International Poster Journal IPJ of Dentistry and Oral Medicine

Int Poster J Dent Oral Med 2012, Vol 14 No 3, Poster 600

Effect of Erosion / Remineralisation Challenges on Microtensile Bond Strength of two Dentin Adhesives

Language: English

Authors:
Dr. Katrin Bekes, Kristina Unverricht, Prof. Dr. Hans-Günter Schaller, PD Dr. Christian R. Gernhardt,
Martin-Luther-University Halle-Wittenberg, Department of Operative Dentistry and Periodontology, Halle, Germany

Date/Event/Venue:
13.-15.10.2011
5th CONSEURO Meeting
Istanbul, Turkey

Introduction

In the last decade, tooth erosion and the associated mechanical wear have drawn increasing attention as a risk factor for tooth damage (1). The benefits of fluoride in the treatment of tooth erosion and associated wear are supported by a range of in vitro and in situ studies (2). Nevertheless, when substance loss, caused by erosive tooth wear, reaches a certain degree, oral rehabilitation becomes necessary. As a result of the improvements in composite restorative materials and in adhesive techniques, it has become possible to rehabilitate eroded dentitions in a minimal invasive manner (3).

Objectives

The aim of the present study was to evaluate the effect of erosion/remineralisation challenges on microtensile bond strength (mTBS) of two dentin adhesives (Optibond FL, Futurabond M) in vitro.

Material and Methods

The study was carried out on 150 extracted third molars. In all teeth cervical dentinal cavities were prepared also allowing the simulation of dentin perfusion. The specimens were randomly assigned to one of the five challenges of thirty samples each: G-1: control; G-2/-3: 10-minute immersion 4x/day in Sprite Zero for 7 days; G-4/-5: 5-minute immersion 6x/day in citric acid for 10 days. In G-3/G-5 the first and the last erosive challenge was followed by 2-minute remineralisation challenge in elmex EROSION PROTECTION dental rinse (GABA). Between the erosive/remineralisation challenges, the specimens were immersed in artificial saliva. Subsequently, the dentin specimens were restored with either Optibond/Grandio (O) or Futurabond/Grandio (F). Microten-sile bond strength was measured 15 minutes after application of the composite using an universal testing machine.

Results

For the test series following tensile bond strengths were evaluated (in MPa) (Tab. 1, Fig. 1).

	G1-O	G2-O	G3-O	G4-O	G5-O	G1-F	G2-F	G3-F	G4-F	G5-F
Mean	25.46	18.59	22.94	11.02	16.00	20.91	15.20	17.04	5.05	11.71
±	5.02	4.77	3.87	2.62	3.53	4.53	3.62	5.32	1.03	2.24

Table 1: Mean values and standard deviations (in MPa) within the different groups

Statistical analysis showed a significant influence of the used adhesive and the challenge on mTBS ($p < 0.001$, ANOVA). Erosive challenges resulted in a significant reduction of mTBS compared to the untreated controls. Remineralisation with elmex dental rinse increased mTBS significantly in G-5 compared to G-4 ($p < 0.05$, Tukey's test).

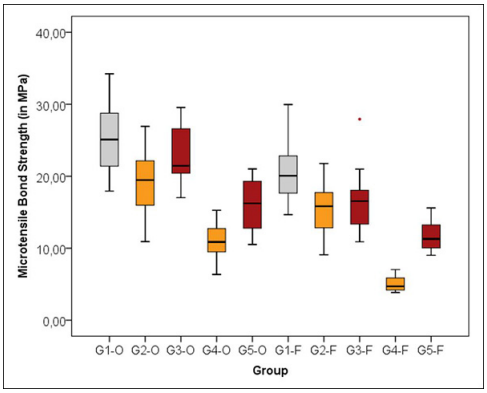

Fig. 1: Boxplot of the results

Conclusions

Erosion affected the mTBS of both adhesives in vitro. Remineralisation with elmex dental rinse might be a solution to increase mTBS of adhesives on eroded dentin.

Literature

1. Lussi A ,et al.: Dental Erosion - An Overview with Emphasis on Chemical and Histopathological Aspects. 2011; 45(suppl 1):2-12.
2. Venasakulchai A, et al.: A comparative evaluation of fluoridated and non-fluoridated mouthrinses using a 5-day cycling enamel erosion model. J Dent 2010; 38(S3): 21-29.
3. Lussi A, et al.: Buonocore Memorial Lecture. Dental erosion. Oper Dent 2009; 34(3):251-62.

Abbreviations

mTBS = microtensile bond strength
MPa = megapsacals

This Poster was submitted by Dr. Katrin Bekes.

Correspondence address:
Dr. Katrin Bekes
Martin-Luther-University Halle-Wittenberg
Department of Operative Dentistry and Periodontology
Grosse Steinstrasse 19
06108 Halle
Germany

Poster Faksimile:

UKH Universitätsklinikum Halle (Saale)

Martin-Luther-University Halle-Wittenberg #234

Effect of Erosion / Remineralisation Challenges on Microtensile Bond Strength of two Dentin Adhesives

K. BEKES*, K. UNVERRICHT, H.G. SCHALLER, C.R. GERNHARDT

Department of Operative Dentistry, Martin-Luther-University Halle-Wittenberg, Germany

Introduction

In the last decade, tooth erosion and the associated mechanical wear have drawn increasing attention as a risk factor for tooth damage.[1] The benefits of fluoride in the treatment of tooth erosion and associated wear are supported by a range of in vitro and in situ studies.[2] Nevertheless, when substance loss, caused by erosive tooth wear, reaches a certain degree, oral rehabilitation becomes necessary. As a result of the improvements in composite restorative materials and in adhesive techniques, it has become possible to rehabilitate eroded dentitions in a minimal invasive manner.[3]

Aim of the Study

The aim of the present study was to evaluate the effect of erosion/remineralisation challenges on microtensile bond strength (mTBS) of two dentin adhesives (Optibond FL, Futurabond M) in vitro.

Material and Methods

The study was carried out on 150 extracted third molars. In all teeth cervical dentinal cavities were prepared also allowing the simulation of dentin perfusion. The specimens were randomly assigned to one of the five challenges of thirty samples each: G-1: control; G-2/-3: 10-minute immersion 4x/day in Sprite Zero for 7 days; G-4/-5: 5-minute immersion 6x/day in citric acid for 10 days. In G-3/G-5 the first and the last erosive challenge was followed by 2-minute remineralisation challenge in elmex EROSION PROTECTION dental rinse (GABA). Between the erosive/remineralisation challenges, the specimens were immersed in artificial saliva. Subsequently, the dentin specimens were restored with either Optibond/Grandio (O) or Futurabond/Grandio (F). Microtensile bond strength was measured 15 minutes after application of the composite using an universal testing machine.

Results

For the test series following tensile bond strengths were evaluated (in MPa) (Tab. 1, Fig. 1):

	G1-O	G2-O	G3-O	G4-O	G5-O	G1-F	G2-F	G3-F	G4-F	G5-F
Mean	25.46	18.59	22.94	11.02	16.00	20.91	15.20	17.04	5.05	11.71
+/-	5.02	4.77	3.87	2.62	3.53	4.53	3.62	5.32	1.03	2.24

Table 1: Mean values and standard deviations (in MPa) within the different groups.

Statistical analysis showed a significant influence of the used adhesive and the challenge on mTBS ($p<0.001$, ANOVA). Erosive challenges resulted in a significant reduction of mTBS compared to the untreated controls. Remineralisation with elmex dental rinse increased mTBS significantly in G-5 compared to G-4 ($p<0.05$, Tukey´s test).

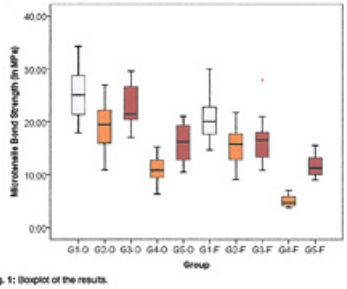

Fig. 1: Boxplot of the results.

Conclusions

Erosion affected the mTBS of both adhesives in vitro. Remineralisation with elmex dental rinse might be a solution to increase mTBS of adhesives on eroded dentin.

References

1. Lussi A ,et al.: Dental Erosion - An Overview with Emphasis on Chemical and Histopathological Aspects. 2011; 45(suppl 1):2-12.
2. Venasakulchai A, et al.: A comparative evaluation of fluoridated and non-fluoridated mouthrinses using a 5-day cycling enamel erosion model. J Dent 2010; 38(S3): 21-29.
3. Lussi A, et al.: Buonocore Memorial Lecture. Dental erosion. Oper Dent 2009; 34(3):251-62.

5th CONSEURO Meeting 13.-15.10.2011 Istanbul, Turkey

Correspondence: katrin.bekes@medizin.uni-halle.de