

Original Research**Pit and fissure sealant vs. flowable composite in the clinic Flowable composite and pit and fissure sealer is the working title****Sapanpuneet kaur ¹***National dental college Derabassi, Gulabgarh, Punjab, India*

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ABSTRACT

Background: When exposed to fermentable carbohydrates over time, the balance of activity and composition of the biofilm bacteria shifts, resulting in dental caries. The goal of this study was to see how pit and fissure sealant and flowable composite compared.

Materials and Procedures: A total of 100 individuals between the ages of 18 and 24 were involved in the study. The teeth were split into two groups, each with 50 teeth. Teeth were repaired using pit and fissure sealant in group I (50), and flowable resin composite in group II (50). There were three levels of retention: completely retained (FR), partially lost (PL), and entirely lost (TL). There was no sign of materials on the surface. The Simonsen criteria were used to assess caries lesions. At baseline and at 6,12 months, each restoration was assessed separately for retention and the occurrence of caries.

Results: At six month, totally restored were 50 in group I, partially lost were 0, total lost was 0. In group II, totally restored was 50, partially restored was 0, and total lost was 0. and total lost were 0 in group II. In group I at 12 months. Fully restored were 30, partially lost were 15 and total lost was 5., while group II had a score of 0 in partial and total lost and all completely retained The difference was statistically significant ($P < 0.05$).

Conclusion: In terms of retention and caries development, flowable composites outperformed pit and fissure sealants.

INTRODUCTION

When exposed to fermentable carbohydrates over time, the balance of activity and composition of the biofilm bacteria shifts, disrupting the demineralization remineralization equilibrium and causing dental caries. The American Diabetes Association (ADA) released the non-cavitated lesion is defined as "initial caries lesion development before cavitation occurs," according to the Caries Classification System. A change in color, glossiness, or surface structure as a result of demineralization before there is macroscopic breakdown in surface tooth structure characterizes non-cavitated lesions." (2) It's thought that any remaining bacteria in biofilm in the fissure after thorough cleaning won't survive or won't proliferate if they do.

(3) As a result, their success as a caries preventive strategy is determined by their retention rate. Otherwise,

a partial loss of sealant material would invariably result in marginal leakage and, as a result, cavities growth underneath the sealant. A sealant is seldom entirely retained during the lifetime of a tooth and must be renewed. The retention rates of sealant materials were previously reported to be 74–96% and 79–92% after one year, respectively. (4)

Pit-and-fissure sealants were first used as a caries prevention technique in the 1960s, and they have a good retention rate. The majority of sealant materials used today are resin-based composite adhesives with Bis-GMA as a key component, which allows for the inclusion of filler particles to the sealant composition, improving wear resistance significantly. (5) Flowable restorative systems have become more popular in dentistry, owing to their advantageous features such as "low viscosity, low modulus of elasticity, and simplicity

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of handling." These characteristics may potentially allow the materials to be used in ultraconservative preparations with retention rates comparable to traditional resin pit-and-fissure sealants. (6) the goal of this study was to see how pit and fissure sealant and flowable composite compared.

Materials and Procedures

The participants in this study were 100 patients, both male and female, between the ages of 18 and 24. The study was explained to all of the participants, and their signed agreement was acquired.

Name, age, gender, and other demographic information were collected. In the first and second molars, all of the patients had at least two non-cavitated pit-and-fissure caries. The teeth were split into two groups, each with 50 teeth. Teeth were repaired using pit and fissure sealant in group I (50), and flowable resin composite in group II (50). Retention was either fully retained (FR), i.e., the materials were fully present on the occlusal surfaces, partially lost (PL), i.e. the materials were present but part of a previously sealed pit or fissure, or both, was exposed, or totally lost (TL), i.e. no trace of materials was detected on the surface. The retention rate was calculated using Simonsen's criteria of full, partial, and total loss.

Results

12-month interval revealed a statistically significant difference.

Group I	50	50 (100%)	0	0
Group II	50	50(100%)	0	0

Table no 2: Retention after 12 months				
Groups	N	Retention at 12 months No. (%)		
		Complete	Partial	Total lost
Group I	50	30(60%)	15(30%)	5 (10%)
Group II	50	50 (100%)	0	0

Table no 3: Intergroup comparison for retention score at an interval of 6 months				
Groups	N	Mean	SD	P value
Group I	50	1.0000	0.0000	> 0.05
Group II	50	1.0000	0.0000	

Table no 4: Intergroup comparison for retention score at an interval of 12 months				
Groups	N	Mean	SD	P value
Group I	50	0.74	0.05	< 0.05
Group II	50	1.00	0.00	

Table II, graph I shows that at 6 months, fully restored were 50, partially lost were 0 and total lost were 0 in group I and fully restored were 50 in group II. At 12 months, fully restored were 30 partially lost were 15 and total lost were 5 in group I, however fully restored were 50 partially lost were 0 and total lost were 0 in group II.

Table no 1: Retention after 6 months				
Groups	N	Retention at 6 months No. (%)		
		Complete	Partial	Total lost

The difference was significant ($P < 0.05$).

Discussion

Caries has been less common in industrialized nations over the last several decades as a result of different methods of avoiding it, either by preventing its start or by introducing therapies that can block progression in the early stages of the disease. Caries on the occlusal surfaces of permanent teeth, on the other hand, has not decreased at the same rate as caries on the smooth surfaces. (7) Pits, which are little pinpoint depressions located at the junction of developing grooves, and fissures, which are deep clefts between neighboring cusps, can be seen on the occlusal surfaces, notably on permanent molars. When dental plaque builds up in these pits and cracks, it can grow unchecked, making mechanical removal difficult. (8) As a result, using a fully-retained fissure sealer, which acts locally by establishing a physical barrier between the fissure microbiota and the oral environment, inhibiting the interchange of metabolic products, is a complete strategy to avoiding caries. The necessity for uniformity of caries detection and diagnosis in various contexts eventually led to the creation of the worldwide caries detection and evaluation system (ICDAS). ICDAS uses a scoring methodology that assigns a score of 0 to a tooth surface that is free of caries after 5 seconds of air drying. (9) The goal of this study was to see how pit and fissure sealant and flowable composite compared.

Teeth were repaired using pit and fissure sealant in group I (50), while flowable resin composite was utilized in group II (50). Ramesh et al¹⁰ reviewed the clinical evidence on the relative efficacy of resin-based pit and fissure sealants in terms of retention (PFS)

When flowable composites were compared against flowable composites on the occlusal surfaces of permanent teeth in clinical testing, they came out on top. (3) A total of ten articles were selected for qualitative synthesis. The data extracted from two of the included articles revealed a statistically significant difference between the two materials in terms of retention potential, with one article favoring superior retention of flowable composites and one article favoring higher retention of PFS, while the remaining eight studies revealed no significant difference between the two materials. The data presented in this study suggests that resin-based pit-and-fissure sealants and flowable composites are beneficial in preventing occlusal caries in permanent molars, although the evidence is of poor quality.

In group I, we discovered that totally recovered cases were 50, partially lost cases were 0 and overall lost cases were 0 at 6 months. In group 2, totally restored was 50, partially lost was 0 and total loss was 0 at 6 months. Over a 24-month period, Erdemir et al¹¹ compared the retention rate and caries prevention efficacy of a flowable composite to a traditional resin-based sealant in a young population. A flowable resin composite (Tetric Evo Flow) or a sealant substance was used to seal the teeth (Helioseal F). At baseline, six months later, and twelve months later, each restoration was assessed separately for retention and the occurrence of caries. For each evaluation period, there were no significant differences in retention rates or caries incidence across the materials ($p > 0.05$).

We discovered that at 6 months, both groups I and II had a 0 score in 100 percent of their teeth, and at 12 months, group 2 had a 0 score, while group 1 had 30 percent entirely retained, 15% partially retained, and 10% totally lost teeth. Singh et al¹² studied thirty

children aged 6 to 9 years old who had all four caries-free first permanent molars without any hypoplasia or fracture but with caries-prone pits and fissures. The first four molars were

Group A (tooth 16; sealant + AB), B (tooth 46; composite + AB), C (tooth 36; sealant), and D (tooth 36; sealant) were the four groups (tooth 26; composite). Modified Simonsen's Criteria were used to assess for partial or entire loss of sealant and caries at 3, 6, 9, and 12 months. Although the findings were statistically insignificant, flowable composite was maintained better than sealant during a 12-month follow-up. The retention of AB followed by acid etching was better than acid etching alone. The retention of mandibular teeth has been demonstrated to be better.

Conclusion

In terms of retention and caries development, flowable composites outperformed pit and fissure sealants, according to the authors.

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