

# Conscious Sedation In Dentistry

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## **ABSTRACT**

*Conscious sedation is administered to produce a degree of sedation without loss of consciousness, in order to perform a desired function without any obstruction. This technique is being widely followed by pedodontist, on uncooperative and anxious patients during any treatment. This technique has many adverse effects. This article reviews the various aspects of conscious sedation in dentistry.*

**KEYWORDS: CONSCIOUS SEDATION , ANESTHESIA, DENTISTRY**

## **INTRODUCTION:**

Conscious sedation is a misnomer terminology that has been used for a long time. The American Society of Anesthesiologists in 2008 had changed the terminology and is now here after known as “Procedural sedation” or “Moderate Sedation”. Periodontal and implant surgery should be done painlessly and with minimal or no worry. Most ideal means of providing painless surgery is by local anesthesia. But patients who are apprehensive may require treatment under mild or moderate sedation.

## **History:**

Modern sedation evolved over the last 100 years. Joseph Priestly in the year 1772 had discovered nitrous oxide. It was this discovery that had led to the evolution of the gaseous drugs that could be used in the medical fraternity for the betterment of treatment to the society. Sir Humphrey Davy had spent most of his lifetime discovering the analgesic properties of nitrous oxide. Horace Wells who has discovered the properties of anaesthesia and is now well regarded as the Father of Anaesthesia. On 10<sup>th</sup> December 1844 John Riggs a civil surgeon had used nitrous oxide to extract his own tooth and he claimed he did not experience pain. William Clark had used ether administered from a towel for the

extraction of a tooth. This was the first ever recorded incidence of anaesthesia for the removal of a tooth. John Wylie in 1978 had published the First National Report on sedation. His report contained details regarding patient communication and drugs with a wide margin of safety .

Conscious sedation is defined as the technique in which the use of a drug or drugs produces 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.<sup>1</sup>

### **Procedural Sedation Continuum:**

Sedation is a sequence of levels ranging from minimally impaired consciousness to unconsciousness. The following terminology refers to the different levels of sedation: Minimum, Moderate, Dissociative, Deep, General anesthesia. Levels of sedation are in a sequence because a sedated patient can go in and out of an intended level quite rapidly.

**Minimal sedation(anxiolysis):** Drug induced state during which the patients can respond normally to verbal commands.

**Moderate sedation:** It is also called as conscious sedation. It is a drug induced depressed consciousness. Need for purposeful response to verbal or tactile stimulation. No interventions are needed to maintain a patient airway. Adequate spontaneous ventilation is required. Cardiovascular function maintained.

**Dissociative sedation:** It is a cataleptic state that occurs with both analgesia & amnesia while maintaining protective airway reflexes, spontaneous respirations and cardiopulmonary stability.

**Deep sedation:** It is considered as a drug induced depression of consciousness during which patients cannot be easily awakened but respond purposefully to repeated painful stimulation. Patients would require assistance to maintain a patent airway and spontaneous ventilation may be inadequate.

### **GOALS OF CONSCIOUS SEDATION:<sup>2</sup>**

- Provision of safe analgesia , anxiolysis, sedation and amnesia during the procedure.
- Safely decreasing adverse responses psychologically associated with procedures.
- Return of patients to their preprocedural level of functioning.
- Facilitating provision of quality care.
- Minimizing the extremes of disruptive behavior.
- Promoting a positive psychological response to treatment.
- Returning the child to a physiological state in which safe discharge is possible.

### **CLINICAL GUIDELINES FOR MINIMAL & MODERATE SEDATION:<sup>3</sup>**

**Patient evaluation:** Current health status of the patient to be evaluated.

ASA have classified health status as;

ASA1- A normal healthy patient

ASA 2- A patient with mild systemic disease

ASA 3- A patient with severe systemic disease

ASA 4- A patient with severe systemic disease that cause a constant threat to life

ASA 5- A patient who is not expected to survive without the operation.

ASA 6- A brain dead patient whose organs are being removed for donation.

**Preoperative physical examination:** Blood pressure, pulse ,Oxygen saturation and respiration are recorded. Appearance and skin color, alertness and exercise tolerance are to be examined.

**Personnel and equipment:** Atleast one additional person trained in basic life support should be available. Positive-pressure O2 delivery system for patient being treated. Functioning inhalation equipment for O2 and drug delivery. Equipment to establish IV access should be available

**Monitoring and documentation:** A trained individual should be in the operatory during and after treatment to monitor the patient. In case of moderate sedation, a qualified dentist administering sedation should be in the operatory. Dentist must not leave the operatory until the patient is fit for discharge. O2 saturation should be monitored. Appropriate anesthetic record should be maintained with drug names and doses administered. The physiological parameters monitored should also be recorded. Monitoring instruments like sphygmomanometer, suction O2 delivery system, fail-safe and scavenger system, pulse oximeter should be available. Level of consciousness must be continuously monitored. Color of mucosa, skin, blood should be evaluated. Respiration is monitored by auscultation, verbal communication with the patient.

**Recovery and discharge:** Determination of level of consciousness, oxygenation, ventilation and circulation should be done while discharging. Postoperative instructions must be given to both patient and the assistant. If any reversal agent is used, it must be monitored until recovery. Reversal agent may have short duration of action and may cause re-sedation of the patient after discharge.

#### INDICATIONS:<sup>4</sup>

One of the prime indications for the use of procedural sedation is the fear of dental treatment also known as Dental Phobia, Odontophobia, or Dental Anxiety.

The other indications include cognitively impaired individuals such as mentally challenged patients or senile dementia, un co-operative children, children and adults with motor dysfunction as in parkinsonism and cerebral palsy, and those patients who are not physiologically tolerable to stress such as ischemic heart disease, hypertension or stress induced asthma.

The procedure can also be carried out for individuals such as for the removal of multiple impacted teeth under one appointment.

#### Routes Of Administration:

Sedatives can be administered by Oral, Sublingual, Inhalational, Intranasal, Parenteral (intramuscular, intravenous), Rectal routes.

ROUTES	FEATURES
INHALATION <sup>5</sup>	Recommended route for conscious sedation for paediatric dentistry. - Operator should use a close-fitting 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.
ORAL <sup>6</sup>	Prescribed and administered by the operating dentist within the facility where the dental procedure is to take place. - Children on oral sedative should be placed in a quiet room facility with staff. - Sedated children should be monitored clinically.
INTRAVENOUS <sup>7</sup>	Intravenous sedation is not recommended in pre-cooperative children. - Single drug intravenous sedation, e.g. midazolam, is recommended for adults who are psychologically and emotionally stable. - Intravenous sedation should only be

	administered by an experienced clinician with a trained dental nurse in an appropriate facility. - A pulse oximetershould be used
RECTAL <sup>8</sup>	Rectal administration is not socially acceptable. - It is currently not recommended out with a hospital facility and requires the assistance of a qualified anaesthetist
INTRAMUSCULAR <sup>9</sup>	This is not recommended. Operators should considerthe alternative provision of a general anaesthetic might carry a lower risk and give greater long-term psychological benefit to the child.

**Oral sedation** : The most common route of administration for light sedation in dental procedures. They mainly help in anesthetic failure and anxiety reduction and are cost effective, needs minimal monitoring. Although most adults readily accept oral medication, pediatric or cognitively impaired patients may not willingly accept it. Severe adverse reactions are relatively less through the oral route. Nevertheless, careful administration of any drug by any route is required as fatalities have resulted from oral sedation. The bioavailability is increased by 27% when given sublingually compared to same dose given orally.

**Disadvantages:** Inability to titrate drug dose to a desired clinical end point. A predetermined dose to be administered with a risk of prolonged action that is too light or too deep. The post-operative action will be prolonged thereby the individual should not leave the office unaccompanied.

Drugs generally used orally are:Zaleplon,Triazolam,Lorazepam<sup>3</sup>

	Zaleplon	Triazolam	Lorazepam
Age	41-64	41-64	41-64
Available dosage	5 and 10 mg	0.125 and 0.25 mg tablets	0.5,1 and 2 mg tablets
Onset of action	15-30 minutes	30 minutes	30-60 minutes
Plasma concentration	1 hour	< 2hours	4-8 hours
Duration of action	1 hour	2 hours	4-8 hours
Half life	1 hour	2.5 hours	12-16 hours
Contraindications	Pregnancy, Liver impairment, severe renal disease, children	Myasthenia Gravis, severe COPD, glaucoma, mental depression, children	Acuteangle glaucoma, hypersensitive to drug, lactation, pregnancy, renal impairment

**Inhalation sedation:** It is the technique of choice for light conscious sedation . Most used is Nitrous Oxide technique.Ratio of nitrogen and oxygen should never go beyond 50:50

Advantage: It has rapid onset of action and recovery

Disadvantages: Initial equipment cost is high. Need of effective scavenging equipment. Long term use can be hazardous to dentist

Contraindications: COPD, Severe emotional disturbance, Early pregnancy

**Phases of sedation:**

- Induction phase: 100% O<sub>2</sub> flow started. Correct flow rate is established of sedative. Scavenging system is checked for function and adjusted. Initially N<sub>2</sub>O flow should be of 20% and titrated to 10% increments every 60 seconds until patient feel relaxed and display the signs.
- Treatment phase: After the ideal level of sedation is achieved, local anesthesia is administered, and treatment process is started. N<sub>2</sub>O flow can be reduced as patient gets comfortable and can be increased if more local anesthesia must be given.
- Recovery phase: When N<sub>2</sub>O is not required, the flow is terminated and 100% O<sub>2</sub> is given for 5 minutes until patient recovers. If the patient completely recovers is no required to be escorted by other individual.

**DRUGD USED FOR CONSCIOUS SEDATION**

Drug	Application	Drawbacks
Nitrous oxide <sup>10-12</sup>	Children with mild to moderate anxiety enabling to accept dental treatment better and to cooperate for sequential visits. - Can be used for dental extractions in children. - preferred for anxious children undergoing orthodontic (premolar) extractions. - Is a cost-effective alternative to general anaesthesia	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 <sup>13-15</sup>	Oral benzodiazepines can be used to relax patients who are anxious prior to dental treatment .	There is no role for intravenous diazepam sedation in pediatric dentistry.
Midazolam <sup>16</sup>	May have a potential value as a pre-medication and sedative agent.	It is not recommended for use without a hospital environment
Flumazenil <sup>17</sup>	Flumazenil should not be used in conscious sedation procedure commonly.	Flumazenil may induce convulsions.
Opioids	It is used to relax anxious patients before dental treatment, but their effects can be unpredictable in children	Repeated administration of chloral hydrate carries a risk of carcinogenesis. - Fentanyl and other opioids should be used by a qualified anaesthetist only in a hospital setting

**Clinical Conscious Sedation:<sup>3</sup>**

1 mg of Midazolam is administered through the IV route and a waiting period of 1 min approximately. Drooping of eyelids is noticed immediately after which another 1 mg Midazolam is administered. "Viril Sign" which is characterized by Eye drooping down and partial ptosis will be noticed. There after 6 mg of midazolam is administered and the patient is allowed 1 min sleep. The patient will respond to stimulated verbal command and the best way to identify proper anaesthesia will be the FINGER NOSE TEST. Once all the signs of anaesthesia work the administration of local anaesthesia is done in the area to be operated. After about 2 to 5 min the probe test is done to check for any signs of pain in the anaesthetized area after which the procedure can be carried out thereafter.

**Complications:** The main complications related to conscious sedation are hypoxia, Nausea and vomiting, Inadvertent general anaesthesia (over sedation).

#### **Clinical Applications In Implant Dentistry:<sup>18</sup>**

Oral or sub lingual doses: 0.125 to 0.25 mg not to exceed doses of 0.5 mg. Fast but short acting benzodiazepines with few side effects (long record of successful use). Effects can be reversed with intravenous Flumazenil and they are proven not to be carcinogenic and has a low potential for abuse and addiction. Extremely safe and most suitable for in office sedation for implant dentistry.

Contraindications are Pregnant, Breast feeding, Ethanol intake, patients under macrolides, ketoconazole, calcium channel blockers

#### **Newer Method Of Sedation In Oral Surgery:<sup>3</sup>**

Local anaesthesia is well known for pain control in dentistry. Insufficient for implant surgery and augmentation procedures. Surgical procedures last for more than 90 min and most of the patients experience fear and pain. Fear, strain, increased heart rate and blood pressure during surgical procedures.

Drugs used for sedation in oral surgery are:

Nonsteroidal anti-inflammatory drug (Ketorolac)

Benzodiazepine (Midazolam)

Local anesthetic (4% Articaine hydrochloride)

Vasoconstrictor (Epinephrine)

#### **Proposed Technique:**

- 60 mg Ketorolac Intramuscular injection
- 0.1mg/kg midazolam Intravenous injection (After 20 min)
- 0.02 to 0.03 mg/kg midazolam injected additionally in case of prolonged procedures.
- Articaine + epinephrine local anesthetic given after 5 min after midazolam.

#### **Pharmacological Advantages:**

Ketorolac has analgesic effect like morphine. Midazolam is distinguished for good analgesic and hypnotic effects. Maximum effect occurs in 2 to 4 min after IV injection. Articaine hydrochloride is one of the most effective anesthetics.

**Monitoring Signs:** Disturbed speech fluency, Horizontal nystagmus

**Advantages:** Lower heart rate and blood pressure. Better hemodynamics, anesthetization effect, and psychoemotional status during surgery. Patients experienced no pain during the surgery with normal BP and heart rate 5 min after midazolam use. Anterograde amnesia

#### **CONCLUSION:**

Dentistry to the common man has been commonly associated with pain and this in turn has produced an aversion to dental treatment. With the advent of successful analgesic techniques such as conscious sedation, even the most anxious of dental patients can be treated without the fear of painful procedures. 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

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