

An Analysis of Moderate Sedation Protocols Used in Dental Specialty Programs: A Retrospective Observational Study

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Abstract

Introduction: Pain and anxiety control is critical in dental practice. Moderate sedation is a useful adjunct in managing a variety of conditions that make it difficult or impossible for some people to undergo certain dental procedures. The purpose of this study was to analyze the sedation protocols used in 3 dental specialty programs at the Case Western Reserve University School of Dental Medicine, Cleveland, OH. **Methods:** A retrospective analysis was performed using dental school records of patients receiving moderate sedation in the graduate endodontic, periodontic, and oral surgery programs from January 1, 2010, to December 31, 2012. Information was gathered and the data compiled regarding the reasons for sedation, age, sex, pertinent medical conditions, American Society of Anesthesiologists physical status classifications, routes of administration, drugs, dosages, failures, complications, and other information that was recorded. **Results:** The reasons for the use of moderate sedation were anxiety (54%), local anesthesia failures (15%), fear of needles (15%), severe gag reflex (8%), and claustrophobia with the rubber dam (8%). The most common medical conditions were hypertension (17%), asthma (15%), and bipolar disorder (8%). Most patients were classified as American Society of Anesthesiologists class II. More women (63.1%) were treated than men (36.9%). The mean age was 45 years. Monitoring and drugs varied among the programs. The most common tooth treated in the endodontic program was the mandibular molar. **Conclusions:** There are differences in the moderate sedation protocols used in the endodontic, periodontic, and oral surgery programs regarding monitoring, drugs used, and record keeping. (*J Endod* 2014;40:1327–1331)

Key Words

Claustrophobia, dental anxiety, endodontics, gag reflex, moderate sedation, monitoring, oral surgery, periodontics

Pain and anxiety control is a critical part of endodontic practice. Fear of dental procedures in general is caused by factors such as past experiences, emotions, beliefs, and expectations (1). Despite advances in oral health care, pain and anxiety continue to be significant deterrents to dental care (2). Anxiety can be managed by pharmacologic and nonpharmacologic means. A calm and relaxed environment can help reduce a patient's response to, or awareness of, painful stimuli (3). Aromatherapy, acupuncture, acupressure, hypnosis, and effective communication have been shown to reduce pain and anxiety (4). Some of these nonpharmacologic methods require time and expertise that may not be practical in a routine endodontic practice.

The current levels of sedation as defined by The American Society of Anesthesiologists are minimal, moderate, and deep. "Moderate sedation/analgesia" ("conscious sedation") is a drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained. "Reflex withdrawal from a painful stimulus is NOT considered a purposeful response" (5).

There are few studies in the endodontic literature that address the use of moderate sedation. It is reported that sedation increases the likelihood of success with local anesthesia in anxious patients or for those who have a history of local anesthesia failures (6). Endodontic therapy and oral surgery procedures are ranked high on anxiety rating scales by patients, and sedation is recommended for anxiolysis (7). One study reported that oral triazolam (0.25 mg) was more effective than oral diazepam (5.0 mg) for endodontic procedures (8); however, the doses recommended are meant to produce a minimal, not a moderate, level of sedation, and minimal sedation may not be adequate to alter the efficacy of local anesthesia (9). It is well documented that sedation is a continuum and not a static point that can be achieved with a specific drug or dose, and it can vary from patient to patient or even for an individual patient (5). The level of sedation that works for 1 patient to reduce anxiety may not be adequate for another (10). Thus, there is the need for a deeper level of sedation at times. It is for this reason that it has been recommended that moderate sedation be taught in graduate endodontic programs (11).

There are no studies in the endodontic literature regarding reasons for using moderate sedation, drugs used, monitoring protocols, anesthesia record keeping, complications encountered, additional procedural time, scheduling considerations, recovery times, or other issues specific to endodontic practice. The purpose of this study was to conduct a retrospective analysis comparing the moderate sedation protocols in the graduate endodontic, periodontic, and oral surgery programs at the Case Western Reserve University (CWRU) School of Dental Medicine (SODM), Cleveland, OH, and

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TABLE 1. Summary of Information Gathered in Each Program

	Endodontics	Periodontics	Oral surgery
Preoperative instructions			
Name	X	X	X
Age	X	X	X
Sex	X	X	X
Fasting (nothing by mouth) status	X	X	X
Escort			
ASA classification	X	X	X
Mallampati classification	X		
Body mass index	X		
Reason for sedation	X		
Procedure			
Tooth number(s)	X	X	X
Diagnosis	X	X	X
Specific procedure	X	X	X
Surgeon	X	X	X
Anesthesia			
Anesthesia provider	X	X	X
Anesthesia type	X	X	X
Local anesthetics: name, dosage	X	X	X
Venipuncture site	X		
Angiocatheter size	X		
Drugs: name, dosage, time of delivery	X	X	X
Intravenous fluid	X		
Start and completion times: anesthesia and procedure	X	X	X
Complications	X	X	X

to see if there was an association for the use of moderate sedation with a specific tooth or endodontic diagnosis.

Materials and Methods

This retrospective cohort study was designed to address these issues. Approval was obtained from the CWRU Institutional Review Board. Data were obtained from records of patients treated under moderate sedation in the graduate endodontic, periodontic, and oral surgery programs at the CWRU SODM from January 1, 2010, to December 31, 2012. Eighty-four records were used, consisting of 15 from the endodontic program, 49 from the periodontic program, and 20 from the oral surgery program. The data collected consisted of blood pressure, heart rate, respiratory rate, blood oxygen saturation, age, sex, American Society of Anesthesiologists physical status classification (12), Mallampati classification (13), body mass index (14), reason for sedation, drugs and dosages used, local anesthetics, tooth number, endodontic diagnosis (15), procedures performed, sedation failures, complications, electrocardiogram readings (ECG), monitoring protocols, preanesthesia instructions, and duration of the procedure.

The data were entered into an Excel spreadsheet (Microsoft Corporation) and SPSS software was used for statistical analysis.

Results

Of the study patients, 63.1% were females, and 36.9% were males. We found that there were differences in the information gathered in each program. Table 1 lists data recorded in the sedation/anesthesia records of each program. Only the endodontic program anesthesia record noted the intravenous fluid and amount used. The endodontic program

TABLE 2. Drugs Used and Routes of Administration

Drug/route of administration	Endodontics	Periodontics	Oral surgery
Midazolam/oral	X*		
Midazolam/intravenous	X	X	X
Diazepam/oral	X		
Nalbuphine/intravenous	X		
Fentanyl/intravenous			X

*Used only for pediatric patients.

used either 5% dextrose and water or 0.9% sodium chloride, the periodontic program used 5% dextrose and water, and the oral surgery program used lactated Ringer solution. The choice of intravenous fluid was based on the program/course director's preference. The drugs used and routes of administration are listed in Table 2. Monitoring differences are shown in Table 3. Figure 1 shows the age range, which was 8–88 years. The mean age was 45 years. Figure 2 shows the percentages of American Society of Anesthesiologists classifications for all programs. Figure 3 shows the reasons for using moderate sedation; however, this was only recorded in the graduate endodontic clinic.

Discussion

Most patients requiring endodontic therapy in an endodontic specialty practice can be managed with local anesthetic alone. However, there are instances in which moderate sedation can make otherwise difficult and uncomfortable treatment experiences less so. Conditions such as a severe gag reflex in which a patient is unable to tolerate the dental dam, bite block, or x-ray sensor/film make it difficult, if not impossible, to provide quality and comfortable endodontic treatment. Temporomandibular disease can limit mandibular opening, making treatment access difficult or impossible (16–22). These patients may also have difficulty keeping their mouths open during prolonged dental procedures and may not be able to tolerate a bite block. Fibromyalgia can make it uncomfortable for a patient to keep still and comfortable in the dental chair (23). A variety of phobias including claustrophobia, which can make use of the dental dam and bite block impossible; fear of needles; and fear of dental treatment in general can be obtunded with the use of moderate sedation (1, 24–28). Patients reporting a history of difficulty getting numb can be helped by using sedation in conjunction with local anesthesia (3, 29). Special needs patients can benefit from sedation as a patient management tool (30). Certain medical conditions requiring stress reduction protocols can be managed more safely by using sedation as an adjunct to local anesthesia (23).

TABLE 3. Monitoring

Monitoring	Endodontics	Periodontics	Oral surgery
Blood pressure (continuously)	X	X	X
Heart rate	X	X	X
Respiration (visual)	X	X	X
Respiration (pretracheal stethoscope)	X		
Electrocardiogram	X		
Capnography			X
Time oriented record	X	X	X

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