

Child behavior in the dental setting relative to parental presence

John C. Pfefferle, DDS, MS J. Bernard Machen, DDS, MS, PhD
Henry W. Fields, DDS, MS, MSD William R. Posnick, DDS, MS, MPH

Abstract

The purpose of this study was to evaluate child behavior relative to parental presence. The behavior of 48 children 36-60 months old was examined during their first dental exam and two subsequent restorative visits. Parental presence or absence was determined randomly, and dentist-patient interactions were regulated by standardized scripts. The duration of four negative behaviors was quantified by two independent raters. No significant differences were found between patients accompanied by parents and those without parents for any of the behavior categories. There were no significant differences in behavior related to age, sex, race, or socioeconomic status. A significant relationship emerged between patient cooperation as predicted by a preoperative parental questionnaire and child behavior.

Opinions vary among clinicians, educators, and researchers on the effect of parental presence in the dental operatory during treatment of the child patient. Dental students often are given rigid guidelines about parents joining their child in the dental operatory and most dentists have definite opinions on this subject.

The dental and psychological literature offer varied opinions on this subject but very little research has examined this issue systematically. As a result, most preferences concerning parental presence are based on clinical impression. Starkey (personal communication, 1976) advocated separation of the child from the parent. Olsen¹ stated that it is unwise to separate the young child from the parent at the initial visit because the parent's presence may aid in a psychological evaluation of future child behavior.

Frankl et al.² investigated the effect of the mother's presence on cooperative behavior of her child during an examination and subsequent treatment visit. The results revealed a significant increase in cooperative behavior for children 41-49 months old when the mother was

present. The authors concluded that the mother can be a valuable aid in establishing rapport between the young child and dentist, if she is properly instructed and motivated.

No differences were found by Lewis and Law³ between mother-present or -absent groups according to psychologic responses for a prophylaxis.

Venham⁴ allowed the parent or child to make the decision concerning separation. This study indicated that the parent and child preferred not to be separated initially, but that over the course of several appointments more separation occurred. There were no differences in negative behavior between separated and nonseparated children.

Venham⁵ also examined the effect of the mother's presence on the response of 89 children, three to eight years old during two treatment visits. The mother was placed in a chair in view of the child and asked to participate as a silent observer. There were no significant behavioral differences between the two groups, and this study provided useful information regarding behavior and anxiety in the dental operatory with a parent present who occasionally interacted with the child during treatment.

In summary, the results are equivocal concerning the effect of allowing the mother to accompany her child during treatment, and research is needed to evaluate child behavior in the presence or absence of parents. This would eliminate the self-selection and parental effectiveness variables and their interaction.

The purpose of this investigation was to study behavior of the child patient relative to the presence or absence of the parent during sequential dental appointments. Patient characteristics including sex, age, race, and socioeconomic status also were examined.

Materials and Methods

Subjects

The subjects for this study were 48 children selected from a sample of 100 preschool children from the Dur-

ham/Chapel Hill, NC, area. There were 29 males and 19 females who met the following requirements for selection. Each child:

1. had no previous dental experience
2. was between the ages of 36 and 60 months
3. was mentally and physically healthy so that no unusual treatment procedures were necessary
4. understood English
5. had no other siblings within the same group
6. had at least two carious lesions requiring a single surface restoration.

All treatment was performed in a clinical operatory in the Dental Research Center at the University of North Carolina at Chapel Hill (UNC-CH) School of Dentistry. Three full-time faculty members, all trained pedodontists, provided the dental treatment with trained dental auxiliaries from the Pedodontic Department. Each patient was treated by the same dentist at all three appointments.

Behavior Rating

All patient behavior in the operatory was videotaped from behind a curtain using black and white videotape. In an attempt to regulate verbal interactions and procedures, all dentists used a tell-show-do approach, a treatment outline, and standardized dialogues whenever possible. Voice control and minimal restraint were used only when treatment progress was repeatedly hindered. Any further behavior management measures eliminated the patient from the study. This was necessary in order to preserve the behavior observed as a function of the child and environmental interaction. Aggressive behavior management techniques would introduce another variable into the equation and make it more difficult to determine if the behavior is the result of the management technique or that behavior usually encountered by the dentist.

Rating the videotaped behavior was accomplished using the North Carolina Behavior Rating Scale (NCBRS). This scale allowed quantification of four types of potentially disruptive child behavior. These behaviors were high hand movement, leg movement, crying and oral-physical resistance. The reliability and validity of this technique has been reported by Chambers et al.⁶ Observed patient behavior was converted to quantitative data using the Esterline Angus Event Recorder.

Rater Training

Two independent raters (a dentist and a dental hygienist) were trained in three phases. The first phase was a 30-minute session of scale explanation which included viewing videotapes that demonstrated behaviors in the scale categories. The second phase familiarized raters with the mechanical event recorder, provided rater practice, and determined areas of rater disagreement. The third phase established interrater reliability with actual

behavior rating. Both raters viewed videotapes of patients from a prior study with the raters separated so neither could observe the other while rating. A high degree of interrater reliability was required before beginning the study evaluations.

Appointment Procedure

Prior to the first appointment, the parents were contacted and informed of the study's purpose and that they would have no choice concerning the group assignment of their child. Assignment was determined using a table of random numbers and a restricted random order design. Parents who accompanied their children into the operatory were asked to participate as passive observers. Each parent was asked to sit quietly on a stool provided at the end of the dental chair in the child's field of vision, but out of the field of the videotape camera.

At the beginning of each appointment the dental assistant greeted the child and parent in the reception area. The child and, if appropriate, the parent were ushered into the treatment area.

During the initial appointment an examination of hard and soft tissues, bitewing radiographs, a rubber cup prophylaxis, and a four-minute topical fluoride treatment using trays were performed. If no interproximal contacts existed, or if the parents preferred that no radiographs be taken, bitewing radiographs were simulated.

Following the initial appointment, patients requiring at least two single surface amalgam restorations were reappointed for treatment. Any child who needed emergency extractions, pulp therapy, or aggressive behavior management was excluded from the study and referred for treatment. On the second and third visits, an amalgam restoration was placed utilizing local anesthesia and a rubber dam.

Reliability

Each appointment was recorded on time-scaled chart paper by the event recorder. The percent of rater agreement for each scale category was calculated by dividing the number of eight-second intervals where the raters agreed by the greatest number of eight-second intervals recorded for that behavior by either rater.

One rater was identified as the primary rater by random selection and this rater's observations were used to report all data. Twenty-four of 144 appointments were selected for evaluation by both raters in order to monitor interrater reliability.

Data Analysis

A multivariate repeated-measure analysis of variance was used to examine the effects of NCBRS variables of:

1. parental presence in the operatory
2. dentist performing treatment
3. different treatment visits (V-1, V-2, V-3)

4. patient characteristics (sex, age, race, socioeconomic status)
5. parent prediction of child cooperation on a preoperative questionnaire
6. interactions of the above.

Significant results were followed with univariate repeated measures analysis of variance.

Results

Interrater reliability for the NCBRS is reported in Table 1. Mean percent behaviors were determined for all categories of behavior and all appointments. Mean appointment length also was calculated. The results are illustrated in Tables 2-5.

Multivariate analysis of variance results for each dependent variable are reported in Table 6, and interactions in Table 7. There was no difference between those

Table 1. Interrater reliability for four behaviors (n = 24 appointments).

High Hands	Legs	Crying	Oral-Physical
96.1	94.4	96.9	90.8

patients who had the parent present and those where the parent was not present. There were overall significant differences for dentists, visits, and the parental questionnaire. There were no significant differences in behavior related to age, sex, race, or socioeconomic status.

Differences between dentists were related to behaviors exhibited by their respective patients. Patients treated by Dentist A exhibited significantly less high hand movement^a and oral-physical resistance^b than the patients treated by Dentists B and C. There were no differences between dentists for leg movement or crying [$\alpha = .05$].

Table 2. Mean percentage behavior occurrence for visit 1.	Parent	Dentist A		Dentist B		Dentist C	
		Absent (n = 8)	Present (n = 9)	Absent (n = 8)	Present (n = 7)	Absent (n = 7)	Present (n = 9)
		\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)
	High Hands	11.4 (30.9)	12.2 (10.7)	35.5 (38.4)	38.2 (30.6)	26.3 (29.7)	33.8 (30.6)
	Legs	4.4 (5.6)	10.2 (19.5)	10.1 (8.3)	17.1 (24.7)	26.8 (36.9)	8.1 (9.4)
	Crying	6.0 (17.2)	11.2 (17.2)	10.2 (18.7)	18.0 (40.0)	35.8 (46.5)	14.8 (31.0)
	Oral-Physical	2.0 (1.2)	1.5 (1.1)	3.6 (1.4)	3.6 (1.7)	2.3 (1.2)	2.7 (1.8)

Table 3. Mean percentage behavior occurrence for visit 2.	Parent	Dentist A		Dentist B		Dentist C	
		Absent (n = 8)	Present (n = 9)	Absent (n = 8)	Present (n = 7)	Absent (n = 7)	Present (n = 9)
		\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)
	High Hands	2.4 (3.0)	5.4 (3.5)	30.4 (29.4)	23.0 (23.7)	28.7 (17.2)	24.2 (25.0)
	Legs	6.6 (6.3)	13.5 (20.5)	14.3 (14.1)	32.9 (31.9)	27.5 (28.3)	18.0 (26.5)
	Crying	11.7 (15.3)	32.1 (32.3)	19.0 (33.2)	35.8 (46.7)	23.1 (37.6)	18.9 (33.1)
	Oral-Physical	1.9 (1.4)	1.5 (0.6)	2.6 (1.9)	4.4 (2.4)	2.0 (1.1)	2.3 (1.1)

Table 4. Mean percentage behavior occurrence for visit 3.	Parent	Dentist A		Dentist B		Dentist C	
		Absent (n = 8)	Present (n = 9)	Absent (n = 8)	Present (n = 7)	Absent (n = 7)	Present (n = 9)
		\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)
	High Hands	3.3 (3.0)	15.4 (10.9)	32.1 (30.9)	30.2 (29.7)	23.9 (14.7)	14.2 (17.9)
	Legs	6.5 (8.4)	27.3 (31.1)	35.5 (34.0)	25.2 (25.9)	32.8 (36.6)	35.4 (32.0)
	Crying	13.1 (33.8)	31.1 (33.9)	19.1 (24.3)	32.4 (45.7)	20.7 (35.2)	31.0 (41.1)
	Oral-Physical	1.0 (0.9)	1.9 (1.6)	3.6 (1.4)	3.0 (2.0)	1.6 (1.3)	1.5 (1.1)

Table 5. Mean appointment length.*		Dentist A		Dentist B		Dentist C	
		Absent (n = 8)	Present (n = 9)	Absent (n = 8)	Present (n = 7)	Absent (n = 7)	Present (n = 9)
		\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)	\bar{X} (S.D.)
	Visit 1	609 (84)	643 (39)	638 (51)	660 (80)	940 (159)	844 (82)
	Visit 2	640 (62)	614 (114)	705 (153)	832 (133)	838 (296)	808 (141)
	Visit 3	553 (46)	692 (111)	711 (263)	699 (327)	832 (100)	743 (111)

* Total seconds.

^a [$F_{(p)} = .0014, df = 2) = 7.69$]

^b [$F_{(p)} = .0002, df = 2) = 10.84$]

Table 6. Multivariate analysis.

Variable	df	F	p-Value
Parental Presence	5,40	0.06	0.9978
Dentist Performing Work	10,74	4.01	0.0002*
Visits	10,148	2.36	0.0128*
Sex	5,42	0.94	0.4647
Age	5,42	1.17	0.3400
Race	5,42	0.63	0.6758
Socioeconomic Status	20,150	0.93	0.5518
Questionnaire	10,80	2.27	0.0217*

* $p \leq .05$.

There were no differences between visits for the high hands, crying, or oral-physical resistance [$\alpha = .05$]. There were significant differences in leg movements^c between visits due to an increase over visits.

There was a significant relationship between the parental prediction of cooperation and child behavior. These results are illustrated in Figures 1-4. An unpaired t-test was used to examine mean behavior difference by questionnaire response (Table 8). At the first visit, negative behavior was most frequent for children predicted to be uncooperative by their parents. Patients predicted to be cooperative displayed the least negative behavior and those whose parents did not predict cooperation occupied an intermediate position. These results were not found at the second and third visits.

Discussion

There was no significant difference in behavior between children treated with parents present and those with parents absent. Venham⁴ also found no behavioral differences between groups of children treated with mother present or mother absent. In contrast to the above results, Frankl et al.² found that children 41- to 49- months-old were more cooperative in the presence of their mother. Differences in the method of assessing behavior may have contributed to the differences in results.

Although the results of the present study were similar to Venham's^{4,5} studies, several methodologic differences existed.

1. Children in this study were restricted to the three- to five-year-old age range.
2. Parent-child pairs randomly were assigned to the experimental groups in the present study.
3. Both of Venham's studies noted some parent-child interaction during treatment; the parent was a passive observer in the present study.
4. All patients in this study had no previous dental experience.
5. The present study provided behavior quantification for four potentially negative behaviors and not an overall behavior rating score.

^c [$F_{(p = .0054, df = 2)} = 25.28$]

Table 7. Variable interactions.

Variable	df	F	p-Value
Sex × Parent	5,40	1.78	0.1397
Parents × Visit	10,148	0.40	0.9446
Sex × Visits	10,148	1.55	0.1264
Sex × Parents × Visits	10,148	1.78	0.0697
Parents × Dentist	10,74	0.98	0.4648
Dentist × Visits	20,278	0.57	0.9326
Parents × Dentist × Visits	20,278	1.37	0.1340
Socioeconomic Status × Visits	40,357	1.01	0.4557
Age × Visits	10,156	1.51	0.1395
Questionnaire × Visits	20,302	1.37	0.1366

6. The present study rated behavior for the entire examination and two restorative appointments.
7. The present study provided longitudinal data for each child and maintained the experimental condition throughout the treatment for each patient.

Since patient-parent interactions were not present in this clinical investigation, application to settings where the dentist has little or limited control over the quality and quantity of these interactions could bear different results.

This research was designed to examine the effect on child behavior of the mother-child bond without examining possible effects of active mother-child interaction during dental treatment. Dentists would be more likely to support passive parental presence if it was beneficial. The effects of active parent-child interactions could be examined in future research but it is questionable whether this would be acceptable by dentists.

There were no significant differences in behavior related to age. (Venham⁵ did find an age effect for a group of black children.) The present study separated children for purposes of statistical examination into groups 36- to 47-months and 48- to 59-months-old. The present finding is in accordance with Erikson's psychosocial theory of child development.⁷ In this developmental stage, children have a definite need to begin new relationships

Table 8. Comparison of percentage occurrence means by questionnaire response groups—visit 1 behaviors.

	Response*	df	t-Value	p-Value
High Hands	Yes vs. No	32	2.66	.01
High Hands	Yes vs. NA	21	1.82	.05
High Hands	No vs. NA	37	.631	NS
Legs	Yes vs. No	32	1.29	NS
Legs	Yes vs. NA	21	1.74	.05
Legs	No vs. NA	37	.032	NS
Crying	Yes vs. No	31	2.80	.005
Crying	Yes vs. NA	19	1.95	.05
Crying	No vs. NA	36	1.07	NS
Oral-Physical	Yes vs. No	30	2.50	.01
Oral-Physical	Yes vs. NA	19	.500	NS
Oral-Physical	No vs. NA	35	1.70	.05

* Answer to question "Will your child be uncooperative?"

with people, and a need to manage their own lives to an extent. The dental environment provides a good situation for a child to manage his own behavior and initiate new relationships with new people.

There were no significant differences in behavior related to sex. This finding is consistent with those of Wright and Alpern,⁸ Frankl et al.,² and Venham.⁵ This finding is somewhat different from that of Shirley and Poyntz,⁹ who found boys consistently more upset than girls during health examinations. They also found girls were about six months more advanced than boys when using verbal protests and in the development of tension and resistance. In the present study, no dental appoint-

ment was longer than 30 minutes. In contrast, Shirley and Poyntz's study involved children attending a facility requiring all day for complete examination. In Venham's⁵ black subject sample, boys were more cooperative with the mother present.

No significant difference in behavior was related to race. Venham⁵ found that blacks were significantly more anxious than whites, but behaved no differently. Frankl et al.² concluded that a child's response to dental care was independent of race. No controlled studies examining the effect of race in response to medical or dental stress have been reported. However, dentists have reported greater initial anxieties among blacks in clinic

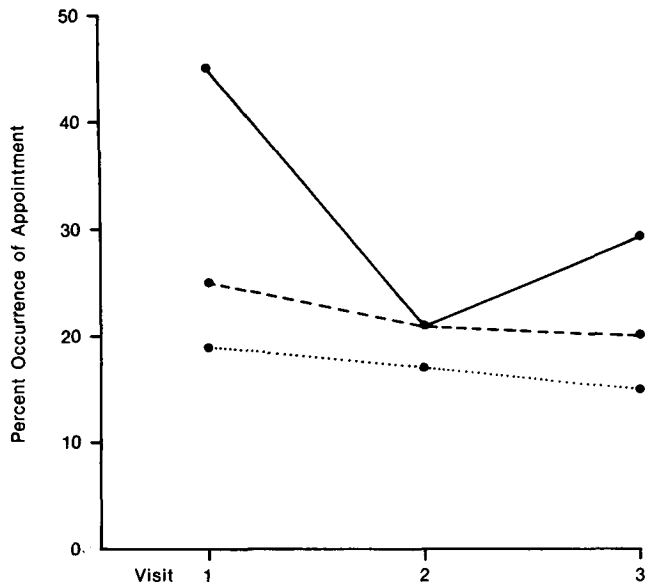


Figure 1. Mean percentage occurrence of high hand movement by response to question, "Will your child be uncooperative?". (Please note: in Figures 1-4, the symbols are as follows, Yes —, No, and N/A - - - -.)

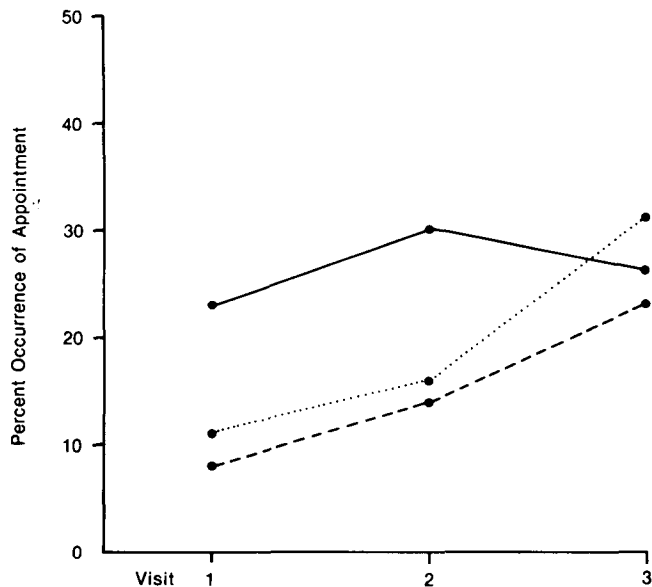


Figure 2. Mean percentage occurrence of leg movement by response to question, "Will your child be uncooperative?"

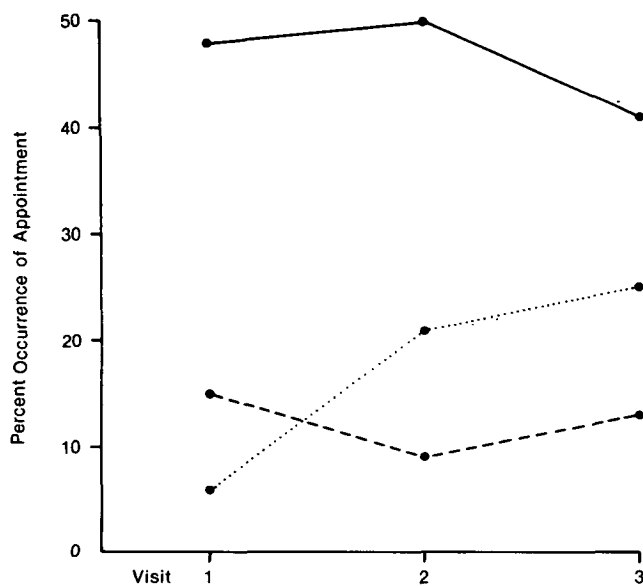


Figure 3. Mean percentage occurrence of crying by response to question, "Will your child be uncooperative?"

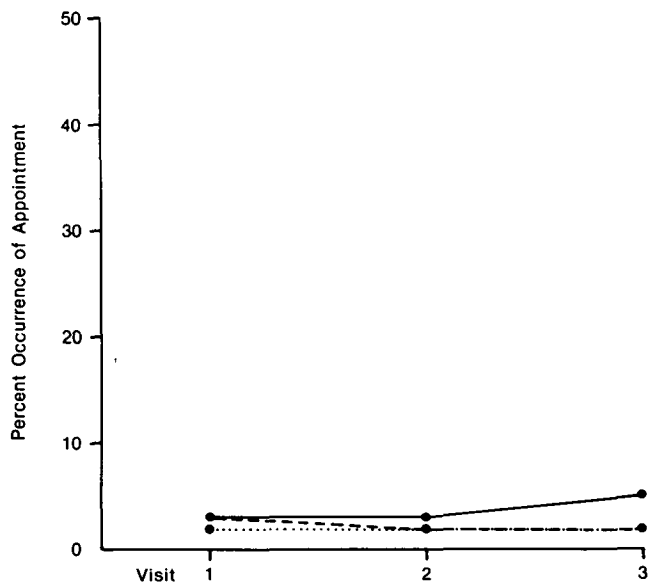


Figure 4. Mean percentage occurrence of oral-physical resistance by response to question, "Will your child be uncooperative?"

situations which supports Venham's findings.

No difference was found in behavior related to socioeconomic status as determined by the Hollingshead index of social position. Frankl et al.² revealed that the child's socioeconomic background had very little influence on the child's overall response to dental treatment, although no statistical analysis was performed. Wright and Alpern⁸ examined the effect of socioeconomic status using the North-Hatt ranking. Using a correlation coefficient, they found better behaved children were from higher socioeconomic groups. However, all but one of the children came from middle- or upper-class groups. The limited number of subjects from lower socioeconomic groups tends to limit the usefulness of their finding.

It appears that parental knowledge of child behavior prior to the first dental visit is valuable. This could be related to child rearing practices. Venham, et al.¹⁰ found that stress, tolerance, and coping skills of the child were increased when the home environment was structured, when mothers were responsive and self-assured, and when parents set limits and provided rewards and punishments.

The significant differences found between dentists for high hand behavior and oral-physical resistance can be explained by procedural differences between operators. Although an attempt was made to standardize dialogue and procedures, one dentist used a management technic that allowed less hand movement and talking. This emphasized the dentist's powerful effect on behavior. Without careful attention to methodological standardization, effects of the dentist will be significant. A significant increase in leg movement was found between visits. Perhaps leg movement is a sign of patient relaxation rather than disruptive behavior, since there was no corresponding increase in crying or high hand behavior.

Conclusions

It appears from the analysis of data that this research supports several conclusions.

1. There were no significant differences in the four negative behaviors between children receiving dental treatment with a parent present and children receiving treatment alone.
2. There were no significant differences in behavior related to sex, age, race, or socioeconomic status.
3. Significant differences between dentists could be explained by procedural differences.
4. Significant differences between visits for leg movement did occur.
5. A significant relationship between the parental pre-operative questionnaire and child behavior existed at the first visit.

Dr. Pfefferle is clinical assistant professor, Department of Pedodontics; Dr. Machen is professor of pedodontics, Office of Dental Education; and Dr. Fields is assistant professor of pedodontics and orthodontics, School of Dentistry (209H), University of North Carolina, Chapel Hill, NC 27514. Dr. Posnick is associate professor, Department of Pedodontics, School of Dentistry, Health Sciences Center, University of Louisville, Louisville, KY 40232.

1. Olsen, N.H. The first appointment—a mutual evaluation session. *J Dent Child* 32:208-211, 1965.
2. Frankl, S.N., Shiere, F.R., and Fogels, H.R. Should the parent remain with the child in the dental operatory? *J Dent Child* 29:150-163, 1962.
3. Lewis, T.M. and Law, D.B. An investigation of certain anatomic responses of children to a specific dental stress. *JADA* 57:769-777, 1958.
4. Venham, L., Bengston, D., and Cipes, M. Parent's presence and the child's response to dental stress. *J Dent Child* 45:37-41, 1978.
5. Venham, L. The effect of mother's presence on a child's response to dental treatment. *J Dent Child* 46:51-57, 1979.
6. Chambers, W., Fields, H.W., and Machen, J.B. Measuring selected disruptive behaviors of the 36 to 60-month-old patient. Part I: Development and assessment of a rating scale. *Pediatr Dent* 3:251-256, 1981.
7. Erikson, E. *Childhood and Society*. W. Norton and Co., New York, 1963.
8. Wright, G. and Alpern, G. Variables influencing cooperative behavior on the first dental visit. *J Dent Child* 38:124-128, 1971.
9. Shirley, M. and Poyntz, L. Children's emotional responses to health examinations. *Child Devel* 16:89-95, 1945.
10. Venham, L. Child-rearing variables affecting the preschool child's response to dental stress. *J Dent Res* 58:2042-2045, 1979.

March Special Section

The March issue of *Pediatric Dentistry* will feature a section of articles devoted to pulpotomies in addition to our regular articles and departments. These articles will discuss: radiographic anatomy of pulpal chambers of primary molars; radiographic and histologic evaluation of formocresol concentrations; autoradiographic study of formocresol pulpotomies; electrosurgical pulpotomies; pulpal management of permanent molars with open apices; tissue changes induced by the absorption of formocresol; and others.