EFFECT OF INCORPORATION OF NANO-OXIDES ON COLOR STABILITY OF MAXILLOFACIAL SILICONE ELASTOMER SUBJECTED TO OUTDOOR WEATHERING -AN INVITRO STUDY

by

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ABSTRACT

BACKGROUND AND OBJECTIVES: Maxillofacial prostheses are used to rehabilitate patient with extra-oral defects. These prostheses are fabricated using silicone elastomers and it requires frequent replacement because the silicone elastomer and its color additives undergo color change with time. Therefore this study was conducted to evaluate the effect of incorporation of 2 different compositions of nano-oxides on color stability of intrinsically colored maxillofacial silicone elastomer subjected to outdoor weathering.

METHOD: 30 Cosmesil M511 silicone elastomer specimens were fabricated pertaining to particular group. Control Group was incorporated with intrinsic coloring agents (umber, brown & yellow), Group A was incorporated with intrinsic coloring agents and Titanium Oxide (TiO_2), rutile, nanopowder <100 nm and Group B was incorporated with intrinsic coloring agents and Zinc Oxide (ZnO), 6% Al doped, nanopowder, <50nm. Color measurements were made in 3 selected areas for all the specimens using spectrophotometer. For outdoor weathering, specimens were mounted on a treated plywood rack and the assembly was placed on the roof of dental school at SDM College of Dental Sciences and Hospital, Dharwad, Karnataka, India for 4 months. Spectrophotometer (Great Macbeth AG) was used to determine the CIELAB (L*a*b*) parameter before and after weathering of each specimen and the values were entered on a spreadsheet. The color change (ΔE) values were analysed by one way ANOVA, Tukey's post hoc test and paired t test.

RESULTS: The color change (ΔE) for groups were Control Group> Group A > Group B in decreasing order. The Control group showed maximum color change and Group B showed least color change among the groups.

INTERPRETATION AND CONCLUSION: The present findings suggest that incorporation of nano-oxides improved the color stability of Cosmesil M511 silicone elastomer and it also it acted as an opacifier. Zinc Oxide (ZnO), 6% Al doped nanopowder, <50nm incorporated Cosmesil M511 specimens showed minimal or no color change and proved to be most color stable after subjecting to outdoor weathering.

KEYWORDS: maxillofacial prostheses, maxillofacial silicone elastomer, color stability, nano-oxides, outdoor weathering.