

Conclusions: The presented model can be used to measure lateral forces on the abutment teeth occurring during the fitting process of removable partial dentures. These forces directly correlate with the deflections of the abutment teeth needed to compensate deviations of the restoration from the CAD construction.

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Conversion of endodontic sealer modified with nanoparticles carrying antibacterial drugs



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Purpose/aim: The aim of this study was to evaluate the polymeric conversion of a commercial endodontic sealer modified with montmorillonite nanoparticles carrying to different antibacterial drugs: chlorhexidine (CHX) and metronidazole (MET).

Materials and methods: The sealer used was AH Plus sealer, and 5% in weight was added of the nanoparticles carrying one of the drugs CHX or MET. Cylindrical specimens were made with 5 mm diameter and 1 mm thick ($n=5$). The degree of conversion (DC) was determined using near FTIR. DC was evaluated using the absorption peak at 4529 cm^{-1} that decrease during polymerization, and the absorption peak at 4623 cm^{-1} which is unaltered as normalization. The measurements were obtained for each sample immediately, 4 h and 24 h after mixing the two pastes of the sealer. A group with no modification by the nanoparticle was added as a control. The data was analyzed using one-way ANOVA/Tukey ($\alpha = 5\%$).

Results: Results are presented in Table 1.

Table 1 – Means (SD) for degree of conversion (%) at 4 and 24 h. No statistical difference was presented among groups for neither periods of evaluation.

Drug	DC (%)	
	4 h	24 h
Control	35 (11) A	68 (8) A
CHX	31 (11) A	81 (11) A
MET	38 (6) A	77 (14) A

Conclusions: Within the limitations of this study it can be concluded that addition of the nanoparticle carrying both drug did not influence the polymerization of the sealer.

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Biaxial flexural strength of bilayered commercial porcelain/Ce-TZP/A disks



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Purpose/aim: Ceria-stabilized zirconia/alumina nanocomposite (Ce-TZP/A) is used as a framework that can be layered with veneering ceramics for dental fixed restorations. It shows a lower coefficient of thermal expansion (CTE) compared to conventional yttria-stabilized tetragonal zirconia polycrystals (Y-TZP). Commercial veneering ceramics are generally adjusted and set to have a lower CTE for Y-TZP. The present study was to clarify the influence of commercial veneering products by evaluating the biaxial flexural strengths of bilayered porcelain/Ce-TZP/A disks.

Materials and methods: Ninety Ce-TZP/A disk specimens (C-Pro Nano-Zirconia, Panasonic Healthcare) and three veneering products (VITA VM9, VITA Zahnfabrik; Cercon Ceram Kiss, Degudent; IPS e.max Ceram, Ivoclar Vivadent) were used as substrates and layering materials, respectively. After cleaning, the specimens (0.8 mm thickness) were veneered with the respective porcelain having different layering thicknesses (1.0, 1.5, 2.0 mm) and fired in a dental furnace (Austromat 654 press-i-dent, Dekema Dental-Keramiköfen). The biaxial flexural test was performed using a universal testing machine (Z010, Zwick) according to ISO6872 (piston-on-three-ball test). The loading of a piston was applied on the center of the top layer (Ce-TZP/A) in each specimen at a 1.0 mm/min crosshead speed and the fracture load was measured. The biaxial flexural strengths for multilayered disks were calculated using two analytical formulas. The strength values were analyzed by non-parametric tests ($p < 0.05$). The variability of strength values was analyzed by calculating the Weibull characteristic strength and Weibull modulus. After testing, the fractured specimen was observed by stereomicroscopy (M400, Wild Heerbrugg) and scanning electron microscopy (LEO 1430, Carl Zeiss).

Results: The top and bottom surfaces in the bilayered specimens showed the respective compressive and tensile stresses. These strength values from the stresses were not significantly different within commercial products; however, the values were significantly higher in the specimens with thinner porcelain layers ($p < 0.05$). The values at the interface in the bottom and top layers showed the tensile stress. The strength values at the interface are significantly higher in the thinner porcelain specimens ($p < 0.05$). Among the products, VM 9 showed significantly higher values at the interface in the top layer ($p < 0.05$). Porcelain delamination was not observed in the fractured specimen with 1 mm porcelain thickness while those with other thicknesses showed the delamination.

Conclusions: The different porcelain thickness and products influenced the stress distributions and the biaxial flexural strengths in bilayered porcelain/Ce-TZP/A disks.

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