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Comparative evaluation of effect of artificial skin secretions on peel bond strength of two silicon based maxillofacial prosthetic adhesives: An In - Vivo Study

[1]Dr. Brijesh Patel, [2]Dr. Vishal Chauhan, [3]Dr. Vilas Patel, [4]Dr. Sareen Duseja, [5]Dr. Harekrishna Jayendra Raval, [6]Dr. Kavan Patel

[1.]MDS, Consultant Prosthodontics, Surat

[2.]MDS, Associate Professor, Dept. of Prosthodontics and Crown & Bridge, Government Dental College & Hospital, Ahmadabad, Gujarat

[3.]MDS, Additional Dean, HOD, Dept. of Prosthodontics and Crown & Bridge, Narsinhbhai Patel Dental College & Hospital, Sankalchand Patel University, Visnagar, Gujarat

[4.]MDS, Professor, Dept. of Prosthodontics and Crown & Bridge, Narsinhbhai Patel Dental College & Hospital, Sankalchand Patel University, Visnagar, Gujarat

[5.]MDS, Sr. Lecturer, Dept. of Prosthodontics and Crown & Bridge, Narsinhbhai Patel Dental College & Hospital, Sankalchand Patel University, Visnagar, Gujarat

[6.]MDS, Reader, Dept. of Prosthodontics and Crown & Bridge, Narsinhbhai Patel Dental College & Hospital, Sankalchand Patel University, Visnagar, Gujarat

Corresponding Author:

Dr. Vilas Patel, Additional Dean, HOD (Dept. of Prosthodontics and Crown & Bridge), Narsinhbhai Patel Dental College & Hospital, Sankalchand Patel University, Visnagar, Gujarat

Running Head: Peel bond strength of silicon based maxillofacial adhesives

Email Id: servieheb@gmail.com

ABSTRACT

Purpose: To evaluate the peel bond strength of two maxillofacial silicone adhesive in the presence of three artificial skin secretions. Effect time duration of exposure to artificial skin secretions on the peel bond strength of two maxillofacial silicone adhesives was also evaluated.

Materials and Method: A total of 120 test specimen stripes of maxillofacial elastomer will be fabricated in to 60×20×3 mm 6 sided gypsum moulds using silicone elastomer (A-2186, Factor II). They were randomly divided into two groups. Group 1: B-400, Secure Medical Adhesive (Factor II) and Group 2: B-520 Adhere Medical Adhesive (Factor II). Further each group was subdivided in to 4 subgroups according to simulated skin secretions. Control (A), simulated acidic perspiration (B), simulated alkaline perspiration (C) and simulated sebum (D). 15 human subjects aged 20 to 40 years were selected. Four silicone specimens on each forearm adhered that were placed 5cm away from each other on using- secure medical adhesive on left hand and adhere medical adhesive on right hand. Peel bond strength of both adhesives was measured after spraying artificial skin secretion at the time interval of 10 minutes and 30 minutes by applying 90 degrees vertical force using universal testing machine.

Statistical test used: For statistics paired t-test, independent t-test and ANOVA were used.

Result: Peel bond strength of secure medical adhesive (B-400) was significantly more than adhere medical adhesive (B-520). Presence of simulated skin secretions affects the peel bond strength of both adhesives, out of which sebum had maximum influence on peel bond strength than perspiration groups. Only control group and acid perspiration subgroup of secure medical adhesive showed increase in the peel bond strength with time interval of 30 minutes ($p<0.05$).

Conclusion: Presence of skin secretion may lead to partial or complete loss of retention of silicone prosthesis. Sebum secretion had more influence on peel bond strength of adhesives than perspiration. Effect of time period on peel bond strength showed that with time interval of 30 minutes peel bond strength of secure medical adhesive was improved even in the presence of simulated skin secretion.

Key Words: Maxillofacial Prosthesis, RTV Silicone Elastomer, Silicone Adhesives, Retention, Peel Bond Strength, Artificial Skin Secretions

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