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Fracture resistance of two all ceramic posterior fixed partial dentures designs: A finite element analysis

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Objective: The aim of this study was to numerically compare the fracture resistance of two all-ceramic posterior cantilever fixed partial dentures and fixed-fixed partial dentures. These fixed partial dentures made from two types of ceramics, non-veneered translucent zirconia and veneered zirconia using a pressed veneer.

Materials and methods: Two 3D finite element models were constructed. The models had missing maxillary first bicuspid and prepared abutments. In the first model prepared abutments were represented by maxillary second bicuspid and first molar. Whereas in the second model, prepared abutments were represented by maxillary cuspid and second bicuspid. Each model was restored by two different materials; press-veneered zirconia and translucent zirconia. Each model-material combination was subjected to compressive vertical load of 100N applied at the central fossa of the pontic.

Results: Four runs on the constructed models were carried out as linear static. Stress field generated under applied load was compared. Location of both maximum Von Mises stress and maximum total deformation was found on the abutment finish line towards the missing tooth for the cantilever design, while for the fixed-fixed design, the location of maximum Von Mises stress and maximum total deformation was on the point of load application.

Conclusion: Both materials are good options for restoring missing maxillary premolars using fixed-fixed design, whereas for the cantilever design, the translucent zirconia is the

Biography

Shereen K. Salem is working as Lecturer of Fixed Prosthodontics, Faculty of Dentistry in October 6 University, Egypt (Since 2011). Received her Doctor degree in Fixed Prosthodontics, Minia University, Egypt, 2011. Received Master degree in Fixed Prosthodontics, Cairo University, Egypt, 2007. Received Bachelor degree in Oral & Dental Surgery from Cairo University, Egypt, 1999.

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