

MANAGING MALADAPTIVE BEHAVIORS: THE USE OF DENTAL SEDATION FOR PERSONS WITH DISABILITIES

PURPOSE

This educational module was developed for the dentist who treats developmentally disabled people and its purpose is to familiarize the practitioner with the following areas:

- Behavior management problems
- Indications for the use of conscious sedation
- Contraindications to the use of conscious sedation
- Drugs most commonly used for sedation
- Monitoring of the sedated patient
- Documentation of the use of sedation
- Preparation for emergencies
- Referral for treatment under general anesthesia
- Legal aspects of the administration of sedative medications
- Controversies related to the use of sedation

LEARNING OBJECTIVES

Upon completion of the module, the participant will be able to:

1. Contrast various techniques of behavior management.
2. List the indications for using conscious sedation.
3. Describe the process of evaluating the patient prior to using conscious sedation.
4. Describe the elements of informed consent.
5. List the steps necessary to document that a "considered decision" was made to use sedation.
6. State which pharmaceutical agents and route of administration are most commonly used to provide conscious sedation.
7. Describe proper monitoring of the sedated patient.
8. List the elements of proper documentation.
9. Identify equipment necessary to deal with a medical emergency.
10. Describe emergency procedures.
11. Describe the process of referral for dental treatment under general anesthesia.
12. Investigate the requirements of the state board of dentistry for administration of conscious sedation.

MANAGING MALADAPTIVE BEHAVIORS: THE USE OF DENTAL SEDATION FOR PERSONS WITH DISABILITIES

INTRODUCTION

The provision of dental care for individuals with developmental disabilities often requires some form of behavior management. This can be as simple as positive reinforcement or verbal communication, however, some individuals may be so anxious or resistant during treatment that possible harm could come to the patient or dental staff and additional management techniques may be necessary. In these cases conscious sedation may be beneficial in providing dental care safely. Conscious sedation may be used alone but is more commonly used in combination with other behavioral management techniques such as physical restraints.

While reviewing this module, it is important to understand that the *occasional* use of conscious sedation to manage maladaptive behavior in the dental environment is in no way similar to the *routine* use of psychotropic medications, sometimes referred to as major tranquilizers, to manage psychotic behavior on a daily basis. For additional information regarding the use of conscious sedation, one may refer to guidelines developed by the Southern Association of Institutional Dentists which have been endorsed by the Academy for Dentistry for the Handicapped. These guidelines may be obtained by writing:

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SCOPE OF MODULE

Since the principal developmental disability encountered in our institutions is mental retardation, the need for conscious sedation to manage behavior due to this cognitive deficiency will be the primary focus of this module. However, the uncontrolled movements of some persons with cerebral palsy, also encountered in our institutions, may require similar conscious sedation techniques as well.

It must be emphasized that this module is intended as a general overview to the subject of conscious

sedation, specifically as it relates to the treatment of certain disabled individuals, and is not an exhaustive study. Certain drug information such as dose ranges and precautions are intended for general reference only.

TERMINOLOGY

- A. Conscious sedation is a minimally depressed level of consciousness that retains the patient's ability to maintain a patent airway independently and continuously, and to respond appropriately to physical stimulation and/or verbal command. The drugs and techniques used should carry a margin of safety so that unintended loss of consciousness is unlikely.
- B. Deep sedation is a controlled state of depressed consciousness or unconsciousness from which the patient is not easily aroused and which may be accompanied by a partial or complete loss of protective reflexes, including the ability to maintain a patent airway independently and to respond purposefully to physical stimulation or verbal command.
- C. **One must keep in mind that the terms sedation and dental sedation as used in this module refer to conscious sedation *only* and not to deep sedation.**

INDICATIONS FOR THE USE OF SEDATION

It would be inappropriate to believe that all persons with mental retardation will require sedation for dental treatment. In general, sedation is only indicated for those individuals presenting with extreme maladaptive behavior in the dental environment for whom less restrictive management techniques have proven inadequate. Unlike the traditional dental setting where sedation may be used to reduce stress and to allay the fear of an anxious yet otherwise cooperative patient, sedation for persons with mental retardation is used to address a severe management problem often characterized by resistant, combative, and uncooperative behavior. As mentioned previously, physical restraint may be necessary as well.

GENERAL ANESTHESIA REFERRAL

Although not necessary for most people with mental retardation, general anesthesia is a vital management tool and may prove to be the safest and the most appropriate technique for some. General anesthesia is discussed in Module 8 of this series, however here, it is important to understand the limitations of sedation and some of the considerations that would influence the decision to make a referral for general anesthesia. These include 1) behavior which can not be safely managed with sedation, 2) complex or extensive treatment needs, and 3) the physical size and medical status of the patient.

PHYSICAL ASSESSMENT

Since medical problems such as congenital heart defects, cardiovascular disease, neurologic disorders, and respiratory difficulties, frequently occur concurrently with mental retardation, and most contraindications to sedation are related to these, the physical assessment should include a comprehensive medical history and possibly a medical consultation.

■ American Society of Anesthesiologists (ASA) Physical Status Classification System

This system has come to represent a method of estimating the medical risk of a patient undergoing surgery or other treatments using sedation or general anesthesia procedures. Dentists treating patients using sedation or at times making general anesthesia referrals should be familiar with these classifications since it will facilitate communications with other medical professionals.

■ ASA Classifications

- **ASA I** These are healthy persons with little or no anxiety. Treatment modification is not warranted and they are candidates for any sedation technique and for outpatient general anesthesia.
- **ASA II** These are healthy ASA I persons with extreme anxiety and fear or are persons having mild systemic disease. Examples include: 1) non-insulin dependent diabetes, 2) well controlled epilepsy, 3) well controlled asthma, and 4) well treated hyper or hypothyroidism.

These persons generally are less stress tolerant, however, they represent minimal risk during treatment. Treatment modifications might include antibiotic coverage and shorter appointments. There

are no limitation on the use of sedative procedures and outpatient general anesthesia may be employed in selected patients.

- **ASA III** These are persons who have a severe systemic disease that limits activity but is not incapacitating. Examples include: 1) angina or previous myocardial infarction (MI), 2) post cerebral vascular accident (CVA), 3) insulin dependent diabetes, 4) congestive heart failure (CHF) with orthopnea and ankle edema, and 5) chronic obstructive pulmonary disease (COPD).

Stress tolerance is limited and stress reduction is essential. Treatment modifications might include shorter appointments and lighter sedation. Outpatient general anesthesia is contraindicated.

- **ASA IV** These are persons who have an incapacitating systemic disease that is a constant threat to life. Examples include: 1) unstable angina, 2) MI within the last 6 months, 3) blood pressure (BP) greater than 200 systolic and/or 115 diastolic, 4) severe CHF or COPD, 5) CVA within the last 6 months, 6) uncontrolled epilepsy, and 7) uncontrolled insulin dependent diabetes.

Generally, these patients have medical problems of greater significance than the planned dental treatment. Whenever possible, defer treatment until the medical condition can be improved.

- **ASA V** A moribund patient not expected to survive 24 hours without an operation.
- **ASA E** Emergency operation of any variety; E precedes the number indicating the patient's physical status (e.g., ASA E-III)

One should be mindful that the majority of persons with mental retardation in institutions fall into classification ASA II to ASA IV.

<p>Table 1 <u>Time of Onset</u> PO 30 min IM 10-15 min IV 1 min INHAL 2-3 min</p>

<p>Table 2 <u>Peak Clinical Effect</u> PO60 min IM30 min IV1-20 min INHAL 3-5 min</p>

<p>Table 2 <u>Duration</u> PO 2-3 hr IM 2-4 hr IV 45 min INHAL varies</p>

<p>Table 4 <u>Depth of Sedation</u> PO cannot easily increase or decrease IM cannot easily increase or decrease IV can easily increase but not decrease INHAL can easily increase or decrease</p>

ROUTES OF ADMINISTRATION

The most commonly used routes of drug administration in dentistry are oral, intramuscular, intravenous, and inhalation. The rectal route, at times used with small children, will not be discussed. Tables 1-4 offer a comparison of the four common routes.

■ Oral Route

The oral route is the most commonly used route of drug administration with the primary advantages of ease and low cost. Lack of predictability is the primary disadvantage since the sedation level is not reached through titration. The oral route is most effective with mild management problems where only light sedation is required. Parenteral routes should be employed for more severe management problems.

■ Intramuscular Route

The IM route is commonly used with extremely uncooperative patients and when venipuncture is not possible. The primary advantages over the oral route are reliability and rapid onset of the sedative effects. The necessary injection and the inability to titrate the dosage are the primary disadvantages.

■ Intravenous Route

The IV route is commonly used with extremely uncooperative patients, providing venipuncture procedures are possible. Advantages include rapid onset, titration of dosage, a shorter recovery time, effectiveness, and the maintenance of an open vein in case of an emergency. The primary disadvantage is the more delicate venipuncture procedure.

■ Inhalation Route

Inhaled nitrous oxide and oxygen, when used alone, have only limited indications for most dental management problems since only light levels of sedation are achieved. For most dental management problems, inhaled nitrous oxide and oxygen is used in conjunction with other sedation techniques. Some degree of cooperation is required to insure proper gas inhalation and this limitation has even greater significance with mouth breathers.

DRUG CATEGORIES

Drugs for dental sedation fall into four categories. Table 5 offers a summary of the common sedative drugs use in dentistry.

Table 5
Common Sedation Agents

Generic Name	Propr. Name	Category	Class	Route of Adm
secobarbital	Seconal	SH	barbiturate	PO,IM,IV
alprazolam	Xanax	AA	benzodiazepine	PO
diazepam	Valium	AA	benzodiazepine	PO,IM,IV
lorazepam	Ativan	AA, SH	benzodiazepine	PO,IM, IV*
triazolam	Halcion	SH	benzodiazepine	PO
midazolam	Versed	AA	benzodiazepine	IM,IV
promethazine	Phenergan	AH	phenothiazine	PO,IM,IV
chlorpromazine	Thorazine	AP	phenothiazine	PO,IM
hydroxyzine	Vistaril	AH	diphenylethane	PO, IM, IV*
meperidine	Demerol	AN	narcotic	PO*,IM,IV
Chloral Hydrate	Noctec	SH	Alcohol	PO

Key: AA – anti-anxiety, SH – Sedative-hypnotic, * – not recommended
AH – antihistamine, AN – Analgesic, AP – antipsychotic

■ Sedative-hypnotics

These agents produce either sedation or hypnosis depending upon dosage. Sedative-hypnotics are commonly classified as either barbiturates or non-barbiturates.

• Barbiturates

These drugs are capable of producing levels of CNS depression up to and including death. Disadvantages include respiratory and cardiovascular depression, tolerance, GI disturbances, drug interactions, and addiction. Pentobarbital (Nembutal) and secobarbital (Seconal) are occasionally used in dentistry today.

The medical history of patients receiving barbiturates should be checked for the following: a) allergy, b) uncontrolled pain, c) known addiction to sedative hypnotics, d) porphyria, e) family history of intermittent porphyria, f) respiratory disease where dyspnea or obstruction is present, and g) severe hepatic dysfunction.

• Non-barbiturates

The two classes of non-barbiturate sedative-hypnotics are the benzodiazepines and the carbamates. The carbamates are less potent than the barbiturate and have many of the same disadvantages. They are infrequently used for dental sedation and will not be discussed. The benzodiazepines are not as potent as the barbiturates but are very popular for sedation since they do not have the same degree of potential hazards. Benzodiazepines commonly used in dentistry as sedative-hypnotics are triazolam (Halcion) and lorazepam (Ativan).

The medical history of patients receiving benzodiazepines should be checked for the following: a) allergy or hypersensitivity to benzodiazepines, b) glaucoma (untreated), and c) phlebitis, thrombophlebitis.

■ **Antianxiety Agents**

These agents include the carbamates and the benzodiazepines. They produce a mild degree of sedation without impairing mental alertness or psychomotor performance.

As previously mentioned, the carbamates are rarely used in dentistry and will not be discussed. Benzodiazepines commonly used in dentistry as antianxiety agents are diazepam (Valium), midazolam (Versed), and alprazolam (Xanax).

The medical history of patients receiving benzodiazepines should be checked for the following: a) allergy or hypersensitivity to benzodiazepines, b) glaucoma (untreated), and c) phlebitis or thrombophlebitis.

■ **Antihistamine Agents**

Sedation and hypnosis are known to develop as side effects of some drugs that are used primarily for other purposes. This is true with two antihistamine agents, used primarily for treatment of allergy, motion sickness, and Parkinsonism. These antihistamines are promethazine (Phenergan) and hydroxyzine (Vistaril). Promethazine (Phenergan), in particular, has proven especially useful in dental sedation.

1. Promethazine (Phenergan)

Promethazine is a member of the antipsychotic group of drugs termed phenothiazines. The action of this drug is different from the barbiturates and other sedative hypnotics. It has less tendency to produce unconsciousness, respiratory and cardiovascular depression, or addiction. In general, promethazine (Phenergan) is a safe drug having a high therapeutic index and limited risk of extrapyramidal side affects. It is often used in combination with other sedative drugs and is useful in the management of nausea and vomiting.

The medical history of patients receiving promethazine (Phenergan) should be checked for the following: a) allergy or hypersensitivity to promethazine, b) glaucoma, c) prostatic hypertrophy, d) stenosing peptic ulcer, and e) bladder neck obstruction.

2. Hydroxyzine (Vistaril)

Hydroxyzine (Vistaril) is derived from a group of drugs called diphenylethanes and has lesser sedative effects than promethazine (Phenergan). In addition to their sedative qualities,

these drugs are antiemetic, antispasmodic, and anticholinergic.

■ **Narcotic Analgesics**

Although classified as analgesics, one drug in this category, Meperidine (Demerol), is commonly used for dental sedation. It is usually used in combination with nonnarcotic CNS depressants to produce a more profound depth of sedation.

The medical history of patients receiving meperidine should be checked for the following: a) allergy or hypersensitivity, b) monoamine oxidase (MAO) inhibitors, c) asthma, and d) COPD and decreased respiratory reserve.

■ **Other Occasionally Used Agents and Emerging Drug Regimens**

Although it is recommended that dentists limit their sedative regimens to a few drugs and routes of administration with which they are familiar and comfortable, there are other sedative drugs that invite attention. Propofol (Diprivan) is one drug used intravenously that appears equal to or superior to IV midazolam (Versed) in many recent studies. Liquid (injectable form) diazepam (Valium) has been prescribed orally having a somewhat shorter onset than tablet form. Ketamine, formerly used as a disassociative general anesthetic and in lower doses as an intramuscular sedative, especially with children, is acquiring more attention in the oral form (given with juice to mask the bitter taste) or as a nasal spray. Midazolam (Versed) as a nasal spray also has proven effective as a sedative agent. Most recent studies show oral triazolam (Halcion) superior to diazepam (Valium).

The dentist using conscious sedation with this population should keep apprised of the current literature (see Module 14), and although continuing a cautious approach using well proven selective drug regimens, should not ignore new drugs and innovative applications. The experienced clinician is often surprised when a patient, who has been refractive to several sedative drugs, is successfully treated using another agent, even within the same drug class.

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SEDATIVE DRUGS AND THEIR ROUTES OF ADMINISTRATION

■ Drugs Employed via Oral Administration

Numerous drugs with sedative properties are available for PO administration (see table 5). Narcotic agonists such as meperidine (Demerol), although widely used for their sedative properties via IM or IV routes, are not indicated for PO sedation. The use of oral meperidine should be limited to pain control. Antihistamines such as promethazine (Phenergan) or hydroxyzine (Vistaril) may be use orally, especially in pediatrics. Barbiturates may be used but present numerous disadvantages. The benzodiazepines, offering both sedative- hypnotic and antianxiety agents, represent the overwhelming majority of oral drugs administered for sedation. Frequently, diazepam (Valium) is administered for mild management problems and triazolam (Halcion) is administered for more moderate management problems.

Dosage: Proper oral dosage must be estimated through an evaluation of the patient's medical history, age, weight, previous drug reaction, degree of anxiety, and level of desired sedation. Package inserts may be used as a guide, however these ranges are based on sedation in a stress free environment and these doses may not be adequate to manage the stresses induced during dental treatment. Titration of dose is not possible, however, titration over two or three visits may allow the appropriate dosage to be achieved.

■ Drugs Employed via Intramuscular Administration

As with the PO route, numerous drugs with sedative properties are available for IM administration (see table 5) and may be considered in two groups. Group I are the nonnarcotics and consists of the benzodiazepines, antihistamines, and barbiturates. Group II are the narcotics. Table 6 offers a summary of these groups and their utilization in combination.

1. Group I (nonnarcotic)

When used alone, drugs in Group I safely provide light to moderate levels of sedation and are indicated for patients presenting with lesser degrees of fear or anxiety.

The benzodiazepines are preferred to the barbiturates because of the adverse effects frequently seen with the barbiturates. Benzodiazepines commonly administered IM include

1) diazepam (Valium), 2) lorazepam (Ativan), and 3) midazolam (Versed). Lorazepam (Ativan) is a very long lasting drug and is rarely indicated for outpatient use. Diazepam (Valium) is absorbed rather inconsistently and can cause tissue irritation. Therefore, it should be administered deep into the muscle. Midazolam (Versed) is water soluble, rapidly absorbed, produces little tissue irritation, and is highly effective.

The antihistamines are less commonly used IM. Promethazine (Phenergan) is a reliable agent having a longer duration than diazepam or midazolam. Hydroxyzine (Vistaril) should be injected deep into the muscle due to its potential for tissue irritation.

2. Group II (narcotic)

Meperidine (Demerol) is the most commonly used narcotic in this group and has the potential for respiratory depression. When used alone, its primary effect is analgesia and not sedation. Therefore, it should be used in combination with other drugs.

3. Combinations

Combinations of drugs from Groups I and II are frequently used to provide more profound levels of sedation. Thorazine and Phenergan are often used in combination with Demerol and the doses must be carefully adjusted due to the potentiating effect of respiratory depression.

Dosage: The dosage of drugs administered IM is derived from a careful calculation and consideration of the following factors: 1) body weight, 2) degree of anxiety, 3) level of sedation desired, 4) concurrent medications, 5) previous sedation history, 6) practitioner experience.

Complications: In addition to drug related complications, other potential complications include injection site problems such as: 1) nerve damage, 2) intra-

Table 6

Drug Group	Recommend	Expected Sedation
(I) alone (benz.)	high	light to moderate
(I) alone (barb.)	low	moderate to deep
(II) alone (narcotic)	low	moderate to deep
(I) and (II)	high	moderate to deep

vascular injection, 3) air embolism, 4) periostitis, 5) hematoma, 6) abscess, 7) cyst and scar formation, and 8) necrosis and tissue sloughing.

■ **Drugs Employed via**

Intravenous Administration

As with the PO and IM routes, numerous drugs with sedative properties are available for IV administration (see table 5). Drug precautions and contraindications are the same as in the other routes of administration. Table 7 at the end of this section offers a summary of common IV sedative agents and their usual duration and average sedative dose.

1. Benzodiazepines

Diazepam (Valium) and midazolam (Versed) have similar characteristics. Lorazepam (Ativan) may be administered IV, however, it is not recommended due to its long time of onset resulting in the inability to titrate the dose.

2. Barbiturates

Secobarbital (Seconal) is the only barbiturate which has retained much popularity for sedation. It has a very long duration time.

3. Antihistamines

Promethazine (Phenergan) fills the void between the duration of less than one hour of Valium and Versed and the two to four hour duration of Seconal.

4. Narcotics

Meperidine (Demerol) is commonly administered IV in combination with other drugs such as the benzodiazepines or the antihistamines for the additive effect.

■ **Common Sedation Regimens**

• **Nitrous Oxide and Oxygen**

Advantages include:

1. Extremely safe, utilized in most pediatric dental practices.
2. Raises the pain threshold which is especially useful in procedures creating minor discomfort, such as prophylaxis.
3. Easily administered and is quickly absorbed and released by the patient.
4. Easily, effectively, and safely augments other sedative medications.
5. Often assists in venipuncture procedures.

Disadvantages include:

1. Has limited effectiveness when used alone with moderate to severe management problems.

**Table 7
Commonly used IV Sedation Drugs**

Generic Name	Proprietary name	Duration	Avg sedative dose (mg)
diazepam	Valium	45 min	10-12
midazolam	Versed	45 min	2.5 - 7.5
secobarbital	Seconal	2 - 4 hrs	100 - 150
promethazine	Phenergan	1 - 2 hrs	25 - 35
meperidine	Demerol	30 - 45 min	37.5 - 50

2. Can generate nausea when used for prolonged periods and at higher concentrations.
3. Can potentiate sedative effect of other drugs.
4. Major equipment costs.

• **Valium (PO)**

**Typical dose: 10-35 mg (.15mg to .5 mg/kg)*

Advantages include:

1. Extremely safe (LD50 is 2000-5000 mg)
2. Easy route of administration.
3. Effective as a muscle relaxant which is additionally helpful with persons with cerebral palsy.
4. Reversal agent available.

Disadvantages include:

1. Has limited effectiveness with severe management problems but has probably been employed in too low dosage.
2. No analgesic properties.

• **Valium (IM)**

**Typical dose: 10-20 mg (.2 to .3 mg/kg)*

Advantages include:

1. Very safe drug.
2. Easy to handle.
3. May be appropriate for patients who will not take medication PO reliably.
4. Reversal agent available.

Disadvantages include:

1. Injection causes discomfort.
2. No analgesic properties.

• **Valium (IV)**

**Typical dose: 10-20 mg (.2 to .3 mg/kg)*

Advantages include:

1. Very safe drug.
2. Easy to handle.
3. May be appropriate for patients who will not take medication PO reliably.
4. Can be titrated at each appointment to obtain desired level of sedation.
5. Reversal agent available.

Disadvantages include:

1. May cause phlebitis if not flushed with saline solution.
2. May cause local irritation and special caution should be employed when using small veins such as those on dorsum of hand or wrist.

3. No analgesic properties.

• **Chloral Hydrate (PO)**

(1000-2500 mg)

**Typical dose: 500-1000 mg (10 to 25 mg/kg)*

Advantages include:

1. Safety.
2. Ease of administration.

Disadvantages include:

1. Very limited effectiveness with moderate to severe management problems.
2. When used alone, has not proven very effective for adults with mental retardation.

• **Seconal (PO)**

**Typical dose: 100-300 mg (2 to 6 mg/kg)*

Advantages include:

1. Easy to administer.
2. May be useful as adjunct to chloral hydrate.

Disadvantages include:

1. Respiratory depression.
2. Decreases pain threshold.
3. May cause nausea.

• **Demerol/Phenergan/Thorazine Combination (IM)**

**Typical dose : Demerol 50-75 mg (1.5mg/kg)*

Phenergan 25-35 mg (1mg/kg)

Thorazine 25-35 mg (1mg/kg)

Advantages include:

1. Raises the pain threshold.
2. Many dental practitioners have considerable experience with this drug combination.
3. This combination has a proven record of success with many patients.

Disadvantages include:

1. Demerol has significant respiratory depressant properties.
2. Thorazine can cause postural hypotension.
3. Thorazine has a long half-life.

• **Demerol/Phenergan Combination (IM)**

**Typical dose: Demerol 50-75 mg (1.5mg/kg)*

Phenergan 25-50 mg (1mg/kg)

Advantages include:

1. Eliminating Thorazine eliminates the hypotension side effect and the long half-life.

Disadvantages include:

1. The effectiveness of this combination is reduced with the removal of the Thorazine for some patients.

• **Ativan (PO)**

**Typical dose: 2-6 mg (.05 mg/kg)*

Advantages include:

1. In single high dose, Ativan has a tranquilizing action of the CNS with no appreciable effect on the respiratory or cardiovascular system.
2. Shorter half-life than Valium.
3. Reversal agent available.

Disadvantages include:

1. Practitioners have limited experience with this drug and may have been administering an inadequate dose.

• **Ativan (IM)**

**Typical dose: 1-4 mg (.05 mg/kg)*

Advantages include:

1. Very safe drug with little or no respiratory depression.
2. Does not enhance respiratory depressant effect of Demerol.
3. Reversal agent available.

Disadvantages include:

1. Practitioners have limited experience with this drug and may have been administering an inadequate dose.

• **Versed (IM)**

**Typical dose: 5-8 mg (.07 to .1 mg/kg)*

Advantages include:

1. Shorter half-life than Valium or Ativan.
2. Less discomfort than Valium upon injection.
3. More rapid onset of sedation than Valium or Ativan.
4. Reversal agent available.

Disadvantages include:

1. Variability of absorption rate.
2. Practitioners have limited experience with this drug.
3. Cost.

• **Versed (IV)**

**Typical dose: 2-8 mg (.03 to .1 mg/kg)*

Advantages include:

1. Shorter half-life than Valium.
2. Dilutes with saline solution.
3. May use in small veins such as the dorsum of the hand.
4. Less chance of phlebitis than Valium.
5. Can be titrated on each appointment to obtain the desired level of sedation.
6. Reversal agent available.

Disadvantages include:

1. Cost.
2. Practitioner experience with this drug is less than with Valium.

***NOTE:** Typical dose ranges and dose/kg relate to healthy adolescents and adult persons with mental retardation and are provided as a general reference only. The prescribing dentist must consider many factors when selecting drug doses for a patient.

PATIENT MONITORING

Patient monitoring is an issue that blends clinical circumstance and judgement, and individual state regulations. Therefore, it is important that the regulations pertaining to your individual state and institution be observed.

Adequate monitoring of a patient undergoing sedation procedures will permit early recognition of potential problems and personnel with monitoring responsibility must be adequately trained. **In all instances, monitoring of a sedated patient's consciousness and responsiveness must be continuous and at no time should the sedated patient be left unattended.** When patient behavior permits, blood pressure, heart and respiratory rates should be monitored and recorded at specific intervals determined by the individual attending practitioner. This monitoring process may be performed by visual, mechanical or electronic means. However, many patients present combative, aggressive and generally uncooperative behavior which renders recording of vital signs impossible and meaningless. Thus the practitioner should utilize other means to measure his patient's consciousness/responsiveness. If a restraint device is used which covers the patient, a hand or foot should be exposed and these devices should be periodically checked to prevent restriction of respiration or circulation. The patient's head position should be checked frequently to ensure a patent airway.

If sedation is given outside the dental clinic, e.g. on the residential unit, proper monitoring should continue from the time sedation is given until the patient arrives at the dental clinic. This is in addition to postoperative monitoring.

DISCHARGE PROTOCOL

Patients who have been sedated for dental procedures must be evaluated by the attending dentist before being returned to the living area and each living area should develop a protocol for the care of patients who have undergone these procedures. Any special orders and/or precautions for the nursing staff must be forwarded to the living area. Upon return, these patients will require special care in the living area, preferably overseen by a registered nurse. Depending on the level of sedation and the patient's overall medical condition, it may be appropriate to monitor vital signs. Patient monitoring (vital signs if appropriate) should continue during the entire period that the sedative drug is affecting the patient's ability to function independently. **Living area staff should notify the appropriate medical personnel if the patient becomes unresponsive to verbal or tactile stimuli, begins vomiting, shows signs of labored breathing, or begins to aspirate.**

The institution and the dental program should have implicitly clear guidelines as to who is responsible for patient monitoring; the level and extent of training needed for proper monitoring (e.g. LPN, RN) and the setting (e.g. quiet rooms, special recovery areas) and equipment needed (e.g. pulse oximetry) for proper patient monitoring from the time the patient receives the medication pre-operatively to the time when the patient is fully recovered. It is generally thought that most direct care personnel are not adequately trained to monitor heavily sedated patients. It should also be remembered that the decision that a patient is fully recovered may be modified if a reversal agent has been used.

INFORMED CONSENT

Informed consent is an important issue and requirements may vary from state to state. Therefore, it is important that regulations pertaining to your individual state and institution be observed.

The dental practitioner should discuss the dental sedation and the necessary treatment with the patient/parent or guardian and this discussion should be

documented in the dental chart. Possible complications should be included as well. The need for a separate informed consent should not be necessary for each visit, choice of drug, dose, or route of administration, unless the patient/parent or guardian has requested this. (For additional information, refer to Module 13 of this series for further discussion of consent issues)

SEDATION RECORD

Documentation is another area where requirements may vary depending upon your location and the local requirements must be observed.

A written record must be prepared for each patient during the administration of sedative drugs. Adequate record keeping will help reconstruct events that occurred during a sedation procedure, provide information regarding a patient's prior response to certain drugs, and prove invaluable from a medical-legal standpoint. The record should remain with the dental chart as part of the permanent record. In general, these notes should include drug dose, route of administration, effectiveness of sedation, suggestions for future drug/dose, complications, the status of alertness or responsiveness of the patient upon discharge (including vital signs if possible), and any instructions given to parents/guardians or living area staff. All entries must be dated, signed, and titled by the dentist.

As part of the sedation record process, each facility should have a sedation evaluation program to track sedation successes, failures, and side effects. A system must be in place where adverse events or drug reactions will trigger a medical review.

EMERGENCY PREPAREDNESS

It is the responsibility of the individual dental practitioner who utilizes any type of sedation to be competent in the management of emergency situations which may be experienced by the patient. These competencies include: a) maintaining an adequate airway, b) administering oxygen, c) providing cardiac and/or pulmonary resuscitation, and d) activating emergency medical services. Equipment must be available which is appropriate for the sedation technique being used. The dentist administering the sedation must assure the accessibility and proper function of this equipment.

The dental facility shall have a positive pressure oxygen delivery system that is capable of administer-

ing greater than 90% oxygen at a 5 liter/minute flow for at least 60 minutes. This equipment should accommodate both children and adults. If the facility provides nitrous oxide/oxygen sedation, this equipment should provide a maximum of 100%, and never less than 20% oxygen concentration at a flow rate appropriate to the patient's needs. It should also have a fail-safe system which is checked regularly.

An emergency cart or kit must be readily accessible and must include the necessary drugs and equipment to resuscitate a non-breathing and unconscious patient, and to provide continuous support while that patient is being transported to a medical facility. The drugs contained on the emergency cart should be checked and maintained regularly.

It is suggested that all office personnel be trained in the recognition and management of life-threatening situations, including certification in cardiopulmonary resuscitation preferably with an annual update. In addition to what has previously been mentioned, it also recommends that an emergency management team be organized, that emergency drills be conducted regularly, and that an annual review of emergency medications be performed.

CERTIFICATION

Most states now require certification for the use of sedation and have adopted the new guidelines established by the American Dental Association. Soon it may be necessary to complete a residency program to obtain a sedation permit and institutions may have difficulty recruiting dentists with these qualifications. There is concern that some institutions will cease to provide this important management modality.

CONCLUSION

General principles of conscious sedation for persons with developmental disabilities have been presented. No effort has been made to be inclusive of all behavior management techniques, indications for sedation or general anesthesia, sedative drugs and dosage, and sedation techniques. The treatment of persons with developmental disabilities using conscious sedation is a team process including the dentist, the physician, and others involved in the patient's care. The patient's overall physical condition, current medications, and previous sedation experiences must be considered. Principles of pharmacology must be observed. Drug interaction must be considered. It is recommended that dentists limit themselves to only a

few drugs so that total knowledge of those drugs will be obtained.

Institutions must assure that patients are managed in a safe and properly equipped environment and that dentists with the necessary competencies in sedation techniques are recruited. Dentists without these competencies should have special training to gain these vital skills. Today more than ever, dentists who are experienced in the use of sedation are greatly needed in our institutions.

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