

Current teaching of restraint and sedation in pediatric dentistry: a survey of program directors

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Abstract

Directors of advanced educational programs in pediatric dentistry were surveyed to examine the usage patterns of various physical and pharmacological restraint techniques over the past five years. Results indicate that while the overall use of sedation has decreased, the use of oral sedative agents reportedly increased by 42.1%. The net decrease resulted from large decreases in parenteral administration. While the survey results showed large decreases in the use of hand-over-mouth and hand-over-mouth with airway restriction, the use of other physical restraint techniques continued to be employed at the same rate. Programs reporting changes in the use of nitrous oxide were divided equally between increased and decreased utilization. The usage pattern of general anesthesia, however, was clearly unidirectional. More than half (57.4%) of program directors reported an increased use of general anesthesia, while only 13.0% reported a decreased use.

Introduction

In 1985, the American Academy of Pediatric Dentistry (AAPD) adopted guidelines for the elective use of conscious sedation, deep sedation, and general anesthesia in pediatric patients. Before this, Goodson and Moore (1983) reported cases involving life-threatening reactions after sedation. Moore et al. (1984), reported that a small number of pediatric dental patients undergoing conscious sedation with a single oral agent did not attempt to clear their airways when obstruction occurred. The loss of protective reflexes indicated that the route of administration was not necessarily associated with the depth of anesthesia. Many other articles in the professional literature and the lay media have addressed issues involved in the sedation of pediatric patients (Trapp 1982; Diamond 1983; Houpt 1988).

In 1985, a conference sponsored by the AAPD examined numerous issues relevant to pediatric sedation and

anxiety control. Before this conference, many states already had passed legislation defining the educational requirements necessary for individuals to use sedation techniques. Rather than defining sedation on a physiological basis, many states and liability insurance carriers equated the level of sedation with the route of administration. IM or IV routes were considered to be in the same risk category as general anesthetics; only oral sedation met the operating definition of conscious sedation. In addition to rising malpractice insurance premiums for those using sedation, legislation, educational requirements, and unwanted publicity have become external forces that may play a role in how dentists chose to care for their patients.

Despite the traditionally high acceptance of sedation by pediatric dentists (Association of Pedodontic Diplomates 1972, 1981), its acceptance among parents may be conditional (Fields et al. 1984). Although ElBadrawy and Riekman (1986) showed a high level of acceptance by parents whose children previously had undergone sedation, acceptance may be lacking when there had been no previous sedation experience (Murphy et al. 1984). The 1988 conference on behavior management, sponsored by the AAPD, highlighted legal issues involved in informed consent, and the standards by which previously accepted techniques now may be judged. Hagan et al. (1984) reported that in those jurisdictions where it has been tested, the materiality standard has superseded professional standards.

Davis (1988) reported a decreased use of conscious sedation and an increased use of nitrous oxide compared to the survey of Diplomates published in 1981. Davis believed that these changes were due to external forces, rather than issues related to the safety and efficacy of sedative agents.

The purpose of this study was to describe the changing patterns of use of physical restraint and pharmacological sedation techniques, in the past five years, as empirically reported by directors of advanced educational programs in pediatric dentistry.

Materials and Methods

A brief survey was mailed to the directors of all accredited advanced pediatric dentistry training programs in the continental United States. Changing usage patterns of various techniques were assessed over the past five years. This period of time was chosen as being most reflective of the rapid changes occurring that relate to the use of these techniques.

Follow-up surveys were mailed to directors who did not respond to the initial mailing. Completed surveys were collected for analysis to determine the usage patterns of various behavior management techniques. Utilization was recorded as being either increased, decreased or unchanged. Contingency testing was performed on the dependent variables of sedation, general anesthesia, and nitrous oxide use, to ascertain associations between any of these variables and the presence of any changes in usage patterns.

Results

Completed survey forms were returned by 54 (96.4%) of all program directors. Of those responding, the average length of tenure was 8.2 years. More than half (62.2%) of the directors had held their positions for more than five years.

Overall Use of Sedative Agents

More than one-third (35.2%, $N = 19$) of the program directors reported a decreased use of sedative agents in patient management. Only 16.6% ($N = 9$) reported an increase in the use of sedation technique.

Route of Administration

Although the use of oral sedative agents increased in 42.6% ($N = 23$) of the programs, IM and IV administration showed large decreases in utilization (Table 1).

Overall Use of Restraint

Despite the large reported decreases in the use of hand-over-mouth (HOM) and hand-over mouth with airway restriction (HOMAR), the use of other restraint techniques, such as the Papoose Board® (Olympic Medical Corp., Seattle, WA), remained largely unchanged (Table 2).

Overall Use of General Anesthesia

More than half (57.4%, $N = 31$) of program directors reported an increased use of general anesthesia in patient management, while only 13.0% ($N = 7$) reported a decreased use of general anesthetic agents.

TABLE 1. Overall use of various routes of administration of sedative agents

	<i>Increased</i>	<i>Decreased</i>	<i>Remained the same</i>
Oral	23 (42.6)	10 (18.5)	21 (38.9)
IM	2 (3.7)	25 (46.3)	27 (50.0)
IV	2 (3.7)	16 (29.6)	36 (66.7)
Other	4 (7.4)	4 (7.4)	46 (85.2)

TABLE 2. Overall use of restraint

	<i>Increased</i>	<i>Decreased</i>	<i>Remained the same</i>
HOM	0 (0.0)	24 (44.4)	30 (55.6)
HOMAR	0 (0.0)	21 (38.9)	33 (61.1)
Other	3 (5.5)	3 (5.5)	48 (89.0)

Overall Use of Nitrous Oxide

While approximately half of all program directors reported no change in their patterns of nitrous oxide use, the remainder were divided evenly between increased and decreased use. More than one-fourth (27.7%, $N = 15$) reported increased use, while 24.1% ($N = 13$) reported decreased use for those patients not requiring premedication.

Contingency Testing

Contingency testing to examine the effect of the absence or presence of change in usage patterns of sedation, general anesthesia or nitrous oxide, revealed that program directors reporting decreased sedation use were significantly more likely to report a decreased use of nitrous oxide ($P < 0.05$, Table 3; see next page).

Additionally, for those programs where a decrease in both sedation and nitrous oxide use was reported, there was a significant decrease in the use of general anesthesia ($P < 0.05$).

Programs where decreased use of both IM and IV routes was reported were significantly more likely to report increased general anesthesia use ($P < 0.05$). This association was also found for those programs reporting a decrease in IV use.

There were no other significant associations among the variables of sedation, general anesthesia, and nitrous oxide.

Discussion

The past several years have witnessed significant changes in the forces that may influence the manner in which dental care is provided. Specifically, state legislation, rising malpractice insurance premiums,

TABLE 3. Contingency table: absolute counts

	<i>Inc. Sedation</i>		<i>Dec. Sedation</i>		<i>Inc. N₂O</i>		<i>Dec. N₂O</i>		<i>Dec. Sedation & Dec. N₂O</i>	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Increased GA (Y)	4	27	12	19	10	21	6	25	4	27
Increased GA (N)	5	18	7	16	5	18	7	16	4	19
Decreased GA (Y)	1	6	4	3	1	6	4	3	4**	3
Decreased GA (N)	8	39	15	32	14	33	9	38	4	43
Increased N ₂ O (Y)	4	11	7	8	-	-	-	-	-	-
Increased N ₂ O (N)	5	34	12	27	-	-	-	-	-	-
Decreased N ₂ O (Y)	3	10	8*	5	-	-	-	-	-	-
Decreased N ₂ O (N)	6	35	11	30	-	-	-	-	-	-

* $P < 0.025$

** $P < 0.001$

changing materiality standards, and adoption of sedation guidelines, are all relatively recent events that may have a profound impact on professional practice.

In their role as educators and guides for the development of philosophies of behavior management for future pediatric dentists, program directors should provide a forum that reflects the changes in society.

Overall, sedation as a behavior management tool is reported to be used less frequently. IM and IV routes of administration largely decreased, while the oral route increased. It probably is not surprising that the oral route is being used increasingly at the expense of parenteral routes. Restrictive malpractice insurance premiums or state legislation may dictate the route of administration, as Davis (1988) had suggested.

Assuming that a child is stubbornly resistant to nonrestrictive behavior management techniques, the alternatives to sedation include restraint or general anesthesia. For relatively brief procedures, restraint may seem a realistic alternative. Fields et al. (1984), however, reported that such techniques are not well accepted by parents. Although program directors report a large decrease in the use of HOM and HOMAR, the use of other physical restraints has remained largely unchanged. Since there is not a reported increase in the use of physical restraint, it appears that physical restraint is not being substituted for sedation. However, despite the diminished acceptance of physical restraint by parents, fewer than half of all directors reported a decreased use of such techniques.

The increased use of general anesthesia over the past five years is noteworthy. Presumably, from a behavioral perspective, the children being treated today are no different from those treated five years ago. There is no indication that the extent of treatment needs, sometimes used as an indication for general anesthesia, has increased in this time frame. It can only be assumed that general anesthesia, once viewed by many as a last-resort technique, is becoming a first line of treatment by de-

fault. This is precisely the scenario predicted by Schuman (1987), as he referred to the consequences of the increase in child abuse reports against dentists engaged in conventional practice. Davis (1988) ascribed a decreased use of conscious sedation to increased costs of professional liability insurance and concerns with maintaining currently accepted protocols for the administration of sedative agents. He believed that in view of recent litigation limiting the use of physical restraint, the pediatric dentist may increasingly be forced to embrace general anesthesia in more cases than now may be considered appropriate. Such a sequence of events was interpreted as a significant erosion of the hierarchy of behavior management tools available to the pediatric dentist.

The morbidities associated with general anesthetic agents are well known. The mortality rate following the administration of a general anesthetic in the pediatric population has been reported as 1:10,700 (Smith 1980). Mortality rates for sedative techniques have been reported to be as high as 1:100,000 for narcotic techniques, and negligible for non-narcotic techniques (Aubuchon 1982). The morbidities associated with the report of physical restraint techniques are less tangible for the patient, although there may be associated legal or criminal implications for the dentist (Bross 1986).

The changing usage pattern of nitrous oxide without concomitant sedation is inconsistent. Although half of all program directors reported an unchanged usage pattern, the remaining respondents were split equally between increased or decreased use. The indications for the use of nitrous oxide in children are fairly well established (McDonald and Avery 1988). Its role in the management of patients who are mildly to moderately apprehensive, but not combative, is accepted widely in pediatric dentistry (Association of Pedodontic Diplomates 1981). It is interesting to speculate on the possible rationales for changing usage patterns. Increased use of nitrous oxide may be secondary to a diminished reliance

on sedative techniques, where nitrous oxide may be used as an inappropriate substitute for sedation. This supposition, however, is not borne out by contingency testing. A decreased use of nitrous oxide may be due to environmental concerns, or to the use of substitute noninhalation techniques. A decreased use of nitrous oxide also may be due to a decreasing caries rate and decreasing severity of carious lesions; this would reduce the need for "psychosedation." Alternatively, such a decreased pattern may be due to increasing the relative numbers of sedation or general anesthesia cases. However, evaluation of contingency testing indicates that for those programs where increased nitrous oxide use was reported, there was no associated change in use of sedation. In fact, quite surprisingly, programs where decreased use of sedation was reported were more likely to report a decrease in nitrous oxide use.

Perhaps the greatest surprise is that among those programs where a decrease in both sedation and nitrous oxide use was reported, there was a concomitant decrease in the use of general anesthesia. Whether the patient population treated at these programs differed from others, or whether the intensity of treatment needs differed, is not known. It is possible that some treatment of the young, unmanageable patient was deferred, until the child no longer needed physical or pharmacological restraints.

Conclusions

Postdoctoral pediatric dental directors have reported changing usage patterns of behavioral management techniques in the past five years. These were:

1. An overall decrease in the use of sedation, composed of:
 - a) large decreases in the use of IM and IV routes of administration
 - b) increases in the use of oral sedative agents
2. Decreased use of HOM and HOMAR
3. Increased use of general anesthesia.

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