

# Clinical effectiveness of an autopolymerized fissure sealant (Delton) after thirty-three months\*

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## Abstract

The clinical effectiveness of Delton (Johnson and Johnson Dental Products Company, East Windsor, New Jersey) fissure sealant was studied in 205 children 6 to 10 years of age (mean age, 7½). A total of 993 children in Grades 1, 2, 3, and 4 was screened, and subjects were selected if there was evidence of previous dental caries in the mouth and if a pair of contralateral maxillary or mandibular first permanent molar teeth was free of caries. After 33 months, there were 5 sealants completely lost, 11 sealants partially lost, 22 experimental teeth carious or filled, and 101 control teeth carious or filled in 164 subjects. Consequently, sealant retention was 77%, and effectiveness in caries reduction was 78%. The number of teeth per 100 saved by sealant application (net gain) was 48.

## Introduction

During the past 10 years, numerous studies<sup>1-8</sup> have demonstrated the retention and clinical effectiveness of the ultraviolet light-polymerized sealants in caries prevention. This study was undertaken to test the retention and effectiveness of a conventionally polymerized fissure sealant (Delton).†

## Materials and methods

Two hundred five subjects were selected from 993 children when there was evidence of caries in the mouth, and a pair of caries-free, contralateral first permanent molars was present. The children were 6 to 10 years of age with a mean age of 7½ years, and they were in Grades 1, 2, 3, and 4 of three parochial schools in Jersey City, a recently fluoridated commu-

nity. Of the 205 subjects treated, 196, 186, 175, and 164 were examined after 5, 11, 24, and 33 months, respectively (Fig. 1). Two pedodontists examined the children independently and recorded the decayed, missing, and filled surfaces as well as the presence or absence of sealant. When there was a disagreement relative to the condition of a particular tooth, the tooth was reexamined by both dentists, and a consensus rating was recorded.

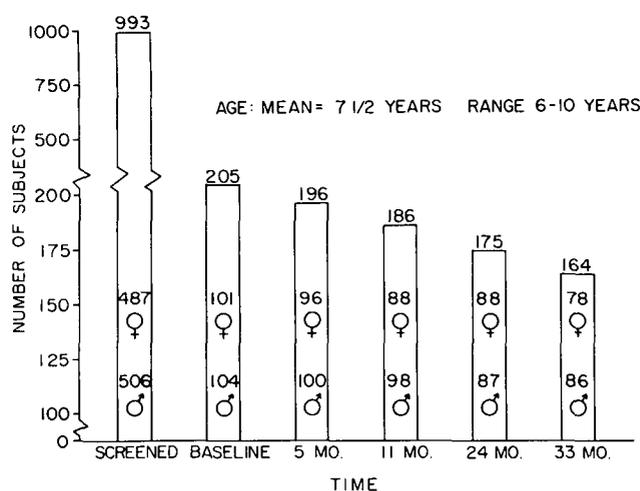


Fig. 1. Description of sample.

The initial examinations and sealant placement were carried out in a new mobile van located near the school building. The mobile van was equipped with two operatories, two separate doors, three sinks, and a desk for recording the data. All subjects entered the van and brushed their teeth with the operator assisting to ensure that the molars were clean. The subjects moved then to Operatories 1 and 2 for sealant place-

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† Johnson and Johnson Dental Products Co., East Windsor, New Jersey.

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ment. After the sealant was placed, Dentist 1 moved to Operatory 2, and Dentist 2 moved to Operatory 1 for examination of the sealants. The subjects were given form letters then informing the parents of the dental needs of the child, and the subjects were dismissed.

Under the supervision of the dentist, the subjects brushed their teeth with a fluoride-containing toothpaste and then rinsed their mouths thoroughly. They were also examined by the dentist to ensure that the molars were clean and free of debris. The experimental tooth (Table 1) was chosen randomly to receive the sealant and was isolated with cotton rolls, dried briefly, and etched for 60 seconds with the conditioning solution supplied by the manufacturer. It was then washed again and dried thoroughly, followed by fissure sealant application according to the manufacturer's instructions. In order to eliminate the possibility that slight amounts of moisture in the air might be blown from the air-water syringe, the water supply was disconnected, and separate air and water syringes were used. In order to place the sealant on partially erupting molars with soft tissue slightly covering the distal ridge of the teeth, soft tissue was displaced by strands of cotton placed into the sulcus. After polymerization of the sealant, the extent of coverage and the margins were checked by both dentists. Immediate postoperative retention of the sealant was checked by trying to pry the sealant off with an explorer. In a few cases, a defect was noted, or the sealant was partially or totally dislodged, and it was reapplied after etching again for 1 minute.

**Table 1. Distribution of treated teeth**

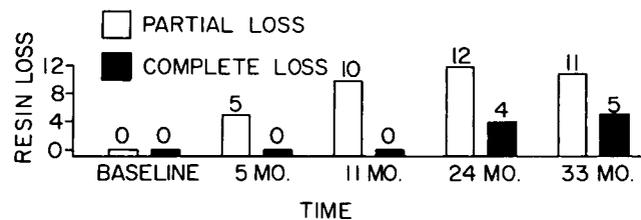
	Right	Left	Total
Maxillary	57	51	108
Mandibular	47	50	97
Total	104	101	205

The recall examinations were performed in the nurse's office of each school with the patient in a supine position. Each child was examined independently by both operators' using a mirror, explorer, and an intraoral flashlight. The retention of the sealant and the presence of carious lesions were checked in the control and experimental teeth. New examination forms were used at each visit in order to prevent any examiner bias. The parent was sent a form letter then describing the dental status of the child.

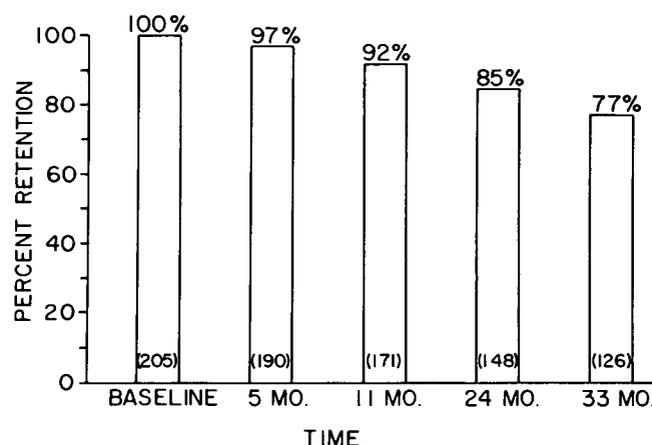
## Results

After 5 months, 196 subjects were examined, and

after 11, 24 and 33 months, 186, 175, and 164 subjects were examined, respectively. After 5 months, only five sealants were partially lost, and after 33 months, 11 sealants were partially lost, and five were completely lost (Fig. 2). Percent retention was 97% after 5 months, 92% after 11 months, 85% after 24 months, and 77% after 33 months (Fig. 3).

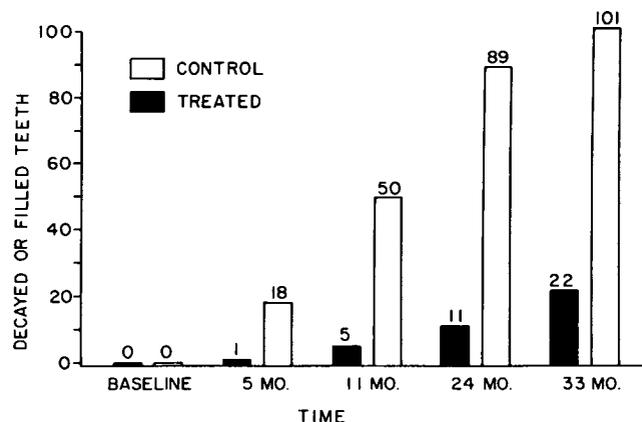


**Fig. 2.** Amount of sealant loss.



**Fig. 3.** Retention of sealant (percentage of total number of subjects examined who have retained the sealant completely, i.e., no sealant loss, decayed or filled teeth).

As shown in Fig. 4, after 5 months, one sealed tooth and 18 control teeth became carious or filled, and therefore, effectiveness in caries reduction<sup>6</sup> was 94%.



**Fig. 4.** Amount of decay or restoration.

After 24 months, 11 of the treated teeth and 89 of the control teeth were decayed or filled, and effectiveness in caries reduction was 88%. After 33 months, 22 treated teeth and 101 control teeth became carious or filled, giving a 78% effectiveness in caries reduction (Fig. 5).

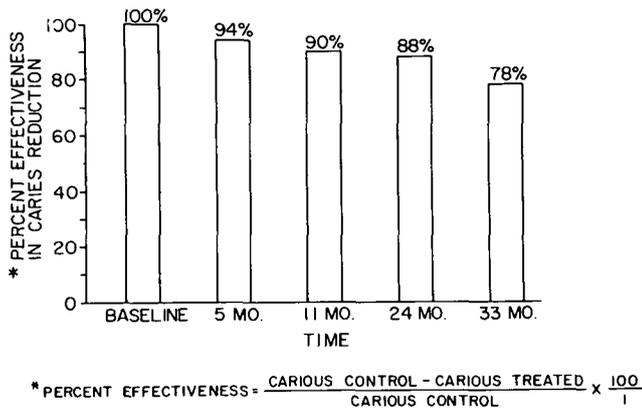


Fig. 5. Effectiveness of sealant in caries reduction.

Fig. 6 reports the net gain of teeth,<sup>4</sup> i.e., the number of teeth saved by sealant application. This value increases with time as more teeth became carious. After 33 months, the number of teeth per 100 saved by sealant application was 48.

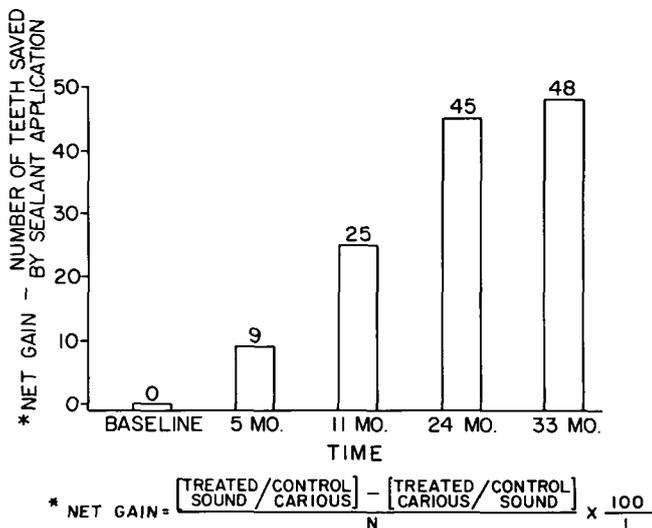


Fig. 6. Net gain, the number of teeth saved by sealant application.

## Discussion

The results of this study are similar to those reported for Delton after 1 year by Bojanini *et al.*<sup>9</sup> and after 2 and 3 years by Brooks *et al.*<sup>10, 11</sup> They are better than those reported after 2 years for the ultraviolet

light-polymerized sealants.<sup>3-8</sup> The superiority of these results may be due to the differences in material or to the different techniques used. Delton appeared easier to use than the ultraviolet light-polymerized materials because the relatively cumbersome light was eliminated. However, although the material was relatively easy to use, a meticulous technique was followed. Of greatest importance, retention was tested at the time of placement by attempting to pry the sealants off.

This study demonstrated that Delton can be placed successfully without rubber dam application if the manufacturer's instructions are followed strictly. Future studies will determine the cost effectiveness of routine sealant application as a preventive measure for all children.

## Conclusion

This study demonstrated that after 33 months, Delton is an excellent fissure sealant with a high degree of retention and a high degree of effectiveness in caries reduction if the manufacturer's instructions are rigorously followed.

The procedures, possible discomforts or risks, and possible benefits were explained fully to the human subjects involved, and their informed consent was obtained prior to the investigation.

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