Effects of Geometry on Fracture Initiation and Propagation in All-Ceramic Crowns

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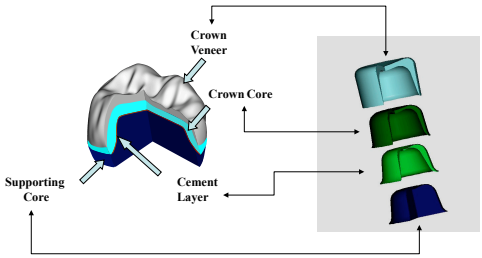
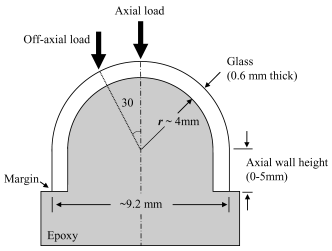
Research Objective

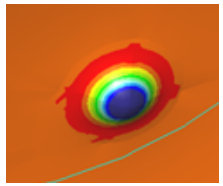


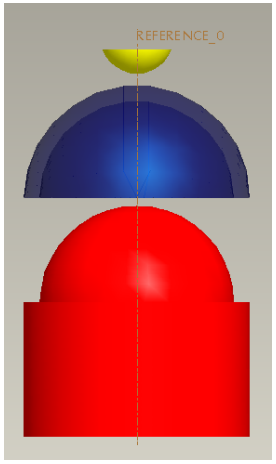
Dental crowns are now being fabricated using ceramic materials for their unique esthetic, mechanical and chemical properties that meet the fundamental requirements as biomaterials. However, the full potential of esthetic ceramic-based crowns have not been realized simply due to the material brittleness,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

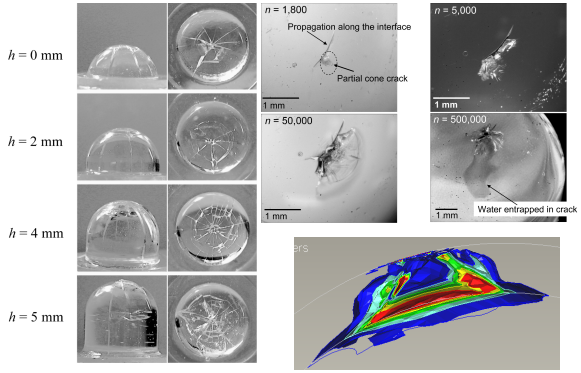
Modeling of Stylized Glass Crown System



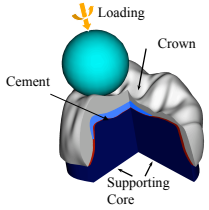


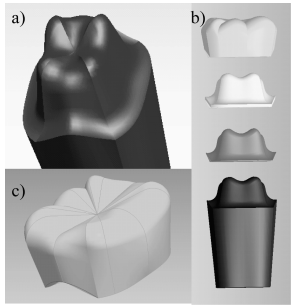


Fracture with Varying Axial Wall Height (h)

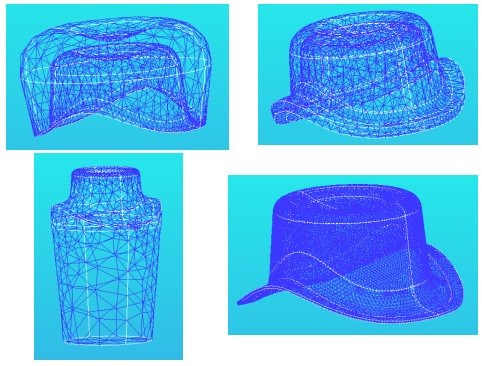


Model of Prepared Mandibula Molar Tooth

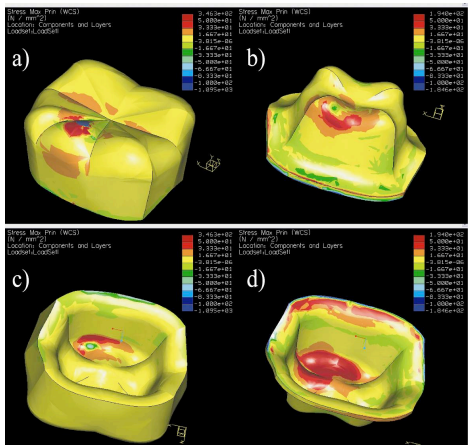




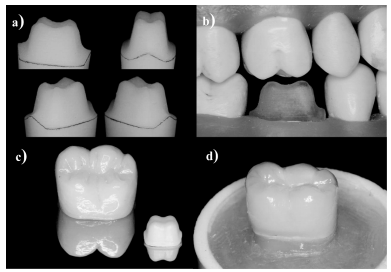
FEA Model of the Stylized Crown System

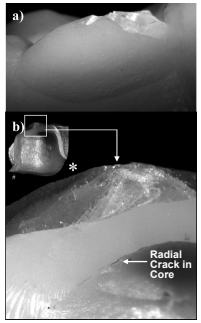


$\sigma_{max\text{-}principal}$ of Veneer and Core Layers



Single Load Tests of the Mandibula Crown Model





Acknowledgements

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