



Future perspectives in adhesive dentistry — biological interactions —

Carmem S. Pfeifer

Division of Biomaterials and Biomechanics
at OHSU School of Dentistry.

Interfacial integrity preservation is still a challenge to be met in Restorative Dentistry. While most of the efforts so far have focused on specific functions of host-derived enzymes in hybrid layer degradation, namely dentin/bacterial proteases and salivary esterases, the complex interaction of the biological aspects involved are yet to be elucidated. This talk will discuss currently available technology, as well as developing strategies, to increase the longevity of bonded interfaces. Specifically, collagen preservation via metalloproteinase inhibition will be reviewed, either involving pre-treatment protocols with small molecule inhibitors, or involving innovative materials with tethered inhibitory functionalities. There is mounting evidence for the role of peptide-derived inhibition of MMP and cysteine/catepsins, but those have not been incorporated in materials thus far. In addition, degradation-resistant polymeric materials, free of ester bonds, have also been shown to significantly improve long-term bond strengths. Methacrylamide-based materials specifically have been shown extraordinary resistance to degradation even at pH as low as 2 and/or in the presence of esterases. More recent evidence suggests a secondary function of these monomers in reinforcing collagen. The mechanisms involved in this preservation, and the roles of the different material components, will be discussed.

<Biography>

Dr. Carmem Pfeifer (DDS, PhD) is Associate Professor in the Division of Biomaterials and Biomechanics at OHSU School of Dentistry. Dr. Pfeifer teaches Dental Materials and serves as an instructor in several Restorative Dentistry pre-clinical disciplines. She has published over 100 research articles in the field of Dental Materials Sciences and Polymer Chemistry and serves as a standing member of the DSR study section for the National Institute of Dental and Craniofacial Research at NIH. She has been recently appointed Associate Editor for the Journal of Dental Research. Dr. Pfeifer's research focuses on the development of innovative polymeric materials for restorative dentistry, and she has received the inventor of the year award from OHSU for the commercial potential of her patented inventions, which have attracted the interest of several potential licensees. She has received over 12 million dollars in funding for her research and career development from the National Institutes of Dental and Craniofacial Research (including the hyper-competitive R35 – Sustaining Outstanding Achievement in Research award), Oregon Medical Research Foundation, National Science Foundation, as well as industry partners.