Abstract

This study aims to analyzing the validity of using a newly introduced thermoplastic over denture material, by estimating the stress distribution, resultant strains and failure locations within the complete telescopic denture, using a three dimensional finite element model. Mainly two materials were tested and compared with each other; an acrylic resin with a Co-Cr alloy and an acrylic resin with a flexible acetal resin, with the later being the new material under testing. The finite element model was implemented based on real data from CT scans. For model validation purposes, ten over dentures were constructed and subjected to experimental fracture tests. Results of modeling method were realistic, and showed a relatively lower over denture stresses using the acetal frameworks compared with those using the Co-Cr framework. In summary, the outcomes of the proposed finite element model were found to be in good agreement with the mechanical testing measurements, which would verify using this model for the evaluation of new dental materials.
Keywords

3D Finite element analysis, modeling, telescopic over dentures, acetal resin