

Accuracy of implant casts generated with conventional and digital impressions – An in vitro study

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Introduction: Studies demonstrated that the accuracy of intra-oral scanners can be compared with conventional impressions for most indications. However, little is known about their applicability to take impressions of multiple implants.

Objectives: compare the accuracy between digital and different conventional impression techniques in implants.

Materials and methods: A stone cast of an edentulous mandible with 4 implants was fabricated to serve as master cast (control), two master models were made: one with parallel implants (Model 1) and another with uneven implants (Model 2).

Master casts and conventional impression casts were digitized with an extraoral high-resolution scanner.

Standard tessellation language (STL) data sets from the seven groups of digital and conventional impressions were superimposed with the STL data set from the master cast to assess the 3D (global) deviations. To compare the master cast with digital and conventional impressions.



Results: Statistical analysis was performed using the IBM® SPSS® Statistics Vs. 24, NY, USA.

The normality of the distributions was analysed with an Kolmogorov-Smirnov test. The median comparison was performed using The differences between the median were analyzed using non-parametric Kruskal-Wallis and Mann-Whitney tests with a significance level of $p < 0.05$.

Model 1: The value for the sum in group D was 1,068,292, which was significantly lower than those of group A, B and C, which were shown to be 2,114,342, 2,165,491 and 1,265,918 respectively.

Model 2: The group F simultaneously presented the lowest sum of the total of the square of the 3 deviations, indicating a significantly higher precision for this group in model 2 – 1,257,835 and 1,660,975 and 1,489,328 for groups E and G respectively.

Conclusions: The methods tested here for the digital impression of full arch models are able to achieve the accuracy of conventional impressions in the in vitro model. However, further in vivo studies are needed to confirm the in vitro results.

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