

## Comparative Study of Prefabricated vs. Digitally Generated Zirconia Crowns for Primary Incisors

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**Objective:** The prevalence of peri-implant diseases has increased in recent years. The purpose of this project was to evaluate the prevalence and risk factors of peri-implantitis in patients seen at UTHealth School of Dentistry at Houston.

**Experimental Methods:** Patients with implants placed before 2021 at the school were screened and implant diagnosis was collected. Peri-implant disease risk factors, including demographic data (gender, race, or age), systemic factors (diabetes, hypertension, osteoporosis, sinusitis, smoking, alcohol, or recreational drug use), and local factors (implant location, history of periodontitis, and bone graft history) were recorded for correlation evaluation. All variables were analyzed via univariate/multivariate logistic regression analysis. Regression coefficients and odds ratios were calculated for independent risk factors, and with Shapley Additive exPlanations (SHAP) to determine association between factors. A 5% significance level was used for all tests.

**Results:** Of 2,864 patients received dental implants at the school, 125 had recorded implant diagnosis. Additional 205 patients were randomly sampled, and peri-implantitis for these patients was defined as radiographic bone loss over 3mm. 930 total implants were included in the study. 77.3% of patients and 76.5% of implants, respectively, were diagnosed with peri-implantitis. Race, hypertension, alcohol usage, and history of bone graft were positively correlated with peri-implantitis per site (all  $p < 0.05$ ). SHAP value analysis determined that gender, history of periodontitis, alcohol and recreational drug use acted as independent risk factors (all  $p < 0.05$ ) and all showed significant associations with peri-implantitis.

**Conclusion:** Previously known peri-implantitis risk factors were confirmed, and additional factors were identified after using SHAP analysis. Control of these factors before implant placement could reduce the risk of disease development.

This study was supported by the UTSD Student Research Program.