An Analysis of Behavior Management Papers Published in the Pediatric Dental Literature

Stephen Wilson, DMD, MA, PhD[1] William E. Cody, DDS[2]

Abstract

Purpose: Behavior management is considered a keystone entity in pediatric dentistry. The purpose of this article was to: (1) categorize behavior management literature primarily published in *Pediatric Dentistry* and the *Journal of Dentistry for Children* over the past 30 years to determine the quantity of survey, opinion, and clinical publication types; and (2) focus on the specific techniques of behavior management, sanctioned by the American Academy of Pediatric Dentistry, to determine the extent of evidence-based support for the techniques.

Methods: A search of articles focusing on behavior management, but excluding sedation, was conducted of *Pediatric Dentistry* and the *Journal of Dentistry for Children* from 1970 to the present time. The publications were reviewed, data on authors, titles, and publication dates entered into a spreadsheet, and the publications divided into different types for analysis.

Results: One hundred sixty-eight articles were identified and used for analysis. The number of publications involving clinical studies was less than a third (30%) of the total number of articles identified, 38% were opinion papers, and 32% were surveys or descriptions of behavior management in the dental setting. The number of clinical studies peaked in the mid1980s, and surveys have increased over the past decade.

Conclusions: The evidence-based data to support a clinical science of the effectiveness of behavior management techniques in pediatric dentistry is limited and needs further development. (Pediatr Dent 2005;27:331-338)

KEYWORDS: BEHAVIOR MANAGEMENT TECHNIQUES, REVIEW

Received August 24, 2004 Revision Accepted April 29, 2005

By design or default, pediatric dentistry has been identified and generally accepted for decades as the dental specialty responsible for the development, research, and expertise in the area of behavior management associated with the dental care of children in practice settings. This is a challenging responsibility, given the broad nature of variables that may arise in dental settings. These variables include individual psychosocial factors, parent/child/clinician relationships, nature and types of dental procedures, equipment and implications of such a collective environment, medicolegal, advocacy, and regulatory issues, safety, and long-term consequences in transitioning from childhood to adult perception and acceptance of dentistry.

The American Academy of Pediatric Dentistry (AAPD) has sponsored 2 consensus conferences on behavior management over the past 2 decades. The most recent one in Chicago in November 2003 confirmed the use of a wide variety of techniques by pediatric dentists in a variety of settings and advocated for a broad-based, open-minded approach to managing children in today's mixed culture. At that conference, however, the supportive evidence was reportedly minimal for the use of the techniques derived from prospective studies using sound scientific principles of clinical research.[1]

The purposes of this paper were to:

1. categorize behavior management literature primarily published in *Pediatric Dentistry* and the *Journal of Dentistry for Children* over the past 30 years;
2. determine the extent of evidence-based support for behavior techniques use in pediatric dentistry.

[1]*Dr. Wilson is professor and chief of dentistry, Children's Hospital, Denver, Colo, chairman, Department of Pediatric Dentistry, and associate dean for postdoctoral programs, University of Colorado School of Dentistry, Denver, Colo;* [2]*Dr. Cody is professor, Department of Pediatric Dentistry, University of Colorado School of Dentistry. Correspond with Dr. Wilson at wilson.stephen@tchden.org*

Methods

A search was conducted with primary focus confined to the journals of *Pediatric Dentistry* and the *Journal of Dentistry for Children*. Every issue of each journal, from 1970 to the present time, was searched for articles relating in some fashion to behavior management. Additionally, a Medline search was conducted done for other publications involving child behavior management. The authors, titles, and publication dates were entered into a spreadsheet. Finally, an attempt was made to divide publications into 3 subgroups based on the study type (ie, opinion paper, survey or observation, and clinical study). Sedation articles were excluded, even if their full or partial aim was the assessment of sedative agents on behavior. A descriptive analysis was completed on the data set.

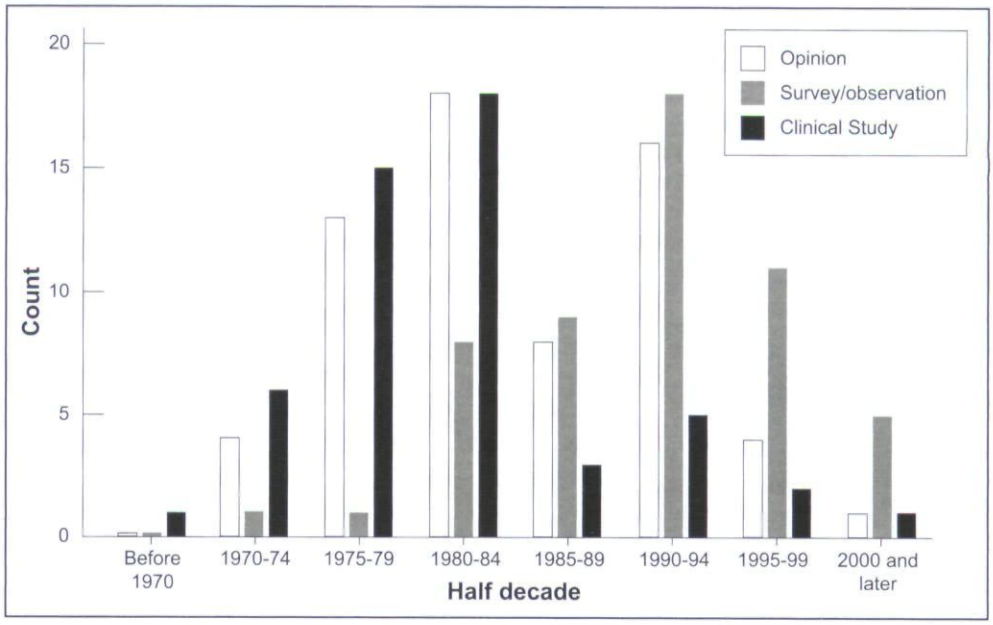

Figure 1. Frequency distribution of type of article on behavior management of children as a function of publication year

Quantitative analysis of behavior management studies

The search generated some interesting results and trends. Although it was difficult to locate articles based on a selection criterion of relevancy to behavior management techniques, 168 total articles were identified as containing a theme related to behavior management and used in the data set for analysis. (Note: the data set was not identical to the references in the body of this article.)

The number of publications exclusively involving clinical studies was less than a third (30%) of the total number of publications identified, whereas 38% were opinion papers and the remaining (32%) were surveys or descriptions of behavior in the dental setting. It is noteworthy that the number of clinical studies associated with some aspect of behavior management peaked in the 1980s and has continued to drop in frequency in the past decade (Figure 1). In contrast, the number of opinion papers has remained variable but stable, and surveys related to behavior management techniques are increasing in frequency. A relatively small proportion of articles were actually related to specific techniques (eg, voice control), their effectiveness, and outcomes when used.

Analysis of evidence-based studies on behavior management techniques

A review of the AAPD's current Reference Manual indicates that behavior management is divided into 2 major classifications:

1. "basic" behavior management typically involving communicative interactions;
2. "advanced" behavior management involving pharmacological or more physical mediated control of the patient (eg, medical immobilization).[2]

The techniques listed in the Reference Manual, although not inclusive, are: (1) voice control; (2) nonverbal communications (ie, body posturing and facial expression); (3) tell-show-do; (4) positive reinforcement; (5) distraction; (6) presence/absence of parent; (7) hand-over-mouth exercise; (8) medical immobilization; (9) inhalational and other sedation routes; and (10) general anesthesia. A literature search suggests that sedation studies are more numerous than studies of the other techniques, but a broad review of sedation studies will be deferred at this time.

Communicative techniques

Tell-show-do (TSD) is promoted as the hallmark of behavior management in pediatric dentistry. In essence, it refers to:

1. describing to and informing the patient about what the dentist or dental staff is about to do;
2. performing a minor demonstration or describing a visual image of what is about to happen; and
3. actually performing or doing the task described.

TSD, although one of the most commonly taught behavior management techniques, has never been assessed scientifically as a single isolated technique, to the best of the authors' knowledge. Some indirect evidence suggests that, when combined with other techniques such as distraction, there is some positive, albeit unclear and confounding, effect.[3,4]

The lack of scientific scrutiny, however, does not negate the likelihood that the technique is helpful in some fashion in guiding behaviors. Its predominance as the single, most frequently used technique[5] would suggest that, at a minimum, it has a neutral—if not beneficial—effect. What might be informative in understanding TSD is a breakdown of the effectiveness and interaction of the 3 elements in guiding behavior in the short- and long-term learning and acceptance of dental procedures (ie, are the words conveyed or the manner in which they are conveyed more important than the task's demonstration or actual performance?). There may be some indirect evidence that familiarization and prior information has little if any effect on reducing anxiety in children receiving dental care,[6] despite one's belief that such processes would be helpful. Hence, there is a need for further research into factors supportive of the effectiveness of TSD.

Voice control, or the modulation of the voice during speech to gain the patient's attention, has been studied.[7-10] The most scientifically based study was conducted in 1990 by Greenbaum et al,[10] who studied 40 children ranging from 3.5 to 7 years of age in an academic clinical setting. All children were seen for a cavity restoration and selected for the study because of their potential for behavior problems. Three pediatric dentists, experienced in voice control and who routinely used voice control in their daily practices, participated.

Prior to arrival, children were randomly assigned to one of 2 conditions of either a "loud" or "normal" voice command. For the loud-voice condition, a sudden, loud, and firm command was issued when the child's behavior disrupted treatment. In the normal-voice condition, similar verbal commands were given when the child disrupted treatment. Standardized scripts of what was to be said were not used. A third group, which did not interrupt treatment and received no voice commands, constituted a nonexperimental control group. Each child was assessed with the children's fear survey schedule and the self-assessment mannequin. Once these assessments were done, the child was taken to an operatory where cavity restorations were completed. All restorations included an injection, rubber dam placement, use of a high-speed drill, and completion of an amalgam restoration. During this time, a video camera taped the child's behavior. Later, the tapes were scored using the behavior profile rating scale designed to measure a child's overt fear and disruptive behaviors. The duration of 22 different disruptive behaviors were scored. Two independent and blinded raters scored the tapes.

The groups did not vary significantly in terms of background variables (eg, gender, self-reported dental fears), and the mean age was 60 months. Approximately 50% of the children (58% of whom were boys) in each group had never received previous dental treatment. There was no statistical difference among groups in terms of rated fear or affect related to dentistry. Strength of voice commands was rated by a naïve evaluator, who sorted cases into the experimental conditions. Verbal content and quality of what the dentists actually said during the voice commands were also rated.

The results indicated that voice commands occurred when disruption increased to the point at which treatment stopped. There was no difference, however, between groups over time in terms of voice control onset. There were significant differences in postintervention behaviors between groups during the 10 seconds following the dentist's commands. The loud-voice group was less disruptive, indicating that the loud voice was effective. The effectiveness in minimizing disruptiveness lasted at least 2 minutes following intervention.

In contrast, the normal voice had little effect on disruptive behaviors and during posttreatment the children reported being more aroused. Furthermore, there was no lingering change in affect between groups after the restorative treatment was completed. The authors concluded the therapeutic punishment procedure of voice control, when applied contingent on disruptive behaviors, was highly effective at reducing children's disruptive behaviors during restorative treatment without causing increased affective or fear response in the children after treatment was completed.

This was a well-controlled study, conducted in the late 1980s, that demonstrated the effectiveness of voice modulation in reducing the interruptive behaviors of children. It is unclear if parents were present during the restorative treatment. Today, parents are often present in the operatory in institutional settings and may object to behavior management techniques, including voice control, if they aren't fully informed of the rationale, timing, and contingencies associated with such techniques prior to their onset.[11-13]

Distraction or the deflection of the patient's attention away from a potentially harmful procedure or situation is a well-established technique in pediatric dentistry.[5,14-18] Typically, verbal distraction is used during the local anesthetic injection, but other modalities—including cartoons, videos, and music—have been used either in contingent or noncontingent formats with pediatric patients.[14,17,19-21] The evidence would suggest that contingent or distraction, mediated under conditions of positive reinforcement principles, may be more effective that noncontingent format using visual stimuli.[20,21] The evidence is less clear, however, using auditory stimuli.[14,19]

Much attention has been given recently to the issue of whether a parent's presence in an operatory is a natural distraction to the development of a positive rapport between the patient and dentist.[22-25] This issue has not been studied in a randomized, well-controlled group or crossover design. Therefore, data supporting or refuting a parent's direct influence and under what circumstances that influence has the most impact are not readily unavailable; yet many speculative innuendoes and anecdotal stories would suggest that the influence is considerable.

Kamp[25] surveyed parent's preference for being present in the dental operatory, whereas Cipes and Miraglia[23] sur-

veyed dentists in private settings and pediatric dental residents regarding parental presence. Kamp's study involved parents stationed at an Air Force base, and the sample involved 79 adults. Of the adults, 77% were mothers of the children and ranged in age from 22 to 46 years, with the mean age of the children being 7 years. Most parents had completed some college work, and 67% had previously accompanied their child into the dental operatory. Sixty-six percent of the parents preferred to be present with their child, 85% indicated they would feel better if present, and 92% thought their child would feel better. On the other hand, 63% who did not wish to be present thought their presence would cause the child to misbehave. Generally, parents wanting to be present had younger children or were accompanying their child to an initial visit.

Cipes and Miraglia[23] sent a survey to practicing pediatric dentists in Connecticut as well as pediatric dental residents in Connecticut and asked about their preference for having parents in the operatory when 3- to 5-year-old patients were being seen. Of the state pediatric dentists, 71% allowed parents to be present for examinations, but only 55% allowed parents to be present for treatment visits. With the residents, this contrasted to 100% for examinations and 99% for treatment. Also noteworthy was the relationship between the length of time in practice and the likelihood of not allowing parents in the operatory during both examination and treatment.

The questions surrounding whether parental presence has a beneficial or detrimental effect and under what conditions each becomes manifested remain unanswered, but are of significant clinical and medicolegal importance. Furthermore, this is a multifaceted puzzle with the possibility for several interactions and interpretations involving:

1. professional philosophy and adaptability;
2. parental characteristics related to willingness and participation in both scenarios, including educational programs for parents;
3. adequate measures of behavioral changes;
4. issues related to medicolegal opinions.

Other communicative techniques or those based on basic reinforcement theory or modeling have been studied and generally are successful.[4,5,16,26-45] One can gain an interesting perspective of the transitional aspect of behavior management over time by reviewing several surveys on the topic of behavior management.[5,46-51] Although somewhat dated today, one of the most comprehensive reviews of studies on pediatric dental fear, its measurements, child development, and behavior management was conducted by Winer.[52]

Advanced techniques

Restraints, medical immobilization, and "protective stabilization" (recommended recently at the AAPD November 2003 Behavior Management Conference) have been used for centuries. Only a few articles on restraints and pediatric dentistry have been published.[53-55] Restraints are devices, wraps, or other individuals assisting in the dental operatory that are designed to prevent patients from causing harm to themselves and to the dental personnel. The devices can also include mouth props or "gags" to keep the jaws in a restrained, open position.[54] Because of the rationale for the use of restraints (ie, patient and dental personnel safety), it may be difficult to conduct a study using scientifically based procedures such as a placebo group. Nonetheless, some prospective studies could be developed to assess the short- and long-term impact of the use of restraints on the child as well as its use and outcome for the patient.

Only two studies specifically addressing the use of the Papoose Board (Olympic Medical Corp, Seattle, Wash) have been published.[55,56] One addressed a modification to the Papoose Board to facilitate the opening of the airway during sedation appointments.[56] In the other, Frankel[55] conducted a survey of parents attending his private practice and whose children were restrained in a papoose board. In his study, 59 mothers returned his survey. The mean age of the mothers and the restrained children was 29.7 and 3.1 years, respectively.

He reported that, in general, the majority of mothers:

1. thought the Papoose Board:
   a. was necessary for their children;
   b. aided in the delivery of dental care;
   c. didn't cause the children to become more afraid;
   d. had no residual negative effect;
2. believed their children had no memory of the Papoose Board;
3. wished to hold their child's hand while he/she was restrained and be present for the restraint appointment;
4. thought the Papoose Board was preferred over a trip to the hospital for general anesthesia;
5. felt that physically holding a child in the chair would result in an unsuccessful outcome;
6. believed the child cried out of fear of their environment and not specifically due to the Papoose Board.

A minority of mothers, however, believed that their children were not comfortable, resulting in a residual negative effect.

This article provides some interesting insight into the experiences of mothers who watched their children restrained in a Papoose Board for dental procedures. Nonetheless, the study has some shortcomings, some of which were noted by the study's author. The sample of parents is small and biased. The parents were not exposed to and did not witness Papoose Board alternatives. There were no control groups, and the study was retrospective in nature. Other studies showing video clips of behavior management techniques have shown that the Papoose Board is often negatively perceived unless sufficient information is provided regarding the description of its use or it is used for emergency purposes.[11-13,57,58]

There are approximately 10 publications related to the hand-over-mouth exercise (HOME).[59-66] Most of these are surveys or a description of the technique,[59-61,63-66] but a few

describe outcome data related to the use of HOME.[62,67] No studies have been completed in which comprehensive scientific principles have been applied, such as the use of prospective paradigms, randomization, and use of control (eg, placebo vs comparison) groups. Therefore, little information is available about the technique's effectiveness, efficiency, or consequences.

Hartmann et al[67] reported on the incidence and use of HOME over a 58-month period in a private practice setting in which 1,773 patients were seen for a total of 10,576 appointments. The patients came primarily from a white middle-class background, and 57% were males and 43% were females. The age range was from 1 to 19 years, with a mean of 7.6 years. They indicated that HOME's purpose was to gain the attention of a hysterical child so that the child can listen to what is being communicated by the dentist.

HOME was used on 172 (10%) patients, and the total number of HOME episodes was 193 (2%). Of the patients on whom HOME was used, 88% were 48 months old or younger and HOME was applied slightly more frequently to females (55%) than males (45%). Most children (89%) received HOME on one occasion, and the most likely time for HOME to be utilized was during an examination. It was used less frequently during treatment only or in a small minority (3%) at both examination and treatment appointments.

This study constitutes the only known one of its kind in which the incidence of HOME is used in a private practice setting. The number of patients seen is somewhat robust. There are several issues that were not reported, however, that may have affected the study's outcome. It is not clear if a single or multiple operators were responsible for the use of all HOMEs and what the gender of the operator(s) was. Also unclear is whether parents were present at the time of the HOME or if they had given informed consent to the use of HOME prior to its application. There is no description of what stimulus or configuration of factors prompted the use of HOME and whether these factors were applied consistently across all patients. The study, as confirmed by the authors, did not report on the use of any outcome measures designed to assess HOME's emotional or psychosocial effect on those who received it.

Barton et al[62] conducted the only study that indirectly assessed the likelihood of general or specific (ie, dental) fears occurring, comparing those that experienced HOME/restraint to a comparison group that did not. They did a retrospective interview survey of patients seen either in a private practice setting or in a university-based children's dental clinic. One of the selection criteria was that the patient had to be 10 years of age or older to participate in the survey. At least 50 patients per group were interviewed. A pilot study, developed by 3 independent researchers, identified problems with interview and questioning techniques. A pediatric dentist and trained staff member conducted the interviews before or after a patient visit over a 4-month period. Information on gender, current age, and age at the time of HOME/restraint, among other factors, was collected. The survey questions dealt with a set of general fears (eg, the dark) and with dental settings (eg, the needle). Questioning for memory of past dental experiences was also done.

The age range over which HOME/restraint occurred was from 2 to 13 years, with the majority (69%) occurring before 7 years of age. The mean time elapsed from HOME/restraint experience to the current interview period was 8 years, 7 months. A chi-square analysis indicated no significant difference between groups for frequency of recall of generalized or dental fears. Snakes provoked the most frequent fearful response in the comparison and HOME/restraint groups. The needle was the most frequent dental fear for both groups. Only 1 of 61 patients indicated a past dental experience of "being held down." There was no difference between groups in terms of early memories that affect their feelings about seeing a dentist currently (no effect in 72% HOME/restraint vs 77% comparison). The majority in both groups thought going to a dentist was positive, with a negative response occurring in 16% of the HOME/restraint compared to 12% in the comparison group. Females generally recalled more negative memories than males, especially when more time intervened between the negative experience and the memory's recall.

The authors concluded that the majority of children do not remember nor seem to be affected by early HOME/restraint experiences, even when placed in a dental setting and asked questions designed to elicit recall of past dental experiences. They also reported on several studies indicating that negative childhood memories are not likely to be recalled, especially if the experience occurs before 4 years of age. From a theoretical and developmental perspective, they reported that Piaget would predict an amnesia effect because, at very early childhood ages, experiences are not organized and, thus, are not recalled due to an immature memory system.[62]

This study did not provide an analysis of how many received HOME or restraint or both, and, thus, no subsampling of effects was available. Furthermore, it is unclear if the control group (or, for that matter, the experimental group) had any negative dental experiences outside of the 2 settings studied or whether consistency in recording of such experiences occurred. They also did not specifically ask each subject if they were ever restrained or had their airway blocked or mouth covered, which may have corroborated Piaget and other supportive studies.[62]

Discussion

This review was instigated, in part, from an interest in understanding the basis of behavior management as an evidenced-based clinical discipline primarily allocated to the domain and profession of pediatric dentistry. The result of the review suggests a dearth of studies addressing specific behavior management techniques, whether com-

municative or advanced. Furthermore, there appears to be a distinct decline, since the mid 1980s, in the number of studies with topics focused on a given behavior management technique. On the contrary, surveys and opinions or descriptions of techniques are more plentiful in our literature, accounting for the majority of publications on behavior management. These surveys and technique opinions/descriptions may potentially provide a resource pool for future investigations or directions for the AAPD to pursue.

There may be several reasons for this trend. Certainly, one of the more challenging and difficult types of studies to complete, in terms of content and context, design, logistics, time, and resources is the well-controlled, prospective study. Pediatric dentists have been exposed to literature in their training programs (and likely in their private practice) for years. They may not have received standardized training and understanding in study design and statistical manipulation of data, however, nor the encouragement or resources to pursue research activities as a part of their professional life.[68] Hence, one's feelings of competency to produce clinical research or ability to identify resource mechanisms to continuously produce such studies may be limited. The profession needs to address whether research endeavors are best indoctrinated as a fundamental part and process of the profession or if they are better approached through identification and support of more outsourcing of resources to accomplish research goals.

Postulating that parenting and child-rearing skills and other societal forces are changing and possibly interfering with the enlistment of children into such studies is not unthinkable.[69] Likewise, the ability to recruit, justify, and perform scientifically sound clinical studies may be more limited in today's litigious society. In this current environment, the design, context, extent of procedural formats, and interpretation of potential physical and psychological harm approved by institutional review boards (IRB) are highly regimented and regulated and often present significant barriers to the efficiency of performing such studies. For instance, this paper's authors are aware that the study of voice control has been interpreted in recent times by an IRB as unnecessary because of the perceived inappropriateness of raising one's voice to a youngster.

Interestingly, it was noted several decades ago that much of the foundation of behavior management techniques used in pediatric dentistry may be borrowed from other disciplines.[70] Also, it is informative that the references cited in the current Guidelines on Behavior Management of the AAPD's 2003-04 Reference Manual – excluding the reference to the Academy's sedation guidelines – are, for the most part, from the late 1970s and early 1980s and, thus, over a decade old. A Medline search suggests that the last article, excluding review or sedation articles or abstracts, that specifically addressed the use of a behavior management technique (ie, hypnosis) was published about a decade ago.[71]

Conclusions

The following can be concluded from this review:

1. There are numerous clinical studies, surveys, and opinions written on the subject of behavior management techniques in the field of pediatric dentistry.
2. Most articles are opinion based, descriptive, or surveys in nature, with less than a third based on clinical protocols incorporating the use of sound scientific principles and methodology.
3. There is minimal evidence derived from clinical studies on techniques used to control children's behaviors and responses to dentistry and published in the principal journals of our profession.
4. Many questions remain regarding the effectiveness and efficiency of clinical protocols associated with behavior management.
5. The potential for future behavior management studies is great.

References

1. Adair SM. Behavior management conference panel I report–rationale for behavior management techniques in pediatric dentistry. Pediatr Dent 2004;26:167-170.
2. Reference Manual 2002-03. Pediatr Dent 2002;24: 68-73.
3. Holst A, Crossner CG. Management of dental behavior problems. A 5-year follow-up. Swed Dent J 1984; 8:243-249.
4. Kaakko T, Riedy CA, Nakai Y, Domoto P, Weinstein P, Milgrom P. Taking bitewing radiographs in preschoolers using behavior management techniques. J Dent Child 1999; 66:320-324.
5. Allen KD, Stanley RT, McPherson K. Evaluation of behavior management technology dissemination in pediatric dentistry. Pediatr Dent 1990;12:79-82.
6. Herbertt RM, Innes JM. Familiarization and preparatory information in the reduction of anxiety in child dental patients. J Dent Child 1979;46:319-323.
7. Chambers DW. Communicating with the young dental patient. J Am Dent Assoc 1976;93:793-799.
8. Pinkham JR, Paterson JR. Voice control: An old technique re-examined. J Dent Child 1985;52:199-202.
9. Roberts JF. How important are techniques? The empathic approach to working with children. J Dent Child 1995;62:38-43.
10. Greenbaum PE, Turner C, Cook EW III, Melamed BG. Dentists' voice control: effects on children's disruptive and affective behavior. Health Psychol 1990; 9:546-558.
11. Brandes DA, Wilson S, Preisch JW, Casamassimo PS. A comparison of opinions from parents of disabled and nondisabled children on behavior management techniques used in dentistry. Spec Care Dentist 1995; 15:119-123.
12. Havelka C, McTigue D, Wilson S, Odom J. The influence of social status and prior explanation on

parental attitudes toward behavior management techniques. Pediatr Dent 1992;14:376-381.
13. Lawrence SM, McTigue DJ, Wilson S, Odom JG, Waggoner WF, Fields HW Jr. Parental attitudes toward behavior management techniques used in pediatric dentistry. Pediatr Dent 1991;13:151-155.
14. Aitken JC, Wilson S, Coury D, Moursi AM. The effect of music distraction on pain, anxiety, and behavior in pediatric dental patients. Pediatr Dent 2002;24:114-118.
15. Buchanan H, Niven N. Self-report treatment techniques used by dentists to treat dentally anxious children: A preliminary investigation. Int J Paediatr Dent 2003;13:9-12.
16. Ingersoll BD, Nash DA, Blount RL, Gamber C. Distraction and contingent reinforcement with pediatric dental patients. J Dent Child 1984;51:203-207.
17. Peretz B, Gluck GM. Assessing an active distracting technique for local anesthetic injection in pediatric dental patients: repeated deep breathing and blowing out air. J Clin Pediatr Dent 1999;24:5-8.
18. Venham LL, Goldstein M, Gaulin-Kremer E, Peteros K, Cohan J, Fairbanks J. Effectiveness of a distraction technique in managing young dental patients. Pediatr Dent 1981;3:7-11.
19. Parkin SF. The effect of ambient music upon the reactions of children undergoing dental treatment. J Dent Child 1981;48:430-432.
20. Venham L, Goldstein M, Gaulin-Kremer E, Peteros K, Cohan J, Fairbanks J. Effectiveness of a distraction technique in managing young dental patients. Pediatr Dent 1981;3:7-11.
21. Ingersoll BD, Nash DA, Blount RL, Gamber C. Distraction and contingent reinforcement with pediatric dental patients. Pediatr Dent 1984;6:203-207.
22. Pinkham JR. An analysis of the phenomenon of increased parental participation during the child's dental experience. J Dent Child 1991;58:458-463.
23. Cipes MH, Miraglia M. Pedodontists' attitudes toward parental presence during children's dental visits. J Dent Child 1985;52:341-343.
24. Martin BJ, Stewart JS, Spencer P. An innovative approach to working with parents. Dent Child 1984; 51:434-437.
25. Kamp AA. Parent child separation during dental care: a survey of parent's preference. Pediatr Dent 1992;14: 231-235.
26. Allen KD, Stark LJ, Rigney BA, Nash DA, Stokes TF. Reinforced practice of children's cooperative behavior during restorative dental treatment. J Dent Child 1988;55:273-237.
27. Allen KD, Stokes TF. Use of escape and reward in the management of young children during dental treatment. J Appl Behav Anal 1987;20:381-390.
28. Barenie JT, Ripa LW. The use of behavior modification techniques to successfully manage the child dental patient. J Am Dent Assoc 1977;94:329-334.
29. Drash PW. Behavior modification: new tools for use in pediatric dentistry with the handicapped child. Dent Clin North Am 1974;18:617-631.
30. Gordon DA, Terdal L, Sterling E. The use of modeling and desensitization in the treatment of a phobic child patient. J Dent Child 1974;41:102-105.
31. Greenbaum PE, Melamed BG. Pretreatment modeling: a technique for reducing children's fear in the dental operatory. Dent Clin North Am 1988;32:693-704.
32. Holst A. Behaviour management problems in child dentistry: Frequency, therapy and prediction. Swed Dent J 1988;54:1-55.
33. Ingersoll BD, Nash DA, Gamber C. The use of contingent audiotaped material with pediatric dental patients. J Am Dent Assoc 1984;109:717-719.
34. Kohlenberg R, Greenberg D, Reymore L, Hass G. Behavior modification and the management of mentally retarded dental patients. J Dent Child 1972;39: 61-67.
35. Melamed BG, Bennett CG, Jerrell G, et al. Dentists' behavior management as it affects compliance and fear in pediatric patients. J Am Dent Assoc 1983;106:324-330.
36. Melamed BG, Hawes RR, Heiby E, Glick J. Use of filmed modeling to reduce uncooperative behavior of children during dental treatment. J Dent Res 1975;54: 797-801.
37. Melamed BG, Siegel LJ. Reduction of anxiety in children facing hospitalization and surgery by use of filmed modeling. J Consult Clin Psychol 1975;43 :511-521.
38. Melamed BG, Weinstein D, Katin-Borland M, Hawes R. Reduction of fear-related dental management problems with use of filmed modeling. J Am Dent Assoc 1975;90:822-826.
39. Melamed BG, Yurcheson R, Fleece EL, Hutcherson S, Hawes R. Effects of film modeling on the reduction of anxiety-related behaviors in individuals varying in level of previous experience in the stress situation. J Consult Clin Psychol 1978;46:1357-1367.
40. Rosenberg HM. Behavior modification for the child dental patient. J Dent Child 1974;41:111-114.
41. Adelson R, Goldfried MR. Modeling and the fearful child patient. J Dent Child 1970;37:476-489.
42. Fields H, Pinkham J. Videotape modeling of the child dental patient. J Dent Res 1976;55:958-963.
43. Stokes TF, Kennedy SH. Reducing child uncooperative behavior during dental treatment through modeling and reinforcement. J Appl Behav Anal 1980; 13:41-49.
44. Allen KD, Loiben T, Allen SJ, Stanley RT. Dentist-implemented contingent escape for management of disruptive child behavior. J Appl Behav Anal 1992; 25:629-636.
45. Rubenstein L, Mourino AP. Time-out: an evaluation of a behavior management technique. Pediatr Dent 1983;5:109-112.

46. Survey of attitudes and practices in behavior management. Association of Pedodontic Diplomates. Pediatr Dent 1981;3:246-250.
47. Choate BB, Seale NS, Parker WA, Wilson CF. Current trends in behavior management techniques as they relate to new standards concerning informed consent. Pediatr Dent 1990;12:83-86.
48. Levy RL, Domoto PK. Current techniques for behavior management: A survey. Pediatr Dent 1979; 1:160-164.
49. McKnight-Hanes C, Myers DR, Dushku JC, Davis HC. The use of behavior management techniques by dentists across practitioner type, age, and geographic region. Pediatr Dent 1993;15:267-271.
50. Technique for behavior management—a survey. The Association of Pedodontic Diplomates. J Dent Child 1972;39:368-372.
51. Tilliss TS. Behavior management techniques in predoctoral and postdoctoral pediatric dentistry programs. J Dent Educ 1993;57:232-238.
52. Winer GA. A review and analysis of children's fearful behavior in dental settings. Child Dev 1982;53:1111-1133.
53. Klein A. Behavior management issues for pediatric patients. J Am Dent Assoc 1991;122:70-72.
54. Kelly JR. The use of restraints in pedodontics. J Pedod 1976;1:57-68.
55. Frankel RI. The papoose board and mothers' attitudes following its use. Pediatr Dent 1991;13:284-288.
56. Adair SM, Durr DP. Modification of Papoose Board restraint to facilitate airway management of the sedated pediatric dental patient. Pediatr Dent 1987;9: 163-165.
57. Murphy MG, Fields HW Jr, Machen JB. Parental acceptance of pediatric dentistry behavior management techniques. Pediatr Dent 1984;6:193-198.
58. Peretz B, Zadik D. Parents' attitudes toward behavior management techniques during dental treatment. Pediatr Dent 1999;21:201-204.
59. Davis MJ, Rombom HM. Survey of the utilization of and rationale for hand-over-mouth (HOM) and restraint in postdoctoral pedodontic education. Pediatr Dent 1979;1:87-90.
60. Acs G, Burke MJ, Musson CM. An updated survey on the utilization of hand over mouth (HOM) and restraint in postdoctoral pediatric dental education. Pediatr Dent 1990;12:298-302.
61. Acs G, Hersch G, Testen RD, Ng MW. A 20-year perspective on the changing use of hand over mouth (HOM) and restraint in postdoctoral pediatric dental education. Pediatr Dent 2001;23:301-306.
62. Barton DH, Hatcher E, Potter R, Henderson HZ. Dental attitudes and memories: a study of the effects of hand over mouth/restraint. Pediatr Dent 1993;15:13-19.
63. Rombom HM. Behavioral techniques in pedodontics: the hand-over-mouth technique. J Dent Child 1993;48:208-210.
64. Levitas TC. HOME-hand over mouth exercise. J Dent Child 1974;41:178-182.
65. Bowers LT. The legality of using hand-over-mouth exercise for management of child behavior. J Dent Child 1982;49:257-265.
66. Forehand R, Long N. Strong-willed children: A challenge to parents and pediatric dentists. Pediatr Dent 1999;21:463-468.
67. Hartmann C, Pruhs RJ, Taft TB Jr. Hand-over-mouth behavior management technique in a solo pedodontic practice: A study. J Dent Child 1985; 52:293-296.
68. Rhodes A, Wilson S. Research in pediatric dental postgraduate programs and residencies: Results of a survey. Pediatr Dent 2004;26:75-78.
69. Casamassimo PS, Wilson S, Gross L. Effects of changing US parenting styles on dental practice: Perceptions of diplomates of the American Board of Pediatric Dentistry presented to the College of Diplomates of the American Board of Pediatric Dentistry 16th Annual Session, Atlanta, Ga, Saturday, May 26, 2001. Pediatr Dent 2002;24:18-22.
70. Chambers DW. Behavior management techniques for pediatric dentists: an embarrassment of riches. J Dent Child 1977;44:30-34.
71. Gokli MA, Wood AJ, Mourino AP, Farrington FH, Best AM. Hypnosis as an adjunct to the administration of local anesthetic in pediatric patients. J Dent Child 1994;61:272-275.