Influence of Crown Geometry and Loading on Stress Distribution

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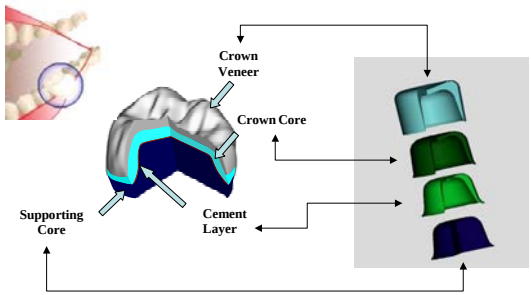
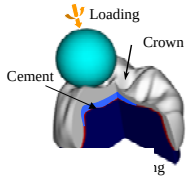
Sponsor: The National Institute of Dental and Craniofacial Research

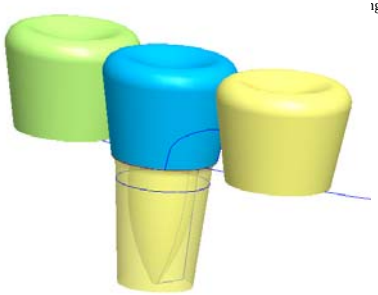
Research Objective



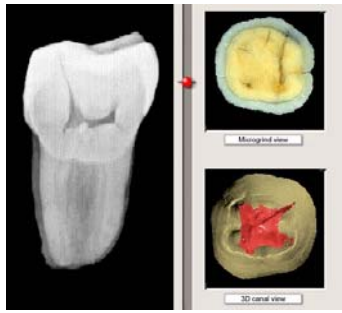
Dental crowns are now being fabricated using ceramic materials for their unique esthetic, mechanical and chemical properties that meet the fundamental requirements as biomaterials. However, the full potential of esthetic ceramic-based crowns have not been realized simply due to the material brittleness, 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

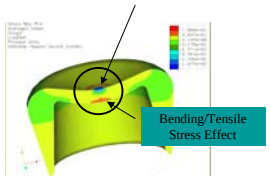




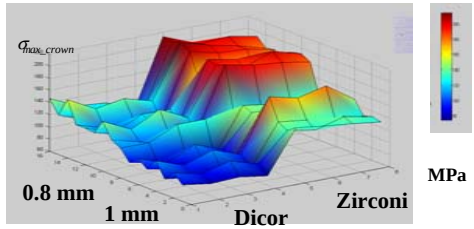
Mandibular Molar Views



Stress in the Contact Area



Effects of Design Parameters

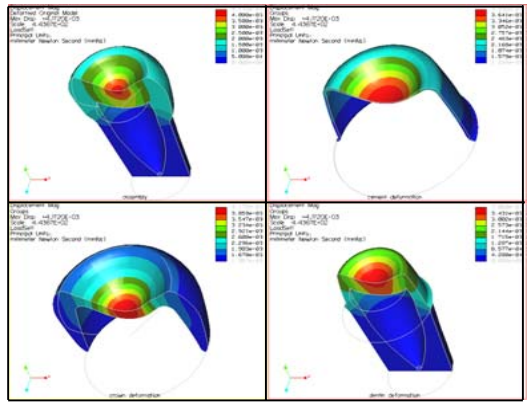


$$c_{max} = 151 + (-6)X_1 + (-1)X_2 + (34)X_3 + (-1)X_4 + (-6)X_5$$

Resin or Phosphate | Normal or Metalcore | Dicor or Zirconia | Central or Offset Load | 15º or 20º

Mouth Motion Simulator

An electro-mechanical device



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