

## THE EFFECT OF EDUCATION UPON DENTISTS' KNOWLEDGE AND ATTITUDE TOWARD FISSURE SEALANTS

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إن مادة قافل شقوق الأسنان لها أثر فعال في منع تسوس تجاويف الأسنان وقد وجدت الكثير من الدراسات أن هذه المادة أن هذه المادة لا تستعمل بكثرة بواسطة بعض أطباء الأسنان. إن الغرض من هذا البحث هو تحديث معلومات أطباء الأسنان عن مادة قافل الشقوق ومعرفة مدى أثر هذا التثقيف على معلومات واستعمالات طبيب الأسنان لهذه المادة. تم توزيع استبيان عن معرفة مدى استخدام المادة السادة اللاصقة من قبل أطباء الأسنان في العيادات الخاصة بمدينة جدة . مائة وتسعون طبيب و طبيبة أسنان أجابوا على الاستبيان ثم تم تقسيمهم إلى مجموعتين متساويتين، مجموعة تم تحديث معلوماتها بحصولها على نشرات مكتوبة عن المادة السادة اللاصقة للمياريب ومجموعة لم يتم تحديث معلوماتها ولم تلتق هذه المسواد إلا بعد الحصول على الاستبيان الثاني. بعد مضي ١٢ شهراً كان عدد الأطباء الذين أجابوا على الاستبيان الثاني مائة وخمسون . الفحص الإحصائي للإجابات أظهر أن معلومات الأطباء في المجموعة الأولى قد ازدادت ازدياداً واضحاً و ذا دلالة إحصائية بينما لم يكن الأمر كذلك في المجموعة الثانية ، بالنسبة لتعامل الأطباء واستعمالهم للمادة السادة للمياريب لم يكن هناك فرق يذكر بين المجموعتين . من هذا نستنتج أن تحديث المعلومات المستمرة لأطباء الأسنان له أثر فعال على المعلومات لديهم أكثر من أثره على سلوكهم وتصرفاتهم نحو المادة السادة للمياريب لذلك يجب الاستمرار في تشجيع الأطباء على استخدام المادة السادة اللاصقة لأن التغيير في السلوكيات يحتاج إلى وقت طويل لظهور آثاره.

Sealants are highly effective in preventing dental caries in pits and fissures of teeth. It has been shown, however, that sealants are not widely used by dentists. This study aimed to inform dental professionals about sealants and to evaluate the effect of such information on dentists' knowledge, attitude and use of sealants. A total of 190 dentists were surveyed to determine their knowledge and attitude toward sealants. Respondents were randomly assigned to an "Education" group who received education materials in contrast with the "No Education" group who did not receive any until after the education phase. After 12 months, 105 dentists responded to the post-intervention survey. Comparison between the two surveys showed that dentists' knowledge increased significantly in the "Education" group. No difference was detected in the dentists' knowledge in the "No Education" group. However, dentists' attitude toward sealant use did not significantly improve in either of the groups. It is, therefore, concluded that continuing education was more likely to change dentists' knowledge rather than attitude and behaviour. Efforts to encourage sealant use by dentists should continue, but with the recognition that changes in behaviour occur over a long time and that other external factors in the professional environment may affect the rate of change.

### Introduction

Epidemiological data show that the prevalence of dental caries in most developed countries has declined in recent decades.<sup>13</sup> It has been suggested that the use of fluoride in various forms has been largely responsible for this decline. Unfortunately, preventing tooth decay on the occlusal surfaces of teeth remains a problem for the practising dentist because fluoride is less effective on these surfaces. Fissure sealants are highly effective in preven-

ting caries in pit and fissures<sup>48</sup> and the management of incipient carious lesions.<sup>9</sup> However, in spite of the scientific evidence supporting their effectiveness, their use by dentists have been minimal.<sup>10</sup> In the United States, it was reported that only 10% of school children in Tennessee had sealant on their teeth,<sup>11</sup> while only 12% had sealants in North Carolina.<sup>12</sup> Chestnutt et al<sup>13</sup> in 1994 reported that only 10.2% of the Scottish school children had sealants which is even higher than the level of sealants reported in 1996 in other parts of the United Kingdom.<sup>14</sup> A more recent study showed an increased use of sealant between 30-50% in the United Kingdom.<sup>15</sup>

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There are many reasons for the sparse use of sealants in caries prevention. Lack of knowledge about sealants has frequently been cited as a possible deterrent to its adoption.<sup>16,18</sup> Lack of public knowledge and belief about the efficacy of dental sealants also influence parental acceptance of sealants for their children.<sup>19</sup> Continuing education has been proposed as a method of increasing sealant utilization among practising dentists.<sup>20,24</sup> Results of these studies suggest that continuing education may have positive effects upon knowledge, opinion and behaviour but without a well-designed research using an adequate control group, the extent of these effects remains speculative.

The caries experience among children in various parts of the Kingdom of Saudi Arabia has been reported to be high.<sup>25,27</sup> However, the adoption of pit and fissure sealants for preventive purposes by the dentists' in the Kingdom has not been evaluated. The author examined 2450 school children from grades 1-9 and found less than 5% of them had sealants (unpublished data). The present study aimed to provide information about sealants to the dentists working in private dental practices in the City of Jeddah and to determine whether dentists' knowledge, attitude and use of sealants could be modified by education.

## Materials and Methods

### Subjects

A list of names and addresses of private dental clinics in the city of Jeddah was obtained from the Ministry of Health. The clinics were contacted by phone to obtain information regarding the number of dental professionals in each clinic. All dentists (312) in the private practice constituted the initial sample. This sample was surveyed to determine level of knowledge, attitude towards sealants and use of sealants. The respondents were randomly assigned to two equal groups, one group was offered educational material and the other served as a control group. After 12 months, a post-intervention survey was conducted to identify differences, if any, in knowledge, attitude and sealant use between the two **groups**.

### Questionnaire

The survey questionnaire was developed, reviewed and pilot-tested among 15 dentists who were not included in the main study. The questionnaire was modified based on the results of the pilot test. A 19-item questionnaire was developed for the study based on questions addressing knowledge, attitude and sealant usage from other investigations.<sup>17, 22,27,28</sup>

The pre-intervention questionnaire consisted of six questions to assess dentists' perception of the value of sealants, the practicality of their application, their cost effectiveness and acceptance by patients. Seven questions were used to measure dentists' knowledge about sealants retention, appropriate teeth for sealing, sealant longevity and their relation with water fluoridation. A three-point scale (1 to 3) was used with the categories "Agree," "Undecided" and "Disagree." Respondents were requested to record their year of graduation from dental school. Data on dentists' current sealant use was obtained by asking for estimates of the average number of patients aged 18 years and younger that the respondents treated per week and the percentage of those who received sealants. If sealants were not being applied in the office, the respondent was asked to choose from a list of 9 reasons why this was so.<sup>18,22,29</sup>

The post intervention questionnaire contained the same questions as the pre-intervention survey. In addition to these, however, the dentists were asked to indicate how valuable the different components of the education materials used in the study have been to them. A composite score for attitude was created by summing the correct responses of each dentist to the questions regarding attitude, then dividing it by the total number of possible responses (six). The result was then multiplied by 100 to arrive at an attitude score with a range of 0-100. Mean attitude scores from pre-and post-intervention surveys were recorded. A composite score for dentist's knowledge about sealants was developed with the same procedure **and** the correct responses were divided by seven.

### Educational Material

The education materials consisted of a newsletter with updated information from scientific studies about sealants and some suggestions for improved decision-making and maintenance based on materials and technique changes. The second portion of the education materials was a plaster model with two plastic teeth of lower first permanent molars one was sealed and the other unsealed. These models were provided to supplement health education materials in the office, and to allow the dentist to visually demonstrate sealants and their effect on pit and fissures to patients. The third portion was the Arabic patient education material in the form of pamphlets with a written introduction about the high caries incidence in the pit and fissure surfaces of the molars, their prevention using fissure sealants, the most suitable age of sealant applications and the cost-benefit effect of sealants. Dentists who were assigned to the "Education" group received the educational material as they responded to the pre-intervention questionnaires. The "No Education" (Control) group received educational materials after the completion of the post-intervention questionnaire.

### **Data Analysis**

Only the data obtained from dentists who responded to both surveys were included in the analysis. All incomplete responses were eliminated. Comparison procedure using paired t-test was used to determine significant differences between the "Education" and "No Education" groups with respect to knowledge and attitude scores and the percentage of patients receiving sealants. The Chi-square test was used to assess the usefulness of the different components of the education materials.  $P < 0.05$  was regarded as significant.

### **Results**

The final sample which responded to both questionnaires consisted of 105 dentists, 64 in the "Education" and 41 in the "No Education" group. Table 1 shows a comparison between

the "Education" and "No Education" groups on the basis of gender and years since graduation from dental school. Regarding sex distribution, 57.8% of the "Education" group were male in comparison to 46.3% in the "No Education" group. This difference was not statistically significant ( $P = 0.37$ ). Since there was no difference in sex distribution between the two groups, they were combined together in all the analysis. The answers to the question regarding years since graduation varied from 2 to 25 years in the "Education" group and from 4 to 27 years in the "No Education" group with a mean of 14.3 years and 14.1 years, respectively.

**Table 1.** Biographic characteristics by group.

Group	Sex		Total n	Mean Years Since Graduation
	Male n (%)	Female n (%)		
Education	37(57.8)	27 (42.2)	64	14.3
No Education	19(46.3)	22(53.7)	41	14.1

$$*\chi^2 = 1.21 \quad df = 1 \quad P = 0.37$$

The mean attitude and knowledge scores and the mean percentage of young patients receiving sealant in the pre and post-intervention surveys are shown in Table 2. The two groups exhibited almost identical attitude scores for pre-intervention survey (57.5 and 56.4 percent of the Education and No Education group, respectively). Although the attitude values of both groups increased slightly, there were no significant differences between pre- and post-intervention results in either of the two groups.

**Table 2.** Knowledge, attitude and use of sealants at pre- and post-intervention surveys by group.

Group		Education n = 64		No Education n = 41	
		%	P Value	%	P Value
Attitude	Pre	57.5	NS	56.4	NS
	Post	58.6		57.1	
Knowledge	Pre	57.6	< 0.005	55.4	NS
	Post	63.2		56.2	
Use of Sealant	Pre	28.1	NS	26.5	NS
	Post	29.4		27.4	

P - Significance of difference using paired t-test  
NS - Non Significant

At the post-intervention survey, while the "Education" group had significantly higher knowledge score than the pre-intervention survey ( $P < .0005$ ), the "No Education" group exhibited no difference between the two surveys. In the pre-intervention survey, results showed the proportions of patients aged 18 years or younger who were receiving sealants: 28.1 and 26.5 percent for the dentists in the "Education" group and "No Education" group, respectively. Sealants placement values were not significantly different at  $P > .05$ . Comparing the use of sealants in the pre- and post-intervention surveys showed that the use of sealants had increased slightly in both groups, but these differences were not statistically significant. At pre-intervention survey, about 30% of the total sample were not using any sealants. Those respondents who reported non use of sealants were asked to rank the most important reasons for non-usage (Table 3). The four most frequent first choices for not using sealants were: 1) Patients have difficulty understanding the value of sealants (27%); 2) Patients are unwilling to pay for sealants (21.2%); 3) Sealants do not last long in the mouth (17.6%); and 4) I do not treat enough children (16.4%).

A question was posed to the "Education" group to evaluate the usefulness of the various educational components of the project. Almost 81 percent of the dentists found the education materials to be useful. The models were reported to be of highest value with 84.6% of respon-

**Table 3.** Percent distribution of reasons for not using sealants among dentists.\*n = 67

Reasons	%
Patients have difficulty understanding the value of sealants.	27
Patients are unwilling to pay for sealants.	21.2
Sealants do not last long in the mouth.	17.6
I do not treat enough children.	16.4
Sealants are not cost effective compared to amalgam filling.	8.2
Sealant effectiveness is unsubstantiated by research.	5.4
It is possible to seal in decay.	1.4
I am unfamiliar with the procedure.	1.4
Other reasons	1.4

\*Multiple responses allowed

dents reporting them to be useful (Table 4). Respondents were somewhat less enthusiastic about the usefulness of the written patient education materials. While none of the dentists considered the model to be useless, 5.8% judged the written material as useless. The differences in the usefulness of the three components were, however, not statistically significant ( $\chi^2 = 2.25$ ;  $df = 4$ ;  $P = .69$ ).

**Table 4.** Usefulness of educational material to subjects in the Education Group (n=64).

	Useful	Undecided	Useless
Component	%	%	%
Newsletter	80.8	15.4	3.8
Written patient education materials	76.9	17.3	5.8
Models for patient education	84.6	15.4	0

$\chi^2 = 2.25$   $df = 4$   $P = 0.69$

### Discussion

The study sample was representative of the private sector's general dentists and since the subjects were randomly assigned to the two groups, the results could be regarded as being representative for this population. Although many of the variables of interest were acquired by a self-report method, this project has helped to promote the diffusion of sealant technology into dental practice as well as the understanding of the effectiveness of continuing education for dentists.

The pre-intervention questionnaire was limited to two pages to increase response rates. The response rates of initial and final questionnaires (61% and 66%, respectively) were comparable with those of other surveys<sup>17-22</sup> which used questionnaires of similar length. However, higher response rate was reported by Cohen (37.6%) who used a 12-pages questionnaire.<sup>28</sup>

Respondents' gender and year of graduation were associated in some surveys with the level of sealants use.<sup>17-22</sup> In the present study, there were no significant differences in the respondents' gender nor mean of years since graduation between "Education" and "No Education" groups.

Findings from the pre-intervention survey

indicated that awareness of sealants is moderately low among respondents. There is a great degree of confusion surrounding the facts about sealant. Results showed that education programs are effective in increasing dentists' knowledge acquisition as evidenced by the improvement in knowledge scores which were significantly higher among the "Education" than the "No Education" group. These findings are similar to those reported earlier.<sup>22,30</sup>

Results showed a slight but not significant improvement in the attitude scores in the second survey in both groups. These results are also similar to the findings from a sealant initiative performed in North Carolina<sup>30</sup> and by Lang et al.<sup>2</sup> In those investigations, small but non significant increase in attitude values were found following education programs. The authors concluded that attempts to change attitudes present a challenging objective for any intervention and probably requires sustained repetitive activities over a long time.

As to the use of sealants, almost 70% of the respondents stated that they were currently using sealants. However, when the level of use is quantified, it becomes apparent that sealants are still under-utilized by the majority of dentists.

Sealants use was not increased by participation in the educational program. Although the time between the pre- and post-intervention surveys may have been insufficient to capture changes in behaviour, evaluation periods may need to be years in duration rather than months. Clearly, the issue of patients' acceptance and willingness to pay for sealants were the concerns of the respondents who were not using sealants. The reasons given for lack of usage are similar to those reported in the literature.<sup>17,28</sup> Reinforcement in patient dental health information specially sealant awareness is needed. In Saudi Arabia, the media would be an influential agent in the dissemination of sealants information to the public. The significant effect of the media as the primary source of information about sealants was reported by several investigators.<sup>31,32</sup>

From this study, it can be concluded that continuing education is likely to improve dentists'

knowledge, but would have little effect upon their attitudes toward sealant use. The following approaches may be beneficial:

1. Dentists should be asked about desirable approaches to continuing education. These information and baseline assessment surveys will permit the profession to construct more effective education programs.
2. Sealant manufacturers should make a more concrete effort to advertise and promote sealants to dentists.
3. Greater effort should be made by professional organizations and governmental agencies to inform patients of the benefits of sealants.
4. Oral health presentation seminars given to lay groups such as school children and parental groups should be encouraged.

#### References

1. Glass RL. The first international conference on declining prevalence of dental caries. Introduction. *J Dent Res* 1982; 61: 1304.
2. Renson CE, Crielaers PJA and Ibikunle SAJ et al. Changing patterns of oral health and implications for oral health manpower: Part I. *Int Dent J* 1985; 35:235-251.
3. Holm AK. Diet and caries in high-risk groups in developed and developing countries. *Caries Res* 1990;24:44-52.
4. Horowitz HS, Heifetz SB and Poulsen S. Retention and effectiveness of a single application of an adhesive sealant in preventing occlusal caries: Final report after five years of study in Kalispell, Montana. *J Am Dent Assoc* 1977; 95:1133-1139.
5. Weintraub J. The effectiveness of pit and fissure sealants. *J Public Health Dent* 1989; 49: 317-330.
6. Simonsen RJ. Retention and effectiveness of dental sealant after 15 years. *J Am Dent Assoc* 1991; 122:34-42.
7. Ripa LW. Sealants revisited: An update of the effectiveness of pit-and-fissure sealants. *Caries Res* 1993; 27: 77-82.
8. Ismail AI and Gagnon P. A longitudinal evaluation of fissure sealants applied in dental practices. *J Dent Res* 1995; 74: 1583-1590.
9. Handelman SL. Therapeutic use of sealants for incipient or early carious lesions in children and young adults. *Proc Finn Dent Soc* 1991; 87: 463-475.
10. Cohen, LD. Pit and fissure sealants. An under-utilized preventive technology. *Int Tech Assess in Health Care* 1990; 6: 378-391.

11. Gillcrist JA, Collier DR and Wade GT. Dental caries and sealant prevalences in school children in Tennessee. *J Public Health Dent* 1992; 52: 69-74.
12. Rozier RG, Spratt CJ, Koch GG and Davies GM. The prevalence of dental sealants in North Carolina school children. *J Public Health Dent* 1994; 54: 177-83.
13. Chestnutt IG, Schafer F, Jacobson APM and Stephen KW. The prevalence and effectiveness of fissure sealants in Scottish adolescents. *Br Dental J* 1994; 177: 125-129.
14. Blinkhorn AS, Hassall DC, Holloway PJ, Mellor AC and Worthington HV. An assessment of capitation in the new General Dental Service contract. *Comm Dent Health* 1996; 13: 3-20.
15. Holloway PJ, Blinkhorn AS, Hassall DC and Mellor AC et al. An assessment of capitation in the general dental service contract. The level of caries and its treatment in regularly attending children and adolescent. *Br Dental J* 1997; 182: 418-23.
16. Gift HC, Frew R and Hefferren JJ. Attitudes toward and use of pit and fissure sealants. *J Dent Child* 1975;42:460-6.
17. Hunt RJ, Kohout FJ and BeckJD. The use of pit and fissure sealants in private dental practices. *J Dent Child* 1984; 51:29-33.
18. Rubenstein LK and Dinius A. Dental sealant usage in Virginia. *J Public Health Dent* 1986; 49: 147-51.
19. Selwitz RH, Colley BJ, Rozier RG. Factors associated with parental acceptance of dental sealants. *J Public Health Dent* 1992; 52: 137-145.
20. Horowitz, AM and Frazier PJ. Issues in the widespread adoption of pit and fissure sealants. *J Public Health Dent* 1982; 42: 312-23.
21. Weintraub JA and Burt BA. Prevention of dental caries by the use of pit-and-fissure sealants. *J Public Health Policy* 1987 8: 542-60.
22. Lang WP, Farghaly MM, Woolfolk MW, Ziemiecki TL and Faja BW. Educating dentists about fissure sealants: Effects on knowledge, attitudes, and use. *J Public Health Dent* 1991; 51: 164-9.
23. Pitts NB, Davis MH and Harden RM. General dental practitioners' needs for continuing education on the management of fissure caries. *Br Dent J* 1992; 173: 133-135.
24. Lewis DW and Main PA. Ontario dentists' knowledge and beliefs about selected aspects of diagnosis, prevention and restorative dentistry. *J Cand Dent Assoc* 1996; 62: 337-44.
25. Al-Shammery AR, Guile EE and Backly M. Prevalence of caries in primary school-children in Saudi Arabia. *Comm Dent Oral Epidemiol* 1990; 18: 320-21.
26. Magbool G. Prevalence of dental caries in school-children in Al-Khobar, Saudi Arabia. *J Dent Child* 1992;59:384-86.
27. Alamoudi N, Salako NO and Massoud I. Caries experience of children aged 6-9 years in Jeddah, Saudi Arabia. *International J of Ped Dent* 1996; 6: 101-105.
28. Cohen L, LaBelle A and Romberg E. The use of pit and fissure sealants in private practice: A national survey. *J Public Health Dent* 1988; 49: 26-35.
29. Abdulrazak I and Lind O. Patient education and preventive care in Malaysian dental practice. *J Clin Pediatr Dent* 1994; 18: 313-322.
30. Bader JD, Sams DH and O'Neil EH. Estimates of the effects of a state-wide sealant initiative on dentists' knowledge and attitudes. *J Public Health Dent* 1987; 47: 186-92.
31. Frazier PJ and Glasrud HP. Public awareness and sources of information about sealants. *J Dent Res* 1986; 65: 340-1537.
32. Kale J and Nathanson D. A survey of usage and parent's attitude and knowledge of dental sealants. *J Dent Res* 1987; 66: 179-581.