

3-D Digitally printed or Poly (methyl methacrylate) (PMMA) milled Provisional Crowns; A Comparison of Marginal Integrity and Proximal Contacts.

Cody Atack, Michele White, DDS, Aaron Glick, DDS, Michelle Thompson, DDS, Gary Frey, DDS, University of Texas Health Science Center at Houston, School of Dentistry, Houston, Texas, USA.

Objectives: Our objective aims to compare additive and subtractive manufacturing methods of digital provisional crown fabrication and their effect on marginal integrity and proximal contacts. We hypothesize that the marginal and proximal fit will be the same whether the provisional restoration is milled or 3-D printed.

Methods: Methods consists of scanning and designing provisional crowns for 20, crown-prepared, prefabricated typodont teeth using Planmeca PlanCAD® Easy software, and generation of provisional crowns via three-dimensional (3 – D) Digital printing and polymethyl methacrylate (PMMA) milling. Deficiencies in marginal integrity will be measured and recorded as open, short, or overextended margins, (mm). Deficiencies in proximal contact will be measured and recorded as no, light, or heavy contact as measured with Shim-stock.

Results: We calculated two variables that had clear statistical significance. First was Mesial (short/long). We calculated a p value far below the threshold for significance (2.54E-06) and the R-squared value was 0.315. The second measurement we calculated with statistical significance was Distal (short/long). We again calculated a P value far below threshold for significance at 4.53E-06 and the R-squared value was 0.304. We interpret these statistics to mean that over 30% of the difference we measured between milled and printed crowns in the Mesial (short/long) and Distal(short/long) areas can be attributed to the fact that they were made by different processes (milling and printing).

Conclusions: Our results support and suggest that both manufacturing methods, 3 – D Digital printing and PMMA milling of provisional crowns are acceptable for fabricating provisional crowns at UTSD, and that clinicians should personally and manually adjust the proximal contact areas when designing provisional digital crowns.

This study was supported by the UTSD Student Research Program.