Int J Prosthodont. 2011 Sep-Oct;24(5):465-8.

Influence of resilient support of abutment teeth on fracture resistance of all-ceramic fixed partial dentures: an in vitro study.

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Source

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Abstract

PURPOSE:

The influence of resilient support of abutment teeth on the fracture resistance of all-ceramic three-unit fixed partial dentures (FPDs) was tested in this study.

MATERIALS AND METHODS:

Three groups (n = 8) of glass-infiltrated, alumina-based, all-ceramic FPDs that were adhesively bonded to human molar teeth were investigated. In control group A, teeth that were rigidly inserted in polymethyl methacrylate (PMMA) resin were used for thermocycling and mechanical loading (TCML), as well as for fracture testing. In group B, TCML was conducted on teeth that had their roots covered with a polyether layer. After TCML, the polyether layer was removed entirely, and the teeth were rigidly fixed in PMMA for fracture testing. In group C, teeth roots remained covered with a polyether layer during TCML as well as during fracture testing. Using a resilient attachment, tooth mobility was determined in axial, buccal, and oral directions.

RESULTS:

Mean tooth mobility was 76 ± 4 Mm in the axial direction, 278 ± 41 Mm in the buccal direction, and 128 ± 17 Mm in the oral direction. Group C showed the lowest mean fracture strength (polyether during both TCML and fracture testing) of 523 N. For group B (polyether during TCML but not during fracture testing), a fracture strength of 676 N was found, and for control group A (rigidly embedded teeth), it was 919 N.

CONCLUSION:

These results confirmed the influence of resilient attachments on the aging process and fracture strength testing of FPDs. Fracture resistance was significantly reduced when this particular interface was used in both TCML and fracture testing.