

Flexural strength assessment of two 3D printing resins for permanent restorations: an in vitro study

Objectives

The aim of the present study is to evaluate the flexural strength of two 3d printed dental resins which have indication for permanent restorations after receiving stress from a simulated oral condition.

Materials and methods

forty specimens of dimensions (25x22mm) were printed. Twenty samples were printed by using VarseoSmileCrown plus (V) and other twenty were printed by using Crowntec (C). All samples were left into distilled water at 37°C for thirty days in a temperature-controlled room. Then the three-point bending test was carried out using an universal test machine. The maximum loading, flexural strength at maximum loading and modulus (E-modulus) were recorded.

Results

maximum loading at fracture (mean DS N) of each group was 22,95391 3,26307 for VarseoSmile Crown plus, 18,11244 2,27390 for Crowntec. Flexural strength at max (mean DS MPa) of VarseoSmile Crown plus was 97,51101 15,19526, Crowntec 94,17018 11,76822. Modulus (mean DS MPa) was 3.716,80214 165.62493 for VarseoSmile Crown plus and 4.020,18442 348.51056. One-way ANOVA with Tamhane post hoc test showed that the difference of flexural strength of two test groups was not statistically significant ($P > .01$).

Conclusions

Mechanical Properties of two 3d printing resins are similar and the differences are not statistically significant. Comparing flexural strength of the resins, although Crowntec recorded lower flexural strength values, the modulus values are higher, meaning that the material is more plastic.

Keywords: flexural strength, 3d printing, resins, permanent restorations