?' in pie chart form. Responses shown as proportion of the following: strongly agree, agree, unsure, disagree and strongly disagree.



ing and a further 22% in disagreement. Only 26% agreed that dentists should be permitted to act as operator/sedationist with 9% unsure and 2% failing to respond (Figure 6).

Comments were invited in the open part of the questionnaire and 57% made comment. The majority of the comments that were made were centred on the safety aspect of providing sedation, in particular the need for competence in resuscitation at the advanced level, the narrow safety margins of some sedation drugs and the practice of the single operator/sedationist. A selection of the more typical comments is given below:

'While I believe that cautious single agent sedation may be appropriate for administration by a dentist/oral surgeon, dual IV sedation requires adequate monitoring by a qualified person usually an anaesthetist who has no other responsibilities.'

'Dentists need to take on the responsibility of sedating patients where appropriate. However, it must be performed by knowledgeable and competent practitioners with full resuscitation available. The demarcation between sedation and anaesthesia is small and easily crossed, hence proper training is paramount.'

'...no one person should administer sedation and perform surgery wherever it is done. It demands adequate monitoring and resuscitation facilities and personnel trained in assessment and resuscitation.'

'Dentists provide excellent local and regional anaesthesia. Adult patients should take responsibility for their own oral health and should not be given the choice of sedation.'

DISCUSSION

The response rate of this study was encouraging and provides a useful insight into the views of consultant anaesthetists in Scotland. In the absence of previous studies of a similar nature it is difficult to judge whether the opinions of Scottish anaesthetists are comparable with those in other parts of the country.

It is clear that anaesthetists are more likely to agree with the provision of conscious sedation by dentists in hospital rather than in practice. In view of the recent guidelines from the Royal College of Anaesthetists,[4] recommending the restriction of general anaesthesia to hospitals and away from the community, this is perhaps not surprising. The fact that only 12% of those surveyed were involved in the provision of sedation for dental treatment would tend to suggest that a limited number of cases are being managed this way and that many hospital dentists provide this type of sedation without the help of anaesthetists.

If we consider the two main definitions of sedation, there is an obvious discrepancy. The GDC guidelines[2] talk about '...the use of a drug or drugs...', while Poswillo[1] clearly defines conscious sedation as '...a carefully controlled technique in which a single intravenous drug is used...' and considers the use of dual IV drugs to be tantamount to general anaesthesia. The comments made by the anaesthetists questioned would suggest that most agree with the Poswillo definition when the single drug used is midazolam and do not agree with the use of propofol or dual IV drugs by non-anaesthetists.

IV midazolam has a long history of use in the dental field. It has a large safety margin, a short half-life and relatively benign cardiovascular, respiratory and CNS effects. It also has an effective antagonist (Flumazenil).

It is important, however, to note that combinations of IV drugs are not commonly used in dental practice, most dental sedationists limiting their drug regimes to IV midazolam and/or nitrous oxide and oxygen. It is perhaps not surprising that anaesthetists were very much against the use of dual IV drugs by dentists who would be less able than anaesthetists to deal with the complications of such regimes. The use of propofol was also deemed unacceptable. As propofol is an anaesthetic induction agent, many were concerned about the narrower safety margin between sedation and anaesthesia, along with the fact that propofol is not licensed for use in dental sedation.

It is noteworthy that while the majority of anaesthetists (58%) felt that they should take on more responsibility for the provision of sedation in dentistry, few (16%) felt that this was a realistic proposition. When we consider that there are currently 2,839 registered dentists in Scotland with only 366 consultant anaesthetists this, is not viable.

In realisation of this shortfall, many of the anaesthetists (59%) felt that dentists should receive training to practice conscious sedation themselves and some (12%) specified in their comments the nature of the training that they felt would be appropriate. From the responses to the questionnaire, it was clear that many anaesthetists had little knowledge of the training presently available to dentists wishing to practice conscious sedation. One of the main concerns in this area (with 7% mentioning it in their comments) involved monitoring, in particular the use of a pulse oximeter, as well as the presence of other suitably trained staff and the need for skills in advanced life support. The present availability of training does consider the need for monitoring, but a short two or three day course in the use of sedation could not be considered sufficient training in advanced life support. Although advanced life support is part of the curriculum in both the Diploma and MSc course, those intending to administer intravenous sedation should give serious consideration to the completion of a formally recognised advanced life support qualification.

While the majority (63%) expressed strong misgivings regarding the dentist acting as operator/sedationist, many mentioned their concern that any medical or dental professional should take on this responsibility. The main reason for this concern (with 11% mentioning this in their comments) was that of the shared airway. Several respondents (4%) also mentioned that it is impossible to monitor a patient closely while carrying out complicated surgery, thus emphasising the need for a second appropriately trained person. Some mentioned that if the second appropriately trained person mentioned in the questionnaire was an anaesthetic nurse or another dentist then this practice would be more acceptable. There was no mention of an appropriately trained dental nurse despite the recognised training course for dental nurses in sedation.

It is of great concern that a considerable number of anaesthetists do not feel that it is appropriate for dentists to be administering even the simplest methods of sedation, particularly by the intravenous route, although many had reservations about the use of nitrous oxide/oxygen inhalational sedation. While the use of dual intravenous drugs could be seen as a specialist procedure only safely carried out by anaesthetists, the use of intravenous midazolam is widespread both in dental practice and in hospitals, with an excellent safety record.[9,13,16] The suggestion by some 4% of anaesthetists that sedation is unnecessary for healthy adult patients is rather naive and does not recognise that many patients are genuinely dentally phobic. Sedation is an extremely valuable tool in the management of anxious and phobic patients and for difficult or unpleasant procedures.

The issues raised in this survey are important both for the dental profession and the general public. If anaesthetists have such concerns about the use of sedation by dentists, there must be a case for change in the way dentists who are carrying out such procedures are trained and assessed. From this study it would seem that greater clarity is needed in the understanding of the term 'conscious sedation' as compared with 'deep sedation'. While conscious sedation as defined by Poswillo[2] has an excellent safety record, straying into the realms of deep sedation may be fraught with difficulties and endanger patient safety.

The availability of appropriate training courses for dentists interested in sedation must be considered. The present system produces a two-tier service of those attending a short course with no hands-on experience working alongside those with an in-depth knowledge and considerable hands-on experience having completed a diploma or MSc in sedation. There is a need for wider availability nationally of suitable courses such as the core sedation course provided in Newcastle and London. This course gives a sound theoretical basis from which to expand on sedation techniques, along with adequate hands-on experience. It must be considered essential that any dentist intending to practise sedation should have adequate hands-on skills as well as knowledge of the drugs involved, the physiology of sedation and the management of complications.

Those dentists who have completed the diploma or the MSc would be ideally placed to offer training in sedation, with access to practical experience, which must be seen as essential for the safe practice of sedation. Other dental schools may wish to reconsider their current position in sedation training for both undergraduates and postgraduates, in order to improve the current situation where there are small clusters of expertise.

The development of a recognised minimum training requirement for dentists wishing to practice conscious sedation would be of great value in reassuring anaesthetists and the general public of our competency in this field of care.

CONCLUSION

It is of concern to the dental profession that a significant number of anaesthetists do not feel that it is appropriate for dentists to be administering even the simplest methods of sedation. At present there are no clear, recognised guidelines as to the level of formal training required for the practice of conscious sedation by dentists. As a result of this study it is apparent that there is a need to reconsider the current practices in dental sedation in Scotland and the rest of the UK.

It is widely predicted that the use of conscious sedation is to be promoted in favour of the use of general anaesthesia in dental practice. It is in the interests of the dental profession and the public to ensure that those choosing to practice sedation do so safely by following recognised guidelines in the training and practice of sedation and that these guidelines are standardised and regulated in order to maintain standards.

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Appendix 1 Questionnaire — the use of sedation by dentists

1 It is appropriate for appropriately trained dentists to administer sedation using

	In dental practice?	In hospital?
IV midazolam as a single agent	Yes/no	Yes/no
IV propofol as a single agent	Yes/no	Yes/no
Midazolam and fentanyl IV	Yes/no	Yes/no
Other dual IV drugs	Yes/no	Yes/no
Nitrous oxide/oxygen inhalational sedation	Yes/no	Yes/no

2 Anaesthetists should take on more responsibility for providing sedation for dental treatment?

Strongly agree Agree Unsure Disagree Strongly disagree

3 It is realistic in service terms for anaesthetists to provide all sedation for dental treatment?

Strongly agree Agree Unsure Disagree Strongly disagree

4 In view of the reduction in GA use in dental practice do you think that dentists should be trained to use sedation techniques instead?

Strongly agree Agree Unsure Disagree Strongly disagree

5 Should dentists be permitted to act as both sedationist and operator, assuming that they have the assistance of a second appropriate person?

Strongly agree Agree Unsure Disagree Strongly disagree

6 How many years have you been a consultant anaesthetist? .....

7 How many sessions each week do you provide GA for non-intubated chairside dental cases? .....

8 How many sessions each week do you provide GA for intubated dental/oral surgery day cases?.....

9 How many sessions each week do you provide intravenous sedation for dental/oral surgery patients?.....

Please add any comments you may have

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