
Fissure Sealant Knowledge and Characteristics of Parents as a Function of Their Child's Sealant Status

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Abstract

A survey was conducted to identify and compare sealant knowledge and sources of sealant information of parents whose children had and had not received fissure sealants. The socioeconomic characteristics of these individuals were also compared. The sealant group was composed of the parents of children found to have a sealant on at least one permanent tooth during dental examinations of 2,036 elementary schoolchildren in southwestern Michigan. Another group of children was selected from the same population and matched to the children with sealants by child's age, sex, school location, and community. Surveys were returned by 210 of 260 sets of parents (81% response rate). Significant differences were found between the two groups with regard to parents' ages and levels of income. Parents of children with sealants had more correct information about the procedure and 74 percent of these individuals reported that the dental office was their primary source of information. For the group without sealants, 48 percent of respondents reported no source of sealant information. Findings suggest that dental personnel may strongly influence dissemination of information about sealants and utilization of this preventive procedure.

Key Words: fissure sealants, prevention, oral health knowledge

Despite investigations that support the efficacy of fissure sealants (1-4) and encouragement for their use from the scientific community (5,6) and professional organizations (7,8), adoption of this preventive agent by dentists has progressed slowly (9-11). Some of the

reasons cited by dentists who were not using sealants relate to patient acceptance of the procedure. More than half of the dentists responding to a survey by Gift (12) felt "patients have difficulty understanding the value of sealants" and "patients [are] unwilling to pay" were reasons for not using sealants. Simonsen (13) reported that when respondents to a survey of general dentists in Minnesota were asked what would lead them to increase their use of sealants, the most frequent responses were "further research data" and "patient demand."

The extent of consumers' awareness of sealants is uncertain due to the absence of surveys of their knowledge about this preventive agent. Little awareness is likely, however, because of the paucity of sealant information for the public. Almost three-fourths of respondents to a 1985 national survey of sealant use by private practice dentists (14) indicated that few of their patients had prior knowledge of the procedure and an additional 12.5 percent of the dentists reported that none of their patients had prior knowledge about sealants. In contrast, a comparison of surveys conducted in 1983 and 1986 in the greater Boston area (15) indicated that the public's familiarity with sealants increased from 46 percent to 58 percent; sealant awareness due to media increased from 29 percent to 40 percent; and awareness due to introduction of the procedure by dentists rose from 21 percent to 34 percent. During this time, the Massachusetts Department of Public Health began a multifaceted sealant program that included both consumer and professional education, and at the same time third-party carriers in the state began reimbursing for sealants (16). The extent of public awareness demonstrated by the preceding surveys varies considerably and implies that regional and temporal differences exist.

In addition to sealant awareness, sources of sealant information for the public have been examined. A 1984 investigation (17) conducted in urban and rural areas of Minnesota found that 47 percent of those surveyed had

heard or read about sealants, and that the most common information source mentioned was radio/television followed by magazines/books, dental offices, and newspapers. In urban Minnesota, the dental office was identified more frequently as a source of information.

While the degree of public knowledge about sealants remains uncertain, the dissemination of information about this preventive procedure appears to emanate primarily from media and dental offices. Since few investigations have assessed the public's awareness of sealants, a survey was performed to identify and compare sealant knowledge and sources of sealant information of parents whose children did and did not have sealants. In addition, the socioeconomic characteristics of these two groups of parents were compared.

Methods

In 1985, dental examinations were performed on 2,036 children at elementary schools in southwestern Michigan to determine their dental health status. The children resided in 46 communities in seven counties. Communities ranged in size from 235 to 79,146 persons with a median population of 1,478 (18). Median family income levels for the seven counties ranged from \$17,503 to \$22,211, and the proportion of residents in each county that were high school graduates varied from 62.1 percent to 75.8 percent (19).

The children's teeth were inspected under fiberoptic illumination by one public health dentist (WPL) using a plane mirror and No. 5 explorer. A sealant was considered to be present if it could be detected clinically, regardless of whether the pits or fissures were completely or partially covered. The examiner dictated all oral findings to a trained recorder who entered the data directly into a portable microcomputer at examination sites. Of the 2,036 children examined, 130 (6.4%) had one or more sealed permanent teeth; the majority, 1,906 children, did not have sealants. The children's age distribution, which ranged from 8 to 14 years, is shown in Table 1.

The participants for this survey consisted of two groups. The parents of all children with sealants com-

prised the Sealant Group. A stratified random sample of 130 children was then selected from among the students who did not have sealants. Stratification was according to age, sex, community of residence, and school location. The parents of these children served as the comparison group—the No Sealant Group. A 22-item mail survey was developed that required respondents to circle answers in a multiple-choice format, or to indicate the extent of agreement with statements on Likert-type scales (20). Items were included to assess socioeconomic characteristics of respondents, knowledge about sealants, sources of information about sealants, and characteristics of dental practices visited by respondents' children. The survey was pre-tested, then mailed in April 1986 to subjects eight months after the examinations. Respondents were asked to return the questionnaire using a self-addressed, stamped envelope. A second mailing was sent to all nonrespondents two weeks later, and follow-up telephone calls were made two weeks after the second mailing.

"Respondents in the Sealant Group generally had more education and reported higher incomes than parents in the No Sealant Group."

Clinical examinations were conducted again in fall 1986, several months after the survey was completed. Parents of children who had detectable sealants at both examinations were included in the Sealant Group. Children who did not have sealants before or after the survey were considered to be sealant-free at the time of the survey.

To compare the responses of the two groups, chi-square statistics were employed, as survey data were categorical and not normally distributed. Variables identified as being significantly different between groups were further analyzed using stepwise logistic regression, with the dependent variable being sealant presence (yes/no). The probability of a "yes" outcome was computed for statistically significant variables.

Results

Surveys were returned by 227 parents, corresponding to an overall response rate of 81 percent, after 17 incomplete questionnaires were discarded. Response rates differed between groups: 111 respondents (85% response rate) were parents whose children had sealants and 99 persons (76%) were respondents whose children had no sealants. An additional 12 respondents were eliminated from the No Sealant Group because their children were found to have sealants at the second examination or were not reexamined and their current sealant status could not be verified. The numbers of respondents displayed in some of the tables vary due to missing data.

TABLE 1
Age Distributions of Children Examined and Children with Sealants

Age (yrs)	Children Examined		Children with Sealants (n)
	n	%	
8	2	0.1	0
9	394	19.4	27
10	691	33.9	51
11	662	32.5	43
12	248	12.2	8
13	37	1.8	0
14	2	0.1	1
All ages	2,036	100.0	130

Characteristics of the Children and Parents. The similarity of the two groups of children was confirmed by comparisons of age and sex distributions. The distribution of the ages of children with sealants (10.3 years) was similar to that of the children without sealants (10.2 years). Each group contained slightly more males than females: 54.1 percent of the group with sealants were males compared to 55.2 percent of the group without sealants.

Characteristics of the parents of the Sealant and No Sealant Groups are displayed in Table 2. The respondents (parents) were primarily female, and the median ages of the two groups were 38.0 years and 36.0 years, respectively. Parents of children in the Sealant Group had generally attained higher levels of education than those of children in the No Sealant Group. In the Sealant Group, 40.2 percent of respondents reported having four or more years of college, compared to only 25.6 percent of respondents from the No Sealant Group.

TABLE 2
Characteristics of Parents in the Sealant and No Sealant Groups

Characteristic	Sealant Group		No Sealant Group		P
	%	n	%	n	
Sex					
Male	7.7	8	9.3	7	
Female	92.3	96	90.7	68	.70*
Median age	38 years		36 years		.01**
Education					
≤High school	23.4	25	36.6	30	
<4 years college	36.4	39	37.8	31	.06*
≥4 years college	40.2	43	25.6	21	
Income					
<\$15,000	7.8	8	21.1	16	
\$15,000-24,999	25.5	26	27.6	21	.03*
≥\$25,000	66.7	68	51.3	39	
Dental insurance					
Yes	66.4	71	53.8	43	
No	33.6	36	46.2	37	.08*

*Chi square test.

**Mann Whitney-U test.

Conversely, more respondents from the No Sealant Group reported being only high school graduates or having fewer than four years of high school than did respondents from the Sealant Group (36.6% vs 23.4%). Income levels were higher in the Sealant Group with 66.7 percent reporting incomes of \$25,090 or more, while only 7.8 percent reported incomes of less than \$15,000. In the No Sealant Group 51.3 percent had incomes of \$25,000 or greater and 21.1 percent had incomes of less than \$15,000. In addition, 66.4 percent of respondents from the Sealant Group reported having dental insurance, compared to 53.8 percent of the No Sealant Group.

Knowledge about Sealants and Sources of Information. Table 3 displays the distribution of responses to questions about dental sealants for each group. The four questions, written in nontechnical terms, determined if respondents could define a sealant, identify the purpose of a sealant, discern if a "dental drill" was needed to place a sealant, and recognize the potential longevity of a sealant. The most striking difference between the two groups was the large number of correct responses from the Sealant Group compared to the larger number of "don't know" responses from the No Sealant Group. Because of the small number of "incorrect" responses, the categories of "incorrect" and "don't know" were combined. Chi-square tests were performed on the distribution of responses to assess differences between groups for each question. For each of the four questions, the proportion of parents in each group with correct knowledge about sealants was significantly different (chi-square test, $P \leq .001$).

Respondents were asked to identify their sources of information about sealants. As displayed in Table 4, the most frequently identified source of information for the Sealant Group was the dental office. The most common response for the No Sealant Group was "no source of information," followed by friends/family, then the dental office. The differences in distribution of sources of information between the two groups were statistically significant.

Characteristics of Dental Practices and Dentists. Most respondents' children received dental care from a general practitioner—73.3 percent of the Sealant Group and 79.3 percent of the No Sealant Group. Children of the Sealant Group were somewhat more likely to visit a pediatric dentist (23.8% compared to 15.9%) and have a

TABLE 3
Percent Distribution of Parents' Responses to Questions Assessing Knowledge about Sealants

Question	Sealant Group (n = 110)			No Sealant Group (n = 87)		
	Correct	Incorrect	Don't Know	Correct	Incorrect	Don't Know
A sealant is a plastic coating applied to teeth	84.5	1.0	14.5	49.4	2.3	48.3
Sealants effectively prevent tooth decay	80.0	6.4	13.6	55.2	0.0	44.8
A dental drill must be used to place a sealant	67.3	8.2	24.5	40.2	6.9	52.9
A sealant will protect a tooth from decay for more than one year	69.1	6.4	24.5	32.2	5.7	62.1

TABLE 4
Sources of Information about Dental Sealants Reported by Parents

Source	Sealant Group		No Sealant Group	
	%	n	%	n
Dental office	73.9	82	17.1	14
Friends/family	12.6	14	21.9	18
Media/other sources	6.3	7	13.3	11
No source	7.2	8	47.6	39
Total	100.0	111	99.9	82

Chi square test, $P < .001$.

TABLE 5
Frequency of Periodic Dental Examinations Received by Children

Visit Frequency	Sealant Group		No Sealant Group	
	%	n	%	n
Every 6 months	75.2	79	50.6	40
7-12 months	20.0	21	32.9	26
More than 12 months	4.8	5	16.5	13
Total	100.0	105	100.0	79

Chi square test, $P < .01$.

TABLE 6
Summary of Stepwise Logistic Regression Analysis
Dependent Variable: Sealant Presence (Yes/No)

Independent Variable	Logistic Regression Statistics		
	Regression Coefficients	T Ratio	Probability of Sealant Being Present
Dental office	1.666	6.594	.83
Other sources	-0.368	-1.396	.40
No source	-1.354	-4.336	.21

source of regular dental care; but overall, differences in the distribution of practice types between the two groups were not significant. Table 5 displays the reported frequency of periodic dental examinations received by children of the two groups. Children in the Sealant Group visited the dentist more frequently, with 75.2 percent of respondents reporting a dental visit for their child every six months, compared to 50.6 percent of respondents in the No Sealant Group. Visit intervals of greater than 12 months were more likely for the No Sealant Group, with 16.5 percent reporting this interval compared to only 4.8 percent for the Sealant Group. These differences were significantly different.

Logistic Regression to Predict Presence of Sealants. Chi-square analyses suggested that certain relation-

ships might exist between some variables and the presence or absence of a sealant in a child's mouth. To test this hypothesis, stepwise logistic regression was performed using as independent variables: respondent's age, education level, income level, frequency of child's dental examination, and source of information about sealants. The dependent variable was the presence or absence of a sealant (yes/no). Results of the regression analysis are shown in Table 6. Source of information was found to be the only significant variable in this model. The probability of a sealant being present in a child was about two times greater if a parent's source of information was the dental office than if a parent reported other sources of information, and about four times greater than if a parent reported no source of information.

Discussion

Findings from this investigation point to two elements that may be linked to the presence of sealants in a child: the socioeconomic status of a family and a source of information about sealants. Results indicate that the dental office may be the primary source of information about sealants, and that in the process of providing information and eventually sealants, parents' knowledge is increased. The interplay of these various elements deserves further scrutiny.

Socioeconomic Status of the Family. Although socioeconomic variables were not major predictors of sealant status as determined by the regression analysis, differences in reported levels of education and income between the Sealant and No Sealant Groups were associated with the children's sealant status. Respondents in the Sealant Groups generally had more education and reported higher incomes than parents in the No Sealant Group. Parents who can afford the out-of-pocket costs of sealants may be more likely to have sealants placed on their children's teeth. Reducing the barrier of out-of-pocket cost would be possible if third parties in this geographic area were to begin reimbursing for sealants, an activity that was not occurring at the time of the investigation. Third-party reimbursement would be beneficial to both groups, as more than 50 percent of all respondents reported having dental insurance. Given the increase in third-party reimbursement for sealants occurring nationally (21), cost may become less of an impediment to the public's access to sealants in the future.

The Role of the Dental Office. Increasing the public's level of knowledge about sealants requires that sources of accurate information be available and accessible. For respondents in this study, the dental office appeared to be the primary source of information about sealants. This finding differs with the findings of others (17,22,23) that support an influential role of media in the dissemination of sealant information to the public. Frazier and Glasrud (17) reported that media played a large part in increasing the public's awareness of sealants in Minnesota; yet, their survey was conducted shortly after a consensus conference of the National Institutes of Health (5). This particular time frame

might explain why media were cited so frequently as a source of information by respondents to that survey. The findings of the present investigation, which occurred more than 18 months following the conference, identified a more typical response regarding source of information about preventive procedures—the dental office.

Differences in knowledge levels between the two groups were considerable. The Sealant Group answered more questions correctly, while the No Sealant Group demonstrated a lack of knowledge. Since the No Sealant Group was drawn randomly from a larger population, their responses may be more indicative of the public's current awareness of sealants: a dearth of knowledge rather than incorrect information. In the elementary schools in which examinations occurred, schoolteachers also completed a dental health knowledge and opinions survey (24). When questioned about sealants, the preponderance of responses were also in the "don't know" category. Taken collectively, the results of these two surveys indicate a low level of sealant knowledge by the public in the study area.

Although parents in the Sealant Group reported that their children received more frequent periodic examinations than the No Sealant Group, visit frequency was independent of sealant placement, and perhaps merely the result of a strong preventive orientation by the parent or the dental office. Certainly, the higher frequency of periodic dental examinations received by children in the Sealant Group provided office staff with more opportunities to explain and promote sealants. It should be borne in mind, however, that the majority of children in the study area had not received sealants, regardless of their frequency of dental visits.

Logistic Regression Analysis. The logistic regression analysis suggests a "dental-office-as-gatekeeper" effect, since the strongest predictor of sealant presence was the dental office as a source of information. Thus, the expectation that public demand for sealants may increase because of information gained from sources other than the dental office may not be realistic. Furthermore, the extent to which public demand can influence dental practitioners to provide certain services is unknown. In a discussion of strategies for promoting sealants, Frazier (25) has proposed that one important route to influencing the behavior of practitioners includes public demand for sealants, which is in turn stimulated by public information about the procedure. Investigations that can assess the effect of public demand for services upon provider behavior are clearly needed. Any plan to promote sealants or other beneficial preventive agents certainly should include a public education component so that demand will emanate from as many sources as possible (26). Based on findings from this investigation, promotional efforts should include a significant attempt to educate dental professionals about the value of sealants because, currently, the dissemination of sealant information and the pro-

motion of the procedure are at the discretion of this group.

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