

A laboratory evaluation of the physical and mechanical properties of selected root canal sealers.

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Abstract:

AIM: To evaluate and compare the porosity, degree of conversion (DC) and hardness of two resin-based sealers; RealSeal and EndoRez, and a silicon-based sealer; GuttaFlow to that of a traditional zinc oxide-based sealer; TubliSeal.

METHODOLOGY: For porosity, four samples from each sealer were prepared and scanned using a SkyScan 1072 Micro-CT. Porosity was then calculated using specialized software. For DC, 10 samples from each sealer were prepared and placed onto a Fourier transform infrared spectroscopy spectrometer. Spectra readings were carried out before and after curing of the sealers, and the DC for each sealer was calculated. For hardness, 10 samples from each sealer were prepared and then tested using a Wallace hardness tester. SPSS software was used for statistical analysis of the data using one-way anova and independent t-tests.

RESULTS: TubliSeal had the highest percentage porosity (3.52%), whilst RealSeal had the lowest percentage porosity (0.41%). Statistically significant differences ($P = 0.01$) in porosity were present between all groups except between RealSeal and EndoRez groups. RealSeal exhibited a significantly higher DC% than EndoRez ($P = 0.01$), whereas EndoRez had the highest hardness number [28.54 Vickers hardness number (VHN)] whilst TubliSeal showed the lowest (13.57 VHN). Statistically significant differences in hardness were found between all groups ($P = 0.01$) except between RealSeal and EndoRez groups.

CONCLUSIONS: Resin-based sealers had less porosity, greater hardness and a high DC