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Finite element study of fracture strength of two different resin bonded bridge designs

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Resin-bonded fixed dental prostheses had variable popularity, since the technique for splinting mandibular anterior teeth with a perforated metal casting was described by Rochette. His work was then suggested as an alternative to conventional metal-ceramic fixed FDPs and its substantial removal of tooth structure needed to create strong, anatomically contoured and esthetic restorations. During and since that period, design parameters have been enumerated and tested clinically, such designs, combined with new technologies for adhesive bonding of resin to most alloys, which have led to a simpler, more reliable prosthetic procedure that complements the dentist's prosthodontic armamentarium. The most accepted design for resin bonded bridge is covering the maximum area of palatal or lingual surface of the abutment which give moderate fracture strength in low stress area like lateral incisor, in this research we tried to compare that conventional design for restoring upper lateral incisor with other more conservative one (by reducing the retainer size) that was proposed to enhance esthetic and fracture strength. Finite element analysis (using solid work software) was used to compare fracture strength of three different restorative material used (PFM, allceramic & zirconium) simulation of occlusal load on the pontic portion of the restoration (computer then was fed by all the individual properties to predict the behaviour of the actual object). This study proved that the fracture strength of the proposed conservative design may exceed that of the conventional design.

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