

FIXED PARTIAL BRIDGE DEGRADATION DUE TO THE TENSIONS GENERATED BY OCCLUSAL LOADING. A NUMERICAL SIMULATION APPROACH.

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INTRODUCTION: The finite element stress analysis technique models actual continuous structures with discrete-element mathematical representations. This approach transforms the problem into one of matrix algebra, which may be solved with the aid of a digital computer. This technique has some very distinct advantages, among which is the ability to obtain accurately the stresses throughout the structure under consideration. Further, the inclusion of any type of anisotropy (directional characteristics) and in homogeneity is conceptually possible by inserting the appropriate distribution of materials properties at the nodes of the elements

METHODS: The fixed partial dental bridge (Fig. 1) was modelled using the MODELA device. This device is mechanical modeling one. The models were obtained in the wireframe mode and also in the render mode. The model was uploaded in PROENGINEER in order to definite the margins and the specifics zone for the bridge. After that the model was imported in ANSYS in order to perform the numerical simulation. We used titanium, all ceramic system, all polymeric system, Co-Cr alloy and gold as the materials for this bridge. It was perform another set of numerical investigations for the situation of different temperature (-10 °C and 50 °C).



Fig. 1: Fixed partial bridge used for modelling.

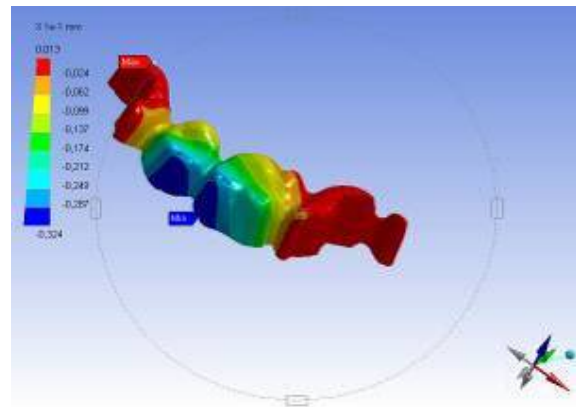


Fig. 2: Effect of stress in the fixed partial bridge after the colossal loading.

DISCUSSION & CONCLUSIONS: The conclusion of this study is that the tension numerically determined on the fixed partial bridge model are bigger in the -10 °C case, for all the materials used in this numerical simulation. The maximum deformation was found in the gold fixed partial bridge, and the minimum deformation corresponded to the Co-Cr fixed partial bridge. There were problems about all ceramic system and all polymeric system because the temperature. The decrease of the temperature leads in these cases to a fracture probability, especially in the cervical zone of the fixed partial bridge (Fig. 2).

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