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Effect of Pulpotomy Agents on MTBS of Pulpal Primary Dentin

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Introduction

Pulpotomy is one the most frequently used treatments to maintain primary molars with carious involvement, symptomless or with reversible pulpitis which otherwise would be extracted (1). The objective of this technique is the removal of inflamed and infected coronal pulp tissue and the application of an effective and compatible bactericidal medicament which encourages the tissue in the root canals to remain vital (2). Traditionally pulpotomized primary teeth have been recommended to be restored with stainless steel crown. With the development of successful dentin and enamel bonding agents, studies have demonstrated that a bonded restoration of endodontically treated primary and permanent teeth strengthens the remaining tooth (3).

Objectives

The present study was undertaken to evaluate the effect of alternative hemostatic agents used for pulpotomy such as ferric sulfate and 5% NaOCl on microtensile bond strength (mTBS) of two adhesive systems to pulpal floor dentin of primary teeth in vitro.

Material and Methods

Seventy-two extracted primary molars were included. Dentin specimens of the pulp chamber were obtained under standardized conditions (Figure 1). The specimens were randomly assigned to one of the six groups of twelve samples each (Figure 2, 3):

group PB-C: Prime&Bond, control group
group F-C: Futurabond NR, control group
groups PB/F-1: immersion for 5 min in ferric sulfate prior to bonding
groups PB/F-2: immersion for 5 min in 5% NaOCl prior to bonding

Microtensile bond strength was measured 15 minutes after application of the corresponding compomer (Dyract/ Glasiosite) using an universal testing machine (Figure 4).

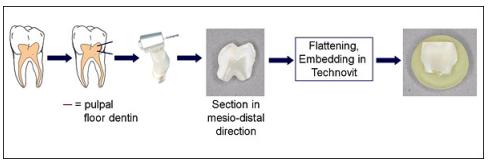

Fig. 1: Specimen preparation: section in mesio-distal direction, flattening and embedding in Technovit

Fig. 2,3: Dentin adhesives used in this in vitro study

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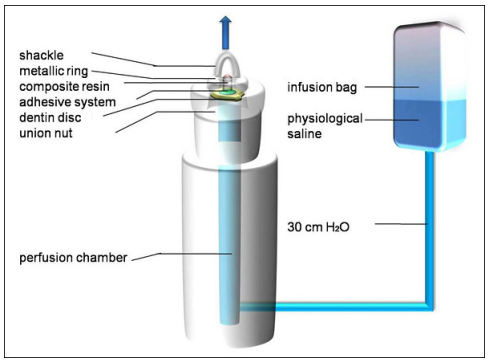

Fig. 4: Experimental device to test microtenslie bond strength

Results

Following mTBS were evaluated (mean values and standard deviations in MPa) (Table 1, Figure 5).

	Prime & Bond			**Futurabond NR**		
Group	PB-C	PB-1	PB-2	FB-C	FB-1	FB-2
Mean	20.3	16.4	14.2	10.5	14.1	14.3
±	3.6	5.6	2.7	3.7	2.8	3.0

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

Statistical analysis showed a significant influence of the used dentin adhesive and the hemostatic agent ($p < 0.001$, ANOVA). The immersion in 5% NaOCl before bonding procedure (PB-2, F-2) resulted in a significant reduction of mTBS compared to the untreated control groups (PB-C, F-C) ($p < 0.05$, Tukey's test). Between the controls and ferric sulfate groups, significant differences could only be detected in the case of Futurabond NR ($p < 0.05$, Tukey's test). Pairwise comparison between Prime&Bond and Futurabond showed no significant differences in all groups ($p < 0.05$, Tukey's test).

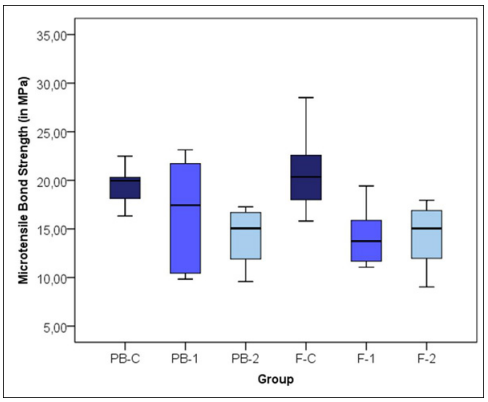

Fig. 5: Boxplot of the results

Conclusions

Within the limitations of an in vitro investigation it can be concluded that hemostatic agents used for pulpotomy might have an adverse effect on mTBS of adhesive systems. In the case the self-etch adhesive Futurabond NR both hemostatic agents reduced mTBS.

Literature

1. AAPD. Guideline on pulp therapy for primary and young permanent teeth. Pediatr Dent. 2004;26:115-9.
2. McDonald RE, Avery DR, Dean JA. Dentistry for the child and adolescent. 8th ed. St. Louis: Mosby; 2004. p. 204-35, 388-412.
3. el-Kalla IH, Garcia-Godoy F. Fracture strength of adhesively restored pulpotomized molars. ASDC J Dent Child 1999;66:238-42

Abbreviations

MPa = megapascals
MTBS = microtensile bond strength

This Poster was submitted by PD Dr. Katrin Bekes.

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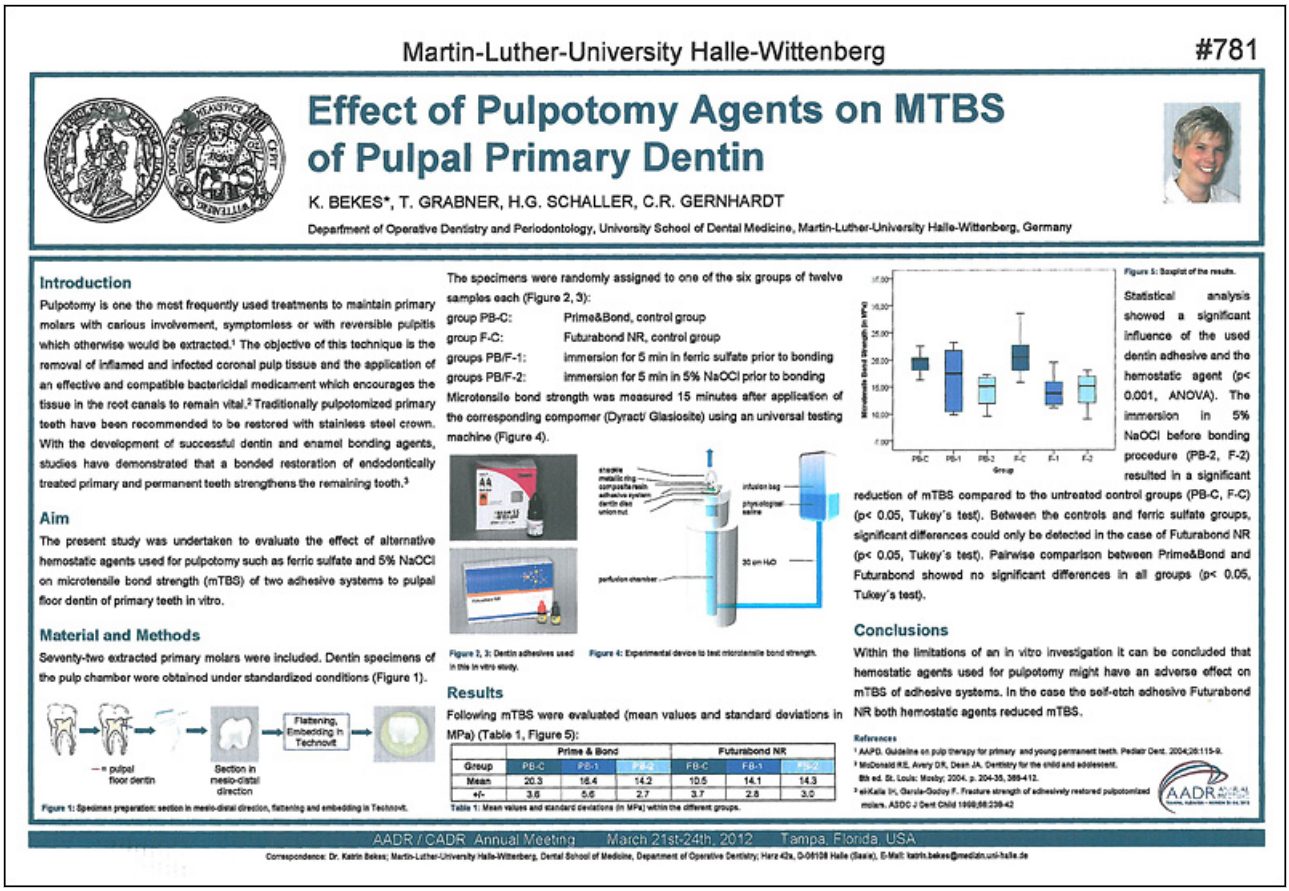

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Figure 2, 3: Dentin adhesives used in this in vitro study.

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Figure 5: Boxplot of the results.

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