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College of Dentistry**



**Studying some mechanical properties of
maxillofacial silicone material before and after
incorporation of intrinsic pigments and artificial
aging**

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of Baghdad in partial fulfillment of the requirements for the degree of
Master of Science in Prosthetic Dentistry

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Abstract

Silicone elastomer become the material of choice in construction of maxillofacial prosthesis because of its ease of manipulation, ease of coloration, durability, inertness and strength, but in spite of these advantageous properties mentioned earlier, the clinician must keep in mind that the properties of maxillofacial silicone elastomer may change after addition of pigments or after 4-14 months of service used.

The aim of this study is to define the optimum concentration for a mixture 2 types of intrinsic pigments that can be added to VST-50 maxillofacial silicone material and studying the effects of mixturing two types of intrinsic pigments on some mechanical properties of VST-50 maxillofacial silicone material before and after (75 hrs and 150 hrs) of artificial aging.

According to the pilot study, 0.1% by weight of rayon flocking and 0.2% by weight of burnt sienna intrinsic pigment concentration were selected because of improvement in tested mechanical properties (tear strength and hardness). Two hundred and forty samples were prepared and divided into four equal test groups. According to the conducted tests (tear strength, hardness, surface roughness, tensile strength and elongation percentage tests), 60 samples were made for each group in order to measure the mechanical properties before and after artificial aging. Each test group includes 6 subgroups with 10 samples made for each one of these sub groups. After that the samples are tested before and after artificial aging (75 hrs, 150hrs). The results of study are collected and statistically analyzed using one-way ANOVA and post-hoc LSD test .The samples were analyzed by Fourier transform infrared spectroscopy (FTIR) and X- Ray Differential test (XRD).



So the results shown for pigmented samples before artificial aging that some mechanical properties (Tear strength, tensile strength and hardness) had improved. After artificial aging (75 and 150) hours, both periods resulted in non-significant decrease in tear strength and high significant decrease in percentage of elongation and tensile strength, while for hardness and surface roughness had highly significantly increased after 75 hrs and 150 hrs of artificial aging.

The addition of intrinsic pigments had improved some mechanical properties of maxillofacial silicone (tear strength, tensile strength and hardness). After subjecting the maxillofacial silicone to artificial aging, all of the tested properties had adversely affected.

