

Application of Conscious Sedation in Dentistry

Nisha Singh¹, Chandan R Agali², Ashok KN³, N Senthil Kumaran⁴,
Geetha L⁵, Saraswati Ghosh⁶

1- Post Graduate student, Department of Pedodontics and preventive dentistry, BIDS, Patna, Bihar, India.

2- Reader, Department of Public health dentistry, TMDRC, Moradabad, Uttar Pradesh, India.

3- Senior Lecturer, Department of Oral Medicine and Radiology, HSRM Dental College and Hospital, Hingoli, Maharashtra, India.

4- Department of Pedodontics and preventive dentistry, Chettinad Dental College and Hospital, Chennai, India.

5- Senior Lecturer, Department of Oral Pathology and Microbiology, HSRM Dental College and Hospital, Hingoli, Maharashtra, India.

6- Professor in Curriculum & Instruction, College of Education, Eritrea Institute of Technology, Mai-Nefhi, Eritrea (Africa).

Correspondence to:

Dr. Nisha Singh,

Department of Pedodontics and Preventive Dentistry, BIDS,
Patna, Bihar, India.

Contact Us: editor@ijdmr.com

Submit Manuscript: submissions@ijdmr.com
www.ijdmr.com

ABSTRACT

Sedation for dental procedures (with or without local anaesthesia) includes the administration by any route or technique of all drugs which result in depression of the central nervous system. Conscious sedation is administered with an aim to produce a degree of sedation without loss of consciousness, in order to perform a desired function without any hindrance. This technique is being widely followed by paediatric dentists, who utilize the method on uncooperative and anxious patients during any treatment. This technique has many adverse effects. This article reviews the various aspects of conscious sedation in general and paediatric dentistry.

KEYWORDS: Conscious Sedation, Anaesthesia, Dentistry

INTRODUCTION

Conscious sedation is defined as a technique in which the use of a drug or drugs produces a state of depression of the central nervous system enabling treatment to be carried out, but during which verbal contact with the patient is maintained throughout the period of sedation.¹ The various drugs and techniques used in providing conscious sedation for dental treatment should carry a margin of safety wide enough to render loss of consciousness unlikely.^{2,3}

Recently, it has been proved that conscious sedation can be delivered using processes that have marked adverse effects. These involve special sedation technique that risk causing unintended deep sedation. Children visiting a dentist need effective sedation during any minor procedure because of fear, ill health, behavioural problems, etc. Some

procedures are common and anaesthetists should know what sedation techniques are effective and likely to be used by other healthcare practitioners. Conscious sedation can be used in children presenting for anaesthesia.

GOALS OF CONSCIOUS SEDATION

Goals of conscious sedations are:³

- Promoting patient welfare and safety.
- Facilitating provision of quality care.
- Minimizing the extremes of disruptive behaviour.
- Promoting a positive psychological response to treatment.
- Returning the child to a physiological state in which safe discharge is possible.

How to cite this article:

Singh N, Agali CR, Ashok KN, Kumaran NS, Geetha L, Ghosh S. Application of Conscious Sedation in Dentistry. Int J Dent Med Res 2014;1(4):90-93.

GENERAL PRINCIPLES OF CONSCIOUS SEDATION

*Patients should be assessed. The assessment should include:*³

- Full medical and dental history that needs to be performed before providing the treatment with conscious sedation.
- Informed consent for a course of dental treatment under conscious sedation must be obtained from patient, each parent/guardian, and the child, prior to the conscious sedation appointment.
- An explanation of the sedation technique proposed must be given.
- Before starting with the procedure, the child and their parent or guardian must be given clear and comprehensive pre- and postoperative instructions in writing.
- Fasting is not required for children undergoing inhalation sedation using nitrous oxide but dentists might recommend that a light meal only is consumed in the two hours prior to the appointment

*Patients with serious medical complications should be dealt with extra concern*³

- If the patient has any serious medical condition, then they must be referred to specialist medical practitioner before planning for any treatment using conscious sedation. If the patient is seriously medically compromised, then an anaesthetist should be present to provide sedation and monitor the patient during the procedure.
- A parent, legal guardian or other responsible adult must accompany the child to and from the treatment facility.

*Documentation should be done*⁴.

Proper documentation of the patient should be done. this should include:

- Name and signature of the operator together with the name(s) of the assistants.

- Contain a clear treatment plan, completed medical history and consent form, appropriate radiographs and briefly give an account of the reason for the need for sedation.
- Document the operative treatment that was performed, the name of the drug, concentration and batch number (if appropriate), dosage, route and duration of sedation.
- State which monitors were used (as appropriate) together with their readings.
- Include a time-based record where appropriate.

*Training of dental staff should be done*⁴

- The dental team must undergo appropriate training on a regular basis.
- It is essential that primary care dentists who sedate children undergo training that is recognized by appropriate authorities and that their clinical skill and knowledge relating to paediatric conscious sedation, including local anaesthesia, behavioural management and the provision of operative dental care for children, is regularly updated.

APPLICATION OF VARIOUS DRUGS FOR CONSCIOUS SEDATION

Drug	Application	Drawbacks
Nitrous Oxide ⁵⁻⁷	<ul style="list-style-type: none"> - Children with mild to moderate anxiety to enable them to accept dental treatment better and to facilitate coping across sequential visits. - Can be used to facilitate dental extractions in children. - Is preferred to general anaesthesia for anxious children undergoing elective orthodontic (premolar) extractions. - Is a cost effective alternative to general anaesthesia 	<ul style="list-style-type: none"> - Is of less value in those who require multiple extractions, - Poor attenders and very young children. - Common cold, tonsillitis, nasal blockage are common - Pre-co-operative children and women at first trimester of pregnancy are contraindicated.
Diazepam and temazepam ⁸⁻¹⁰	<ul style="list-style-type: none"> - Oral benzodiazepines can be used to relax anxious patients prior to dental treatment but their 	<ul style="list-style-type: none"> - There is no role for intravenous diazepam sedation in paediatric dentistry.

	effects can be unpredictable in children.	
Midazolam ¹¹	- May have a potential value as a pre-medication and sedative agent.	- Is not recommended for use out with a hospital environment.
Flumazenil- ¹²	-Reversal with Flumazenil should not be used as a routine part of the conscious sedation procedure	- Flumazenil may induce convulsions.
Opioids and other miscellaneous agents with sedative properties (chloral hydrate, hydroxyzine, promethazine hydrochloride, fentanyl & pethidine)	-can be used to relax anxious patients prior to dental treatment but their effects can be unpredictable in children.	- Repeated administration of chloral hydrate carries a risk of carcinogenesis. - Fentanyl and other potent opioids should only be used by a qualified anaesthetist in a hospital setting.

ROUTES OF ADMINISTRATION

	Routes	Features
1	Inhalation ¹³	- Recommended route for conscious sedation for paediatric dentistry. - Operator should use a close-fitting scavenging nasal hood. An air-entrainment valve is not required. - Efficacy is reduced when patient object to the nasal hood or have difficulty breathing through the nose.
2	Oral ¹⁴	- Prescribed and administered by the operating dentist within the facility where the dental procedure is to take place. - Children who are given an oral sedative should be placed in a quiet room facility together with their escort and a competent member of staff. - Sedated children should be monitored clinically and electronically.
3	Intravenous conscious sedation ¹⁵	-Intravenous sedation is not recommended in pre-cooperative children. Dentists should consider whether the provision of an elective general anaesthetic might be preferable in such circumstances. - Single drug intravenous sedation, e.g. midazolam, is recommended for adolescents who are psychologically and emotionally suitable. - Intravenous sedation should only be administered by an experienced dental sedationist with a trained dental nurse in an appropriate facility. - A pulse oximeter, at least, should be used.
4	Rectal ¹⁶	-Rectal administration is not socially acceptable. - It is currently not recommended out with a hospital facility and requires the assistance of a qualified anaesthetist.
5	Intramuscular sedation ¹⁷	-This is not recommended. Operators should consider whether the alternative provision of a general anaesthetic might carry a lower risk and give greater long-term psychological benefit to the child.

COMPLICATIONS

The main complications related to conscious sedation are :^{18,19}

- Hypoxia
- Nausea and vomiting
- Inadvertent general anaesthesia (over sedation).

MONITORING

All patients undergoing intravenous sedation must be monitored continuously and thoroughly with pulse oximetry. There must be regular record of various vital signs like pulse rate, oxygen saturation and blood pressure.²⁰

Hypoxemia is a major complication following conscious sedation in paediatric patients. Traditional methods of monitoring sedated paediatric patients include visual observation of skin colour, depth and rate of respiration, listening to heart and breath sounds using a pre-cordial stethoscope.^{21,22}

Oxygen administration reduces hypoxia during procedures carried out during sedation and therefore should be readily available.²³

CONCLUSION

The provision of adequate anxiety control is an integral part of the practice of dentistry. All patients deserve appropriate anxiety control for any dental procedure. The application of conscious sedation should be carried out effectively and precisely so that it maintains a healthy gap from general anesthesia and unconsciousness. More concern should be taken when this process is applied on pediatric patients. Sedationist must be aptly trained to perform sedations on patients.^{4,18}

REFERENCES

1. Nathan JE. Management of the difficult child: a survey of pediatric dentists' use of restraints, sedation and general anesthesia. *ASDC Journal of Dentistry for Children* 1989; 56: 293–301.
2. Roberts GJ, Brook AH, Page J, Davenport ES. British Society of Paediatric Dentistry. A policy document on sedation for paediatric dentistry.

- International Journal of Paediatric Dentistry 1996; 6: 63–66.
3. General Dental Council. Maintaining Standards. Guidance to dentists on professional and personal conduct. Publisher City, Country: Publisher, 1997; modified 1998.
 4. Guidelines for the elective use of conscious sedation, deep sedation and general anesthesia in pediatric dental patients: Reference manual 1999–2000. *Pediatric Dentistry* 1999; 21:68–73.
 5. Major E, Winder M, Brook AH, Berman DS. An evaluation of nitrous oxide in the dental treatment of anxious children. A physiological and clinical study. *British Dental Journal* 1981; 151: 186–191.
 6. Veerkamp JS, Gruythuysen RJ, Hoogstraten J, van Amerongen WE. Anxiety reduction with nitrous oxide: a permanent solution? *ASDC Journal of Dentistry for Children* 1995; 62: 44–48.
 7. Parbrook GD, James J, Braid DP. Inhalational sedation with isoflurane: an alternative to nitrous oxide sedation in dentistry. *British Dental Journal* 1987; 163: 88–92.
 8. Laskin JL, Williamson KG. An evaluation of the amnesic effects of diazepam sedation. *Journal of Oral & Maxillofacial Surgery* 1984; 42: 712–716.
 9. Harris D, O'Boyle C, Barry H. Oral sedation with temazepam: controlled comparison of a soft gelatin capsule formulation with intravenous diazepam. *British Dental Journal* 1987; 162: 297–301.
 10. Lundgren S, Ekman A, Blomback U. Rectal administration of diazepam in solution. A clinical study on sedation in paediatric dentistry. *Swedish Dental Journal* 1978; 2: 161–166.
 11. Parbrook GD, Still DM, Parbrook EO. Comparison of i.v. sedation with midazolam and inhalation sedation with isoflurane in dental outpatients. *British Journal of Anaesthesia* 1989; 63: 81–86.
 12. Rodrigo MR, Chan L, Hui E. Flumazenil reversal of conscious sedation for minor oral surgery. *Anaesthesia & Intensive Care* 1992; 20: 174–176.
 13. Dworkin SF, Schubert M, Chen AC, Clark DW. Psychological preparation influences nitrous oxide analgesia: replication of laboratory findings in a clinical setting. *Oral Surgery, Oral Medicine, Oral Pathology* 1986; 61: 108–112.
 14. Shapira J, Holan G, Botzer E, Kupieztky A, Tal E, Fuks AB. The effectiveness of midazolam and hydroxyzine as sedative agents for young pediatric dental patients. *ASDC Journal of Dentistry for Children* 1996; 63: 421–425.
 15. Houpt MI. Project USAP – Part III: Practice by heavy users of sedation in pediatric dentistry. *ASDC Journal of Dentistry for Children* 1993; 60: 183–185.
 16. Laskin JL, Williamson KG. An evaluation of the amnesic effects of diazepam sedation. *Journal of Oral & Maxillofacial Surgery* 1984; 42: 712–716.
 17. Rita L, Seleny FL, Mazurek A, Rabins SY. Intramuscular midazolam for pediatric preanesthetic sedation: a doubleblind controlled study with morphine. *Anesthesiology* 1985; 63: 528–531.
 18. Cote CJ, Notterman DA, Karl HW, Weinberg JA, McCloskey C. Adverse sedation events in pediatrics: a critical incident analysis of contributing factors (see comments). *Pediatrics* 2000; 105: 805–814.
 19. Cote CJ, Karl HW, Notterman DA, Weinberg JA, McCloskey C. Adverse sedation events in pediatrics: analysis of medications used for sedation. *Pediatrics* 2000; 106: 633–644.
 20. Wilson S. Conscious sedation and pulse oximetry: false alarms? *Pediatric Dentistry* 1990; 12: 228–232.
 21. Wilson S. Patient monitoring in the conscious sedation of children for dental care. *Current Opinion in Dentistry* 1991; 1: 570–576.
 22. Iwasaki J, Vann WFJ, Dilley DC, Anderson JA. An investigation of capnography and pulse oximetry as monitors of pediatric patients sedated for dental treatment. *Pediatric Dentistry* 1989; 11: 111–117.
 23. Rohlffing GK, Dilley DC, Lucas WJ, Vann WFJ. The effect of supplemental oxygen on apnea and oxygen saturation during pediatric conscious sedation. *Pediatric Dentistry* 1998; 20: 8–16.

Source of Support: Nil

Conflict of Interest: Nil