Influence of Crown Geometry and Loading on Stress Distribution

Guangming Zhang, Institute for Systems Research, University of Maryland
Dianne Rekow and Masly Harsono, Dental School of the New York University
Sponsor: The National Institute of Dental and Craniofacial Research

Research Objective

Dental crowns are now being fabricated using ceramic materials for their unique esthetic, mechanical and chemical properties that meet the fundamental requirements as biomaterials. However, the full potential of esthetic ceramic-based crowns have not been realized simply due to the material brittleness, which leads to cracking. The research effort is now focusing on the design of a layer system. By layering materials, inherent limitations of constituent materials can be overcome, and more cracking tolerant systems can be realized.

System Modeling

Mandibular Molar Views

Stress in the Contact Area

Effects of Design Parameters

Mouth Motion Simulator

An electro-mechanical device

Acknowledgements

This research is sponsored by the National Institute of Dental and Craniofacial Research through 2 grants: NIDR 1 PO1 DE10976-01 and NIDCR PO1 DE10976-06. Dr. Dianne Rekow, Dr. Van Thompson and Mr. Masly Harsono at the New York University have provided valuable technical support.