Novel 2-Al Dental Sealants: Moving beyond anti-biofilm by revealing new selective anti-Streptococci strategy for managing dental caries

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BACKGROUND

Since 2016, the American Dental Association has made a strong recommendation for using dental sealants on sound occlusal surfaces and non-cavitated occlusal carious lesions in children and adolescents to stop the spread of this disease. The "School program application of sealants" is currently funded by 20 states that support basic oral health programs. While the sealant strategy is proven to be effective, the methacrylate-based sealants have intrinsic flaws. Sealants are mechanically fragile when grinding and chewing forces are applied.

We have developed a novel and effective anti-biofilm/anti-caries dental sealant using 2-amino-imidazole (2AI), a small molecule analog of natural marine biofilm inhibitors with significant anti-biofouling activity against S. mutans biofilm. Recently, this compound was tested by our research group in a rodent model as a mouthwash-like solution and demonstrated significant anti-caries effect with no toxicity and selective anti-biofilm effect.

APPROACH

The flexural strength was improved and the graph showed a plastic material with higher toughness. UDMA was selected due to the crosslink properties, as shown in urethane esters, urethane-urethane, hydroxyl-urethane bonds are created and most probably happened when the compound was incorporated into the network. After 2 days, the material containing H10 showed lower CFU count, and this difference increased after 5 days. The confocal and SEM images show that the bacteria were not eliminated but the biofilm dispersed.

RESULTS

Elastic modulus for experimental sealant doped with 2AI = H10

CONCLUSION

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