Statement of problem. In lay-retained resin-bonded fixed partial dentures (RBFPDs) are conservative prosthetic restorations; however, their resistance to fracture is not clear.

Purpose. The purpose of this study was to compare fracture loads of posterior complete coverage metal-ceramic restorations with all-ceramic inlay-retained RBFPDs.

Material and methods. Thirty-two posterior ceramic RBFPD restorations were divided into 4 groups (n=8): (1) Complete metal-ceramic fixed partial dentures (MC-FPDs) fabricated of Ni-Cr-based alloy (Wirolloy) and veneered with a ceramic (IPS d.SIGN) as the control group; (2) inlay-retained metal-ceramic (MC RBFPDs) with the same materials as the control; (3) inlay-retained lithium disilicate (LD) glass-ceramic (IPS Empress 2) RBFPDs; and (4) inlay-retained zirconia-based (Z) ceramic (Cercon) RBFPDs. Control specimens were prepared to receive conventional complete MC-FPDs designed to include a 1.3-mm-circumferential, 90-degree flat shoulder with rounded angles. Inlay-retained RBFPD specimens were prepared with 2-mm occlusal reduction but without bevels at the occlusal or gingival margins. Specimens were loaded and fracture loads (N) measured at fracture with a universal testing machine at a crosshead speed of 1.0 mm/min and 250 kgf load cell. Data were analyzed with 1-way ANOVA and Duncan test (alpha=.001).

Results. Fracture loads (mean +/- SD) were greatest for control specimens (1318.43 +/- 211.00 N) and Z-RBFPD (1247.70 +/- 262.51 N) specimens as compared to MC-RBFPD or LD-RBFPD (P<.001). MC-RFPFD exhibited the next highest fracture loads (958.01 +/- 194.29 N), and LD-RBFPD exhibited the significantly lowest values (303.23 +/- 92.54 N) of the materials tested (P<.001).

Conclusion. Inlay-retained zirconia-based ceramic RBFPDs demonstrated the greatest fracture resistance among all inlay-retained restorations tested.

Keywords

**KeyWords Plus:** DENTAL CERAMICS; RESTORATIVE MATERIALS; CLINICAL REPORT; STRENGTH; DESIGN; TEETH; RELIABILITY; PROSTHESES