

Impact of length variation and manufacturing orientation of hollow alumina cylinders manufactured by stereolithography

Objective: ceramic dental prosthesis manufactured by stereolithography (SLA) are less adapted to the tooth preparation than those manufactured by subtractive technique. The objective of this study was to evaluate the influence of the variation of the length and the shaping orientation of a hollow cylinder on the deformations due to the manufacturing process of SLA.

Materials and Methods: four cylinders of 3 different lengths were manufactured by SLA. The smaller cylinder was manufactured in 2 orientations. The samples were scanned by microtomography before and after heat treatment and the root mean square (RMS) was calculated using the control software.

Results: the RMS in the lower surface increased compared to the upper surface. The RMS in the lower surface of the horizontally shaped small cylinders was lower than those vertically shaped. For the upper surface, the RMS of the small cylinders has decreased compared to the medium and large ones. These results could be explained by the proximity of the walls of the cylinder in the intrados as well as the deformations following the removal of the pillars in the extrados.

Conclusions: the variation in length and the shaping orientation influenced the deformations of the simplified models of dental prostheses.