

Original Article

AQ5 Assessment of Embrace-WetBond and Fissurit F Pit and Fissure Sealants' Marginal Sealing Abilities

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ABSTRACT

Objectives: The goal of the current research was to assess marginal sealing abilities of 2 commercial pit and fissure sealants. **Materials and Methods:** A total of 30 premolar teeth were equally classified into 2 groups: Group A-application of Embrace-WetBond sealant and Group B-application of Fissurit F, Voco sealant. After sealant placement, samples were preserved in artificial saliva for 48 hours prior to thermocycling. Later, samples were submerged for 24 hours in a 2% methylene blue solution. The amount of microleakage based on the quantity of dye penetration at interface between the tooth substance and sealant was compared under an optical stereomicroscope. The obtained data were statistically analysed for the dye penetration scores in both groups. **Result:** It was observed that 8 samples from Group A (53%) had no dye penetration (Grade 0), whereas 4 samples from Group B (26%) showed Grade 0 penetration. In 5 out of 15 samples (33%) from Group B, the dye penetration was the greatest (Grade 3; $P = 0.012$). **Conclusion:** It was concluded that Embrace-WetBond had lesser microleakage compared to group 2-Fissurit F, Voco sealant.

KEYWORDS: Embrace-WetBond, Fissurit F, pit and fissure, sealant

INTRODUCTION

One of the most prevalent infectious diseases involving both children and adults worldwide is dental caries. Deep fissures and pits in molars encourage food retention, creating an ideal environment for

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oral microorganisms to flourish and break down the carbohydrates into acids, demineralising the enamel.^[1] Regular use of fluoride, which has cariostatic properties, is the most tried-and-true method for preventing cavities.^[2]

Pits and fissures commonly occur on the occlusal surfaces of teeth, making them more susceptible to caries and offering a favourable environment for demineralisation with little salivary access. Due to the shape of their chewing surfaces, molar teeth are thought to be the teeth that are most prone to dental caries.^[3] The sealants act as a physical barrier to stop cariogenic microorganisms from colonising, thereby preventing tooth decay. The pitiful ability of the fissures to seal is a major factor in the effectiveness of pit and fissure sealing materials.^[1,2] Bis-GMA resin serves as the foundation of the fissure sealant. Sealants come in clear, tinted, filled and unfilled varieties. The glass ionomer cement (type IV), Clinpro, Helioclear F, Ultraseal XT, Embrace-WetBond and Fissurit F are a few of the commercially available pit and fissure sealants.

The clinical efficiency of sealants' margin sealing ability is only partially supported by the literature. In order to compare and evaluate the marginal sealing capabilities of Embrace-WetBond and Fissurit F pit and fissure sealants, the current study was conducted.

MATERIALS AND METHODS

A total of 30 human premolar teeth were equally classified into 2 groups: Group A-application of Embrace-WetBond, sealant and Group B-application of Fissurit F, Voco sealant. The study used healthy premolar teeth that had been extracted for orthodontic reasons. After etching the teeth in accordance with the manufacturer's instructions, sealants were placed on the occlusal pit and fissure area. Before thermocycling,

Table 1: Microleakage grade for the groups

Grade	Group A (n-15) Embrace-WetBond	Group B (n-15) Fissurit F, Voco	Total	P
0	8 (53.3%)	4 (26.7%)	12 (40%)	0.012*
1	5 (33.3%)	2 (13.3%)	7 (3.3%)	[Table 1]
2	1 (6.7%)	4 (26.7%)	5 (16.7%)	
3	1 (6.7%)	5 (33.3%)	6 (20%)	
Total	15	15	30	

* $P < 0.05$, statistically significant, test used Chi-square test

Table 2: The intergroup comparison of microleakage scores between the groups

Group	n	Mean rank	Sum of rank	P
Group A	15	18.65	647.50	0.016*
Group B	15	32.18	423.50	

* $P < 0.05$, statistically significant, test used Mann-Whitney U test

samples were then kept for 48 hours in artificial saliva (to simulate the oral environment). Later, samples were submerged for 24 hours in a 2% methylene blue solution. The amount of microleakage based on the quantity of dye penetration at interface between the tooth substance and sealant was compared under an optical stereomicroscope. With a $P < 0.05$, the Chi-square test and Mann-Whitney test were used to statistically analyse the dye penetration scores in both groups.

RESULT

It was observed that 8 samples from Group A (53%) had no dye penetration (Grade 0), whereas 4 samples from Group B (26%) showed Grade 0 penetration. In 5 out of 15 samples (33%) from Group B, the dye penetration was the greatest (Grade 3; $P = 0.012$) [Table 1]. Group A has lowest microleakage [Table 2]. It was concluded that Embrace-WetBond had least microleakage compared to group 2-Fissurit F, Voco sealant.

DISCUSSION

Regardless of the nature and type of the sealant, a number of local factors affect its ability to penetrate into pits and fissures.^[2]

The marginal sealing abilities of 2 commercial pit and fissure sealants were compared by Sridhar *et al.* They found that Clinpro performed better and with less microleakage than Helioclear F.^[2] On permanent molars, Prabakar *et al.* measured the microleakage of two different pit and fissure sealants. They came to the conclusion that the less microleakage, the better the sealant would be retained for a longer period of time and would have a cariostatic effect.^[4] Harsha P and Vivek Dhruv K came to the conclusion that there was significantly more microleakage in the fissure sealant type compared to self-adhering flowable composite type.^[3] The quantity of *in vitro* microleakage of 3 various types of pit and fissure sealants (GC Fuji TRI-AGE, GC corporation), (Vertise Flow, Kerr), (Helioclear-F, Ivoclar Vivadent) and the impact of occlusal preparation on the leakage value were assessed by Khidir and Suleman. They came to the conclusion that the material with the lowest microleakage was Helioclear-F.^[5]

According to Ifzah and Kumar, conventional sealants are superior sealants in terms of retention.^[1] Joshi *et al.* came to the conclusion that composite material performs comparably better as a sealant material than glass ionomer cement and compomer.^[6] According to Nirwan *et al.*, the retention of pit and fissure sealant bonded using the 6th (Adper prompt), 7th (Optibond) and 8th (Futurabond Dual Cure) generations of adhesives is not significantly different.^[7] According to Baheti *et al.*,

Embrace-WetBond sealant has better retention than CL and HF.^[8]

Due to the diverse thermal expansion coefficients of resin and tooth material, dental materials in the oral cavity are frequently exposed to heat and pH changes, which results in thermal stress and the formation of marginal gaps and microleakage. The coefficients of thermal expansion of resin materials are higher (25-60 ppm/°C) than those of enamel (11.4 ppm/°C) and dentin (8 ppm/°C). Thus, one of the methods that is frequently used to reproduce the long-term stresses that the restorations are subjected to in order to assess the *in vitro* performance of resin materials is thermocycling.^[2]

We found that Embrace-WetBond was better compared to Fissurit F, Voco sealant in sealing ability. Further studies are needed to validate the results.

CONCLUSION

It was concluded that Embrace-WetBond had least microleakage compared to group 2-Fissurit F, Voco sealant.

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Conflicts of interest

There are no conflicts of interest.

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