

THE USE OF DENTAL SEALING IN CLUJ, ROMANIA: FREQUENCY, MATERIALS AND TECHNIQUES – A QUESTIONNAIRE STUDY

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Abstract

Aims. Dental decay is a condition that affects both temporary and permanent dentitions. Prophylactic methods for dental decays consist of: dental sealing, use of fluorides, oral hygiene and healthy diet habits. This article focuses on the frequency, dental materials and techniques of dental sealing used for caries prophylaxis in the Cluj County.

Materials and methods. The study used a set of questionnaires that was applied to 175 doctors/dentists from Cluj. The questionnaire contained 11 questions and was delivered to the doctors personally or by the internet

Results. From the interviewed dentists 85.7% use dental sealing and 86.7% use materials based on composite resins in this respect. For diagnostic purposes, 76% of the dentists use inspection and palpation, 68.66% use cotton rolls and aspiration for isolation, 74% use professional brushing, 74% call back the patient after 6 months for a check-up and 60% of the doctors redo the sealing if the sealant is partially or entirely lost or they perform a filling if a secondary decay appeared.

Conclusions. Most of the interviewed dentists perform dental sealing and consider it as a good caries prophylaxis method. Also, most of them use a material based on composite resins as pit and fissure sealant. The techniques for this procedure are different among the interviewed dentists.

Keywords: dental sealing, dentists, dental techniques, pit and fissure sealants

Background and aims

Prophylaxis is any medical or public health procedure whose purpose is to prevent, rather than treat or cure, a disease or other medical problem. Dental or oral prophylaxis may include plaque detection, removal of supra- and sub-gingival plaque and calculus, application of caries-preventing agents, checking of restorations and prosthesis and correcting overhanging margins and proximal contours of restorations, and checking for signs of food impaction [1]. Caries prophylaxis, used in particular for children's oral health, consists of: dental sealing, use of fluorides, oral hygiene and good diet habits.

Dental sealing is a prophylaxis method for dental decay carried out by applying a material in the pits and fissures of the occlusal surfaces of the premolars and molars, buccal surface of the lower molars, lingual surfaces of the upper incisors and occlusal surfaces of the temporary teeth in patients with predisposition to dental decay [2].

Dental pit and fissure sealants are based on composite resins and glass-ionomers. More recent materials combine resins with glass-ionomers. The efficiency of the sealing procedures depends on the correct application technique, which differs according to the material used [3]. Apparently, composite resins are the most commonly used materials, but glass-ionomers cements have their advantages too [4]. As for the technique, the method for detecting dental fissure decays is inspection and gentle palpation with

dental explorers, the mostly employed method of cleaning the tooth being professional brushing; the isolation is done with cotton rolls and aspiration, and the demineralisation time is less than 60 seconds, when composites are used [5]. The percentage prevalence of dental sealing is below the patients' needs, as highlighted in literature [6,7].

The aim of the study was to gather information regarding the current situation of the prevention of dental decay by using fissure sealants in the Cluj County.

Material and methods

The present study included a number of 175 dentists.

The inclusion criteria were: age between 25 and 60, enrolment in the Cluj College of Dentists, (CMD). The location of the study included private dental offices, university dental clinics and dental offices in schools. A questionnaire comprising 11 questions was used to collect the data from the dentists. The questions are presented in Figure 1.

1. Do you use dental sealing as a prophylactic method for dental decay?
2. How do you detect fissure decays?
3. What type of dental sealing do you use?
4. Does the dental assistant help you when you perform dental sealing?
5. What methods of cleaning the tooth do you use before dental sealing?
6. What methods of isolation of the tooth do you use before dental sealing?
7. Do you prepare a cavity before dental sealing?
8. How long do you etch the surface?
9. What bonding system do you employ?
10. When are the follow-up visits scheduled?
11. When do you consider that the sealed tooth requires reintervention?

Figure 1. The questionnaire.

The questionnaire was emailed to the CMD of Cluj and they forwarded it to the doctors affiliated to their institution. The answers were introduced into an Excel table automatically, by accessing the link or directly from the written form. The dental materials used as pit and fissure sealants were searched in catalogues and classified into four groups: composite resins, glass-ionomer cements, compomers and resin- modified glass- ionomer cements.

The results were expressed as percentages, using the Excel spreadsheet.

The study was approved by the Medical Ethical Commission of "Iuliu Hatieganu" University of Medicine and Pharmacy in Cluj-Napoca, under the notice no. 6 of 16 January 2014.

Results

The prophylactic methods used for fissure decay are included in table I.

Table I. Prophylactic methods

| Method | Number (%) |
|---------------------------|------------|
| Dental sealing | 150 (85.7) |
| Periodical visits | 20 (11.4) |
| Oral hygiene instructions | 3 (1.7) |
| Fluoridation | 2 (1.1) |

The materials used for pit and fissure dental sealing are presented in table II.

Table II. Dental sealants

| Materials | Number (%) |
|--------------------------------|------------|
| Composite resins | 137 (86.7) |
| Glass- ionomer cements | 13 (8.22) |
| Compomers | 6 (3.79) |
| Resin-modified glass- ionomers | 2 (1.26) |

The methods of fissure decay detection are presented in table III.

Table III. Methods of detecting fissure decays

| Method | Number (%) |
|--|------------|
| Inspection and palpation | 114 (76) |
| Inspection, palpation and dental x-ray | 35 (23.33) |
| Decay indicator | 1 (0.66) |

From the interviewed dentists, almost one third needed the dental assistant's help, another third did not need help. The last third of the doctors mentioned the need of a dental assistant only in some difficult cases. These results are presented in table IV.

Table IV. Working in team: doctor and dental assistant

| Method | Number (%) |
|--------------------------|------------|
| With dental assistant | 47 (31.33) |
| Without dental assistant | 58 (38.66) |
| Depends on the case | 45 (30) |

The isolation methods used in dental sealing are shown in table V.

Table V. Isolation methods used for dental sealing

| Method | Number (%) |
|---|-------------|
| Cotton rolls and aspiration | 103 (68.66) |
| Cotton rolls, aspiration and rubber dam | 23 (15.33) |
| Cotton rolls | 10 (6.66) |
| Rubber dam | 7 (4.66) |
| Aspiration | 4 (2.66) |
| Aspiration and rubber dam | 3 (2) |

The cleaning methods used before sealing are included in table VI.

Table VI. Cleaning methods used before dental sealing

| Method | Number (%) |
|-------------------------------------|------------|
| Professional brushing | 111 (74) |
| Supervised manual toothbrushing | 3 (2) |
| Airflow | 10 (6,6) |
| Professional brushing without paste | 1 (0.66) |
| Combined methods | 24 (16) |

One doctor answered she did the professional brushing without any paste (0.66%).

Regarding the cleaning method, most of the doctors prepare a cavity, if the tooth is uncertain to have fissure decay, a smaller part do not use burs at all and only a few dentists prepare a cavity in all situations. The percentages are included in table VII.

Table VII. Mechanical preparation before dental sealing

| Method | Number (%) |
|-------------------------------|-------------|
| Depends on the case | 104 (69.33) |
| No mechanical preparation | 37 (24.66) |
| Always mechanical preparation | 9 (6) |

For composite based sealants, doctors use phosphoric acid in various protocols, as shown in table VIII.

Table VIII. Etching the surface before dental sealing

| Method | Number (%) |
|--|------------|
| Less than 30 seconds | 95 (59) |
| 30 second for permanent teeth and 60 seconds for temporary teeth | 42 (26.08) |
| More than 60 seconds | 3 (1.86) |
| 60 seconds for temporary teeth and 120 seconds for permanent teeth | 1 (0.6) |
| Only permanent teeth | 17 (10.55) |
| Only temporary teeth | 3 (1.86) |

To the question regarding the use of a bonding system, the answers are presented in table IX.

Table IX. Bonding system used before dental sealing

| Type | Number (%) |
|-------------------|------------|
| Total- etch | 74 (52.11) |
| Self- etch | 22 (15.49) |
| No bonding system | 46 (32.39) |

Doctors schedule follow-up visits at different intervals of time. Two doctors answered they were calling back the patient depending on the carious risk (1.33%), results included in table X.

Replacement of the sealant is performed depending on the situation, as shown in table XI.

Table X. Follow-up examinations

| Period of time | Number (%) |
|-------------------------------|------------|
| After 6 months | 111 (74) |
| After less than 6 months | 25 (16.66) |
| After 12 months | 10 (6.66) |
| After more than 12 months | 2 (1.33) |
| Depending on the carious risk | 2 (1.33) |

Table XI. Reintervention

| Situation | Number (%) |
|---|------------|
| The sealant is partially lost | 31 (20.66) |
| The sealant is completely lost | 2 (1.33) |
| Secondary decay | 1 (0.66) |
| The sealant is partially or completely lost | 26 (17.33) |
| All three situations | 90 (60) |

Discussion

Our study evidences that a large number of dentists use dental sealing as a prophylactic method for dental decay in Cluj. Yet, DMF (CAO) index increased from 2.95 to 5.42, according to the latest study [8]. Even if fissure sealant programs serve only to delay rather than prevent the need for restorative care, there is still a substantial benefit to be gained [9], since it has been shown that the half-life of restorations is considerably longer if the child is older than nine years when the restoration is placed [10].

The most commonly used dental materials for pit and fissure sealing in Cluj county are based on composite resins. For example, resin modified glass-ionomers have advantages such as: good adherence, retention and marginal integrity, fluoride addition, abrasion- resistance and easy application because most of them are light-curing and disposed in syringes [11]. Another material used, from a frequency point of view, is based on glass-ionomer cements. These materials have a lot of advantages, but the most important are: fluoride-release and hydrophilic properties [12].

As for the diagnostic technique for pit and fissures decays, the most commonly used are inspection and gentle palpation. Other methods are: (quantitative) light- induced fluorescence (Spectra device) [13], laser cavity detection (DIAGNO-dent device) and electrical caries monitor [14]. Dental radiographs are inadequate for detecting decay on the occlusal surfaces until the lesion is well advanced through the enamel and into the dentin [8,14] and when dental sealing is no longer an option.

The cleaning method before sealing is mainly professional toothbrushing (74%). Other methods, like pumice slurry, airflow, air abrasion, air polishing improve cleaning the tooth before dental sealing. In addition, some use round burs (69%) for removing the coloured fissures or small caries.

The isolation method is mostly cotton rolls and aspiration (69%). Similar results in retention, loss and incidence of carious lesions can be obtained either with cotton rolls or rubber dam [15].

The etching time, when composite resins are used, is less than 30 seconds (59%) and total etch is mainly used as a bonding system (52%). There are no statistically significant differences concerning the bond strength value between different etching times and different bonding strategies [16]. Temporary teeth need more etching time because of their irregular layer of a prismatic enamel [17].

Bonding is not necessary for 32.4% of the doctors, results found also in the literature [18].

Finally, most doctors in our study consider that the effort of caring for the sealed tooth must be made in all three situations: when the sealant is partially or totally lost and when the marginal decay appears. This is the reason why 74% of the doctors schedule a follow-up visit after 6 month. For the follow-up check, the assessment of the carious risk is important; this is a concept based on etiology, diagnose, prophylaxis and treatment of dental decay, evaluated through different carious monitoring systems: frequency index, intensity index, carious rate, significant carious risk [9].

Conclusions

Our study has showed that most of the dentists in Cluj county consider dental sealing to be an important method of dental decay prevention.

The dental materials used for dental sealing are based on: flowable, light- curing composite resins and hydrophilic, fluoride- releasing glass-ionomer cements.

The technique of dental sealing consists of all these steps: decay detection, tooth cleaning, tooth isolation, applying the dental sealant with or without etching and bonding, depending on the doctor and the material used.

Acknowledgement

To College of Dentists of Cluj and the Quality Assurance Department of the "Iuliu Hatieganu" University of Medicine and Pharmacy.

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