

Fracture strength of artificially aged 3-unit adhesive fixed partial dentures made of fiber-reinforced composites and ceramics: an in vitro study.

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OBJECTIVE: The aim of this in vitro study was to examine the fracture strength of metal-free 3-unit adhesive fixed partial dentures (AFPDs) bonded to mandibular incisors.

METHOD AND MATERIALS: Extracted human incisors were positioned in pairs in polymethyl methacrylate resin simulating a clinical anterior situation. Their lingual sides were prepared for adhesive retainers with surfaces and finishing lines in enamel. Eight 3-unit AFPDs were made on master casts per material system: Connect/belleGlass (Girrbach), StickNet (StickTech)/Sinfony (3M Espe), and Empress 2 (Ivoclar Vivadent). The dentures were bonded adhesively using the dual-curing system ED Primer/ Panavia F (Kuraray Europe) and aged by thermocycling (6,000 x 5 degrees C/55 degrees C H₂O; 2 minutes each cycle) and mechanical loading (1.2 x 10⁶ x 20 N with 1.66 Hz) in an artificial oral environment representing a wearing period of 5 years. The fracture strength was determined in a universal testing machine (UTM 1446, Zwick) at a speed of 1 mm/min, applying the load buccoincisally on the pontics. The different forms of failure were described optically. Medians (25th/75th percentiles) of the fracture results were calculated. Statistical analysis was performed using Mann-Whitney U and Kruskal-Wallis tests (P < or = .05). **RESULTS:** Five StickNet/Sinfony AFPDs and 7 Empress 2 restorations failed in the artificial oral environment. The remaining Empress 2 dentures showed the highest medians of fracture forces (339 [200/506] N) compared to Connect/belleGlass (257 [242/310] N) and StickNet/Sinfony (256 [204/347] N). Statistical comparisons showed no significant differences. **CONCLUSION:** Only Connect/belleGlass and Empress 2 showed sufficient resistance against mastication

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