

Pharmacologic Management of Patient Behavior

PHARMACOLOGIC MANAGEMENT

Pharmacologic management is a broad term that describes the use of drugs to manage the behavior of pediatric patients undergoing dental procedures. The types of drugs used include inhaled gases, oral medications, drugs administered via intravenous infusion, intramuscular injection, and other routes of administration. Pharmacologic management is further divided into two subcategories, sedation and general anesthesia.

Degree of sedation:

Minimal sedation – (anxiolysis) a minimally depressed level of consciousness, produced by a pharmacologic method that retains the patient's ability to maintain an airway independently and continuously and respond normally to tactile stimulation and verbal commands. Although cognitive function and coordination may be modestly impaired, ventilator and cardiovascular functions are unaffected.

Moderate sedation – (Conscious Sedation) a drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained.

Deep sedation – (Analgesia) a drug-induced depression of consciousness during which patients cannot be easily aroused but respond purposefully following repeated or painful stimulation. The ability to maintain ventilatory function independently may be impaired. Patients may require assistance in maintaining a patent airway, and spontaneous ventilation may be inadequate. Cardiovascular function is usually maintained.

General anesthesia – a drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation. The ability to maintain ventilatory function independently is often impaired. Patients often require assistance in maintaining

a patent airway, and positive pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function. Cardiovascular function may be impaired.

Practitioners intending to produce minimal or moderate sedation should be able to diagnose and manage the physiologic consequences of patients whose level of sedation becomes deeper than initially intended. The term “**rescue**” is often used to describe this management, and refers to steps taken to return the patient to the initially desired level of sedation.

The goals of sedation for the pediatric patient are

- (1) to guard the patient’s safety and welfare;
- (2) to minimize physical discomfort and pain;
- (3) to control anxiety, minimize psychological trauma, and maximize the potential for amnesia;
- (4) to control behavior or movement so that the procedure can be completed safely;
- (5) to return the patient to a physiologic state in which safe discharge, as determined according to recognized criteria, is possible.

Indications for pharmacological behavior management technique:

1. Very young children.
2. Children with reduced (psychological or emotional) maturity or those with (cognitive, physical or mental) disability.
3. Children who are intensely fearful and anxious.
4. Children who require extensive dental care and would benefit from prolonged dental visit.
5. Children who have allergy to local anesthesia.

Pre-treatment Documentation and Assessment

A. Documentation

Each sedation or general anesthetic procedure should be documented in the patient’s record by the practitioner. Documentation should include the following:

1. Rationale for sedation or general anesthesia: the dental surgeon should briefly document the reason for the need for sedation or G.A.
2. Informed consent: each patient, parents or other responsible individual is entitled to be informed regarding benefits, risks, alternatives to sedation or G.A. and the patient record should document that appropriate informed consent was obtained.
3. Instructions to parents or responsible individual: The dental surgeon should provide verbal and written instructions (to parents and responsible individual)

which should include clear explanation of pre and post anesthesia precautions potential or anticipated behavior, and limitation of activities.

4. Dietary instructions: food and liquids intake should be limited prior to treatment.

Sedation in pediatric dentistry

The decision to sedate a child requires careful consideration by an experienced team. The choice of a particular technique, sedative agent and route of delivery should be made at a prior consultation appointment to determine the suitability of the child (and their parents) to a specific technique.

The use of any form of sedation in children presents added challenges to the clinician. During sedation, a child's responses are more unpredictable than that of adults. Their proportionally smaller bodies are less tolerant to sedative agents and they may be easily over-sedated.

Anatomically differences in the pediatric airways include:

- The vocal cords positioned higher and more anterior.
- The smallest portion of pediatric airway is at the level of the subglottis (below cords) at the level of the cricoid ring.
- Children have relatively larger tongue and epiglottis.
- Possible presence of large tonsillar/adenoid mass.
- Larger head to body size ratio in children.
- The mandible is less developed and retrognathic in younger children and infants.
- Children have smaller lung capacity and higher metabolic rate resulting in a smaller oxygen reserve. Hence, children desaturate more quickly than adults do.

Patient preoperative assessment

The preoperative assessment is among the most important factors when choosing a particular form of sedation. This assessment must include:

1. A thorough medical and dental history that include:

1. Allergies or adverse drug reaction that might increase the potential for airway obstruction, such as a history of snoring or obstructive sleep apnea.
2. Current medications (if any including the dose, time, rout and site of administration)
3. Previous hospitalization and past operations (date and purpose)
4. History of previous treatment under general anesthesia or sedation and any associated complications.
5. Family history of diseases or disorders especially those might affect sedation and general anesthesia.

6. Patient medical status (diseases, disorders or physical abnormalities):
 - History of recent respiratory illness or current infections.
 - Assessment of the airway to determine suitability for conscious sedation or general anesthesia (GA).
 - Fasting requirements and the ability of the caregiver to comply with instructions.
 - Proposed procedures being performed.
 - Patient's weight and vital signs.
7. Review of body systems.
8. Age (in years and months) and weight.
9. Name, address, and contact information of the child's home.

2. The **physical evaluation** which should include the following:

- a. Height and weight in kilograms or pounds.
- b. Vital signs, including heart and respiratory rates and blood pressure. If determination of baseline vital signs is prevented by the patient's physical resistance or emotional condition, the reason(s) should be documented.

****Note: Resting vital signs in children:**

Age	Heart rate (beats/min)	Blood pressure (mmHg)	Respiratory rate (breaths/min)
Neonate	120–170	75–85/45	45–60
2–4 years	110–130	90/50	40
4–6 years	100	100/60	30
10 years	90	110/60	25
15 years	80	120/65	12

- c. Evaluation of airway patency, to include tonsillar size and anatomic abnormalities that may increase the risk of airway obstruction (e.g., mandibular hypoplasia, large, short neck, limited mandibular range of motion).
- d. Physical abnormalities or conditions that may affect routine intraoperative monitoring (e.g., recent orthopedic injuries to arms or legs, active skin rashes).
- e. ASA classification.

****Note: American Society of Anesthesiologists' Physical Status (ASA)**

- P1 A normal healthy patient*
- P2 A patient with mild systemic disease*
- P3 A patient with severe systemic disease*
- P4 A patient with severe systemic disease that is a constant threat to life*
- P5 A moribund patient who is not expected to survive without the operation*
- P6 A declared brain-dead patient whose organs are being removed for donor purposes*

So according to ASA, generally, patients categorized into classes III and IV are better managed in a hospital setting.

Dentists should also assess the degree to which behavioral abnormalities will affect the ability for the child to be assessed during sedation. The child's failure to respond appropriately to verbal interaction places a greater degree of responsibility upon the dentist for determining and maintaining an appropriate level of sedation.

Preoperative dietary instructions:

Dietary instructions should be as follows:

1. No milk or solid foods for 6 hours for children 6 to 36 months old and for 6 to 8 hours for children 36 months and older
2. Clear liquids up to 3 hours before the procedure for children aged 6 months and older.
3. Let everyone in the home know the above information, because siblings or others living in the home often unknowingly feed the child.

Note: Patients with a known history of gastroesophageal reflux or with a high potential for aspiration would benefit from an appropriate increase in fasting duration.

ROUTES OF DRUG ADMINISTRATION

Inhalational Route

Enteral Route

Rectal Route

Intramuscular Route

Submucosal and Subcutaneous Routes

Intravenous Route

Onset of action

Oral	30 min
Inhalation	2-3 min
IM	5-10 min
IV	20 to 40 seconds

Peak clinical effect

Oral	60min
Inhalation	3-5
IM	30min
IV	1-10min

Titration

Ability to administer small increments of a drug to achieve a desired clinical effect

Oral	Titration not possible
Inhalation	Titration possible
IM	Titration not possible
IV	Titration possible

Recovery

Need for an escort (somebody) to leave the office

Oral	recovery not complete even after 2-3hrs
Inhalation	recovery almost always complete, may be discharged alone
IM	not complete need escort