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Retention of pit and fissure sealants used by two different techniques: A comparatively study

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Abstract

Background: Prevention of oral diseases is preferable to treatment and is the key method of achieving cost effectiveness for oral health improvement programs. The present study was conducted to assess the retention of pit and fissure sealants placed using acid etch alone and a combination of air abrasion and acid etch techniques.

Materials & Methods: The present study was conducted on 48 patients of both genders (Males- 28, Females- 20). Two techniques were used in different selected teeth. In group I (24), mandibular permanent first molar of both sides was treated by acid etching alone while in group II (24), mandibular permanent second molar of both sides was pretreated by with air abrasion followed by acid etching.

Results: Out of 48 patients, males were 28 and females were 20. After 3 months, completely retained sealants was observed in 32 in group I and 29 in group II, partially in 12 in group I and 14 in group II and missing in 4 in group I and 5 in group II. The difference was non- significant ($P > 0.05$). After 6 months, sealants were completely present in 28 in group I and 26 in group II, partially in 14 in group I and 12 in group II and missing in 6 in group I and 10 in group II. The difference was non- significant ($P > 0.05$).

Conclusion: Pit and fissure sealants are useful in preventing dental caries. There was no significant difference in retention of pit and fissure sealants in either of technique.

Keywords: acid etching, molar, pit and fissure sealants

Introduction

The overall caries rates have decreased considerably in most industrialized countries, the percentage of caries in pit and fissures compared to smooth surfaces has increased. Prevention of oral diseases is preferable to treatment and is the key method of achieving cost effectiveness for oral health improvement programs. According to National center for health statistics in USA the prevalence of dental caries increases with age, from 21% to 67% in adolescents with 90% of carious lesions found in occlusal surfaces of molars in children and young adults^[1].

Prevention results in less pain and trauma to the patient and reduces the need for highly trained professional personnel. Various preventive strategies for dental caries have been tried and are still being developed. The occlusal pits and fissures of posterior teeth are highly susceptible to caries because of the anatomy of pit and fissure surfaces, which favours stagnation of bacteria and substrates^[2].

Fissure sealing has been shown to be an evidence- based caries preventive method for protecting the occlusal surfaces against caries. Non- sealed teeth need to be restored approximately 50% more frequently compared to their sealed counterpart^[3]. The present study was conducted to assess the retention of pit and fissure sealants placed using acid etch alone and a combination of air abrasion and acid etch techniques.

Materials & Methods

The present study was conducted in the department of Endodontics. It comprised of 48 patients of both genders (males- 28, females- 20). The purpose of the study was explained to patients and ethical clearance was obtained. Patients with absence of restorations or prior sealants on the teeth, absence of carious lesions were selected.

Two techniques were used in different selected teeth. In group I (24), mandibular permanent first molar of both sides was treated by acid etching alone while in group II (24), mandibular permanent second molar of both sides was pretreated by with air abrasion followed by acid

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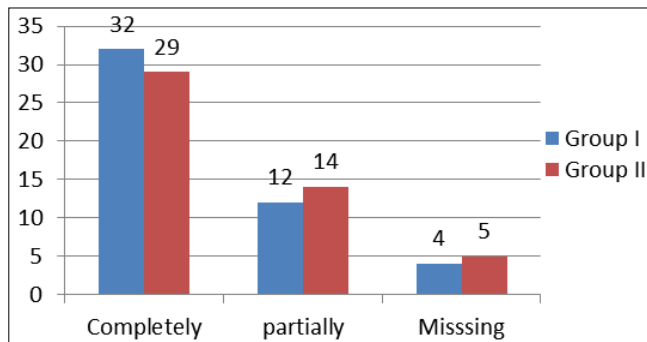
etching. In group I, 37% phosphoric acid solution was applied in molar occlusal pits and fissures with the help of applicator tip and left for 15 seconds for etching. In group II, air abrasive system with 50 micron alumina particles was used for 5 seconds at 5 mm distance from tooth surface followed by etching. A light curing, resin-based, color changing, unfilled pit and fissure sealant was applied to etched pits and fissures of occlusal surface using applicator tips. Sealant was cured with the light curing unit for 20 seconds as per manufacturer's instructions. All patients were clinically evaluated after 3 and 6 months of sealant placement and assessed as completely retained, partially retained and missing. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table 1: Distribution of patients

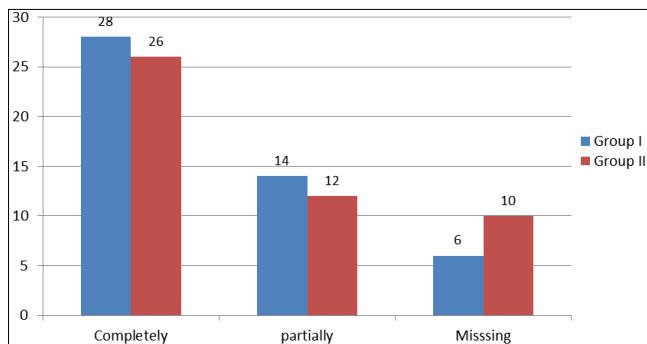
Total- 48		
Gender	Males	Females
No.	28	20

Table I shows that out of 48 patients, males were 28 and females were 20.



Graph I: Sealant retention after 3 months in both groups

Graph I shows that after 3 months, completely retained sealants was observed in 32 in group I and 29 in group II, partially in 12 in group I and 14 in group II and missing in 4 in group I and 5 in group II. The difference was non-significant ($P > 0.05$).



Graph II: Sealant retention after 6 months in both groups

Graph II shows that after 6 months, sealants were completely present in 28 in group I and 26 in group II, partially in 14 in group I and 12 in group II and missing in 6 in group I and 10 in group II. The difference was non-significant ($P > 0.05$).

Discussion

Dental sealants are a dental treatment intended to prevent tooth decay. Teeth have recesses on their biting surfaces; the

back teeth have fissures (grooves) and some front teeth have cingulum pits. It is these pits and fissures which are most vulnerable to tooth decay because food and bacteria stick in them and because they are hard-to-clean areas. Dental sealants are materials placed in these pits and fissures to fill them in, creating a smooth surface which is easy to clean [4].

The different methods recommended to improve sealant retention include cleaning of the occlusal surface prior to sealant placement with hydrogen peroxide, pumice prophylaxis, air polishing, mechanical preparation of fissures and air abrasion. In present study, we assessed the retention of pit and fissure sealants placed using acid etch alone and a combination of air abrasion and acid etch techniques [5].

We included 48 patients in which pit and fissure sealant were used. They were divided into 2 groups. In group I, mandibular permanent first molar of both sides was treated by acid etching alone while in group II, mandibular permanent second molar of both sides was pretreated by with air abrasion followed by acid etching.

Acid etching is the evidence-based method for enamel preparation before fissure sealing. However, concern has been expressed that the traditional acid etching technique for sealant placement does not allow for complete cleaning of the pits and fissures prior to sealant placement. A new method for sealant application using air- abrasive technology is less technique sensitive and allows for further cleaning of the grooves prior to sealant placement. The abrasive particles used in air abrasion effectively remove organic plug material from the grooves and allow for deeper penetration of the sealant material into the grooves [6].

We observed that after 3 months, completely retained sealants was observed in 32 in group I and 29 in group II, partially in 12 in group I and 14 in group II and missing in 4 in group I and 5 in group II. Similarly, after 6 months, sealants were completely present in 28 in group I and 26 in group II, partially in 14 in group I and 12 in group II and missing in 6 in group I and 10 in group II. This is in agreement with Knobloch *et al.* [7].

According to Feigal *et al.* [8] a structured fissure sealing programme is of great benefit to oral health of subjects since those who had no sealants had significantly poorer dental health than those who had all four first permanent molars sealed. Doyle *et al.* [9] found no significant difference in retention of sealants in Group A and Group B ($p > 0.05$) after three and six months follow up. The difference in sealant retention in primary and permanent molars was not significant ($p > 0.05$). Maxillary molars showed superior retention compared to mandibular molars, which was statistically significant at both three and six months ($p < 0.05$). The limitation of the study is small sample size. Moreover, the follow up period used in the study was very less. Long term follow up could lead to different results.

Conclusion

Pit and fissure sealants are useful in preventing dental caries. There was no significant difference in retention of pit and fissure sealants in either of technique.

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