



Roya Hazara

Conscious Sedation in Dentistry: Selecting the Right Patient

Abstract: In recent years, conscious sedation has grown in popularity as an alternative to general anaesthesia in a primary setting due to its safety and efficiency. It is imperative to carry out a full patient assessment prior to treatment under conscious sedation. Conscious sedation is provided intravenously, by inhalation or oral route. Clinical and physical examination as well as medical, social and mental history play a fundamental role in selecting the right patient. In addition, to optimize safety of patients, it is necessary to follow available guidelines and standards, provide an appropriate environment and adequate staff training.

CPD/Clinical Relevance: This article highlights the importance of pre-assessment prior to treatment under conscious sedation. The vast majority of adverse events during sedation occur as a result of inadequate pre-assessment and preparation.

Dent Update 2020; 47: 353–359

Managing patient anxiety is a fundamental aspect of dentistry. Dentists are under obligation to provide appropriate and safe pain and anxiety management for each patient. Patients have the right to have appropriate anxiety control for any procedure. In order to ensure that a high standard of conscious sedation is provided for patients, the dentist providing the procedure must make sure that all guidelines and standards are met, from choosing the suitable patient, using the right drug, the environment, appropriately trained staff.¹ The importance of a thorough pre-assessment cannot be overemphasized when selecting patients to sedate in a primary care setting.

Conscious sedation

Conscious sedation is '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 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.^{2,3} Sedation provides anxiolysis and amnesia for patients. Conscious sedation can be achieved with a single drug or multiple drugs using various different routes.

According to the sedation continuum, there are three stages of sedation: minimal, moderate and deep (Table 1). When patients are further down the sedation continuum and are unconscious, general anaesthesia is achieved. Patients are unarousable and might require airway and ventilation support. For the duration of a specific treatment, it is ideal to reach and maintain moderate sedation, which is also known as conscious sedation. During conscious sedation, patients are able to respond to verbal commands, ventilation and the cardiovascular system remains unaffected.⁴

Intravenous sedation can be achieved with a single drug or multiple drugs, using various different

routes. In a dental setting, using single drug technique is recommended with midazolam. Midazolam is a benzodiazepine that is safe, fast acting and has a short half life. It can be administered via several routes, oral, intramuscular, intravenous, submucosal, intranasal, without the risk of cardiopulmonary depression.⁵ Regardless of how sedation is achieved, the ultimate goal is for the patient to be conscious and respond to verbal commands throughout the procedure.⁶

The main indications and contra-indications of conscious sedation in a primary setting for dental procedures are shown in Table 2.⁷

Risks and issues of conscious sedation in dentistry

Some of the risks associated with conscious sedation are:

- Airway obstruction/loss of airway;
- Difficulty maintaining airway (anatomy);
- Loss of consciousness;
- Cardiovascular depression;
- Oversedation/undersedation.

The Intercollegiate Advisory Committee for Sedation in Dentistry 2015 (IACSD) and Scottish Dental Clinical

Roya Hazara, BDS, MFDS, Clinical Fellow, Queen's Hospital, Rom Valley Way, Romford, Essex, RM7 0AG, UK.

Effectiveness Programme (SDCEP) Guidance and Standards,⁸ accredited by NICE, aims to promote good clinical practice through recommendation for safe and effective provision of conscious sedation in dental care by publishing detailed documents on all aspects of conscious sedation in dentistry. SDCEP and IACSD (RCS) standards state that all patients should consider appropriate behavioural and non pharmacological therapy prior to selecting sedation. All dental teams providing sedation must follow these standard and guidelines in order to provide the safest and most effective treatment.⁷ The important areas highlighted in the guidance are:

- Patient assessment;
- Conscious sedation techniques;
- Environment;
- Staffing;
- Conscious sedation in children;
- Clinical governance.

Pre-assessment

The main purpose of pre-assessment for sedation is to establish a baseline health status of the patient and recognize factors that may present a risk for the patient during sedation.⁶ Thorough assessment is required to assess patient suitability for sedation with respect to airway, fasting, venous access, intra-operative and post-operative monitoring, drug pharmacokinetics and pharmacodynamics, appropriately trained staff and a well equipped recovery room. SDCEP standards state that detailed patient assessment should be carried out at a different day to the day of the procedure, to allow sufficient time for the dentist to consider all the information required and the patient to comprehend all the given information and consider all the options available without the added pressure of the treatment on the same day. Operator/Sedationist will be responsible to carry out a thorough patient history and assessment and must have the appropriate knowledge, skill and training to carry out sedation.⁸ Pre-sedation assessment must include:

- Medical history;
- Dental history;
- Weight, BMI;
- ASA status;
- Baseline vital signs;
- Conscious sedation and general anaesthetic history;
- Dental treatment plan;
- The selected conscious sedation technique;
- Any individual patient requirement;
- Provision of pre- and post-operative written instructions provided before treatment;

- Written consent for conscious sedation and dental treatment.

A thorough and full medical assessment must be carried out, including prescribed and non-prescribed medication and use of any recreational drugs. An assessment of sedation need must also be carried out to choose the appropriate

	Minimal Sedation	Moderate Sedation	Deep Sedation	General Anaesthesia
Response	Responds normally to verbal commands	Responds purposefully to verbal commands/ light touch	Responds to pain	No response
Airway	Maintained	Maintained	May require support	Requires support
Cardiovascular support	Not needed	Not needed	May be needed	May be needed

Table 1. The sedation continuum.

Indications for Sedation	Contra-indications for Sedation
Dental anxiety, severe gag reflex	Severe needle phobia
Long dental procedures (eg implant placement)	Patients classified ASA III
Learning difficulty	Body Mass Index over 30
Medical problems where stress exacerbates systemic conditions, eg epilepsy, asthma	Patients with challenging behaviour and severe learning difficulties

Table 2. The main indications and contra-indications of conscious sedation in a primary setting for dental procedures.⁷

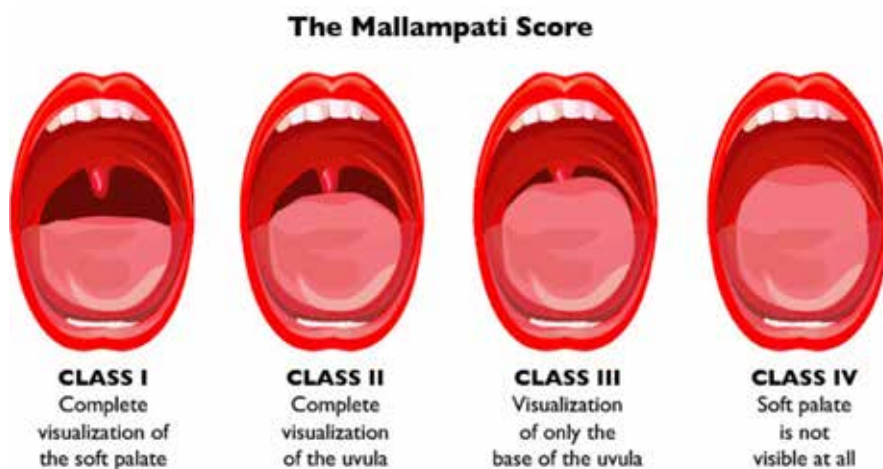


Figure 1. Adapted from: <https://www.clinicaladvisor.com/home/the-waiting-room/understanding-the-mallampati-score/>.¹³

ASA Classification	
ASA 1	Healthy person, fit, BMI under 30
ASA 2	Patient with mild systemic, well-controlled disease, eg controlled hypertension, diabetes
ASA 3	Patient with severe systemic disease, significant functional limitations, eg COPD – poorly controlled diabetes, hypertension, obesity
ASA 4	Severe systemic disease constantly threatening life, myocardial infarction, stroke, unstable angina
ASA 5	Moribund – not expected to live beyond 24 hours
ASA 6	Braindead

Table 3. Adapted from American Society of Anesthesiologists' classification.¹⁰

Airway Anatomy in Adults	Airway Anatomy in Children
Flatter occiput	More pronounced occiput flexing head and neck when supine on flat surface
Airway diameter in proportion	Smaller airway diameter
Relatively smaller tongue, tonsils	Larger tongue, tonsils, adenoids
Spade shape, flat, erect, flexible	Floppier and posterior sloping epiglottis (U-shaped)
Plate is vertical	Airway smallest at cricoid cartilage level (plate funnel)
Trachea longer and more posterior	Trachea angled anterior and shorter

Table 4. The airway anatomy in adults and children.

technique and assess patient suitability.⁹

The American Society of Anesthesiologists' classification is to categorize patients according to their health status.¹⁰ ASA I and ASA II patients can be treated in a primary care setting under conscious sedation. Patients in ASA III and above category must be referred for treatment in the secondary care. Each patient that is pre-assessed for sedation must have an ASA grade to indicate their suitability for sedation (Table 3).

Physical and clinical examination consists of the assessing patient compliance as well as assessing and identifying the common predictors of a difficult airway. The mnemonic (LEMON) is used to assess and predict the difficulty of airway:

L – Look externally: craniofacial abnormalities, facial trauma, beard, moustache, tongue, large tongue and

large incisors.

E – Evaluate 3-3-2 rule

- i Jaw opening: patient's mouth is fully open and allows three fingers between the upper and lower teeth;¹¹
- ii Hyomental distance: three finger breadths space;
- iii Thyromental distance: two finger breadths space.

M – Mallampati score is a simple grading system which consists of the ability to visualize the faucial pillars, soft palate and base of uvula when the patient protrudes the tongue as far out as possible and is a way of assessing the airway difficulty specifically in sedation (Figure 1).¹² The higher the Mallampati score, the more difficult the airway.

O – Obstruction. Anything that could potentially obstruct the airway, for example tumours, limited mouth

opening, abscess, foreign body, dentures, haematoma, etc.

N – Neck mobility. Patients must be able to extend their neck and able to move it around. This is particularly important for clearing airway obstruction.

Some common challenges relevant to conscious sedation and patient selection

Age is an important factor in selecting the right patient for conscious sedation. Declining renal and hepatic functions affect drug metabolism in the elderly, resulting in reduced dosage requirements of medications to achieve the same desired results. There is a significant change in the pharmacodynamic and pharmacokinetic properties of drugs in elderly patients, with some drugs taking longer to be metabolized and eliminated. It is therefore essential that all drugs are carefully titrated to effect.¹⁴ Blood pressure and heart rate of the elderly are significantly and easily affected by the sedative drugs, which may lead to cerebral or cardiac ischemia.¹⁵ Similarly, with children, their reaction to certain drugs can be unpredictable and their understanding and comprehension of the procedure may hinder their treatment under conscious sedation. Therefore each patient must be assessed and treated according to his/her individual needs and tolerance.⁹ Sedation is contra-indicated for children under one year of age.¹⁶

Adults' and children's airway anatomy differs significantly, hence it should be taken into account when assessing for conscious sedation (Table 4).¹⁷ Anatomy of the airway in children is more fragile and there is increased risk of airway obstruction.

Any person under the age of 12 is considered a child, those between 12 to 16 years are classified as young person, and anyone 16 years and over is considered as adult. According to the standards, inhalation sedation with nitrous oxide and oxygen for child, young person and adult is standard technique. Intravenous, oral, transmucosal sedation with midazolam for young people and adults is also standard technique. Midazolam by any route for a child is advanced technique, therefore must only be provided by a specialist trained team.^{1,8}

The mental ability of children will also have an impact on their suitability to have treatment under intravenous sedation. They must have the ability to respond to verbal commands and follow instructions, however, some may not be able to have the mental capacity to do so, therefore placing the sedationist in a very challenging and difficult position. This highlights the importance of thorough pre-assessment and the need for a specialist trained team for children under the age of 16.

Obesity and obstructive sleep apnoea

One of the most prominent challenges when selecting patients for conscious sedation is obesity. Obesity is defined as having excess fat and generally those with BMI of over 30. Management of airways in obese patients is difficult due to the possibility of rapid oxygen desaturation as a result of excess fat narrowing the airway. There is also increased vulnerability to respiratory depression due to the effects of sedatives.¹⁸ Obese individuals tend to metabolize drugs differently compared to non-obese individuals. Pharmacokinetics and pharmacodynamics of drugs are unpredictable in obese patients. High BMI can result in high adipose tissues, reduced total body water, higher glomerular filtration rate and reduced hepatic clearance. These factors may mean that higher doses of sedative drugs might be required, thus leading to unpredictable sedative risks and patient reaction.¹⁹ Organs involved in drug metabolism and elimination can be affected by other co-morbidities caused by obesity and thus may result in a prolonged drug elimination process.²⁰

Obesity is a risk factor for developing obstructive sleep apnoea (OSA). OSA is a disorder where there is *'partial or complete obstruction of the upper airway during sleep'*. When sleeping, the muscle tones are relaxed, the soft palate and tongue obstructs the airway, resulting in sudden awakening from sleep.

All obese individuals and those with suspected OSA should go through a concise pre-operative

assessment, including filling out a STOP-BANG questionnaire. A STOP-BANG questionnaire consists of a series of questions about snoring, tiredness, daytime sleepiness, blood pressure and body mass index. The score helps assess the probability of having obstructive sleep apnoea. Those with sleep apnoea are classified as ASA III and therefore are unsuitable for treatment under conscious sedation at a dental surgery, and must be referred to hospital.²¹

Monitoring

All patients selected for conscious sedation must have baseline vital signs including blood pressure, saturation levels, heart rate recorded pre-operatively, intra-operatively and post-operatively. Monitoring equipment such as ECG, Pulse oximeter, End tidal CO₂, NIBP (non invasive blood pressure), defibrillator should be readily available.²² For those patients (ASA I and ASA II) having inhalation sedation, this baseline monitoring is usually not required.

The clinic where sedation is taking place must be fully equipped with medical emergency kit, resuscitation and airway management equipment. Reversal agent must be available and should be easily accessed. There must also be a dedicated recovery room. The staff involved in sedation must check that all equipment and drugs are up to date and within easy access prior to starting sedation procedure.

Consent

To comply with legal requirements and GDC standards, informed written consent must be obtained from each patient undergoing any type of dental treatment with or without conscious sedation.

Consent must be obtained on a different day to the procedure. The Sedationist must ensure that all steps of the procedure have been explained to the patient thoroughly including:

- Type of sedation such as: oral, inhalation, intravenous, transmucosal;
- Route of sedation – steps of IV access must be explained;
- Use of sedative drugs;
- Risks and benefits discussed;
- An advice leaflet should be given to

the patient;

- An escort must be available on the day of procedure and must understand information given.

Staffing

All staff providing conscious sedation must be adequately trained. In a dental setting there may be a dedicated Sedationist or Operator-Sedationist. There must be an appropriately trained nurse present at all times to assist the Operator-Sedationist and to monitor the patient continuously. For advanced technique, there must be a dedicated Sedationist. All members of staff involved in providing sedation must have knowledge, skill and immediate life support training to deal with complications arising during sedation.

Conclusion and take away points

Conscious sedation in dentistry has gained greater popularity in recent years as an alternative to general anaesthesia. Its safety and efficacy in a primary setting means that it is an attractive technique to use both from the dentist and patient perspective. Patients are becoming more educated about the choices available and dentists are obligated to provide effective pain and anxiety control. Conscious sedation is not without its challenges in a primary setting. Strict guidelines and standards must be adhered to, to reduce risks and prevent complications and promote good clinical practice. Consequently, a thorough patient assessment is essential, taking into consideration every patient's individual needs and requirements.

Patient selection is paramount in the provision of dental care under conscious sedation. It is the duty of the sedation provider to ensure the safety of the patient and his/her environment.

Compliance with Ethical Standards

Conflict of Interest: The authors declare that they have no conflict of interest.

References

1. Standards for Conscious Sedation in the Provision of Dental Care. Report of the Intercollegiate Advisory Committee for Sedation

- in Dentistry. 2015. The Dental Faculties of the Royal Colleges of Surgeons and the Royal College of Anaesthetists.
- Poswillo DE. General anaesthesia, sedation and resuscitation in dentistry. Report of an expert working party. London: Standing Dental Advisory Committee, Department of Health, 1990.
 - Smith I. Office-based anaesthesia: the UK perspective. *Ambulatory Surg* 1998; **6**: 69–74.
 - Eldawlatly AA. Moderate sedation: Introducing the 'modified sedation continuum' and the 'moderate sedation ladder'. *Saudi J Anaesth* 2014; **8**: 449–450.
 - Corcuera-Flores JR, Silvestre-Rangil J, Cutando-Soriano A *et al*. Current methods of sedation in dental patients – a systematic review of the literature. *Med Oral Patol Oral Cir Bucal* 2016; **21**: e579–e586.
 - Harbuz DK, O'Halloran. Techniques to administer oral, inhalational, and IV sedation in dentistry. *Australas Med J* 2016; **9**: 25–32.
 - Wilson K. Vital guide to conscious sedation. *Vital* 2008; **5**: 19–22.
 - <http://www.sdcep.org.uk/wp-content/uploads/2018/07/SDCEP-Conscious-Sedation-Guidance.pdf> (Accessed 05/05/2019).
 - Collado V, Faulks D, Nicolas E *et al*. 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**: e71240.
 - American Society of Anesthesiologists <https://www.asahq.org/standards-and-guidelines/asa-physical-status-classification-system>. (Accessed 01/06/2019).
 - Mshelia DB, Ogboli-Nwasor EO, Isamade ES. Use of the 'L-E-M-O-N' score in predicting difficult intubation in Africans. *Nigerian J Basic Clin Sci* 2018; **15**: 17–23.
 - Iyer MS, Pitetti RD, Vitale M. Higher Mallampati scores are not associated with more adverse events during pediatric procedural sedation and analgesia. *West J Emerg Med* 2018; **19**: 430–436.
 - <https://www.clinicaladvisor.com/home/the-waiting-room/understanding-the-mallampati-score/> (Accessed 31/05/2019).
 - Kanonidou Z, Karystianou G. Anesthesia for the elderly. *Hippokratia* 2007; **11**: 175–177.
 - Lim YS, Kang DH, Kim SH *et al*. The cardiovascular effects of midazolam co-induction to propofol for induction in aged patients. *Korean J Anesthesiol* 2012; **62**: 536–542.
 - Attri JP, Sharan R, Makkar V *et al*. Conscious sedation: emerging trends in paediatric dentistry. *Anesth Essays Res* 2017; **11**: 277–281.
 - Harless J, Ramaiah R, Bhanankar S. Pediatric airway management. *Int J Crit Illn Inj Sci* 2014; **4**: 65–70.
 - Schumann R. Anaesthesia for bariatric surgery. *Best Pract Res Clin Anaesthesiol* 2011; **25**: 83–93.
 - Jirapinyo P, Thompson CC. Sedation challenges: obesity and sleep apnea. *Gastrointest Endosc Clin N Am* 2016; **26**: 527–537.
 - De Baerdemaeker Luc EC, Mortier EP, Struys MMRF. Pharmacokinetics in obese patients. *BJA* 2004; **4**: 152–155.
 - Okoronkwo U Ogan, Plevak DJ. Anesthesia safety always: an issue with obstructive sleep apnea. Newsletter The official journal of the anesthesia patient safety foundation. 1997; **12**(2). <https://www.apsf.org/article/anesthesia-safety-always-an-issue-with-obstructive-sleep-apnea/>
 - Kapur A, Kapur V. Conscious sedation in dentistry. *Ann Maxillofac Surg* 2018; **8**: 320–323.



Gabby Logan is helping us to champion the benefits of interdental cleaning.

Healthy habits, healthy lifestyle. TePe and Gabby Logan are working together to help you spread the word.

Making the healthy choice the easy choice. Swedish-made TePe are the No.1 selling and most widely available interdental brushes in the UK.

Recommended and OHF approved. TePe interdental brushes are recommended by 94% of dental hygienists.*

Available in **Original**, **Angle** (long handle) or **Extra Soft** for gentle cleaning.

TePe.com/Gabby

* Source: A survey of 201 dental hygienists in the UK, Ipsos, (2019).

