The effect of restorative treatment on children's behavior at the first recall visit in a private pediatric dental practice

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Clinicians anecdotally believe that children, who have an invasive dental procedure after the initial office visit, often exhibit negative behavior at the recall examination. The purpose of this study was to document the behavior of children having the first recall visit at a private pediatric dental practice to determine if the restorative dentistry experience influenced behavior at recall. All children presenting for the first recall visit in the private practice of the author were included in the study (n = 271). Patient age, method of payment as an indicator of socio-economic status and whether or not they had restorative dental treatment subsequent to the initial visit was recorded by the author, who was also the treating dentist. Behavior was evaluated using the scale formulated by Sarnat, which rates behavior in 5 categories from completely cooperative to completely uncooperative. Behavior at the initial visit was also recorded and retrieved from retrospective examination of patient records. The results showed that 3 to 6 year olds, who underwent restorative dentistry, exhibited more negative behavior than those who did not. No difference in behavior was found in those children under 3 years or over 6 years of age. Depending on the age, behavior at the first recall visit may be influenced by having undergone a restorative dental procedure after the initial examination.
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INTRODUCTION

Controlled studies reporting child dental patient behavior with independent observers, who were not providing the treatment in clinic and university settings, have been published by several authors.[1-5] In a private practice setting, Brill has documented the behavior of his patients and found that the younger the child and the more threatening the procedure, the more often negative behavior was observed.[6,7] Brill also observed that having restorative dental treatment at the first visit versus the second did not result in more negative behavior.[8] The investigations by Venham *et al*.[1,2] and Koenigsberg and Johnson[4,5] focused on behavior during sequential visits starting with the initial examination and continuing through several restorative visits. Venham found an increase in negative response from the initial exam through the first 3 restorative visits, with a decrease in negativity for the 4th restorative visit and final polish session.[2] Koenigsberg had inconsistent results between his two studies; for children age 3 to 7 negative behavior decreased with each visit in one study[5] and no significant relationships between the behavior of children who improved or deteriorated was noted in another.[6]

Howitt and Striker[4] used cardiac rate as a marker for physiological activity and did note a decrease in rate in children at the six-month recall compared to the initial visit. They also found that the basal heart rate at recall was significantly lower than scores for the initial exam and all restorative sessions.[3] In a private practice setting, Brill found that 30% of the children up to the age of 5, who came in for a recall visit exhibited negative behavior. The occurrence of negative behavior at recall decreased with age; for children greater than age 12 years, negative behavior was observed only 1 percent of the time.[6]

Besides the reports by Howitt and Striker,[4] and Brill,[8] there are no reports of the behavior of pediatric dental recall patients at the first recall visit, nor of the influence on behavior at recall of children having undergone restorative dental treatment. Therefore, the purpose of this investigation was to document the behavior of children at the first periodic recall visit and to compare the behavior of those, who had restorative dental treatments subsequent to the initial office visit, to those who did not in the private pediatric dental practice of the author.

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MATERIALS AND METHODS

All new patients enrolling in the private pediatric dental practice of the author as of July 15, 1999 regardless of prior dental experience were included. Patients were scheduled for recall examination 6 months after completing all necessary dental treatment. If any of the children required invasive dental treatment or sealants they were then assigned to the "restorative group". While every attempt was made to appoint patients for the recall visit in a timely fashion, there were patients that failed to return for this dental evaluation and some that returned later than the due date only after being contacted and informed that they were due for the procedure.

Patient behavior was scored using the scale described by Sarnat *et al*.[9] Behavior patterns quantified by the Sarnat scale are:

- Active Cooperation: Smiles, offers information, initiates light conversation, gives positive responses;
- Passive Cooperation: Indifferent, but obedient, follows instructions, quiet;
- Neutral, Indifferent: Needs convincing, mild crying, follows instructions under pressure;
- Opposed, Disturbs Work: Seizes hands of the dentist, not relaxed, sits and stands alternatively;
- Completely Uncooperative, Strongly Opposed – Cries, refuses to sit or to enter office.

For each patient visit, the age, sex, method of payment, Sarnat score and referral source was noted. Behavior observation data were recorded by the author on the patient's chart and transferred to a computer database program for analysis. For purposes of data analysis, patients scored as 3, 4 or 5 on the Sarnat scale (S345) were grouped together. This grouping was used as a marker for negative behavior and is the same criteria used by Brill in earlier studies.[6-8] Statistical analysis of age group response was done using either the chi-square test or Fisher's Exact Test, where appropriate, with $p < 0.05$ considered significant for differences between the behaviors of the age groups.

Written informed consent for all dental treatment was received from parents or legal guardians.

RESULTS

There were 271 children included in the study, who presented for the first recall examination out of a total of 1147 children, who were seen for an initial examination at the start of the investigation, representing a 24% rate of return for recall. Of the 271 children presenting for recall, 107 (39%) did not need any restorative treatment, thus the recall represented the second visit to the practice; 170 (63%) were covered by Medicaid as shown in Table 1.

Considering all recall patients, 27% (74/271) exhibited negative behavior at recall; 24% (26/107) of the children, who did not have a restorative visit exhibited negative behavior and 29% (48/164) of the children, who did have restorative dental treatment after the initial visit exhibited negative behavior, as seen in Table 2. Only for age 3 to 6 was there a significant difference for behavior at recall between the non-restorative and restorative cohorts ($p<0.05$). For the age group >6 using Fisher's Exact Test, there was no difference in behavior ($p>0.05$) between the two recall groups.

Table 1. Recall patient population characteristics.

	number	percent
All Recall Patients	271	
Medicaid	170	(63)
Fee for Service	101	(37)
No Restorative Dental Treatment After initial visit	107	
Medicaid	57	(53)
Fee for Service	50	(47)
Restorative Dental Treatment after initial visit	164	
Medicaid	113	(69)
Fee for Service	51	(31)

When restorative treatment and no restorative treatment are considered for Medicaid patients compared to fee for service patients, (see Tables 3 and 4), it was observed that there was no difference in behavior between children covered by Medicaid versus fee for service for all age groups ($p>0.05$).

Table 5 shows the behavior at recall of children, who had Sarnat scores of 3, 4 or 5 at their initial visit. For all patients, there was no difference in behavior between the age groups ($p>0.05$, $df = 2$), with 71% of these children continuing negative behavior (49/69).

However, when segregating between those who had restorative treatment and those who did not, the difference in behavior of children ages 3 to 6 and those 6 years of age and older was significant ($p <0.05$), with those who had restorative treatment exhibiting more negative behavior than those that did not.

Table 6 shows the relationship of the behavior of children, who had Sarnat scores of 1 or 2 at the initial visit with those who were scored S345 at recall, segregating those who had restorative dental treatments from those who did not. Only for age group 3 to 6 was the difference in behavior at recall significant, with those who had restorative treatment showing more negative behavior than those who did not ($p< .05$). Comparing these results to those in Table 5 (children with Sarnat scores of 3, 4 or 5 at the initial visit), it can be seen that except for the group

Table 2. Recall patients with Sarnat scores 3/4/5 by age.

	All patients Initial visit			No restorative treatment initial visit			Restorative treatment after		
Age Group (Years)	**# Recall Patients**	**#S3/4/5**	**(%)**	**# Recall Patients**	**# S3/4/5**	**(%)**	**# Recall Patients**	**#S3/4/5**	**(%)**
0 - 3	76	43	(57)	41	21	(51)	35	22	(63)
3 - 6	111	27	(24)	42	5	(12)	69	22	(32)
>6	84	4	(5)	24	0	(0)	60	4	(7)
Total	271	74	(27)	107	26	(24)	164	48	(29)

Table 3. Fee for service patients with S345 behavior at the first recall visit.

No restorative dental treatment after after initial visit				Restorative dental treatment initial visit			
Age (Years)	**# Patients**	**# Patients with S345 behavior**	**(%)**	**Age (Years)**	**#Patients**	**#Patients with S345 behavior**	**(%)**
0 – 3	19	9	(47)	0 – 3	8	7	(88)
3 – 6	23	3	(13)	3 – 6	23	7	(30)
>6	8	0	(0)	>6	20	0	(0)
All ages	50	12	(24)	All ages	51	14	(27)

Table 4. Medicaid patients with S345 behavior at the initial recall visit.

No restorative dental treatment after after the initial visits				Restorative dental treatment the initial visit			
Age (Years)	**#Patients**	**# Patients with S345 behavior**	**(%)**	**Age (Years)**	**#Patients**	**#Patients with S345 behavior**	**(%)**
0 – 3	22	12	(55)	0 – 3	27	15	(56)
3 – 6	19	2	(11)	3 – 6	46	15	(33)
>6	16	0	(0)	>6	40	4	(10)
All ages	57	14	(25)	All ages	113	34	(30)

Table 5. Behavior at recall of children who had Sarnat scores of 3/4/5 at their initial visit.

	Initial visit #S3/4/5	No restorative treatment after initial visit		Restorative treatment after initial visit	
Age (Years)		**# S3/4/5**	**(%)**	**# S3/4/5**	**(%)**
0 – 3	50	17	(34)	19	(38)
3 – 6	15	3	(20)	7	(47)
>6	4	0		3	(75)
All ages	69	20	(29)	29	(42)

Table 6. Children at recall with Sarnat scores of 3, 4 or 5 who had Sarnat scores of 1 or 2 at their initial visit: No restorative treatment vs. restorative treatment after the initial visit.

		No restorative treatment after the initial visit		Restorative treatment after the initial visit	
Age (Years)	**# Patients with Sarnat score 1 or 2 at their initial visit**	**# Patients with Sarnat score 3, 4 or 5 at their recall visit**	**(%)**	**# Patients with Sarnat score 3. 4 or 5 at their recall visit**	**(%)**
0 – 3	26	4	(15)	3	(12)
3 – 6	96	2	(2)	15	(16)
>6	80	0	(0)	1	(1)
All ages	202	6	(3)	19	(9)

greater than 6 years of age, where there were no subjects, in all instances, the difference in behavior was significant between those children who had restorative treatment and those who did not ($p < .05$). When considering the cohort that had restorative dental treatment and the cohort that did not, using the behavior at the initial visit as a marker, those who had Sarnat scores of 3, 4 or 5 in all instances had more negative behavior than those who scored S1, 2 ($p < .05$).

DISCUSSION

In contrast to controlled studies conducted in clinics and university settings with different individuals providing the treatment and observing patient behavior, pediatric dentists in private practice do not have the luxury of independent observers on staff with the sole purpose of grading patient response. Additionally, reporting on the total experience of a private practice population, while not necessarily following controlled experimental conditions and not eliminating all factors that could complicate results, has value for others to compare and predict how the patient populations might react under similar circumstances. For example, while the placement of sealants might not be considered an invasive procedure compared to restoring a tooth with a pulpotomy and stainless steel crown, it still represents a significant dental manipulation and as such, can be considered being more than a non-invasive procedure.

As in previous studies reported by the author,[6-8] children with Sarnat scores of 1 and 2 and those with scores of 3, 4 or 5 were grouped separately. The rationale was the same as before, i.e., patients with Sarnat scores of 3, 4 or 5 were often deemed to be behavior problems by referring general dentists.[6] While a pediatric dentist might not consider a child who needs convincing, exhibits mild crying and follows instructions under pressure to be a behavior problem (Sarnat 3), it is the impression of the author, gathered from referral forms supplied by the referring clinicians, that general dentists very often feel differently and this distinction was also utilized for this study. It is also true that children, who had prior dental experiences at other offices, are likely to have different reactions to than those who are neophyte dental patients. This distinction was not made in order to more accurately portray all patient responses in a private practice.

With these caveats, the results showed that for ages 3 to 6, the behavior of children at recall is related to having undergone prior restorative dental procedures. Very young children behave poorly at recall and older children behave well, regardless of whether or not they had restorative dental treatment in between the initial and first recall visits. This may be attributable simply to age, i.e., very young children behave poorly in the dental situation because they do not understand it and older children behave better due to a more mature level of understanding of situations in which they find themselves. While children in the intermediate age group (3 to 6) may understand the dental experience, they may not find it comfortable.

No specific data was collected about the socio-economic demographics of the patients, however, assuming that being a Medicaid recipient is indicative of lower socio-economic status, it was seen that socio-economic status was not a factor in observed behaviors.

Additionally, those children who exhibited negative behavior at the initial visit tended to exhibit negative behavior at recall. Age, however, is a factor for these children, since for only age group 0 to 3 was there no difference between the two cohorts. It is likely that these children have not developed the cognitive skills to cope with dental experiences, no matter the level of invasiveness. By extension, for children over 3 years of age, there is likely a remembrance of what was perceived of as an unpleasant experience, i.e., restorative dental treatment. Although individual children were not longitudinally followed, the results suggest that as children get older, even with having negative behavior at the initial visit and having experienced invasive dental procedures, behavior

improves. While this may be empirically assumed by dentists, these results give this belief an evidence basis.

While it is true that these results can only be specifically applied to a particular private practice, they may be indicative of clinical practice and therefore may be helpful to dentists anticipating how child patients will behave. Additionally, since the author was both the deliverer of service and the rater of behavior, some bias may have been introduced. All effort was made for objectivity of evaluation and strict adherence to the criteria of the Sarnat scale.

Some may be concerned by the low rate of return by the children for recall examination. The rate reported included new patients, who were part of closed panel dental plans and needed referral to a pediatric dentist for any treatment. Since these children were referred back to the referring dentist for recall, being the gatekeeper primary care general dentist, the true recall rate is likely higher than reported, i.e., all patients presenting for initial examination were utilized for calculation of recall rate. There are no reports in the literature as to the recall rate in a private pediatric dental practice, so it is not known if the 24% rate of return is comparable to similar practices.

CONCLUSIONS

Children 3 to 6 years of age, in a private pediatric dental practice, had more negative behavior at first recall examination if they previously had restorative dental treatment. Children, who exhibited negative behavior at the initial examination, tended to exhibit negative behavior at the first recall regardless of intervening dental experience. In all instances, socio-economic strata did not appear to have an influence.

(The author has a University of Maryland affiliation, and University regulations required IRB approval, which was obtained for record review of anonymous patient record data.)

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