SDM
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AN IN-VITRO STUDY TO EVALUATE THE EFFECT OF SIMULATED SKIN SECRETIONS ON THE COLOUR STABILITY AND WEIGHT CHANGES OF MAXILLOFACIAL SILICONE, IN CONJUNCTION WITH OUTDOOR WEATHERING

By

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ABSTRACT

BACKGROUND AND OBJECTIVES: Maxillofacial prostheses are used to rehabilitate patients with extra-oral defects and silicone elastomer is a material commonly employed for this purpose. However, the tendency of maxillofacial silicone materials to gradually discolour in service, over time is one of the main drawbacks of maxillofacial silicone material. The colour deterioration of prostheses results from several factors including natural climatic conditions, service time and human body secretions.

Hence, the purpose of this study is to evaluate the influence of simulated skin secretions namely sweat and sebum, in conjunction with natural outdoor weathering on the weight and colour stability of a maxillofacial silicone, over time.

METHOD: 44 specimens were fabricated using silicone elastomers pertaining to particular groups. They were divided into 4 groups.

Specimens belonging to Group A were immersed in simulated acidic perspiration solution and subjected to natural outdoor weathering exposure.

Specimens belonging to Group B were immersed in simulated alkaline perspiration solution and subjected to natural outdoor weathering exposure.

Specimens belonging to Group C were immersed in simulated sebum solution and subjected to natural outdoor weathering exposure.

Specimens belonging to control Group D were subjected solely to natural outdoor weathering exposure.

A spectrophotometer (i1 X-rite Macbeth) was used to determine the CIELAB (L*a*b*) parameter using the MeasureTool 5.0 software, before weathering of each specimen.

The weights of each specimen was measured before and after natural outdoor weathering using a digital pocket scale (Professional Digital Pocket Scale, MH-Series, China) in the grams weighing mode.

For outdoor weathering, specimens of control Group D were suspended on a treated plywood rack by stainless steel ligature wire, and all the specimens were placed on the roof of dental school at SDM College of Dental Sciences and Hospital, Dharwad (SDMCDSH), Karnataka, India for 4 months.

The colour change (ΔE) and weight change (ΔW) values were tabulated and subjected to statistical analysis i.e. one way ANOVA, Tukey's post hoc procedure and paired t test.

RESULTS: The colour change (ΔE) values for all the groups after outdoor weathering were found to be in the increasing magnitudes as Silicone elastomer incorporated with intrinsic colouring agents (GD) < Silicone elastomer incorporated with intrinsic colouring agents and stored in alkaline perspiration (GB) < silicone elastomer incorporated with intrinsic colouring agent and stored in acidic perspiration

(GA) < silicone elastomer incorporated with intrinsic colouring agent and stored in sebum (GC).

The weight of specimens belonging to the control group remained the same. Specimens immersed in acidic and alkaline perspiration showed an increase in weight whereas specimens immersed in sebum showed a loss of weight.

INTERPRETATION AND CONCLUSION: The present findings suggest that sebum has the highest effect on the colour properties of silicone, followed by acidic and then alkaline perspiration; and that the colour change in specimens immersed in all three solutions is more than the colour change of specimens of the control group subjected solely to natural outdoor weathering.

Specimens immersed in acidic and alkaline perspiration showed an increase in weight due to absorption of water whereas specimens immersed in sebum showed a loss of weight due to a probable extraction of compounds by the sebum.

KEYWORDS: Maxillofacial prostheses; maxillofacial silicone elastomer; colour stability; outdoor weathering; simulated skin secretions; sebum.