

Summary result

Study title:

Accuracy of Different CAD Software Programs and Design Methodologies in Generating Implant-Supported Restorations

Baseline characteristics:

The study was based on 20 single posterior implant-supported restoration cases. For each case, a clinically acceptable screw-retained implant-supported restoration was created and scanned to generate a reference STL file. These reference STL files served as the control designs for the digital comparison.

Participant/design flow:

Twenty reference restoration STL files were included in the analysis. For each reference STL file, CAD design proposals were generated using two CAD software programs: exocad and Dental System 3Shape. The designs were generated using two design methodologies: the library method and the correlation method. Therefore, each reference case contributed paired CAD design files for comparison between the two software programs within each design methodology. All 20 reference cases were included in the final analysis.

Adverse events:

Not applicable. The reported outcomes were based on digital CAD design comparisons and STL file analysis. No adverse events related to the digital design comparison were reported.

Outcome measures:

The main outcome measure was morphological accuracy, assessed using the root mean square deviation between each CAD-generated STL file and the clinically acceptable reference STL file.

For the library method, exocad showed significantly higher mean deviation than Dental System 3Shape: 0.13 ± 0.05 mm versus 0.06 ± 0.05 mm, respectively. The mean difference was 0.07 mm, and the difference was statistically significant with $P < 0.001$.

For the correlation method, exocad also showed significantly higher mean deviation than Dental System 3Shape: 0.39 ± 0.15 mm versus 0.23 ± 0.10 mm, respectively. The mean difference was 0.16 mm, and the difference was statistically significant with $P < 0.001$.

Conclusion:

Dental System 3Shape generated CAD design proposals that were more comparable to the clinically acceptable reference STL designs than exocad, using both the library and correlation design methods.