

Antibacterial Efficiency of Ozonated Water and Its Effect on Dentin Shear Bond Strength

A thesis

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ABSTRACT

Remaining bacteria under restorations are regarded as one reason for secondary caries and, thus, restoration failures. Many disinfectant used for sterilization of the cavity before inserting the composite restoration but may cause inhibitory effect on bond strength.

Purpose: To evaluate the influence of direct application of ozonated water (4mg/L) on adherent Mutans streptococci on dentin, and also to assess of its effect on dentin shear bond strength.

Materials and methods: Fifty freshly extracted human premolars for orthodontic treatment between 20-30 years were utilized in this study, dentin was exposed by diamond disc and 600-grit sic paper. The study composed of two parts: bacteriological and shear bond strength.

Mutans streptococci bacteria were isolated from saliva and all samples were inoculated in a modified glass trough containing bacterial suspension allowing adhesion to dentin occur. After incubation for 24 hours at 37°C, dentin surfaces of all samples were washed with sterile distilled water and divided into five groups, each dentin surface per sample group was exposed for 10 seconds by immersion in antibacterial agent selected for this study as follows:

GI: Untreated served as –ve control.

GII: Sterile distilled water served as +ve control.

GIII: 5.25% sodium hypochlorite.

GIV: 0.2% chlorhexidine.

GV: 4mg/L ozonated water.

Swab taken by scrubbing the dentin surfaces with sterile paper point and an inoculum of 0.1 ml from each selected dilution was spread on the selective medium (mitis salivarius bacitracin agar). Count of

bacteria was recorded expressed in colony forming unit (CFU) taking in consideration the dilution factor.

After that all samples were washed with sterile distilled water and then divided into five groups corresponds to bacteriological study, each dentin surface per sample group was exposed for 10 seconds by application of cotton pellet immersed in antibacterial agent selected for this study.

Type II DBA (Unibond2, Ventura, Spain) which based on 2 clinical steps: etch, prime and bond combined was used for conditioning and priming the dentin. Composite resin (Similux, Ventura) was inserted in the ring through silicon iris retained by acrylic mold modified to maintain alignment on dentin surfaces and cured according to the manufacturer instruction. After storage in sterile distilled water at 37°C for 2 days, shear bond strength was measured using Instron compression load cell. Data were analyzed using ANOVA and Student t-test.

Results: There was high significant reduction in viable count of adherent M.S treated with ozonated water 4mg/L compared with the other groups at $P < 0.01$ level, also high significant increase in bond strength was detected for ozonated water treated samples compared to controls at $P < 0.01$.

Conclusions: According to the circumstances of this study, ozonated water was very potent antibacterial agent against mutans streptococci and can be used successfully as cavity disinfectant after cavity preparation to increase the shear bond strength of dentin to composite.