**Moderate (i.e. Conscious) Sedation**

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- Calcium release stimulates hydroxyapatite and secondary dentin bridge formation
- Alkaline pH promotes healing
- Significant calcium release leads to protective seal
- Protects and insulates the pulp
Moderate Sedation

- i.e.,
- Oral Sedation
- Conscious Sedation

Definition - Moderate Sedation

- Minimally depressed level of consciousness where patient **can independently and continuously maintain** own airway

- Respond to physical stimulation and verbal command i.e. "**open your eyes**"

- i.e...conscious sedation, enteral sedation

***Patient’s whose only response is reflex withdrawal from repeated painful stimuli are **not considered** to be in a state of moderate sedation.***
Anatomic & Physiologic Considerations

Unique challenge:
surgical site proximity to the pharynx, pt is susceptible to airway obstruction & irritation → hypoxia

Anatomic & Physiologic Considerations

• AIRWAY IN CHILDREN
  – Tongue large relative to size of oral cavity
  – Tongue positioned higher in oral cavity, impinging on soft palate
  – Lymphoid hypertrophy (tonsils & adenoids) between ages 4-10
  – Airway diameter smaller
  – Pediatric trachea more compliant (causing collapse of trachea & bronchial passages-crying tends to increase negative inspiratory pressure)
Anatomic & Physiologic Considerations

• **AIRWAY IN CHILDREN**
  - Ribs more horizontal relative to vertebral column; adults have a caudal slant accessory muscles less developed results in less effective thoracic expansion and dependence and diaphragmatic breathing
  - Smaller & fewer alveoli (At age of 8, number stops, size increases)
  - Funct Residual Capacity (volume of gas in lung after normal expiration) is related to surface area of lung; children have lower FRC
    - FRC is decreased in sedated pts – results in more rapid desat of Hb during resp depression, example apneic episode of 41 seconds= 85% in child VS 84 seconds in adult

More Rostral Pediatric Larynx

Laryngeal apparatus develops from brachial clefts and descends caudally Infant’s larynx is higher in neck (C2-3) compared to adult’s (C4-5)
Differently shaped epiglottis

- Adult epiglottis broader, axis parallel to trachea
- Infant epiglottis omega (Ω) shaped and angled away from axis of trachea
- More difficult to lift an child’s epiglottis with laryngoscope blade

Funneled shape larynx

- narrowest part of infant’s larynx is at the level of the undeveloped cricoid cartilage, whereas in the adult it is the glottis opening (vocal cord)
Sensory Innervation:
Supraglottic larynx:
  Recurrent Laryngeal Nerve
Infraglottic larynx:
  Internal Branch of Superior Laryngeal Nerve

Motor Innervation:
  Cricothyroid muscle
  External branch of Superior Laryngeal Nerve
  All other laryngeal muscles
  Recurrent Laryngeal Nerve

Anatomy

Oral Sedation

Oldest and most common route

Used for stress reduction, pre- & post-op pain
Advantages of Moderate Sedation

- Most Common
- Easy to administer
- Low Cost
- Low incidence of Adverse Rxn
- Relatively safe with one drug
- No needles
Disadvantages of Oral Sedation

- Pt compliance
- Latent period (30-60 mins)
- Unreliable drug absorption (GI --> hepatic metabolism)
- Inability to titrate
- Prolonged duration of action

Goals of Moderate Sedation

- Guard patient safety
- Control behavior & movement
- Minimize Physical Discomfort & Pain
- Control anxiety, minimize psychological trauma, maximize anesthesia
- Return to a safe discharge state
Factors influencing Sedation Outcome

- Age: younger = less accepting
- Cognitive ability: impairment = less likely for success
- Socialization
  - Child w few boundaries or few limits = difficult sedation
- Child’s behavior
  - Fearful = difficult
  - Approachable/adaptable to new environments = more cooperative

Key Points In Patient and Family Education

- Education, individually geared to the patient and family, helps alleviate concerns associated with conscious sedation.
- Key points
  - duration of sedation (children may fear never waking up)
  - interindividual variability of response to drugs
  - potential for sedation failure
  - alternatives to sedation
  - potential for adverse events
  - plan for monitoring by residents during the procedure and discharge criteria.
Documentation

• Notes: Rationale for Sedation
• Informed consent
• Pre/post sedation Instructions to parents
• Dietary precautions
• Preoperative assessment
• Intraoperative assessment
• Postoperative assessment

Informed Consent

• The prescriber should review the sedation plan with the patient/guardian as soon as possible. Discussion and documentation should include
  – potential risks and benefits
  – potential problems after the procedure
  – potential for sedation failure
  – consequences of not providing sedation/analgesia
  – alternatives to receiving sedation/analgesia
Focused History and Exam

• History should focus on factors that may increase
  – patient sensitivity to sedatives/analgesics
  – patient risk of respiratory/cardiovascular complications
  – difficulty in managing complications

Focused History, con’t

• **Cardiopulmonary disease** may accentuate hemodynamic/respiratory depression caused by sedatives and analgesics. May require decreased drug dosages; EKG monitoring warranted.

• **Hepatic or renal abnormalities** may impair drug metabolism, causing altered sensitivity and duration of action when sedatives/analgesics are administered.

• **Medication interactions** between a patient’s routine medications & sedatives/analgesics may alter normal drug responses.
Focused History, con’t

- **Patient allergies** must be known and documented.
- **Alcohol/illicit substance abuse** may increase tolerance to sedatives/analgesics while acute use prior to conscious sedation will be additive or synergistic with medication effects.
- **Tobacco use** increases airway irritability and risk of bronchospasm during sedation.
- **Prior adverse reaction** to anesthesia/sedation may increase risk during subsequent procedures.

Focused Patient Selection

- ASA Classification (I/II)
- Current Illness; chronic conditions
- Allergies
- Gag reflex
- Current medications (herbal can increase action of sedatives)
- BMI
- Sleep Apnea
- Evaluation of airway patency & tonsil size
Mallampati Scale

M = Mallampati

Class I = visualization of the soft palate, fauces, uvula, anterior and posterior pillars.
Class II = visualization of the soft palate, fauces and uvula.
Class III = visualization of the soft palate and the base of the uvula.
Class IV = soft palate is not visible at all.

Focused Airway Assessment

- This picture represents a Mallampati Class I airway.
- The entire uvula and tonsillar pillars are seen.
- This individual should be easy to mask ventilate or to intubate with a laryngoscope and endotracheal tube.
Focused Airway Assessment, cont

• This picture represents a Mallampati Class III airway.

• Soft palate visible. None of the uvula or tonsillar pillars are seen.

• This individual may hard to mask ventilate, and quite difficult to intubate.
Brodsky Tonsillar Classification

BMI

- **Body Mass Index**
- BMI is a reliable indicator of body fatness for most children and teens

  Formula: weight (kg) / [height (m)]²

<table>
<thead>
<tr>
<th>Weight Status Category</th>
<th>Percentile Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>Less than 5th percentile</td>
</tr>
<tr>
<td>Healthy weight</td>
<td>5th-85th</td>
</tr>
<tr>
<td>Overweight</td>
<td>85th-95th</td>
</tr>
<tr>
<td>Obese</td>
<td>Greater than 95th</td>
</tr>
</tbody>
</table>

- Underweight = <18.5
- Normal weight = 18.5–24.9
- Overweight = 25–29.9
- Obesity = BMI of 30 or greater
BMI

Body mass index (BMI) is a measure of body fat based on height and weight that applies to both adult men and women.

- Enter your weight and height using Standard or Metric measures.
- Click on “Compute BMI” and your BMI will appear in the heart of the figure.

BMI Categories:

- Underweight = <18.5
- Normal weight = 18.5-24.9
- Overweight = 25-29.9
- Obesity = BMI of 30 or greater

The BMI Tables

Aim for a Healthy Weight:

- Assessing Your Risk
- Limitations of the BMI
- Controlling Your Weight
- Recipes

BMI Calculator for Child and Teen

Sleep Apnea

- Persons breathing is interrupted during sleep
- Each pause in breathing can last a few seconds to minutes and can occur up to 30 times an hour
- Treatment
  - CPAP - continuous positive airway pressure
  - Surgery
  - Oral appliance therapy

Risks Factors
- Male
- Overweight
- Large neck - over 17 in
- Large tonsils/tongue
- Family history
- GERD
- Nasal Obstruction

Conscious Sedation ABSOLUTELY CONTRAINDICATED for patients with Sleep Apnea

Armamentarium
Levels of Sedation

- **Sedation Levels**
  - I. Mild sedation; anxiolysis
  - II. Interactive
  - III. Non-interactive / arousable with stimulus
  - IV. Deep Sedation
  - V. General Anesthesia

*II & III = MODERATE SEDATION*

Equipment

- Oxygen delivery system capable of administering greater than 90% oxygen at a **10 L/minute flow rate** for at least 60 minutes is mandatory.
- Equipment must **accommodate children** of all sizes.
- Functional suction apparatus must be in **working** order.
- A sphygmomanometer (with cuffs appropriate for pediatric patients) shall be immediately available.
- Equipment to **monitor** patient before, during, and after procedure is mandatory.
- **Emergency cart or kit** must be accessible must include drugs and age appropriate equipment to resuscitate and rescue a non-breathing patient.

Pulse Oximetry

- **Measures o2 saturation of peripheral oxyhemoglobin**
- **Oxygenated blood** absorbs more Infrared Light allowing Red light to pass
- **Deoxygenated blood** absorbs more R light, allowing IR to pass
- Red light is in the **600-750 nm** wavelength light band. Infrared light is in the **850-1000 nm** wavelength light band
- Patient movement, temperature, nail polish, hyper/hypoventilation may reduce accuracy
Capnography

- Provides a rapid and reliable method to detect life-threatening conditions (malposition of tracheal tubes, unsuspected ventilatory failure, circulatory failure and defective breathing circuits) and to circumvent potentially irreversible patient injury.

- Normal Carbon dioxide levels range between 33 – 40 mm Hg

- ASA closed claim analysis study (Tinker et al. Anesthesiology 1989;71:541-6) that the application of capnography and pulse oximetry together could have helped in the prevention of 93% of avoidable anesthesia mishaps

- Capnography directly reflects the elimination of CO₂ by the lungs to the anesthesia device. Indirectly, it reflects the production of CO₂ by tissues and the circulatory transport of CO₂ to the lungs

Additional Equipment

Blood Pressure

- Most sedative agents do not cause fluctuations in blood pressure levels
- It is important to obtain a baseline level but is not clinically significant
- Uncooperative patients make a baseline level difficult
- **Cuff should be 2/3 upper arm length**

Precordial Stethoscope

- Best location for evaluating airway patency id over the presternal notch below the thyroid cartilage
- Registers extraneous sounds/noise
- Does not determine degree of airway patency
Armamentarium Requirements for Sedation in the Dental Office

- **Minimal**: Clinical Observation; 2 personnel
- **Moderate**: BPC; PO; PC OR Capno; 2 personnel
- **Deep**: BPC; PO; PC; Capno; ECG; 3 pers
- **General**: BPC; PO; PC; Capno; ECG, Temp; 3 pers

BPC=Blood pressure cuff; PO= Pulse Oximeter; Capno= Capnograph; PC= Precordial Stethoscope; ECG= Electrocardiograph

Oral Sedatives

- Chloral Hydrate
- Diazepam (Valium)
- Midazolam (Versed)
- Hydroxyzine (Atarax)
- Diphenhydramine (Benadryl)
- Meperidine (Demerol)
- Promethazine (Phenergan)
Chloral Hydrate (no longer produced)

Chloral Hydrate (Noctec)
Nonbarbiturate Sedative Hypnotic
25-50 mg/kg up to 1g max dose
Onset: 30-60 min; 60 min working time
Duration: 4-8 hrs
Drug interaction: Warfarin
Mechanism of Action: binds to benzodiazepine receptors; enhances GABA effects
Adverse Reactions: nausea, vomiting, diarrhea, sedation
Overdosage: hypotension, respiratory depression, coma, cardiac arrhythmias
Metabolite: Trichlorethanol
Contraindications: Hepatic/renal impairment, potentiates Coumadin
NO REVERSAL AGENT

Diazepam (Valium)

Benzodiazepene
Sedative Hypnotic
Amnesia, Ataxia
0.12-.8mg/kg (review)
0.25-0.50 mg/kg (blue) PO MAX 10mg
**1mg/ year of age**
Onset: 45-60 min; 60 min working time
Half life 20-40 hrs
Indications: CP (athetoid)
Mechanism of Action: binds to benzodiazepine receptors; enhances GABA effects
Adverse Reactions: decrease respiratory rate, apnea, cardiac arrest, drowsiness, confusion, hypotension
Contraindications: narrow angle glaucoma
Potentiated by: erythromycin
Midazolam (Versed)

Benzodiazepene
Sedative Hypnotic
Amnesia, Ataxia,
0.5-1.0 mg/kg (review)
0.5-0.75 mg/kg (blue) PO MAX 15 mg
Onset: 15 min; 40 min working time

Metabolized by cytochrome oxidase system, subject to hepatic first pass metabolism

Adverse Reactions: hiccups, decrease respiratory rate, apnea, cardiac arrest, drowsiness, confusion, hypotension

Contraindications: CNS depression

Midazolam (Versed)

Shown to cause anxiolysis in up to 80% of patients

May be potentiated with nitrous oxide- shown deep sedation in 12% of patients

Unlike Ketamine, causes loss of airway muscle tone

One study demonstrated 56% incidence of upper airway obstruction with 0.5 mg/kg of midazolam and 50% nitrous oxide*

Benzodiazepene Mechanism

- Via **GABA-a** Receptors (ligand gated ion channels) in the brain
- GABA is the major inhibitory neurotransmitter in the CNS.
- GABAa Receptors respond to gamma butyric acid (GBA)....chief inhibitory neurotransmitter in the brain
- Benzodiazepenes attach to receptors, form ligands, making receptor responsive to GBA

![](image)

Benzodiazepines: Adverse Effects & Special Considerations

- BZDs may cause dose-related respiratory depression, hypotension, and tachycardia, particularly in the elderly.
- Midazolam administered rapidly is particularly likely to produce apnea.
Benzodiazepines: Relative Potency

- Midazolam is 3-4x more potent than diazepam.
  - 10 mg diazepam = 2.5-3 mg midazolam.
- Lorazepam (Ativan) is 5x more potent than diazepam.
  - 10 mg diazepam = 2 mg lorazepam.
- At right is a crystalline pictograph of midazolam.

Hydroxyzine (Atarax)

*Antihistamine, Antiemetic*
*Analgesia/dry mouth*

*Effect is similar to N2O*

Onset: 15-30 min; 2-4 hr working time

Dose: PO 2-4 mg/kg (review); 0.6 mg/kg (blue)

Adverse reactions: drowsiness, dry mouth, dizziness, ataxia, weakness, headache, hypotension

**Mechanism of Action:** antagonizes central and peripheral H1 receptors (non-selective antihistamine)
Diphenhydramine (Benadryl)

Antihistamine
Antiemetic
Analgesia/dry mouth
Onset: 15-30 min; 2-4hr working time
Half life: 2-8hrs
Dose: 1-2 mg/kg PO; Max: 50 mg/dose; 300 mg/day

Adverse reactions: drowsiness, dry mouth, dizziness, ataxia, weakness, headache, hypotension

Mechanism of Action: antagonizes central and peripheral H1 receptors (non-selective antihistamine); suppresses the medulla cough center (antitussive); possesses anticholinergic properties, resulting in antidyskinetic, antiemetic and sedative effects

Promethazine (Phenergan)

Antihistamine

Shown to cause death in <2 YO

Onset: 15-30 min; 2-4hr working time
Dose: 0.5-1 mg/kg

Adverse reactions: sedation, confusion, dry mouth, dizziness, dystonia

Contraindications: narrow angle glaucoma, <2 YO

Mechanism of Action: antagonizes central and peripheral H1 receptors (non-selective antihistamine)
ANTIHISTAMINES

• Also known as histamine antagonists
• Inhibits the release or action of histamine
• Histamine released by Mast cells or basophils

Meperidine (Demerol)

Narcotic, Analgesic, Antispasmodic
Contraindications: patients on MAO inhibitors (potentiate Demerol)
Precautions: patients with seizures, renal failure
May cause seizures, esp with local anesthesia
May cause histamine release in asthmatic patients
Dose: PO 1-1.5 mg/kg; max 50mg; Onset: 30 mins; Half-life: 2.5-4h

Lowers seizure threshold, esp w LA

Adverse reactions: hypotension, tachycardia, bradycardia, emesis, dizziness, nausea, vomiting, drowsiness, peripheral vasodilation, weakness, headache, increased intracranial pressure, do not use w pts w asthma (can cause histamine release); use with caution in children with hepatic/renal disease

Mechanism of Action: binds to various opioid receptors, producing analgesia and sedation (opioid agonist)
Metabolized by liver, excreted by kids
Rescue: Naloxone/ Narcan 0.1-0.3 mg/kg IM IV SC
• Furano-coumarins in grapefruits and grapefruit juice interfere with cytochrome p450 in liver/intestine
• Juices grab the CP450.
• More sedation meds available....increasing level of sedation

A Typical Sedation Day.....
Instructions to Parents

• Explanation of presedation and postsedation dietary precautions
• Potential or anticipated post op behavior
• Limitation of activities
• 24 hour contact number

Responsible Adult

• Pediatric patient should be accompanied by parent or legal guardian. A second responsible adult is encouraged to attend to assist in helping the 1st adult- and also help monitor the child.
Preprocedural Fasting Guidelines To Minimize Aspiration Risk

<table>
<thead>
<tr>
<th>Substance Ingested</th>
<th>Minimum Fasting Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Liquids</td>
<td>2</td>
</tr>
<tr>
<td>Breast Milk</td>
<td>4</td>
</tr>
<tr>
<td>Infant Formula</td>
<td>6</td>
</tr>
<tr>
<td>Non-human Milk</td>
<td>6</td>
</tr>
<tr>
<td>Light Meal</td>
<td>6</td>
</tr>
</tbody>
</table>

WHY DO WE RECOMMEND NO EATING/DRINKING AFTER MIDNIGHT?

Dietary Precautions

Pulmonary aspiration of gastric contents in the pediatric patient during anesthesia is reported in up to 10 incidents per 10,000 cases

Emergency scenario- cause vomiting with atropine, glycopyrrolate, or metoclopramide
PRE OP

• Confirm Informed Consent with legal guardian (signature MUST be obtained PRIOR to appt date NOT day of)

• Next to signature PRINT who is signing (mother, father, etc.)

PRE OP

• Make sure assistant has room set up for ALL possible procedures (exos/ssc)

• Test handpieces to make sure they are working
Preoperative Health Evaluation

- ASA
- Diseases, disorders etc.
- Allergies
- Current meds
- Review of systems
- Vital signs (BP, pulse, RR)
- Evaluation of airway patency & tonsil size (Mallampati)
- BMI
- Sleep Apnea

PRE OP

- Medical Hx (if asthmatic did pt bring inhaler, etc..)
- Guardian?
- NPO? How to ask... (“What did we have for breakfast?”)
- Lungs clear to auscultation (check everywhere)
- Check nasal passages
PRE OP

- Weight (convert to kg) How is this done?
- Wt in lbs/ 2.2= kg
- Determine what treatment to be performed
- Discuss regimen w/ chief; then w/ attending.

Dosing: Example

- Today’s Tx Plan: A/B/S/T Pulpotomy + SSC
- Regimen A: 2 mg/kg of hydroxyzine + 0.5 mg/kg of versed
TYPICAL MEDICATIONS USED

CHILD: 35 lbs = 16kg

Midazolam 2mg/mL
Dose 0.5mg/kg
Administer 0.5mg/kg x 16 kg = 8 mg
Midazolam

4 mL = 8 mg

Hydroxyzine 10mg/5 ml= 2mg/mL
Dose 2.0 mg/kg
Administer 2.0 mg/kg x 16 kg = 32 mg
Midazolam

16.0 mL = 32.0 mg
Administration

- Children may take meds PO willingly
- If not, child may need knee to knee administration
- Use MOLT to open mouth, and syringe mixture 1 ml; allow to swallow
- You may pinch nose to induce faster swallowing
- Do NOT administer too much, too fast!
- Can aspirate- and caused increased plasma level of drug in alveoli

WAIT TIME ~15-20 mins
Operative Session

- Two operators, 1 keeps patients centered & monitors vitals; 1 performs restorative
- Make sure that N2O nasal does not close off nasal passages; as you have the rubber dam on as well!
- Keep head in "chin up" position, a rolled bedsheet under the shoulders helps facilitate this
- Make sure rubber dam is WELL SEALED.

Operative Session

- Anesthesia- ONE carpule MAX FOR WHOLE PROCEDURE.
- This avoids systemic toxicity.
Why one carpule?

• Local anesthetics reduce seizure threshold
• Potential for toxic reactions increases when local anesthetics are used with sedation medications
• CNS symptoms can be masked, thus the first sign of toxicity may be CVS depression

Operative Session

• Well punched & sealed rubber dam
Operative Session

• NO water for Dr. Chu PO sedation cases

Records

• Record must be kept of sedatives used
• Record must be kept of vitals, recorded in 5 min intervals
• Residents signs
• Attending countersigns
• Physician order must be written for meds, resident & attending sign
Discharge

• Needs to be responsive
• Needs to be ambulatory
• May have SMALL sips of water..do NOT give too much
• Make sure parent has help, and transportation home
• Discuss head positioning with parent

Discharge

• Post Anesthesia Recovery Score
  – Airway in uncompromised
  – CV function is stable
  – Pt is awake, protective reflexes intact
  – Adequate hydration
  – Pt is responsive
  – Ambulatory with assistance
  – Responsible adult present
  
  – FOR OR Discharge
  – 8-10 is ok for DC
Sample Sedation Note

Date
- 3 yr presents for sedation. Risks / Benefits / Alternatives Discussed with parent / guardian.
- Informed Consent obtained written and oral from parent/guardian
- PMH, Medication, Allergies
- NPO confirmed
- Lungs: CTABn, No recent URI’s, Cardiac: S1S2 RRR without m,r,g
- Weight = kg  Ht: = inches
- At 9:30 am, 14 mg Midazolam (0.7mg/kg) given to patient PO, patient resisted given with syringe
- Waited x 30 min

continued

Sample Sedation Note

To Dental Operatory:
- Therapeutic restraint, Standard Monitors: NIBP, SP02, Precordial
- 100% O2 6L x 5 min with face mask
- 50% n20/O2 (3L/3L) x Face mask then nasal hood x 35 min
- 100% O2 6L at end x 5 min
- 1 episode of intraoperative vomiting occurred
- At end of procedure, brought to recovery bed x 30 min
- Patient discharged at 11:00 am, return to presedative state, per discharge criteria, maintained spontaneous respiration throughout procedure.
- D/C to home with mom via cab. Post op instructions given written and oral
- Post op discharge score:
- BEH (-,+) cried in the beginning and improved significantly for operative. Sedation successful
- NV: Sedation / recommended dosing
- Dr. A.ManiDMD
## CRISES

### Sedation Sequelae

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Arrest</td>
<td>43.2%</td>
</tr>
<tr>
<td>Respiratory Depression</td>
<td>30.5%</td>
</tr>
<tr>
<td>Cardiac Arrest</td>
<td>8.4%</td>
</tr>
<tr>
<td>Desaturation</td>
<td>5.3%</td>
</tr>
<tr>
<td>Seizure</td>
<td>5.3%</td>
</tr>
<tr>
<td>Laryngospasm</td>
<td>3.2%</td>
</tr>
<tr>
<td>Respiratory Distress</td>
<td>2.1%</td>
</tr>
</tbody>
</table>
Laryngospasms

- Initiate BLS
- Call EMS
- Positive Pressure with Ambu-bag
- Succinylcholine*
- Deeper sedation (best with IV)

Ambu- Bag
Overdose

• What is the antidote for versed overdose?

Flumazenil

• Benzodiazepene Antagonist
• Reverses overdose and prolonged sedation (binds to Gaba receptors)
• 0.01 mg/kg every minute until 1 mg is administered
• After administration, there is a possibility of RESEDATION after 60 minutes, monitor w Pulse Ox
• May precipitate seizure in patients w/underlying disorder
• Calculate this medication preop session
Overdose

- What will we administer for overdose/oversedation of demerol (meperidine)? (a narcotic)

Naloxone

- Narcotic antagonist
- Naloxone is an opioid antagonist which binds to CNS opioid receptors to displace opioid agonists.
  - with maximum of 2mg/dose
  - Onset of action 1-2 mins; 45 minute duration- SO MONITOR
Some tips to avoid crises

- Pre-op Evaluation
- Shoulder roll
- Proper head positioning
- Maintain airway
- Proper rubber dam punch
- Acid etch
- Work efficiently
- Monitor patient, recognize crisis early
- Know ABC’s
- Proper Post Op instructions

The use of four-handed dentistry, high-speed suction, ligation of a properly fitted rubber dam clamp, and a gauze throat shield remains the most effective means of preventing aspirations and swallowing materials and loose instruments in dentistry.*

A. Adewumi, BDS, et. Al. “Stainless Steel Crown Aspiration During Sedation in Pediatric Dentistry” PEDIATRIC DENTISTRY V 30 / NO 1 JAN / FEB 08
Factors Contributing to Adverse Events

- Death permanent neurological injury occurred more in non-hospital based facilities
- Inadequate resuscitation
- Inadequate monitoring
- Inadequate pre-sedation evaluation
- Medication Errors
- Inadequate recovery procedures
- Lack of independent observer

Post-Sedation Period

- Some studies recommend discharge not occur before 30 minutes after last medication given
- Adverse event may occur on the way home following a sedation appointment
Emergency Basics

• Be familiar with emergency procedures
• Have a plan/practice it
• Keep emergency cart up to date
• Recognize problems
• Patient PABCD [position – airway- breathing- circulation- decision (drug)]

Emergency Preparedness

• Personnel preparedness (Dentist BLS/PALS; Staff BLS)
• Know your patient
• Follow guidelines (NPO, Monitoring, Discharge)
• Emergency Equipment (even LMA in office) and appropriate size
• Quality Assurance (Learn from experience)
2005

- PO Sedation day
- I was in peds backroom working on research
- “Chu, get the crash cart!!”
- Intubated patient with Bibi
- Water collecting behind rubber dam
- Pt had undiagnosed asthma
- Anesthesia removed Demerol from our kits
  - DON’T FOCUS ON TOOTH!!!
Emergency Services

• BARNABAS: know CODE- 4444.
• Nonhospital: develop an emergency assist system- train staff on nearest hospital to call; develop office protocols for untoward events.

Patients have expired in the dental office....even children:
Armamentarium Requirements for Sedation in the Dental Office

- **Minimal**: Clinical Observation; 2 personnel
- **Moderate**: BPC; PO; PC OR Capno; 2 personnel
- **Deep**: BPC; PO; PC; Capno; ECG; 3 pers
- **General**: BPC; PO; PC; Capno; ECG, Temp; 3 pers

BPC=Blood pressure cuff; PO= Pulse Oximeter; Capno= Capnograph; PC= Precordial Stethoscope; ECG= Electrocardiograph
• Remember, as with all procedures in the office, you’re the one in charge.

• Proper preparation and a cool head will promote successful treatment!

• This is only one lecture. Please always learn more through continuing education!
References

- American Academy of Pediatric Dentistry, Annual Guidelines 2014
- “Conscious Sedation Presentation: Ann Willemse-Dunlap, CRNA, MSN”