

Fracture Resistance and Bond Strength of Two Machinable Ceramic Materials Luted With Adhesive Cement

Sherine Hashem

Abstract

Objectives: To evaluate the influence of composition, as well as, surface conditions of two machinable all-ceramic materials on the fracture resistance of bonded inlays and ceramic-resin bond strength, with the investigation of the stress pattern involved during bonding testing.

Materials and methods: Fracture resistance test: 12 feldspathic inlays and 12 lithium disilicate inlays were fabricated using CEREC3 In Lab (Sirona MCXL, Bensheim, Germany). The inlays of each group were subdivided into 2 subgroups according to surface treatment and subjected to cyclic loading for 5000 cycle followed by static loading till failure. Microtensile bond strength test: 12 pairs of feldspathic specimens and 12 pairs of lithium disilicate glass ceramics were prepared. Each pair was cemented using an adhesive resin cement, then was cut down into 1mm² microbars. Each microbar was subjected to tensile load till failure. Then finite element analysis was carried out.

Results: Fracture resistance: Etched lithium disilicate unetched feldspathic inlays showed the lowest mean fracture resistance value *3773080:502:2+0"Uvcvkuvkecn"cpn{uku"ujqygf"cu"ukipkhkecpv"fkhhgtgpeg"kp"ogcp" fracture resistance values (N) between inlays of different materials, as well as between etched and unetched inlays. Microtensile bond strength: Etched lithium disilicate glass specimens showed the highest microtensile bond strength values (75.706 MPa), while unetched feldspathic specimens showed the lowest microtensile bond strength values (26.502 MPa). **Conclusion:** This study suggests that the difference in the composition of ceramic materials, as well as, their surface condition significantly affect their fracture resistance and ceramic-resin bond strength. In addition, bending should be considered during microtensile bond strength testing using the lateral mode of specimen attachment.

Egyptian Journal 2010, January