THE DENTAL CLINICS OF NORTH AMERICA

Dent Clin N Am 46 (2002) 767–780

Conscious sedation for dentistry: risk management and patient selection

Douglass L. Jackson, DMD, MS, PhD[a,*], Barton S. Johnson, DDS, MS[b]

[a]*Department of Oral Medicine, University of Washington School of Dentistry, B412 Health Sciences Building, Seattle, WA 98195, USA*

[b]*Departments of Restorative Dentistry and Hospital Dentistry, University of Washington School of Dentistry, Seattle, WA 98195, USA*

Despite the many advances in pain control that have expanded our abilities to perform a wide range of dental treatment in a pain-free environment, many adult dental patients still have a great deal of fear about treatment-evoked pain. Discussions about conscious sedation, and possibly general anesthesia, seem to be appropriate in developing treatment plans for this population of fearful patients. Are there other adult populations that also may benefit from sedation during dental treatment? For example, what about the developmentally disabled adult who is unable to cooperate with the dental treatment team, thus decreasing the efficiency and safety of delivering dental treatment? Or what about the adult with a medical history of angina that can be precipitated by moderately stressful events like intraoral injections of local anesthesia? These two examples should suggest that there are other patient populations that would also benefit from sedation during dental treatment.

Given the unpleasant nature of many dental procedures, one could argue that sedation is used too little in the practice of dentistry. In contrast, many disciplines of medicine use some sort of sedation when performing procedures that can be considered simple and less stressful when compared with many dental procedures. There are clearly several situations in which local anesthesia alone may be insufficient to deliver dental treatment. In some cases the use of parenteral sedation (ie, intramuscular and intravascular) or general anesthesia may be among the pharmacologic methods for consideration as treatment adjuncts. Advanced clinical training and licensing is

* Corresponding author.
E-mail address: jacksond@u.washington.edu (D.L. Jackson).

PII: S0011-8532(02)00034-4

required to deliver parenteral sedation and general anesthesia, however. Additionally, some parenteral sedation techniques and general anesthesia depress the patient's level of consciousness to a point at which several significant risks arise that need to be considered. We would like to suggest that nitrous oxide/oxygen (N_2O/O_2) inhalational sedation and enteral (oral) sedation with a single pharmacologic agent are two additional conscious sedation techniques that can be used by most dental practitioners with reasonable success. Unlike parenteral sedation and general anesthesia, the amount of advanced training required to administer N_2O/O_2 inhalational sedation and enteral sedation with a single pharmacologic agent is considerably less, and the margin of safety is much greater.

The goal of this article is to review the many aspects of risk management that need to be considered when using N_2O/O_2 inhalational sedation and enteral sedation in adults and children. Understanding the regulations and guidelines that need to be followed when delivering conscious sedation greatly increases the margin of safety. This article reviews the definitions and guidelines for delivering conscious sedation, establishes the criteria for selecting appropriate patients, and discusses the many aspects of clinical preparedness. These risk management discussions are applicable to the following two articles in which N_2O/O_2 inhalational sedation and enteral sedation in adults and children is discussed, and the remaining article in this section that reviews emergency drugs and their use in dental situations.

Definitions

The anxiety evoked by dental treatment can be successfully controlled by slightly depressing the level of consciousness in many patients. For these patients, the use of conscious sedation may be appropriate. Before engaging in a comprehensive review of N_2O/O_2 and enteral sedation for any dental patients, however, it is important to be familiar with some definitions that establish the guidelines for keeping sedation safe. The House of Delegates of the American Dental Association (ADA) has adopted a policy statement and guidelines for the use of sedation and general anesthesia in dentistry [1]. Although the ADA's guidelines provide a reasonable foundation for defining the scope of anxiety and pain control in the practice of dentistry, most states also have published a modification of these guidelines to meet their individual needs. The guidelines of most states are similar to those adopted by the ADA, but we recommend that all dentists review the exact guidelines they are expected to follow.

The ADA's House of Delegates has provided definitions for sedation and general anesthesia (see box below). The House of Delegates defines *conscious sedation* 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

Definitions of sedation and general anesthesia

Conscious sedation

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 pharmacologic or nonpharmacologic method or a combination thereof.

Deep sedation

An induced state of depressed consciousness accompanied by partial loss of protective reflexes, including the inability to continually maintain an airway independently and/or to respond purposefully to physical stimulation or verbal command, and that is produced by a pharmacologic or nonpharmacologic method or a combination thereof.

General anesthesia

An induced state of unconsciousness accompanied by partial or complete loss of protective reflexes, including the inability to continually maintain an airway independently and respond purposefully to physical stimulation or verbal command, and that is produced by a pharmacologic or nonpharmacologic method or a combination thereof.

ADA Policy Statement on Use of Conscious Sedation, Deep Sedation and General Anesthesia in Dentistry; as adopted by the American Dental Association House of Delegates, October 2000.

that is produced by a pharmacological or non-pharmacological method or a combination thereof'' [1]. The drugs and techniques that are acceptable for producing conscious sedation should have a reasonably large therapeutic index, making it unlikely that the patient will lose consciousness [1]. Depressing the level of consciousness to the point at which the patient's only response is a reflex withdrawal from painful stimulation is well outside of the range of conscious sedation and is to be avoided. Conscious sedation is NOT to be used as a way to reduce pain during dental treatment! Local anesthesia is still required as the principle means for eliminating the sensation of orofacial pain during treatment. Conscious sedation may make the process of local anesthetic administration much more acceptable to the patient, however.

In contrast, the ADA defines *deep sedation* as ''an induced state of depressed consciousness accompanied by partial loss of protective reflexes,

including the inability to continually maintain an airway independently and/or to respond purposefully to physical stimulation *or* verbal command…'' [1]. Deep sedation is similar to *general anesthesia*, with the only difference being that a state of unconsciousness is induced with general anesthesia.

It should be clear from these definitions that maintaining a certain level of responsiveness in which the patient is capable of responding appropriately to stimuli is an important safety consideration in conscious sedation. As long as the patient maintains this level of consciousness there is a high degree of safety with any chosen sedation technique. Once protective reflexes become compromised, especially the ability to maintain and clear one's airway, the person providing the sedation assumes a greater responsibility for the patient's well-being and must have the appropriate training and certifications to do so.

Patient selection and preparation

Physical assessment

An important step in determining whether any patient is a candidate for conscious sedation of any type is to have a thorough and current written medical history. This comprehensive medical history should include a review of the major physiologic systems (ie, cardiovascular, respiratory, central nervous, endocrine, hepatic, and renal). Particularly close attention should be given to the central nervous, respiratory, and cardiovascular systems because the actions of sedative agents and the physiologic responses to stress may have profound effects on these three specific systems. Information about the hepatic and renal systems provides valuable information about the patient's ability to effectively metabolize and eliminate certain medications that require these organ systems for their deactivation. Careful assessment of the central nervous system function alerts the dentist to disease processes (eg, seizure disorder) or medical therapies that may have an impact on the selection and dosage of sedative agents (eg, depression). Finally, the medical history must include a current list of all prescription and over-the-counter medications (including ''herbal,'' ''alternative,'' or ''complimentary'' medications) that are taken by the patient, and any drug allergies and unpleasant side effects. It is prudent to extend the inquiry about medications to include any that may have been discontinued within the last 6 months.

Most clinicians ask their patients or the patient's guardian to complete a written health questionnaire. The completed questionnaire should be reviewed with the patient to verify specific responses, obtain more in-depth information, and make sure that all the questions were understood by the person completing it. The medical history should be updated at a minimum of every 6 months. It also is wise to inquire at each appointment whether there have been any changes to the history since the last visit.

A basic physical inspection of the patient also provides valuable information that may be useful in making determinations about whether conscious sedation can be used safely. Besides looking for obvious physical signs that are suggestive of systemic conditions (eg, shortness of breath in response to minimal physical exertion, distended jugular veins when seated, the scent of acetone on the breath), observe the patient for signs of fear (eg, sweaty palms, nervous tremor in the voice). Included in this initial physical assessment of the patient are their baseline vital signs, consisting of blood pressure, heart rate, respiratory rate, and temperature. Because the dosages of some sedative medications depend on the patient's weight, information about their height and weight should also be recorded. Besides measuring and recording vital signs at the initial screening appointment, it is recommended that the vital signs be measured and recorded immediately before administering any sedatives or local anesthetics.

If one has any concerns or questions about a patient's responses to the medical history questionnaire or one's physical findings during the patient inspection, consideration should be given to consulting their physician. One should be specific in the request to the physician. Most importantly, one should be sure to include the nature of any abnormal or questionable findings from the assessment, specifics about the proposed procedure, and information about the patient's anticipated response and ability to tolerate the proposed procedure. Be sure to ask for a written confirmation of this consultation to complete documentation.

A useful method of assessing the level of risk involved in treating a patient is to assign a physical status classification to the patient. A classification scheme that is easy to use has been developed by the American Society of Anesthesiologists (ASA) [2]. This classification scheme is presented in the following box (American Society of Anesthesiologists, 1963). As the patient's classification number increases, so does the inherent risk for evoking unwanted medical complications during dental treatment. ASA I and II patients are the most appropriate to receive conscious sedation for dental appointments. The general health of ASA I and II patients is reasonably good, and there is minimal likelihood that the physiologic stressors of the dental procedure, local anesthetics, or the sedative will precipitate a significant medical complication. In contrast, more severe, life-threatening systemic disease dictates that a patient receives an ASA classification greater than II. An ASA status greater than II indicates the likelihood of a high level of risk when treating these patients in normal situations without taking appropriate precautions. In some situations, the use of sedation may be appropriate in this more seriously compromised patient population as a way of reducing the physiologic stress the dental procedure may produce. Providing sedative medications during dental treatments with some of these compromised patients (eg, ASA III) is not advised without first consulting the patient's primary physician. Serious consideration should be given to having someone with more training in

Physical status classification for patients as defined by the American Society of Anesthesiologists (ASA)

ASA I: A normal healthy patient
ASA II: A patient with mild systemic disease (eg, well-controlled hypertension)
ASA III: A patient with severe systemic disease (eg, congestive heart failure)
ASAIV: A patient with severe systemic disease that is a constant threat to life (eg, unstable angina)
ASA V: A moribund patient who is not expected to survive without the operation
ASA VI: A declared brain-dead patient whose organs are being removed for donor purposes
(**E**: Emergency operation of any variety; used to modify one of the above classifications [ie, ASA II-E])

Adapted from American Society of Anesthesiologists. New classification of physical status. Anesthesiology 1963;24:111; with permission.

sedation techniques and treating medically compromised patients deliver the sedation to these patients in the most appropriate clinical setting.

Once these topics have been considered, informed treatment decisions can be made that minimize the level of risk. Dental treatments are elective procedures in most situations. Therefore, one should not initiate treatment if one's physical assessment results in uncertainty about the health status of the patient.

Psychologic assessment

Fear of dental treatment is an indication that some form of sedation may need to be considered and discussed with the patient. Fearful dental patients can identify several dental instruments and procedures that contribute to their dislike of dentistry. Dental treatments that involve the use of syringes to deliver local anesthetic solutions intraorally and rotary handpieces to prepare hard tissues are consistently cited as producing fear during dental treatment [3–7]. Although these and other physical stimuli inherent to dentistry are capable of producing the psychologic response of fear, they also evoke many physiologic consequences. Increases in the heart rate and blood pressure are among the physiologic changes that accompany dental fear during treatment situations, and indicate profound activation of the sympathetic nervous system. Extreme elevations of these specific vital signs are not well tolerated by some patient populations (eg, persons with angina), and need to

be avoided. The best way to prevent these undesirable physiologic changes is to identify what evokes them and take actions to eliminate or reduce their occurrence before initiating treatment.

The patient's behavior may provide clues that the patient is fearful. Behaviors such as not seeking dental care on a regular basis, frequently canceling dental appointments, and arriving late are subtle clues that dental fear is present. Tightly gripping the arms of the dental chair and the asking of numerous questions immediately before a procedure are examples of more overt demonstration of dental fear. Asking the patient or their caregiver about their possible fear of dental treatment is appropriate in these situations. Unfortunately, many patients are embarrassed about their dental fear and are uncomfortable talking about it with their dentist. Once the patient feels comfortable talking with the dental team and is sure that they will not be ridiculed or have negative judgments made about them secondary to their dental fear, the dentist can start to explore treatment options that may minimize the unpleasantness of the situation. Each patient is their own "gold standard" about how dentistry affects them. Questions about the patient's use of dental services (eg, how long since the last visit to the dentist) and their concerns about dental treatment may begin a dialogue that makes the dentist more aware of the treatment challenges that may be ahead.

Standardized questionnaires also can determine the level of fear that dental situations evoke in patients. The Dental Anxiety Scale [8] is among the most widely used instruments to determine how fearful patients are about dental treatment (see box). This particular questionnaire is short and can be completed in a few minutes by most adults. Points are assigned to the patient's choices, ranging from one point for selecting choice (a) through five points for selecting (e). Total scores range between 4 and 20, with scores in the range of 13 or greater being suggestive of at least a moderate degree of dental fear [9].

Patient preparation

After completing the physical and psychologic assessments of the patient, it is time to prepare the patient for the upcoming sedation appointment. This includes providing information about the delivery of the sedative agents, discussing what to realistically expect, answering any questions, and obtaining consent. One of the most important considerations that has an impact on the success of the sedation is being assured that the patient is well informed and has the correct set of expectations. Too often patients have the impression that they will be "knocked out" (ie, asleep) for the appointment. It is important that the patient have an understanding of what is meant by conscious sedation. The ability of inhalational and oral sedation methods to provide relaxation is an important attribute to emphasize when discussing treatment options with the patient. When one is considering using a sedative that produces amnesia, the more skeptical patient may be more willing to

Dental anxiety scale

Questions

1. If you had to go to the dentist tomorrow, how would you feel about it?
   a. I would look forward to it as a reasonably enjoyable experience
   b. I would not care one way or the other
   c. I would be a little uneasy about it
   d. I would be afraid that it would be unpleasant and painful
   e. I would be very frightened of what the dentist might do
2. When you are waiting in the dentist's office for your turn in the chair, how do you feel?
   a. Relaxed
   b. A little uneasy
   c. Tense
   d. Anxious
   e. So anxious that I sometimes break out in a sweat or almost feel physically sick
3. When you are in the dentist's chair waiting while he gets his drill ready to begin working on your teeth, how do you feel?
   a. Relaxed
   b. A little uneasy
   c. Tense
   d. Anxious
   e. So anxious that I sometimes break out in a sweat or almost feel physically sick
4. You are in the dentist's chair to have your teeth cleaned. While you are waiting and the dentist is getting out the instruments that he will use to scrape your teeth around the gums, how do you feel?
   a. Relaxed
   b. A little uneasy
   c. Tense
   d. Anxious
   e. So anxious that I sometimes break out in a sweat or almost feel physically sick

From Corah NL. Development of a dental anxiety scale. J Dent Res 1969;48:596; with permission.

accept the sedation treatment plan. The importance of having the patient able to participate during some aspects of the procedure may need to be emphasized, thus making conscious sedation the most effective manner in which to proceed. Most importantly, the patient needs to recognize that the primary objectives of one's sedation treatment plan are their safety and comfort.

Training requirements

As seen in other articles in this issue, there are many wonderfully effective options when it comes to sedating the adult dental patient. A great deal of emphasis has been placed on the use of N_2O/O_2 inhalational sedation and single enteral agent sedations (especially with benzodiazepines).

To administer N_2O/O_2 inhalational sedation either alone or in combination with a single enteral agent, however, a minimal level of training is required. The amount of training required to administer these conscious sedation modalities is under the jurisdiction of each state or region. Regardless of whether any sedation techniques are used in a dental practice, the dentist and all staff involved in patient care need to be certified in the level of Basic Life Support (BLS) commensurate for healthcare providers. BLS recertification is required at least every 2 years because the guidelines are continually updated based on the results of ongoing research in the area of resuscitation. Effective use of some or all of the BLS skills in emergency situations is necessary to keep critical tissues like the brain and heart perfused with oxygenated blood. The most important of the BLS skills to master when sedation is part of the dental practice are assessing and maintaining the patency of the airway and delivering positive pressure ventilation to the patient having respiratory difficulty. Diligence in monitoring the airway, the adequacy of ventilation, and early recognition and corrective measures of airway and ventilation problems are necessary to keep respiration-related complications from becoming more serious.

Besides maintaining current certification in BLS, the ADA suggests that the dentist administering conscious sedation with a single enteral agent, the inhalation of nitrous oxide and oxygen, or a combination of single enteral agent and of nitrous oxide and oxygen meet certain training criteria. First, the dentist should successfully complete to the level of competency didactic and clinical training consistent with Part I and Part III of the ADA's Guidelines for Teaching the Comprehensive Control of Anxiety and Pain in Dentistry. This training is part of the predoctoral dental curriculum of all accredited dental schools in the United States. Postdoctoral training programs in the United States that offer comprehensive training in the areas of conscious sedation with a single enteral agent and the inhalation of nitrous oxide and oxygen may also satisfy the training criteria. Of course, the regulations of each state or geographic region outline the absolute training requirements to provide this type of conscious sedation. For example,

the State of Washington requires that the dentist administering conscious sedation with a single enteral agent or N_2O/O_2 have completed a minimum of 14 hours of either predoctoral dental school or postgraduate instruction that includes the pharmacology and physiology of these sedative agents. To prescribe and purchase enteral sedatives, the dentist must also be registered with the Drug Enforcement Administration (DEA) of the United States Department of Justice.

General office preparedness

Medical emergencies occur in the dental setting regardless of whether conscious sedation is part of the practice repertoire. As long as the sedated patient maintains a level of consciousness in which they are able to respond appropriately to verbal commands and physical stimulation and can maintain control over their protective reflexes, the likelihood of serious medical emergencies is minimal. Even though the likelihood of medical emergencies is rare when sedating patients with N_2O/O_2 either alone or in combination with a single enteral agent, a certain level of preparedness is essential. *Dental treatment needs to be suspended at the first sign of a problem*. Remember, the anesthesia permit holder/provider is responsible for the anesthetic management, adequacy of the facility, and the treatment of emergencies associated with the administration of enteral or combination inhalation-enteral conscious sedation.

As mentioned earlier in the section on training requirements, maintaining current certification in BLS is a requirement for the person administering the sedation, and is highly recommended for all members of the staff that participate in patient care. The responsible administration of sedative agents and monitoring of the sedated patient make it unlikely that cardiopulmonary resuscitation will be necessary. A subset of BLS skills may be necessary in extreme situations, however. For example, in the rare situations in which the patient loses consciousness, positioning the patient's head in a way that keeps the airway patent may become necessary. In extreme situations of depressed consciousness, it also may be necessary to provide positive pressure ventilation with oxygenated air to the lungs until normal respiratory function is restored. Early recognition and treatment of inadequate respiratory function is important in preventing the more serious cardiac complications that begin to appear after prolonged periods of hypoxia.

An emergency kit needs to be readily available when using conscious sedation. An emergency kit can be either bought from a commercial vendor or custom made. Although the commercial kits are a convenient method for compiling and storing all of the drugs and supplies that may be indicated for treating medical emergencies, they tend to be expensive. These kits also tend to contain equipment and drugs that are not indicated in the initial response to an emergency, or one may not be trained in their indications or use (eg,

adenosine, laryngoscopes). In contrast, one can make an emergency kit that specifically addresses one's needs and the emergencies one will most likely encounter. The contents of the emergency kit should be in one container that is easily identified and easy to transport. Make sure that the office staff knows where to find the kit and how to use the basic equipment it contains. The contents of a basic emergency kit are listed in the following box. Perhaps the single most important piece of equipment in the emergency kit, especially if one performs sedation, is a device for delivering positive pressure ventilation (eg, bag-valve-mask). Routine inspections of emergency equipment and drugs, including the adequacy of the oxygen supply, should be performed and documented. Don't forget to check the expiration dates on all of the emergency medications during these inspections.

The inclusion of flumazenil (the competitive receptor antagonist for the benzodiazepine drug class) makes the emergency kit used for sedation

Contents suggested for a basic dental office emergency kit when using nitrous oxide/oxygen inhalational sedation and enteral sedation

Emergency equipment

- Stethoscope
- Blood pressure cuffs (adult and large adult sizes)
- A mechanism for delivering positive pressure oxygen (eg, self-inflating bag-valve device)
- Clear face masks
- High-volume suction tubing and yankauer suction tips
- Syringes (1-ml tuberculin, 3-ml, 10ml)
- Needles (27-gauge, 20-gauge)
- Dilution fluids (sterile water, 0.9% sodium chloride)
- Alcohol sponges
- Gauze
- Oral and/or nasal airways

Emergency drugs

- Oxygen (at least one portable ''E''-sized cylinder with regulator)
- Epinephrine (1:1000 = 1 mg/ml × 3, or an EPI-Pen® × 2)
- Diphenhydramine (Benadryl®, 50 mg/ml)
- Albuterol inhaler (Proventil®)
- Glucose (eg, cake frosting)
- Nitroglycerine (spray or paste)
- Aspirin
- Flumazenil (Romazicon®, benzodiazepine antagonist)

slightly different from the one used in general dental situations. If benzodiazepines are being used to produce sedation, flumazenil needs to be readily available. Although the intravenous route of administration for flumazenil is preferred, especially in the hospital emergency room setting, it can also be administered by way of other routes like sublingual, intramuscular, or rectal [10]. Compared with IV administration, the latency to reverse the complication of profound respiratory depression is slightly longer when using these other routes, requiring a couple of additional minutes. Next to the IV route, the sublingual and IM routes have the next fastest onsets, respectively [10]. Although the outcome of reversing the effects of the benzodiazepine is similar regardless of the route of flumazenil administration, one must be prepared to provide positive pressure ventilation for a slightly longer period of time to adequately oxygenate the patient because of the delay in achieving sufficient blood levels of the antagonist when administered intramuscularly or sublingually.

Having a medical emergency kit readily available is only part of the picture when assessing the preparedness of a dental office that uses sedation. Proper training in the use of the kit's contents is also important. This training should extend beyond the dentist to include other key office personnel that participate directly in patient care (eg, dental assistants and hygienists). In some situations the dentist may not be readily available or able to direct or administer the delivery of emergency care, so others in the office need to be prepared.

Attention also should be given to how the Emergency Medical System (EMS) will be activated if needed. When training office personnel about EMS activation, it is important that they know the telephone number to call (911 in practically all areas in the United States), and how to report the pertinent emergency information. The person activating EMS should be prepared to provide important information that will be asked by the operator regarding the location of the emergency. It is helpful to post the address (including the exact location inside office parks and medical complexes like outpatient clinics) and the phone number of the office on or near each phone to help the person activating the EMS. The person activating EMS may also be responsible for meeting the EMS at the street when they arrive or for reserving an elevator in the building to expedite their arrival at the scene.

Conducting regular emergency drills is a good way of assessing how well the office is prepared to handle medical emergencies, including those emergencies that are related to sedation. These drills serve to reinforce each person's responsibility during the emergency and provide an opportunity to practice the skills. Just like so many other skills, the skills necessary to perform emergency procedures and protocols like positive pressure ventilation and EMS activation can be easily forgotten if not used on a regular basis. Emergency drills should therefore be conducted at a *minimum* of once per year. One of the most important parts of the emergency drill is the critique that follows. Providing each member of the team with feedback about their

performance is the only way they will know whether they performed their tasks adequately. It is important to identify tasks they may not have performed satisfactorily, and provide an opportunity for personnel to learn or practice those tasks to proficiency. Don't forget that it is equally important during the critique to acknowledge tasks that were done well. Office personnel should also feel comfortable in performing the tasks they are assigned, and should be given the opportunity to relinquish any tasks that may make them uncomfortable or that they cannot perform.

Summary

There are many safe and effective medications available to the dental practitioner for producing conscious sedation. Given the many sedatives available, all possessing slightly different clinical characteristics and various degrees of risk, careful consideration needs to be given to the objectives of the sedation when deciding which pharmacologic agents to use. Before making plans to sedate dental patients, however, one needs to make sure that several "layers" of risk management are in place to ensure the sedation procedure is as safe as possible.

Included in this risk management plan is a complete understanding of the regulations that define conscious sedation and the training that is required to deliver this state of depressed consciousness. Careful attention also needs to be given to selecting appropriate dental patients for sedation. A thorough understanding of the patient's physical and psychologic status is necessary when making decisions about sedation. Because most dental disease is not life threatening, dental treatment needs tend to be primarily elective in nature. Considering the training requirements for delivering inhalational or enteral conscious sedation with a single agent, it is prudent to limit this type of sedation to the patient population that is healthy (eg, ASA I and II) and psychologically stable as a way of minimizing risk. The amount of additional risk one encounters when sedating more medically compromised patients (ASA III and greater) should suggest that deferring elective dental treatments until the health status improves is prudent. In situations in which an improvement in the patient's health status is not likely, referral to someone with more experience sedating medically compromised patients is strongly recommended. Equally important to the conscious sedation risk management plan is an assurance that the patient understands what is meant by conscious sedation and that their treatment expectations are realistic. Finally, even though conscious sedation is safe when all precautions are followed, being prepared to manage unexpected sedation-related emergencies is necessary.

The principles of risk management covered in this article are applicable to other articles in this issue, in which N_2O/O_2 inhalational sedation and enteral sedation in adults and children are discussed. The remaining article in

this section that reviews the prevention of medical emergencies and the pharmacologic agents necessary to treat emergency events that are likely to occur in dental settings further enhances the level of preparedness necessary when administering conscious sedation to adults and children.

References

[1] American Dental Association House of Delegates. Guidelines for the use of conscious sedation, deep sedation and general anesthesia for dentists. Address at: www.ada.org/prof/ed/guidelines/cs-guide.html 2000. Accessed March 26, 2002.
[2] American Society of Anesthesiologists. New classification of physical status. Anesthesiology 1963;24:111.
[3] Bernstein DA, Kleinknecht RA, Alexander LD. Antecedents of dental fear. J Pub Health Dent 1979;39:113–24.
[4] Gale E. Fears of the dental situation. J Dent Res 1972;51:964–6.
[5] Kleinknecht RA, Klepac RK, Alexander LD. Origins and characteristics of fear of dentistry. J Am Dent Assoc 1973;86:842–5.
[6] Milgrom P, Getz T, Weinstein P. Recognizing and treating fears in general practice. Dent Clin N Am 1988;32:657–65.
[7] Milgrom P, Weinstein P, Getz T. Treating fearful dental patients: a patient management handbook. Seattle (WA): Continuing Dental Education, University of Washington; 1995.
[8] Corah NL. Development of a dental anxiety scale. J Dent Res 1969;48:596.
[9] Corah NL, Gale EN, Illig SJ. Assessment of a dental anxiety scale. J Am Dent Assoc 1978;97:816–9.
[10] Heniff MS, Moore GP, Trout A, et al. Comparison of routes of flumazenil administration to reverse midazolam-induced respiratory depression in a canine model. Acad Emerg Med 1997;4:1115–8.