

A clinical comparison of visible light-initiated and autopolymerized fissure sealant: one-year results

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Abstract

The clinical effectiveness of visible light-initiated vs. autopolymerized fissure sealant was compared with 304 sealants placed on 207 teeth of 73 children 6-8 years of age residing in Jerusalem, Israel. After 1 year, overall retention of the sealants was 90%, with 86% for the visible light-initiated material and 94% for the autopolymerized material.

In recent years, long-term results of clinical studies have demonstrated that fissure sealants prevent tooth decay.¹⁻³ There is now relative consensus that sealants are a valuable preventive adjunct for practitioners treating children.⁴ In an attempt to make the procedure simpler, there have been experiments with various aspects of the procedure. A visible light-initiated material was developed and it was hypothesized that this material might prove superior to conventional autopolymerized materials because less time is required for polymerization. Consequently, the present study was performed in order to compare the effectiveness of a visible light-initiated material with the conventional autopolymerized sealant material.

Methods and Materials

Seventy-three children aged 6-8 years (mean age 6.3) residing in a recently fluoridated area of Jerusalem, Israel, participated in the study. Each child had at least 1 caries-free first permanent molar which was sealed with clear Delton^{®a} fissure sealant and ran-

domly assigned to receive either the visible light-initiated material or the autopolymerized material. When more than 1 molar was available, the material for the first tooth was selected randomly and the remaining teeth alternated with both materials.

A total of 304 sealants (160 light polymerized, 144 autopolymerized) were placed on 207 teeth (Table 1) with maxillary molars receiving separate sealant on the central pit and distolingual fissure sites. Of the 73 children, 8 had only 1 tooth sealed, 23 had 2 teeth sealed, 15 had 3 teeth sealed, and the remaining 27 each had 4 teeth sealed. Cotton roll isolation was used and the sealant was applied according to manufacturer's instructions. The teeth were cleaned with a slurry of pumice and water and etched for 60 sec with a 37% phosphoric acid-etching solution.

Of the 304 sealants placed, 11 sites had slight mechanical preparation in which the fissure was slightly widened with a round bur to ensure that no caries were present. Light-polymerized sealants were cured for 20 sec with the Elipar^b light unit. Following placement, all sealants were checked by attempting to pry them off with an explorer. In 7 instances, the sealant was dislodged partially or totally and it was reapplied after an additional 60-sec etch.

The sealants were evaluated at baseline and after 1 year according to the following criteria:

1. Retention (total, partial, or complete loss)
2. Marginal adaptation (no defect, slight catch, moderate catch, slight crevice, or extensive crevice)
3. Caries (present or absent).

^a Delton[®] — Johnson & Johnson Dental Products Co: East Windsor, NJ.

^b Elipar Light Unit — ESPE Co: Oberbay, West Germany.

TABLE 1. Distribution of 1st Molar Teeth Receiving Sealants

	<i>Maxillary Right</i>	<i>Maxillary Left</i>	<i>Mandibular Right</i>	<i>Mandibular Left</i>	<i>Total</i>
Light-polymerized	25	33	30	18	106
Auto-polymerized	26	21	21	33	101
Total	51	54	51	51	207

Results

After 1 year, 285 sealants in 69 children were available for examination. Of the 150 light-polymerized sealants placed, 11 demonstrated a slight marginal catch, 8 demonstrated partial sealant loss, and 13 were lost completely with caries developing in 5 teeth. Of the 135 autopolymerized sealants, 4 demonstrated a slight marginal catch, 2 partially were lost, and 5 were lost completely with caries developing in 3 teeth. Complete retention was 86% for the light-polymerized sealant and 94% for the autopolymerized sealant, with a 90% combined overall retention rate. These differences in retention were statistically significant at the .05 level (Chi-square = 6.238) and, consequently after 1 year, the autopolymerized sealant appeared slightly superior to the visible light-initiated material.

Discussion

The overall retention rate of the sealant material in this study was similar to retention rates for a Delton sealant after 1 year as previously reported.^{2,3} Quite unexpected was the finding that the autopolymerized material had a higher retention than the visible light-initiated material. Since both types of sealants were placed by the same operators in the same patients, and method of polymerization was the only variable, it is possible that the polymerization of the visible light-initiated sealants slightly affected the retention

of the material. It is possible that more than 20 sec with the Elipar light unit are required for optimum retention of the light-polymerized materials. Greater differences between the 2 materials may become evident after they have been in place for 2, 3, or 4 years.

Conclusion

This study demonstrated that in regard to Delton fissure sealant there was a significant difference in the clinical performance between the visible light-initiated and autopolymerized types, with the autopolymerized material demonstrating a higher rate of retention.

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