

Effect on the Bond Strength between Composite Resin and Glass Ionomer Cement

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Glass ionomer cements are tooth-coloured materials that bond chemically to dental hard tissues and release fluoride for a relatively long period. Glass ionomer is the ideal radiopaque liner for use under all types of composites. It bonds to dentin, reduces microleakage enhances the bond strength of composite.

Key words: Bond strength, glass ionomer cement, composite resin

Glass ionomer cement and composite resin are the most popular restorative materials in operative dentistry today¹. Glass ionomer cement have certain characteristics that are attractive to the dentist. They bond adhesively to both enamel and dentin^{2,3}, release fluoride ions over a prolonged period of time⁴, are biocompatible and have approximately the same thermal expansion as enamel⁵. Glass ionomer is the ideal base cement and dentin substitute for use under all composite. It is dentin-shaded, radiopaque and acid-etchable⁶.

Hinoura et al⁷ showed that etching the surface of glass ionomer cement markedly increased the strength of the bond to the bonding agent, composite resin.

deMenezes et al⁸ also stated that the dual-polymerizing systems were much effective than the light-activated systems in bonding indirect composite restorations to dentin. The purpose of this study is to evaluate the effects of the viscosity and chemical factors of bonding agents on bond strength.

Materials and methods

The bond strength was determined by subjecting cyclinders of pairs of the materials to a tensile-type stress. Two glass ionomer cements, Fuji Ionomer II and GC Lining Cement were used. The Fuji Ionomer II was permitted to set for 5 minutes and GC Lining Cement for 3 minutes. The surface of each cement was etched with 37% phosphoric acid for 60 seconds, washed with tap water for 25 seconds, and air-dried. The seven formulations of bonding agents and composites were placed over the cement and light cured for 20 seconds. The finished specimens were allowed to set for one hour, at which time all assembled specimens were transferred to distilled water and stored at 35°C.

Results

Table shows the bond strength between Fuji Ionomer II and GC Lining Cement with the seven bonding agents. Bond agent group I was the strongest, followed by group VI. The remaining bonding agents were weaker. Statistically the difference was not significant ($P>0.05$).

Table: Bond strength between Fuji Ionomer II and GC lining cement with composite

Bonding agent (kg/cm ²)	Bong strength
I	75.3
II	31.3
III	34.4
IV	30.7
V	25.0
VI	72.2
VII	32.2

Discussion

It is interesting that the best bond strength is obtained from the lowest viscosity bonding agent. It appears that the consistency of the agent is the most important factor influencing bond strength between composite and glass ionomer cements. Conversely, the high viscosity bonding agent formed a thick film, fracture occurred between the glass ionomer cement and the composite. Because of the design of the experiment, it was not possible to determine the effect of chemical formulations of composite and glass ionomers.

References

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