ABSTRACT

Accuracy of 3D printed Models vs Traditional Stone Models

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3D models are an essential device used in various fields of dentistry. Dental models are used for the fabrication of crowns, dentures, orthodontic treatments, and surgical equipment. Traditionally, 3D models are created from gypsum stone. However, 3D printed resin may provide a higher degree of precision and ease of sharing between professionals. Multiple studies have confirmed the accuracy of the Trios 3Shape 3D scanner, but few studies provide information on the reliability of 3D printers. The purpose of this study is to determine the dimensional accuracy of 3D printed models for future application in dental and orthodontic treatments. Four anonymous participants received an alginate impression and 3D dental scans on the upper and lower dental arches for a resulting sample size of n=4. Prints were made from a Form Labs Form 2 3D printer and an Anycubic Photon 3D printer. These prints, as well as the gypsum model resulting from the alginate impression, were designated specific dental markers in which measurements were taken. Graphs of width and height were constructed after data analysis on Excel. There were no statistically different measurements between models of the same patient. Expected statistical differences were seen between patients, due to being different samples, which helped to validate the width and height measurements as statistically sound. This indicates that the measurements taken from stone models are as accurate as the 3D printed models. 3D printed models would be beneficial for cost reduction for orthodontic treatment and provide immediate surgical guides or dental study models.

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