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The influence of adhesive luting systems on bond strength and failure mode of an indirect micro ceramic resin-based composite veneer

Sarabi, N.[a] , Ghavamnasiri, M.[b] , Forooghbakhsh, A.[c]
[a] Department of Operative Dentistry, **Mashhad** School of Dentistry, **Mashhad University** of **Medical Sciences**, **Mashhad**, Iran
[b] Department of Operative Dentistry, School of Dentistry and Dental Research Center, **Mashhad University** of **Medical Sciences**, **Mashhad**, Iran
[c] School of Dentistry and Dental Research Center, **Mashhad University** of **Medical Sciences**, **Mashhad**, Iran

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Abstract

Aim: This study evaluated the bond strength and failure mode of enamel/resin-based composite veneers bonded with three different dual cured resin adhesive systems. Methods and Materials: Standard preparations for laminate veneer restorations were made on ٣٠ human central incisors using depth cutting burs (٠,٥ mm depth at the incisal area and ٠,٣ mm at the gingival area). Thirty indirect laminates were prepared using a highly filled polymeric material (GC Gradia) according to the manufacturer's instructions. After sandblasting the fitting surfaces, the specimens were randomly divided into three groups (ten per group) based on the type of resin cement luting systems; Excite/Variolink II, Single Bond/Rely X Veneer Cement, and Clearfil New Bond/Panavia F. The specimens were stored in water at ٣٧°C for ٤٨ hours. Fracture testing was performed using a universal testing machine where the load was applied from the incisal direction at ١٣٥ to the long axis of the tooth (٠,٥ mm/min). The one-way analysis of variance (ANOVA) and Chi-Square tests were used for statistical analysis at a significance level of p>٠,٠٥. Results: The ANOVA showed no significant difference was found among the groups (P>٠,٠٥). Indirect veneers showed mean enamel bond strength of ١١٤,٤ ± ٤٨N, ١٥٩.٧ ± ٨٣,٤ N, and ١٢٦,١ ± ٥١,٧ N with Variolink II, Rely X veneer cement, and Panavia F, respectively. The Chi-Square tests showed no significant difference regarding the failure mode frequencies in different types of failure in the three groups (p>٠,٠٥). The failure mode analysis showed mainly adhesive failure in the resin cement/laminate interface in all groups. Conclusion: There was no significant difference in bond strength of veneers with the three different resin cements tested. In addition, there was no significant difference in the frequency of the failure mode in each type of failure among the three test groups. The failure analysis revealed mainly an adhesive failure at the resin cement/veneer interface. Clinical Significance: The results of this study suggest the use of Excite/Variolink, Single Bond/RelyX, or Clearfil New Bond/Panavia F are all appropriate choices for luting of indirect micro ceramic resin-based composite veneers in terms of bond strength and failure mode.

Author keywords

Adhesive resin; Bond strength; Indirect resin composite veneer; Luting resin cement

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