COMPRESSION STRAINS AND DISPLACEMENTS OF SELECTED COPINGS ON REMAINING TEETH FOR DENTURE SUPPORT

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Abstract

The stresses generated to the supporting tissues during occlusal loading significantly influence on design of denture and overdenture copings. The aim of this study is to compare the distribution of strains and displacements on two different designs of copings of the partially edentulous mandible. The method for full field measurement of strains and displacements is three-dimensional image correlation system ARAMIS, that provides a synchronized stereo view of the specimen. The experimental models were partially edentulous mandibles fabricated with SLA 3D printer Formlabs Form2 (Formlabs, Somerville, MA) using standard grey dental model resin – the 1st one with conventional oval design of the copings and the 2nd one with experimental design of circumferential milled copings. The most intensive deformations were under working force of the maximum intensity of up to 1000 N. The crack of the less displaced tooth model was recorded at 500 N. Displacement values of conventional oval copings ranged from -0.45 to +7.07 mm and for experimental copings displacements ranged from -0.01 to +0.54 mm. Strains have shown that the maximum applied force at the final stage for conventional oval copings on supporting surfaces resulted in maximal deformation for remaining incisor with 3.392% value, for canine-0,515% and for premolar-3.391%, but experimental milled copings of remained incisor have maximal deformation of 0.126% value, canine-0.102% and premolar-0.125%. Strains within the remaining teeth roots were influenced by vertical displacement of the caps with particular sentence at the joint site of the cap and the tooth substance.

Keywords

Copings, Overdenture, Dentures, Partially edentulous mandible