Scientific Article

Pharmacologic Behavior Management of Pediatric Dental Patients Diagnosed with Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder

Carolyn A. Kerins, DDS, PhD[1] • Alton G. McWhorter, DDS, MS[2] • N. Sue Seale, DDS, MSD[3]

Abstract: ***Purpose:*** *The purpose of this study was to conduct a survey of Texas pediatric dentists to determine: (1) the percentage of patients they treat with attention deficit disorder (ADD)/attention deficit hyperactivity disorder (ADHD); (2) the behavior management techniques that are utilized to treat their patients who suffer from ADD/ADHD; and (3) the relative success rates of these techniques in their practices.* ***Methods:*** *A 17-question, single-answer, multiple choice survey was mailed to 343 Texas pediatric dentists. The mailing list was obtained from American Academy of Pediatric Dentistry and Texas Academy of Pediatric Dentistry member rosters. One mailing was sent, including a self-addressed stamped envelope, for returned responses.* ***Results:*** *A 54% response rate (186 surveys) revealed that nitrous oxide was the most frequently used pharmacologic behavior management technique; however, demerol/promethazine/nitrous oxide was rated as effective most often for treating ADD/ADHD patients.* ***Conclusions:*** *Practitioners believe the incidence of attention deficit disorder/attention deficit hyperactivity disorder is increasing, and they are familiar with the medications used to treat the conditions. Texas pediatric dentists are using a variety of sedation techniques and are interested in developing guidelines for sedation of these patients. (Pediatr Dent 2007;29:507-13) Received July 20, 2006 / Revision Accepted February 6, 2007.*

KEYWORDS: BEHAVIOR MANAGEMENT, ORAL SEDATION, GENERAL ANESTHESIA, ATTENTION DEFICIT DISORDER, ATTENTION DEFICIT HYPERACTIVITY DISORDER

Attention deficit disorder (ADD) and attention deficit hyperactivity disorder (ADHD) are considered to be the most common neurobehavioral disorders among school-age children. They are estimated to affect 3% to 5% of this population.[1] ADD is a diagnosis applied when a patient: (1) persistently fails to give close attention to details; (2) doesn't seem to listen; and (3) is easily distracted by external stimuli. This patient is often referred to as "the daydreamer." ADHD, on the other hand, is a diagnosis applied to a persistent pattern of: (1) hyperactivity; (2) impulsivity; and/or (3) inattention. This person seems to be "always on-the-go." Boys are 3 to 5 times more likely than girls to be affected. While the nature of ADD/ADHD changes as a child reaches adolescence, it is estimated that only 20% of children "outgrow" this disorder.[2] The symptoms of ADD/ADHD are caused by a chemical imbalance in the brain, especially in areas controlling concentration and impulsive behavior.[3]

[1]Dr. Kerins is assistant professor, [2]Dr. McWhorter is professor, and [3]Dr. Seale is Regents Professor and Chairman, all in the Department of Pediatric Dentistry, Baylor College of Dentistry, Texas A&M University Health Science Center, Dallas, Tex. Correspond with Dr. Kerins at ckerins@bcd.tamhsc.edu

Most children being treated for ADD/ADHD are managed with a combination of behavioral and pharmacologic therapies. Current drugs employed in the treatment of ADD/ADHD include: (1) prescription stimulants; and (2) nonstimulants. The stimulant category includes: (1) methylphenidate (Ritalin); (2) dextroamphetamine (Dexadrine); (3) pemoline (Cylert); (4) amphetamine salts (Adderall); and (5) sustained-release methylphenidate (Concerta). The stimulant medications exert their effect paradoxically by:

1. increasing activity in underactive areas of the brain and normalizing cerebral blood flow and glucose metabolism[4]; or
2. altering the levels of norepinephrine and dopamine.[5]

Recently, nonstimulant medications were introduced to treat ADD/ADHD, including atomoxetine (Strattera) and buproprion (Wellbutrin), which tend to act similarly to antidepressants.

In 1999, the Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder—funded by the National Institute of Mental Health—followed nearly 600 school-age children. It found that stimulant medications were the most effective treatment for ADD/ADHD.[6] Growing concerns from the advisory committee of the Food and Drug Administration, physicians, and parents, however, have re-

newed interest in behavioral therapy. ADD/ADHD management includes a balanced treatment plan of pharmacologic methods combined with behavioral or psychotherapy as well as environmental manipulation.[7] The stimulant medications reduce hyperactivity and improve concentration, while behavior therapy addresses difficulty with organizational and social skills.[6] Behavior therapy is a structured system of rewards to encourage desired behaviors and consequences to decrease the frequency of undesirable behaviors. Behavior therapy also includes environmental changes designed to minimize distractions. The results of this study indicated that stimulants combined with behavior therapy were superior for long-term improvement of: (1) anxiety; (2) academic performance; (3) parent-child relations; and (4) social skills.[6]

It has been suggested that "provision of comprehensive dental treatment to children suffering from ADHD requires modifications in the standard regimen."[2] Exactly what these modifications are remains unclear. To date, there are no in-depth retrospective and no prospective research studies looking at the effect of ADD/ADHD on dental treatment. Because pediatric dentists typically treat patients from younger ages through adolescence, it is likely that they will treat ADD/ADHD patients. Their treatment presents unique challenges to the practitioner in terms of pharmacologic and nonpharmacologic behavior management. Not only does the dentist have to work to gain the child's trust, but he must also work to focus the patient's attention throughout the entire dental procedure[8] either through "tell-show-do", directive guidance, and/or voice control.

For those children who are unable to be nonpharmacologically managed in the dental office, pharmacologic mild to moderate sedation may be considered. Ultimately, most ADD/ADHD children have a behavior problem but exhibit normal or above-average intelligence. Thus, the reasons for sedating this type of patient may be different than those for treating an anxious patient or one that is too emotionally immature to cooperate. A pediatric dentist may choose to use anti-anxiety drugs such as diazepam or midazolam vs antihistamines or opioid analgesics such as meperidine for sedation to avoid perceived drug-drug interactions. As most drugs used to treat ADD/ADHD are "stimulant" medications, one might suspect that the potential for failed sedations exists, as the 2 treatment regimens appear to "cancel each other out."

Many practitioners have suggested that they experience failed oral sedations or have to use higher concentrations of sedative medication to achieve optimal sedation for ADD/ADHD patients. Indeed, these observations have been supported by Ririe et al,[9] who reported inadequate sedation when midazo-lam was administered to a patient taking methylphenidate. In this report, increased doses of midazolam and additive time were needed to reach the desired effect. Perhaps the delay in onset was due to delayed absorption of the midazolam, as methylphenidate inhibits liver microsomal enzymes. Additionally, patients taking methylphenidate may be at risk for prolonged sedation, as most sedative-hypnotic medications are metabolized in the liver. Thus, if these patients do require higher doses of sedation medications, these levels may remain unusually high even after discharge from the dental office.

There is little research and scant guidelines to direct the pediatric dental practitioner regarding sedating ADD/ADHD patients taking stimulant medications. Consequently, dentists have had to "experiment" to determine regimens that work or fail. These methods may include: (1) altering the dose or discontinuing the dose of stimulant medication prior to the dental appointment; (2) administering a stronger dose or a cocktail of sedation medications; (3) treating these patients in the morning; or (4) scheduling them for treatment on "drug holidays," which are usually school breaks.

This study's purpose was to survey Texas pediatric dentists to determine: (1) the percentage of patients they treat with attention deficit disorder/attention deficit hyperactivity disorder; (2) which pharmacologic behavior management techniques they utilize to treat these patients; and (3) the relative success rates of these techniques in their practices.

Methods

This study was reviewed by the Institutional Review Board of Baylor College of Dentistry and given "exempt" status. A multiple-choice survey was sent to 343 pediatric dentists (not including pediatric dental residents) in the state of Texas. Names and addresses were obtained from the American Academy of Pediatric Dentistry Web site and from the mailing list of the Texas Academy of Pediatric Dentistry. Dentists were given approximately 2 weeks to respond to the survey. A self-addressed, stamped envelope was included in the mailing. There was neither a second mailing nor any attempt to procure surveys from dentists who did not respond.

The survey was composed of 17 questions. The survey's first section obtained demographic information. The second section surveyed the practitioner's familiarity with medications used to treat ADD/ADHD. A third section inquired about behavioral management techniques the practitioner utilized to treat ADD/ADHD dental patients. The respondents were instructed to consider their answers based on healthy children with the diagnosis of ADD/ADHD and not those who exhibited ADD/ADHD as part of a syndrome or other disorder. The last series of questions asked the practitioner's opinions regarding: (1) education; (2) guidelines; and (3) referrals. The questions were either single-answer multiple choice or Likert-type scale that included choices "very frequently, frequently, sometimes and never" for whether the dentist performed a given sedation regimen.

The practitioners were asked to rate the effectiveness of the sedation regimen they reported using as "very effective, effective, occasionally effective, and not applicable." "Strongly agree, agree, neutral, disagree, and strongly disagree" were choices to questions surveying the dentist's attitudes and opinions regarding the need for education or sedation guidelines. When asked how often a pediatric dentist might refer a patient to his physician to be diagnosed for ADD/ADHD, the Likert responses included "always, sometimes, rarely, and never."

Questions with more than one answer were not included in the analysis. The data were reported as percentages and frequency tables, then analyzed using chi-square analysis and 2- and 3-way analysis of variance as appropriate with the StatView SE (version 5.0.1, Abacus Concepts, Berkeley, Calif) and Abstat (release 1.94 Anderson Bell, Arvada, Colo) statistical packages. Comments were categorized and reported by response.

Results

Of the 343 surveys mailed, 196 were returned for a 57% response rate, but only 186 could be included in the survey for an adjusted response rate of 54%. Reasons that returned surveys were excluded from data analysis included: (1) retirement from private practice; or (2) full-time academics.

Demographic/background data. Figure 1 presents a summary of the distribution of respondents by the year of graduation from dental school and by the year of graduation from pediatric residency. The largest percentage of respondents graduated from both dental school and residency between 1991 and 2000.

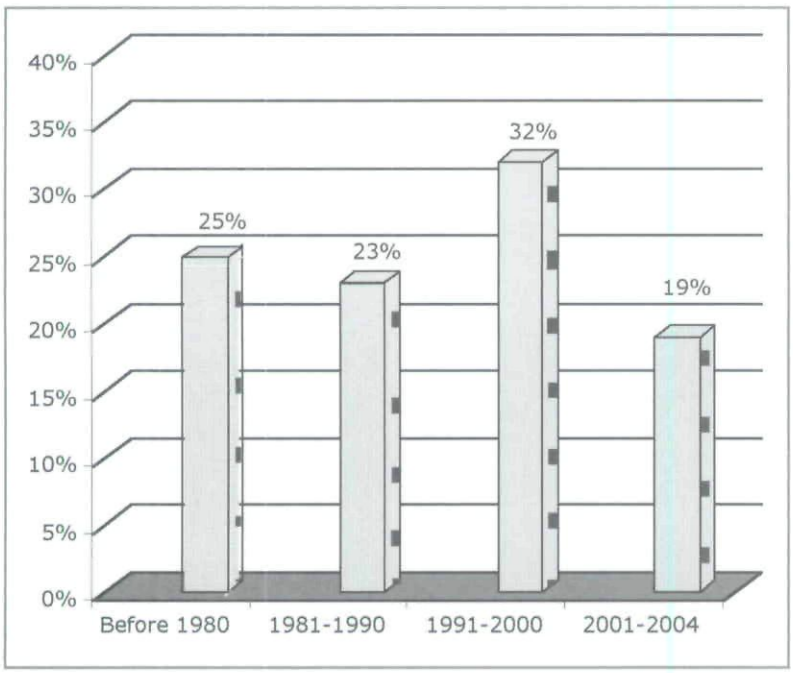

Figure 1. Distribution of respondents by year of graduation from pediatric dentistry residency.

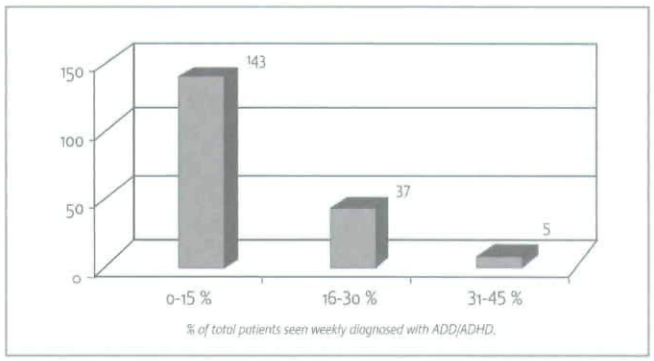

Figure 2. Distribution of responses to the question, "On average, what percentage of your patients seen weekly are diagnosed with ADD/ADHD?"

Figure 2 demonstrates the percentage of ADD/ADHD patients seen weekly by each practitioner. All responding practitioners reported treating patients diagnosed with ADD/ADHD. The majority, 143 (77%) pediatric dentists, responded that fewer than 15% of their patients seen each week have this diagnosis. Forty-three (23%) dentists responded that 16% to 45% of the total patients seen weekly have the diagnosis.

Sixty-four percent of the respondents thought the diagnosis of ADD/ADHD has increased in the last 5 years, while 20% thought it has remained the same. For each group of graduation years, the majority thought this diagnosis was increasing, although respondents graduating earlier from pediatric dental residency were more likely to report that they thought the diagnosis of ADD/ADHD has increased (P=.002).

When asked to rate their familiarity with the medications used to treat ADD/ADHD, Ritalin and Adderall were known by virtually all the respondents (98%). Concerta and Strattera were less well-known to the practitioners at 89% and 73% respectively.

Pharmacologic behavior management. Eight percent of the respondents claimed to not perform in-office conscious sedations, whereas some did not utilize specific pharmacologic agents for sedations. Consequently, all percentages regarding conscious sedation modalities were tabulated and cross-checked back to the number of respondents who answered the question for that sedation regimen to determine the relative prevalence of use for that sedation regimen.

Figure 3 demonstrates the prevalence of use of various pharmacologic regimens and the percentage of respondents utilizing that regimen who rated the regimen effective or very effective. Nitrous oxide was the most

widely used pharmacologic agent for behavior management of dental patients with ADD/ADHD, as 173 (95%) responding dentists reported using it. Additio-nally, of the 173 pediatric dentists using nitrous oxide, 130 (75%) rated it as effective when treating these patients. Diazepam was used by 74 (49%) respondents. Forty-three of these (55%) reported diazepam alone to be effective when treating these patients. The combination of diazepam and nitrous oxide were the second most prevalent pharmacologic behavior management technique, used frequently or very frequently by 91 respondents to this question. Of those 91, 65 (71%) rated it to be effective. Midazolam and nitrous oxide in combination was used by 69 (43%) responding dentists. This combination was rated effective by 41 (60%) pediatric dentists who used this combination to treat patients with ADD/ADHD (Figure 3).

Although use of meperidine combinations was not as widespread by respondents when treating ADD/ADHD patients (Figure 3), those who used them reported them more likely to be effective than some non-narcotic pharmacologic regimens. Meperidine/promethazine/nitrous oxide was used by 80 of 160 (50%) responding dentists (Figure 3); 66 of these 80 (83%) rated this combination to be effective. Fifty-one (34%) responding dentists reported using meperidine/hydroxyzine/nitrous oxide, and 37 of the 51 dentists (73%) reported it to be effective.

A combination of meperidine/midazolam/nitrous oxide was used by only 9 (6%) respondents. Triazolam was used by 12 (8%) responding dentists, and chloral hydrate was used by 10 (7%) pediatric dentists. Each of these drugs was rated with similar effectiveness by responding dentists who use these regimens (Figure 3).

Although the most common pharmacologic combinations were surveyed, 30 pediatric dentists reported using other combinations not listed on the survey; 24 (80%) reported their unlisted regimen to be effective or very effective. There was no consistently recurring pharmacological combination of those additional regimens reported. Additionally, the authors were unable to determine from this survey if intravenous conscious sedation or general anesthesia were considered as alternative pharmacologic behavior management tools for these questions.

Forty-three responding dentists reported that 16% to 45% of their patients seen weekly are diagnosed with ADD/ADHD (Figure 2). Therefore, the prevalence of sedation regimens used among this group was compared to that of the overall responding dentists. Nitrous oxide followed by a diazepam/nitrous oxide combination were the 2 most prevalently used regimens by respondents overall. Similarly, nitrous oxide was the most readily used pharmacologic agent among those dentists treating large populations of ADD/ADHD patients, however, meperidine/promethazine/nitrous in combination was the second most commonly used.

When asked how ADD/ADHD patients were managed prior to administration of sedative medications: (a) 56% of respondents said they have the patient take the usual dose of ADD/ADHD medication prior to the sedation appointment; (b) 18% of respondents chose to have patients discontinue the usual dose of ADD/ADHD medication prior to the appointment; (c) only 1% schedule sedation appointments during medication holidays; and (d) an additional 26% admitted they may do either of b or c, depending on the patient.

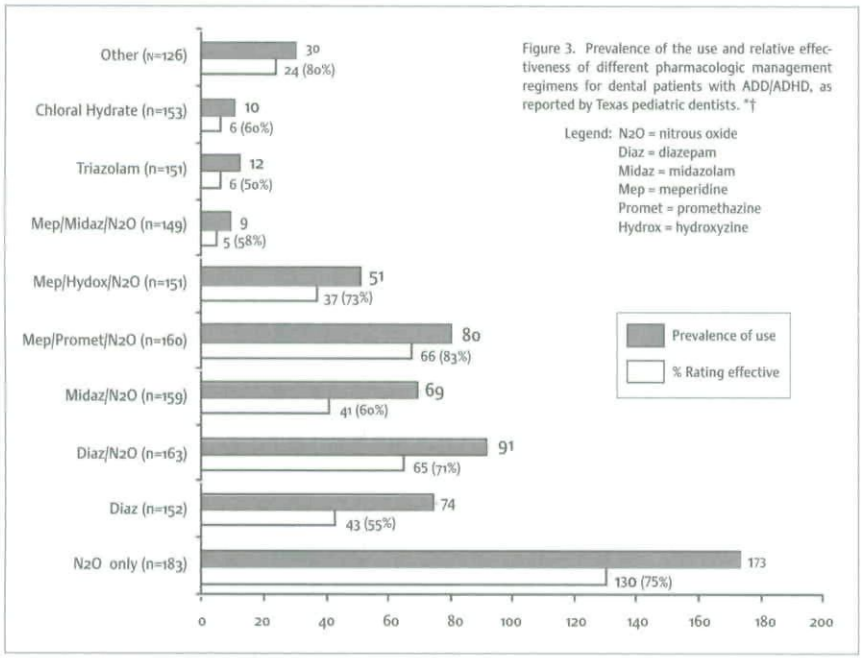

Figure 3. Prevalence of the use and relative effectiveness of different pharmacologic management regimens for dental patients with ADD/ADHD, as reported by Texas pediatric dentists. *†

* Prevalence of use is reported as the no. of dentists who responded using a regimen frequently or very frequently.

† % rating effective is displayed as the N and % of those practitioners who reported using a particular regimen as effective or very effective

Practitioner opinions. When asked "What percentage of your patients diagnosed with ADD/ADHD require general anesthesia or IV conscious sedation to manage their behavior?": (a) 138(76%) responding pediatric dentists stated that fewer than 10% of their ADD/ADHD patients could not be managed in a conventional office setting; (b) 33 reported that between 11% and 20% of these patients required management beyond oral conscious sedation; and (c) only 7 dentists replied that greater than 21% of their ADD/ADHD patients were treated under general anesthesia in the operating room or with intravenous conscious sedation.

Whether or not a practitioner has his patients take the usual dose of ADD/ADHD medication prior to appointment was not significantly related to the perception of

the practitioner that these patients required general anesthesia or IV conscious sedation to manage behavior; 78 of the 103 (also 76%) responding dentists who do have their patients take their usual dose of ADHD medication prior to appointment reported less than 10% of their ADD/ADHD patients could not be managed in a traditional office setting.

When asked to rate on a Likert scale the statement, "I see atypical reactions to sedative medications given to patients who are being treated for ADD/ADHD": (a) only 20% of respondents agreed; (b) 45% did not agree; and (c) 36% were neutral (percentages rounded).

Approximately 73% of responding pediatric dentists agreed that they would like to know more about ADD/ADHD and its treatment modalities. There was a nonsignificant distribution of agreement by year of graduation from pediatric dental residency. Moreover, 69% of responding pediatric dentists agreed that guidelines should be developed to more effectively treat ADD/ADHD patients with pharmacologic, nonintravenous minimal or moderate sedation. Approximately 17% were neutral, and 14% disagreed with respect to developing sedation guidelines. There was a nonsignificant distribution of practitioner opinion by year of graduation from pediatric residency (Table 1).

Table 1. RESPONSE TO THE STATEMENT, "I BELIEVE THAT SPECIFIC SEDATION GUIDELINES FOR PATIENTS CURRENTLY TAKING MEDICATIONS FOR ADD/ADHD SHOULD BE DETERMINED"; DATA ARE REPORTED BY YEAR OF GRADUATION FROM PEDIATRIC RESIDENCY, AND THE DISTRIBUTION WAS NON-SIGNIFICANT.

Year of pediatric residents	Agree (%) †	Neutral (%)	Disagree (%)
2001-2004	69	22	8
1991-2000	72	15	13
1981-1990	57	16	24
1971-1980	68	23	10
1961-1970	67	33	0

† Percentages are rounded and may not total 100%.

In the survey's comments section, many practitioners chose to share their opinions regarding the diagnosis of ADD/ADHD. The most recurring theme was that ADD/ADHD is over-diagnosed and that "ADD/ADHD is a parenting issue and not a behavior disorder" or that "poor parenting and lack of discipline are often confused with ADD."

Discussion

This survey was intended to be a pilot survey to determine what pediatric dentists in the state of Texas are doing when treating patients with behavior management issues related to ADD/ADHD. The demographics indicated that this was a representative sample of the state. One limitation of this survey was that the sampling was confined to the state of Texas. There are 3 advanced training programs in Texas that provide considerable training in hospital dentistry and sedation techniques; therefore, these data may not be easily extrapolated to the rest of the United States where the programs differ in the scope of training.

It may be challenging to distinguish true ADD/ADHD from other disorders that affect attention, such as: (1) anxiety disorders; (2) mood disorders; (3) substance abuse; (4) schizophrenia; and (5) hyperthyroidism.[10] Additionally, ADD/ADHD may coexist with other diagnoses, such as: (1) conduct disorder; (2) oppositional defiant disorder; and (3) speech/learning disability. The criteria for diagnosis of ADD/ADHD are cited in the *Diagnostic and Statistical Manual of Mental Disorders*.[11] There is no single test for ADD/ADHD, and diagnosis is usually made following history given by patients, parents, and teachers.[10]

Behavior problems stemming from sleep-disordered breathing (SDB) must also be differentiated from ADD/ADHD. Sleep-disordered breathing is associated with enlarged tonsils and adenoids, leading to airway obstruction during sleep.[12] Symptoms of SDB include snoring, apnea, and restless sleep with frequent awakening. SDB exists in approximately 1% of children.[13] Interestingly, SDB children are not more sleepy during the day (mistaken for ADD), but tend to me more: (1) hyperactive; (2) rebellious; and (3) aggressive.[14] Although ADD/ADHD may coexist with other conditions, the dentists surveyed were asked to limit their responses to ADD/ADHD patients only and not consider children with: (1) syndromes; (2) autism; and (3) other psychiatric conditions.

On the whole, Texas pediatric dentists report being familiar with the medications used to treat ADD/ADHD; however, it seems new medications designed to treat behavioral or psychiatric disorders are either continuously beginning clinical trials or have become available in the market. It is a challenging task to stay current, especially when some patients may present to the dental office taking medications for off-label uses. Therefore, it is prudent for the dentist to question the parent as to the exact name of the medication and for what reason it was prescribed. The lesser degree of familiarity with Cylert or Strattera is not surprising, as Cylert was originally marketed for adolescent and adult use; this drug has since been removed from the market.

Strattera, marketed in 2002, was also targeted for adults but is also now used in children both as an adjunct or alternative to stimulant medications or when stimulant medications have failed. Although over 2 million prescriptions for Strattera have been written since its introduction, approximately 40% of survey respondents did not know the percentage of the ADD/ADHD patients they treat who took Strattera. Additionally, a similar percentage estimated that fewer than 10% of their patients take Strattera for the treatment of

ADD/ADHD. Because the mechanism of action for Strattera differs from that of stimulant medications, it is foreseeable that a patient taking this medication may have a different sedation experience from those patients treated with conventional stimulants.

When planning nonintravenous pharmacologic minimal or moderate sedation, the practitioner must consider additional medications a patient is taking to prevent drug interactions. It is reasonable to think that a stimulant combined with a sedative could potentially counteract each other. Although the predominant use of diazepam and midazolam overall was greater than the use of meperidine in combination, a larger percentage of practitioners reported meperidine/hydroxyzine/nitrous oxide to be more effective than diazepam or midazolam. Although practitioners were not asked to state why they used their preferred regimen, many factors may influence this choice, such as: (1) cost; (2) ease of availability; (3) postdoctoral training; (4) availability of a sedation nurse; or (5) facility guidelines.

There are many factors influencing successful rendering of dental treatment under pharmacologic minimal/moderate sedation. Treatment setting, such as a private dental office vs public health or hospital clinic, may affect the child's interaction with the environment as well as the drug regimen chosen and amount administered (facility guidelines). The relative invasiveness of the planned dental procedure (ie, 1-surface composite vs extraction) and whether or not a child is restrained may also influence the success of a sedation appointment. Pharmacologic differences between drug classes will partially account for depth of sedation, but also the patient's inherent physiology must be considered. Some patients' weights may be too large to allow for the maximum dosage per pound of body weight, as the dose would exceed recommended maximum dosages. These patients may be at a distinct disadvantage compared to those who are receiving the recommended dose per body weight.

Does pharmacologic control of ADD/ADHD affect the efficacy of sedation? We suggest it might affect it positively. Ultimately, those patients with an accurate diagnosis of ADD/ADHD exhibit underactivity in certain areas of the brain, and the medicines help to bring those areas of the brain to baseline levels, thus improving the likelihood of better behavior at the dental appointment.

This survey did not ask pediatric dentists about their practice setting. Therefore, it cannot be determined if the treatment setting would affect sedation success. These concerns, although outside the scope of this survey, should be addressed in well-designed case-control studies or randomized clinical trials.

Drug interactions causing atypical reactions could be the cause for those ADD/ADHD patients who require management by intravenous conscious sedation or general anesthesia. The available data from this survey do not suggest that atypical reactions are the principal reason why these patients are treated outside of the traditional practice setting. Perhaps these patients are referred for intravenous conscious sedation or general anesthesia as a result of the patient's, parent's, and/or practitioner's impatience.

Whether or not one believes that ADD/ADHD is a true neurochemical imbalance leading to a behavior disorder or that it is a parenting issue, more children are taking medications to treat this disorder. Buncher et al stated that between 3% and 5% of children were diagnosed with ADD/ADHD in 1996,[1] but the vital health statistics report in 2006 (reporting data from 2004) states that 4.5 million children between 3 to 17 years of age (7%) have ADHD. Thus, the incidence of these disorders is increasing.[15] Ultimately, it will be up to the dentist to determine the best way to manage the patient to meet the treatment needs. Whether a dentist employs directive guidance coupled with short, early morning appointments, other nonpharmacologic behavior management, or pharmacologic behavior management will depend on the nature and extremity of the behavior to be modified.

Conclusions

Based on this study's results, the following conclusions can be made:

1. All responding Texas pediatric dentists reported treating patients with attention deficit disorder/attention deficit hyperactivity disorder (ADD/ADHD).
2. Texas pediatric dentists reported using a variety of pharmacologic behavior management techniques when treating ADD/ADHD patients, with varied effectiveness.
3. Texas pediatric dentists support the creation of guidelines to better enable them to pharmacologically manage ADD/ADHD patients.

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Abstracts of the Scientific Literature

Third Molars and Dental Crowding

The relationship between third molar eruption and anterior dental crowding remains controversial. This study sought to survey, evaluate, and compare the opinions of orthodontists and oral surgeons regarding the association between third molar eruption and anterior dental crowding. A survey inquiring views on the force exerted by erupting third molars, relationship to crowding, and recommendations for prophylactic removal was sent to orthodontists and oral maxillofacial surgeons practicing in the US. Responses between orthodontists' and oral surgeons' answers were analyzed using Chi-square analysis. Answers to all questions were significantly different (P< 0.001) between orthodontists (N = 393) and oral surgeons (N = 458). Regarding erupting maxillary and mandibular third molars, more orthodontists than oral surgeons did not believe that an anterior force was exerted. For maxillary and mandibular third molars, more orthodontists than oral surgeons felt that they "never" or "rarely" caused anterior crowding. Further, more orthodontists than oral surgeons said they "never" or "rarely" recommended prophylactic removal of third molars to prevent crowding. Significant disagreement exists among practitioners, including both orthodontists and oral maxillofacial surgeons, regarding the fundamental issues underlying the role of third molars in dental crowding. ***Comments:*** *As primary care providers, pediatric dentists are often confronted with this common question as child patients approach adolescence. Crowding of the incisors is a multifactorial phenomenon that involves a decrease in arch length, increased tooth size and abnormal shape, narrowing of the intercanine width, biomechanical peculiarities of tooth contacts, and mandibular growth changes occurring in adolescence. The influence of third molars on the alignment of the anterior dentition remains controversial.* ***RKY***

Address correspondence to Steven J. Lindauer, Department of Orthodontics, School of Dentistry, Virginia Commonwealth University, PO Box 980566, Richmond, VA 23298-0566; e-mail: sjlindau@vcu.edu.

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