Gingival Shade Composite Bonding to Denture Base Resins: A Review

Dr. Radha Goverdhan,[1] Dr. Neelam Pande,[2] Dr. Usha Radke,[3] Dr. Saee Deshmukh,[4] Dr. Tushar Mowade,[5] Dr. Rajlakshmi Banerjee,[6] Dr. Priti jaiswal,[7]

1 PG student
2 Professor & PG Guide
3 Professor & HOD
4 Reader
5 Reader
6 Reader
7 Senior Lecturer

Department of Prosthodontics, VSPM DCRC, Nagpur

Abstract: The purpose of the present study was to determine an effective surface preparation for the bonding of a gingival shade composite resin to a denture base resin. The flat surfaces of a heat-processed denture base resin were prepared in various ways. A highly filled gingival shade composite resin was applied and polymerized. Shear testing was performed in a universal testing machine, and the maximum fracture load values were determined. The application of chemically activated resin using the different technique was an effective surface preparation for the bonding of a gingival shade composite resin to a denture base resin.

Introduction: The aim of denture fabrication is not solely for the replacement of missing teeth but also for the restoration of function, aesthetics and phonetics which impact the overall quality of life. There is an increase in demand for aesthetics in patients, as they desire a denture that is more natural-looking, harmonized within dentition and soft tissues, unique and personal to them, meaning the rigid and monolithic appearance of fixed and removable partial dentures.

The characterization of denture base resin is of interest in the field of Prosthodontics. Pound created a characterized denture by sifting colored polymers into the denture base resin.(1) The construction method of a custom-shaded denture base using visible-light-cured resin has also been reported.(2)

A highly filled light-polymerized gingival shade composite resin has just been commercialised, with shades that are identical to those found in natural gingiva.

This material can serve as an effective substitute for brittle porcelain gingiva(3,4) and can be used for a combined fixed partial denture and removable partial denture. It has also been used in an alternative technique to fabricate a customized screw-retained infrastructure to replace lost soft tissue and bone.(5,6)

This gingival shade composite resin offers unlimited possibilities, for the characterization of acrylic denture bases.(7)

It is assumed that highly filled composite resin does not easily bond to a denture base resin. A prior study looked at the effect of surface preparation on the bonding of a densely filled gingival shade composite resin to a denture base resin.

Within the study's limitations, Shimizu et al(8) found that tribochemical silica coating and the application of dichloromethane after the silane coupling agent were effective surface preparations.

The purpose of the present study was to review the bond strength of a highly filled gingival shade composite resin to a denture base resin.

Materials and methods:

Search strategy: An electronic search of publications from 1997 to 2015 was established from three electronic databases: PubMed, The Journal of Prosthetic Dentistry and Web of Science. The search strategy used a combination of controlled vocabulary and free-text words. A combination of controlled vocabulary, free-text words and well-

defined inclusion and exclusion criteria guided the search.

Inclusion criteria: Only English-language publications published in peer-reviewed dental journals were included in the literature search. The reference lists of identified papers on Bonding of Gingival Shade Composites to a Denture Base Resin were reviewed to find additional studies.

The search design was as follows: Electronic search: "Bonding of Gingival Shade Composites to a Denture Base Resin "→Review of abstracts→Review of full texts→Individual selection of the final articles.

Exclusion criteria: Unpublished reports or abstracts or case reports as well as reports that did not cover Bonding of Gingival Shade Composites to a Denture Base Resin were not included.

Results: The search turned up three references in PubMed, four in Web of Science and three in Journal of Prosthetic Dentistry.[15] articles were chosen after careful consideration of the titles, abstracts and full text. Because certain research were found in two databases, the total number of publications was limited to ten. Three papers were located in both PubMed and Web of Science, while one article was found in all three databases.

Discussion: This study aimed to review the Bonding of a Gingival Shade Composites to a Denture Base Resin . The null hypothesis was rejected in this study, as there was a statistically significant difference in Bonding strength of a Gingival Shade Composite to a Denture Base Resin.

Conventional composites differ in composition, viscosities and filler particles, which would result in different bond strength values. It is important to emphasise that the tested characterising composites had different viscosities: they are more flowable, resulting in different mechanical properties of the material after ageing.

In addition, previous studies used the shear bond strength test which has been reported to be inadequate to evaluate the true bond strength between two different materials, with large discrepancies and inconsistencies in results.[9,10] However, making a direct comparison between the study results and previous studies is difficult.

Conclusion: Clinically adequate bond strength values have yet to be defined and are actively researched. Dentures are subjected to different types of forces in different directions in the oral cavity and the clinical effectiveness of bonding between characterisation composites would be more accurately measured in more relevant conditions similar to the complex natural environment. The main limitation of these research is the inability to fully mimic an oral environment by, for example, exposing the materials to multiple environments and multidirectional forces instead of one directed force, as done in these research.

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