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

<table>
<thead>
<tr>
<th>CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>31</td>
</tr>
<tr>
<td>34</td>
</tr>
<tr>
<td>46</td>
</tr>
<tr>
<td>52</td>
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<td>104</td>
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<td>105</td>
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<tr>
<td>106</td>
</tr>
<tr>
<td>112</td>
</tr>
<tr>
<td>116</td>
</tr>
</tbody>
</table>

SAAD DIGEST | VOL.28 | JANUARY 2012
Welcome to the SAAD Digest for 2012. It has been a busy year for the Society since the last Digest went to press. Members of the Board of Trustees have been involved in a number of ventures over the last year or so, many of which are reflected in the articles published here.

The SAAD Annual Conference saw the launch of two documents produced by the Independent Expert Group on Training Standards for Sedation in Dentistry. Three of the Board of Trustees (David Craig, Chris Holden and I) are members of that group and SAAD has covered the expenses for the production of these documents. There are further details of this work on page 61 in the article by David Craig. The conference itself had a record attendance of 213. In the run up to that symposium the Trustees became aware of the fact that SAAD is the second largest dental society in the UK (as judged by number of members). The only one that beats us is the BDA, which means that we are the largest specialist dental society in the UK.

The report of the conference is, as usual, included in Digest, but at this point I would like to thank all those involved in its organization.

2011 marks the end of the term of the SAAD visiting Professor’s appointment. Since his appointment Peter Milgrom and his team have contributed at least one article per year to Digest as well as a number of presentations at conference. I would like to thank Peter for his support for Digest, and hope that we will continue our contact in the future.

The Board of Trustees has decided to continue our efforts to further research in sedation. Given the publication of the NICE guidance on sedation for children and young people at the end of 2010, it seemed apt to focus this effort on paediatric sedation. It was thus decided to award a PhD Studentship for a study in the area of paediatric sedation. All dental schools in the UK were contacted and 5 high quality applications were received. The joint application from Sheffield and Liverpool was successful and details of this can be found on page 31.

The SAAD Toolkit has been revised and re-launched as the Safe Sedation Practice Scheme. Paul Averley and Chris Holden have really taken the lead in this project. At the Conference Darrin Robinson reported the experience gained from putting all the IDH Sedation Practices through the scheme and felt that it was positive and had helped to improve the quality of care provided within that group of practices. The Board of Trustees would commend this to you with the advice of inspect yourself before someone else does it for you!

On the evening of Friday 22nd September we held a dinner at the RAF Club in London. We usually hold a dinner for speakers at conference. This year we also awarded Honorary Memberships for Life to a number of individuals who have made an outstanding contribution to the society and or the field of pain and anxiety control in dentistry. Details of this dinner can be found on page 71.

One issue which seems to be rearing its head again is that of whether sedation is an entity or part of a continuum. This debate seems to polarise opinion from those who come from a dental background compared with those who come from an anaesthetic background. The definition of conscious sedation has a clear distinction as to when sedation is not sedation (namely when the patient is not in verbal contact with the team treating him). The increasing use of the term “moderate sedation” where the patient is responsive to “verbal and or mild physical stimulation” is not helpful in this regard as it removes the clear distinction between conscious sedation and oversedation. What is mild physical stimulation versus moderate? How hard do you have to shake someone before you go beyond mild physical stimulation?

The difference in perception of these entities may relate to the different start points for the dentist and anaesthetist coming to sedation. The dentist is coming to the study of sedation having always managed conscious patients using behavioural techniques to aid the patient’s journey through treatment. The only episodes of unconsciousness in the dental environment are unplanned and unintended. The anaesthetist comes from the perspective of having experience of intentionally producing loss of consciousness before learning to produce a relaxed but conscious patient. (The sedation module in the current anaesthetic specialist training comes towards the end of training.) It is thus perhaps not surprising that there are two contrasting views of what is the same clinical entity. Co-operation and dialogue between all the different professional groups who provide conscious sedation for dentistry is needed to ensure that the priority is the quality of care delivered to patients, rather than the interests of specific groups or individuals.

I hope that you enjoy Digest 2012 with its varied subject matter.

Nigel Robb
In this article we shall review the past and recent work of the King’s College London Dental Institute Health Psychology Service for individuals with dental anxiety. Much of this work has been generously supported by the Society for the Advancement of Anaesthesia in Dentistry (SAAD). Our work aims to provide a series of interventions that are proportionate to the level of anxiety expressed by the individual. Key to this process is ascertaining the individual’s anxiety level and identifying effective techniques to alleviate dental fear. These non-pharmacological techniques complement the use of sedation and general anaesthesia in the care of patients.

In terms of identifying the characteristics and treatment needs of individuals attending for secondary care in relation to their dental fear, previous work from the King’s College group has demonstrated these. The most prevalent fears were seeing, hearing and feeling the vibrations of the dental drill, and the perception of an accelerated heart rate. Other factors such as general, mental and dental health and alcohol use were related to referral but less important. A group of individuals who would benefit from psychological approaches to management were clearly identified. Follow-up of these patients 24 months later found that of the 100 patients initially referred, 72 attended the treatment planning session, 66 of the 72 (92%) attended for initial dental treatment, and 33 of 66 (50%) completed treatment. Dental Fear Survey (DFS) scores were related to attendance at the initial treatment visit but not to completion of treatment. Patients with mental health problems encountered more barriers to attending their appointments.

Arising from this work we were also able to explore the relationship between dental fear, dental treatment need and the demographic characteristics of individuals attending for treatment under sedation using a statistical technique known as Structural Equation Modeling. A direct significant association of referral with dental anxiety and attendance patterns was detected but not with oral health status. However, oral health and anxiety were highly correlated. Also signalled were correlations between age and education and between gender and bad past experience. We concluded that treatment under sedation appears to be motivated by both fear and irregular patterns of attendance, thus emphasizing the importance of sedation as part of comprehensive care where curative treatments are long or unpleasant for patients.

On the basis of this work, in September 2008 the King’s College London Health Psychology Service for people with dental phobia was launched. Patients referred for treatment of their extreme dental fear are assessed in terms of their suitability for Cognitive Behavioural Therapy and those suitable are treated following written protocols over ten sessions (each of one hour) of Cognitive Behaviour Therapy, based around the principles of controlled exposure in order to facilitate their transfer to primary care settings. All patients are assessed on a battery of psychological tests to determine the nature of their dental fear and to target treatment. The outcome of treatment is assessed using the same battery of tests and by assessing the degree to which patients transfer to primary care.
The CBT offered is highly structured and is detailed in a manual, devised by the KCL team. Session One is introductory and primarily comprises the clinician informing the patient about CBT and discussion of the goals, wishes and needs of the patient. Patients complete a standardized assessment including measures of dental fear, psychological well being and oral health related quality of life. Homework is given to patients following Session One, which is typically reading about CBT and providing information to ensure that all the patients’ questions are answered.

Session Two commences with a review of homework and goals, followed by an introduction to relaxation and distraction techniques. The clinician identifies the events that trigger dental fear for the patient and discuss it with the patient. Homework will be becoming proficient in relaxation and or distraction.

Sessions Three and Four focus on the cognitions that are maintaining the anxious behaviour. Each session begins with a review of homework and/or goals. Patient and clinician discuss the thoughts the patient has surrounding their anxiety, how real these thoughts are and how useful (or not useful) they are. The patient is guided through the cognitive restructuring of their unhelpful thoughts and in the development of new, more appropriate and realistic thoughts about dentistry.

Session Five explores and seeks to develop appropriate coping strategies for anxiety. In Sessions Six to Nine the patient undergoes graded exposure to the feared stimulus. In the final session the patient’s goals and achievements are reviewed. The patient completes a final assessment questionnaire and is offered a review session after 6 months time. Patients with dental care needs are treated by staff in the Department of Sedation and Special Care Dentistry as part of their graded exposure to their fear. All patients will be dentally healthy on discharge but are expected to make contact with a general dental practitioner for their future dental care.

Although the manual offers a structured approach, the sessions are flexible and are adapted to the needs of the individual patient and the speed at which they progress. As such, patients can complete the therapy is fewer than 10 sessions and this is often the case. The service has been recommended as a model of excellence by the Department of Health 4.

The manual which describes in detail the Cognitive Behavioural Approach adopted by the team is available from SAAD, entitled “Cognitive Behaviour Therapy for Adults with Dental Anxiety: A Toolkit” 5. The toolkit is aimed at dental healthcare professionals who wish to work with people with dental fear, combining effective and proven cognitive behavioural techniques with pharmacological management approaches and comprises:

- An overview of Cognitive Behavioural Therapy
- A review and bibliography of relevant literature including reviews of effectiveness
- A guide to typical CBT sessions for individuals with high levels of dental anxiety
- Example behavioural experiments
- Homework tasks
- Assessment materials for patients
- Guidance on producing written materials for patients
- Resources for graded exposure
- Resources for challenging common ‘unhelpful beliefs’
- A guide to evaluation including assessment scales.

Photocopyable resources and digital copies of photos, video and sound materials to support CBT are included.

At the 2010 SAAD conference we undertook a small scale survey of those attending, to seek their views on training in CBT for the dental team. A large proportion felt that they would like to attend such a course and we have developed training courses in Cognitive Behavioural Techniques for dental anxiety, based on this toolkit. For more information on these courses see:

https://www.kcl.ac.uk/prospectus/shortcourses/index/name/cognitive-behavioural-techniques-for-treatment-of-dental-fear/keyword/dentistry

The first course was held over two days in April and May 2011. The feedback from participants was very positive.

With generous financial support from SAAD we were able to develop a UK version of CARL – a computer aided program for fear of dental injections 6. CARL
Four studies adopted interventions that could be seen as adopting the framework of social marketing. Pickrell and colleagues\textsuperscript{11} demonstrated the use of a memory restructuring intervention in the management of dental anxiety. The intervention comprises four components. Firstly the visual component, pictures taken previously of the child smiling during the dental procedure were shown back to the child as a visual reminder about the dental experience. Secondly verbalization, the child was asked how he/she would explain to the parents how well they handled the dental appointment. Thirdly concrete example, the child was asked to recall a good example of their improved behaviour in the dental setting. This would lead to the fourth component, the sense of accomplishment. The distinctive feature of this intervention is the fact that it is employed after the dental procedure and seeks to tackle the cognitions around the dental experience. Three studies sought to make the dental environment more attractive to children attending the dental surgery\textsuperscript{12-14}. For example, Fox and Newton\textsuperscript{14} reported decreased state anxiety following exposure to positive images of the dental surgery as opposed to neutral images prior to treatment. Based upon theories of social learning and cognitive reconstruction, the authors aimed to provide positive cognitions concerning a trip to the dental clinic, in non-phobic children.

Kritsidima, Newton & Asimakopoulou\textsuperscript{15} found that lavender scent reduces anxiety as measured by STAI-6 during the immediate period of the dental visit; however, it had no effect on dental anxiety surrounding thoughts of future dental visits, as measured by the Modified Dental Anxiety Scale. The data showing a reduction in state anxiety are in agreement with previous studies conducted in a dental setting\textsuperscript{16}. In an extension of previous work, however, the current intervention failed to reduce dental anxiety as measured by the MDAS. This randomized control clinical trial provides evidence in favour of the use of lavender scent in dental settings as a low cost, simple intervention for alleviating affective components of dental patient anxiety. However, lavender has no effect on the cognitive aspects of anxiety and hence at the processes which are likely to maintain anxiety-provoking thoughts and behaviours, we argue that such aspects of dental anxiety are targeted via appropriate behavioural interventions\textsuperscript{17}. This demonstrates the importance of conceptualising Dental Anxiety as a complex multidimensional problem.

(Computer Assisted Relaxation Learning) is a freestanding computerised, exposure-based therapy program for the treatment of dental injection fear that was created by Professor Peter Milgrom and his colleagues at the University of Washington in Seattle\textsuperscript{7}. CARL presents to the patient a video based 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 programme 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 to do graded exposure.

Ten patients were recruited to the initial evaluation of CARL-UK. Patients generally took no longer than three one-hour sessions to complete CARL, with a large number completing the programme within one session of one hour. All patients that started the programme 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 \textit{in vivo} graded exposure. Participants rated the programme very positively and felt it was a useful way to introduce the idea of graded exposure.

More recently the team at KCL has undertaken a systematic review of randomized controlled trials of non-pharmacological techniques to alleviate anxiety in children which identified a number of effective interventions\textsuperscript{8-14}. Three of these studies explored behavioural management techniques that are used at the chairside; tell-show-do\textsuperscript{8,9}, and choice-based distraction\textsuperscript{10}. The delegates at the first King’s College London Dental Institute Health Psychology Service training day in Cognitive Behaviour Therapy for dental fear.
Given our interest in identifying effective techniques for managing dental anxiety in children and adults, and the dissemination of such techniques to practitioners, we have undertaken two surveys of the knowledge of behaviour management principles amongst specialist and non-specialist dental practitioners. The first survey was conducted amongst dentists specialising in special care dentistry with a comparison group of general dental practitioners. The survey comprised questions about dentists perceived ability to manage behavioural problems. The dentists were found to be highly confident and experienced in using behavioural methods. The dentists reported familiarity with most of the management techniques including behavioural management techniques. They also reported using many of these techniques frequently or very frequently (see Figure 1). However, when the dentists were assessed on their knowledge of behavioural management principles, they scored quite poorly (mean score of 6.36 ± 0.62 out of a total of 16). Only 33.3% of ‘specialists’ and 7.1% of ‘non-specialists’ were able to answer 50% of the questions correctly.

These results suggest that although the dentists are using a wide variety of behaviour management techniques quite frequently, they might not have an adequate understanding of the underlying principles upon which these techniques are based.

In conclusion, the work of the King’s College London Dental Institute Health Psychology Service has demonstrated the feasibility of combining psychological management with the use of pharmacological management strategies in the management of individuals with dental phobia. We have developed a model of the use of Cognitive Behavioural Therapy that could be adopted by other service providers, and developed a toolkit, resources and training programmes to support those interested in adopting such an approach. Preliminary results from our surveys suggest that there is a need for training in the principles and practice of behaviour management techniques. We have also begun work on the development of interventions for individuals with low to moderate levels of dental anxiety, incorporating the full range of possible management strategies based on the available evidence of effectiveness, including the provision of environmental changes to make the dental setting less stressful.
References


Abstract
This paper describes the development of a novel tool to indicate need of conscious sedation in dentistry. This tool consists of three sets of information; anxiety, medical history and treatment complexity. The sum of the three ranking scores gives a total score between 3 and 12. A score of 3 or 4 suggests that there is a minimal need for sedation. A score of 5 or 6 suggests moderate sedation need and a high need for sedation would be identified in individuals who score 7 to 9. A score of 10 to 12 suggests very high need of sedation.

Introduction
The indications for conscious sedation may seem obvious in the clinical dental setting but perhaps this area of decision-making is not so clear as we may believe. Dentists do actually vary significantly in their recommendation of mode of control of pain and anxiety for a given patient. Perhaps there would be use therefore in developing a tool to support decision-making that would challenge dentists and could be used as an educational aid. For dentists not providing sedation services themselves it is envisaged that this tool could be used as a referral aid. Such a tool could also be used beyond this to identify the number of patients in a population that are in need of sedation for dentistry to assist planning of sedation services, that is, as a health needs assessment (HNA) tool.

Background
After a presentation about commissioning anaesthesia and sedation services at the Dental Sedation Teachers Group Annual Symposium held in Manchester in 2008, Tony Jenner, Deputy Chief Dental Officer for England, challenged delegates to build the evidence for recommending conscious sedation for dental patients. The author on behalf of the delegates took on this challenge and drafted a decision making tool based on patient anxiety, general health and treatment complexity. This was undertaken with the help of Colette Bridgeman and then piloted in Manchester and also in Liverpool with the help of Lesley Gough and Lesley Longman. The tool did seem to facilitate decision making and so a much larger formal investigation of the indicator of sedation need tool (IOSN) was undertaken with Iain Pretty, Michaela Goodwin and then later Mohammad Sharif joining the team. Tony Jenner maintained his involvement throughout.

Description of the IOSN Tool
The most common indication for sedation is patient anxiety of dental treatment but there is agreement amongst sedationists that additional reasons may include
the patient’s general health and the invasiveness of the dental treatment. The IOSN consists of three components: anxiety, medical indication and treatment complexity. A score is given for each and the three scores are then summed to give a total that correlates with the patient’s need for conscious sedation for dental treatment.

**Anxiety Score**
There are several patient report anxiety scores available but the Modified Dental Anxiety Score (MDAS) was chosen because of its relevance, validity and brevity. The MDAS is to be completed by the patient and takes only a few minutes. It consists of five questions and gives a total summed score between 5 and 25 that is then translated to a rank score of 1 to 4 for this section. The range for each item is from 'not anxious' to 'extremely anxious' in response to the prospect of a dental visit, when in the waiting room, and if about to have a tooth drilled, have a scaling and a local anaesthetic injection.

**Medical and Behavioural Indicators**
Some dentists may consider that conscious sedation is contraindicated if a patient has a systemic disease such as hypertension or angina but sedationists would recognise that patients with mild systemic disease may benefit from conscious sedation to reduce the risk of disease exacerbation. Anxiety increases production of catecholamines and exacerbates these diseases. Other patients may also benefit from conscious sedation for dental treatment such as those with asthma or epilepsy. Patients with multiple sclerosis or parkinsonism may be eager to co-operate but physically unable to do so and sedation with a benzodiazepine may be useful because of its muscle relaxation properties.

Patients may also require conscious sedation to enable their dental treatment to be carried out for such diverse reasons as learning difficulties or a strong gag reflex that could better be described as behavioural indicators rather than medical indicators.

These medical and behavioural indicators can be ranked by the dentist from 1 for 'no medical or behavioural indicator' to 4 for the greatest indication.

**Treatment complexity**
Some patients who are able to cope with routine treatment under local anaesthesia alone may not be able to cope with more complex treatment and conscious sedation may be indicated to facilitate this. Some invasive oral surgery may be an obvious indicator for sedation but so too may complex restorative or other dental treatments. It is not straightforward to define treatment complexity as this is multifactorial and may relate to treatment duration, number of quadrants or invasiveness and is personal to the patient. Rather than offer very strict definitions for treatment complexity, typical examples are given as guidance to the dentist who is asked to make a professional judgement in rating complexity for the IOSN from 1 to 4.

**Health Needs Assessment**
A study was conducted as a service evaluation of four dental practices in England with each completing an IOSN form for 100 NHS Band 1, 2 and 3 patients. The IOSN form was modified so that no personal data other than sex, age and postcode was obtained. The IOSN form is shown in Figure 1.

![Figure 1. The IOSN Form](image-url)
Patients and dentists completed the forms which were then securely returned to the data entry team. Data was entered into SPSS, the IOSN score noted and the Index of Multiple Deprivation (IMD) score obtained using postcode data. Statistical analyses of the data used descriptives and group comparisons using Kruskal-Wallis and Mann Whitney U tests.

### Table 1. IOSN Scoring Tool

<table>
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<tr>
<th>IOSN Domain</th>
<th>Scores</th>
<th>Source</th>
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<tbody>
<tr>
<td>Anxiety</td>
<td>1-4</td>
<td>Taken from MDAS score:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MDAS between 5-11 is minimal anxiety scores 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MDAS between 12-18 is moderate anxiety scores 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MDAS between 19-25 is high anxiety scores 3</td>
</tr>
<tr>
<td>Medical history</td>
<td>1-4</td>
<td>A range of medical &amp; behavioural indicators are provided including gag reflex, fainting attacks, hypertension, angina, asthma, epilepsy, arthritis and Parkinson’s disease.</td>
</tr>
<tr>
<td>Treatment complexity</td>
<td>1-4</td>
<td>An indicative list of treatments are provided – if the referer is in doubt about the complexity of any given treatment they are asked to score high.</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>IOSN Metric</th>
<th>IOSN Descriptor</th>
<th>Sedation Need?</th>
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<tbody>
<tr>
<td>1–4</td>
<td>Minimal need for sedation</td>
<td>No</td>
</tr>
<tr>
<td>5–9</td>
<td>Moderate need for sedation</td>
<td>No</td>
</tr>
<tr>
<td>10–12</td>
<td>High need for sedation</td>
<td>Yes</td>
</tr>
</tbody>
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**Results of Health Needs Assessment**

A total of 607 IOSN forms from 625 returned were fully complete and suitable for data analysis. The distribution of treatment bands within the returned forms was Band 1 297 (49%), Band 2 209 (35%) and Band 3 100 (16%).

A potential flaw was observed in the IOSN threshold and weighting system in that anxiety was not distributed across the sedation need thresholds as one would expect. Within high sedation need there were five patients with high anxiety and five with moderate anxiety compared to 34 patients present in the moderate need for sedation category that all scored High Anxiety on the MDAS Scale. Following assessment with a Mann Whitney U test there was a significant difference for anxiety between minimal and moderate need (U = 11653, z = -9.42, p < 0.0001), and minimal and high need (U = 450, z = -4.77, p < 0.0001). There was no significant difference between moderate and high need (U = 450, z = -4.77, p > 0.05). From this we concluded that the anxiety score as it stood in the early IOSN did not capture all of patients that may require sedation due to their anxiety. The original weighting for the MDAS scores used three rankings and treatment complexity and medical indicators had four. To adjust for this disparity a new anxiety indicator was devised as shown in Table 2, with Table 3 demonstrating the impact on sedation need distribution with a high needs indication of 5.1%. There was a single patient with a medical indicator score of 4 that was not in the high need group and when added took the overall needs assessment for sedation to 5.3%. A Mann Whitney U test was applied to the revised figures as a significant difference between moderate and high sedation need was seen when considering anxiety score (U = 1725, z = -3.26, p < 0.001). The figure of 5.3% is in line with international reporting. Chanpong, et al. (2005) reported 12.4% of respondents were definitely interested in sedation or GA for dental treatment. Dione’s 1998 telephone survey stated that while 2.8% of people received sedation or GA, 8.6% would prefer it.

### Table 2. New weightings for anxiety score

<table>
<thead>
<tr>
<th>Score Rank Score</th>
<th>Need</th>
<th>New number of respondents</th>
</tr>
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<tbody>
<tr>
<td>5–9</td>
<td>1</td>
<td>Male 185</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female 188</td>
</tr>
<tr>
<td>10–12</td>
<td>2</td>
<td>Moderate Anxiety 33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female 63</td>
</tr>
<tr>
<td>13–17</td>
<td>3</td>
<td>High Anxiety 19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female 65</td>
</tr>
<tr>
<td>18–25</td>
<td>4</td>
<td>Very High Anxiety 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female 45</td>
</tr>
</tbody>
</table>

### Table 3. Sedation need indicators from adjusted anxiety weightings. 5.1% of patients have a high need for sedation.

When assessing sedation need by sex in the sample, of those that had high need, 91% were female and therefore were 6.7 times more likely to need sedation when compared to males. This corresponds with an earlier study where the authors reported females were 2.5 times more likely to report themselves as having a high level of dental fear. We examined predictive variables to determine if they had any effect on the need for sedation. Neither age (F (2,603) = 0.91, p > 0.05), practice location (H (2) = 0.470, p > 0.05) or deprivation score (H (2) = 5.318, p > 0.05) had any significant effect. However the MDAS score (H (2) =
107.277, p < 0.0001) and gender ($\chi^2 (2) = 13.43, p < 0.05$) were both statistically significant variables. Only anxiety produced a significant difference in relation to sex or respondent. Females were found to be 4.7 times more likely to be anxious in relation to dental treatment.

Use of the IOSN

The sum of the three ranking scores gives a total score between 3 and 12. A score of 3 or 4 suggests that there is a minimal need for sedation. A score of 5 or 6 suggests moderate sedation need and a high need for sedation would be identified in individuals who score 7 to 9. A score of 10 to 12 suggests very high need of sedation. The IOSN scoring tool is shown in Table 1.

MDAS score of 5-9 is rank score 1, 10-12 is 2, 13-17 is 3 and 18-25 produces a rank score of 4. These rankings were chosen empirically and then modified at piloting at the University Dental Hospitals at Manchester and Liverpool and again after the health needs assessment study. The rank scores for the medical and behavioural indicators and treatment complexity were similarly determined but did not require adjustment.

Findings from the medical history questionnaire are ranked by the dentist as 1, 2, 3 or 4 and entered into the IOSN tool. ASA I patients are ranked 1. Systemic disorders (not of severity to exclude sedation) that may be exacerbated by the stress of dental treatment are ranked 2, 3 or 4. These disorders may include hypertension, angina, asthma or epilepsy. Conditions that compromise the patient’s ability to co-operate such as multiple sclerosis or parkinsonism are ranked 2, 3 or 4. ASA II would generally be a score of 2 or 3 and an ASA III would result in a rank score of 4. A patient with a gag reflex or behavioural difficulty would have a rank score 2 or 3 according to severity entered into the IOSN tool.

Where there is a medical history finding, such as for example an adult with severe learning difficulties that compromises a person’s ability to co-operate for even simple procedures under local anaesthesia or when a highly complex clinical procedure is planned, a rank of 4 in that component would be recorded.

Any patient with a single rank of 4 in medical history or clinical complexity will have an overall score of at least 6 and so the dentist need not complete the whole assessment to support their decision for the need for sedation. This makes the IOSN sensitive to hospital use so that compromised patients or those who have a severe clinical complexity procedure need not complete the MDAS questionnaire.

The anticipated treatment complexity is also ranked, receiving a 1, 2, 3 or 4 score and entered into the IOSN as the third and final set of information that is required.

Conclusion

The need for conscious sedation could be considered by assessing and ranking a combination of information on patient anxiety, medical history and the complexity of the clinical treatment planned. The development of this IOSN tool has been described and the early validation in a health needs assessment of four dental practices described. This IOSN has the potential to support clinicians in their decision making and commissioners of dental service to identify patients who need conscious sedation.

However, care must be taken to use such a tool appropriately and the decision to recommend conscious sedation for a patient should always be that of the clinicians. We found that 5.3% of patients attending the four dental practices in our study were determined to be in high need of conscious sedation. This figure does not of course take into account the patients in the population who are non-attenders and of course of the barriers for this group may be dental anxiety.

References


Abstract

Aim: To identify and quantify anxious dental patients and dental office environment factors that may influence anxiety.

Objective: To develop and implement a questionnaire to investigate dental anxiety and identify factors that enhance or lessen dental anxiety in the surgery setting.

Methods: Data was collected from patients by a self-completed questionnaire when attending dentists at a general dental practice and hospital clinics.

Results:
The estimated prevalence of dental anxiety in the total sample was 17.0%. A higher proportion of females were highly anxious. Those attending the Dental Hospital were less likely to be anxious than those who were attending the Dental Practice. An inverse relationship between frequency of dental attendance and dental anxiety was found. Anxiety was significantly higher for those respondents that indicated that a delay in their appointment would make them more anxious. Of the reported fears regarding their dental visit, 60% of respondents claimed that they were “afraid it’s going to hurt”. When compared to non-anxious patients, more anxious patients feared “feeling out of control”, a “negative experience”, the needle, the drill, and being bothered by the smell associated with dental materials. The majority of respondents had a preference for a dentist that was young, friendly, talkative and native English speaking. In general, patients preferred the surgery temperature to be slightly cool. Regardless of anxiety level, 31.0% of patients said that they would prefer the chairside mouth rinse to be plain water with 49.1% not having a preference.

Conclusions:
This study demonstrates that a significant proportion of patients experience anxiety about visiting the dentist. Many of them have preferences about dentists and the surgery environment which may be modulators of their anxiety. Awareness by the dental profession of the causes of dental anxiety and measures taken by dentists to
minimise these trigger factors could have a substantial impact on anxious patients.

Keywords: Dental anxiety, patient preferences, regularity of attendance.

Introduction

Epidemiological studies suggest between 3% and 20% of the population have levels of fear and anxiety about dental treatment that is considered to be problematic. In a recent national survey in Ireland 20% of a representative random sample of 16-24 and 35-44 year-old adults reported that they felt worried (or worse) while waiting for their turn in the dental chair. Avoidance of dental care due to anxiety appears to be strongly associated with deterioration of oral and dental health and poses a significant problem for the dental profession. The aim of this study was to identify anxious dental patients, and to develop a questionnaire to investigate patient anxiety and identify factors that may enhance or lessen their perceived anxiety in the dental surgery.

Despite formidable challenges arising from patients’ dental anxiety, we have only limited knowledge about what causes and abates this significant problem facing the dental profession. While dentists employ a number of different techniques to allay dental anxiety, many unanswered questions remain about patient preferences, including personality and appearance of the practitioner as well as attributes of the dental surgery, particularly those of patients most anxious about their visit. Awareness of the causes of dental anxiety and management strategies to help alleviate this problem could have a substantial impact on an anxious dental patient. Although the literature includes suggestions for combating dental anxiety (appropriate attire and making pharmacological support available), the bulk of the research on this subject documents anxiety rather than the modulating factors and how best to reduce them.

Past studies on dental anxiety and the factors that stimulate such anxieties have been based on relatively small non-random samples many of which were college students in the classroom setting. In this study we took the most opportune time to gather data on dental anxiety; when a patient was waiting to go into a dentist for an appointment.

Methodology

Ethical approval for the survey was obtained from the Clinical Research Ethics Committee of the Cork Teaching Hospitals. During a 3-week period a total sample of 395 patients were invited to complete a 5-page anonymous questionnaire (see appendix one) evaluating the extent of their dental anxiety and preferences in a dental setting. Consecutive patients completed the questionnaire while waiting to see the dentist. The questionnaire was piloted prior to use to test its functionality and allow modifications prior to implementation. Two patient samples were recruited by the principle investigator who worked at two locations. 200 patients were sampled from a general dental practice and 195 attending the Cork University Dental School and Hospital. The target sample size was arrived at after consideration of previous dental anxiety surveys. Patients completed the questionnaires in the waiting areas while waiting to see the dentists. The general practice was located in a market town. There were 3 dentists in the practice, two male and one female. At the dental hospital, students and staff saw the patients for treatments and consultations. To aid in the development of our questionnaire previous surveys were reviewed, in particular a similar study carried out on college students by Bare in the USA.

The self-completed questionnaire was divided into sections and incorporated the Corah Dental Anxiety Scale (DAS), which is a recognised measure designed to identify patients who are dentally anxious.

DAS contains four multiple-choice questions dealing with the patient’s subjective reaction to the dental situation:

- Anticipating a visit to the dental clinic.
- Waiting in the dentist’s office for treatment.
- Waiting in the dental chair for drilling of teeth.
- Waiting in the dental chair for scaling the teeth.

There are five possible answers to each of the four questions comprising scores in ascending order, from 1 to 5. Each question carries a possible minimum score of 1 and a maximum score of 5, resulting in a total possible minimum score of 4 and a total possible maximum score of 20 for the entire scale.

The survey which consisted of 16 questions in yes/no, fill in the blank, and multiple-choice formats, began with the consent form which had a brief description of dental
anxiety and the study’s purpose. Questions were designed to identify the subject’s age, gender and whether they were a regular or irregular attendee. The four questions of the Corah Dental Anxiety Scale were incorporated into the early part of the questionnaire to identify anxious patients. The survey also included questions in which patients rated reasons for their anxiety (such as afraid it’s going to hurt, feeling out of control, unpleasant stories heard from others, and a negative experience such as gagging). Questions regarding patients fears were included, e.g. the treatment, the needle, the drill and would a delay in a patient’s appointment time affect anxiety? In addition, they were asked to elucidate their preferences for the dentist; friendly or aloof, younger or older than age forty-five, native or foreign, female or male, and talkative or silent. Additional questions asked the respondent to indicate what might enhance their comfort in the surgery setting; such as preferred temperature and music in the background. The principal author also included several questions about factors that had been mentioned to him by patients, such as the smell of dentistry (dental cements), the flavour of the chairside rinse and lying back in the chair.

Statistical Analysis
The data was entered into and analysed using the SPSS® statistical package (version 14.0). Anxiety scores (DAS) of 13 or more have been used in the literature to indicate that a person is highly anxious. This cut-off point was used in the analyses presented here to indicate whether a person is anxious or not. A binary variable was constructed with the two levels indicating that a person has a low anxiety level (DAS < 13) or high anxiety level (DAS ≥ 13). Cross tabulations of this binary variable against the levels of selected questions are presented. Statistical significance of observed differences in mean DAS scores for different levels of selected questions and to evaluate any association between the binary anxiety variable and the questionnaire variables were carried out using two-sided, 2-sample t-tests and chi-squared tests respectively both with a 5% level of significance.

Results

Table 1 – Sample demographics
The total number of patients available for statistical analysis was 388. Of the 388 patients in the sample, 197 (50.8%) were from the dental practice setting and 191 (49.2%) were from the dental hospital setting. The age of participants assessed in the general sample ranged from 16-83 years. The proportion of regular attenders in the sample was 72.5%. A higher proportion of females (21.7%) than males (11.2%) were highly anxious.

<table>
<thead>
<tr>
<th>Sample Demographics</th>
<th>Total % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental practice</td>
<td>50.8% (197)</td>
</tr>
<tr>
<td>Dental Hospital</td>
<td>49.2% (191)</td>
</tr>
<tr>
<td>Male</td>
<td>44.3% (172)</td>
</tr>
<tr>
<td>Female</td>
<td>55.7% (216)</td>
</tr>
<tr>
<td>Regular attendee</td>
<td>72.5% (280)</td>
</tr>
<tr>
<td>Irregular attendee</td>
<td>27.5% (106)</td>
</tr>
<tr>
<td>Anxious</td>
<td>17.0% (65)</td>
</tr>
<tr>
<td>No anxiety</td>
<td>83.0% (317)</td>
</tr>
<tr>
<td>Proportion of males who are anxious</td>
<td>11.2% (19)</td>
</tr>
<tr>
<td>Proportion of females who are anxious</td>
<td>21.7% (46)</td>
</tr>
</tbody>
</table>

| Total | 388 (100%) |

Table 2 – Cross tabulation of dental attendance against anxiety level
While only 12.9% of regular attenders were anxious (DAS ≥ 13), 27.5% of irregular attenders were anxious (Table 2). Using the chi-squared test with Yates’ continuity correction, there is an association between whether a subject is a regular/irregular attendee and whether that subject is anxious or not anxious (p < 0.005).

<table>
<thead>
<tr>
<th>Not anxious</th>
<th>Anxious</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular attendee</td>
<td>242 (87.1%)</td>
<td>36 (12.9%)</td>
</tr>
<tr>
<td>Irregular attendee</td>
<td>74 (72.5%)</td>
<td>28 (27.5%)</td>
</tr>
<tr>
<td>Total</td>
<td>316 (83.2%)</td>
<td>64 (16.8%)</td>
</tr>
</tbody>
</table>

Table 3 – Mean Dental Anxiety Scores (DAS) by location

<table>
<thead>
<tr>
<th>Location</th>
<th>Mean DAS score</th>
<th>n</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental Practice</td>
<td>9.43</td>
<td>192</td>
<td>3.660</td>
</tr>
<tr>
<td>Dental Hospital</td>
<td>8.24</td>
<td>190</td>
<td>3.377</td>
</tr>
<tr>
<td>Total</td>
<td>8.84</td>
<td>382</td>
<td>3.567</td>
</tr>
</tbody>
</table>
The anxiety scores were higher for patients attending the dental practice (DAS 9.43) while the mean anxiety score for the patients who attended the dental hospital was lower at 8.24 (Table 3). There was a significant difference ($p = 0.001$) between the mean DAS scores for those who attended the dental hospital and for those who attended the dental practice.

Table 4 – Cross tabulation of reasons for fear and dental anxiety level

With regard to what patients were afraid of regarding their dental visit, over half of all patients who responded (60.6%) claimed that they were “afraid it’s going to hurt” while the corresponding percentages for anxious and non-anxious subjects were quite similar at 64.6% and 58.6% respectively. Approximately 15.6% of all patients who responded to these questions stated that they feared “feeling out of control” while the corresponding percentages for anxious and non-anxious patients were 30.8% and 11.6% respectively. Also 40.0% of all patients indicated that they were afraid of the “drill” while the corresponding percentages for anxious and non-anxious patients were 55.4% and 36.0% respectively. Using the chi-squared test with Yates’ continuity correction there is an association between selection/non-selection of this category (“the drill”) and anxiety level ($p < 0.01$).

Table 5 – Cross tabulation of opinion of smell from chemicals and cements against anxiety level

The smell from the chemicals and cements bothers 18.5% of the anxious patients and only bothers 7.4% of the non-anxious patients.

Table 6 – Cross tabulation of effect of a delay in appointment against anxiety level

Over half of the anxious patients (53.8%) stated that a delay in their appointment would make them feel “more anxious”. Only 23.7% of non-anxious patients indicated that a delay in their appointment would make them more anxious. There was a statistically significant association between effect of a delay in dental appointment time and anxiety level at the $p < 0.001$ level.

Table 7 – Cross tabulation of preference for dentist traits against anxiety level

With regard to preferences for dentist traits, anxious and non-anxious patients indicated similar preferences for all dentist traits (Table 6). For example 70.0% of anxious and 71.8% of non-anxious patients indicated a preference for a “young” dentist (aged $\leq 45$ years). Of the general sample irrespective of anxiety, respondents had a preference for a dentist that was young (71.5%), friendly (97.1%), talkative (87.8%) and native English speaking (90.8%).
have been used. Although the DAS is often used, there are many studies that have used other recognised scales such as the dental fear scale and some studies, such as Bare’s, used custom-made scales for dental anxiety. Even when DAS is used, studies differ in the cut-off scores, for example, the prevalence of dental anxiety in an adult population in Sweden was found to be 5.4% (DAS ≥ 15 = high anxiety), while the prevalence in an adult population in Denmark was 10.2% (DAS ≥ 12 = high anxiety). We used a DAS ≥ 13 = high anxiety for the present study, as Corah considered most highly anxious patients to score 13 or higher on the scale. However, a DAS of less than 13 does not necessarily denote no anxiety.

It was interesting that there was a significant difference between the mean DAS scores for those who attended the dental hospital compared to those who attended the dental practice. There were more females in the dental practice sample and as females were found to be more anxious than males it is likely that the mean DAS scores would be higher for those attending the general practice. The finding in this study that females had a significantly higher mean DAS score (9.50) than males (8.01) is in agreement with many other reports.

In this study a subject was considered to be a regular attendee if self-reported dental visits were at least one to two times per year. While in the case of an irregular attendee the subject reported not to have had a dental visit for over a year or reported to visit the dentist in an emergency only. While only 12.9% of regular attendees were anxious (DAS ≥ 13), 27.5% of irregular attendees were anxious. This inverse relationship between frequency of dental attendance and anxiety has been reported by many previous studies because regular attendees have less anxiety than irregular attendees. Dental patients seeking regular treatment often report lower levels of dental anxiety than other patients; this may be because highly anxious people tend to seek dental care less frequently and, thus, are not often included in study samples.

Regarding patient fears about their dental visit, 60% of all patients who responded to this survey claimed that they were “afraid it’s going to hurt”. In this study fear of the needle was reported by highly anxious respondents to be the most anxiety-provoking stimulus followed by fear of the drill. This supports findings by other studies where fear of injections was found to lead the anxiety-provoking stimuli in the dental situation followed by the drill. In this study the percentage of highly anxious patients was 17.0% (DAS > 13) which correlates with the recent national survey in Ireland in which 20% of a representative random sample of 16-24 and 35-44 year-old adults reported that they felt worried (or worse) while waiting for their turn in the dental chair. One difficulty with comparing anxiety prevalence between different studies is that many different forms of anxiety assessment

## Discussion

The DAS allows identification of anxious patients based on their score for the four items using the following rating as a guideline.

Anxiety rating:
- 9–12 = moderate anxiety
- 13–14 = high anxiety
- 15–20 = severe anxiety (or phobia).

Corah considered most highly anxious patients to score 13 or higher on the scale.

In this study, the percentage of highly anxious patients was 17.0% (DAS > 13) which correlates with the recent national survey in Ireland in which 20% of a representative random sample of 16-24 and 35-44 year-old adults reported that they felt worried (or worse) while waiting for their turn in the dental chair. One difficulty with comparing anxiety prevalence between different studies is that many different forms of anxiety assessment

<table>
<thead>
<tr>
<th>Dentist Traits</th>
<th>Not anxious</th>
<th>Anxious</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent (Number)</td>
<td>Percent (Number)</td>
<td>Percent (Number)</td>
</tr>
<tr>
<td>Young (under 45 years)</td>
<td>71.8% (173)</td>
<td>70.0% (35)</td>
<td>71.5% (208)</td>
</tr>
<tr>
<td>Old (&gt; 45 years)</td>
<td>17.4% (42)</td>
<td>8.0% (4)</td>
<td>15.8% (46)</td>
</tr>
<tr>
<td>No preference</td>
<td>10.8% (26)</td>
<td>22.0% (11)</td>
<td>12.7% (37)</td>
</tr>
<tr>
<td>Female</td>
<td>39.2% (96)</td>
<td>30.8% (16)</td>
<td>37.7% (112)</td>
</tr>
<tr>
<td></td>
<td>43.7% (107)</td>
<td>40.4% (21)</td>
<td>43.1% (128)</td>
</tr>
<tr>
<td>Male</td>
<td>17.1% (42)</td>
<td>28.8% (15)</td>
<td>19.2% (57)</td>
</tr>
<tr>
<td>No preference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friendly</td>
<td>97.2% (278)</td>
<td>96.8% (61)</td>
<td>97.1% (339)</td>
</tr>
<tr>
<td>Aloof</td>
<td>0.3% (1)</td>
<td>0.0% (0)</td>
<td>0.3% (1)</td>
</tr>
<tr>
<td>No preference</td>
<td>2.4% (7)</td>
<td>3.2% (2)</td>
<td>2.6% (9)</td>
</tr>
<tr>
<td>Talkative</td>
<td>87.4% (215)</td>
<td>89.5% (51)</td>
<td>87.8% (266)</td>
</tr>
<tr>
<td>Silent</td>
<td>8.9% (22)</td>
<td>7.0% (4)</td>
<td>8.6% (26)</td>
</tr>
<tr>
<td>No preference</td>
<td>3.7% (9)</td>
<td>3.5% (2)</td>
<td>3.6% (11)</td>
</tr>
<tr>
<td>Native English speaking</td>
<td>91.3% (219)</td>
<td>89.1% (49)</td>
<td>90.8% (268)</td>
</tr>
<tr>
<td>Foreign</td>
<td>0.8% (2)</td>
<td>0.0% (0)</td>
<td>0.7% (2)</td>
</tr>
<tr>
<td>No preference</td>
<td>7.9% (19)</td>
<td>10.9% (6)</td>
<td>8.5% (25)</td>
</tr>
</tbody>
</table>
A significant percentage of anxious patients feared “feeling out of control” and “a negative experience” about their dental visit. Dickinson and Fiske demonstrated a “traffic light system” of hand controls that allowed patients to have some control over the progress of their treatment. By explaining to a patient that they can signal to the dentist to stop at any time by raising their hand, the patient is likely to feel more in control of the situation and therefore able to better manage their anxiety.

With regard to the surgery environment and its effects on dental anxiety, a number of interesting findings were made. A statistically significant (p < 0.001) number of anxious patients were bothered by the smell of cements and chemicals used by the dentist thus supporting a study by Hakeberg et al. in which dental odour was rated with high scores by a majority of patients with dental phobia. The odour of eugenol could evoke memories of unpleasant dental experiences and, therefore, negative feelings such as anxiety and fear. The smell of eugenates (cements containing eugenol) are often associated with dentistry. In a study by Robin et al., eugenol was shown to evoke negative basic emotions, especially fear, in anxious dental patients, thus confirming the potential role of odours as elicitors of emotional memories. This study also supports the possible influence of the ambient odour, due to eugenol, impregnating the dental office in strengthening negative conditioning towards dental care. This could be avoided by eliminating the odour of eugenol in the dental office. The possibility of masking it by a pleasant and relaxing odour, such as lavender, should be considered especially in areas such as the waiting room.

In the general sample, a higher percentage (56%) of patients said that they would prefer a slightly cool temperature in the surgery; this supports a similar result found in Bare’s study. Based on these results, to enhance patient comfort, further work could be carried out to identify the ideal surgery temperature (range). Interestingly, regardless of anxiety 32% of patients said that they would prefer the chairside mouth rinse to be plain water with 49% not having a preference. Flavoured mouth rinses are commonly used in dental practice, and it is interesting to note from this study that only 20% of the patients in this sample preferred a flavoured rinse. There appears to be very little in the literature regarding patient preference for the chairside mouth rinse and indeed one would wonder if plain water might be better, as the flavoured rinse can perhaps contribute to the smell of the dental environment which some patients dislike.

In this study irrespective of anxiety, respondents had a preference for a dentist that was young, talkative and native English speaking. Approximately 70% of anxious patients had a preference for a young dentist (aged < 45). This is in contrast to Bare’s study in which the anxious patients preferred a male dentist older than age forty-five. Because of the small sample size and convenience sampling, Bare acknowledged that confidence in the results regarding anxious patient’s preference for a male or female dentist was limited and felt the results required replication. Although convenience sampling was a feature of the present study, the results are likely to have greater validity as the sample size was larger and the two samples were not largely from a student population as in Bare’s study.

This study had a number of shortcomings. There was no distinction between patients who were waiting for an operative procedure to those waiting for a check up or consultation. It is likely that those awaiting a procedure were more anxious. Also some of the questions in the questionnaire could be considered emotive.

Suggestions for future research are for more in-depth development of the questionnaire especially for validity and reliability and qualitative patient interviews in an attempt to understand the issues surrounding anxiety during a dental visit from the patient’s point of view. These interviews can be carried out in a number of ways, individually or in a group setting, face to face or via telephone for example.

**Conclusion**

This study supports a number of other studies suggesting that the causes and triggers of dental anxiety are similar wherever they occur. Just over half of the anxious patients indicated that a delay in the waiting time for their dental appointment would make them more anxious. Developing time management strategies and organisation systems that reduce waiting times will help this.

Interestingly in contrast to a previous study anxious patients in the present study had a preference for a young dentist. Anxious patients in this study were bothered by the smell of dental materials in the dental surgery. Although many patients indicated that they had no preference for the chairside mouth rinse, a higher proportion of patients indicated a preference for a plain
mouth rinse than a flavoured mouth rinse. Future research should aim to use consistent measurements of dental anxiety to allow more comparisons across sample groups. It is possible that self-reported dental anxiety measures can provide valuable information to dentists interested in evaluating and reducing their patients’ anxiety levels. Dentists who address these issues with their patients demonstrate concern and increase patients’ confidence. By screening the very anxious patients, it should be possible to instigate a management plan for them. Some may even require referral to a more specialised centre to enable them to have dental treatment.

Good communication between the dental profession and the patient is essential and beneficial to both parties. Allowing patients to express their anxieties enables the dental team to prevent and reduce many of the factors responsible for dental anxiety. This study demonstrates that patients do indeed have preferences about dentists and the surgery environment and therefore it is important that dentists are aware that they need to address these issues which are unrelated to the individual dentist’s expertise and skill. Awareness of the causes of dental anxiety and measures taken by dentists to minimise these trigger factors could have a substantial positive impact on anxious patients, and indeed make the working environment more pleasant for dentists and their staff. By developing strategies to combat dental anxiety, the regularity of dental visits should increase with a corresponding improvement in oral health, which indeed is one of the goals of the dental profession.

References


Appendix 1 Questionnaire

Dental Anxiety Survey

Please work through this short questionnaire ticking the relevant boxes as you go. For some questions you may be asked to tick more than one box. Remember that your name does not appear anywhere on this questionnaire.

1. Your Age _____ Years.

2. Are you:
   - □ Male
   - □ Female

3. How do you feel about this dental visit?
   (Please tick one box):
   - □ I look forward to it as a reasonably enjoyable experience.
   - □ I don’t care one way or the other.
   - □ I am a little uneasy about it.
   - □ I am afraid that it will be unpleasant and painful.
   - □ So anxious, that I sometimes break out in a sweat or almost feel physically sick.

4. When you are waiting in the dentist’s office for your turn in the chair, how do you feel?
   (Please tick one box):
   - □ Relaxed.
   - □ A little uneasy.
   - □ Tense.
   - □ Anxious.
   - □ So anxious, that I sometimes break out in a sweat or almost feel physically sick.

5. When you are in the dentist’s chair waiting while he gets his drill ready to begin work on your teeth, how do you feel?
   (Please tick one box):
   - □ Relaxed.
   - □ A little uneasy.
   - □ Tense.
   - □ Anxious.
   - □ So anxious, that I sometimes break out in a sweat or almost feel physically sick.
6. You are in the dentist’s chair to have your teeth cleaned. While you are waiting and the dentist is getting out the instruments which he will use to scrape your teeth around the gums, how do you feel? (Please tick one box):

☐ Relaxed.
☐ A little uneasy.
☐ Tense.
☐ Anxious.
☐ So anxious, that I sometimes break out in a sweat or almost feel physically sick.

7. If you are afraid of visiting the dentist, what things are you afraid of? (Please tick all that apply):

☐ Afraid it’s going to hurt.
☐ Feeling out of control.
☐ Unpleasant stories heard from others.
☐ A negative experience.
☐ Choking or gagging.
☐ A previous medical experience unrelated to dentistry.
☐ Other:

Please specify if you ticked other: __________________________

8. Sometimes in the dentist’s surgery there is a smell from the cements and chemicals used by the dentist. Does this smell bother you?

☐ Yes.
☐ No.

9. While waiting in the waiting area to see the dentist, would a delay in your appointment time make you feel (Please tick one box):

☐ Less anxious.
☐ More anxious.
☐ No change.

10. If you fear your dental visit, what are you afraid of? (Please tick one box):

☐ The treatment.
☐ Needle.
☐ Dislike of cotton rolls placed in your mouth by the dentist when he is treating you.
☐ The drill.
☐ Other:

Please specify if you ticked other: __________________________
11. When having dental treatment, would you prefer to have your treatment (Please tick one box):

☐ Sitting upright in the chair.
☐ Lying back in the chair.
☐ No preference.

12. Would you prefer the chair-side mouth rinse to be: (Please tick one box):

☐ Plain water.
☐ Flavored water.
☐ No preference.

13. Dentists have different personalities and approaches to their patients. Which of the following of each pair of traits about the dentist would you prefer? A dentist who is:

(Please tick one of each pair (i) to (v))

(i) ☐ Young OR ☐ Old (>45 yrs old)
(ii) ☐ Female OR ☐ Male
(iii) ☐ Friendly OR ☐ Aloof
(iv) ☐ Talkative OR ☐ Silent
(v) ☐ Native English speaking OR ☐ Foreign

14. Would you find the following helpful at your dental appointment to help you relax in the surgery (Please tick all that apply):

☐ Music in the background.
☐ Televisions (with headphones).
☐ Acupuncture.
☐ Having taken a relaxation drug.
☐ Hypnosis.
☐ Nitrous oxide (laughing gas).

15. Would prefer the temperature of the dental office to be:

☐ Slightly warm.
☐ Slightly cool.

16. The last time you were waiting at the dentist for your turn in the chair, how did you feel? (Please tick one box):

☐ Relaxed.
☐ A little worried.
☐ Worried.
☐ Frightened.
☐ So frightened I perspired or felt sick.
☐ Cannot remember / never attended dentist.

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Abstract

Dental fear is a barrier to receiving dental care, particularly for those patients who also suffer from mental illnesses. The current study examined United States dental professionals’ perceptions of dental fear experienced by patients with mental illness, and frequency of sedation of patients with and without mental illness. Dentists and dental staff members (n = 187) completed a survey about their experiences in treating patients with mental illness. More participants agreed (79.8%) than disagreed (20.2%) that patients with mental illness have more anxiety regarding dental treatment (p < .001) than dental patients without mental illness. Further, significantly more participants reported mentally ill patients’ anxiety is “possibly” or “definitely” a barrier to both receiving (96.8%; p < .001) and providing (76.9%; p < .01) dental treatment. Despite reporting more fear in these patients, there were no significant differences in frequency of sedation procedures between those with and without mental illness, regardless of type of sedation (p’s > .05). This lack of difference in sedation for mentally ill patients suggests hesitancy on the part of dental providers to sedate patients with mental illness and highlights a lack of clinical guidelines for this population in the US. Suggestions are given for the assessment and clinical management of patients with mental illness.
Introduction

Individuals with mental illness typically have worse oral health than individuals without mental illness. Mental illnesses such as mood, anxiety, and psychotic disorders have been linked to increased caries and periodontal disease. These patterns remain consistent whether these individuals reside in inpatient or community settings. Lower income, lack of knowledge of dental needs, and xerogenic side effects of psychotropic medications have all been shown to impact oral health in this population. It is critical, then, that individuals with mental illness receive regular dental care in order to lessen the impact of mental illness on their oral health.

Among the many factors that impede access to adequate dental care in this population, dental fear frequently is linked to poor oral health outcomes. High dental fear has been linked to lower scores on the SF-36 mental health scale and increased numbers of psychiatric diagnoses. Pohjola and colleagues found that individuals with depressive disorders and generalized anxiety disorder were significantly more likely to have dental fear than those without these psychiatric disorders even when differences in socioeconomic characteristics were taken into consideration.

Treating dentally anxious patients is often linked to increased stress in dental providers and combining patients’ fear with other mental health issues can further complicate treatment. Dentists who perceived that psychological problems led to increased dental fear in their patients were more likely to report increased stress in their professional lives. Further, dentists express frustration that mentally ill patients frequently miss appointments and do not follow through on treatment recommendations. Many dentists surveyed noted that they were not well equipped to identify or treat patients with mental illness, and tended to focus on physical aspects of patients’ dental problems rather than addressing any aspects of patients’ psychological problems.

The goal of this study was to examine United States (US) dental professionals’ perceptions of dental fear experienced by patients with mental illness, and their patterns of providing different types of sedation to patients with and without mental illness.

Methods

Sampling and Participants

Participants were dentists and dental staff (dental hygienists, dental assistants, and front office/billing personnel) attending the 2011 Pacific Northwest Dental Conference in Seattle, Washington. Study personnel staffed a booth in the conference exhibit hall. Signs at the booth informed individuals of the opportunity to participate in a survey about working with mentally ill patients, and study personnel approached individuals passing by the booth to solicit their participation. All participants currently employed as a dentist or dental staff member working at least in part with adult patients (i.e. not paediatrics) were eligible to take part in the study, regardless of whether they felt their practice regularly treated individuals with mental illness. Upon agreeing to participate, participants were given a clipboard, questionnaire packet and pen, and shown to a nearby seating area where they could complete the survey. If members from the same dental office completed the survey, they were asked to complete the survey independently from one another to ensure individual responses.

Materials

The questionnaire contained 86 questions about dental personnel’s attitudes toward and experiences in working with adult patients with mental illness. For the purpose of this study, mental illness was defined as “any type of emotional difficulties including, but not limited to, mood disorders including depression and bipolar disorder, anxiety disorders, eating disorders, schizophrenia, and substance abuse”. Further, the introduction stated “these conditions may or may not be treated by medications and/or therapy, and may or may not cause limitations in a person’s ability to function”.

Participants were asked what percentage of patients in their dental practice they estimated are currently taking psychotropic medications, as well as what percentage of patients in their practices they estimated are known (e.g. via the patient’s health history) or suspected (e.g. through patients’ behavioural observations or comments) to have a mental illness but are not treated for this mental illness. Participants were then asked how much they agreed with a series of statements about treating patients with mental illness compared to patients without mental illness (e.g. “Patients with mental illness are more anxious about..."
having dental treatment."). Possible item responses ranged from "strongly disagree" (1) to "strongly agree" (4).

Participants were asked about barriers they perceived to mentally ill patients receiving adequate dental care (e.g. "dental anxiety or fear"), and barriers they as dental professionals perceived toward treating mentally ill patients (e.g. "patients' fear or anxiety during treatment"). Participants identified each statement as not a barrier (1), possibly a barrier (2), or definitely a barrier (3). Frequency of sedation techniques used was also assessed for patients with and without mental illness. Participants were asked, "If sedation is needed, how often do you provide it to adult patients in your practice who are/not known or suspected to be mentally ill?" Sedation types included sedation of any type, nitrous oxide (relative analgesia) only, oral sedation only, nitrous oxide plus oral sedation, and intravenous (IV) sedation. Possible item responses ranged from “never” (1) to “very often” (5).

Demographic information was collected regarding participants' age, gender, race, ethnicity, role in the dental office (dentist, hygienist, assistant, billing staff, front office staff, and other), time employed in the dental field, primary type of practice (general/family, pediatric, other specialty), location of practice (rural, urban, suburban, other), and clinic type (private solo, private with one other partner, private with 3 or more providers, community clinic, or other).

Statistical Analyses
Descriptive analyses were done to examine the demographic characteristics of the sample. Nonparametric tests examined differences in proportions of responses on 3- and 4-point Likert scales. One-way analyses of variance (ANOVA) results showed no significant differences between dental professional type (dentist, hygienist, assistant, or front office/billing) on any of the variables of interest. The results for all four professional groups, therefore, were combined for analysis.

Ethics
The Institutional Review Board at the University of Washington approved the study protocol. Participants were informed that their participation was voluntary and their responses anonymous. The first 80 participants received a $5 USD gift card.

Results
Demographic characteristics
Two hundred individuals participated. Nine questionnaire packets were returned as incomplete and were not included in the final analysis. As the population of interest was professionals working primarily with adult patients, data from the 4 participants self-identified as working in pediatric practice were removed from analysis once it was determined that results did not differ significantly after omission of their data. This resulted in a final sample size of 187 (93.5%).

Table 1 presents the demographic characteristics of the sample. The mean age of the sample was 42.2 years (s.d. = 13.1; range 20-88 years) and 77.5% percent of the sample was female. Most (70.6%) were White/Caucasian, and 96.2% considered themselves to not be Hispanic or Latino/a.

Thirty-eight percent of respondents were dentists, 34.8% dental hygienists, 20.9% dental assistants, and 6.3% were front office, billing, or other staff. The average length of time in the dental field was 16.4 years (s.d. = 13.1) and ranged from 0 to 67 years. Over forty percent (41.9%) described their practice as suburban, and 85.6% of practices were described as general/family practice.

Table 1. Demographic information on sample of US dentists and dental staff members responding to a survey of care of mentally ill patients in 2011.

<table>
<thead>
<tr>
<th>Demographic Variable</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender of Dental Professional</strong></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>145 (77.5)</td>
</tr>
<tr>
<td>Male</td>
<td>42 (22.5)</td>
</tr>
<tr>
<td><strong>Race of Dental Professional</strong></td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino/a</td>
<td>7 (3.8)</td>
</tr>
<tr>
<td>Not Hispanic or Latino/a</td>
<td>179 (96.2)</td>
</tr>
<tr>
<td><strong>Ethnicity of Dental Professional</strong></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>132 (70.6)</td>
</tr>
<tr>
<td>Asian</td>
<td>25 (13.4)</td>
</tr>
<tr>
<td>More Than One Race Reported</td>
<td>12 (6.4)</td>
</tr>
<tr>
<td>Don't know/Not Reported</td>
<td>12 (6.4)</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>5 (2.7)</td>
</tr>
<tr>
<td>Native Hawaiian/Other Pacific Islander</td>
<td>1 (0.5)</td>
</tr>
<tr>
<td>Black/African-American</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>
Prevalence of mental illness in dental practice

Participants estimated that on average, 31.4% (s.d. = 21.8; range 0–99%) of patients in their practice are taking psychotropic medications currently. Participants also estimated that 14.1% (s.d. = 14.6; range 0–9%) of patients were either known or suspected to have some form of untreated mental illness. Dentists provided significantly lower estimates of patients taking psychotropic medications (24.0%) than did hygienists (35.8%; p < .01). There were no other differences by dental professional type in the estimates of patients taking psychotropic medications or having untreated mental illness.

Dental fear in patients with mental illness

Table 2 shows the percentage of dental professionals who responded “agree” or “strongly agree” to the question, “patients with mental illness are more anxious about having dental treatment”. In addition, Table 2 shows the percentage of participants who indicated that the dental fear of patients with mental illness is “possibly” or “definitely” a barrier to patients seeking dental treatment or dental professionals providing treatment. Analyses show that significantly more dental professionals agreed (79.8%) than disagreed (20.2%) that patients with mental illness have more anxiety about receiving dental treatment (p < .001) compared to dental patients without mental illness. Further, results showed that significantly more participants reported patients’ anxiety is “possibly” or “definitely” a barrier to patients receiving dental treatment (96.8%; p < .001) or dental professionals providing dental treatment to patients with mental illness (76.9%; p < .01).

Use of sedation in patients with and without mental illness

Figure 1 illustrates the mean frequency of each type of sedation used between patients with and without mental illness. There were no significant differences between patients with and without mental illness for the use of different types of sedation (p's > .05). For patients with mental illness, participants indicated that nitrous oxide
alone is used significantly more than any other type of sedation (p’s < .05) in their practices. For patients without mental illness, participants reported that nitrous oxide alone is used in their practices significantly more than any other type of sedation (p’s < .01).

**Discussion**

When compared to US national averages, the dental professionals in our sample estimated treating nearly three times as many patients taking psychotropic medications (31% in this sample versus 11%) yet less than half as many patients with untreated mental illness (14% in this sample versus 29%). The dentists and dental staff in our sample consistently reported that their patients suffering from mental illness are more anxious about receiving dental treatment than their patients without mental illness, and that patients’ anxiety is a significant barrier both to patients seeking treatment and dental professionals providing treatment. These findings are consistent with prior research suggesting that dentists who feel they are not well trained in treating patients with special health care needs are less likely to provide treatment to such patients.

When faced with a patient population that consistently presents with higher dental fear and more dental disease, it could be expected that dental professionals would be more likely to use sedation techniques to treat these individuals. Despite consistent reports that their mentally ill patients have more anxiety about dental treatment than patients without mental illness, dental providers in our sample reported no significant differences in the frequency of sedation used for these two patient groups, regardless of type of sedation.

Using sedative techniques with the same frequency in patients with mental illness despite higher perceived levels of dental fear suggests hesitancy on the part of dental providers to use sedation with mentally ill patients. This hesitancy may stem from a lack of experience or confidence in working with this population, or a misconception that use of certain medications may push mentally ill patients "over the edge", exacerbating their psychiatric symptoms even in the absence of clear medical contraindications. Dentists have indicated a lack of confidence in identifying mental illness in their patients, and dental providers faced with unusual patient behaviour may avoid using pharmacological adjuncts in the absence of a formal psychiatric diagnosis for fear of "making the patient worse".

Individuals with mental illness are considered by the Special Care Dentistry Association (SCDA) to require special treatment accommodations similar to those of other populations with special health care needs. Resources are being developed currently to help dental providers better understand and care for adults and children with mental illness. Yet, no formal guidelines exist for the use of sedative techniques with individuals with mental illness. Malamed strongly emphasizes the importance of assessing patients’ psychiatric conditions prior to using sedative techniques. In addition, Table 3 provides a summary of commonly prescribed psychotropic medications and their interactions with sedative and/or anesthetic drugs.

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**Table 3. Common psychotropic medications and their interactions with sedative or anesthetic drugs.**

<table>
<thead>
<tr>
<th>Psychotropic Medication/Purpose</th>
<th>Examples</th>
<th>Interacting Dental Drug</th>
<th>Interaction effects</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticonvulsants, Bipolar Disorder</td>
<td>Carbamazepine, Lamotrigine, Valproic acid</td>
<td>Barbiturates</td>
<td>May decrease metabolism of barbiturates, increasing plasma concentrations</td>
<td>Monitor for excessive phenobarbital effect</td>
</tr>
<tr>
<td>Benzodiazepines, Anxiety</td>
<td>Alprazolam, Diazepam, Midazolam</td>
<td>Barbiturates</td>
<td>May increase sedative effects</td>
<td>Observe patient for increased CNS depression; decrease dosage of benzodiazepine if necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Benzodiazepines (other)</td>
<td>May increase sedative effects</td>
<td>Observe patient for increased CNS depression; decrease dosage of benzodiazepine if necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Opioids</td>
<td>Increased risk of respiratory depression and hypotension, and increased recovery time</td>
<td>Monitor for excessive sedation and titrate dosages as necessary</td>
</tr>
</tbody>
</table>
To ensure good patient care, all dental patients seeking dental treatment under sedation should complete a carefully history of both their physical and psychological and/or psychiatric history, regardless of whether they are currently treated for a mental illness. By understanding a patients’ psychological/psychiatric history prior to administering sedative medications, dental providers may help anticipate secondary complications stemming from the patient’s mental illness.

As an example, a patient diagnosed with schizophrenia, paranoid type, may indicate that he is suspicious of the effects of the sedative medications to be used during the procedure. Assuring the patient that you will be in close contact with his physician and/or psychiatrist to ensure that all medications are safe and compatible with his existing medications may be critical in alleviating his concerns. Table 4 presents common psychiatric diagnoses seen in the dental office and considerations for each. As a note, the information presented in Table 4 is not meant to take the place of nor supersede a diagnosis from a trained psychologist, psychiatrist, or other mental health professional that has assessed the patient(s) in question.

Table 4. Common mental health/psychiatric illnesses and dental considerations prior to sedation.

<table>
<thead>
<tr>
<th>Mental illness</th>
<th>Symptoms</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bipolar Disorder</td>
<td>Presence of manic and depressive episodes. <strong>Manic Episode</strong> – period of 1 week or more where mood is consistently elevated or irritable; may include decreased need for sleep, pressured speech, racing thoughts; increased activity; and distractibility (pp. 357-361) <strong>Depressive Episode</strong> – see Major Depressive Episode/Disorder</td>
<td>• Patients may be reluctant to discuss Bipolar Disorder diagnosis due to fear of stigma; discuss diagnosis in judgment free terms. After discussing with patient, speak with treating psychologist or psychiatrist, particularly about any prior or current substance abuse.</td>
</tr>
<tr>
<td>Generalized Anxiety Disorder</td>
<td>Presence of excessive worry and anxiety for a period of 6 months or more; patient finds it difficult to control the worry; accompanied by physical symptoms such as restlessness, fatigue, and disturbed sleep (pp. 472-476).</td>
<td>• Patients may express significant worry and feeling overwhelmed about dental needs and/or safety of sedation procedure. • Focus on what will be fixed first (avoiding long discussions of future treatment needs) and how positive an experience it will be for the patient.</td>
</tr>
</tbody>
</table>
The current study included currently practicing dentists and dental staff members primarily from Washington State who were attending a professional dental conference. A broader survey of dental providers across the US could provide more generalizable results. However, dental professionals from across different types of practices (private and community clinics) and in different professional roles participated, providing a picture of the different types of dental providers mentally ill individuals may encounter when accessing dental care. Further, providers were eligible to participate regardless of how many mentally ill patients they regularly treated, providing a range of responses based on actual experiences versus perceived challenges with this patient population.

Individuals with mental illness are at increased risk for poor oral health outcomes, and fear of dental treatment often accompanies these other psychiatric diagnoses, making treatment under sedation a viable option. The current survey results, however, suggest that many US dentists may be hesitant to provide sedation to patients with mental illness. Standardized guidelines for the use of sedative techniques in this population are a critical first step in assuring that this underserved population has access to necessary dental treatment.

Acknowledgements

The authors would like to thank the Washington State Dental Association for allowing this study to be conducted at the 2011 Pacific Northwest Dental Conference, and the study participants for their time and assistance. This study was funded by the University of Washington School of Dentistry Alumni and NIH/NIDCR Grant 5K23DE019202-03.

References


DECISSON AIDS IN PAEDIATRIC DENTAL SEDATION: HELPING CHILDREN CHOOSE WHAT IS RIGHT FOR THEM

Successful application for SAAD funding for a PhD studentship

Applicants: Professor Helen Rodd1, Dr Zoe Marshman2, Dr Sarah Baker3, Dr Sondos Albadri1
1Unit of Oral Health and Development and 2Unit of Dental Public Health, School of Clinical Dentistry, University of Sheffield, UK, 3School of Dentistry, University of Liverpool, UK

Contact details: H Rodd, School of Dentistry, Claremont Crescent, Sheffield, S10 2TA.
Tel: 0114 2717885; Fax: 0114 2718843; Email: b.d.rodd@sheffield.ac.uk

‘…there should be no decision about me without me’
Achieving excellence and equity for children,
Department of Health, 2010

The project in brief
This 3-year PhD project will take a psychosocial approach and will focus on information-giving and decision-making for children and young people who are faced with choices about which sedation regimen to pursue. The study seeks to develop, and evaluate evidence-based decision aids for use in paediatric dental sedation, which should have wide application and a positive impact on patient experiences.

Background to proposed research
Rationale for the study
The 2010 NICE Guidelines, ‘Sedation in children and young people’ outline best practice for the management of children and young people who require sedation for medical interventions. Specific recommendations are made regarding the quality of written and verbal information that should be given to children, young people and their families to help them make an informed decision about what is best for them. Patients should be fully informed about the proposed sedation technique, the alternatives to sedation and the associated risks and benefits.

At the very heart of good patient-centred care is the shared treatment decision-making model (Charles et al., 1999). The three main components of the shared model are communication, information giving, and sharing of decisions between health care professional and patient. However, patients cannot express informed preferences about their treatment unless they are given sufficient and appropriate information.

Patient decision aids
A relatively new concept for supporting information exchange and reducing the potential for decisional conflict is through the use of decision aids. These provide tailored information on options, benefits and harms, outcomes and probabilities and their value has been well supported in a recent systematic review (O’Connor et al., 2009). Patient decision aids (PDAs) are defined as interventions to support patient involvement in decision-making and facilitate the move towards a more shared model of decision-making. They may be used within the context of the physician-patient interaction, or independently by the patient before or after their consultation.
The last decade has seen a rapid increase in the development of PDAs for a range of health decisions, utilising a wide variety of formats including: leaflets; interactive videos; audio tapes, and decision boards. A common approach is to include personal stories, which are first-person narratives that provide illustrative examples of others’ experiences with decision making.

**Research protocol**

**Aim**
The overall aim of this project is to develop a patient decision aid to help children, and young people make informed choices about dental sedation.

**Objectives**
The specific objectives are:
1. To explore what factors are involved, from the young persons’ viewpoint, in initially making the decision whether or not to undergo sedation for dental treatment, and subsequently, what form of sedation to choose;
2. To gain knowledge of the information and support needs of children and young people in making sedation decisions, including the content, format, and timing of such resources;
3. To develop a patient decision aid to facilitate children and young people in making an informed treatment decision, together with their families, about their dental sedation;
4. To evaluate the decision aid according to established criteria;
5. To determine the impact of a decision aid for paediatric dental sedation in terms of patient/parent satisfaction, patient anxiety, attendance and compliance with treatment.

**Method**

- **Stage 1: obtaining children’s accounts of dental sedation**
  Participants (n=20) aged 6-16 years, from the Paediatric Dentistry Departments of Sheffield and Liverpool Dental Charles Clifford Dental Hospital will be invited to participate in home interviews, which will centre around the participants’ experiences of a range of dental sedation techniques and/or general anaesthesia. The overall aim is to obtain a range of narratives about treatment experiences and a variety of participatory activities will be employed to facilitate the interview.

- **Stage 2: PDA development**
  Development of the PDA will be in line with the framework produced by the International Decision Aid Standards (IPDAS) collaboration, which incorporates 12 quality domains (O’Connor et al., 2005). Children’s accounts will be used to develop a PDA to help future patients understand decision making for dental sedation. Stories will be selected to present a range of positive and negative experiences relating to decision-making and experiences of treatment in the four main categories:
  - Treatment without sedation
  - Treatment with nitrous oxide inhalation sedation
  - Intravenous sedation with Propofol
  - General anaesthesia.

  The next step in the PDA development process will be the formation of expert groups to develop and review the PDA. It is anticipated that PDA will be based on electronic communication technologies.

- **Stage 3: testing the intervention**
  The final stage of the project will be to determine the effect of the PDA in terms of changing patient outcomes and experiences within their dental sedation care pathway. Participants will be recruited at their initial new patient assessment at Liverpool dental school and will form two groups i) 30 patients will be recruited prior to the development of the PDA (non-intervention group) and ii) 30 patients will be recruited following the development of the PDA (intervention group). Group i) will be given conventional clinical counselling prior to their sedation treatment choice and group ii) will be given the PDA as well as clinical counselling prior to treatment.

  The PDA group will be asked to work through the resource prior to their pre-sedation assessment clinic. At the pre-sedation clinic, all patients will attend as normal to make a choice about what treatment option to pursue. A record will be made of the patient’s age, gender, socio-economic status, ethnicity and treatment choice (no sedation; inhalation sedation; intravenous sedation or general anaesthesia). Following this appointment, all participants and parents will be invited to complete validated questionnaires to determine their satisfaction.
with the information provided, opportunity to participate in decision-making, and anxiety levels.

At the treatment visit, patients and parents will be asked to repeat the measures on overall satisfaction and anxiety. Differences in anxiety and satisfaction between intervention and non-intervention groups will be tested using repeated measures analysis of covariance.

Project team
The study will be well supported by a project team comprising:

- Professor C Deery, Dr S Harrison and Mrs N Dunning, Sheffield Dental School
- Mrs A Macpherson, Liverpool Dental Hospital
- Dr M Davies, Royal Liverpool and Broadgreen University Hospitals Trust.
- Mrs Enid Hirst, patient representative

Key references


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case reports of interest to SAAD members
and suitable for publication
in the
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SAADoffice@btinternet.com
Introduction

Pain and anxiety management is fundamental to the modern practice of dentistry. The prevalence of dental anxiety and phobia is significant; in the UK Adult Dental Health Survey of 2009, 48% of those who had ever been to a dentist were classified as having moderate or extreme dental anxiety. The significance of dental anxiety as a barrier to obtaining dental care, particularly as a result of avoidance, is well recognised. Furthermore, it has been reported that dental anxiety does not just affect patients but can be a significant source of stress for dental practitioners who treat an anxious patient. The General Dental Council (GDC) has stated that dental practitioners have a ‘duty to provide’ and patients have a ‘right to expect’ adequate and appropriate techniques aimed at controlling pain and anxiety.

Conscious sedation plays a paramount role in the control of pain and anxiety of patients in operative dentistry. It can be 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 understand and respond to verbal commands.”

This definition was originally proposed in the Wylie Report in 1978 and has now been adopted by the GDC, the Department of Health, the Society for the Advancement of Anaesthesia in Dentistry (SAAD), the Dental Sedation Teachers Group (DSTG), the Scottish Office National Dental Advisory Committee and the British Society of Gastroenterology.

As a dental undergraduate, I have realised that exposure to conscious sedation teaching is limited and for those interested in further developing their skills, pathways to do this may not be very well known. So, the aims of this article are to consider current undergraduate teaching in conscious sedation and also to explore education and training currently available at postgraduate level.

Undergraduate Teaching

The GDC’s framework for undergraduate dental education, ‘The First Five Years’, states that the control of anxiety and pain is fundamental to the practice of dentistry and dental graduates must have had clinical experience in the administration of both inhalation and intravenous conscious sedation including: assessment and preparation, care under treatment, and recovery and discharge of patients receiving conscious sedation.

Teaching in conscious sedation aims to provide the undergraduate with the knowledge, skills and attitudes required for the competent practice of conscious sedation for dentistry. It moreover enables and encourages students to acquire adequate clinical experience in managing patients who require conscious sedation.

I decided to carry out a study to gain the opinions of current undergraduate dental students from the two London undergraduate dental schools: Barts and The London School of Medicine and Dentistry and King’s College London. The objectives of my study included:

- Finding out how important students feel inhalation and intravenous sedation teaching is as part of the undergraduate curriculum.
- Considering the opinions of current undergraduate students about the current undergraduate sedation teaching.

Figure 1- Undergraduate sedation training
students regarding the sedation course, specifically its content, clinical requirements and timing.

- Determining the awareness of dental students to the pathways available to further develop their skills in sedation as a postgraduate and opinions on the need for these.

My first observation of conscious sedation teaching in general was that the extent and opportunity of practical, hands-on undergraduate sedation teaching was not consistent across the country in all dental schools. In this case, it was found that Barts and The London teach conscious sedation as part of an intense 6–7 week course, whereas King’s College London dental students are placed on a 6-monthly conscious sedation teaching rotation which is combined with oral surgery teaching. I designed a questionnaire to find out more (Appendix 1). Before using the questionnaire, I piloted it on a small group of students and refined it as necessary. A total of 70 questionnaires were delivered to the fifth year students of School A, and 90 questionnaires were delivered to fourth and fifth year students of School B. Data was collected over a period of 3 weeks and the results then collated. The response rates for School A and B were 79% and 72% respectively. Appendix 2 includes tables summarising the data collected. The results from the 120 completed questionnaires were then analysed.

Figure 2 shows that an encouraging majority of students from both schools rated conscious sedation teaching at an undergraduate level as very important or imperative. Furthermore, 98% felt that teaching at their dental school gave a good overview of the use of conscious sedation in a dental setting. 85% felt that the teaching was provided at the correct time during undergraduate training; the remainder felt that it might have been more beneficial delivered during their 3rd year rather than the 4th or 5th year.

The recommended minimal clinical experience suggested by the DSTG to represent a sound foundation in conscious sedation techniques is 5 patient assessment cases, 10 inhalational sedation cases (to include both adults and children) and 20 intravenous sedation cases (to include both restorative and oral surgery cases). Figure 3 shows that, overall, all students from both schools felt that a slightly greater number of patients would need to be seen in all 3 aspects of care to gain a sound understanding of conscious sedation. However, these greater numbers might not be realistic within the time constraints of the dental undergraduate curriculum.

43% of all students felt that they had had enough exposure to carry out inhalation sedation on graduating without further training and, surprisingly, a higher percentage of 46% felt that they had enough exposure to use intravenous sedation techniques on graduating without further training. Although less than half, these are significant percentages. Furthermore, 45% of students from school A and 49% of students from school B felt that postgraduate study was not necessary. 93% felt that the teaching of conscious sedation was necessary at undergraduate level rather than solely post-graduation. It is extremely important that new graduates appreciate the limitations of undergraduate experience and the need to refer selected cases to an appropriate care setting; perhaps more emphasis needs to be made on these points during undergraduate teaching. It is also important for students to understand the importance of supplementary postgraduate study as required, and the role of continuing professional development.
Only 5% of undergraduates from School A and 2% from School B were aware of the pathways available to develop skills and gain qualifications in conscious sedation after graduating. This clearly shows that there is an evident need to increase awareness of the options available for students on their graduation.

**Postgraduate Education and Training**

There are several options available to dentists seeking postgraduate training in conscious sedation. These include:

- Short courses and programmes
- Certificate courses
- Diploma courses
- Master's degrees

**Short Courses and Programmes**

Short courses in sedation are offered by postgraduate dental deaneries, dental teaching hospitals and private organisations. SAAD is one of the UK's largest postgraduate teaching organisations for dentistry. It has been running such courses for over forty years. SAAD offer a very popular 2-day (total of 12 hours) course which covers the underpinning knowledge and clinical skills required for the safe provision of conscious sedation in dental practice. A recent attendee gave their feedback on the course:

> "This was a lively weekend with friendly and approachable lecturers."  

The course is led by dentists with sedation expertise. It is run three times a year, with around 80 spaces available for dentists and costs for 2011 are £540 for dentists and £510 if one is already a SAAD member. This course is designed as an introduction and does not offer clinical training and hands-on experience with patients; therefore it should be emphasised that the requirement for such experience needs to be sought on an individual basis before embarking on independent practice.

Currently, there is no formal mechanism to achieve further clinical training on completion of the course apart from small-scale mentoring schemes such as those offered by the DSTG and SAAD. A list is available which consists of practitioners who are prepared to offer advice, and to supervise dentists who are inexperienced. The list contains over 80 dentists and gives details of location and the type of sedation used. All those on the list are SAAD members or members of the DSTG. Contact is normally made after attending a SAAD course and arrangements for clinical teaching sessions are made on an individual and mutually agreed basis. The advantages of such a scheme are that it is flexible, one can work in the familiar surroundings of their own practice and the mentor can provide tailored feedback and assistance if problems arise. Nevertheless, there is still a cost to the mentee and the mentor also has to spend time away from his/her practice.

The University of Central Lancashire also offers a similar short course in intravenous or inhalation sedation for dentistry. Short programmes of clinical experience are often organised by a number of regional maxillofacial units and dental teaching hospital departments. However, the experience available from these is often limited to selected groups of patients and conscious sedation techniques.

**Certificate Courses**

Longer courses which allow postgraduates to achieve a certificate in conscious sedation are also available. Previously a course of this type was offered at Liverpool University but this one is no longer running. However, one is still offered by University College London, Eastman Dental Institute. The course includes lectures, problem-based learning, observed clinical sessions and final examinations. Figure 4 gives information on the duration and cost:

<table>
<thead>
<tr>
<th>University</th>
<th>Duration (part-time)</th>
<th>Cost (UK/EU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>University College London</td>
<td>12 months</td>
<td>£4,680</td>
</tr>
</tbody>
</table>

Figure 4 - Certificate course duration and cost details

**Diploma Courses (PGDip)**

In the UK, a few dental schools offer a diploma in conscious sedation; these include King’s College London, University of Newcastle-upon-Tyne, and University of Dublin Trinity College. These courses aim to give a systematic and detailed understanding in the theoretical principles which underlie conscious sedation in dentistry.
as well as comprehensive practical understanding of clinical skills in inhalational and intravenous sedation. Diplomas also aim to give practitioners the ability to critically evaluate the evidence-based and clinical issues involved in the safe independent practice of conscious sedation to the highest standards.

Diplomas are awarded on successful completion of a formal academic programme and assessment. The intake for the diploma programmes varies from 10-15 students per year. Figure 5 summarises their duration and cost at the various dental schools:

<table>
<thead>
<tr>
<th>University</th>
<th>Duration (part-time)</th>
<th>Cost (UK/EU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>King’s College London</td>
<td>9 months</td>
<td>£4,050</td>
</tr>
<tr>
<td>University of Newcastle-upon-Tyne</td>
<td>12 months</td>
<td>£4,285</td>
</tr>
<tr>
<td>University of Central Lancashire</td>
<td>12 months</td>
<td>£18,000</td>
</tr>
<tr>
<td>University of Dublin Trinity College</td>
<td>18 months</td>
<td>£6,087</td>
</tr>
</tbody>
</table>

Figure 5 - Diploma duration and cost details 13,14,15,16

Teaching within diploma programmes is via: formal lectures and seminars, extensive hands-on clinical practice, self-directed learning, continuous assessment, workplace audit as well as written and practical examinations.

Masters Degree (MSc)

Master’s degree programmes are offered by a number of dental schools; these aim to provide comprehensive teaching in conscious sedation techniques in dentistry. Teaching styles are similar to that of diplomas but students are additionally required to produce a detailed research project to facilitate career development. The courses have been designed to fulfil contemporary guidelines in conscious sedation, providing future proficient practitioners for the National Health Service and teachers for educational environments in the management of pain and anxiety. However, entrance into these courses is competitive and some universities only take on around 6-8 students per year. Figure 6 gives a summary of the duration and cost of a master’s degree at a number of UK dental schools:

<table>
<thead>
<tr>
<th>University</th>
<th>Duration (part-time)</th>
<th>Cost (UK/EU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>King’s College London</td>
<td>2 years</td>
<td>£15,060</td>
</tr>
<tr>
<td>University of Newcastle-upon-Tyne</td>
<td>2 years</td>
<td>£10,292</td>
</tr>
<tr>
<td>University of Central Lancashire</td>
<td>3 years</td>
<td>£23,600</td>
</tr>
<tr>
<td>University of Dublin Trinity College</td>
<td>3 years</td>
<td>£11,082</td>
</tr>
</tbody>
</table>

Figure 6 - Master’s degree duration and cost details 17,18,19

The master’s degree programme run by King’s College London offers specialised training in both sedation and special care dentistry. This course encompasses all dental disciplines in managing patients with complex requirements under conscious sedation where appropriate, therefore providing a holistic approach to patient care. Furthermore, there are opportunities to visit external specialist clinics offering experience in other clinical areas. Below is an opinion from a dental practitioner who has achieved this master’s degree:

“This was a fantastic course. It helps to network and get to know other practitioners who practice conscious sedation. It enables you to bounce ideas off one another. It is also reassuring to know that your colleagues are always there to help you anytime in the future.”

Retention and continual improvement of theoretical knowledge and practical skills relies upon regular updating by means of suitable refresher courses. The timing and method of updating is dependent on the individual and their circumstances. Nevertheless, all courses that have been attended should be documented. So, it is evident that there are several postgraduate training programmes available, ranging from short courses to more advanced degree level qualifications (Figure 7). However, at present, there is insufficient provision or intake available on postgraduate courses to meet the demands by dental practitioners. One cross-sectional study with 423 responders of 603 randomly selected UK dentists (70% response rate) reported some use of conscious sedation techniques as part of clinical practice, with intravenous sedation being the most commonly used. However, only 6% held a postgraduate qualification of any sort and 21% wished to pursue a postgraduate qualification.20 Also, as mentioned earlier, SAAD courses are very popular and have been
oversubscribed for many years. The Department of Health has recognised the difficulty of accessing clinical experience and has devised a National Course in Conscious Sedation (England and Wales). Unfortunately, this initiative has not been supported by sufficient funding.  

Conclusion

In summary, conscious sedation plays a vital role in the management of pain and anxiety in dentistry. Undergraduates rate the importance of sedation teaching as very high. However, there may be a need to increase awareness of the limitations of undergraduate teaching and the need and possibilities to further develop one’s skills. A range of postgraduate education and training programmes are evidently available. Nonetheless, there may still be a need to increase accessibility to these courses, perhaps by raising awareness and improving funding, allowing dental practitioners to maximise the benefits of conscious sedation techniques in daily practice.

References


Appendices

Appendix 1 – Questionnaire

Dear Student,

THIS IS A VOLUNTARY AND ANONYMOUS QUESTIONNAIRE ABOUT CONSCIOUS SEDATION.

All information will be kept strictly confidential and used for study purposes only.

Your responses will be greatly appreciated.

Please tick the appropriate box:-

University: Barts & The London (QM) ☐ Kings College London (KCL) ☐
Year: 4 ☐ 5 ☐
Gender: Male ☐ Female ☐

Have you yet undertaken any clinical work using sedation? Yes ☐ No ☐

1. Rate the importance of inhalation and intravenous sedation teaching as part of the undergraduate curriculum (0=Not important at all, 5=Imperative):
   1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

2. Do you feel the teaching at your school gives you a good overview of the use of conscious sedation in a dental setting?
   Yes ☐ No ☐ Unsure ☐

3. How many patients do you feel you need to see to get a good understanding of the potential of sedation as an undergraduate?
   Patient assessments: 0-5 ☐ 5-10 ☐ 10-30 ☐ 30-60 ☐ 60-100 ☐ 100-150 ☐ 150+ ☐
   Inhalation sedation: 0-5 ☐ 5-10 ☐ 10-30 ☐ 30-60 ☐ 60-100 ☐ 100-150 ☐ 150+ ☐
   Intravenous sedation: 0-5 ☐ 5-10 ☐ 10-30 ☐ 30-60 ☐ 60-100 ☐ 100-150 ☐ 150+ ☐

4. In your opinion, is the sedation teaching provided at the correct time during your undergraduate training?
   Yes ☐ No ☐ Unsure ☐

If no, please suggest the most appropriate year/term of study: ______
5. Do you feel you have enough exposure to conscious sedation to use these techniques on graduation without further training?
   Inhalation sedation: Yes □ No □ Unsure □
   Intravenous sedation: Yes □ No □ Unsure □

6. Do you feel postgraduate study is necessary before practising conscious sedation?
   Yes □ No □ Unsure □

7. Do you think that conscious sedation should only be taught at postgraduate level?
   Yes □ No □ Unsure □
   Please give your reasons: __________________________________________

8. How many patients do you feel you need to see before safely and comfortably using sedation in practice?
   Patient assessments: 0-5 □ 5-10 □ 10-30 □ 30-60 □ 60-100 □ 100-150 □ 150+ □
   Inhalation sedation: 0-5 □ 5-10 □ 10-30 □ 30-60 □ 60-100 □ 100-150 □ 150+ □
   Intravenous sedation: 0-5 □ 5-10 □ 10-30 □ 30-60 □ 60-100 □ 100-150 □ 150+ □

9. Are you aware of the pathways you can take to develop your skills and gain qualifications in conscious sedation after graduation?
   Yes □ No □

10. Do you plan on carrying out any further study or training in conscious sedation?
    Yes □ No □ Unsure □

PLEASE FEEL FREE TO MAKE ANY OTHER COMMENTS:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Thank you very much for your time
## Appendix 2 – Data Collected

### Student details

<table>
<thead>
<tr>
<th>School A</th>
<th>School B</th>
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</thead>
<tbody>
<tr>
<td>Year 5</td>
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<td>Female</td>
</tr>
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### Question 1 – Rating the importance of inhalation and intravenous sedation teaching

<table>
<thead>
<tr>
<th>Rating</th>
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<th>School B</th>
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### Question 2 – Teaching at the school gives a good overview of the use of conscious sedation in a dental setting

<table>
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### Question 3 – Number of patients students feel they need to see to get a good understanding of the potential of sedation as an undergraduate

<table>
<thead>
<tr>
<th>Number of patients</th>
<th>School A &amp; B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient assessments</td>
<td>Inhalation sedation</td>
</tr>
<tr>
<td>0–5</td>
<td>5</td>
</tr>
<tr>
<td>5–10</td>
<td>10</td>
</tr>
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<td>0</td>
</tr>
<tr>
<td>150+</td>
<td>0</td>
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</table>

### Question 4 – Teaching at the correct time during undergraduate training

<table>
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<tr>
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<tbody>
<tr>
<td>Yes</td>
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<tr>
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<td>5</td>
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</table>
Question 5 – Feel have enough exposure to use techniques on graduation without further training

<table>
<thead>
<tr>
<th></th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>School A</td>
</tr>
<tr>
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<td></td>
</tr>
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<td>23</td>
</tr>
<tr>
<td>No</td>
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<td>Intravenous sedation</td>
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<td>28</td>
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Question 6 – Postgraduate training is necessary before practising conscious sedation

<table>
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<th>Number of students</th>
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</thead>
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<td>25</td>
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</table>

Question 7 – Conscious sedation should only be taught at postgraduate level

<table>
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<tbody>
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<td></td>
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<td>51</td>
</tr>
<tr>
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</table>

Question 8 – Number of patients students feel they need to see before safely and comfortably using sedation in practice

<table>
<thead>
<tr>
<th>School A &amp; B</th>
<th>Number of patients</th>
<th>Patient assessments</th>
<th>Inhalation sedation</th>
<th>Intravenous sedation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0–5</td>
<td>3</td>
<td>0</td>
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<td>5–10</td>
<td>7</td>
<td>5</td>
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<td>76</td>
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<td>5</td>
<td>9</td>
<td>10</td>
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<td>100–150</td>
<td>0</td>
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<td>1</td>
</tr>
<tr>
<td></td>
<td>150+</td>
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<td>1</td>
<td>1</td>
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</tbody>
</table>

Question 9 – Aware of pathways one can take to develop skills and gain qualifications in conscious sedation after graduation

<table>
<thead>
<tr>
<th></th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>School A</td>
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<td>Yes</td>
<td>3</td>
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<td>No</td>
<td>52</td>
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</table>

Question 10 – Plan on carrying out further study or training in conscious sedation

<table>
<thead>
<tr>
<th></th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>School A</td>
</tr>
<tr>
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<td>3</td>
</tr>
<tr>
<td>No</td>
<td>41</td>
</tr>
<tr>
<td>Unsure</td>
<td>11</td>
</tr>
</tbody>
</table>
The muffled sound of my surroundings ringing in my ears, a wave of nausea and a sense of impending doom heralds; NO – not the onset of a medical emergency, but the turning of the page of my “Conscious Sedation” exam paper! My mind begins to frantically struggle to grasp the reasoning behind why I have put myself through this torture. That’s easy, it’s a subject that I have been interested in for ages and studying for this exam is simply the best thing I’ve done in years!

Let me explain my journey and how I could feel panic and passion in the same heartbeat.

I am a dental nurse and have worked for the South Devon Community Dental Service for the last 13 years. Before this I worked in Practice for a time and took a break to have a family. It was a much longer break than I had planned, 14 years to be precise, but a move to Torquay and increasingly less dependent children stimulated my desire to look for a job. The very day I decided to look for a dental nursing position, I saw a “Community Dental Nurse” post advertised in the local paper. I was fortunate enough to be successful in my application and started to appreciate the variety that community work affords. Our remit is principally “Special Needs children and adults” with some cover for unregistered emergency patients. My very first week I shadowed the senior nurse as we took three special needs patients to the local hospital and with the benefit of a general anaesthetic, completed all their necessary dental work in one go.

I can’t tell you how much I love my job, especially the satisfaction I feel when we achieve co-operation with the patient who has previously been too frightened even to come into the room. The needs of our patients are so varied and for many the only way to treat them is with a general anaesthetic. Sometimes we have a patient come in with two or three carers all poised in case they take a “swipe” at the dentist. At this point you know that if they need any treatment it will have to be with the aid of a general anaesthetic! I have been responsible for co-ordinating our Special Needs list at the hospital for several years and value this adjunct to our service. Sometimes, however, there is the dilemma that our patient might only need a good scaling to achieve a thorough examination. Unfortunately, they can’t quite co-operate for this just sat in the chair, but a general anaesthetic seems a step too far. The concept that we should only use the least intervention necessary to achieve our goal has always been a natural preference for me, even before I saw it in black and white as part of the Conscious Sedation guidelines I had to learn for my exam!

Our current Clinical Director joined us about four years ago and brought with him a wealth of conscious sedation and medical emergency knowledge and experience. It was a very exciting time to see our department progress in several ways, not least in starting to develop a sedation service. Only our Senior Nurse/Practice Manager is qualified as a sedation nurse and it soon became apparent that there were some “training needs” in the service. “Zippity Doo Dah!” It was a chance to do some training in a subject close to my heart, although at 47 years of age I was afraid that a few too many grey cells may have died off. It was at this point that I became aware of SAAD as we heard about a nurse’s course held in London in June 2009. Three of us were successful in our application for funding of the course and excitedly planned our trip! It was particularly good to be able to share the experience and would prove to be invaluable as we would later study together and support each other through the exam. I remember that the weather was beautiful as we walked along Mile End Road to the Queen Mary Campus in London. We registered and eagerly sat, about half way back in case we got picked on for anything, looking through the proposed plan for the weekend. The speakers were charismatic and the scheduling and delivery style aided the “absorption” of a lot of information. We talked about what we had learnt that evening over dinner and the possibilities for our service. We were really excited as our eyes had been opened to Conscious Sedation and we could all see the benefits it
would bring to our patients. We were very good and went to bed early so we could get up bright and breezy for the next day. I remember sitting in bed flicking through the course booklet thinking, “I’ll never remember all this!” The next day was equally stimulating and we left the course energised and eager to proceed with our study. A particularly high point for me and one of my colleagues was the cannulation practice. We really loved having the opportunity to learn how to cannulate each other and still hope that we might be able to train to do this at some point in the future.

We were fortunate enough to be offered funding to attend the Conscious Sedation course at Bristol Hospital and over an intense six months, October 2009 to March 2010, attended a series of study days. These picked up from where our SAAD experience left off and continued to feed our enthusiasm for the subject. In the meantime our Clinical Director was carrying out IV sedation and we were able to assist under the supervision of our Senior Nurse. To be truthful, there were times when the responsibility of our role seemed huge, but as I became more adept at monitoring and more knowledgeable about the whole subject I felt more confident in my acquired knowledge and abilities. I started a log book of all the cases I was involved in and looked for two subjects I could use as case studies. I would like to share something about one of them. For me, this case typifies the reason for carefully assessing a patient and working together as a team to decide the best “mode” of treatment, which may not always be the same for each visit. The following example encapsulates the real sense of achievement felt by the patient and dental team when things go well, and a little job satisfaction goes a long way! The patient in question was an emergency booking, driven to attend our clinic by excruciating pain and accompanied by a very patient mother! The patient was a 26-year-old woman and extremely phobic, in fact she spent a good five minutes standing in the corridor outside the surgery when I called her name, and even with her Mum’s coaxing was reluctant to set foot in the door. She complained that she couldn’t stand the dental smell, even in the corridor. When she eventually came in she rushed to the far side of the room and sat in a chair as far away as possible from the dental chair. She sat ringing her hands and rocking with fear. Her behaviour reminded me of so many of our special needs patients. Our remit doesn’t include phobic patients as such but perhaps “phobia” is a special need! She never did make it into the dental chair but with a lot of chat, and some very poor jokes, our Clinical Director just had a quick look in her mouth with a mirror and me trying to aim the dental light at her mouth from across the room. We arranged several brief but regular appointments to desensitise and started to discuss different ways to approach her treatment. After a lot of work (I even sprayed my Jean Paul Gaultier “Classique” in the corridor before she came in to mask the dental smell!) we agreed that IV sedation was the best way forward and arranged an appointment. It certainly wasn’t a text book response. Her fear seemed to override the sedation for the most part, even with 14mg of midazolam, but after several visits we managed to achieve most of her treatment. Unfortunately our patient always said that she felt nauseous after the sedation, an uncommon response, but this increasingly became more and more unacceptable to her. To our amazement one day, she attended an appointment set aside for an extraction of a lower tooth and said that she wanted to try it without the sedation. After we all picked ourselves up off the floor, we seized the moment, numbed her up and with a lot of TLC we managed to carry out the extraction. I won’t pretend it was easy, and there was a lot of teamwork, but I was thrilled to see that the relationship built up over the visits had helped this patient overcome her disability of fear. She came in the next week for a final review and scale and polish and we all reflected on the massive journey she had been on. She is attending again now to make a little partial denture to replace the missing teeth and has no hesitation in coming – wow!

It is the same story with inhalation sedation; sometimes it’s just enough to make the difference between a complete “stand off” and completion of treatment. We recently had an “Introduction to RA” appointment booked for a young man. The dentist said to me that she didn’t think it would work because at the last visit he had been so difficult and wouldn’t even look at the nosepiece when the process was being explained. However, he had agreed to come again and that was something. The patient knew that he would not be having any treatment at this appointment and that it was just to trial the sedation to see what he thought. He sat in the chair, barely breathing, saying that he felt...
The period of time between our first eye-opening foray into the world of Conscious Sedation at the SAAD course and the turning over of the examination paper absolutely flew by, but I can honestly say that it was the most fulfilling and satisfying endeavour I’ve undertaken in years. I can’t deny that taking the exam terrified me beyond reason. But even then, the huge sense of achievement we all felt as we gathered in the pub and waited for the last nurse from our class to finish the afternoon “viva” was immense. There was a tremendous sense of relief and, a few Pinot Grigio’s later, we hugged and promised to check each others results on Facebook! Well, that’s my story and ....... what? You want to know if I passed?

Well, yes, this old 47-year-old passed, with merit, and I enjoyed every minute of the SAAD course and study days at Bristol Dental Hospital. Even the “pain” of the exam is all forgotten!

All three of us qualified as sedation nurses and the training together has strengthened our friendship. I would urge you to consider taking this course, I know you’ll get hooked and want to do the exam. As registered Dental Nurses I think it is important to value yourselves and reach your potential. Aim for gold standard and qualify as a sedation nurse bringing the optimum knowledge and skilled support to your dental surgeon in the sedation service they offer.

I titled my essay “The best job in the world” and that is how I feel. There is never a day that I feel I don’t want to go to work. I feel valued and equipped with the necessary skills and support to do my job and even though there are NHS cuts and some uncertainties for the future in the current climate, I know we are supplying an invaluable service that our patients appreciate receiving and we enjoy providing.

How much better does it get? ■

exactly the same and it wasn’t working! We encouraged him to stop talking and spoke quietly to him in dull and boring tones. We persevered, watching to see that now he was breathing more deeply and had stopped complaining. While he was still belligerently staring at the ceiling, refusing to show any interest, I detected the corner of his mouth move and shortly after a wide grin appeared! I guess you had to be there but it was a priceless moment as he gave in to the nitrous oxide. As we lightened the sedation his demeanour stayed pleasant and Mum asked if she could take some home with her! We haven’t undertaken any treatment as yet but it was an achievement for him, and us, and perhaps a landmark step towards beginning to build the trust and co-operation necessary to get his treatment completed.

It is so good to be able to offer this Conscious Sedation service now as there really is not much available for people who need that extra support. It is still early days but I hope to see the service expand and serve the local community.

As with most things in life, not much is ever simple and certainly not black and white. People’s needs are all different and the most important appointment, in my view, is the assessment appointment. This is the time when you need to be discerning, to ask all the necessary questions but also ascertain the best mode of treatment for that patient. Can they cope with just local anaesthetic if it’s complemented by a lot of support and encouragement, or do they need a deeper level of support in the form of Conscious Sedation? It is not just a matter of the details of their medical history; you need to build a full picture of the person, socially and psychologically, to achieve the optimum result for everyone concerned. Maybe just a little inhalation sedation is enough to tip the balance, or some IV midazolam to cope with a difficult procedure. Sometimes a general anaesthetic is the only way to get the treatment done but this, although perfectly acceptable, should be the last resort after considering all other options.
The aim of this project was to investigate the frequency of General Dental Council Professional Conduct Committee hearings between 2005 and 2009 that involved conscious sedation as a main issue and to highlight repeated areas of concern. Annual Professional Conduct Committee summary data and the related determinations containing detailed information from the hearings of the cases which involved Conscious Sedation as a main concern were requested from the General Dental Council. The data was analysed, discussed with experts in Conscious Sedation and any areas of concern were identified.

The number of cases involving Conscious Sedation as a main concern from 2005 to 2009 dropped steadily from five (11.4%) cases in 2005 to no (0%) cases in 2009. Areas of concern highlighted by the PCC hearings included: taking written and informed consent (75% cases), issuing pre- and post-operative instructions (50% cases) and record keeping (50% cases).

A probable reason for the fall in the number of Conscious Sedation related cases being heard by the GDC include the establishment of clear guidelines for safe Conscious Sedation practice. If these guidelines are followed, standard techniques in Conscious Sedation for dental treatment can be safely carried out.

Introduction

The main aims of the General Dental Council (GDC) are to protect patients, to promote confidence in dentists and dental care professionals and to be at the forefront of health care regulation. These aims are achieved through the publication and establishment of guidelines and the setting of standards to which dental professionals must adhere. Every dentist must register with the GDC to practice in the United Kingdom; however, registration can be withdrawn at any time if a dental professional’s fitness to practice is thought to be impaired. This can be due to ill health, conduct or performance.

The key documents involved concerning the provision of dental sedation have been produced by a number of sources including directly from the regulatory body (the GDC) and those commissioned by the Department of Health (DoH). The main recommendations contained in each document are outlined in Table 1.
<table>
<thead>
<tr>
<th>Year Published</th>
<th>Name of Document</th>
<th>Publishing body</th>
<th>Aims of document</th>
<th>Key features/Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>Roswell Report 1</td>
<td>Expert working party chaired by Professor Roswell</td>
<td>✧ To consider use of general anaesthesia and sedation in dentistry. &lt;br&gt;✦ Develop guidelines for the safe use of general anaesthesia and sedation in dentistry. &lt;br&gt;✦ Consider training requirements for sedation and general anaesthesia in dentistry.</td>
<td>“Sedation should be used in preference to general anaesthesia wherever possible.”</td>
</tr>
<tr>
<td>1998 (updated Nov. 2001)</td>
<td>Maintaining Standards 1</td>
<td>General Dental Council</td>
<td>A general guide for dentists on their professional and personal conduct.</td>
<td>Contained a number of paragraphs specific to practice of conscious sedation in dentistry (paragraphs 4.11 - 4.13), including definition of conscious sedation and specific guidance on key areas.</td>
</tr>
<tr>
<td>2000</td>
<td>A Conscious Decision: A review of the use of general anaesthesia and conscious sedation in primary dental care 1</td>
<td>Department of Health</td>
<td>To review the safety of dental general anaesthetics taking place outside of the hospital setting.</td>
<td>From 31st December 2001, all dental general anaesthetics must take place in a hospital setting. &lt;br&gt;✦ High standards of conscious sedation must be attained from: &lt;br&gt;◇ Use of dedicated assistants &lt;br&gt;◇ Appropriate undergraduate and postgraduate training &lt;br&gt;◇ Similar arrangements to general anaesthesia for assessment, consent and patient escorts.</td>
</tr>
<tr>
<td>2003</td>
<td>Conscious Sedation in the Provision of Dental Care 1</td>
<td>Department of Health</td>
<td>To develop clear guidelines to ensure the provision of conscious sedation was provided to the highest possible standards.</td>
<td>Recommendations for good practice in dental conscious sedation.</td>
</tr>
<tr>
<td>2005</td>
<td>Standards for Dental Professionals 1</td>
<td>General Dental Council</td>
<td>Sets out the principles and values to work with when making decisions concerning the treatment of patients.</td>
<td>Advises dentists to refer to two documents when providing dental treatment using general anaesthesia or conscious sedation. These are: &lt;br&gt;◇ A Conscious Decision—a review of the use of general anaesthetics and conscious sedation in primary dental care 1. &lt;br&gt;◇ Conscious sedation in the Provision of Dental Care 1.</td>
</tr>
<tr>
<td>2007</td>
<td>Standards for Conscious Sedation in Dentistry: Alternative Techniques 1</td>
<td>Standing Committee on Sedation for Dentistry</td>
<td>To define what is meant by an alternative dental sedation technique and what minimum standards are required to safeguard patients receiving this care.</td>
<td>Requirement for additional training in any alternative techniques used. &lt;br&gt;Circumstances outlined in which a dedicated sedationist must administer any sedation drugs. &lt;br&gt;Importance of continuing professional development and auditing of records.</td>
</tr>
</tbody>
</table>

Table 1: Outlining the key guidance documents released since 1990, governing the provision of conscious sedation for dentistry.
All of the dental Conscious Sedation (CS) related case determinations used in this project resulted from an investigation by the Professional Conduct Committee (PCC). When the GDC receives a complaint about a dentist, it follows a set complaints procedure which may result in a public enquiry into the matter. Figure 1 shows the stages of the GDC complaints procedure, outlining the journey from the receiving of a complaint to the dentist being investigated by the PCC. The GDC measures the conduct of the dentist against the principal guidance document available at the time the alleged incident took place.

There are a number of possible outcomes of PCC hearings, which are outlined in the 2009 GDC document; "Guidance for the Professional Conduct Committee". This document advises that the least serious sanction should always be considered first. Of the cases involving CS (2005 to 2009), two outcomes were found; erasure in 4/12 (33%) cases and case concluded in 8/12 (66%) of the cases.

The PCC has the power to erase a dentist from the GDC register, preventing them from practicing in the UK. This outcome is sanctioned if it is required to protect the public or maintain the public confidence in the dental profession. The PCC can also find that a registrant’s practice is not impaired and choose to conclude the case. This can be done following an expression of disapproval or the issuing of advice on future conduct.

The aim of this project was to investigate the frequency of GDC PCC hearings between 2005 and 2009 that involved CS as a main concern and additionally to highlight repeated areas of concern to reinforce good practice in dental CS. Annual PCC summary data and the related determinations from the cases which involved CS as a main concern from 2005 to 2009 were requested from the GDC. Key figures in dental CS provision were identified by one of the authors (David Craig). The data was analysed, discussed with experts in CS (Dr Nigel Robb and Dr Christopher Holden) through a semi-structured interview (Table 2) where their views were recorded through a scheduled telephone questionnaire, which lasted for approximately fifteen minutes.

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<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
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<tr>
<td>1.</td>
<td>How do you think conscious sedation for dental treatment has changed over the last two decades since the Poswillo report?</td>
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<tr>
<td>2.</td>
<td>What do you think has had the single most important impact on dental conscious sedation?</td>
</tr>
<tr>
<td>3.</td>
<td>Do you think these changes have had a positive impact for i) Patients and ii) Dentists</td>
</tr>
<tr>
<td>4.</td>
<td>Result collected from GDC PCC cases show that despite an increase in the number of overall cases heard by the GDC, the number involving conscious sedation fell from 11% in 2005 to 0% in 2009. i. What do you think has contributed to an increase in the number of overall cases? ii. Why do you think the numbers involving conscious sedation have fallen?</td>
</tr>
<tr>
<td>5.</td>
<td>Are you aware of any current areas of controversy in current conscious sedation provision in the UK?</td>
</tr>
<tr>
<td>6.</td>
<td>What improvements to current guidance would you recommend?</td>
</tr>
<tr>
<td>7.</td>
<td>Have there been any recent cases that have highlighted any weaknesses in current dental conscious sedation provision?</td>
</tr>
<tr>
<td>8.</td>
<td>Are you aware of any imminent changes/reports/papers which may affect conscious sedation provision in the UK?</td>
</tr>
<tr>
<td>9.</td>
<td>Where do you see conscious sedation in 10 years time?</td>
</tr>
</tbody>
</table>

Table 2: Shows the questions used in the semi structured interviews with experts in the field of dental conscious sedation.
Analysis of the data included noting all proven or admitted heads of charge (i.e. areas of CS provision which fell below the minimum expected standards) regardless of the outcome of the case. The reason for the initial investigation of the dentist was also noted at this stage.

**Results**

Out of a total of 351 GDC conduct hearings between 2005 and 2009, CS was identified as having a significant role in 14 of these, determinations were available for 12 of the cases. The GDC was unable to supply determinations for the final two cases, the reason for this was not disclosed. Data supplied by the GDC shows that the number of PCC cases that involved CS as a main concern dropped from 11.4% in 2005 to 0% in 2009 (Fig 2).

The actual number of cases involving CS also fell repeatedly each year from five cases in 2006 to no cases in 2009, despite the overall number of Conduct Hearings heard by the GDC rising sharply from 44 in 2006 to 87 in 2009.

In 4 of the 12 cases (33%), the dentist was found guilty of serious professional misconduct and erased from the dental register. In the remaining cases (66%) the case was concluded, so the dentist was able to carry on practicing. In five of these eight concluded cases, disapproval was expressed or advice was given on future conduct.

Prior to the date of the GDC PCC Hearing, a list of alleged charges is drawn up. In the PCC Hearing, evidence is heard to establish the facts of the case and which of the allegations are able to be proved. Each proven allegation was included, regardless of the final outcome of the case. In eleven out of the twelve cases (92%), this resulted in the inclusion of more than one allegation. The most common areas in which practice was found to fall below minimum expectations was consent (75%), lack of written pre- and post-operative instructions (50%) and poor record keeping (50%). There were further areas in which CS practice repeatedly failed to reach minimum standards (Fig 3).

![Figure 2: The percentage of professional conduct cases investigated by the General Dental Council that involved conscious sedation from 2005 - 2009](image)

The 1998 UK Adult Dental Health Survey (ADHS) found that 64% of adults felt nervous about undergoing a dental procedure and just under 50% agreed that they always feel nervous about going to the dentist. Whilst in some of these cases, behaviour management and a sympathetic manner may be all that is needed, CS forms an important tool in attaining and maintaining oral health for a number of patients. Reducing anxiety and thus removing barriers to accessing dental care encourages regular attendance where preventative work can be carried out, hopefully preventing the need for dental treatment in the future. It is imperative that high standards are maintained by all dentists practicing dental CS in order to reassure these patients and provide a safe and effective clinical service.

The overall number of cases heard by the GDC has been shown to have increased between 2005 and 2009, this was attributed in the structured interviews with the experts to an increasingly litigious society, where the actions of professionals are being increasingly questioned. In contrast, the decreasing number of these cases involving CS might be
the result of the publication of guidelines, where standardised and safe practice in dental CS is extensively recorded. Further research to confirm this link is needed. The telephone interviews with the experts in CS mentioned the introduction of the new NHS contract in 2006 and its possible contribution to a reduction in the number of dentists providing NHS sedation services. With fewer dentists carrying out sedation, it is probable that the number of complaints reaching the GDC would reduce also.

In five of the twelve cases, the areas in which CS practice was found to be deficient was not in the actual administration of the sedation, but in risk assessment and reduction and preparation of the surgery and patient prior to the procedure. Dental CS has few absolute contraindications, but careful pre-operative assessment and allocation of an ASA status (a five category measure of physical health introduced by the American Society of Anaesthesiologists) is required to identify the best clinical setting in which sedation should take place, e.g. primary care or hospital setting. Good preparation of the surgery is essential so that in the unlikely event of an emergency, appropriate care and equipment are available. The importance of careful titration of the sedative drug to safeguard patients was also highlighted in the case determinations, along with the use of a suitable concentration of the drug to aid accurate titration.

Each case heard by the GDC PCC is compared to the published guidance available at the time the dental treatment is carried out. There were three heads of charge, which were proven in at least half of the cases, identified through the case determinations. These were failure to: take written and informed consent, issue pre- and post-operative instructions and record accurate contemporaneous notes. Further research in these areas might help to understand why dentists are performing poorly in these areas.

Informed consent is defined by the Oxford English Dictionary 1998 as ‘permission granted in the knowledge of the possible consequences; consent to clinical treatment, given after all relevant information (especially regarding the potential risks and benefits) has been disclosed to the patient, or to his or her guardian’. Carrying out treatment on a patient from which consent has not been obtained can result in an allegation of battery under ‘Common Law’. The 2009 DoH document ‘A Reference Guide to Consent for Examination or Treatment’ warns that poor handling of the consent process may result in complaints to professional bodies such as the GDC.11 50% of the GDC cases involving CS found that the obtaining of written and informed consent failed to meet minimum requirements. Other guidelines which outline the importance of acquiring consent for dental treatment under CS include the 2003 document ‘Conscious Sedation in the Provision of Dental Care’, which advises the practitioner to follow the principles outlined by the DoH in their document ‘A Reference Guide to Consent for Examination or Treatment’, published in 2001, but later updated in 2009.11 These two documents both underline the need for valid consent. Merely obtaining a signature does not imply that consent was given. Consent must be ‘given voluntarily by an appropriately informed person’. The GDC’s 2005 document ‘Principles of Patient Consent’, also follows this principle and stipulates that consent must be informed and voluntary and by a person who has the ability to make an informed decision. Consent can obviously not be given by anyone under the influence of CS.

Prior to carrying out any dental treatment under sedation, the dentist must provide the patient with information about the procedure including the intended benefits and any possible adverse effects that may result from it. The DoH have created a consent form: ‘patient agreement to investigation or treatment’ to aid this process.10

Another area in which practice was repeatedly found to be below minimum expected standards in 50% of the cases was in the issuing of written pre- and post-operative instructions. Current guidance provided by the 2003 document ‘Conscious Sedation in the Provision of Dental Care’ requires that patients receive verbal and written pre- and post-operative instructions prior to sedation being provided.1 More details about these are provided by the Society for the Advancement of Anaesthesia in Dentistry (SAAD) document published in 2009 to enable ‘Standardised Evaluation of Conscious Sedation Practice for Dentistry in the UK’, it was designed to provide dentists, Primary Care Trusts (PCTs), Commissioners and the Care Quality Commission (CQC) with a guide to assure quality and safety in the provision of CS. This document provides a checklist including details of what information should be included in the pre- and post-operative instructions. The pre-operative instructions should be written and given to each patient and should include details about escorts, eating and drinking prior to treatment, transport arrangements and a contact telephone number. The post-operative instructions must also be written and should include information about the escort’s responsibilities, pain relief, smoking and alcohol consumption and contact details in case of emergency. Driving, using machinery or signing legal documents are not permitted. In the case of extractions, instructions on care of the extraction site and control of haemorrhage should also be included.
In half of the case determinations studied, it was found that the dentist failed to record accurate contemporaneous notes concerning their provision of dental treatment under CS. Accurate record keeping by dental professionals is not only essential in providing safe and high quality dental care to each patient, but it is also a legal obligation. Contemporaneous notes allow the dentist to have a clear picture of levels of dental disease and any care and treatment previously provided to the patient. A recent document published in 2009 by the Faculty of General Dental Practice provides a comprehensive document of good practice in record keeping.\(^1\) In the provision of CS where the patient is often unaware of any treatment that is carried out whilst sedated, good record keeping is especially important. This has been highlighted repeatedly in numerous guidelines produced to outline good practice in CS.\(^1,2,3\)

Each guidance document advising on minimum standards in CS provision highlights the need for detailed and accurate dental records for each course of treatment. This has culminated in a comprehensive list provided in the 2003 document ‘Conscious Sedation in the Provision of Dental Care’ commissioned by the DoH.\(^4\) The requirements for good record keeping in CS are outlined clearly in the 2003 document produced by the DoH ‘Conscious sedation in the provision of dental care: report of an expert group on sedation for dentistry’.\(^5\)

### Conclusion

It is evident that since the publication of the Poswillo report in 1990, there has been significant focus on the establishment of guidelines to promote CS for anxious patients as well as best practice for dentists to follow whilst providing dental treatment for patients using CS. This has been facilitated by DoH reports and also through the input of key organisations such as Dental Sedation Teachers Group (DSTG) and The Society for the Advancement of Anaesthesia in Dentistry (SAAD). Clear guidelines have been established for both standard and alternative dental sedation techniques and this is reflected in the impeccable safety record of dental sedation provided by UK dentists. Cases in which the GDC PCC have become involved have almost always involved dentists who have not followed these clear guidelines. Further work should therefore concentrate, perhaps not on providing more guidance, but on raising awareness of the existence of current guidelines and promoting compliance with them.

### References

Abstract

Dental fear may be the most common reason for referral for intravenous sedation. Intravenous sedation offers many patients an opportunity to obtain needed dental care. However, intravenous sedation also has costs and may not help patients overcome their fear. Given a sample of 518 dentally-fearful patients in the USA presenting for dental care, this study examined the variables which predicted receiving intravenous sedation or not. About one-fifth of the patients received intravenous sedation, while the others received only cognitive behavioural therapy. Having more carious teeth, higher dental fear, more negative beliefs about dentists, lifetime diagnoses of panic disorder and/or generalized anxiety disorder, fewer existing coping skills, and a lower desire to cope with the dental situation were each predictive of having intravenous sedation. When the variables were considered simultaneously, only lower desire to cope contributed uniquely to the prediction. In a setting where psychological treatment for dental fear is available, patients’ desire to cope with their fear was the most important factor in determining whether they received intravenous sedation or not.

Background

Recently, a sample of 99 dentists in Northern Ireland stated that the most important factor in deciding which patients should be offered intravenous (IV) sedation was dental fear, yet only 2% used a standard dental fear measure to assess their patients’ fear. The authors suggest that such an informal assessment of a patient’s need for IV sedation may mean that some patients are offered IV sedation when it is not necessary, and/or that others who might be ideal candidates are not offered this option.

Providing treatment recommendations for the fearful patient may not always be clear cut. On the one hand, while cognitive behavioural techniques for reducing dental fear are effective, they require additional time and costs for psychological appointments, and they are not successful for all patients. On the other hand, while IV sedation has allowed many dentally-fearful patients to receive necessary dental treatment, it may have little effect on patients’ fear as they may remain convinced that they can only tolerate dental treatment if sedated; furthermore, this modality entails its own costs and medical risks. Thus, a more nuanced examination of the determinants related to receiving IV sedation in a sample in which both IV sedation and cognitive behavioural techniques are available may be illuminating.

Existing literature suggests that there are several possible risk factors for referral for IV sedation. Greater dental needs, irregular attendance patterns, and higher levels of
Dental fear have each been identified as reasons for referral for IV sedation. Lower levels of trust of dentists and physicians is associated with not having a regular dentist, which suggests that negative beliefs about dentists may also be related to the decision to refer for sedation.

Dentally-fearful patients often have other psychiatric diagnoses as described by the Diagnostic and Statistical Manual of Mental Disorders (DSM), although the literature is somewhat inconsistent in terms of which diagnoses are more common, due to sampling differences as well as whether the researchers examined current, prior, and/or lifetime (current and prior) prevalences. For example, Roy-Byrne et al. found lifetime histories of major depression, substance abuse, panic disorder, and additional simple phobias (i.e., other than phobia of the dentist) in 26%, 24%, 20%, and 45%, respectively, of fearful patients. These authors also found that 5% had lifetime histories of generalized anxiety disorder, but assessed this in a restricted manner which undercounted the number who would have otherwise been diagnosed. Hägglin et al. found that individuals with higher levels of dental fear were significantly more likely to have current major depression in one of two samples. Anttila et al. found that patients who were currently depressed were less likely to have regular dental attendance, but the relationship between being anxious and dental attendance was less clear. Pohjola et al. found that dentally-fearful individuals were more likely to have had major depression, social phobia, and generalized anxiety disorder in the prior 12 months, but were not more likely to have panic disorder. Locker et al. found that fearful individuals were currently more likely to have agoraphobia, social phobia, additional simple phobias, and/or conduct disorder, but were not more likely to have major depression or generalized anxiety disorder. In sum, it seems that dentally-fearful patients are more likely to have other psychiatric disorders, but the specific disorders vary from sample to sample. None of the studies examined risk factors for IV sedation.

Objective of This Research

The objective of this study was to examine the roles that the previously-identified factors (dental needs, irregular attendance patterns, dental cognitions such as fear or negative beliefs about dentists, other psychiatric diagnoses, and patient resources) had on whether a dentally-fearful patient received IV sedation when both IV sedation and cognitive behavioural techniques were available.

Methods

Setting

The Dental Fears Research Clinic (DFRC) is a specialty dental clinic at the University of Washington in Seattle, USA, serving dentally-fearful children, adolescents and adults. Following psychological and dental examinations, the treatment team develops a plan that will best fit each patient. The goals are to help the patient obtain needed dental treatment, develop increased coping skills, and maintain a pattern of regular dental attendance. For most patients, the plan includes cognitive behavioural treatment without IV sedation. However, for others IV sedation is recommended.

Ethical Approval

The University of Washington IRB gave ethical approval for this study.

Data Collection

As part of a larger study, we extracted and coded chart data from fearful patients seen in the DFRC.
Dental Needs

Since the charts didn’t always describe the patients’ dentition at intake in the same way, we approximated dental needs by examining the intake radiographs. Using these radiographs, one dentist rated each tooth for the presence or absence of decay. As a check on accuracy, radiographs from approximately 10% of the patients were rated twice, with very high agreement for the number of decayed teeth (Spearman’s rho = .915).

Dental Attendance Patterns

Dental attendance patterns were measured in three ways: the length of avoidance (if any) before coming to the DFRC, self-report tendencies of putting off or canceling dental appointments, and an assessment of the likelihood that the patient would cancel or not show up for dental appointments. At intake, patients had been asked when their last dental appointment was, and the psychologist entered the information as the number of years since the last appointment. (If the patient had been to a dentist within 6 months before entering DFRC, then the number of years was marked as “0”.) Self-reported tendencies to avoid appointments or cancel/not show up for appointments were measured by the scores patients gave for two items from the DFS which ask about these on a 5-point scale. After the interview, the psychologist rated whether the patient would be likely to present future problems with regards to canceling or not showing up.

Dental Cognitions

Dental cognitions were measured by scores on the DFS, the Revised Dental Beliefs Survey (R-DBS)\(^\text{14}\), and a measure of desire for control in the dental setting. The DFS scores can range from 20 to 100, with higher scores indicative of greater levels of dental fear. The R-DBS is a 28-item questionnaire assessing negative beliefs about dentists (such as whether dentists recommend unnecessary treatment, aren’t empathic, and insist on continuing treatment even if the patient indicates that he/she feels pain). Possible scores can range from 28 to 140, where higher scores indicate more negative beliefs about dentists. Desire for control in the dental setting was assessed by the psychologist who carried out the intake interview on a 5-point scale, ranging from very weak to very strong.
Psychiatric Diagnoses

During the psychology interview, the psychologist asked patients about a number of DSM psychiatric disorders, and coded the patient as ever having the disorder or not on a check list. If a check list item was blank, the coding psychologist read the intake psychologist’s summary statement and the list of psychiatric diagnoses given there to determine if the patient had the diagnosis or not. Eleven diagnoses were included in the data set, including generalized anxiety disorder, panic disorder, specific phobia (other than phobia of the dentist; this disorder was formerly called simple phobia), obsessive-compulsive disorder, post traumatic stress disorder, major depression, dysthymia, bipolar disorder, substance abuse (including nicotine and substances such as alcohol, amphetamines, narcotics, and other substances), eating disorder, and schizophrenia. If the chart indicated that a patient had both major depression and dysthymia, for the data set the patient was coded as having depression only. As a check on accuracy, approximately 10% of the charts were coded twice for each of 11 diagnoses. The agreement was very high, with a mean kappa of .97 (range for all diagnoses = .89–1.00). With regards to the diagnoses referred to in the literature described previously, we chose not to include substance abuse because the DFRC charts did not distinguish between nicotine abuse and abuse of other substances such as alcohol, amphetamines, or narcotics. Thus, for this study we examined the impact of those diagnoses described in the literature which we had data on, namely major depression, panic disorder, generalized anxiety disorder, and other specific phobias.

Data Entry and Statistical Analyses

After abstraction and coding, data were entered into an Excel database using double entry for accuracy. Analyses were conducted using SPSS Version 14.0 (SPSS, Chicago, IL) and Stata Version 10 (Stata Corporation, College Station, TX). Univariate analyses included chi square for categorical variables and either student’s t tests or Mann Whitney for continuous variables (determined by whether the distributions were normal or not). The variables which were significantly related to group assignment (received IV sedation or not) were then entered into a logistic regression analysis using the Enter procedure. For each statistical analysis, only cases with complete data on the variables being analyzed were included. A p value of less than .05 was considered statistically significant, while a p value of .05–10 was considered a trend.

Results

Demographics

There were a total of 586 patients who were potentially eligible for this study. Of these, 66 were eliminated for various reasons, including having only had an assessment but never entered treatment (24), were children or for another reason had not received the DFS (31), had received previous treatment for dental fear as part of experimental studies conducted in DFRC (11), or for miscellaneous reasons (2), resulting in 520 potential cases. IV sedation data were missing for two patients, leaving a final sample size of 518. Table 1 includes the raw data for the patients who did or did not receive IV sedation expressed as means and standard deviations or percents. The patients’ mean age at intake was 41.6 years (SD = 13.0, range = 12–6), and 94.6% of them were aged 18 or older. Most (71.8%) were females. About one-fifth (112, or 22%) of the fearful patients had received IV sedation, while the other 406 (78%) had not. There were no relationships between age or gender and having had IV sedation.

Dental Needs

At intake, the fearful patients had between 0 and 24 carious teeth, with a mean of 3.8 (SD = 4.4). The patients who received IV sedation had on average about 3.3 more carious teeth than did those who did not; this

Patient Resources

Most of the information about patients’ resources was rated by the psychologist who conducted the intake interviews, including social support from spouse/partner for the clinic activities, financial resources for needed dental and psychological treatment, existing coping skills, and the patient’s desire to cope in the dental situation. In addition, patients were asked to rate their current level of stress as a number between 1 and 100, where 1 is very low and 100 is “the highest stress you have ever experienced”. Finally, demographic information (age and gender) were given by the patient at intake.
Table 1: Means or Percents for Predictors of Receiving IV Sedation in a Sample of Dentally-Fearful Patients Seen in Seattle, USA between 1992 and 2009

<table>
<thead>
<tr>
<th>Factor</th>
<th>Variable</th>
<th>Had IV Sedation Mean (SD) or Percent</th>
<th>Didn't Have IV Sedation Mean (SD) or Percent</th>
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<tr>
<td><strong>Demographics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Age: Years</strong></td>
<td>42.4 (13.7)</td>
<td>41.4 (12.8)</td>
</tr>
<tr>
<td></td>
<td><strong>Gender: % Female</strong></td>
<td>69.6%</td>
<td>72.4%</td>
</tr>
<tr>
<td><strong>Dental Needs</strong></td>
<td><strong>D: Number of carious teeth</strong></td>
<td>6.5 (5.5)</td>
<td>3.1 (3.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dental Attendance</strong></td>
<td><strong>Length of avoidance: Years</strong></td>
<td>5.0 (7.5)</td>
<td>4.6 (6.5)</td>
</tr>
<tr>
<td></td>
<td><strong>Put off making appointment:</strong></td>
<td>4.2 (1.3)</td>
<td>4.2 (1.2)</td>
</tr>
<tr>
<td></td>
<td><strong>DFS item on 5-point scale (higher = more likely)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Cancel/no show for appointment:</strong></td>
<td>2.7 (1.6)</td>
<td>2.5 (1.5)</td>
</tr>
<tr>
<td></td>
<td><strong>DFS item on 5-point scale (higher = more likely)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Future cancel or no show: % rated as problems foreseen</strong></td>
<td>11.2%</td>
<td>12.9%</td>
</tr>
<tr>
<td><strong>Dental Cognitions</strong></td>
<td><strong>DFS sum (higher = more fearful)</strong></td>
<td>76.8 (16.5)</td>
<td>73.2 (16.7)</td>
</tr>
<tr>
<td></td>
<td><strong>R-DBS sum (higher = more negative thoughts)</strong></td>
<td>85.6 (24.9)</td>
<td>79.2 (24.9)</td>
</tr>
<tr>
<td></td>
<td><strong>Desire for control: 5-point scale (higher = greater desire)</strong></td>
<td>3.7 (1.1)</td>
<td>3.9 (1.1)</td>
</tr>
<tr>
<td><strong>Psychiatric Diagnoses</strong></td>
<td><strong>Panic disorder: % with diagnosis</strong></td>
<td>42.1%</td>
<td>28.5%</td>
</tr>
<tr>
<td></td>
<td><strong>Generalized anxiety disorder: % with diagnosis</strong></td>
<td>44.4%</td>
<td>30.9%</td>
</tr>
<tr>
<td></td>
<td><strong>Other specific phobia: % with diagnosis</strong></td>
<td>42.5%</td>
<td>40.3%</td>
</tr>
<tr>
<td></td>
<td><strong>Major depression: % with diagnosis</strong></td>
<td>51.1%</td>
<td>43.0%</td>
</tr>
<tr>
<td></td>
<td><strong>Number of comorbid diagnoses</strong></td>
<td>2.5 (1.9)</td>
<td>2.1 (1.6)</td>
</tr>
<tr>
<td><strong>Patient Resources</strong></td>
<td><strong>Social support: 4-point scale (higher = less support)</strong></td>
<td>1.7 (.9)</td>
<td>1.9 (1.1)</td>
</tr>
<tr>
<td></td>
<td><strong>Problems financing treatment: 3-point scale (higher = greater problems)</strong></td>
<td>1.6 (.8)</td>
<td>1.5 (.6)</td>
</tr>
</tbody>
</table>
difference was statistically significant (Mann Whitney = 13064.000, p < .001).

Dental Attendance Patterns

On average, the patients had not seen a dentist for 4.7 years (SD = 6.7; range = 0–40). The patients who received IV sedation had been avoidant for about 5 months longer, compared with those who did not receive IV sedation (5.0 years vs. 4.6 years), but this difference was not significant. There were also no significant differences for the two items from the DFS which assess putting off or canceling appointments. Similarly, there were no significant differences on the psychologist’s rating of the patient’s likelihood of canceling or not showing up.

Dental Cognitions

The patients’ mean score on the DFS was 74.0 (SD = 16.7, range = 22–100). Nearly all (96.1%) had scores higher than 37, which delineates highly fearful patients\(^{1}\). Group comparison indicated that the patients who received IV sedation had significantly higher scores on the DFS, compared with the patients who did not (Mann Whitney = 13674.000, p = 0.035). Overall, the mean score on the R-DBS was 80.6 (SD = 25, range = 28–140). The patients who received IV sedation had significantly higher R-DBS scores than the patients who did not have IV sedation (t = 2.118, df = 398, p = 0.035). There were no significant differences on the measure of desire for control.

Psychiatric Diagnoses

The data for lifetime prevalences for the four psychiatric diagnoses revealed that 31.3% of the patients had panic disorder at some point in their lives, 33.7% had generalized anxiety disorder, 40.7% had one or more additional specific phobias, and 44.7% had major depression. Among the four psychiatric disorders, patients who received IV sedation were significantly more likely to have panic disorder and/or generalized anxiety disorder (chi square for panic disorder = 5.326, df = 1, p = 0.021; chi square for generalized anxiety disorder = 4.713, df = 1, p = 0.030). There was no significant difference for having another specific phobia, nor was there a difference for major depression. The mean number of additional diagnoses seen in the patients as a whole was 2.1 (SD = 1.7, range = 0–9) out of a possible 11. There was a trend for patients who received IV sedation to have more diagnoses, compared with the patients who did not receive IV sedation (Mann Whitney = 19290.500, p = 0.067).

Patient Resources

There were no significant differences between the two groups of patients on social support. There was a trend for the patients who received IV sedation to have greater problems financing dental and/or psychological treatment (Mann Whitney = 14123.000, p = 0.087). The patients who received IV sedation were rated as having significantly worse existing coping skills than the patients who did not receive IV sedation (chi square = 1.221

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Odds Ratio</th>
<th>Standard Error</th>
<th>z</th>
<th>Probability</th>
<th>Lower 95% CI</th>
<th>Upper 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>1.130</td>
<td>0.045</td>
<td>3.07</td>
<td>0.002</td>
<td>1.045</td>
<td>1.221</td>
</tr>
<tr>
<td>DFS</td>
<td>0.986</td>
<td>0.014</td>
<td>-0.95</td>
<td>0.340</td>
<td>0.959</td>
<td>1.015</td>
</tr>
<tr>
<td>R-DBS</td>
<td>1.008</td>
<td>0.010</td>
<td>0.85</td>
<td>0.396</td>
<td>0.989</td>
<td>1.027</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>0.546</td>
<td>0.232</td>
<td>-1.43</td>
<td>0.154</td>
<td>0.238</td>
<td>1.254</td>
</tr>
<tr>
<td>Generalized anxiety disorder</td>
<td>1.665</td>
<td>0.719</td>
<td>1.18</td>
<td>0.238</td>
<td>0.715</td>
<td>3.800</td>
</tr>
<tr>
<td>Existing coping skills</td>
<td>0.980</td>
<td>0.471</td>
<td>-0.04</td>
<td>0.966</td>
<td>0.382</td>
<td>2.513</td>
</tr>
<tr>
<td>Desire to cope</td>
<td>1.905</td>
<td>0.449</td>
<td>2.73</td>
<td>0.006</td>
<td>1.120</td>
<td>3.023</td>
</tr>
</tbody>
</table>

Table 2: Initial Logistic Regression Predicting Receiving IV Sedation in a Sample of Dentally-Fearful Patients Seen in Seattle, USA between 1992 and 2009
They were also rated as having significantly lower desire to cope in the dental situation than the patients who did not receive IV sedation (t = 4.547, df = 170.444, p < 0.001). Self-reported stress levels were the same for patients in both groups, at approximately 50 out of 100 for each group.

The seven variables which were significantly different for patients who had or had not received IV sedation (D, DFS sum, R-DBS sum, panic disorder diagnosis, generalized anxiety disorder diagnosis, existing coping skills, and desire to cope) were entered into a logistic regression to predict receiving IV sedation or not. The initial model is shown in Table 2. The overall model was significant (chi square = 24.36, df = 7, p = 0.001). Self-reported stress levels were the same for patients in both groups, at approximately 50 out of 100 for each group.

Further testing revealed that there was a significant interaction between D and desire to cope, but not between D or desire to cope and any of the other six variables. Therefore, a second logistic regression was carried out which included the initial seven variables and the interaction term. Table 3 presents the results of this analysis. The revised model was significant (chi square = 25.36, df = 8, p < 0.002). In the revised model, only desire to cope remains significant (p = 0.007), while D drops to a trend for significance (p = 0.089). The results indicate that, when these variables are considered simultaneously, for each unit of being rated as less desirous of coping in the dental situation, a patient was 2.3 times more likely to receive IV sedation.

**Discussion**

Boyle et al. found that high dental fear was the strongest predictor related to whether patients in London were referred for sedation or to a regular dental clinic. This is consistent with Hunt et al.’s finding that northern Irish dentists rated dental anxiety as the most important factor in choosing sedation for a patient. Our USA data set allowed us to look at treatment modality in greater detail: given that all of the patients were fearful, what differentiated those who received IV sedation from those who did not?

The results of the univariate analyses indicate that variables from four of the five sets of factors predicted which fearful patients received IV sedation. In particular, higher dental needs (measured by D at intake), greater

**Table 3: Final Logistic Regression Predicting Receiving IV Sedation in a Sample of Dentally-Fearful Patients Seen in Seattle, USA between 1992 and 2009**

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Odds Ratio</th>
<th>Standard Error</th>
<th>z</th>
<th>Probability</th>
<th>Lower 95% CI</th>
<th>Upper 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction: D and Desire to cope</td>
<td>0.947</td>
<td>0.050</td>
<td>-1.03</td>
<td>0.302</td>
<td>0.855</td>
<td>1.050</td>
</tr>
<tr>
<td>D</td>
<td>1.341</td>
<td>0.231</td>
<td>1.70</td>
<td>0.089</td>
<td>0.957</td>
<td>1.879</td>
</tr>
<tr>
<td>DFS</td>
<td>0.986</td>
<td>0.014</td>
<td>-0.94</td>
<td>0.345</td>
<td>0.959</td>
<td>1.015</td>
</tr>
<tr>
<td>R-DBS</td>
<td>1.007</td>
<td>0.010</td>
<td>0.76</td>
<td>0.447</td>
<td>0.989</td>
<td>1.026</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>0.528</td>
<td>0.225</td>
<td>-1.50</td>
<td>0.133</td>
<td>0.229</td>
<td>1.215</td>
</tr>
<tr>
<td>Generalized anxiety disorder</td>
<td>1.764</td>
<td>0.769</td>
<td>1.30</td>
<td>0.193</td>
<td>0.751</td>
<td>4.146</td>
</tr>
<tr>
<td>Existing coping skills</td>
<td>1.001</td>
<td>0.486</td>
<td>0.00</td>
<td>0.998</td>
<td>0.386</td>
<td>2.594</td>
</tr>
<tr>
<td>Desire to cope</td>
<td>2.317</td>
<td>0.725</td>
<td>2.69</td>
<td>0.007</td>
<td>1.255</td>
<td>4.279</td>
</tr>
</tbody>
</table>
dental fear, more negative beliefs about dentists, lifetime
diagnoses of panic and/or generalized anxiety disorder,
poorer coping skills, and lowered desire to cope were
each predictive of IV sedation. There were also trends
for higher numbers of comorbid psychiatric diagnoses
and fewer financial resources to predict receiving IV
sedation. The only category which did not predict
receiving IV sedation was dental attendance, whether this
was measured by length of avoidance, self-reports of
putting off or canceling/becoming a "no show" due to
dental fear, or the psychologist’s rating that the patient
was likely to present future problems with canceling or
not showing up for appointments.

The mean DFS sum in Boyle et al.’s’ sample of patients
referred for sedation was 69.8 (SD = 18.9, range = 20–97),
with 62% scoring over 37. In the current sample, the
mean DFS sum was 74.0 (SD = 16.7, range = 22–00),
with 96.1% scoring over 37. Clearly, the DFRC patients
had high levels of dental fear. Thus, were the dentists
from Hunt et al.’s study to consider the DFRC patients,
presumably they would refer them for sedation.

Furthermore, given the overall high level of dental fear
seen in this sample, it would not have been surprising to
find no significant difference in fear level between those
who received IV sedation and those who did not. The
fact that fear level was significantly different provides
additional evidence for the importance of this variable in
making decisions about IV sedation.

However, when considered jointly with the other
variables which also predicted IV sedation in the
univariate analyses, dental fear was not a significant
factor in the regression analyses. In the final model,
desire to cope was the only variable offering unique
predictive ability, followed by a trend for the number of
carious teeth.

The literature indicates that many dentally-fearful
patients have other psychiatric diagnoses, as discussed
above. The DFRC patients also showed high lifetime
comorbidities for four other diagnoses. It is common for
patients with one anxiety diagnosis (such as phobia) to
have additional anxiety diagnoses (such as additional
phobias, panic disorder, and/or generalized anxiety
disorder); similarly, as major depression is a common
disorder (occurring in up to 25% of females during their
delimes, and perhaps 12% of males), it is also common
for patients with anxiety disorders to also have major
depression7. Indeed, an earlier study of 73 DFRC
patients which included assessments of more psychiatric
diagnoses than covered in this study found that 69% of
the fearful patients had at least one other lifetime
psychiatric diagnosis7.

Given that there is some evidence that higher levels of
psychiatric dysfunction bode ill for psychotherapeutic
treatment7, it may seem counterintuitive that, in this
sample, IV sedation was not used with all patients with
additional psychiatric diagnoses, according to the
univariate analyses, and that comorbid diagnosis did not
predict IV sedation in the multivariate analyses. Rather,
low desire to cope with the dental situation was the only
uniquely significant predictor for IV sedation. Desire to
cope with a stressful situation is recognized as a positive
indication for successful psychotherapy7,12,13. Desire to cope
entails motivation to change oneself to be better equipped
to handle the stressful situation, a belief that one can in
fact cope better, and a belief that one would be better off
with better coping skills. Some medical situations (such as
appendectomy) may be “one time only”, where it may not
matter much that the procedure is carried out under
sedation. However, inasmuch as optimal dental health
entails repeated regular dental appointments, we believe
that there is value in helping patients learn to cope with
stressful dental stimuli so that they can undergo
appointments without having to be sedated.

In this study, we were able to examine the charts of all
fearful patients who presented for care at DFRC during
the period of the study (late 1992 – spring, 2009). However,
it is important to recognize potential weaknesses of the study. First, the data are based on
patients who chose to attend one dental clinic (DFRC)
in the US, and therefore may not be representative of
patients attending other clinics. Second, since the data
are from patients who chose to seek dental care at a
clinic, they may not be representative of fearful patients
in general, especially those who only seek emergency
and/or episodic care. Furthermore, since insurance
schemes are likely to vary in different locales, it is
possible that the relative weight of patients’ financial
resources for psychological and/or sedation costs would
be different in other samples of fearful patients.

Nevertheless, to our knowledge this is the first study to
assess the various predictors of receiving IV sedation
simultaneously, in a sample in which both IV sedation
and cognitive behavioural options are available.
Conclusion

Among dentally-fearful patients seen in one US clinic, greater dental needs, higher dental fear, more negative beliefs about dentists, more psychiatric pathology, fewer coping skills, and lower desire to cope were associated with receiving IV sedation. When considered simultaneously, lower desire to cope was the most important predictor for receiving IV sedation.

Acknowledgements:

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References:


In 2007 the Standing Committee on Sedation for Dentistry at the Faculty of Dental Surgery, RCS Eng published guidance on the use of ‘alternative’ conscious sedation techniques. Since then a number of expert groups have sought to advance training by developing a syllabus. Earlier this year the Intercollegiate Advisory Committee for Sedation in Dentistry (IACSD) succeeded in reaching agreement on the majority of outstanding issues relating to alternative adult techniques and also guidelines on sedation related CPD. Unfortunately this committee was disbanded before the work could be completed.

Because the need for progress in this area remains pressing and further delays pose a threat to the proper governance and provision of dental conscious sedation a group comprising many previous members of the IACSD elected to continue the work as an ‘independent expert group’.

David Craig
Chairman of IEGTSSD
The Independent Expert Group on Training Standards for Sedation in Dentistry (IEGTSSD) has now finalised both the adult and paediatric syllabi and also CPD recommendations.

Publication of all these documents was announced at the SAAD Annual Symposium held at the Royal Society for Medicine on 24th September. Although IEGTSSD is an independent group, its work is supported financially by SAAD.

Both the IACSD and the IEGTSSD recognised that the majority of conscious sedation dental procedures involve the use of a single drug – either nitrous oxide with oxygen or midazolam and so these have now been designated ‘basic’ techniques. These highly effective and safe techniques form the basis of undergraduate teaching in UK dental schools and also on SAAD’s National Course in Conscious Sedation for Dentistry.

Conscious sedation involving other drugs and some modes of administration are now designated ‘advanced’ (rather than ‘alternative’). Advanced conscious sedation techniques are far less widely used and more complex to administer than the basic techniques. In order to ensure essential standards of quality and safety, it is important that all dental and medical practitioners administering advanced sedation are trained to the same high standard and meet a prerequisite set of competencies. Many of the drugs that are used for conscious sedation are also used to produce general anaesthesia and thus require specific training in their administration. At present, hands-on postgraduate training opportunities for advanced conscious sedation techniques are scant.

The IEGTSSD considers that continuing access to a range of effective and safe sedation techniques is necessary in order to provide appropriate care for patients who are unable to tolerate treatment without sedation and also to avoid the unnecessary use of general anaesthesia. Irrespective of where treatment is carried out, all providers of advanced conscious sedation have a responsibility to ensure full compliance with contemporary standards. All current guidance is based on the work of sequential expert committees and expert working groups representing stakeholders who have taken care to ensure that changes to earlier guidance have been based on published evidence and audit data rather than emotive and unsubstantiated opinion.

The IEGTSSD’s syllabi seek to formalise training for those practitioners who wish to commence the provision of advanced sedation and to facilitate the development of practical training programmes. The documents describe the requirements for entry to training, the training objectives, the syllabus, models of learning, supervision and assessment. They define the knowledge, skills, attitudes and behaviours required of dental and medical practitioners wishing to undergo training in advanced sedation techniques for dentistry. However, IEGTSSD acknowledges that some practitioners currently providing advanced conscious sedation may have received appropriate training by a different route.

The adult and paediatric syllabi are based on recommendations contained in three publications: *Conscious Sedation and the Provision of Dental Care – Report of an Expert Group on Sedation for Dentistry*, Department of Health Standing Dental Advisory Committee (2003), *Standards for Conscious Sedation in Dentistry: Alternative Techniques*, the Standing Committee on Sedation for Dentistry, Royal College of Surgeons of England (2007) and *Sedation in children and young people: National Institute for Clinical Excellence* (2010). These documents have been accepted by healthcare professions; however, none provides a training syllabus for either basic or advanced conscious sedation techniques.

IEGTSSD’s *Guide to Maintaining Professional Standards in Conscious Sedation for Dentistry* makes recommendations on sedation-related CPD. It was written in response to the large number of queries received by SAAD relating to the amount and nature CPD required by sedationists. The document contains detailed guidance on the amount of verifiable CPD, non-verifiable CPD, management of complications, clinical audit, recording adverse events and regular checks of clinical facilities and team training.

IEGTSSD and SAAD hope that sedationists will find these three documents helpful – a valuable guide to continuing dentistry’s excellent record of providing safe and effective pain and anxiety management for our patients. The documents can be downloaded from: www.saad.org.uk/documents.
As always, we were greeted at the RSM for the SAAD Annual Conference by a well organized registration team.

Nigel Robb (SAAD President) welcomed over 200 delegates, the number reflecting the interest and support for sedation in dentistry.

SAAD is now the second largest dental society in the UK and is the largest dental specialist society in the UK.

The day was well supported by the trade with many stands providing much of interest. SAAD and delegates are grateful to these companies.

The morning session kicked off with the ‘double act’ of Graham Manley and Nick Ransford who gave an excellent personal account of using Midazolam intra-nasally. Although not licensed for intra-nasal use, Midazolam administered in this way is now a recognized technique and is backed by documented evidence as a safe and effective technique. It is particularly useful in individuals with severe learning disability, Parkinson’s Disease, Huntington’s Disease and Alzheimers to allow cannulation for intravenous drugs. The advantages of intra-nasal are cited as (1) effective, leading to a 96% successful cannulation rate, (2) well accepted by patients and carers are very positive, (3) cost effective. There are now 149 centres in the UK using the intra-nasal preparation of Midazolam. However the speakers emphasized that there is still a minority of patients for whom general anaesthesia is still the only way in which treatment is possible.

We were then treated to an overview of the use (or lack of use) of sedation in dentistry in Spain by Angel Alcaide Raya. Angel is trying to promote the use of sedation in Spain. However the political and legislative obstacles he is encountering are enormous and frustrating. Angel is not daunted by this task and is setting up courses introducing inhalation sedation techniques, assisted by McKesson. Angel finished his presentation by issuing a plea, that we value and look after the sedation tool we have in this country as anxious patients in Spain are not receiving dental treatment due to the lack of availability of sedation.

After a break, Nigel Robb reviewed the changes in legislation allowing Dental Therapists and Hygienists to use inhalation sedation. SAAD piloted a course for Therapists and Hygienists based on the principle that there is only one standard of training and using the relevant sections from DSTG training. The course ran in parallel with the Dental Nurses and Dentists and a post-course multiple choice test was completed. The
Therapists and Hygienists are required to complete a log book of cases which must be verified by SAAD. To date, half of the participants have completed the log book. The post-course feedback has been positive and a second course is to be run in November 2011. SAAD is again fulfilling the training need for DCPs and promoting sedation techniques.

Chris Holden then reviewed the latest documents published by the Independent Expert Group on Training Standards for Sedation in Dentistry: (1) Advanced Conscious Sedation Techniques for Adults Training Syllabus and (2) A Guide to Maintaining Professional Standards in Conscious Sedation for Dentistry. We were all given copies of these documents to digest on the train home.

Sanjay Chopra reviewed the CPD requirements for Dentists in relation to sedation. As he said we are good at doing the CPD but generally not so good at recording it. He pointed out that there are five areas in which we can record CPD in relation to sedation: verifiable, non-verifiable, Immediate Life Support, clinical audit, regular checks of clinical facilities.

The morning session ended with the presentation of the SAAD prizes. Tracy Pryce was awarded the SAAD prize for attaining the highest score in the NEBDN sedation exam in March 2010. Louise MacDonald was the winner of the prize for the overall highest score in the November 2010 and March 2011 exams. Sue Brown was awarded the SAAD Dental Nurse Essay Prize for her essay ‘The Best Job in the World!’. Reena Wadia won the SAAD Dental Student Essay Prize with her essay ‘An Unconscious Decision? Undergraduate and Postgraduate Sedation Teaching’. It is encouraging to see the dental nurses and dental students participating and the excellent standards they achieve. As Sanjay had commented, successful dental sedation is very much a team sport.

Lunch was next on the agenda, the usual excellent standard of catering at the RSM was enjoyed by all. The timetable allowed time to chat and exchange news with old friends.

Carole Boyle and Avi Banerjee presented the day’s second ‘double act’ immediately after lunch. They gave a really stimulating presentation discussing the changing medical and dental needs of the ‘baby boomer’ generation, as well as the subsequent generations ‘X, Y and Z’. These generations have greater expectations in
reference point to start this and then consider the Safe Practice Scheme as an external assessment. His advice was well received and was based on experience and knowledge of the current legislation.

Tim Newton returned to the SAAD conference and reviewed his techniques of Cognitive Behavioural Therapy.

This year’s SAAD conference left us all feeling that sedation techniques are advancing and becoming more available as the need is increasing. The training and monitoring programmes are standardised and meeting the expectations of both the profession and patients.

At the end of the day we realized having listened to Angel that we are privileged to be able to offer sedation for dentistry in this country therefore making treatment available for all.

We are also lucky to have people who are still prepared to advance techniques such as intra-nasal sedation and that there is an open forum for us to share this information, hence improving treatment for our patients. This is something to be appreciated by ourselves as clinicians and our patients and we must continue to support SAAD in representing us. The enthusiasm shown by the high number of delegates attending the day bodes well for the future.

We are grateful to the SAAD Board of Trustees for arranging such a positive and stimulating programme with high calibre speakers. Delegates came away re-stimulated with ideas to implement in our daily practice.
The technique of administering intranasal midazolam followed by intravenous titration to provide conscious sedation was described. An account of how the technique came about was followed by evidence for its safety and efficacy. Finally, some practical points were presented concerned with obtaining the concentrated midazolam and using the formulation for intranasal sedation.

The presentation focused mainly on its use for people with disability, particularly challenging behaviour. For this group of patients, intravenous midazolam for conscious sedation provided a valuable management technique for provision of necessary dental care although the process of cannulation provided considerable problems. The technique of oral and intravenous midazolam provided a partly useful solution to the problem; however, difficulties were experienced. Some patients refused to accept the drug orally, the effect was often unpredictable and the length of time for provision of effective sedation from the oral dose was in some cases prolonged. For these reasons, the intranasal administration was developed as an alternative and found to work very well. The available preparation at the time of this initial introduction was 10 mg/2 ml and the nasal spray administration involved quite a lot of fluid (i.e. 2 ml) for a useful dose of 10 mg. This problem was addressed by Guy’s and St Thomas’ Pharmacy Department (Paul Forsey) who concentrated the solution to 40 mg/ml. An effective and much more acceptable intranasal administration (of 10 mg) could then be provided in 0.25 ml.

The technique was audited retrospectively and prospectively providing data from the combined studies of some 538 administrations. The prospective study was a multicentre audit examining the safety, effectiveness and acceptability of this technique. From a total of 316 sedation episodes in primary and secondary care settings, cannulation was achieved in 96%.

Dental examination and treatment was carried out without any interference from the patient in 78.8%. In 15.7% of cases the operating conditions were not ideal; however, an exam and simple aspects of treatment (which in some cases was all that was required) could be carried out. In 5.6% of cases a referral for general anaesthetic was required. Adverse sedation events occurred in 6%, the most frequent being desaturation which was easily managed. There were no incidents with serious sequelae.

Favourable acceptability ratings were given by carers regarding: ease of administration, speed of onset of the intranasal dose, and reduction in the stress associated with cannulation and also treatment compared to that provided with general anaesthesia. The evidence therefore supports the safety and efficacy of this technique and commends its use for the treatment of people with disability and also those who have a specific needle anxiety.

Although the use of intranasal followed by intravenous midazolam sedation is considered to be a Basic Technique (Standards for Conscious Sedation in Dentistry: Alternative Techniques Royal College of Anaesthetists 2007) it was emphasised that this should only be used by...
practitioners experienced in the administration of midazolam and proficient in cannulation. Information on sourcing the formulation and the Mucosal Atomisation Device was provided, and the value of documentation of the procedure for its use was recommended.

SEDATION IN SPAIN

Angel Alcaide Raya

Sedation in dentistry in Spain is a field yet to explore. Although evidence widely available proves that it is safe on trained dentist’s hands and it is highly beneficial for the dental patients, authorities are still reluctant to openly accept it. Given the structure of the autonomous communities and provinces, legislation varies significantly throughout the country. From places where there is no law about it to places where sedation is just not allowed, the situation is confusing even for our own Spanish dentists.

In response to this situation a group of dentists interested on the field have started setting up an association from which we can influence in the legislation processes and organise taught courses to increase both the interest and skills on the subject. With this target in mind, British dental societies work and publications, and manufacturers support, are proving to be a key to success.

Finally, an increasing number of Spanish dentists are coming to the UK to practise, perhaps even administering sedation. And on the other hand, many British citizens are now Spanish residents who request the same kind of dental care they receive in their home country. It is therefore important to familiarise with what their training, experience and availability really is.

GUIDE TO MAINTAINING PROFESSIONAL STANDARDS IN CONSCIOUS SEDATION FOR DENTISTRY

Sanjay Chopra

One of the most frequently asked questions by those practicing conscious sedation is what constitutes an appropriate amount of sedation-related CPD. This question was considered by the Independent Expert Group for Training Standards for Sedation in Dentistry (IEGTSSD).

Having taken into account all the currently accepted guidance, the group has published a guide which helps dentists focus their efforts productively, yet trying not to make it too restrictive or arduous as the committee recognises the many other duties a busy doctor or dentist may have.

Training and update requirements may be considered under five subheadings:

Verifiable CPD
Non-verifiable CPD
Complications – Management and Prevention
Clinical audit, including recording adverse events
Regular checks of clinical facilities and team training

Sanjay Chopra, a member of this group, presented this publication at the SAAD conference, with particular reference to how the guidance can be implemented. Being a practice owner of a busy referral practice for nervous patients (www.highlandview.co.uk), his emphasis is on making all this possible with minimal disturbance to the running of a practice.
Christopher Holden

TRAINING FOR ADVANCED SEDATION TECHNIQUES FOR DENTISTRY

The need for a structured and quality assured training for advanced sedation techniques for dentistry is established through a series of recommendations from committees emanating from the Department of Health, the Royal Colleges, and specialist societies.

Whatever the background specialty of healthcare workers providing this type of sedation, to date none have received a clear pathway of education in this subject. Whilst it is accepted that current provision and access is holding down the number of unnecessary general anaesthetic exposures and it is acknowledged that dentistry has an excellent record of safety in this field, it is fundamental that future trainees receive training under the auspices of a university dental department.

To achieve this the Independent Expert Group on Training Standards for Sedation in Dentistry (IEGTSSD) has completed the sequential work of several previous committees to produce a syllabus defining appropriate training. This syllabus is directed to all medical and dental practitioners including anaesthetists without a CCT provided within the remit of the Royal College of Anaesthetists. The document published today by the IEGTSSD does not address the training of current practitioners.

The syllabus defines basic and advanced sedation techniques. It details the entry requirements which are based on a thorough grounding and clinical experience in basic techniques. The overall aim of training in this subject is the provision of safe and effective patient care.

The syllabus is introduced in this presentation with a review of the content. IEGTSSD commends the document to the professions as it represents a consensus of stakeholders based on previous and accepted evidence rather than emotive or personal opinion. The committee expects that the implementation of this syllabus will contribute to the proper governance of advanced sedation techniques and their safe delivery for dentistry.

BABY BOOMERS: THE CHALLENGES FOR DENTISTRY AND SEDATION

Avi Banerjee & Carole Boyle

This presentation aims to define the relevant patient group, that is those born between 1946 and 64, their present and future dental needs and aspirations with evidence taken from the Adult Dental Health Survey (2009).

The promotion of ‘MI’ dentistry in contemporary oral health practice will be discussed, detailing the role of minimally invasive operative management of dental caries as part of the holistic, patient-centred team-care approach that is minimal intervention dentistry. The latest
concepts regarding the operative management of caries, innovative caries excavation technologies and the latest development in adhesive restorative materials will be outlined with direct relevance to patients requiring sedation for their operative dental treatment.

The sedation techniques required will need to be modified to incorporate the medical conditions often suffered by this patient group, that is cardio-respiratory disease, diabetes and dementia. The conclusions drawn are that careful combined dental and sedation care planning can lead to many patients being treated in the primary care setting rather than being referred to a secondary or tertiary centre. The modern concepts of MI dentistry can simplify the operative procedures so perhaps reducing the need or length of sedation, making the whole process more tolerable to the individual patient.

AN INSPECTOR CALLS: EVALUATION BENEFITS FOR CLINICAL GOVERNANCE & CQC – STANDARDISED SEDATION ASSESSMENT

Darrin Robinson

Clinical governance requirements from both the GDC and the CQC require dentists to monitor and check upon the quality of care they provide. In the growing world of clinical accountability, this is more important than ever in the field of dental sedation. Dental commissioners, practice owners and future practice buyers all have an interest in the information provided by the assessment. The standardised sedation assessment is a powerful tool to provide evidence of the standards provided by a dental sedation service. The assessment is aimed to be a developmental positive experience for the team and typically will take a day to complete. Most practices successfully complete the evaluation and the assessor provides detailed feedback with recommendations for any improvements necessary. Most practitioners have found the experience, whilst a little stressful at the time, very rewarding for the whole team once complete. Practitioners are encouraged to assess their own services before considering a full external assessment.

ANXIETY MANAGEMENT WITHOUT DRUGS: AN UPDATE

JT Newton, K Asimakopoulou, S Scamblar & S Scott

The use of sedative techniques and general anaesthesia offers an effective technique for the management of individuals with severe dental phobia who require dental treatment. Non-pharmacological treatments can complement such approaches by both offering alternative methods of management where there is no urgent treatment need, and by enabling individuals who find the preliminary steps involved in attending for pharmacological management to be anxiety provoking. This article presentation will outline new approaches to anxiety management which have been developed by the King’s College London Dental Institute Health Psychology Service.
The Annual General Meeting of SAAD was held on Saturday 24th September 2011, after the Annual Conference, which had been attended by a record breaking number of delegates.

Following the adoption of the minutes of the last AGM (2010), the President (Dr Nigel Robb) alluded to a busy year. The work of the IEGTSSD, which is chaired by Dr David Craig, has been supported financially by SAAD and two documents ‘A Guide to Maintaining Professional Standards in Conscious Sedation for Dentistry’ and ‘Advanced Conscious Sedation Techniques for Adult Dental Patients Training Syllabus’ were launched at the Annual Conference. He reported that SAAD will be funding a PhD in paediatric sedation, a project which was led by Dr Carole Boyle. The RA machine loan scheme continues to be successful. The Annual Conference attracted 213 delegates this year, and was organized by Dr Carole Boyle and Dr Christopher Holden. Dr Robb applauded the work of Dr David Craig and the teaching faculty, whose successful courses provide much of SAAD’s income. This year SAAD has honoured seven members with Honorary Life Membership: Dr David Craig, Dr Derek Debus, Dr Barry Devonald, Dr Christopher Holden, Dr Hugh Lyons, Dr Douglas Pike and Dr Diana Terry. Dr Robb thanked the Trustees, Editorial Board and in particular Fiona for their hard work over the year. He thanked the membership for their continuing support of the Society.

The Secretary’s report would have been delivered by Dr Derek Debuse, who was due to retire as Honorary Secretary at this AGM. Due to ill health, he retired from his post a day early and his successor, Dr Francis Collier, delivered the Secretary’s report to the AGM. He reported that there had been many requests for advice or information over the past year, which fell into three main groups of enquiry: equipment – purchase, use and maintenance; drugs – procurement, storage, maximum dosages; regulatory issues – CPD requirements, mentoring, training requirements. There are questions about the relative indications for sedation with different medical conditions and different degrees of obesity in patients. He advised that requests to provide SAAD courses in different locations at home and abroad are invariably refused for practical reasons. Dr Collier paid tribute to Dr Debuse for sharing his wide experience of this post with him, thus equipping him to take over as Secretary upon Dr Debuse’s retirement. Dr Collier thanked Fiona for all her support, and that of Busola and Zoe at the AAGBI.

The Treasurer’s report (Dr Stephen Jones) emphasized the continuing success of the Society, despite the economic slow-down. The economic base remains strong, with the majority of its income generated by the sedation courses led by Dr David Craig. There was an increase in membership subscriptions during 2010. The £29K surplus reported this year will provide funding for PhD research in paediatric sedation, a project instigated by Dr Carole Boyle.

Dr Derek Debuse has now retired as Honorary Secretary, and he was thanked in his absence by Dr Robb on behalf of the Trustees and Membership, wishing him and his wife well for the future. Dr Andrew Wickenden will continue as Membership Secretary for another term. Dr Darrin Robinson and Dr Michael Wood were due to retire from the Board by rotation. There were two nominations to the Board: Dr Michael Wood (proposed by Dr David Craig and seconded by Dr Derek Debuse) and Dr Bill Hamlin (proposed by Dr Nigel Robb and seconded by Dr Francis Collier). The two nominees were appointed to the two Board vacancies and were welcomed by the President.

There was no other business to discuss.

Francis I Collier
Honorary Secretary SAAD
Each year, on the eve of our annual conference the SAAD Trustees host a dinner for the conference speakers. This year the event was a very special occasion. Not only because the venue was the Royal Air Force Club (kindly arranged by Dr Francis Collier) but also because we were joined by some ‘old’ SAAD friends.

SAAD confers Honorary Life Membership on those members who have provided exceptional service to SAAD either in an official capacity or by advancing the interests of the Society in the wider world.

Over recent years SAAD has been through a period of development to bring the Society in line with its charitable objectives and the regulations imposed by the Charity Commission and Companies House. Unfortunately during this intense activity the awarding of Honorary Life Membership was overlooked. It is now time to take stock and give credit where credit is due.

The SAAD Board awarded Honorary Life Membership to seven colleagues who had served SAAD in an official capacity. All have given freely of their time, experience and energy to further the interests of the Society and ensure a secure future. There were three Past-Presidents, two Honorary Secretaries, an Honorary Treasurer and an Honorary Membership Secretary.

SAAD President, Dr Nigel Robb, thanked the new Honorary Life Members for their valuable contribution to SAAD and presented each of them with a membership scroll.
Dr David Craig has served SAAD for a number of years, as a member of the Board, as Course Director and as President. As Course Director, David continues to run the SAAD courses, which are the main source of income for the Society. He represents SAAD in the wider sedation community and is an energetic proponent of sedation. In recent times he has chaired the Independent Expert Group on Training Standards for Sedation in Dentistry, steering the publication of the adult and paediatric syllabuses for advanced conscious sedation techniques along with a guide to maintaining standards in conscious sedation for dentistry (CPD).

Dr Derek Debuse is known to SAAD members most recently as the Honorary Secretary of SAAD, a role which he has admirably fulfilled for a number of years. Derek is a long time supporter of SAAD and for many years has been a member of the SAAD faculty and the Course Registrar. Unfortunately due to poor health Dr Debuse was not able to attend the presentation dinner.

Dr Barry Devonald served SAAD initially as a member of the Board before taking on the role of Membership Secretary. He took a fresh look at the membership and subscription processes of the Society ensuring that continued financial stability of the Society. Latterly Barry was responsible for the logistics of the SAAD Annual Conference, including overseeing the move to our current conference venue, the Royal Society of Medicine.

Dr Christopher Holden is a Past President of SAAD; he was a member of the board of organisers of the IFDAS 2003 Congress, hosted by SAAD in Edinburgh, and has also served as the Course Director. Chris is an enthusiastic and widely respected promoter of dental sedation and often represents SAAD on sedation related
committees. Continuing to serve on the SAAD Board, Chris has been instrumental in the development of the Safer Practice Evaluation Toolkit.

Dr Hugh Lyons was SAAD’s Honorary Treasurer during the complicated period leading to the incorporation and modernisation of the Society, when his patient and calm approach proved invaluable. Hugh’s detailed analysis and careful planning ensured that the finances of the Society remained healthy and future proofed.

Dr Diana Terry is a Past President of SAAD, and was our first female president. She has been the Course Director and also ran the First Response Courses in Bristol. Diana researched and drove the process of incorporation of SAAD. As an anaesthetist and President of the Association of Dental Anaesthetists, Diana has never missed an opportunity to enhance the sometimes tense relationship between medically and dentally qualified sedationists.

The presentation evening was notable for its relaxed and convivial atmosphere - a meeting of friends with a common interest and a passion for promoting the role of sedation in dentistry. ■
I was born in Eltham, London and followed in the footsteps of my older sister Hazel to study dentistry at Guy’s Hospital Medical School, School of Dental Surgery, where I qualified in 1978. Joining as a Dental Cadet whilst an undergraduate, I subsequently served as a Dental Officer in the Royal Air Force for 6 years.

Following a short period as a Community Dentist, I took up the offer of a post in a military hospital in Saudi Arabia, where I stayed for 3 years in order to fund a course of postgraduate study. This took the form of a Master of Science Degree (MSc) in Gerodontics at the London Hospital Medical College, after which I was appointed as a Senior Community Dentist in Hertfordshire, a post which I held from 1991 until 2006. During this time I was responsible for the care of patients with a wide range of disabilities, for whom inhalation sedation, general anaesthesia and later intravenous sedation were widely used as treatment modalities.

I was delighted to return to Guy’s Hospital in 2002 as a postgraduate student to undertake a Diploma in Conscious Sedation for Dentistry (DipDSed) in the Department of Sedation and Special Care Dentistry. Upon completion of this qualification I was appointed to the departmental staff as a part time Clinical Demonstrator, providing teaching and supervised clinical practice, in both sedation and special care dentistry, for undergraduate and postgraduate students.

Due to a very happy change in my personal circumstances in 2006, when I was married to my wife Sue, I relocated to Manchester where she lived. We moved to Aberdeenshire the following year, to enable me to take up a newly created post in the NHS Grampian Salaried Dental Service, with a remit to provide and develop sedation services. I provide dental treatment with sedation for a wide range of patients who have difficulty in accepting routine dentistry, and I have an interest in providing training in sedation for dentists, dental students and DCPs.

I have been a member of SAAD since 2001, and a SAAD Sedation Mentor since 2006. I was appointed to the SAAD Board as Assistant Honorary Secretary in 2009, succeeding Derek Debuse as Honorary Secretary in September 2011. I am a National Committee member for the Dental Sedation Teachers Group, representing Aberdeen Dental School, where I hold an honorary post as a Senior Clinical Teaching Fellow. I am an examiner for the National Examination Board for Dental Nurses in the National, Sedation and Special Care Dentistry Certificates. I was pleased to gain mediated entry to the General Dental Council Specialist List in Special Care Dentistry in 2010.

Being located in the Grampian region of Scotland has allowed me to enjoy hill and coastal walking, and fully utilize my membership of the National Trust for Scotland. I have a lifelong passion for rail travel and model railways, and am an avid student of political, military and transport history. Frequent trips to London keep me in touch with family there, and allow me to visit my military club.
Present post Consultant in Anaesthesia and Intensive Care, Royal Blackburn Hospital Blackburn
Graduated Leeds MB ChB 1977

I started training in anaesthesia in 1980 on the Leeds rotation. My interest in chair dental anaesthesia started with two research projects, done on patients undergoing anaesthesia for exodontias in general dental practice. One looked at dysrhythmias occurring under halothane anaesthesia and the other looked at dreaming under anaesthesia. As a senior registrar I did chair dental anaesthesia with a contemporary friend.

On becoming a consultant in 1989 I was fortunate enough to take over a retiring consultant’s dental anaesthetic practice. Interesting times, the facilities then even by standards of the day were wanting in some of the practices, and I had to say no more on occasion. With Poswillo the practices I serviced reduced to one and we ran until the final whistle with publication of A Conscious Decision.

I was then involved in the transfer of services to hospital and still do two dental lists, one for children and the other for special needs patients.

My experience with dental sedation is largely with those patients who have special needs where I use midazolam or propofol.

I first became involved with SAAD when as a member of ADA I was invited to sit on the board of SAAD as the ADA rep. As well as this I have been on the SAAD journal editorial board since the start of the new format Digest in 2006.

When not gassing people, I enjoy sailing and cycling to keep fit. To avoid watching too much television I enjoy model engineering and making railway models, 7mm these days as 4mm is now too small for my eyes!

I look forward to serving SAAD as a trustee.
I decided that I would like to do dentistry from about 13 years old. I was influenced by my own dentist and, at an impressionable age, decided that he did not manage a naughty anxious boy very well.

I qualified at Stellenbosch University in 1986 with an intolerance to wine and then proceeded to do two years of National Service where I did a fair amount of ‘bush dentistry’, particularly in what is now known as Namibia. The dental clinics in townships in and around Cape Town occupied my time for the next few years before I arrived at Heathrow in 1991 with a backpack to do a bit of travelling and a little bit less dentistry.

At an early stage I was exposed to the ‘travelling gasman’ and the ‘fairy liquid’ if the adult patients were anxious. Dr Gideon Bosch then introduced me to Conscious Sedation in 1992 – and it was surprising how many adults did not require GA. After working at Leagrave Dental Anaesthetic Clinic as a part-time associate for a few years I became the Principal in 1996.

In 1999 saw me starting an MSc in Sedation and Special Care Dentistry at Guy’s and completing a project on intranasal sedation in children. At the end of 2001 we stopped doing GA and Professor James Roelofse spent some time at Leagrave showing us some of his techniques which he uses to great success in paediatric sedation.

The clinic has grown and we now have 5 full-time, 3 part-time dentists and a part-time oral surgeon and part-time endodontist. We also have two part-time medically qualified sedationists. Annually we perform about 6,500 sedations. I have an ongoing audit of over 9,500 paediatric sedations.

I am active in giving lectures especially on paediatric sedation, and the dental management of patients who require special care. I am also an expert witness for and against the GDC in matters concerning paediatric sedation. I have been treasurer of Bedfordshire LDC for the past 10 years and is also on the Bedfordshire Oral Health Advisory Group and chairman of the Luton Dental Liaison Group. I am a registered specialist for Special Care Dentistry and is on the SAC of this committee. I have held an oral surgery contract for Luton PCT for the past 5 years as a Dentist with Special Interest in Oral Surgery. I have completed four years of study at Lille Medical University in Maxillofacial and Oral Implantology and recently became a Fellow of the American Academy of Implant Dentistry.

The family has expanded to 3 lovely children and a very supportive wife, Greer. We enjoy skiing, walking in the wilds, and travelling, particularly back to our extended families back in Southern Africa.
From Nigel Robb Course Developer

Introduction

The current Scope of Practice Document from the General Dental Council (GDC) includes the administration of inhalation sedation with nitrous oxide and oxygen as an additional duty for Dental Hygienists and Therapists. In order to be able to undertake this additional duty this group of DCPs would require appropriate post registration training. The GDC documentation does not give any guidance as to what an appropriate level of training might be.

In January 2010 the Board of Trustees of the Society for the Advancement of Anaesthesia in Dentistry decided to develop and pilot a course with a view to running the pilot in November 2010.

Drs Nigel Robb and Carole Boyle were tasked with the development and implementation. The work involved a number of phases.

The first phase was the development of an appropriate syllabus. In considering this the principle of one standard of training was considered to be important. In other words no matter what the professional background of an individual wishing to train in this technique, at the end of training they should be trained to the same standard of competency. In order to achieve this, the Dental Sedation Teachers’ Group document Training in Conscious Sedation from 2005 was used as the basis of this standard. The relevant sections of the syllabus were selected. It was also deemed to be important that sufficient information on the other sedation techniques to enable the candidates to assess patients and select the most appropriate management technique needed to be included.

In devising the curriculum the differences in the pre-registration training of the hygienists/therapists and dentists was considered. The area of most difference relevant to the development of this course was in the area of pharmacology, where the DCPs had little teaching of the pharmacology of benzodiazepines and nitrous oxide.

The didactic course

The course needed to be designed to run in parallel with the existing courses for dentists and dental nurses. The programme was developed such that the hygienist/therapist course had 10 sessions of teaching that was dedicated to that group, 5 sessions with the dentists and 5 with the dental nurses. Each session was a teaching activity in the course and the range of durations was between 30 and 60 minutes. It was felt appropriate to have teaching of the different groups together as the underpinning philosophy of education in sedation is that there should be one standard.

An element of assessment was included. The post course MCQ was marked and retained by SAAD as a record. The hygienists/therapists also undertook an assessment of their ability to check the safety of an IS machine for clinical use. This was based on the National Examining Board for Dental Nurses competency within the Certificate of Dental Sedation Nursing. The results of that assessment were also retained by SAAD.

Supervised clinical practice

All dentists who wish to learn to administer conscious sedation for dentistry (irrespective of the technique) require to undertake supervised clinical practice. It was thus felt that the same level of supervised clinical practice should be expected of the hygienists/therapists. The DSTG documentation requires dentists to administer 10 cases under supervision and thus it was felt that the same should apply to the hygienists/therapists. The requirement for this...
supervised practice to be arranged prior to attendance at the course was made a part of the prerequisites for the course.

Recruitment of participants
Eleven hygienists and therapists were recruited for the pilot course. This was mainly carried out by word of mouth. The criteria that were used were:

• The candidate was keen to attend the course
• The candidate could demonstrate that learning the technique would have a benefit within his/her area of work
• The candidate had support from the employer to provide supervised clinical practice

Running of the course
The course was run in November 2010 in parallel with the existing courses. At the end of the two days feedback was sought both verbally and by questionnaire from the participants.

All were then issued with a logbook and a certificate of attendance for the 2 days.

Once a completed logbook had been received and verified, a certificate of completion of the course was issued.

Feedback obtained at the end of the course
The feedback obtained at the end of the course was overwhelmingly positive. The positive points commented on in the free text sections of the feedback form were:

The participants were delighted that someone had chosen to run the course

The quality of teaching and friendliness of the course teachers

The negative points commented on in the free text sections of the feedback form were:

The participants wanted to be taught on their own rather than mixing with the dentists and dental nurses

That the session on setting up in practice was not relevant to the DCPs

Response to the feedback
The course is to be run again in November 2011 and June 2012. Some minor changes in the programme have been made, but the ethos of the programme will be maintained.

Future developments
The completion rate (as in the number of logbooks that are submitted) will continue to be monitored and the candidates who attended the first course and have yet to submit a logbook will be contacted to try to establish the reasons that they have not been submitted.

One of the candidates, Kate Jones, submitted her logbook and has written a short article on her perception of the course, which is published here.

Summary
The introduction of this course shows that SAAD are continuing to meet the educational needs of the dental professions. The society continues to strive to advance education in pain and anxiety control and thus to encourage the appropriate provision of safe and effective pain and anxiety control for patients.

Reference
It was shortly after the General Dental Council published ‘Scope of Practice’, setting out skills and abilities registrants might develop in the future, that I took up a second part-time post in the Community Dental Services. I qualified as a Dental Therapist at New Cross in 1980, and have always worked in community. In my new post, my job description listed main duties and responsibilities, one of which included treating patients with inhalation sedation. There had been a waiting list for patients needing treatment under inhalation sedation, so I was employed in part to help reduce the waiting time, once of course I had undergone appropriate training in the delivery of inhalation sedation.

I was certainly keen to develop my skills and competencies further, so the challenge I faced was to find suitable training that would equip me with the necessary knowledge and practical skills to carry out inhalation sedation effectively and safely. Initially, I could only find courses for dentists and nurses, but after many phone calls and emails, I was delighted to hear that the Society for the Advancement of Anaesthesia in Dentistry (SAAD) was planning to run a pilot course for Dental Therapists and Hygienists in November 2010, and so I made every effort to secure a place!

For me however, I was pleased that I would soon be able to complete a course of treatment without having to pass the very challenging or anxious patients back to the referring dentist for treatment under inhalation sedation or possibly GA. Most importantly, I felt it would enable me to deliver better patient care, and patients would experience a smoother care pathway. Inhalation sedation provides an alternative to GA, and I believe dental therapists are ideally placed to provide this service. The dental services will also benefit financially, as I have been informed that the GA cost to the CDS per patient is about seven hundred pounds.

On the first day of the SAAD National Course in Conscious Sedation, there seemed to be a real buzz of
excitement and anticipation amongst fellow therapists and hygienists. I believe there were about twelve of us in number (mostly therapists), and of course a much larger group of dentists and nurses. Although I had observed children and adults being treated with inhalation sedation in the community setting, the reality of starting inhalation sedation training myself felt a bit daunting. However the staff and tutors couldn’t have been more welcoming and we were all given a clear outline of the course content for the weekend. I have to say that the course was very well planned, and the timetable was followed with precision timing! Some of the sessions were tailored specifically for therapists and hygienists, whilst other sessions were shared with the nurses and dentists. Examples of topics covered were anatomy, physiology and pharmacology, management of medical problems and complications, BLS and legal issues (presented by Dental Protection). We also gained hands-on experience in delivering and/or receiving inhalation sedation. There were always opportunities to ask questions, and no question was deemed too simple or trivial. The different styles of teaching in both theory and practical sessions added variety to the day, and crucially we were individually tested on setting up and carrying out safety checks on the inhalation sedation equipment and machine. A short multiple-choice exam at the end of the course helped assess the level of knowledge we had acquired, and I came away from the course feeling motivated and eager to complete my training in the CDS.

On our final day at Queen Mary College, we were all invited to evaluate and reflect upon the SAAD pilot course, and I hope we provided some useful feedback and suggestions for future courses. Some of us for example felt that the half hour lecture on anatomy, physiology and pharmacology was too brief, and we would have liked to have looked at these subjects in more depth. Finally, longer practical sessions would have enabled more of us to either experience or administer inhalation sedation. However, I do appreciate the complexity of organising a new course such as this, as there are so many topics to cover in just two days. I have to add that the comprehensive book of lecture notes has proved invaluable, and I still like to refer to it.

My inhalation sedation training continued over the next five months, under the watchful eyes of the Senior Dental Officers, each having a great deal of experience in delivering inhalation sedation. I was very fortunate to have a wealth of support and advice from both dentists and nurses during this period. I was required to keep a logbook of clinical experience and submit ten inhalation sedation mentored cases to SAAD, in order to assess that I had fulfilled the requirements for independent clinical practice. In addition to this, I kept detailed patient logs which I used purely for the purpose of reflective learning, and it was particularly useful when discussing treatment outcomes in mentoring sessions and looking at what, if anything, I could do differently next time. I completed my ten cases by the end of April 2011, and was awarded my certificate in inhalation sedation shortly afterwards. I have since continued to keep a fairly detailed log of clinical experience, and to date have treated about twenty patients independently with inhalation sedation. I now deliver inhalation sedation in both of the Trusts that I work, and I have between three and six planned appointment times per week set aside for patients needing treatment with inhalation sedation. My training has taught me that inhalation sedation is not successful in every case, but I feel I’m gaining confidence in recognising at what point to stop, and accepting that there will inevitably be some failures.

I have been careful to follow advice from Dental Protection to ensure that there is always a dentist on the premises when I’m carrying out inhalation sedation. This is not due to any lack of ability or confidence, but to allow for the possibility for changes to the treatment plan, i.e. when a deciduous tooth charted for a restoration proves to be non-vital and requires extraction. Making a phone call to a dentist colleague mid-treatment would be out of the question! Of course it is essential that good, clear treatment plans, ideally with radiographs, are provided by the dentists.

It was great to hear that SAAD are now planning another inhalation sedation course for therapists and hygienists this November, and are helping us to progress as a profession. I know of four other therapist colleagues who have recently completed IHS training and are using their newly-acquired skills. One therapist colleague has successfully treated twenty five children and adults since completing the SAAD course. I feel very fortunate that I have had access to excellent mentors and the right clinical environment, and I am pleased to be one of the first therapists to add inhalation sedation to my skill set!
Q. What do you need to set up a Relative Analgesia service?

A. The operator/sedationist should have received theoretical and practical training in this technique, as well as having undergone supervised clinical practice using Relative Analgesia. The availability of appropriately trained dental nurses must be considered. The purchase and installation of suitable equipment, which needs to include components to facilitate active scavenging, may be organized through one of the specialist suppliers. Consideration needs to be given to the safe storage of gas cylinders on the surgery premises.

Q. What time interval is necessary for a patient between episodes of conscious sedation?

A. There are no hard and fast recommendations for repeat sedations, although the pharmacology of the sedation agents being used will influence the answer.

With nitrous oxide/oxygen inhalation sedation, where the vast majority of the sedation agent is exhaled unchanged within 20 – 30 minutes, there would be no problem in providing a repeat administration the following day.

Where intravenous sedation with midazolam is used, most of the sedation drug has undergone biotransformation and excretion within 8 hours. It would be possible to repeat sedation after about 48 hours.

However, the timing of repeat sedations is often more to do with the dentistry, patient’s requirements and the appointment book!

Q. Who can provide mentoring for a dentist who is starting out in sedation?

A. One of the barriers to the provision of conscious sedation in practice may be the difficulty in acquiring the necessary supervised clinical practice. This problem may be resolved through the use of a mentor or tutor. Whilst SAAD and DSTG hold a Mentors List of clinicians who have expressed a willingness to help others in this regard it is not a prerequisite for a mentor to appear on this list. The mentor may be any sedationist with experience in the sedation techniques needing to be carried out by the training clinician.

Q. Can you provide intravenous sedation for a patient who has mild Chronic Obstructive Airways Disease?

A. This condition is usually slowly progressive, and encompasses chronic bronchitis and emphysema. It has a close association with smoking.

The patient’s suitability for sedation in a primary care setting may be established at the sedation assessment. A patient who has good oxygen saturation and whose daily activities are not impaired significantly by their disease may fall within ASA II. In such cases it may be possible to provide intravenous sedation. Their General Medical Practitioner may be contacted to confirm their diagnosis, progression of their medical condition and current medication before proceeding.

Q. Where do you obtain the concentrated solution of midazolam for use in intranasal sedation?

A. The concentrated solution of midazolam (40 mg/ml) + lidocaine hydrochloride (20 mg/ml), which may be used for sedation through the intranasal route is available from the pharmacy at St Thomas’ Hospital in London.

Contact details: Order Processing Service, Guy’s and St Thomas’ Production Unit, Pharmacy Department, St Thomas’ Hospital, Westminster Bridge Road, London SE1 7EH. Fax number: 020 7188 5013. A box of 5 x 0.5 ml ampoules costs £63.70.

Details for ordering may now be found on the SAAD website.
Q. How would you manage a sedation patient who has had a recent Transient Ischaemic Attack?

A. A Transient Ischaemic Attack (TIA) is an indication of the presence of small emboli in the cerebral tissues, and may be an indication that further TIAs or even a full CVA may occur in the future.

For the patient who is due to receive dental treatment under sedation it would be prudent to:
Postpone the planned treatment for a short period.

In the meantime make contact with the patient’s General Medical Practitioner for further information, including any subsequent clinical investigations and medication.

When proceeding to provide sedation:
Check blood pressure carefully and wait or refer if raised.

Ensure patient has been taking their prescribed medication.
Carefully titrate midazolam (especially in older patients).
Avoid hypoxia by using supplemental oxygen throughout.

Q. Is there an upper age limit for the administration of conscious sedation?

A. There is no cut-off point regarding age and sedation for dentistry. Patients of 80 years + have been satisfactorily sedated. However, care should be exercised when sedating older people, who may have undiagnosed vascular disease and also where the effects of the sedative drugs may be enhanced. It is usually considered prudent to administer the sedative drugs in smaller increments with larger time intervals than normal, with particular care to avoid hypoxia.

Dear Editor

In 1979 in London at the 2nd International Dental Congress on Modern Pain Control I presented a paper "Setting the Standards for Sedation Practice". I just cannot believe that some 32 years later anaesthetists have “woken up” (no pun intended) to Sedation and the need for standards of practice suggested in the synopsis of Dr M Blayney’s paper in the Journal Scan section of SAAD Digest (SAAD Digest 27:78-80:2011). I believe this to be the same Dr Michael Blayney whose lecture is summarized in the same issue on p 71.

In 2003, in Edinburgh at the 10th IFDAS Congress I presented a paper "Sedation- entity or continuum?” in which I argued strongly against the statement by Dr. Blayney that Sedation and General Anaesthesia are a continuum. Sir, Sedation as practised in Dentistry is an entity!

Dental sedationists should be wary of this sort of statement from anaesthetists who by Dr. Blayney’s own admission are unskilled in the art of dental sedation. These statements are thrown in to scare the uninitiated. It simply blows me away that Dr. Blayney can say that because "anaesthetists are experts in the use of anaesthetic drugs and management of the unconscious patient that they are therefore qualified to provide sedation services". Nothing could be further from the truth! Dental sedation does not seek to use anaesthetic drugs nor render the patient unconscious.

If a dental sedationist is not skilled in managing his/her patient within safe levels then they should not be allowed to practice. Dr. Blayney speaks of "inexperienced practitioners" having "adverse effects". Just who are these practitioners? He is at pains to quote mortality figures for gastroenterologists. This has naught to do with us. I would suggest that numbers of these patients are medically compromised. What Dr. Blayney again fails to recognise is that we can ‘case select’. We can readily reject patients on medical grounds. Our medical colleagues have less opportunity to do this.

A further point that is totally missed by Dr. Blayney is that dental sedation involves 3 vital elements which seem unfamiliar to anaesthetists- these are compassion, empathy and finesse.

In Dentistry we have a fear component with which we have to deal, along with the need to encourage patients to reach a higher standard of oral care and overcome their anxieties.
I have never heard a patient say “I hate gastroenterologists!”
So will anaesthetist training simply centre on drugs, or will they be trained in the importance of calm and compassion in the dental setting and above all finesse?

In his lecture Dr. Blayney calls for guidelines that “WE need to formulate”. Dental sedationists beware who indeed is ‘WE’? Do not be trampled on by well meaning but dentally inexperienced medical personnel.
He talks of ‘standard and alternative techniques.’ Are we to be so confined such that Drug A is standard and Drug B is alternative? What sort of professionals are we?

Finally I urge all members to fully support SAAD and their efforts on your behalf and also the International Federation (IFDAS) to show that we are strong, dedicated and well trained professionals, leaders in our field for over 40 years. Demand a voice in any change and demand respect whenever and wherever you encounter arrogance.

Dr James K Grainger
Honorary Life Member of SAAD
New South Wales
Australia

BOOK REVIEW

Review of the Cognitive Behaviour Therapy for Adults with Dental Anxiety: A toolkit
King’s College London in association with SAAD
Authors: Tim Newton, Koula Asimakopoulou, Carole Boyle, Sacha Scambler and Suzanne Scott

This excellent resource has been developed from the work undertaken by the Department of Sedation and Special Care Dentistry at Guy’s and St Thomas’ NHS Foundation Trust in conjunction with the launch of the King’s College London (KCL) Dental Institute Health Psychology Service for Adults with Dental Anxiety.

The Cognitive Behavioural Toolkit should be an essential part of an anxiety management service for general dental practitioners, salaried primary care practitioners and those working in the hospital dental services who aim to help patients achieve control over their dental anxiety by non-pharmacological approaches to anxiety control.

Although the ability for all services to have direct engagement with health psychologists would be ideal and should be commended as the ‘gold standard’, the reality in these times of financial constraints means that this resource will provide an evidence-based approach to care that healthcare professionals can use to run a service for adults with dental phobia. The Toolkit describes in detail the general principles underpinning behavioural management techniques and a summary of typical cognitive behavioural management sessions and guidelines for the development of further materials for practical use in treatment sessions.

The Toolkit bibliography and detailed referencing is excellent as are the links to other resources and the worksheets with detailed explanation for their use. The accompanying DVD/CD has multimedia resources for systematic desensitisation. This includes CARL, the computer aided form of Cognitive Behavioural Therapy which is for individual patient use, whilst the CD has a number of realistic dental sounds that will help patients allay their anxieties through engaging with the healthcare team and the toolkit.

The authors are to be congratulated for developing this excellent resource which should be widely promoted.

Dr Shelagh Thompson
Reader and Honorary Consultant in Conscious Sedation and Special Care Dentistry,
School of Dentistry,
Cardiff University.
DEREK CHARLES DEBUSE
1944 - 2011

Derek Charles Debuse was born in London on 31st March 1944 and educated at the Latymer Grammar School, Edmonton. He went on to study dentistry at the Royal Dental Hospital, graduating BDS (ULond.) in 1966. His first appointment was as an associate dentist in Loughton, Essex, but by the following year he was married to his fiancée, Gill, and moved to Felpham, near Bognor Regis. From 1974, until his retirement in 2008, Derek was a principal in a large family dental practice in Billingshurst, West Sussex.

In 1975 Derek became a part-time demonstrator at the Royal Dental and, following its merger with Guy's in 1985, was promoted to Senior Demonstrator in Conservative Dentistry at the newly formed 'United Medical and Dental Schools' (UMDS). With his keen interest in pain and anxiety control, in 1989 Derek was appointed as a Senior Demonstrator in the Department of Sedation and Special Care Dentistry; a position he held until his official retirement in 2008. Even in retirement, Derek continued to make significant contributions to the department, particularly as a teacher.

As a skilful and caring clinician, Derek made an enormous contribution to pain and anxiety control for dentistry. But perhaps his greatest contribution was as a teacher, examiner, course organiser and officer of a number of national societies. During his long career, Derek taught and inspired thousands of undergraduate and postgraduate students. Despite holding only a part-time contract, he also ran the UMDS/KCLDI Diploma in Conscious Sedation and the MSc in Sedation and Special Care.
Dentistry programmes for a number of years. He was extremely popular with staff, students and patients, who enjoyed his gentle sense of humour and his ability to tell a good story well. Derek was a generous man and gave freely and willingly of his time.

For nearly ten years from the mid-nineties, Derek performed sterling work for the Dental Sedation Teachers Group. As Honorary Secretary he supported the group’s first Chairman and then, as Chairman, he led the group’s crusade to improve the quality of sedation teaching in all UK dental schools. Derek’s knowledge and charm made him a most valuable and effective spokesman. In 2005 Derek became Honorary Secretary of the Society for the Advancement of Anaesthesia in Dentistry, a role he combined with that of Course Registrar.

Not content with this extraordinary workload, Derek was, for two decades until 2001, an examiner for the National Examining Board for Dental Nurses. During this era, he will also be remembered by many alumni as the Secretary of the Royal Dental Hospital ‘Old Students and Staff Association’ (OSSA) and, soon after the merger of King’s College Dental School with UMDS, as the Honorary Treasurer of what has now become the ‘KCLDI Alumni Association’.

Away from his professional activities, Derek was an accomplished amateur musician. He taught himself the piano at an early age and, like everything he did, he threw himself into music with great enthusiasm. He played in a jazz band, a chamber trio and also a tango band accompanying singers and instrumentalists. He was Chairman of the Bognor Regis Music Club for thirty-three years.

Derek’s professional achievements have been nationally recognised. He was awarded honorary life membership of both the BDA and SAAD. In addition, in 2011 King’s College London Dental Institute conferred upon him their ‘Distinguished Service Award’.

Derek Debuse made an outstanding contribution to his profession and the care of patients. He died on 10 December 2011 at the age of 67, following a long-standing illness, which he bore with great fortitude. He will be greatly missed by his wife, Gill, his children Maddy and Stuart, and all of us who had the great good fortune to be influenced by his knowledge, commitment, dignity and charm.

David Craig
After a healthy, productive and very energetic life, at the blessed age of 95 years Doreen Vermeulen-Cranich passed away at Elburg on November 8 2011.

She will be remembered by the dental community in the Netherlands and internationally as the most distinguished “trait-d’union” between anaesthesiologists and dentists working in the field of Pain and Anxiety Control for the vulnerable dental patient.

She was knighted Commander of the British Empire and Companion of the Order of the Dutch Lion (Ridder in de Orde van de Nederlandse Leeuw). Many Scientific Societies bestowed on her a Life Honorary Membership or Fellowship: The Dutch Society of Anaesthesiology, The Association of Anaesthetists of Great Britain and Ireland, the British Medical Association, The Royal Society of Medicine, The Association of Dental Anaesthetists (ADA), The European Federation for the Advancement of Sedation and Anaesthesia in Dentistry (EFAAD) and The History of Anaesthesia Society (HAS).

After graduating from the Welsh National School of Medicine, Cardiff in 1940 she obtained a post as resident at the University College Hospital UCH, London. In these World War II years she describes her work in UCH and the Brompton Hospital as fascinating, seeing at work such renowned anaesthetists as I Magill, M Nosworthy, R Mansfield and Professor R Macintosh amongst others.

Having married an officer in the Dutch merchant navy, she made the ‘leap to the Continent’ on June 17 1946, where, armed with her experience and a British training, she took up the challenge to improve anaesthesia at the Amsterdam University Hospital, at the invitation of Professor W Noordenbos Snr. who held the Chair of Surgery. The University of Amsterdam was the first to give recognition to anaesthesiology by appointing her as
Privaat Docent (lecturer) in Anaesthesia, in 1951, to be followed by the appointment with Royal consent as Professor of Anaesthesiology in May 1958. This was the first chair in anaesthesiology on the Continent and the first ever to be held by a woman in anaesthesiology.

As part of her educational assignment she started a unique and ambitious programme on analgesia and anaesthesia in dentistry in the newly opened dental faculty at the University of Amsterdam in 1965. At the request of the Department of Children's Dentistry and Dentistry for the Disabled, Professor Vermeulen-Cранch arranged a demonstration of nitrous oxide inhalation sedation in December 1978. This resulted in a research project initiated by Dr Peter Makkes, soon followed by the first Postgraduate Course on Nitrous Oxide Sedation in Dentistry in 1981. The use of nitrous oxide sedation in dentistry was permitted by law in the Netherlands in 1986. Without the support of Professor Vermeulen-Cранch this process of legalization would have been, without any doubt, far more laborious.

In her 1983 valedictory speech, entitled ‘emancipation process’, she recalled the long and difficult process of emancipation of anaesthesiology within the academic medical field in the Netherlands. At the end of her speech she openly criticized the Dutch anaesthesiologists in failing to give adequate support to dental colleagues seeking help, "Will the difficult process of emancipation in anaesthesia repeat itself in dentistry by our doing?"

From that period on Doreen Vermeulen-Cранch, now Emeritus Professor, felt even more responsible for a better understanding between anaesthetists and dentists. So she took us, Dutch dentists, to the United Kingdom and urged us to become member of the scientific societies dealing with pain and anxiety control in dentistry: SAAD, ADA and EFAAD. We took up that challenge and visited many scientific meetings of these societies.

I had the privilege to be nominated in 1991, together with Doreen Vermeulen-Cранch in the Council of the EFAAD, on behalf of the Dutch Society for Disability and Oral Health. There she had, of course, a leading role in the development of the first Recommendations by the Council of EFAAD Concerning European Standards for Anaesthesia, Analgesia and Sedation in Dentistry (1994). In her valedictory speech Professor Vermeulen-Cранch did not want to mention names, with one exception: Dr Ruth Mansfield whom she called her ‘mother in anaesthesia’.

For us dentists Doreen Vermeulen-Cранch will always remain our ‘mother in safe sedation and anaesthesia for the vulnerable dental patient’.

Elinor C M Bouvy-Berends
Past president of the European Federation for the Advancement of Anaesthesia in Dentistry (EFAAD)
Past president of the Dutch Society for Disability and Oral Health (VBTGG)
Forty delegates attended the meeting. Dr Terry gave the President’s Welcome and explained that the Society’s future lay in the hands of the membership and that today’s meeting needed those present to help plot the future path educationally of the society.

Session One.
Continuing Professional Development.
Chair Dr R. Pollard.

Current CPD for Dentists.
Dr David Craig.

Dr Craig outlined the history of dental CPD for the sedationist. He explained how reports created between 1990 and 2000 had shaped education but quality improvement was questionable. Later reports, 2003 DOH, 2007 RCS and 2010 NICE, had created the environment for a good look at CPD requirements for sedationists. An intercollegiate committee had been set up. At the last minute the RCoA had withdrawn. Those remaining formed IEGTSSD, they felt that the work was so near completion that it should be completed and published. The documents ‘Advanced Conscious Sedation Techniques for Adult Dental Patients Training Syllabus’ and ‘A Guide to Maintaining Professional Standards in Conscious Sedation in Dentistry’ were created, and are now available. A paediatric manual is imminent.

The bottom line is sedationists need 12 hours verifiable CPD every five years.

Level three CPD Matrix for Anaesthetists.
Dr Diana Terry.

Dr Terry presented the current method of acquiring level one, two, and three CPD for anaesthetists. ADA as a specialist society had been asked by the college to suggest level three topics in sedation and anaesthesia related to dentistry for the matrix. The audience was then split into small groups to discuss sedation topics for both anaesthetists and dentists appropriate to dental sedation which would fit the CPD matrix. The discussions were collated and reflected back to the delegates at the end of the afternoon. These will be edited and sent to RCoA by ADA.

Session Two
Issues in Dental Pre-operative Assessment.

Pre-operative Screening for Haemoglobinopathies and Clotting Disorders.
Dr Amrana Qureshi.

Dr Qureshi started with anaemia, saying that children less than seven have a normal range with the lower limit below ten. Only above seven do they have the adult range. She then presented a logical approach to anaemia starting with the division of inappropriately low reticulocytes and high reticulocytes. Further divisions showed a logical approach to diagnosis. Next haemoglobinopathies were discussed with an emphasis on thalassemia, a reduced globin synthesis disease and sickle cell, a structural variant disease. All children born in the UK have been screened for these for the last ten years. Sickle cell disease is the most common inherited genetic disorder in the UK. These tests are recorded under the child’s NHS number and should be available from the GP. If not available then an at risk child should be re-screened. Most sickle homozygotes will have had complications by one year of age. Thalassemia becomes evident as HbF falls at six months. Pre-op assessment and treatment was mentioned.

Lastly clotting was discussed, advice was to take a
bleeding history as patients with normal clotting may bleed and vice versa. The various clotting adjuvants were then discussed. And the talk summarised.

AGM.
Dr Christine Arnold became the new President of ADA.

Session Three.
Airways National and International.

NAP4 Airway safety. Dr Audrey Quinn.

Dr Quinn presented selected episodes relevant to the shared airway used during dental procedures from the NAP4 audit on airway accidents. There are approximately 2.9 million general anaesthetics per year in the UK. Of these 56% use a supraglottic airway, the technique used for most dental cases. There were recurrent themes in reported cases. These were poor or no airway assessment with no plan B or failure to plan for failure.

Awake fibre optic intubation was not used when indicated for various reasons including lack of skill, poor judgement or lack of equipment.

Multiple repeat attempts at intubation showed a lack of thinking about alternative action after a technique had failed.

Supraglottic airways were used inappropriately in obese patients and others with multiple risk factors, usually due to inexperience of the anaesthetist.

Aspiration was the commonest cause of death in anaesthetic events.

Capnography, failure to correctly interpret the capnograph trace led to several oesophageal intubations going unrecognised.

1/3 of all episodes occurred in recovery.

NAP4 should provide impetus to changes to further improve airway management in anaesthesia.

Airway Experiences with Noma.
Dr William Hamlin.

Dr Hamlin described the Epidemiology and pathology of Noma, a disease of childhood which carries an 80% mortality. It has been described since Greek times but only recently by WHO. The disease affects the mouth and in the survivors causes gross facial disfiguration with, in many cases, complete trismus.

Slides demonstrated the anaesthetic techniques used including nasal and oral fibre optic intubation plus use of the glide scope. The results gained were shown and the plastic surgery techniques were discussed. Finally some unusual dental pathology was presented.

Registrar’s prize.
The Incidence of Partial or Complete Obstruction of the LMA during Routine Oral Surgery Procedures. Dr Rachel Taute.

Dr Taute presented a study of 61 adult patients undergoing dento-alveolar day case procedures. All had their airway protected with a reinforced LMA during the procedure. The LMA was not taped in position to allow dental access and a gauze pack was used in every case.

There were 10 incidents of LMA obstruction, four (6%) were partial and of these one resolved without intervention and three required chin lift to resolve. Six (10%) were complete. Again four were relieved by chin lift but two required removal of the gag. The cases where obstruction occurred were not related to a specific treatment. All cases of obstruction were easily resolved. In conclusion it is felt the benefits of using the LMA for oral surgery outweigh any difficulties which may occur.

Bill Hamlin ■
Liverpool: “The very name conjures up images of a glorious maritime history, world-beating musical heritage, two of the Premiership’s biggest football teams and not one, but two, majestically different Cathedrals”, or so the tourist board tells us. It goes on to say “Not forgetting its inhabitants, of course, who are famously friendly and will welcome you with pride”. Well, Lesley Longman and her team most certainly lived up to that expectation.

The theme for this year’s DSTG Symposium was New Perspectives in Teaching Conscious Sedation. Which tied in nicely with the venue, as Albert Dock provided new perspectives in warehouse construction, providing for the first time safe bonded warehouse storage in 1845.

The morning started with a bang as they were testing the fire alarm; well at least we knew what it sounded like now! The coffee and refreshments provided helped us overcome the journey and the presence of a good selection of trade stands and the posters ensured those arriving early were not short of something to do.

Lesley introduced Professor Callum Youngson, the Head of School and Professor/Hon. Consultant in Restorative Dentistry at the University of Liverpool, who welcomed us all and complimented us as dental sedationists who, in his opinion, played an important role in helping the dentally disenfranchised to access care.

The first session of the day was then opened by the chair, Dr Mary Clarke. We all know Mary from her very valuable work as secretary of DSTG and from the fantastic work she did hosting last year’s symposium in Dublin. She introduced Dr Paul Avery, who we all know has been involved in establishing conscious sedation services in primary care since 1997. I’m sure we also know of Paul’s work on several national guidance documents on conscious sedation including the 2010 NICE guideline for the use of sedation in children and that he is a member of the Oral Health Advisory Group. But did you also know that he enjoys sailing? Which is why, he told us, he felt so at home at the Albert Dock.

Paul explained that the purpose of guidance was as a platform to move forwards and stressed the need for people, dentists, anesthetists, nurses, etc. to do just that. He then went on to apologise for the length of the document, but explained that it didn’t just cover dentistry, but other areas of medicine as well. He then went on to tell us about the background to the document; that sedation failure could have serious negative outcomes, that many techniques were available as one size does not fit all patients, but that there was insufficient evidence for their use and not enough training, that careful assessment was always needed and that there simply were not the resources to give every child a general anaesthetic for every procedure.

He then explained the scope of the NICE guideline, explaining that they had omitted palliative care, critical care and mental health use of sedation but had tried to cover ninety per cent of other cases. The main purpose of the guidelines was to improve effectiveness and safety and reduce the variation in standards, and whilst the current guidelines referred to children he hoped these could lead to the development of guidelines for adults. He explained that whilst many preferred the term “conscious sedation” this was mainly used within dentistry and the American terms, minimal, moderate and deep sedation where more generally used, thus he expected that we would need to use these terms in the future. Whilst explaining certain terms in the document he went on to inform us that they used the term specialist to refer to a specially trained professional and deliberately chose not to use anaesthetist as there weren’t enough anaesthetists to go around, but they were felt to be important in training sedationists. He also mentioned that “alternative” techniques generally described non-standard techniques, e.g. using combinations of drugs, but that they hoped to replace this term with “complex”
in the future. He went on to stress the need to adhere to the principle that there should always be a WIDE margin of error, which makes loss of consciousness unlikely.

This tied in nicely with the section on sedation itself which he described as a continuum. He stressed the need to be aware of the target level for sedation and the need to take both the aim of treatment and the competence of the team delivering it into consideration. Whilst the guidelines contained 37 key priorities not all of them applied to dentistry, but they were all good starting points for reflection and he thought the key areas for dentistry included pre-assessment and training. Whilst he thought dentists on the whole were good at pre-assessment he felt the process was very complex and that good communication was often the key to success, especially when choosing the most suitable technique. This decision needs to be based on the procedure involved, the target level of sedation needed, any contraindications or side effects and the patient’s, along with parents’ or carers’, preference.

Paul went on to say that the main difference between dental sedation and other areas of medicine is that dental sedation was often given in a primary care setting, whilst other specialties delivered sedation in a hospital setting where other facilities, e.g. crash team or intensive care unit, were readily available. He suggested that this made the delivery of sedation in dentistry different but nevertheless suggested that if there were any concerns about airway or breathing then specialist advice should always be obtained and staff should be available who were skilled in managing these areas.

This brought us neatly onto training, when Paul stressed that healthcare professionals with the knowledge, understanding and competence in sedation were needed. They should have both practical experience of the techniques they practiced and be able to manage medical emergencies. Dentists, he pointed out, were already trained to manage medical emergencies and their practices had to be equipped to deal with any emergency, whether treatment was to be provided with sedation or just under local anaesthesia. He did feel that anyone using alternative techniques should have ILS. He went on to tell us that descriptions of the clinical environment and monitoring were in line with what we already practiced as was the need to assess pain and coping, e.g. checking that the local has worked. He pointed out that the document contained algorithms for assessment criteria (page 62) and also for training and monitoring.

Paul then went on to say that research was needed in a number of areas including the factors which were important in the assessment of the need for sedation and risk reduction, the need for fasting, the psychological effects and the levels of training needed to both achieve and maintain sedation skills. His list continued with the safety/efficacy profiles of sedation/anaesthetic agents, for example can patient controlled propofol be used with children/adolescents? I noted that all trainers on Master’s programmes in sedation were busy writing this list down!

Paul then addressed the issue of cost and particularly savings. He stated that over 50,000 general anaesthetics were given for dental procedures each year and that the cost of each one could be reduced by £450 if sedation were used instead. Thus there was a potential to save £22.5 million per year in England (I wonder if Paul posted that on the governments crowd sourcing site wanting ideas to save money). He then went on to explain that he felt this saving should be used to improve access to services and for training to increase the availability of sedation services.

Paul concluded by reminding us that the guidelines can be used to reflect upon the systems that are in place for the delivery of sedation and how we can improve these. We can also reflect on training and ensuring all members of the team are up to date and competent. The consensus is that not only is dentistry an integral part of sedation provision for patients, dentists are pioneers in this area, he felt we could reflect on how we could develop sedation with the help from colleagues such as anaesthetists, but that they were often open to ideas from dentists. Finally he mentioned commissioning and ways to improve this. He ended by stating that current dental guidance was consistent with the NICE guidelines and whilst none of it was perfect, he felt that it was pretty good and encouraged us to download it from http://guidance.nice.org.uk/CG112/Guidance.

Mary thanked Paul for his very thorough presentation, advised us that questions would be taken at the end of the session and then introduced Dr Anna-Maria Rollin. Dr Rollin is a distinguished anaesthetist who has served
on several national committees concerned with standards in GA and sedation. She is currently a member of the Intercollegiate Advisory Committee for Sedation in Dentistry and is Professional Standards Adviser for the Royal College of Anaesthetists, and Lead Assessor for Anaesthesia for the General Medical Council.

Dr Rollin first explained that whilst she did work in the ivory tower which was the Royal College of Anaesthetists, she also worked in Epsom General Hospital and therefore she ensured that any standards set could be carried out in a “bog-standard” hospital. She began with a historical overview, pointing out that opium, laudanum, chloral hydrate and alcohol had all been used historically and that whilst Humphry Davy knew of nitrous oxide and its use as a recreational drug, it took a dentist, Horace Wells, to realise its potential as an anaesthetic. She mentioned that the first anaesthetic given in the UK was carried out by James Robinson, a London dentist who used ether for extractions. Finally she enthralled us with the heart-wrenching story of the first recorded death from the use of chloroform in dental practice in 1858. Pointing out that recommendations at the inquest included the presence of both an operator and a sedationist and that even then the need for careful monitoring of the patient was recommended.

She wondered why anaesthetists were so slow to catch on to the need for training in sedation and thanked the dental profession for leading the way. She thought that this stemmed from the fact that anaesthetists were trained to manage the whole continuum and that there were no clear lines between anaesthesia and sedation; therefore it was always assumed that they could manage any point on that continuum. She also pointed out that the pharmacology of sedation and anaesthesia was not distinct as all sedation agents could produce anaesthesia and all anaesthetic agents could produce sedation. Finally she confirmed our suspicion that general anaesthesia was far easier for anaesthetists and that conscious sedation was much more difficult to manage (adding, much to everyone's amusement, that one of the reasons for this was that you had to actually talk to your patients!).

Dr Rollin explained that the training guidelines for SHO anaesthetists in 2001 were that they needed to “know the definition of sedation and be able to manage sedated patients”. It became apparent that this needed changing as not only dentists, but also cardiologists, radiologists and endoscopologists increasingly used conscious sedation. Thus the current position is that the Royal Colleges training requirements are that all anaesthetists have to have sedation training. A spiral training pathway exists from SHOs who must have basic training in sedation for patients who are under 80 years old and ASA1 to SpRs who must be able to carry out all types of sedation and are able to choose between different techniques and show leadership within a team. She also pointed out that whilst anaesthetists were highly skilled they were used to working in a very protected environment within hospitals where crash teams, ICUs, more experienced colleagues, etc. were always available. The availability of a separate voluntary module on sedation for dentistry helped enable them to cope with the differing requirements of the primary care setting, it also helped develop the behavioural management skills she had seen used so well by her dental colleagues. Thus with formal assessments of competence in technical and monitoring skills, audit and critical incident reporting along with the usual requirement for ALS and CPD, they could meet the objectives in patient safety, technical skills, situational awareness and team working set nationally and approved by the GMC.

Finally Dr Rollin explained that there was a plan within the UK academy of Medical Royal colleges to update the “Implementing and ensuring Safe Sedation Practice for healthcare procedures in adults” as a core document with a number of satellite documents alongside it for sedation specialists, regardless of their original speciality.

This session ended with a lively question and answer session where both speakers agreed that standards for carrying out sedation and its assessment and training needed to be set and that anaesthetists and dentists could learn from each other. On this happy note we all adjourned for a well earned cup of coffee or tea.

When we returned, Avril Macpherson, Consultant/Hon. Clinical Lecturer in Special Care Dentistry at Liverpool University Dental Hospital, took the chair. She did introduce Paul Coulthard (despite saying he needed no introduction!), who, as many of you already know, is Professor of Oral and Maxillofacial Surgery at the University of Manchester and Consultant and Clinical Lead for Oral Surgery at Central Manchester NHS
Foundation Trust. Paul has a special interest in the Control of Pain and Anxiety, has published over 140 scientific papers and was a previous Chair of DSTG.

Paul’s main objective was to update us on the work he and his team were doing on the development of an index of sedation need. He began by explaining that the use of sedation within dentistry was variable and that there was both underprescribing and overprescribing, so his main question here was “How do you make it fair?” He and his team where trying to meet the challenge set by Tony Jenner at the DSTG meeting in Manchester in 2008 and were trying to find an evidence based approach to try and answer this question. Paul explained that they had started by trying to combine patient anxiety measures with medical and behavioural factors, and factors relating to the complexity of treatment to produce an overall score which hopefully reflected the patient’s need for dental treatment under sedation. The index had been trialled in a number of centres and it had become apparent that some of the factors could be simplified and other aspects weighted so that they reflected the clinical situation. The results of this pilot are to be published in the BDJ.

Paul was at pains to point out that this wasn’t a replacement for clinical decision making, but an aid to this. He also pointed out that whilst he hoped that this index met the requirements of Commissioners for an evidence base for our decision making and thus improve access to treatment under sedation, he was aware that these things had a habit of being used in different ways than we hoped or expected. Nevertheless he felt that it was important to gather evidence to support the claim for the need for sedation in dentistry.

He went on to update us on the work of Ian Pretty who had used the index within four dental practices in North West England to assess the need for their patients to have treatment under sedation. They all found the index easy to administer and the results showed that more women needed sedation than men, age was not a factor, neither was deprivation nor social status. The index demonstrated a need for sedation in 2.4% of patients, which is on the low side and therefore the anxiety section of the index may need adjusting to produce more reliable figures and what needs to be borne in mind is that this was carried out in a population of dental attenders, whereas non dental attenders are generally much more anxious. These results were also to be published in the BDJ.

The team then looked at factors affecting non-attenders, carrying out 12,000 telephone interviews, and this confirmed that the number one reason for not attending the dentist regularly was anxiety. This research has resulted in yet another paper to be published in the BDJ.

Finally Paul’s team wanted to know if the index was helpful when referring patients; so they asked four practices accepting patients for treatment under sedation (different ones from the previous study) to send out the forms to their top referrers. The results seemed to show that the forms were easy to use in 68% of cases and that 78% of the referrals were deemed appropriate using the index score, compared with 85% deemed appropriate by the dentists accepting the referrals. Obviously this produced a fourth article, so we are all going to have to keep our eyes open for these in the BDJ in the near future.

Following Paul’s presentation, questions were asked about the M:F ratio, this was based on roughly the same number of male and female respondents, on the suitability for the use of the index with children to which Paul replied that it wasn’t suitable at the moment but this was being worked upon and on the use for special care patients, to which Paul replied that this was a good idea. At this point I could see at least two more papers in the offing. So after thanking Paul for his presentation and congratulating him and his team on all their hard work Avril moved us on the next speaker.

Carole Boyle is somebody else who needs no introduction, but for those of you new to DSTG, Carole is a consultant in Special Care Dentistry in the Department of Sedation and Special Care Dentistry at Guy’s & St Thomas’ NHS Foundation Trust London. She is President-elect of SAAD and a past Chairman of the Dental Sedation Teachers Group. Carole’s particular interests are using sedation for people who require special care and teaching sedation to both undergraduate and postgraduate students.

Carole started off by explaining that 18 years ago DSTG played a major role in ensuring that sedation training was enshrined within the undergraduate dental
curriculum. We had all worked hard to create standards for assessment and training, but that we were now in a position of having to defend our status in an ever more crowded curriculum.

Carole outlined the programme at Kings where there are 160 students in each year and where they run three undergraduate programmes simultaneously, furthermore they work within two different NHS foundation trusts and there is an independent academy based in Portsmouth. This, she pointed out, meant that the students came up against a wide variety of views. The theory within the course was given in the form of lectures, clinical work being done in both the paediatric dentistry and oral surgery departments before the students attended the special care unit. The course they gave was over four days, the students worked in pairs, 10 to 12 attending at any one time. They had 13 dental chairs, each with two sedation trained dental nurses, on an open clinic, and there were three teachers. They used IV sedation, inhalation sedation and intra-nasal sedation as appropriate. The students always rated the course highly, in fact they always came out top in the evaluations. Carole went on to explain that this was probably because there was no written exam, however she was at pains to point out that they did contribute to an OSCE. When the feedback was analysed the fact that this was a short, well defined course which was a bit different to usual, that the patients were all carefully selected and that the focus was on patient management and not on dentistry alongside the experienced, enthusiastic staff where the nurses were seen as a really important part of the team all combined to produce the very high rating.

Carole then outlined what she called the “X-factors” which make sedation teaching so important in the undergraduate curriculum. Firstly sedation is a good experience, the students enjoy it and this helps improve ratings in the National Student Survey that universities in general find very important. Sedation is a “value added” course which can help discriminate between students who have or have not participated and thus helps with job prospects. Undergraduate sedation training also makes our schools unique within Europe. Thus we should be telling students how lucky they are to get this training.

Secondly sedation gives students a unique opportunity to apply the basic sciences of pharmacology, respiratory physiology, looking at blood pressure and pulse oximetry. Thirdly it provides a unique clinical experience as the students see patients with complex, not just dental, needs and encourages realistic and flexible treatment planning skills.

Fourthly it increases the students "amalgam experience" as frequently amalgam is the restorative material of choice due to the constraints of treatment under sedation (short window of time, difficulties with isolation, high caries risk, etc). It also gives the students opportunities to treat new carious lesions, unlike restorative clinics where replacement restoration is the norm.

Fifthly the students work in pairs and work closely with the dental nurses, increasing their practical knowledge of teamwork.

Sixthly it widens the students’ patient experience as they get the opportunity to meet "interesting" patients, rather than the usual "nice" people they are familiar with. They get to apply their knowledge of human diseases and it provides insight into anxiety and dental phobia. They also get to practice and improve their communication skills.

Seventhly treatment under sedation encourages a holistic approach to treatment; the students need to treat the patients as people, not just teeth. They are also confronted with the importance of taking a good social history to prevent escort problems and ensure the patients can take time off work and fit not only the dental treatment but also the extended effects of the sedation into their lives.

Finally Carole spoke about the medico-legal aspects. Sedation provided practical experience of taking consent, and therefore assessing capacity to provide that consent. It also provided opportunities to come face to face with regulations such as COSHH and controlled drug regulations. Thus all in all sedation was a very important part of the curriculum and should not be lost.

Personally, I would like to congratulate Carole on giving us a perfect summary of the value of sedation to the undergraduates and would suggest that this synopsis be
distributed to the teaching committees and deans of all our dental schools.

Carole was then faced with a question relating to the exposure of nervous patients to undergraduates to which she replied that they didn’t have any problems with this as it was explained to the patients at the outset and that patients were carefully selected; often they had already had an appointment with a member of staff, to ensure that they were suitable for sedation before being treated by the undergraduates. At this point John Pinder pointed out that after many years of experience of teaching, he had come to the conclusion that you can’t teach without some of the patients suffering; it was, he said, a fact of life (well he did use much more colourful language, but I think this is what he meant!).

We then all adjourned whilst the scene was set for the AGM (which will no doubt be reported to members elsewhere). Non-members then took the opportunity to visit the trade stands, look at the posters; Bispectral Index monitoring - a useful tool in monitoring intravenous sedation for dental treatment? by Panna Shah, Graham Manley and David Craig, Department of Sedation & Special Care Dentistry; Guy’s Hospital, London and Audit of consent forms for sedation in children by Sylvia Rippl, Arathi Papineni, Diane Rose and Prabhleen Anand, Department of Paediatric Dentistry, Eastman Dental Hospital; or just catch up with colleagues they hadn’t seen for a while, before sitting down to lunch.

After lunch Sarah Manton, Consultant in Special Care & Restorative Dentistry, Dundee Dental Hospital, opened the proceedings by introducing the third Paul of the day, Paul Redmond. Paul is head of Careers and Employability at the University of Liverpool and one of the country’s leading experts on generational theory and the graduate labour market. Paul’s work brings him into contact with a range of organisations, including the BBC, ABTA, AGR, Corus, NHS and many other leading national and international firms. Paul is Vice-president of the Association of Graduate Careers Advisory Services (AGCAS), and was elected a Fellow of the Royal Society of Arts, Manufacturing and Commerce in 2009.

Dr Redmond began by explaining that whilst most of us here were members of the baby boomers generation, most of the students were two generations further on, being of generation Y. Paul explained that his research into the effect of different generations was used by organisations, e.g. BBC to investigate market segments. He explained that he spoke about career development to all 4500 freshers in Liverpool and that this year’s students, being born in 1992, had never before experienced an economic downturn, nor a world without internet or mobile phones! He explained that whilst the number of graduates had increased rapidly, major companies believed that there was still the same proportion of people with talent, so they now used other factors in their search for suitable employees. These include telephone screening, online exercises, personality tests, numeracy tests, verbal reasoning and more extensive use of assessment centres. They concentrated on personal capital, including economic capital, cultural capital, social capital and more controversially, erotic capital. So whereas previously qualifications were enough, this is no longer the case. He went on to explain that different generations were defined by the things they were exposed to when they were growing up. This resulted in the boomers (1945–61) being idealists, generation X (1962–1977) being reactionary, generation Y (1978–1999) being civic and the millennials (2000–) being adaptive. He said that whilst boomers were often open to technology, they needed such things as instruction manuals, generation X were digital immigrants whilst generation Y tended to be digital natives. Thus when we allow laptops into lectures we are trying to bring a 17th century idea into the 21st century, but when it came to exams (no laptops) we suddenly reverted to 19th century values.

He went on to say that for generation Y the joint narrative (e.g. what they would later put on Facebook) was far more important that reality. This also explained their lack of interest in online learning; for generation Y, computers are for keeping in touch with their friends, not education!

He then went on to explain that this generation also came with “helicopter parents” who always hovered in the background acting as “White Knights”, “Agents”, “Bankers”, “Bodyguards” or even “Black Hawks”. Paul’s research into the future of work, ‘generation Y’ and the rise of ‘helicopter parents’ is currently attracting considerable attention among both graduate recruiters and the media, so we were very fortunate to have such an entertaining and informative speaker.
Sarah then went on to introduce Dr Sin Yong, who was a Senior Clinical Teaching Fellow in Control of Pain and Anxiety at University of Manchester but who is now a part-time Specialty Dentist in Oral Surgery there, working the rest of the time in practice. Dr Yong edits the DSTG website and wanted to bring our attention to the Forum they had recently added. So if you have a spare moment log on at http://www.dstg.co.uk/user?destination=forum and if you haven’t got your user name and password handy then you can e-mail either Chris Dickinson (chris.dickinson@kcl.ac.uk) or Dr Yong (sin.lyong@manchester.ac.uk).

The final session of a very busy day was chaired by Chris Dickinson, our Hon. Treasurer and Membership Secretary and Consultant in special care dentistry at Guy’s & St Thomas’ NHS Foundation Trust. Chris was in charge of the 10-minute papers and introduced us to a selection of speakers from various parts of Europe (although mainly now UK based!) with something for everybody.

Firstly Mr Eleftherios Martinis, who qualified in Athens, posed the question ‘Are we meeting patients’ expectations when treating them with intravenous sedation for oral surgery procedures?’. Apparently we are, well at least at Kings where his study demonstrated that 97% of patients treated under IV sedation for oral surgical procedures are satisfied with their treatment and 99% of these patients would have treatment under IV sedation with midazolam again.

This was followed by Mrs Christina Vila Bea. Christina is Spanish by birth, but is now based in Liverpool and she investigated the role of dental nurses in sedation teaching. In spring 2011 she sent out a questionnaire to all DSTG dental school reps and got a 90% response rate. Her very interesting findings demonstrated that the majority of dental schools involve dental nurses in conscious sedation teaching, the nature and extent of the teaching roles varying significantly between dental schools. Nevertheless this just proved how important the nurses are to sedation teaching and echoed the words of Carole Boyle earlier in the day.

Dr V Toedtling, who is Austrian, explained her retrospective survey of IV sedation practice at Dundee Dental Hospital in response to the National Patient Safety Guidelines 2008/RRR011. She provided a fascinating insight into the response of the two groups of professionals providing sedation concluding that with the implementation of the low strength midazolam, anaesthetists increased the size of their increments, transforming to a bolus type technique, in comparison to the dentists who were more likely to apply a fine and slow titration technique potentially fine-tuning the sedation endpoint and keeping total midazolam dosage to a minimum. I wonder if the people responsible for this RRR will be surprised at this result.

She was followed by Dr Jean-Frédéric ANDRE who practices in his native France where midazolam has ceased to be available. Dr Andre showed us statistics from nearly 3000 cases, which in itself is very impressive and concludes that whilst midazolam is definitely better when you can’t get hold of it diazepam provides excellent results.

Mehdi Yazdi came along from Kings and reminded us of the effect of cannabis use on conscious sedation. This was a major topic at DSTG in 2009. He interviewed a number of dental sedationists and concluded that all of the interviewees believed that cannabis use did have an effect on the patient’s sedation pattern and that this effect was very ‘unpredictable’.

By this time we were running late, which comes from trying to give us all excellent value for money and packing so much into one day. Nevertheless Emily Carter who gave the final paper was definitely worth listening to. She raised the important topic of sedation for older patients, and had conducted a retrospective cohort study of 50 case notes from patients who had undergone intravenous conscious sedation prior to oral surgery procedures, grouping the patients by age. The results showed that there is a correlation between age and midazolam dose, which decreases with increasing age, leading her to recommend that midazolam should be titrated in reduced increments in older patients to achieve a sedation endpoint. An important note on which to end.

Lesley Longman then invited those of us who didn’t have to rush off to further tea, coffee and biscuits thus ending another busy but very informative and successful DSTG symposium. She concluded by reminding us that next year’s meeting was to be in Sheffield (so I won’t have far to travel!) □
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Before the introduction of lidocaine the choice of local anaesthetics was limited. Procaine was less toxic than cocaine but had a short duration of action. Tetracaine had significant systemic toxicity limiting its use to spinal anaesthesia. This article is based mainly on an interview with Torsten Gordh who conducted the first clinical evaluations on lidocaine.

Lidocaine was discovered from systematic investigations at the Institute of Chemistry, Stockholm University in the early 1930s whilst Hans von Euler-Chelpin was looking at the chemical genetics of mutant barley. He isolated an alkaloid they named gramine. From this they synthesised isogramine. Holger Erdtman found that this chemical made his tongue numb. Several further isomers were made by Erdtman and Lofgren, but none were as good as procaine and investigations were discontinued.

LL30 was brought to Gordh’s attention at a dinner in 1943; he was interested but said he would like to know its toxicity before testing it. There things rested for a year until Gordh met Lundqvist and Lofgren and interest was again re-sparked.

Clinical trials began in 1944. Gordh was involved because he had close ties with Astra AB and was the only educated anaesthetist in Sweden at the time, having
studied under Ralph Waters 1938–40. He tested it on colleagues, patients and students. Patients received 5 Swedish crowns and students were given the choice of a packet of cigarettes or a copy of Gordh’s thesis. Most chose the cigarettes. At the same time Leonard Goldberg was performing the toxicology work which took a total of three years. A maximum safe dose was set at 1 gram as toxicology testing showed fitting to occur at 3 gram.

Initially clinical testing was with skin wheals using 1ml of various local agents. The procaine wheals were anaesthetic for an average of 17 minutes where as lidocaine lasted 70 minutes. Gordh comments “The results were so completely reliable I felt statistical analysis unnecessary”. These tests were followed by infiltration and nerve block trials, epidural and spinal anaesthesia. In all cases lidocaine far outclassed all other drugs. At this time it was also tested by a group of dentists who established its efficacy for dental use.

The first public talk was to the Swedish Anaesthesia Club in 1947. This delay was due to problems registering the drug. A patent applied for in 1943 was only granted in 1948. The first English paper was published in Anaesthesia 1949.

There are many rumours about the pharmaceutical industry and lidocaine from its first discovery in 1943. These include secret flights to London and a desire not to see it fall into German hands. It ended up in 1943 in the portfolio of Astra AB, a Swedish company. The name Xylocaine comes from its major constituent xylinal and the generic local anaesthetic end of aine. In November 1948 the American food and drug administration licensed it for use in the States.

Torsden Gordh in a lecture in 1985 finished with the words ‘Xylocaine has for more than three decades stood the test as a reliable and highly efficient local anaesthetic’.

Bill Hamlin

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**STRATIFICATION OF SEDATION RISK – A CHALLENGE TO THE SEDATION CONTINUUM**

*Pediatric Anesthesia 21 2011 924–931.
S. M. Green, K. P. Mason.*

Sedation is often required to facilitate painful or disturbing procedures. We propose the existing paradigm of the sedation continuum be re-considered. Future guidelines should include an objective mechanism to predict the risk of serious adverse events.

Twenty-five years ago there were no real guidelines for sedation. Following a series of deaths in sedated dental patients, the US National Institute of Health and the American Academy of Paediatrics in 1985 produced similar guidelines. The guidelines introduced the concept of a continuum with increasing depth associated with increased risk of cardiopulmonary depression. These guidelines have evolved into a universal tool to permit graded recommendations for monitoring. Graded sedation levels allow the acknowledgement that as depth progresses there is a need for increased monitoring and practitioner skills.

Originally the divisions were conscious sedation, deep sedation, and general anaesthesia. This has become the current revised nomenclature of minimal, moderate deep and general anaesthesia.

**Limitations of the Existing System**

Current guidelines were formulated when monitoring was limited to ECG and vital signs, consequently the subjective measurement of patient responsiveness was used. This has always demonstrated substantial drawbacks; take the core definition of moderate sedation, the patient should respond to verbal command either alone or accompanied by light tactile stimulation. There is no consistent agreement on when this condition is or is not met, furthermore this definition cannot be applied to those with any form of special needs. There are also areas of sedation use where you wish the patient to be quiet and don’t wish to continuously check sedation level, this becomes counter-productive to the goal of sedation. In practice sedation depth is not assessed frequently or consistently and documentation is subjective. The existing nomenclature does not apply to some sedative drugs notably ketamine and dexmetomidine. Primary reliance on responsiveness is not appropriate for these agents as it does not necessarily reflect the risk of adverse events.

**A New Objective Approach to Predicting Sedation Risk**

We propose an expansion of the sedation continuum to incorporate an objective measurement to predict the risk of adverse events. The proposed tool for this would also be configured as a series of progressive levels.
Specific derived thresholds of physiological parameters either singularly or in combination would define each sedation depth. Focused research will be required to identify which physiological modalities can best predict levels of progressive risk. The proposed objective tool would be rapidly responsive to changes in patient condition and able to integrate data from multiple sources. As well as current parameters electroencephalography cerebral oxygenation and respiratory impedance may be used.

Creating an Objective Risk Assessment Tool for Sedation (ORATS)
We propose an objective tool to achieve the critical safety goal by predicting associated risk. Table 1 gives four unnamed levels of risk 1:10000, 1:1000, 1:100 and 1:10. For each level the practitioner should be able to rescue from the subsequent level. Risk figures used are only for illustration. The tool would allow classification of the minimum appropriate provider skill set and required monitoring for each level. For the creation of such a scale we propose the following steps.

Step 1: Specify and Define Outcome Measures
A committee should achieve consensus on which serious events should be used to predict escalating levels of the reformulated nomenclature and then designate terminology and standardised definitions for them. Studies so far have used either adverse events, defined as thresholds e.g. SaO₂, respiratory frequency, or interventional episodes, e.g. airway assistance or patient stimulation. If we take hypoxia as an example this would seem a logical choice; it is already accepted as an untoward event and when sustained will lead to patient injury. However, sedationists vary considerably in their use of supplemental oxygen which delays desaturation with ventilatory depression. Pulse oximetry therefore is not a reliable marker. Accordingly we should look for a direct marker of ventilatory depression to define sedation level risk

Step 2: Assemble Risk Hierarchy
The probability of serious adverse events defined by the expert committee would be assembled into a hierarchy in the form of tiered levels (ORATS). These risks would be predicted based on current physiological measurements. If this is done frequently then the trends in prediction would allow the sedationist to modify the course of the sedation by looking at predicted risk trend. It would also alert the sedationist to the possible need for patient rescue earlier.

Step 3: Designate Personnel and Monitoring
Use of more objective assessment tools would allow the expert committee to propose precautions appropriate for each tier of risk, rather than the subjective tiers presently used. For example, if the predicted risk of ventilatory depression over the next two minutes is 1:10000 then the skill set needed for this level of sedation would be different from the sedation level where that predicted risk is 1:100.

Step 4: Designate and Refine Predictors
This is the most difficult task. Research would have to look at candidate predictor variables both alone and in combination for instance change in oxygen saturation, say of, 3% rather than an absolute trigger level, cnography patterns rather than absolute levels, or change in respiratory rate. Once their predictive value has been established they can be sorted accordingly and the most accurate predictive values inserted into the hierarchy definitions. It is proposed that the hierarchy risk predictors are refined in use and subsequent research, they will not be a static definition.

Conclusion
The creation of an objective risk tool would have numerous advantages. Monitoring would be tailored to predicting risk and allow the sedationist to pre-empt problems as well as defining more reliably a given level of sedation. By defining sedation levels in this way training and certification becomes easier. Objective monitoring would allow the inclusion of computerised decision support algorithms and even closed-loop systems which would prevent deeper sedation than set or desired.

Bill Hamlin

A COMPARISON OF FOUR SEDATION TECHNIQUES FOR PEDIATRIC DENTAL SURGERY

C. Heard, J. Smith, P. Creighton, P. Joshi, D Feldman, J. Lerman.
Pediatric Anesthesia 2010 20: 924–930.

Summary
Four sedation techniques were assessed in our dental clinic. Oral midazolam, intranasal (IN) midazolam, IN midazolam combined with oral transmucosal fentanyl citrate (OTFC), and IN midazolam combined with IN
sufentany. This was a non-randomised study looking at children attending the clinic over a six-month period. One sedation technique was used for a whole session and was chosen by the anaesthetist at the start of the session. Quality of sedation was monitored by a research nurse and discharge was following satisfactory recovery from the sedation.

One hundred and two children were sedated. The sedation was successful in 73%. The time to onset was longest, 37 min in the OTFC group and shortest, 17 min in the IN midazolam group; the other two groups were 20 and 30 min. Recovery was prolonged significantly, 39 min in the OTFC group. Efficacy of sedation and frequency of complications, 9% nausea and 6% desaturation were similar for all groups.

Nitrous oxide alone is an inadequate sedative. Part of the requirements for training in paediatric dentistry requires residents to be instructed in dental sedation. The anaesthetic department was invited to assist in developing new sedation regimes evaluating their effectiveness and to supervise training.

**Method**
All patients were assessed as needing sedation, all were ASA 1 or 2 and fasting, and had not had a recent infection. Choice of sedation was made at the beginning of the session by the anaesthetist. Sedative doses were oral midazolam 1mg/Kg, IN midazolam 0.7mg/Kg, IN midazolam/OTFC 0.5mg/Kg 10–15 mcg/Kg and IN midazolam/IN sufentanyl 0.3 mg/Kg 1mcg/Kg. Oxygen was administered and sedation was started in the dental chair. Pulse oximetry gave saturation and heart rate. NIBP was taken every 5 minutes. Monitoring was continued in the recovery room, adverse events were recorded. A subsequent phone call checked for adverse events when the child had returned home. 1% lignocaine with adrenaline was infiltrated into the gums for anaesthesia.

Quality of sedation was scored 0–4 in three parameters: 1) University of Michigan Sedation score (UMSS), 2) effectiveness and 3) Ohio State Behaviour Rating Score (OSBRS). Good sedation was defined by the child whose sedation was effective and who was quiet during the procedure, successful was where the child was still but cried, and a failure was where the child cried and struggled.

**Results**
The median ages, weights and sex of the children in the four groups were similar. Duration of the procedures was similar, 25 min. A median of three procedures was carried out on each child.

The median time to onset of sedation in the IN midazolam group was significantly less, 17 min, than those of the other three regimes. The recovery time for the IN midazolam/OTFC was significantly longer than the other three at 39 min. All children became sedated, no children were over sedated but the IN midazolam OTFC group were significantly more sedated than the other three groups. Most of the sedations were good or effective, 23% were considered very effective but the failure rate was 27%; this did not differ significantly in all the groups. All children completed their treatment plans even in the “failure” group.

The incidence of complications did not differ in the groups, overall nausea and vomiting was 8.8%, airway complications were minor at 5.9%, but highest in the IN midazolam OTFC group at 17%. All episodes lasted less than 60 sec. Pain from IN midazolam was noted.

**Discussion**
The four regimes were equally effective. Sedation scores remained stable throughout treatment though it was noted that the children’s behaviour deteriorated. Those distressed in the chair seemed to settle in the recovery period.

IN midazolam has a number of advantages; however it often causes the children to cry during and immediately after it is instilled.

Our overall failure rate at 27% is in line with other studies.

These sedation regimes which included medications with antagonists are designed for use by all practitioners including nurses, dentists and non-anaesthesia physicians. We appreciate that these regimes do not allow titration; future efforts are needed to allow titration to improve success while avoiding excess sedation.

Given the size of the study we cannot comment on the safety profile. Rare and serious complications occur too infrequently to be detected in the small sample size.

Bill Hamlin
EFFECTIVENESS AND ACCEPTABILITY OF INTRAVENOUS SEDATION IN CHILD AND ADOLESCENT DENTAL PATIENTS: REPORT OF A CASE SERIES AT KING’S COLLEGE HOSPITAL, LONDON

L. Lourenço-Matharu & G. J. Roberts

British Dental Journal 210, 567 – 572 (2011)
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• Provides information on the safety of IV sedation in clinical paediatric dentistry.
• Provides information on the efficacy of IV sedation when providing care to children.
• Demonstrates the broad range of procedures in young children who would otherwise have had general anaesthesia.

Abstract

Introduction Conscious sedation for young patients continues to be challenging. Few studies have shown positive results using intravenous midazolam when sedating young patients. This case series reports an investigation of conscious sedation using intravenous midazolam for young patients receiving dental treatment.

Objective To determine acceptance, safety and efficacy of intravenous midazolam for conscious sedation in children and adolescent patients undergoing dental treatment.

Patients and methods Patients from seven to 16 years of age, ASA I, II and III, opted to have extractions, minor oral surgery and/or conservative treatment with IV midazolam and local anaesthesia. A pulse oximeter was used to monitor vital signs and the Houpot scale to assess overall behaviour.

Results A total of 552 patients, 234 boys and 318 girls with mean ages of 13.3 years and 13.5 years respectively, were included. Three hundred and sixty-five patients (66%) claimed to be anxious or very anxious before treatment. The average dose given was 5.7 mg and dosage ranged from 2 to 10 mg. Four hundred and fifty-seven patients (83%) scored ‘very good’ and ‘excellent’ for overall behaviour. Side-effects included crying, drowsiness and amnesia.

Conclusions Intravenous midazolam is accepted by patients and is a safe and effective method of sedation for use in children and adolescents, producing some level of tearfulness.

Michael Wood

ADMINISTRATION OF ORAL MIDAZOLAM IN ORAL SURGERY

A. Parsa

Oral Surgery

Abstract

Objectives: This retrospective study assessed the suitability of using oral midazolam in surgical dentistry on patients with anxiety and to present a guideline on the required dosage of oral midazolam to achieve good subjective conscious sedation.

Material and Methods:
Between 1989 and 2003 1549 patients were administered oral midazolam for sedation for dental implants and surgical extractions. The following data was collected: age, gender, patient's weight, surgical procedure, total dosage, mg/kg, time between dosage and operating, effect of sedation, complications and recovery time after the procedure.

Results:
After oral sedation patients experienced a relaxed and positive surgical session. The sedative effect was good in the majority of cases except in 152 (9.8%) patients where a second oral top-up dose was required. (This dose was half the initial dose.) All those patients achieved satisfactory sedation following the second dose.

Conclusion:
The sedative effect of oral midazolam was found effective in this study and patients describe this course of treatment positive and relaxing. Using oral midazolam for conscious sedation for dento-alveolar surgery on patients who are anxious is a feasible, easily administered and efficient method with low complication rates. This
study has presented a table as a guideline for the recommended dose of oral midazolam based on patient’s age and weight to achieve conscious sedation. In a few cases a second top-up dose was required to achieve adequate sedation – this additional dose was 50% of the initial dose. The findings in this study indicate that using oral midazolam is efficacious for inducing conscious sedation in dentistry.

Michael Wood

NEEDLE BREAKAGE DURING LOCAL ANAESTHESIA IN THE ORAL CAVITY – A RETROSPECTIVE OF THE LAST 50 YEARS WITH GUIDELINES FOR TREATMENT AND PREVENTION

Augello M, von Jackowski J, Grätz KW, Jacobsen C.


Source
Department of Oral and Craniomaxillofacial Surgery, University Hospital of Zurich, Frauenklinikstrasse 24, 8091 Zurich, Switzerland. augello@gmx.ch

Abstract
Needle breakage in the oral cavity after local anaesthesia is a common complication with possible serious complications of injuring vital structures. There are different possible reasons for needle breakage, with a main focus on preventable mistakes in treatment. In this study, an analysis of literature of the last 50 years as well as own cases has been performed to renew knowledge and prevention and therapy strategies for this serious complication. A systematic, multilingual review of medical literature from 1900 until today was conducted and information was evaluated systematically. In the majority of cases needle fracture happened during inferior alveolar nerve block. It is mainly a problem due to inadequate technique or the use of too-thin needles for the performance of inferior alveolar nerve block. Different arguments about possible therapy strategies and methods exist. Basically, if a hypodermic needle fractures, it should be removed surgically under general anaesthesia. To localize the fragment, use of either multi-plane X-rays or fluoroscopy with at least two reference needles in place or, if possible, of three-dimensional CT scans is recommended. This article shows that despite progression in material, needle fracture is still an existing, preventable problem, if some basic rules are followed.

Michael Wood

SICKLE CELL DISEASE, DENTISTRY AND CONSCIOUS SEDATION

Cathy Bryant and Carole Boyle

Dental Update 2011: 38; 486–492.

Abstract
The features of sickle cell disease (SCD) is described. Two case reports of patients treated in a dental institute are presented and the dental management of patients with SCD discussed. Since infection is one of the major risk factors for sickle cell crisis, the prevention of oral disease and infection is vital for this group of patients and there is no contra-indication to the delivery of dental treatment under local anaesthetic with inhalational sedation if required in the primary care setting. Since patients with SCD are particularly vulnerable to the effects of periods of hypoxia, which may produce significant morbidity, and because of the additional practical challenges in sedating this group of patients, intravenous sedation should be undertaken in a specialist unit.

Clinical relevance
The increasing prevalence of SCD highlights the importance of dentists practicing in multi-cultural communities having an understanding of this condition and its implications on their clinical practice. This will facilitate the safe management of patients with SCD.

Michael Wood
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1 Intranasal/intravenous sedation for the dental care of adults with severe disabilities: a multicentre prospective audit
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