

Anxiolysis in General Dental Practice

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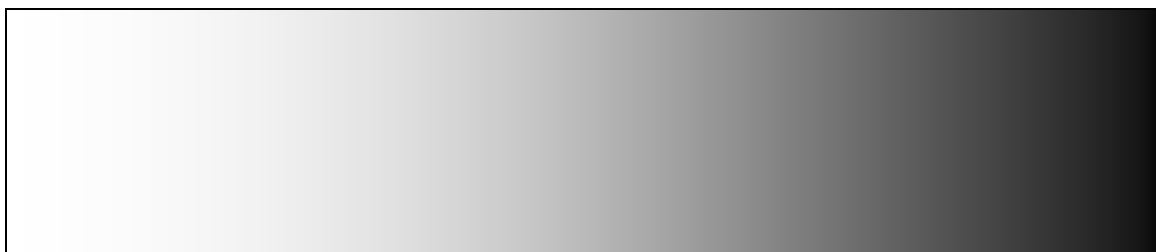
In this age of anxiety, pain control and sedation have become important aspects of dental care. It is now becoming more common for general practitioners to provide in-office sedation for routine dental procedures. A segment of the population that would otherwise not seek care because of fear or anxiety is now receiving treatment. The use of sedation for dental care has become a topic of intense interest, and many states are re-writing their regulations to require a special permit to provide this service. The intent of this article is to introduce definitions and concepts pertaining to oral sedation that may be helpful to the general dental practitioner.

There has been much debate concerning different levels of sedation, and what is appropriate for the dental office. Anxiolysis and conscious sedation are well suited for oral medications, and depending on state regulations, may be safely and effectively administered in the dental office.

The definition of anxiolysis is simply, “a reduction in anxiety”¹. More precisely stated, “...a drug induced state in which patients respond appropriately to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are unaffected”². In the spectrum of sedation, anxiolysis is the lightest level of sedation (see Figure 1). For the purpose of many state regulatory agencies, anxiolysis involves the use of a single anxiolytic drug (per day, not including nitrous oxide), in a single dose, prescribed before a patient’s appointment, and administered prior to the beginning of the dental appointment.

Figure 1.

THE SPECTRUM OF SEDATION



ANXIOLYSIS

CONSCIOUS SEDATION

DEEP
SEDATION

GENERAL
SEDATION

The anxiolysis technique must be distinguished from conscious sedation for the following reasons:

- 1. Anxiolysis is a technique that all dentists could implement. Many states (and provinces in Canada) have now developed restrictions on the use of conscious sedation by dentists, thereby limiting the ability to perform needed sedation for certain procedures. These restrictions mostly prevent dentists from administering conscious sedation without a special permit, usually one that requires training in intravenous drug administration. However, as defined above, anxiolysis is permitted in all fifty states and in Canada. (Those dentists who are interested in conscious sedation should consider continuing their sedation training and satisfy their state requirements for a conscious sedation permit).**
- 2. Anxiolysis provides a light level of sedation. A situation may arise in which the dentist and/or patient desires a lighter level of sedation than conscious sedation provides. An example may be the slightly anxious patient who states that they need the “edge taken off” in order to receive treatment. Anxiolysis could be appropriate for this situation. Many patients in general practice presently benefit from a medication given pre-operatively, ultimately helping them relax for a perceived invasive procedure.**
- 3. Anxiolysis is ideal for shorter sedation appointments. Typical anxiolysis protocol consists of an oral medication given pre-operatively. Some newer sedation medications have short durations, and when given orally, can be effective for a short appointment. If, for instance, the expected length of the procedure is 90 minutes or less, anxiolysis may be indicated. It should be noted, however, that anxiolysis may also be appropriate for longer appointments, up to and sometimes exceeding four hours.**

Indications and Contraindications for the use of anxiolysis

Indications

1. Fearful patients
2. Anxious patients
3. May be a helpful adjunct to achieving profound local anesthesia
4. Can be useful for longer appointments
5. Can be helpful during invasive procedures (e.g. endo, 3rd molar ext)
6. Patients with pronounced gag reflex

Contraindications

1. Patient who is medically unstable (e.g. angina, diabetes)
2. Patient who is medically complex (e.g. ASA III - IV).
3. Pt who has had an adverse rxn to the planned sedation medication
4. Pregnant patients
5. Elderly patients

ANXIOLYSIS VERSUS CONSCIOUS SEDATION

There is no clear demarcation between anxiolysis and conscious sedation. Theoretically, all patients pass through a lighter level of sedation (anxiolysis) before entering conscious sedation. As such, the drugs used for anxiolysis produce conscious sedation to one degree or another if given in greater dosages, or in combination with other CNS altering medications. The definition of anxiolysis involves a patient who can respond to verbal commands and maintains normal respiratory and cardiovascular function. Conscious sedation is defined as, “a minimally depressed level of consciousness that retains the patient's ability to independently and continuously maintain an airway and respond appropriately to physical stimulation or verbal command and that is produced by a pharmacological or non-pharmacological method or a combination thereof”².

Some state regulatory agencies differentiate between the two levels of sedation by the number of medications used, route of administration, or the dosage prescribed. These states may require a special permit for dentists to administer conscious sedation. The criteria for licensure can be up to 80 hours of CE as well as 20 patient experiences. States and provinces differ regarding specific regulations, so dentists should consult their state regulatory agencies for specific guidelines before performing any sedation procedure. The primary point regarding regulatory agencies is that every state and province presently allows anxiolysis without an additional permit.

With regard to procedure protocol, there are more similarities than differences between anxiolysis and conscious sedation. For example: patient assessment, airway management, monitoring, record keeping, documentation, and the verbal skills are identical. Variations relate to the method of administering the anxiolytic drug, the dosages used, and when (if any) subsequent dosages are used. For anxiolysis, the drug(s) is usually not dispensed in the office, but is prescribed in advance. The patient obtains the medication at the pharmacy and takes it as directed by the dentist.

While there are differences between conscious sedation and anxiolysis for the dental team, and in the eyes of the state board, there appears to be little difference to the patient. In other words, the patient will perceive a positive dental experience with vague memories of the visit (Anterograde amnesia is a common occurrence with certain medications, most commonly benzodiazepines), and may feel they slept through most of the procedure.

As stated previously, the providers' perception of conscious sedation versus anxiolysis may vary. The length of the appointment may be shorter with anxiolysis, as subsequent or incremental doses may not be given to maintain a conscious sedation level. In addition, with anxiolysis, the patient may be more arousable, and as a result, more challenging to manage. Patient management remains a challenge

in both the administration of anxiolysis and conscious sedation. Continuing education courses can aid the inexperienced anxiolysis provider in many aspects of patient management. Important management topics may include: internal marketing of anxiolysis, verbal skills for the sedated patient, patient selection, drug protocol selection, and keys to patient monitoring. One may also learn why some sedation patients become uncomfortable, and most importantly one will learn how to recognize and manage the sedation that does not go as planned.

ANXIOLYTIC MEDICATIONS

Benzodiazepines have become the drug class of choice for sedation in dentistry. Compared to older medications such as barbiturates, they are safer, have a shorter duration, and provide a more clinically significant reduction in anxiety. What follows is a brief description of some of the drug options.

Diazepam

Diazepam (Valium) has a long history of safe and effective use as a sedative/hypnotic agent in dentistry. This benzodiazepine produces a mild level of sleep and amnesia, and has an onset after oral administration of about 1 hour. Diazepam is metabolized by the body into several active metabolites that may also cause sedation, a characteristic that accounts for diazepam's half-life of 20-100 hours. This characteristic also makes diazepam an effective anxiolytic agent for pre-operative use the night before a dental procedure. Diazepam is supplied in 2, 5, and 10 mg tablets. The average dosage for an adult would be 5-10 mg.

Like all benzodiazepines, diazepam affects the gamma amino butyric acid (GABA) receptors in the limbic system, where it causes a reduced level of consciousness. CNS depression from diazepam (and all benzodiazepines) can be "reversed" by the competitive antagonist, flumazenil (Romazicon). Extra precautions (reduced dosage) should be taken with patients taking other CNS depressants, the elderly or debilitated patients, or when the patient is taking drugs that can influence the enzymatic metabolism of diazepam (e.g. cimetidine). Diazepam is contraindicated in pregnancy, those patients with known hypersensitivity to benzodiazepines, pediatric patients less than six months of age, and patients with acute narrow angle glaucoma³. Diazepam is an FDA-approved anxiolytic.

Lorazepam

Lorazepam (Ativan), another benzodiazepine, can produce a higher level of hypnosis (defined as the ability to cause sleep) and amnesia than diazepam. The usual anxiolytic dosages are 2-3 mg. Its oral onset of action, like diazepam, is approximately 1 hour, although its half-life is 12 to 14 hours. Unlike diazepam, lorazepam has no active metabolites, and the effects last about 6 to 8 hours. It is available in 0.5, 1, or 2 mg tablets and, like all benzodiazepines, may be reversed with flumazenil. Precautions should be taken in elderly and debilitated patients,

and those patients with impaired renal and hepatic function. Contraindications are: known hypersensitivity, pregnancy, children less than 12 years of age, and acute narrow angle glaucoma⁴. Ativan is an FDA-approved anxiolytic.

Hydroxyzine

Hydroxyzine (Vistaril or Atarax) is an antihistamine with H1 antagonistic actions. It has bronchodilatory, antisialogogic, antiemetic, muscle relaxant, antiarrhythmic, and ataractic (having a tranquilizer effect) properties⁵. Hydroxyzine is useful in reducing the dosage of narcotic and benzodiazepine requirements in preoperative sedation because of synergism. It can produce moderate levels of sleep without amnesia, and has one active metabolite. (the non-sedating anti-histamine Zyrtec [cetirizine HCl] is an active metabolite of hydroxyzine).⁶ Hydroxyzine has a rapid onset of action (15 minutes), a half-life of 3 to 7 hours, and duration of action of 4-6 hours. It is supplied in 10, 25, 50, and 100 mg caps, with an average dosage of 50 to 100 mg. It does not affect GABA receptors. While there is no specific antidote, antihistamine medications remain extremely safe with low incidence of adverse reactions⁷. When hydroxyzine is administered concomitantly with another CNS depressant, precautions should be taken. Contraindications include early pregnancy, known hypersensitivity, nursing mothers, children under 1 year, and acute narrow angle glaucoma⁷. Hydroxyzine is an FDA-approved anxiolytic.

Zaleplon

Zaleplon (Sonata), a newer generation anxiolytic, is most commonly prescribed for the short-term treatment of insomnia. It is in the pyrazolopyrimidine class, which is structurally different from benzodiazepines, yet it has been shown to affect the GABA receptor mechanism. Animal studies have shown the actions of zaleplon may be reversed with flumazenil, suggesting that this drug appears as a benzodiazepine to the body⁸. It produces high levels of sleep, along with moderate levels of amnesia. Zaleplon has a relatively fast rate of onset, half-life, and duration of action (30 minutes, 1 hour, 1-2 hours respectively). It is supplied in 5 and 10 mg tabs, with the usual dose being 10 mg. Precautions should be taken with those patients who are elderly, have hepatic impairment, or are on other medications that affect its metabolism. The major pathway for zaleplon's metabolism is the aldehyde oxidase system and the minor pathway is the cytochrome p450 system (specifically the 3A4 isoenzyme). It has no active metabolites. Zaleplon is contraindicated in children under 18 and in severely depressed patients⁹.

Triazolam

Triazolam (Halcion) has a long and well-documented record of safe and effective use as a sedative/hypnotic agent in dentistry. This benzodiazepine produces a high level of sleep and amnesia. Triazolam's onset of action is within 1 hour, with a half-life of

2 to 5 hours, and a duration of action of 2 to 4 hours. Triazolam has been described as “near ideal anti-anxiety medication”¹⁰ for oral sedation in dentistry. Despite some past problems related to over-prescribing, it remains extremely safe and effective when used properly. It has not been shown to cause respiratory depression, even at higher than normal doses¹¹, and along with midazolam, another member of the benzodiazepine family, is described as a short half-life, high potency benzodiazepine.

Triazolam is supplied in 0.125 and 0.25 mg tablets, with an average dose of 0.25 mg. As with other benzodiazepines, triazolam affects GABA receptors and is reversible with flumazenil. Cautions should be observed with elderly or debilitated patients. Contraindications include acute narrow angle glaucoma, known hypersensitivity, psychosis, pregnancy or nursing mothers, and with medications that inhibit the CYP450 (specifically 3A4) enzyme complex¹².

Midazolam

Midazolam (Versed), a short acting (1 hour) benzodiazepine, is capable of producing high levels of sleep and amnesia. It can be given orally either as a pre-mixed syrup or by injecting the medication into a liquid and swallowed (Versed should not be delivered in grapefruit juice because of the potential interaction with the cytochrome p450 enzymes.¹³) Midazolam has a half-life of 1 to 3 hours, and has no active metabolites. The usual adult dose of oral midazolam is 10-15 mg, and for children the dose is .5 mg/kg^{14, 15}. Like other benzodiazepines, midazolam effects GABA receptors, and can be reversed with flumazenil. Caution should be observed in combining midazolam with other CNS depressants. Contraindications include known hypersensitivity, acute narrow angle glaucoma, geriatric patients, and pregnant and nursing mothers¹⁶.

Nitrous Oxide (N₂O)

Nitrous oxide, an inhalation anesthetic, is the oldest anxiolytic currently in use in dentistry. It is especially useful as a supplement to other anxiolytic agents. It can produce mild sleep, with a very rapid onset of action, usually within three minutes, and has no metabolites. The effects of nitrous oxide are dependent on length of administration and concentration used. Administration of N₂O should always be followed by 100% oxygen flushing to prevent diffusion hypoxia. Nitrous oxide is not metabolized within the body and is exhaled unchanged after the termination of administration. The effects of nitrous oxide can be completely reversed by 100% oxygen. Nitrous oxide does not affect GABA receptors, and the usual adult dosage is 50% N₂O (for children 20-30%). It does not produce amnesia. Caution should be observed in patients with chronic obstructive pulmonary disease or patients that are malnourished¹⁷. Pregnancy is an absolute contraindication during the first trimester¹⁸ (nitrous oxide appears to impair B12 metabolism, which is involved in

organogenesis during the first trimester.^{19,20}) Nitrous oxide is an FDA-approved anxiolytic agent.

Additional Medications

There are many choices when selecting a drug regimen for either anxiolysis or conscious sedation. Some other drug classes which have been used for oral sedation are: narcotics, phenothiazines, barbiturates, alcohols and anxiolytics.

The most common oral narcotic for sedation is meperidine (Demerol). This medication together with the phenothiazine (Phenergan) has long been used in dentistry as a sedation regimen. Studies have shown the administration of Phenergan with Demerol enhances the sedative effects of the narcotic²¹. The principal negative effect of using a narcotic is the potential for respiratory depression.

In general, barbiturates have been replaced by benzodiazepines as sedation medications, and have been used in dentistry as an effective alternative. The most common barbiturate used for oral sedation is pentobarbital (Nembutal). Barbiturates as a drug class have a lower therapeutic index with a smaller margin of safety when compared to benzodiazepines. The potential for dangerous respiratory depression exists if these drugs are used improperly.

Chloral hydrate is perhaps the most common pediatric sedation medication used today. It is metabolized into trichloroethanol by the liver. Serious adverse events such as gastrointestinal irritation, nausea/vomiting, and respiratory depression have decreased its usage in favor of the more tolerable oral midazolam. There is no reversal agent for chloral hydrate.

With the advent of anxiolysis in dentistry, practitioners have searched for medications which decrease anxiety without causing sedation. It has been suggested that the use of anxiolytic medications could be useful to this end. The most common example is the drug buspirone (BuSpar). The major disadvantage of using this medication for oral sedation is that it must be taken for several days or weeks before clinically significant anxiolysis occurs²². For this reason, one-time dosing for oral sedation would not be effective.

Required Monitoring and Emergency Equipment

Monitoring needed

1. Pulse Oximeter

Emergency equipment

1. Oxygen Delivery System

- | | |
|------------------------|--------------------------------|
| 2. Blood Pressure Cuff | 2. Appropriate reversal agents |
| 3. Pulse | 3. Basic Emergency Kit |
| 4. Respiration Rate | |

ANXIOLYSIS PROTOCOLS

After determining that a patient is a candidate for oral sedation, the practitioner must decide on the medication(s) to be used. Each individual should refer to their state regulations on what medications can be used and how they should be administered. Typically, medications are administered in one of two ways to achieve anxiolysis. First, a medication can be given the night before to establish a blood level of the drug (and to help the patient rest comfortably), and another dose can be given one hour pre-operatively. Or, a single oral dose may be given approximately one hour before the procedure is expected to begin. Alternatively, the determination of which protocol to use is a combination of several factors: state regulations, level of a patient's anxiety, intended sedation level, type of dental procedures, and length of appointment.

Pre- and Post-Operative Instructions

Pre-op

1. Take regular medications unless specified by Physician or Dentist
2. Do not eat or drink for 8 hours prior to the dental appointment
3. Patient must be driven to the office by a responsible companion
4. No smoking or drinking alcohol for 8 hours prior to the dental appointment
5. Sedative medications must be taken according to Dentists' instructions

Post-op

1. Take all regular or prescribed medications as outlined by Physician or Dentist
2. No alcohol for 12 hours post-surgery
3. No driving for 12 hours post-surgery
4. Do not operate machinery for 12 hours post-surgery
5. Must have a responsible companion drive patient home and observe recovery
6. Phone number where Dentist can be reached must be provided

ADJUSTMENTS TO PROTOCOL FOR THE SECOND APPOINTMENT

Dosage adjustments may need to be made for subsequent appointments based on the anxiolysis experience of the first visit. A positive experience for the patient is one in which the patient achieved a level of relaxation where they could receive treatment with little or no discomfort. A typical response on a post-operative interview is, "I was so relaxed in the chair that I think I dozed off for much of the

appointment.” A positive experience for the office is one in which the patient was sufficiently relaxed so the dental team could perform the planned procedures in a timely and effective manner.

Obviously, if the first anxiolysis experience is good for both the patient and the office, then no adjustments need to be made for the second anxiety-free appointment. If however, the experience was positive for the patient, but not for the provider, then appropriate dosage changes should be made. If the experience is negative for both the patient and the office, then the patient should be reassessed for conscious sedation, or a “test appointment” is needed to allow adjustments to the anxiolytic protocol. A test appointment should be considered an appointment in which the level of anxiolysis is assessed while providing a very simple, painless procedure such as a prophylaxis.

Emergency Management for Anxiolysis

Assessment	Check monitors for malfunction Manually check patient vitals Activate EMS / Call 911
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Maintenance	ABC's
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Definitive Care	Defibrillator (AED) Reversal Agents Emergency Medications
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Discharge	Release patient to companion Send to hospital
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* Note: The most important aspect of patient discharge is releasing the patient to a responsible companion

PRESCRIPTION EXAMPLES

Below are examples of how prescriptions for anxiolytic medications could be written. Dosages would be adjusted according to the individual patient's needs:

John D. Doe, DMD <i>Anxiolytic Dental Care</i> 000 Anywhere Drive Anytown, Anystate, 00000		DEA No. _____ License No. _____ PH: 101-101-1011
NAME _____ AGE _____ ADDRESS _____ DATE _____		
Rx Valium 5 mg Disp: #1(one) Sig: Take QHS		
REFILL: NR 1 2 3 4 5 _____ DMD		

John D. Doe, DMD <i>Anxiolytic Dental Care</i> 000 Anywhere Drive Anytown, Anystate, 00000		DEA No. _____ License No. _____ PH: 101-101-1011
NAME _____ AGE _____ ADDRESS _____ DATE _____		
Rx Ativan 2 mg Disp: #1(one) Sig: Bring to dental office at time of appt.		
REFILL: NR 1 2 3 4 5 _____ DMD		

John D. Doe, DMD <i>Anxiolytic Dental Care</i> 000 Anywhere Drive Anytown, Anystate, 00000		DEA No. _____ License No. _____ PH: 101-101-1011
NAME _____ AGE _____ ADDRESS _____ DATE _____		
Rx Sonata 10 mg Disp: #1(one) Sig: Bring to dental office at time of appt.		
REFILL: NR 1 2 3 4 5 _____ DMD		

John D. Doe, DMD <i>Anxiolytic Dental Care</i> 000 Anywhere Drive Anytown, Anystate, 00000		DEA No. _____ License No. _____ PH: 101-101-1011
NAME _____ AGE _____ ADDRESS _____ DATE _____		
Rx Hydroxyzine 50 mg Disp: #1(one) Sig: Bring to dental office at time of appt.		
REFILL: NR 1 2 3 4 5 _____ DMD		

CONCLUSION

Anxiolysis, when administered properly by a trained general practitioner, can prove to be a safe and effective method of providing dental care to fearful patients. Unlike the incremental conscious sedation, no additional permit is required by state or provincial regulatory agencies. Dental anxiety has been shown to be one of the biggest obstacles to seeking needed care for patients²³. The technique of anxiolysis has proven helpful to providers and patients in overcoming this obstacle and achieving oral health.

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