Conscious sedation and general anesthesia

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- General anesthesia can be defined as an irregular, reversible depression of the higher centers of the central nervous system (CNS) that makes the patient **unconscious and insensible to pain.**

- general anesthesia as “hypnosis (sleep or loss of consciousness) accompanied by the loss of protective laryngeal reflexes (cough). Ideally, general anesthesia represents the simultaneous presence of analgesia (loss of pain), amnesia (loss of memory) and hypnosis along with reflex inhibition and loss of skeletal muscle tone which allows for safe surgical procedures.”

Challenges in Dental Conscious Sedation

1. Shared airway between the dentist and the anesthesiologist
2. Phobia and anxiety
3. Coexisting medical conditions such as cardiac anomalies, mental instability, and epilepsy
4. Chances of arrhythmias during surgery due to trigeminal nerve stimulation
5. Enlarged tonsils and adenoids in children likely to precipitate respiratory obstruction
6. Difficult airways include large protuberant incisors, large overbite, an inability to advance the mandible, small interincisal distance, large tongue, narrow or high-arched palate, shorter thyromental distance (including retrognathia and micrognathia), excessive mandibular soft tissue, short neck, increased neck circumference, and decreased range of neck motion.
7. Risk of patient losing consciousness, respiratory, and cardiovascular depression
8. Vasovagal syncope due to the dependent position of legs in dental chair.

- Sothat, dental practitioners often prefer nasotracheal intubation to allow for treatment in the oral cavity.
- For this reason, inspection of the nasal cavity is recommended
- Likewise, anaesthesiologists should be aware that various congenital syndromes can alter airway anatomy
- The following parameters should also be measured: weight, height, vital signs (blood pressure and pulse), respiratory rate, oxygen saturation, and ability to obtain venous access.

Notes: Detailed airway examination is done for pediatric patients to look for adenotonsillar hypertrophy or any other anatomical airway abnormalities. In case of any medical or surgical condition, the concerned specialist should be consulted for optimization before taking up the patient for dental procedure

Fasting instructions

• Preparation for Conscious Sedation

Preparation for conscious sedation involves the preparation of patients as well as preparation in an operating area.

• Patient preparation

a. Consent for treatment:

Valid informed consent is necessary for all patients receiving dental care under conscious sedation, and this should be confirmed in writing. In case of children, valid consent should be signed by the legal guardian

b. Check-up: Patient's detailed history and examination were performed.

Table 2: American Society of Anesthesiologists physical status classification with recommendation from the article by Harbuz and O'Halloran

ASA-I	ASA-II	ASA-III	ASA-IV	ASA-V	ASA-VI
Healthy patients	Mild systemic disease	Chronic conditions	Severe systemic disease	Moribund patient	Brain-dead patient whose organs are being removed for donor purposes
Candidate for conscious sedation	Higher risk of complications with sedation, safe if correct precautions taken	Hospital environment only	Hospital environment only	Not appropriate for dental sedation	Not appropriate for dental sedation

ASA=American Society of Anesthesiologists

Only patients who satisfy the criteria of ASA Grade I and II should be considered for sedation in dental surgery outside hospital.

For pediatric patients, it is recommended that only the ASA Grade I patients are sedated outside a hospital environment[3] as in Table 2,

- Myocardial and ischemic heart disease are associated with a higher incidence of post-operative heart failure.
- In fact, the risk of re-infarction is highest within 6 weeks. Therefore, elective procedures should be postponed for at least this long, but ideally for 6 months after a myocardial infarction, or until the patient's cardiologist is satisfied that the measures taken have addressed the problem of unstable angina

- Valvular heart disease and arrhythmias often raise concerns for dental practitioners because they require appropriate management using antibiotic prophylaxis due to the risk of infective endocarditis.
- Patients with cardiac problems, and particularly those with heart failure, should be placed in a supine position post-operatively because they may experience symptoms related to pulmonary congestion

Pharmacology of Drugs Used for Conscious

Nitrous oxide

- N_2O is a colorless gas used as an inhalational anesthetic agent. It is an anxiolytic/analgesic agent that causes CNS depression and varying degree of muscle relaxation and euphoria with hardly any effect on the respiratory system.
- The technique employs of N_2O delivered along with oxygen through a nasal mask.
- The use of N_2O is contraindicated in patients with common cold, porphyria, and COPD.

Preinstructions

1. The patient should be advised to avoid the heavy meal prior to the use
2. Patients with contact lenses should be removed as gas leaks around the bridge of the nose may produce drying of the eyes.
3. Introduction of 100% oxygen for 1–2 min, followed by titration of N_2O in 10% intervals is recommended.
4. The concentration of N_2O should not routinely exceed 50%

The objectives of nitrous oxide/oxygen inhalation include

- Reduce or eliminate anxiety
- Reduce untoward movement and reaction to dental treatment
- Enhance communication and patient cooperation
- Raise the pain reaction threshold
- Increase tolerance for longer appointments
- Aid in treatment of the mentally/physically disabled or medically compromised patient
- Reduce gagging

Indications for Conscious Sedation

1. Dental phobia and anxiety
2. Traumatic and long dental procedures
3. Medical conditions aggravated by stress such as angina, asthma and epilepsy
4. Children more than 1 year of age
5. Mentally challenged individuals
6. Ineffective local anesthesia due to any reason.

Contraindications

1. Chronic obstructive pulmonary diseases
2. Severe emotional disturbances or drug-related dependencies
3. First trimester of pregnancy]
4. Treatment with bleomycin sulfate(Bleomycin is a type of antibiotic that is only used in cancer chemotherapy. It slows or stops the growth of cancer cells in your body)
5. Methylenetetrahydrofolate reductase deficiency.

- Whenever possible, appropriate medical specialists should be consulted before administering analgesic/anxiolytic agents to patients with significant underlying medical conditions (e.g. severe obstructive pulmonary disease, congestive heart failure, sickle cell disease, acute otitis media, recent tympanic membrane graft, acute severe head injury.

Advantages

- Easy to administer
- Onset of action is rapid
- N_2O has bland, pleasant, nonirritating order
- Rapid uptake and elimination of N_2O ensures that no hangover effect is experienced
- Recovery is fast, last for 3-5 minutes after the mask has been removed
- Titration is possible
- There is a wide margin of safety
- There is cardio-respiratory stability
- Nausea and vomiting are uncommon
- Reflex integrity is maintained
- No preparation of patient is required
- No need for any escort.

Disadvantage

1. Equipment is expensive
2. Patient must be able to breathe through the nose
3. Interference of the nasal hood with injection to anterior maxillary region.

Benzodiazepines

- Benzodiazepines, including diazepam and midazolam, have proved to be safe and effective for IV conscious sedation

- benzodiazepines are known to possess skeletal muscle relaxation and anticonvulsant activity; however, these drugs have no analgesic properties. Mechanism of action is through GABA-mediated opening of chloride channels

- They are normally added to N_2O/oxygen for conscious sedation, as N_2O produces the analgesic effects. The most commonly used benzodiazepine is midazolam.

- It is used for conscious sedation in the pediatric dentistry.

- It is mixed with a sweet, such as simple syrup, and used orally either via drinking cup or through a syringe without needle and deposited in the retromolar area.

- Syrup can be given 20 min before the procedure. Dose under 25 kg is 0.3–0.5 mg/kg in adults but should be administered in a hospital setup only.

- It can also be given intramuscularly, intravenously, rectally, and nasally.

- Its effects are enhanced by various drugs such as opioids, clonidine, antidepressants, antipsychotics, erythromycin, antihistaminics, alcohol, and antiepileptics and should be avoided or used with caution.

- it is contraindicated in patients taking benzodiazepines for seizure disorder or high doses of tricyclic antidepressants.

Ketamine

- Ketamine, a phencyclidine derivative, is an NMDA receptor antagonist. It is a unique drug giving complete anesthesia and analgesia with preservation of vital brain stem functions.
- Ketamine can be given intramuscularly at a dose of 3–4 mg/kg or intravenously at a dose of 1–2 mg/kg. However, administering a lower dose of the drug may be safer to achieve adequate levels of sedation in children due to the problem of potential severe respiratory depression.

Propofol

- Propofol is chemically described as 2,6-diisopropylphenol.
- Propofol is given usually at a dose of 1 mg/kg body weight, followed by maintenance dose ranging from 0.3 to 4 mg/kg/h.

Opioids

- All of the above-mentioned drugs do not have analgesic effects except ketamine. Opioid analgesic, therefore, needs to be supplemented. Duration of action is 30–60 min.
- Fentanyl can be administered by parenteral, transdermal, nasal, and oral routes.
- Recommended dose is 1 μg/kg/dose IV which can be repeated by 1 μg/kg if required.
- Constipation, nausea, and vomiting are common side effects.