

EVALUATION OF MICROLEAKAGE OF LIGHT-CURING COMPOSITE USED IN ORTHODONTIC AFTER THERMAL CYCLES. *An in vitro study.*

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INTRODUCTION

During orthodontic treatment with fixed appliances, one of the main problems is bracket detachment, because several factors affect the bond strength of orthodontic composite to tooth enamel. However, a little research has been done on the effect of the thermal cycles on the microleakage of orthodontics composite.

METHODS

Bioethical approval was obtained from the University's Bioethical Committee, No. BEC-OF-05. 40 recently extracted first molars, were randomly divided into two groups of 20: experimental group (affected by thermal cycles) and control group. Buccal surface of each tooth was polished, etched, coated with primer and bonded with a layer of light-curing composite (HIGH-Q-BOND BRACKET) (length 3mm, width 4mm, thickness 1mm). According to study protocol, before the experiment all samples were tested with a stereomicroscopy (ZEISS Stemi 2000-CS) with camera (ZEISS AxioCam MRc 5) and submerged into 37°C saline for 24h until the start of the experiment. The experimental group teeth were dipped 2,000 times in saline at 5°C and at 55°C (immersion time in each bath was 30 s, transfer time - 2-3 s) (accordance to ISO agreements) [4]. The control group was kept throughout the study in 37°C saline. Before the test with stereomicroscopy all teeth were immersed in saline with dye and divided bucco-lingually through the centre of the composite. Penetration depths of dye between the tooth and the light-curing composite were divided into 4 group (0-no penetration, 1-penetration ¼ of distance, 2-penetration ½ of distance, 3-penetration ¾ of distance, 4-penetration all of distance. Statistical analysis was performed with the SPSS. Chi-square test was used to calculate and compare the results.

CONCLUSIONS

Thermal cycles increase the risk of microleakages in the composite used in orthodontic. This study shows that thermal cycles damages the surface of the orthodontic composites, which can impact on adhesion of the brackets to the tooth surface.

AIM

To evaluate the effect of a thermal cycles on the microleakage of a composite used for bonding brackets.

RESULTS

Before the experiment no micro lesions were observed on composite surfaces in both sample groups. After thermal cycles in the composite surface of experimental group the micro lesions were detected. No micro lesions were observed on composite surfaces in all teeth of the control group. 20 control group teeth (100%) had no penetration of dye. Evaluating composite surface of the experimental group, the results were the following: 2 teeth (10%) had ½ of distance penetration, 8 teeth (40%) had penetration of dye ¾ of distance, 10 teeth (50%) had dye penetrate all of distance.

Comparing the results of the test in experimental group and control group, statistically high significance was found ($\chi^2=40$; $df=3$; $p<0.001$). Thermal cycles have a significant effect on the frequency of microleakage between the tooth surface and the composite.