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Preventive Sealing of Dental Fissures with Heliosil: A Two-year Follow-up

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ABSTRACT

Due to their shape and configuration of dental crown, especially its biting surface with numerous pits and fissures permanent molars are suitable sites for retaining food remnants and bacteria. For this reason, preventive efforts and early prophylactic procedures should prevent the development of caries at these critical sites. Deciduous and permanent teeth of 300 children aged 6–7 years with healthy parallel teeth were included in the study. Fissure sealing was performed on one side, whereas contralateral teeth served as controls. During a two-year period, control examinations with finding recordings were performed every six months. During the two-year follow-up period, the sealed teeth remained free of caries as long as the coating persisted. In deciduous teeth, the sealant was first observed to be missing at 18 months in 5%, and at 24 months in 8% of the teeth. None of these teeth was affected by caries, suggesting that a part of the sealant was retained in the fissures. In permanent teeth, caries developed in 18% of the sealed teeth at 24 months.

Introduction

Due to their shape and configuration of dental crown, especially its biting surface with numerous pits and fissures permanent molars are suitable sites for retaining food remnants and bacteria. In children, 80% of the surface of thus shaped teeth are affected by caries soon after eruption.

Fissure caries is seen in nearly all children with caries¹. For this reason, preventive efforts and early prophylactic procedures should prevent the development of caries at these critical sites. The advent of pit and fissure sealants has contributed greatly to these preventive measures^{2–6}, being highly efficient when properly indicated and used⁷.

Material and Methods

Deciduous and permanent teeth of 300 children aged 6–7 years with healthy parallel teeth were included in the study. Fissure sealing was performed on one side, whereas contralateral teeth served as controls. Care was taken to evenly seal the left and right side teeth, as well as the mandibular and maxillary teeth. Only results obtained in the children who were present through the study period and who attended all control examinations were considered in data analysis. Forty-six pairs of deciduous and 56 pairs of permanent molars were analyzed. The teeth were submitted to standard preparation for sealing. During a two-year period, control examinations with finding recordings were performed every six months.

Results

There were no changes in the deciduous teeth observed (Table 1). In the control group, a caries increase was recorded in 2%, 9%, 21% and 31% of the teeth observed at 6, 18 and 24 months. No such changes were seen in the sealed teeth. In permanent teeth, a caries increase was only observed at 24 months, in 18% of the teeth (Table 2). Durability study in deciduous teeth showed the earliest sealant missing at 18 months in 5%, and at 24 months in 8% of the teeth (Table 3). In permanent teeth, the sealant was missing in 3% of the teeth at 6 months, with the same finding recorded at 12 months. At 18 and 24 months, the sealant was missing in 14% and 21% of the treated teeth, respectively (Table 4).

Discussion

The results showed that during the two-year follow-up period, the sealed teeth remained free of caries as long as the coating persisted. In deciduous teeth,

the sealant was first observed to be missing at 18 months in 5%, and at 24 months in 8% of the teeth. None of these teeth was affected by caries, suggesting that a part of the sealant be retained in the fissures. In permanent teeth, caries developed in 18% of the sealed teeth at 24 months.

In the control teeth, caries occurred already at 6 months in 14% and at 24 months in 59% of the observed teeth. The coating held well and was first observed to drop out at 18 months, when 55 of maxillary sealants were missing. However, mandibular sealants were found to drop out earlier, i. e. at 6 months, which was ascribed to failures in the procedure. Dryness of the field of work is of paramount importance. The use of cofferdam is recommended, as it has been found more efficient in protection from salivation than celltissue. Fissure sealing is highly efficient in the prevention of dental caries in pits and fissures, provided it is performed by dentists properly trained in the program of public health measures⁸. Two-year persistence of sealants was recorded by Horovitz in 73%, Roch in 80%, and Banozzi in 87% of the sealed teeth⁶. The results obtained in the present study are consistent; with these reports, pointing to justifiability of this form of caries prevention and supporting its wider use³. Dental professionals from Ohio have reported on an increased use of dental sealants from 79.4% in 1989, to 91.8% in 1992. This method of prevention has been quite infrequently used by 42%, moderately by 43%, and frequently by 15% of the dentists. More than three fourths of dentists wish to perform sealing of incipient caries. The proportion of children involved in the program of dental sealing is also influenced by health insurance policy, as the procedure is not covered by health insurance⁹. The time required for sealing of one tooth is approximately 5 minutes, whereas one

TABLE 1
INCIDENCE OF CARIES IN DECIDUOUS TEETH

| Duration of follow-up in months | Deciduous teeth | | | | | | Total no. of teeth |
|---------------------------------|-----------------|--------------|-------------------|---------------|--------------|-------------------|--------------------|
| | Control teeth | | | Treated teeth | | | |
| | No. of teeth | Cariou teeth | % of cariou teeth | No. of teeth | Cariou teeth | % of cariou teeth | |
| 6 | 46 | 1 | 2 | 46 | 0 | 0 | 92 |
| 12 | 46 | 4 | 9 | 46 | 0 | 0 | 92 |
| 18 | 38 | 8 | 21 | 38 | 0 | 0 | 76 |
| 24 | 35 | 11 | 31 | 35 | 0 | 0 | 70 |

TABLE 2
INCIDENCE OF CARIES IN PERMANENT TEETH

| Duration of follow-up in months | Permanent teeth | | | | | | Total no. of teeth |
|---------------------------------|-----------------|--------------|-------------------|---------------|--------------|-------------------|--------------------|
| | Control teeth | | | Treated teeth | | | |
| | No. of teeth | Cariou teeth | % of cariou teeth | No. of teeth | Cariou teeth | % of cariou teeth | |
| 6 | 56 | 8 | 14 | 56 | 0 | 0 | 112 |
| 12 | 56 | 15 | 27 | 56 | 0 | 0 | 112 |
| 18 | 56 | 28 | 50 | 56 | 0 | 0 | 112 |
| 24 | 39 | 23 | 59 | 39 | 7 | 18 | 78 |

TABLE 3
RETENTION OF FISSURE SEALING MASS IN DECIDUOUS TEETH

| Duration of follow up | Retention of fissure sealing mass in deciduous teeth | | | | | |
|-----------------------|--|------------------------------|-------------------------|--------------|------------------------------|-------------------------|
| | Upper teeth | | | Lower teeth | | |
| | No. of teeth | No. of teeth without sealant | % of teeth with sealant | No. of teeth | No. of teeth without sealant | % of teeth with sealant |
| 6 | 21 | 0 | 100 | 25 | 0 | 100 |
| 12 | 21 | 0 | 100 | 25 | 0 | 100 |
| 18 | 18 | 1 | 95 | 20 | 0 | 100 |
| 24 | 12 | 1 | 92 | 14 | 0 | 100 |

TABLE 4
RETENTION OF FISSURE SEALING MASS IN PERMANENT TEETH

| Duration of follow up | Retention of fissure sealing mass in permanent teeth | | | | | |
|-----------------------|--|------------------------------|-------------------------|--------------|------------------------------|-------------------------|
| | Upper teeth | | | Lower teeth | | |
| | No. of teeth | No. of teeth without sealant | % of teeth with sealant | No. of teeth | No. of teeth without sealant | % of teeth with sealant |
| 6 | 27 | 0 | 100 | 29 | 1 | 97 |
| 12 | 27 | 0 | 100 | 29 | 1 | 97 |
| 18 | 27 | 4 | 85 | 29 | 4 | 97 |
| 24 | 19 | 4 | 79 | 20 | 4 | 97 |

first-class amalgam filling takes 15 minutes. Soo et al.¹⁰ report on the finding of higher caries index in non-sealed teeth,

recorded in their study conducted in Australia, and conclude that this preventive measure should be given priority in the

future. The procedure of dental sealing appears to be preferable also in terms of cost effectiveness, since the lifetime of a sealant is about 5 years, and that of amalgam filling up to 10 years, which means that two sealing procedures take less time at a considerably lower cost. Heller et al. report on the best results achieved by sealing incipient carious lesions instead of hard fissures, and recommend the procedure to be performed in such teeth¹¹. It should be emphasized that fissure sealing is performed on healthy teeth to protect them from detri-

mental effects of food remnants and bacteria for as long as possible, especially at time when the teeth are young and immature, and thus susceptible to harmful effects. The aspect of comfortableness and acceptability for the children is by no means negligible.

Accordingly, we recommend the procedure of sealing first permanent molars to be proclaimed a precondition for enrolling in the first grade of primary school for all children in Croatia, as proposed by the program of complex caries prevention.

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DVOGODIŠNJE PRAĆENJE PREVENTIVNOG PEČAĆENJA ZUBNIH FISURA S HELIOSILOM

SAŽETAK

Trajni kutnjaci svojim oblikom i konfiguracijom zubne krune, naročito njezine grizne plohe s mnogo jamica i udubina (fisura), imaju pogodna mjesta za zaustavljanje ostataka hrane i bakterija. Radi toga preventivna nastojanja i rani profilaktički zahvati trebaju spriječiti nastanak karijesa na tim mjestima. Za ispitivanje smo izabrali mlječne i trajne zube kod 300 djece u dobi od 6–7 godina i to tako, da su imali zdrave paralelne zube. Pečatili smo zube jedne strane dok je druga strana bila kontrolna. Tijekom dvije godine svakih šest mjeseci izvršeni su kontrolni pregledi uz bilježenje nalaza. Na mlječnim zubima nije se pojavio karijes u tijeku dvogodišnjeg praćenja kad se

pečat zadržao na zubu i prvi puta nedostaje nakon osamnaest mjeseci i to kod 5% zubi, nakon dvadeset i četiri mjeseca kod 8% zubi, a da niti na jednom zubu nije nastao karijes što znači da je u fisurama ipak ostao jedan dio mase za pečaćenje. Kod trajnih zubi karijes se pojavio kod 18% pečaćenih zubi i to nakon dvadeset i četiri mjeseca.