

## **Chapter X:**

### **Anesthesia for Office-Based Pediatric Dental Surgery-Allan Schwartz, DDS, CRNA**

#### **Key Points**

- Caries (a dental cavity) is the most prevalent chronic infection in early childhood, and is a major cause of school absenteeism.
- Caries in children can cause intense pain, severe infection, and aesthetic embarrassment, as well as difficulties in eating, swallowing, and chewing.
- 56% of children between ages 2 and 3 have caries, and 80% of children have experienced caries by age 17.
- Caries has reached epidemic proportions in lower income pediatric populations.
- Dental visits by children are increasing.
- Office-based anesthesia for dental surgery can be performed safely, conveniently, and with less cost to the patient. This availability could lift barriers to treatment for many patients.

#### **Case Synopsis**

A 7-year-old female patient was presented to our dental office with complaints of pain in the teeth and the jaws.

#### **Preoperative Evaluation and Demographic Data**

##### **Past Medical/Surgical History**

- Autism/ pervasive developmental disorder
- Obesity

##### **List of Medications**

- None

**Diagnostic Data**

- None

**Height/Weight/Vital Signs**

- 144.8cm, 50 kg, Body Mass Index (BMI) of 23.9, blood pressure-118/80, heart rate-98, respiration per minute-13, oxygen saturation 99% on a 70% mixture of Nitrous oxide in oxygen (due to patient behavior).

**Pathophysiology*****1. Examine the pathological process of dental caries.***

Dental caries (cavity) is the molecular destruction of calcified tooth structures (enamel, dentin, or cementum), which can progress into the dental pulp. Caries results in gradual loss of tooth structure, which can affect chewing, facial structure, and cause infection if left untreated. (See Figure X-1) Caries is caused by the acidic metabolites (low pH) of oral bacteria, principally *streptococcus mutans*. The oral microbiological flora combined with liquid saliva, salivary proteins, and food debris can form into a sticky mass called *biofilm* or *dental plaque*.<sup>1</sup>

Dental periodontal structures consist of the *gingiva* (gums), *oral mucosal tissue*, the *periodontal membrane*, and the *bones* of the maxilla or the mandible. Biofilm adhering to exposed tooth structures causes caries, periodontal tissue inflammation, and permanently destructive periodontal disease. Endotoxins released from oral bacteria into the bloodstream can cause inflammation of the coronary arteries. Therefore treatment for periodontal disease is now recognized as a reversible cause of coronary artery disease.

## ***2. Explain the Prevalence of dental caries in children***

Caries is the most prevalent chronic infection found in early childhood, and is a major cause of school absenteeism. It occurs 5-8 times more frequently than asthma. Caries in children can cause pain, and aesthetic embarrassment, as well as difficulties in eating, swallowing, chewing, and speaking.<sup>2,3</sup> 56% of children between ages 2 and 3 have caries and 80% of children have experienced caries by age 17.

## ***3. Discuss the effects of caries on the pediatric population.***

Caries has reached epidemic proportions in lower income pediatric populations in North America. Early childhood caries has a lasting impact on both the child's primary dentition ("baby teeth") and their permanent dentition ("adult teeth"), because infection in the primary dentition disrupts the development of the permanent dentition.<sup>4</sup>

Other long-term effects and serious illnesses resulting from untreated carious lesions are: life threatening systemic infections that can spread through the fascial spaces of the head and neck, through the jawbones (osteomyelitis), into the brain.<sup>2</sup> Also, circulating bacterial endotoxins progress through the coronary vasculature of the heart, causing coronary artery disease.

Fortunately, dental visits by children are increasing. Pediatric dentists and pediatricians recommend **the first dental visit at the first year of age**. The oral flora of the infant develops from oral and bodily contacts with the primary caregiver, so careful and thorough oral hygiene is important for the primary caregiver.<sup>2</sup>

***4. Restate the importance of daily oral hygiene to the caregiver(s) for the pediatric patient.***

It is essential for the **parent(s) or guardian(s)** to remove the child's biofilm each day, by brushing and flossing the teeth, since the child lacks the coordination to thoroughly cleanse their teeth with the needed proper and meticulous technique. Infants without erupted teeth should have their mouth cleansed of biofilm at least daily with a clean wet washcloth, swabbing or wiping the entire inside of the mouth and the oral tissues.<sup>3,5</sup> This process will have already be described and demonstrated by the dental team to the parent(s)/guardian(s), but can also be reinforced by the anesthesia provider.

***5. Express the importance and avoidance of nursing bottle syndrome to the caregiver(s).***

The use of a nursing bottle to comfort the child at bedtime can be detrimental should never be practiced except being filled with water. Salivary flow rates, along with the frequency of swallowing decreases as the infant or child sleeps. Therefore, sugars contained within fruit juices, sweet drinks, or milk provides a hospitable environment for cariogenic bacteria to thrive and cause severe dental caries.

***6. Discuss the relationship between autism and dental pathology.***

Autism is a neurodevelopmental disorder with severe impairments of language, social interaction, behavior, and cognitive functions. The majority of autistic patients function with moderate mental retardation; while it is found that autistic females often display severe mental retardation. Classic autism is prevalent in 10-20 cases per 10,000 births, with a male: female ratio of 3:1.

The pharmaceuticals used to manage autism may have side effects of concern to dentists and anesthesia providers. Antipsychotic drugs may cause motor impairment affecting speech, swallowing, along with central nervous system depression, and orthostatic hypotension; sialorrhea (excessive salivation), or xerostomia (dry mouth). Other common symptoms are dysguesia (altered taste), bruxism (teeth grinding along with clenching), stomatitis, and glossitis. Autistic patients can also present with gastro esophageal reflux disease (GERD), and a typical demand for low-textured foods, resulting in significant dental disease.<sup>6</sup>

Autistic patients can be challenging yet manageable candidates for office-based dental anesthesia.

### **Surgical Procedure**

#### ***7. Describe current dental treatments for caries.***

A dentist treats caries by careful and thorough excavation of caries from the tooth, and then replaces the missing tooth structure with silver amalgam or glass filled composite. In more extensive caries with pulpal invasion, the caries is carefully excavated, the pulpal remnants in the crown of the tooth are removed, and the remaining pulpal tissue is mummified with formocresol. The tooth is then restored with a stainless steel crown. Root canal is not performed on primary teeth due to future exfoliation of the tooth with the eruption of the permanent adult teeth. Keep in mind that the dental handpiece (drill) or dental laser necessarily uses copious amounts of water, which must be carefully suctioned by the dental assistant to prevent serious airway stimulation, causing coughing or laryngospasm.

**Figure X-1: Types of Dental Caries.**

**Anesthetic Management and Considerations**

***8. Identify some indications and contraindications for office-based pediatric dental surgery.***

Some indications for office-based anesthesia for pediatric dental surgery are listed in Tables X-1 and X-2. The anesthesia provider, along with the dentist, must weigh such factors as the medical condition of the patient, the behavior of the patient, and the capabilities of the dentist/supporting staff to deal with the challenging pediatric patient.

**Table X-1**

**Some Patient Indications for Office-Based Anesthesia for Pediatric Dental Surgery<sup>3,7,8</sup>**

- Uncooperative/unmanageable behavior
- Patient who requires immediate dental treatment
- Unable to thoroughly examine
- Unable to obtain intraoral dental radiographs
- Necessity for little or no patient movement or no swallowing
- Mentally challenged child or adult patients
- Hyper salivation
- Small mouth
- Large Tongue
- Unable to attain intraoral local anesthesia
- Claustrophobic
- Need for comprehensive dental treatment needed in multiple quadrants
- Need for tooth extraction(s)
- Desire for convenience and significant cost savings

**Table X-2:**

**Some Patient Contraindications for Office-Based Anesthesia for Pediatric Dental Surgery**

- Severe allergies
- Severe asthma
- Severe cardiovascular pathology
- Need for invasive monitoring
- Inadequate facility or supporting staff
- Craniofacial deformities

Aggressive or violent behavior  
Severe seizure disorder  
Severe claustrophobia  
Physical status III or greater



8. Do you now, or have you had any of the following?

<b>Yes No</b>		<b>Yes No</b>		<b>Yes No</b>	
<b><u>Respiratory/Lungs</u></b>		<b><u>Cardiovascular</u></b>		<b><u>Liver/Kidneys</u></b>	
Recent Cold	<input type="checkbox"/> <input type="checkbox"/>	Rheumatic fever	<input type="checkbox"/> <input type="checkbox"/>	Kidney diseases	<input type="checkbox"/> <input type="checkbox"/>
Pneumonia / Cough /Flu	<input type="checkbox"/> <input type="checkbox"/>	Mitral valve prolapse	<input type="checkbox"/> <input type="checkbox"/>	Hepatitis/Jaundice	<input type="checkbox"/> <input type="checkbox"/>
Asthma/Bronchitis	<input type="checkbox"/> <input type="checkbox"/>	High/Low Blood pressure	<input type="checkbox"/> <input type="checkbox"/>	Liver Disease	<input type="checkbox"/> <input type="checkbox"/>
Emphysema Short of Breath	<input type="checkbox"/> <input type="checkbox"/>	Abnormal Rhythm	<input type="checkbox"/> <input type="checkbox"/>	<b><u>Other</u></b>	
Easily Winded	<input type="checkbox"/> <input type="checkbox"/>	Peripheral Vascular Disease	<input type="checkbox"/> <input type="checkbox"/>	Diabetes	<input type="checkbox"/> <input type="checkbox"/>
Tuberculosis	<input type="checkbox"/> <input type="checkbox"/>	Blood clots	<input type="checkbox"/> <input type="checkbox"/>	AIDS/HIV/STD	<input type="checkbox"/> <input type="checkbox"/>
		Leukemia or anemia	<input type="checkbox"/> <input type="checkbox"/>	Thyroid disease	<input type="checkbox"/> <input type="checkbox"/>
<b><u>Musculoskeletal</u></b>		Blood transfusion	<input type="checkbox"/> <input type="checkbox"/>	Frequently tired	<input type="checkbox"/> <input type="checkbox"/>
Arthritis/Back or Hip problem	<input type="checkbox"/> <input type="checkbox"/>	Bleeding difficulty	<input type="checkbox"/> <input type="checkbox"/>	Cancer	<input type="checkbox"/> <input type="checkbox"/>
Joint replacement/Implant	<input type="checkbox"/> <input type="checkbox"/>	Heart disease	<input type="checkbox"/> <input type="checkbox"/>	Stomach trouble/Nausea	<input type="checkbox"/> <input type="checkbox"/>
Muscle weakness/Paralysis	<input type="checkbox"/> <input type="checkbox"/>	Congestive Heart Failure	<input type="checkbox"/> <input type="checkbox"/>	Hiatal hernia / Gastric reflux	<input type="checkbox"/> <input type="checkbox"/>
Numbness/Tingling	<input type="checkbox"/> <input type="checkbox"/>	Swollen ankles	<input type="checkbox"/> <input type="checkbox"/>	Hay fever/Seasonal allergies	<input type="checkbox"/> <input type="checkbox"/>
		Cardiac Pacemaker/AICD	<input type="checkbox"/> <input type="checkbox"/>	Radiation therapy	<input type="checkbox"/> <input type="checkbox"/>
<b><u>Neurological</u></b>		Heart murmur	<input type="checkbox"/> <input type="checkbox"/>	Glaucoma	<input type="checkbox"/> <input type="checkbox"/>
Fainting	<input type="checkbox"/> <input type="checkbox"/>	Congenital heart lesions	<input type="checkbox"/> <input type="checkbox"/>	Recent weight gain loss	<input type="checkbox"/> <input type="checkbox"/>
Epilepsy/Convulsions/Seizures	<input type="checkbox"/> <input type="checkbox"/>	Cardiac Stent	<input type="checkbox"/> <input type="checkbox"/>	Cold sores	<input type="checkbox"/> <input type="checkbox"/>
Psychiatric treatment/Nervous	<input type="checkbox"/> <input type="checkbox"/>	Heart Attack/Angina	<input type="checkbox"/> <input type="checkbox"/>		
Stroke/Transient ischemic attack	<input type="checkbox"/> <input type="checkbox"/>	Chest Pain	<input type="checkbox"/> <input type="checkbox"/>		

9. **Women only:**

	<b>Yes</b>	<b>No</b>
a) Are you pregnant or do you think you may be pregnant?	<input type="checkbox"/>	<input type="checkbox"/>
b) Are you nursing?	<input type="checkbox"/>	<input type="checkbox"/>
c) Are you taking birth control pills?	<input type="checkbox"/>	<input type="checkbox"/>

**Are you now using or have you ever used drugs such as: Cocaine, heroine, methamphetamine, marijuana or others?**  
 **Yes**     **No**

\_\_\_\_\_  
**Patient Signature**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Doctor Signature /Anesthesia Provider Signature**

\_\_\_\_\_  
**Date**

**Updated** \_\_\_\_\_

## **Anesthetic Management and Considerations**

### ***9. Describe the necessity of a pre-surgical consultation appointment.***

It is important to meet the patient, parent(s) or guardian(s) prior to the scheduled surgical appointment for a pre-surgical appointment consultation. This gives the anesthesia provider the chance to perform a detailed examination of the patient's health history. See Figure X-2.

This appointment also allows the anesthesia provider to interact with the patient, and gauge the temperament and challenges the patient could pose at the dental surgical appointment. This meeting also gives the anesthesia provider the chance to ask and answer questions, and discuss procedural rules such as strict nothing-by-mouth (npo) policies, determine the need for physician consultation if necessary, and evaluate the need to premedicate the pediatric patient.

In lieu of the anesthesia provider, dental office staff may also obtain all necessary forms and consents at this visit, as well as making financial arrangements. If legal guardian(s) are consenting to the anesthesia and dental surgery, obtain a copy of the court-granted guardianship paper for the patient's record.

### **Preoperative Period**

#### ***10. Demonstrate importance of the day-of-surgery anesthesia assessment.***

It is very helpful to interview the parent(s)/guardian(s) and assess the patient the day of the dental surgery. This valuable document shows your care and concern for the patient's wellbeing. The assessment could be performed by a well-trained assistant, and then reviewed by the anesthesia provider for time saving.

See figure X-3.

**There are times that the anesthetic and the dental surgical procedure may necessitate cancellation, as a result of the day-of-surgery anesthesia assessment.**

Table X-3 lists some considerations that could postpone or cancel the dental surgical appointment, due to a current medical condition(s) or an uncontrollable temperament of the patient. For patients with severe behavioral affect, consider referral to a pediatric dentist (pedodontist), treatment in an ambulatory surgical center or an operating room under general endotracheal anesthesia.

**Table X-3: Some Considerations for Postponement or Cancellation of Pediatric Office-Based Dental Surgery**

1. Patient is not within accepted guidelines of nothing by mouth (NPO).
2. Recent upper respiratory infection.
3. Unwilling or unable to allow premedication.
4. Systemic infection, other than due to dental causes.
5. Inability to transfer or position the patient for dental surgery.
6. Inability to obtain i.v. access.
7. Inadequate number of needed assistants.
8. Parental or caregiver interference.

***11. Describe the process of oral premedication for the office-based dental treatment of the pediatric patient.***

Before administering oral premedication, it is important to have the patient use the restroom to avoid patient movement after the onset of the premedication, and to prevent soiling of the dental operatory.

Premedication – Oral Midazolam .25-1 mg/kg (maximum 20mg as a single dose) can be dissolved in either liquid ibuprofen (100mg/teaspoon) or liquid acetaminophen

(240mg/teaspoon), dosed according to the patient's weight.<sup>9,10</sup> Your anesthesia armamentaria must be ready before administering the premedication, in case of an unintended reaction by the effects of the oral premedication.

See table X-4 for a guide to needed anesthesia armamentaria.

Be sure to consult your particular state dental practice act, which imparts laws, rules, recommendations and guidelines concerning anesthesia. A dentist must follow their state dental practice act, regardless of who the anesthesia provider is. Some state dental practice acts have very specific stipulations.

We have found that oral premedication is primarily necessary for a patient's separation from the caregiver(s), insertion of the intravenous line insertion, and for its amnestic effects. Vivid memories of a difficult dental visit could affect future dental care the patient could seek as they mature. Some patients require no premedication. The anesthesia provider must decide whether or not to use premedication, and dose the premedication within the recommended range of dosages, according to the requisites of the patient.

Allow the premedication to take effect for about one-half hour by the clock. The patient should rest only with the parent(s)/caregiver(s), in a quiet and non-stimulating room, away from the office reception area. Too much stimulation could elicit unwanted behaviors and unnecessarily upset the patient. A warm blanket helps preserve body heat from the start, and provides a sense of security

for the patient. Check on the progression of the patient's premedication, and reassure the parent(s)/caregiver(s) as necessary.

After the onset of the premedication, with the probable onset of amnesia, visit the caregiver(s) and provide them with some additional information. It is important to inform before you perform, as parent(s)/caregiver(s) are protective of their child, and will appreciate your care and concern.

Table X-5 lists items to cover with parent(s)/caregiver(s) during the premedication.

#### Table X-4: Pediatric Dental Surgery Anesthetic Armamentaria

##### **Utilities**

Back-Up power (Uninterruptible Power System)

##### **Equipment**

###### *Local Infiltration, Intravenous (IV) Sedation*

1. Patient Monitor to include: pulse oximeter, electrocardiogram, blood pressure monitor with a selection of adequate-sized cuffs.
2. Liquid crystal body temperature stickers.
3. Emergency E cylinder Oxygen tanks. (also consider the dental office oxygen/nitrous oxide supply.
4. Positive pressure ventilation sources including an ambu bag, with properly sized face masks, and a mouth-to-mask unit.
5. Defibrillator (charged) or AED.
6. Suction source or a suction machine, tubing, suction catheters, and Yankauer suction. Plan for emergency suction in the event of power failure.

7. Anesthesia cart to provide for organization of supplies including endotracheal equipment, Laryngeal mask airways, combitubes, face masks, nasal cannulas, Connell airways, disposable face masks with oxygen tubing, oral and nasal airways, syringes (tuberculin, 3ml, 5ml, 10ml, 30, 60ml), 18ga 1.5-inch needles, 20ga and 22ga intravenous catheters, tourniquets, intravenous fluids and tubing, alcohol pads, adhesive tape, disposable gloves, stethoscope, protective eyewear for you and the patient, and appropriate anesthetic medications.
8. Battery powered flashlight for emergency lighting, along with extra batteries.
9. Medication Syringe Pump.
10. Warm blanket(s), large pillow, and dog-bone shaped travel pillow.
11. Emergency medications to include, at a minimum, atropine, glycopyrrolate, epinephrine, ephedrine, phenylephrine, lidocaine, diphenhydramine, hydrocortisone, and a bronchial dilator inhaler such as albuterol.
12. Anesthesia Forms and clipboard. Anesthesia Charts/black ink pens, indelible ink pens.
13. Anesthetic Medications – In addition to the emergency medications listed above,  
Propofol, Etomidate, Ketamine  
Narcotics – Midazolam, Fentanyl, Alfentanil  
Muscle Relaxants – Succinylcholine  
Cardiovascular Drugs – Labetalol, Esmolol, Verapamil, Hydralazine  
Narcotic Reversal Drugs – Naloxone, Flumazenil  
Antiemetic Drugs – Ondanestron, Dolasetron

### **Additional Emergency Equipment and Supplies**

Cricothyrotomy Kit

Compression board

#### **Table X-5: Preoperative Information for the Caregiver(s)**

1. Patient may require multiple attempts at intravenous line insertion.
2. Patient could have horizontal red marks on the eyelids due to taping of the eyes closed.
3. Patient could have redness in the neck area from the bell of the precordial stethoscope.
4. Patient may have needle insertion mark on arm or thigh due to the necessity for intramuscular ketamine for behavioral management.
5. Reinforce that the patient will still receive intraoral local anesthetic, and that they should monitor the patient postoperatively, so as not to bite their lip or tongue.
6. Remind the parent(s)/caregiver(s) of the necessity for a quiet and unemotional exchange of the patient to the caregiver.



## **Intraoperative Period**

***12. Determine that it is appropriate to take the patient from the caregiver(s) and begin the anesthetic procedure.***

Once the patient has attained an adequate level of premedication, it is best to carry the patient, or a wheelchair/patient cart to transport patient to the dental operator. Remember to quietly separate the patient from the parent(s)/caregiver(s).

***13. Illustrate the anesthetic process for the office- based dental treatment of the pediatric dental patient.***

Positioning – Preset the chair to a comfortable recumbent position to the preference of the dentist. Small patients can be cushioned on a standard dental chair with a large pillow placed horizontally on the dental chair, along with a small dog-bone-shaped travel pillow under the neck. Foam pads or rolled towels may also be used for positioning of the arms. Consider the use of a blanket, or an electric blanket (covered by a washable blanket) for cleanliness.

Monitoring – Attach standard monitors (3 –lead EKG, pulse oximeter, appropriately sized blood pressure cuff). Be sure you have assistants to help support and protect the patient.

Intravenous (I.V.) Line Insertion – Prior to I.V. insertion, allow the patient to inhale a mixture of N<sub>2</sub>O/O<sub>2</sub>, titrated to effect (some dental units with nasal masks can deliver a mixture up to 70% N<sub>2</sub>O). Support the patient's head and face, and guard for possible patient movement.

For poorly behaved patients, who appear to be unaffected by the oral midazolam premedication, consider an intramuscular dose of ketamine, 2-10 mcg/kg.<sup>10</sup>

Consider using a subcutaneous bolus of 2% plain Lidocaine, administered with a 29 gauge insulin syringe at the I.V. insertion site. Securely support the patient's arm and hand to prevent sudden movements.

Induction – Upon I.V. insertion and securing, immediately administer the antisialagogue Glycopyrrolate 10mcg/kg.<sup>10</sup> Always have intraoral suction available to evacuate saliva from the floor of the mouth and from the buccal vestibules, until the antisialagogue takes effect.

Turn off the nitrous oxide, leave the oxygen flow at 3 liters per minute via the nasal mask for at least 5 minutes to allow dissipation of the nitrous oxide. You may then switch to a pediatric-sized nasal cannula, to allow better access by the dentist to the patient's mouth.

Hand bolus propofol, approximately 1mg/kg until sedation is observed. Paradoxical movement can occur upon administration of the propofol. Instruct your assistant(s) to carefully support the patient.

A special dental laryngeal mask airway (Dental LMA) will soon be available to assist the anesthesia provider and the dentist in maintaining and safeguarding the airway. The Dental LMA can be adapted to work with dental nitrous oxide/oxygen delivery systems, or attached to an anesthesia machine. Its advantages are listed in table X-6.

Begin administering a maintenance dose of propofol. (See maintenance below)  
Tape the eyes, attach the bell for the precordial stethoscope and prepare to bolus small amounts of propofol (200mcg/kg) to counteract the stimulation from the administration of the intraoral local anesthetic.

Maintenance – Infuse propofol beginning at a rate of 100-150mcg/kg/min, titrated to effect.<sup>9</sup> Patients experiencing stimulating dental procedures require noticeably higher maintenance infusion rates of propofol, when compared to maintenance rates of propofol in the operating room.

If the patient will require dental extractions, consider using incremental doses of Fentanyl, diluted to 10mcg/ml. Ketamine may also be diluted to a dose of 10mg/ml and titrated

to help stabilize and control the behaviorally agitated patient. The addition of these adjuncts will reduce the maintenance infusion rate of propofol.

Lastly, consider using Dexamethasone for post-extraction swelling and antinausea effects, Ketorolac for postoperative pain, and Ondanestron for nausea.<sup>9,10</sup>

Anesthesia data is recorded on an American Association of Nurse Anesthetists Anesthesia Record, which has been modified for office-based dentistry.

See Figure X-4.

#### Table X-6: Advantages of the Dental LMA for Office Based Pediatric Anesthesia

1. Allows protection of the airway from dental debris, saliva, secretions, and blood.
2. Provides a secure airway.
3. Is easily placed.
4. Is relatively atraumatic to the patient's mouth, throat, and airway.
5. Can be adapted to work with dental nitrous oxide/oxygen machines.
6. Can work with an anesthesia machine.
7. Can be repositioned from side-to-side, to allow the dentist better access to the patient's mouth.
8. Allows disconnection and reconnection at its mid-point to allow the dentist to check the occlusion (the bite) of the teeth.

### Postoperative Period

***14. Explain the process of the pediatric patient's emergence from anesthesia after dental surgery.***

Emergence – Even without the use of narcotics, emergence from propofol is found to be slow. Continue to support the airway, remove the tape from the eyes, and have several assistants available. Leave the oral bite block in, to allow access to the posterior pharynx for suctioning. Consider administering Flumazenil 10mcg/kg up to 1mg, for reversal of the midazolam oral premedication, to aid emergence, and help assure a non-sedated patient, ready for discharge. Gently support and reorient the patient upon emergence. Consider bringing only one caregiver/parent to the operatory, after the patient has nearly fully emerged, is stable, and is

breathing room air. If a parent/caregiver is present from the start of recovery, there may be tension and distress related to the amount of time recovery is taking, and the probability of emergence delirium.

***15. Correlate Modified Aldrete signs to the assessment of the patient during the period of recovery.***

Recovery – Recovery begins at the end of the dental surgical procedure. Recovery can be accomplished within the dental operatory or after transport of the patient to a well-equipped recovery area. The area should remain quiet, and with the presence of a well-trained assistant. The bottom right portion of the Modified Dental Anesthesia Record provides an area to document the anesthetist's assessment of the modified Aldrete signs for a patient recovering from anesthesia. See Figure X-4.

Hospital recovery room nurses commonly use modified Aldrete signs, for post-anesthetic assessment of the patient. The modified Aldrete score is obtained by assigning an objective score to assessment of the patient's activity, respirations, circulation, consciousness, and color. Discharge is appropriate when a patient is stable, and has attained a modified Aldrete score of 8-10.

Pediatric patients anesthetized in an office-based setting typically recover to a discharge modified Aldrete level within 20-30 minutes, unless an analgesic narcotic, such as Fentanyl or Morphine were used for post-operative pain.

## **Chapter X Review Questions**

1. Advanced caries can be characterized by:
  - a. decreased amounts of intraoral inflammation or infection
  - b. minimal patient morbidity
  - c. pain and destruction of tooth structure
  - d. naturally occurring and non-preventable causes
  
2. Which of the following types of patients should not be considered for office-based pediatric dentistry?
  - a. A physical status III or greater patient.
  - b. A potentially cooperative 2-year-old patient.
  - c. An immaturely behaved 11-year-old patient who refuses to premedicate.
  - d. A mentally challenged 55-year-old adult patient.
  
3. The preoperative consultation and interview is:
  - a. an unnecessary duplicity of the patient's health history.
  - b. performed only by the anesthesia provider.
  - c. completed prior to the patient's dental surgical appointment.
  - d. highlights concerns that could interfere with the anesthetic.
  
4. Premedication is performed:
  - a. prior to set-up of the anesthesia equipment and supplies.
  - b. in a quiet, non-stimulating environment.

- c. with the parent(s)/guardian(s) and all family present.
- d. on all pediatric patients.

5. Recovery of the pediatric patient:

- a. can be performed in the dental chair/operatory.
- b. should be performed with the parent(s)/caregiver(s) present immediately after dental surgery.
- c. can be performed after transport to a well-equipped recovery room.
- d. requires the availability of a well-trained assistant.

**Suggested Readings**

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### **Chapter X Review Answers**

1. Advanced caries can be characterized by:

**Answer C** – At first caries will cause almost unnoticeable destruction of tooth structure. The patient may not even the sensation of pain, but the patient will probably notice sensitivity to touch, temperature, and when eating sugary foods. Later more severe pain and oral tissue destruction will occur.

2. Which of the following types of patients should not be considered for office-based pediatric dentistry?

**Answer A** – Patients presenting with a compromised medical state, such as a physical status III or greater patient, are best treated in a hospital, where access to advanced medical help and equipment occurs.

3. The preoperative consultation and interview is:

**Answer D** – This important assessment provides a timely assessment of the patient's health the day of surgery, and gives the anesthesia provider a highlight of concerns that could interfere with the anesthetic that day.

**4. Premedication is performed:**

**Answer B** – It is best to premedicate the patient, if needed, in a quiet, non-stimulating environment which will promote sedation rather than promoting activity and agitation.

**5. Recovery of the pediatric patient:**

**Answers A, C, and D** – always recover your patient in a well-equipped and well-staffed environment. Emergence delirium necessitates room for staff to stabilize any untoward patient movement, and to assist you.

**References**

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### **Disclaimer**

The intent of this chapter is to familiarize you with the rationale for the use of the medications and anesthesia techniques presented. No specific outcomes, warranties, or guarantees are expressed or implied for your patients with the anesthesia techniques, or the drugs and dosages discussed. You are referred to a recognized pharmacology textbook, pharmacist, or drug handbook for the manufacturer's specific recommendations pertaining to the medications discussed, as well as recognized anesthesia textbooks for more information.