Abutment Material Effect on Peri-Implant Soft Tissue Color and Perceived Esthetics

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Objectives: The purpose of the study is to evaluate the effect of implant abutment material on peri-implant gingival color using spectrophotometric analysis and to compare the outcomes with patient and clinician perception and satisfaction.

Methods: Thirty patients and four prosthodontic faculty participated. Abutments consisted of zirconia, gold-hued titanium, and titanium. Peri-implant gingival color results of a single anterior implant restoration were compared to a patient’s control tooth. Spectrophotometric analysis was conducted using SpectroshadeTM Micro to measure the color difference ($\Delta E$, $\Delta L^*$, $\Delta a^*$, $\Delta b^*$) between the midfacial peri-implant gingiva and the marginal gingiva of the control tooth for each abutment material. Patient and clinician satisfaction survey was conducted using hand-held color-correcting light source (Rite-liteTM 2).

Results: Zirconia abutments displayed significantly smaller gingival color difference ($\Delta E$) compared to titanium and gold-hued titanium abutments (respectively, $3.98 \pm 0.99; 7.22 \pm 3.31$; $5.65 \pm 2.11; p<0.05$). Among $\Delta L^*$, $\Delta a^*$ and $\Delta b^*$, only $\Delta a^*$ showed significant difference between groups. There was no significant correlation between gingival tissue thickness (measured from patient’s cast) and $\Delta E$, but thick biotype (determined by probe test) demonstrated a smaller $\Delta E$ than thin biotype ($4.82 \pm 1.49; 6.41 \pm 3.27; p=0.097$). There was no statistical difference in patients’ or clinicians’ satisfaction among abutment materials. Patients’ satisfaction was significantly higher than clinicians’ and perceived differences were lower than clinicians’ ($P<0.01$). Clinicians’ satisfaction was higher for gingival (pink) esthetics than crown (white) esthetics ($P<0.05$).

Conclusion: This study attempted to relate spectrophotometrically measured gingival color to patient and clinician perceived esthetic acceptability. Within the limitation of the present study, zirconia abutment had significantly lower color difference than titanium or gold-hued titanium abutments. However, no statistical difference in patients’ or clinicians’ satisfaction among abutment materials was demonstrated, and patients’ satisfaction was significantly higher than clinicians’.