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Original Articles

Antimicrobial Effects of Zinc Oxide in an Orthodontic Bonding Agent

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Abstract

Objective: To test the null hypothesis that the addition of zinc oxide (ZnO) has no effect on the antimicrobial benefits and shear bond strength of a light-cured resin-modified glass ionomer.

Materials and Methods: ZnO was added to Fuji Ortho LC to create mixtures of 13% ZnO and 23.1% ZnO. Specimen discs of the modified bonding agent were incubated with *Streptococcus mutans* for 48 hours in a disc diffusion assay that was used to measure zones of bacterial inhibition. In addition, brackets were bonded to bovine deciduous incisors with the modified bonding agents, and shear bond strength was evaluated with a universal testing machine.

Results: The modified samples showed that antimicrobial activity increased as the concentration of ZnO increased. There were significant differences ($P < .05$) in antimicrobial activity. Post hoc tests showed that the antibacterial effects were 1.6 times greater with 23.1% ZnO than with 13% ZnO. There was no difference between Transbond and 0% ZnO (the negative control). After 1 month of daily rinsing, the antibacterial effects of 23.1% ZnO and 13% ZnO decreased 65% and 77%, respectively, but both maintained significant effects over the negative controls. There were no significant differences ($P = .055$) in shear bond strength between any of the mixture comparisons.

Conclusions: The incorporation of ZnO into Fuji Ortho LC added antimicrobial properties to the original compound without significantly altering the shear bond strength. ZnO holds potential for preventing decalcification associated with orthodontic treatment.

Keywords: [Zinc oxide](#), [Antimicrobial effects](#), [Decalcification](#), [Bond strength](#)

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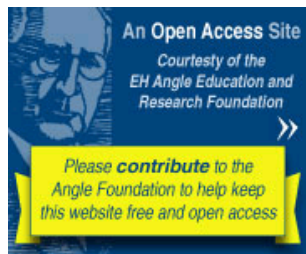
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