

**In vitro examination of the fracture strength of 3 different fiber-reinforced composite and 1 all-ceramic posterior inlay fixed partial denture systems.**

**[Kolbeck C](#), [Rosentritt M](#), [Behr M](#), [Lang R](#), [Handel G](#).**

Department of Prosthodontics, University of Regensburg, Germany. carola.kolbeck@klinik.uni-regensburg.de

**PURPOSE:** This in vitro study was carried out to examine the fracture strength of metal-free posterior inlay fixed partial dentures (IFPDs). The 3-unit IFPDs were made of either a polyethylene fiber-reinforced composite, 3 glass fiber-reinforced composites, or an all-ceramic material. **MATERIALS AND METHODS:** Eight IFPDs were fabricated of each material in accordance with the manufacturer's instructions and luted to extracted human molars with a dual-cure adhesive system. The molars were positioned in PMMA resin 10 mm apart mesiodistally. Inlay cavity preparations with enamel finishing lines were used. After thermal cycling and mechanical loading in an artificial oral environment, the cemented IFPDs were mechanically loaded until failure. Visual and radiologic examinations were done out to discern the different forms of fracture. Median and 25%/75% percentile values were calculated. Statistical analysis was performed using the Mann-Whitney U test and the Kruskal-Wallis test ( $p < \text{or} = 0.05$ ). **RESULTS:** With a median (and 25%/75% percentile) fracture strength of 368 N (234 N/424 N), the FibreKor/Conquest Sculpture showed significantly lower values than the Connect/BelleGlass [898 N (736 N/1033 N)], Vectris/Targis [723 N (692 N/806 N)], Everstick/Sinfony [634 N (532 N/673 N)], and Empress2 [520 N (385 N/706 N)]. **CONCLUSIONS:** Assuming maximum chewing forces of  $>$  or  $= 500\text{N}$  in posterior areas, all systems showed sufficient fracture strength in most cases and warrant further investigation for potential clinical use. Copyright 2002 by The American College of Prosthodontists.

PMID: 12501138 [PubMed - indexed for MEDLINE]