Oral Sedation for General Dentistry: “What Works, What’s Safe, and What’s Allowed in Florida”

Oral Sedation in Dentistry “Post-Prandial Lecture” Sedation

Florida Dental Society of Anesthesiology

- State component of American Dental Society of Anesthesiology
- Membership open to all dentists
- Annual CE meeting
- Annual SimMan ‘hands-on’ high-fidelity sedation emergency simulation training
- Newsletter
- Advocacy for anesthesia in dentistry
- Website:
  - Scientific Articles
  - Sedation & anesthesia meeting information

Clive B. Rayner, DMD

- Board Certified in Oral & Maxillofacial Surgery
- Board Certified in Dental Anesthesiology
- Board of Directors, Florida Society of Oral & Maxillofacial Surgery
- Co-founder & past-President of Florida Dental Society of Anesthesiology (FDSA)
- Currently Executive Director of FDSA
- Editor & author of “Vital Signs” newsletter of the FDSA
- Liaison from FSOMS and FDSA to Board of Dentistry
- Consultant & Expert Witness to Board of Dentistry on Anesthesia
- Member, Anesthesia Committee of Board of Dentistry
- Office anesthesia site evaluator for FSOMS, Board of Dentistry

Conflict of Interest Disclosure

- None: no commercial or industry connections
- Founder, Past-President, and currently Exec Director (unpaid) of Florida Dental Society of Anesthesiology

FDNC lecture notes are not complete:
- Go to www.fdsahome.org for complete, updated lecture notes, copies of reference articles, and other course information.
- Contact information:
  - jawdoc0@aol.com (Dr. Clive Rayner)
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Wireless Audience Response System

- Respond to questions with wireless keypad
- You will have 10 seconds
- Your last ‘click’ is the one recorded
- Computer will tabulate results
- Results are anonymous
- Please return transmitter when you leave

Question:
Have you ever had to terminate a procedure because of patient anxiety?

1. Yes 67%
2. No 33%

Question:
How would you manage this patient?

1. Tell him “hold still, it doesn’t hurt” 33%
2. Use relaxation techniques 33%
3. Use sedation 33%
4. Take him to the hospital for anesthesia 0%
5. Send him to another dentist 0%
Question:
Who’s in the audience? Are you a:
1. General dentist
2. Periodontist
3. Endodontist
4. Prosthodontist
5. Oral surgeon or Dental anesthesiologist

Question:
Did you have any sedation/anesthesiology training?
1. Dental school
2. GPR
3. Specialty residency
4. Post-grad course
5. None

What We’ll Discuss
• Why, who, when, and how to use oral sedation
• Non-drug anxiety/stress reduction techniques
• Published guidelines (ADA, AAOMS, APD, etc)
• Rules governing use of oral sedation in Florida
• Different levels of sedation
• Basic pharmacology and pharmacokinetics
• Oral sedative classes – in general
• Benzodiazepines – in depth, specifically those useful to dentistry

What We’ll Discuss
• Adult oral sedation protocols
• Drug titration
• Patient evaluation and preparation
• Informed consent
• Recovery, discharge, record keeping
• Monitoring
• Complications: emergency preparation and management, airway management, drug reversal
• Sedation failures, and alternatives to oral sedation
• Resources for further training and education

Why Use Anxiolysis/Sedation?
• Pain vs anxiety vs phobia
• Pain is an emotional response to a noxious physical stimulus
• PAIN is whatever the patient says hurts, not what the dentist thinks should hurt
• Anxiety causes the brain to interpret all noxious stimuli (e.g., pressure) as pain
• Most dental phobics and fearful patients were created by dentists!
(To you can thank your colleagues when you get one of these patients)
• “We have met the enemy and he is us” – Pogo
• And yet, anesthesia was invented by dentistry
  -- It is our heritage, yet we don’t use it, and we are losing it.
Horace Wells – dentist and father of modern anesthesia

Who should not do oral sedation? (somewhat tongue in check)

- You don’t want to relearn pharmacology & physiology
- You don’t want to take time to review the patient’s medical history & consult with MDs
- You prefer to be a technician than doctor of the mouth
- You don’t want to spend time training your team
- You don’t want to regularly practice emergency drills with your staff
- You don’t know difference between syncope and allergic reaction, nor how to treat

Why Use Oral Sedation?

Let’s not create any more dental phobic patients....

Why Use Oral Sedation?

My philosophy:

Never hurt a patient, even when they say...

“It’s ok doc, keep going,”

...and especially if they tell you,

“It hurts!!”

Why Use Sedation?

- The greatest fear patients have is of PAIN
- Local anesthetics are the most effective drugs in medicine for the prevention of pain
- However, the act of receiving the local anesthetic is THE most traumatic part of the dental experience for most.
- Deal with the FEAR first then PAIN will be a minor problem during procedure
- Most “failures” of adequate local anesthesia and “reactions” to local anesthesia are actually anxiety reactions

Why Use Sedation?

- The primary goal of sedation is to permit the STRESS-INTOLERANT patient to receive dental treatment in a safe and efficient manner
- 75% of medical emergencies in the dental office are related to stress and anxiety (fear and pain), usually from the injection, not from the local itself.
- Therefore, another goal of sedation is to PREVENT medical emergencies
75% of dental office medical emergencies are stress or pain related!

**Stress-related**
- Syncope
- Angina pectoris
- Seizures
- Bronchospasm
- Hyperventilation
- Acute pulmonary edema
- CVA
- Acute adrenal insufficiency
- MI

**Non-stress**
- Allergy
- Postural hypotension
- Hypoglycemia
- Local anesthesia overdose

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**When to Use Oral Sedation**

- Oral sedation can help the majority of patients with mild to moderate levels of fear and anxiety, but may be ineffective in patients with severe anxiety or in more stressful or painful procedures.
- Sedation can be useful in preventing medical emergencies in compromised patients.
- However, some patients will not be successfully managed with oral sedation, because empiric dosing is not an exact science.
- These patients may require deeper sedation and intravenous titration.

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**Anxiety Evaluation Questionnaire**

Can you tell us how anxious you get, if at all, with each dental visit? Rate your dental anxiety from 0 to 10 on the anxiety axis using the following scale:

- **Not at all**: Very anxious
- **Not at all**: Not at all
- **Not at all**: Not at all
- **Not at all**: Not at all

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**Stress Reduction Protocol**

- Recognition of anxiety
- Discuss / offer sedation
- Effective pain control
- AM appointment
- Keep appointments short
- New patient: start with non-invasive, simple treatments
- Get the patient out of pain before you work on them
- Don’t work on a patient already in pain (they’ll associate it with you)
- Good nights sleep before:
  - Give sedative night before if needed
  - Reduce time in waiting room
  - Give patient permission to stop procedure at any time, and do it!
- Guided relaxation, breathing exercises, guided visualizations

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**Question:**

How often do patients visit your office?

1. 120 per year
2. 30 per year
3. 60 per year
4. 15 per year

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**Another good use for oral sedation:**

- The gagging patient!
- Gagging is usually related to anxiety / stress
- That’s why hypnosis & distraction work

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Non-drug Techniques of Anxiolysis

- Acknowledge patient’s fears and anxiety and discuss
- Chairside manner: calm & reassuring
- Give patients control: give breaks, stop when asked
- Clinical hypnosis
- Acupuncture
- Distraction:
  - Audio, earphones
  - Video, dark glasses
- Guided imagery / relaxation training
- Breathing exercises


Question:

What is your preferred adjunctive stress reduction technique?

1. Hypnosis
2. Distraction (headphones, video)
3. Breathing exercises
4. Guided imagery, guided relaxation
5. None of the above

The Art and Science of Sedation

Science:
- Anatomy & physiology
- Pharmacology
  (yes, you have to learn “that pharmacology stuff”)
- Patient evaluation
- Emergency preparedness
- Techniques

Art:
- Clinical experience in the administration of CNS depressant drugs
- Clinical experience in the dental treatment of sedated patients
- Sedation is an art that is learned through experience

Guidelines for Practice

- American Dental Association
  http://www.ada.org/sections/about/pdfs/anesthesia_guidelines.pdf
- American Academy of Pediatric Dentistry
- American Association of Oral & Maxillofacial Surgeons
- American Academy of Periodontology
- American Dental Society of Anesthesiology
- American Society of Dental Anesthesiologists
- American Society of Anesthesiology

Regulations for Practice

Board of Dentistry Rules:
Florida Administrative Code, Chapter 64B5-14

- https://www.flrules.org/gateway/ChapterHome.asp?Chapter=64B5-14
Definitions of Sedation Levels

OLD
- Anxiolysis
- Conscious Sedation
- Deep Sedation
- General Anesthesia

NEW
- Minimal Sedation
- Moderate Sedation
- Deep Sedation
- General Anesthesia

But SEDATION & ANESTHESIA are really a CONTINUUM

- Minimal Sedation (Anxiolysis): is a drug-induced state during which patients respond normally to verbal commands. Although cognitive function and physical coordination may be impaired, airway reflexes, and ventilatory and cardiovascular functions are unaffected.

- Moderate Sedation/Analgesia (“Conscious Sedation”) is 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 is a drug-induced depression of consciousness during which patients cannot be easily aroused but respond purposefully** to repeated or painful stimulation. The ability to independently maintain ventilatory function 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 is a drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation. The ability to independently maintain ventilatory function 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.

Revised definitions "General Anesthesia" and "Conscious Sedation" have been approved by the ANA Council on the Practice of Anesthesia and the practice and education providers. A formal review will be done to verify the definitions for inclusion in the 2006 American Society of Anesthesiologists guidelines and to ensure a formal review of definitions.
**Remember!**

Without formal anesthesia training:

Conscious & responsive = **SAFE**

VS.

Unconscious or unresponsive = **UNSAFE**

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**Regulations**

- **64B5-14.001** Definitions.
  - (1) Anesthesia – The loss of feeling or sensation, especially loss of the sensation of pain.
  - (2) General anesthesia – A controlled state of unconsciousness, produced by a pharmacologic agent, accompanied by a partial or complete loss of protective reflexes, including inability to independently maintain an airway and respond purposefully to physical stimulation or verbal command. This modality includes administration of medications via parenteral routes; that is, intravenous, intramuscular, subcutaneous, submucosal, or inhalation, as well as enteral routes, that is oral, rectal, or transmucosal.

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**Regulations**

**64B5-14.001** Definitions.

- (3) Deep Sedation – A controlled state of depressed consciousness accompanied by partial loss of protective reflexes, including either or both the inability to continually maintain an airway independently or to respond appropriately to physical stimulation or verbal command, produced by pharmacologic or non-pharmacologic method or combination thereof. Deep sedation includes administration of medications via parenteral routes; that is intravenous, intra muscular, subcutaneous, submucosal, or inhalation, as well as enteral routes, that is oral, rectal, or transmucosal.

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**Regulations**

**64B5-14.001** Definitions.

- (4) Conscious sedation – A depressed level of consciousness produced by the administration of pharmacologic substances, that retains the patient’s ability to independently and continuously maintain an airway and respond appropriately to physical stimulation and verbal command. This modality includes administration of medications via all parenteral routes, that is, intravenous, intramuscular, subcutaneous, submucosal, or inhalation, as well as enteral routes, that is oral, rectal, or transmucosal. The drugs and techniques used should carry a margin of safety wide enough to render unintended loss of consciousness unlikely.

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**Regulations**

**64B5-14.001** Definitions.

- (10) Minimal Sedation (anxiolysis) – The perioperative use of medication to relieve anxiety before or during a dental procedure which does not produce a depressed level of consciousness and maintains the patient’s ability to maintain an airway independently and to respond appropriately to physical and verbal stimulation. This minimal sedation shall include the administration of a single enteral sedative or a single narcotic analgesic medication administered in doses appropriate for the unsupervised treatment of anxiety and pain. If clinically indicated, an opioid analgesic may also be administered during or following a procedure if needed for the treatment of pain. Except in extremely unusual circumstances, the cumulative dose shall not exceed the maximum recommended dose (as per the manufacturers recommendation). It is understood that even at appropriate doses, a patient may occasionally drift into a state that is deeper than minimal sedation. As long as the intent was minimal sedation and all of the above guidelines were observed, this shall not automatically constitute a violation. A permit shall not be required for the perioperative use of medication for the purpose of providing anxiolysis.
Regulations

• **64B5-14.001** Definitions.

(11) Titration of Oral Medication – The administration of small incremental doses of an orally administered medication until an intended level of conscious sedation is observed.

Regulations

• **64B5-14.002** Prohibitions

• (7) Titration of Oral Medication. The Board of Dentistry has determined that the perioperative titration of oral medication(s) with the intent to achieve a level of conscious sedation poses a potential overdosing threat due to the unpredictability of enteral absorption and may result in an alteration of the state of consciousness of a patient beyond the intent of the practitioner. Such potentially adverse consequences may require immediate intervention and appropriate training and equipment. Beginning with the effective date of this rule, no dentist licensed in this state shall use any oral medication(s) to induce conscious sedation until such dentist has obtained a permit as required by the provisions of this rule chapter. The use of enteral sedatives or narcotic analgesic medications for the purpose of providing minimal sedation (anxiolysis) as defined by and in accordance with subsection 64B5-14.001(10), F.A.C., shall not be deemed titration of oral medication and shall not be prohibited by this rule.

Sedation Advertising Rules in Florida

Sleep Dentistry

No sight. No sound. No anxiety...

• General anesthesia is implied here
• Better have a GA permit!

Clear & accurate advertising:

Sleep Through Your Next Dental Appointment with Pain-Free Sedation Dentistry for ANY Procedure

Our Unique Sedation Program Combines:

* On Staff Board-Certified ANESTHESIOLOGIST
* IV Sedation permit by Florida Board of Dentistry
* Miami Beach’s ONLY Prosthodontist (4 years Additional Cosmetic Dental Training)

Clear and accurate:

Relax Today

Questionable ad:

What are you getting?
Misleading, and may run afoul of Board of Dentistry
Better: implies relaxation and comfort, not sleep

Good: Clear and accurate descriptions of level of sedation

Other Florida sedation rules:

- You must hold a general anesthesia permit to bring a nurse anesthetist to your office.
  - CRNAs must work under supervision of a DDS with a GA permit or an MD anesthesiologist.
- You must hold either a sedation or GA permit to bring in an MD anesthesiologist, and the office can only provide sedation to the level of that dental office permit.
- If you do not have a permit, you CAN take your patient to the office of a GA provider (OMS or DA) for sedation or anesthesia while the DA, OMS, or MD provides anesthesia.
- You must complete a 4 hour CE course on working on sedated patient with "hands-on" airway management training.

Practice Guidelines for Sedation and Analgesia by Non-Anesthesiologists

An Updated Report by the American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists
Anesthesiology, V 96: 1004-17, No 4, Apr 2002

“Guidelines for the Use of Sedation and General Anesthesia by Dentists”
American Dental Association, 2007

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

Note: In accord with this particular definition, the drug(s) and/or techniques used should carry a margin of safety wide enough never to render unintended loss of consciousness. Further, patients whose only response is reflex withdrawal from painful stimuli would not be considered to be in a state of minimal sedation.
Sedation as a continuum

Continuum of Sedation

- Levels of sedation progress as a continuum and each level can be achieved regardless of the route of drug administration.
- Employing oral sedation does not guarantee that a patient will be in a state of anxiolysis nor does it imply that a patient will not drift into deeper levels of sedation.
- While it is unlikely that appropriate doses of oral sedatives will produce significant respiratory depression; this is not to be confused with respiratory obstruction.
- Respiratory obstruction and depression are NOT synonymous and should not be confused: respiratory obstruction CAN occur with lighter levels of sedation.

Definitions of Sedation Levels

<table>
<thead>
<tr>
<th></th>
<th>Minimal Sedation (Anxiolysis)</th>
<th>Moderate Sedation (Conscious Sedation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsiveness</td>
<td>Normal response to verbal stimulation</td>
<td>Purposeful response to verbal or tactile stimulation</td>
</tr>
<tr>
<td>Airway</td>
<td>Unaffected</td>
<td>No intervention required</td>
</tr>
<tr>
<td>Spontaneous ventilation</td>
<td>Unaffected</td>
<td>Adequate</td>
</tr>
<tr>
<td>Cardiovascular function</td>
<td>Unaffected</td>
<td>Usually maintained</td>
</tr>
<tr>
<td>Need for local anesthesia</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Definitions of Sedation Levels

<table>
<thead>
<tr>
<th></th>
<th>Deep Sedation</th>
<th>General Anesthesia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsiveness</td>
<td>Purposeful response after repeated or painful stimulation</td>
<td>Unarousable, even with painful stimulus</td>
</tr>
<tr>
<td>Airway</td>
<td>Intervention may be required</td>
<td>Intervention often required</td>
</tr>
<tr>
<td>Spontaneous ventilation</td>
<td>May be inadequate</td>
<td>Frequently inadequate</td>
</tr>
<tr>
<td>Cardiovascular function</td>
<td>Usually maintained</td>
<td>May be impaired</td>
</tr>
<tr>
<td>Need for local anesthesia</td>
<td>Yes</td>
<td>?</td>
</tr>
</tbody>
</table>

REMEMBER!

- The route of administration alone does **NOT** determine depth of sedation or anesthesia!
- Nor are there any drugs that are regulated or classified by the route of administration.

Drug, amount, and route all combine to determine depth of sedation
Routes of Drug Administration

**Enteral vs. Parenteral definition:**

- **Parenteral:** intravenous, intramuscular, inhalation, intranasal, sublingual, transdermal
- **Enteral:** oral, rectal (everything else is parenteral)

**Enteral vs Parenteral:**

**Enteral:**
- Drug passes through enterohepatic circulation (liver) before entering systemic circulation
- Liver metabolizes part of drug
- Less drug available to produce clinically desired effect

**Parenteral:**
- Drug enters directly into systemic circulation bypassing the enterohepatic circulation (liver)
- More drug available to produce clinically desired effect

**Why use the oral route?**

**ADVANTAGES:**
- Almost universal acceptability
- Ease of administration
- Low cost
- Decreased incidence of adverse reactions
- No needles, syringes, or equipment
- No specialized training
- No specialized permitting or office inspections
- No increase in liability insurance needed

**Is Oral Drug Administration Inherently Safer?**

- Perhaps; but not always....
- Any CNS depressant drug MAY produce any or all levels of sedation and anesthesia, including death.
- You can achieve deep sedation with Halcion, or light sedation with Propofol.
How do you spell safety with any type of sedation?

**TITRATION**

**Question:**
Which of these drug routes can be safely titrated?

1. Oral
2. Intramuscular
3. Inhalation
4. Transdermal
5. Inhalational

**TITRATION Possible?**

- Oral: NO
- Rectal: NO
- Intramuscular: NO
- Intranasal: NO
- Sublingual: NO
- Transdermal: NO
- Inhalation: YES
- Intravenous: YES

**Why?**

- Drugs are not absorbed by the stomach, they must get to the intestine.
- With anxiety, there is delayed and unpredictable gastric emptying.
- Orally administered drugs may not be absorbed at the time anticipated.
- “First pass effect” through the liver is unpredictable.
- Both first and second oral doses may ‘peak’ at the same time leading to over sedation.

**First-Pass Metabolism**

- Drugs administered PO must first travel through the liver before they reach circulation.
- They may be changed to inactive metabolites before they actually reach the systemic circulation.
- Therefore, PO doses are generally larger than those injected. (Also, PO doses may be destroyed in the stomach or not be absorbed at all!)

Many Factors Effect Oral Drug Absorption

**Patient Characteristics**
- Surface area of GI mucosa
- Stomach pH
- Gastric emptying time
- Duodenal pH
- Bacterial colonization of GI tract
- Baseline clinical condition
- Presence of food in stomach
- Anxiety

Sublingual vs Oral

- Sublingual topical administration is technically parenteral administration, as it bypasses liver.
- Faster onset, increased effect.
- Eg: giving sublingual triazolam increases bioabsorption by 28% over oral administration
- Something to think about.........

Target Organ of Sedation is the

Central Nervous System

Pharmacokinetics

- Onset most affected by distribution (lipid solubility into brain)
- Duration determined more by redistribution (absorption by adipose), and presence of active metabolites
- “Half-life” of drug is secondary to above effects
**Drug Half Lives, T\textsubscript{1/2}**

The time it take any drug concentration to fall 50%

- Generally a reliable indicator of the rate of removal of a drug from the blood and body
- Depends upon clearance and volume of distribution

**Duration of action**

- Highly lipid soluble drugs are an exception (e.g., diazepam has a half life of 20 - 50 hours but it is very fat soluble so blood levels fall like a drug with a much shorter half life)

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**Drug Response Variations**

- **Age**
  - Children
  - Elderly
- **Genetics**
  - CYP liver enzymes
- **Co-existing diseases**
- **Anxiety Level**
  - Physiological antagonism
- **Drug interactions**
  - Potentiation by CNS depressants
  - Antagonism by CNS stimulants
- **Normal biologic variation**
- **Pharmacokinetic factors**

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**Factors affecting drug response**

- **Dosing of anxiolytics**
  - Dosage based primarily on:
    - patient’s level of anxiety
    - invasiveness / intensity of expected procedure
    - duration of procedure
  - Eg: prophyl vs. third molar extractions
  - Secondarily dose based on weight, BMI, age, health, etc.
Sedative – Anxiolytic Drug Classes

- Many classes
  - Benzodiazepines
  - Barbiturates
  - Antihistamines
  - Opioids
  - Misc: e.g., chloral hydrate
- All produce similar effects
  - Primary effect follows dose response curve
  - Respiratory depression
  - Dependence
  - Paradoxical excitation
- But there are none better than the benzodiazepines

<table>
<thead>
<tr>
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<th>Benzodiazepines</th>
<th>Barbiturates</th>
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<tr>
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<td>+++</td>
<td>+++</td>
<td>+</td>
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<td></td>
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<tr>
<td>Side effects</td>
<td>++</td>
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<td>0</td>
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<tr>
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<td>+++</td>
<td>+</td>
<td>0</td>
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<tr>
<td>amnesia</td>
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<tr>
<td>Anticholinergic</td>
<td>0</td>
<td>0</td>
<td>++</td>
</tr>
<tr>
<td>Antiemetic</td>
<td>0</td>
<td>0</td>
<td>++</td>
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</tbody>
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Source: Sedation: Management of Pain & Anxiety in the Dental Office, 2002

History of Oral Sedatives

- Chloral hydrate (Noctec) 1832
  - Generalized CNS depressant capable of deep sedation, very low margin of safety, halogenated, poor side effects
- Barbiturates:
  - Barbital (Veronal) 1903
  - Amobarbital (Amytal) 1920
  - Secobarbital (Seconal) 1930
- Antihistamines:
  - Diphenhydramine (Benadryl) 1946
  - Promethazine (Phenergan) 1951
  - Hydroxyzine (Atarax) 1956
- Benzodiazepines 1960+
  - Wide margin of safety, minimal respiratory no cardiovascular effects, excellent efficacy, few side effects

History of Benzodiazepines

- 1960 Chlordiazepoxide (Librium)
- 1960-70 Diazepam (Valium) Oxazepam (Sera) Flurazepam (Dulmane)
- 1970-90 Clonazepam (Klonopin) Lorazepam (Ativan) Prazepam (Centrane) Chlorazepate (Transene)
- 1980-90 Alprazolam (Xanax) Triazolam (Halcion) Temazepam (Restoril) Midosazolam (Versed)
- 1990-2005 Zolpidem* (Ambien) Zaleplon* (Sonata) Eszopiclone* (Lunesta)

Oral Sedative Agents

Nonbenzodiazepines
- Ethyl alcohol
- Chloral hydrate
- Barbiturates
- Imidazopyridines
  - Zolpidem (Ambien)
  - Zaleplon (Sonata)
  - Eszopiclone (Lunesta)
- Histamine (H1) Blockers
  - Promethazine (Phenergan)
  - Hydroxyzine (Vistaril)
  - Diphenhydramine (Benadryl)
- Opioids

Benzodiazepines

VERSUS

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Benzodiazepine Selection

- Safety and sedative efficacy of the numerous benzodiazepines are virtually identical.
- Individual differences in onset and duration are due to each drug’s unique pharmacokinetic profile.
- Understanding these differences enables the practitioner to select the right drug at the right dose for the right patient and right procedure.
Pharmacology of BDZ

Effect on CNS:
- Depressant effect on limbic system and thalamus: areas involved in emotion and behavior.
- Other sedatives and barbiturates do not exhibit this selective depression, instead produce generalized CNS depression.
- Ataxia and deep sedation only occur at doses beyond anti-anxiety doses = wide margin of safety.

Benzodiazepine Mechanism of Action

- BDZs promote binding of neurotransmitter GABA at neuronal synapse in brain and spine.
- Effect of BDZ is to prolong effect of GABA.
- GABA is an inhibitory neurotransmitter, reducing nerve transmission in brain.
- GABA decreases sensory messages perceived by brain, causing:
  - sedation, anxiolysis, muscle relaxation, and anticonvulsant effects.

GABA Receptor

Benzodiazepine Mechanism of Action

- Other sedatives like barbiturates, chloral hydrate, propofol act directly on nerve to decrease nerve transmission; whereas BDZ only potentiates the body’s endogenous neurotransmitter GABA.
- This is why BDZs have wider margin of safety than other sedatives. They can only act on existing neurotransmitters, not act directly itself.
- Other agents can be lethal in high doses, but lethal overdose of BDZ is almost unheard of.

Non-benzo “benzodiazepines”

The “Z compounds” zolpidem (Ambien), zaleplon (Sonata), eszopiclone (Lunesta)

Ambien, Sonata, Lunesta:
- The new “Z compounds” are chemically modified benzodiazepines, and act on the same BDZ receptors, have similar pharmacokinetics, and effectively act like BNZs, therefore we will treat them as BNZs.
- Alleged differences from traditional benzodiazepines are primarily drug company marketing.
- Empirically they may be shorter acting...

Benzodiazepine Agonist Effects

Primary Therapeutic
- Anxiolytic / Antipanic
- Anticonvulsant
- Muscle Relaxant
- Induction of Sleep (hypnosis)

Secondary Effects
- Memory Impairment (amnesia)
- Sedation/Somnolence
- Psychomotor Impairment (ataxia)

Tertiary
- EEG Beta Activity
- Cortisol, Growth Hormone

Courtesy of Dr. Morton Rosenberg, Department of Anesthesia at Tufts-New England Medical Center
Acute Adverse Effects

- Respiratory
  - Minimal respiratory depression when administered alone
  - Note: ventilatory obstruction can still occur
  - Higher doses can depress hypoxic drive
  - COPD and OSA patients are a concern
- Cardiovascular
  - Minimal depression of CV system when administered alone

Paradoxical Effects of BDZs

Occasional idiosyncratic reactions to BNZ:
- Crying, hysteria, anxiety, agitation, aggression, etc.
- Caused by “behavioral disinhibition” effect of BNZ.
  - Patients are very fearful, but “keeping it together,” until BNZ removes conscious inhibition (control) and patient is then unable to contain anxiety.
  - Use of different BDZ will not help.
  - Use nitrous, opioid, barbiturate, or propofol, etc, instead.
  - These patients need deep sedation or GA.

Anterograde Amnesia

- Patients may have little or no memory of the procedure after benzodiazepine sedation, especially halcion.
- “Z compounds” have less anterograde amnesia
- Patients may believe that they have been “put to sleep.”
- This works to your advantage and disadvantage.

Anterograde Amnesia vs Unconsciousness

- Patients may be conscious during event, and will experience event, but not remember.
- Contrast with barbiturate or general anesthetic: patient rendered unconscious will not experience event, nor remember event.
- Eg, patient sedated with BDZ may cry out during palatal injection, but not remember and swear they were asleep.

BDZ Characteristics

- All BDZs are equally effective in producing anxiolysis and sedation.
- Great variation among BDZs due to pharmacokinetics: half-lives, lipid solubility, and pattern of elimination.
- Metabolism in liver, elimination by kidneys
- Clearance: some are transformed to active metabolites

BDZ Characteristics

- Most pharmacology literature categorizes BDZs based on half-life as short, intermediate, or long.
- But half-life is not only or even primary factor in clinical duration.
- After a single dose, lipid solubility is primarily responsible for onset and duration.
  - Increased lipid solubility = faster onset, faster offset (redistributes to fat stores)
- Half-life more important in repeated administration.
Half-life vs. Lipid Solubility

Contrast pharmacokinetics of Valium vs Ativan:

- Diazepam (Valium): active metabolites = long duration of effect
- Lorazepam (Ativan): less lipid soluble, so slower onset and longer duration, even though short half-life.

Choice of BDZ Based On:

All equally effective for anxiolysis and sedation, therefore chose by:

- Rapidity on onset
- Duration of effect
- Doctor familiarity with agent
- Patient’s prior experience

Dose of BDZ Based On:

- Patient prior experience
- Patient age, wt, medical history
  - Elderly: less drug needed generally (~ ½)
- Invasiveness / stress of procedure
  - Generally more important than wt
- Patient’s level of anxiety
- “the art of sedation”
- Start initial appt with lowest dose feasible, & increase subsequent appts as needed

Special conditions:

- Elderly:
  - reduced hepatic metabolism and renal clearance, decreased cerebral blood flow, decreased pulmonary fxn, etc
  - give ½ usual dose, and use shorter acting agents
- Cardiac dz:
  - patients will BENEFIT from reduced cardiac stress
  - but avoid over-sedation hypoxia
- Renal and hepatic disease:
  - reduced elimination and accumulation more important with chronic use
  - single dose usually OK
- Respiratory dz:
  - Asthma; normal dosing
  - COPD; consider lower dose

Special Conditions:

- Epilepsy:
  - BDZ are protective and beneficial
  - normal dosing
- Diabetes:
  - Normal dosing
  - but beware confusing sedation with hypoglycemia
- Obstructive sleep apnea: RED FLAG!
  - Pts extremely sensitive to sedatives
  - If over-sedated, airway can be very difficult to manage
  - Consider supplemental oxygen
- Acute narrow angle glaucoma
  - BDZs contraindicated, but these patients are not going to dentist!
  - Condition is severe, acute, eye pain, N/V, fixed pupil, sudden loss of vision

Special Conditions: Pregnancy

- BDZ use is controversial
- FDA labeling says BDZs are potential risk to fetus
- Ob/Gyn docs usually follow FDA labeling, but these recommendations are not supported by current scientific literature
- Literature says that a single doses of BDZs are safe, but regular use should be avoided in first trimester
- But since FDA and MDs say not to use BDZ (or nitrous oxide), we’re stuck.
Special Considerations: Pregnancy

Consider:
“Studies suggest that the administration of a hypnotic, opioid, or sedative drug will not have deleterious effects on embryonic or fetal development. The current consensus is that benzodiazepines are not teratogenic and a single dose appears safe... regular use particularly in the first trimester should probably be avoided.”


Special Considerations: Breast Feeding

• Less drug passes into breast milk than crosses placenta.
• Child exposed to approx. 1% of maternal dose.
• In the case of midazolam, only 0.0005% of the maternal dose is transferred to the breast milk during a 24 hour period.
• 2001 AAP policy statement: no reported effects to nursing infants from diazepam, midazolam, lorazepam.
• But mothers may be concerned: tell them to pump and store pre-op, pump and waste day of procedure.

Oral Peak Plasma Levels (hr)

<table>
<thead>
<tr>
<th>Drug</th>
<th>Peak Plasma Level (hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flurazepam</td>
<td>0.5 - 1</td>
</tr>
<tr>
<td>Midazolam</td>
<td>0.5</td>
</tr>
<tr>
<td>Triazolam</td>
<td>1.3</td>
</tr>
<tr>
<td>Alprazolam</td>
<td>1 - 2</td>
</tr>
<tr>
<td>Oxazepam</td>
<td>1 - 4</td>
</tr>
<tr>
<td>Diazepam</td>
<td>2</td>
</tr>
<tr>
<td>Lorazepam</td>
<td>2</td>
</tr>
<tr>
<td>Temazepam</td>
<td>2 - 3</td>
</tr>
<tr>
<td>Chlordiazepoxide</td>
<td>4</td>
</tr>
</tbody>
</table>

Drug Half Lives

<table>
<thead>
<tr>
<th>Drug</th>
<th>Half-Life (hr)</th>
<th>Active Metabolites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flurazepam</td>
<td>2.3</td>
<td>Yes</td>
</tr>
<tr>
<td>Midazolam</td>
<td>1.2 - 12.3</td>
<td>No</td>
</tr>
<tr>
<td>Triazolam</td>
<td>1.5 - 5.5</td>
<td>No</td>
</tr>
<tr>
<td>Alprazolam</td>
<td>12 - 15</td>
<td>No</td>
</tr>
<tr>
<td>Oxazepam</td>
<td>5.7 - 10.9</td>
<td>No</td>
</tr>
<tr>
<td>Diazepam</td>
<td>20 - 70</td>
<td>Yes</td>
</tr>
<tr>
<td>Lorazepam</td>
<td>12</td>
<td>No</td>
</tr>
<tr>
<td>Temazepam</td>
<td>10</td>
<td>No</td>
</tr>
<tr>
<td>Chlordiazepoxide</td>
<td>24 - 48</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Benzodiazepines

<table>
<thead>
<tr>
<th>Drug</th>
<th>Equivalent Oral Dose</th>
<th>MRD (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triazolam</td>
<td>0.25mg</td>
<td>0.5mg</td>
</tr>
<tr>
<td>Diazepam</td>
<td>10 mg</td>
<td>20 mg</td>
</tr>
<tr>
<td>Alprazolam</td>
<td>0.5mg</td>
<td>2 mg</td>
</tr>
<tr>
<td>Lorazepam</td>
<td>1 mg</td>
<td>6 mg</td>
</tr>
</tbody>
</table>

Question:
Which is your preferred oral benzodiazepine?

1. Valium
2. Xanax
3. Halcion
4. Ambien / Sonata
5. Other

[Bar chart showing preference distribution]
The Big Three

<table>
<thead>
<tr>
<th></th>
<th>Triazolam</th>
<th>Diazepam</th>
<th>Lorazepam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metabolites</td>
<td>Insignificant</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>T½ (hr)</td>
<td>1.5 – 5.5</td>
<td>20 – 100</td>
<td>10 – 20</td>
</tr>
<tr>
<td>Onset (min)</td>
<td>30 – 60</td>
<td>60 – 90</td>
<td>90 – 120</td>
</tr>
<tr>
<td>Clinical Effect (duration/hr)</td>
<td>1 – 3</td>
<td>2 – 4</td>
<td>3 – 6</td>
</tr>
<tr>
<td>Anxiolytic Dose (mg)</td>
<td>0.125 – 0.5 mg</td>
<td>5 – 10 mg</td>
<td>1 – 2 mg</td>
</tr>
<tr>
<td>Sedative Dose (mg)</td>
<td>0.25 – 7 mg</td>
<td>10 – 20 mg</td>
<td>2 – 6 mg</td>
</tr>
</tbody>
</table>

Courtesy of Dr. Morton Rosenberg, Department of Anesthesia at Tufts-New England Medical Center

Diazepam (Valium)
- “Prototypical” BDZ
- Onset 45 - 90 mins
- Peak 60 - 120 mins
- Duration of effect 6 – 8 hours
- Half-life 80 hours
- Adult dose 2 – 20 mg
- Long half-life and active metabolites = long duration of effect
- Metabolized by CP450, so subject to age, liver dysfunction, drug interactions.
- Best administered night before surgery for sleep – May have daytime drowsiness, “hang over”

Triazolam (Halcion)
- Onset 30 – 60 mins
- Peak 75 – 90 mins
- Duration of effect 2 – 3 hours
- Half-life 1.5 – 5 hours
- Adult dose: 0.125 to 0.5 mg PO
- No active metabolites, but metabolized by CP450 so subject to age, liver dysfunction, drug interactions.
- Short acting, quick onset make it ideal choice for most dental procedures.

Lorazepam (Ativan)
- Onset 1 – 2 hours
- Peak 2 – 3 hours
- Duration of effect 3 – 6 hours
- Half-life 10 – 20 hours
- Adult dose: 0.5 to 4 mg
- No active metabolites
- Not metabolized by CP450, so less affected by variables of age, liver disease, drug interactions

Zolpidem (Ambien)
- “Non-benzodiazepine” hypnotic
- Onset 30 – 60 mins
- Peak plasma 90 mins
- Duration of effect 1 – 2 hours
- Half-life: 1.5 – 2.4 hours
- Adult dose 10 – 20 mg
- No active metabolites,
- “Rapid” absorption/onset and short duration
- No muscle relaxant, anti-convulsant effects at usual doses
- Less amnestic effect than BDZs

Drug and Dosage Selection
Dependent on:
- Age
- Weight
- Medical status
- Drug interactions
- Level of anxiety
- Previous experience
- Invasiveness / stress of procedure
Drug response curve

Typical bell curve

“68 – 95 – 99.7 rule”

Implications for oral drug dosing:

- 68% of patients will respond to usual dose
- ~14% will need ½X normal dose and 14% will need 2X normal dose
- ~2% will need ½X normal dose and 2% will need 4X normal dose

Implications for oral dosing: observe patient carefully for oversedation / undersedation

Adult Sedation Protocols

“K.I.S.S.” (keep it simple)

- SHORT (1 hour) zolpidem (Ambien) 10 mg
- AVERAGE (1 - 2 hours) triazolam (Halcion) 0.25 mg
- INTERMEDIATE (4 – 6 hours) lorazepam (Ativan) 2.0 mg
- LONG (for sleep PM before) diazepam (Valium) 10 mg

Some Recommendations:

Average Duration Appointment

- Halcion (triazolam)
- Administer 0.25 - 0.5 orally 1 hour, (or sublingually 30 mins) prior to procedure
- Titrate nitrous oxide as needed
- Use a pulse oximeter

Some Recommendations:

Long Duration Appointment

- Ativan (lorazepam)
- Administer 2 mg orally, two hours prior to the procedure
- Titrate nitrous oxide as needed
- Use a pulse oximeter

Some Recommendations:

Short Appointment, Faster onset

- Ambien (zolpidem)
- Administer 10 mg orally, thirty minutes prior to procedure
- Titrate with nitrous oxide as needed
- Use a pulse oximeter

Some Recommendations:

For sleep at home evening before procedure

- Valium (diazepam)
- Take 10 mg orally, 1 hour before bedtime
- May have some drowsiness in AM
Rule Change!

• Since 2001, in Florida, it’s OK to combine a single dose of oral sedative with nitrous oxide – no permit or advanced training needed.
• Rationale:
  – Nitrous oxide is easily and quickly titratable and reversible in the event of over-sedation
  – Giving nitrous oxide also means giving you are giving supplemental oxygen

To Increase Depth of Oral “Minimal” Sedation

• Add nitrous oxide to regimen to “titrate” sedation to effect.
• If still inadequate, reschedule patient and give evening dose evening before, and / or give higher dose pre-op as allowed by MDR dose.
• Do not administer additional oral drugs day of procedure.

“Balancing Efficacy and Safety in the Use of Oral Sedation in Dental Outpatients”

Continuing concerns over the safety of oral sedation and new controversies regarding the incremental use (“titration”) of the benzodiazepine triazolam for the sedation of dental outpatients prompted a 2003 meeting called “Workshop on Enteral Sedation in Dentistry” and cosponsored by the United States Pharmacopeial Convention, the Anesthesia Research Foundation of the American Dental Society of Anesthesiology and the Dental Anesthesia Research Group of the International Association for Dental Research.

Halcion Package Insert

• ‘The recommended dose for most adults in 0.25 mg before bedtime.’
• ‘A dose of 0.125 mg may be found to be sufficient for some patients (e.g., elderly, small)’
• ‘A dose of 0.5 mg should only be used for exceptional patients who do not respond to a trial of a lower dose since the risk of several adverse reactions increases with the size of the dose administered.’
• ‘A dose of 0.5 mg should not be exceeded.’

“Balancing Efficacy and Safety in the Use of Oral Sedation in Dental Outpatients”

Background. Concerns about the safety of pediatric oral sedation and the incremental use of triazolam in adults prompted a workshop cosponsored by several professional organizations.

Balancing Efficacy and Safety in the Use of Oral Sedation in Dental Outpatients

Conclusions. Clinical trials are needed to evaluate oral sedative drugs and combinations, as well as to develop discharge criteria with objective quantifiable measures of home readiness. Courses devoted to airway management should be developed for dentists who provide conscious sedation services. State regulation of enteral administration of sedatives to achieve conscious sedation is needed to ensure safety.

Practice Implications. Safety in outpatient sedation is of paramount concern, with enteral administration of benzodiazepines appearing safe but poorly documented in the office setting. Conscious sedation by the enteral route, including incremental triazolam, necessitates careful patient evaluation, monitoring, documentation, facilities, equipment and personnel as described in American Dental Association and American Academy of Pediatric Dentistry guidelines.
Balancing Efficacy and Safety in the Use of Oral Sedation in Dental Outpatients

...these attributes of triazolam suggest that administering additional amounts of the drug at time points less than one hour on the basis of the patient's sedative response would result in additional dosing while the central effects of the original dose are still increasing.

By the time the increased concentration of drug from the second dose is achieved in the plasma and eventually at the active site, over-sedation may be produced by the delay in CNS effects.

“Pharmacokinetics and Clinical Effects of Multidose Sublingual Triazolam in Healthy Volunteers”

Study designed to determine the pharmacokinetics and sedative effects of incremental sublingual dosing of triazolam (total 1.0 mg) in healthy adults.

The study was funded by the Dental Organization for Conscious Sedation (DOCS).

Pharmacokinetics and Clinical Effects of Multidose Sublingual Triazolam in Healthy Volunteers

Ten subjects received SL triazolam (0.25 mg) followed by additional doses after 60 (0.50mg) and 90 (0.25mg) minutes. (D.O.C.S. suggested protocol)

Plasma triazolam concentrations, clinical effects and bispectral index (BIS) were measured intermittently for three hours.

Triazolam concentrations gradually increased with time in all subjects and concentrations and drug effects were greatest at the end of the three hour evaluation period.

Concentrations were still increasing at the time of the last measurement (180 minutes) and thus no max concentration or minimum BIS could be determined.
Pharmacokinetics and Clinical Effects of Multidose Sublingual Triazolam in Healthy Volunteers

Journal of Clinical Psychopharmacology 2006 Feb;26(1):4-8;
Jackson DL, Milgrom P, Heacox GA, Kharasch ED.
Departments of Oral Medicine, Dental Fears Research Clinic, University of Washington School of Dentistry.

- Eight subjects had sedation scores consistent with definition of deep sedation or general anesthesia.
- Four subjects had BIS scores less than 60.
- BIS less than 60 is generally regarded as the threshold for general anesthesia.

Conclusion:
"The current clinical application of incremental dosing with sublingual triazolam in dentistry has moved ahead of an adequate research foundation."
–Jackson, et al.

Pharmacokinetics and Clinical Effects of Multi-dose Sublingual Triazolam in Healthy Volunteers

Journal of Clinical Psychopharmacology 2006 Feb;26(1):4-8;
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Pre-op, Intra-op, Post-op Care

To quote a famous anesthesia educator, Robert Dripps, MD:
"The satisfactory outcome of anesthetic care is largely determined by the quality of the pre-anesthetic and post-anesthetic care."

This also true for dental office sedation.

PRE-SEDATION EVALUATION

- “Never treat a stranger”
- Never do anesthesia on a patient you have not previously evaluated.
- Always have a consultation first! Never sedate on first patient visit.

PRE-SEDATION CONSULTATION / EXAM

- Evaluation of anxiety level
- Review of medical history
- Physical exam
- Review medications, drug allergies
- Assign ASA classification
- Review prior sedation / anesthetic history
- Obtain informed consent
- Give pre-sedation instructions

QUICK BREAK!

Pre-Operative, Intra-Operative, Post-Operative Care

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- Physical exam
- Review medications, drug allergies
- Assign ASA classification
- Review prior sedation / anesthetic history
- Obtain informed consent
- Give pre-sedation instructions
Medical history

- Diseases to evaluate:
  - CAD, CHF, HTN; asthma, COPD, URI; DM;
  - pregnancy; psychiatric; renal; hepatic;
  - obesity; sleep apnea; etc.
- Medications
- Prior anesthetic experience
- Allergies
- Hospitalizations

“Medical Clearance”

There is no such thing!

Medical Consultations

- Getting pre-operative “medical clearance” from MD is clinically useless and meaningless, and irrelevant as defense in court of law.
- The dentist providing the surgery and anesthesia is entirely responsible for the outcome of the surgery and anesthesia.
- The MD does not know what you are doing and cannot evaluate the risk to the patient.
- The surgeon / dentist is “the decider” as to whether it is safe to proceed with the dental or surgical procedure, NOT the consulting MD.

Examples of Useless Medical “Clearance”

- Written on an Rx pad, “cleared for surgery”
- Written on Rx pad, “cleared for surgery under local, etc.”
- MD says: “Avoid hypotension, hypertension, hypoxia, hypercarbia”
- MD says “Monitor EKG, SaO2, BP carefully”
- MD says “Avoid epi”

But the MD said “avoid epinephrine”

Consider this:

- “Failure to produce complete local anesthesia results in significant increased cardiac stress and myocardial ischemia” which may produce more endogenous epinephrine than was in the local anesthetic.
- MDs are used to thinking of epi in mg doses, not the microgram doses we use. They have no concept of the epi doses used in dentistry.
- One carpurle is ~20mcg of epi. MDs think in terms of 300mcg for allergy patients and 1000mcg for cardiac arrest patients.

Source: Anesthesiology, 2006
So how do you get the info you need?

- Ask the right questions; create a form or letter that requires specific questions to be answered.
- Ask for a recent complete H&P, list of all medications, allergies, hospitalizations, lab results, progress notes, etc.
- Then ask the MD:

  "Considering the patient’s baseline diseases, is the patient in the best possible condition for this elective procedure, in the dental office, using _____ sedation, and _____ monitoring?"

  Then decide: Should I do this case?

What is helpful:

- "this patient has the following medical problems X, Y, Z. The patient is compliant with their care."
  - "condition X has required the following interventions over the years, and is now stable with appropriate medications and bimonthly exams"
  - "Y is inactive for 5 years"
  - "Z is chronic and severe, however the condition is not amenable to further optimization"

What the surgeon and anesthetist need to know from the MD

- The patient is optimal considering their baseline diseases, or
- The patient is not optimal re: baseline diseases, but this procedure is important to and elective is not likely to impact their medical condition, or
- The patient is not optimal, but the surgery is sufficiently emergent that proceeding is important. The attempts at optimizing medical status may have equally adverse outcomes, or
- The patient is not optimal re: baseline diseases. Elective surgery should be postponed until patient is optimized.

Physical Exam for Sedation

- Blood Pressure and Heart Rate
- Appearance
- Height, Weight, & BMI (Body Mass Index)
- Mental & psychological status
- Cardiac & pulmonary eval;
  - Exercise tolerance ("if they can walk up 2 flights of stairs to your office, they’re probably ok for anesthesia")
- Airway evaluation

Body Mass Index (BMI)

<table>
<thead>
<tr>
<th>Classification of Obesity According to the Body Mass Index (BMI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight deficiency: BMI = 20 kg/m²</td>
</tr>
<tr>
<td>Normal: BMI 18.5 to 25 kg/m²</td>
</tr>
<tr>
<td>Overweight: BMI 25 to 30 kg/m²</td>
</tr>
<tr>
<td>Obesity: BMI &gt; 30 kg/m²</td>
</tr>
<tr>
<td>Morbid obesity: BMI &gt; 40 kg/m²</td>
</tr>
</tbody>
</table>

Patient selection:
Who NOT to sedate unless you are sure of your airway management skills!
Airway Evaluation

- BMI (Body Mass Index)
- History of Obstructive Sleep Apnea, snoring
- Mallampati score
- Protrusive (ask: “bite your upper lip with your lower teeth”)
- TMJ range of motion (oral opening)
- Neck circumference, neck ROM

One reason for doing an airway evaluation before sedation!

ASA Physical Classification

- I  A normal healthy patient
- II A patient with mild systemic disease
- III A patient with severe systemic disease
- IV A patient with severe systemic disease that is a constant threat to life
- V  A moribund patient who is not expected to survive without the operation

ASA Class 1

- Normal healthy patient:
- No organic, physiologic, or psychiatric disturbance; excludes the very young and very old; healthy with good exercise tolerance.
- Patients are able to walk up two flights of stairs or two blocks; little or no risk.
- = “green flag”

ASA 1 examples:

- 27 yo healthy male, no meds, with fractured mandible
- 72 yo healthy female, on Zocor, Ambien with Ludwig’s Angina
ASA 2

- Patients with mild systemic disease
- No functional limitations; has a well-controlled disease of one body system.
- Acceptable exercise tolerance: able to walk up two flights of stairs, but needs to rest after.
- Minimal risk.
- = possible "YELLOW FLAG"

ASA 2 examples:

- 37 yo with Type 1 diabetes, well-controlled (HbA1C = 6)
- 25 yo cigarette smoker, no COPD
- 45 yo with controlled HTN, obesity (BMI 32)
- 35 yo with severe dental phobia / anxiety
- 26 yo pregnant female

ASA 3

- Patients with severe systemic disease
- Some functional limitation; has a controlled disease of more than one system, no immediate danger of death.
- Able to walk up one flight of stairs, rests halfway.
- = “RED FLAG”

ASA 3 examples:

- 57 yo with controlled congestive heart failure, stable angina, S/P MI
- 48 yo with poorly controlled HTN, morbid obesity,
- 65 yo smoker with COPD, HTN, angina, chronic renal failure

ASA 4

- Patients with severe systemic disease that is a constant threat to life
- Has at least one severe disease that is poorly controlled or at end stage.
- Unable to walk up one flight or from parking lot; distress even at rest.
- Significant risk; too great for elective treatment. Palliative treatment only.
- = “STOP SIGN”

ASA 4 examples:

- 65 yo with symptomatic CHF, unstable angina, advanced cirrhosis of liver
- 32 yo with end-stage renal failure (on dialysis, pending kidney transplant), HTN, CHF
ASA 5

- Moribund patient who is not expected to live.
- Usually already hospitalized or in hospice care.

ASA 5 examples:

- 62 yo in ICU with multiple organ failure
- 47 wo with sepsis with coagulopathy

ASA classification made easy:

Question:
You have a 43 yo female patient, PMH: type 2 DM (HgA1c 10.3), Wt 240#, BMI 44, asthma (uses her rescue inhaler six times/week), OSA (uses CPAP), can walk up one flight of stairs, but then rests. She wants to oral “sedation” for extraction of several abscessed teeth, I&D of abscess, and cavition debridement. What ASA class would you rate her?

1. ASA 1
2. ASA 2
3. ASA 3
4. ASA 4
5. “Ask the MD, not me.”

Question:
You have a 21 yo male student, plays college soccer, smokes “1 PPD,” denies recreational drug use (but your part time scrub tech tells you privately he is reputed to “party with Ecstasy”), who wants GA for removal of wisdom teeth. What ASA class would you rate him?

1. ASA 1
2. ASA 2
3. ASA 3
4. ASA 4

Question:
You have a 87 yo male patient, PMH: s/p stroke 8 years ago (no residual), walks 2 miles/day, rides a bicycle, controlled HTN. He needs extractions and crown preps and wants sedation. What ASA class would you rate him?

1. ASA 1
2. ASA 2
3. ASA 3
4. ASA 4
Drawbacks to ASA Classification System

• Does not consider age or invasiveness of surgical procedure
• However, remains a useful basis for considering risk for sedation (and surgery) in the dental office

Question:
In general, what ASA classes would you feel comfortable giving minimal sedation (anxiolysis) to?

1. ASA 1
2. ASA 1, 2
3. ASA 1, 2, 3
4. ASA 1, 2, 3, 4

Question:
Do you (the doctor) get written, informed consent for each and every surgical procedure or sedation?

1. Yes
2. No

Informed Consent

• Administration of sedative drugs (or performing surgery) without written consent constitutes “battery.”
• It’s a process, not a piece of paper.
• Verbal and written informed consent must be given at the pre-op consultation appointment, not the day of surgery.
• Cannot be obtained once medications are administered.
• New written consent must be obtained for each procedure or sedation.
• Consent to surgery does not imply consent for sedation; sedation needs to be specified.
• Consent must be obtained by the doctor in face-to-face meeting, not a staff member.

Pre-Sedation Instructions

• Give both verbally and in writing
• Fasting (“NPO”) instructions (if needed)
• “Vested” escort to accompany patient
• Patient’s other medications?

Pre-Procedure Fasting (“NPO”)

• Only necessary if both oral sedative AND nitrous oxide together will or may be used
• Minimum 2 hours for clear liquids and 6 hours for solid food
Psychological preparation

Psychological preparation of the patient for the sedation is paramount. Explain the different types of sedation available; do not lead patient to believe they will be asleep. Tell them they will be “relaxed, drowsy, comfortable,” and “aware and in control.” Give realistic expectations to patient and explain that every patient reacts differently, and they may need more / less medication or different technique at future appointments.

Discharge Criteria

- Vital signs normal (within 20% baseline)
- Airway patency uncompromised
- Patient awake, or awake on command
- Can breathe deeply
- Protective reflexes intact (can cough on command)
- Adequate hydration, able to drink
- Patient can speak normally
- Patient can sit unaided
- Patient can walk with minimal assistance
- Responsible, “vested,” adult escort is available
- No pain, no nausea or vomiting,

Post-sedation Instructions

- Verbal and written instructions must be given to the escort upon discharge from the office
- Should include:
  - Potential and anticipated post-sedation effects
  - Limitations of activity (driving, machinery) x 24 hrs
  - Dietary precautions and suggestions
  - No alcohol, or other sedatives x 24 hrs
  - 24 hour contact number for practitioner

Minimal Sedation - Records

- “An appropriate sedation record must be maintained, including the names of all drugs administered, including local anesthetics, dosages, time of administration, and monitored physiologic parameters.”

ADA “Guidelines on Use of Sedation... By Dentists,” 2007
Record Keeping
Written sedation record should include:
• Age, height, weight, BMI
• VS: BP, HR, O2 saturation (if used)
  – Pre-op, post-op, and intra-op
• ASA class, airway eval note
• Monitors used
• Medications used and time administered
• Procedure, local anesthetic used
• Discharge: time, escort, VS, POI given
See www.fdsahome.org for sample moderate sedation record

Protocol for Administration of Oral Sedation
• Review pre-op instructions
• Check for escort
• Check for NPO status
• Doctor administers drug in office (preferred)
• Leave patient in an area under direct visual observation throughout induction
• Apply monitors, check vital signs and record
• Good local anesthesia
  • Sedation is NOT a substitute for good PAIN control
• Titrate nitrous oxide to increase sedation if needed


Question:
What do you do when the anxiolysis / sedation fails?
(Unable to continue procedure due to patient anxiety or lack of cooperation)

1. Give more medication and have the patient wait an hour
2. Reschedule patient and larger dose next time
3. Refer to IV sedation provider
4. Tell them to “hang on, we’ll be done in a few minutes.”

What if anxiolysis doesn’t work?
• Add nitrous oxide to “titrate”
• If still inadequate:
  – reschedule appointment and give PM dose pre-op,
  – give higher procedure dose as allowed,
  – refer for IV sedation or general anesthesia
• Do not administer additional oral drugs on day of appointment

What if oral anxiolysis doesn’t work?
There are patients who will require deeper sedation and some will require general anesthesia.

When to give up on oral sedation!
• 0.75 triazolam + nitrous, or
• 30 mg diazepam + nitrous, or
• 6 mg lorazepam + nitrous

If treatment cannot be started with patient cooperation using above, need a new technique, not more oral drugs.
Explain to patient: “I cannot safely administer any further medication. Do you want to continue? Or we can arrange to refer you to an anesthesia provider, or take you to hospital.”
IV Moderate Sedation

Advantages:
- Quick onset
- High degree of control of depth of sedation, highly titratable
- More predictable response
- Greater success controlling anxiety & fear
- Greater amnestic effect
- Multiple drugs and regimens available
- IV access available for rescue
- Rapid recovery / emergence

Disadvantages:
- Costs: equipment, training, permitting, CE, staff training, supplies, drugs
- Risks associated with deeper sedation: over-sedation, airway compromise
- More vigilance required, more staff, greater staff training
- IV access required; may be problem for occasional provider
- Greater time required with patient; doctor cannot leave patient

General Anesthesia

Advantages:
- Extremely phobic patients will not respond to moderate or even deep sedation, and require general anesthesia
- “Open airway” vs. “controlled airway” technique
- Office vs. surgery center vs. hospital

Disadvantages:
- Increase risk
- May need O.R. facility if medically complex patient or difficulty airway
- Intensive training requirement
  - Min. OMS residency, or
  - Two year GA residency
- Increased cost, staffing, staff training, equipment, facility,
- Complex permitting / licensing requirements

Office Preparation Protocol

Day of sedation treatment, check for R.O.A.D.S.:
- Reversal agent
- Oxygen
- Ambu-bag/ Airways
- Drugs
- Suction

Monitoring Depth of Sedation

Continually assess:
- Response to verbal command
- Response to treatment
- Orientation X3 (person, place, time)
- Eyelids (droopy) and slow or slurred speech (but this now moderate sedation)

Hazards with Minimal Sedation

- Minimal risk if maintained at “mild sedation” (“anxiolysis”) level
- Moderate sedation introduces potential airway embarrassment
- 99.9% of risks of moderate sedation are related to airway, ventilation, oxygenation
Sedation too deep!?

- If inadvertently enter moderate sedation, be prepared to:
  - discontinue dental procedure
  - manage airway, ventilate, & oxygenate as needed
  - monitor oxygen saturation
  - return patient to lighter level of sedation

Complications

- Office-based oral sedation is safe if:
  - Correct patient, drug, and dose selected
  - Patient kept conscious
  - Airway is maintained
  - “airway, airway, airway;” or, “It’s the airway, stupid”
  - Almost all morbidity and mortality from sedation is related to failure to manage the airway.
  - Monitoring is essential to recognizing problem quickly
  - Prevention is key

Airway Complications

Potential airway complications:

**Upper Airway Obstruction**
- Anatomic obstruction - oversedation, improper positioning
- Foreign body obstruction – crown, tooth, file, etc.
- Laryngospasm – secretions, water spray, blood on vocal cords
- Laryngeal edema – allergic reaction

**Lower Airway Obstruction**
- Bronchospasm – asthma, allergic reaction
- Aspiration

Airway Management 101

To successfully recognize and manage complications the provider must have skills in 4 major areas:

- Patient Monitoring
- Airway Adjuncts
- Manage Complications
- Drug Therapy

Primary Assessment “A Team Approach”

Doctor
- Look/Suction
- Head Tilt
- Chin Lift
- Jaw Thrust
- Pulse (Oximeter Probe)
- Blood Pressure

Auxiliary
- Always Provide Supplemental Oxygen
- Look
- Listen
- Feel

Airway Anatomy
Question:
Have you ever ventilated a patient, or administered CPR?
1. No
2. Yes

Question:
You are doing a quadrant of restorative dentistry on an ASA 2 patient, BMI 42, who received 0.5 mg Halcion orally 90 minutes ago. You notice that the patient does not answer when asked to open his mouth wider. What do you do?
1. Attempt to arouse the patient by poking or shaking him.
2. Let him sleep and finish your treatment.
4. Call 911
5. Reversed the sedation with flumazenil.

Question:
You notice that the patient, who has been snoring throughout your procedure, now has a pulse oximeter reading of 92%. What do you do?
1. Nothing; anything over 90 is an “A” right?
2. Check the finger sensor.
3. Start oxygen
4. Open the airway

Always perform a primary assessment
- Airway
  - Look / suction
- Breathing
  - Look / listen / feel
- Circulation
  - Pulse? Use pulse oximeter
  - BP
First things first...

- Head tilt, chin lift
- Jaw thrust
- Tongue grasp
- Turn on or turn up O2

Open the Airway:
Head Tilt - Chin lift - Jaw Thrust

APNEA!

- Ventilate with Bag-Valve-Mask
- If difficulty ventilating with BVM
  - Insert oral or nasal airway
- Call 911
  - (based on your degree of comfort managing situation)

Question:
You have opened the patient’s airway, but his chest is not rising, and he does not seem to be breathing. What do you do first?

1. Call 911
2. Perform “mouth to mouth” rescue breathing
3. Have assistant get Bag-Valve-Mask and start ventilating patient with oxygen
4. Reverse the sedation with a SL of flumazenil injection.
Bag-valve-mask ventilation

- Most effective means of positive pressure ventilation
- Squeeze 1/3 bag volume (= 600ml)
- 10 breaths / minute = one every 6 seconds
- Keep pressure below 20cm (use BVM with manometer gauge) to avoid inflating stomach
- Oxygen regulator at max (preferably use a regulator with 15 L/M capability) for optimal oxygenation

Remember:

- The “C & E” hand position
- “The seal is the deal!”

Question:
You are ventilating with the BVM, but the patient’s O2 saturation now drops to 88%. What do you do next?

1. Call 911
2. Nothing, it will come back up in a couple of minutes
3. Make sure the oxygen is turned on.
4. Insert an airway adjunct and continue ventilating.

Predicting the “Difficult Airway” for Ventilation

- Large tonsils
- Large tongue
- Edentulous
- Retrognathia
- Short “thyromental distance”
- Short / fat neck
- Limited neck mobility
- Obesity
- Facial hair / beard
- Mallampatti score 3, 4
- Limited oral opening
Advantage of nitrous “mask”:
Capable of positive pressure ventilation, with interchangeable universal anesthesia fitting!

Question:
Do you and your staff practice simulated medical emergencies?
1. Never have
2. Occasionally
3. Frequently

Aviation Disaster Research & Anesthesia Safety
Research on commercial aviation disasters revealed that failures in leadership, communication, decision making, and group awareness of the situation accounted for the majority of disasters.

“Crisis Resource Management” Training
• Developed from aviation emergency simulation training.
• Adapted to medical & anesthesia emergencies.
• Designed to train team members how to achieve effectiveness in time urgent environment under stress.
• Simulation training provides the means for teams to learn, retain, and use seldom needed, complex, high stakes skills.

Experts train for the unexpected emergency with simulation training
• Doctors and staff must regularly practice emergency management
• In a recent study, only 15% of staff could ventilate adequately
• And 50% could not operate the tank regulator to turn O2 on!

New ADSA & FDSA Courses:
“High-Fidelity Simulation Management of Complications During Sedation”
• Simulated management of sedation emergencies is now a Board of Dentistry requirement for moderate sedation and general anesthesia permits in Florida.
• FDSA will sponsor “high-fidelity” hands-on emergency simulation training yearly.
• Also available from ADSA, ADA, AAOMS.
“High Fidelity” Emergency Management Simulation Training

New ADA Hands-On Course:
“Management of Complications During Sedation”
(a.k.a. “the ADA Airway Course”)

- Given yearly at annual ADA meeting
- Emergency simulation training, with emphasis on airway management
- Designed for GPs who provide minimal and moderate sedation
- Part I: 4 hours online didactic material
- Part II: 5 hour hands-on emergency management simulation

New ARF Sedation Emergency Initiative
“Ten Minutes Saves A Life”

- Adult sedation emergency management program of the American Dental Society of Anesthesiology
- Goal: optimize patient management for ten minutes until resolution or EMS arrives
- “Ten Minutes Saves a Life” program includes:
  - Emergency training programs
  - Emergency drug kits available at “cost”
  - Emergency algorithms included in kits

Ten Minutes Saves a Life!℠ ADSA Anesthesia Research Foundation

- Practitioner chooses the drugs to place in the Emergency Drug Case and orders from distributor of their choice
- Case available at manufacturer’s cost
- Vendor supplies practitioner the drugs of choice and tracks expiration dates for practitioner

Medical Emergency Checklists
**Ventilation vs Respiration**

**Ventilation** = breathing: moving air in & out of lungs  
**Respiration** = transport and exchange of oxygen between air and cells  
**Respiratory depression** = reduced pulmonary drive from CNS over sedation  
**Ventilatory obstruction** = pulmonary drive still present, but airway is obstructed

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**Flumazenil**

- First benzodiazepine antagonist approved for clinical use in 1991  
- It is a competitive antagonist with a high affinity for the GABA(A) benzodiazepine receptor  
- Does not displace the agonist, but rather occupies the receptor when the agonist dissociates from the receptor (dynamic situation)

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**Flumazenil Indications**

- Respiratory depression secondary to benzodiazepine administration  
- Paradoxical reactions- aggressive behavior, agitation, disorientation, tachycardia, and crying  
- Over-sedation  
  - caution advised, probable re-sedation later

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**Flumazenil Contraindications**

- Hypersensitivity to flumazenil or to benzodiazepine  
- Chronic benzodiazepine therapy  
- Prior seizure disorder  
- Known or suspected tricyclic antidepressant poisoning  
- Severe liver disease  
- Known panic disorders  
- Head trauma

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**Flumazenil Dosage**

- Availability 0.1 mg/ml IV solution  
- Initial dose is 0.2 mg (2cc) IV over 15 seconds  
  - Additional 0.2 mg pm  
  - Repeat every five minutes until recovery or total of 1 mg  
- Doses of approximately .01 to 0.2 mg produce partial antagonism  
- Higher doses of 0.4 to 1.0 mg usually produce complete antagonism with usual sedating doses of benzodiazepines  
- Onset of reversal is within 1 to 2 minutes given IV  
- 80% response within 3 minutes; peak effect at 6 to 10 minutes
Re-Sedation

- Never reverse sedated patient with flumazenil just to wake them up to go home
- T1/2 of flumazenil (~30 mins) is much shorter than triazolam T1/2 (2-3 hours)
- Therefore, flumazenil will wear off before triazolam is worn off and patient will re-sedate
- Be prepared to monitor patient for at least one hour after reversal of sedation
- Re-sedation is most likely in long cases where cumulative doses have been given
- Again, flumazenil is NOT to be used post-op as routine part of sedation regimen (same with Narcan)
- Reversal agents like flumazenil and narcan are not innocuous drugs; they have their own side effects.

Flumazenil Re-sedation

- Re-sedation after reversal with flumazenil is due to its short half-life (~1 hour)
- When high benzodiazepine plasma levels are anticipated for a prolonged time, a single dose of flumazenil only generates a “window” of consciousness
- Prolonged monitoring after reversal with flumazenil is indicated since re-sedation is common

Question:
Can you inject parenteral drugs sublingually?

1. Yes
2. No
3. Sometimes

What about giving flumazenil by sublingual injection?
Will it work???

Comparison of Routes of Flumazenil Administration to Reverse Midazolam-induced Respiratory Depression in a Canine Model
Heniff MS, Moore GP, Trout A, Cordell WH, Nelson DR
Academy of Emergency Medicine, 1997 Dec; 4 (12): 1115-8

“Although reversal of respiratory depression was successful with all injection methods, the mean reversal time was significantly shorter with intravenous administration (120 +/- 25), versus sublingual administration (262 +/- 95), versus intramuscular administration (310 +/- 134) seconds.”
Sublingual Injection of Romazicon (flumazenil)

2 minutes IV vs 4 minutes SL vs 5 minutes IM!

- Sublingual injection is an intramuscular injection, just a very vascular muscle.
- Reversal of benzodiazepine with flumazenil SL injection is unreliable and too slow in airway emergency or respiratory depression.
- Practitioner must be prepared to support the airway, oxygenate, and ventilate the patient for at least 5 minutes if SL route used.

Sublingual flumazenil?

- SL injection of flumazenil is far less effective in an emergency than IV administration.
- SL = IM – (the tongue / floor of mouth is just another muscle)
- Takes 4 – 5 minutes, and if you don’t or can’t ventilate the patient, it will be too late by the time flumazenil takes effect to reverse the respiratory depression
- IV takes 1 – 2 minutes to effect

Minimal Sedation Monitoring

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel</td>
<td>At least one additional person trained in basic life support (healthcare provider level) must be present in addition to the dentist</td>
</tr>
<tr>
<td>Oxygenation</td>
<td>Color of mucosa, skin or blood must be evaluated continually. Oxygen saturation by pulse oximetry may be clinically useful and should be considered</td>
</tr>
<tr>
<td>Ventilation</td>
<td>Must observe chest excursions continually. Must verify respirations continually.</td>
</tr>
<tr>
<td>Circulation</td>
<td>Blood pressure and heart rate should be evaluated preoperatively, postoperatively and intraoperatively as necessary (unless patient is unable to tolerate such)</td>
</tr>
</tbody>
</table>

Source: ADA “Guidelines for Use of Sedation… by Dentists,” 2007

Definitions

- “Continually” – means repeated regularly and frequently
- “Continuously” – means prolonged and without any interruption

Source: ADA “Guidelines for Use of Sedation… by Dentists,” 2007

Question:

Does your office use certified dental anesthesia assistants to monitor patients during sedation?

1. Yes
2. No

Graph: 55% Yes, 45% No
AAOMS Dental Assistant Anesthesia Certification Program ("DAANCE")

- AAOMS program, open to any and all dental assistants
- 6 month self-study, doctor mentored program
  - Basic sciences
  - Patient evaluation and preparation
  - Anesthetic drugs and techniques
  - Patient monitoring
- DAANCE test upon completion
- Anesthesia assistants review courses available at AAOMS and ADSA
- Many states making mandatory for dental assistants to assistant in office sedation

Pulse Oximetry

- Means of continuously monitoring arterial hemoglobin oxygen saturation (and pulse rate)
- Hemoglobin oxygen saturation can be extrapolated from oxyhemoglobin dissociation curve to estimate blood oxygenation.
- Indispensable safeguard against unexpected hypoxemia.

Oxygen Transport

- Only 1-2% Dissolved in Plasma (PaO₂)
- 98-99% Bound to Hemoglobin

SaO₂ (arterial blood plasma oxygen)
SpO₂ (arterial Hb oxygen saturation)

Monitoring Oxygenation

- Color of patient’s blood
- Color of patient’s skin and mucosa
- Pulse oximetry

Pulse Oximeters

Effect of Age, Obesity, Health on Oxygen Desaturation
Question:
What oxygen saturation would you consider dangerous or an emergency?
1. 95%
2. 90%
3. 80%
4. 71%

Oxyhemoglobin Dissociation Curve

Pulse Oximetry

- It is NOT an early warning system!!
- It takes several minutes from onset of respiratory depression to decline in SpO2.
- Low O2 saturation is a delayed / late sign of respiratory / ventilatory problem.
- It does NOT monitor ventilation
- However, hypoventilation and / or airway obstruction are the principle causes of hypoxemiaduring sedation.

Oximetry pearls:

- Nail polish: no problem
- Cold hands: will cause problem

Suggested Reading

Texts:
- Management of Pain & Anxiety in the Dental Office; by Dionne, Phero, Becker; Saunders
- Sedation: A Guide to Patient Management; by Malamed; Mosby

Articles:
- Oral Sedation: A Primer on Anxiolysis; by Donaldson, Anesthesia Progress
- Respiratory Monitoring; Becker, Anesthesia Progress
- Recognition & Management of Complications of Sedation; by Becker, Anesthesia Progress
- Preoperative Medical Evaluation: Part 1, General Principles, Becker, Anesthesia Progress

“Oral Sedation: A Primer on Anxiolysis for the Adult Patient”

Mark Donaldson, BS,Phm, RPh, PharmD,* Gino Gizzarelli, BS,Phm, DDS, MSr,† and Brian Chanpong, DDS, MSc‡

The use of sedatives has established efficacy and safety for managing anxiety regarding dental treatment. This article will provide essential information regarding the pharmacology and therapeutic principles that govern the appropriate use of orally administered sedatives to provide mild sedation (anxiolysis). Dosages and protocols are intended for this purpose, not for providing moderate or deeper sedation levels.

Course materials available on FDSA website for course participants:

www.fdsahome.org

- Complete handout of this lecture
- "Anesthesia Progress" review articles on sedation, monitoring, emergency management, pre-op evaluation
- Board of Dentistry rule 64B5-14 (sedation & anesthesia)
- Sample dental anxiety questionnaire
- "Ten Minutes Saves a Life" emergency algorithms
- "Ten Minutes Saves a Life" emergency kit recommended contents

For Further Training:

- ADSA two day in depth seminars on oral sedation available www.adsahome.org
- Sedation courses online: http://www.dentalanesthesiaonline.com/default.aspx

IV sedation training

Where to get IV sedation training:

- Dental schools: few now provide undergraduate training
- Residency: GPR, pedo, perio, OMS
- Post-graduate CE programs:
  - ADA guideline: 2 week, 60 hour didactic, 20 live patient sedations
  - Likely will change to mini-residency requirement

IV sedation training programs

- USC School of Dentistry, Los Angeles, CA - Malamed
- Univ. Oregon School of Dentistry, Portland, OR – Reed
- Miami Valley Hospital, Dayton, OH – Becker
- Medical College of Georgia, Augusta, GA - Getter
- Duquesne University, Pittsburgh, PA – Bennett
- Montefiore Hospital, Bronx NY – O’Reilly
- Univ. of Alabama, Birmingham, AL – Louis
- Lutheran Medical Center, Brooklyn, NY
- Univ. of Alberta, Alberta, Canada – Crowell
- Etc....

Quiz:

What is the most effective route of administration of Romazicon to reverse a benzodiazepine in the event of a respiratory emergency?

1. Intravenous
2. IM deltoid injection
3. Sublingual injection

Quiz:

Which is the principal feature that distinguishes the so-called “non-benzodiazepines” (eg. Ambien) from benzodiazepines?

1. Molecular structure
2. Metabolism and half life
3. Mechanism of action
4. Sedative efficacy
Quiz:
Flumazenil can be used to reverse the action of all of the following sedatives EXCEPT:
1. Triazolam
2. Diazepam
3. Zolpidem
4. Hydroxyzine

Quiz:
Since the benzodiazepines have low toxicity and cause little “respiratory depression,” you can’t kill a patient by giving too much. True or False
1. True
2. False

In conclusion.....
If you’re going to do it, DO IT RIGHT

• If all you have is a hammer, everything looks like a nail!

• Nothing works every time. It’s important to have several techniques in your armamentarium.

• If oral sedation with nitrous oxide supplementation is inadequate for treatment, consider referral to psychotherapist for counseling, hypnosis, or guided imagery relaxation training. Or refer to another provider trained in moderate IV sedation or general anesthesia.

Words to practice sedation by:

“I do not ask my conscious sedation regimen to do more than it is capable of. That is when people get in trouble”.

Florida Dental Society of Anesthesiology

• State component of American Dental Society of Anesthesiology
• Membership open to all dentists
• Annual CE meeting
• Annual SimMan ‘hands-on’ high-fidelity sedation emergency simulation training
• Newsletter
• Advocacy for anesthesia in dentistry
• Website:
  – Scientific Articles
  – Sedation & anesthesia meeting information