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The cover photograph is scanning electro-micrograph of Fentanyl. It is reproduced with the kind permission of the National High Magnetic Field Laboratory, Florida State University.

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EDITORIAL



Welcome to 2010! No! You have not been too much at the Midazolam over the vacation. This Editorial is for once, not the work of our ever industrious SAAD President Nigel Robb. As you may not have noticed since we reinvigorated the Digest, we now have an Editorial Board rather than a single Editor, so my turn has finally arrived to occupy this spot.

Looking through the current issue, I see that it is a record 88 pages, with a diverse range of articles so it is especially hard to pick out any plums from such riches! As you can see, we continue to work our Visiting Professor Peter Milgrom hard and he has contributed to two papers in this Journal. I was particularly interested in the account of the development of a UK version of CARL. CARL (Computer Assisted Relaxation Learning) is a freestanding computerised, exposure-based therapy program for the treatment of dental injection fear, created by Professor Milgrom and his colleagues at the University of Washington in Seattle, and now developed for the UK in conjunction with Carole Boyle and Tim Newton from King's. Although the number of cases described in this pilot study is currently low, it does seem to have had very positive benefits for the phobic patients who have taken part. I am also proud to commend to you the SAAD Student Essay Prize-winning paper, from Sameer Patel, a former Bart's and The London student!

In his Editorial last year Nigel referred sadly to the occasional inter-professional bickering that has let down the cause of sedation in the UK, and our need to pull together to advance the safety and efficacy of pain

control in dentistry. I would like to refer here to another interest close to my heart, which I feel is equally if not more important in ensuring that sedation in the UK continues to advance. Apart from the ADA, the two bodies in the UK that are most concerned with sedation are SAAD and the DSTG, the Dental Sedation Teachers' Group. Although it has broadened its remit somewhat, the DSTG exists primarily to support the teaching of sedation to undergraduates within the UK university-based dental schools. SAAD likewise has as its primary role the provision of its world-renowned postgraduate courses.

As someone who has directed undergraduate sedation teaching for some years now within a London dental school, I have found that students almost invariably show a great interest in sedation and take to the limited experience we are able to give with great enthusiasm. To be honest, considering they are in their final 12 months of qualifying, when all extraneous teaching might be considered by them to be a distraction, and that sedation is hardly a mainstream area or essential to pass Finals, this is particularly revealing and heartening. However, I think we have been missing a trick over the years, since I suspect few, having left for vocational training, actively pursue and nurture this awakening of interest in sedation.

I was particularly pleased, therefore, when SAAD Council recently agreed to support up to two final-year students from each UK dental school to attend the SAAD Annual Conference at a much reduced rate. SAAD has for many years offered a prestigious student essay prize, which has included in its 'benefits' an invitation to attend the Annual Conference, but this has limited numbers of entries each year and only one winner. I picked out a total of only two students at the 2009 Conference, but I hope that in 2010 we will see all the UK dental schools taking up this most enlightened offer, which would mean a very significant lowering of the average age of the attendees at the Conference! I would suspect that over the years a fair proportion of such attendees might take up membership of SAAD and that such action might well help to sustain their interest in sedation from their earliest days in practice. For sedation to have a future we need to sustain this interest clearly awakened at dental school and onward through VT into everyday general practice. ■

Chris Mercer

WHAT'S NEW IN PAEDIATRIC CONSCIOUS SEDATION IN DENTISTRY?

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Children undergoing dental procedures are often frightened and may even be unco-operative. This anxiety may be worsened by parental anxiety, unfamiliar environments, and the anticipation of pain from the procedure itself. Paediatric conscious sedation, in the hands of the trained and skilled practitioner, remains one of the valuable options available to treat anxious children safely and effectively.

Paediatric sedation is one of the fastest-growing areas in anaesthesia care, and has become an important option in treating anxious children outside the operating room. Worldwide there is renewed interest in paediatric sedation, both for medical and dental procedures. Children probably represent the highest-risk, lowest-error tolerance group, because of the unique differences between adults and children. The demand for sedation for paediatric dental procedures outside the operating room has and will increase.

The need to provide some form of behaviour management, analgesia, amnesia, sedation, to prevent and treat fear and anxiety has resulted in the proliferation of many drugs, alone and in combination – outside the operating room. Polypharmacy has become commonplace. This has led to renewed interest, especially amongst hospital-based practitioners, in paediatric sedation as an alternative to general anaesthesia. Paediatric sedation is fast evolving as a subspeciality.

The term procedural sedation and analgesia is widely used, and practised by a diverse group of sedation practitioners¹. It must be noted that this term may include our understanding of the definition of conscious sedation² but procedural sedation may also mean deeper levels of sedation¹.

With the practice of paediatric sedation we, as practitioners, need to ask ourselves: is it necessary to sedate the child, are there any contra-indications, who

should do the sedation, which technique is appropriate, do we have the ability to rescue the child if necessary, do we have back-up systems, and would general anaesthesia not be a safer, more reliable and preferable option?

Lowrie et al³ define paediatric sedation services as the 'formal allocation of identifiable resources and providers' in order to provide scheduled sedation for children at various locations outside the operating room. A wide variety of subspecialties are therefore involved in paediatric dental sedation, using different drugs and administered by different routes, and calling this procedural sedation. There is some disagreement on who should be the sedation provider, the drugs to be administered, the techniques employed, the practice settings, and what support staff should be involved. Unfortunately, few institutions have dedicated and structured paediatric sedation services and training programmes in spite of the recommendations from various organisations in this regard⁴.

Training in paediatric sedation services remains a major obstacle, with few centres providing structured paediatric sedation training, let alone structures for the maintenance and update of competencies at all levels. A system is needed that can accredit individual sedation practitioners, and training must be expanded to include other healthcare professionals in order to meet this growing demand for sedation services. The absolute crux in training remains how to rescue a patient: one can teach and test on many things like safety precautions, risks, the airway, drugs, documentation and other basic principles, but this does not mean that a particular practitioner can safely manage the airway.

In a sense, avoiding a rescue situation is the ultimate goal, but sooner or later, rescue will be required and the best way to ensure that all practitioners know how to handle these possible emergency situations is to train and develop training.

REFEREED PAPER

A review of worldwide opinions and guidelines leaves us as sedation trainers with an important question. Who qualifies for sedation training, i.e. are non-anesthesiologists capable of providing safe sedation to children?⁵ It is accepted worldwide by trainers in conscious sedation that all health care practitioners, not only anaesthetists, need to be trained as paediatric sedation providers to meet the growing need. Wooley⁶ et al recommended in their article, “paediatric trainees should receive sedation training”.

The question still remains who can do what as far as sedation techniques are concerned. The obvious answer to this question is that nobody should be involved in paediatric sedation without training. Two groups of sedation techniques⁷ – standard techniques and alternative techniques – are currently used in the UK for conscious sedation. This classification of sedation techniques gives us the opportunity to suggest who can do what. One can accept that standard techniques, e.g. nitrous oxide/oxygen or oral/transmucosal drugs, are safe and effective for use by non-anaesthetists, but what about the use of titrated, intravenous midazolam, which is a standard technique, in children? Robb et al⁸ report that a large number of dentists are already providing dental treatment using paediatric conscious sedation. Rosen et al⁹, after studying the results of various studies on the use of intravenous midazolam for paediatric conscious sedation, come to the conclusion that the ‘safety and tolerability profile of midazolam in paediatric patients is comparable or superior to that observed in adults’. This is an interesting and very important statement.

The issue of a sedation provider becomes even more complicated with the use of alternative techniques in paediatric dentistry. It is not the purpose of this article to debate whether it is appropriate or not. Alternative techniques are used by anaesthetists and non-anaesthetists, and we need to address this issue to make the techniques used safe. My concern about this is whether we always practise conscious sedation.

The question often asked is, can conscious sedation be done with combinations of drugs? Why is it necessary to combine drugs? Is the practice safe? Conscious sedation with combinations of drugs is possible, but not in all children, and it should be done by an experienced sedation practitioner. It is probably one of the reasons why the use of the term procedural sedation has become commonplace. The success in achieving conscious sedation according to our understanding of the definition

of conscious sedation in the UK depends on various factors, e.g. age of the child, previous traumatic experiences, extent of surgery, behaviour management techniques, and experience of the sedation practitioner. It is, however, a misconception that complicated multi-drug sedation techniques should always be used.

As the use of combinations of drugs is becoming more popular and training in alternative techniques in the UK is under debate, it is necessary to say a bit more on this issue. The use of parental drug combinations, outside the operating room, for paediatric sedation remains controversial in some centres. Research to find safe and effective combinations is crucial. The patient profile in South Africa, especially in dentistry, is diverse and tends towards an overload of disadvantaged individuals. Multiple extractions and fillings in dentistry are commonplace. To treat such children under standard sedation techniques, i.e. nitrous oxide and oxygen, is extremely difficult, and the waiting lists for general anaesthesia are extremely long. This has led to research to develop various combinations of drugs for paediatric sedation. The setting where such sedation takes place will play an important role in the safety of sedation practice. In a sedation unit or facility outside the operating room that meets all the requirements for safe sedation practice, a low incidence of adverse events and complications can be predicted. If those requirements are not met, and robust planning and rescue systems are not in place, the outcome could be disastrous.

There are not many publications available on the use of combinations of drugs for paediatric intravenous conscious sedation in dentistry. Robb et al¹⁰ published on the use of drugs such as ketamine, midazolam and fentanyl. The authors came to the conclusion that combinations of drugs can be used safely in children outside the operating room. Roelofse¹¹ reported on the issue of multiple drugs for paediatric conscious sedation in dentistry in children aged 3–10 years of age after a pilot study. It is stated in the article that sedation practitioners must not always blame drugs for adverse events, as risk may be increased with inexperienced sedation practitioners, inadequate pre-sedation assessment, secretions, water from the drill, depression of the chin and the position of the head – the human factor may play a very important role in the incidence of adverse events. Averley et al¹² compared the efficacy of a combination of intravenous midazolam with inhalation agents to midazolam alone. Their study clearly shows the value of combination techniques for paediatric conscious sedation.

This brings us to the issue of which combinations of drugs are safe for paediatric conscious sedation in dentistry. This will depend on many factors, e.g. age of the child, experience of the sedation practitioner and the setting where sedation takes place. Within this framework we can look at combinations of drugs – if appropriate – that exclude the use of opioids, and those that include the use of opioids. Ultra-short-acting opioids, used with discretion, can play a vital role in paediatric sedation for painful procedures, provided that there is an indication to use it, and drugs are titrated to effect. It is believed that non-opioid analgesic drugs, e.g. intravenous paracetamol, ketamine, and non-steroidal anti-inflammatory agents, e.g. ketorolac, will, however, assume a future key role as analgesics during paediatric sedation outside the operating room.

Alfentanil, sufentanil and remifentanil¹¹ are used either for bolus administration or as part of an infusion technique. In a research study¹³ on 270 children under the age of eight years for paediatric dental sedation, a combination of propofol, ketamine and alfentanil was used. All vital signs remained stable – no complications were encountered. It was concluded that an intravenous bolus dose of 1–2 µg kg⁻¹ alfentanil, titrated, is safe and effective in children. When used as a bolus dose, alfentanil should be given two minutes before the expected painful stimulus. When used as an intravenous infusion, and in combination with other drugs, a maximum dose of 10–12 µg kg⁻¹h⁻¹ is recommended. It is interesting that evidence-based studies^{14,15,16} recommend bolus doses of alfentanil in children from one month to 16 years as 3–5 µg kg⁻¹h⁻¹. These doses are high; when children are stimulated during the procedure we usually do not see respiratory depression. When in the recovery room, without stimulation, the effect of opiates, especially with high doses, may be disastrous. The analgesic effects of sufentanil, when combined with other drugs in children under 20kg, are being assessed in sedation for painful dental procedures. No adverse events or escalation in care have been seen in any of the 300 children treated (in conversation with L. Smit, DA, June 2009).

The age at which a child is considered to be safe for combined drug techniques for conscious sedation, and not deep sedation, is open to debate. If the idea of the sedation practitioner is to target immobility then this will lead to unpredictable levels of sedation, and an increase in complications¹⁷. Roelofse¹¹ in his pilot study of 154 children aged 3–10 years, studied the incidence of oxygen saturation drops (below 92%) during conscious sedation

for dentistry. In children under 5 years 17% of children had a drop in oxygen saturation below 92%, as compared with 3% in the group 5–8 years, and none over 8 years. Interestingly, all the drops in saturation levels were restored to normal with either extension of the head (airway management) and release of depression of the chin¹¹. This study, although small, shows clearly that the smaller/younger child is a higher risk for using combination techniques.

One would like to see more studies regarding adverse events with combined drug techniques. Cravero et al¹⁸ reported on the incidence and nature of adverse events during paediatric sedation for procedures outside the operating room. A total of 26 institutions submitted data on 30,037 sedations. Various procedures were done, 1.1% of them dental procedures. Serious adverse events were rare, with no mortalities. However, oxygen desaturation, stridor, laryngospasm and vomiting did occur, all potential disastrous complications. Cravero et al¹⁸ reported that their data indicate that paediatric sedation for procedures outside the operating room is unlikely to yield serious adverse events in ‘institutions with highly motivated and organized sedation services’. This study supports the idea of a dedicated sedation unit for children.

To find an acceptable paediatric sedation model that suits every case and sedation technique is difficult. Sedation provider model services outside the operating room are in demand inside the hospital environment, in the office/surgery, or in other facilities that meet all the requirements for safe sedation practice⁴. The following sedation provider models are available and can be used:

- The sedation unit model inside the hospital environment is probably the best and safest model available for alternative techniques. In our unit we have available nitrous oxide/oxygen sedation, nitrous oxide/oxygen and sevoflurane, and combinations of drugs as options for sedation for children. Our unit is next to the operating theatres and if there is an escalation of care, e.g. general anaesthesia for a failed sedation, then this option is available. However, this model alone cannot meet the increasing demands for paediatric dental sedation.
- The nitrous oxide/oxygen operator/sedationist model for paediatric sedation in appropriate primary care settings and in hospitals⁶. This is an excellent model and everybody doing paediatric dental sedation should be trained in this technique.

REFEREED PAPER

- The mobile sedationist model outside the hospital, a model that is becoming very popular, but one that is also highly controversial depending on the sedation technique used. Paediatric sedation is administered in the surgery of the dentist by the operator/sedationist (standard techniques) or a dedicated sedation provider for alternative techniques. Treatment in the dental surgery gives the dental practitioner the opportunity to do procedures in his/her own rooms in a familiar environment with the ready availability of specialised equipment. This is a cost-effective approach as it avoids the add-on costs generated when such procedures are performed in hospital operating rooms. The surgeries must meet all the criteria for safe sedation practice. This development in paediatric sedation services makes structured training in specific paediatric sedation techniques even more crucial.
- The sedation unit model in facilities previously used for the administration of general anaesthesia in the UK. They are probably the best alternative for sedation outside the hospital environment.

Probably the single most important aspect of any successful sedation technique for children is to gain their trust. Treatment of children is challenging as past traumatic experiences with e.g. general anaesthesia may make them extremely anxious. All sedation techniques must include the use of behavioural management techniques. There is no reasonable chance of success in children without a sympathetic, understanding and patient approach.

This leaves me with the 'dos and don'ts' of paediatric sedation, whether one practises standard or alternative techniques¹⁹. If one cannot comply with the following, one should not be doing paediatric conscious sedation in dentistry. Don't give sedative drugs at home before the dental procedure. A careful, meticulous pre-sedation assessment to identify risk factors is crucial for the safety of the child. An airway examination remains one of the most important approaches to safe paediatric sedation practice. It is essential that the child must be evaluated to exclude anything that may compromise the airway. See that children are fasted, and give fasting instructions (excluding nitrous oxide/oxygen inhalation sedation). A sound knowledge of the pharmacokinetics and pharmacodynamics of drugs used, and the possibility of drug interactions, is mandatory. It is estimated that children are increasingly taking herbal and homeopathic

medication²⁰. This should be addressed at the preoperative examination.

Paediatric conscious sedation is all about skills and knowledge, also updating knowledge, and the ability to rescue. This means that appropriate training in specific techniques should be mandatory. We see this advice in all the sedation guidelines; maybe it is time to implement it.

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DEVELOPMENT OF A UK VERSION OF CARL: A COMPUTER PROGRAM FOR CONDUCTING EXPOSURE THERAPY FOR THE TREATMENT OF DENTAL INJECTION FEAR

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Background

A large proportion of adults in the United Kingdom are afraid of dentists¹. Approximately one in four adults in the UK delay seeking help for a painful dental condition as a result of their dental fear². The prevalence of dental anxiety has not changed markedly in the last 30 years, in spite of more modern and less painful technology. Psychological services for fearful dental patients are not widely available³ despite the finding that behavioural treatments for fear and phobia are very successful. The therapy most commonly used in the treatment of any phobia is graded exposure. Considerable evidence supports this approach⁴. However, in the absence of an adequate workforce to provide such services, access is poor and treatment costs are high. Early successes with tape-recorded voice and videotape exposure therapy⁵ led to the recent introduction of computer-guided exposure therapy in which computers helped the patient create an exposure hierarchy,

instructing him/her to imagine hierarchy situations, relax, plan and do homework, and rate anxiety during each task done⁶. Advances in technology have expanded the value of computers in exposure-based therapy^{6,7}.

CARL (Computer Assisted Relaxation Learning) is a freestanding computerised, exposure-based therapy program for the treatment of dental injection fear, created by Professor Peter Milgrom and his colleagues at the University of Washington in Seattle⁸. CARL presents to the patient a videotaped exposure hierarchy for dental injection fear, and presents scripts to a dentist or hygienist to use while working with a patient. CARL is self-directed; the program itself trains the user both how to use it and how to complete behavioural assessment tests. CARL registers subjects, trains them to do physical and cognitive relaxation and graded exposure, and gives feedback on the helpfulness of each therapy component. CARL uses data entered by the patient to direct and control the exposure of each individual.

As part of a larger randomised controlled trial⁹ CARL's effectiveness was evaluated in 144 adults. Dental anxiety scores fell significantly compared with baseline at follow-up 12 months later. Eighty-nine (69%) had visited the dentist since completion of the study. The automated therapy was clearly effective. CARL was originally devised for patients in North America and the current investigators have devised a UK version reflecting different practices and terminology. The purpose of this open trial was to make a preliminary investigation of the effectiveness and usability of CARL-UK.

SAAD funded a project to adapt and pilot test a version of the CARL program for United Kingdom patients¹⁰. The filming was carried out in the Department of Sedation and Special Care Dentistry and involved a dentist and an actor as the anxious patient (Figure 1).



Figure 1. CARL-UK - filming

Aim

The aim of the project was to evaluate the usability/ functionality and patient acceptance of CARL-UK in an open trial in individuals with severe dental anxiety.

Method

Researchers at King's College London Dental Institute evaluated CARL-UK in collaboration with the original developers of CARL at the University of Washington. The usability and acceptability evaluation followed the general guidelines suggested by Foster and Nash¹¹. The sample comprised 10 English-speaking patients in the Department of Sedation and Special Care who reported fear of the dentist and had a score of greater than 37 on the Dental Fear Survey¹². Preliminary data from patients attending the department suggested that 95% of all patients scored above this cut off, the average score being 69 (SD 18)¹³. Individuals with co-morbid psychiatric conditions such as mood or anxiety disorders were excluded. The sample included both men and women.

Patients attended at weekly intervals to use the program on a dedicated laptop computer in the Department of Sedation and Special Care Dentistry. Progression through the program was dependent on individual patients, their anxiety and how frequently they practised the relaxation techniques at home. There are seven steps of self-exposure to dental needles (Table 1), ending with

Table 1. Content of the exposure hierarchy segments – UK version

Segment 1	The dentist explains local anaesthetic to the patient, shows the patient the syringe, and explains the reason for the length of the syringe (to see and reach the site of the injection).
Segment 2	The dentist discusses needles, that they come in an individual sterile package, the length, the flexibility, the need only to insert the top of the needle a short distance.
Segment 3	The dentist discusses topical anaesthetic with the patient. Topical is applied to the patient's tongue to demonstrate its numbing actions. The patient demonstrates the ability to breathe and swallow while numb.
Segment 4	The dentist applies topical anaesthetic to the area in which the injection will be given, and demonstrates to the patient that the area is numb by touching the tissue at the site and on the opposite side of the mouth.
Segment 5	The dentist rehearses an actual injection with the patient, but leaves the cap on the needle, so that it is not visible.
Segment 6	The dentist rehearses an actual injection with the patient without the cap on the needle, but the patient is not actually injected.
Segment 7	The dentist administers the patient an infiltration injection of local anaesthesia.



Figure 2. CARL-UK - patient receiving an injection

an injection (Figure 2). The patients watched each sequence, which range from one to three minutes in length. At the end of each section they were asked to rate their anxiety on a scale of 1 to 9, with 1 being 'not at all anxious' and 9 being 'extremely anxious'. Only when the sequence was viewed with low anxiety (a score of 4 or less) were they able to move on to the next section. The program is designed to time out after 45 minutes of use however it allows the patient to finish the sequence he/she is on before timing out. Patients will be able to work with the program for up to nine visits. From the American work it had been established that most people take one to two visits to complete.

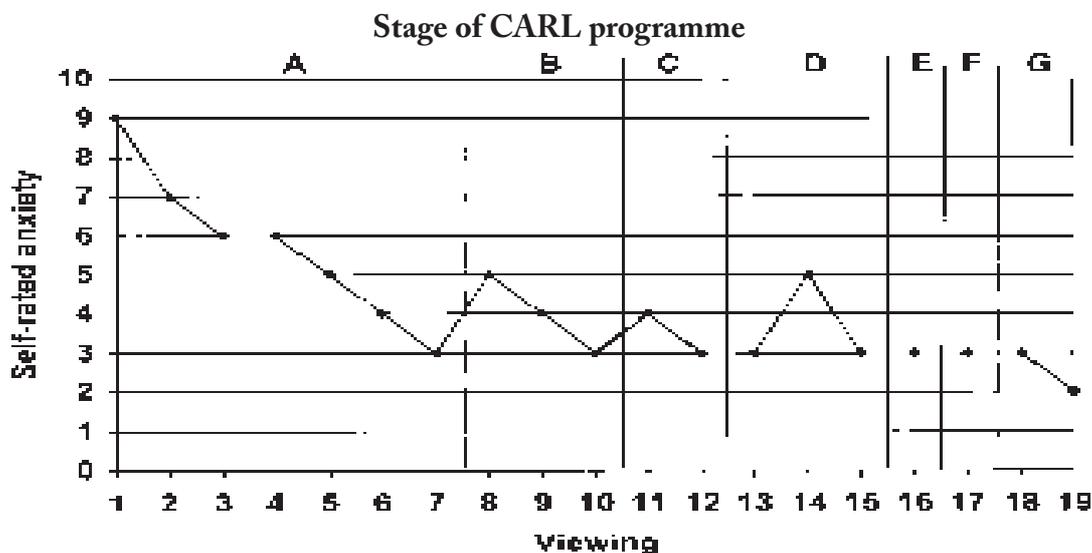
Post treatment the 10 patients and any dropouts were interviewed about the ease and efficiency of their use of CARL-UK and the electronic automatic record of each patient's use of the program.

Results

Ten patients were recruited to the initial evaluation of CARL-UK. All scored over 19 (out of 25) on the Modified Dental Anxiety Scale (MDAS), which indicates a phobic level of dental fear, and all scored 5 out of 5 on the fear of needles item on the MDAS. Additionally, one patient was recruited to the study but refused to participate, because she was too anxious to watch the videos. Patients generally took no longer than three one-hour sessions to complete CARL-UK, with four completing the program within one session of one hour. All patients that started the program completed it and were able to observe the videos without feeling anxious, though they may have required more than one viewing before their anxiety level had reduced to a satisfactory level. However, no patient felt able to receive a dental injection solely after watching the video materials, though all went on to receive in vivo graded exposure. This involved working with a psychologist and dental therapist in a dental surgery to repeat the seven steps in person.

Participants rated the program very positively using a specific measure (the Treatment Evaluation Inventory). They were also interviewed and felt it was a useful way to introduce the idea of graded exposure. Figure 3 depicts one patient's progression through the program. This patient was a 20-year-old female, whose self-rated fear of needles prior to CARL-UK was 10 (on a scale of 0 to 10 where 10 is maximum anxiety). She undertook CARL-UK over three sessions. At the end of the graded

Figure 3. Graph showing a patient's progress through CARL-UK



exposure her self-rated fear of needles was 4 on the same 10-point scale. As can be seen at the first stage, the patient's anxiety is very high, but declines with repeated viewings of the first video. Subsequently she found observing the videos easier at each successive stage. At the end of the program her overall rating of CARL-UK was 'Very Good' – the highest rating possible.

Conclusion

We successfully devised and pilot tested a computerised form of cognitive behaviour therapy for individuals with extreme fear of dental injections. This program provides a useful introduction to the process of graded exposure to the feared stimulus, as a supplement to face-to-face cognitive behaviour therapy. It also provides data that will assist in planning a future larger clinical trial.

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THE SAFETY AND EFFICACY OF INTRANASAL MIDAZOLAM SEDATION COMBINED WITH INHALATION SEDATION WITH NITROUS OXIDE AND OXYGEN IN PAEDIATRIC DENTAL PATIENTS AS AN ALTERNATIVE TO GENERAL ANAESTHESIA

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Introduction: Conscious Decision¹ was published in 2000 by the Department of Health, effectively ending the provision of dental general anaesthesia (DGA) outside the hospital environment. Other aspects of dental anxiety and behavioural management and sedation techniques were encouraged before the decision to refer for a DGA was reached. Although some anxious children may be managed with relative analgesia (RA), some may require different sedation techniques for dentists to accomplish dental treatment. Little evidence has been published in the UK to support the use of alternative sedation techniques in children. This paper presents another option using an alternative conscious sedation technique.

Aim: to determine whether a combination of intranasal midazolam (IN) and inhalation sedation with nitrous oxide and oxygen is a safe and practical alternative to DGA.

Study design: a prospective clinical audit of 100 cases was carried out on children referred to a centre for DGA.

Method: 100 children between 3 and 13 years of age who were referred for DGA were treated using this technique. Sedation was performed by intranasal midazolam followed by titrating a mixture of nitrous oxide and oxygen. A range of dental procedures was carried out while the children were sedated. Parents were present during the dental treatment. Data related to the patient, dentistry and treatment as well as sedation variables were collected at the treatment visit and a telephonic post-operative assessment from the parents was completed a week later.

Results: it was found that 96% of the required dental treatment was completed successfully using this technique, with parents finding this technique acceptable in 93% of cases. 50% of children found the intranasal administration of the midazolam acceptable. There was no clinically relevant oxygen desaturation during the procedure. Patients were haemodynamically stable and verbal contact was maintained throughout the procedure.

Conclusions: in selected cases this technique provides a safe and effective alternative to DGA and could reduce the number of patients referred to hospitals for DGA. It is recommended that this technique should only be used by dentists skilled in sedation with the appropriate staff and equipment at their disposal.

Introduction

Dental treatment is perceived as stressful for many children and a dental visit may invoke many anxieties. Often their coping skills are not sufficiently developed to deal with these situations and they experience fearful behaviour. These feelings may be enhanced if the child is referred to a DGA facility where there may be some psychological consequences for both the parents and the child. The consequences of dental fear in children include avoidance of dental care, behaviour management problems and deterioration of dental health and general health.

In the UK the only taught alternative to DGA has been the use of a titrated inhaled dose of nitrous oxide and oxygen, which can only be used in co-operative children who are old enough to understand the concept of breathing through the nose while keeping their mouth open. This has been found to be an unreliable technique in young children.

In the UK there has not been much evidence available for the use of alternative conscious sedation techniques in children. It is felt that fearful children should receive pre-medication to help alleviate stress and fear of dental treatment, to ease separation anxiety and to prevent post-operative psychological and behavioural problems in the child.

Manley et al² used intranasal midazolam successfully in the management of dental patients requiring special care and managed to avoid DGA in a number of cases. Paediatric conscious sedation is an area of great interest and on-going debate. For years paediatric dentists and anaesthetists have searched for the ideal sedative drug and route that would allow the safe control of the patients, provide adequate time for the treatment to be performed, and allow for the return to a pre-treatment level of consciousness by the time the patient is discharged.

Midazolam possesses many of the characteristics of an ideal sedation drug. It has anxiolytic, hypnotic, anticonvulsant, muscle-relaxant and anterograde amnesic properties characteristic of the benzodiazepines.

The question, however, remains: which is the best route of administering a sedative agent? Midazolam has been used for preoperative sedation by the intramuscular, rectal and oral routes. Disadvantages of these routes include painful injection, slow onset (oral and rectal routes) and delayed recovery (oral route). Nasal administration may present a viable, acceptable option of administering sedative drugs. This route has the advantage of rapid absorption of the drug directly into the systematic circulation, from an area rich in blood supply, without the disadvantage of passing through the portal circulation.

Drugs with a high hepatic clearance, such as midazolam, should have a much higher systematic availability following nasal, rather than oral, administration^{3,4}.

Numerous studies have since been done to evaluate the efficacy and safety of nasal administration of midazolam. Once administered intranasally, the level of sedation or co-operation may not be sufficient and a practical method of 'topping up' the sedation is necessary. Titrated nitrous oxide in oxygen until the patient is sufficiently co-operative is one possible method of achieving this. This could also extend the duration of the sedation and will also enhance the oxygen delivery to the patient.

Audit

On the basis of the referral form the patient was invited to take part in the audit. The patient must:

- have been referred for a dental general anaesthetic
- be between 3 and 13 years old
- be ASA 1 or ASA 2
- have no upper respiratory tract infections.

In addition:

- dental treatment required in only one or two quadrants with no complicated treatments
- dental treatment usually extractions, restorative, mixed extractions and restorative with or without preventive treatment.

Method

A letter of invitation along with an explanation was sent to the patients with an appointment for the procedure. Parents were required to confirm their appointments by telephone and discuss any concerns that they might have. Parents had the opportunity to cancel the appointment or insist on a general anaesthetic appointment if they thought that their child had behaviour management problems and would not cope with the sedation. The first 100 patients receiving intranasal midazolam took part in the audit.

An information leaflet was given to the parents explaining the technique, the significance of the technique and the advantages of the technique for their child. Information was also given regarding the off-licence use of midazolam and consent obtained for the procedure.

Data was recorded during the assessment and treatment of the patient. Patients were weighed, a medical and dental history and examination was performed and appropriate radiographs taken. Anxiety levels (using a 5-

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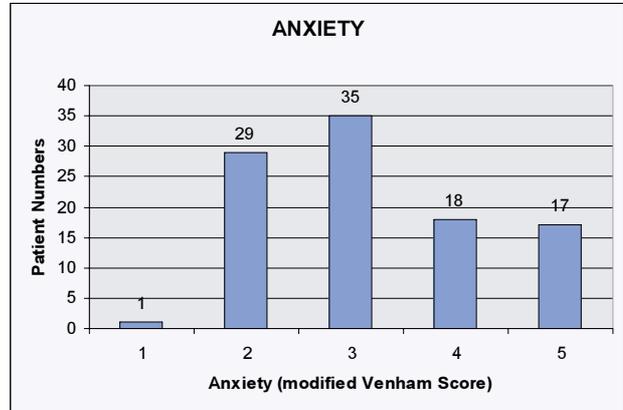
point modified Venham scale) and levels of co-operation were determined (4-point scale where 0 is non-co-operation, 1 = sit in chair but no oral examination possible, 2 = sit in chair and permit an oral examination, but not accepting the nasal hood, 3 = fully co-operative). Baseline oxygen saturation levels were measured and the patient was introduced to the nasal hood of the RA machine. Intranasal midazolam was administered at 0.2mg/kg via a perforated 22-gauge cannula with half of the liquid administered to each nostril. The child's reaction to the administration of the midazolam was recorded either as acceptable or not acceptable if there was crying, shouting or severe coughing or sneezing. About 5–10 minutes later RA was administered until an end point where dental treatment could begin. Topical bubblegum-flavoured benzocaine was applied and articaine 4% was infiltrated to provide local anaesthesia. Dental treatment was carried out while the patient was continually monitored both clinically and by pulse oximeter. The ODA/recovery nurse acted as independent assessor and monitored and recorded all necessary data. To determine the quality of sedation, a 4-point crying scale was used, a movement scale and a 5-point depth of sedation scale was used. An Ellis 5-point scoring system was used to assess patients' behaviour and ease of dental treatment carried out. Recordings of oxygen saturation and heart rate were recorded at five-minute intervals. After treatment the patient was transferred to the recovery room where the recovery nurse gave parents verbal and written post-operative instructions and assessed the patient for discharge.

A week later parents, who were present in the dental surgery throughout the treatment, were phoned and asked to answer questions regarding the treatment of their child. The first 100 cases of intranasal midazolam and RA were audited. The clinician worked as operator/sedationist and was experienced in the provision of conscious sedation.

Results

A total of 100 children were included in the audit, with 61 girls and 39 boys ranging from 3 to 13 years of age (median = 7 +/- 2.25 years). Body weight ranged from 12 to 48kg (26 +/- 7.42kg). ASA 1 accounted for 80%, while the ASA 2 group was almost entirely children with well controlled asthma.

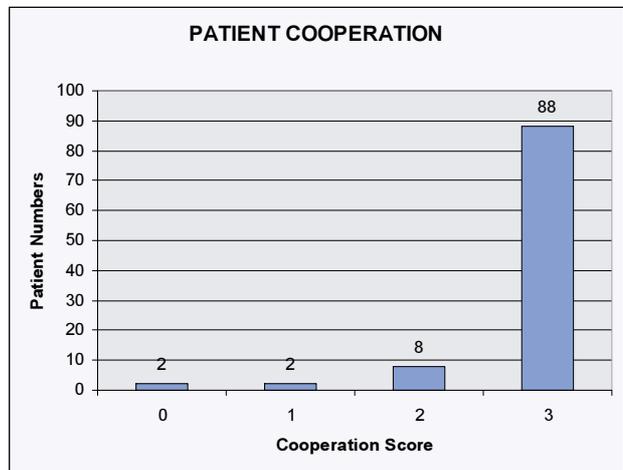
Pre-operative anxiety.



Patient anxiety measured on the modified Venham scale as below.

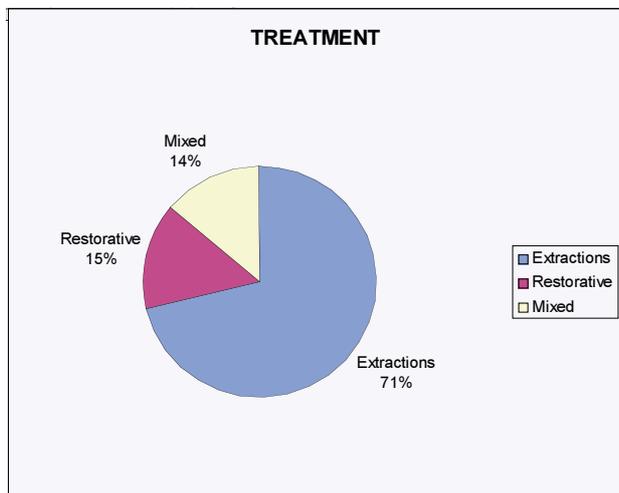


Preoperative co-operation patient co-operation was assessed:



- 0 = No co-operation at all – would not sit in the dental chair
- 1 = Patient would sit in the chair but would not allow an intraoral examination with a mirror and would not accept the nasal mask
- 2 = Would sit in the chair and allow an intraoral examination but would not accept the nasal mask.
- 3 = The patient sat in the chair, allowed intraoral examination and accepted the nasal mask – very co-operative.

Dental treatment carried out



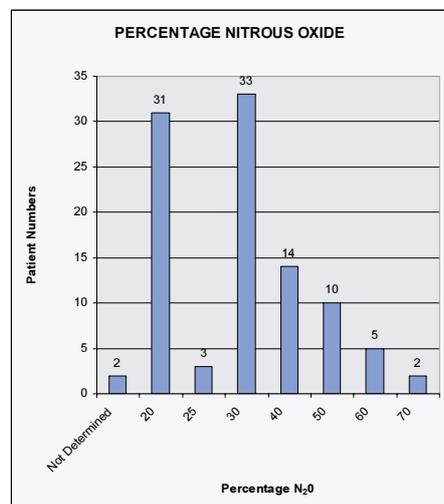
Most children (48) had only one tooth treated, 32 children had two teeth treated, and 13 had three teeth treated, with up to 4 teeth treated in 5 children. (2 not determined).

Acceptability of INM

50% of children found the technique acceptable, while 50% exhibited reactions like coughing, sneezing, crying as the midazolam went down the nose into the back of the throat. They complained of a stinging sensation, bad taste and some spat out the liquid instantly.

The duration of the dental procedure ranged from 15 to 35 minutes with the average being 21 minutes.

Concentration of N₂O used.



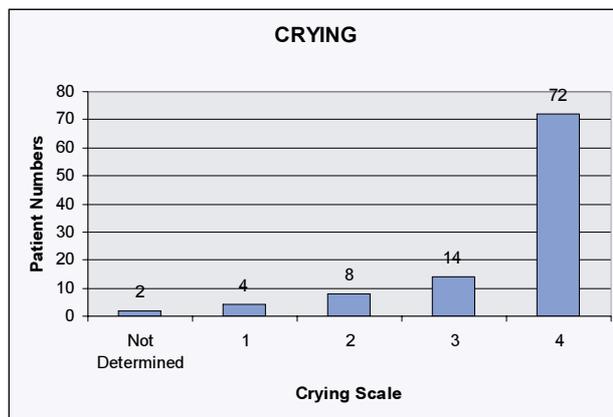
The range of N₂O used was 20%–70%.

The average N₂O% was nearly 32% with the median and mode being 30%.

Two of the four failures received partial treatment 60% and 70% N₂O respectively and the patients were not sufficiently sedated for treatment to be carried out safely.

Movement of patient

- 1 = Violent movement that interrupts treatment
- 2 = Continuous movement that makes treatment difficult
- 3 = Controllable movement that does not interfere with treatment
- 4 = No movement

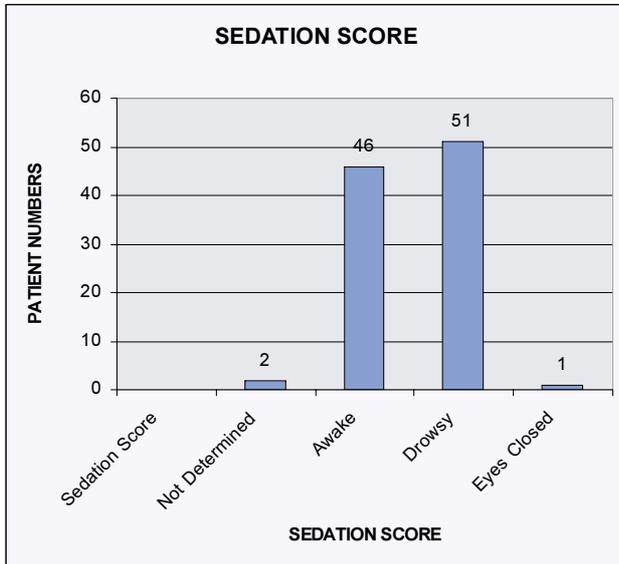


Crying

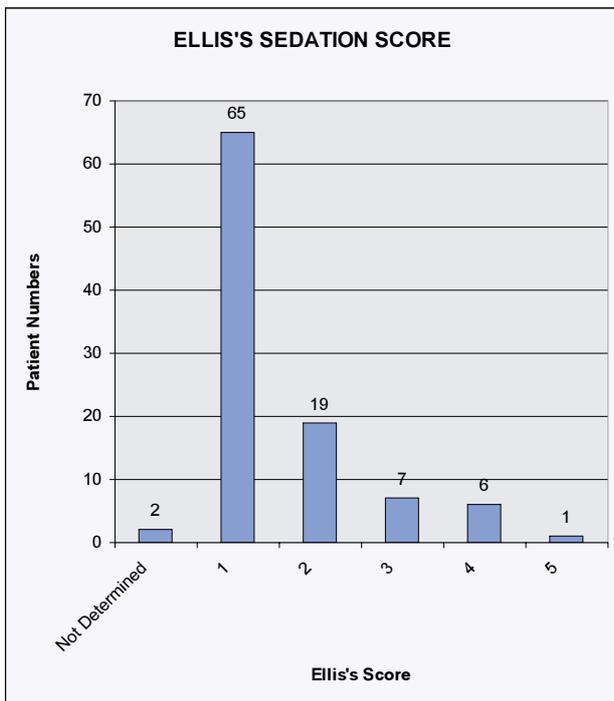
- 1 = Hysterical crying that interrupts treatment
- 2 = Continuous, persistent crying that makes treatment difficult
- 3 = Intermittent, mild crying that does not interfere with treatment
- 4 = No crying

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Sedation score



Ellis's sedation score



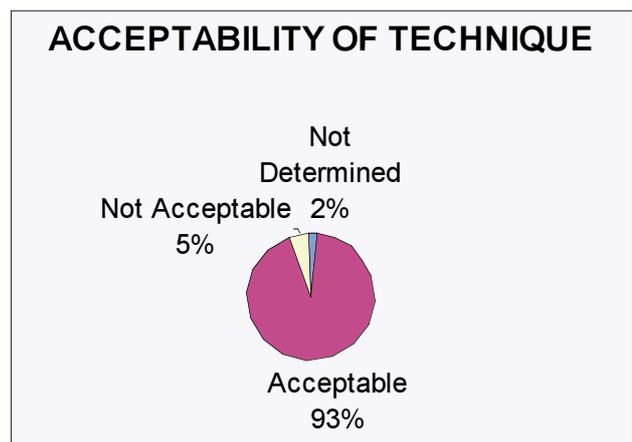
Ellis scoring system used to grade behavioural characteristics of patients under IN Sedation (1996).

- 1 = No uninvited limb movement. Total co-operation – no restlessness.
- 2 = Small amount of uninvited limb movement. Still total co-operation and no restlessness

- 3 = More uninvited limb movement. Small degree of restlessness and anxiety. Patient less co-operative. Still able to perform all dental procedures.
 - 4 = Considerable degree of limb movement. Perhaps unhelpful head movements. Poor co-operation . Patient quite restless and anxious. Able to perform only basic dentistry. Advanced delicate work not possible.
 - 5 = Restless, anxiety and limb movements severe. Impossible to perform any dentistry.
- Not Determined = too unco-operative

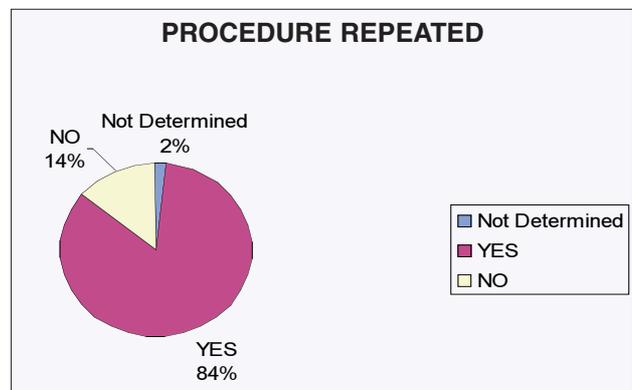
PARENT'S RESPONSE TO THE TECHNIQUE

Acceptability of technique



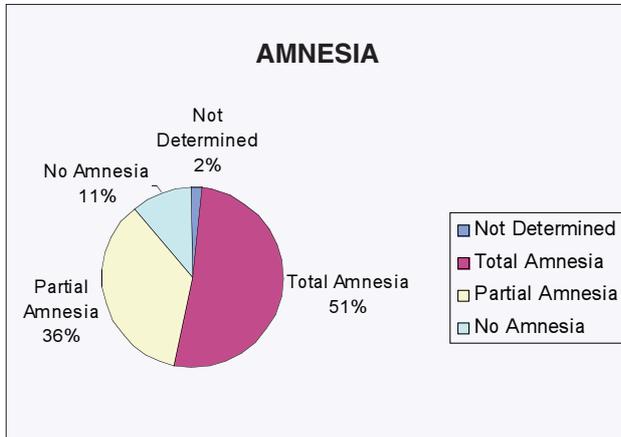
93% found it acceptable and 84% would like the procedure done this way again.

Repetition of Procedure



Those who did not like the procedure, did not like the intranasal squirting of midazolam or thought that their children would be more deeply sedated.

Amnesia



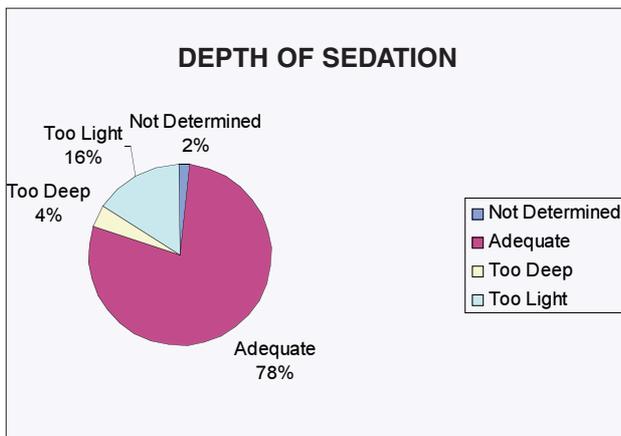
Nearly all remembered the squirting up the nose.

Very few remembered the intraoral injections, 51% had total amnesia.

What they tended to remember was the operator speaking about McDonalds.

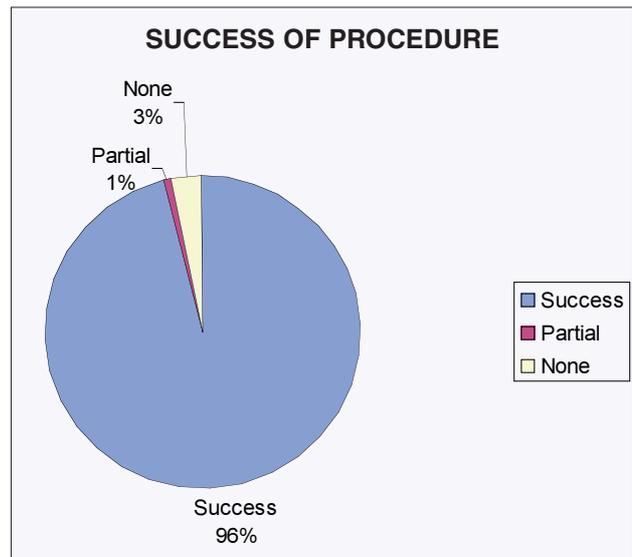
Those who did not have any amnesia were generally older than 6 years and had an average weight of 31kg (range 22 – 48kg) indicating greater volumes of midazolam used. There would be higher probability of the patients swallowing the solution that being absorbed through the nasal mucosa.

Depth of Sedation



Success of the procedure

The majority of the patients managed to have all of the proposed treatment performed, with 3 having no treatment at all, one having restorations carried out but had to return for the extraction under general anaesthetic.



Discussion

Following a review of the literature it was decided to use a 0.2mg/kg intranasal midazolam dose and the 5mg/ml injectable aqueous midazolam solution was used as it was easily obtainable (Roche®, Basle, Switzerland). Wilton et al⁵ could find no additional clinical benefit using a 0.3mg/kg dose, which required a larger volume and resulted in more coughing, sneezing and expulsion of the solution. Rey et al⁶ found that the 0.2mg/kg dose produced a rapid, non-invasive and safe preoperative sedation in pre-school children. Fuks et al⁷ found no statistical benefits of using the higher dose (0.2mg/kg and 0.3mg/kg) when sedating paediatric dental patients. Adequate sedation occurred more rapidly using 0.2mg/kg INM compared to 0.5mg/kg orally or 0.3mg/kg rectally in children⁸. Fukuta et al⁹ thought that the 0.3mg/kg would have resulted in a higher plasma concentration and therefore created respiratory depression; they therefore preferred the 0.2mg/kg dose. Because the first pass metabolism is circumvented using this technique, total drug dosage requirements were reduced. The effects of INM were consistent with other reports of rapid onset⁹ (5–15 minutes) and a short duration of effect (40–60 minutes).

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In the pilot study a 2ml syringe was attached to a blunt needle that was inserted into the top of a Xylocaine® spray nozzle. This created a fine spray when the plunger was depressed. Problems with leakage around the various joints, blockage of the nozzle, cross-infection and sterilisation concerns prompted us to use a perforated sterile venflon tube attached to a 2ml syringe that also created a fine spray. These were disposable and the plastic tube was called a 'tickly stick', which helped to create a playful atmosphere in the surgery while the child was acclimatising to the new surroundings. When half of the INM was administered to the first nostril the child would get such a shock and a swift switch to the other nostril was required to administer the rest of the solution. Often the movement of the child would cause spillage and leakage of the drugs – this amount could not have been determined.

INM has successfully been used in various forms in medicine and dentistry. It has been shown to be safe and effective when used for anxiolysis, conscious sedation and its muscle relaxant properties. Midazolam was not licensed for intranasal use in the UK. The 10mg in 2ml IV solution of midazolam was used. The clinician may, however, use it if he or she considers its use clinically justifiable, has written consent from the parent or patient and is aware of its current usage and of the literature available on the subject so that his or her actions are supported by the available evidence.

Concern had been raised by the lack of scientific data on the use of medicines in children. Studies throughout Europe have shown that health professionals use medicines that are either not licensed for use in children or used at a different dose, for a different indication, or by an alternative route from that recommended ('off-label')¹⁰. Two thirds of children in hospital and 90% of sick newborn infants receive medicines that are unlicensed or off-label. There is an urgent need for research and training in paediatric therapeutics. It is essential that children receive medicines that are safe, effective and of high quality. Medicines are clearly essential for the care of children and these medicines need to be tested scientifically as part of a controlled clinical trial¹¹. The alternative is for paediatric sedationists to continue to use medicines without an evidence base.

Disruptive behaviours, particularly from those lacking in co-operative ability, often are prompted by the need to protest about an unpleasant situation and the impulse to protect oneself from perceived danger. Such behaviours,

depending on the child's age and cognitive ability, should be seen as an attempt of the child to cope with a frightening situation. As many young children do not understand the need to sit still and keep their hands out of the operating field, many dentists find it necessary to use restraints to provide safe treatment. Various sheet-wrapping techniques, i.e. Papoose Board® or Pedi-wrap®, have been successfully used⁹. The mother and the dental nurse reassuringly held the child's hands during treatment. A mouth prop was also used to keep the child's mouth open so that treatment could progress efficiently. Painful procedures were always remembered as negative experiences and were associated with restraint¹².

It is important to consider as many aspects of behavioural control as possible before the decision to use restraints on children is reached and only with consent by the parents and only with the primary goal of preventing injury to the patient and staff. Restraint is not meant to be used as a form of punishment and must not be used solely for the convenience of the dental staff.

INM is not to be regarded as a sedative panacea for paediatric dental treatment because 50% of children found it an unacceptable route of administration by exhibiting crying, coughing, sneezing or combative behaviour. This was due to an unpleasant burning sensation plus a bitter taste, which has made this technique less than optimal. The burning sensation was thought to be due to the acidic pH of 3.5 of the injectable midazolam, which sensitised peripheral pain receptors in the distribution of the trigeminal nerve supply to the nasal mucosa¹³. Despite the stinging sensation of the irritant midazolam solution, 50% of children tolerated the administering of the drug while the other half found it unacceptable. This negative behaviour range varies in the literature from rare¹⁴ to 100% of patients¹⁵. An immediate burning sensation was described by some patients; this persisted for about five minutes. This was accompanied by mild to moderate inflammation of the nasal mucosa that persisted for up to one hour after the administration of the INM. Most of these children also complained of a bitter taste of the midazolam as it ran down to the oropharynx and came into contact with the tongue. The bitter taste was an inherent characteristic of midazolam.

An Accuspray nasal syringe (Bekton Dickenson®, New Jersey, USA) has been developed and it contains midazolam at a concentration of 10mg/ml in a phosphate buffer providing a pH of 5.8. The formulation contains 0.1% benzylkonium chloride preservative and EDTA

0.05% as a stabiliser. These chemicals were not expected to harm the nasal mucosa. The pH of 5.8 was achieved by using water-soluble betacyclodextrin, which acted as a solubiliser of the midazolam which is independent of the pH. It was non-irritating to the nasal mucosa and minimal absorption took place. In an experiment of 0.1mg/kg INM comparing this 10mg/ml solution to the traditional 5mg/kg aqueous injectable form, there was far less nasal irritation, far fewer patients complained of a bitter taste and there was a higher acceptability of the higher concentration formulation¹⁵.

Other institutions have found that the discomfort in some patients was so great that patients who had previously desired an alternative to injections later indicated that they would prefer the injection over INM drops. Lignocaine was then administered as a nasal spray prior to the INM and this technique was more tolerable to the patients¹⁶.

Most children experienced anxiolysis and some were euphoric and smiling when they inhaled the nitrous oxide mixture. None of the children fell asleep.

Most treatments were completed within 25 minutes of administration (90%). After 35 minutes of administering the drug, all treatments had been completed. A concentrated preparation of midazolam is available in the UK (40mg/ml) and its use may be more acceptable for children as small amounts of fluid would of necessity be required for the appropriate dose.

Dental treatment was limited to one or two quadrants for this audit. 85% of the children required at least one extraction with 29% requiring some form of restorative treatment. The majority (50%) required treatment on two or more teeth in that treatment session while 48% only required treatment on one tooth. Most teeth were extracted as a result of tooth decay and trauma to anterior deciduous teeth. Very few teeth were extracted due to orthodontic reasons. Many of the children seen had been experiencing dental pain and frequently draining sinuses were present from these decayed teeth.

The N₂O mixture enhanced the duration of action of the midazolam and this duration was well suited to the dental environment. N₂O was started at 20% and titrated from this level. In 31 cases it was not necessary to increase the level of N₂O and it could be argued that they may not have required any N₂O at all to complete the dental treatment. A total of 67 patients out of 98 who reached this stage received 30% or less N₂O (68.3%).

In this audit the 20% N₂O gave a relatively low baseline concentration where the concentration could rapidly be increased if required. The patient received the additional safety benefit of 80% O₂, which maintained a high O₂ saturation throughout the procedure with no instances of desaturation occurring before or during treatment. Hypnotic doses of midazolam could cause respiratory suppression; the simultaneous co-administration of N₂O in O₂, which is also a CNS depressant, could cause many clinicians to regard this as a 'deep sedation technique' bordering on a GA. Although N₂O is a CNS depressant, its respiratory effect is considered to be minimal¹⁷. Desaturation was defined as a fall of at least 8% of O₂ from baseline levels for at least 20 seconds. At no stage in any of the patients did we need to encourage patients to breathe (other than telling them to breathe through their noses) or use any techniques to open the airway because the patient maintained the airway even when dental work was performed on the mandibular arch.

The INM does not provide any analgesia and topical anaesthetic with local anaesthetic was used in all cases. In 90% of cases the local anaesthetic could be administered painlessly before the nasal hood had been placed on the patient's nose while in 10 patients N₂O was administered to reach an adequate level of sedation where an intraoral injection could be given.

Good rapport between the dentist and patient is essential to this process. The dentist must gain the child's trust and attention and the dentist must be sensitive to the mood and the expressions of the child. A total of 87 children did not have any significant movement that would interfere with treatment (88.8%).

Although some children exhibited some movement the treatment was still completed. Children, when they were under the influence of N₂O, often felt as if they were floating on a cloud and that their limbs became weightless and they were acting out this behaviour. Midazolam often causes the nose to experience itchiness and there was a tendency for the children to scratch their noses despite having a nasal hood covering their noses.

A total of 86 children did not cry or cried a little which did not impact on the treatment. Most of the time if crying did occur it was during or shortly after the administration of INM. Treatment was completed with difficulty in some children who cried persistently.

All patients except one were awake or drowsy. This patient closed his eyes and could open them when we

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asked him to do this. Eyes were slightly droopy, hand movements were slow and there appeared to be a delay between asking them to do anything and actually performing the task or trying to locate any dental treatment activity with their tongues. It was felt that the patients experienced more anxiety than sedation and verbal contact was maintained throughout with patients responding intelligently to questions asked. There were a range of emotions displayed; some feeling happy, relaxed, giggling and euphoric while some were clearly distressed and disinhibited.

In 91 of the 98 cases the patients were sufficiently co-operative to complete all dental procedures while some patients allowed only basic dentistry like a quick extraction to be performed due to excessive limb or head movements. These seven patients I would regard as displaying the 'disinhibitory effect' as they may have been slightly more settled initially but got more excited and agitated as time progressed and required higher levels of nitrous oxide to sedate them so that dental work could proceed.

Parents were invited to stay in the surgery for the duration of the procedure. It was felt that separation anxiety could be reduced and societal attitudes have changed towards increased parental participation during the child's dental experience. Parents were mostly inert and sat in a chair away from the dental chair (54%) while 45% were encouraging and supportive to their children and held their hand throughout the procedure. The fact that so many parents were inert could have been due to the fact that the children were sufficiently co-operative throughout the procedure that they did not feel the need to become actively 'involved' with the treatment. Some parents were clearly anxious themselves and did not want to observe the treatment directly but were content to listen to the treatment and often glanced up and offered encouragement to try to be supportive to their children.

Only 84% of parents would have preferred to have the procedure repeated, although the procedure was 96% successful. Parents found the procedure acceptable in 93% of cases. Parents were asked to find out what the child thought of the procedure during the days following the dental visit. It was difficult from the post-operative interview to ascertain how the child viewed the dental visit and it was only through the replies of the parents that this opinion could be determined. Possibly, a direct question to the child may have obtained more accurate information in this respect. It was not determined which mode of patient management the parents would prefer their children to have in the future if they preferred not to let their child

have INM. If a similar audit were to be undertaken in the future, this question may need to be addressed.

Although the same dose of midazolam (0.2mg/kg) was given to all patients, parents found the depth of sedation too light in 18% of cases and too deep in 4% of cases. This may have been due to the fact that less or more of the solution had been absorbed respectively, patients had inherent differing responses to the drug or the fact that different parents had varying expectations of the technique.

Total amnesia occurred in 51% of children and partial amnesia occurred in 36% of cases. The fact that the child did not remember the procedure may prevent psychological scarring in the event of a traumatic visit, but the disadvantage is the fact that these children may not develop a coping mechanism or strategy that would have helped them to cope with the following dental visit.

All patients were discharged within 30–45 minutes after the dental treatment had been completed. Patients had to have stable and satisfactory cardiovascular function with a clear airway. Patients had to be conscious with all their reflexes intact – the children were often given some Ribena® drink to improve their glucose levels and to assess their ability to swallow liquids. They were asked to identify some cartoon characters in pictures on the wall of the recovery room. Children had to be able to sit and walk unaided and the parent was present to escort the child home after receiving all the relevant post-operative instructions.

Some patients reported hiccups in the recovery room. Ataxia was evident up to +/- 20 minutes post-operatively. There were no allergic reactions and no post-operative nausea and vomiting in the recovery room.

A significant proportion (96%) of children referred with the request from their practitioner for DGA were able to complete treatment successfully without the need for recourse to DGA. Fuks et al⁷ used a similar technique – but used a fixed 50% N₂O concentration and used a Papoose Board® to restrain all their patients – and found that they obtained a 100% success rate using both 0.2mg/kg and 0.3mg/kg INM in a population of 30 pre-school children for dental treatment. This study was undertaken in a paediatric dental department in a teaching hospital and the dental treatment was performed by specialist paediatric dentists.

In the UK no similar study has been reported in children, in fact there was very little in the literature on paediatric sedation in children other than using N₂O.

Tyrer¹⁸ found that 75% of children referred for DGA could have had the treatment completed with local anaesthetic in a community dental clinic. The findings of this audit appear to support published evidence that the views and opinions of a dental professional influence parental choice in deciding upon whether or not they should opt for a DGA¹⁹.

Ultimately it is for dental practitioners to ensure that DGA is avoided wherever reasonably possible. Practitioners should actively discourage patients and parents from seeking GAs and wider use of alternative sedation techniques and skills should become available to further reduce the need for GA.

Conclusions

- Of the 100 children admitted to the audit we managed to complete all the planned treatment for that session in 96 cases, thereby in effect reducing the number of GAs by 96% in this group of selected patients initially referred for GA.
- This technique avoids the use of 'the needle' and thus reduces fear.
- It has marked amnesic properties.
- It has a high margin of safety, exhibiting haemodynamic stability at the dose that was used.
- The titration the N₂O permitted an adequate depth of sedation and anxiolysis so that dental treatment could be carried out safely.
- Verbal contact was retained throughout the procedure and the techniques we employed gave us a wide enough margin so as to make it highly unlikely that loss of consciousness would occur.
- The parents stayed at chairside throughout the procedure and they found the technique acceptable in 93% of cases and 84% said that they would like the technique repeated if given the same situation again.
- The main disadvantage of the technique is the fact that 50% of children experience distress at administration of the intranasal midazolam due to the low pH.
- Another disadvantage occurs in the heavier children who need larger volumes of INM where an immeasurable amount trickles into the nasopharynx and as it has a very bitter taste, is either spat out or swallowed.

This technique is a safe and effective way of providing paediatric dental treatment to a selected population of anxious patients and thereby avoids the need for dental general anaesthesia.

Conscious sedation for children should only be undertaken by teams that have training and experience in the case selection, behavioural management and administration of sedation for this age group, and in an appropriate environment²⁰.

It is important to remember that the use of sedative drugs in children enhances the coping strategy of the child at that visit, but it is not a substitute for behavioural techniques. It is important to interact with the child and not pass on the responsibility to the drug.

Suggestions for further research

A more concentrated solution, e.g. a 10mg/ml solution or more, to reduce the volume of solution required and then it could be administered in metered doses or even inhaled as in an asthma pump.

A buffered solution or in combination with a local anaesthetic spray to reduce the discomfort of the nasal mucosa.

Consideration could be given to a powder of midazolam crystals, which could be rubbed on the gingivae or under the tongue of children, with an enhanced taste so that sedation could be effortlessly administered.

Manufacturers might think about modifying the midazolam chemical structure to prevent amnesia in every situation so that patients may be able to develop coping mechanisms.

The development of a cheap, concentrated nasal spray of flumazenil, the benzodiazepine antagonist, to quickly reverse the sedative effects of the benzodiazepines without establishing venous access.

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IS NITROUS OXIDE A SAFE AGENT TO USE IN CONSCIOUS SEDATION FOR DENTISTRY?

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Nitrous oxide (N₂O) is a colourless, gas with a pleasant, sweet smell. It is the only non-organic compound (other than carbon dioxide) that has central nervous depressant properties and is the only inorganic gas used to produce anaesthesia. Historically, it has a high use in dentistry due to its anaesthetic and analgesic properties. There are, however, concerns regarding its safety to personnel and the environment. There have been restrictions in various countries including New Zealand and some states in the USA because of the potential harm that the gas could cause¹. The study presented in this essay aims to understand the properties of nitrous oxide and determine whether this sedative agent widely used in conscious sedation in the UK has significant harm associated with its use.

Conscious sedation is defined as 'a technique in which the use of a drug or drugs produces a state of depression of the central nervous system enabling treatment to be carried out, but during which verbal contact with the patient is maintained throughout the period of sedation. The drugs and techniques used to provide conscious sedation for dental treatment should carry a margin of safety wide enough to render loss of consciousness unlikely. The level of sedation must be such that the patient remains conscious, retains protective reflexes, and is able to respond to verbal commands².'

Nitrous oxide was originally used as a recreational analgesic, anaesthetic and sedative agent since it was discovered by Priestley in the 18th century and is credited as the first anaesthetic agent used specifically for the elimination of pain. It has been used for over 150 years as a pharmacosedative agent. In 1798, Humphrey Davy first identified the gas's possible uses when describing the effects of self-administration for toothache: '...pain always diminished after the first four or five inspirations... As nitrous oxide in its extensive operation appears capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place.' Over the following decades, the well-known effects of nitrous oxide were used for entertainment

purposes (as 'laughing gas'). It was almost fifty years later before nitrous oxide was used for pain relief for a clinical procedure (during the extraction of a wisdom tooth in 1844). The patient stated that they had been totally unaware of the procedure and that there had been absolutely no pain associated with it. In 1862, Joseph T. Clover introduced a mixture of nitrous oxide and oxygen (in an 80% to 20% ratio) in order to make the agent safer and more pleasurable. More recently, with the advent of local anaesthesia, nitrous oxide is more often used for managing apprehensive dental patients rather than pain. With the increasing use of nitrous oxide, guidelines for its use were also created, ensuring its safety and efficacy in current practice².

As the use of sedation has become more widespread, a clearer understanding of the ideal sedative agent has been developed. The ideal agent should have smooth induction characteristics to ensure the sedation progresses in an even way. The agent should also have anxiolytic and analgesic properties, as many patients who attend for sedation do so due to their anxiety of dentists – mostly due to the expected pain or loss of control. It is also important that it shows cardiorespiratory stability with low blood gas solubility. There should also be ease of titration to allow the sedationist to fully control the level of sedation the patient is under. In addition, it is important for the sedationist to use an agent that has rapid induction and recovery to allow for an efficient onset and the possibility of a rapid return to normal if need be. There must be no systemic toxic effects or effects on the environment. Nitrous oxide is a good anxiolytic agent (hence its widespread use in dentistry) and has analgesic properties. It is stable in terms of the cardiorespiratory system and offers low blood gas solubility. It does not bind to any molecules in the blood, allowing fast induction and recovery. Its weak potency means that titration is easier as an increase in the amount of nitrous given does not increase the effects by a large amount. There is some evidence, however, that there may be systemic toxic effects with prolonged use, and wide-scale environmental effects.

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There have been a number of recorded toxic effects of nitrous oxide, especially for those with chronic exposure. There are two main biochemical effects of nitrous oxide. In long-term exposure, nitrous oxide can cause oxidation of vitamin B12 and, as a result, can affect the function of methionine synthetase. Methionine is important in bone marrow metabolism and disruption within this enzymatic pathway can lead to transient bone marrow depression and pernicious anaemia. These findings were based on studies undertaken in a laboratory with animals under 24 hours of constant exposure to nitrous oxide. Much more important is the potential harm of repeated short-term exposure to nitrous oxide. Neuropathies resembling those in patients with vitamin B12 deficiency have been reported in dentists using nitrous oxide regularly and recreational users. This is probably due to the actions on methionine synthetase from exposure to high concentrations of nitrous oxide. Clinical personnel are exposed to much higher concentrations of nitrous oxide than found in the atmosphere, when nitrous oxide is used for clinical application². Cohen et al³ reported that dental teams are exposed to 2–3 times greater concentration of nitrous oxide than hospital personnel, which makes the dental team more vulnerable to nitrous oxide related hazards. This is especially true in dentistry as, with an open mouth, it is more difficult for a patient to create a sufficient seal over the larynx to expire through their nose, especially when under sedation. This means that inspired nitrous oxide is expired into the environment rather than returning to the scavenging units through nasal expiration.

There have also been some retrospective epidemiological studies that have shown that women working in operation rooms have a rate of spontaneous abortion 2.3 times higher but a cause and effect relationship has yet to be established³. Nitrous oxide is used extensively during labour, premixed 50% with oxygen as entonox, and has been shown to have no effects on the strength of the contractions and only causes foetal hypoxia if oxygen is at less than 20%, which is very rarely the case with the most common preparation of nitrous oxide and oxygen – ‘gas and air’⁴.

Rowland et al⁵ have shown that there is also an effect on general fertility in women who have chronic exposure to nitrous oxide. It has been postulated that nitrous oxide has an effect on the hypothalamic-pituitary-gonadal axis, especially with regards to the control of hormones that control the release of luteinising hormone. For each hour working in an unscavenged environment, there was a reported 6% reduction in the probability of conception during each menstrual cycle.

Bruce et al⁶ found that the incidence of audiovisual problems in personnel with chronic exposure to nitrous oxide is four times that of personnel with no exposure. These results have not been replicated in follow-up studies.

There is also controversy with regards to whether renal problems can be directly attributed to chronic exposure to nitrous oxide. It has been reported that there may be an increased incidence of renal stones in men and genito-urinary tract infections in women but the general consensus is that nitrous oxide has no effect on the renal system².

There is, however, more evidence to suggest that chronic exposure to nitrous oxide may cause liver problems. Yagiela⁷ states that chronic side effects of nitrous oxide are dependent on many factors apart from the degree and periodicity of exposure. He also found that liver problems are also associated with inactivation of methionine synthetase, diet (which aids recovery of the biochemical block induced by nitrous oxide) and natural variation in humans’ biochemical and tissue sensitivity to nitrous oxide.

It is important to note that all of the above potential side effects have conflicting literature and all are based on chronic exposure of dental staff. There is much less evidence to suggest that there are any long-term effects on the patients undergoing inhalation sedation. Babl⁸ studied the effects of high-concentration nitrous oxide (70%) in children undergoing emergency treatment and found no difference in side effects to patients undergoing sedation at 50% nitrous oxide. However, there were some adverse effects at both concentrations. Eight per cent of patients suffered mild symptoms, the majority experiencing vomiting and nausea. Of the 762 patients enrolled in the study, one patient suffered chest pain and one had temporary desaturation, both of these effects occurring at 70% nitrous oxide. Overall, this study showed that nitrous oxide is a safe form of sedation for children and the adverse effects only occur at very high concentrations of nitrous oxide that are rarely used in dentistry. This confirmed findings by Kanagasundaram et al⁹ that showed a similar prevalence of vomiting.

Berge¹⁰ stated similar findings in the use of nitrous oxide sedation for oral surgical procedures in adults. Of 194 patients undergoing oral surgical procedures, 16 patients suffered minor, easily reversible side effects. The analysis showed that ASA 2 patients, apprehension and previous negative experiences of dentists increased the chances of suffering from these minor adverse effects.

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Studies have shown, however, that there is one particular phenomenon that can have significant consequences. Lockwood and Yank¹¹ suggested that the use of nitrous oxide is contra-indicated in patients with intraocular gas. In this circumstance, the ease at which nitrous oxide can leave the blood leads to raised intraocular pressure and can cause irreversible blindness. Intraocular gas is used for patients who have had conditions such as a detached retina; therefore, a thorough history must be taken to identify any risk of this occurring.

Overall, nitrous oxide has some side effects for patients but the vast majority of these are very minor effects such as vomiting and nausea. Whilst raised intraocular pressure with nitrous oxide can lead to a severe adverse effect such as blindness, this is only in a specific group of patients who can be easily identified pre-operatively. Nitrous oxide also offers a variety of benefits for patients who have anxiety about dental treatment. Patients undergoing nitrous oxide inhalation sedation do not require an escort or undergo a fasting protocol pre-treatment. It is also very useful in reducing sensitive gag reflexes in patients, allowing dental treatment to be undertaken. In a review of the use of nitrous oxide, Holroyd and Roberts¹² found that 'nitrous oxide sedation is a safe straightforward technique... It has no absolute contraindications... [and is a] useful alternative [to] general anaesthesia.'

Studies have shown that whilst nitrous oxide sedation is safe for patients, there is some evidence to suggest that chronic exposure to the dental team may lead to some adverse effects. It is therefore important that the level of nitrous oxide exposure is kept within predetermined safe limits. The main reason for a movement to restrict or ban the use of nitrous oxide is with regards to the environment. Nitrous oxide is a potent greenhouse gas with 310 times more impact per unit compared with carbon dioxide. Therefore, despite its low concentration, it is the fourth highest contributor to global warming. The majority of the man-made atmospheric nitrous oxide originates from agriculture and the chemical industry but whilst dentistry does have a lesser contribution to this amount, it is important to attempt to limit its effect on the environment¹³.

Guidelines for safe levels of nitrous oxide vary from country to country. In the USA, the maximum biological threshold is 50ppm¹⁴. In the UK, the maximum accepted level is 100ppm at an eight hour time weighted analysis in any 24 hours¹⁵. There are a variety of measures that have been put in place to ensure that these exposures are adhered to.

The Department of Health has published a document outlining the environmental protocols required for inhalation sedation with nitrous oxide/oxygen: *Conscious Sedation in the Provision of Dental Care* (2003)¹⁶. It has recommended a dedicated, purpose-designed machine for the administration of inhalation sedation. These machines should conform to British Standards (BS4273) and be maintained according to manufacturers' guidance. The machines should be regularly serviced by trained technicians. This will prevent inadequate containment of gases and prevent nitrous oxide leaking into the environment.

Gas supply lines for inhalation sedation machines must be connected by non-interchangeable colour-coded pipelines (often blue/black for nitrous oxide and white for oxygen). On installed pipework there should be a low pressure warning device and audible alarm. It is essential that failsafe mechanisms be in place to ensure that gas mixtures without enough oxygen cannot be delivered. Nitrous oxide and oxygen cylinders must be stored safely with regard to current guidelines and be secured safely to prevent injury.

Scavenging of waste gases must be active and sufficient to fully conform to current COSHH standards. Previously, sedation would occur in a room with a window open (known as passive scavenging). Active scavenging occurs either via an attached scavenging unit or attaching the expiration limb to the wide bore suction. Breathing systems should have a separate inspiratory and expiratory limb to allow proper scavenging. Nasal masks should be close-fitting, providing a good seal to prevent large quantities of nitrous oxide leaking into the atmosphere. Not only is it important that nitrous oxide is actively scavenged to prevent chronic adverse effects on dental staff; if nitrous oxide is released from the relative analgesia machine it may have a similar, if smaller, effect on the staff, which may prevent providing the highest-quality care for patients. It is important to note, however, that even when actively scavenged, nitrous oxide is released into the atmosphere and still, therefore, contributes to the greenhouse effect.

Whilst nitrous oxide is safe for the patient and exhibits little harm to staff under adequate protocols, the effect on the environment has meant that other potential inhalation agents are being developed and used. The alternative agent with the greatest potential for inhalation sedation is sevoflurane. Sevoflurane is a relatively new agent in the UK but has been used in Japan since the 1980s. The physical characteristics of

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sevoflurane are ideal for inhalation sedation. Unlike nitrous oxide, sevoflurane has no identified systemic toxicity or environmental effects. However, it has no analgesic properties, although the standard use of local analgesia for dental procedures means that this property is not a necessity for its use as a sedation agent. Sevoflurane has been identified as being as effective as nitrous oxide in the level of sedation and amnesic properties; however, a specially calibrated vaporiser is required to titrate the low concentrations of sevoflurane (up to 1%)¹⁷. Sevoflurane is partly metabolised (unlike nitrous oxide, which is hardly metabolised) and so care needs to be taken with patients who have kidney and liver disease¹. Other potential agents include propofol, but the narrow margin of safety between sedation and anaesthesia and the need for specialist equipment may prevent its uptake in general practice.

Nitrous oxide has been used in healthcare for over 150 years as a sedative agent. Whilst there is evidence that chronic high-level exposure to nitrous oxide can cause adverse effects (seen in the dental team), these are largely limited by following published protocols. There has been no evidence of serious, long-lasting effects in patients. The future of the use of nitrous oxide is also affected by its potency as a greenhouse gas and although it is safe to use as a sedative agent, other agents (such as sevoflurane) have more favourable properties overall and, as such, will be the agents more commonly used in future².

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PROPRANOLOL AND D-CYCLOSERINE AS ADJUNCTIVE MEDICATIONS IN REDUCING DENTAL FEAR IN SEDATION PRACTICE

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Abstract

Extensive research and clinical experience have demonstrated the usefulness of sedation in helping fearful patients receive dental treatment, particularly when they have urgent treatment needs. In addition, the efficacy of behavioural programmes for managing dental fears is well established. While often these two approaches are seen as oppositional, our work in Seattle, Morgantown and at King's College London Dental Institute demonstrates the complementarity of the two approaches. Using the example of two compounds, one very familiar, propranolol, and one that has recently become of interest, D-cycloserine, we wish to illustrate the manner in which these medications can be used to enhance behavioural approaches to managing dental anxiety.

Introduction

Pharmacological approaches are an everyday part of dental practice in preventing and alleviating pain, yet many practitioners currently under-utilise them, failing to fully address anxiety, fear and panic. Behaviour therapy alone is very effective¹, yet is largely unavailable in dental surgeries or specialist hospitals. The combination of anxiolytic medications and behavioural techniques has great potential but is rarely practised in the UK or elsewhere. Several possibilities are available, including the use of behavioural approaches to enhance compliance with pharmacological approaches (such as sedation). This article focuses on a currently available anti-anxiety medication (propranolol) with demonstrated efficacy, and a medication (D-cycloserine) on the horizon, which has promise in terms of enhancing behavioural exposure (see Table 1 for a glossary of clinical terms) for anxiety disorders, including dental phobia.

We have argued in this journal¹ that dental sedation patients would be more effectively treated in the long run if they first received preparatory behavioural treatment. Indeed, this approach is being evaluated on a pilot basis at the Department of Sedation and Special Care Dentistry at King's College London Dental Institute. In this on-going study, patients who are to be sedated because they have difficulty co-operating are able to learn coping skills to manage their own anxiety using a computer-driven self-help program, and therefore have the opportunity to develop more positive associations with dental care. Care then is safer because drug doses can be lower in patients who do not rely on intravenous medications alone to cope with dental treatment.

Propranolol

Propranolol (e.g. Angilol® in the UK) is a beta-adrenergic blocking agent primarily used for hypertension² and the treatment of migraines.³ It is used in the UK as an anxiolytic. It has been used to treat test anxiety⁴ and acute stage fright.⁵ In clinical research,

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Mealy and colleagues⁶ randomly assigned 53 patients undergoing day surgery to receive either 10mg propranolol or placebo on the morning of and prior to surgery. Those receiving a low dose of propranolol reported significantly lower scores on the Hospital Anxiety and Depression Scale compared to placebo, but no significant differences were found in blood pressure, heart rate or pain experience between propranolol and placebo. Recommended dosing in the UK is 40mg once daily, increased to 40mg three times daily if necessary.⁷

Interestingly, the newest version of the British National Formulary⁸ says that 'beta blockers... do not affect psychological symptoms of anxiety...' New evidence, to the contrary, suggests that besides impacting physiological symptoms, propranolol alters the reconsolidation of fearful memories after they are activated. In other words, when a fear memory is recalled (activated), propranolol can block the reconsolidation of the feared memory, such that the memory is less emotionally arousing at that time and in the future.⁹⁻¹⁰ Propranolol may work in part to lower noradrenergic activity in the amygdala and subsequent release of cortisol during stressful events,¹¹ thereby disrupting the fear and anxiety conditioning process. Use of propranolol to modify traumatic memories is discussed later in this paper.

Use of propranolol in dentistry

In a study of patients with dental phobia, Liu, Milgrom and Fiset¹² found lower self-reported anxiety during dental injections and lower overall pain intensity and perceived aversiveness of treatment with 80 or 120mg of propranolol when compared with placebo. This study built on earlier work by Pichot and colleagues¹³ comparing oral oxprenolol hydrochloride, diazepam or a placebo as a pre-medication to reduce anxiety and upset before restorative dentistry. In the Liu and colleagues¹² study, 23 healthy dental patients meeting DSM-III¹⁴ criteria for dental phobia were screened using the Dental Fear Survey (DFS).¹⁵ The patients had a mean score of 74 and no subject had a score less than 54, indicating a high level of clinical fear. Only those with high physiological reactivity were included. For reference, a recent study in the Department of Sedation and Special Care Dentistry at Guy's Hospital found patients referred for sedation at an average DFS score of 68 while

restorative patients at St. Thomas' Hospital had an average score of 35 on the same survey instrument.¹⁶

In the Liu and colleagues¹² study, the dose of the medication was chosen based on individual response to a physiological challenge and was administered orally by capsule one hour prior to treatment. Patients received either restorative or endodontic care involving an injection of local anaesthetic. The study showed that the group of patients receiving propranolol experienced a clinically significant reduction in anxiety during the procedure as well as less post-treatment pain and evaluation of aversiveness. All were able to co-operate sufficiently to have treatment completed. Nevertheless, there were no differences between groups on observers' ratings of videos of the appointments, and the observer ratings averaged 4 to 5 on a one-to-seven scale, in which seven indicated maximal upset.

The rationale behind the beta-blocker treatment in the study was that some dental patients primarily are physiological responders¹⁷ and their anxiety is manifested by tachycardia, shortness of breath and other symptoms similar to a panic attack, but triggered by a specific stimulus. The patients become afraid of the symptoms of anxiety (i.e. anxiety sensitivity: see Table 1 glossary)¹⁸ and often regard their physiological reactivity as potentially life-threatening. Treatment delay and refusal likely is an outcome of such a process, in which patients avoid the dental situation as for them it involves physiological hyper-arousal. Interpreting the results of the study, such patients still may need sedation, as those treated with propranolol behaved no differently from those who received the placebo. Since this article appeared, seven other papers in neuroscience and psychiatry journals have cited it.¹⁹⁻²⁵ Interestingly, only one of these papers was in a dental journal and it was not clinical.²⁵

In an earlier longitudinal study of patients undergoing sedation versus behavioural dental fear treatment (formally structured gradual exposure to dental stimuli and subsequent reduction and extinction of fear involving multiple appointments), patients completing behaviour therapy showed better long-term dental attendance at 2- and 10-year follow-up than did patients completing care under general anaesthesia and sedation.²⁶⁻²⁷ Kvale and colleagues²⁸ also published a meta-analysis of dental research papers showing the effectiveness of

behaviourally oriented treatment. Ideally, reducing overall dental anxiety prior to sedation can help achieve the goal of patients establishing a pattern of regular dental care after most invasive work has been completed under sedation.²⁹

Propranolol and post-traumatic learning

As previously mentioned, research has shown that propranolol may help change the way in which a traumatic memory is reconsolidated, thereby reducing its fear-inducing properties. It has been argued that some dental fears, elicited by painful dental treatment, are a form of post-traumatic stress disorder (PTSD).³⁰ PTSD is a condition that often develops following a traumatic event and includes recurrent nightmares, flashbacks, feelings of reliving the trauma, intense psychological distress when presented with reminders of the event, emotional numbing or, conversely, hyperarousal.³¹ Nineteen individuals meeting DSM-IV³² criteria for PTSD for traumatic events such as childhood sexual abuse, physical assault and motor vehicle accidents recounted their personal traumatic experiences and then were administered 40mg of propranolol or placebo by mouth, then 60mg of long-acting propranolol or placebo two hours later.³³ One week after receiving propranolol or placebo, participants listened to 30-second scripts describing their personal traumatic experiences, and were asked to imagine the event for 30 seconds. Patients given propranolol after recounting the traumatic scripts showed significantly less physiological responding (i.e. heart rate, galvanic skin conductance, facial muscle EMG) when re-experiencing the event a week later than those given placebo.

Pitman and colleagues³⁴ gave 40mg propranolol by mouth to 41 patients presenting in an emergency room after traumatic accidents (i.e. motor vehicle, motorcycle) and meeting preliminary criteria for PTSD. Patients were given the first dose no later than six hours after the trauma, then four times daily for 10 days. One month after the trauma, one of 10 (10%) patients taking propranolol and six of 20 (30%) of placebo subjects continued to meet the criteria for PTSD. Patients given propranolol also showed significantly less physiological responding (i.e. heart rate, skin conductance, facial muscle EMG) than did those who were administered a placebo.

Assessing the suitability of propranolol for dental fear and anxiety

Patients' fear of the dental situation should be assessed formally with an instrument such as the Dental Fear Survey (DFS)¹⁵ in order to determine the feared aspects of the dental situation for each individual. The DFS questions used to assess symptoms of physiological arousal, addressed in part by propranolol, are presented in Table 2. The DFS is preferable to the MDAS used in research in the UK and elsewhere because it provides the clinician with more information of clinical value.³⁵ While patients with high physiological arousal in the dental situation may find reduction of their physical symptoms of anxiety and fear, propranolol also has the promise of also addressing the fear memory itself, as previously described.

Guidelines for the use of propranolol are given in the British National Formulary and elsewhere. Use of propranolol with benzodiazepines is not contraindicated, although research has shown that propranolol may prolong elimination of diazepam, but not that of lorazepam or triazolam.³⁶ Also related to dental treatment, animal literature has suggested that propranolol increases the serum levels of lidocaine³⁷ and increases the threshold for lidocaine-induced convulsions.³⁸ Because there are no amnesic effects of propranolol, patients will be fully able to give consent for any subsequent sedation. Administration of propranolol should reduce attendance failures, as fears are often maximal immediately before an appointment.²⁹

One implication of the use of propranolol in dentistry is the use of such a non-selective beta-blocker with some local anaesthetics. There have been reports of an increased likelihood of an elevation in blood pressure when epinephrine-containing local anaesthetics are used.³⁹ Consideration thus needs to be given to the choice of local anaesthetic administered.

Directions for future research in propranolol

Propranolol has been used effectively to manage the physiological symptoms of anxiety and fear in the dental setting.¹² Its ability to reduce dental fear and anxiety through longer-term cognitive changes, however, has yet to be studied. Future research in this area may follow

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prior studies of PTSD-related anxiety symptoms. For example, fearful individuals anticipating dental treatment may be asked to recall a traumatic dental experience a week prior to the scheduled dental treatment. They then are given a dose of propranolol after retrieving this fear memory. A week later, at the dental appointment, they are given another dose of propranolol prior to treatment. If propranolol is able to reduce anxiety related to fearful memories of dental treatment, these individuals should show decreased anxiety in the second appointment, even as they are preparing for imminent dental treatment. Propranolol has promise to reduce fear and anxiety in dental patients both peripherally, by reducing physiological symptoms, as well as centrally, by changing the way the feared experience is re-stored in memory.

A new agent: D-cycloserine

In the past decade, there has been a burgeoning interest in the potential use of D-cycloserine (DCS; Cycloserine, King Pharmaceuticals Ltd., Herts) to facilitate the reduction of fear and avoidance through enhancement of extinction learning (see Table 1, glossary) in exposure-based behavioural treatment. DCS is an antibiotic used in the UK in the treatment of drug resistant tuberculosis⁴⁰ and currently not listed in the formulary for the treatment of anxiety. At the glycine binding site, DCS is a partial agonist of the glutamatergic N-methyl-D-aspartate (NMDA) receptor that affects brain processes involved in fear, specifically in the amygdala.⁴¹

Initial animal research testing the use of DCS in expediting extinction learning arose deductively from theories of brain circuitry, as well as empirical data that showed that NMDA antagonists inhibit extinction learning. Existing compounds that were NMDA agonists were identified as potentially impacting extinction, and so were tested with animals. Positive findings from animal work about DCS then led to limited human trials, an excellent example of translational research.⁴²

Use of DCS in the treatment of anxiety

DCS does not act directly as an anxiolytic. Rather, it expedites learning by impacting the neural circuitry that

is involved in extinction, which is the basis for behavioural treatments to reduce fears. Ressler and colleagues⁴³ found that 28 individuals with acrophobia (fear of heights) showed greater anxiety reduction, as measured by self-report ratings and skin conductance, after exposure therapy (see Table 1, glossary) with DCS versus participants treated with a placebo. DCS was taken orally by capsule two to four hours prior to exposure therapy. A 500mg dose of DCS was no more effective than a 50mg dose with regard to extinction. Prior research by this group demonstrated through a drug-free extinction trial that DCS has no anxiolytic properties of its own.⁴⁴ DCS typically is dosed at 50 to 500mg in isolated, rather than chronic, dosing to enhance the effects of exposure treatment for anxiety and fear.⁴¹ DCS is generally well tolerated.⁴⁰

It is important to note that DCS does not appear to make standard behaviour therapy more effective. Rather, it seems to expedite the reduction of fear and anxiety, making behaviour therapy more efficient. This research suggests that administering DCS during a practice session prior to sedation treatment may help the patient decrease his or her fear more quickly than with exposure therapy alone. For example, patients may undergo a brief practice session, during which they 'rehearse' the placement of the cannula while practising relaxation strategies. Administration of DCS in conjunction with this rehearsal session would help expedite fear and anxiety reduction, leading to less fear and anxiety during the cannulisation. In this type of learning, reinforcement of fear (e.g. temporary relief of fear by escaping the situation: see Table 1 glossary) is avoided in order to extinguish the fear response through exposure. Systematic practice by the patient of the steps involved in dental treatment (e.g. sitting in the dental chair, relaxing one's limbs and torso, opening one's mouth) substitutes for the earlier fear response.

Directions for future research in DCS

To date, clinical studies of DCS's enhancement of exposure treatment and other cognitive-behavioural treatments have been limited to acrophobia,⁴³ social phobia/social anxiety disorder,⁴¹ and obsessive-compulsive disorder.⁴⁵ Since DCS has been found to enhance exposure treatment, in both animals and humans with

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regards to several different anxiety conditions, the use of DCS has promise to facilitate extinction learning (see Table 1, glossary) in dental anxiety, fear and phobia as well.

At present, use of DCS in dentistry is theoretically promising, and studies of the enhancement efficacy of DCS in dentistry are at an early stage of development at King's College London Dental Institute to determine its appropriateness for routine use in clinical care. While it cannot be assumed that DCS will enhance exposure treatment for all phobic or other anxiety disorders, there is considerable promise for using DCS as an aid for dental fear exposure treatment, which ultimately may allow affected patients to utilise dental services more comfortably with improved attendance. In testing its effectiveness, as DCS acts to enhance memory, it is critical that any dental experiences in which DCS is used be positive. Short-term behavioural preparation of patients involves controlled exposure to fearful stimuli, so use during clinical care should be carefully considered and planned to maximise a positive experience throughout. This novel pharmacological adjunct shows promise in its ability to combine with behavioural methods to reduce anxiety and fear in dental patients.

Conclusion

Dental fear is a common problem among adults in the United Kingdom,⁴⁶ and approximately 25% of adults in the UK avoid dental care due to fear, even when they are experiencing a painful dental condition. These numbers are similar to those found in the United States, and while dental technology has improved considerably over the last 30 years, the prevalence of dental fear has remained remarkably consistent.⁴⁷ Avoidance of dental treatment due to fear often leads to a significant impairment in oral health.⁴⁸

Certainly, the field of dentistry has not shied away from utilising pharmacology to help patients be more comfortable and less anxious during dental treatment. Indeed, it has been a leader. The use of pharmacological adjuncts, however, has focused largely on sedative and analgesic medications, which do not allow patients to learn or utilise adequate behavioural strategies to increase

their comfort and attendance in the long term. No work has been done to follow up the original study of propranolol by Liu and colleagues and no use of DCS in dentistry has been investigated. Such work is necessary. Propranolol has been used successfully to manage physiological symptoms of anxiety in dentistry¹² and other anxiety-provoking situations^{4,6}, yet it appears from other clinical literature that beta-blockers can be utilised for more long-term anxiety management by changing the way the fear memory is stored in the brain. In this way, administration of beta-blockers not only decreases anxiety in the short term, but also may help alleviate dental anxiety in an enduring way. Such use of propranolol should lead to less need for aggressive treatment and increased patient safety during procedures.

While DCS works via a different mechanism from beta-blockers and is not directly anxiolytic, it shows promise in its ability to also modify individuals' learned associations with dentistry, allowing more positive associations to be made and anxiety to be decreased over the long term. By enhancing the positive associations made during exposure, individuals' anxiety about dental treatment may decrease, and dental treatment may be made easier for both patients and providers. Reducing anxiety by using behavioural and pharmacological strategies in combination is an approach appropriate for research into further application in sedation dentistry.

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Table 1: Glossary of clinical conditioning terms

Term	Definition	For more information:
anxiety sensitivity	'Fear of fear.' Individuals are afraid of the symptoms of anxiety and fear, regarding their physiological reactivity very negatively and even as potentially life-threatening.	Taylor, S. Anxiety Sensitivity: Theory, Research, and Treatment of the Fear of Anxiety. Mahwah, NJ: L. Erlbaum Associates, 1999. Taylor S, Zvolensky MJ, Cox BJ, Deacon B, Heimberg RG, Ledley DR, Abramowitz JS, Holaway RM, Sandin B, Stewart SH, Coles M, Eng W, Daly ES, Arrindell WA, Bouvard M, Cardenas SJ. Robust dimensions of anxiety sensitivity: development and initial validation of the Anxiety Sensitivity Index-3. Psychol Assess. 2007 Jun;19(2):176-88.
classical conditioning (also known as Pavlovian conditioning)	Learning process in which a neutral stimulus (e.g. dental treatment) comes to be associated with a response (e.g. fear) when it is paired with a stimulus (e.g. pain) that brings about that response automatically.	Pavlov, I (1927). Conditioned reflexes. London: Oxford University Press. AllPsych Online: Learning Theory and Behavioral Psychology: http://allpsych.com/psychology101/conditioning.html
exposure therapy	An anxiety reduction technique involving repeatedly presenting the feared stimulus (e.g. dental treatment) without pairing it with the previously matched stimulus (i.e. pain), thereby reducing the automatic response (fear).	Marks I. Exposure therapy for phobias and obsessive-compulsive disorders. Hosp Pract. 1979 Feb;14(2):101-8.
extinction	The end result of exposure therapy. That is, the previous learned response (e.g. a person learns to fear dental treatment because of a previous painful experience) becomes extinct after the stimuli are no longer paired (e.g. a person has several positive, non-painful dental procedures and his fear of dentistry decreases).	Extinction and Exposure Therapy: http://psychiatry.healthse.com/psy/more/extinction_exposure_therapy/
operant conditioning	Learning process in which behaviour (e.g. fear) is acquired and/or maintained as a function of the antecedent conditions as well as positive ('reinforcement') and negative ('punishment') consequences (e.g. scheduling a dental appointment but then not showing up, temporarily relieving fear).	McNeil DW, Sorrell JT, Vowles KE. Emotional and environmental determinants of dental pain. Behavioral Dentistry, 2006. Mostofsky, DI, Forgione, AG, Giddon, DB (Eds.) Blackwell/Munksgaard.
social learning	Learning process in which behaviour is acquired through experience observing others in real life or through various media (e.g. film).	VL-PATSy – Vicarious Learning and Case-based teaching of clinical reasoning skills http://www.informatics.sussex.ac.uk/research/groups/appcog/Joomla/index.php?option=com_frontpage&Itemid=1 Bandura A, Ross D, Ross SA. Transmission of aggression through imitation of aggressive models (1961). Journal of Abnormal and Social Psychology. 1961;63:575-82.

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Table 2: Dental Fear Survey:14 questions used to assess physiological reactions

When having dental work done:

	Never	Once or twice	A few times	Often	Nearly every time
My muscles become tense	1	2	3	4	5
My breathing rate increases	1	2	3	4	5
I perspire	1	2	3	4	5
I feel nauseated and sick to my stomach	1	2	3	4	5
My heart beats faster	1	2	3	4	5

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FACILITATION OF THE PROVISION OF INHALATIONAL SEDATION

A PILOT SCHEME FOR SAAD MEMBERS

SAAD Council has recently approved a scheme to loan inhalational sedation and scavenging systems for a six-month trial period to SAAD members.

The two successful applicants will have the opportunity to purchase the systems at the end of the trial period.

Details of the scheme and application forms are available from the SAAD website, www.saad.org.uk or **Derek Debuse**, Hon. Secretary SAAD, **contact details:** SAADoffice@btinternet.com, **tel:** 01302 846149.

COURSE IN PAKISTAN

NITROUS OXIDE ANALGESIA IN DENTISTRY – TRAINING COURSE AT THE AGA KHAN UNIVERSITY IN KARACHI, PAKISTAN

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Introduction

When I was invited to lecture at the Aga Khan University Hospital (AKUH) in Karachi, Pakistan, I was intrigued. I had heard a little about this philanthropic, non-profit private teaching institution and hospital and I was keen to learn more about it, so I accepted the invitation and was on my way.

As the plane touched down in Karachi, I could already sense the energy that would permeate this trip. The passengers, all wearing traditional clothing, had jumped out of their seats way before the plane had come to a stop, grabbing bags and shouting into their mobile phones. As I sat there in my tracksuit with my seatbelt still securely fastened, I found myself wondering 'will I fit in here?!'

Although a lady of the 21st century, I was relieved for the 'women and children'-only queues in Karachi airport, which meant that I didn't have to join the mad rush to the other queues!

My first stop, after freshening up, was the university hospital. I was driven through crazy traffic, weaving through colourful ornamented buses with people hanging off the back, motorbikes carrying entire families, rickshaws, cars and people selling anything from towels to fruit trying to make a living and clearly all following differing road rules. It was fascinating – I felt as though I had travelled through time as well as distance. Then suddenly in the middle of this colourful chaos was the AKUH, an architecturally magnificent building with

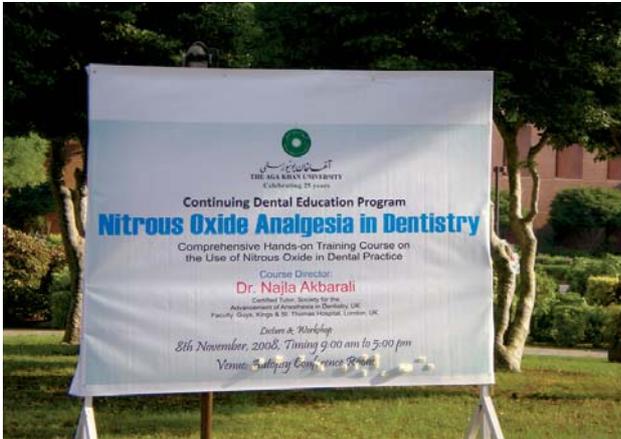


carved out calligraphy in its walls to make the most of the bright sun flooding in, set in a tranquil environment surrounded by the sounds of nature and water running through the various water features and gardens. A little paradise in the middle of Karachi.

The AKUH

On arrival, I was greeted by a small congregation of people and I was pleased to see a large poster by the entrance advertising the course that I would be teaching.

COURSE IN PAKISTAN



It was a unique and exciting experience, especially when I realised that I was there to teach the first-ever course on sedation in the history of dentistry in Pakistan.

About the AKUH

The AKUH started operations in 1985, as an integrated, healthcare delivery component of Aga Khan University (AKU). It is committed to providing the best possible options for diagnosis of disease and team management of patient care. It is the first hospital in Pakistan and among the first few teaching hospitals in the world to be awarded the prestigious Joint Commission International Accreditation (JCIA) for practising the highest internationally recognised quality standards in healthcare.

The university's objective is 'to promote human welfare in general, and the welfare of the people of Pakistan in particular, by disseminating knowledge and providing instruction, training, research and service in the health sciences, education and such other branches of learning as the University may determine' (www.aku.edu).

The dental department was very impressive, with well equipped, state-of-the-art surgeries that were designed in a way that made them feel welcoming, a true achievement for any dental surgery! An extensive range of treatments is offered and provided by highly trained faculty members, many of them international or postgraduate dentists. Dental treatment is provided under local anaesthesia and general anaesthesia. Currently there are no conscious sedation services available. This means that all anxious patients (adults and children) that are not able to tolerate dental treatment under local anaesthesia are referred for treatment under

general anaesthesia. This often means longer waiting times, increasing patient discomfort, limitations in treatment options and an increase in cost to the patient or family. A large number of these patients are borderline anxious: they are nervous but may be able to cope with dental treatment with the help of a sedative agent such as nitrous oxide. Therefore, the AKUH dental department are keen to set this up as it is felt it should be an option for all patients.

The course

The course was taught over three days. The first day comprised a series of lectures on relative analgesia given to all the dental staff members and postgraduate students, followed by a practical session in the afternoon. The dentists were from various backgrounds and a few of them had attended a SAAD course in the UK in the past and saw this as an opportunity to refresh their knowledge. The participants seemed very engaged and I was relieved to see nods and laughs in all the right places.

I was bombarded with questions, both academic and practical, and thankfully in English. I was informed earlier by the course organiser that I would find the participants very hungry for knowledge, and this became apparent during the session, as well as in the breaks. There was a lot of healthy discussion and everyone seemed to engage very well. The aim was to train these participants with a basic understanding so that they could then feed this knowledge and training further to enable them to pioneer conscious sedation services in the future. There was a great deal of discussion on regulatory standards, as there seems to be a lack of dental regulation enforcement in Pakistan, and the AKUH wish to adhere to the highest possible standards so that they can then be role models to other dental professionals. There was also some concern about the cold reception this course received from some of the fellow anaesthetists who felt that nitrous oxide is their territory, and discussion ensued on how to get them on board to enable this service to work in the most productive way.

The practical session in the afternoon was carried out in one of the surgeries. Only one relative analgesia machine was available for use (an MDM matrix machine with a digital head), so the participants were split into three groups. Everyone was keen to try out the nitrous oxide

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and the effects varied a great deal as expected. Comments were made on the ease of use and the safety. Some who believed it may be some kind of 'miracle cure' realised its limitations and reliance on co-operation whilst the more sceptical participants were pleasantly surprised by its effects. All in all, at the end of the first day, the general feeling was that relative analgesia was seen as a positive step in giving the practitioner freedom and choices in the way they practise, and the patient in the treatment they have.

Day 2: practical session

On the second day, I supervised the participants from the previous day, treating patients with the use of relative analgesia. Four patients were booked in for treatment, all of them under the age of 10 years. One treatment session had to be abandoned but the other three were successful in otherwise very anxious children where previously dental treatment had not been possible. The importance of patient co-operation and good operator technique was highlighted. It was interesting to see that all four children presented with rampant caries.



There were limitations due to the size of the nasal hood available, and the fact that a quiet environment was not possible due to the number of people in the treatment room. This was because of the participants who obviously wanted to watch, myself supervising, and the number of patient family members who wished to stay in the room. It seems that there is a culture in Pakistan whereby many family members, including younger siblings and extended family, like to come and support the patient during any hospital appointment. This can be an obvious obstacle, but with a little explanation and understanding, it was

sometimes possible to convince the family members to wait outside the surgery in the lovely waiting rooms available. The children that we treated looked small for their age in comparison with British children of the same age. Aside from obvious differences in size and appearance based on where you're from, I feel that the lack of good nutrition also played a part. I was saddened to hear that the 'credit crunch' had worsened the poverty in Pakistan, leading to families having to cut down to one or two meals a day, and those were the lucky families!

Day 3: treatment session

The third day was a lecture morning and practical session carried out for dentists from outside the AKUH. There were a total of 30 participants and the majority of them were general dental practitioners, some of them already



with relative analgesia facilities in their practice. Those who were using relative analgesia already either had had training in sedation abroad or had been taught by colleagues in their practice. Some felt unhappy about the way in which the relative analgesia was being used in their practice, or felt they wanted better training prior to using it themselves. They also felt that they wished to be better prepared for any questions they may face from patients, authorities or medical professionals. Hence they hoped that this session would improve their skills, knowledge and confidence.

It was a good day; again, the participants had a variety of experiences and the feedback was positive.

I felt overwhelmed with the respect I was given and how well I was looked after. The respect from the participants

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extended to all teachers and it seemed that the appreciation for the gift of knowledge was huge. I was starting to understand why these teachers/dentists who have come from all corners of the world had chosen to come and teach in Pakistan, often sacrificing their personal 'wants', all bonded by the same humanitarian goal.

The future of sedation at the AKUH

Overall, the course was successful in introducing participants to the use of relative analgesia for dentistry. It provided a good basic understanding and a thirst for further knowledge and training.

On speaking to the director of dental services, I understood that the aim is to get the service up and running within a year. This will require more equipment, the creation of necessary documents (e.g. consent forms, patient information), a closer look at regulations that need to be followed and further training. It is hoped that

two or three dentists can be sent to the UK to attend a full SAAD course in the near future and, in the long run, the aim is to train trainers, so that this knowledge and experience can be passed down to make the hospital and community self-sufficient in this area, and to provide a good service for patients treated at the AKUH.

The obvious limitations will be the cost of both equipment and training, and the cost to the patient and family. However, this cost to the patient will be considerably less than the cost of a general anaesthetic.

The AKUH is often looked upon as the 'role model' for other dental service providers in Pakistan and so it is hoped that this service, once set up to the highest standards possible, and fully running, will inspire others to do the same.

With these added skills in sedation and patient management, dentists in Pakistan should be able to provide a service to patients that should be a basic choice for every patient. After all, should it not be a basic choice at the treatment planning stage for every patient worldwide and not just for the people lucky enough to be born into a western society? ■

**The SAAD Editorial Board
are interested to receive case reports
of interest to SAAD members
and suitable for publication in the
*SAAD Digest***

SAADoffice@btinternet.com

2009 CONFERENCE

PRACTICAL SEDATION: TRANCES, NEEDLES AND CONSENT SAAD ANNUAL CONFERENCE 2009

David Pearson

This year's Annual Conference, as in previous years, took place at the home of the Royal Society of Medicine, Wimpole Street, in the heart of London, on 26 September 2009. The conference was bustling, with well over 100 dentists, doctors, nurses and students travelling from all over the United Kingdom and Europe, stimulating enthusiastic debate and a great sharing of knowledge throughout the day.

The introduction was led by Diana Terry, President of SAAD for the last three years and a speaker later in the day.

The morning session was kept to order by Francis Collier with the eagerly anticipated theme: The Long Sedation Case: How do I manage it?

He welcomed to the stage Sheldon Collins, a dentist with over 30 years of practical experience in managing anxious patients. Sheldon gave us a run through of his experiences and stressed the safety of midazolam as a single-drug technique. He gave us an insight into the practicalities of guiding patients through the long case, concentrating on the importance of building up a rapport



Stephen Jones, Hon. Treasurer and Derek Debusse, Hon. Secretary

at the earliest possible opportunity. He touched upon the tactile connection between patient and operator, along with the importance of good treatment planning. He emphasised the significance of carrying out all invasive elements at the start of the session, and also highlighted the value of further postgraduate training and how his technique has improved following the Guy's Diploma and his subsequent lecturing.



Andre du Plessis, Sheldon Collins and Francis Collier take questions from the floor.

Next came the well-drilled double act of Joe Omar and André du Plessis. These vastly experienced medical practitioners work with over 200 referring dentists whilst also lecturing nationally on conscious sedation. They continued with the theme of patient rapport, the importance of the initial assessment and management of the patient's perception of sedation as opposed to general anaesthetic. They gave more tips on patient comfort and communication with the sedationist before giving an overview of multi-drug techniques, the pros and cons of the plethora available to us and the benefits of careful administration and documentation of both local anaesthetic and sedative agents.

David Craig followed, discussing the benefits of propofol for the long and very short case. Whilst comparing propofol to other sedative agents, he discussed its

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delivery and idiosyncrasies. He also touched upon the important issue of operator fatigue during the long case, with its obvious implications for treatment planning and resultant outcome.

A panel of the speakers convened and the audience were invited to debate the issues raised in the presentations. Thus ensued an enthusiastic discussion showing the high level of delegate interest in the field, before a short break for refreshment.

The next section gave a unique insight into two forms of complementary anxiety management. The first was the use of hypnosis. Needless to say, Mike Gow held our attention with ease. The President of the British Society of Medical and Dental Hypnosis showed us how he has integrated the art into his dental practice and began with a synopsis of a case he did with the BBC. This was an eye-opener into the potential of hypnosis in patient management. As he gave us an overview of techniques and tips, one could easily see behavioural pathways we could adopt into our everyday sedation practice and the obvious benefit of the trancelike state (when applied to the patient rather than the staff!).

This led smoothly into Dave Johnson's most informative introduction to acupuncture, moving from blow darts to Ray Mears before giving us an appreciation of the history and science of acupuncture. His techniques for relaxation, myofascial pain and gagging would provide an extremely useful adjunct for any learned practitioner.



Derek Debuse, David Pearson, Sadie Thomas and Sarah Higham

We were then all reminded of the availability of the SAAD RA machine loan scheme, whereby any SAAD member who has completed a recent SAAD course can borrow an RA machine for 12 months free of charge. Please see the website for details.



Sameer Patel, winner of the Dental Student's Essay Prize, receives his award from Diana Terry

This year the Dental Student Essay Prize was won by Dr Sameer Patel and presented by Diana Terry.

With lunch came the dilemma of choosing between the most informative trade stands of Maney Publishing and RA Medical or being first in the queue for the sea bass.

Thankfully there was room for both in the open space of the Max Rayne Atrium. It was wonderful to see students enjoying the day and quizzing their mentors over coffee and cake.



The RA Medical display

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Martin Foster, Avril Macpherson, Graham Manley and Diana Terry take questions from the floor.

After a chance to catch up with movers and shakers in the sedation world, came the afternoon session, this time with Nigel Robb in the chair.

First to present in the afternoon session was Diana Terry with an update on consent in England and Wales. This was another polished performance, with the emphasis on access to information for the practitioner. The overview highlighted some of the complexities in the system and resources available to obtain the answers.

Then came Martin Foster, Assistant Clinical Director; Specialist in Paediatric Dentistry, NHS Lothian, with his comments on differences north of the border. If he hadn't decided on a career in the Community Dental Service with admission to the Scottish Bar he would have made one hell of a history teacher! I, like many, went into the afternoon wondering why there seemed so many differences and was enthralled by the historical wrangling. With ruling monarchy, infighting and European intervention the evolution of Scottish law seemed to roll out in front of us.



Avril Macpherson and Sheila Thompson

Just when we were coming to terms with consent, Graham Manley was given the brief 'What to do when treating those who do not have the capacity to consent'. Graham led us stoically through the convolution and challenges of the system and paperwork in England and Wales before getting to the heart of the issue, the simple but often forgotten adage of communication and putting the patients' interests first.



Diana Terry hands the SAAD Presidential chain of office to Nigel Robb

Next into the breach came Avril Macpherson. She was introduced by Nigel Robb, who congratulated her in her recent appointment as a Consultant in Special Care Dentistry. She gave an overview of the current status and issues in Scotland. Whilst weaving her way through the complexities of the Adults with Incapacity (Scotland) Act 2000, she gave us a tour of some of the most beautiful and other more functional homes of the Scottish legislative system.

All were invited to stay for the AGM before Nigel brought proceedings to a close on yet another successful, enjoyable and most informative day out! ■

PRACTICAL SEDATION: TRANCES, NEEDLES AND CONSENT

SAAD AUTUMN CONFERENCE ABSTRACTS

26 SEPTEMBER 2009

THE LONG SEDATION CASE: HOW DO I MANAGE IT?

Sheldon Collins

This abstract presents my personal experience and opinions in managing long sedation cases.

It's important for you to note that in general I deal with high-end general dental practice, so unlike many of you I don't encounter special needs or highly medically compromised patients but rather a lot of elective cosmetic or implant cases with their associated surgical procedures such as bone grafting or antral lifts. It's my extreme conservatism that has seen me through the day.

Ironically I am sharing this section with David Craig, Joe Omar and André du Plessis. David, because he was both my teacher and mentor and therefore entirely responsible for the way in which I NOW practise my speciality. And the irony with Joe and André because despite us being in competition they have shown me nothing less than the greatest professional respect and camaraderie whenever I have had the pleasure to meet up with them personally! The significant difference I feel between myself and Joe and André of course is that I was a practising dentist for almost 30 years and it is this that plays a big role in my planning of a long case and in some instances even to advise the operator on access and other practical approaches or problems that arise clinically from time to time.

I cannot in all fairness attribute my success to any evidence-based science here but rather to my personal approach and personal experiences together with a simple psychological approach.

In the 25 years I've been practising IV sedation I've had to my memory 2^{1/2} failed cases, none of which were long cases! But I have supervised or been the operator/sedationist in a large number of long cases – frequently three to four but sometimes up to six hours. In



Sheldon Collins

the earlier part of my career it was the repair or rehabilitation of greatly diseased or neglected dentitions under the health service, but in latter times the sorts of cases I outlined above.

So how do I deal with these?

Firstly, it is important to note I am generally never able to make a pre-sedation assessment of the patient personally and neither do I have the opportunity in many instances to meet the referring dentist if he is a new client or any of his nursing staff personally before the actual day of the sedation so I do this most often by liaising with the practice manager or receptionist by phone and/or email and gather as much information about the patient as possible. I then email the patient directly, offering them my direct contact number so that they may discuss with me any queries or concerns they have about the sedation, but it is indeed rare for them to call me, so my first contact with them is not until the actual day of the procedure.

The evidence I am presenting to you is somewhat ethereal rather than scientific, but it is experience based on over 25 years of personal practice of IV conscious sedation. What I describe now would apply to any case, long or short.

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On first meeting the patient I adopt a very personal, empathetic and friendly face to face approach with very open body language (and I lay great stress by that) and explain to the patient that I am a qualified dentist as well and emphasise to them that my role is purely to look after their comfort and to ensure they feel no unnecessary pain or anxiety and that my attention is only to them during the procedure and nothing else. I like to try and throw in a few quips and brevities about their dentist and very frequently perceive a general and immediate relaxation and sense of trust coming from the patient. This pseudo-psychological preparation is deliberate; it gives me a sense of the type of patient I am dealing with and the depth of their anxiety and what it is that particularly worries them. The most frequent question I get is, 'Will I still feel anything?' Hugely reassured by me that it's my job to ensure that they won't, the anxiety quickly softens. From this brief interaction I try to draw a projection of how the case might go. Next I discuss with the operator the exact procedure he/she is about to undertake. This is crucial because it may necessitate me trying to change the order in which he/she wishes to proceed. In general I will ask him/her to carry out all invasive procedures during the first part of the sedation: drilling, extractions, very deep scalings, bone grafting, malleting etc. This means that suturing, impression taking, actual filling of cavities, checking occlusion and fitting temporaries or anything else will take place in the latter, less profound, part of the session when, if the patient is lightening, they should not be traumatised.

During my 25 years of sedating patients I spent the first 17 years without any formal training or CPD in sedation and went from a somewhat hit and miss attitude to a more structured clinical performance. Many cases that I undertook were full repairs or rehabilitations, quite frequently four hours in length or occasionally more, and without, to my memory, any complaints from any patient about its success. Does this not speak volumes and almost evidentially for IV midazolam as a safe technique?

You can imagine that embarking on David's diploma course was to say the least an eye-opener. He above all taught me strict protocols and discipline of process within my limitations; that is to say only with IV midazolam! I have not been trained to use propofol or polypharmacy techniques and I never wander into their realm – ever. Therefore, my personal experience clearly demonstrates the incredible wide margin of safety that midazolam in general practice gives. Discipline,

professionalism and restraint seem to have been the secret of my success not only with long but also with short or routine cases. I rarely have to top up and when I do it's generally a single large bolus that does the trick. This seems to be most highly effective on the patient attending for gag reflex where there are signs of the reflex gradually reappearing.

And by the way... the 2^{1/2} failures? They weren't long cases.

1985: insufficient LA and insufficient control of local infection on attempting to extract an UR6.

2006: Patient dealt well with surgical 8 extraction but absolute intolerance to air turbine noise.

2007: Unsatisfactory level of sedation with midazolam; patient returned one week later for induction with fentanyl and this is the sole time in the whole 25 years I have used polypharmacy discussed in advance with David Craig.

Nothing magical in what I've said or done, just actual practical experience, but in my conservatism I will conclude to you that 'if it ain't broke don't fix it'!! I'm presenting here the continuing case for midazolam and do sometimes ask myself at conferences like this as well as DSTG if there isn't a bit of navel-gazing going on in our profession. I understand there never to have been a death by midazolam in dentistry in general practice. But isn't it a wonderful gift for us to enable patients to make a visit to the dentist for it to turn out to be such an easy and stress-free and seemingly very short event. ■

THE LONG SEDATION CASE USING MIDAZOLAM, PROPOFOL AND OPIATES

Dr Yusuf (Joe) Omar and Dr André du Plessis

Partners in a private practice limited to the provision of conscious sedation services in central London.

Fellow co-ordinators of the Eastman/UCL Certificate in Conscious Sedation and Pain Management.

Dr Omar is a well-known teacher in resuscitation skills in the UK.

This lecture formed part of the 'trilogy' on the management of the long case, but this time with the added benefit of opiates.

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Joe Omar



André du Plessis

Statistics show that long operations (four hours or longer) represent a significant segment of the practice work in this rather demanding socio-economic group, Joe then shared with the audience the way they go about the preparation before, and management during, these long cases. André then gave a synopsis of the methodology and behavioural management that applies during the pre-operative conversation with the patient, and then touched on some points that should be considered during the surgery, before Joe discussed pharmacological agents most commonly used in long cases, with specific reference to the beneficial role of opiates during prolonged surgery in the dental chair. Opiates clearly increased patient comfort during the long case, assisted with the quality of sedation, and played a positive role in relation to post-operative morbidity. ■

THE LONG SEDATION CASE: MIDAZOLAM + PROPOFOL INFUSION

David Craig

David described a conscious sedation technique using titrated midazolam followed by propofol infusion. This technique takes advantage of midazolam's profound sedative and amnesiac properties and the faster recovery associated with propofol. It is useful for managing longer cases, particularly those where the most unpleasant phase of the treatment occurs at the beginning.

Propofol is a potent, short-acting, intravenous anaesthetic agent. In sub-anaesthetic concentrations it is a reliable

and safe drug for intravenous sedation, with a considerably shorter distribution half-life than midazolam. By comparison with midazolam, recovery is rapid and patients report feeling 'clear-headed' more quickly. Amnesia is often less profound. Propofol confers a greater degree of anxiolysis than sedation and patients appear less sleepy than with midazolam. When administered by continuous infusion, propofol is more controllable than titrated midazolam and the depth of sedation may be varied during the procedure. It is particularly useful for very short and also longer procedures. There are few contra-indications to propofol but it should be avoided if there is known or suspected allergy to any of its components or for patients with epilepsy.

The following regimen is suitable for adult patients under the age of 65 years.

Midazolam is administered in the usual manner:

2mg injected over 30 seconds

Pause for 90 seconds

Further increments of 1mg administered every 30 seconds until sedation is judged to be adequate

Watch for any adverse responses, in particular respiratory depression. The correct dose has been given when there is a slowed response to command, slurring of speech and the patient looks relaxed.

After 20–30 minutes an intravenous infusion of propofol (1%) is started at a rate of 200mg per hour. This infusion rate may need to be adjusted during the procedure.

Careful clinical monitoring and pulse oximetry is mandatory. As with all dental sedation techniques, the



David Craig

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use of appropriate local analgesia is essential. The procedure for recovery is similar to that for midazolam. The criteria for discharge and instructions for aftercare suggested for midazolam should be observed. Propofol infusion techniques are not suitable for use by an operator/sedationist. The technique may only be used by a second practitioner who has received specific training and is experienced. ■

ALTERNATIVE / COMPLIMENTARY ANXIETY MANAGEMENT

HYPNOSIS

Mike Gow

Prior to the advent of reliable chemical anaesthesia, British medical surgeons such as Elliotson, Esdaile and Braid pioneered the use of hypnotic techniques in controlling pain and anxiety associated with medical surgery in the 19th century. The first reported use of hypnosis for pain control during a dental extraction was in 1836 when Oudet, a Parisian physician, extracted a tooth from a hypnotised patient. With the advent of more reliable chemical anaesthetics, however, the medical and dental professions understandably focused on researching and developing these techniques.

There is now, however, a plethora of research into hypnosis which is establishing an impressive and growing evidence base.

Modern medical and dental hypnosis has a wide spectrum of applications; however, one field that gains much interest from the profession and in research is that of pain control. A meta-analysis by Montgomery et al (2000) highlighted the convincing evidence base for hypnosis in acute and chronic pain management for a number of conditions. The exact mechanisms of how hypnosis actually works in pain control is only now in the 21st century becoming more understood, with an increase in neuro-imaging studies such as those carried out by Derbyshire et al (2004).

“The term “hypnosis” denotes an interaction between one person, the “hypnotist”, and another person or people, the “subject” or “subjects”. In this interaction the hypnotist attempts to influence the subjects’ perceptions,



Mike Gow

feelings, thinking and behaviour by asking them to concentrate on ideas and images that may evoke the intended effects. The verbal communications that the hypnotist uses to achieve these effects are termed “suggestions”. Suggestions differ from everyday kinds of instructions in that a “successful” response is

experienced by the subject as having a quality of involuntariness or effortlessness. Subjects may learn to go through the hypnotic procedures on their own, and this is termed self hypnosis’ (Heap 2002). A hypnotic subject is said to be in trance, defined by Oakley (2001) as ‘a particular frame of mind characterised by focused attention, dis-attention to extraneous stimuli, and absorption in some activity, image, thought or feeling’. Often there will be time distortion in that the passage of time is underestimated. People can and do enter trance spontaneously every day, for example when lost in thought, daydreaming or absorbed in a book or listening to music. Most patients will experience some form of trance during a dental visit. Dentists can often therefore effectively use ‘informal’ hypnotic techniques and suggestion without any hypnotic induction per se. Such techniques can be used in day-to-day dental practice in the form of specific suggestions, embedded commands, communication skills, body language, rapid rapport building techniques, goal-setting, future rehearsal, use of positive language and feedback, careful choice of language, distraction techniques, etc.

Hypnosis in preparation for dental treatment

As long as almost 50 years ago, Pearson (1961) concluded that hospital stays were shortened by 2.42 days with a short post-operative hypnotic suggestion. Similarly, hypnosis can ultimately allow quicker and less stressful dental treatment. In preparation for dental treatment, hypnosis can be used to uncover the reason why the phobia developed, resolve feelings about previous bad experiences, engage the patient in their treatment by using future rehearsal techniques, act as an adjunct to desensitisation techniques, overcome embarrassment/other issues, and so on.

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Hypnosis to complement local anaesthetic

During dental treatment, hypnosis and suggestion can be used to complement local anaesthetics by reducing levels of anxiety and pain. As the majority of dental patients have their treatment carried out using local anaesthetics alone, this is an area where a dentist trained in hypnosis could use 'informal' hypnotic techniques and suggestion on a day-to-day basis.

Hypnosis to complement sedation

Without behavioural intervention, a sedated patient can often still be difficult to manage. The advantages of positive suggestion with inhalation sedation have long been known and practised. Treatment that combines hypnotic techniques and suggestions with sedation is often quicker, helps the patient learn coping skills, helps build trust, expectation, motivation and rapport, and removes some of the dependency on the sedation. Often less sedative is required and recovery and healing times are faster (Spencer Brown 2004, Whalley et al 2008, Potter (in preparation).

Other advantages of combining sedation and hypnosis include:

- Reduction in anxiety, blood pressure, heart rate, etc.
- A technique called 'glove anaesthesia' can create altered sensation in a hand or arm prior to IV cannulation.
- Relaxation and breathing techniques that work synergistically with inhalation sedation.
- Hypnotic time distortion can allow longer cases to seem shorter to the patient.
- Suggestions can be given to control pain, bleeding and gagging.
- Suggestions, especially with IV sedation, can be given to create amnesia or enhance recall as appropriate.
- Post-hypnotic suggestions can be given to promote comfort and healing after the treatment.
- A recent study by Whalley et al (2008) highlighted the fact that there is increased suggestibility with nitrous oxide inhalation sedation.

Hypnosis as an alternative to local anaesthetics and/or sedation

There are a few situations where hypnosis may be considered as an alternative to local anaesthetics and/or sedation, e.g.:

- Allergy to local anaesthetics is very rare; however, hypnosis could be used in some situations, e.g. when a true allergy is diagnosed, or to deal with an emergency while allergy testing is carried out, etc.
- Known allergy or history of unusual response to sedation techniques.
- At the patient's request. Many patients dislike the feeling of local anaesthetics or sedation, with some saying that they feel unwell afterwards. Also, there are growing numbers of patients who prefer non-pharmacological options.
- The need for a chaperone and the recovery time required for some forms of sedation may be significant barriers for some patients.
- Complicated medical history: hypnosis could be used in situations when use of local anaesthetics and/or sedation could be dangerous to the patient due to underlying medical conditions.
- Educational: to demonstrate the effectiveness of hypnosis so that the public, medical practitioners and dentists may be aware of and may consider hypnosis as an option in combination with LA/sedation.

Training

For more information on training in hypnosis visit www.bsmdh-scot.com, www.bscah.com and www.hypnosisunituk.com.

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Gow M.A. and Friel P.J. (2008b) Dental Extractions, immediate placement and temporisation of dental implants in the aesthetic zone. Michael A. Gow and Philip J. Friel present a case featured on BBC television using hypnosis in place of local anesthetics- a world first in dental practice. Part 2 of 2. Dentistry 21 March 2008. ■

ACUPUNCTURE: AN ANCIENT TECHNIQUE IN THE MODERN-DAY DENTAL CLINIC

David Johnson

It's Monday morning and you're just starting to get back into the swing of things after a weekend of madness. Then in walks that patient. He's a lovely gentleman in his fifties, pleasant in his manner and appearance, but he's a gagger. You saw him two weeks ago and he just about got through the examination with only a mirror. You didn't even consider attempting bitewings for the fear of the response it would evoke. And now, today, you have to attempt an ID block, MO on a lower premolar and a scale and polish whilst you're waiting for the anaesthesia to work. The fact that you'll only get three UDAs is the least of your worries. This is going to take time and be a struggle for both of you, at best!



David Johnson

Would you like to learn a simple, effective technique to help eliminate this patient's gag, making treatment a great deal easier for both the patient and you?

Later that same day, you are presented with a 15-year-old girl, accompanied by her mother, complaining of pain and tenderness on both sides of her face extending from the lower border of the mandible up to her forehead. She is experiencing difficulty eating and has pain on opening her mouth; overall she is distressed and finding it difficult to study for her GCSEs. After a thorough examination you explain to the patient and her mother that she has TMJD of muscular origin. The opinions you have to offer her are splint therapy, but this will take a week to come back from the lab, or you could try a low-dose muscle relaxant, such as diazepam. But you're hesitant to prescribe her this type of medication. Ideally you'd like to offer her some form of treatment now, whilst she's in the chair, but what?

Would you like to learn a simple, effective technique to help treat this young lady's acute symptoms there and then?

The aim of my talk was to outline the scientific theory behind the ancient technique of acupuncture and how the dental team can incorporate this into their everyday practice.

If you would like to learn more on how dental acupuncture can help you treat these patients and other oro-facial conditions, visit www.dentalacupuncture.co.uk. ■

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CONSENT IN ENGLAND AND WALES

Diana Terry

Consent to treatment is defined as ‘a fundamental principle of medical law. The basic rule is simple...’(MPS Guide to Consent in the UK 2009). However, when we examine how this works in practice, keeping abreast of important changes in process and documentation is far from simple. Many regulatory bodies have an interest in ensuring that practitioners are aware of the current law and ethical standards that apply. Practitioners should be aware of the guidance produced by the Quality Care Commission, General Dental Council (GDC), General Medical Council (GMC), and the Departments of Health in England and in Wales. The NHS England is currently undertaking a review of consent in the NHS with a view to making regulation and quality assurance more robust.



Diana Terry

Both the GMC and GDC have six overriding principles of good practice and practitioners must ensure that their consent processes meet these requirements.

The GMC document on consent is titled ‘Patients and Doctors Making Decisions Together’. This reflects a major change in the way the process of consent must be carried out and recorded. You are strongly recommended to read the whole document, which is available on the GMC website.

An important feature is the requirement to respect patients’ dignity and choices. The GDC guidance states that you must ‘recognise and promote the patient’s responsibility for making decisions about their bodies, their priorities and their care, making sure you do not take any steps without the patients’ consent (permission)’ (GDC: Standards for Dental Professionals, 2008).

There are three components to valid consent (www.medicalprotection.org.uk/booklets/consent):

Capacity
Information
Voluntariness

The GDC states that ‘every adult has the right to make their own decisions and must be assumed to be able to do so unless they show otherwise. If there is any doubt, assess whether the patient is able to give informed consent. Consider whether or not the patient understands and can weigh up the information needed to make the decision in question.’

The capacity assessment refers to that specific decision, and it may be challenging for practitioners to ensure that information is given at the right time, in the right manner and in a way the patients can understand and assimilate.

Practitioners should be aware of the Mental Capacity Act 2006 and the Amendment; Deprivation of liberty safeguards October 2008, in addition to legislation on human rights, when planning their operating procedures for obtaining consent from their patients. ■

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A recommended reading list of websites.

www.parliament.uk	Heath and Social care Bill 2007–8
www.mps.org.uk	GMC Consultation on confidentiality Nov 2008
www.medicalprotection.org/uk/booklets/consent	MPS Guide to Consent in the UK
www.dh.gov.uk/en/Publicationsandstatistics/ Publications/PublicationsPolicyAndGuidance/ DH_4005204	Consent – what you have a right to expect: a guide for Adults 2001
www.dh.gov.uk/en/Publicationsandstatistics/ Publications/PublicationsPolicyAndGuidance/ DH_4005202	Consent – what you have a right to expect: a guide for Parents 2001
www.dh.gov.uk/en/Public health/ Scientificdevelopmentgeneticsand bioethics	Consent: interim position and useful links Reference Guide to consent for examination or treatment, second edition 2009
www.rcoa.ac.uk	Your anaesthetic March 2007 plus other patient links
www.aagbi.org	Consent for Anaesthesia revised edition 2006
Department of Health. Gateway reference 8965	Mental Capacity Act 2005 Briefing sheet-Deprivation of Liberty Safeguards October 2008
www.gdc-uk.org	Standards for Dental Professionals May 2005. Consent guidance
www.gmc-uk.org/guidance/ethical_guidance /consent_guidance/how_guidance	Consent: patients and doctors making decisions together 2008
ethics@bma.org.uk/ethics	BMA Consent 3rd edition 2008
www.bma.org.uk/ethics	Mental Capacity Act Toolkit
www.wales.nhs.uk/Publications	Reference Guide for consent to examination or treatment Consent; what you have a right to expect Good Practice in consent implementation Guide

2009 CONFERENCE

PROVIDING TREATMENT FOR THOSE WHO ARE UNABLE (DO NOT HAVE THE CAPACITY) TO CONSENT

Graham Manley

The provision of conscious sedation should be accompanied by written consent. This requires an understanding by the patient of the nature and implications of the sedation and treatment proposed. The Mental Capacity Act 2005 was introduced to provide a legal framework and comply with best interests for those adults who do not have capacity to follow the consent process. Adults may have a disability that presents problems with communication (e.g. hearing and/or visual impairment, cerebral palsy, locked-in syndrome) but be fully competent. For such people, clear communication must be established and if written consent is not possible it may be witnessed in writing by an accompanying adult. For those patients without capacity (e.g. severe learning disability, challenging behaviour, some cerebral palsy, adults with Alzheimer's, dementia) the clinician providing care is usually the nominated decision-maker and needs to confirm that a) the patient is not competent and b) the care/treatment proposed is in his/her best interest, and record in writing the reasons for this. Capacity may vary depending on both the adult's level of comprehension and the complexity of what is proposed and for these reasons any agreement for treatment will need to be specifically related to the care proposed. Capacity may also vary over time in cases for example of patients recovering from a stroke or other neurological disorders. As a starting point it should always be assumed that the patient is competent and all efforts to help with decision-making must be employed. In general terms the less restrictive alternatives may be appropriate but care provided must be in the patient's best interest. If serious treatment is proposed (e.g. limb amputation, hysterectomy) and the adult without capacity does not have an independent source of support (e.g. relative, friend), an Independent Mental Capacity Advocate (IMCA) may be appointed. Any aspects of care that the patient may have specified prior to losing capacity must be respected, as should religious and cultural beliefs. In England the patient's general medical practitioner does not need to be involved in the determination of capacity. If the clinician is concerned about the treatment proposed he/she may consider it prudent to involve a colleague in the process who may provide written (signed) evidence of their involvement. The appropriate



Graham Manley

records should be maintained in dealing with patients who do not have capacity and confirm that the patient does not have capacity and that care proposed is in the patient's best interest. It is good practice to involve the patient's carer (who may sign to agree these two points) and relative if not the carer.

For adults who do not have capacity their care must not be delayed or avoided for fear of legal action. This is not in their best interests. ■

THE SITUATION IN SCOTLAND FOR THOSE WHO ARE UNABLE (DO NOT HAVE THE CAPACITY) TO CONSENT

Avril Macpherson

Background

Prior to 2005, Scots law did not reflect the increasing societal and professional awareness of the rights of adults with incapacity and of the need to safeguard their personal and financial welfare. The law was unclear with regard to consent for medical and dental treatment where the patient was unable to give or withhold their consent, the only absolutely certain route being to approach the courts for authority to treat.

The Scottish Law Commission's Report on Incapable Adults, presented to Parliament in 1995, made a series of recommendations that formed the basis of the Adults with Incapacity (Scotland) Act 2000, one of the first pieces of social legislation laid before the new Scottish Parliament.

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The Adults with Incapacity (Scotland) Act 2000

The Act relates to the property, financial affairs and personal welfare of adults (from the age of 16 years) who are incapable by reason of mental disorder or inability to communicate.

All interventions under the Act must be based on five general principles:

- Benefit to the adult
- Minimum necessary intervention (the least restrictive option)
- Take account of the wishes of the adult (past and present)
- Consultation with relevant others (relatives, carers, guardians etc.)
- Encourage the adult to exercise residual capacity.

'Incapable' is defined by the Act as being incapable of: acting, or making decisions, or communicating decisions, or understanding decisions, or retaining memory of decisions.

Proxies may be appointed to make decisions about medical and dental treatment on behalf of the incapable adult, the two most common of which are welfare attorneys and welfare guardians.

A welfare attorney is granted by the adult while they still have capacity and only becomes active when the adult becomes incapable under the terms of the Act. The welfare attorney is usually a family member, friend or solicitor. The power of attorney is drawn up by a solicitor and registered with the Office of the Public Guardian Scotland.

A welfare guardianship order is a Sheriff Court appointment that authorises the welfare guardian to make decisions, including consent to treatment, on behalf of an adult with incapacity. The Office of the Public Guardian Scotland issues each welfare guardian with a Certificate which confirms their duties.

The Mental Welfare Commission Scotland is tasked with ensuring that proxies act in the incapable adult's best interests. It also has a role in the resolution of disagreement between proxies and healthcare professionals regarding the 'best interests' of the patient by facilitating a second opinion by a nominated practitioner experienced in the relevant medical/dental



Avril Macpherson

speciality. The ultimate forum for appeals is the Court of Session, the highest civil court in Scotland.

Adults with Incapacity (Scotland) Act 2000: Part 5 – Medical Treatment and Research

On 1 July 2002, it became a new legal responsibility for the doctor primarily responsible for the care of an adult, usually their general medical practitioner, to assess an adult's capacity to reach a decision in connection with medical (including dental) treatment and certify incapacity by completing a Certificate of Incapacity. Dentists, whilst continuing to assess the capacity of their patients to consent to treatment, were not permitted to make an independent assessment of incapacity. Instead, the dentist was compelled by the Act to ask their medical colleagues to certify incapacity and give them 'delegated authority to treat', including treatment plan, the patient. Such a Certificate of Incapacity was valid for a maximum period of one year.

Amendments to the Act and the Medical Code

It was quickly recognised that requiring a medical practitioner to assess incapacity on behalf of all healthcare professionals and issue a new certificate on a yearly basis was not in the best interests of patients and often delayed treatment.

As a result, the Act was amended in the Smoking, Health & Community Care (Scotland) Act 2005 to enable appropriately trained dentists, ophthalmic opticians and registered nurses to issue a Certificate of Incapacity within their own area of practice. The maximum length of validity of an Incapacity Certificate

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rose to three years in specific circumstances including severe and profound learning disability.

An accompanying revised Medical Code of Practice became effective in January 2008.

Adults with Incapacity – the challenges

The logistics of obtaining an assessment of incapacity remain cumbersome since few dentists in Scotland have undergone the necessary formal training and none can currently access it. There therefore continues to be heavy reliance on the goodwill of medical colleagues.

A significant proportion of dentists may be unaware that the legislation applies in their sphere of practice, e.g. the provision of dentures for an incapable but compliant care home resident.

There is no clarity regarding the definition of an 'emergency', where the patient's best interests would take priority over assessment and certification of incapacity, in dentistry.

The Medical Code states 'A single certificate of incapacity is entirely appropriate when an adult requires a single procedure e.g. an operation.' Again, clarity is lacking regarding the definition of an operation, e.g. whether or not this includes all dental treatments under sedation or only relates to general anaesthesia.

There are currently some 28,000 welfare attorneys and 1,200 welfare guardians registered in Scotland and the trend is upward. Many proxies appear to be unaware of their duties under the Act, including making themselves known to healthcare professionals and actively engaging with treatment options and health prognoses. Indeed, many live so distant from the patient that it is impossible to meet with them as part of the consent process. There is also a lack of specific guidance regarding the recording of consent obtained from a proxy, and in fact no specific consent form exists in Scotland for this purpose.

There is no doubt that Adults with Incapacity legislation and the accompanying codes of practice aim to support and protect vulnerable adults. The many issues around the practical application of the Act in dentistry will no doubt be clarified as case law develops. ■

SAAD AGM

The Annual General Meeting of SAAD was held after the main conference, which was a great success

Following the adoption of the minutes of the last AGM (2008), the President (Dr Diana Terry) reported that the final year of her presidency was marked by great activity in the field of Conscious Sedation. A core area of SAAD's work is the National Course in Conscious Sedation which continues to provide definitive training, with courses that are continually booked far ahead.

The Secretary's report (Dr Derek Debuse) dealt with correspondence received. The arrangements with the Association of Anaesthetists of Great Britain and Ireland (AAGBI) were working well. He attended the meeting of the Specialist Societies and reported that SAAD measure up well against the others. Fiona Wraith, the Executive Secretary, was thanked for her support throughout the year.

Dr Stephen Jones presented the Treasurer's report. He was able to report that despite the recession and the fall in investment income, SAAD's finances were in good shape. SAAD is therefore able to contribute financially

to educational projects, thus fulfilling and justifying our charitable status.

Each year, two trustees retire from the SAAD Board. This year, Dr Derek Ryan and Dr Carole Boyle retired. Dr Ryan decided not to stand again and Dr Boyle was made President-elect with a Committee vote. Dr Terry thanked Dr Ryan for his contribution to the work of SAAD.

Two new trustees were elected to the Board: Dr Peter Walker (proposed by Dr Nigel Robb and seconded by Dr Conor O'Brien), and Dr Chris Mercer (proposed by Dr Derek Debuse and seconded by Dr David Craig).

Dr Nigel Robb was installed as President, being officially awarded the SAAD chain of office. Dr Robb thanked Dr Diana Terry for her three years of guiding the Society, and a bouquet was presented by Dr Robb on behalf of the society.

Derek Debuse
Hon Sec SAAD

PROFILE



PETER WALKER

It all went wrong in 1996 when I matriculated at Dundee University to start my degree in dentistry. Up until this point I had grown up in Edinburgh and had had an innocent life not knowing the difference between amalgam and composite. To me the dentist was a nice old man who was really impressed when I could open my mouth very wide. The day I had fissure sealants placed, my response to Mum was ‘that was no big deal.’

So when I was faced with my first patient as an undergraduate and asked to place crowns and restorations for the first time it opened my eyes to the vast new world of teeth.

Since then my first post was as a general professional trainee south of the border in Newcastle. This is where my interest in sedation started. Part of the training was spending time in the sedation suite treating patients with the aid of intravenous midazolam sedation. However, I probably spent more of my time singing to patients instead of treating them.

I then moved further south to York for a couple of years, carrying out SHO duties in maxillofacial surgery. After my sentence was up I finally retreated back north of the border to Glasgow and in 2007 married a west coaster from Ayrshire.

Suddenly my life became very busy both at work and at home. I am now working as a senior salaried dentist providing dental sedation within Stobhill Hospital. I also supervise student and postgraduate clinics at Glasgow Dental Hospital. I am currently in my first year of a Masters in Primary Dental Care at Glasgow University.

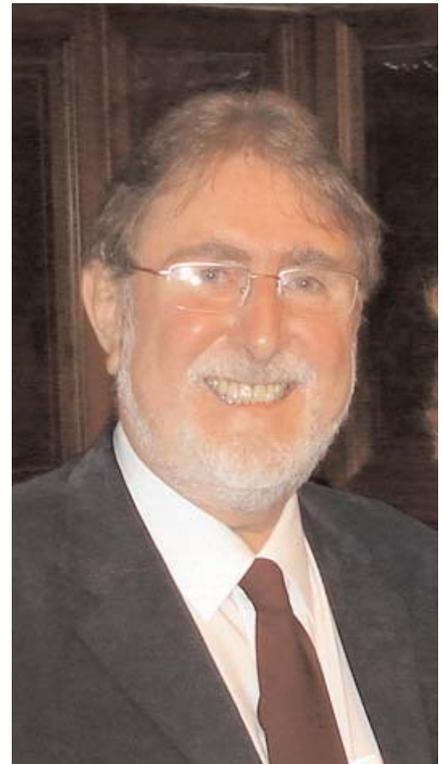
To top it off at home my wife Alison and I are expecting twins in the New Year, and my social life then ends! Prior to this I enjoyed skiing, dog-walking and socialising. ■

INTERVIEW WITH NIGEL ROBB PRESIDENT OF SAAD

with Derek Debuse (Hon Sec)



Nigel Robb, SAAD President



Derek Debuse, SAAD Hon. Secretary

DCD: First of all, congratulations on your recent appointment as President of SAAD. When did your association with SAAD begin?

NDR: Thank you. I do, however, feel that it is I who should be thanking SAAD for the honour of asking me to be their President. My first associations with SAAD were when Stuart Hargrave (the consultant anaesthetist who mentored me through my initial sedation training) introduced me to the great and the good at a meeting about training in Birmingham in the early 1990s. Shortly thereafter I was invited to join the teaching faculty and was delighted to accept! I was elected to Council in 2000 and have been there ever since!

DCD: When and where did you qualify? Were sedation techniques being taught then?

NDR: I qualified from Edinburgh in 1982. We were not taught anything about sedation at that point. I was still from the era where we had to administer a set number of general anaesthetics as part of the sign-up to finals.

I was aware as a student that on some sessions sedation was carried out in one of the surgeries on the Cons floor. We got the occasional glimpse through the door, but it was a bit of a mystery! There were RA machines in Children, but we never got to use them.

NEW PRESIDENT

DCD: I am aware that your early interests were in restorative dentistry. What prompted your interest in conscious sedation?

NDR: The short answer would be a series of lucky accidents! Whilst I was an Oral Surgery SHO (in 1983–4) I had undertaken training in hypnosis and developed an interest in anxiety management. I had also carried out a number of intravenous sedations (not very well) with the teaching of stick a needle in a vein and give it slowly! When I moved to Newcastle in 1989 one of my colleagues was active in the Territorial Army, and suggested that I join. One of the early courses I did was the Casualty Anaesthetic Support Officers Course. That taught me a lot about pharmacology, physiology, airway management and anaesthesia – not to mention cannulation skills.

When I returned from that course the colleague had handed in his notice, leaving a vacancy for someone to run the sedation teaching. It seemed ideal for me, so I started working on that project. My training was really an apprenticeship with one of the anaesthetists (Stuart Hargrave) who had an interest in sedation. He taught me a number of techniques, including IV midazolam, midazolam and fentanyl and propofol.

I found that I really enjoyed it and seemed to be quite good at it. The rest, as they say, is history!

DCD: You are a senior lecturer at Glasgow Dental School. Can you describe the sedation unit there? What undergraduate and postgraduate teaching is done?

NDR: The sedation suite in Glasgow is located on the seventh floor of the building. We have two surgeries, a recovery room and a waiting room for escorts. In addition, within the unit there is a nurses' room, my office and clean and dirty rooms.

The fourth-year students come to the department for seven sessions. They attend in groups of four and work as operator/sedationist and assistant. The students also attend one of my Sedation Assessment Clinics.

The Cons SHOs have a treatment session in the sedation suite and we run a course for them every six months.

The oral surgeons run two of the morning treatment sessions, and treat patients on two afternoons, where their junior staff are also given supervised clinical practice. I am also lucky to have two days when members of CDS staff come in to help with both teaching and treatment.

The students attend from the end of September to May each year, so in the summer we use the teaching sessions for postgraduates. We are integrating our teaching into the MSC in Primary Care, and hope to be able to offer that option from next year.

DCD: Roughly, how is your time split between teaching, research, administration and service provision?

NDR: The new consultant contract (which is not that new now) means that I have 3.5 direct clinical contact sessions. I have three teaching sessions, and four administration sessions. Sadly, I have very little time to do research. I have some links with the University of Padua, and Gastone Zanette and I have managed to publish some work together!

DCD: As President of SAAD, do you anticipate any major changes of policy or activity during your period of tenure?

NDR: I am not planning a revolution, if that is what you mean! I feel that the aims and objectives that we revisited in our revision a few years ago are still appropriate. We have been moving forward with these, but need to continue the impetus.

I will be striving to make SAAD's voice heard whenever and wherever sedation in dentistry is discussed. We have a voice on the NICE Committee that is looking at Sedation in Young People in Paul Averley. I would hope that we would be recognised as the body to contact for advice and comment.

The Practice Inspection Process is a good example of something that we have achieved that will get our name known! We must move on to the next project! Needless to say that is a matter for debate at the Board of Trustees!

NEW PRESIDENT

I am also keen that we make the Annual Conference one of the main things those involved in sedation wish to do for their relevant CPD.

DCD: Where do you stand on the provision of sedation for the under-12s?

NDR: All patients have a right to expect adequate pain and anxiety control (to quote old GDC guidance). This applies regardless of age, and so the under-12s have the same rights as the over-12s. Patients for whom inhalation sedation is the most appropriate sedation technique should receive this, but for those for whom other techniques are the most appropriate, these should be available. All of the guidance emphasises the importance of training of the team. All who provide sedation for children should be trained in the techniques that they use and their use in children. I am totally against a 'one size fits all' approach. Each patient should be carefully assessed to ensure that they receive the right sedation technique.

DCD: SAAD has a history of political activity to support the provision of conscious sedation. Are there any burning issues that you would like to see addressed?

NDR: I think the two major issues that are on-going at present are:

The issue of access to sedation in primary dental care under the new GDP contract in England and Wales. Whilst we wait to see the impact of the report produced under Jimmy Steele's chairmanship, there is the problem of sedation not being viewed as a core activity. We are already active in this area, but it is important that we move forward to ensure that there is adequate service provision for both standard and alternative techniques.

The second issue is that of training for alternative sedation techniques. SAAD were well represented at the meeting on this topic at the RCSEng in September 2009. We have a long tradition of teaching and I am keen that we continue to be involved in this development.

DCD: How do you relax in your free time? What outside interests do you pursue?

NDR: There are a number of things I do to relax. Music is a big part of that. I now sing with the City of Glasgow Chorus, and am writing this four days after we performed Messiah. I have sung in choirs virtually all my life, and enjoy both the practices and rehearsals.

I have been a fan of Dundee United Football Club since my uncle took me there in the mid-1960s. I have a season ticket and go to as many games (both home and away) as I can. I used to take my sons, but Neel is now in Norwich and Calum is playing rugby for the school 1st XV and Gosforth Colts, so they come less often now.

I go and watch Calum play when I can. It is the only time I can shout at him now without him answering back (he is 16 and taller than I am).

I love cycling (particularly off-road) although this year my trips have been very limited!

My other love is TVRs. I managed to buy my first one in 2004, when the boys grew out of the back seats of 2+2s – I now have a sensible car and fun ones as well.

I just wish there were more hours in the day and days in the week!

DCD: Thank you, Nigel. Good luck for the next three years.

NDR: Thank you! I just hope that I can live up to the examples of many whose names are on the Presidential Chain of Office! ■

MENTORING

MENTORING FOR INTRAVENOUS SEDATION IN THE RURAL NORTH EAST OF SCOTLAND – A PERSONAL VIEW

Francis I. Collier MSc BDS DipDSed (Lond)
Daniel Sowter BSc BDS (Lond) MFDS RCS (Eng)



It can be a problem to acquire clinical experience in sedation, particularly if you are located in an area which is remote from a dental school, where diploma courses or clinical attachments are more readily available. It was possible, in a rural area of Aberdeenshire and Moray, to provide one dentist, who had attended a SAAD weekend course, with the supervised clinical experience he required through the use of a mentoring arrangement.

Francis Collier took up a newly created appointment in NHS Grampian as Senior Salaried General Dental Practitioner in Anxiety Management and Sedation in late 2007, with part of his responsibility to develop sedation within the Primary Care Dental Service.

He qualified in dentistry at Guy's Hospital Medical School in 1978, and gained his Diploma in Sedation in 2002. He has wide clinical experience within the Community Dental Service and Salaried Dental Service,

as well as having held a part-time teaching post in the Department of Sedation and Special Care Dentistry at King's College London Dental Institute (Guy's Campus). He has been on the SAAD Mentors List since 2006.

Dan Sowter is a Community Dental Officer based in the Elgin area of Aberdeenshire, who has also had experience in general dental practice since qualifying at Guy's Hospital in 1999. He undertook some intravenous sedation cases as an undergraduate but had not had any clinical experience using this technique since then.

The two dentists first met when Francis organised training in inhalation sedation for a number of clinicians and their nurses, all of whom were based in the Moray area of NHS Grampian. After getting to know these colleagues a little better, Dan expressed an interest in pursuing further training to allow him to offer intravenous sedation for a range of patient groups, such

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as those with learning disabilities, which were within his remit as a Community Dental Officer.

As a clinician with 10 years' postgraduate experience, Dan was a very suitable candidate for this, and would be in a position to utilise such additional skills to benefit his client group. He was already booked to attend a SAAD weekend sedation course in March 2009, and it was agreed that following this Francis would act as his mentor for intravenous sedation.

The supervised clinical practice provided by the mentor for both the 'trainee' and his dental nurse would fulfil the requirement in the Standing Dental Advisory Committee's guidance of 2003 that all members of the dental team providing treatment under conscious sedation have received appropriate supervised clinical training.

Whilst it is impossible to guarantee competence after any particular number of clinical cases, the recommended number of cases to achieve competency in intravenous sedation is 20 (DSTG, Training in Conscious Sedation for Dentistry, 2005). In addition, at least five patient

assessments should be carried out, underlining the importance of appropriate patient selection in sedation practice.

The polyclinic facility at Elgin in which Dan would carry out his sedation activities was still under construction when they were ready to start his mentored cases, so it made sense for him to come across to Banff, where appropriate facilities were already established and in use. This was one of the two newly built NHS Grampian practices in which Francis provides sedation.

Bayview Dental Practice in Banff is a four-surgery facility, built to a very high specification, with stunning views across Banff Bay and out to sea into the Moray Firth. It is fortunate to have the facility of a dedicated 'meeting room' which may serve, at different times, as a recovery area and for initial consultations for sedation patients, away from an overtly clinical environment.

The mentored clinical sessions take place about twice a month, and fit within the clinical programme of both parties. Prior to the start date, Dan's dental nurse attended the one-day initial training course organised by



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Francis for nurses prior to them assisting with intravenous sedation. She has subsequently benefited from the supervised clinical practice when assisting Dan on his mentored sessions.

Initially, adult patients were selected from the sedation waiting list and assessed by Francis in the usual way, with the written consent specifically alluding to the fact that two named dentists would be involved in providing the sedation and subsequent dental treatment. It was explained that Dan was an experienced dentist who was enhancing his sedation skills under expert supervision. As the sessions progressed, Dan was able to assess a number of patients himself prior to treating them.

Most of the arrangements for the mentoring sessions were made over the telephone, as Elgin is some 35 miles from Banff, so the first visit by Dan and his nurse was to familiarise themselves with the clinic and surgery layout, discuss the sedation protocol, storage of drugs and recording their use in the Controlled Drugs register. Revision in the provision of positive pressure ventilation on the 'Little Anne' mannequin, and practice in drawing up drugs using water ampoules was carried out. Dan undertook some cannulation on both the Laerdal 'arms' and on Francis himself. The case notes of some future patients were reviewed and discussed, as was the system of record-keeping.

Documentation for both assessment and sedation are recorded on structured forms, which had been developed by Francis as part of a quality assurance initiative, for reasons of clarity, consistency of content, ease of recall and subsequent audit purposes. The dentistry itself is also recorded on Kodak R4 computer software.

On days when mentored cases are undertaken, a short discussion on the prospective sedation and dental treatment and perusal of the clinical notes is carried out prior to the treatment session, after which the patient is invited into the surgery. Initially, the patient was greeted by Dan and Francis and their dental nurses. Francis remained within the surgery in the initial cases, but as the sessions progressed his presence became less obtrusive. However, at all times he was immediately available for consultation and had no other simultaneous clinical or administrative commitments during these sessions. Francis would see the patient prior to discharge, after which a short debrief with Dan and his nurse allowed problems and concerns with that case to be discussed immediately after they had occurred. Both Dan

and Francis sign the sedation notes, and Francis signs the entry in Dan's Clinical Logbook.

This has been a most successful arrangement, with very few problems, and everybody concerned has enjoyed a most cordial working relationship. Most of the difficulties encountered have been related to difficult venepuncture, and the only post-sedation/operative problem was due to a dry socket. To date, 16 episodes of intravenous sedation and five assessments have been successfully carried out.

As both the mentor and mentored clinicians are salaried employees of NHS Grampian Primary Care Dental Services the subject of fees for the training did not arise. There was consultation with, and approval sought from, the Dental Clinical Director before embarking upon this process, which was felt to be advantageous for the future development of the Dental Service.

At the satisfactory completion of at least 20 intravenous sedations plus five assessments, Francis will issue a letter to confirm Dan's competency in the technique, a copy of which will be sent to the Clinical Director. A copy of this letter, his clinical logbook, CPD certificate from his SAAD course and a record of publications with which he was issued before commencement of the mentoring process (Practical Conscious Sedation by Craig and Skelly, SDCEP Guidance in Conscious Sedation 2006 and the SAAD DVD Routine Dental Treatment under Conscious Sedation) will be retained within the files of the Sedation Clinical Governance Group, which are held by Francis, who organises this group within NHS Grampian.

In the future, Dan may continue to undertake cases at Banff independently, until his sedation surgery at Elgin is complete. At that point, Francis and Dan will undertake a risk assessment/examination of the facilities to confirm their suitability for him to start sedation cases there. Dan will be encouraged to select more straightforward patients initially, with good veins, before progressing onto more challenging cases. The two will keep in close touch on an on-going basis, with the expectation that there will be dialogue and even joint management of cases in the future, where this is felt to be appropriate. Dan and his nurse are members of the Sedation Clinical Governance Group in Grampian, and will participate in their audit activities and meetings in the future. ■

SAAD NATIONAL COURSE

SAAD NATIONAL COURSE IN CONSCIOUS SEDATION

Chris Wright

Hello and welcome to the SAAD national course in conscious sedation. The course is the most popular and well attended in the UK. As well as covering the essentials of conscious dental sedation, the course also introduces and discusses more advanced techniques. Despite being held three times a year it is always oversubscribed. So whether you are new to dental sedation and thinking of attending for the first time or attending for a refresher on the subject, an early application for a place is advised. Sedation is a teamwork subject and the course is open to both dentists and nurses. Dentists are encouraged to attend with their nurses if possible.

The three courses each year are held in March, June and November and cater for the basic training of the dental team. The courses run over two days, Saturday and Sunday. They are conducted to the highest national standards and are constantly under review. The faculty of lecturers are experienced dental practitioners and senior nurses working in the dental profession. The lecturers know and understand the problems and challenges of modern dentistry and are able to relate to the participants on the course.

All the members of the teaching faculty are friendly and approachable. They are some of the best names in the country and are drawn from a broad spectrum of

academic and clinical dentistry. They possess a vast experience of teaching conscious dental sedation. They are nationally regarded and could be described as some of the prime 'movers and shakers' in the subject. They are highly regarded for their publications and contribute widely on national committees that help to regulate our profession.

Queen Mary, University of London is the venue for the weekend course. The course is held in the Bancroft Building on the university campus, which possesses the space and all the necessary modern teaching facilities. The lecture and tutorial rooms are air-conditioned and have state-of-the-art audiovisual facilities.

The dentists and nurses attend separate lectures, demonstrations and practical sessions. This caters for the different requirements of dentists and nurses. The two sections of the course run in parallel and complement each other. They mainly utilise the same speakers at different times, which ensures that the same message is communicated. Coffee and tea breaks are provided mid-morning and afternoon together with lunch on both days. During these breaks there is ample opportunity to meet new friends and greet old acquaintances.

Registration of the participants commences at 9.00 a.m. on the Saturday and you will find a welcoming cup of tea or coffee on arrival. The dentists and nurses are directed to their respective lecture rooms and it is here that the programme for the weekend, together with the aims and objectives of the course, are explained.

Participants on the course are kept active and occupied with a mixture of formal lectures and presentations and more informal group meetings and tutorials. The course sets out to provide a basic knowledge to act as a firm foundation for the skills and techniques of conscious sedation. The subjects are introduced gradually and progressively to build confidence in the subject. Time is allocated to teach as much hands-on practical skills as possible. Every effort is made to provide a close one-to-one approach with the tutors, when learning and



SAAD NATIONAL COURSE



practising new skills. During all aspects of the course the participants are encouraged to ask questions. The lecturers are very approachable and happy to deal with any queries privately.

On the second day of the course allied subjects are covered. These include the standards by which we should practise and medico-legal issues. Consideration is also given to the setting-up and provision of sedation services in primary care. The dentists have a choice of whether to practise further cannulation skills or attend a discussion on alternative sedation techniques. The nurses, on the other hand, are encouraged to refine their skills on life support and the use of airway adjuncts.

Finally, towards the end of the course, both dentists and nurses complete their own self-assessment MCQs and time is allowed for final questions. It is important that the participants on the course complete an appraisal form, which gives important feedback to the organisers. Careful attention to this feedback is taken in preparing subsequent courses.

The course is lively and exacting but nevertheless acts as a great confidence-booster for participants in the safe provision of conscious sedation. Everybody feels satisfied that progress has been made in the subject and this accounts for the course's great popularity.

Dentists are encouraged to develop their practical skills and are advised about contacting a mentor. The mentoring further enhances the theory learned on the course. The practitioners can arrange to visit their mentor's practice and observe sedation treatment. Alternatively, the mentor can advise on sedation provision



by visiting the participant's practice and assist them whilst treating their own patients.

Nurses are encouraged to sit the NEBDN examination in conscious sedation for which a Part 2 course is provided at Guy's Hospital. This is a follow-on from the initial course and builds on the knowledge that they have gained. On this Part 2 course they also learn the examination skills that enable them to sit the examination successfully.

Attendance certificates are given out at the end of the course to the participants. These are very often proudly displayed. The participants have successfully completed the SAAD course on dental conscious sedation.

Full information about the sedation courses can be obtained from our website at www.saad.org.uk/courses. You can find out the dates of the course, download application forms to reserve places and be informed about the current costs. ■



SECRETARY'S CORRESPONDENCE

Derek Debus

Members often contact SAAD with a variety of requests and questions. Many are run-of-the-mill questions about membership and availability of courses, but invariably there are questions of a technical or clinical nature that require some thought and even some research. The purpose of this article is to discuss some of the subjects that have been brought up, together with the responses that they elicit.

Training

A practice manager was concerned about the fact that her dentist was going to start a sedation service and the only training was what the dentist had received as an undergraduate. He/she qualified from a London school in 2007. I replied that postgraduate training is recommended in all the guidelines. The dentist might be in hot water if an appearance before the courts or the GDC occurred. Such bodies would be very interested in evidence of training and clinical experience in sedation. Whilst it is not mandatory to have a Diploma or similar qualification, significant attention to training would count very strongly towards a favourable outcome.

CPD is an important aspect of the provision of a conscious sedation service in practice. Many practitioners ask what sort of time interval should pertain between courses. It's a difficult question to answer as it very much depends on the amount of sedation they are carrying out. If they are only involved in the occasional case, more frequent updating would be advised, say every four or five years. If they offered a significant amount of care using sedation, updating should be every six or seven years. In general, techniques have not changed that much over the last few years, but there have been significant changes in attitudes and priorities, and this also applies to dental nurses. Sedation-related CPD should be a part of the annual CPD cycle and attendance at the SAAD Annual Conference or a similar event demonstrates a commitment to on-going CPD in the field.

Protocols

It is very appropriate to have a printed protocol for the provision of sedation, and this should be kept up to date and posted in the practice where all staff can read it. SAAD often gets asked to provide such a protocol but we decline on the basis that every practice has its own way of

doing things depending on its layout, patient mix and operator preferences. SAAD simply advises that a protocol should be devised using as a template the document from the Standing Dental Advisory Committee *Conscious Sedation in the Provision of Dental Care*. This can be downloaded from the SAAD website at www.saad.org.uk.

Oral and intranasal sedation

The question was asked whether it was necessary to cannulate every case of oral or intranasal sedation. The correct answer to this question is that one should, as there may be a requirement to reverse the sedation in an emergency, to give emergency drugs, or, indeed, to enhance the sedation with further increments of midazolam. There will be the occasional case, however, where cannulation may not be possible on clinical grounds, but extreme caution should be observed in such cases and the reasons documented.

Medical considerations

A member was asked to provide sedation in practice for a 20-year-old male with cystic fibrosis. This is an inherited disorder and occurs in approximately 1 in 2,000 births. Adult patients with the condition are usually very well informed about it and have a good working relationship with their physiotherapist. Physiotherapy keeps the secretions mobile, and advice from their physio is very helpful. If the condition does not affect their day-to-day existence, they can usually be classed as ASA 2. For sedation with midazolam, no extra precautions need to be taken, apart from avoiding opiates and supplementary oxygen unless it is humidified. Normal, non-humidified oxygen will dry up and thicken their secretions. We must bear in mind that these patients have probably been sedated many times in the past for bronchoscopies. If they have suffered significant lung infections, they may show some bronchiectasis and cardiac symptoms that will render them ASA 3, at which point they should only be seen in a 'specialist' environment.

A member was concerned about giving intravenous sedation to a patient who was taking anti-malarial drugs prior to going on holiday to Africa. I was able to get advice from a variety of sources, including the BNF, who were able to reassure us that there should be no side effects or drug interaction.

Medico-legal aspects

I was asked whether I could provide a standard sample contract between a sedationist (or anaesthetist) and a dentist. I had to say that there is no proforma contract. The guidelines are clear, however. The dentist must ensure that the anaesthetist (or other dentist) has had training in dental sedation, has read the guidelines and provides sedation in an appropriate way. Just because a consultant anaesthetist is experienced in dental anaesthesia or general sedation for other disciplines does not mean that he/she will provide safe sedation for dental patients. Ultimately, it is the dentist who has to take responsibility for what goes on in their dental surgery. It would be wise for any contract to deal with the issue of who supplies the drugs and equipment and who is responsible for ensuring their servicing and maintenance. It is important that there is an

understanding about the roles of all parties regarding patient assessment, consent, roles during treatment, and management of possible complications during both recovery and discharge as well as during treatment.

A member had been asked to provide intravenous sedation in another practice. It is possible to do so, provided that the practice has the appropriate facilities and layout. One needs also to make sure that the patients are suitable, to have read the literature and to have complied. Consent to dental treatment with sedation should have been agreed beforehand. It is also advisable that the operating dentist understands what sedation can do, and the importance of airway management. It is advisable if possible to have assistance from your usual dental nurse when working elsewhere, but is not mandatory, as the sedationist will be able to monitor the patient. ■

BOOK REVIEW

Safe Sedation for All Practitioners

by James Watts

There is a place for a book on sedation between a relatively simple handbook such as Craig & Skelly's *Practical Conscious Sedation* and a weightier one like Stanley Malamed's *Sedation*. James Watts subtitles his book 'A Practical Guide', and this is undoubtedly a well written and easy-to-follow guide, with an extensive bibliography for those who wish to delve further. His use of Learning Points in each chapter and selection of actual practical mistakes trawled from newspapers and official publications encourage the reader to think carefully about the hows, whys and wherefores of sedation. He clearly differentiates between drugs with sedative effects and sedative drugs, which is something that may cause confusion, particularly in the inexperienced, and leads well with the section on what we know as 'advanced' techniques.

As a consultant anaesthetist, Watts clearly lays out his viewpoint as medical practitioner, hospital based and oriented. He writes for all who practise sedation, whether doctor, dentist or nurse, and quotes extensively from dental authorities, with in particular DSTG and SAAD being mentioned with regards to training and setting standards. This background and orientation does lead to an

interesting slant on the relative safety of sedation vs. general anaesthesia, but those of us who are trained in and practise conscious sedation for dentistry may not always be aware of some of the practices of our medical colleagues, many of which appear not to reach the popular press.

There is a large section on sedation for different treatment groups, of which dentistry is but one. Here Dr Watts may be at odds with some who are in general (dental) as opposed to community practice but the reader must always bear in mind the caveat that although most of us are happy to generally stay within the ASA 1 and 2 groups much medicine is, of necessity, practised on the ill as opposed to the relatively well patient. Dr Watts is aware that his dental experience is dated and primarily theoretical.

There is a place for a textbook on sedation between a simple handbook and a weighty tome. Is this the one for the dental sedationist? Perhaps. Is this the one for the dental sedationist experienced in advanced techniques? Probably not.

Tony Caen ■

DSTG ANNUAL SYMPOSIUM

24 and 25 April 2009

The Education Centre, Bristol Royal Infirmary

Sandra Zijlstra-Shaw

This year's DSTG Symposium was held in Bristol, once one of the most important trading ports in England and now home to the BBC's world-famous Natural History Unit, Aardman Animations (creators of Wallace and Gromit) and Deal or No Deal!

At this year's Symposium there were sessions devoted to governance, teaching, research and practice, thus echoing Bristol's claim to provide something for everybody.

Chris Bell, the local organiser, welcomed us to Bristol and thanked everyone for coming, before chairing the first session, 'Patient Assessment and Contracts'.

The first speaker was Dr Roger Yates, Consultant in Restorative Dentistry at Bristol Dental School, which was only round the corner from the Symposium venue. Dr Yates led us through the ups and downs of setting up a restorative sedation teaching service at Bristol Dental School. He explained that he discovered a lack of any service between conventional delivery of restorative treatment and treatment under general anaesthesia. Furthermore, the GDC inspection report in 2003 noted that undergraduates received little experience in sedation, which isn't surprising as one of the general recommendations from the 2003-5 visitation report is that 'The teaching of conscious sedation needs to be reviewed, in order to increase students' hands-on experience before graduation'.

Roger went on to explain how he had used the opportunities provided by the increase in student numbers, the changes in the NHS contracts and a curriculum review within his five-year plan to develop and deliver a restorative sedation programme for the undergraduates. He explained that he encountered problems with allocation of chair space and time, but that the biggest obstacle was related to the 'mystery' surrounding sedation: most colleagues who didn't understand sedation thought it was either inappropriate or dangerous.

He went on to address the needs of the course, which included a teaching site with the appropriate facilities, appropriately trained staff and a pool of suitable patients.

He found one area of the clinics which was under-utilised, looked for staff across the whole hospital and found sedation-trained staff in restorative, oral surgery and oral medicine as well as a dozen sedation-certified dental nurses. Roger pointed out that sometimes you would need to 'borrow' staff from different departments. Much of the teaching is done using a Blackboard-based electronic learning environment in conjunction with the practical sessions. He took advice on staff: student ratios and discovered that a ratio of three staff to five student pairs allowed for maximum flexibility and safety. Roger also emphasised the need for good nursing support.

The patients were fed through from consultant clinics and often came through Oral Surgery; they were generally dental phobics, ASA 2/3, drug abusers or alcoholics. A large group of patients is needed as getting them to turn up to appointments is not easy; in fact, Roger's staff telephone them two days before to confirm the appointment.

Despite presenting his plan in 2006 with a view to beginning in September 2007, modifications were needed and the course began a year later, since when he has received very good feedback from the students. Roger concluded by stating that sedation experience was vital for undergraduates and that it must be protected. A thought echoed by all those present.

Chris Bell then introduced the next speaker, Dr Michael Allen, who runs a specialist sedation referral practice in Monmouthshire and is also a Lecturer in Sedation and Special Care Dentistry, and Postgraduate Trainer in Conscious Sedation, at University Dental Hospital, Cardiff.

Once again the theme was ups and downs; this time we were treated to Dr Allen's description of his experiences of setting up a primary care sedation service. Using a cinematic theme, which included 'A Tale of Two PCOs', 'Close Encounters', 'The Good, The Bad and The Ugly', 'Hannah and Her Sisters' and finally 'Touching the Void', Michael took us on the journey from before the arrival of the new contract in April 2006 to the present day.

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Michael began by describing his original practice in Cardiff. He had provided a sedation service there for 12 years; however, the new contract arrived and there was no provision for sedation at all! The Cardiff Local Health Board expected him to provide this treatment at no extra cost to themselves.

Michael had previously tried to set up a practice in Monmouthshire and had received a favourable response from the Local Health Board. Despite this plan stalling due to the imminent arrival of the new contract, he went back to reopen discussions with them. This time they awarded him a contract that did include provision for sedation in Abergavenny. However, the premises that he had chosen were considered too rural, so it was back to the drawing board again.

Michael explained how he had contacted Paul Averley, who provided him with lots of advice, which helped him become better equipped to enter into further discussion with the LHB about allocation of UDAs and performance monitoring.

Suffice to say, the practice is now up and running and becoming more successful each year. Michael not only provides a sedation service but has become the 'gatekeeper' for all but emergency treatment under GA in the area and now has training places for both postgrads based at Cardiff and for dental nurses who want to take the NEBDN qualification in conscious sedation. Local GDP support and patient satisfaction are very high and there are plans to increase the service to include a DwSI Oral Surgery provision.

Michael concluded by reminding us that perseverance can pay off. You really need to educate PCOs, who are usually not aware of the increasing need for a sedation service. He suggested that you need to present an unanswerable case using literature and papers as evidence. This way you can remind the PCO that GA is riskier, more expensive and solves little for the patient's future care.

Chris Bell continued this information-packed morning by introducing the next speakers, Dr Martin Sasada, Consultant Anaesthetist at Bath RUH and Specialist Referral Sedation Clinic, and Dr Ian Skerrat, a dental practitioner who runs a sedation referral practice with Dr Sasada. Their presentation 'Clinical Governance and the PCT: High BMI Patients and Recreational Drugs' was brave and salutary, leaving many of us with the 'There but by the grace of God' feeling.

Dr Sasada and Dr Skerrat began a GA referral service for

both adult and child patients, which was primarily NHS-funded and for minor oral surgery procedures, about 15 years ago. Over the years this had become a sedation referral service and they had developed an excellent relationship with the local secondary referral centre at Bristol Dental Hospital. An increasing number of their patients were drug abusers, and what started out as a trickle of patients from a rehabilitation unit who arrived with good supervision rapidly became busloads without! This led to a number of problems, including physical attacks on the practice staff and increasing concerns about the levels of post-op care provided for this group of patients, which finally culminated in the death of a patient during the aftercare period following sedation.

These circumstances led to the decision by Dr Sasada and Dr Skerrat to withdraw their service from drug abusers, and so they contacted their PCT, who informed them that if they did they would be in breach of their terms of service. Thus they contacted the BDA (who suggested they should use LA only), and this matter was also discussed in SAAD Council. They continued to discuss the problem with the PCT until a second death during the aftercare period occurred. Finally the PCT agreed to the suspension of the service whilst they investigated alternatives.

This resulted in the practice having to notify GDPs in the area about the change to their referral acceptance criteria. One would imagine that this was the end of the matter; however, one helpful GDP then wrote anonymously to the GDC accusing the practice of discriminating against a group of patients on the grounds of a medical condition. The GDC then referred Dr Skerrat to the Fitness to Practice committee who, having read the robust defence and discovered how conscientious and thorough the partners had been, dismissed the case.

What the anonymous GDP (and many more of us) don't realise is how highly volatile cannabis users can become under benzodiazepines. They can become violent or psychotic and most centres now insist that patients must refrain from cannabis use for at least four weeks before treatment under sedation.

The other group of patients Dr Sasada and Dr Skerrat find unsafe to treat in a practice situation are patients with morbid obesity. Patients with a BMI above 40 are either only treated under LA or are asked to lose weight, or are recommended to be seen in hospital with an overnight stay. The airway management of these patients is a particularly important issue, and they are now treated at Bristol Dental Hospital, where a consultant anaesthetist-led sedation service is available.

Chris Bell thanked Dr Sasada and Dr Skerrat for taking time out of their busy schedule to talk to us, and during questions he not only confirmed that there was a very good working relationship between Bristol Dental Hospital and their practice, but also that he was now treating many of the patient group they had previously treated and that this group of patients were causing difficulties and damage to Bristol Dental Hospital. This led him into the introduction of Sally Lewis, a nurse practitioner working specifically with drug abusers in the Bristol area.

Sally then continued with her presentation 'Addiction: the Drugs and the Patient's Perspective'. She began by explaining that the research on why people became drug addicts was ambivalent. There was no evidence of causative factors, but some protective factors could be seen in the literature. These included a supported childhood with a strong adult figure and regular school attendance. Sally then used a case description to give us insight into the world of a typical drug abuser. Unhappy children are vulnerable children; this leaves them open to abuse, which only increases the unhappiness and often leads to the child being taken or put into care because the parent(s) can't or won't look after them. This situation is worsened by the lack of people willing to adopt or foster older children and results in young adults who feel unwanted. Many teenage girls in these circumstances are introduced to drugs by their 'boyfriends' and enter prostitution, often earning to supply drugs to both themselves and the 'boyfriend'. Finally, her life becomes so unbearable she is faced with the question 'Is life as a drug addict better than nothing?'. When this leads to a suicide attempt, she then faces hostility from staff in the A&E department.

Sally noted at this point that whilst society has empathy for the children in this situation there does not seem to be any available for adults. She explained that during her work with drug abusers she encounters more problems with people's attitudes towards the users than with the users themselves. Her advice is simple – positive attitudes towards these people can change lives for the better; negativity and a judgmental attitude just make things worse.

Chris Bell then led a lively questions session during which we all discovered that cannabis farming is one of the world's great successes in genetic modification. There has been an increase in THC in modern cannabis plants from 5% to 35%, such that any further increase would actually kill the plant! This results in a drug that gets into the central nervous system much more quickly, has many more drug interactions, especially in the liver, and can take up to

100 days to clear from the system. Sally also suggested working with local drug support teams when trying to provide a service to drug users as they could provide advice on general management (e.g. failed appointments) and members of these teams were often very happy to provide this advice.

Just before we went into the AGM and on to lunch Chris Dickinson, Consultant in Special Care Dentistry, King's College London, Treasurer and Membership Secretary of DSTG, asked members of DSTG to confirm their entries in the society's membership database as he was trying to update it (if you weren't able to, maybe you would like to confirm your details by email).

The afternoon session was ably chaired by Dr Lesley Longman, Clinical Lead for Sedation and Special Care Dentistry, Liverpool University Dental Hospital, Secretary of DSTG and Chairman-elect. She introduced Colette Bridgman, Consultant in Dental Public Health, and Professor Paul Coulthard, Chairman of DSTG, Professor of OMFS and Director of Graduate Education and Research, University of Manchester, who explained their work towards developing an Indicator of Sedation Needs. They explained that this was as a response to the challenge set by Tony Jenner at last year's Symposium, when he suggested that as a group we should assess the need for sedation services in order to put our case towards service commissioners and thus manage our own futures. They pointed out that whilst we were all aware that access to a sedation service was generally based mainly on local availability, resources should be available based on informed decisions with regard to the effective use of sedation resources, the equitable provision of care, a responsive access to specialist services and the development of care pathways for anxious patients. Having briefly outlined the current NHS structure, the role of PCTs (PCOs) and the World Class Commissioning Assurance system, Colette and Paul went on to explain that within this system the care being delivered should be needs-led and focused on outcomes. However, a good enough measure for sedation need is not available and therefore these factors cannot be assessed. Paul then went on to explain the system they had been piloting. This system was based on a combination of three factors: anxiety score (using the modified dental anxiety scale), medical history (includes consideration of age and special conditions) and treatment complexity. These were combined to produce a score that could then categorise the patient into minimal, moderate, high or very high need. Finally a decision, now based on the needs of the patient, could be made about future treatment management, which could be under LA alone or with behavioural management

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or with sedation in either a primary or secondary care situation or even GA Obviously this presentation resulted in a very lively discussion and Paul was delighted to take members' views to enhance the future development of IoSN. Firstly, in answer to a question from David Craig, Paul emphasised that this scale would be further piloted, but the two small pilots already carried out had found it useful. Useful information from the floor included the fact that needle phobics were often not picked up by these types of scales and the need for sedation in some circumstances in order to prevent patients developing dental phobia would probably not be assessed either. The need to increase patient input into the index was also suggested, to which Paul replied that work to do just that had already commenced. The audience was certainly positive about this development.

Lesley Longman then introduced David Wragg, from City of Bristol College, who explained about their Preparing to Teach: City & Guilds 7303 course. This course was available to anyone with a subject-specific qualification who wanted to try teaching. The course was designed as a part-time flexible blended learning module of 30 hours. The course covered managing behaviours, roles and responsibilities, record-keeping, assessing, legislation (mainly covering diversity), and key skills (e.g. communication). It was a very practical course where students were expected to write a scheme of work, write lesson plans, do a 30-minute micro-teach on a subject of their choice, which they were to evaluate (to encourage reflection) and keep a journal. Assessment on the course used a variety of techniques, for example written assignments, poster-making and the use of Blackboard. David explained that there had been over a thousand students through the course whose feedback about the course was positive. The course was designed as a taster but could also be used to progress onto an advanced course where teaching experience would be essential. As she rounded up the questions, Lesley summarised this 'Preparing to Teach in the Lifelong Learning Sector' course as being one that might be useful to encourage dental nurses and to enable them to develop their careers, for example teaching their own sedation skills to other dental nurses.

We all took a well-earned tea break before returning for the final session of the day, ably chaired by Mary Clarke, Specialist in Oral Surgery/Lecturer in Sedation, Dublin Dental School, and Secretary-elect DSTG. This session was the five free papers and included three from Cardiff, which, I was assured, is a beautiful scenic trip away from Bristol! Dr Steve Wolley, a Clinical Research Fellow from Cardiff, began with a paper entitled 'Paediatric conscious

sedation: views and experience of Specialists in Paediatric Dentistry' in which he argued that sedation training should be part of the core training for specialists in paediatric dentistry.

This was followed by a presentation by Anjali Kandiah, an SpR in Paediatric Dentistry at Leeds Dental Institute. Anjali explained how, having assessed the need using an audit, an IV sedation service was set up for children aged 12+. She reminded us that this was an especially difficult age group as many of them have already had an experience in the dental chair that has led to their phobia. Her interesting paper led to a number of questions, which revealed that both King's and Dublin dental hospitals provided sedation services to 12–16 year olds, which they had found to be very successful and which had cut the need for GA services in this group of patients.

Sonita Koshal, from King's College London Dental Institute, then outlined their study of hypertension in patients attending their Oral Surgery department. The study revealed a significant prevalence of undiagnosed and poorly controlled hypertension in the general population. The group also concluded that there was a 'clear indication for use of IV midazolam for oral surgery procedures in patients with a high BP recording at pre-assessment, irrespective of the degree of patient anxiety or complexity of the surgical procedure' (which, incidentally, we might want to note as part of IoSN). A lively discussion followed this interesting paper.

The next paper described an audit of consent at the sedation unit at the School of Dentistry in Cardiff. Dr Shelagh Thompson gave a very open and honest presentation on behalf of the audit team. She pointed out that we all believed that consent was important and that we followed the correct procedure all the time, the central question being 'Do we?'. At the point when she suggested that the patient's copy wasn't always given to the patient, I remembered running down two flights of stairs to hand one of my patients her copy, as she had left the surgery without it, and that was only a couple of days before the Symposium. I am sure we would all agree with her conclusions that the consent form is complex and time-consuming and that redesigning the form with a simpler layout would improve the situation.

Finally, we heard Dr Steve Wolley *again* (his word, not mine). This time Steve presented 'An Audit of Referrals to a Secondary Care Sedation Unit'. Now if the title looks familiar, that's because the paper had now been published in the British Dental Journal (Mar 2009; 206(5):E10). Steve had discussed whether he should present the paper

now that it had been published, but Chris Bell had assured him we would be disappointed if he didn't and the lively discussion at the end just demonstrated how right Chris had been.

This rounded off a busy and informative day and we were then able to find our accommodation and explore the further delights of Bristol.

Chris Dickinson welcomed us all to the second day of the Symposium and introduced Professor Tim Newton, Professor of Psychology as Applied to Dentistry at King's College London Dental Institute. Tim is now a TV star, having appeared on the BBC's *The One Show*. He received the 2007 Gidden award for his work on self-perceived oral health and is also chairman of a charity for eating disorders.

Tim, in his own inimitable style, described the psychological methods used to treat dental phobics at King's College. Leading us through a description of phobias and anxiety, Tim explained how cognitive behavioural therapy could be used to help dental phobics and how they had developed a model, using computerised CBT, to create a patient pathway for extremely anxious or phobic patients, which King's hoped could then be more widely used. At the moment patients were able to be either treated using CBT or using sedation, but the team at King's was hoping to develop a trial in which highly phobic patients could be given CBT to help them receive treatment under sedation. Questions about dropout rates (variable stages in the process and for different reasons), cost (expensive but did free up sedation slots and you could train dental nurses or hygienists/therapists to give the CBT) and patient care pathways abounded. Chris Dickenson, fortunately ever

mindful of resources, was able to round off the session on time and sent us all for coffee.

The final session was chaired by Nigel Robb, Senior Lecturer in Sedation in Relation to Dentistry/Honorary Consultant in Restorative Dentistry, Glasgow Dental Hospital, and President-elect of SAAD Council. Nigel had ensured that we each had a précis of the Rapid Response Report on midazolam sent out by the NHS in December 2008. The report had asked for a response to be lodged by June 2009 and Nigel was concerned that the dental profession should produce a considered response to this issue. Nigel had broken down a possible response into four main questions:

How do we risk assess sedation in a dental setting?
What are the risks of changing to a new formulation?
Do we need a written protocol (or would that be making a rod for our own back)?
Who should be the responsible clinician (bearing in mind the report suggests a consultant anaesthetist)?

These questions were discussed in the breakaway groups and the results reported back to the meeting.

Nigel then promised to collect all the results and produce a document in response to the Report. Further details of this will be available from DSTG.

This lively discussion ended a very fruitful and successful meeting. Our thanks must go to Chris Bell and his team for looking after us so well. The thought that next year's Symposium was to be held in Dublin only increased our enthusiasm to put this date in our diaries as soon as it is announced. ■

REPORT TO SAAD FROM THE ASSOCIATION OF DENTAL ANAESTHETISTS, AUTUMN 2009

The ADA had a successful joint scientific meeting in Manchester for the 2008 conference. After deliberation regarding another joint meeting with affiliated societies it was decided to have a London-based meeting of one day's duration to accompany the AGM and elections.

Attendance has been difficult in recent years and the committee deliberated as to what subjects, venue and format will satisfy the needs of members. ■

X11 INTERNATIONAL DENTAL CONGRESS ON MODERN PAIN CONTROL

Michael Wood

Every three years the International Federation of Dental Anaesthetic Societies (IFDAS) (12,000 members) holds a meeting where delegates from many countries gather to promote the international exchange of knowledge, technology and research achievements in dental anaesthesia, analgesia and sedation and other related branches of dentistry. This meeting was hosted by the Australian Society of Dental Anaesthesiology and was held at the Gold Coast Convention and Exhibition Centre, Surfer's Paradise, about an hour's drive south of Brisbane, Australia, from 14 to 17 October. This was an excellent modern facility for the conference.



Surfer's Paradise with GCCEC in centre

The weather was as you'd expect, hot without any rain or clouds. The dust storms stayed away and the bush fires were a good few hundred miles to the north. Numbers were down from previous meetings due to the global economy, swine flu, the very strong Australian dollar and clashes with various other international dental meetings, but many of the great and good in this field attended.

The topic for this year's conference was 'Towards Global Consensus on Pain Free Dentistry'. Professor Kaneko, President of IFDAS, welcomed us all and thanked President-elect Professor Douglas Stewart, from Westmead Dental Hospital in Sydney, for hosting the conference. Dr Greg Mahoney, scientific organiser, explained the local rules: 1) no one above the age of 35 years should be seen wearing Speedo swimming togs at the beach or swimming pool and 2) holding up a sock in one hand and a sandal in the other, he explained to especially the Europeans that the two are never worn together!



Professors Stewart and Kaneko

In parallel with the lectures, Dr Ken Harrison, consultant anaesthetist from Westmead Dental Hospital and deputy director of the Medical Retrieval Unit in Sydney, led the hands-on simulator training in medical emergencies. Ken has been involved with the Graduate Diploma in Sedation at Westmead since 1999. Workshops were also held on inhalation sedation and also team training in sedation.

Professor Stephen Wilson, Director of the American Association of Paediatric Dentistry sponsored sedation course, was the first keynote speaker who spoke about pharmacological considerations in sedation and general anaesthesia in paediatric dentistry. He reminded us that dental behavioural management techniques were most likely to fail in 1) young children, 2) anxious children, 3) children with developmental disabilities and 4) children with overprotective or permissive parents. In anxious children where nitrous oxide inhalation sedation had failed, he preferred an oral sedation technique cocktail of chloral hydrate, meperidine and hydroxyzine combined with inhalation of nitrous oxide in oxygen.

Michael Wood (Legrave Dental Sedation Clinic, Luton) presented an audit of 1,004 paediatric sedations treated during 2008 using a range of sedation techniques and drugs as operator/sedationist.

Jeff Field, a dental anaesthesiologist from Toronto, now providing paediatric sedation services in Perth, Australia and Qatar, emphasised the importance of sedationists to

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Michael Wood and Ken Harrison appreciating the local wine

self-regulate, to accept a zero-tolerance policy in paediatric mortality and to reduce morbidity. The cornerstone of this is training and education of paediatric sedationists. The most important factor is *who* is providing the sedation, with *where the sedation occurs* being less important. Airway assessment and advanced airway management in paediatric sedation are key to a successful outcome. Rigorous recovery and discharge criteria are important.

There were four parallel sessions involving speakers from all over the sedation globe. A common theme was the use of Bispectral Index monitor in sedation monitoring – it appears useful as a research tool but not very useful in conscious sedation as correlation with clinical monitoring is good.

The highlight of the day was the ESPE expert panel discussing the pros and cons of articaine 4% 1:200,000 epinephrine vs. lidocaine 2% 1:80,000 epinephrine for inferior alveolar nerve blocks (IANB) and also for infiltrations. The panel consisted of Dr Wolfgang Jakobs and Dr Monika Daublander from Germany, Prof. Eliezer Kaufman from Jerusalem, Prof. Joel Weaver (editor of *Anesthesia Progress*), Prof. John Yagiela, Prof. Stanley Malamed from the USA and Dr John Meechan from Newcastle. The risk of permanent nerve damage following an IANB with articaine 4% seems to be 1.5–3 per million injections. To put this in perspective: 1 in every 200 dental practice years. This is due to the increased neurotoxicity of the higher concentration of the anaesthetic agent.

When posed with the question what they would prefer if they needed local anaesthesia for extraction of a lower first molar, four would have articaine 4% IANB and infiltration, JY and JM would want a 2% IANB with lidocaine and buccal infiltration with 4% articaine while JW would dilute the articaine down to 3% with saline and

have that as an IANB and infiltration! Due to the safety pharmacokinetic profile Prof. Kaufman uses articaine 4% 1:200,000 epinephrine routinely as he treats a lot of special-care patients within his department.

The Tony Reyes-Guerra (founder of IFDAS in 1976) lecture was delivered by Monika Daublander. This lecture discussed the similarities and differences between articaine and lidocaine – and posed the question: a time for change?

Education with the aid of simulation in sedation, airway management and medical emergencies was the theme for the next session, with representatives from different countries presenting how they provide this training.

The gala dinner at the convention centre included a good meal with some fine Australian wines. Professor Kaneko handed over the Presidency to Prof. Douglas Stewart, who thanked James Grainger, outgoing General Secretary of many years, for his service to the organisation. Dr Jim Phero from the USA was inducted as the President-elect.



Ian Corbett, winner of the best research paper at conference, Greg Mahoney and John Meechan at the gala dinner

The Saturday morning started with an excellent overview of local anaesthesia presented by John Meechan in his unique entertaining style. His lecture was complemented by Dr Alan Reid from Sydney, who kept our attention with an interesting review of current concepts about the pharmacology and anatomy of local anaesthesia related to the IANB.

The meeting closed with Dr Ian Corbett from Newcastle being awarded a prize for his paper comparing the anterior middle superior alveolar nerve block (AMSA) with the infra-orbital nerve block (IONB) for anaesthesia in anterior maxillary teeth. Old friends said their goodbyes and many set out to enjoy the scenic delights of Queensland's Gold Coast. Jim Phero will host the next IFDAS in March 2012 on Big Island, Hawaii – hope to see you all there. ■

Michael Wood

JOURNAL SCAN



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INTRAVENOUS SEDATION WITH LOW-DOSE DEXMETOMIDINE: ITS POTENTIAL FOR USE IN DENTISTRY

Canadian Journal of Oral Health 2009 Feb 33–42

Sachie Ogawa, Hiroaki Seino, Hiroshi Ito, Shinya Yamazaki, Steven Ganzberg and Hiroyoshi Kawai

Thirteen healthy volunteers were sedated using Dexmetomidine (Dex) at a loading dose of 6mcg/kg/h for 5 minutes and a continuous infusion dose of 0.2mcg/kg/h for 25 minutes. Physiological, sedative and recovery parameters were investigated. Dex is a sedative and analgesic agent that acts through an μ_2 -agonist effect and is licensed for sedative use in the intensive care unit after surgery. Effects include reduced anaesthetic requirements and attenuated blood pressure and heart rate in response to stressful events. The μ_2 -receptors within the spinal cord modulate pain pathways, thereby producing some analgesia. Dex also creates sedation similar to natural sleep yet the sedated patient is still easily and uniquely rousable – an effect not previously seen with other sedatives. In addition, Dex has amnesic properties and produces rapid recovery and thereby approaches many of the properties associated with an ideal sedative agent.

The tidal volume decreased significantly despite non-significant changes in respiratory rate, minute ventilation, oxygen saturation and end tidal CO₂. Although there was a significant decrease in mean arterial blood pressure and heart rate, it was within clinically acceptable levels. Amnesia to pinprick was present in 69% of patients. Sedation levels were assessed using a BIS monitor and a Ramsay scale. Recovery was assessed with the Trieger dot test and one leg standing, eyes closed test. The lowest BIS reading was 73.6 at 30 minutes after the start of the infusion. Ramsay score was between 3 and 4 between 15 and 30 minutes after the start of the infusion. Although the elimination half-life is 120 minutes, all volunteers could stand on one leg, eyes closed at 60 minutes after stopping the infusion. Patients were orientated from 15 minutes after stopping the infusion. The authors suspect that the amnesic properties of Dex at this dose lie somewhere between the sedative levels of propofol and midazolam.

The authors conclude that sedation with a low-dose infusion of Dex appears to be safe and potentially efficacious for young, healthy patients undergoing dental procedures.

THE EFFECT OF TRANSMUCOSAL 0.2MG/KG MIDAZOLAM PREMEDICATION ON DENTAL ANXIETY, ANAESTHETIC INDUCTION AND PSYCHOLOGICAL MORBIDITY IN CHILDREN UNDERGOING GENERAL ANAESTHESIA FOR TOOTH EXTRACTION

Br Dent J. 2009 Jul 11; 207(1): E2; discussion 32–3.
Epub 2009 Jul 3

Hosey MT, Asbury AJ, Bowman AW, Millar K, Martin K, Musiello T, Welbury R

Background

The project aims were to evaluate the benefit of transmucosal buccal midazolam 0.2mg/kg pre-medication on anxiety, induction behaviour and psychological morbidity in children undergoing general anaesthesia (GA) extractions.

Method

One hundred and seventy-nine children aged 5–10 years (mean 6.53 years) participated in this randomised, double-blind, placebo-controlled trial. Ninety children had midazolam placed in the buccal pouch. Dental anxiety was recorded preoperatively and 48 hours later using a child-reported MCDAS-FIS scale. Behaviour at anaesthetic induction was recorded and psychological morbidity was scored by the parent using the Rutter scale preoperatively and again one week later. Subsequent dental attendance was recorded at one, three and six months after GA.

Results

While levels of dental anxiety did not reduce overall, the most anxious patients demonstrated a reduction in anxiety after receiving midazolam pre-medication ($p = 0.01$). Neither induction behaviour nor psychological morbidity improved. Irrespective of group, parents reported less hyperactive ($p = 0.002$) and more pro-social behaviour ($p = 0.002$) after the procedure; older children improved most ($p = 0.048$). Post-GA dental attendance was poor and unaffected by pre-medication.

Conclusion

0.2mg/kg buccal midazolam provided some evidence for reducing anxiety in the most dentally anxious patients. However, induction behaviour, psychological morbidity and subsequent dental attendance were not found to alter.

PAEDIATRIC CONSCIOUS SEDATION: VIEWS AND EXPERIENCE OF SPECIALISTS IN PAEDIATRIC DENTISTRY

Woolley SM, Hingston EJ, Shah J, Chadwick BL

Br Dent J. 2009 Jul 24. [Epub ahead of print]

Objectives

The objectives were threefold: to investigate the level of conscious sedation training received prior to and during specialist training in paediatric dentistry; to establish the use of conscious sedation during and following specialisation; and to determine the attitudes of specialists in paediatric dentistry to conscious sedation.

Subjects and methods

A self-administered postal questionnaire was sent to all specialists in paediatric dentistry registered with the General Dental Council in January 2008. Non-responders were contacted again after a four-week period.

Results

A response rate of 60% was achieved. Of the 122 respondents, 67 (55%) had received sedation training as an undergraduate; 89 (75%) had been trained during specialisation. All respondents had performed dental treatment under sedation as a trainee and the majority used nitrous oxide inhalation sedation (NOIS). Over 90% of respondents felt that NOIS should be available to all children, both in appropriate primary care settings and in hospitals. One hundred and twenty-one (99%) respondents thought that all trainees in paediatric dentistry should have sedation training.

Conclusions

The most popular form of sedation amongst specialists in paediatric dentistry was NOIS. However, some of the respondents felt that children should have access to other forms of sedation in both the primary care and hospital settings. Additional research on other forms of sedation is required to evaluate their effectiveness and safety.

Comment: Prior to children having access to different sedation techniques, paediatric dentists need to be adequately trained in the alternative sedation techniques. SAAD is looking at how this training would best be provided.

HOW CAN WE ADAPT THIS MODEL FOR THE SAFE TRAINING AND CREDENTIALING OF SEDATION FOR PAEDIATRIC DENTISTRY IN THE UK?

Pediatric Anesthesia 2008 18: 30–35

Krauss B, Green SM

Review article: Training and credentialing in procedural sedation and analgesia in children: lessons from the United States model

In this article the authors describe procedural sedation and analgesia (PSA) outside the operating theatre in the USA, its advantages and disadvantages, and applicability of this model to the UK and Europe.

In an ideal world PSA in children would be safe, effective and time-efficient. There would be uniform minimum standards of care in dental practice, clinics and hospitals and children would have access to a full range of dental treatment – not only extractions under GA in hospital. Individual policies for settings would be tailored to meet the needs of each setting, along with clearly defined training, accreditation, quality assurance and on-going skill maintenance programmes. This would result in a painless and non-traumatic experience for patients, families and health professionals involved.

The Joint Commission in the USA (similar to the Care Quality Commission) has stipulated a core set of minimum requirements for the provision of PSA and leaves the broader issues of implementation to the discretion of the particular local institutions. They dictate that PSA care should be comparable throughout an institution and that PSA practitioners have a minimum skill set that includes management of the compromised airway and the ability to rescue patients who drift into a deeper level of sedation than the anticipated sedation end point.

For dental practices in the UK the actual authority in determining PSA practices will lie with PCTs or the Care Quality Commission, based on recent guidelines (2003 and 2007). At a local level the local authority may be an individual or a committee. There may be great variation in how these leaders will oversee this because of local resources, traditions and politics. When determining fitness to practise PSA, PCTs may look for

some kind of accreditation or training. Some institutions may have more elaborate training requirements, such as didactic or web-based learning modules, pre and post-testing, and/or completion of short courses such as Advanced Cardiac Life Support or Paediatric Advanced Life Support. Annual short stints in a paediatric anaesthetic department with a day of simulator training on medical emergencies and sedation complications may become mandatory.

There are advantages to the USA model which has mandatory core standards allowing some broad flexibility in implementation. Evidence of safe practice from a variety of settings indicates remarkable overall safety.

Leaving decision-making locally to hospitals and sedation facilities permits them to write their local guidelines. If a sedationist has the appropriate skills, knowledge and premises to perform alternative sedation techniques with consistent quality, they may be granted these privileges. Some PCTs may not be convinced about the capabilities of their corresponding sedationist/s or facilities and can restrict such privileges or enforce individualised stipulations. SAAD has a role to play here and may advise PCTs of appropriate practice of sedation or help mediate when PCTs and sedationists have not arrived at a suitable outcome.

Finally, this model permits innovation. As new sedative agents become available and practitioners enhance their sedation skills, hospitals or clinics have the freedom to gain experience in different approaches to sedation. PSA has evolved a lot in the past two decades and it is likely to evolve in ways that can no longer be anticipated.

Disadvantages include a lack of uniformity: some practitioners may be permitted to carry out alternative sedation techniques while others may only be allowed to use RA in children or some route of midazolam sedation in children.

In the USA this non-uniformity has been criticised for various reasons. Some groups say that the core standards of the Joint Commission don't go far enough to ensure patient safety. These critics advocate more stringent uniform requirements to specify which sedationists can and which can't use some sedation techniques. They want detailed requirements of specific drugs and specifics about minimum requirements for initial and on-going accreditation.

This non-uniformity ultimately affects patient care and many children who may have safely and efficiently been treated in the primary care setting when having a range of dental treatments will be sent to the hospital for extractions under DGA.

Sedationists with similar skill sets may receive or be denied sedation privileges based more on local politics or power structures than on best practices as supported by evidence-based literature.

Many speciality organisations, e.g. SIGN or BSPD, have issued specific guidelines that are not consistent with national guidelines, and sedationists have been confused about which ones to follow. This discourages open inter-speciality dialogue on optimal sedation practices. Fearing restrictions, certain sedationists choose instead to be secretive about their sedation practices or to call their technique conscious sedation where in fact it is GA, but by another name. Besides being academically dishonest, this adversarial relationship between specialities prevents practitioners from learning from each other.

In the USA the anaesthesia fraternity's response has been mixed. They have championed the development of a series of guidelines that, along with the JC guidelines, provide a framework for safe sedation practice. On the other hand anaesthetists (on both sides of the Atlantic) have classified many short-acting agents used for PSA (including fentanyl, ketamine and propofol) as anaesthetic agents, using this to justify restricting access to these agents by non-anaesthetists. This has led to contentious battles to lessen such limitations, especially among sedationists with advanced PSA skills.

Several factors, most notably ethical and manpower, have and will continue to influence the evolution of PSA practice in the UK.

Providing rapid relief of pain and anxiety associated with toothache must become an ethical priority, especially for children. Giving repeated courses of antibiotics and sending the child for a DGA is not the most appropriate solution.

As a result of this ethical imperative, PSA will need to take place in a non-theatre setting and probably in the primary care setting. Such sedation may be required at short notice. Some PCTs may permit their sedationists to use short-acting sedative agents while others may not.

There are currently not enough anaesthetists to provide PSA in those settings and the situation is unlikely to change.

Several other specialties continue to expand their experience and training in PSA to fill this gap.

PSA has long been used in dentistry and emergency medicine and other specialties are following.

It is unlikely in the current financial climate that the government will be investing in this area of patient care. When Poswillo (1990) recommended adequate funding for DGA, this was one of the recommendations not accepted by the government and adequate funding for pain and anxiety control has consistently been ignored by successive governments.

So, how should anaesthetists respond to dentists using PSA in the UK? There are four possible courses of action.

Anaesthetists could regulate all PSA and maintain full authority over this process.

Conversely, they could adopt a *laissez-faire* approach, providing each speciality the flexibility to define and enforce their own PSA practice within the confines of national guidelines, but without anaesthetists' oversight.

The USA model delegates responsibility for sedation to a person or interdisciplinary committee. This would enact and enforce local customised sedation policies.

A final approach, less regulatory and more proactive, would be to create local sedation committees to teach and be a resource. They would not erect undue barriers unless there was compelling evidence of not meeting national standards of care, but rather oversee an open and non-threatening dialogue on optimal PSA practice so that various specialists or clinicians could learn from each other.

The authors encourage the fourth approach as it draws from the successes of the USA model while attempting to avoid its divisiveness. It would allow anaesthetists to play a significant and constructive role using their expertise to advise rather than regulate PSA dental practice.

Anaesthetists would specifically advise and directly help other specialties who were interested in initiating or expanding PSA practice, including the development of appropriate training and accreditation processes, and the creation of basic and advanced skills training programmes to be implemented at local hospital level. This could include didactic sessions, web-based training modules, practicals including supervised theatre time, simulation-based training, a minimum number of supervised sedations and mentoring and a web-based or written examination. They could help establish programmes for on-going skill maintenance and quality assurance.

In this approach the focus of the accreditation process would move from competency based on medical speciality (anaesthetists vs. non-anaesthetists) to competency based on skill set and experience. The requisite skill set would consist of four fundamental elements:

- airway management (with emphasis on managing a non-intubated airway via bag-mask ventilation and appropriate airway alignment procedures)
- drug pharmacology (pharmacokinetics, pharmacodynamics and adverse event profile)
- vascular access
- resuscitation.

Placing the emphasis on skill set would address the heterogeneity of skills among specialists other than anaesthetists, allowing training and accreditation programmes to be tailored to the specific skill level of each group.

Drug access could be based on accreditation with a two-tier accreditation system allowing access to the short-acting agents only to the advanced-tier practitioners. No practitioner, irrespective of speciality, should be denied access to PSA agents if they possess the required training and skill set.

The issue of safety, cost and effectiveness of DGA in theatre vs. dental PSA in the primary care setting will be resolved over time as the research evidence base increases.

At present in the UK anaesthetists are working together with dental sedationists but it seems that each has a divergent agenda. Although we are all concerned with safety, there is no way that all alternative paediatric

sedation will be able to be performed in hospitals by paediatric consultant anaesthetists. In the past 10 years we have seen more than a million cases of alternative paediatric sedation administered in primary care by non-anaesthetists using a range of techniques without any known fatalities. There are many examples of good practice and experienced clinicians looking after great numbers of children safely and effectively. Let us not lose sedation like we lost DGA a decade ago because of compromised standards and letting anaesthetists dictate dental sedation practice. Many of these anaesthetists wanting to dictate to us have no experience of paediatric dental sedation and are trying to govern our practice. We will welcome their advice, but not their control of our domain!

CHILDREN'S DESIRE FOR PERIOPERATIVE INFORMATION

Fortier, M et al.

Anaesthesia & Analgesia Vol 109(4) Oct 2009: 1085–1090.

Abstract

There is very little data on children's desire for perioperative information other than one small study by Smith and Callery. This study involved a group of 143 children aged 7–17 who completed a 40-item questionnaire. Parents also completed a questionnaire assessing their child's temperament and their own anxiety.

Results showed most children had a desire for information about their surgery, particularly with questions related to pain.

Method

143 ASA 1 or 2 children aged 7–17 undergoing outpatient elective surgery were recruited. 143 was the minimum calculated to give significance. The questionnaire consisted of 40 items rated using a scale: -1 = I don't want to know
0 = I don't care
1 = I might want to know
2 = I really have to know.

Information avoidance score was noted looking at all the -1 scores. Each child's total desire for information was calculated as the sum of all their answers. This test

demonstrated an excellent internal consistency of 0.93 as measured by Cronbachs Alpha.

Child temperament was assessed using a validated standard 20 items, scoring the child in 4 behavioural categories: emotion, activity, sociability and impulsivity (EASI). Both children and parents were also assessed with state-trait anxiety inventory (STAI) for children (STAIC). This is well validated and has good reliability.

All information was collected at the time of attendance.

Results

The range of frequencies on questions with the answer 'I really have to know' varied from 14% to 71.5%, with more than 40% of the children really wanting to know 25 of the 40 questions. The frequency of 'I don't want to know' was very low, with the highest percentage being for 'Will I get a needle?' at 19.1%.

Child characteristics and desire for information
Children's state anxiety was negatively correlated with information avoidance ($r = -0.22$) and positively correlated with desire for pain information ($r = +0.26$).

There was no difference in results tested against demographic variables, age or gender.

There was also no difference with children who had had previous surgery. Desire for information varied if the group was split into ages 7–11 and 12–17. Younger children desired more information about the medical environment ('What does the surgery look like?').

The five most important questions:

1. How long will I be in pain after the operation? (91.5%)
2. Will I feel any pain? (89.3%)
3. Will there be pain? If so, how bad will it be? (88.4%)
4. Will the operation hurt? (87.7%)
5. Will I be all right? (86.2%)

Discussion

The study shows that the vast majority of children prefer to have comprehensive information, most importantly about pain. The more anxious a child is, the more information they desire, and this is probably a coping strategy. Pre-adolescent children have a greater interest in the environment they are to enter. These results would support the increasing involvement of children in discussions for surgery. ■

Contact details for Fiona Wraith,

SAAD's Executive Secretary

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SAADoffice@btinternet.com

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1. Chadwick BL, White DA, Morris AJ, Evans D, Pitts, NB. Non-carious tooth conditions in children in the UK, 2003. *Br Dent J* 2006;200(7):379-384.

Reference to a book

3. Craig DC, Skelly AM. *Practical Conscious Sedation*. London: Quintessence; 2004. pp. 1-10.

Reference to a book chapter

6. Robb ND. Conscious sedation in dentistry. In: Heasman PA, editor. *Master Dentistry Vol. 2: Restorative Dentistry, Paediatric Dentistry and Orthodontics*. Edinburgh: Churchill Livingstone; 2003. pp. 149-168.

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9. GDC. *Reaccreditation and recertification for the dental profession*. London: GDC; 1997.

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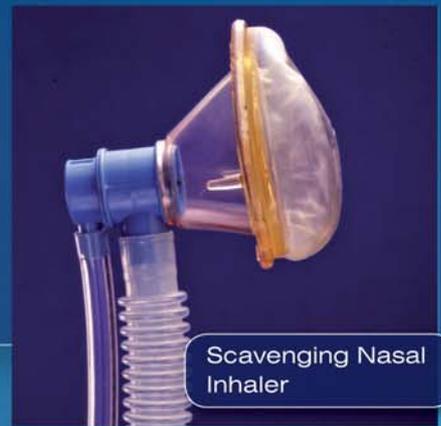
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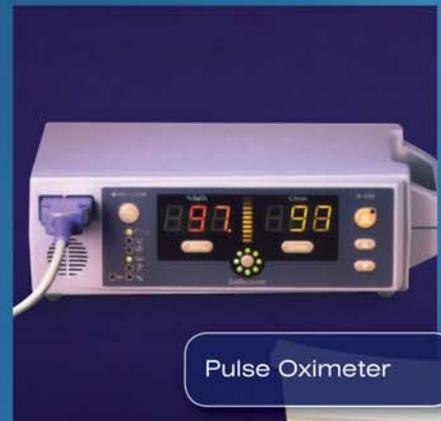
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DIARY SCAN

Compiled by Dr C E Mercer

2010	DATE	ORGANISATION	THEME/TITLE	VENUE	CONTACT
JANUARY					
	20-22	WSM London		QEII Conf. Centre Westminster	http://www.aagbi.org/events/wsm.htm
FEBRUARY					
	21-22	SAAD	Dental Nurse Part II Course		http://www.saad.org.uk/courses
	25-27	ADSA	Las Vegas Reviews	Caesar's Palace Hotel Las Vegas, USA	http://www.adsahome.org/meetings.html
MARCH					
	6-7	SAAD	National Course in Conscious Sedation for Dentistry (inc nurses)	London	http://www.saad.org.uk/courses
	15	Society for Education in Anaesthesia (UK)	Annual Scientific Meeting	Sheffield, The Mecure St Pauls Hotel & Spa	http://www.seauk.org
APRIL					
	29-May 1	ADSA	Annual Session	Ritz Carlton, Key Biscayne, Florida	http://www.adsahome.org/meetings.html
MAY					
	14-15	DSTG	Annual Symposium	Dublin	www.dstg.co.uk
JUNE					
	10-15		Euroanaesthesia 2010	Helsinki Fair Centre	http://www.euroanaesthesia.org/sitecore/content/Congresses/Euroanaesthesia2010
	19-20	SAAD	National Course in Conscious Sedation for Dentistry (inc nurses)	London	http://www.saad.org.uk/courses
	30-2 July	GAT	Annual Scientific Meeting	Cardiff, City Hall	www.aagbi.org
JULY					
	until 2	GAT	Annual Scientific Meeting	Cardiff, City Hall	www.aagbi.org
SEPTEMBER					
	4-5	SAAD	Dental Nurse Part II Course		http://www.saad.org.uk/courses
	8-11	ESRA	XXIX Annual ESRA Congress	Porto, Portugal	http://www2.kenes.com/esra2010/pages/home.aspx
	22-24	AAGBI	Annual Scientific Meeting	Harrogate	http://www.aagbi.org/events/congress.htm
	25	SAAD	Annual Conference	RSM - 1, Wimpole Street, London	www.saad.org.uk
OCTOBER					
	TBC	IFDAS	13th International Dental Congress on Modern Pain Control	Ritz-Carlton, Biscayne Resort Key Biscayne, Florida	http://www.ccm.com/au/index.php?page=events
	TBC	ESRA - Spain	XVI Annual Meeting	TBC	http://www.esra-spain.org/
NOVEMBER					
	6-7	SAAD	National Course in Conscious Sedation for Dentistry (inc. nurses)	London	http://www.saad.org.uk/courses
	TBC	UK Society for Intravenous Anaesthesia	Annual Scientific Meeting	TBC	http://www.sivauk.com/joom/
DECEMBER					
	TBC	ADSA	Chicago Review	Renaissance Hotel Chicago, USA	http://www.adsahome.org/meetings.html