

## DIMENSIONAL ACCURACY OF DENTAL MODELS PRODUCED BY SLA 3D PRINTING TECHNOLOGY

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### Abstract

*Dental models are used as working models for planning and making dental crowns and bridges. Conventional methods are based on taking impressions of patient's upper and lower dental arches and require a labour-intensive manual process to create dental models. Manufacturing dental models digitally from 3D scans and subsequent 3D printing simplifies the workflow, speeds the process and lowers the costs. Except significantly reduced manufacturing time compared to conventional methods, increase in dimensional accuracy is also noticeable. Any deviation from real dimensions, especially of the remaining dental tissues, results in non-fitting of crowns and bridges, or failure in insertion. Nowadays, Stereolithography (SLA) 3D printing technology is commercially available and represents an alternative technology for dental model manufacturing in terms of production cost and speed.*

*Most SLA printers have small platform surface, and if there is a demand to print many models at once there is a request for printing them on a steeper angle. That requires more layers of print, which may influence the dimensional accuracy of a model. The objective of this paper was to assess the influence of selected orientations of dental models during printing, i.e. number of layers necessary to print a part. Dimensional accuracy was compared of dental models with 0 deg., 45 deg., and 90 deg. printing angle, according to the platform. Printed dental models, of different printing orientations, were scanned using Geomagic Capture® industrial-grade 3D scanner and attained models compared to .stl files, on the basis of which the printing was performed.*

### Keywords

Dental model, Dimensional accuracy, 3D printing, Stereolithography (SLA), 3D scanner

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