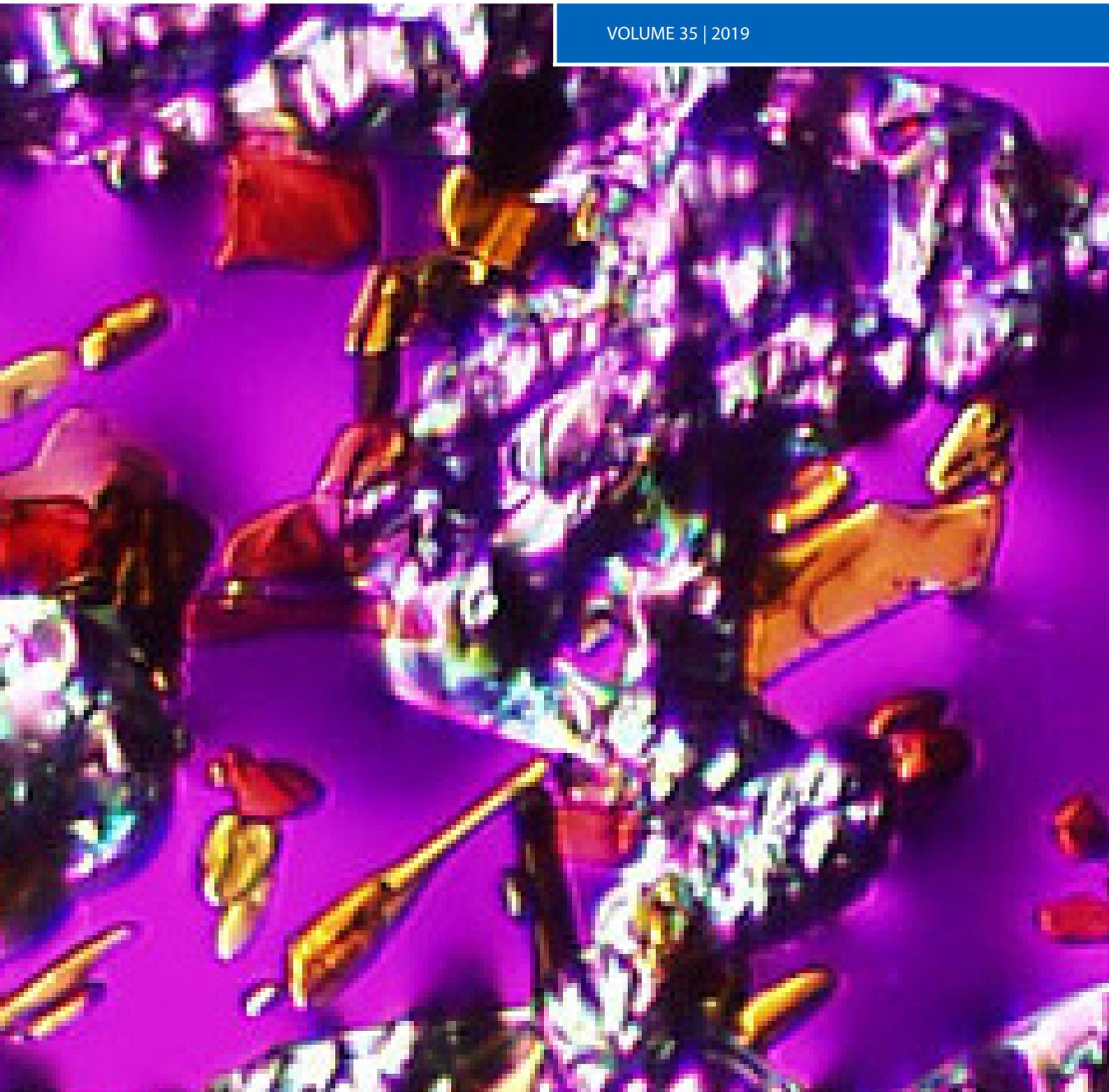




**SAAD DIGEST**

JOURNAL OF THE  
SOCIETY FOR THE ADVANCEMENT  
OF ANAESTHESIA IN DENTISTRY

VOLUME 35 | 2019



**Illicit drug use and sedation | Visual mental imagery**

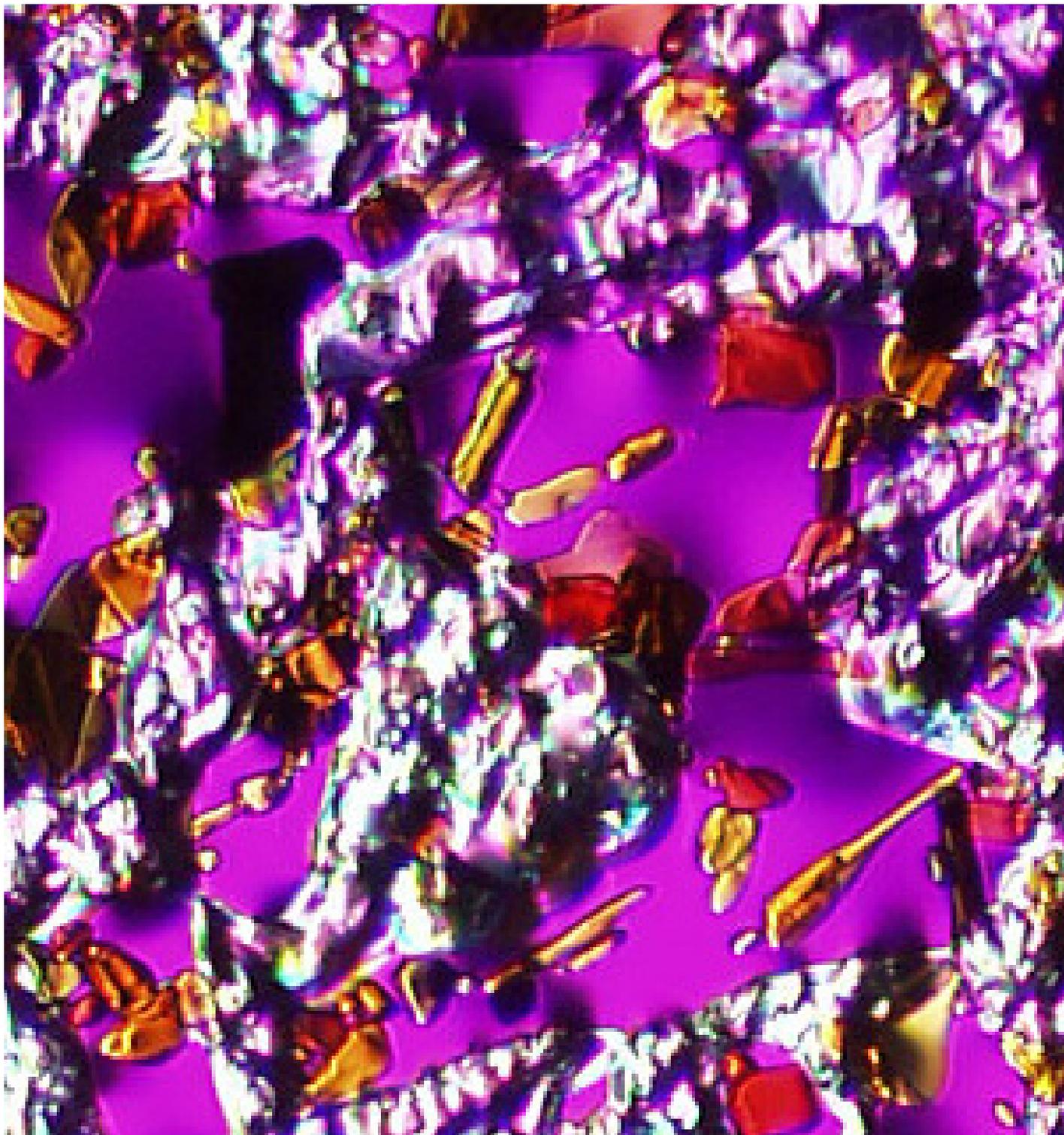
**Use of flumazenil**

# STORY BEHIND THE COVER

## METHADONE

A description of methadone and its effects can be read in the article '*Assessment and Management of Patients taking Methadone for Intravenous Dental Sedation*', on page 3.

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





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### Original articles and correspondence should be addressed to:

Fiona Trimmingham  
 SAAD Editorial Board  
 21 Portland Place, London W1B 1PY  
 Tel: 01302 846149 Email: fiona@saad.org.uk

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'Better late than never', however, be that as it may, here is the 2019 edition of the SAAD Digest! Prompt production and hence circulation, is dependent upon on many factors but particularly the requirement for invited authors to fulfil their agreement to submit articles in time to the Editorial Board. Non-compliance from some has led to this delay, my apologies. In the future a more formal agreement between SAAD and its authors will be put in place to help to avoid such occurrences.

How digital communication has shrunk the world - obliterating distances, reducing carbon footprints and enabling online meetings to occur! Nigel Robb, SAAD Digest Editor, is now successfully embedded in Griffith University, Gold Coast, Australia. Using the internet, he has been able to continue to lead the Editorial Board despite the (approximately) 10,307 miles or 16,597 kilometres distance, and the nine or ten hour time differences (depending on BST or GMT); true dedication for which I am extremely grateful. My thanks also to Yi Kwan Loo, SAAD Trustee, who acts as the link between the Editorial Board and the Board of Trustees.

The cover of this issue of the Digest features a scanning electro-micrograph of methadone and sets the scene for a series of three related articles. They focus attention on the problem of illicit drug use within every stratum of society where methadone is used, including those on rehabilitation programmes. The interactions between drugs used either for therapeutic or recreational purposes and those used to achieve dental sedation may have unpredictable and undesirable effects, with which the sedationist may have to contend. There may also be significant restorative dentistry challenges with these cohorts of patients as a consequence of changes in lifestyle that may affect attention to personal and oral hygiene care leading to periodontal problems, dental caries and dental erosion.

The street names of drugs, described in the article: '*Introduction to illicit drug use*', has generated an interesting social dialect; knowledge of such terminology can support enhanced communication between the dental team and users of such substances.

The following five refereed papers look at a range of sedation and clinical dental procedures, and pain control. The value of audit is highlighted in the report from an oral surgery team based at the Eastman Dental Hospital who have demonstrated how the collection of seven items of clinical information at the pre-assessment visit has led to an increase in clinical efficiency, a reduction in the appointment failure rate and a projected reduction in costs.

The view from Singapore investigated the barriers that have impeded the acceptance of conscious sedation in dental practice there; certainly the UK currently enjoys a more favourable position in this respect.

In last year's Editorial, Nigel Robb stated, '*despite advances in pain control, patients with no experience of dental care are still*

*presenting as "too anxious to have treatment under local anaesthesia"*'; the use of visual mental imagery was found to have a positive effect on patients' relaxation during extractions under local anaesthesia, and is described in the article from a team from Birmingham Dental Hospital and School of Dentistry and Brecon War Memorial Hospital.

The fourth paper was a retrospective study that investigated the use of flumazenil in patients with Learning Difficulties; reassuringly the reversal agent was not used to manage over-sedation but to assist with 'safe discharge' for this group of patients who may become unduly distressed during the recovery period.

The role of the 'DOOuble agen7', capsaicin, in the control of dental-related pain is described in the article by Pankaj Taneja, who is based in Aarhus University; the conclusion states that further research into this substance, and the TRPV1 receptor where it works, are areas for further research.

A host of other interesting and relevant articles are to be found which should satisfy readers of this truly weighty journal.

The National Courses go from strength to strength and it is with satisfaction that the one hundredth dental therapist / hygienist successfully completed the SAST assessment; hearty thanks to the Training Board and especially to Nigel Robb and Chris Dickinson who were instrumental in getting this programme off the ground.

A record of last year's Symposium held at the Royal Society of Medicine, London is set out in this Digest commencing at page 59. David Pearson and Shilpa Shah, SAAD Trustees, and SAAD Executive Secretary, Fiona Trimmingham, are busily engaged in putting together the arrangements for the 2019 Symposium which will be held in Manchester at the Bridgewater Hall on Saturday 28 September.

It is with pleasure that I can report that the Board of Trustees recently agreed to support a clinically-based PhD that will be investigating aspects of inhalation sedation. The research student will be supervised by Jinnous Tahmassebi at the Dental School, University of Leeds; the project will commence in June this year. Updates will be provided through SAAD's regular Newsletters, to inform members of progress of the study.

A joint Study Day with the South East Branch of British Society of Paediatric Dentistry was held in March this year at New Hunt's House, Guy's Campus, London; this very successful event focussed on Paediatric Sedation and has provided the impetus for possible future planning with other specialist societies where dental sedation has a role.

It would be remiss not to thank many dedicated individuals who ensure that SAAD and our journal, The Digest, continue to flourish. This publication does not just happen; it requires much hard work and commitment during the year from the Editorial Board and also from the individual contributors, for their effort into producing and submitting papers. The demands of our day jobs are considerable so to all involved in any way in the production of another excellent publication - well done, all much appreciated.

Enjoy this edition – and please undertake the on-line CPD to gain verifiable sedation hours as part of the quinquennial sedation-related requirements.

Stephen Jones

# Patients taking methadone - assessment and management for intravenous dental sedation

**Heather Mitchell BDS (Hons) MFDS RCS Edin**

*Dental Core Trainee 2 in Special Care Dentistry*

*OSCAR Dental, University Hospital Llandough, Penlan Road, PENARTH CF64 2XX*

**Robert Baker BDS Lon LDS RCS Eng MFDS RCPS Glas MSND RCS Edin MSc Bristol**

*Consultant Specialist Special Care Dentistry*

*OSCAR Dental, University Hospital Llandough, Penlan Road, PENARTH CF64 2XX*

## Correspondence:

*heather.mitchell2@wales.nhs.uk*

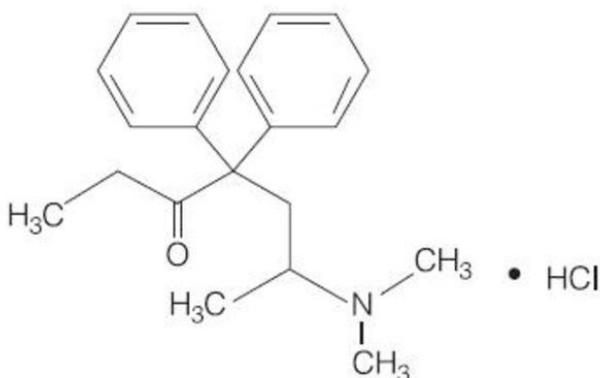
## Abstract

Managing the dental care of a patient who has a history of illicit opioid drug use can be challenging due to: high levels of dental disease; physical & psychological co-morbidities related to illicit drug use and the lifestyle surrounding it. However, when such a patient is also dentally anxious it can become very challenging. This article will focus on patients in a methadone maintenance programme who are likely to be attending the dentist for the first time in many years, anxious and requiring extensive treatment, focusing particularly on the assessment and management of their treatment under intravenous sedation.

## Introduction

Methadone hydrochloride is a synthetic opioid developed in the late 1930s in Germany.

It is described as 3-heptanone, 6-(dimethylamino)4, 4-diphenyl-, hydrochloride, and is a white, odourless, bitter-tasting crystalline powder. It is very soluble in water, soluble in iso-propanol and in glycerine. A solution (1:100) in water has a pH between 4.5 and 6.5.<sup>1</sup>



### Chemical structure of methadone hydrochloride (figure 1)

It is a  $\mu$ -opioid receptor agonist. Methadone hydrochloride has a similar potency to morphine but longer duration of effect. It also has some agonist actions at the  $\kappa$  and  $\sigma$  opiate receptors. These actions result in analgesia, depression of respiration, suppression of cough, nausea and vomiting (via an effect on the chemoreceptor trigger zone) and constipation. The plasma  $t_{1/2}$  is very long and

variable 13-100 hours.<sup>2</sup> Patients taking methadone hydrochloride can develop dependence,<sup>3</sup> as it is a highly addictive drug.<sup>4</sup> It is metabolised in the liver, through the cytochrome P450 system, eliminated via faecal and renal routes. Consequently medications which inhibit or induce the cytochrome P450 enzyme, raise or lower the systemic levels of methadone.<sup>5</sup>

The side effects of methadone hydrochloride include: sweating, dry mouth, lethargy, reduced libido, cardiac side-effects and constipation.<sup>1</sup> Similar to other opioids, an effect on the nucleus of the automotor nerve, and perhaps on opioid receptors in the pupillary muscles causes pupillary constriction [miotic action on the pupil of the eye / pinpoint pupils] and respiratory depression.

Methadone hydrochloride crosses the placenta; is excreted in breast milk; and can cause foetal dependence.<sup>6</sup>

## Indications for use

The licensed uses of methadone hydrochloride are:

1. Severe pain [oral or subcutaneous or intramuscular injection],
2. Adjunct in treatment of opioid dependence [oral solution],
3. Control of intractable cough in terminal disease [linctus].<sup>7</sup>

However, it can also be used illicitly as a drug of addiction.

## Severe pain and control of intractable cough

Methadone hydrochloride is used in the management of acute pain e.g. oral ulceration<sup>8</sup> and cancer. In the authors' experience the patients in these two groups are in ASA categories IV or V and are likely to be either bedridden or hospitalised and generally only requiring emergency dental care. Any intervention is likely to be anaesthetist-led and so outside the scope of this paper.

Patients with opioid dependence disorders may be prescribed methadone hydrochloride during opioid detoxification or Methadone Maintenance Therapy.<sup>1</sup>

## Methadone detoxification

NICE guidelines state that methadone hydrochloride is the first line pharmaceutical intervention for opioid detoxification. NICE

highlights the importance of psychosocial interventions such as counselling.<sup>9</sup> This involves the administration of methadone hydrochloride in the short-term to ameliorate the abstinence symptoms of opioid dependent patients, gradually tapering the dose over weeks to months. An average dose of 40mg per day controls withdrawal symptoms but will not eliminate craving for heroin. The target is to achieve a drug-free state. Unfortunately there is a high level of relapse.<sup>6</sup> Induction presents a potential risk and should be undertaken with care. Patients will be monitored closely for respiratory depression, especially in the first 24-72 hours of initiating therapy. But the illicit additional use of heroin, crack cocaine and benzodiazepines is a problem. During drug reduction there is a reported increase in anxiety.<sup>10</sup>

The authors would therefore advise avoidance of dental sedation at this time, postponing dental treatment under sedation until a more opportune moment.

## Methadone Maintenance Therapy [MMT]

MMT is the legal supply of methadone hydrochloride to the opioid dependent individual. The number of methadone prescriptions rose by 75% between 2004 and 2010 due perhaps to more people accessing opioid substitution treatment, and retention improving.<sup>11</sup> The aim of treatment is to allow the addict to cease the illicit use of heroin in order to: work and earn a legal living; avoid the health side-effects of opioid use; avoid crime & prostitution to fund a drug habit; and to reduce the cost to society of criminal activity and consequent imprisonment.

It takes 3-10 days for plasma concentrations to reach steady state after methadone hydrochloride is initiated. A dose tolerated on day 1 may become toxic by day 3. Titration of the optimal dose takes several weeks<sup>7</sup> so the authors would recommend that IV sedation should be avoided at this time.

Once treatment has been successfully initiated, the patient's life will follow a daily routine. Patients attend on a daily basis, usually in the morning, to receive the medication – there are anecdotal reports of patients selling their prescription to buy illicit drugs so avoiding the temptation of large quantities of medication. Methadone hydrochloride is usually administered under supervision, as a sugar-free solution, the proprietary names being Methadose, Metharose and Physeptone.<sup>7</sup> The oral dose has a slow onset and less "rush". The patient becomes lethargic referred to as being "on the nod". When it wears off, the patient can tackle the needs of daily living.

Metharose and Physeptone contain liquid maltitol,<sup>12,13</sup> a member of a family of bulk sweeteners known as polyols [sugar alcohols] it is about 90% as sweet as sugar and non-cariogenic.<sup>14</sup> The pH of the Methadose 10mg/ml Oral Solution is 4.5 – 6.5.<sup>15</sup> This product is designed to be used with a diluent to maintain the volume of liquid whilst reducing the dose of methadone. If mixed with the diluent, the pH should not change from the above range. The pH of Physeptone is 3-4.<sup>16</sup> As the patient holds the product in the mouth for a considerable period of time to allow trans-mucosal drug delivery, it is probable that they are both erosive and cariogenic. The bioavailability is about 80%.

The authors recommend establishing the time when the patient

receives their methadone hydrochloride and to arrange appointments at appropriate times.

Opioid dependent patients undergoing MMT have high levels of co-morbid disorders, both physical and psychological.<sup>17</sup> Naji et al. (2017) found 85% were smokers, 68% had a physical comorbidity, and 57% had a psychiatric comorbidity. Physical co-morbidities would include human immunodeficiency virus [HIV], hepatitis, tuberculosis, cardiac disorders such as infective endocarditis [IE], epilepsy, chronic pain and liver disease.

The cardiac status of patients with substance abuse disorders is particularly relevant to the dental practitioner:

- (i) Infective Endocarditis – patients with substance abuse disorder are more likely to have right-sided endocarditis.<sup>18</sup> An analysis of 80 cases studied at necropsy found that 59/80 had active endocarditis, 11/80 healed endocarditis and 10/80 both healed and active.<sup>19</sup> Depending on the criteria used to define IE, it is estimated that anywhere between 5% and 20% of people who inject drugs have had IE.<sup>9</sup>
- (ii) Methadone hydrochloride is itself cardio-toxic causing prolongation of QT interval and torsade de pointes.<sup>1</sup>

Psychiatric co-morbidities include depression and anxiety disorders.<sup>17</sup> Patients with substance abuse disorders may use a variety of substances. They are a patient group with a high level of alcohol dependence.<sup>20,21</sup> The manufacturers warn that alcohol will increase respiratory depression for patients prescribed methadone hydrochloride. Iguchi et al found that former opioid abusers, particularly those on MMT were taking large doses of benzodiazepines and smoking.<sup>20</sup>

Practitioners should be aware that these patients are immensely strong, coping with the various vexations and vicissitudes of their lives. Many of us would struggle to live rough, and consume multitudinous illicit drugs.

Anecdotally, they may be dentally anxious and have low pain tolerance requiring careful pain relief. Many active drug-users self-medicate when in dental pain in order to avoid attending the dentist due to fear or lack of access to dental care. Dental problems can become more noticeable during methadone use because it is less sedative and does not have the same analgesic effect as heroin. Probably many GPs have methadone users among the patients attending the practice.

## Pre-operative assessment

Successful sedationists will recognise the importance of the pre-operative assessment, starting from the first time of meeting the patient. Building a good rapport is integral for successful treatment under sedation. Once rapport is built it is more likely an honest answer to sensitive questions will be obtained. Often the pre-operative assessment starts with identifying any pre-existing medical conditions and medications the patient is taking prescribed and recreational. Patients with a history of substance misuse may not be aware of their full medical history and it is good practice to contact the patients' GP as required [with patient's consent]. When asking about non-prescribed drug use it is important to appear non-judgmental and matter-of-fact. Do not assume they have stopped using heroin or other substances. Also ask about prescription drugs used in other ways than prescribed

such as undisclosed methadone users.<sup>4</sup>

Patients should be questioned about alcohol intake, present and past. Patients saying they do not drink should be asked about past alcohol dependence. Patients taking methadone hydrochloride should be careful with alcohol as both are nervous system depressants and it can be an important factor in opiate overdose. Alcohol misuse can lead to liver and kidney problems which may be undiagnosed, therefore a bleeding history should be obtained. Questions such as how easily do you bruise? If you cut yourself does it take long stop bleeding? Have you had any problems in the past with bleeding after dental extraction? If concerned it would be advisable to request a coagulation screen, full blood count and liver function tests. As patients on MMT have multiple co-morbidities consequent to substance misuse, enquiries are necessary regarding viral infections as a result of injecting Intravenous drugs such as HIV; Hepatitis B & C; and bacterial infections such as IE. With a history of endocarditis the sedationist should contact the patient's doctor / cardiologist for antibiotic cover advice.

Pre-existing mental health conditions can be accentuated by opioid drug misuse and be associated with the development of mental health problems. Thorough questioning regarding mental and behavioural disorders such as depression is relevant for patients with opioid dependence disorders. Under the influence of intense pain e.g. dental pain, any usual anxiety associated with a psychological disorder may be dramatically magnified.<sup>22</sup> Baseline recordings of the heart rate and arterial blood pressure should be recorded in the notes.

Further investigations may be required to establish the patient's suitability for sedation. These could include: ECG; respiratory examination; INR; full blood count, liver function test; glomerular filtration rate; oxygen saturation; and screening for infectious diseases.

Patients taking methadone hydrochloride are also at risk of adrenal suppression from years of opioid misuse. For minor oral surgery the current guidelines state that steroid cover is not required.<sup>23,24</sup>

Venepuncture can be difficult on these patients because their veins can have collapsed due to intravenous drug misuse. Assessment is important before the sedation appointment; the patient may know the best vein. If no suitable veins are present, inhalation sedation should be considered. Intranasal and oral sedation are not appropriate if cannulation cannot be achieved, there is also a poor chance of success with these two types of sedation due to tolerance issues in this patient group.

After taking a thorough history and recording the patient's vital signs the patient's ASA status should be determined. Many patients on MMT will present as ASA II or III. The authors would therefore recommend that these patients be best treated under sedation in secondary or tertiary care due to the complexity of their medical history and unpredictability when sedated.

At the assessment appointment it is important to manage the patient's expectations of having treatment under IV sedation. They must understand they will be conscious throughout and due to their history of drug use it may be difficult to sedate them. Pre- and post-operative instructions should be given both verbally and written including an information leaflet for the escort.

Another part of the pre-operative assessment is establishing whether the patient has a suitable escort for intravenous sedation and means to get home safely. The patient's escort should be seen before appointing the patient and suitable transport ensured. RB vividly remembers, many years ago, watching an escort perilously perched behind the patient on a moped as they left the hospital car park.

Opioid drug users often lead chaotic lifestyles and surround themselves with other drug users. Hopefully a patient receiving MMT is on a journey to recovery and will have positive life influences suitable as escorts. However, if there isn't a suitable escort the patient may need to be treated as an inpatient or inhalation sedation used.

Treatment planning for the patient receiving MMT should be realistic. Patients with substance abuse disorders may have poor oral hygiene. Due to their lifestyle, they may find themselves discontinuing MMT due to: homelessness; imprisonment; not accessing social income; and illicit drug misuse.<sup>25</sup> Their life expectancy is lower than patients not misusing illicit substances.<sup>26</sup> Patients [with poor oral hygiene; no income to purchase dental consumables; and without the benefits of a comfortable home life] are unlikely to be able to look after complex dental work. It is not unusual to read in the hospital notes that patients in acute psychotic episodes are admitted with only their underwear.

The authors would therefore recommend that treatment is limited to simple direct restorations and extractions. The benefits of such an approach are easily appreciated by patients who have been homeless and the authors have in the past been thanked for their realism.

The GDC states in its guidance *Standards for the Dental Team* (2013) paragraph 3.1.6 that written consent must be obtained where treatment involves conscious sedation.<sup>27</sup> This should be obtained at the pre-operative assessment and confirmed at the each treatment appointment - before sedation is administered.

There is no need to stop methadone hydrochloride prior to dental sedation as it has a long half life and would need to be stopped for a considerable period which would be unacceptable to the patient and run the risk of alternative illicit drug use. It would probably be more harmful for the patient to stop methadone hydrochloride prior to sedation.

## Considerations at the sedation appointment

The patient should be visually assessed, if they smell of alcohol; have miotic pupils, slurred speech or other signs of opioid or alcohol intoxication then the appointment should be terminated and the patient re-booked for re-assessment.

The accompanying adult should be seen and appropriate transport confirmed.

Midazolam is a CNS depressant with effects similar to methadone hydrochloride<sup>7</sup> this could put the patient at higher risk of going into respiratory depression during sedation. This must be taken into consideration when treating patients. Checking when the last dose of methadone hydrochloride was taken prior to sedation is

vital, according to IACSD guidelines benzodiazepines may be up to eight times more potent after prior administration of an opioid. Enquiry should also be made regarding illicit drug use.<sup>28</sup>

Consent should be confirmed.

Slow titration of the drug and close monitoring of clinical signs and vitals should be undertaken.

NIBP monitoring should be carried out pre-operatively, intra-operatively at intervals appropriate to the patient's condition and technique, and post-operatively.<sup>29</sup> Methadone hydrochloride has a narrow therapeutic index, any small increase in the drug can lead to toxicity. So caution should be exercised when prescribing for these patients: macrolide antibiotics can increase the concentration of methadone hydrochloride and prolong the QT interval.<sup>7</sup>

The patient may become over-sedated due to either the midazolam or methadone hydrochloride. It may be necessary to reverse the patient with flumazenil after midazolam has been administered. Flumazenil is a selective benzodiazepine receptor antagonist, it will reverse the midazolam and any other benzodiazepines the patient has taken. This can be an issue if the patient has taken benzodiazepines for epilepsy and could potentially induce an epileptic fit.

In the event of clinically significant respiratory or cardiovascular depression narcotic antagonists may be required but methadone hydrochloride is a long acting depressant (36 to 48 hours) whereas antagonists only act for 1 to 3 hours, so antagonist treatment should be repeated as required.

Nalorphine (0.1mg per Kg) or Levallorphan (0.02mg per Kg) should be given intravenously as soon as possible and repeated, as required, every 15 minutes.<sup>10</sup>

For a person physically dependent on narcotics, administration of the usual dose of narcotic antagonist will precipitate an acute withdrawal syndrome; use in such a person of the antagonist should be avoided if possible but if it must be used to treat serious respiratory depression it should be administered with great care.

Oxygen, intravenous fluids, vasopressors and other supportive measures may be employed as indicated.

The authors would therefore recommend that these patients may be best treated under sedation in secondary or tertiary care under anaesthetist supervision.

Local anaesthetic with vasoconstrictors can increase the risk of myocardial infarction and cardiac arrhythmias: it is also important to achieve adequate local anaesthesia. RB has observed, whilst undertaking extractions under general anaesthetic without local anaesthetic, significant increases in blood pressure due to the release of endogenous adrenaline. This endogenous adrenaline directly released into the blood stream is likely to be of greater significance than the quantities of adrenaline in local anaesthetic correctly administered outside blood vessels.

Bleeding has not presented a problem in the past. Many of these patients will smoke and the problem can be complete absence of a blood clot. They are unlikely to comply with post-operative

instructions or maintain good oral hygiene and are therefore at higher risk of dry socket in the authors' opinions.

## Recovery and post op instructions

There is no set amount of time a patient must be kept in recovery after sedation according to IACSD guidelines. On discharge the patient should be orientated in time, place and person and vital signs which are stable and within normal limits for the patient.

Post operative instructions verbal and written must be given to both the patient and escort.<sup>29</sup>

The authors have the BDA guidance on endocarditis printed on the reverse of their post-operative instructions for dental extractions.

## Conclusion

Patients on MMT are a difficult group to manage, especially under intravenous sedation and the authors would recommend that referral to an anaesthetist-led facility for patients with dental anxiety may be required. There are currently no guidelines specifically for the sedation of patients on MMT.

## References

1. Martindale. 38<sup>th</sup> Ed. Editor Brayfield A. London: Pharmaceutical Press, 2014.
2. Miller RD, Miller's Anaesthesia. 8 Ed. Philadelphia: Elsevier Saunders, 2015 ISBN 978-0-7020-5283-5.
3. Goth's Medical Pharmacology. 13 Ed. Clark WG, Brater DC, Johnson AR, St Louis Missouri: Mosby Year Book, 1992.
4. P. G. Robinson, S. Acquah and B. Gibson. Drug users: oral health-related attitudes and behaviours. Br Dent J 2005;189: 219-224.
5. Harrison T, Kornfeld H, Aggarwal A, Lembke A. Perioperative Considerations for the Patient with Opioid Use Disorder on Methadone, or Naltrexone Maintenance Therapy. Anesthesiol Clin 2018; 36: 345-359.
6. Anderson I B, & Kearney T E. Use of Methadone West J Med 2000; 172 (1): 43-6.
7. Joint Formulary Committee. British National Formulary. 76th ed. London: BMJ Group and Pharmaceutical Press, 2017.
8. Gallagher R, Methadone Mouthwash for the Management of Oral Ulcer Pain. J Pain Symptom Manage 2004; 27: 390-1.
9. Methadone and buprenorphine for the management of opioid dependence. London: National Institute for Health and Care Excellence, 2007.
10. Editor Hussein Rassod G. Dual Diagnosis Nursing. Oxford Blackwell Publishing Ltd, 2006 ISBN – 13: 978-14051-1902-3.
11. Pilling S, Strang J and Gerada C. Psychosocial interventions and opioid detoxification for drug misuse: summary of NICE guidance. BMJ.2007; 335: 203-205.
12. Rosemont Pharmaceuticals Limited. Methadose 10mg/1ml Oral Concentrate. 2017. Available at <https://www.medicines.org.uk/emc/product/6681/smpc>. (accessed November 2018).
13. Martindale Pharma. Physeptone 1mg/ml oral solution sugar-free. 2017. Available at <https://www.medicines.org.uk/emc/product/3704/smpc> (accessed November 2018).
14. Dominick T, Are sugar substitutes also anticariogenic?. J Am Dent Assoc 2008; 139, Supplement 2: 9S-10S.
15. Rothwell J, Rosemont Pharmaceuticals Ltd Personal communication 11/11/2018.
16. Thakor A, Martindale Pharma Ref 55167 Personal communication 12/11/2018.
17. Najji L, Burns Dennis B, Bawor M, et al The association between age of onset of opioid use and comorbidity among opioid dependent patients receiving methadone maintenance therapy. Addict Sci Clin Pract 2017; 12.9 DOI 10.1186/s13722-017-0074-0.
18. Moss R, & Munt B. Injection drug use & right-sided endocarditis. Heart 2003; 89: 577-81.
19. Dressler FA, Roberts WC, Infective endocarditis in opiate addicts: analysis of 80 cases studied at necropsy. Am J Cardiol 1989; 63: 1240-57.

20. Joseph H, Appel P: Alcoholism and methadone treatment: consequences for the patient and program. *Am J Drug Alcohol Abuse*. 1985; 11: 37-53. 10.3109/00952998509016848.
21. Best, D, Lehmann, P, Gossop, M, Harris, J, Noble, A & Strang, J, 'Eating too little, smoking and drinking too much: Wider lifestyle problems among methadone maintenance patients', *Addiction Research* 1998; 6: 489-498.
22. Titsas A, Ferguson MM. Impact of opioid use on dentistry. *Aust Dent J* 2002; 47: 94-98.
23. Nicholson G, Burrin JM, and Hall GM. Peri-operative steroid supplementation. *Anaesthesia* 1998; 53: 1091-1104.
24. Gibson N, & Ferguson JW. Steroid cover for dental patients on long-term steroid medication: proposed guidelines based upon a critical review of the literature. *Br Dent J*. 2004; 197: 681-5.
25. Lo A, et al. Factors associated with methadone maintenance therapy discontinuation among people who inject drugs. *J Subst Abuse* 2018; 94: 41-6.
26. Hser Y, Hoffman V, Grella CE, Anglin MD, A 33-Year Follow-up of Narcotics Addicts. *Arch Gen Psychiatry* 2001; 58: 503-8.
27. Standards for the Dental Team. London: General Dental Council, 2013.
28. Standards for Conscious Sedation in the Provision of Dental Care. Edinburgh: The Dental Faculties of the Royal Colleges of Surgeons and the Royal College of Anaesthetists, 2015.
29. Conscious Sedation in Dentistry (3rd Edition). Dundee: Scottish Clinical Effectiveness programme, 2017.

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## Introduction to illicit drug use

**Alexandra Clegg**

Level 4 certificate in education and training, Level 3 Health and Social Care  
Senior Substance Misuse Trainer

Turning Point

<https://www.turning-point.co.uk>

**Correspondence:**

[alexandraclegg@hotmail.co.uk](mailto:alexandraclegg@hotmail.co.uk)

### Introduction

From prescription drugs and over the counter medications to illicit street drugs, virtually any drug can be abused. Over the past ten years the emergence of novel psychoactive substances has grown, and we are now seeing different variations of substances coming onto the market. Historically these could mostly be classified and identified under the following three main categories:

- Stimulants
- Depressants/sedatives
- Psychedelics/hallucinogens

Whilst drugs in these categories will have similar effects, due to unknown ingredients and strength it's impossible to say exactly how the individual may feel or react to taking such substances. Below is a table explaining drug, street names, clinical effects, risks associated and what you may see through regular use of these substances.

Substance	Other names	Clinical effects	Risk associated Contra-indications	Signs and symptoms of regular use
Nitrous oxide A colourless gas used for its calming and anaesthetic properties.	Laughing gas Nos Hippie crack Nangs Balloons Chargers Noz	Known for its significant medical uses in dentistry and surgery, for its anaesthetic and pain reducing effects.	Displaces air and available oxygen. Hypoxia. Oxygen supply to the brain can be cut off. Impaired oxygen to other tissues including the heart. Brain damage.	Intoxication. Euphoria/dysphoria. Reduced pain sensitivity. Muscular spasms. Vitamin B deficiency Oxygen deprivation. Nerve damage. Tingling and numbness in fingers and toes. Regular use can stop white blood cells forming properly.
Midazolam Used in sedation and to treat epilepsy	Unknown	Used for medical procedures and dental surgery	Compromised airways. Central nervous depressant. Severe respiratory depression. St John's Wort decreases blood levels of midazolam. Grapefruit juice results in reduced metabolism and higher plasma concentrations.	Dependence Over sedation Cough Vomiting Hiccups Dangerous when used with any other depressant substance including alcohol. Overdose

Substance	Other names	Clinical effects	Risk associated Contra-indications	Signs and symptoms of regular use
<p><b>STIMULANTS</b></p> <p>Speed up the central nervous system to increase neural activity in the brain.</p>	<p>Cocaine - coke, flake, Charlie, snow.</p> <p>Crack - rock, base, sugar block.</p> <p>Amphetamines - glass, methamphetamine, Meth, crank.</p> <p>MDMA - Ecstasy, molly, XTC, E, X.</p>	<p>Used to treat:</p> <p>ADHD</p> <p>Narcolepsy</p> <p>Depression</p> <p>Obesity</p> <p>Insomnia</p> <p>Asthma (historically)</p>	<p>Raise blood pressure.</p> <p>Weight loss.</p> <p>Paranoia.</p> <p>Strokes.</p> <p>Heart attacks.</p> <p>Chest pains.</p> <p>Blood infections.</p> <p>Strong psychological dependence.</p> <p>Using with depressant substances increases the likelihood of overdosing and higher levels of intoxication.</p>	<p>Intoxication</p> <p>Erratic behaviour</p> <p>Restlessness</p> <p>Chest pains</p> <p>Psychosis</p> <p>Paranoia</p> <p>Panic</p> <p>Suicidal tendencies</p> <p>Dental problems</p> <p>Sweating</p> <p>Anxiety</p> <p>Depression</p> <p>Delusions</p> <p>Tolerance</p> <p>Enlarged pupils</p> <p>Feeling alert</p> <p>Unable to concentrate.</p> <p>Poor gum health</p> <p>Burnt gums</p>
<p><b>DEPRESSANTS</b></p> <p>Slow down the central nervous system and calms activity in the brain.</p>	<p>Heroin/morphine - Smack, brown, skag</p> <p>Sedatives</p> <p>Methadone</p> <p>Buprenorphine</p> <p>Alcohol</p> <p>Ketamine - Super k, special k, ket, wonk.</p> <p>Benzodiazepines - Mazzies, moggies, jellies, blues, downers.</p> <p>Glues/gases/aerosols</p>	<p>Pain relief</p> <p>Sedation</p> <p>Muscle relaxation.</p> <p>Lowered blood pressure.</p> <p>Lowered heart rate.</p> <p>Anesthesia</p>	<p>Cognitive/memory problems.</p> <p>Respiratory depression.</p> <p>Death</p> <p>High levels of intoxication leading to overdose when mixed with other depressant substances.</p>	<p>Coming across as being 'drunk'</p> <p>Slurred speech</p> <p>Smelling of alcohol</p> <p>Disorientation</p> <p>Confusion</p> <p>Tolerance</p> <p>Burns around the face/lips and teeth.</p> <p>Fits</p> <p>Death</p> <p>Tolerance</p> <p>Tremors</p> <p>Vomiting</p> <p>Collapsed veins</p> <p>Abscess</p> <p>Increase in mental health.</p> <p>Short term memory loss.</p>

Substance	Other names	Clinical effects	Risk associated Contra-indications	Signs and symptoms of regular use
<p><b>NEW PSYCHOACTIVE SUBSTANCES</b></p> <p>Drugs containing one or more chemical substances that produce similar effects to drugs like cocaine, cannabis and ecstasy.</p>	<p>Nps, novel psychoactive substances, M Kat, meow meow, spice, clockwork orange, PMA,</p>	<p>Not known</p>	<p>Not fully known Strain on nervous system. Seizures Fast heart rates High blood pressure. Sweating</p>	<p>Anxiety Paranoia Psychosis Increase in cold/flu symptoms. Lethargic Forgetful Physically unstable Withdrawal symptoms. High body temperature. Combative</p>
<p><b>HALLUCINOGENS</b></p> <p>Drugs that cause hallucinations and other substantial changes in thoughts and emotions.</p>	<p>Ketamine - Super k, special k, ket, wonk. LSD - Trips, micro dot, acid, tab, stars. Magic mushrooms - Shrooms, magics, liberty caps.</p>	<p>Current trials being held using ketamine for depression and PTSD.</p>	<p>Increased heart rate. Paralysis of the body. Loss of reality Lack of pain Incontinence Liver damage Mental health Psychotic symptoms</p>	<p>Confusion Feeling nauseous large dilated pupils Not being able to speak Coming across as being 'drunk' Panic Auditory and visual hallucinations. Depression Flashbacks Dizzy Stomach pains diarrhoea</p>

## Further Information

[www.drugsforum.com](http://www.drugsforum.com)  
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# Come up and see me, make me smile - improving the oral health of addiction service users in Wolverhampton

**Jennifer Hare**

*Trainee Health Psychologist*

*The Royal Wolverhampton NHS Trust, Community and Special Care Dental Service*

## Co Authors

*Jane Davies Slowi, Sandeep Klair, Helen Davenport, Silan Burns, Pat Gutteridge.*

*The Royal Wolverhampton NHS Trust, Community and Special Care Dental Service*

**Correspondence:** *Sandeep Klair (Senior Dentist, Wolverhampton Community and Special Care Dental Services)*

*Email: sandeep.klair@nhs.net*

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*Jennifer Hare is now a Consultant in Health Psychology,*

*Dental Health Psychology Service and Sedation & Special Care Dentistry, Guy's Hospital*

## Abstract

Dental health is fundamental to physical health and psychological well-being and this is especially important among individuals who are in recovery to live a drug-free life. Drug use is known to contribute to poor oral health which is exacerbated by other lifestyle factors and social issues. However, when in recovery, poor dentition may reduce individuals' self-esteem and confidence to stay drug-free; compounded by poor access to dental services, this may increase the likelihood of relapse. Therefore, a pilot project was initiated in which dental drop-in sites were run alongside the shared-care service to promote oral health among service users in Wolverhampton. Collaborative work between the dental and addiction services, service user involvement team (SUIT) and local pharmacies was essential to target the individual needs of local service users; rooting oral health promotion as an integral part of building recovery. This report outlines the project development and hopes for the future.

**Key words:** *Dental health, addictions, recovery, health promotion, service improvement, collaboration*

## Background

It has been demonstrated that drug users have high levels of oral health problems and yet a low uptake of dental services (Reece, 2007). Reece (2007) also highlighted an association between severity of dental problems and the dose and duration of drug use. Drug use (opiates, cannabinoids and stimulants) is understood to contribute to poor dental health both directly (i.e. can cause dry mouth) and indirectly (i.e. consequence of a high-sugar food preference) and this can be further complicated by lifestyle and social factors (i.e. dental hygiene may be a low priority) (Ford et al., 2011; Titsas & Ferguson, 2002). There is some evidence to suggest that individuals engaged in drug use may have a low pain tolerance (Meechan, 1999), which may be relieved by further drug use on a short-term basis (Robinson et al., 2005). Furthermore, dental anxiety from previous experiences and a negative view of dental services (Robinson et al., 2005), may explain why individuals

access emergency treatment services more often than preventative services (Metsch et al., 2002).

Poor oral health has a consequence on both physical health and psychological wellbeing. Metsch et al. (2002) summarise some startling correlations to mortality and morbidity seen in cardiovascular disease, coronary heart disease, acute myocardial infarction and systemic conditions including diabetes. Additionally, they highlight the impact on speech, reduced employability and self-image. This finding is echoed by Gray (2005), who emphasises the feelings of embarrassment, shame, guilt and the impact this has on individuals' employability and confidence; *"their teeth are a beacon to their drug past"* (Gray, 2005, pp.1). Ultimately, these consequences may impact an individual's recovery.

Advocated in the Drug Strategy (2010), "building recovery" is a key aspect in supporting individuals to live a drug free life. As part of this commitment, the strategy acknowledges that *"key to successful delivery in a recovery oriented system is that all services are commissioned with the following best practice outcomes in mind... [which include] improvement in mental and physical health and wellbeing"* (pp. 20, Drug Strategy, 2010). Under these guidelines, dental health is an integral part of physical health and wellbeing. The holistic benefits of good oral health have been highlighted to improve general health, confidence, dignity, self-esteem and social integration (Fiske et al., 2000). These could be considered fundamental outcomes to individuals engaged in drug and addiction services, whereby a "whole systems" approach to recovery is delivered to "address the needs of the whole person" (pp. 20, Drug Strategy, 2010). *"Enabling drug misusers to build a lifestyle that promotes health and wellbeing, social and personal capital, as well as tackling drug dependence, requires local partnerships to develop comprehensive and multidisciplinary systems"* (pp. 5, NTA, 2010).

## Local Pilot Project

In Wolverhampton, there are an estimated 2900 problematic drug users (i.e. heroin, crack and cocaine) (SUIT, 2009). There are currently just over 1300 service users in effective treatment (i.e.

using the Addiction Services), around 300 of which are in shared-care.

A pilot project was initiated to promote oral health among users of the shared-care service in Wolverhampton, via two dental drop-in clinics, running parallel with the shared-cared clinics. This pilot was based inspired by a similar model operating in Scotland (NHS Lothian Community Dental Services); other pilots have been conducted elsewhere with varying success (Charnock et al., 2004; Scheutz 1984). However our service model has relied on close collaborative working relationships with the local Addictions Service (specifically shared-care), local pharmacies and the local Service User Involvement Team (SUIT). This has been essential to target the individual needs of local service users; rooting oral health promotion as an integral part of building recovery.

## How Does It Work?

- Two dental drop-in clinics run in parallel with two shared-care clinics, encouraging access and enhancing uptake (*including some evening time-slots*)
- Free mouth checks offered initially – with free course of treatment (*depending on benefits*)
- Prioritise individual treatment wishes (*where possible, i.e. after necessary treatment*)
- Drop-ins for any addiction service user are also welcomed
- Information leaflets promote the service, dispel myths and provide specialist oral health promotion advice
- Leaflets primarily distributed by local
- pharmacies (during prescription collections) and key workers – able to offer signposting and health promotion via guidance in the leaflet
- SUIT promote service via text networks,
- website and magazine
- Advertising in addiction services and third sector premises

Additionally, drug awareness training was provided by a local GP working with shared-care and SUIT for the whole dental service; tailored training was also provided to the dental staff working directly in the pilot areas. The training provided increased knowledge and understanding for all staff, enabling them to better manage patients presenting in general clinic outside of the drop-in times. Indeed, such specialist training is advocated by Sainsbury (1999) to enhance understanding and effective management of this service user group.

Recommended by Mackridge et al. (2010) and Sheridan et al. (2001), the involvement of local community pharmacies has been beneficial to enhance the uptake of this dental health intervention. Pharmacies have regular and direct contact to many service users accessing prescriptions for methadone or the needle-exchange programme; therefore they have key opportunities to provide information and crucial signposting.

The leaflet produced for the service has also enabled a range of non-dental staff to promote the service and provide accurate oral hygiene and health promotion advice; this has been particularly useful for individuals who were not ready or able to attend the drop-in clinics.

## Impact

The pilot has been running for just over 6 months and continues to evolve around local issues. A more detailed report outlining the project outcomes is planned for 2012, however the following testimonial has been provided by a user of the service - Dave.

### TESTIMONIAL “Come up and see me, make me smile”

“As someone who has battled with addiction for the best part of ten years, the last thing I thought about was my teeth.

In the madness, personal hygiene goes out of the window and as someone who has always had a fear of dentists, my teeth have certainly been neglected.

When I heard that the dental health team, had approached Horizon House, with a view to offering their dental service I decided it was time to get sorted, as by now, even chewing, in some areas of my mouth was becoming a problem.

As this service has been targeting drug users, they have an understanding of some of the issues we have faced and the choices we have made. I was not judged or criticised, rather I was encouraged for being there.

On my initial visit, (cold sweats increased heart rate etc.) I sat in the chair while years and years of neglect were identified by the dentist. I was pleasantly surprised though, that the problems were not as bad as I thought. I was also offered gas and air to help with my anxiety, which I tried on my first treatment.

I was pleasantly surprised that during my years of avoiding dentists, there have been many improvements, in equipment and materials. The drills are much quieter, the fillings much more user friendly and the dental staff much more approachable.

I cannot recommend this service enough .On my second visit I dispensed with the gas and air, as I had one of my complicated fillings. Later that day I discovered I had got my bite back. What a result!

I was surprised what a difference this treatment makes. Everyone has their own journey, but to be able to SMILE confidently, is something everyone needs and makes the world a better place.”

## Future Directions

While the pilot continues, there are several hopes for this developing service:

- Closer work with the key workers in other areas of the city (i.e. in shared-care clinics where there is currently no drop-in service)
- Increased links with GPs and use of a referral system into the dental service
- Increased number of clinics within the city as the demand increased - this may be in different locations within the city
- Sharing of information with other services

We look forward to further developing this localised dental service to the evolving needs of Wolverhampton, whereby dental health is a key aspect of "building recovery" among local service users. The NTA have recognised this work as an example of innovative practice.

## Acknowledgements

This pilot has involved many collaborators and stakeholders, which are key to the success so far.

- *Wolverhampton Community and Special Care Dental Service - part of The Royal Wolverhampton NHS Trust (formerly Wolverhampton PCT)*
- *Wolverhampton Addictions Service – part of the Black Country Partnership Foundation Trust (formerly Wolverhampton PCT: including the key workers of shared-care service)*
- *SUIT – Wolverhampton Drug Service User Involvement Team (www.suiteam.com) (special thanks to Sunny Dhadley, Drug Service User Involvement Officer)*
- *GP involvement (special thanks to Dr George Ryan of Low Hill Medical Centre)*
- *Local Pharmacies (special thanks to Dhiren Raja, Local Pharmacy Committee Lead)*
- **Donations:** *have been provided from Colgate, Oral-B, Boots (Bentley Bridge) and Waitrose (Wolverhampton) – generously donating tooth paste, tooth brushes and chewing gum*

The purpose of this review was to outline the development of a local dental service pilot, however for a more detailed account of the direct consequences on oral health as a result of drug use refer to the following articles: Titsas & Ferguson, 2002; Laslett et al., 2008; Brazier et al., 2003; Shaner et al., 2006; Molendijk et al., 1996.

## References

Brazier, W.J., Dhariwal, D.K., Patton, D.W., & Bishop, K. (2003). Ecstasy related periodontitis and mucosal ulceration – a case report. *British Dental Journal*, 194 (4), 197-199.

Charnock, S., Owen, S., Brookes, V., & Williams, M. (2004). A community based programme to improve access to dental services for drug users. *British Dental Journal*, 196 (7), 385-388.

Drug Strategy. (2010). Reducing demand, restricting supply, building recovery: Supporting people to live a drug free life. The Home Office, 2010.

Fiske, J., Griffiths, J., Jamieson, R., & Manger, D. (2000). Guidelines for Oral Health Care for long-stay patients and residents. *Gerodontology*, 16, 204-209.

Ford, C., Halliday, K., Lawson, E., & Browne, E. (2011). Guidance for the use of substitute prescribing in the treatment of opioid dependence in primary care. (1st Edition). Royal College of General Practitioners (RCGP). Retrieved February 25, 2011 from [www.smmgp.org.uk](http://www.smmgp.org.uk)

Gray, R. (2005). The oral effects of methadone use. *Substance Misuse Management in General Practice Resource Library*. Retrieved February 25, 2011 from <http://www.smmgp.org.uk/html/newsletters/net010.php#OralMethadone>

Laslett, A., Dietze, P., & Dwyer, R. (2008). The oral health of street-recruited injecting drug users: prevalence and correlates of problems. *Addiction*, 103, 1821-1825.

Mackridge, A.J., Beynon, C.M., McVeigh, J., Whitfield, M., & Chandler, M. (2010). Meeting the health needs of problematic drug users through community pharmacy: A qualitative study. *Journal of Substance Use*, 15 (6), 367-376.

Meechan, J. G. (1999). Drug abuse and dentistry. *Dental Update*, 26: 182-187. Metsch, L.R., Crandwell, L., Wohler-Torres, B., Miles, C.C., Chitwood, D.D., & McCoy, C.B. (2002). Met and unmet need for dental services among active drug users in Miami, Florida. *The Journal of Behavioural Health Services & Research*, 29 (2), 176-188.

Molendijk, B., Ter Horst, G., Kasbergen, M., Truin, G.J., & Mulder, J. (1996). Dental health in Dutch drug addicts. *Community Dentistry and Oral Epidemiology*, 24, 117-119.

NTA. (2010). Commissioning for Recovery: Drug treatment, reintegration and recovery in the community and prisons: a guide for drug partnerships. National Treatment Agency for Substance Misuse, NHS. January 2010.

Reece, A. (2007). Dentition of addiction in Queensland: poor dental status and major contributing drugs. *Australian Dental Journal*, 52 (2), 144-49.

Robinson, P., Acquah, S., & Gibson, B. (2005). Drug users: oral health-related attitudes and behaviours. *British Dental Journal*, 198: 219-24.

Sainsbury, D. (1999). Drug addiction and dental care. *New Zealand Dental Journal*, 95 (420), 58-61.

Scheutz, F. (1984). Five-year evaluation of a dental care delivery system for drug addicts in Denmark. *Community Dentistry and Oral Epidemiology*, 12 (1), 29-34.

Shaner, J.W., Kimmes, N., Saini, T., & Edwards, P. (2006). "Meth Mouth": Rampant caries in methamphetamine abusers. *AIDS Patient Care and STDs*, 20 (3), 146-150.

Sheridan, J., Aggleton, M., & Carson, T. (2001). Dental health and access to drug treatment: a comparison of drug users and non-drug users attending community pharmacies. *British Dental Journal*, 191 (8), 453-457.

SUIT (2009). User: Friendly – a Service User Guide to Drugs & Treatment in Wolverhampton. Available from <http://www.suiteam.com/user-friendly>

Titsas, A., & Ferguson, M.M. (2002). Impact of opioid use on dentistry. *Australian Dental Journal*, 47 (2), 94-98.



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## The effect of visual mental imagery on patient relaxation during dental extractions

**Adeel Muhammed Mughal BDS**

*Foundation Dentist*

*Brecon War Memorial Hospital*

**Kasim Butt BDS MJDF (RCS Eng) PgCert Dent Ed**

*Dental Core Trainee in Oral Surgery and Sedation*

*Birmingham Dental Hospital and School of Dentistry*

**Bilal Ahmed BDS DDPH MSc MFDS**

*Specialist in Oral Surgery*

*Birmingham Dental Hospital and School of Dentistry*

### Correspondence:

[adeel\\_mughal@hotmail.co.uk](mailto:adeel_mughal@hotmail.co.uk)

### Abstract

**Aims:** To determine whether the use of visual mental imagery has any effect on patient relaxation during dental extraction oral surgery procedures.

**Methodology:** Simple randomisation was used to select 43 patients treatment planned for dental extraction procedures, to take part in this trial. A standardised visual mental imagery technique involving patients being asked to look at a picture of a beach at sunset for one minute was conducted. Patients were guided by a standardised script. After the treatment, the patients completed an anonymous questionnaire on the technique.

**Results:** In this study 60% of patients reported that the technique helped them feel more relaxed. Only 50% of all males reported that the technique made them feel more relaxed compared to 71% of all females. 93% of patients would recommend this technique to another patient.

**Conclusion:** Within the limitations of this study, the results show that the use of visual mental imagery does have a positive effect on patient's relaxation during dental extractions procedures. This technique has the potential to provide practitioners a non-pharmacological method to aid relaxation and help manage patient anxiety during dental extraction procedures.

### Introduction

In the Adult Dental Health Survey of 2009, it was recorded that 12% of adults who had been to a dentist had an MDAS (Modified Dental Anxiety Scale) score of 19 or more which suggests extreme dental anxiety. 30% of adults reported that having a tooth drilled will make them very or extremely anxious, whereas 28% reported anxiety when a local anaesthetic injection was administered.<sup>1</sup> Based on these findings, we can say that dental anxiety can be an issue for the delivery of dental care in the UK. As a result of dental anxiety, patients may end up lengthening the duration of the treatment, delaying treatment to a later date or even avoiding treatment altogether, which may result in further disease progression.

Dentists employ both pharmacological and non-pharmacological techniques to manage dental anxiety.<sup>2</sup> Pharmacological techniques include the use of conscious sedation and general anaesthesia. General anaesthesia is undertaken in secondary care hospitals and is anaesthetist led. Validated training in conscious sedation is now required for all new starters prior to practising sedation techniques.<sup>3</sup> Non-pharmacological techniques on the other hand, do not require validated training and are therefore an important part of the armamentarium for many general dental practitioners when managing dental anxiety. Non-pharmacological techniques include the use of deep breathing/relaxation techniques, audio-visual distraction, hypnosis, cognitive behavioural therapy and acclimatisation with systematic desensitisation.<sup>4</sup>

It has been shown that mental imagery can impact on the emotions.<sup>5</sup> Negative mental images lead to emotional distress but also make it progressively worse, for example in the form of autobiographical memories. This can also be applied to positive mental images which can do the exact opposite, and provide the patient with an emotional uplift.<sup>6</sup> Fox and Newton found that exposure to positive photographic dental images prior to a dental appointment reduced anticipatory anxiety in children.<sup>7</sup> Simply remembering a time or a place where one felt most relaxed or most at peace can significantly improve one's outlook on a situation<sup>4</sup> by tricking the brain into thinking someone that they are actually reliving the experience again.<sup>8</sup> The aim of this paper is to determine whether the use of visual mental imagery has any positive effects on patient relaxation during dental extraction procedures.

### Objective

Determine whether visual mental imagery has any positive effect on patient relaxation during dental extractions within the oral surgery department at the Birmingham Dental Hospital.

### Method

A total of 43 patients who required dental extraction oral surgery procedures were randomly selected to take part in this trial. Simple randomisation was used to select patients from the cohort of

**Figure 1 – the image used for participants in the study**



patients requiring dental extractions at the Oral Surgery Department, Birmingham Dental Hospital and ethical approval for this clinical study was granted by the relevant committee. Prior to the patients dental extraction procedure they were asked to complete question 1 of an anonymous standardised questionnaire (figure 2) evaluating the patient's pre-operative dental anxiety (1 = not anxious, 5 = extremely anxious). Patients were then asked to look at an image of a beach at sunset for a fixed time of one minute, and were then asked to imagine themselves in this image (figure 1). They were guided with a standardised script which aimed to help the participants visualise the sounds and smells, and what they would be doing if they were present in the scene set in the image. They were asked to imagine this image to the best of their ability throughout the dental procedure. Once the treatment was complete, the patients were asked to complete a standardised anonymous questionnaire. There was also an additional section to be completed by the author regarding the type of procedure, reason for extraction and how many teeth were extracted (Figure 2).

## Results

Overall, approximately 60% of patients reported that the use of the visual mental imagery made them feel more relaxed during the procedure (figure 3). A higher proportion of females (71%) reported to have found the use of visual mental imagery helped them feel more relaxed during their dental extraction procedure as opposed to only 50% of males (figure 4). 53% of patients with a self

**Figure 2- the questionnaire used in the study pre-operatively to assess patient self-reported pre-operative anxiety, as well as the effect of the visual mental imagery technique on the patient after treatment**

### EFFECT OF VISUAL MENTAL IMAGERY ON PATIENTS DURING ORAL SURGERY PROCEDURES

**Please circle what age group you belong to:**

16-24      25-34      35-44      45-54      55-64      65+

**Gender: M/F**

**Highest educational attainment:**

GCSE    A-level    Diploma/Degree    Other

**Question 1 to be completed BEFORE the procedure**

**Q1) On a scale of 1-5 (1= not anxious, 5= extremely anxious), could you score your own level of anxiety before today's procedure?**

**Please circle**

1      2      3      4      5

**Q2) Did the use of this image make you feel more relaxed during the procedure?**

Yes/No/Not sure

**Q3) If you had a previous surgical/non-surgical extraction in the past, did you feel that this extraction was more pleasant than the previous one?**

Yes/No/Not applicable

**Q4) on a scale of 1-5 (1= didn't help at all, 5= helped a lot), how helpful was this technique used today?**

1    2    3    4    5

**Q5) would you recommend this procedure to all patients who may need it?**

Yes/No/Not sure

*Thank you for taking part in this study*

**TO BE COMPLETED BY STUDENT**

**Q6) Surgical or non-surgical extraction?**

Surgical    Conventional    Conventional turned to surgical

**Q7) Number of teeth extracted?**

1    2    3+

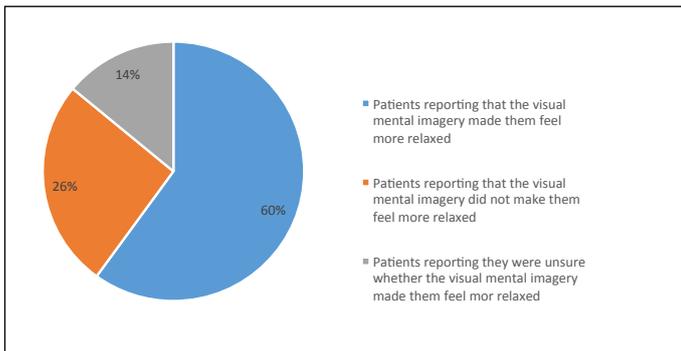
**Q8) Reason for extraction?**

Caries    Periodontal    Retained root    Other

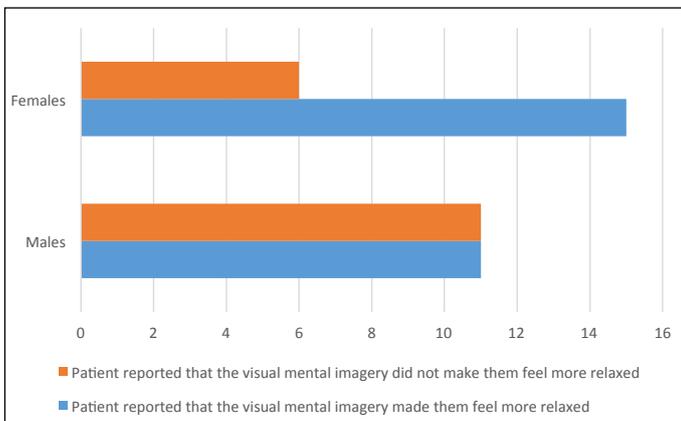
reported pre-operative anxiety of “very or extremely anxious” found that the visual mental imagery technique helped them feel more relaxed during the procedure (figure 5). Of the 43 patients included in the study, 6 had a surgical extraction. This procedure involved making an incision, raising a full thickness mucoperiosteal flap and bone removal. 37 of the 43 patients had a conventional non-surgical extraction only, involving the use of dental forceps and elevators. Of the patients who undertook a surgical extraction procedure 66% felt that the use of visual mental imagery helped them feel more relaxed, whilst 60% of patients who underwent a non-surgical extraction procedure reported that the use of visual mental imagery helped them to feel more relaxed (figure 6).

Overall, 63% of patients scored the helpfulness of this technique as a 4 or 5 out of 5, meaning that it had benefitted the participant compared to 21% who scored the technique as a 1 or 2, meaning that it didn't or hardly helped the patient (figure 7). However, only 30% of patients who reported that the image helped scored the level of helpfulness a maximum score of 5 out of 5. Finally, 93% of patients reported that they would recommend the use of the visual mental imagery technique to another patient (figure 8).

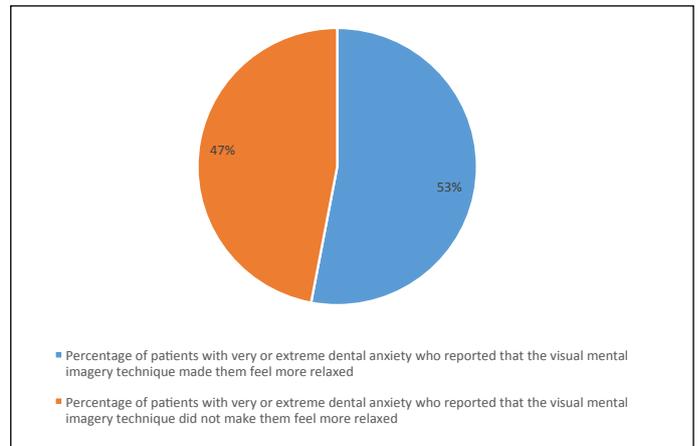
**Figure 3- the percentage of patients reporting whether the use of the visual mental imagery technique made them feel more relaxed during the procedure**



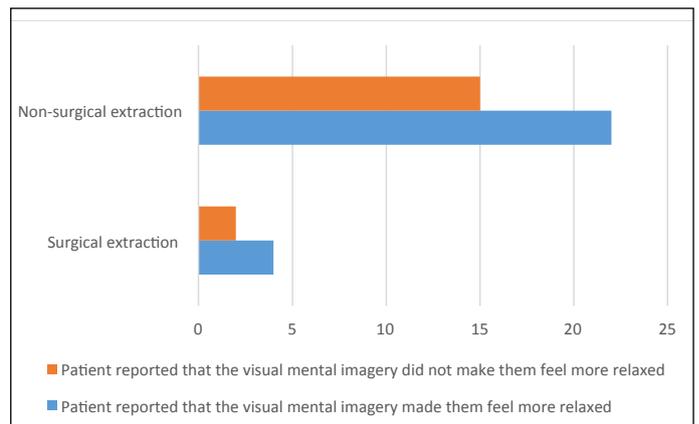
**Figure 4 – The proportion of males vs. females reporting whether the use of the visual mental imagery technique made them feel more relaxed**



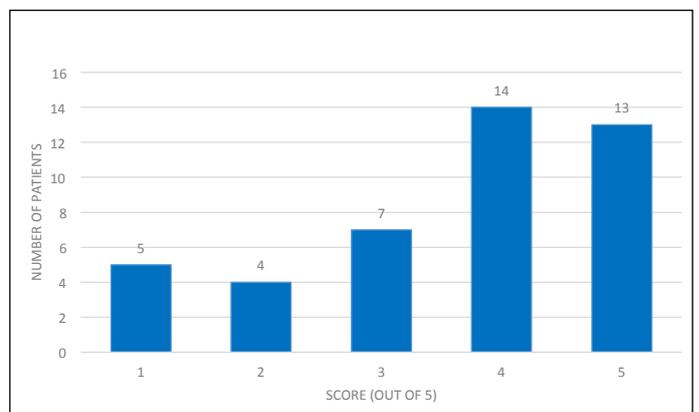
**Figure 5 – The percentage of patients reporting to be very or extremely anxious prior to the procedure (n=15) who stated that the visual mental imagery technique made them feel more relaxed**



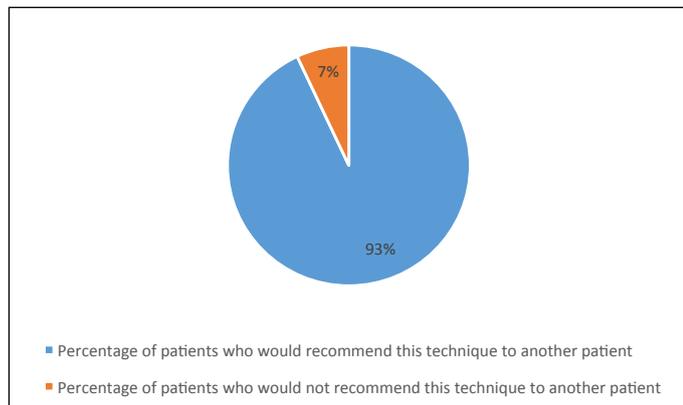
**Figure 6 - the number of patients undertaking surgical and non-surgical extractions who reported that the visual mental imagery helped them feel more relaxed during their respective procedures.**



**Figure 7 - Bar chart showing number of patients who scored the helpfulness of this technique a value of 1-5, 1 = didn't help at all, 5 = helped a lot**



**Figure 8 - Percentage of patients who would recommend the visual mental imagery technique to another patient**



## Discussion

The primary aim of this study was to investigate whether the use of visual mental imagery impacted patients emotions during oral surgery extractions by making them feel more relaxed. A beach was chosen by the authors as a standardised image and place of relaxation. Although subjective, the authors selected this image to standardise the study and allow the use of the same image and script for every patient. In a pilot study, we found that patients were unable to self-select and vividly imagine a place they found personally relaxing and therefore a standardised image of a beach was used for every patient.

The technique used involved guided imagery to enable the patient to visualise themselves in the image displayed on the digital screen of a tablet showing a beach at sunset (figure 1). Most patients liked the idea of imagining the dental chair as the hammock in the image displayed. The script helped the patient to further build up a vivid image in their minds by triggering them to think about what sounds they would be hearing (such as the waves crashing against the beach), the sensations around them and who would they be with in such a place. Patients who had previously been to a beach holiday may have been able to imagine the scene more easily and vividly.

Patients due to undertake oral surgery dental extraction procedures were selected to take part in this study as opposed to patients receiving general dental conservative treatment. The reason for this was patients due to have dental extraction procedures were having treatment which is usually relatively invasive involving the use of local anaesthetic administration via the use of a needle. It also involves dental instruments such as elevators and forceps. These factors can all contribute to patient anxiety and so therefore the authors felt that the study would be more effective in a department which involved more anxiety provoking procedures.

From the results we can gather that the technique used in this study was successful and that the image displayed to the patients did help the majority of patients feel more relaxed during the procedure. However, the results of this study may be limited given the small number of participants in this study. Also, it should be noted that although 60% patients reported that the oral surgery

appointment involving the use of visual mental imagery was more pleasant than previous extractions, this could be due to a number of factors. These factors include; the possibility that their previous dental extractions were generally more difficult, or that more teeth were involved, or it may possibly have been a surgical extraction as opposed to a non-surgical extraction.

The study was kept as standardised as possible. The study involved only experienced clinicians performing the extraction and the same person reading the script out to the patient.

A few limitations were identified during the process of carrying out the study. Firstly, the image of the beach (figure 1) as part of the visual mental imagery technique could have been brighter. The silhouette images of palm trees and a hammock in the image used with the orange colours of the sky in the background may have elicited a different range of emotions compared to other colours. For example, the colour red is related to words such as exciting and stimulating. Orange is usually linked to words such as 'distressed'. On the other hand, the colour blue is linked to being secure/comfortable or even soothing, which would make the use of more blues in the image more suitable for this study, especially for patients who are anxious during dental procedures.<sup>9</sup> One of the main limitations identified is the time for the patient to visualise themselves in the relaxing environment set by the image displayed. The time for the patient to look at the image, listen to the script and finally imagine themselves within the scenery of the image was a fixed time of one minute for every patient. This was to ensure that the appointment would not be significantly longer, which may delay dentists with the rest of their appointment schedules.

The ideal study would include a control group, therefore making a better comparison between a test group and a control who would receive no intervention i.e a blank white sheet of paper, and the other receiving visual mental imagery in terms of a relaxing picture. A study by Gonzales et al involved 44 adults randomly assigned into two groups, one being the control and the other listening to a guided imagery compact-disk (CD), both receiving privacy for 28 minutes, which is a considerable amount of time for one to visualise themselves in a relaxing scene set by the CD.<sup>10</sup> Overall, the outcome of the study by Gonzales et al showed that guided imagery can significantly reduce pre-operative anxiety in patients before surgery. Similarly, the results of this study completed at the Birmingham Dental Hospital, although not showing a reduction in pre-operative anxiety show that the use of visual mental imagery can help patients to feel more relaxed during invasive oral surgery dental extraction procedures.

Despite the fact that the literature regarding guided imagery and other similar relaxation techniques have been shown to reduce anxiety levels within patients, the use of visual mental imagery or guided imagery is still not used widely among dentists or other healthcare professionals. CBT may involve the use of guided imagery, but this is usually a separate form of therapy outside of the dental surgery. Guided imagery is easy to learn and use in practice by dentists and even can be performed through the use of audio recordings.<sup>4,10</sup> It is worth appreciating the great benefit of this technique for helping patients to relax during invasive procedures.

## Conclusion

The use of visual mental imagery does have a positive effect on patients' relaxation during oral surgery dental extraction procedures, but the significance of this result is questionable due to the small number of participants included in this study. We now know that visual imagery can impact one's emotional state and in our study, in a helpful way. Females were found to more likely benefit from visual mental imagery compared to males. This study has shown that this technique has potential in the future to help anxious patients feel more relaxed during treatment and therefore may help to lessen their feelings of fear during dental procedures. Visual mental imagery is a useful tool in a dentist's armamentarium in managing patient dental anxiety and can be used to help patients relax by keeping them focussed on a positive image, thus distracting them from their dental fears, allowing treatment to commence.

## References

1. Access and barriers to care- a report from the Adult Dental Health Survey 2009. Leeds: The Health and Social Care Information Centre. 2011.
2. Karnad MP. Dental anxiety--how would you manage it? SAAD Digest. 2015; 31:26-31.
3. Holroyd I. Intercollegiate advisory committee for sedation in dentistry: review of the guidelines published in 2015. Dental Update. 2015; 42:704-8.
4. Appukuttan D P. Strategies to manage patients with dental anxiety and dental phobia: literature review. Clin Cosmet Investig Dent 2016; 8:35-50.
5. Holmes E A, Mathews A, Mackintosh B, Dalgleish T. The causal effect of mental imagery on emotion assessed using image-word cues. Emotion 2008; 8: 395-409.
6. Clark I A, James E L, Iyadurai L, Holmes E A. Mental imagery in psychopathology: from the lab to the clinic. In Clinical Perspectives on Autobiographical Memory. pp 133-153. Cambridge: Cambridge University Press, 2015.
7. Fox C, Newton JT. A controlled trial of the impact of exposure to positive images of dentistry on anticipatory dental fear in children. Community dentistry and oral epidemiology. 2006; 34: 455-9.
8. Maltz M. Psycho-cybernetics. United Kingdom: Simon & Schuster; 1994.
9. Wexner, L B. The degree to which colors (hues) are associated with mood-tones. J Appl Psychol 1954; 38: 432-435.
10. Gonzales E A, Ledesma R J, McAllister D J, Perry S M, Dyer C A, Maye J P. Effects of guided imagery on postoperative outcomes in patients undergoing same-day surgical procedures: a randomized, single-blind study. J Am Assoc Nurse Anesth 2010; 78: 181-188.



## CONTACT DETAILS

**Fiona Trimingham 01302 846 149 • [info@saad.org.uk](mailto:info@saad.org.uk)**

Executive Secretary & Webmaster

Course enquiries, payments, cancellations and deferrals

Membership and website enquiries

SAS, SASN and SAST schemes

**Toni Richman 07583 039 309 • [toni@saad.org.uk](mailto:toni@saad.org.uk)**

Course Administrator

Course weekend logistics

**Emma Lee • [emma@saad.org.uk](mailto:emma@saad.org.uk)**

SAAD Assessed Sedation Nurse (SASN) scheme Co-ordinator

SAAD, 21 Portland Place, London W1B 1PY

01302 846 149 • [info@saad.org.uk](mailto:info@saad.org.uk)

# Conscious sedation for dentistry and barriers in Singapore - a questionnaire on safety perceptions

**G X David Lim BDS MSc Spec care D PG Dip Con Sed D MFDS RCS**

*Dental Surgeon, Tzu Chi Singapore Free Clinic*

*Visiting Clinician, Geriatrics and Special Care Dental Centre, National Dental Centre Singapore*

*Adjunct Lecturer, Nanyang Polytechnic Oral Health Therapy*

**S C Bertrand Chew BDS FRACDS MDS FAMS**

*Consultant in Oral Surgery, Ng Teng Fong Hospital Jurong Health Campus*

*Consultant Jurong Medical Centre Dental Service*

*Senior Visiting Specialist Singapore Armed Forces Military Medicine Institute*

*Clinical Lecturer National University of Singapore, Faculty of Dentistry*

*Associate Staff National University Health System, Dental Clinic 2*

## Correspondence to:

*davidlimcare@gmail.com*

## Abstract

**Background:** Even in the tertiary dental services Singapore dentists seldom provide conscious sedation to patients with special care needs. A perception of poor safety due to a lack of training in sedation is listed as one reason. This questionnaire aims to investigate if basic education could improve the safety perception of conscious sedation in Singapore.

**Method:** A lecture presentation on "Consciousness in Dental Sedation" was given to Singapore oral health professionals. The lecture defined the scope of conscious sedation and discussed cases. Surveys were issued immediately after the lecture and collected.

**Results:** 43 surveys were collected of which 39 were valid. The participants comprised 61.5% oral health therapists, and 38.5% dentists. Of these, 94.5% had no previous exposure to conscious sedation. Safety perception of conscious sedation improved for 59.5% of individuals, while none changed negatively. The Wilcoxon test concluded that the difference between the median safety scores before and after the lecture were statistically significant ( $p=0$ ), and the mean difference in median scores improved by a value of 1.55 out of 5.

**Conclusions:** Safety perception of conscious sedation improved following education. There are still multiple barriers preventing its integration and widespread use in Singapore.

## Introduction

In the 1980s and 1990s, a few high-profile cases in the US of mismanaged sedation increased malpractice insurance premiums<sup>1,2</sup> and inevitably discouraged dentists from practising conscious sedation (CS). In Singapore, dentists are trained to manage patients with local anaesthesia (LA), whilst general anaesthesia (GA) is performed by anaesthetists and is reserved for oral surgery procedures. The administration of conscious sedation by dentists is sporadic, and even lacking in tertiary dental institutions treating patients with special care needs (PSCN). Sedation is limited to inhalation sedation with nitrous oxide and undertaken by paediatric dentists. An anaesthesiologist is often called upon to administer 'deep sedation' or GA in the private and public sectors.

The refinement of techniques over recent decades has raised the safety profile of CS,<sup>2,3</sup> suggesting it might be more hazardous to practise dentistry for certain groups of patients without any form of pharmacological anxiolysis or sedation.<sup>4</sup> Recently, a dedicated CS service in Singapore has been proposed to benefit dental patients with anxiety and those with special care needs.<sup>5</sup>

When a PSCN has difficulty co-operating, either GA or chair-side restraint is considered. Whilst GA is shown to carry a low risk of morbidity for people with disabilities, many considerations for PSCN exist. These include fasting protocols, recovery procedures, consent issues, and financial barriers.<sup>6,7</sup> This demands a detailed individual assessment and risk-benefit analysis.<sup>7-9</sup> Often in Singapore, physical restraint is employed for those who do not qualify for GA. This contravenes human rights, according to the United Nations Convention on the Rights of Persons with Disabilities (UNCPRD) and the "least restrictive" principle pursuant to the Mental Capacity Act (MCA).<sup>10-12</sup> Extensive physical restraint is also counter-productive. Factors to be considered include:

- physical trauma
- risk of anxiety-induced emergencies (acute coronary syndromes, adrenal crisis, asthmatic attack, seizures, and stroke)
- psychological trauma
- injury to healthcare staff,
- difficulty in execution of satisfactory dentistry, and
- unpredictable outcomes of dental visits<sup>4,5,7-9</sup>

The above reasons justify the use of CS, yet its uptake among Singapore oral health professionals is very low, making it important to investigate their attitudes to CS, and to see if they can be improved. Whilst views and opinions of dental sedation amongst dentists and anaesthetists have been investigated internationally, no such studies have previously been done in Singapore.<sup>13-18</sup>

## Aims and Objectives

This study investigated the safety perception of CS among Singapore oral health professionals, and whether this could be improved with education. If safety perception were improved, might this raise its acceptability, and generate a local interest to learn more about CS?

## Methods

A one hour lecture on the basics of CS, titled “Consciousness in Dental Sedation”, was prepared for an audience of over 50 oral health professionals. It emphasised the range of CS techniques, with case discussions and videos that simulated exposure to clinical applications. The topics included:

1. Introduction and definition of CS
2. Methods for management of co-operation and anxiety
3. Importance of managing anxiety and related emergencies
4. Conscious sedation versus GA
5. Inhalation sedation with case-based discussion
6. Oral sedation with case-based discussion
7. Intravenous sedation with case-based discussion
8. Ketamine sedation with case-based discussion
9. Intra-nasal sedation with case-based discussion
10. Ministry of Health (Singapore) guidelines on conscious sedation for non-anesthesiologists
11. International guidelines, policies or documents on dental sedation
12. References, Q&A and contacts

Questionnaires were handed out afterwards and collected after completion. The Lecture was delivered at the 6th Medical Alumni Dental Continuing Education Program organised by the Alumni Association (Singapore) in October 2017.

The questionnaire consisted of six questions reflecting professional demographics, previous exposure to CS, safety perceptions, interest in learning more, and patient demographics (refer to Appendix 1).

Permission to conduct this survey was granted by the Organising Chairman and the Medical Alumni Association Executive Committee. The audience were informed at the start regarding an optional post-lecture survey. There was also an option to withhold consent for the use of data in research.

## Results

A total of 43 forms were collected, of which four withheld consent. Of the remaining 39 valid forms, three participants did not answer all the questions.

### Question 1

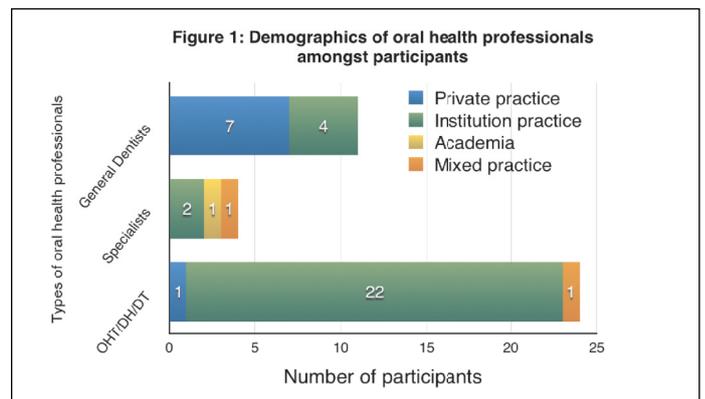
The demographics of the 39 health care professionals included 11 (28.2%) general dental practitioners, four (10.3%) dental specialists, and 24 (61.5%) oral health therapists, dental therapists or dental hygienists (OHT/DT/DH). This was further divided into practice sectors: eight were in private care, 28 in institutions, one in academia, and two in mixed practices (working in a mix of private practice, institutions and/or academia). There were no non-dental participants. The details are shown in Figure 1.

### Question 2

Only two out of 39 participants had prior exposure to the use of CS in their current practice. One used midazolam, the other ketamine and inhalation sedation.

### Questions 3 & 4

The perceived safety score of CS was rated on an ordinal scale of 1

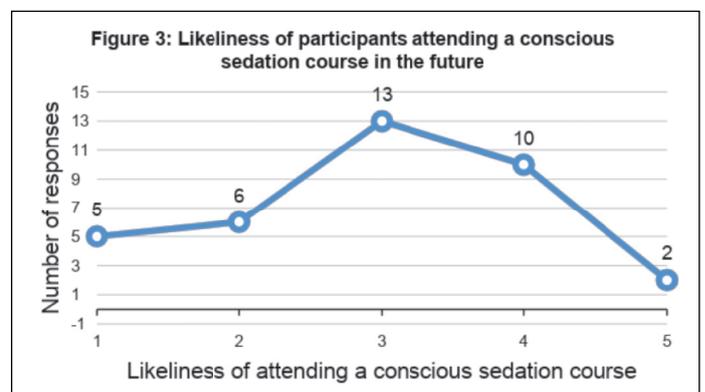


to 5: from “very low” (score 1) to “very high” (score 5). The “before lecture” safety scores awarded ranged from 1 to 5, and had a mode and median of score 3. The “after lecture” scores ranged from 3 to 5, with a mode and median of 4. Thirty seven out of 39 responded to questions three and four. The details are shown in Figure 2.



### Question 5

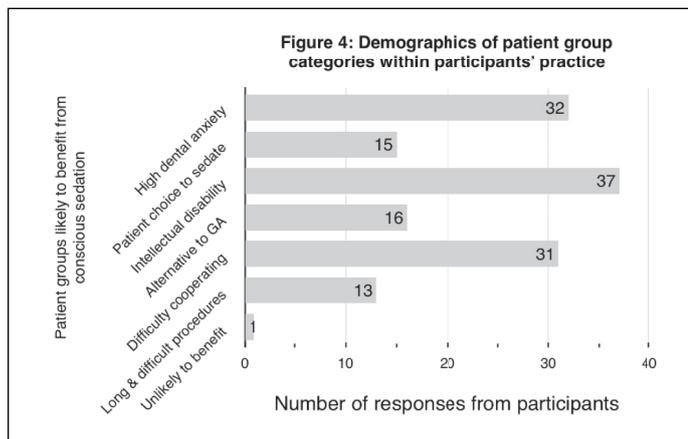
The likeliness of attending a local certified course for “CS in dentistry” was scored on a scale of 1 to 5: from “very unlikely” (score 1), to “surely” (score 5). Thirty six participants responded, with the scores ranging from one to five, with the mode and median scores of three. The details are shown in Figure 3.



### Question 6

This question offered eight groups of dental patients that would benefit from CS in the participants’ practice. More than one group

could be chosen. All 39 participants responded, with a total of 145 patient groups chosen. The results are shown in Figure 4.



## Discussion

### Use of Conscious Sedation in dentistry in Singapore

Most participants (94.9%) did not have any exposure or access to CS in their practice. Despite this, almost all participants reported that patients they treat would benefit (see Figure 4), especially those with intellectual (learning) disabilities (seen by 94.9% of responders), dental anxiety (82.1%) and difficulty co-operating (79.5%). The two participants who had exposure or access to CS are dental specialists, although it is unknown if they personally administered it. No general dentists from the survey had exposure or access, and this is much lower compared with dentists from other established healthcare systems. For example, in various parts of UK, the use of sedation by primary care dentists ranged from 12.1% to 42%.<sup>13,14,18</sup> Another explanation of the low figure was that most of the participants (61.5%) were OHT/DT/DHs.

In Singapore, when sedation is required, dentists are often dependent on anaesthetists. However, dentists are permitted to administer midazolam CS.<sup>19</sup> Propofol sedation by dentists is not allowed. The Ministry of Health (Singapore) guidelines did not specify the dental use of other sedative agents including ketamine, dexmedetomidine, sevoflurane, and combination techniques,<sup>5,19,20</sup> they have, however, occasionally been used. Dexmedetomidine has been proposed as an alternative to IV midazolam in third molar surgery by oral surgeons in a Singapore clinical trial.<sup>20</sup> Meanwhile as many as 54.4% of all IV and intramuscular ketamine sedation episodes were for paediatric laceration (mostly orofacial) repairs, and carried out mainly by dentists, within Singapore emergency departments.<sup>21</sup>

Administration of nitrous oxide by OHT/DT/DHs in Singapore is not endorsed under the Dental Registration Act, unlike the UK, US or Australia.<sup>22-25</sup> Despite this, OHT/DT/DHs are seeing a high volume of school age children and adolescents. Up to 17.7% of Singaporean school children experience high levels of dental anxiety, compromising optimal oral healthcare.<sup>26</sup> Clearly, a referral system for CS services should be established. Another possibility would be to expand OHT/DT/DHs' work scopes since they have a great impact on oral health promotion in Singapore, and are often the first oral health professional seen by children.<sup>22,27</sup>

### Changes in Perceptions Before and After

Following the lecture, median (and mode) of safety perception increased from 3 to 4. Whilst this appears to be short of score 5, CS does carry a risk, as does any form of drug administration including LA. Studies on dentist-administered conscious sedation have reported minor complication rates of 0.5% to 3% for single-drug sedation, and from 1.4% to 10.2% for multi-drug sedation.<sup>28</sup> A large-scale UK audit of 1756 CS cases reported minor complication rates of 2.3%.<sup>29</sup> These included desaturation, paradoxical reaction, tolerance, bradycardia or tachycardia. Under the National Patient Safety Agency definitions, these are "no harm" or "low harm".<sup>29</sup> Whilst modern CS has a safe and predictable outcome, competent training is the foundation to safety. With such, a score of 4 may indicate a more realistic understanding.

A pre and post analysis was done where each participant served as their own control, and the statistical unit of analysis was the difference in the score before and after the lecture. This was done because comparing score changes within individuals might be a stronger indicator of effect, than, say, comparing the changes in a generalised score such as the mode or median. For example, an increase in score of 3 to 4 for one participant might mean a different magnitude of change compared to the decrease of 4 to 3 for another.

This analysis showed that 22 participants' scores improved (59.5% gained at least 1 point after the lecture), 15 remained unchanged (40.5% had same scores after the lecture), none had reduced. 13 participants already had scores of 4 or 5 prior to the lecture and were unlikely to further increase. The non-parametric Wilcoxon-Signed Rank (matched pairs) test was performed, since the scores are matched (or dependent) variables, with a two-tailed significance level of 5%. The null hypothesis being: there is no difference between the median of before and after scores.

The Wilcoxon test concluded that post-lecture safety perception scores were statistically different from pre-lecture safety perception scores ( $Z = -4.11$ ,  $p < 0.05$ ). The paired results of 37 participants produced a sample size of 22. The mean difference in median was an improved safety score of 1.55. Since there were no decrease in safety scores after the talk, the W-value, thus p-value, is zero (see Table 1).

**Table 1: Result details of Wilcoxon matched pair test for pre and post-lecture safety perception scores**

Sample Size (N):	22
W-value:	0
Mean difference:	-1.55
Sum of positive ranks:	0
Sum of negative ranks:	253
Z-value:	-4.1069
Mean (W):	126
Standard deviation (W):	30.8

### Limited Interest for Learning Conscious Sedation

Only 12 out of 36 (33.3%) responded with a positive enthusiasm (score 4 or 5) to attend an accredited sedation course, despite the substantial shift in safety perception scores (see Figure 2) and treating a variety of patients who needed CS (see Figure 4). Although 61.5% of participants were OHT/DT/DHs and were less likely to attend courses out of their approved work scope, a

handful of them expressed interest in learning. Studies exploring barriers that impede the acceptance of CS suggested these factors:<sup>13-17</sup>

1. No access to adequate training of (dentistry specific) CS regionally. There is no training as such within Singapore's undergraduate and postgraduate dental curricula.<sup>5</sup>
2. Avoidance of medico-legal liabilities related to conscious sedation.<sup>13-15</sup> Although the anaesthetists' fees for sedation or GA is around S\$800 (~£450) per hour, employing their services allowed the transfer of liability and overhead costs.
3. Differing view of anaesthetists on dental sedation.<sup>16,17</sup>
4. Significant operational, indemnity and training costs.<sup>13-15</sup> A registered nurse is also required to perform monitoring for "moderate" sedation according to the Ministry's guidelines, hence contributing to further costs.<sup>19</sup>
5. Low acceptance of sedation in dental patients. A lower "willingness-to-pay" for dental services was reported for Singaporeans with lower Oral Health-related Quality of Life.<sup>30</sup> This potentially reflects a low "willingness-to-pay" for conscious sedation services particularly in those who need it.<sup>30</sup> On top of this, physical restraint had previously been accepted as a model of care for PSCN, even by their families. While this is changing in the face of UNCRPD, currently implemented through the SG Enabling Masterplan of 2016, poor perceptions are still nourished by news sensationalising adverse outcomes.<sup>1,2,7,32</sup> This description was picked up in a Scottish news report addressing dental anxiety, "*pop legend Michael Jackson died after an overdose of fast-acting sedative Propofol which is often used in dental procedures*"<sup>31</sup>
6. Inertia from dentists themselves. Poor safety perception of conscious sedation amongst Singapore dentists exist. This can be improved with training, as suggested in this study. Another perception to be changed is that conscious sedation can be profitable and efficient. If this service is rarely provided, few patients will demand it and many may acquiesce to accepting sub-optimal care.

These hypotheses of barriers seek to explain the lukewarm interest. However, targeted research involving surveys or qualitative studies may be required to establish these propositions.

## Limitations

A large majority of responders (61.5%) are OHT/DT/DHs who might have differing views on CS compared to dentists. The convenient (non-randomised) sample of 39 responders is also hopefully able to represent the views of over 2000 dentists and 400 OHT/DT/DHs in Singapore.

It is possible that the participants who attended the lecture could already have had a vested interest in CS services, and might not reflect the perception of the masses. This suggestion tallies with the large proportion (94.9%) who saw patients with intellectual disabilities in their place of work. However, the pre and post analysis ought to negate this by comparing changes, rather than a single result from preconceived perceptions.

## Conclusions

Education through a lecture, effectively improved the safety perception of CS in dentistry. However, this does not apparently

translate to higher acceptability or an interest to learn. Multiple factors at play hinder Singapore dentists from integrating and executing CS. Further fact-finding research is required to identify and address these factors.

Team training, facilities, emergency preparedness, and care pathways are required to complete a conscious sedation service.<sup>23</sup> These are steps that some countries have taken.<sup>33</sup> In conjunction with this, putting together a multi-disciplinary team of experts to formulate a Singapore-based recommendation on conscious sedation for dentistry will ally divided opinions.<sup>16,17</sup> Singapore dental professionals should capitalise on conscious sedation to reform patient care in recognition that disabilities and anxiety are potent barriers to oral healthcare.

## Declaration and conflict of interests

The authors do not represent any product or brands and have no financial interest in this article. Hence, there is no conflict of interest.

## Acknowledgements

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## References

1. MacDonnell W A. Dentist Anesthesiologists. Alpha Omegan 2006; 99:67-69.
2. Malamed S F. Sedation and safety: 36 years of perspective. Alpha Omegan 2006; 99: 70-74.
3. Craig D C, Boyle C. Practical Conscious Sedation. 2nd ed. London: Quintessence Publishing Co. Ltd, 2017.
4. Robb N D. Sedation in practice. 4: The use of sedation for the medically compromised patient. Dent Update 1997; 24: 54-59.
5. Ong K S, Tan J M, Chong W L, Yeo J F, Lee T L. Use of sedation in dentistry. Singapore Dent J 2000; 23: 14-7.
6. Enever G, Nunn J, Sheehan J. A comparison of post-operative morbidity following outpatient dental care under general anaesthesia in paediatric patients with and without disabilities. Int J Paediatr Dent 2008; 10: 120-125.
7. Scully C, Dios P D, Kumar N. Special Care In Dentistry Handbook Of Oral Healthcare. 1st ed. Edinburgh: Churchill Livingstone/Elsevier, 2009.
8. Scully C. Handbook of Medical Problems in Dentistry. 9th ed. London: Elsevier Health Sciences, 2016.
9. Messieha Z. Risks of general anesthesia for the special needs dental patient. Spec Care Dentist 2009; 29: 21-25.
10. United Nations Convention on the Rights of Persons with Disabilities. United Nations: UN CRPD Committee, 2006.
11. Mental Capacity Act - Chapter 177A. Singapore: Singapore Statutes, 2008.
12. Mental Capacity Act - Chapter 9. United Kingdom: UK Legislation, 2005.
13. Whiston S, Prendergast M J, Williams S A. Sedation in primary dental care: an investigation in two districts of northern England. Br Dent J 1998; 184: 390-393.
14. Foley J. The way forward for dental sedation and primary care? Br Dent J 2002; 193: 161-164.
15. Johnson C, Weber-Gasparoni K, Slayton R L, Qian F. Conscious sedation attitudes and perceptions: a survey of American Academy of Pediatric Dentistry members. Pediatr Dent 2012; 34: 132-7.
16. Shearer J, Wilson K E, Girdler N M. A survey of the opinions of consultant anaesthetists in Scotland of sedation carried out by dentists. Br Dent J 2004; 196: 93-98.
17. Costa P S, Valadao W J Jr, Costa L R. Dental Sedation by Dentists: A View From Anesthesiologists Working in Central Western Brazil. Anesth & Analg 2010; 110: 110-114.

18. Chadwick B L, Thompson S, Treasure E T. Sedation in Wales: a questionnaire. *Br Dent J* 2006; 201: 453-456.
19. Guidelines on Safe Sedation Practice for Non-Anaesthesiologists in Medical Clinics. Singapore: Ministry of Health, 2014.
20. Fan T W, Ti L K, Islam I. Comparison of dexmedetomidine and midazolam for conscious sedation in dental surgery monitored by bispectral index. *Br J Oral Maxillofac Surg* 2013; 51: 428-433.
21. Ng K C, Ang S Y. Sedation with ketamine for paediatric procedures in the emergency department—a review of 500 cases. *Singapore Med J* 2002; 43: 300-304.
22. Dental Registration Act - Chapter 76. Singapore: Singapore Statutes, 2009.
23. Scottish Dental Clinical Effectiveness Programme. Conscious Sedation in Dentistry - A Clinical Guidance. 2017. Online information available at [www.sdcep.org.uk/wp-content/uploads/2017/07/SDCEP-Conscious-Sedation-Guidance.pdf](http://www.sdcep.org.uk/wp-content/uploads/2017/07/SDCEP-Conscious-Sedation-Guidance.pdf) (accessed April 2018).
24. American Dental Hygienist's Association Council. Dental Hygiene Practice Act Overview: Permitted Functions and Supervision Levels by State. 2017. Online information available at [www.adha.org/resources-docs/7511\\_Permitted\\_Services\\_Supervision\\_Levels\\_by\\_State.pdf](http://www.adha.org/resources-docs/7511_Permitted_Services_Supervision_Levels_by_State.pdf) (accessed April 2018).
25. Australian Dental and Oral Health Therapists' Association. Who can administer nitrous oxide for relative analgesia. 2016. Online information available at [www.adohta.net.au/files/uploads/8c0ff\\_9f7eb\\_160128\\_Who\\_can\\_administer\\_nitrous\\_oxide\\_for\\_relative\\_analgesia.pdf](http://www.adohta.net.au/files/uploads/8c0ff_9f7eb_160128_Who_can_administer_nitrous_oxide_for_relative_analgesia.pdf) (accessed April 2018).
26. Chellappah N K, Vignehsa H, Milgrom P, Lam L G. Prevalence of dental anxiety and fear in children in Singapore. *Comm Dent & Oral Epidemiol* 1990; 18: 269-271.
27. Lee A G, Seah F, Chen L L, Rahmat N A B, Le J T J. Public awareness and knowledge of the oral health therapy profession in Singapore. *Annual Clin J Dent Health* 2018; 6: 26-31.
28. Saiso K, Adnonla P, Munsil J, Apipan B, Rummasak D, Wongsirichat N. Complications associated with intravenous midazolam and fentanyl sedation in patients undergoing minor oral surgery. *J Dent Anesth Pain Med* 2017; 17: 199-204.
29. Jones S. Audit of Conscious Sedation Provision in a Salaried Dental Service. *SAAD Digest* 2016; 32: 37-40.
30. Nair R, Yee R. Differences in willingness to pay for an extraction, a filling, and cleaning teeth at various levels of oral health-related quality of life, as measured by oral impacts on daily performance, among older adults in Singapore. *Singapore Dent J* 2016; 37: 2-8.
31. Deadline News Agency. More Scots dental patients opt for sedation when faced with the dentist's chair. 2013. Online information available at [www.deadlinenews.co.uk/2013/01/16/more-scots-dental-patients-say-i-wanna-be-sedated](http://www.deadlinenews.co.uk/2013/01/16/more-scots-dental-patients-say-i-wanna-be-sedated) (accessed April 2018).
32. Association of South East Asian Nations. ASEAN Disability Forum - Singapore. 2009. Online information available at [aseandisabilityforum.org/digalari](http://aseandisabilityforum.org/digalari) (accessed April 2018).
33. Hamzah S Z, Koburunga S, Dickinson C. Care Settings in Conscious Sedation for Dentistry: What is Required? - A Literature Review. *Malaysian Dent J* 2016, 39: 45-80.

## Appendices

### Appendix 1: Feedback survey form

*Feedback Survey*

**6th Medical Alumni Seminar**  
**CONSCIOUSNESS IN DENTAL SEDATION**

**Feedback Survey**

---

Dear Participant,

Thank you for attending the above mentioned talk and taking the time to answer the following questions:

- Which of the following best describe your work scope? (Tick in the appropriate box, or boxes, that applies)

	Private Practice	Institution Practice	Academia	Others (Please specify)
General Dental Practitioner				
Dental Specialist Please specify:				
Oral Health Therapist (or DT/DH)				
Healthcare Professionals (non-dental)				
Others Please specify:				

- Have you had exposure to any form of conscious sedation in your current practice? (Yes / No)\*  
If yes, please specify the type(s): \_\_\_\_\_
- Before this session, how SAFE do you rate conscious sedation? (Circle the number)

Very low Very high

←—————→

1      2      3      4      5

Page 1 of 2

*Feedback Survey*

- After this session, how SAFE would you rate conscious sedation? (Circle the number)

Very low Very high

←—————→

1      2      3      4      5

- If there is a course/certification for **conscious sedation in dentistry** held in Singapore, how likely are you to attend? (Circle the number)

Very unlikely Surely

←—————→

1      2      3      4      5

- Which group of patients within your practice can stand to benefit from conscious sedation?

**Tick in the circle(s) that apply**

<input type="radio"/> Patients with <b>high dental anxiety</b>	<input type="radio"/> Patients who <b>chose to be treated under sedation</b>
<input type="radio"/> Patients with <b>intellectual disability</b>	<input type="radio"/> Patients who used to be treated under GA can have an <b>alternative option</b> of sedation
<input type="radio"/> Patients who have <b>difficulty cooperating</b>	<input type="radio"/> Patients who undergo <b>long difficult procedures</b> (e.g. removal of all wisdom teeth)
<input type="radio"/> My patients will <b>NOT likely benefit</b>	<input type="radio"/> <b>Others:</b> _____

Please let us know if you have any comments or suggestions to improve the CDE:  
 \_\_\_\_\_  
 \_\_\_\_\_

Email (optional) : \_\_\_\_\_

*We may use the information from this survey to inform you of further CDE, or collated for research purposes. Your contribution will remain strictly confidential.*

Tick here if you wish to opt out **THANK YOU**

Page 2 of 2

## An audit to assess the quality of pre-assessment for patients undergoing oral surgery under intravenous sedation

**Ammi Suchak BDS MFDS**

*Senior House Officer, Oral Surgery, Eastman Dental Hospital*

**Ambareen Naqvi BDS MJDFRCS**

*Specialty Registrar in Oral Surgery, Eastman Dental Hospital*

**Mehri Eghtessad LDS RCS MSc (Oral Surg)**

*Speciality Doctor in Oral Surgery, Eastman Dental Hospital*

### Correspondence address:

*ammi.suchak@nhs.net*

### Abstract

Intravenous sedation is commonly used in oral surgery to enable treatment to be carried out where local anaesthetic alone would not be possible. However, since it takes up more clinical time and cost a complete and thorough pre-assessment is imperative.

Audits are carried out to review clinical outcomes and to ensure that a high level of safety and continuing improvement in quality is maintained in order to enhance patient safety and improve the quality of care. It is particularly important that Sedation services are included within such audits.<sup>1</sup>

The aim of this audit was to assess the quality of the pre-assessment for patients undergoing oral surgery under Intravenous Sedation, to assess any failures and to develop recommendations that could reduce any cost implications. Two complete audit cycles were undertaken in order to assess if appropriate referrals were made to sedation clinics within Eastman Dental Hospital. Recommendations of a pre-assessment checklist were implemented between the cycles and data was collected and compared to see if this checklist improved information gathering.

Our results have shown an improvement from 42% completion of the checklist, to 80% in the second cycle. Failures were mainly due to inability to gain venous access. A reduction has been seen in failure of appointments due to implementation of the checklist, therefore increasing clinical efficiency, reducing both waiting times and costs. However, there is still room for further action such as venous access training for staff.

### Introduction

Intravenous sedation can be defined as 'a technique in which the use of a drug or drugs produces a state of depression of the nervous system, enabling treatment to be carried out, but during which verbal contact with the patient is maintained. The drugs and techniques used should carry a wide safety margin rendering loss of consciousness unlikely'.<sup>2</sup>

Intravenous sedation is most commonly used for patients who have severe dental anxiety, traumatic dental procedures or medical conditions in which anxiety is undesirable.<sup>3</sup> Within the oral surgery department at Eastman Dental Hospital, a single drug technique is used to help these patients.

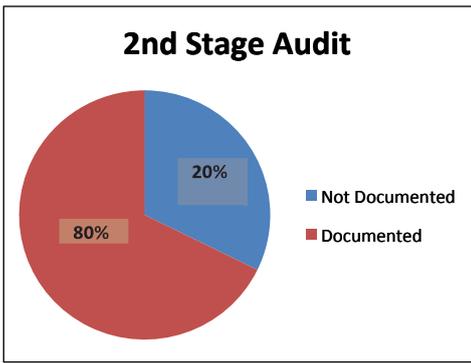
Following the publication of 'A Conscious Decision' in 2000, which cited 8 deaths in dental practices from 1996 – 1999, there has been a ban of general anaesthetics in primary dental care since January 2002.<sup>4</sup> However, in the UK, titrated intravenous midazolam has an excellent safety record. For many patients, conscious sedation combined with local anaesthetic is an acceptable alternative to general anaesthetic.<sup>5</sup>

Within the oral surgery department at Eastman Dental Hospital, there are 14 Intravenous sedation appointments per week, undertaken by SHOs, post-graduate students and registrars. Each appointment is 45 minutes long. Due to its popularity and reduced availability of clinics, the waiting list for sedation appointments is longer than local anaesthetic appointments alone. Hence, trying to ensure that there are reductions in failures of sedation appointments is highly important.

Consideration of the patient pathway is important, in order to try and identify which anaesthetic procedure is most suitable and safe for the patient. It is here, where the pre-assessment for sedation appointments is of particular importance. Patients attend new patient clinics where their anxieties about the treatment and modality of treatment is discussed. Patients are helped to decide whether they would like their care undertaken under local anaesthetic alone, intravenous sedation or general anaesthetic. Risks and benefits of each option are discussed so that the patient can make an informed decision.<sup>6</sup> If intravenous sedation is chosen, further information is required:

1. Justification of procedure – Why is intravenous sedation suitable for this patient?
2. Blood Pressure – Midazolam has an effect in reducing the blood pressure and heart rate and therefore the 'normal' for the patient needs to be known.
3. Heart Rate.
4. ASA Grade – to determine if an outpatient setting is the safest setting for these patients or whether they need more specialised care at the main hospital site, under a Consultant anaesthetist.
5. Venous access assessment – to determine if venous access is possible.
6. Availability and Suitability of Escorts – to ensure patients have an English-speaking escort above the age of 18 yrs old who can bring them to the appointment, take them home, and look after them post-procedure.

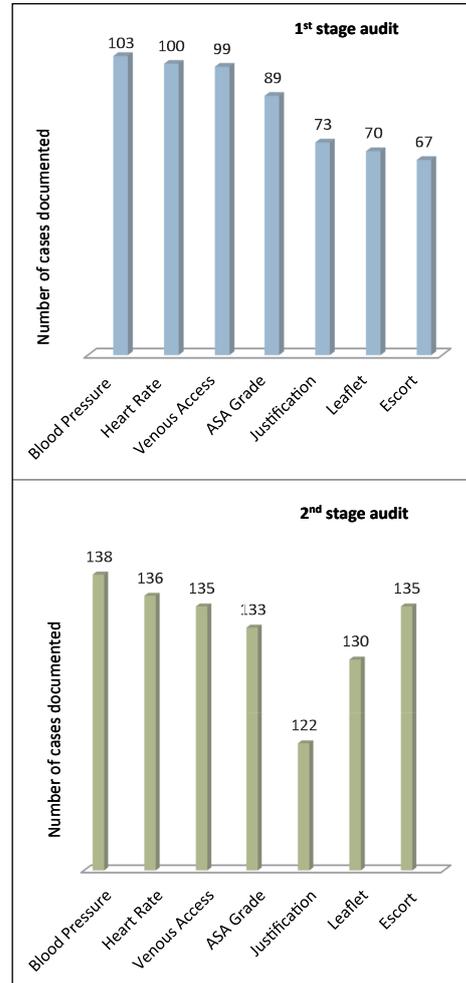




Failed intravenous appointments were due to a number of reasons. Of the 13 failures, the most common reason was failure to gain venous access (4 patients – 31%). On the day of the procedure, 3 patients changed their minds and declined sedation and chose to have their treatment completed under local anaesthetic alone (23%). These cases were completed successfully. Two patients were booked onto the wrong clinic and were therefore rebooked onto the correct clinics (15%). One patient was unco-operative and the procedure was completed under general anaesthetic (7%). One patient attended without an escort and was rebooked when an escort was available (7%). One patient attended with an inappropriate escort (a child) and was also rebooked, in which the patient attended with an appropriate escort. One patient was consistently hypertensive throughout the procedure, and therefore it was unsafe to continue at that appointment (7%). This patient was later rebooked on a sedation clinic once this had been investigated further by their General Medical Practitioner (7%).

Regarding the pre-assessment points, some points were more commonly missed out than others. After the implementation of the checklist, fewer leaflets and discussion of an escort were missed out. Initially in only 63%, documentation of an escort was noted, however, in the 2nd cycle, this increased to 95%. However, the most commonly missed out point was the justification for use of sedation, where 21 patients were not documented (Figure 3).

**Figure 3 - Documentation of each type of 7 pre-assessment points between audit cycles**



Out of 7 points, in the majority of cases, usually one point was missed out. Within the first cycle, 3 patients were booked for



## Symposium & AGM 2019

**Saturday 28 September 2019**

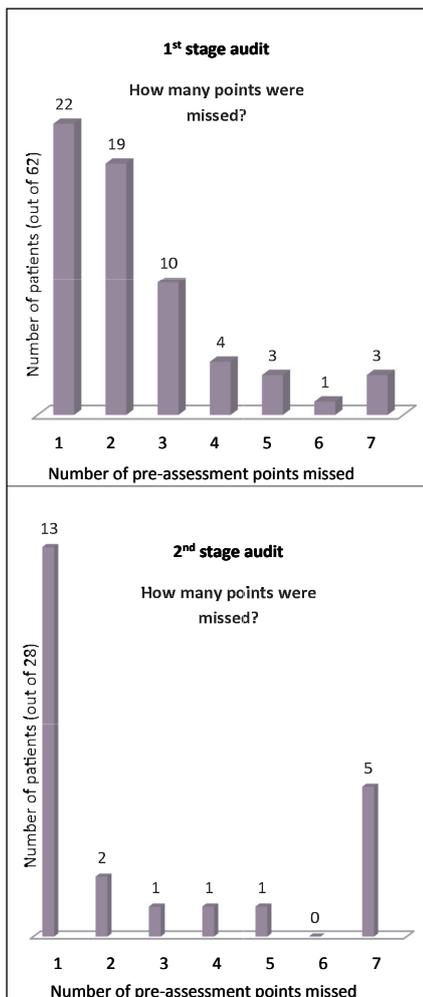
*Bridgewater Hall, Manchester*

**Details and online registration at [www.saad.org.uk](http://www.saad.org.uk)**

sedation treatment without any evidence of the 7 point pre-assessment having been implemented.

Within the 2nd cycle, 5 patients were booked for Intravenous Sedation without a pre-assessment, however, this correlated with all 5 not having undertaken sedation due to being booked onto the wrong clinic, wrong escort and medical conditions (Figure 4).

**Figure 4 - Number of pre-assessment points missed between audit cycles**



## Discussion

As discussed earlier, a pre-assessment checklist is important in ensuring smooth running intravenous sedation clinics, as well as a smooth patient journey. There have been significant improvements gained in having a pre-assessment checklist, particularly only 20% did not have a complete pre-assessment, with mostly only one point being missed out.

There has also been a reduction in failure rates of clinics, from a 24% failure rate to a 9% failure rate – meeting the departmental target of 10%.

Overall, this two-cycle audit shows that the addition of a pre-assessment checklist at the new patient clinic acts a very important aid memoire for clinicians, which has helped meet departmental standards for failed sedation appointments and therefore reduced cost implications.

However, the standard set for all 7 points of pre-assessment points has still not been met. This was set at 100% and was only met at 80%. There are multiple reasons for this:

- Lack of time to complete all the paperwork at the new patient appointments
- Due to new implementation, clinicians may not be aware of significance and importance of all 7 points
- High turnover of junior staff leading to members of the team not receiving pre-assessment training

Another aspect that this audit highlighted was that the most common reasons for failure of sedation was the inability to gain venous access, and treatment planning. These are areas which should have been highlighted at the initial appointment and could have been prevented. It is important that junior staff are encouraged to seek advice from more experienced clinicians when required.

Intravenous sedation appointments require more clinic time and resources than treatment under local anaesthetic alone, making it a scarcer and more expensive resource. It is important to not waste this resource, and to try and ensure that all sedation appointments are successful, saving clinical time, departmental money as well reducing waiting times. Intravenous appointments are around £150 more expensive per appointment, and therefore reducing these failures provides a significant cost benefit to the department. Implementing the pre-assessment checklist has shown that 26 failed appointments has been halved to 13. Further training for venous access assessment was introduced into our SHO induction along with ongoing clinical training. This simple addition of a checklist has helped save money, clinical resources and time.

## Conclusion

This audit highlights the importance of a detailed pre-assessment of patients undergoing intravenous sedation. The implementation of a checklist at the new patient clinics has helped improve the process as well as helped reduce failures within the department.

It is important to conduct a thorough pre-assessment for all patients prior to IVS to enable sedation to be used optimally and to minimise failures. By understanding the reasons why the pre-assessment was not carried out thoroughly we were able to make recommendations to improve the pre-assessment process. This in turn will make the sedation service in the oral surgery department safer for patients with fewer failures of treatments, more efficient with savings to the department and a smoother patient journey

## References

1. IACSD Standards for Conscious Sedation in Provision of Dental Care – 2015 Report. Available at: <https://www.saad.org.uk/images/Linked-IACSD-2015.pdf> (Accessed June 2018)
2. Academy of Medical Royal Colleges. Implementing and Ensuring Safe Sedation Practice for Healthcare Procedures in Adults. London: AoMRC; 2001.
3. NHS Education for Scotland: Conscious Sedation in Dentistry Dental Clinical Guidance 3rd Ed (SCDEP): Available at: [http://www.saad.org.uk/Documents/SDCEP\\_Conscious\\_Sedation\\_Guidance.pdf](http://www.saad.org.uk/Documents/SDCEP_Conscious_Sedation_Guidance.pdf) (Accessed June 2018)
4. A Conscious Decision: A Review of the Use of General Anaesthesia and Conscious Sedation in Primary Dental Care. Department of Health, 2000.
5. Commissioning Dental Services: Service Standards for Conscious Sedation in a Primary Care Setting: Available at <https://www.england.nhs.uk/wp-content/uploads/2017/06/dental-commissioning-guide-service-standards-conscious-sedation-2.pdf> (Accessed November 2018)
6. GDC Standards – Available at: <https://standards.gdc-uk.org/> (Accessed June 2018)

## The use of flumazenil in a community dental service – a service evaluation

**Claire R Harryy BDS MPDS**

*Senior Dental Officer*

*Somerset Partnership NHS Foundation Trust*

**Nigel D Robb TD PhD BDS FDS RCSEd FDS (Rest Dent) FDSRCPS FDTF FHEA**

*Professor of Restorative Dentistry*

*School of Dentistry and Oral Health, Griffith University, Australia*

### Correspondence:

*Claire.Harryy@sompar.nhs.uk*

### Abstract

The aim of this study, in line with the Rapid Response Report (2008) and current conscious sedation guidance, is to evaluate flumazenil use, reasons for use and to investigate factors which may influence flumazenil use in PWLD having intravenous (IV) sedation with midazolam for dental treatment. The purpose would be to make recommendations to the dental service provider. A retrospective sample of 115 episodes of sedation, comprising of 115 PWLD was selected from patient records to identify level of, and reasons for flumazenil use, as well as factors which may be associated with this. These included: use of premedication; dose of IV midazolam and sedation score, which might be considered as factors which influence flumazenil use. The rate of use of flumazenil was 14.78%. The majority of cases of its use (88%) was due to delayed recovery, 12% were due to difficulty in maintaining satisfactory oxygen saturation (<91%). There were no medical emergencies.

It was noted that there is potential for multiple sedation appointments for some individuals who often need flumazenil, to affect the independence of the sample and 'skew' the results.

There was no significant association seen between flumazenil use and use of premedication, increasing dose of IV midazolam or higher sedation scores.

### Introduction

Flumazenil is a competitive antagonist for the benzodiazepines and was introduced to clinical practice as an emergency reversal agent, with a requirement that it must be available wherever sedation with benzodiazepines is administered.<sup>1</sup> Since that time it has been used more routinely, particularly in patients with additional needs who may have varying levels of learning disability plus complex medical conditions which introduce particular challenges to providing dental treatment.

The Rapid Response Report,<sup>1</sup> has suggested that the use of flumazenil should be audited as a marker for oversedation in dentistry. This proposal assumes that flumazenil is only ever administered when patients are over-sedated. The authors are aware that flumazenil is more widely used for indications such as lack of comprehension during recovery from sedation for those with a learning disability (LD). This may lead to them actively trying to leave the premises before being safely able to do so. Also for those with physical impairments as well as LD there may be

justification in using flumazenil in order to safely discharge the patient.<sup>2</sup>

The study was carried out as part of a wider service evaluation in order to identify the rate of use of flumazenil and identify factors which may influence the use of flumazenil in People with Learning Disability (PWLD) having IV sedation with midazolam, where the adjuncts of premedication, oral midazolam and intranasal midazolam are often necessary to facilitate IV cannulation. It was also carried out to investigate the effect of the dose of IV midazolam given and the sedation score on flumazenil use. This was a retrospective study, reviewing the patient records of PWLD who had received dental treatment using conscious sedation with IV midazolam.

### Materials and Method

#### Ethical Approval

Approval was obtained from Somerset Partnership NHS Foundation Trust (SOMPAR) for a service evaluation to investigate flumazenil use by a Community Dental clinic in East Dorset.

#### Study population

The study population included PWLD who had attended for oral examination and dental treatment under IVS with midazolam.

Patients who had received dental care using IV midazolam between 1/09/2013 and 31/08/2015 were identified from records at a Dorset community dental clinic. A convenience sample of three hundred sedation episodes for PWLD was selected. LD level as described by the BSDH classification: Clinical Guidelines and Integrated Care Pathways for the Oral Health of People with Learning Disabilities,<sup>3</sup> were identified by markers on the computer notes or from the paper notes. Only patients with LD were included.

The sedation was carried out by four operator/sedationists, appropriately trained, and experienced in providing IVS with midazolam for this patient group. The team providing the care and the facilities were compliant with the current standards for conscious sedation.<sup>4,5</sup>

#### The sample

All episodes of sedation carried out during the study period were collected. All individuals who had one or more episodes of sedation were included. Data was collected for 300 episodes,

giving a representative convenience sample size of 300 episodes of sedation with a confidence level of 95% +/- 5%.<sup>6</sup>

## Data collection

A data collection sheet was designed using an Excel spread sheet. This recorded the information about each included episode of IVS. At the time of this study, the paper notes contained the relevant information regarding that episode of treatment. Only PWLD were included and their level of LD (mild, moderate or severe). Episodes where premedication, oral or IN sedation with midazolam was given, but where cannulation was not achieved due to inadequate cooperation, were not included in the data.

Data was collected which included:

1. Use of flumazenil
2. If used, the reason for use
3. Use of premedication before arrival at the clinic
4. Use of oral midazolam as an adjunct
5. Use of IN midazolam as an adjunct
6. Dose of IV midazolam
7. Sedation score. DSTG logbook criteria<sup>7</sup>

## Reasons for use of flumazenil.

The data collection sheet had the following options

- Delayed recovery: 1 hour or more, following the last increment of midazolam
- Unable to maintain satisfactory oxygen saturation levels: O<sub>2</sub> saturation < 91% and not tolerating nasal oxygen
- Attempting to leave the surgery before recovered: unsteady and unsafe to leave
- Medical emergency: paradoxical reaction and failure of sedation; respiratory distress; anaphylaxis; heart rate or blood pressure outside of acceptable ranges)<sup>4,8</sup>

## Criteria for Delayed Recovery

As the service evaluation was retrospective, the 4 operator/ sedationists were asked to clarify in a questionnaire, the circumstances in which "delayed recovery" was selected as the reason for flumazenil use.

The following criteria were used by the operator/sedationists to define Delayed recovery, one hour after the last increment of midazolam:

- Patient curling up in a ball in the chair, unable or unwilling to co-operate during the recovery period.
- Patient attempting to remove the cannula and not recovered enough for discharge.
- Eyes remaining closed, but showing other signs of recovery from sedation.
- Patient unable to weight bear, but usually able to do so. Disoriented but other muscles have good tone.

## Data analysis

Provisional data analysis was carried out using the 300 episodes of sedation sample. Data was collected from 115 patients, some of whom had multiple visits ranging from two to a maximum of six episodes. The initial 300 episode sample analysis raised the possibility that multiple visits by PWLDs who require flumazenil on multiple occasions might bias the data. In order to investigate the

independence of this original sample, these results were compared with a subset group from the 300 episode sample. In the subset, data was analysed from the first episode of sedation only, so that multiple visits were not included. The 2 groups were compared and advice sought from a statistician. Chi squared analysis and p-value interpretation suggested the 2 samples had significant differences. In order to establish which sample was more representative, data from a second subset, from the single or 2nd (where there were multiple visits) episode of sedation from the 300 episode sample (n=115) was analysed. The results suggested that the subset groups were more similar to each other than the 300 episode sample. It was deemed more appropriate to present the results from the analysis of one visit per individual (the 1st). This resulted in a sample size of n=115.

## Results

### Patient demographic

Table 1 shows the patient demographic breakdown.

Of the 115 patients there were 7(6%), patients with mild LD, 12 (10.4%) patients with moderate LD and 96 (83.4%) patients with severe LD

The age range was from 15 to 74 years with an average age of 41.2 years.

The number of sedation appointments per patient within the 2 year study period was between 1 and 6 appointments, with an average of 3 sedation appointments per patient.

**Table 1. Patient demographic. Episodes of sedation = 300 (n=115)**

LD	Mild	7
	Moderate	12
	Severe	96
	Total	115
Age	Minimum age	15
	Maximum age	74
	Mean age	41.23
No. of appointments	Minimum # appts	1
	Maximum # appts	6
	Mean # appts	3

There were 55 episodes where flumazenil was administered in 32 PWLD.

The data showed that there was variation in flumazenil use for the same PWLD at different episodes of IVS. Ten of the 115 required flumazenil on each occasion they were sedated.

Table 2 shows the frequency of flumazenil use and the number of sedation visits for these multiple visit individuals.

**Table 2. Flumazenil use and multiple visits for dental treatment with IVS. (300 episodes)**

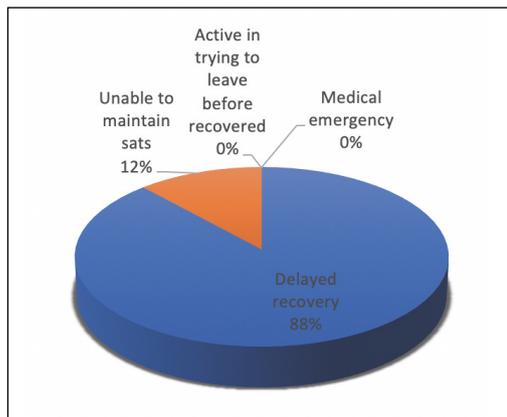
	Flumazenil used x 1	Flumazenil used x 2	Flumazenil used x 3	Flumazenil used x 4	Flumazenil used x 5
# episodes IVS in study					
One episode	3	X	X	X	X
Two episode	5	2	X	X	X
Three episode	5	4	3	X	X
Four episode	4	2	0	2	X
Five episode	1	0	0	1	0

The results from the full 300 episode sample are shown in table 2, however, results from the subset (n=115) group are presented from this point forward.

**The reasons for using flumazenil during recovery from IVS with midazolam.**

There were 17 patients (14.78%) who required flumazenil. The reasons for flumazenil use fell into two of the four categories described. 15 (88.24%) of these were due to delayed recovery and 2 (11.76%) were due to unsatisfactory oxygen saturation (< 91%). None were classified as for a medical emergency or as a result of the patient attempting to leave before recovered (figure 1).

**Figure 1. Reasons for flumazenil use**

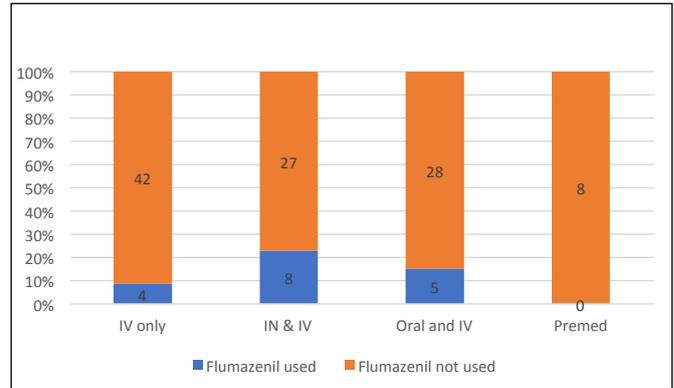


**Premedication as an adjunct to IV midazolam and the use of flumazenil.**

There were 46 patients who had IVS only. 4 (8.70%) of these required flumazenil. 8 patients had premedication as an adjunct to IVS but none required flumazenil (Figure 2). Where oral midazolam was used there was a higher incidence of flumazenil use (14.71%) than where IVS alone was used (8.70%). Chi squared analysis found  $p=0.37$  which was not statistically significant, however, small numbers (<5) in some cells suggests these results should be treated with caution.

Of those having IN and IVS, 8 (22.86%) out of a total of 35 patients required flumazenil. This result was approaching statistically significant ( $p=0.074$ ) although again, small numbers in some cells suggest caution in interpreting these results.

**Figure 2. Premedication/Routes of administration of midazolam and flumazenil use.**

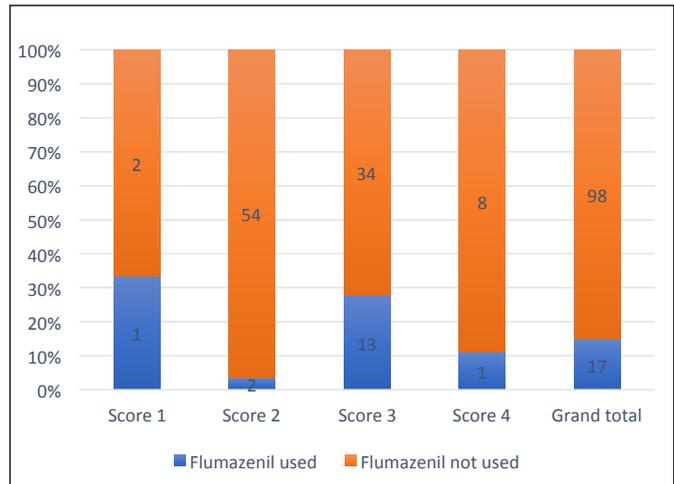


**The relationship between the sedation score and the use of flumazenil.**

The most frequent sedation scores overall were score 2 in 56 (48.70%) patients and score 3 in 47 (40.87%) patients.

The most frequent sedation score where flumazenil was used was score 3 in 13 (27.66%) out of 47 patients. There were small numbers with scores 1, 2 and 4 where flumazenil was used (figure 3). Chi squared analysis found  $p=0.0053$  which is also statistically significant, although small numbers in some cells again suggest caution in interpretation.

**Figure 3. Sedation score and flumazenil use**



**The relationship between the dose of IV midazolam given, and the use of flumazenil.**

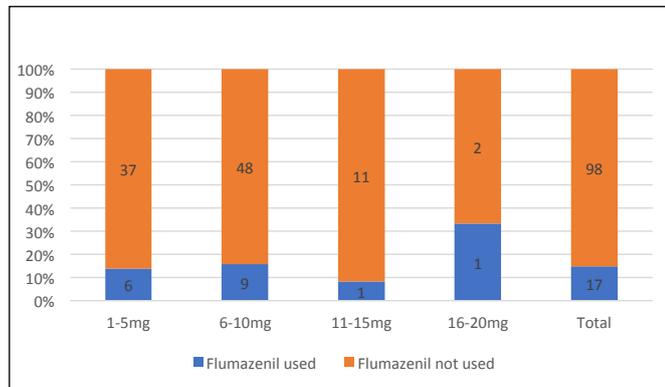
The mean dose of midazolam was 7.41mg overall and the median dose was 7mg with an interquartile range of 5-9mg (4mg).

The range of doses was between 1 and 20 mg of midazolam, divided into 4 dosage groups for ease of analysis.

The mode dosage was 6-10mg given for 57 (49.57%) out of 115

patients, followed by 1-5 mg in 43 (37.39%) patients. The distribution of midazolam dose and use of flumazenil is shown in figures 4 and table 3. Chi squared analysis found  $p=0.73$  (not statistically significant). Small numbers in the highest dose cell suggest caution in interpreting these results.

**Figure 4. Dose of IV midazolam and flumazenil use.**



**Table 3. IV dose and flumazenil use**

Subset (n=115) Midazolam dosage	Flumazenil not used	Flumazenil used n (%)	Total
1-5mg	37	6(13.95%)	43
6-10mg	48	9 (15.79%)	57
11-15mg	11	1 (8.33%)	12
16-20mg	2	1 (33.33%)	3
Total	98	17 (14.78%)	115

## Discussion

### Rate of flumazenil use.

In this study the rate of use of flumazenil was 14.78%. This was in contrast to other studies evaluating its use. However, it is not clear whether these studies looked at multiple episodes from a smaller number of patients, or single episodes from individuals. Henthorn and Dickinson<sup>2</sup> at the Department of Sedation and Special Care Dentistry, Guy's Hospital carried out a prospective audit and concluded that use of flumazenil was low (7%) with distinct indications for use. Ransford et al,<sup>9</sup> in a multicentre prospective audit looking at IN & IVS for the dental care of adults with severe disabilities, found reversal with flumazenil at 22.8%, to manage agitated behaviour or to aid safe transfer of the patient out of the surgery. It was suggested that this was not an indicator of overdosing or unsafe technique.

Lewis et al,<sup>10</sup> in another multicentre audit of flumazenil use in PWLD undergoing conscious sedation for dental treatment, found 71 out of 325 episodes (21.8%) used flumazenil to reverse for non emergency reasons.

### The reasons for the use of flumazenil.

Delayed recovery was recorded as the main reason for use. Several criteria relevant to PWLD, were considered by the

operator/sedationist as 'delayed recovery' as the reason for giving flumazenil. The remaining episodes where flumazenil was required, occurred due to difficulty in maintaining oxygen saturation at a satisfactory level (<91%). This occurred in approximately 12% of those requiring flumazenil. Administration of supplemental oxygen may not be easily tolerated in PWLD, recovering from conscious sedation. The time taken to complete the dental treatment may have varied. Some patients may have been at a more advanced stage of recovery than others after completion of treatment.

The criteria "active to trying to leave before recovered" was not selected. This is in contrast to Ransford et al,<sup>9</sup> who found that the majority, 41 out of 62 episodes needing reversal were "attempting to leave trying to leave before properly recovered". Some of our patient group might be physically unable to do this but their physical disabilities were not documented. It was reassuring that in this service evaluation, flumazenil was not required due to a medical emergency. Delayed recovery in PWLD may have more impact on their safe discharge due to the effect of physical impairments increasing the need for carer support. Larger individuals may need more physical support from their escorts. Also the person's LD itself may lead to distress during recovery if there is limited cognition. They may try to remove the cannula themselves or attempt to leave while still partially sedated and unsafe to do so.

### The effect of premedication as an adjunct.

These results do not suggest that premedication has an effect on flumazenil use. In the subset group (n=115) 8 patients required premedication. None of these needed flumazenil, even when sedation was initiated with oral or IN midazolam following premedication. Where there was use of oral or IN midazolam as adjuncts to IVS (premedication not given), there may appear to have been an increased rate of flumazenil use compared to IV midazolam alone. Chi squared analysis did not indicate significance with oral as an adjunct whereas with IN the increased rate of flumazenil use was approaching significance. The small numbers involved suggest results should be interpreted cautiously.

### The relationship between the sedation score and the use of flumazenil

This study shows no association between higher sedation scores and increased flumazenil use. It was observed that DTS criteria,<sup>7</sup> described sedation score 3 had the highest rate of flumazenil use in 13 (27.66%) out of 47 PWLD ( $p=0.0053$ ), which was statistically significant. There were small numbers with sedation scores of 1 (2), and 4 (9) and very small numbers who needed flumazenil (1 in each). Therefore these results should be interpreted with caution.

It may appear a contradiction that a sedation score of 1 (fully awake and orientated) should require flumazenil. However, the alertness of the patient during treatment or the attempt to treat may have changed to a higher sedation score once treatment had been completed or abandoned and the patient allowed to recover, undisturbed.

It was reassuring that over sedation was not the reason for use of flumazenil, generally. This service evaluation suggests that the amount of IV midazolam was carefully and appropriately titrated to a recognised end point and the patients were not over sedated. This is consistent with the authors' and other colleagues' clinical experience that the dose of midazolam is not necessarily related to the sedation score.

## Effect of the dose of IV midazolam on the use of flumazenil.

Increasing the dose of IV midazolam does not affect flumazenil use.

The mode dosage of IV midazolam (6-10mg) was the dose most frequently associated with flumazenil use, at a rate of 15.79% The next most used dose was 1-5mg, with flumazenil use at 13.95%. There were small numbers (3 out of 115) requiring the highest doses (16-20mg) so that any requiring flumazenil (1 out of the 3) might give the impression of a relatively high use rate (33.33%). These few individuals in the outlying group may affect how the overall use of flumazenil appears. Chi squared analysis did not show results ( $p=0.73$ ) to be statistically significant.

## Conclusions

1. The main reason for use of flumazenil in this service evaluation was delayed recovery.
2. The use of premedication as an adjunct does not have a relationship with flumazenil use.
3. There was a significant relationship between flumazenil use and lower sedation score 1 (small numbers suggest caution in interpretation) and the 'ideal' sedation score 3 ( $p=0.0053$ ). High sedation scores 4 & 5, were not associated with higher flumazenil use.
4. There was no significant relationship between the IV dose and flumazenil use.

## Recommendations from this service evaluation

The criteria for use of the term 'delayed recovery', was explored in a questionnaire completed by the operator/sedationists. In future it would be helpful to describe the specific criteria for delayed recovery in the patient record.

The findings of this service evaluation show that the use of sedation with IV midazolam, with or without adjuncts to aid cannulation in PWLD, is a safe procedure. The findings also support the view that the use of flumazenil in PWLD acceptable in certain prescribed circumstances for facilitating safe discharge from the dental clinic after conscious IVS.

These results reinforce the need for cannulation as recommended in the current sedation guidelines,<sup>4,5</sup> which require the operator/sedationist to be proficient in cannulation and ready to carry this out.

In any future service evaluation concerning flumazenil use,<sup>11</sup> it should be considered whether the independence of the sample is affected by patients who need multiple visits for their dental treatment and often need flumazenil. The results from each episode are not necessarily independent of each other and may skew the overall results. It may be wise therefore in future evaluations of flumazenil use, to compare single episodes of sedation from individual patients.

The importance of appropriate training in sedation, experience in the field of Special Care Dentistry for the operator and supporting staff and compliance with the current sedation guidelines, is once again acknowledged.

## References

1. National Patient Safety Agency Report (2008) Rapid Response Report NPSA/2008/RRR011. Reducing Risk of Overdose with Midazolam Injection in Adults. [pdf] London: National Reporting and Learning Service. Available at: <http://www.nrls.npsa.nhs.uk/resources> [Accessed 1st June 2016].
2. Henthorn K and Dickinson C (2010). The use of flumazenil after midazolam induced conscious sedation. *British Dental Journal*; 209: E18. Available at: <http://doi:10.1038/Sh.bdj.2010.1132> [Accessed 6th Nov. 2017]
3. British Society of Disability and Oral health (BSDH) (2012). Clinical Guidelines and Integrated Care Pathways for the Oral Health Care of People with Learning Disabilities [PDF] London, Faculty of Dental Surgery, the Royal College of Surgeons of England. Available at: <http://www.rcseng.ac.uk/oral-health-care> [Accessed 30th Jan. 2016]
4. The dental faculties of the Royal colleges of surgeons and the Royal College of Anaesthetists (2015). Standards for Conscious Sedation in the Provision of Dental Care. Report of the Intercollegiate Advisory Committee for Sedation in Dentistry (IACSD). Available at: <http://www.rcseng.ac.uk/dental-faculties/fds/publications-guidelines/standards-for-conscious-sedation-in-the-provision-of-dental-care-and-accreditation/> [Accessed 8th June 2017].
5. Scottish Dental Clinical Effectiveness Programme (SDCEP) (June 2017). *Conscious sedation in dentistry. Dental Clinical Guidance, 3rd edition.* [pdf] Dundee: SDCEP. Available at: <http://www.sdcep.org.uk/published-guidance> [Accessed 30th Sept. 2017].
6. Fereday S. An introduction to statistics, for local audit and improvement (2015), 3rd edition [pdf] Healthcare Quality Improvement Partnership (HQIP) Ltd p.19-24. Available at: <http://www.hqip.org.uk/public.cms> [Accessed 1st Dec. 2017].
7. Ramsay MA, Savege TM, Simpson BR, Goodwin R. Controlled Sedation with alphaxalone-alphadolone. *BMJ* 1974; 22: 656-659.
8. Resuscitation council (UK) (2016), Immediate Life Support, 4th edition. London. Resuscitation council.
9. Ransford N, Manley M, Lewis D, Thompson S, Wray L, Boyle C and Longman L. Intranasal/intravenous sedation for the dental care of adults with severe disabilities: a multi centre prospective audit. *Br Dent J* 2010; 208: 565-569
10. Lewis D, Wray L, Sherbourne M, Frolander C, Shill J, Dalley K, Bell S and Wong D. The use of flumazenil for adults with learning disabilities undergoing conscious sedation with midazolam for dental treatment: a multi centre prospective audit. *Journal of Disability and Oral Health* 2015; 16: 33-37.
11. Flood C, Matthews L, Marsh R, Patel B, Mansaray M and Lamont T. Reducing risk of overdose with midazolam injection in adults: an evaluation of change in clinical practice to improve patient safety in England. *J Eval Clin Pract* 2014; 21: 57-66.

# Capsaicin - the D00uble Agen7

**Pankaj Taneja BDS MJDF RCS (Eng) MOral Surg PG Cert**

Department of Dentistry and Oral Health, Section of Orofacial Pain and Jaw Function, Aarhus University, Vennelyst Boulevard 9, DK-8000 Aarhus C

**Correspondence:**

pan0980@yahoo.co.uk

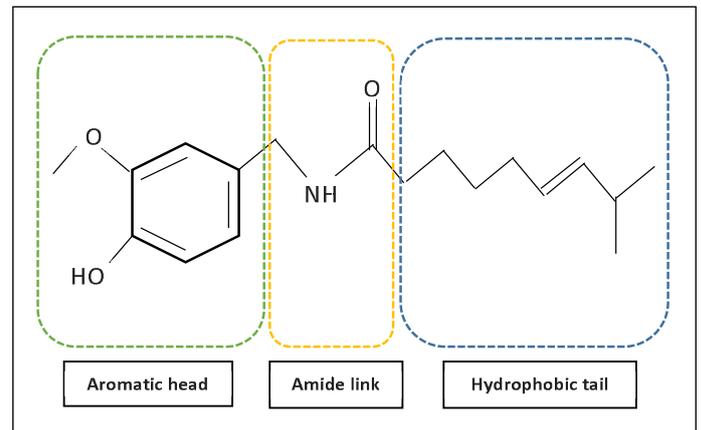
## Abstract

Capsaicin, the chemical that causes heat and burning sensations when consuming chilli peppers, is generally not thought of as a medicament. However, it provides a dual role. The initial pain experience is via activation of specific nociceptor ion channels on the sensory terminal known as Transient Receptor Potential V1 (TRPV1), causing the release of neurotransmitters (in particular substance P). The pain elicited by capsaicin is reproducible and is used as a reliable method within oral pain models. Furthermore, repeated exposure to capsaicin causes the enhanced release of substance P and inhibited uptake. This creates a period of “desensitisation” preventing noxious stimuli from activating the neurone and providing an analgesic role. Within dentistry this property has been utilised and investigated (e.g. by topical application) in the treatment of conditions such as trigeminal neuralgia, pain in the temporomandibular joint area and atypical odontalgia. Advantages over other analgesics are namely that of avoidance of certain side effects and ability to be used for those with complex medical histories. Providing action at the start of the pain pathway allows for future drug treatments to use possible targeted delivery systems with potentially enhanced properties. Nonetheless, placebo effects and capsaicin’s associated side effects should not be overlooked.

## Introduction

Within the pain field, professionals are equipped with an array of medications to aid the pain patient in returning to (or close to) normality. One product that has had a proven effect is the naturally occurring plant-derived agent known as capsaicin (trans-8-methyl-N-vanillyl-6-nonenamide). This chemical is not only responsible for the heat pain and burning sensations experienced when consuming chilli peppers, but has also found a place in the treatment of pain.<sup>1</sup> It is these dual properties that allow me to suggest in the title of this paper, that it is a double agent! I will describe some basic pharmacological and pharmacokinetic properties of capsaicin that allow for its dual use in the creation of pain (for its use in experimental studies), and its therapeutic uses in certain pain conditions, paying particular attention to uses in Dentistry.

Historically, the use of capsaicin within dentistry is illustrated by Native Americans who rubbed pepper pods on their gums to soothe toothache.<sup>2</sup> This analgesic potential was identified and incorporated into European folk medicine, as seen by the Dublin Free Press recommending the use of alcoholic hot pepper extract for relief of sore teeth.<sup>2</sup> Like other compounds used in dentistry, for example eugenol derived from cloves, capsaicin is a member of the vanilloid family and structurally is made up of a benzene ring, a hydrophobic carbon tail, linked with a central amide bond (figure 1).<sup>3</sup>



**Fig.1. Chemical structure of capsaicin**

The hydrophobic tail explains the non-water-solubility of the molecule, preventing capsaicin from diffusing in water, meaning topical preparations and sprays require preparation with alcohol or other solvents. It is also the reason that drinking water does not alleviate the oral effects following capsaicin consumption.<sup>4</sup> To aid the understanding of how capsaicin elicits such sensations its pain pathway must first be revisited.

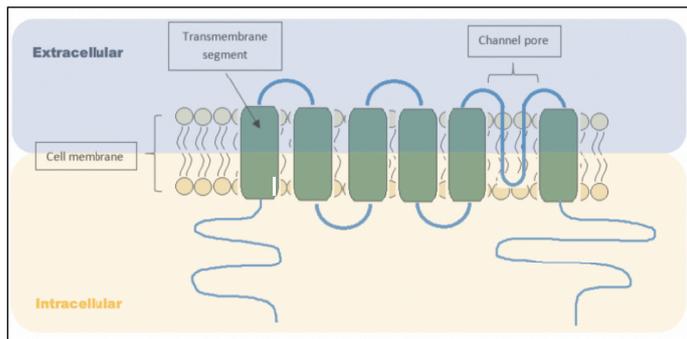
## Nociception and the pain pathway

Nociception is a sub modality of somatosensation and is defined as “the neural process of encoding noxious stimuli”.<sup>5</sup> Examples of such stimuli are mechanical, thermal or chemical stimuli which give rise to the sensation of pain.<sup>6</sup> The peripheral nerve fibres that detect and are activated by these potentially injurious stimuli, are termed nociceptors.<sup>7</sup> There are two general types of nociceptors, and they differ in the velocity at which the nerve impulse is carried, and consequently the type of pain that is produced. The A $\delta$ -fibres are lightly myelinated, with a medium diameter and conduct action potentials rapidly. Hence, they contribute to the virtually immediate pain that an individual may first experience when exposed to a noxious stimulus. The C-fibres differ, as they are unmyelinated with a small diameter and conduct action potentials slowly, hence contributing to the delayed secondary, pain that is felt.<sup>7,8</sup> In the skin of the face, nociceptive fibres transmit signals from the source to the spinal cord via cell bodies located in the trigeminal ganglia. At the level of the spinal cord the nociceptors cause the release of neurotransmitters within the dorsal horn, which in turn activate neurones that transmit to higher-order pain centres in the brain.<sup>8,9</sup> However, when stimulated, neurotransmitters are not only released from those terminals located in the spinal cord (central) but also from peripherally located terminals. Examples of such neurotransmitters are substance P and calcitonin gene-related peptide (CGRP).<sup>10,11</sup>

The way in which capsaicin activates this complex system is via selective ion channels on nociceptor sensory terminals which respond to specific noxious stimuli,<sup>11</sup> in the case of capsaicin, the transient receptor potential (TRP) ion channel family.<sup>4,12</sup>

## Capsaicin and the TRPV1 receptor

Capsaicin is an exogenous agonist that activates afferent nociceptors by binding to a specific nerve receptor known as Transient Receptor Potential V1 (TRPV1).<sup>10,13</sup> This is a serpentine receptor that is made up of six transmembrane segments with a stretch between segments 5 and 6 considered to form the channel pore (Figure 2).<sup>13</sup>



**Fig.2. Schematic representation of the TRPV1 receptor**

Upon this receptor are sites that are sensitive to specific direct-acting chemicals such as capsaicin. Widely distributed in bodily tissues such as the brain, bladder, kidney and bowel,<sup>2</sup> within nociceptive sensory nerve endings (most commonly c- and A $\delta$ -fibres), TRPV1 receptors are also stimulated by endogenous agonists such as noxious heat (> 43°C), acidosis (< 5.2) and lipids.<sup>14-16</sup> When in contact, the initial activation of TRPV1 causes opening of the pore and the influx of calcium ions into the neurone, triggering the release of neurotransmitters (such as substance P and CGRP) involved in the central processing of pain (described earlier). In addition, peptides are released which contribute to the production of local pro-inflammatory and pro-algesic factors collectively termed the inflammatory soup.<sup>11</sup> TRPV1 also contains a heat-sensitive subunit thereby eliciting sensations of a warming and/or burning nature, in addition to sensations of stinging and/or itching.<sup>10</sup> Initial contact therefore results in a local sensitisation, and further stimulations can have an increased painful response (primary hyperalgesia and allodynia).<sup>17</sup> In general, contact of capsaicin results in pain, inflammation and a localised burning sensation.<sup>12</sup>

When prolonged or repeated exposure of the TRPV1 receptor is achieved via capsaicin then the release of substance P is enhanced and its uptake inhibited, resulting in a depletion in the central and peripheral nervous system.<sup>18</sup> The result is a lasting refractory period termed desensitisation<sup>18,19</sup> and the once previously excited neuron is now unresponsive to capsaicin and also to a range of other painful stimuli.<sup>19-22</sup> In addition, a degeneration of the nociceptive nerve fibres may also follow.<sup>22</sup> It is these aspects that are utilised when using capsaicin for analgesia. Although the literature tends to focus on capsaicin induced analgesia by the substance P depletion hypothesis, alternate theories also exist. Anand and Bley<sup>10</sup> suggest that all neuropeptides (in particular CGRP) would be lost from retraction of nociceptive nerve fibres thereby providing analgesia.

However, with a vast array of analgesics and anti-inflammatories to help alleviate pain, the question arises as to why capsaicin based products are needed? One justification might be in order to avoid the potential side effects of classical analgesics. For example, opioids have excellent proven effects but can cause constipation or respiratory depression. This can lead to a greater disturbance to the individual, thereby resulting in the cessation of the drug. In addition, caution is required when prescribing to those that have suffered addictions to such medications, or who have medical conditions contraindicating their use.<sup>11</sup> The same can be said for NSAIDs in individuals that suffer from, for example, gastrointestinal problems. Due to the risks associated, individuals will need alternate medicaments/means to aid in the treatment of inflammatory pain, and nociceptor-specific targeting chemicals such as capsaicin might overcome these potential barriers.<sup>9</sup>

## Capsaicin in dentistry

A number of different modalities for the administration of capsaicin exist, namely, oral, systemic, topical and intradermal.<sup>4</sup> Within the UK, capsaicin can only be prescribed via the topical route, with creams available to prescribe in concentrations of 0.025% and 0.075% for osteoarthritis and post hepatic neuralgia/painful diabetic neuropathy, respectively.<sup>23</sup> Application is recommended 3-4 times daily. A patch of concentration 179 mg (8%) for peripheral neuropathic pain in non-diabetic patients is also available.<sup>23</sup> Justification for the topical route is that capsaicin remains at the site of application staying relatively unchanged and allowing continual action, unlike other routes where it may be absorbed and thereby eliminated.<sup>10</sup> Treatment for neuropathic pain seems to be the focus for capsaicin as a result of the desensitisation from inhibited substance P uptake and therefore suppression of C-fibre transmission.<sup>18</sup>

It seems logical therefore, that capsaicin has been used to investigate neuropathic conditions in the facial region, namely in the treatment of trigeminal neuralgia. Fusco and Alessandri<sup>24</sup> studied the analgesic effect of topical capsaicin (0.05%) in 12 patients diagnosed with idiopathic trigeminal neuralgia (ITN). Patients had undergone medical treatment (but not surgical) with medication for ITN stopped at least 10 days prior to the study. The pain was localised to a variety of divisions of the trigeminal nerve with capsaicin application (1g three times a day for several days) to the skin overlying the trigeminal branch and trigger points that were affected. The study reported that, overall, 10 patients had improved symptoms ( $\geq 60\%$ ), with 2 patients experiencing no relief of pain with the use of topical capsaicin. Follow up over 1 year found that 4 patients experienced a relapse, and of these, 3 had an effective reduction in pain (scored 0 – 2, on a 0 – 10 pain numerical rating scale). However, these results need to be interpreted cautiously as this was a pilot study utilising a small sample. In addition, there were no placebo treatments offered and patients were not blinded.

A similar study was carried out by Epstein and Marcoe<sup>18</sup> on the topical application of capsaicin (0.05 % cream four times a day) for the treatment of 24 patients diagnosed with either trigeminal neuralgia or neuropathic pain. In contrast to Fusco and Alessandri<sup>24</sup> pain was not limited to extra oral sites and included the mucosa, periodontium and tongue. The application of capsaicin was advised at the site of discomfort. The study reported that 12 neuropathic pain patients experienced a decrease in pain that was

≥ 50%. However, statistical analysis was not performed and there was no determination of placebo effect.

One of the neuropathic pain conditions included in the latter study was burning mouth syndrome (BMS). Pain/discomfort of a burning nature can affect the entire oral cavity.<sup>25</sup> To alleviate the associated symptoms and provide an analgesic role, capsaicin as an oral rinse has been suggested. This method of application was used within one study identified by McMillan et al.<sup>25</sup> in a Cochrane review on the interventions in treating BMS. It concluded that the oral rinse provided good long-term symptomatic relief against BMS, however, evidence was of very low quality.

A further analgesic use of topical capsaicin investigated within the dental field was to treat pain in the temporomandibular joint area.<sup>26</sup> A Cochrane review performed by Mujakperuo et al.<sup>27</sup> listed the study by Winocur et al.<sup>26</sup> as the only one that used capsaicin as a pharmacological intervention for the treatment of temporomandibular disorders (TMD). The study was carried out as a randomised double-blinded trial using medicated cream (0.025% capsaicin) and a placebo cream. Patients rubbed cream onto the painful area four times daily. However, there were no significant effects of treatment found between the two creams in reducing the pain in TMD (mean difference -0.61; 95% CI -2.45 to 1.23; P = 0.52). Hence, the indifference between the 2 treatment groups was attributed to the placebo effect.<sup>26</sup>

An intraoral condition that the capsaicin-analgesic properties have been used for is atypical odontalgia. Classified as a subtype of persistent idiopathic facial pain by the International Headache Society<sup>28</sup> with characteristics of “a continuous pain in one or more teeth or in a tooth socket after extraction, in the absence of any usual dental cause.” Due to the unclear nature of the underlying mechanisms through which the pain occurs,<sup>29</sup> management of this condition tends to be based on expert opinion.<sup>30</sup> The analgesic effect of capsaicin from inhibition of peripheral nerve terminal function has therefore led to a place in the treatment of this condition.<sup>17,31</sup>

## Side-effects

In general, capsaicin is considered as safe, however, it is not without potential adverse effects.<sup>18,24</sup> Common effects seen are that of a transient pain and erythema which are local to the site of contact,<sup>10,26</sup> burning<sup>3,26</sup> and stinging.<sup>26</sup> A transient hyperthermia increasing body core temperature (1-2°C) results in sweating and cutaneous vasodilation.<sup>11</sup> In addition, coughing has also been reported with the use of 0.075% cream,<sup>13</sup> likely resulting from the release of peptides from nerve terminals, inducing events such as inflammation as well as broncho-constriction.<sup>19</sup> This side effect has been utilised for cough testing studies, as it allows for a dose-dependent reproducible cough response.<sup>3</sup>

In light of these adverse effects, difficulty may be experienced with patient compliance as well as in undertaking studies involving capsaicin, leading to participant withdrawal.<sup>1,26</sup> Nonetheless, in continual use via topical routes, a decline in the incidence of side effects has been reported.<sup>26</sup>

However, as previously described, the analgesic effects of capsaicin are preceded by that of pain. The pain related effects caused are not only enjoyed by some who consume it, but have led to

capsaicin's use as a tool in human and animal studies.<sup>32</sup> Symptoms from capsaicin-activated nociceptive afferents allow for its use with good reliability, within oral models for experimental pain.<sup>32,33</sup> Such models are of great importance, as they allow for transitional studies to study the symptoms and mechanisms of pain,<sup>4,34</sup> as well as for techniques that may modulate such pain<sup>34</sup> hence allowing research within the dental field of orofacial pain to flourish.

## Future perspectives

The identification of the desensitisation effects of capsaicin provides for its exploitation for therapeutic purposes.<sup>35</sup> By being located at the start of the pain pathway, the effect of capsaicin on the TRPV1 receptor not only allows for its own analgesic role, but by opening the pore of the receptor, provides the opportunity for molecules to be passed through into nociceptive neurones.<sup>36</sup> This may allow for future nociceptive targeted delivery systems with potentially enhanced properties than if administered alone, as well as the potential to avoid adverse events.<sup>36</sup>

## Conclusion

Capsaicin is a useful medicament in the armamentarium of pain control and offers a method of analgesia delivery that may otherwise be contraindicated in those individuals with complex medical histories. It provides an alternative method of nociceptive targeted pain relief that allows for its use specifically in certain neurological diseases. In addition, the properties of capsaicin in inducing pain, allow for its reliable and reproducible use within pain models, whereby alternate pain reducing treatments can be tested.

Understanding the function of the TRPV1 receptor, and its presence in sensory nociceptive neurones provides the basis for understanding that the topical route of capsaicin administration seems to be most prevalent when it allows maximum concentration at the target site. It aids the justification for this method of application to be commonly used to investigate treatment of a number of pain conditions.

With capsaicin providing a promising addition to the general pain armamentarium, this article highlights that the continual research in its analgesic contribution to conditions to the orofacial region is required to overcome any placebo effects. However, it also identifies that capsaicin and the TRPV1 receptor is an important target for future drug development.

## References

1. Mason L, Moore RA, Derry S, Edwards JE, McQuay HJ. Systematic review of topical capsaicin for the treatment of chronic pain. *BMJ*. 2004;328:991.
2. Szallasi A, Blumberg PM. Vanilloid (capsaicin) receptors and mechanisms. *Pharmacogn Rev*. 1999;51:159-212.
3. Hayman M, Kam PC. Capsaicin: a review of its pharmacology and clinical applications. *Curr Anaesth Crit Care*. 2008;19:338-343.
4. O'Neill J, Brock C, Olesen AE, Andresen T, Nilsson M, Dickenson AH. Unravelling the mystery of capsaicin: a tool to understand and treat pain. *Pharmacogn Rev*. 2012;64:939-971.
5. IASP. IASP Taxonomy. 2018; <https://www.iasp-pain.org/Taxonomy>. Accessed 01/02/2018, 2018.
6. Julius D, Basbaum AI. Molecular mechanisms of nociception. *Nature*. 2001;413(6852):203.

- Basbaum AI, Bautista DM, Scherrer G, Julius D. Cellular and molecular mechanisms of pain. *Cell*. 2009;139:267-284.
- Stucky CL, Gold MS, Zhang X. Mechanisms of pain. *Proceedings of the National Academy of Sciences*. 2001;98:11845-11846.
- Basbaum AI, Julius D. Toward better pain control. *Scientific American*. 2006;294:60-67.
- Anand P, Bley K. Topical capsaicin for pain management: therapeutic potential and mechanisms of action of the new high-concentration capsaicin 8% patch. *Br J Anaesth*. 2011;107:490-502.
- Julius D. TRP channels and pain. *Annu. Rev. Cell Dev. Biol*. 2013;29:355-384.
- Reyes-Escogido MdL, Gonzalez-Mondragon EG, Vazquez-Tzompantzi E. Chemical and pharmacological aspects of capsaicin. *Molecules*. 2011;16:1253-1270.
- Caterina MJ, Schumacher MA, Tominaga M, Rosen TA, Levine JD, Julius D. The capsaicin receptor: a heat-activated ion channel in the pain pathway. *Nature*. 1997;389:816.
- Tominaga M, Tominaga T. Structure and function of TRPV1. *Pflügers Arch*. 2005;451:143-150.
- Fernandes E, Fernandes M, Keeble J. The functions of TRPA1 and TRPV1: moving away from sensory nerves. *Br J Pharmacol*. 2012;166:510-521.
- Cortright DN, Szallasi A. Biochemical pharmacology of the vanilloid receptor TRPV1. *The FEBS J*. 2004;271:1814-1819.
- Padilla M, Clark GT, Merrill RL. Topical medications for orofacial neuropathic pain: a review. *J Am Dent Assoc*. 2000;131:184-195.
- Epstein JB, Marcoe JH. Topical application of capsaicin for treatment of oral neuropathic pain and trigeminal neuralgia. *Oral Surg Oral Med Oral Pathol Oral Radiol*. 1994;77:135-140.
- Bevan S, Szolcsányi J. Sensory neuron-specific actions of capsaicin: mechanisms and applications. *Trends Pharmacol Sci* 1990;11:331-333.
- Lambert D. Capsaicin receptor antagonists: a promising new addition to the pain clinic. *Br J Anaesth*. 2009;102:153-155.
- Knotkova H, Pappagallo M, Szallasi A. Capsaicin (TRPV1 Agonist) therapy for pain relief: farewell or revival? *Clin J Pain*. 2008;24:142-154.
- Holzer P. Capsaicin: cellular targets, mechanisms of action, and selectivity for thin sensory neurons. *Pharmacogn Rev*. 1991;43:143-201.
- Committee JF. *British National Formulary* (online). 2018; <http://www.medicinescomplete.com>.
- Fusco BM, Alessandri M. Analgesic effect of capsaicin in idiopathic trigeminal neuralgia. *Anesth Analg*. 1992;74:375-377.
- McMillan R, Forssell H, Buchanan JAG, Glenny A-M, Weldon JC, Zakrzewska JM. Interventions for treating burning mouth syndrome. *Cochrane Database Syst Rev*. 2016(11).
- Winocur E, Gavish A, Halachmi M, Eli I, Gazit E. Topical application of capsaicin for the treatment of localized pain in the temporomandibular joint area. *J Orofac Pain*. 2000;14.
- Mujakperuo HR, Watson M, Morrison R, Macfarlane TV. Pharmacological interventions for pain in patients with temporomandibular disorders. *Cochrane Database Syst Rev*. 2010(10).
- IHS. IHS Classification ICHD-3. 2018; <https://www.ichd-3.org/13-painful-cranial-neuropathies-and-other-facial-pains/13-12-central-neuropathic-pain/>. Accessed 21/03/2018, 2018.
- Melis M, Lobo SL, Ceneviz C, et al. Atypical odontalgia: a review of the literature. *Headache: The Journal of Head and Face Pain*. 2003;43:1060-1074.
- Baad-Hansen L. Atypical odontalgia—pathophysiology and clinical management. *Journal of Oral Rehabilitation*. 2008;35:1-11.
- Vickers ER, Cousins MJ, Walker S, Chisholm K. Analysis of 50 patients with atypical odontalgia: a preliminary report on pharmacological procedures for diagnosis and treatment. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontics*. 1998;85:24-32.
- Ngom PI, Dubray C, Woda A, Dallel R. A human oral capsaicin pain model to assess topical anesthetic-analgesic drugs. *Neuroscience letters*. 2001;316:149-152.
- Baad-Hansen L, Jensen TS, Svensson P. A human model of intraoral pain and heat hyperalgesia. *J Oral Rehabil*. 2003;17.
- Naganawa T, Baad-Hansen L, Ando T, Svensson P. Influence of topical application of capsaicin, menthol and local anesthetics on intraoral somatosensory sensitivity in healthy subjects: temporal and spatial aspects. *Exp Brain Res*. 2015;233:1189-1199.
- Trevisani M, Szallasi A. Targeting TRPV1 for pain relief: should we quench or reignite the fire. *J Pain Man*. 2011;4:229-247.
- Kim HY, Kim K, Li HY, et al. Selectively targeting pain in the trigeminal system. *Pain*. 2010;150:29-40.

## PRACTICE EVALUATIONS

**Have your Practice evaluated in accordance with the SAAD Safe Sedation Practice Scheme: A Quality Assurance Programme for Implementing National Standards in Conscious Sedation for Dentistry in the UK**

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## Coincidence does not prove causation - a case report following intra-nasal/intravenous sedation

**Lucy Wray BDS Dip D Sed**

Senior Dental Officer

Solent NHS Trust

**Correspondence:**

lucy.wray@solent.nhs.uk

### Case summary

A 17 year old female patient was referred by her GDP to the Solent NHS Trust Dental Service for restoration of both lower second molars (37 and 47) under sedation.

Following assessment, the patient and her mother agreed that intra-nasal/intravenous (IN/IV) sedation was the preferred option.

Treatment using IN/IV enabled restoration of 37 and 47 in a single visit. However, follow up revealed the patient had lost her sense of smell.

**Pre-treatment assessment:**

The patient was unable to accept treatment without sedation due to high anxiety and profound needle phobia.

**Medical History:**

Allergy to artificial lavender. Dyslexia. Taking the contraceptive pill. Unable to receive immunisations due to needle phobia. No smoking, alcohol or recreational drug use.

**Dental History:**

Local Anaesthetic (LA) accepted in the past prior to increase in anxiety. Several failed attempts to accept LA with her trusted General Dental Practitioner. Recent completion of orthodontic treatment.

**Social History:**

Lives with her mother and father and 14 year old brother. Attends a local 6th form college where she is studying catering.

Examination confirmed the caries in 37 (LL7) and 47 (LR7) this was confirmed by the Bitewing radiographs provided by the GDP.

The patient was assessed as being suitable for sedation. (MCDASf 30)<sup>1</sup>

The base-line observations at assessment were :  
Blood pressure 104/73 (mild hypotension), pulse 85, sats: 99%

The treatment options with pros and cons for each were discussed. The patient (with agreement from her mother) made the informed choice to accept treatment under IN/IV sedation. She also agreed to take part in a clinical audit and service evaluation of conscious sedation with midazolam for young people receiving dental care. Information leaflets about the evaluation, sedation, pre/post sedation instructions and an escort information leaflet were given to the patient. A questionnaire was also given to the patient to be returned post-operatively as part of a survey into sedation for adolescents.

**The treatment provided was as follows:**

Sedation: Intra-nasal midazolam (IN) 10mg (0.25 ml of 40mg/ml midazolam and 20mg/ml lidocaine (see footnote)) enabled cannulation of the R dorsum where a further 4mg midazolam were titrated to the sedation end point. Initial reluctance to accept IN was managed with re-assurance, the sedation went well with the patient remaining alert and co-operative throughout and the operative conditions were good.

Dental: Local anaesthesia (LA) 2% lidocaine 1:80000 adrenaline 2ml Inferior Alveolar Nerve Block on the right and 4% articaine 1:200000 adrenaline 1.5ml via buccal infiltration on the left provided adequate anaesthesia for restoration of 37 and 47 with composite.

Recovery: normal and uneventful.

10 days after the sedation the clinician received a 'Thank you' card from the patient and also the post-sedation questionnaire. (See appendix 1 and 2)

The questionnaire mentioned that the patient had lost her sense of smell following the intranasal sedation.

On telephoning the home her mother reported that the following day the patient had not been able to smell the burnt bread that the rest of her catering class had noted. It was agreed to follow this up in a week.

On speaking to the patient a week later she reported that her sense of smell was improving but not back to normal. On questioning she was able to smell strong smells such as nail polish remover but had lost the sense of smell for more subtle odours. This was not causing undue concerns to the patient but resolution was to be hoped for. Review in a further week was agreed, otherwise a referral to her GP or ENT was to be considered.

Meanwhile the clinician contacted colleagues from SAAD and no-one had experienced this situation before.

The weekly review indicated that the condition was still not fully resolved and the GP appointment was made. Full details of the intranasal sedation spray were given to the GP.

The GP appointment (7 weeks after the sedation appointment) resulted in the provision of Flixonase nasal spray (27.5 mcg/spray) for hayfever. This medication resulted in complete resolution of the sense of smell for the patient.

## Reflection/discussion

The sense of taste and smell, (gustation and olfaction) are known as "chemical senses" because of their ability to transmit chemical stimuli as a neural signal. These senses, although they may seem trivial, are crucial to the perception of the environment and quality of life.

The sense of smell is always subjective and hence difficult to measure. Different people may smell/describe the same odour differently.

Any alteration in the baseline is important. The patient is hoping to be a chef in the future and her sense of smell would be extremely important in her career choice. The safety and efficacy of intra-nasal sedation have been confirmed in 2 large multi-clinic reviews.<sup>2,3</sup> No serious side effects or hyposmia (reduced ability to smell) were reported. To date no other case report of this effect could be found following intra-nasal midazolam.

This unusual post-sedation effect appeared to be long-lasting (7 weeks). Follow up and treatment by the GP for hayfever resolved the temporary hyposmia. This suggests that the sedation was in fact unrelated to the development of the hyposmia. The clinician was reminded of the fact that 'coincidence does not prove causation'.

Resolution of the problem provided relief for the patient, her mother and the clinician. The patient reports she would still be happy to have this treatment again in the future should the need arise.  
(See Appendix 1)

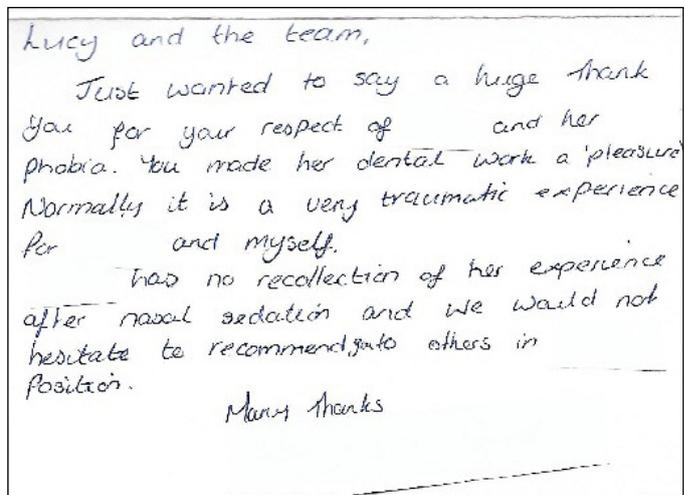
Footnote: Intranasal midazolam is available from : Guy's and St Thomas' Production Unit, Pharmacy Department, St Thomas' Hospital, London SE1 7EH Tel 020 7188 4992

## References

1. Howard K E and Freeman R. Reliability and validity of a faces version of the Modified Child Dental Anxiety Scale. *Int Journal of Paedi Dent*; 2007;281-8
2. Ransford N J, Manley MCG, Lewis DA, et al Intranasal/ intravenous sedation for the dental care of adults with severe disabilities: a multicentre prospective audit. *Br Dent J* 2010; 208: 565-569.
3. Manley M C G, Ransford N J, Lewis D A, et al. Retrospective audit of the efficacy and safety of the combined intranasal/intravenous midazolam sedation technique for the dental treatment of adults with learning disability. *Br Dent J* 2008; 205: E3.

## Appendix 1

Thank You card from patient and mother



## Appendix 2

Patient comments from the questionnaire

### Comments from questionnaire

- Patient agreed that the sedation had helped.
- She had felt relaxed.
- She could not remember what had happened after sedation.
- She reported that she had understood what would happen to her during the period of sedation.
- She agreed she would have this treatment again.

In the 'other comments' section she recorded that "After nasal sedation sense of smell has altered. No smell for approx 1 week and not fully returned as of 12/06/18"

Questionnaire was returned on 12/06/18.

A full copy of the questionnaire will be available following completion of the on-going service evaluation.

**The SAAD Editorial Board would welcome receiving case reports of interest and original papers for publication in the SAAD Digest**

**Submission deadline 31st July 2019**

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**Contact - [fiona@saad.org.uk](mailto:fiona@saad.org.uk)**

## A case of anosmia following administration of intra-nasal midazolam

**Joanna Dick BDS MJDF (RCS Eng) Dip Conc Sed**

*StR in Special Care Dentistry*

*Royal London Dental Hospital, Bart's Health NHS Trust, London E1 1BB, UK*

**Zahra Shehabi BDS MFDS MSc MSCD MSc (Management) CILT**

*Consultant in Special Care Dentistry*

*Royal London Dental Hospital, Bart's Health NHS Trust, London E1 1BB, UK*

### Correspondence:

*Joanna.dick@nhs.net*

### Case summary

A 59 year old female patient was referred for treatment at the dental hospital. She was aware of having several broken teeth and a mobile lower incisor. Medically, she was fit and well, but was needle phobic and anxious. On examination the patient had chronic periodontitis, several retained roots, caries, and severe tooth wear thought to be associated with gastric oesophageal reflux. Dental treatment was carried out over ten visits using intra-nasal and intra-venous midazolam. Following one of these treatment sessions the patient reported temporary loss of smell and the intra-nasal midazolam was cited as a possible cause.

### Patient details

Gender: Female

Age at start of treatment: 59 years

### Pre-treatment assessment

#### History of presenting patient's complaints

- Needle phobia: Had previous failed extractions under sedation
- Several broken teeth: no pain at present, but aware some teeth will require removal
- Loose tooth: pointed to LL1

#### Relevant medical history

- Fit and healthy ASA 1
- No reports of formerly diagnosed GORD

#### Dental history

- Bad experience as a child with dentists, failed extractions under sedation/GA in past, fainting with bloods
- Brushing with Aloe Vera paste

#### Clinical examination

- Intra-oral examination: fair oral hygiene, no pockets greater than 3mm, significant buccal recession of 9mm, and grade 1 mobility of LL1 were noted.

- Severe palatal tooth surface loss causing visibility of reactionary dentine consistent with intrinsic erosion, was noted to affect:

1	6	5	4	3	2		1	2	3	4	5	6
1		5	4	3	2		1	2	3	4	5	6

- Retained roots

	6	5										
	7	6										

- Caries

									6			

- Sensibility testing: negative for LL6, UL34 and positive for all other teeth

#### General radiographic examination

Peri-apical radiolucency was found associated with LL6, and horizontal bone loss posteriorly up to 10%, but up to 70% in the lower incisor region.



## Diagnostic summary

- Severe generalised erosion
- Retained roots UR65 LR76
- Periapical periodontitis LL6 UL34
- Chronic periodontitis

## Aims & objectives of treatment

- To provide dental treatment using a modality that is acceptable to the patient
- To restore patient confidence
- To improve oral health
- To prevent further tooth wear

## Treatment plan

- Liaise with general medical practitioner (GMP) for investigation of possible gastro-oesophageal reflux (GORD)
- Prevention with high concentration sodium fluoride toothpaste 1.1%
- Conscious sedation for
  - o Supra and subgingival debridement of teeth
  - o Extractions UR6, UR5 LR7, LR6, LL6
  - o Direct composite restorations of worn teeth
  - o Endodontic treatment UL3, UL4

## Treatment undertaken

Dental treatment under IN and IV sedation with midazolam over 10 treatment sessions

- 12mg midazolam IN at every visit
- Average of additional 1-3mg midazolam titrated intravenously
- Complained re loss of smell sensation after 3rd sedation for a period of two days- had gone to her GP who suggested may be from the IN- symptoms subsided before next visit 3 weeks later.
- Ellis grade 2<sup>1</sup> (see table 1 for Ellis scoring system)
- Extraction of UR6, UR5, LR7, LR6, LL6
- Endodontic therapy UL3, UL4
- Direct composite restorations- UR4321 UL123456
- Non-surgical periodontal therapy-LL1

## Post treatment radiographs



## Long term treatment and future considerations

Prevention of future tooth wear is vital for this patient if she wishes to retain her remaining teeth and maintain the aesthetic appearance following treatment. It must be ensured that the possibility of GORD is followed up with her GMP and is managed accordingly. Any additional causes of tooth wear such as bruxism, acidic dietary factors or frequent vomiting must also be ruled out and if required, managed appropriately.<sup>2</sup>

Helping the patient to overcome/manage her needle phobia and dental anxiety would improve her access to dental care. The number of dental practitioners who can provide sedation is limited and those who are experienced in the administration of intranasal midazolam prior to cannulation are even more so.<sup>3</sup> Both the composite restorations placed and periodontal health will require regular maintenance appointments in order for dental health to be sustained.<sup>4,5</sup> Referral for Cognitive Behavioural Therapy may therefore be beneficial to improve access to dental care.<sup>6</sup>

## Discussion

Administration of midazolam intra-nasally to allow provision of intravenous sedation can offer better access to dental treatment for those who cannot tolerate cannulation, be that due to a severe learning disability or needle phobia.<sup>7</sup> In this case, it allowed access to treatment for a patient who was needle phobic and had considerable dental need; although her teeth were currently asymptomatic, there was large potential for pain and infection in the future. An alternative option could have been to provide inhalation sedation (IHS) with nitrous oxide in order to facilitate cannulation.<sup>8</sup> However, in this case, the patient's needle phobia was such, that the anxiolytic effects of IHS were insufficient to allow co-operation for cannulation.

Given that the treatment plan took ten visits to complete, it could be argued that a one visit general anaesthetic (GA) to complete all treatment would be more preferable.<sup>9</sup> Although this would result in fewer appointments and be more cost-effective and convenient for service providers and the patient, a GA would have necessitated a more aggressive treatment plan,<sup>9,10</sup> and may not be available for anxious adults locally as was the case here. The patient was adamant that she wished to retain as many teeth as possible; if a GA had been provided, the UL3 and UL4 would have been extracted rather than root treated, rendering conscious sedation the most appropriate treatment modality. Conscious sedation with propofol infusion could have offered the benefit of longer treatment sessions and therefore fewer visits, due to its rapid action and short half-life<sup>11</sup> and additionally the patient might have responded favourably to a patient-controlled administration technique.<sup>12</sup> Again, this was not available locally.

The patient's experience of loss of smell following an episode of administration of intra-nasal midazolam is not widely reported in the literature. A reason may be that the majority of patients who have intra-nasal midazolam in order to facilitate cannulation are those with a severe learning disability who would have difficulty in communicating an alteration in their sense of smell. It is therefore very difficult to quantify whether or not this is a true side-effect of intra-nasal midazolam. In addition, in the case of this patient, the possibility of alternative causative factors was not fully explored.

Hayfever, an upper respiratory tract infection or sinusitis, could all have given rise to a temporary loss of sense of smell.<sup>13</sup> Irritation or inflammation of the nasal lining can also lead to anosmia.<sup>14</sup> It is possible therefore that the pressure of the Mucosal Atomisation Device spray could cause damage to the inner lining of the nose, leading to loss of sense of smell. Medications, such as antibiotics, anticonvulsants, nasal decongestants and antihistamines have also been linked with anosmia,<sup>14</sup> therefore the midazolam (or lidocaine) itself could be the causative factor. Indeed there is an example in the literature of topical nasal anaesthesia leading to permanent anosmia.<sup>15</sup>

Further research is therefore needed to explore whether any loss of sensation could be a side-effect of any of the constituents of intra-nasal midazolam or the method of administration itself.

**Table 1 Ellis Scoring System<sup>1</sup>**

Ellis Score	Description
1	No unwanted limb movement; total co-operation and no restlessness
2	Small amount of uninvited limb movement; still total co-operation and no restlessness.
3	More uninvited limb movement; small degree of restlessness and anxiety. Patient less co-operative; still able to perform all dental procedures.
4	Considerable degree of limb movement; perhaps also unhelpful head movements; co-operation poor; patient quite restless and anxious; able to perform only basic dentistry; advanced, delicate work not possible.
5	Restlessness, anxiety and limb movements severe; impossible to perform any dentistry.

## References

1. Ellis S. Response to intravenous midazolam sedation in general dental practice. *Br Dent J* 1996; 180: 417-420.
2. Carvalho J C, Scaramucci T, Aimee N R, Mestrinho H D, Hara A T. Early diagnosis and daily practice management of erosive tooth wear lesions. *Br Dent J* 2018; 224: 311-318.
3. Manley M C G, Skelly A M, Hamilton A G. Dental treatment for people with challenging behaviour: general anaesthesia or sedation? *Br Dent J* 2000; 188: 358-360.
4. Milosevic A. Clinical guidance and an evidence-based approach for restoration of the worn dentition by direct composite resin. *Br Dent J* 2018; 224: 301-310.
5. Axelsson P, Lindhe J. The significance of maintenance care in the treatment of periodontal disease. *Journal of Clinical Periodontology* 1981; 8: 281-294.
6. Hare J. Combining sedation and cognitive behavioural therapy (CBT) to overcome dental phobia: a case report. *SAAD Digest* 2017; 33: 29-33.
7. Manley M C G, Ransfor N J, Lewis D A, Thompson S A, Forbes M. Retrospective audit of the efficacy and safety of the combined intranasal/intravenous midazolam sedation technique for the dental treatment of adults with learning disability. *Br Dent J* 2008; 205; E3: 1-5.
8. Collado V, Faulks D, Nicolas E, Hennequin M. Conscious sedation procedures using intravenous midazolam for dental care in patients with different cognitive profiles: A prospective study of effectiveness and safety. *PLoS ONE* 2013; 8: 1-11.
9. Glassman P, Caputo A, Dougherty N, Lynos R, Messieha Z, Miller C, Peltier B, Romer M. Special Care Dentistry Association consensus statement on sedation, anaesthesia, and alternative techniques for people with special needs. *Spec Care Dentist* 2009; 29; 2-8.
10. Manley MCG, Skelly AM, Hamilton AG. Dental treatment for people with challenging behaviour: general anaesthesia or sedation? *Br Dent J* 2000; 188(7); 358-360.
11. Craig DC, Boyle CA, Fleming GJP, Palmer P. A sedation technique for implant and periodontal surgery. *J Clin Periodontol* 2000; 27: 955-959.
12. Osborne GA, Rudkin GE, Jarvis DA, Young IG, Barlow J, Leppard PI. Intra-operative patient-controlled sedation and patient attitude to control. *Anaesthesia* 1994; 49: 287-292.
13. Sobol S, Frenkiel S, Mouadeb D. Olfactory dysfunction: what's that smell. *The Canadian Journal of Diagnosis* 2002; 55-63.
14. Bromley S M. Smell and Taste Disorders: A Primary Care Approach. *Am Fam Physician* 2000; 61; 427-436.
15. Salivinelli F, Casale M, Hardy J F, D'Ascanio, Agro F. Permanent anosmia after topical nasal anaesthesia with lidocaine 4%. *British Journal of Anaesthesia* 2005; 95; 838-839.

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## A Synopsis of articles of interest from the last twelve months to inspire further reading



Fareed Ahmad



Jennifer Hare



Rosie Whatling

### A review of the indicator of sedation need (IOSN): what is it and how can it be improved?

Shokouhi B,<sup>1</sup> and Kerr B<sup>2</sup>

<sup>1</sup> Senior Speciality Dentist in Oral Surgery, Oral Surgery Department;  
<sup>2</sup> Consultant in Sedation and Special Care Dentistry, Sedation and Special Care Department Guy's Hospital Great Maze Pond, London, SE1 9RT

*Br Dent J* 2018; 224: 183–188

#### Abstract

The indicator of sedation need (IOSN) is a tool that has been devised to help with clinical decision making, health needs assessment and commissioning purposes for the provision of sedation services. It can potentially increase access for patients to sedation when used as a screening tool, however, there are some shortcomings in the IOSN, such as the fact that it is not speciality specific, that can reduce its efficacy. As such, in its current form the IOSN may not be robust enough to be used as a sole commissioning tool and may in fact create barriers to patients that would benefit from sedation. By addressing these issues and understanding its limitations, the IOSN can be used more effectively for its intended purposes.

#### Background

The decision as to whether sedation is required lies mainly with the clinician, through a discussion with the patient. However, more than often it is not a simple situation of being able to easily identify those in need and those who can be managed without sedation. The IOSN has been designed as a tool to assist in decision making but it has limitations which is the main discussion point of this paper. The purpose of the IOSN has been proposed to be either as a referral tool for use in commissioning of services, or as a health needs assessment (HNA) tool, and it is comprised of three components, Patient anxiety, Medical History and Treatment Complexity. These three areas are each assigned a score based on an anxiety questionnaire filled in by the patient and an assessment matrix completed by the dentist assigning a Modified Dental Anxiety Score (MDAS), which are combined to give a rating of sedation need. This final score is suggested to allow the clinician to

decide whether there is a 'need' or 'no need' for sedation for that particular patient.

IOSN was first described in a four-part series of publications in 2011 using data based in the North West of England. The original papers that were published to describe and validate the IOSN, used a sample of 606 patients gathered from four general dental practices in primary care in the North West of England. The authors state that it can be argued that this is not a representative sample to be used on a larger scale, particularly when considering different specialities such as oral surgery and special care dentistry. Using data from general practices in primary care and attempting to apply them to a very different type of practice in secondary care could be considered unrepresentative and can potentially underestimate or overestimate the need for sedation.

Additionally, the mean age of respondents in the sample was 54, which is relatively high. For example, patients requiring third molar surgery often present at a much younger age with some studies quoting a mean age of 27. As such, the data used to validate the IOSN may not be representative when considering different specialities that may have a different set of demographics.

It is also generally understood that need for sedation is not only based on dental anxiety levels but also the complexity of treatment and providing care in a comfortable and non-threatening manner. Therefore, some of the shortcomings of the IOSN are that there is no consideration for extraction of teeth, root canal treatment or any other potentially lengthy and uncomfortable procedures. This can clearly have an impact on the overall anxiety score, as a patient may not be anxious about routine treatment but may be extremely worried about having an extraction carried out. As such this will underestimate the total level of anxiety and give a lower IOSN score leading to a recommendation of no need for sedation.

Conversely, the medical history element does not take into account specific conditions and for example, the IOSN would potentially suggest that someone with severe respiratory disease requires sedation whereas this can, in fact, be dangerous for the patient.

Another drawback is that the IOSN can be rather easy to manipulate to score higher and create a need for sedation, which can create a demand-led service rather than a need based one, which is something the IOSN aimed to reduce.

## Comments

The article highlights the need to revisit the IOSN tool to make it more robust and beneficial to clinicians, referrers, commissioners and ultimately to be in the best interest of patients. The authors offer certain suggestions, for example an 'OSDAS' (oral surgery dental anxiety score) to be used for oral surgery specific referrals. Also, they suggest listing potentially uncomfortable procedures such as a complex wisdom tooth removal, and more importantly to somehow incorporate the clinician's thoughts and experience into the scoring system – in a scenario where a dentist who knows their patients very well - would be in a good position to advise on whether they are likely to benefit from sedation or not. Finally, the inclusion of a traffic light scoring system, where green indicates a 'no need for sedation', red indicates a 'clear need for sedation' and amber to 'take into account the clinician's opinion and other significant modifying factors', could be considered.

Nevertheless, the IOSN has to be refined much further and be adaptable in different set-ups to prove its worth. It must take into account the specific phobias associated with dentistry which can vary from patient to patient. For example needle phobia varies to the extent that a patient will accept local anaesthesia in the mouth but will be absolutely terrified at the prospect of having a needle in the arm or the hand and vice-versa. Some patients will express willingness to having an extraction carried out routinely without sedation, but will not tolerate any drilling because they cannot stand the noise or vibration. Indeed, certain patients will accept all manner of complex treatment but cannot cope with the sensation of an ultrasonic scaler. Another situation is where adequate local anaesthesia cannot be achieved in a non-phobic patient and where sedation may prove useful say in the extirpation of a sensitive pulp. Further decision options to consider would be the type of sedation which could be offered, ranging from nitrous oxide based inhalational sedation to advanced sedation services. These additional pointers would no doubt make the assessment tool more complex and time-consuming but they would ultimately improve the quality of the data and enhance the assessment process. In the final analysis, the clinician, along with an informed patient, remain the ultimate deciders of sedation need.

FA

## Can intravenous conscious sedation with midazolam be effective at facilitating surgical dentistry in adolescent orthodontic patients? A service evaluation

Stamp A J,<sup>1</sup> Dorman M L,<sup>2</sup> C. R. Vernazza C R,<sup>3</sup> et al  
 1 Clinical Fellow;  
 2 Specialist Oral Surgeon, Queensway Dental Clinic, Billingham;  
 3 NIHR Clinician Scientist, Centre for Oral Health Research, Newcastle University.  
*Br Dent J* 2017; 222: 113-119

## Background

Surgical dentistry during orthodontic care often occurs in adolescence and may involve surgical removal or exposure of teeth. The invasive nature of treatment, combined with dental anxiety, means care can often be provided under general anaesthesia (GA). Best-practice guidelines, however, endorse conscious sedation as an alternative, where appropriate. Although a limited number of studies have shown safe and effective use of intravenous conscious sedation (IVCS) with midazolam in this cohort, robust evidence to support routine use is lacking.

## Aim

To assess whether IVCS with midazolam can effectively facilitate surgical dentistry in adolescent orthodontic patients in primary care.

## Method

A retrospective service evaluation was undertaken reviewing clinical records of adolescents (aged 12–15 years) undergoing surgical exposure and/or surgical removal of teeth under IVCS with midazolam.

## Results

A total of 174 adolescents (mean age 14.2 years) attended for treatment between 2009 and 2015. Of these adolescents, 98.9% (N = 172) allowed cannulation, with all surgical dentistry completed during a single visit. Midazolam dose ranged from 2–7 mg with 79.1% of patients having good or excellent co-operation and three minor adverse events occurring.

## Conclusion

This service evaluation shows IVCS with midazolam can effectively facilitate surgical orthodontics in carefully selected adolescents. There is however a distinct need to further explore potential for this technique to provide a viable alternative to GA.

## Comments

Treating dentophobic teenagers using IVCS is considered a challenge because of the difficulties experienced by some practitioners in achieving optimum sedation in this group of patients. Despite published recommendations supporting the use of this sedation modality in this cohort in primary care, and further endorsed by NICE, which has reported midazolam as a sole-agent used in children in dentistry to have a 'good' safety profile, some health areas restrict IVCS use in primary care to adults only, because currently, there remains a lack of robust evidence demonstrating effective use of midazolam based IVCS in adolescents.

This service evaluation attempts to add to the evidence base for the use of IVCS in adolescents within a primary-care setting, and illustrates the potential for conscious sedation to provide a viable alternative to GA for some adolescents undergoing surgical dental procedures, including surgical removal and exposure or transplantation of teeth. It also identifies the need for appropriate assessment of patient suitability to receive treatment under conscious sedation and highlights the potential for IVCS to facilitate care for young people both within other areas of dentistry and medical specialties.

The study looked at 174 patients aged 12 years and over but less than 16 years of age who required at least one tooth requiring surgical removal or exposure and for whom treatment was performed under IVCS with midazolam and LA.

Interestingly, only 2 of these patients (1.1%) refused cannulation and were discharged for onward referral for treatment under GA and the remaining 172 patients were cannulated successfully. Twenty-eight patients (16.3%) were noted as being very nervous or teary on cannulation, exhibiting anxiety related to this aspect of care; once sedated, 19 (67.9%) settled well and exhibited good or excellent co-operation. The dose of midazolam administered ranged from 2-7 mg.

The positive aspect of this study is that adolescents who required a surgical procedure were treated successfully with IVCS and avoided GA. One of the key reasons for good co-operation could well have been that the patients themselves were keen to undergo the treatment because the orthodontic procedure they were undergoing was essentially to improve their appearance, which they evidently desired. Dentophobic adolescents requiring simple orthodontic extractions (for whom GA would not be 'justified') despite their phobia, seem to be able to motivate themselves to accept treatment under nitrous oxide based inhalational sedation and local anaesthetic, for the same reason.

The study has shown IVCS with midazolam, in combination with effective LA, can successfully facilitate surgical orthodontic treatment in carefully selected adolescents in primary care. This supports the appropriate use of this technique by suitably trained, experienced and equipped teams to facilitate not only surgical orthodontic treatment, but also less complex dental procedures.

Although this evaluation showed that a competent team, led by a highly experienced operator-sedationist, could provide effective adolescent care under IVCS with midazolam, the authors conclude that there is a distinct need for other dental teams to reproduce this success through prospective study and explore the potential of this technique to provide a safe and effective alternative to GA and benefit a significant proportion of adolescent patients, particularly those undergoing elective orthodontic procedures.

FA

## Use and perception of nitrous oxide sedation by French dentists in private practice a national survey

Vilanova-Saingery C,<sup>1,3</sup> Bailleul-Forestier I,<sup>2,3</sup> Vaysse F,<sup>2,3</sup> et al  
1 Perpignan Saint Jean Hospital, Paul Sabatier University, Toulouse, France;  
2 Ranguel Teaching Hospital, Paul Sabatier University, Toulouse, France;  
3 Paul Sabatier University, Toulouse, France  
*Eur Arch Paed Dent* 2017; 18: 385-391

### Abstract

**Aim:** The aim of this national survey was to record the use of

nitrous oxide and the perceptions of French dental practitioners to this form of sedation. The use of nitrous oxide sedation (NOS) has been authorised in private dental practice in France since December 2009 but, to date, no study implementing both quantitative and qualitative methods has explored such use.

**Methods:** The data were collected using a Google Forms questionnaire. A mixed methodology was used for data analysis: a quantitative approach to explore the use of conscious sedation and a qualitative thematic approach (using Nvivo software) to determine the practitioner's perception of it.

**Results:** Responses were collected from 225 practitioners (19% of the target population of 1185). Most of the responders were trained in NOS use in private dental clinics. Seventy-three percent of those who trained privately actually used NOS, compared to 53% of those trained at university ( $p$ -value = 0.0052). Above all, NOS was used for children requiring restorative dentistry. The average price of the sedation was 50 Euros and it lasted, on average, for 37 min. The qualitative and thematic analysis revealed the financial and technical difficulties of implementing NOS in private practice. However, it also showed the benefits and pleasure associated with NOS use.

**Conclusion:** This statistical survey of French dental practitioners offers an insight of the current state of the use of conscious sedation with nitrous oxide in private general dental practice in France. It also includes the first report of dental practitioners' perceptions of NOS use and may lead to a better understanding of the reasons why sedation is sometimes not used in private practice.

### Comments

In France, the use of nitrous oxide in dentistry was restricted to hospitals and became available for general use in private dental practice as late as 2009 for trained practitioners. Only an equimolar mixture i.e. a fixed 50/50 concentration of oxygen and nitrous oxide can be prescribed and other forms of conscious sedation are not available. This puts into context the tremendous advance made in the UK in promoting the wider range of conscious sedation techniques which are permitted in general dental practice within a sound regulatory and training framework.

The main objective of the present study was to employ a qualitative analysis to record the use of nitrous oxide, the frequency of such use and the added quality of care it provides, as perceived by practitioners using this technique. The study mentions that, to date, there has not been a reliable picture of the use of nitrous oxide in private dental practice in France or in Europe. Its use in private dental surgery in other countries is documented by numerous studies. Wilson's studies are mentioned as particularly interesting because they show the evolution of sedation in the USA over the last 25 years (Wilson 1996; Wilson and Houpt 2016). Those authors noted an overall increase in the number of inhalation sedations using nitrous oxide, involving 50% of patients. However, 30% of participants said they had reduced their practice of conscious sedation due to increased costs and more restrictive legislation. A study by Daher et al. (2012) conducted in Brazil, showed that the majority of practitioners had a good opinion of nitrous oxide, although 40% did not. In France,

the only previously available study was a quantitative one including a limited number of subjects (Annequin et al. 2000)

The results show that although the number of dentists trained in NOS has increased, not all of them offer this service in their practices because of technical, organisational and financial reasons. As to the costing, the fees have to remain competitive otherwise some patients might opt to avail of the free treatment available in hospital.

Interestingly, not all participants were convinced of the efficacy of NOS and felt that the use of premedication or hypnosis was potentially more useful. This is logical because NOS has definite limitations and although some practitioners utilise this form of inhalational sedation for a wide range of treatments including implants – the study cites that the maximum NOS session was 3 hours long – it seems that the French dental service, whilst retaining NOS, needs to move forward to embrace the wider concept of other forms of conscious sedation for the overall benefit of its phobic patients. It also needs to remove its fixation with the non-titratable 50/50 prescription and enable more flexibility in the dosage administration.

FA

## Cognitive behaviour therapy for anxious paediatric dental patients: a systematic review.

Gomes H S, Viana K.A, Batista A C, et al  
*Int J Paed Dent*, 2018, 28: 422-431

### Abstract

**Background:** There is a paucity of evidence about cognitive behaviour therapy in the management of dentally anxious children.

**Aim:** To systematically review evidence of the effectiveness of cognitive behaviour therapy for children with dental anxiety or dental phobia.

**Design:** Clinical trial registries, grey literature, and electronic databases, including The Cochrane Library, EMBASE, PubMed, Scopus, Web of Science, LILACS/BBO, and PsycINFO, were searched (April 2018). The reference lists of relevant studies were hand-searched. Randomised controlled trials that evaluated the effects of cognitive behaviour therapy on dental anxiety or on acceptance of dental treatment in dental patients up to 18 years were included. Two trained and calibrated reviewers performed the study selection and risk of bias assessment. The quality of the evidence was evaluated using the Grading of Recommendations Assessment, Development and Evaluation (GRADE).

**Results:** Six studies with a total of 269 patients, aged 41 months to 18 years, were included. Cognitive behaviour therapy decreased level of anxiety compared to control groups and improved cooperation/behaviour, although the quality of the evidence was low.

**Conclusions:** Cognitive behaviour therapy produces better anxiety reduction than diverse behavioural management techniques but the evidence was of low quality and further studies in children are needed.

### Comments

This systematic review presents a well-written summary of the evidence for utilising CBT approaches for dental anxiety among children. While many studies and reviews have been completed for adults, this is the first review among children – strengthening our understanding of how CBT can be used effectively among a younger population.

Using the PICOS (Population, Intervention, Comparator, Outcomes and study design) strategy for study eligibility criteria, well specified inclusion parameters were used. The six included studies covered a timeframe between 1980 and 2017, with representation from the US, Jamaica, Iran, Norway and Sweden. A range of outcomes were included, though all sought the childrens' own perceptions. All studies included a comparator of CBT to conventional behavioural management techniques (including inhalation sedation, conscious sedation, general anaesthesia and non-pharmacological approaches) – which will be of interest to the readership of Digest. While the authors acknowledged that the quality of the evidence was low, five of the six studies demonstrated significant reductions in anxiety compared to control.

What may be of interest, is what constituted CBT within the included studies; indeed three of the papers provided CBT in a single session. This somewhat contradicts traditional notions of CBT and the repeated sessions of graded exposure required to reduce anxiety in the long-term. However, as the authors note, a single-session approach to moderate dental fear has been successfully used among adults already. Perhaps this highlights an area to explore further, in which the level of anxiety and length of time affected by anxiety, are aspects to consider within intervention delivery. Indeed, one may expect someone with moderate anxiety and specific fears to be targeted successfully in a one-off session, particularly compared to someone with high anxiety about several issues. Nonetheless, what is not in question is how CBT can be effectively used within a considered model of proportionate intervention for children. The 'proportionate model'<sup>1</sup> demonstrates how the anxiety treatment approach selected, is dependent on both the level of dental anxiety and the urgency of treatment need; where forms of sedation provide a vital means to treat children with high anxiety and urgent dental treatment, with CBT offering a long-term management solution to rehabilitate individuals from fear.

1. The management of dental anxiety: Time for a sense of proportion? Newton J T, Asimakopoulou K, Daly B, Scambler S, Scott S. *Br Dent J* 2012; 213: 271-274.

JH

## Survey of treatment policies under conscious sedation at centres dealing with people with high levels of dental anxiety across the United Kingdom.

Heidari E, Banerjee A and Newton, T.  
*Br Dent J* 2018; 224: 627-632

### Abstract

**Introduction:** Individuals with dental anxiety and phobia have poorer oral health. This study sought to evaluate the extent to which service level restrictions are perceived to exist in the provision of dental treatment, through a survey of the frequency of dental treatments believed to be offered for patients with dental phobia by the dentists who provide sedation and dental care services.

**Methods:** A questionnaire survey of 70 dental practitioners working within services providing treatment under sedation for individuals with dental anxiety and phobia.

**Results:** The majority of dental care for dentally anxious and phobic patients were simple restorations (amalgam and tooth coloured fillings) (64, 91%), scaling (50, 71%) and extractions (65, 94%). More complex dental treatments (such as molar endodontics, crowns and bridges and implant replacement of missing teeth) were either never provided or were referred to a specialist clinic. Participants perceived limitations (for example restrictions to type of treatment episodes and availability/commissioning of services, in particular for patients with diagnosis of dental anxiety and phobia alone) for provision of dental care under intravenous sedation.

**Conclusion:** Most dentists routinely provided simple restorative and periodontal treatment indicating that gingivitis and periodontal disease is present in this group. The increased rates of extractions in comparison to complex dental treatments (such as root canal therapy, implant, crowns and bridges) might indicate advanced disease (therefore basic treatment), patients' and dentists' treatment preference, or service limitations as a result of specific commissioning restrictions. Few participants mentioned factors related to the dentist (lack of ability, competence or skill) as barriers for provision of complex care.

### Comments

This is the first UK-based questionnaire survey of secondary care dental settings offering conscious sedation for the management of dental anxiety; exploring perceptions of service level restrictions and frequency of dental treatments offered to individuals with dental phobia. Secondary care settings included a thorough review of those that existed within the UK, to include community dental services (CDS), general dental practices (GDPs) and teaching hospitals. Of 224 services contacted, 70 eligible questionnaires were received and are reported; reflecting the demographic, occupation and setting of the responding clinician, also highlighting the number of participants on the specialist list. In terms of treatment provided, a detailed table presents the frequency ("frequently, occasionally, seldom, never") of provided treatments across the 70 sites; with extractions reported as the most frequently provided treatments (followed by restorations and simple cleaning, while more complex care such as molar

endodontics was seldom or never provided. In terms of perceived barriers, 62% of the responders reporting having a sedation policy for phobic patients – highlighting that a good proportion did not. A detailed discussion follows, highlighting the complexities in treatment planning for individuals with dental phobia and the perceived barriers to care provision. This is a noteworthy article providing an insight into the treatment provided across sedation services in the UK.

JH

## Internet-based Cognitive Behavioral Therapy for children and adolescents with dental anxiety: open trial.

Shahnavaz S, Hedman-Lagerlöf E, Hasselblad T, et al  
*J Med Internet Res* 2018; 20: e12 (Published online)

### Abstract:

**Background:** Cognitive behavioural therapy (CBT) is an evidence-based method for treating specific phobias, but access to treatment is difficult, especially for children and adolescents with dental anxiety. Psychologist-guided Internet-based CBT (ICBT) may be an effective way of increasing accessibility while maintaining treatment effects.

**Objective:** The aim of this study was to test the hypothesis that psychologist-guided ICBT improves school-aged children's and adolescents' ability to manage dental anxiety by (1) decreasing avoidance and affecting the phobia diagnosis and (2) decreasing the dental fear and increasing the target group's self-efficacy. The study also aimed to examine the feasibility and acceptability of this novel treatment.

**Methods:** This was an open, uncontrolled trial with assessments at baseline, post-treatment, and the 1-year follow-up. The study enrolled and treated 18 participants. The primary outcome was level of avoidance behaviours, as measured by the picture-guided behavioural avoidance test (PG-BAT). The secondary outcome was a diagnostic evaluation with the parents conducted by a psychologist. The specific phobia section of the structured interview Kiddie-Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime (K-SADS-PL) was used. Other outcome measures included level of dental anxiety and self-efficacy. The ICBT, which employed exposure therapy, comprised 12 modules of texts, animations, dentistry-related video clips, and an exercise package (including dental instruments). Participants accessed the treatment through an Internet-based treatment platform and received Web-based guidance from a psychologist. Treatment also included training at dental clinics. Feasibility and acceptability were assessed by measures of engagement, adherence, compliance, completed measures, patient and parent satisfaction scale, and staff acceptability.

**Results:** The level of avoidance (according to the primary outcome measure PG-BAT) and dental anxiety decreased, and self-efficacy increased significantly ( $P < .001$ ), within-group effect sizes for both

the primary outcome (Cohen  $d=1.5$ ), and other outcomes were large in the range of 0.9 and 1.5. According to K-SADS-PL, 53% (8/15) of the participants were free from diagnosable dental anxiety at the 1-year follow-up. At the 1-year follow-up, improvements were maintained and clinically significant, with 60% (9/15) of participants who had been unable to manage intraoral injection of local anaesthetics before ICBT reporting having accomplished this task at a dental clinic. The target group showed improvement in all the outcome measures. High levels of feasibility and acceptability were observed for the treatment.

**Conclusions:** ICBT is a promising and feasible treatment for dental anxiety in children and adolescents. Integrating it into routine paediatric dental care would increase access to an effective psychological treatment. The results of this open trial must be replicated in controlled studies.

### Comments

This is an exciting study demonstrating the merits of providing psychologist-guided internet-based CBT (ICBT) in a young population (aged between 8-15 years) in Sweden. The average age of the sample was 11-years-old and the majority of participants were female (61%). The 12-week internet-based CBT was provided online, with continuous access to an assigned psychologist throughout the intervention via a secure messaging system (reportedly responding within 36-hours). Parents/carers or "coaches" undertook the first two sessions, to prepare them in how to support the child and arrange the required dental visits with a local dentist, so to provide the elements of exposure. The other 10 sessions were directed to the child, each ending with homework; a vital tenant of CBT. Homework involved both knowledge-based questions and practical exercises, including exposure to photos, audios and videos; exposure to the dental surgery was set as homework from week 6 onwards. Numerous outcome measures were assessed, which can be read in detail in the full manuscript. Results demonstrated significantly reduced avoidance (seen in the behavioural avoidance test) and dental anxiety levels, with a significant increase in self-efficacy. Furthermore, these results were maintained at 1-year follow-up, with 60% having received a dental injection who had not been able to prior to the ICBT intervention.

While the ICBT was provided online, rather than face-to-face, this was not a self-help intervention; indeed, a psychologist would communicate with individuals on a weekly basis – spending a reported 5.4-hours of clinical time (approximately 30-minutes per participant). Standard face-to-face CBT is usually delivered for 1-hour sessions, so this intervention does demonstrate a reduction in therapist time, whilst maintaining encouraging results. This form of intervention certainly provides food for thought in how CBT interventions can be innovatively delivered to increase access to the approach. Additionally, the use of the parent/carer 'coach' setting-up appointments with local dentists for exposure, provides a neat mechanism to foster confidence with a local dentist which can be maintained long after the intervention has finished; this also reduces the reliance on single-Centres to provide intensive CBT. Although there will be children who are not suited to this approach and will require more intensive face-to-face input, this novel delivery to increase access for children is worth further exploration – perhaps investigating how it might work in a UK context.

JH

## Cost-effectiveness of treating severe childhood caries under general anesthesia versus conscious sedation

*Burgette J M, and Quiñonez R B.*

*JDR Clinical and Translational Research 2018; 3: 336-345*

### Abstract

**Background:** Two common methods of treating paediatric dental patients with severe early childhood caries (S-ECC) are general anaesthesia (GA) and conscious sedation (CS). We sought to first evaluate the cost-effectiveness of treating S-ECC with GA versus CS and then compare the cost-effectiveness at 2 time points: 2011 and 2015.

**Methods:** We used a decision tree model to produce 2-year estimates of costs and outcomes from the Medicaid perspective. The model cohort consisted of healthy 3-year-olds with S-ECC in need of a theoretical set of dental treatments to be performed under either a single GA visit or 3 CS visits. Outcomes were measured in caries-free months. Costs were evaluated in 2015 US dollars. Costs, probabilities, and outcomes were estimated from published data, expert opinion, and Medicaid billing at an academic health center. One-way and probabilistic sensitivity analyses were performed.

**Results:** As compared with CS, GA resulted in 4 additional caries-free months per child. The cost of a caries-free month for GA versus CS rose from \$596 in 2011 to \$881 in 2015. These findings were sensitive to loss to follow-up for subsequent CS visits and total cost of GA.

**Conclusions:** Comprehensive S-ECC treatment had better outcomes when performed under GA versus CS. However, GA was not cost saving when compared with CS. While the cost of dental treatment increased for both GA and CS from 2011 to 2015, the cost rose faster for GA. These results have important implications due to the increasing cost to Medicaid insurance and the rising number of young children being treated for S-ECC under GA.

### Comments

This American-based study reports on the health economic comparisons of treating children with severe childhood caries with either conscious sedation (CS) or general anaesthesia (GA). As the authors alarmingly highlight, caries are the most common chronic childhood disease in America affecting more than a sixth of American children.

Based on the American care model using the Medicaid perspective to create a person-level decision tree model, this study presents results on the cost-effectiveness of treating 1000 healthy (ASA-I) 3-year-old children at two time points (2011, 2015). Outcomes were presented as caries-free months. Parameters of the model and assumptions are outlined in detail; interestingly, for CS treatment, a parameter was set that 3 treatment visits would be completed 1-month apart, within a 3-month period to reach full dental rehabilitation. The model also accounted for follow-up visits at 3, 6, 12, 18 and 24-months. As the abstract highlights, the model demonstrated 4 caries-free months for children treated with GA versus CS. However the costs associated with GA were significantly

higher, with 2015 costs highlighting an average of \$3667 extra spend per child compared to CS. Incremental cost effectiveness ratio (ICER) were calculated (as incremental costs over incremental effectiveness) and demonstrated that in 2015, treatment with GA versus CS was \$881 per caries-free month for the 2-year timeframe. Additionally, the comparison of costs in 2011 and 2015 highlighted that while both CS and GA treatment costs increased, GA increased more rapidly. One would suspect these increases in healthcare costs to be reflected internationally. The authors highlight the limitations of calculating costs using theoretical models and recognise the costs calculated reflect those incurred by the Medicaid bill-payer; it does not reflect the consequences and associated costs to families and children such as impact of pain on diet and sleep, anxiety, loss of earnings or school absence. The model did account for "aggressive preventative services" (i.e. frequent fluoride varnish or oral hygiene information) to treat decay when CS or GA was not available; however, it does not discuss the wider implications or comparable costs of prevention before reaching this point of treatment need – presumably this would be very complex to model in health economics with the various variables to consider. Nonetheless, this paper provides an insight into the costs associated with provision of treatment with CS and GA for treating severe childhood caries.

JH

## Pre-operative assessments and treatment outcomes in conscious sedation. How pre-sedation assessments can identify risk factors that can influence the success of conscious sedation

Champaneri S, Morgan C and Shehabi Z  
*Faculty Dental Journal 2018; 9: 58-64*

### Reviewer's evaluation, opinion and points of interest:

This service evaluation looked at 200 patients of ASA grade 1 or 2, seen in a 1-year time period at the Royal London Hospital in a teaching environment. They were treated by clinicians ranging from undergraduates, to Consultants in Special Care and Restorative dentistry. The age range of patients was 16- 70 years with a mean age of 36.6 years, and a higher proportion of obese patients (32.8%) than the national average (24.8%).

Whilst the study's aim was to review the effect of pre-operative assessments and the subsequent impact on the success of Conscious sedation, it was their findings with respect to Body Mass Index (BMI) which were particularly interesting. It is known that an excessive quantity of fat around the neck and peripheral structures has a negative effect impact on respiratory function which is exaggerated when laid flat. Likewise, it is thought that midazolam IV sedation, in conjunction with a compromised airway, increases the likelihood of oxygen desaturation during sedation. However, obstructive sleep apnoea is not linearly related to increased BMI.

In this cohort, they reported no statistically significant differences in: incidence of cannulation success on the first attempt with those high or low BMIs; high BMI and Ellis sedation grade; high BMI and

incidence of prolonged recovery periods; and high BMI and oxygen desaturation levels.

The authors showed that overall, a high BMI had no significant impact on sedation outcome and suggest that alternatives to BMI should be considered as adjuncts in risk assessments for patients being treated in primary care or outpatient settings, given the increasing obesity epidemic and constrained health budget. They recommend the use of the STOP-BANG assessment aimed at assessing the risk of obstructive sleep apnoea. Finally, they postulated that a high BMI may be more relevant to practical decisions regarding the loading limit of the dental chair, with most currently accommodating up to 133kg, rather than to an assessment of suitability for outpatient conscious sedation.

RW

## Treatment outcomes of using inhalation sedation for comprehensive dental care

Madouh M, BaniHani A, Tahmassebi JF  
*Eur Arch Paed Dent. 2018; 19: 33-37*

### Reviewer's evaluation, opinion and points of interest:

This large study by researchers in Leeds, looked at the outcomes of dental treatment within a UK specialist hospital setting. This was conducted as a retrospective cohort study of 465 case notes of patients under 17 years old over a 6-year period. Patient age ranged from 2 -17 years with the mean age being 10. There were multiple operator sedationists including specialists in Paediatric dentistry but the majority were postgraduate students where English may have been their second language and who may have been learning this technique for the first time.

The outcomes were split into five groups: (i) treatment completed as planned - 63.6%, (ii) modified treatment completed -7.1%, (iii) treatment abandoned under sedation and referred for general anaesthesia - 15.9%, (iv) sedation not needed and treatment done under local anaesthesia - 2.2% and (v) child 'was not brought' to complete their treatment - 11.2%. Treatment outcomes were significantly associated with patients age ( $p=0.002$ ), with those falling into group (iii) and requiring general anaesthesia having significantly lower mean patient ages.

It would have been interesting to break down whether the grade of staff either treatment planning or completing the treatment under sedation, had any effect on the successful outcome/ completion of the course of treatment, as the figure reported revealed less success than in other previously published hospital-based studies. However, this work further evidences that children respond well to this form of sedation and is a successful alternative option to general anaesthesia for many children.

RW

# The gag reflex - aetiology and management

**Ashish Patel BDS**

Senior House Officer/Dental Core Trainee

Oral & Maxillofacial Surgery, Northwick Park Hospital, Harrow HA1 3UJ

Correspondence: [ashishpatel93@hotmail.com](mailto:ashishpatel93@hotmail.com)

## Abstract

The gag reflex, (or the pharyngeal response), is a normal, automated defence mechanism designed to prevent foreign bodies from entering the upper airway. This is a protective response present in most people, but in some it may be absent whilst in others it may be more pronounced. One study of 140 healthy subjects found that in 37%, a gag reflex was absent.<sup>1</sup> In the dental setting, a severe gag reflex may pose challenges both for the patient and the dentist.

Various management techniques can be tried to suppress the gag reflex. Sedation is a pharmacological technique often used to manage patients with marked gag reflexes, however, it is not effective in all cases. To help explain this, the science and anatomy of the gag reflex should be explored as well as the mechanism of its action. Understanding how common sedation techniques, namely intravenous and inhalational sedation, impact on the gag reflex may explain why sedation techniques are not always successful in reducing the gag response. Alternative methods such as acupuncture and behaviour modification, and their effects on the gag reflex may also be useful in management. Clearly, a detailed assessment for each patient should always be taken to ensure that the most appropriate techniques are employed to achieve the best outcome in each individual case.

## What is the gag reflex?

The gag reflex is an automated defence mechanism intended to prevent foreign bodies from entering the trachea, larynx and pharynx. The term 'gagging', is often interchangeable with 'retching', however, the literature suggests that the two terms are different; 'gagging' refers to a protective response to objects entering the mouth and oropharynx, whereas 'retching' is defined as the ejection of noxious substances. The reflex is believed to be caused by the stimulation of the cranial nerves leading to an automatic contraction of the oropharyngeal muscles, resulting in a motion of air passing over the epiglottis. This motion is often compared to 'reverse peristalsis' and results in a retching sound.<sup>2</sup> Patients with a marked gag reflex often find that dental treatment is disrupted or difficult to undergo, and in severe cases it may not be possible to tolerate dental treatment at all. Understanding the science and anatomy of the gag reflex may explain how even a well-sedated patient can often exhibit a marked gag reflex.

## Aetiological factors of the gag reflex

Triggering of the gag reflex result from both somatogenic and psychogenic causes. Whilst most people have some propensity to gag, our focus here is on those with a moderate to very severe gag reflexes (Grade III – V, gagging severity index).<sup>3</sup> Rather than considering individual aetiological factors, the focus should be on understanding how the contributing factors come together to trigger a gag response, as is discussed later.<sup>4</sup>

### Local and systemic disorders

Many conditions have been thought to exacerbate the gag reflex including: nasal obstruction, sinusitis, conditions of the GI tract and apprehension. It has been proposed that individuals with GI tract conditions can demonstrate a more excitable gag reflex as they are more prone to irritation, whether this be from dryness or fluid build-up around the throat; a similar theory is said to be the case for smokers or drinkers.<sup>5,7</sup>

### Anatomical factors

There is limited evidence suggesting natural variation in anatomy may predispose certain individuals to a more severe gag reflex. One study involved radiographically assessing anatomical differences between a group of denture patients, involving an equal number of gaggers and non-gaggers, with their dentures in and out. The results showed no significant anatomical differences between the two groups.<sup>6</sup>

However, when these patients wore their dentures, a diversity in features including distalisation of soft palate and tongue and narrowing of the linguopharyngeal and palatolaryngeal airways, were observed. Another theory has been proposed that gaggers have a more extensive afferent neural pathway in the region of the palate and the posterior lingual region. Nonetheless, there are many factors that can aggravate a gag reflex and in this instance, a conclusion cannot be made whether anatomical variation is a contributory factor, or how well the dentures were made.<sup>5,6,8</sup>

### Psychological factors

Anxiety is the most common psychogenic trigger of the gag reflex.<sup>8,9</sup> One proposal for this link is that the medulla oblongata, through which sensory neurones from the trigger zones of gag reflex pass, also has an extensive neural pathway to higher centres. The psychogenic origin of a gag reflex can also be described through classical conditioning, which occurs when a neural stimulus becomes paired over time with a behavioural response through learned behaviour. A hypothetical example could be that a patient develops a gag reflex whenever they see a dental mirror.<sup>10</sup> A similar belief is thought to relate to other conditions, including temporomandibular joint dysfunction (TMJD) and atypical facial pain, where there is often no organic cause to the condition, but rather a psychogenic origin.<sup>11</sup>

One study, involving 90 patients undergoing endoscopic examination, assessed the benefit of applying topical anaesthetic to the pharynx, as well as the use of IV sedation. One group received the topical anaesthetic, another received a placebo and the third received neither. The results showed no significant difference in responses, as all groups were sedated well enough for the procedure. Theoretically, this study also demonstrates that if the cause of the gag reflex is psychogenic, then attempting to manage the somatogenic aspect will not necessarily make a difference.<sup>12</sup>

## Iatrogenic factors

The gag reflex can even be intensified by us as practitioners. For instance, the gag reflex can be triggered during a routine intra-oral examination by contacting the tongue, soft palate or tonsillar pillars and the use of a 3-in-1 and suction can also elicit reactions in patients with a severe gag reflex.<sup>6</sup>

The way in which dentures are designed can also aggravate a patient's gag reflex.<sup>13</sup> For example, excessive thickness of the denture base material can often limit freedom of movement for the tongue; whether it be a thick lingual extension of a lower denture or a thick upper maxillary denture.<sup>14,15</sup> Similarly, an incorrect OVD or a poorly constructed denture which is constantly moving around due to a lack of retention, can initiate gagging; a common link in these manufacturing errors appears to be that the tongue often finds itself displaced posteriorly towards the opening of the pharynx so initiating gagging.<sup>6</sup> During restorative or oral surgery procedures, patients can often develop a marked gag reflex during the administration of palatal injections making treatment challenging.<sup>6</sup>

In conclusion, it would be unwise to consider causative factors individually as the aetiology of the gag reflex is multifactorial. For example, a denture patient may suffer from a strong gag reflex due to iatrogenic, anatomical and psychological contributions. Equally, a patient who gags whenever a dental mirror is used to examine soft tissue around the soft palate or posterior lingual region may not do so when they brush their teeth at home, raising the question whether their gag reflex is somatogenic or psychogenic in nature. The clinician needs to be aware of the complex nature of the gag reflex and to assess each patient holistically.<sup>3</sup>

## How the gag reflex works

Stimulation of the trigger zones of the gag reflex, which include the base of tongue, palate, palatoglossal and palatopharyngeal fold, uvula, posterior pharyngeal wall result in transmission of afferent nerve impulses sent via the trigeminal, glossopharyngeal and vagus nerves.<sup>2,16</sup> These impulses travel to the brain, passing through the medulla oblongata; the brain then transmits efferent impulses to the muscles of the tongue, oropharynx and GI tract, which results in contraction of muscles such as the superior constrictor muscles and the circumoral musculature.<sup>17</sup>

The medulla oblongata, the gag control centre, is also close to the centre that controls hypersalivation and vomiting and so this can help to explain why these are expressed along with the gag reflex. In addition to the neural pathway, the way in which various conditioning theories may modulate these must also be considered.<sup>18</sup> For example, a patient who has been subject to a distressing experience in the dental chair may subsequently associate future dental examination or treatment with their previous experiences and this is an example of classical conditioning.<sup>19</sup>

Visual, auditory and olfactory afferent nerve impulses which are sent to the brain, can also impact the gag reflex;<sup>20</sup> this concept can be more easily appreciated when related to 'real-life' scenarios such as a gag reflex provoked by a foul smell, the sound of the fast handpiece or suction, or even the sight of blood.<sup>3,18,21</sup>

## Management of the gag-reflex

A range of methods can be trialled to control the gag reflex including non-pharmacological and pharmacological techniques. In all cases, a thorough history should be taken in order for the clinician to reveal likely contributing factors to the gag reflex and to decide on the best management strategy. Here I would like to consider how different management techniques affect the gag reflex and how they achieve this. Table 1 below summarises some common gagging management techniques.

NON-PHARMACOLOGICAL TECHNIQUES	PHARMACOLOGICAL TECHNIQUES
Distraction Techniques	Local anaesthesia
Desensitisation	Inhalational sedation
Cognitive Behavioural Therapy	Intravenous sedation
Hypnosis	General anaesthesia
Hypnotherapy	
TENS	
Acupuncture	

**Table 1: Common non-pharmacological and pharmacological techniques used to control the gag reflex**

### What is sedation?

Conscious sedation is defined as a technique in which the use of one or multiple drugs creates a state of depression of the central nervous system thus enabling treatment to be carried out; it differs from General anaesthesia as the patient is still conscious but in a relaxed state, yet they are still able to maintain verbal contact throughout treatment, and there is a wide margin of safety with the drugs and techniques commonly used.<sup>22</sup>

### Intravenous sedation

Intravenous sedation is a newer method of conscious sedation in dentistry; midazolam alone is currently the most preferred drug for this technique.<sup>23</sup> Midazolam itself is a benzodiazepine, which consequently gives it both anxiolytic and amnesic properties. More specifically, it is an enhancer of the neurotransmitter GABA, and the effect that this has on GABA<sub>A</sub> receptors is one of neural inhibition. The use of midazolam results in anxiolysis, muscle relaxation, anticonvulsant effects and retrograde amnesia.<sup>24,25</sup> The benefit of IV sedation is that patient co-operation is not as salient to the success of the treatment compared to inhalational sedation, due to a more profound level of sedation. The duration of suppression of the gag reflex is variable, depending on the patient's response to midazolam.

### Inhalational sedation

Inhalational sedation is an alternative technique in which gaseous nitrous oxide (N<sub>2</sub>O) is the drug used. N<sub>2</sub>O is an odourless, colourless, non-irritant analgesic and anxiolytic agent which is

titrated with O<sub>2</sub>. This technique is commonly used, and is preferred to the use of IV sedation when sedating children below the age of ten. N<sub>2</sub>O can produce symptoms of euphoria, anxiolysis and analgesia. The mechanism of action of N<sub>2</sub>O is not fully known, but current understanding is that it is an NMDA glutamate antagonist.<sup>26</sup> There is evidence that N<sub>2</sub>O can reduce the severity of the gag reflex.

One study compared the use of nitrous oxide with table salt when palpating the soft palate with a spoon; whilst the use of table salt didn't appear to have any effect on the gag reflex, nitrous oxide showed a marked reduction in sensitivity of the gag reflex. Whilst there is evidence of N<sub>2</sub>O reducing anxiety, this appears to be indirectly through anxiolysis, yet there is no evidence suggesting a direct mechanism by which the gag reflex is suppressed.<sup>27,28</sup> A comparison of the two techniques is shown in Table 2.

Whilst our understanding of sedative agents is broad, it has not yet been established whether sedative agents can directly suppress the gag reflex or whether they reduce anxiety and affect it indirectly. For instance, Midazolam is said to provide a more profound sedation experience yet there is limited evidence to suggest that either technique is more effective than the other.<sup>29,30</sup>

INTRAVENOUS SEDATION	INHALATIONAL SEDATION
Anxiolytic	Anxiolytic
Amnesic	No amnesic effect
No analgesic effect	Analgesic
Long recovery time	Short recovery time
Long induction	Short induction
Shorter 'sedation window' to work with	Able to maintain sedation level for longer

**Table 2: Comparison between intravenous and inhalational sedation**

### Local anaesthesia

The role of local anaesthesia in the suppression of the gag reflex is mostly relevant to patients with a somatogenic-derived gag. One may consider the use of local anaesthetic to reduce the patient's awareness of tactile sensation. The local anaesthetic can be administered either topically or through an injection. One of the drawbacks of using local anaesthesia for suppressing the gag reflex is that the region most affected is the posterior palate and consequently by anaesthetising this region, one can also suppress other essential reflexes such as coughing and swallowing.<sup>31</sup> However, this technique has value with co-operative patients with somatogenic derived gagging, in clinical scenarios such as impression taking or restorative procedures on posterior teeth.

### Acupuncture

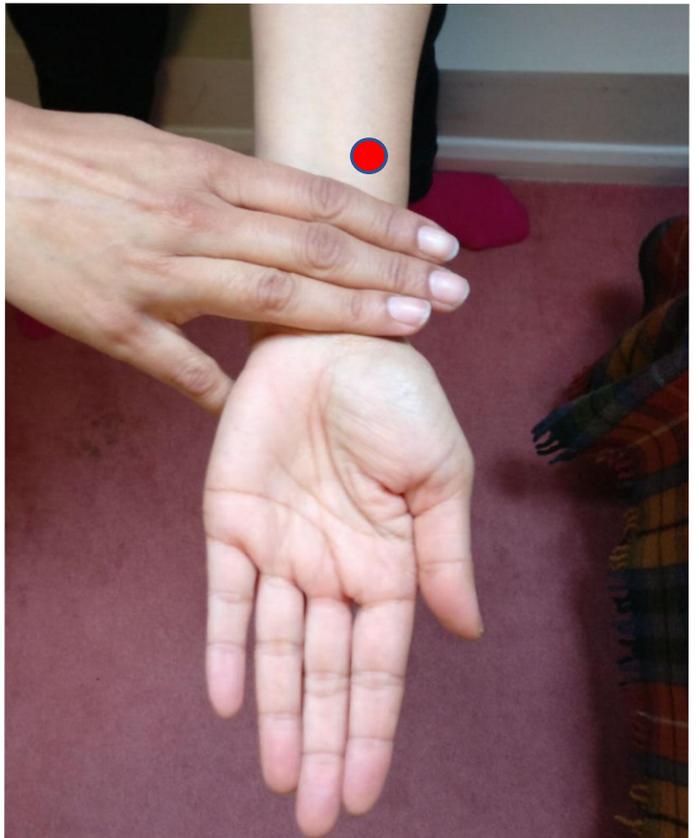
Acupuncture is a technique that involves the application of small gold or silver needles to specific points around the ear, face and

arm. Specific anti-gagging points have been identified in the literature including the PC-6 point on the arm, the CV-24 point in the mentolabial groove and the 3 points on the ear; namely the Shenmen, stomach and throat points. Various trials have shown evidence of their success in reducing the severity of the gag reflex.<sup>3,32-34</sup> Illustrations of these anti-gagging points can be seen below in Figures 1,2,3.

**Figure 1: The CV-24 point on the mentolabial groove**



**Figure 2: The PC-6 point on the arm**



**Figure 3: The 3 anti-gagging points on the ear:**

● Shenmen ● Stomach ● Throat



The mechanism of action of acupuncture in suppressing the gag reflex is unknown. However, for ear acupuncture, there is speculation that the acupuncture points are in the region innervated by the laryngeal branch of the vagus nerve and close to that of the auriculo-temporal branch of the trigeminal nerve. These are two cranial nerves that innervate many of the muscles involved in the gag reflex and even though there is no evidence of a specific mechanism of action, some authors have considered the possibility that acupuncture has an inhibitory effect on the motor function of these nerves and the muscles involved in the gag reflex.

One study involved 10 patients with either severe or very severe gag reflexes who would not otherwise be able to tolerate dental treatment. Acupuncture needles were applied to specific points on the ear for 2-3 minutes. Results showed that the gag reflex was completely controlled in 8 out of the 10 patients and partially controlled in the remaining 2; nonetheless, dental treatment was carried out successfully in all 10 patients.

The study showed that not only was ear acupuncture effective, but it did not take up too much additional chairside time, the additional cost per patient was £0.20 and there was no extensive recovery period for the patients. Even so, a more extensive trial would be required to eliminate or otherwise the potential placebo effect that could have played a role in the suppression of the gag reflex here, rather than the acupuncture itself.<sup>3</sup>

## Behavioural management

Non-pharmacological methods can also be practised to reduce anxiety in patients or progressively change their conditioning so that they can learn to tolerate dental treatment.

Distraction techniques can help reduce anxiety by drawing a patient away from the stimuli that is precipitating anxiety and subsequently focusing on something unrelated to the treatment. An example of this are breathing exercises in which a patient reduces their tendency to gag by focusing on their abdominal breathing, this reduces their anxiety by diverting their attention from its cause.<sup>7</sup>

Desensitisation is a more gradual process in which the patient exposes themselves progressively with each appointment to a 'seemingly' harmful aspect of dental treatment, such as dental needles or impression trays. This method works by empowering the patient with knowledge and belief that they can tolerate treatment. This is a process that shouldn't be rushed as this could result in a backward step for the patient and a potential breakdown in the dentist-patient relationship.<sup>35</sup>

The impact of behavioural techniques should not be underestimated and clinicians should always aim to work through a cascade of least invasive methods to more invasive ones. In addition, whilst pharmacological techniques are often very effective at managing patients on a short-term basis, it could be argued that the best way of eliminating the gag reflex long-term for patients lies within non-pharmacological methods.

## Discussion

The gag reflex is a complex automated response that is exacerbated by multiple factors. As a result, patients should be thoroughly assessed to ascertain the cause of their gag reflex and managed appropriately to eliminate the causative factor where possible.

Having reviewed the anatomy of the gag reflex and the main management techniques, one could conclude that the main way in which sedation suppresses the gag reflex is indirectly through anxiolysis and muscle relaxation. There is no suggestion that sedation has a direct inhibitory effect on the mechanism of the gag reflex itself other than through reducing the impact of contributing factors, such as anxiety. As to why sedation does not work in all cases, theoretically this could be since not all patients have a psychogenically-derived gag reflex and if the cause is somatogenic in nature, then sedation may not be particularly effective. Further research analysing effectiveness of sedation techniques on gaggers with a non-psychogenic aetiology could help us to learn more about how sedation affects the gag reflex.

Acupuncture appears to have a role in suppressing the gag reflex, however, what is uncertain is how much the placebo effect has a role in acupuncture rather than the effect of the acupuncture itself. Acupuncture is an appealing treatment option due to its inexpensive nature, its minimal impact on chairside time, the fact that it is painless for patients and doesn't require extensive recovery time unlike sedation; a controlled trial would appear to be the next step in improving our knowledge of this technique and its value.

Behavioural management strategies should always be attempted prior to pharmacological intervention; this underpins the importance of carrying out a thorough assessment of all patients to determine the cause of the patient's pronounced gag reflex. For instance, it would be unwise to manage a denture-wearer with a severe gag reflex with IV sedation immediately, without even considering whether the nature of their gag reflex is iatrogenic and whether denture adjustments could be made first. The goal with any patient who is a gagger is eventually to rehabilitate them to a point where they can overcome their fears about treatment. Pharmacological methods such as IV sedation arguably do not contribute to this aim as patients often forget their sedation experience and their anxiety levels do not reduce over time, unless a combination of pharmacological and non-pharmacological methods is employed.

Above all, it is important to note that clinicians should not forget fundamental skills such as rapport-building with their patient, ensuring that the dental surgery is an appropriate setting where the patient feels comfortable and that they are treated with care and compassion. Only if these aspects of patient care are achieved will other techniques work.

## Accreditations

Special thanks to Mr Sami Stagnell BDS MFDS(RCSEd) MSc MFGDP(UK) AKC MOraISurg(RCSEngJEd) AFFMLM, Specialist Oral Surgeon, for his guidance and support on this piece of work.

## References

- Davies A, Stone S, Kidd D, MacMahon J. Pharyngeal sensation and gag reflex in healthy subjects. *Lancet* 1995; 345: 487-488.
- Meeker H, Magalee R. The conservative management of the gag reflex in full denture patients. *N Y State Dent J* 1986; 52: 11-14.
- Fiske J, Dickinson C. Acupuncture: The role of acupuncture in controlling the gagging reflex using a review of ten cases. *Br Dent J* 2001; 190: 611-613.
- Hoad-Reddick G. Gagging: a chairside approach to control. *Br Dent J* 1986; 161: 174-176.
- Wright S. Medical history, social habits, and individual experiences of patients who gag with dentures. *J Prosthet Dent* 1981; 45: 474-478.
- Wright S. An examination of factors associated with retching in dental patients. *J Dent* 1979; 7: 194-207.
- Barsby M. The control of hyperventilation in the management of 'gagging'. *Br Dent J* 1997; 182: 109-111.
- Wright S. The radiologic anatomy of patients who gag with dentures. *J Prosthet Dent* 1981; 45: 127-133.
- Kramer R, Braham R. The management of the chronic or hysterical gagger. *ASDC J Dent Child* 1977; 44: 111-116.
- Schole M. Management of the gagging patient. *J Prosthet Dent* 1959; 9: 578-583.
- Fink G. *Stress: Concepts, Cognition, Emotion and Behavior*. 1st ed. United States: Academic Press, 2016.
- Cantor D, Baldrige E. Premedication with meperidine and diazepam for upper gastrointestinal endoscopy precludes the need for topical anesthesia. *Gastrointest Endoscop* 1986; 32: 339-341.
- Krol A. A new approach to the gagging problem. *J Prosthet Dent* 1963; 13: 611-616.
- Means C, Flenniken I. Gagging—a problem in prosthetic dentistry. *J Prosthet Dent* 1970; 23: 614-620.
- Faigenblum M. Retching, its causes and management in prosthetic practice. *Br Dent J* 1968; 125: 485-490.
- Conny D, Tedesco L. The gagging problem in prosthodontic treatment. Part I: Description and causes. *J Prosthet Dent* 1983; 49: 601-606.
- Logemann J. Swallowing physiology and pathophysiology. *Otolaryngol Clin North Am* 1988; 21: 613-623.
- Newton A. The psychosomatic component in prosthodontics. *J Prosthet Dent* 1984; 52: 871-874.
- Noble S. The Management of Blood Phobia and A Hypersensitive Gag Reflex by Hypnotherapy: A Case Report. *Dent Update* 2002; 29: 70-74.
- Pastorello J. Chronic gagging in the new denture wearer. *Journal Am Dent Assoc* 1959; 59: 748-749.
- Miles T, Nauntofte B, Peter S. *Clinical Oral Physiology*. 1st ed. Copenhagen: Quintessence, 2004.
- SDCEP. *Conscious Sedation in Dentistry*. 2017. Online information available at <http://www.sdcep.org.uk/wp-content/uploads/2017/07/SDCEP-Conscious-Sedation-Guidance.pdf> (Accessed March 2018).
- Bardhan K, Morris P, Taylor P, Hinchliffe R, Harris P. Intravenous sedation for upper gastrointestinal endoscopy: diazepam versus midazolam. *BMJ* 1984; 288: 1046.
- Edwards M, Serrao J, Gent J, Goodchild C. On the Mechanism by Which Midazolam Causes Spinally Mediated Analgesia. *Anesthesiology* 1990; 73: 273-277.
- Olkkola K, Ahonen J. Midazolam and other benzodiazepines. *Handb Exp Pharmacol* 2008; 182: 335-360.
- Jevtović-Todorović V, Todorović S, Mennerick S et al. Nitrous oxide (laughing gas) is an NMDA antagonist, neuroprotectant and neurotoxin. *Nat Med* 1998; 4: 460-463.
- Chidiac J, Chamseddine L, Bellos G. Gagging prevention using nitrous oxide or table salt: a comparative pilot study. *Int J Prosthodont* 2001; 14: 364-366.
- Kaufman E, Weinstein P, Sommers E, Soltero D. An Experimental Study of the Control of the Gag Reflex with Nitrous Oxide. *Anesth Prog* 1988; 35: 155-157.
- Wilson K, Girdler N, Welbury R. A comparison of oral midazolam and nitrous oxide sedation for dental extractions in children. *Anaesthesia* 2006; 61: 1138-1144.
- Yoshida H, Ayuse T, Ishizaka S, Ishitobi S, Nogami T, Oi K. Management of Exaggerated Gag Reflex Using Intravenous Sedation in Prosthodontic Treatment. *Tohoku J Exp Med* 2007; 212: 373-378.
- Canard J, Letard J, Palazzo L, Penman I, Lennon A. *Gastrointestinal Endoscopy in Practice*. 1st ed. Edinburgh: Churchill Livingstone, 2011.
- Firouzabadi V, Daneshkazemi A, Daneshkazemi P, Davoudi A, Badrian H. Is acupuncture effective in controlling the gag reflex during dental procedures? A review of literature. *Anesth Essays Res* 2016; 10: 173.
- Rosted P, Bundgaard M, Fiske J, Pedersen A. The use of acupuncture in controlling the gag reflex in patients requiring an upper alginate impression: an audit. *Br Dent J* 2006; 201: 721-725.
- Rahshenas N, Mostofi S, Valaai N, Farajad A. The effect of acupressure on the gag reflex. *Journal of Research in Dental Sciences* 2015; 12: 130-133.
- Taylor G, Campbell C. A clinical guide to needle desensitization for the paediatric patient. *Dental Update* 2015; 42: 373-382.

## An audit to assess the escort's knowledge of patient safety following intravenous sedation at Manchester Dental Hospital

Daniel Watson

5th Year BDS student University of Manchester

Correspondence: dan.pat.watson@gmail.com

### Abstract

**Background:** Dental anxiety, fears and phobias are ubiquitous in the provision of dental care. Intravenous conscious sedation is a common management strategy for these conditions. A key element in managing risk with this strategy, is that the patient has to attend their appointment with an appropriate escort.

**Aims:** To assess escorts' understanding of their responsibilities to the patient following dental treatment under intravenous sedation. Objectives of the audit were to identify the current level of patient safety under care of escorts and improve the information given to escorts if required.

**Methods:** Cross-sectional survey and audit of 51 escorts of patients treated under midazolam-led sedation in the oral surgery division of Manchester Foundation Trust. Standards: 100% should have been informed of their duties and have thorough knowledge of post operative patient safety instruction.

**Results:** 51 questionnaires were collected between 16th Oct 2017 – 24th Nov 2017. The 100% target was not met.

**Action plan:** Provide the escort with another information sheet at the appointment and sign to confirm their responsibilities, before the patient is sedated. Improve the information sheet given to escorts. Implement a strategy to provide video information that can be sent to the escort to watch. Re-audit in 6 months.

### Introduction

Dental anxiety, fears and phobias are ubiquitous in the provision of dental care. When patients either have anxiety, fear or a phobia associated with their dental treatment this can have a huge impact on their quality of life and limit the quality of dental treatment, either due to poor attendance or the ability to perform the required treatment if they do attend.<sup>1</sup> The prevalence of dental anxiety in the UK is estimated at 49% by the 2009 UK Adult Dental Health Survey, this was assessed using the Modified Dental Anxiety Score.<sup>2</sup>

There are a number of management strategies for these patients; behavioural and cognitive therapies and tools, conscious sedation and general anaesthesia. Conscious sedation is a commonly used method of managing the anxious patient. The widely accepted definition of conscious sedation is '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'.<sup>3</sup>

Intravenous sedation (IVS) is now commonly used in the delivery of dental care. Midazolam, a benzodiazepine, is the most commonly used IVS drug in dentistry. It is useful to facilitate the treatment of highly anxious or phobic patients undergoing routine dental extractions, allowing general anaesthesia to be avoided and is also of benefit in facilitating the treatment of mildly-anxious patients undergoing a single episode of minor oral surgery. IVS is also used for complex and unpleasant procedures and also may be used for patients whose medical condition could be worsened by stress – e.g. angina, anxiety induced asthma.<sup>4</sup> Pretty et al.<sup>5</sup> have suggested that the prevalence of dental anxiety in the population is estimated at 4%. This is can only be an estimate as they could only assess those who actually attended, and the majority of the dentally anxious patients do not attend unless they are in pain.

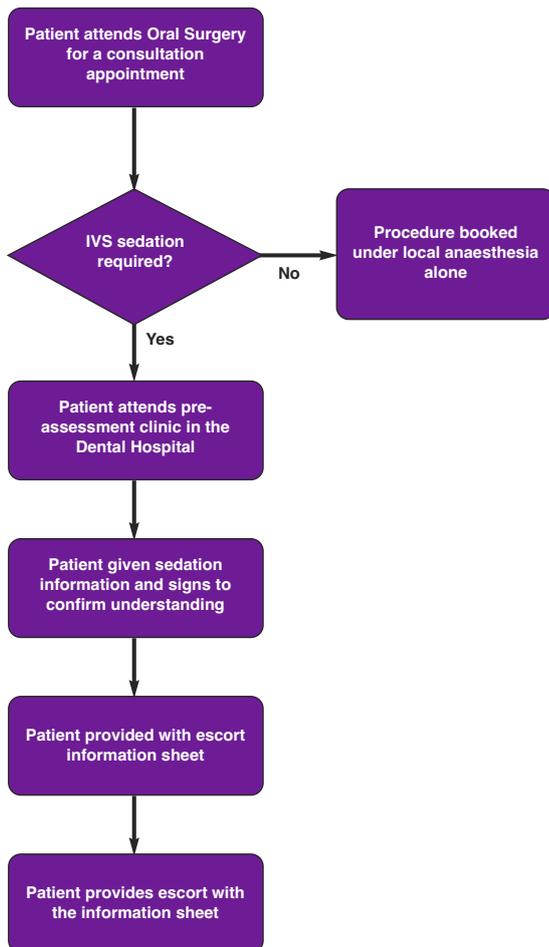
Guidelines exist for the consent process, delivery of sedative drugs and post operative recovery care for patients undergoing treatment under IVS. The dental faculties of the Royal Colleges of Surgeons and the Royal College of Anaesthetists produced the document 'Standards for conscious sedation in the provision of dental care'.<sup>6</sup> The Royal College of Surgeons' guidelines have now been superseded by the Scottish Dental Clinical Effectiveness Programme guidelines. One of the key elements in managing risk in the provision of IVS is that the patient has to attend their appointment with an appropriate escort. That escort has to be physically able to care for the patient for 24 hours after they are discharged from the sedation staff. An escort can be defined as a person who travels with someone in order to protect and guard them.<sup>7</sup>

The escort has to be provided with written instructions about their responsibilities and post operative care prior to the treatment.<sup>8</sup> These are the requirements and responsibilities of the escort:

1. The escort should be an adult.
2. The escort should be of able body, to support the patient unaided.
3. The escort should attend without children or dependants.
4. The escort should accompany the patient to their place of residence, preferably not by public transport.
5. They should stay with the patient for the rest of the day or, for late sedation appointments, overnight.
6. They should ensure that the patients maintain any medicine routines they are taking.
7. They should ensure the patient doesn't operate machinery, sign any legal documentation, consume alcohol or drugs for 24 hours.
8. They should ensure the patient does not drive a car for 24 hours.
9. The escort should know who to contact if any problems arise when the patient is in their care.

There are no set standards for the delivery of this information to the patient and their escorts. This means that there may be many variations in the details given to the patient and the method of delivery used. In Manchester Dental Hospital and Dental Sedation Suite at the MRI there is no formal assessment of a patient's escort. Across the two locations there are between 10-30 IVS patients seen on a weekly basis.

The procedure for informing and consenting the patient for IVS, in Manchester Dental Hospital, is represented by the flow chart below:



The hospital staff send the patient a letter and text message to inform and remind them of their treatment appointment. The patients are not required to give to the hospital staff the details of the escort who will accompany them. On the day of their treatment, the patient and escort book into reception and the oral surgery nursing staff visually assess the escort for their suitability. The patient and escort are questioned on the type of transportation that will be utilised to get them home after they are discharged. The treatment is carried out and the nursing staff give verbal post-operative instructions to the patient and escort in the recovery area. There are no set standards for the detail of instruction given to escorts or methods to ensure escorts understand their role and responsibilities.

The standards for conscious sedation in the provision of dental care.<sup>6</sup> state that "sedation services must demonstrate a high level of safety and a continuing improvement in quality. The use of appropriate audit tools to review clinical outcomes is an essential component of good clinical practice. Careful and reflective use of such data will enhance patient safety and improve the quality of

care". It is imperative that we reduce any risk to our patients pre-, during and post-operatively. So, having a clear and effective protocol to assess patients' escorts is a method to manage and reduce post operative issues.

## Objectives

**Aim:** To assess escorts' understanding of their responsibilities to the patient following dental treatment under intravenous sedation. Objectives of the audit were to identify current levels of patient safety under care of escorts and improve the information given to escorts if required.

## Standards

The gold standard for this audit was the patient information provided, at Manchester Dental Hospital, in the pre-assessment booklet and escort information leaflet. These standards are in line with the SDCEP standards stated above. Escorts are informed of the post-operative instructions and sign to say they understand them all. The target was for 100% of intravenous patients' escorts to have a thorough knowledge of post-operative patient safety instructions.

	Patient information
1	You must not consume alcohol 24 hours prior and after your treatment.
2	You must not smoke cigarettes for 48 hours after your treatment.
3	You must not take any recreational drugs, including cannabis, 48 hours prior to your treatment and 48 hours after your treatment.
4	You must not drive a car or any other vehicle for 24 hours after your treatment.
5	You must not operate any types of machinery including computers/phones/kettles or carry children as you may feel lightheaded following sedation.
6	You must not sign any legal documentation for 24 hours following your treatment.
7	You must not breast feed for 24 hours following your treatment.
8	Do not wear false nails/acrylic/nail varnish.
9	Your escort must be 18 years+ and physically fit to wait in the waiting area, take you home by car or taxi, NOT public transport and to look after you for 24 hours following your treatment.
10	Your escort has to have sole responsibility for looking after you for the 24 hours post-operative period. They cannot look after children or other relatives.
11	You and your escort has to have access to a telephone at home day/night.
12	Your treatment will be cancelled if you or your escorts attend with children under the age of 16.
13	If your escort requires an interpreter please let the nurse know prior to your treatment date.

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## Methods

The prospective audit was carried out between 16th Oct 2017 and 24th Nov 2017 in the Oral Surgery Department of the Manchester Dental Hospital and the Dental Sedation Suite of the Manchester Royal Infirmary.

51 randomly chosen escorts were invited to complete a questionnaire consisting of 23 questions. The questionnaires were provided at reception on arrival at the Departments involved. The completed questionnaires were answered and returned to the nursing or reception staff. The responses were compared to the gold standard. On evaluating the responses, a risk assessment and action plan will be implemented on the procedure for informing the escorts of their duties.

## Results

The audit resulted in 51 questionnaires being completed and collected across the two locations. The target of 100% of intravenous patient escorts to have a thorough knowledge of post-operative patient safety instructions was not met.

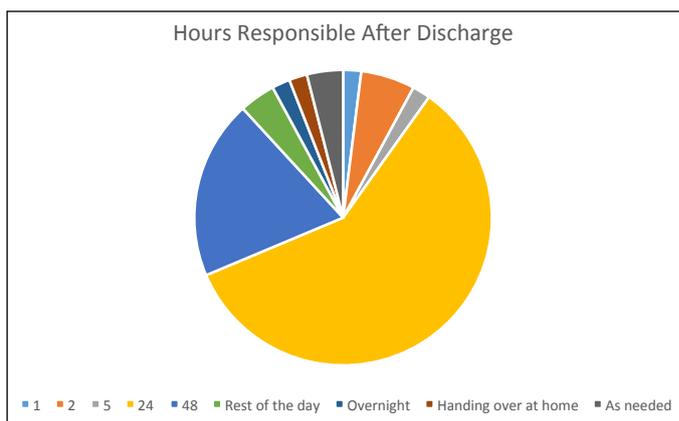
The first section of the questionnaire asked key information about the duties of the escort and their responsibilities in general. The results are tabulated below and answers are expressed in percentages. The green represents full compliance with the gold standard and the red represents the shortfall in relation to the gold standard:

Question	Yes	No
Has the patient informed you of your duties as an escort?	100%	0%
Have you read the information sheet regarding today's appointment?	86%	14%
Do you know what treatment the patient is having today?	100%	0%
Do you know who to you call if you have concerns once the patient is at home?	84%	16%

From the data above 100% of the escorts said they had been informed of their duties and knew what treatment the patient was having on the day but 14% of the escorts had not read the information sheet that was given to the patient, for them to read concerning their roles and responsibilities. 16% of the escorts did not know who to call if they had concerns once the patient was at home. This is a huge patient safety and risk management issue.

At the pre-operative assessment, it is made very clear that the patient should be transported home in either a private car or taxi and not to use public transport. This element of the questionnaire illustrated that this information is understood with a 100% compliance. 34 of the escorts drove the patients home and 17 used taxi services.

The final question in the general information section of the questionnaire was to determine if the escort knew for how long they were to be responsible for the patients care and wellbeing after they were discharged from the hospital's care. The chart below shows the answers that were provided.



In total 78% of the escorts answered 24 hours or 48 hours and would meet the gold standard. However, 22% answered below this standard. The alarming responses of 1 hour, 2 hours and 5 hours raises some concerns. These patients would be left vulnerable and at risk. This means the escort is 'unsafe' as they are unaware of the potential consequence of IVS. However, the author does feel that the escort may have found it difficult to understand the question and this could have contributed to the varied responses.

In section 2 of the questionnaire, specific questions were asked in relation to post operative activities that the patient could and couldn't carry out. The results are presented in the table below in percentage format:

Which of the following activities can be carried out by the patient in the next 24 hours?	Yes	No	Unsure
Make a cup of tea	27%	69%	4%
Go back to work	2%	98%	0%
Go for a walk outside	14%	80%	6%
Be left alone	4%	92%	4%
Climb a ladder	0%	98%	2%
Drink alcohol	0%	96%	4%
Use the internet	53%	35%	12%
Cook a meal	4%	88%	8%
Drive a car	2%	98%	0%
Look after children	4%	96%	0%
Have a shower/bath	39%	37%	14%
Sign legal documents	2%	94%	4%
Go to sleep	27%	59%	14%
Change their clothes	94%	0%	6%
Drink water	98%	0%	2%
Watch TV	96%	2%	2%
Exercise	39%	53%	8%

The responses were varied and not one question met the 100% standard that was set for this audit. If the escort answered 'unsure', it represented an incorrect answer to the question. The questions set had varying risk associated with each one; the most dangerous

questions, such as “Can the patient climb a ladder?” and the least risky question, such as “Can the patient drink water?” the answers were more to do with common sense. However, when the risk was between least and most, such as “Can the patient go to sleep?” the answers took more thought. The answers then displayed some uncertainty and incorrect responses. The author’s opinion is that the information isn’t clear on the leaflets provided, or the escorts don’t read the information.

## Conclusion

Patient risk management is a key element to deliver safe, efficacious and effective patient care. This is a vital part of Clinical Governance that all care providers must adhere to and improve on at every opportunity.

It is evident from the results that there is an information sharing gap between the patient and their escorts. The fact that 14% of the escorts did not read the information leaflet provided to the patient on the pre-assessment examination, is of concern and asks the question “Are the escorts suitable and safe for the duties that are required of them?”. Moreover, 16% of the escorts did not know whom to call if there were concerns or an emergency with the patient after discharge from the hospitals. On the specific questioning section of the questionnaire, some serious issues are raised from some of the answers provided. 4% of the escorts thought it was permissible for the patient to be left alone, 2% of the escorts thought it was safe for the patient to drive, 39% would let the patient exercise after sedation. There are errors in patient risk management and this should be addressed in the action plan.

The specific questioning element of the questionnaire has indicated that a much simpler and effective process for the passage of information and a clearer information display system is required; one that is easier to understand and perhaps encompasses different learning styles. In this modern era, with technology at everyone’s finger tips, the use of visual imagery via video messages and coloured charts for accurate information indication, may close the gap in relation to the IVS escorts’ knowledge on their roles and responsibilities. Patel et al.<sup>9</sup> suggest that visual information sharing improves short and long term memory retention in comparison to written information sharing.

The problem may be that the patient either isn’t giving the leaflet to the escort or possibly they may be giving them it but it isn’t being read or even that the escort is unable to read. The patient has so much information to retain on their pre-operative assessment that they are possibly unable to retain all of it and are less concerned with the escort’s details.

## Action plan

The following actions could be taken to improve the escorts’ knowledge of post-operative instructions for I.V. sedation patients:

- Provide the escort with the information leaflet for the second time, on the day of the appointment and get them to sign that they understand their roles and responsibilities before the patient is sedated.
- Redesign the escort information sheet to use images or colour to stimulate better information retention
- When the patients receive their appointment confirmation text message from the dental hospital text service, a video link to

the hospital YouTube channel could be included. The video would demonstrate information on all the critical roles and responsibilities that the escort requires to be ‘safe and effective’. The patient should then forward the link on for their escort to watch.

- Re-audit in 6 months to evaluate the changes.

## Acknowledgements

My thanks are due to Dr Neil Patel, BDS(Hons), Specialist Registrar in Oral Surgery at the University of Manchester Dental Hospital for his support and guidance with this audit.

## Appendix 1

### Sedation Services Escort Questionnaire – Oral Surgery

We are currently reviewing the quality of information we provide to escorts of patients undergoing conscious sedation. We would be grateful if you could please spend a few moments to complete the following questionnaire:

About today’s appointment:

Question	Yes	No
Has the patient informed you of your duties as an escort?		
Have you read the information sheet regarding today’s appointment?		
Do you know what treatment the patient is having today?		
How are you getting home today?		
How long will you be looking after the patient?	(Hours)	
Do you know who to you call if you have concerns once the patient is at home?		

After the treatment at home:

Which of the following activities can be carried out by the patient in the next 24 hours?	Yes	No	Unsure
Make a cup of tea			
Go back to work			
Go for a walk outside			
Be left alone			
Climb a ladder			
Drink alcohol			
Use the internet			
Cook a meal			
Drive a car			

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Look after children			
Have a shower/bath			
Sign legal documents			
Go to sleep			
Change their clothes			
Drink water			
Watch TV			
Exercise			

Thank you for taking the time to complete this questionnaire. You are helping to improve the patient experience and make their care even safer.

Have a safe journey home.

Yours thankfully,  
The Oral Surgery Team

## References

1. Milgrom P, Newton J T, Boyle C, Heaton L J, Donaldson N. The effects of dental anxiety and irregular attendance on referral for dental treatment under sedation within the National Health Service in London. *Community Dent Oral Epidemiol* 2010; 38: 453-459.
2. Humphris GM, Morrison T, Lindsay SJ. The Modified Dental Anxiety Scale: validation and United Kingdom norms. *Community Dent Health* 1995; 12: 143-50.
3. Academy of Medical Royal Colleges. (2013). *Safe Sedation Practice for Healthcare Procedures: Standards and Guidance*. Online information available at [www.rcoa.ac.uk/document-store/safe-sedation-practice-healthcare-procedures-standards-and-guidance](http://www.rcoa.ac.uk/document-store/safe-sedation-practice-healthcare-procedures-standards-and-guidance) (accessed Oct 2017).
4. Coulthard P. Conscious Sedation in Dentistry: Dental Clinical Guidance. *Evidence-Based Dentistry* 2000; 7: 81-82.
5. Pretty I, Goodwin M, Coulthard P, et al. Estimating the need for dental sedation. 2. Using IOSN as a health needs assessment tool. *Br Dent J* 2011; 211; 1-5.
6. The Intercollegiate Advisory Committee for Sedation in Dentistry. *Standards for Conscious Sedation in the Provision of Dental Care* 2015. <https://www.rcseng.ac.uk/-/media/files/rcs/fds/publications/dental-sedation-report-2015-web-v2.pdf> (accessed October 2017)
7. Collins dictionary. Definition of an escort. Online information available at <https://www.collinsdictionary.com/dictionary/english/escort>. (accessed Oct 2017)
8. Scottish Dental Clinical Effectiveness Programme. *Conscious Sedation in Dentistry 2017*. <http://www.sdcep.org.uk/wp-content/uploads/2018/07/SDCEP-Conscious-Sedation-Guidance.pdf> (accessed October 2017)
9. Patel JH, Moles DR, Cunningham SJ. Factors affecting information retention in orthodontic patients. *Am J Orthod Dentofacial Orthop* 2008; 133: S61-S67.

# SAAD ESSAY PRIZES

**Three essay prizes are available annually**

**Drummond-Jackson Essay Prize of £500**

**Dental Student Essay Prize of £300**

**DCP Prize of £300 for a case report  
or service evaluation**

*Details on page 80*

# SAAD Symposium 2018

## Challenges for the Future

Saturday 22 September 2018

The Royal Society of Medicine, London, UK

The 2018 SAAD Symposium was opened by the retiring President, Dr Francis Collier, who welcomed delegates and announced that our Course Director, Dr David Craig has been awarded an MBE in Her Majesty The Queen's Birthday Honours List that Summer.

Dr Craig, who is Consultant and Head of the Sedation and Special Care Dentistry Department at Guy's & St Thomas' NHS Foundation Trust, was our first speaker of the day. He gave an overview of the assessment of potential airway and breathing difficulties when treating patients under conscious sedation, and the importance of patient monitoring and the advantages and disadvantages of different electrical devices. He emphasised the need to be able to recognise and manage airway related complications.

Our next speaker, Dr Lucy Wray, is a Specialist in Special Care Dentistry and works as a Senior Dental Officer for Solent NHS Trust. We have increasing numbers of diabetic patients within our community in the UK. Lucy presented from the view of an expert patient, and updated our knowledge of diabetes, and our understanding of the impact and complications of this condition. She suggested how to best manage dental treatment and sedation for diabetic patients.

From the North East of Scotland we enjoyed a presentation from Dr Vikram Kavi, who uses conscious sedation to support his implant dentistry work in a general practice setting. Dr Kavi shared his concepts for team working when providing conscious sedation for patients undergoing dental implant treatment, as well as the possible pitfalls. He explained how the dental team can enhance the patient experience of patients undergoing dental implant treatment.

We welcomed back Dr Jennifer Hare, Consultant Health Psychologist, and Dr Bryan Kerr, Consultant in Special Care Dentistry, to update us on the progress since last year's symposium, in their work to explore the use of immersive 360-degree video in graded exposure within a Cognitive Behavioural Therapy approach for dental phobia. Again, a practical demonstration was given during lunch time which provided delegates an opportunity to try the Virtual Reality technology for themselves.

Before breaking for lunch and the Society's AGM, Dr Collier presented some prizes:

Dental Care Professional Essay Prize: Stephanie Reilly

Dental Student Essay Prize: Daniel Watson

Drummond Jackson Essay Prize: Ashish Patel

Best Poster: First Prize: Thea Dickens:

Second Prize: Geraldine McDermott

In the Centenary Year of the Royal Air Force, it was a great pleasure to welcome Group Captain (Ret'd) Marguerite Reith, who had recently retired from the RAF Dental Branch. She has the rare distinction of having served as a Dental Officer in both the Royal Australian Air Force as well as the Royal Air Force. A very well illustrated talk gave background to dental services and dental sedation in the RAF, as well as her own experiences during her service career.

The importance of effective patient communication was discussed by Mrs Kate Rivett, who has a background as lay patient lead at the Royal College of Anaesthetists. She has wide experience in a variety of lay roles. She was appointed as the patient representative to the IACSD, where she developed the patient information in collaboration with clinicians. She emphasised the importance of effective patient communication, for tailored written patient information to engage with a variety of patient groups and issues relating to the obtaining of valid consent.

The Sheffield self-help Cognitive Behavioural Therapy programme for dentally anxious children was presented by Dr Fiona Noble (Academic Clinical Fellow in Paediatric Dentistry) and Dr Jen Kirby (Speciality Registrar in Paediatric Dentistry), both from Charles Clifford Dental Hospital in Sheffield. The extent of childhood dental anxiety was discussed, stating that it has often been managed pharmacologically. The use of Cognitive Behavioural Therapy for managing dental anxiety was presented, with key features of the self-help CBT guide, followed by the practical application of this guide and case studies.

Colleagues from Bradford Community Dental Service presented the Anxiety Management Pathway they had developed. Dr Nadiya Suida (Senior Dental Officer) and Dr Edwina D'Souza (Dental Officer) outlined the challenges which their patients may present, and the evolution of their anxiety management pathway which encompasses a variety of techniques, both non-pharmacological and pharmacological. They concluded that the use of both types of management may help to rehabilitate anxious patients, as well as providing cost savings.

The Symposium was closed by the newly appointed SAAD President, Dr Stephen Jones, who had been confirmed as the successor to Dr Francis Collier at the Society's Annual General Meeting during the lunch break. Dr Jones paid tribute to Dr Collier's Presidency and his work in producing the Scientific Programme for this Symposium. He thanked delegates for attending and invited them to attend the 2019 Symposium to be held on Saturday 27th September at the Bridgewater Hall in Manchester.

*Francis Collier*

## SAAD Annual Symposium Abstracts

### 'Breathing matters'

David Craig MBE FDS RCSEd  
Consultant / Honorary Senior Lecturer  
Head of Sedation & Special Care Dentistry  
Guy's & St Thomas' NHS Foundation Trust  
Floor 26, Tower Wing, Guy's Hospital  
Great Maze Pond, London SE1 9RT  
david.craig@kcl.ac.uk



Conscious sedation is now being used in a wide variety of medical specialties to render uncomfortable diagnostic and therapeutic procedures more acceptable to patients. In dentistry in the UK, sedation using a range of safe and effective techniques is widely available in both primary and secondary care settings. The high quality of these services owes much to the long history of excellent knowledge, skills and experience-based training /updates offered by SAAD, University departments and other accredited providers. This is a growing market – in the last three years the Sedation Training Accreditation Committee (STAC) has approved over 55 programmes and over 60 'independent' supervisors. The SAAD SAS, SASN and SAST schemes are increasingly popular.

Careful assessment of potential airway and breathing difficulties, recognition of the importance of meticulous patient monitoring (including understanding the advantages and disadvantages of different electrical monitoring devices e.g. pulse oximetry and capnography) and the prompt and effective recognition and management of any airway-related complications are important elements in ensuring patient safety.

This presentation addressed these topics by providing a brief update on: health assessment, airway assessment, monitoring of ventilation, managing complications, maintaining ILS-level airway rescue skills and the importance of clinical audit and research.

In relation to health assessment, the original ASA classification (1941) was compared with the revised version (2014). The latter is an improvement in that it contains helpful examples of medical conditions, which should make determination of an individual's medical status more accurate. That said, it remains a deceptively imprecise tool which can lead to misunderstanding of the risks

posed by some patients undergoing procedures under conscious sedation. The use of the 'National Early Warning Score ('NEWS') was also discussed.

A variety of schemes for predicting difficult B-V-M ventilation were discussed. These included: including LEMON, BONES and STOP-BANG. In 2012 the RCoA recommended consideration of the following: age (>55), BMI (>26), lack of teeth, facial hair and a history of snoring. Neck mobility is clearly also important.

The advantages and disadvantages of pulse oximetry and capnography were discussed. The latter has the potential to warn of hypoxaemia by up to 240 seconds in advance of the former. However, more evidence relating to the use of capnography for dental patients who are receiving IV conscious sedation is required before making firm recommendations about its routine use in dentistry. It is most likely to be useful for patients who are classified ASA III – V.

IACSD expects all those providing conscious sedation to be able to manage the complications listed on page 28 of their Standards (2015). The most critical of these is respiratory depression /apnoea. It is important to understand that the risk of critically reduced ventilatory drive is much higher when more than one conscious sedation drug is used e.g. an opioid plus a benzodiazepine (see Baily PL et.al. Frequent hypoxemia and apnea after sedation with midazolam and fentanyl. *Anesthesiology*. 1990 73: 826-30). IACSD expects sedation team members to have current ILS airway rescue skills and to audit the use of conscious sedation.

### Sedating the diabetic patient

Lucy Wray BDS Dip D Sed  
Specialist in Special Care Dentistry,  
New Milton Dental Clinic, New Milton Health Centre,  
Spencer Road, New Milton, HANTS BH25 6EN  
lucy.wray@solent.nhs.uk



Lucy gave a presentation from the view of an expert patient (having had Type 1 diabetes for 44 years) with the aim of reducing any barriers to care for patients with diabetes.

A brief overview of this complex condition was described. The prevalence and its worrying rate of increase was discussed. The Afro-Caribbean, South Asian and lower socio-economic groups as well as those with large waist sizes were all recognised as being at increased risk of developing diabetes.

Treatment for both types of diabetes and the different management strategies were described. She reminded the audience that over 40% of Type 2 diabetics were in fact insulin dependent.

The importance of monitoring blood glucose levels was stressed for all insulin dependent diabetics and those Type 2 diabetics taking Sulphonylureas. Lucy demonstrated both the regular Blood Glucose Monitor and also her Flash glucose monitor which measures the interstitial blood glucose level. Lucy reminded the audience that the average diabetic only spends 30% of the day within the 'normal' blood glucose range of 4-8mmol/l

The extremes of the blood glucose spectrum were described and the causes and treatments were given for each of these.

The different complications of diabetes emphasised the impact that this condition can have on multiple body systems. Lucy explained that the psychological impact of living with this 'fickle master' of a condition should not be underestimated. Suggestions for how to manage dental treatment (including sedation) for patients with diabetes were given. Updating the signs of a hypoglycaemia, regular use of a BGM and a well-informed, reliable escort were all recognised as being important in order to maintain patient safety. Lucy reminded the delegates that there is usually an expert on their own diabetes sitting in the dental chair.

Two case reports were given to show how to manage both the diabetic patient under sedation (Case 1) and an undiagnosed diabetic patient (case 2)

Following this Lucy informed the audience of future developments in diabetes care and the hopes for a future cure. She concluded with the cost to the NHS of treatment for diabetic patients (the majority of which is spent on the cost of complications) and the duty of all healthcare professionals to help reduce this by referring patients for diagnosis and treatment when appropriate.

## Conscious sedation and implant dentistry

*Vikram Kavi BDS MFDS RCS Edin  
Thistle Dental Orthodontic and Implant Centre  
Aberdeen  
vikram.kavi@thistledental.com*



With new challenges on the horizon it is important to look at new concepts and ways of working with sedation with regards to dental implants in the future. This talk included a summary of the challenges being faced today and those of the future. Even though a clear pathway forwards is difficult to achieve, new protocols and workflows need to be engineered to make sure that the future is safe

## Virtual reality for dental phobia

*Dr Jennifer Hare DHealthPsy, CPsychol AFBPS  
Consultant in Health Psychology  
Dr Bryan Kerr BDS, MSc, MSpec Care Dent  
Consultant in Special Care Dentistry  
Dental Health Psychology Service and Sedation & Special Care  
Dentistry, Guy's Hospital  
Jennifer.hare@kcl.ac.uk bryan.kerr@kcl.ac.uk*



A year following the introduction of the same topic at the last Symposium in 2017, Dr Jen Hare and Dr Bryan Kerr presented an update, providing an overview for those unfamiliar with the work and a sneak-peek at the results gathered from their research – "A feasibility study, to explore the use of immersive 360-degree

video in graded exposure within a Cognitive Behaviour Therapy (CBT) approach for dental phobia”.

Their talk began with an introduction to CBT for dental phobia, capturing the theory, evidence-base and challenges in implementing the approach more widely across the UK. Opportunities to increase access were explored, pointing to the role of technology and the existing evidence-base when using computer-delivered CBT and virtual reality (VR), which have demonstrated good results for other phobias. The presentation provided VR's brief history in time and the recent advances in increasing access to this novel technology; no longer clunky machines seen in 90s games arcades, now our very own telephones are capable of such things with the use of head mounted display (HMD) units... also at a fraction of the cost.

Their talk concluded with ‘hot off the press’ results collected in the previous weeks for the feasibility study. Initial findings were reported from participants who had viewed the VR videos made by the team, revealing overall high levels of consistency between the virtual dental environment and the real world. Minimal or no side effects were noted by participants, with one commenting on mild levels of nausea for the first few seconds before acclimatising to the virtual dental films. A full scientific report of this study will be published in due course, and likely highlighted in a future journal scan.

After the presentation, Symposium attendees were once again invited to try the VR technology over the lunch break, where lots of interested parties had a go at wearing the HMDs and to view the videos made by the team, sharing helpful feedback. Thank you to all those who came to discuss with Jen and Bryan and watch this space for the next update on getting closer to using this exciting technology within the service for patient benefit.

## RAF100 – dental sedation in the Royal Air Force

*Margeurite Reith MBA BDSd DipDSed MFGDP(UK) RAF (Retd)  
Sedation Service, Oral Health Centre, Level 6  
288 Herston Rd, Herston QLD 4006, Australia  
marguerite.reith@health.qld.gov.au*



2018 marks the Centenary of the Royal Air Force. Winston Churchill's contention that ‘Never in the field of human conflict has so much been owed by so many to so few’ was exemplified in the turn out over the summer for the various public celebrations.

Alongside the new arm of the UK military, it became clear that there was a need for a dental service and, on 1 Apr 1930, The Royal Air Force Dental Branch was born. Recruiting was hampered by the state of the dentition of potential Airmen and a points system was employed to assess dental fitness: a candidate was credited with two points for every molar and one point for every premolar, canine or incisor that had a sound or saveable opposing tooth; the minimum acceptable score was eleven. From the very earliest days, sedation was a part of the service. So common were acute abscesses and the requirement for extractions that ‘Scale D2, Dental Anaesthetic Equipment’ was almost invariably issued with ‘Scale D1, Dental Surgery Equipment’. Certainly in those days there were many anxious patients. The use of Brietal and Diazemuls and Midazolam followed but dental sedation in the military was dependent on the activities of a few ‘enthusiastic amateurs’ until the need for a more organised provision of sedation for military patients was championed by Gp Capt Peter Gallagher. Despite some opposition by senior officers on the grounds that sedation should not be something required by military personnel, two dental officers were selected to undergo Diploma training at Guy's and to set up the service.

The presenter considered the advantages of carrying out conscious sedation in the military setting: generally fit and healthy patients, a low failure to attend rate and easy access, as well as some challenges: the nature of military culture, dealing with opposition to the sedation service by senior commanders and the difficulties of finding suitable escorts and wrestling with the problem of needing to ‘downgrade’ personnel who were unable to accept routine dentistry. She described some cases that highlighted its value, including those of a veteran helicopter pilot who, despite calmly managing a number of high intensity operational tours of Iran and Afghanistan was a dental phobic, and a 22 year old triple amputee who had developed a severe gag response following emergency intubation after an improvised explosive attack.

Finally she reflected on her career in the RAF delivering conscious sedation, the value of teamwork, a common goal, good mentorship, robust training and attention to detail and procedures - whilst also having fun and making the most of the job whatever and wherever it was.

## A way with words – patient information in practice

Kate Rivett  
Lay Board Member IACSD  
info@saad.org.uk



The basis of this presentation was to show the disparity between the use of 'medical terminology' and the general abilities of many members of the population to comprehend the content. This in turn limits their ability to manage their own health effectively. Reference was made to the average reading age (9 years) and the need for clinicians to moderate their use of 'elite language' when considering both oral and written communication.

With reference to *Montgomery v Lanarkshire Health Board*, the need for the provision of accurate information, including the awareness of material risk as part of the consent process was highlighted. Using the examples of the Paediatric patient information literature from the Royal College of Anaesthetists, the need for age specific or pictorial information was demonstrated and examples of relevant text from the IACSD report were presented.

In conclusion the presentation stated the fact that the provision of patient information, including escort information for conscious sedation, is now embedded into both medical and dental care and this should be developed within all areas of dental practice.

## Self help Cognitive Behavioural Therapy for dentally anxious children

Jen Kirby BDS MFDS MPAedDent MClintDent PGCert Med Med PGCert  
Med Leadership, StR in Paediatric Dentistry  
Charles Clifford Dental Hospital, Sheffield  
jen.kirby@nhs.net  
Fiona Noble BDS MFDS PG Cert in Medical Education  
NIHR ACF/ StR in Paediatric Dentistry  
Charles Clifford Dental Hospital, Sheffield  
f.noble@sheffield.ac.uk



Childhood dental anxiety is very common, with just over half of UK children reporting some level of dental anxiety. It is distressing and can have a negative impact on the quality of life of young people and their parents, as well as being associated with poor oral health. Traditionally, dental anxiety in children has been managed using pharmacological techniques. Cognitive behavioural therapy (CBT) is widely recognised as an evidence-based and acceptable approach for the management of a variety of anxiety disorders in children and young people.

The presentation began by providing an overview of the current role and use of CBT within dentistry and how it differs from pharmacological approaches. It introduced the self-help resource based on the principles of CBT, called 'Your teeth you are in control' which has been specifically designed for delivery by dental practitioners. The resource, which is aimed at young people aged 9-16 years with mild to moderate dental anxiety, has been developed by a UK multidisciplinary research group with input from adolescents, parents and dental team members. The guide and online training package can be accessed at [www.lltff.com/dental](http://www.lltff.com/dental); all materials are free. The presentation then summarised the findings of a feasibility study which showed there was a significant reduction in dental anxiety and an increase in health-related quality of life following the use of the CBT resource. The self-help approach had high levels of acceptability to stakeholders.

The presentation concluded with case examples of how the CBT resource can be utilised in a clinical setting when treating dentally anxious young people.

**Acknowledgements:** The presentation included results of independent research funded by the National Institute for Health Research (NIHR) under its Research for Patient Benefit (RfPB) Programme (Grant Reference Number PB-PG-1111-26029). The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

# SYMPOSIUM 2018

## The Bradford Community Dental Service Anxiety Management Pathway - an evolution

*Nadiya Suida, BDS MFDS (RCPSG) Dip Con Sed (Ncl)  
Senior Dental Officer and Clinical Lead for Anxiety Management Services,  
Edwina D'Souza BDS PGCert Dental Sedation and Pain Management  
Community Dental Officer,  
Bradford District Care NHS Foundation Trust  
Community Dental Service, Level 2, Horton Park Health Centre  
99 Horton Park Avenue, Bradford BD7 9EG  
Contact email: Edwina.dsouza@gmail.com*



The final presentation of the day was given by community dentists, Nadiya Suida and Edwina D'Souza, on the anxiety management

patient pathway used in the Community Dental Service (CDS) in Bradford. The speakers started by describing the history of sedation services in the Bradford area and how anxiety management within the CDS has evolved over time, culminating in the anxiety management pathway they currently use for anxious patients. They explained the use of non-pharmacological techniques for anxiety management in primary care including behaviour management, cognitive behavioural therapy (CBT), acupuncture and hypnosis, which can be used as adjuncts or alternatives to sedation or general anaesthetic for anxious patients. The speakers then explained the results of a pilot study in which patients were treated using the anxiety management pathway. Their findings included a reduction in dental anxiety and potential for large cost savings to the community dental service. They then presented two interesting case studies to illustrate the use of some of their techniques. It was shown that both patients' anxiety was reduced, and that successful treatment outcomes were achieved. Moreover, these case reports illustrated that providing dental treatment in this manner avoided the use of general anaesthetic and conscious sedation respectively, hence also resulting in improved patient confidence and a reduction in the cost of providing dental treatment to these patients. Their presentation concluded that non-pharmacological anxiety management techniques can be used successfully alongside pharmacological techniques where necessary, to aid in patient rehabilitation and to help reduce costs of dental service provision to anxious patients.

## Letters to the Editorial Board of the SAAD Digest

We welcome letters concerning any subject related to Conscious Sedation, Anxiety Control, General Anaesthesia or Analgesia in dentistry.

Subject to editorial control, these will be published on the SAAD website at [www.saad.org.uk/digest-newsletters/letters](http://www.saad.org.uk/digest-newsletters/letters) along with any replies.

## Poster Presentation Abstracts

### 1st Prize

#### An audit to assess outcome of inhalation sedation appointments and an analysis of appointments with poor outcomes within Locala Dental Care.

<sup>1</sup>Dickens T and <sup>2</sup>Booth I

*1 Salaried Dentist, 2 Clinical Director, Locala Community Partnerships, Kirklees and Calderdale*

#### Introduction

Locala Dental Care uses inhalation sedation (IHS) to treat some patients, but complex patients are treated under general anaesthesia in a hospital setting. Locala Dental Care has sites across Kirklees and Calderdale, waiting lists are high and it is important that clinical time is used optimally.

#### Aims

- Assess the outcome of IHS appointments
- Analyse the reasons for the failed appointments
- Assess clinical records for completion of suitability assessments

#### Method

- IHS appointments analysed (October 2017-March 2018)
- All data was collected and recorded anonymously
- A comparison of successful and unsuccessful appointments was completed
- Clinical records where patients were unsuitable were checked for suitability assessments

#### Findings

- 49% of appointments were unsuccessful
- 54% of failed appointments occurred because IHS was unsuitable
- Suitability assessments were not recorded for any of the unsuitable patients

#### Changes made

- Teaching provided on IHS to the clinical team
- Introduction of the Indicator of sedation need (IOSN) in June 2018
- Clinicians now obtaining and documenting Modified Dental Anxiety Scale scores and hence an IOSN score prior to IHS appointments
- A re-audit has been planned outcomes and clinical records will be reassessed.

### 2nd Prize

#### Introduction of nitrous oxide sedation service for the provision of paediatric dental care

McDermott G

*HSE, Ireland*

The poster reflects a quality improvement project which improved paediatric patient safety in a dental community setting within the HSE. It illustrates how risks of patient morbidity and mortality are reduced by providing dental care under inhalation sedation versus general anaesthesia, and also illustrates how this project lowers patient waiting lists and times, while reducing costs to the Irish tax-payer. A new clinical policy was implemented to ensure accountability and transparency through a clear governance structure and standard operating procedures focusing on quality patient care. The HSE Change Model (2008) guided this project.

The poster emphasises the continuous improvement drive within the Irish healthcare services and the drive to continuously improve patient safety, through setting standards and monitoring quality, (which was through the use of the Donabedian Model of Evaluation for this quality improvement project). The integration of best evidence enabled the introduction of this new gold standard clinical service and clinical effectiveness processes promoting an up to date, effective and consistent service for patients. Education and training initiatives were implemented for upskilling of the nitrous oxide dental team with CPD provided through the Dental Council.

The implementation of this new service was published in the CHO1 newsletter, Edition 3 (February 2018) and distributed all across the CHO1 area. This highlighted the positive impact of this new service to our patients and staff alike. This is a more cost-efficient service. The cost of treating one child under GA is €819 versus €37 with nitrous oxide inhalation sedation, a positive outcome for use of resources, reducing dependency on costly hospital-based GA services.

## A “rapid review” of the literature examining conscious sedation for dental implant surgery.

*\*Dick J, \*Fitzgerald R and Morgan C.*

*\*Joint first authors.*

*Royal London Dental Hospital, Barts Health NHS Trust*

### Introduction

Dental implants are increasingly being provided, however, their placement can be an unpleasant procedure meaning pharmacological support is sometimes indicated. Sedation is often preferable to general anaesthesia due to reduced morbidity and mortality risk.

There is no consensus on sedation technique for this procedure due to several choices of drug/drugs, staff training needs and equipment availability. The Royal London Hospital provides sedation using solely midazolam for implant surgery, with dedicated operators and sedationists.

We aimed to summarise existing literature regarding sedation for dental implant surgery, to inform our current practice, as well as to highlight areas for future research.

### Methods

Four databases were searched by two independent reviewers using the terms “sedation”, “implant”, and “oral/dental”, and inclusion/exclusion criteria applied. Data were extracted, summarised thematically, and assessed for quality.

### Results

Twenty-seven papers were found after inclusion/exclusion criteria were applied. Common themes were identified and used to guide analysis e.g. sedation technique, patient satisfaction, drug comparison etc. Quality of evidence was moderate to low.

### Conclusion

There is insufficient evidence in the literature to determine the optimal sedation regime for implant surgery. There is a need for high quality research such as well-designed clinical trials comparing patient-related outcomes following a range of sedation techniques.

## Can experienced Birmingham Dental Hospital team members demonstrate maintenance of sedation skills?

*Martin S, Purkiss P, Anstey H and Pearson D*

*Birmingham Dental Hospital – Oral Surgery Department*

### Introduction

• This was a questionnaire-based study/baseline audit to see

if sedation team members kept a logbook of cases.

- The aim was to provide guidance and support for staff if this proved necessary.

### Background

IACSD/SCDEP both indicate that staff should ‘maintain a log of all sedation cases to demonstrate clinical practice’ (section 2.2/8.3 SCDEP)

### Study standards

- Baseline audit to see if staff maintain a log book (standard 100%)
- Assess what information is being recorded and compare with IACSD/SCDEP recommendations

### Method

Questionnaire-based study carried out within the oral surgery department May 2018.

### Results

- A total of 74% of staff kept a log book, falling short of the gold standard.
- For those that did, the information recorded was not consistent with IACSD standards.

### Outcome

- Cascade results to staff at team meetings and stress the importance of maintaining a logbook.
- Develop recommendations for staff about what they should be recording, and consider whether this could be a team-based log.
- Re-audit, extending to other BDH departments providing sedation.

## An audit conducted to find the anxiety of patients attending dental sedation to different aspects of dental treatment using a further modified dental anxiety scale

*Michael W D A, Barlow G, Rothwell E and Usher C*

*The Dental Sedation Clinic, 19 Lord Street, Burscough, Lancashire. L40 4BZ*

### Aim

To determine the level of dental anxiety among sedation patients, to various aspects of dental treatment using a further modified dental anxiety scale (modified MDAS)  
There is a group of dental patients who are very anxious about having any dental treatment, indeed Research shows about 10% of the adult population have dental anxiety.

### Method

We modified the MDAS to include dental extraction but omitted the ‘not anxious’ part. We excluded patients referred for

inadequate local anaesthesia and mentally handicapped but included patients with a gag reflex. Our survey included 400 patients, and was conducted over an eighteen months period.

### Significant observations made of the patients, some:

- had pierced tongues
- had several studs in their ears /eyebrows/lips and elsewhere
- Some had whole body tattoos and some were awaiting more
- Some demonstrated self-inflicted injuries.
- Some showed need for treatment on the day of assessment or the next day
- Some used +++ or/// or √√√ to indicate their levels of anxiety
- Some mentioned some items that were intolerable to them or which and might cause panic attacks

### Conclusion

This was shown to be a special group of patients who need to be treated with great sympathy, empathy and care.

## An audit to assess the escort's knowledge of patient safety following intravenous sedation at Manchester Dental Hospital

Watson D

5th Year BDS student, (Winner of the 2018 SAAD Dental Student Essay Prize)

University of Manchester

### Background

Dental anxiety, fears and phobias are ubiquitous in the provision of dental care. Intravenous conscious sedation is a common management strategy for these conditions. A key element in managing risk with this strategy, is that the patient has to attend their appointment with an appropriate escort.

### Aims

To assess escorts' understanding of their responsibilities to the patient following dental treatment under intravenous sedation. Objectives of the audit were to identify current level of patient safety under care of escorts and improve the information given to escorts if required.

### Methods

Cross-sectional survey and audit of 51 escorts of patients treated under midazolam-led sedation in the oral surgery division.

### Standards

100% should have been informed of their duties and have thorough knowledge of post-operative patient safety instruction.

### Results

51 questionnaires were collected between 16th Oct 2017 – 24th Nov 2017. The 100% target was not met.

### Action plan

- Provide the escort with another information sheet at the appointment before the patient is sedated, and to sign to confirm their responsibilities,.
- Improve the information sheet given to escorts.
- Implement a strategy to provide video information, that can be sent to the escort to watch.
- Re-audit in 6 months.

**Ed. Note:** *The following abstract should have been included in the 2018 issue of the Digest. The Editorial Board apologises for the omission.*

## Management of spontaneous bleeding from the maxillary alveolus and carious teeth with IV sedation in a patient with severe spinal muscular atrophy - a case report

Karanjkar R

DCT3 NHS Forth Valley

This report describes the case of an ASA 4, 32 year-old man with severe spinal muscular atrophy. The patient presented with spontaneous prolonged bleeding of unknown cause from the upper right alveolar ridge where he had multiple broken carious teeth.

It describes the difficulty in diagnosis of the source of bleeding and the immediate steps taken to manage this. It then goes on to discuss the challenges faced in planning dental care in the context of his medical co-morbidities. It reports on why local anaesthesia was unsuccessful and general anaesthesia was not in the best interest in the management of the bleeding for this particular patient. The report then discusses how IV propofol sedation, in a theatre setting, was successfully used to help provide the treatment required to stabilise the patient.

It ends with a discussion on why a patient specific approach perhaps with the involvement of a multidisciplinary team is paramount in holistically planning a solution to patients' clinical problems, particularly when there are multiple complicating co-morbidities.

## Interview with Steve Jones President of SAAD

*Manni Deol (Honorary Secretary)*



**Manni Deol: Hearty congratulations upon your appointment as SAAD President!**

**Steve Jones:** Thank you Manni, this honour is really beyond my wildest expectations and imagination; it is deeply humbling to have been deemed worthy of it. The names of Past Presidents on the chain of office engender deep respect; as role models the challenge will be to attain their standards and achievements.

**MD: For how long have you been connected with SAAD?**

**SGJ:** My first introductions to SAAD were in 1975 and 1976, the first two years after my graduation when I attended the National Courses in inhalational sedation and intra-venous sedation.

The completion of the Diploma in Conscious Sedation at the University of Newcastle upon Tyne, under the guidance of Dr Nigel Robb, (a former President of SAAD from 2009-2012), was a defining moment for me. A few years post-award Nigel contacted me to ask if I would consider taking on the role of Honorary Treasurer of SAAD; this appointment was formalised so my shirt sleeves were rolled up from January 2005 as I set about looking after SAAD's finances. Since that date until the AGM in September 2018, the Trustees ensured that, every three years when this Board appointed post was due for consideration, an offer was made that I couldn't refuse!

**MD: You live on the west coast of Cumbria although your roots are in the Midlands. Why did you move away?**

**SGJ:** My gradual migration commenced in phases; whilst at school

I was introduced to Youth Hostelling, cycling trips and camping in North Wales, Yorkshire and the Lake District. It was the lure of the open air and the adventure of the mountain environment in those formative years that stoked my desire to practise in such places. Whilst reading dentistry at Liverpool University, regular forays to these areas were undertaken so the decision to cut the cord and to establish Base camp 'up North' became an unremarkable thing to do.

**MD: Had you always wanted to be a dentist?**

**SGJ:** Initial thoughts were to follow my father's career as a GP and read medicine. However, there were quite a number of school contemporaries who were aiming to become dentists which made me consider this as an alternative; the street-talk appeared to make dentistry more 'glamorous and action-packed'! As a sixth form pupil an insight was gained by visiting a local dental practice that focussed on crown and bridge work; the principal cared for the members of an internationally mega-famous rock band - one is quite impressionable at that age!

Over the years, employment in the primary care setting - general dental practice and the salaried service serving as Clinical Director for twenty years and now as Clinical Lead for Dental Sedation with the University of Central Lancashire (UCLAN) based at Preston, have vindicated this decision and I have no regrets.

**MD: How much sedation was taught on your undergraduate course at that that time?**

**SGJ:** Sedation was mentioned in passing during paediatric dentistry lectures, the consultants and senior staff in the paediatric department used inhalation sedation, but this technique was not taught to us as students. The modus operandi, particularly for exodontia, was general anaesthesia, (GA) which was 'the norm' for high street dental practitioners to deliver. In those days the BDS qualification enabled one to administer general anaesthetics, which would now be regarded as incredible.

**MD: Who or what were the main influences which led you towards an interest in sedation?**

**SGJ:** The practice where I started post-graduation was a multi-surgery, multi-dentist set-up that offered conscious sedation and dental chair dental GA. The techniques of inhalation and intra-venous sedation - (Diazepam then Diazemuls were the drugs of choice) - were available for patients; Methohexitone, (Brietal) was used as an intra-venous general anaesthetic induction agent. Two of the dentists administered dental chair GA and a hospital consultant anaesthetist attended a couple of mornings a week, such was the demand. That particular coastal strip experienced high levels of socio-economic deprivation which was reflected in the oral health of the local population; there was a high need for exodontia, full/full dentures and routine restorative care, for which all these techniques were used.

During that first year, the principal encouraged me to attend a SAAD National Course to receive instruction on inhalational

sedation which I have practised ever since. The following year I started using intra-venous sedation, further to attending another SAAD course.

Over the years, the direction of my travel has been to develop sedation skills and indeed to support others as their first steps are undertaken; on reflection, sedation has always been a 'comfortable thing to do'. Fortunately an ability to communicate with highly anxious and phobic patients has made the delivery of sedation such a joy to undertake.

When it became a must for GA to be given only in a district general hospital, in 1997 I commenced study for the Diploma in Conscious Sedation at the University of Newcastle, under the guidance of Nigel Robb. This award opened opportunities - appointment to the NEBDN Sedation Panel of Examiners, assistance on post-graduate teaching courses and the direct link with SAAD, further to Nigel's recommendation to the Board of Trustees that I fulfil the role of Honorary Treasurer. The experience of serving as an officer with SAAD over these years has been so valuable and rewarding.

**MD: In what way did your sedation training change your clinical practice?**

**SGJ:** Being able to offer dental sedation to anxious patients, spanning the range of ages from young children to the elderly and those with specific requirements, all who might otherwise struggle to receive routine care, has enabled 'their dentist' to deliver the 'whole clinical package'. I find this professionally rewarding as it obviates the need for already anxious patients to start again with another professional thus avoiding an onward referral - yet another daunting hurdle and barrier for them to overcome.

**MD: What changes do you intend to make in SAAD over the next three years?**

**SGJ:** The underlying theme will be to incrementally improve some of our schemes and processes in order to make life as easy as possible for members who operate at the sharp and busy end of the clinical - sedation interface and to maintain our profile at a national level.

As the external digital world has evolved, so SAAD has embraced the changes to ensure efficiency and to improve communication methods with members. For example, administrative aspects of SAAD's Safe Sedation Practice Scheme are being developed so a more user-friendly web-based system for the collection of the required data prior to the on-site practice assessment will be available in the near future.

There is a growing trend for patient-centred treatments to be delivered by professionals within the health care setting and also for the 'individual' to take on a more active role in decision-making and responsibilities of their care pathways. CBT and sedation are inextricably linked for modifying dental anxiety and dental-avoidance behaviour so there is the intention to enhance this programme for the benefit of patients and SAAD members.

Then there are always events, being prepared to deal with the unknowns that appear out of the blue as complete surprises - let's see what Brexit holds for us all!

**MD: You seem to have had a varied and interesting career in dentistry. Can you tell me which has been your favourite job or role?**

**SGJ:** Dentistry has been kind to me over the years and still

continues to provide stimulation and challenges that keep the mind and body ticking. The Clinical Director role with Cumbria Partnership NHS Foundation Trust ranks 'up there' as it combined elements of clinical dentistry - which was almost exclusively sedation-related - and the challenges of leadership and management of all aspects of the service allowed another avenue of self-discovery to be made. Over the years it was also possible to train junior dental officers in sedation techniques. This now continues through the university post at UCLAN taken up after retirement from the NHS in April 2017; being involved with the education and training of the next generation of sedationists is very satisfying.

**MD: So what is an average week like for you at the moment?**

**SGJ:** Each week has periods of predictability with the potential for some random unpredictability! Regarding dentistry, work is undertaken on an 'as and when' basis whether this be delivering sedation-related activities as part of the UCLAN role or with a high street dental practice working with their sedation team.

Clinical supervision of UCLAN dental students and dental therapists occurs at the four dental education centres located in Accrington, Blackpool, Carlisle, and Morecambe in the North West of England so plenty of motorway journeying to do!

Whilst occupying the Honorary Treasurer post, there was almost daily activity of some description or other - settling invoices, keeping the ledgers up to date, liaising with the Executive Secretary and our accountants and a host of other tasks. The diary for Presidential duties is now beginning to fill up; it will be of interest to compare and contrast these roles.

To fulfil a long-standing ambition that was geared up to coincide with retirement from the 'day job' the textbooks have been opened again. I'm now in the second year of study for a BA (Hons) degree in Classical Studies with the Open University; careful time management with flexible timetabling for at least sixteen hours of study a week - plus a good dose of discipline and ground coffee - is required to ensure completion of bookwork, online activities and submission of the dreaded Tutor Marked Assessments!

**MD: What about your interests outside dentistry?**

**SGJ:** Interests that help to keep me out of mischief include being a member of a local mountain rescue team which has filled, and indeed continues to fill, a significant part of life's cup; commitment to training, team meetings, call outs and much more. Maintaining physical fitness is important, so time is allocated to cycling, gym work, swimming, climbing and fell walking depending on the season of the year.

Another pastime is keeping track of four children who are scattered around the globe, so forays to Spain, London and York are made to touch base with them.

Various other leisure activities have been put on the back burner for the time being but nevertheless there is plenty going on in life to keep one busy!

**MD: Thank you for sharing your thoughts with me, and my very best wishes for your forthcoming period of office.**

**SGJ:** Thank you Manni; may I wish you every success in the demanding role of SAAD Honorary Secretary that you have just taken on.

## SAAD Diamond Jubilee survey of members

Yi Loo BDS MFDS Dip Con Sed AFHEA

SAAD Trustee

info@saad.org.uk

### Abstract

In 2017, SAAD celebrated its Diamond Jubilee, marking 60 years since its inception. SAAD is now one of the United Kingdom's largest postgraduate teaching organisations for dentistry. The year was one for celebration and reflection; the anniversary provided an opportunity to take stock, recharge and innovate. SAAD undertook a members' survey as part of the anniversary events, aiming to establish how the membership felt about the society and how they would like SAAD to move forward.

### Purpose of the survey

SAAD wished to gain a greater understanding of the views of its membership with regards to its current services. It also aimed to inform the society's direction and to ensure that future SAAD services are valuable to members.

### Survey design

An online survey was circulated to the SAAD membership between March 2017 and January 2018. During this period, emails allowing access to the survey were sent to members' registered email addresses and the survey was publicised through social media and at SAAD events. It comprised 10 questions, six multiple choice questions and four that provided respondents with the opportunity to give their opinions in the form of free text. The intention was to design a short questionnaire that would not be too laborious for the respondent, whilst allowing the society to reach its aims.

The survey intended firstly to determine members' views on the current services and asked:

- What services members value the most?
- What they thought SAAD did well?
- How they would rate the quality of SAAD services?
- How satisfied members were with their membership?

Secondly, questions were asked to determine how the membership wished the society to proceed into the future:

What changes would improve SAAD membership?

Would you recommend SAAD membership?

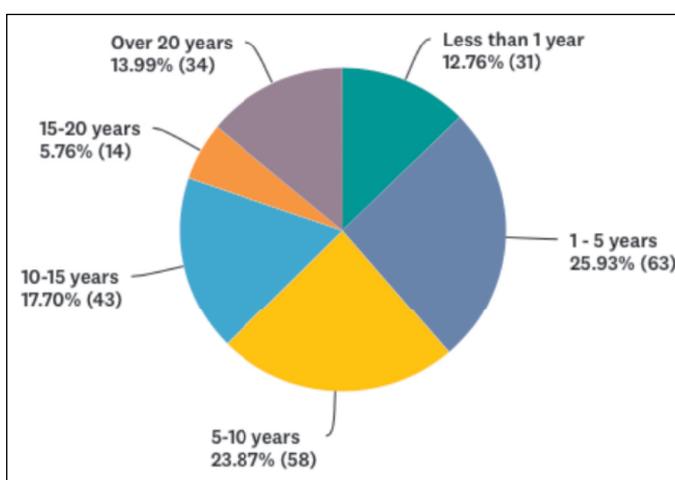
Where do they see SAAD in the next 60 years?

### Results

The survey was completed by 20% of members. Whilst this is not the majority of members, it is a reasonable response rate when compared to similar surveys such as the British Dental Association member survey, which had a 17% response rate<sup>1</sup>.

The majority (68%) of respondents had been a member for between 1 to 15 years, with a sizeable response also received from both new members who had joined within the year (13%) and those who have been part of the society for the last 2 decades (14%). The responses are shown in Figure 1.

Figure 1. Length of SAAD membership for respondents to the SAAD Jubilee Anniversary Survey

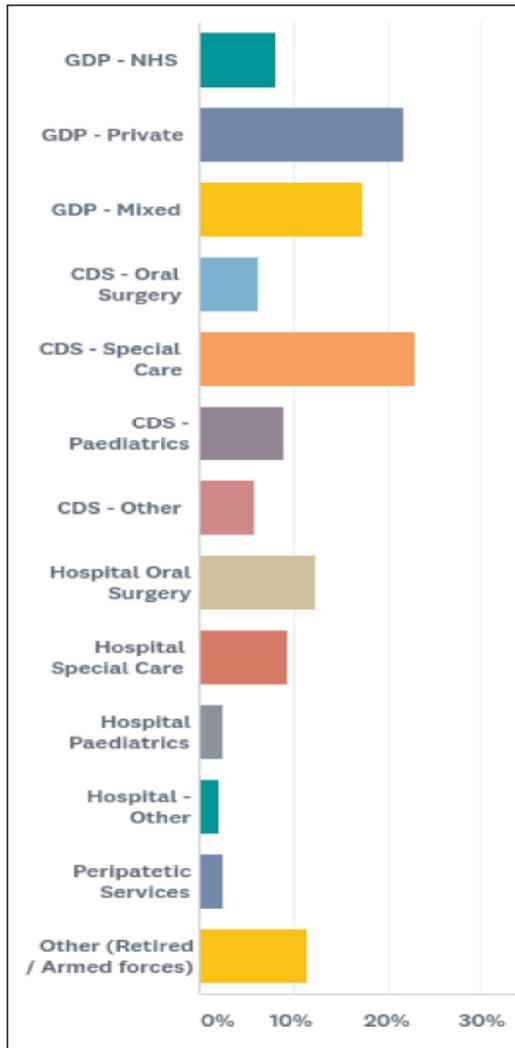


47% of the respondents work in general dental practice, 45% in the community dental services and 27% in a hospital setting. This suggests that many members work in multiple settings as shown in Figure 2. The majority of GDP respondents work in private or mixed practices rather than solely NHS practices. Within the secondary and tertiary care settings, special care dentists, followed by oral surgeons and then paediatric dentists were most represented. In the same time period as the data was collected, 40,427 dentists were present on the GDC register, of which 714 were specialist oral surgeons, 300 were special care dentists and 234 were paediatric dentists<sup>2</sup>. The survey respondents also included members who are involved in undergraduate and postgraduate teaching, the armed forces, prison dentistry and members who have now retired from clinical dentistry.

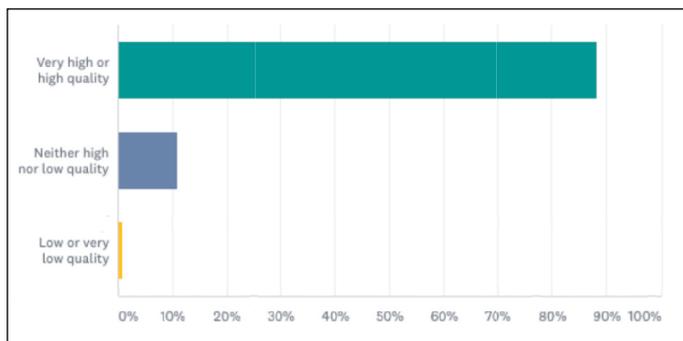
89% of members felt SAAD provides a very high or high quality service and commented that they had 'experienced the attention to detail, the incredibly high quality and standard of teaching and administration on courses and professional presentation at the symposia'. Members commended the society stating that they 'considered SAAD to be cutting edge in their thinking whilst striving for the highest standards'. Satisfaction with services was ranked neither high nor low quality by 11% of members, 1% of members ranked services as low and 0% ranked services as very high.

# SAAD MEMBERSHIP SURVEY

**Figure 2. Current area of sedation practice**

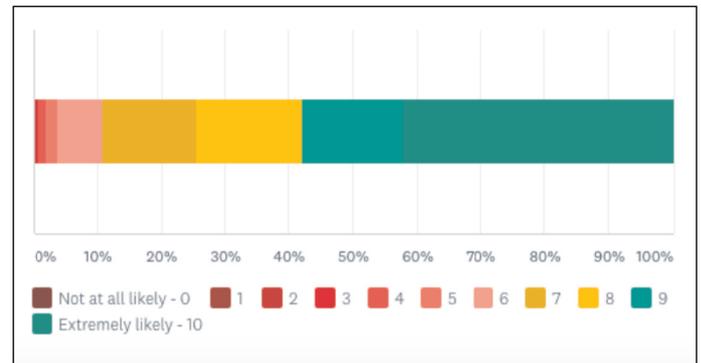


**Figure 3. Results from SAAD members when asked 'How would you rate the quality of SAAD services?'**



The majority of members felt they would recommend membership to a colleague. Figure 4 demonstrates that over 40% of members were extremely likely to recommend SAAD to a colleague and that overall, only 10% of members were neither likely nor unlikely or not at all likely to recommend SAAD.

**Figure 4. Likelihood of recommending SAAD to a colleague**



SAAD provides many services to the membership. When asked which two services SAAD members valued the most, training courses were the most highly regarded with 83% respondents selecting these events. Each year, SAAD runs The SAAD National Courses in Conscious Sedation for Dentistry for Dentists, Nurses and Dental therapists/hygienists, the Annual Symposium and Study Days. Registered medical practitioners are also welcomed to the courses. 35%, 30% and 19% of members respectively ranked the courses in their top two services (Figure 5). The accompanying notes encompassed a wealth of positive comments about the 'sensible, professional teaching' and 'high quality and standard of teaching'. Comments also highlighted the role of training by SAAD as a 'benchmark' for sedation practice.

**Figure 5. Percentage of respondents who chose each response to Question 1. Which SAAD services do you value the most?**

▼ Providing representation and advice to members, professional protection societies, committees of enquiry and official advisory bodies	51.24%
▼ SAAD courses (dentists, nurses and dental therapists / hygienists)	34.71%
▼ SAAD Symposium	30.17%
▼ CPD	27.27%
▼ SAAD Digest and Newsletter	25.21%
▼ Access to relevant documents	20.25%
▼ SAAD Study days	18.60%
▼ Prizes and grants and furthering research in sedation	3.31%
▼ Equipment loan	2.48%
▼ SAAD shop	1.24%

Further to the courses, 51% of respondents value the representation SAAD provides, for example, on the Intercollegiate Advisory Committee for Sedation in Dentistry (IACSD), to the Dental Sedation Teachers' Group and The International Federation of Dental Anesthesiology Societies. Members felt that they value SAAD as the 'leading expert group' in the field, 'representing the dental sedation fraternity at a national level' and that they appreciate the 'opportunities to mix with other sedationists' at the courses. A quarter of respondents valued the annual SAAD Digest and Newsletters most highly, for their 'regular updates and communication' and 'relevance'. The area of service chosen by a fifth of members was the direct access to relevant documents in the sedation field via the website, highlighting that it is 'kept up to date and is easy to log in and follow'. On a more personal, one to one level, members thanked the society for being 'approachable, honest and helpful', for providing 'dependable leadership and expert advice in the field' and for providing the 'confidence to provide nervous patients with a service'.

# SAAD MEMBERSHIP SURVEY

When asked 'What does SAAD do really well', similar themes were highlighted, as shown in the word cloud below.



Looking to the future, the survey aimed to assess SAAD's performance by opening itself to enquiries and critique. The questions were intended to look to the future, to seek innovation, to see whether members wished for any changes and how members wished the society to modify its services, if at all. In addition to a section for general comment and suggestions, two open questions asked what changes would most improve SAAD and what members would like SAAD to focus on over the next 60 years. There were three main themes to the responses.

Firstly, there were requests for SAAD events 'away from London'. Having analysed the possibilities and weighed up the options, SAAD are currently making exciting plans to host our 2019 Annual Symposium outside London. On Saturday 28th September 2019, the SAAD Annual Symposium will be hosted at Bridgewater Hall, Manchester.

Secondly, many respondents requested mentoring for young practitioners or new starters. The IACSD 'Standards for Conscious Sedation in the Provision of Dental Care' state that practitioners offering supervised clinical experience for 'new starter' sedationists must be accredited by a university, deanery or IACSD<sup>3</sup>. SAAD has introduced two schemes to facilitate 'supervised clinical experience' for both dentists and dental nurses. Information about the SAAD Assessed Sedationist scheme or SAAD Assessed Sedation Nurse scheme can be found in both *The Digest* and on the SAAD website.

Thirdly, respondents requested 'more joint specialty study days' following the success of the SAAD & BSDH Study Days on General

Anaesthesia for Special Care Dentistry and Sedation for Special Care Dentistry. On Saturday 23rd March 2019, SAAD hosted Getting More Giggles, a joint study day supported by the British Society of Paediatric Dentistry South East Branch, featuring speakers including Richard Welbury, Clare Ledingham and Tim Newton. The programme encompassed aspects of Paediatric Sedation and Anxiety Management.

In addition, SAAD members requested more frequent publications of *The Digest*, which will be proposed to the Editorial Board, and more clinically based research, which has been noted by the Board of Trustees. There were also suggestions ranging from desires for more case studies, provision of advanced technique training, requests for more anaesthetic input and assistance with commissioning and service provision.

## Conclusion

The survey provided usable feedback on the range and quality of services provided by SAAD so that actions to improve and develop services can be identified. It also highlighted new areas where services may be of use to the society's members. Whilst it is heartening to confirm and highlight aspects of the society's activities that are providing outstanding value for members, SAAD needs to ensure that it continues to update its philosophy, innovate and develop to keep pace with the advances being made in dentistry today. Hopefully, all the suggestions will positively inform the society's activities, so that SAAD can continue to have a dynamic, pivotal role in the field.

## References

1. Skelton S et al. BDA hospital dentists survey 2017 *BDJ* 2018;225:566-567
2. General Dental Council. Registration Report January 2018. Online information available at <https://www.gdc-uk.org/api/files/Registration%20Report%20January%202018.pdf> (accessed 1 October 2018)
3. Standards for Conscious Sedation in the Provision of Dental Care, London: Dental Faculties of the Royal Colleges of Surgeons and the Royal College of Anaesthetists, 2015

## INHALATION SEDATION LOAN SCHEME

### Inhalational Sedation and Scavenging System

Available for a six-month loan to SAAD members  
who have recently attended a SAAD course

Opportunity to purchase the system after the loan period

Details of the scheme at  
[www.saad.org.uk](http://www.saad.org.uk) or email [fiona@saad.org.uk](mailto:fiona@saad.org.uk)

## SAAD Assessed Sedation Therapist (SAST) scheme

SAAD Trustee, Paul Howlett, interviews Emily Fry, the 100th candidate to complete the SAST scheme.

The 2009 General Dental Council's Scope of Practice document included the administration of inhalation sedation as an additional skill for dental therapists and dental hygienists.

Dental therapists and dental hygienists are an integral part of the dental team and instrumental in providing holistic care for our patients. The addition of inhalation sedation is a fantastic adjunct to hygiene and therapy treatment and can truly unlock the full scope of practice, especially in relation to paediatric dentistry.

In a response to this change, SAAD ran the first SAAD Assessed Sedation Therapist (SAST) scheme in 2010 to provide didactic and practical clinical training for dental therapists and dental hygienists wishing to integrate inhalation sedation into their clinical practice. Since then through this scheme, SAAD has supported over 100 participants, training them to deliver safe and effective inhalation sedation. We are delighted that the 100th candidate, Emily Fry, has taken time out of her busy practice schedule to talk to us about her experiences of the course and subsequent implementation into clinical practice.

If you would like any more details about the SAST scheme, please visit [www.saad.org.uk](http://www.saad.org.uk)



Emily Fry  
SAAD Assessed Sedation Therapist

### What is your background and why did you choose to become a Dental Therapist/Hygienist?

I spent much of my childhood at the dentist's (from eating too many sweets!) and became very relaxed within a dental environment. After school I decided working within a dental setting would be an excellent job for me. I qualified as a dental Nurse in 2014, and as much as I loved nursing, I knew I wanted to be even more hands-on with patients. Dental Therapy is the perfect job for me, I have a passion for delivering oral health and love carrying out childrens' treatments. Treating children is challenging but very rewarding!

### Could you describe your practice/the practice you work in please?

It's a private paediatric practice in Marylebone called Happy Kids Dental. We treat children aged from 0-18 where I'm part of a large multidisciplinary team who carry out all forms of dental care for children. Within the team we have consultants, specialists, orthodontists, therapists and nurses!

### Why did you want to gain training in the provision of IHS?

Inhalation sedation is an excellent way of putting anxious patients at ease. At Happy Kids Dental we often recommend inhalation sedation for certain treatments and for anxious children. I was lucky that my employer wanted everyone who worked at her practice to be trained in inhalation sedation and I've found that it's a great qualification to have!

### Why did you choose the SAAD SAST scheme?

I had been advised by other hygienists and therapists that the SAAD SAST scheme was the course that would give me the most hands-on experience along with great knowledge.

### How did you find the course days?

The course days were both fun and informative. There is a lot of theory to take in but it is taught in a relaxed manner that makes it much easier to remember! You are also given a booklet of everything you have learned to read through later. The course is very hands-on as you get to experience inhalation sedation and also to practise using the equipment.

### How was your experience of completing your supervised cases and the case log?

Completing my supervised cases and case log was difficult at times as I had to have a more than one supervisor due to unforeseen circumstances. However, it was also very rewarding once it was completed. I found having different supervisors beneficial as I was able to observe different behavioural techniques being used throughout the sedation.

### How have you implemented IHS into your routine clinical practice?

I carry out at least 3 inhalation sedation treatments a week, which allows me to use the skills and knowledge gained from the course on a regular basis.

### Would you recommend the SAST scheme to other dental hygienists or therapists?

Absolutely! I would advise all hygienists and therapists to complete the scheme. It contributes greatly to your CV and is being used more and more in many practices! This scheme in particular is well accredited and you are supported throughout the whole process of obtaining your qualification.

## Secretary's correspondence

Manni Deol BDS, MJDF, PGCMedEd, PGDipConSed

SAAD Honorary Secretary

[manni.deol@saad.org.uk](mailto:manni.deol@saad.org.uk)

The following is a selection of the more commonly asked questions I have received as secretary over the last year:

**Q: Is the administration of 10mg temazepam one hour prior to treatment considered to be a pre-medication, or subject to the same regulations as an oral sedation with higher doses.**

A: You are using temazepam as a pre medication therefore there is no need to treat this as oral sedation.

With oral *premedication* for dental procedures, taken by the patient before attending the surgery or the night before the appointment, no additional monitoring or sedation training is needed and there is no requirement for cannulation.

Oral *sedation*, usually a higher dose Benzodiazepine, is given to the patient when they arrive at the dental surgery by an appropriately sedation trained dental team member. In order to administer oral sedation for dental procedures, sedation training in the form of knowledge, skills training and supervised practice are mandatory. Appropriate monitoring equipment is required and the patient should be cannulated as soon as practicable following the oral sedation.

**Q: We are a practice considering offering intravenous sedation to be delivered by a visiting anaesthetist. What we would need to have in place? Would the practice need to be inspected and by whom? Do we need a separate recovery room for the patient? Do both the dentist and nurse need to have ILS training annually?**

A: One view is you would need two appropriately qualified/trained members in the surgery when treatment is being performed, one being the anaesthetist and one other - i.e. sedation trained/qualified nurse.

However, this is a slightly contentious issue. Personally, I think it is sensible to have an appropriately trained dental nurse but some feel strongly that one trained dedicated sedationist is enough.

Guidance does state that the practising dentist, if not sedation trained, should have some sedation knowledge (e.g airways, muscle relaxation therefore higher aspiration risk, need for good suction etc) which can be imparted by the sedationist to the team. It's a good idea to have this documented. I always suggest that it is sensible, although not mandatory, to have a sedation trained nurse at the

practice but the whole team involved in sedation should have ILS or equivalent, to include deployable airway skills.

Please look at the education and training section of the latest guidance document.

<https://www.rcoa.ac.uk/system/files/PUB-STDS-CONSC-SEDN-DNTL-2015.pdf>

You may also find <https://www.saad.org.uk/images/Linked-Safe-Practice-Scheme-Website-L.pdf> useful

It is not mandatory to have the practice inspected but you may find this useful and a great support if this is a new field to you. Please have a look at the SAAD Safe Sedation Practice Scheme.

Also note when you have routine CQC visits they will also want to know if you are carrying out sedation and inspect accordingly.

A separate recovery room is not a mandatory requirement but wherever the patient is recovered the chair must be able to go into a head tilt down position (lay the patient flat).

If the patient is being recovered in the same dental chair you will need to allow sufficient time for appointments to carry out the procedure and recover the patient.

**Q: I am concerned about treating a type 2 diabetic patient using intravenous sedation.**

A: I am assuming you are working in primary care, General Dental Practice.

Firstly during your assessment or sedation consultation process assess the ASA of the patient.

If the patient has well controlled diabetes you will be able to treat him/her in that setting, ASA2, if not you may need to refer to a secondary care unit ASA3+.

If the patient is appropriate for care with you, ask him/her to take all their medication as normal and have a meal before the appointment.

Check the blood glucose levels prior to treatment and before discharge.

Check the blood sugar mid-sedation if it is a long case. The general advice is to ensure the blood sugar is 7-10mmol/L at the start to allow for a drop during sedation. (See BDJ article: "The diabetic patient and dental treatment:an update" by L. Wray, this includes information on Conscious Sedation in diabetic patients. Lucy Wray spoke at the symposium this year.)

[https://www.nature.com/articles/sj.bdj.2011.724.pdf?WT.ec\\_id=BDJ-20110910](https://www.nature.com/articles/sj.bdj.2011.724.pdf?WT.ec_id=BDJ-20110910)

Note the patient may not eat for some hours after treatment as they may be numb as well as recovering from sedation.

The risk to consider is if the patient becomes hypoglycaemic this may be mistaken as drowsiness during recovery or after discharge. Warn the escort of this. I would keep the patient onsite and in recovery for a longer period of time than normal if in doubt.

Managed well and all aspects taken into consideration diabetic patients can be treated with IVS in a primary care setting.

<https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system>

**Q: A Dentist has attended the SAAD National course and completed supervised training. They want to set up and provide intravenous sedation for their patients, and are asking for advice re the equipment, facilities and training requirements, could you advise them please?**

A: I recommend the following two documents to help you in this:

<https://www.rcoa.ac.uk/system/files/PUB-STDS-CONSC-SEDN-DNTL-2015.pdf>

<https://www.saad.org.uk/images/Linked-Safe-Practice-Scheme-Website-L.pdf>

In the SAAD Safe Practice Scheme there is an inspection checklist, this will help you with the equipment and facilities required.

Training requirements will be found in the Standards for conscious sedation document.

For IV Sedation a list of the required equipment would include:

Medical emergency drug kit, emergency equipment including igel airways, pulse oximeter, BP machine (with a selection of BP cuff sizes), 2 oxygen cylinders.

Chair / trolley rated to the patient's weight, that can be rapidly moved to a head down tilt position during treatment- think about where the patient will be recovered.

Cannulas

10ml syringe to draw up midazolam,

needle to draw up drugs,

tegaderm film to secure the canula,

cosmopore dressing for after removal of canula

sedative agents - midazolam

reversal drugs

saline

mouth props

Please note this is not an exhaustive list but will be a good starting point.

**Frequently Asked Questions  
are posted on the  
SAAD website**

**[www.saad.org.uk/index.php/generalfaq](http://www.saad.org.uk/index.php/generalfaq)**

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# **Symposium and AGM**

**Saturday 28 September 2019**

*The Barbirolli Room, Bridgewater Hall  
Manchester*

**Details and registration at [www.saad.org.uk](http://www.saad.org.uk)**

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SAAD

# NATIONAL COURSE IN CONSCIOUS SEDATION FOR DENTISTS AND DENTAL NURSES DENTAL HYGIENISTS AND THERAPISTS

**Patients appreciate being offered** sedation for their dental treatment, whether they are fearful, phobic or simply have a long and tedious procedure in prospect.

**The SAAD course provides** underpinning knowledge and training in the clinical skills required to provide the Standard sedation techniques. Advanced sedation techniques are introduced and discussed.

**It is designed both as an introduction and as an update** for more experienced sedationists. Guidance is given regarding further training and the acquisition of clinical experience. 'New starters' in conscious sedation are advised to refer to the SAAD Assessed Sedationist Scheme for information on how to obtain the necessary clinical experience.

**Dentists are encouraged** to enrol their dental nurses on the parallel course as successful sedation depends on effective team work.

**SAAD's teaching is provided** by a faculty that includes some of the best-known names in conscious sedation in the UK. The courses are 'busy' but fun with many opportunities for hands-on sessions.

**Quotes** from recent evaluation forms:

'A lively weekend with friendly and approachable lectures.'

'I am now confident that I can provide a better service to my patients.'

The course is held at

**Mile End Road Campus, Queen Mary, University of London.**

## **ENQUIRIES:**

**Fiona Trimmingham** (Executive Secretary)

Course enquiries, payments, cancellations and deferrals, hygienist & therapist course logbooks

**01302 846 149** [fiona@saad.org.uk](mailto:fiona@saad.org.uk)

**Toni Richman** (Course Administrator) Course weekend logistics

**07583 039 309 (text)** [toni@saad.org.uk](mailto:toni@saad.org.uk)

Details for the SAAD Assessed Sedationist and SAAD Assessed Sedation Nurse scheme are on pages 78 & 79

## **FORTHCOMING COURSES:**

2/3 March 2019

15/16 June 2019

2/3 Nov 2019

14/15 March 2020

13/14 June 2020

7/8 Nov 2020

## **DETAILS AND ONLINE REGISTRATION**

[www.saad.org.uk](http://www.saad.org.uk)

## **SAAD Assessed Sedationist (SAS) scheme**

Under current IACSD guidance, any practitioner who was not practising sedation independently prior to April 2015, is designated a 'New Starter' and will need to undergo a period of supervised clinical practice before being able to practice sedation independently.

Following on from the SAAD National course, the IACSD accredited, SAAD Assessed Sedationist scheme (SAS scheme) facilitates acquisition of the required supervised clinical experience (see IACSD Standards, Table 1)

The SAS scheme includes  
approval of a proposed supervisor(s),  
verification of a Clinical Logbook,  
Directly Observed Procedural Skills (DOPS) forms  
and the Practice Evaluation checklist.

Successful practitioners will receive a SAAD certificate confirming 'SAAD Assessed Sedationist' status which will enable them to practise independently.

Enrolment in the SAS scheme is only available for 'New Starters' registered for the SAAD National course.

The total fee for enrolment on the SAS scheme is £1000.  
(includes the National Course fee of £700)

Further details are available at  
<https://www.saad.org.uk/index.php/sas-scheme>

Enquiries to [fiona@saad.org.uk](mailto:fiona@saad.org.uk)

NB: Practitioners who have already attended SAAD (or other sedation courses) are not eligible.

# **SAAD Assessed Sedation Nurse (SASN) scheme**

Under the IACSD standards anyone who was not practising sedation before April 2015 must attend a university, deanery or IACSD accredited sedation course that includes the provision of knowledge, skills and supervised clinical practice.

The SAAD Assessed Sedation Nurse (SASN) scheme is IACSD accredited and provides the skills, knowledge and supervised clinical practice required to assist in the provision of sedation before a final assessment of competence.

## **What is involved**

The first stage of the SASN scheme is the two day SAAD Dental Nurse Course in Conscious Sedation for Dentistry, (SAAD National Course) this is when you will acquire the underpinning knowledge and skills. This course is a stand alone course that can be also attended as a refresher.

## **How to enrol**

If you would like to enrol for the SASN scheme please complete the online registration for the first stage, SAAD Dental Nurse Course in Conscious Sedation for Dentistry, the fee for the first stage is £400.

Then enrol for the second stage, SAAD Assessed Sedation Nurse scheme, via the SAAD website ([www.saad.org.uk](http://www.saad.org.uk)) the fee for this stage is £470.

The SASN scheme will run from the date you attend the SAAD National course

The total fee to become a SAAD Assessed Sedation Nurse is £870.

## **Any questions?**

Further details are available at  
<https://www.saad.org.uk/index.php/sasn-scheme>

If you have any questions please contact [fiona@saad.org.uk](mailto:fiona@saad.org.uk)  
in the first instance.



# ESSAY PRIZES

## DRUMMOND-JACKSON ESSAY PRIZE

**£500**

## DENTAL STUDENT ESSAY PRIZE

**£300**

**For essays on any subject related to  
Conscious Sedation, Anxiety Control,  
General Anaesthesia or Analgesia in Dentistry.**

The winners of the SAAD Essay Prize receive a complimentary registration for the SAAD Symposium in order to be presented with their award certificate and cheque. In addition to this the prize-winning essays are considered for publication in the SAAD Digest.

- Write an essay in **ENGLISH** in A4 format with double spacing, as a Microsoft Word document. Drummond-Jackson not exceeding **5,000** words, DCPs not exceeding **2,500** words, Dental Students not exceeding **3,000** words.
- Entries must be received and acknowledged by **31st March**.
- Essays must be written in accordance to SAAD's Guidelines for Authors available from the SAAD website and on page 86 of this Digest.
- The decision of the panel of assessors appointed by SAAD will be final.
- Entries, accompanied by name, address and telephone number, should be emailed to [fiona@saad.org.uk](mailto:fiona@saad.org.uk)



# DCP PRIZE

## £300

**For a case report or  
service evaluation related to  
Conscious Sedation,  
Anxiety Control,  
General Anaesthesia or  
Analgesia in Dentistry**

Dental Care Professionals from anywhere in the world are invited to submit a case report or service evaluation report for the annual SAAD DCP Prize. All submissions must use the templates available from [fiona@saad.org.uk](mailto:fiona@saad.org.uk).

The prize is presented at the SAAD Annual Symposium and the winning report may be published in the SAAD Digest or the SAAD website for the benefit of the SAAD membership.

Entries must be received and acknowledged by the 31 March for the relevant year



**www.saad.org.uk**

- **Online CPD**

Log-on the membership area and follow the link 'Online CPD'  
Answer multiple choice questions related to the refereed papers in this issue of the Digest.  
Download your CPD certificate

- **Latest news relating to conscious sedation**

- **SAAD courses**

details, dates and online registration

- **Sedation related documents for downloading**

- **Membership details and subscribe online facility**

- **Download back issues of the Digest and Newsletter**

- **Details of IHS Machine Loan Scheme, research grants and essay prizes**

- **Online registration for the symposium**

- **SAAD contact numbers and email addresses**

## **IN THE MEMBERSHIP AREA**

- **Media page – members of SAAD may use the SAAD logo on their literature.**

The logo is available in PDF or JPEG format to download from the website.

- **Documents – course handbook**

- **Pay subscriptions online**

- **Forum for adverts**

(equipment, positions vacant, positions sought etc)

- **Complimentary access to the online CPD**

- **Electronic template samples**

# **McKESSON**

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## **Suppliers of:**

- **Inhalation Sedation Equipment**
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    - **Servicing**

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**Please contact us**

**Tel: 01246 276111**

**Email: [info@cestradentmckesson.co.uk](mailto:info@cestradentmckesson.co.uk)**

**Web: [www.cestradentmckesson.co.uk](http://www.cestradentmckesson.co.uk)**

**Tradent House, 110 Park Road, Chesterfield, S40 2JX**



## Dental Sedation Immediate Life Support Course From ResusPlus Training

This one day ILS course is for the dental team giving IV, IHS and other forms of conscious sedation to adults +/- paediatrics. It includes:

- Recognition and management of over sedation during anaphylaxis, asthma, myocardial infarction, seizure, hypoglycaemia and choking
- Hands on practice with all medical emergency drugs including IM injection training
- Airway management including positive pressure ventilation and i-gel
- Excess sedation and cardiac arrest scenarios
- Team roles and responsibilities

*All courses are delivered and assessed by Resuscitation Council (UK) clinical instructors and dental medical emergency specialists. Courses are quality assured and fully comply with IACSD conscious sedation standards 2015.*



Successful, full course attendees, receive 7 quality assured, verifiable ECPD points which also satisfies, annual Basic Life Support and medical emergency training obligations as per GDC

*"Thank you for a brilliant ILS course. It was really useful and delivered brilliantly"*  
*J.Aziz Dentist*

*"Thank you very much, I found the course very enjoyable and an invaluable experience"*  
*Orchard Health Centre*

*"Thank you so much for our in-house ILS course - we will definitely recommend you!"*  
*Woodborough Dental Practice*

To book on one of our Midlands ILS courses or an in-house ILS course or for medical emergency training, please contact Lynn at ResusPlus Training:

[www.resusplustraining.com](http://www.resusplustraining.com) | [info@resusplustraining.com](mailto:info@resusplustraining.com)  
01280 704014 | 0770 250 9967



# THE INHALATION SEDATION SPECIALISTS

A specialist company for the supply, installation, repair and maintenance of Inhalation Sedation and associated equipment.

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We have a comprehensive selection of R A flowmeters to choose from, including the the latest in digital flowmeters, the Accutron Ultra Digital which aids compliance with 21st Century infection control protocols.

Inhalation Sedation is a well tried and trusted, safe and non-invasive technique, suitable for 90% of the average GDP's anxious patients.



R A Medical Services Limited  
Holmes House, Skipton Road,  
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Tel: 01535 652 444  
Fax: 01535 653 333

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# Guidelines for Authors

## SAAD Digest: Guidelines for Authors

SAAD Digest is the Journal of the Society for the Advancement of Anaesthesia in Dentistry and has been published regularly in London UK, since 1970. It has been produced in its current format since 2006. One edition is published each year in January. Copies of all editions produced since then are available online at <http://www.saad.org.uk/saad-digest/>

The Digest has become a unique and invaluable international forum for all interested in advancement of knowledge in pain and anxiety control for dentistry. The Editorial Board invites contributions from all active in the field. Since only one edition is produced each year, potential Authors should be aware of the following details and schedule to avoid excessive publication delay and disappointment.

### Contribution formats

The Board welcomes Research articles, Reports of Randomised controlled trials, articles derived from Diploma Dissertations, Practice-related articles, Education, Professional Opinion, Case Reports and General articles. If in any doubt about the format or content of a proposed article please contact the Secretary before submission. It should be noted that articles are now only accepted in digital format and via email. It is a condition of acceptance of manuscripts that they are the work solely of the author or authors stated and that they have not been previously published elsewhere (either in print or electronic format) nor are they under consideration by any other periodical. Manuscripts should meet the following criteria: they should be original, clearly written, relevant to dentistry, reader-orientated (in other words written to appeal to the readership of any interested in pain and anxiety control in Dentistry) and designed to inform, add to discussion or debate, or entertain. Research papers should also have appropriate study methods, valid data and conclusions that are supported by the data.

### Publication Schedule

The following annual publication schedule is provided for guidance only and assumes a Digest publication date of January Year 01.

August Year -1 > July 31st Year 00: Articles may be submitted for Jan 01 Edition

August 1st 00: Submission for Jan 01 edition closed. (Articles submitted after 31st July will be considered for Year 02 Edition)

### Submission and review

Manuscripts may only be submitted by email to the Secretary at [fiona@saad.org.uk](mailto:fiona@saad.org.uk). Manuscripts will generally be processed as they are received and it is expected that submission will be acknowledged by the Secretary soon after they are received, with a reference number allotted for future correspondence.

Authors should note that submitted papers not fully conforming to these 'Authors Guidelines', **especially in terms of length and manuscript format**, will be returned for correction without consideration or peer review, and in such cases publication might well be delayed or subsequently declined.

Peer review is carried out by at least two anonymous referees, and the Chairman of the Editorial Board. Additional statistical advice may be sought if required.

Authors will be advised as soon as possible, that either their Paper....

1. is suitable for publication without amendment,
2. is suitable for publication with some amendments,
3. may be suitable but requires major rewriting,
4. is rejected.

In any case, Authors will receive the anonymous structured feedback of the reviewers from the Secretary advising them of the decision level as above, and the action (if any) to be taken before resubmission. Delays in action on such advice may cause publication delay or even rejection if the publication deadlines are missed.

Once a manuscript is accepted for publication, authors will be advised whether their paper is to be published in the next issue or is, at the discretion of the Board, to be held for the following issue in order to obtain the appropriate balance for each edition. For similar reasons, in some cases the final decision on acceptance may be delayed. All decisions to publish are at the discretion of the Board alone whose decision is final.

The principal author of a manuscript accepted for publication will later be e-mailed a pdf version of their article for proofing. Any errors identified and requiring correction must be notified by email without delay, and at the latest within 1 week. No revision of the wording or other change, other than correction of proofing errors, will be allowed at this stage.

### Manuscript Format

Manuscripts should be word-processed in Microsoft Word format and double-spaced with a margin of at least 4 cm on the left-hand side. The pages should be numbered consecutively with the numbers centred at the bottom of each page. The first page of the manuscript should give only the title of the article, and the author's/authors' name(s), qualifications and address(es) including email address(es).

### Length of contributions

Contributions should be of no more than 3,000 words, to include tables and figures. Each table and figure will count as 100 words. Case reports are welcomed, but should be of no more than 750 words in length.

Titles must be descriptive of the contents of the article, but yet concise. Papers should be introduced with a short abstract which should be able to stand alone. The abstract should not contain references or abbreviations, and should be no longer than 200 words. The abstract will not contribute to the 3000 word limit.

Data or tables may be submitted in Microsoft Excel format or embedded in the text of the Word document.

Figures or images should be submitted as separately attached and clearly labelled files in JPEG format at a high resolution of 300 dpi. Colour illustrations are preferred where possible. If the illustration is of a subject's face, written consent for its publication must be obtained from the subject and attached with the article. Illustrations obtained from other sources such as books, or from colleagues, must again be accompanied by appropriate documentation indicating approval for their publication as part of the article from the copyright holder, or individual concerned.

Units used in the manuscript must conform to the *Système Internationale d'Unités* (SI).

**References** must be in the Vancouver style. They should be numbered in the order in which they appear in the text. The numbers should be inserted as superscripts each time the author is cited (Robb<sup>3-5</sup> reported similar findings). Other references to the paper should be given in the same way after punctuation (Other studies have shown this to be true.<sup>4,5</sup> Drummond-Jackson et al.<sup>6</sup> demonstrated...). At the end of the article the full list of references should give the names and initials of all authors unless there are more than six, in which case only the first three should be given followed by et al. The authors' names must be followed by the title of the article; the title of the journal abbreviated according to Index Medicus and Index to Dental Literature style; year of publication; volume number; and the first and last page numbers in full. Titles of **books** should be followed by the place of publication, publisher, and the year. If this reference citation style is not followed exactly, **especially in relation to punctuation and spacing**, the manuscript will be returned without review.

### Examples of reference styles

Reference to an article

1. Molar L R, Fang-Jones Q, Jaw U. Are Teeth biting back?. *Br Dent J* 2006; 200: 144-146.

Reference to a book

2. Craig D C, Skelly A M. *Practical Conscious Sedation*. 1st ed. London: Quintessence, 2004.

Reference to a book chapter

3. Robb N D. Conscious sedation in Dentistry. In Heasman PA (ed) *Master Dentistry*. Vol. 2; Restorative Dentistry, Paediatric Dentistry and Orthodontics. pp 149-168. Edinburgh: Churchill Livingstone, 2003.

Reference to a report

4. Re-accreditation and re-certification for the dental profession. London: General Dental Council, 1997.

Reference to a webpage

3. General Dental Council. Scope of practice. 2009. Online information available at [www.gdc-uk.org/Newsandpublications/Publications/Publications/ScopeofpracticeApril2009\[1\].pdf](http://www.gdc-uk.org/Newsandpublications/Publications/Publications/ScopeofpracticeApril2009[1].pdf) (accessed April 2012).

The author/principal author is responsible for the accuracy of the reference list.

Acknowledgements should be grouped in a paragraph at the end of the text before the references. Permission and approval of the wording must be obtained from the person(s) thanked. Where any research project was supported by industry, this should be acknowledged in a covering letter to the Editor on submission of the manuscript.

**Declaration of interests:** Author(s) must ensure that they declare any possible conflicts of interest in their paper. This includes matters such as: direct funding from an organisation or company for the research; funding received (or payment in kind) for any related work carried out from an organisation or company that could be linked to the research; consultation or advisory positions held in an organisation or company involved in the research or an organisation involved in similar research; any other situation that could be construed as a conflict of interest.

### Ethics

Articles reporting clinical research must include a statement indicating that appropriate Ethical Committee approval has been granted.

### Copyright

Upon acceptance for publication in SAAD Digest, it is assumed that the author(s) assign(s) copyright of the article to the Society for the Advancement of Anaesthesia in Dentistry. Single copies of the published article for personal study may be made free of charge but multiple copies will require permission of the Editor prior to production.



# SAAD Digest Case Report Template

Case reports should use the template below, and be of no more than 750 words in length. They do not need to be scientific in nature. Please also refer to the SAAD Guidance for Authors

**1) CASE SUMMARY**

*A brief description of the case, maximum 100 words*

**2) PATIENT DETAILS**

Gender:

Age at start of treatment:

**3) PRE-TREATMENT ASSESSMENT**

History of presenting patient's complaints:

Relevant medical history:

Dental history:

Clinical examination:

General radiographic examination (if relevant): Radiographs taken and why Radiographic findings

Pre-treatment photographs – extra-oral (if relevant)

Pre treatment photographs – intra-oral (if relevant)

**4) DIAGNOSTIC SUMMARY**

**5) AIMS & OBJECTIVES OF TREATMENT**

*(Add as few or as many as are appropriate to the case)*

i.

ii.

iii. etc

**6) TREATMENT PLAN**

*(Add as few or as many as are appropriate to the case)*

i.

ii.

iii. etc

**7) TREATMENT UNDERTAKEN**

*(Provide a sequential summary of clinical treatment provided with a time line)*

i.

ii.

iii. etc

**8) POST-TREATMENT PHOTOGRAPHS & RADIOGRAPHS *(if relevant)***

*(Insert clearly dated and labelled)*

**9) LONG TERM TREATMENT & FUTURE CONSIDERATIONS**

*(following the completion of the treatment)*

**10) DISCUSSION AND REFLECTION ABOUT CASE PRESENTED**

*(This is an important part to reflect on the case history presentation. Consider what is to be learnt from providing care for this patient and what alternative methods, techniques could have been used. Think about any long term sequelae there may be. Do not provide an extensive literature review)*

**11) REFERENCES *(a maximum of 20 relevant references). For citation method please see Authors' Guidelines on p 86***

## SAAD Digest 2018 Online CPD Answers to the Questions

### What's new in... Dementia and Dentistry

1. It is estimated that dementia affects one in fourteen people over the age of:
  - a. 55 Years
  - b. 60 Years
  - c. 65 Years
  - d. 75 Years

Answer: c

2. Which of these drugs is **not** routinely used in the management of Alzheimer's dementia?
  - a. Memantine
  - b. Levodopa
  - c. Donepezil
  - d. Rivastigmine

Answer: b

3. Which of these factors contribute to an increase in the drug elimination time of midazolam in older adults?
  - a. Relative Increase in body fat
  - b. Reduced cardiac output
  - c. Increase in total body water
  - d. Reduction in plasma proteins available for binding

Answers: a and d

4. Which of the following was noted to be the most common complication with sedation using propofol?
  - a. Epistaxis
  - b. Hypotension
  - c. Bradycardia
  - d. Coughing

Answer: d

### The Use of Intranasal Midazolam in a Special Care Dentistry Department in a Hospital Setting

1. The standard dose of intranasal Midazolam is:
  - a. 0.25-0.3mg/kg body weight
  - b. 0.5-0.7mg/kg body weight
  - c. 0.25-0.3ug/kg body weight
  - d. 25-30mg/kg body weight

Answer: a

2. What class of drug is Midazolam:
  - a. Opioid
  - b. NSAID
  - c. Amphetamine
  - d. Imidazobenzodiazepine

Answer: d

3. The mucosal atomisation device should be attached to which type of syringe?
  - a. Slip tip
  - b. Eccentric tip
  - c. Luer lock
  - d. Catheter tip

Answer: c

4. Kiesselbach's plexus is NOT supplied by the:
  - a. Superior labial artery
  - b. Greater palatine artery
  - c. Sphenopalatine artery
  - d. Posterior superior alveolar artery

Answer: d

## Can Clinical Hypnotherapy Be Used as an Adjunct or an Alternative to Conscious Sedation in Dentistry?

1. What is clinical hypnosis?
  - a. A technique where the individual carries out anything the hypnotherapist wants
  - b. A technique where an individual is rendered incapable of making any decisions by themselves
  - c. A technique of deep relaxation, within which the individual becomes highly suggestible
  - d. A technique where an individual is made to carry out suggestions without their free will

Answer: c

2. Glove anaesthesia is a technique taught to patients, which allows them to envisage that:
  - a. A hand has been rendered essentially numb, and they can transfer this lack of sensation to other people
  - b. A hand has a leather glove on which they can take on and off as they wish
  - c. They are warm when they become cold
  - d. A hand has been rendered essentially numb, and they can transfer this lack of sensation to other parts of the body

Answer: d

3. Patients undergoing maxillofacial surgery with hypnosis showed a reduction in:
  - a. Oxygen saturation
  - b. Diastolic blood pressure
  - c. Respiratory rate
  - d. Heart rate

Answer: c

4. Hypnotherapeutic induction techniques include which of the following?
  - a. Simple eye closure, rapid eye movement, tactile induction, Eye flickering
  - b. Eye fixation, tactile induction, rapid eye movement, simple eye closure
  - c. Simple eye closure, Leg elevation, rapid eye movement, tactile induction,
  - d. Eye fixation, tactile induction, rapid eye defocusing, simple eye closure

Answer: d

## Audit of Written Patient Information for Conscious Sedation across a Community Dental Service

1. The IACSD 2015 guidelines for conscious sedation recommend additional instructions for which groups?
  - a. Children
  - b. Children and patient escorts
  - c. The patient's general medical practitioner
  - d. Patient escorts

Answer: b

2. Patient information relating to sedation should be available in verbal and written forms that:
  - a. ... is easily assimilated by patients, their parents or carers
  - b. ... is bright and colourful.
  - c. ... uses minimal technical language.
  - d. ... has an average reading age below 12

Answer: a

3. All patient information sheets should contain:
  - a. A description of the recommended sedation procedure
  - b. Subjective feelings during and after sedation
  - c. Out of hours contact details
  - d. Alternatives to the sedation form specified

Answers: a, b, c and d

4. The information leaflet should include contact details for:
  - a. The ombudsman
  - b. The local maxillofacial unit
  - c. Out of hours advice and emergencies
  - d. The care provider

Answers: c and d

# DIARY SCAN

Compiled by Dr C E Mercer

2019	DATE	ORGANISATION	THEME/TITLE	VENUE	CONTACT
<b>MAY</b>					
	1-3	British Pain Society	ASM	London	<a href="http://www.britishpainsociety.org/">www.britishpainsociety.org/</a>
	14	DSTG	Annual Symposium	Cork	<a href="http://www.dstg.co.uk">www.dstg.co.uk</a>
	20-22	Society for Pediatric Sedation	Conference	Aurora, Colorado	<a href="http://www.pedsedation.org/conferenes">www.pedsedation.org/conferenes</a>
<b>JUNE</b>					
	1-3	ESA	Euroanaesthesia 2019	Vienna	<a href="http://www.esahq.org/">www.esahq.org/</a>
	15	SAAD	National Course in Conscious Sedation for Dentistry	London	<a href="http://www.saad.org.uk/index.php/coursesbyrole/view-all-courses">www.saad.org.uk/index.php/coursesbyrole/view-all-courses</a>
	28	University of Portsmouth	Conscious Sedation Update	Portsmouth	<a href="http://www.port.ac.uk/study/courses/conscious-sedation-update">www.port.ac.uk/study/courses/conscious-sedation-update</a>
<b>JULY</b>					
	3-5	GAT	Trainee Conference	Telford	<a href="http://www.gatasm.org">www.gatasm.org</a>
<b>SEPTEMBER</b>					
	11-13	AAGBI	Annual Congress	Glasgow	<a href="http://www.annualcongress.org">www.annualcongress.org</a>
	11-14	ESRA	38th Annual Congress	Bilbao	<a href="http://www.esra-congress.com/">www.esra-congress.com/</a>
	19-21	ESPA/IAPA	Congress	Rotterdam	<a href="http://www.euroespa.com/congress/2019-rotterdam/">www.euroespa.com/congress/2019-rotterdam/</a>
	19-21	ERC	Congress	Ljubljana	<a href="http://www.resuscitation2019.eu">www.resuscitation2019.eu</a>
	28	SAAD	SAAD Annual Symposium	London	<a href="http://www.saad.org.uk">www.saad.org.uk</a>
<b>OCTOBER</b>					
	19-23	ASA	Annual Congress	Orlando	<a href="http://www.asahq.org/annualmeeting">www.asahq.org/annualmeeting</a>
<b>NOVEMBER</b>					
	2	SAAD	National Course in Conscious Sedation for Dentistry	London	<a href="http://www.saad.org.uk/index.php/coursesbyrole/view-all-courses">www.saad.org.uk/index.php/coursesbyrole/view-all-courses</a>
	28-29	SIVA	Annual Scientific Meeting	Bristol	<a href="http://siva.ac.uk/joom2/">siva.ac.uk/joom2/</a>
<b>DECEMBER</b>					
	6	BSDH	Winter Conference	London	<a href="http://www.bsdh.org">www.bsdh.org</a>
<b>2020</b>					
<b>JANUARY</b>					
	8-10	AAGBI	Winter Scientific Meeting	London	<a href="http://www.aagbi.org/education/events/conferences">www.aagbi.org/education/events/conferences</a>
<b>FEBRUARY</b>					
	TBA	ADSA	Las Vegas Meeting	Las Vegas	<a href="http://www.adsahome.org/las-vegas">www.adsahome.org/las-vegas</a>
<b>MARCH</b>					
	14-15	SAAD	Dental Nurse Course in Conscious Sedation for Dentistry	London	<a href="http://www.saad.org.uk/index.php/coursesbyrole/view-all-courses">www.saad.org.uk/index.php/coursesbyrole/view-all-courses</a>
	23	SEA (UK)	Annual Scientific Meeting	Warwickshire	<a href="http://www.seauk.org/">www.seauk.org/</a>