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Parental acceptance of pediatric dentistry behavior management techniques

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Abstract

The purpose of this study was to assess the attitudes of parents toward behavior management techniques employed in pediatric dentistry. Sixty-seven parents viewed videotaped segments of actual treatment of three- to five-year-old children with whom the following behavior management techniques were used successfully: general anesthesia, Papoose Board®[a], sedation, hand-over-mouth exercise (HOME), physical restraint by the dentist, physical restraint by the assistant, mouth prop, voice control, positive reinforcement, and tell-show-do. Each parent indicated the acceptability of each technique for treating their child. Mean ratings and rankings were calculated for the behavior techniques, relationship of the approval of techniques to demographic and historical variables was established, and the correlations among age, socioeconomic status, and the approval of other behavior management techniques were calculated.

Both ratings and rankings indicated that the majority of parents favored tell-show-do, positive reinforcement, voice control, and mouth props. Physical restraint by the dentist and assistant were viewed significantly more favorably than sedation and HOME. The least acceptable techniques were general anesthesia and Papoose Board. Parents with more than one child found the Papoose Board significantly less acceptable than those with one child. Parents who visted the dentist before they were seven years old found voice control more acceptable. Parental age was not significantly related to approval of a technique, and parental socioeconomic status was correlated negatively with approval of general anesthesia.

$\mathbf{A}$lthough the majority of young children exhibit little disruptive behavior in the dental setting,[1] there is a small percentage who exhibit behavior which makes dental treatment difficult. Dentists utilize numerous management techniques to obtain cooperative behavior. Tell-show-do,[2] expectation,[3] positive reinforcement,[4] and voice control[5] can be incorporated easily into mildly disruptive situations. Mod-

eling,[6] distraction,[7] desensitization,[8] and hypnosis[9] have been proposed as preventive and corrective techniques for uncooperative behavior, but these techniques require additional time and skill for successful implementation. Hand-over-mouth-exercise(HOME)[10] commonly is used to establish communication and obtain cooperation with highly disruptive or defiant children. Physical restraint appears to be indicated with extremely young, disruptive, or handicapped children.[11] When other techniques fail or seem inappropriate, sedation or general anesthesia may be indicated.[12]

While dentists continue to use these same management strategies, societal attitudes toward dealing with children have changed.[13] Health professionals no longer can assume that parents are aware and approve of even the most routine behavior management technique. In addition, the use and acceptance of a technique by the profession does not assure its legality as viewed by today's courts.[14] With the emphasis on children's rights, the attitude of parents toward behavior management techniques constitutes another important factor which must be considered when selecting an approach for managing behavior.

The purpose of this study was to assess parents' attitudes toward 10 behavior management techniques employed by dentists treating young children.

Methods and Materials

The 67 subjects for this study included parents from the Durham, Raleigh, and Chapel Hill, North Carolina areas. The only requirement for participation was that they must be or have been parents, but there was no limitation on socioeconomic status. All 67 subjects volunteered and before participation were informed of the study content.

At the beginning of the study, data were collected to calculate the Hollingshead index[15] as well as infor-

mation pertaining to previous dental experiences of the parents. Frequently used behavior management techniques were selected and described to the parents in the following manner.

1. *Tell-show-do (TSD):* The dentist or assistant explains to the child what is to be done using simple terminology and repetition and then shows the child what is to be done by demonstrating with instruments on a model or the child's or dentist's finger. Then the procedure is performed exactly as described. Praise is used to reinforce cooperative behavior.
2. *Voice control (VC):* The attention of a disruptive child is gained by changing the tone or increasing the volume of the voice. Content of the conversation is less important than the abrupt or sudden nature of the command.
3. *Mouth props (MP):* A device is placed in the child's mouth to eliminate closing when a child refuses or has difficulty maintaining an open mouth.
4. *Positive reinforcement (PR):* This technique rewards the child who portrays any behavior which is desirable. Rewards include compliments, praise, or affectionate physical contact.
5. *Hand-over-mouth-excercise (HOME):* The disruptive child is told that a hand is to be placed over the child's mouth. When the hand is in place, the dentist speaks directly into the child's ear and tells the child that if the noise stops the hand will be removed. When the noise stops the hand is removed and the child is praised for cooperating. If the noise resumes the hand again is placed on the mouth and the exercise repeated.
6. *Physical restraint by the dentist (PRD):* The dentist restrains the child from movement by holding down the child's hands or upper body, placing the child's head between the dentist's arm and body, or positioning the child firmly in the dental chair.
7. *Physical restraint by the assistant (PRA):* The assistant restrains the child from movement by holding the child's hands, stabilizing the head, and controlling leg movements.
8. *Papoose Boards[a] and Pedi-Wraps[b] (PR):* These are restraining devices for limiting the disruptive child's movement. The child is wrapped in these devices and placed in a reclined dental chair.
9. *Sedation (SED):* Sometimes drugs are used to sedate a child who does not respond to other behavior management techniques or is unable to comprehend the dental procedures. Often, these drugs are administered orally.
10. *General anesthesia (GA):* The dentist performs the

[a] Olympic Medical Corp., Seattle, WA.
[b] Clark Associates, Worcester, MA.

dental treatment with the child anesthetized in the operating room.

Participants viewed a videotape simulating what might happen in the operatory during treatment of their disruptive child. Each management technique portrayed in the videotape was consistent with the above explanations. The validity of the videotaped behavior management techniques was established by having a group of eight pediatric dentists on the faculty at the University of North Carolina view and evaluate the tape for accuracy of presentation. Five behavior management techniques were retaped at the recommendation of this group. The order of presentation of the techniques was determined randomly and a visual symbol of each technique was presented in conjunction with the videotape.

A questionnaire allowed parents to rate the 10 behavior management techniques in accordance with their willingness to have them used to gain the cooperation of their child. The questionnaire consisted of a single horizontal line running lengthwise across the middle of a page. The right and left end points of the line were labeled most acceptable and least acceptable, respectively. Each parent placed stickers for each technique on the line to indicate the level of acceptability of that technique relative to the scale and to the other techniques. In order to simplify the task, ties were permitted.

To establish reliability, a pilot group of 13 participants was tested twice within a period of six weeks. Results were analyzed using the paired t-test, which focused on the differences between the responses for the first or second test, and the signed rank test which also tested the difference and was appropriate for the small sample size.

In order to assess acceptability, the distance on the line from least to most acceptable was divided into quarters and responses were scored by quartile and rank in quartile (0-9 in the first quartile, 10-19 in the second quartile, 20-29 in the third quartile, and 30-39 in the fourth quartile). The 0-9 score represented the least acceptable techniques and 30-39 the most acceptable techniques. Thus, each of the techniques was assigned a rating from 0 to 39. For example, the third-ranked technique in the first quartile was 2 (0, 1, 2).

To compare the levels of acceptability, the mean rating for each of the 10 behavior management techniques was determined. Variability among the means was investigated using asymptotic regression methodology as discussed by Koch et al.[16] A computer program was used to implement this methodology for multivariate categorical data.[17] Hypotheses stating similar distributions among techniques were tested using a chi-square statistic. A general statistical model incorporating the results of these tests proved to be

an adequate representation of the variability of the means using the criterion of a goodness-of-fit test, which evaluates populations for distribution homogeneity. By this method, similar techniques could be paired or grouped and contrasted to other techniques.

Another framework of analysis was to develop rankings for the behavior management techniques. A rank of 1 indicated that a technique was least acceptable, while a rank of 10 indicated that a technique was most acceptable. If ranks tied, the average rank was assigned to each technique. It was assumed that the resulting ranks were equivalent to what would have been indicated if the parent had been asked to rank instead of rate each technique. Mean ranks and standard errors were calculated for each technique. This part of the analysis was undertaken in the manner outlined in Koch et al.[18] Again, hypotheses stating similarities among techniques were tested. In addition, the Friedman statistic[19] was calculated from the ranks of the behavior management techniques. This test was directed at the hypothesis that each possible ranking of a technique is equally likely. The alternative hypothesis was that some techniques tend to be ranked higher than each other.

Further analysis, using the chi-square statistic focused on the relationships between demographic and historical data and the acceptability of five of the most acceptable management techniques. Finally, the acceptability of each management technique was correlated with each other technique to determine significant relationships by a Pearson Product correlation.

Results

The results of the paired t-test were not significant at the p = 0.01 level and the signed rank test con-

TABLE 1. Rating Means and Standard Errors for 10 Behavior Management Techniques* (N = 67)

Technique	Mean	Standard Error
Papoose Board®	5.1	.97
General anesthesia	5.4	1.12
Sedation	11.8	1.46
Hand-over-mouth-exercise	13.7	1.24
Physical restraint, assistant	15.9	1.29
Physical restraint, dentist	16.1	1.29
Voice control	21.1	1.27
Mouth prop	22.2	1.10
Positive reinforcement	28.3	.78
Tell-show-do	30.2	.60

* 0 = least acceptable / 39 = most acceptable; techniques that are not significantly different in mean ratings are grouped.

TABLE 2. Ranked Means for 10 Behavior Management Techniques* (N = 67)

Technique	Mean	Standard Error
Papoose Board®	2.51	.189
General anesthesia	2.96	.293
Sedation	4.27	.306
Hand-over-mouth-exercise	4.68	.232
Physical restraint, dentist	5.22	.247
Physical restraint, assistant	5.27	.289
Mouth prop	6.47	.220
Voice control	6.49	.253
Positive reinforcement	8.18	.231
Tell-show-do	8.97	.177

* 1 = least acceptable / 10 = most acceptable; techniques that are not significantly different in mean ratings are grouped.

firmed that the responses for the first and second tests were not significantly different.

Ninety-four per cent of the parents were female, with an average age of 34.3 years. Seven parents were single, 50 were married, and 10 were divorced. Fifty-three of the parents previously had taken their children to the dentist and 28 had watched their children receive treatment in the dental operatory. As a whole, the parents themselves made a visit to the dentist every 18 months. Their average age at their first dental visit was 9.1 years. The largest proportion of the sample was medium business, technical, or minor professionals with the remainder equally divided between major professional and clerical workers. The sample could be typified as upper middle class.

Table 1 shows the *rating* means and standard errors for the 10 behavior management techniques on the 0-39 scale. Positive reinforcement and tell-show-do had the most acceptable ratings of 28.3 and 30.2, respectively; general anesthesia and Papoose Board had the least acceptable ratings, 5.4 and 5.1.

Chi-square analysis revealed significant differences between the mean ratings at the p < 0.01 level. The model and its goodness-of-fit statistic confirmed that the mean ratings were essentially the same for the following pairs of techniques: general anesthesia and Papoose Board, sedation and HOME, physical restraint by the assistant and physical restraint by the dentist, and mouth prop and voice control. There were significant differences between tell-show-do and positive reinforcement.

The mean *ranks* and the standard errors for the 10 behavior management techniques on the 1-10 scale are presented in Table 2. Significant differences exist between pairs of ranks at the p < 0.05 level. The model and its goodness-of-fit statistic verify that the mean ranks for the following pairs were essentially the same; general anesthesia and Papoose Board,

TABLE 3. X^2 Summary for Relationship Among Five Behavior Management Techniques and to Various Demographic and Historical Variables

X^*	Y	X^2	$p\text{-}value/(1df)$
N-Child	Physical restraint, assistant	0.72	.40
N-Child	General anesthesia	1.40	.23
N-Child	Papoose Board®	6.10	.01
N-Child	Voice control	0.05	.48
N-Child	Hand-over-mouth-exercise	0.57	.45
O-Child	Physical restraint, assistant	0.39	.53
O-Child	General anesthesia	0.11	.74
O-Child	Papoose Board®	0.84	.36
O-Child	Voice control	1.90	.16
O-Child	Hand-over-mouth-exercise	0.01	.93
Y-Child	Physical restraint, assistant	3.70	.05
Y-Child	General anesthesia	0.02	.88
Y-Child	Papoose Board®	3.00	.08
Y-Child	Voice control	0.004	.95
Y-Child	Hand-over-mouth-exercise	0.11	.74
Visit Freq	Physical restraint, assistant	2.10	.14
Visit Freq	General anesthesia	1.40	.23
Visit Freq	Papoose Board®	1.40	.23
Visit Freq	Voice control	0.95	.33
Visit Freq	Hand-over-mouth-exercise	0.96	.33
Visit Age	Physical restraint, assistant	0.45	.50
Visit Age	General anesthesia	0.09	.76
Visit Age	Papoose Board®	0.12	.76
Visit Age	Voice control	6.10	.01
Visit Age	Hand-over-mouth-exercise	1.60	.20
W-Dent	Physical restraint, assistant	0.07	.79
W-Dent	General anesthesia	0.13	.72
W-Dent	Papoose Board®	0.16	.69
W-Dent	Voice control	0.00	1.00
W-Dent	Hand-over-mouth-exercise	0.29	.59
Dental Exp	Physical restraint, assistant	0.001	.97
Dental Exp	General anesthesia	0.14	.71
Dental Exp	Papoose Board®	0.001	.97
Dental Exp	Voice control	0.26	.61
Dental Exp	Hand-over-mouth-exercise	0.01	.93

* Classification Scheme
Age = respondent's age (35 and under/over 35)
N-child = number of children of respondent (none or 1/more than 1)
O-child = age of respondent's oldest child (7 and under/over 7)
Y-child = age of respondent's youngest child (5 and under/over 5)
Soc = respondent's socioeconomic status (1-39/40-66)
Visit Freq = frequency of respondent's dental visits (annually and biannually/emergency)
Visit Age = respondent's age at first dental appointment (7 and under/over 7)
W-Dent = whether or not respondent has watched his child receive dental treatment (yes/no)
Dental Exp = respondent's dental experience (minor/extensive)

sedation and HOME, physical restraint by the assistant and physical restraint by the dentist, and mouth prop and voice control. There were significant differences between tell-show-do and positive reinforcement. The Friedman statistic value of 284.5 also confirmed significant differences between mean rankings.

Two associations with significant chi-square statistics (p = 0.01) emerged in this analysis (Table 3). Parents with more than one child found Papoose Boards less acceptable than parents with one child. A greater percentage of parents who first visited a dentist at seven years of age or younger found voice

TABLE 4. Correlations Between the Acceptability of 10 Behavior Management Techniques, Parental Age, and Socioeconomic Status

	AGE	SES	PRA	PRD	GA	TSD	PB	MP	VC	SED	HOME	PR
PRA	−.25	−.14	1.0									
PRD	−.29	−.15	.73*	1.0								
GA	−.08	−.58*	−.02	.15	1.0							
TSD	−.13	.38	.09	.14	−.17	1.0						
PB	.09	−.22	.24	.12	.04	−.44	1.0					
MP	.11	.08	.29	.14	−.19	.01	.09	1.0				
VC	.12	.06	−.07	.12	.27	.07	.20	.11	1.0			
SED	.13	−.27	−.25	−.12	.39	−0.1	−.12	−.05	.07	1.0		
HOME	.19	−.01	.19	.14	−.17	−.20	.45	.19	.53*	−.18	1.0	
PR	−.10	.45	−.06	−.05	−.51*	.56*	−.14	−.06	.04	−.23	−.07	1.0

* p-value ≤ 0.0001.

control more acceptable than parents whose first visit was at eight years or older.

The correlations revealed there were no significant relationships between the age of the parent and the approval of a specific management technique (Table 4). There was a significant negative correlation between socioeconomic status and approval of general anesthesia (Table 4). As one's socioeconomic status increases the approval of general anesthesia decreases.

Four significant relationships emerged in this analysis (Table 4). There was a significant positive relationship between approval of physical restraint by the dentist and physical restraint by the assistant. There was a significant negative relationship between approval of general anesthesia and positive reinforcement. There was a positive relationship between positive reinforcement and approval of tell-show-do. Finally, there was a positive relationship between approval of HOME and approval of voice control. Due to the reasonably large sample size, correlations were not reported as significant if they were less than 0.50. Correlation coefficients of this magnitude would account for approximately 25% of variability and could have clinical significance.

Discussion

There have been no investigations of parental attitudes toward the use of behavior management techniques for the disruptive child dental patient. This study examined the relative acceptability of 10 behavior management techniques. The mean ratings for these techniques served as a method of quantifying relative acceptability. Since 20 on the 0-39 scale is the theoretical midpoint, those with a mean rating greater than 20 are considered in the more acceptable range. Only four techniques have mean ratings on the more acceptable side of the continuum. These included: voice control, mouth prop, positive reinforcement, and tell-show-do. The less acceptable techniques included: physical restraint by the dentist or assistant,

HOME, sedation, general anesthesia, and Papoose Board. As expected, the least invasive or aggressive techniques were most acceptable. Techniques employing drugs (i.e., general anesthesia or sedation) were rated as least acceptable. Other authors have emphasized the need to use these methods only as a last resort after all alternative management methods have failed[3,4] — parents seem to agree.

Following the asymptotic regression analysis, it was possible to group techniques with similar levels of approval. The Papoose Board and general anesthesia were viewed with equal disapproval. Sedation was viewed distinctly more favorably than general anesthesia and was grouped with HOME. It is evident that HOME was seen as similar in severity to a pharmacological technique, but separate from and less positively than physical restraint by the dentist and assistant.

Despite the fact that all mean ratings for physical restraining techniques were on the less acceptable side of the continuum, the interval between Papoose Board and physical restraint by a dentist or assistant was statistically significant. These types of restraint were perceived differently.

The mean rankings developed for the behavior management techniques were very similar in order when compared to the mean ratings. The only differences were due to order changes between physical restraint by the assistant and physical restraint by the dentist, and voice control and mouth prop. These pairs of techniques were found to be statistically similar by both assessment methods. The differences that were present may reflect the fact that the 0-39 rating scheme takes some measure of distance into account.

Although there was no statistically significant correlation between the parents' age and the approval of management techniques, there was a statistically significant (r = .38) relationship between parents' higher socioeconomic status and reduced approval of the general anesthesia procedure. This relationship may be related to the fact that higher socioeconomic

status parents either understand or imagine the increased risk that is involved in the general anesthesia procedure or have encountered that risk and have made the value judgment that is required. Also, these same persons are probably more unfamiliar with advanced dental disease and the attendant pain.

Most of the statistically significant relationships that emerged in this analysis are understandable; possibly more interesting are those that did not emerge. Those parents who are most likely to approve physical restraint by the assistant are more inclined to approve physical restraint by the dentist (r = .73). These two techniques have been ranked and rated similarly by the parents throughout this investigation and have been paired closely in all analyses. On the other hand, approval of HOME and the approval of voice control also are related significantly (r = .53). These two procedures have not been paired or adjacent to each other in any of the analyses performed. In fact, physical restraint by the dentist and physical restraint by the assistant were intermediate between these techniques in all ratings. An obvious relationship between these two techniques is not apparent. Finally, parents who approve of tell-show-do also approve of positive reinforcement (r = .56). These procedures were consistently adjacent to each other in all rankings and ratings of approval and were the most approved ratings. It should be noted that although they were similarly rated they were statistically significantly different in their ratings at all points throughout the analysis. Parents seem to see these techniques in the same light, but as distinctly different procedures.

Limitations of the Study

The nature of this data is descriptive and any conclusions reached should be restricted to the actual test population. An inability to use a scientific sampling scheme to obtain the test sample limits the degree to which these subjects are representative of a general population.

Conclusions

1. The techniques used to determine parental attitudes appear to be reliable.
2. There is a difinite hierarchy of parental attitudes relative to management techniques.
3. The least aggressive techniques are more accept-

able. Techniques employing drugs and restraint are less acceptable.

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