Expanding child behavior management technology in pediatric dentistry: a behavioral science perspective

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Abstract

Changing attitudes on the part of dentists and parents alike have resulted in increasing interest by dentists to develop additional child behavior management techniques. Collaborative research between dentists and behavioral psychologists has been encouraged by the American Academy of Pediatric Dentistry (AAPD) to address these concerns, but additional research is needed. This paper describes three techniques that, from a behavioral science perspective, offer promise for pediatric dentists managing disruptive children. In addition to scientific appeal, these techniques appear to have potential for acceptance and incorporation into the dental operatory. Although early research suggests these procedures can fit easily into routine practice, are time and cost efficient, and are relatively easy to learn, additional research is needed to clearly establish their external validity, cost efficiency, and ease of implementation. The discussion focuses on issues relevant to incorporating new technology into the dental school curriculum and disseminating it to practicing dentists. (Pediatr Dent 16:13–17, 1994)

Behavior management is as fundamental to the successful treatment of children as are handpiece skills and knowledge of dental materials.[1] Disruptive behavior can interfere significantly with providing quality dental care, resulting in increased delivery time and risk of injury to the child. In fact, surveys of clinicians have found that dentists consider the uncooperative child to be among the most troublesome problems in clinical practice.[2] Recent findings suggest that nearly one in four children (22%) seen by pediatric dentists may present marked management problems.[3] These difficulties have lead to the development of a well-established child behavior management armamentarium for dentists. For example, the American Academy of Pediatric Dentistry (AAPD) recently endorsed 10 behavior management methods in their 1991–1992 *Guidelines for Behavior Management*.[4] Five consist of communicative management techniques, including: voice control, tell-show-do, positive reinforcement, distraction, and nonverbal communication. Also listed are the hand-over-mouth (HOM) technique and physical restraint. The last three methods comprise pharmacological interventions such as conscious sedation, nitrous oxide, and general anesthesia. The focus of this paper, however, is the nonpharmacological management of children's problem behavior.

Two decades ago, the use of these 10 traditional behavior management techniques in the dental clinic generally was accepted without question. However, societal and professional views on managing child behavior have changed dramatically in the past 20 years. Today, there is increased scrutiny by both parents and dentists because: 1) the traditional behavioral techniques do not always work with all children; 2) changes in community standards have resulted in parental objection to techniques like HOM, physical restraint, and pharmacological intervention;[5–7] and 3) changes in legal and ethical standards have made many dentists hesitant to use some of the traditional techniques because of increased concern over liability and risk management.[8,9]

As a result, many dentists are interested in additional noninvasive, acceptable alternatives. For example, more than half of the respondents to a recent survey believed there was insufficient information available to them on current anxiety/behavior management techniques.[10] Research between dentists and behavioral psychologists may help address these concerns. To the technical and management expertise of dentists, behavioral psychologists can contribute an understanding of the interface between child development and principles of behavior management, resulting in collaboration that offers considerable promise. Indeed, the AAPD has called for interdisciplinary research with behavioral scientists to identify new noninvasive procedures to help dentists deal with disruptive and uncooperative children.[11] Consistent with the AAPD call, other disciplines are promoting collaboration with behavioral psychologists to enhance education and research. For example, accredited pediatric residency programs now require exposure to behavioral and developmental issues.[12]

As behavioral scientists, we offer several observations concerning the research and development of child behavior management techniques in pediatric dentistry. We acknowledge our limited understanding of dental technology, but believe our considerable experience in managing difficult children in a variety of clinical settings, including the dental clinic, may make these observations valuable. Consider then, that while devel-

oping new techniques is important and has certain appeal, we believe it may be fruitful also to promote exposure to those promising techniques that already possess an initial research base, but have not received enough support or attention to be incorporated into common dental practice. The purpose of this paper is to summarize three of these techniques and to stimulate renewed interest in further research and, perhaps, dissemination to practicing dentists.

The three management techniques presented were chosen based on initial research efficacy with pediatric populations. All three management procedures are relatively nonintrusive and do not require additional personnel or significant alterations in the existing dental routine. The techniques are not cumbersome to implement and have been (or can be) adapted to fit into the existing dental routine. Finally, these particular management techniques have conceptual appeal, as they are consistent with our current understanding about why children behave the way they do, particularly in situations where escape and avoidance behaviors are likely.

Contingent distraction

Some pediatric dental patients' disruptive behavior can be controlled by diverting their attention and engaging them in alternative activities like watching TV, playing video games, or listening to audiotaped stories. Distraction is thought to gain control over an aspect of the patient's capability to respond (i.e., paying attention) that is incompatible with disruptive behavior.[13] Overall, scientific studies looking at the use of various distraction procedures in the dental operatory have yielded mixed results.[14–18] Typical distracting stimuli do not appear to compete well with the more potent reinforcement obtained from disruptive behavior (i.e., temporary escape from an undesirable situation[19]). A recent effort to overcome this problem involved enhancing the saliency of the distracting stimuli by providing a requirement that demanded attention to the distracting stimulus. This procedure proved highly effective in decreasing anxious and disruptive behavior in children.[13] Unfortunately, the distraction technique was complicated and required additional time, as well as other nondental personnel to implement.

Ingersoll and her colleagues, however, developed a distraction procedure that required very few additional resources. Their work suggests that children's disruptive behavior can be reduced by making access to a distracter such as an audio tape, dependent (contingent) upon cooperative behavior, as opposed to providing unlimited access to audiotapes.[20, 21] Children were informed that they could listen to audio taped material through headphones, as long as they remained cooperative. Each time the child became disruptive or uncooperative, the dentist immediately terminated the audio presentation and did not reinstate it until the child exhibited cooperative behavior. Three- to 9-year-old children in the contingent distraction group exhibited decreased levels of disruptive behavior (30–6%), while children in the noncontingent distraction group remained the same (28–28%) and children in the control group increased (31–37%).

Initial research studies suggest that contingent distraction may be an effective, yet practical means of reducing problem behavior. Start-up costs are modest and the equipment can be operated by means of a foot pedal so as not to interrupt ongoing activities. Replication is needed, and future research should focus on evaluating the efficacy of contingent distraction with patients selected for more severe levels (> 30%) of disruptive behavior, and with children younger than 4 years old. In addition, while there is no reason to believe that other forms of distraction (i.e., video games) wouldn't be equally effective, further research is needed to identify those distracters that are most salient, yet easily accessed by pediatric patients. The ease of implementation and minimal cost suggests that incorporating this tool into the standard operatory procedures holds considerable promise even as a preventative measure.

Live modeling

Permitting children to observe other children adaptively undergoing dental treatment is an effective way of preparing them to accept treatment and to demonstrate what is expected of them.[22] Numerous studies have shown the efficacy of filmed modeling in reducing fear-related disruptive behavior.[23–27] However, practicing dentists have not incorporated filmed modeling into their management regimen,[3, 10] possibly due to the economic and logistical difficulties of making one's own video and accessing playback equipment. Research has demonstrated, however, that dentists can obtain marked reductions in disruptive behavior by simply allowing children to observe one another during dental treatment. In a study by Stokes and Kennedy,[28] children first observed 10–15 min of another child receiving dental treatment, and then served as a model for a peer while receiving their own treatment. Substantial decreases in disruptive behavior were observed for children previously identified by the dentist as a severe management problem. A followup investigation[29] studied live modeling during more invasive dental procedures, and determined that simply *being observed by peers* during dental procedures was sufficient to decrease levels of disruptive behavior. The researchers felt that these children were more cooperative because being observed by the next patient placed them in the role of a coping model. An important advantage of live modeling is that no additional equipment, personnel, or alterations in the dental routine are required.

Future research is needed to assess the efficacy of live modeling with larger numbers and a wider age range of pediatric patients. In addition, while the procedure has been shown to reduce uncooperative behavior for children referred specifically for disruptive behavior, further research might evaluate the efficacy and/or necessity with less problematic children. Unlike many other nontraditional management techniques, there is some evidence that live modeling is making its way into more dental clinics.[3]

Contingent escape

Dentists have long recognized that giving children a sense of trust and control is an important strategy in coping with dental procedures. Using nonverbal communication techniques (e.g., raising a hand) to allow a child to stop treatment when they experience discomfort is one way that dentists have allowed children to gain that trust and instill a sense of control.[30] However, hand raising is not the only response that produces control in the dental operatory. Disruptive behavior also serves this function for a child because it often results in temporary escape from ongoing dental procedures. Escape from unpleasant or undesirable events is one of the most common and powerful sources of motivation, and plays a major role in a wide variety of problem behaviors[31] including tantrums[32] and other disruptive behavior.[33] Many aspects of restorative treatment (e.g., syringe, sounds from a drill, tightness of the rubber dam clamp) may become feared stimuli because they are unfamiliar or are associated with discomfort. Efforts to escape or avoid (i.e., thrashing, blocking with hands, turning the head, crying) are natural responses that are more likely to occur than raising one's hand. Unfortunately, the dentists' natural tendency to stop dental treatment in response to disruptive behavior may, in many cases, serve to encourage that behavior.[34]

One recently developed management procedure takes advantage of the powerful motivation to escape, and uses it to teach more cooperative behaviors.[34–37] It is an adaptation of existing management techniques (e.g., raising a hand) that allows the child some control over the dental routine. In this procedure, brief periods of escape from ongoing dental treatment are provided contingent upon cooperative behavior. Instead of raising a hand, the child can receive praise and brief escape (about 5 sec) from dental treatment by simply lying very still and quiet. Any disruptive behavior by the child delays escape until cooperation is regained. The dental instruments remain in or around the child's mouth until the child becomes calmer and more cooperative.

In their most recent research, Allen and his colleagues[35] found that a dentist who used this procedure with four extremely disruptive children was able to dramatically improve their behavior in a relatively short amount of time. Interestingly, although three of the children were at an age often considered "precooperative,"[38] during which fears and negative behavior peak,[22] the dentist did not have to wait long for cooperative behavior to occur.

Observations in our clinic suggest that most disruptive behaviors are the end product of a response chain that begins early in the dental visit. The provision of brief opportunities for escape early in the treatment visit can interrupt this chain, preventing more frequent and intense levels of disruptive behavior. While others have discussed the use of behavioral interventions both in response to problem behavior and in preventing future occurrences,[39] the contingent escape procedure may present the most potential when initiated early and maintained throughout the entire treatment visit to prevent the response chain from escalating toward increased levels of disruptive behavior.

Contingent escape is based on well-established learning principles and is designed to not only diminish undesirable behaviors, but also to increase desirable behaviors. Delayed consequences not tied to specific behaviors fail to teach children how to improve their "in-chair" behavior.[40] Contingent escape, however, provides immediate feedback to teach children more adaptive coping behaviors. The procedure is especially promising because it requires little training and can be used continuously with all children with no alteration in the typical treatment plan. In fact, unlike pharmacological interventions, which often increase total treatment time,[41] initial studies have shown that contingent escape requires less time (and produces comparable or better results) than some traditional management procedures.[35]

Future research should focus on determining optimal training parameters and criterion testing to ensure adequate skill levels in implementing the contingent escape procedure. For example, research is still needed to ascertain how easy (or difficult) it is to teach contingent escape to dental students and to assess the potential for preventing behavior problems before they start. Finally, as with all three of the procedures described in this article, the efficacy of contingent escape needs to be evaluated with larger numbers of children before dentists consider placing it in the dental curriculum.

Conclusions

The need to develop additional behavior management technology has been well established. Collaboration between dental and behavioral scientists has been encouraged and viable alternatives have begun to be developed. This paper presents three promising cost- and time-effective techniques that possess an initial research base, but require further study to be fully incorporated into the practicing dentist's armamentarium. Specifically, research is needed to more firmly establish treatment parameters, some of which

are discussed in this review, as well as the efficacy and scope of each technique. It is becoming increasingly clear, however, that empirical validation alone does not ensure acceptance and incorporation into the dentist's armamentarium. Research published in the dental and psychological literature has demonstrated the effectiveness of a number of noninvasive management techniques, yet surveys show that many of these are not used regularly by practicing dentists.[3,10] Nontraditional techniques like desensitization, filmed modeling, and hypnosis have been found effective,[26,42-44] but have not been widely disseminated, perhaps because they violate variables critical to the acceptance of management techniques.[3] Behavioral management procedures must fit easily into the routine practice, be time and cost effective,[39] and be relatively easy to learn.[3]

There are, however, several promising nontraditional behavior management techniques that do not appear to violate these principles. While it may be that these techniques have not undergone adequate scientific investigation, it is also possible that dentists simply do not receive sufficient exposure to these applications because much of the research is published in psychology journals, and an already crowded dental curriculum (c.f. Cohen[45]) makes it difficult to expose students to nontraditional management techniques.

Considerable study must be directed at how best to disseminate newly developed technology. Certainly one important component of dissemination includes increased exposure in the dental literature, as we have attempted to achieve here. Exposure appears to be particularly critical during dental school, as evidence suggests that techniques learned during early training experiences largely shape what will be practiced in the clinic.[10] But perhaps more important is finding ways to encourage faculty to take a core behavioral science didactic curriculum to the clinic floor, where students' interactions with patients would involve application of these new technologies.[46] Finally, it is important to note that these techniques serve not to replace, but to supplement traditional management methods. Dentists whose training requirements include demonstration of minimal competence with well-researched alternatives will be in better position to choose among or combine various child behavior management strategies.

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