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Microleakage of Fissure Sealants after Aging Based on Fissure Configuration

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Introduction

Fissure sealants are materials applied to the tooth surface to obliterate fissures and remove the sheltered environment in which caries may thrive.This conservative technique of tackling pit and fissure caries is a minimal-intervention approach which even most children have no difficulty in accepting. Therefore, pit and fissure sealants undoubtedly play a critical role in preventing occlusal caries in both primary and permanent teeth. Against this background, the use of pit and fissure sealant materials has been promoted for a number of years to prevent the incidence of dental caries. Owing to the widespread adoption of pit and fissure sealants, their mechanical properties and clinical effectiveness are well documented in published literature.

Objectives

The aim of this study was to evaluate the microleakage of four fissure sealants (Ultraseal XT, Conseal f, Smartseal&loc F and Delton) in relationship to fissure configuration after artificial aging.

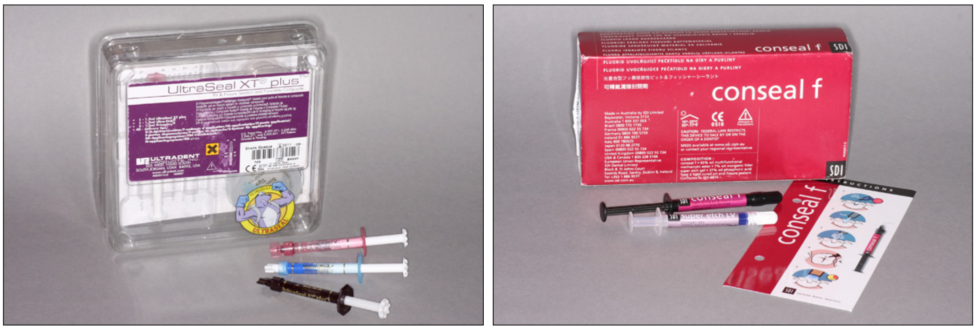

Fig. 1-2: Fissure sealants Ultraseal XT (Ultradent) and Conseal f (SDI) used in this investigation

Fig. 3-4: Fissure sealants Smartseal&loc F (Detax) and Delton (Dentsply) used in this investigation

Material and Methods

843 fissures of extracted non-carious molars sealed with either Ultraseal XT, Conseal f, Smartseal&loc F or Delton were examined. Following prophylaxis with Klint, the fissure sealant was applied as recommended by the manufacturer. One half of the teeth was thermocycled (5-55 degree celsius, 5000 cycles). Following that, all teeth were immersed in methylene blue for 48 hours, rinsed, sectioned and examined with digital light microscopy (10-200x). Fissures were characterized as U, V, I and IK based on their crosssectional shape (Fig. 5).

Microleakage was scored as
0 = no dye penetration
1 = dye penetration into the occlusal third of the enamel-sealant interface
2 = dye penetration into the middle third of the interface
3 = dye penetration into the apical third of the interface.

Statistical analysis was performed using SPSS 18.0.

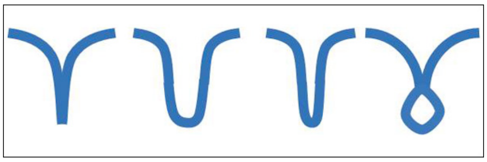

Fig. 5: Fissure configuration: V-, U-, I- and IK-Type.

Fig. 6: Score 0 = no dye penetration

Fig. 7: Score 1 = dye penetration into the occlusal third of the enamel-sealant interface

Fig. 8: Score 2 = dye penetration into the middle third of the interface

Fig. 9: Score 3 = dye penetration into the apical third of the interface

Results

Following mikroleakage scores were evaluated:

	Ultraseal XT				**Conseal f**				**Smartseal**				**Delton**			
Fissure	U	V	I	IK	U	V	I	IK	U	V	I	IK	U	V	I	IK
no thermocycling																
Mean	0.24	0.21	0.09	0.91	0.09	0.09	0.08	0.2	0.46	0.37	0.76	0.7	0.26	0.65	0.27	0.29

SD	0.43	0.42	0.29	1.04	0.29	0.3	0.39	0.45	0.71	0.56	0.6	0.82	0.16	0.25	0.7	0.79
thermocycling																
Mean	0.58	0.63	0.27	0.57	0.87	0.42	0.61	0.71	1.0	1.11	1.0	1.0	0.35	0.69	0.29	0.57
SD	0.69	0.72	0.46	0.98	0.88	0.65	0.83	1.11	0.85	0.76	0.85	0.82	0.65	0.9	0.49	0.76

Table 1: Microleakage scores and standard deviation within the different groups.

Regardless of the fissure configuration, significantly higher average microleakage scores were obtained after thermocycling ($p < 0.001$, ANOVA). In particular, Smartseal&loc F yielded the highest microleakage scores after artificial aging ($p < 0.05$, Tukey's test).

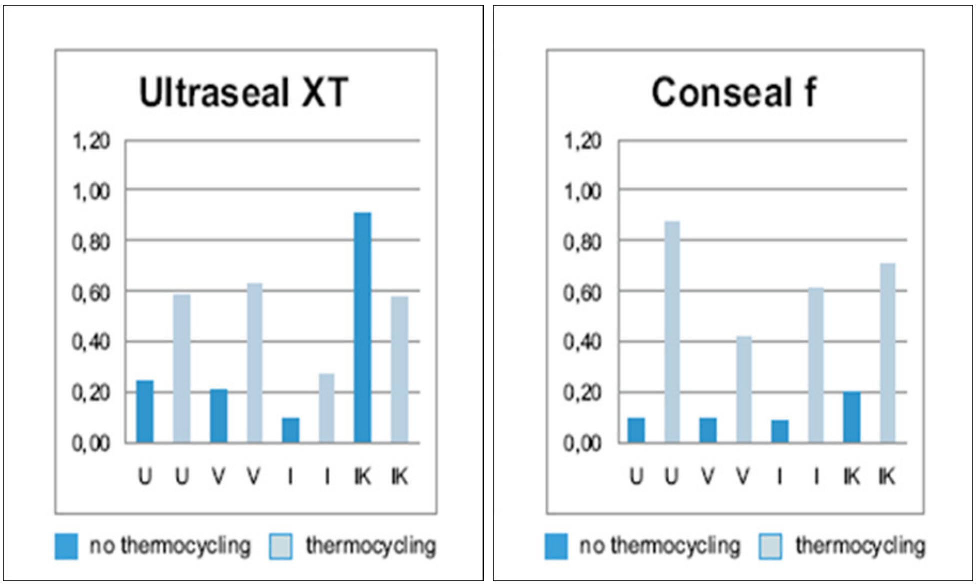

Fig. 10-11: Graphically expression of the results (mean values).

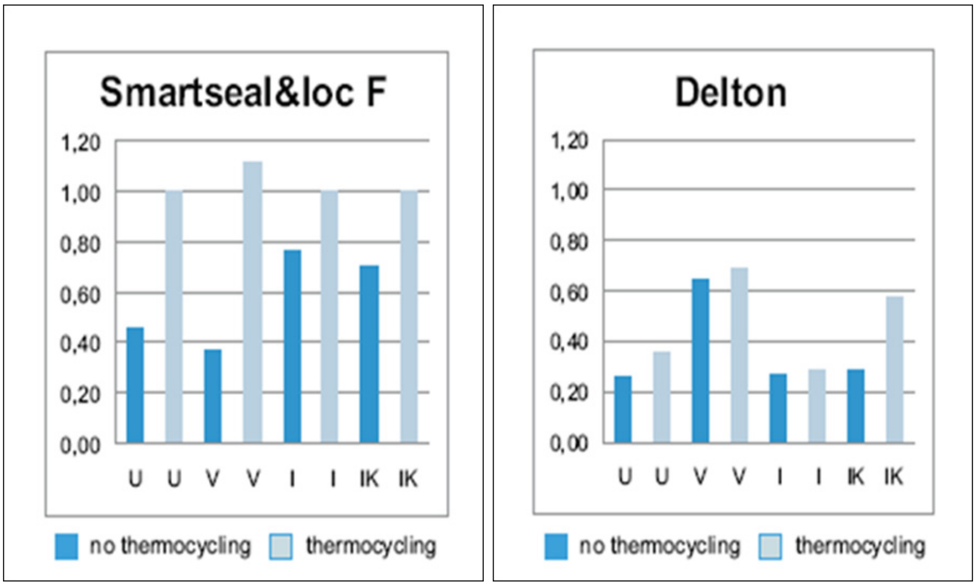

Fig. 12-13: Graphically expression of the results (mean values).

Conclusions

Within the limitations of the present study, it can be concluded that artificial aging increased microleakage of the four fissure sealants significantly.

Literature

1. Gordon PH, Nunn JH. The prevention of oral disease, 3rd ed, Oxford University Press, NewYork, 1996, pp.78-94.
2. Feldens EG, Feldens CA, deAraujo FB, Souza MA. Invasive technique of pit and fissure sealants in primary molars: aSEMstudy. J Clin Pediatr Dent 1994; 18(3): 187-190.
3. Walker J, Floyd K, Jakobsen J. The effectiveness of sealants in pediatric patients.ASDC J Dent Child 1996; 63(4): 268-270.
4. Ripa LW. Sealants revisited: an update of the effectiveness of pit-and-fissure sealants. Caries Res 1993; 27: 77-82.

This Poster was submitted by Karolin Verena Brandt.

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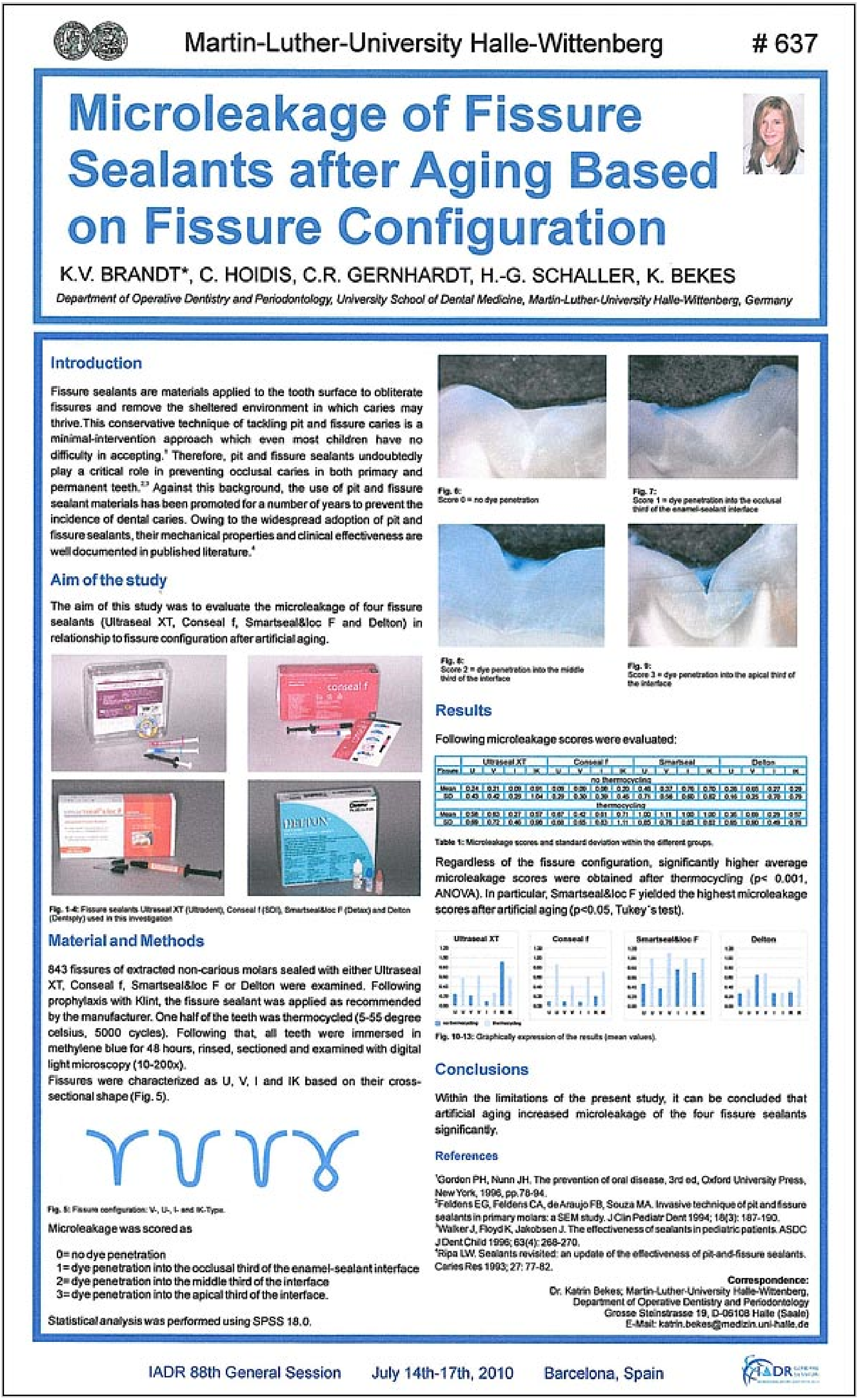

Martin-Luther-University Halle-Wittenberg # 637

Microleakage of Fissure Sealants after Aging Based on Fissure Configuration

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Introduction

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Aim of the study

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Fig. 1-4: Fissure sealants Ultraseal XT (Ultradent), Conseal f (SDI), Smartseal&loc F (Detax) and Delton (Dentsply) used in this investigation

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