

POSTER

“Translucency of monolithic hybrid tetragonal/cubic zirconia crowns vs lithium disilicate”

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Objective:

Monolithic Y-TZP crowns are claimed to have better mechanical properties than layered ones, however the lack of translucency still remains an issue in full-contour crowns. Recently a translucent hybrid tetragonal/cubic zirconia (Katana STML and UTML, Kuraray-Noritake) has been introduced to meet the demand for esthetic restorations. The aim of this study is to compare the translucency of CAD/CAM crowns made out of zirconia and lithium disilicate ceramic.

Material and methods

One first lower molar was scanned with Lava C.O.S, then prepared and used as a model to replicate 40 crowns made of cubic translucent zirconia (20 Katana STML and 20 UTML) using CAD/CAM technology. Following the same procedure, 20 lithium disilicate crowns (IPS e.max CAD LT A2) were milled as a control. Translucency was evaluated using the direct transmission method with a digital photoradiometer mounted in a dark chamber, according to the protocol described by Baldissara et al¹. An additional measure of translucency was obtained by calculating the contrast ratio (CR) and Delta E (ΔE), placing each crown over black and white replicas of tooth abutments by means of Try-In test cement (A2 shade). The analysis was performed with a spectrophotometer (Spectroshade). Three measurements were taken for each crown. For zirconia crowns data were collected before and after mechanical polishing. The null hypothesis tested was that there was no differences in translucency between cubic zirconia and lithium disilicate crowns. Kruskal-Wallis test followed by multiple Mann-Whitney tests were performed with the Bonferroni correction ($\alpha = 0,05$).

Results

UTML zirconia crowns showed higher values of translucency (74.95 ± 0.53) $\times 10^3$ lx, compared to STML and lithium disilicate (35.20 ± 0.93) $\times 10^3$ lx in dark chamber ($p < 0,01$). The analysis performed with the spectrophotometer also showed a lower value of CR (0.895 ± 0.018) and higher ΔE (13.876 ± 1.935) for Katana UTML, followed by STML, compared to lithium disilicate (CR= 0.934 ± 0.017 and $\Delta E = 7.585 \pm 0.946$), with $p < 0,01$.

Conclusions

Cubic zirconia ML monolithic crowns (Katana UTML and STML) appeared significantly more translucent than monolithic lithium disilicate ones tested in the present work.. The new hybrid tetragonal/cubic zirconia could represent an advantageous alternative to lithium disilicate, considering also their claimed superior mechanical properties.