

INTRODUCTION

The use of new self-etch adhesives and cements has reduced the number of steps and time needed to place indirect restorations. However for clinical success, long-term bond durability should not be compromised by the ease of use.

BelleGlass NG (BGNG) is an indirect composite system that incorporates advanced nano-particle and submicron filler technology. It has high polish and shine, along with superior strength and wear characteristics. It has "biomimetic" properties, similar to tooth structure, including less wear to opposing dentition than porcelain.

OptiBond All-In-One (AIO) is a single component, one bottle, self-etch, bonding agent that significantly simplifies the restorative procedure, providing more consistent results and less technique sensitivity. It also provides a low film thickness for indirect procedures.

NX3 cement has a unique initiator system that is compatible with acidic monomers, so it can be used with single bottle, self-etch bonding agents without needing a dual cure activator. It provides high bond strength and is also extremely color stable.

OBJECTIVE

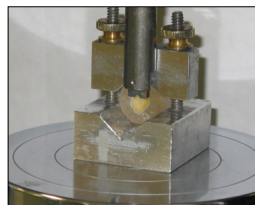
To evaluate the long-term shear bond strength (SBS) of a new resin cementation system, NX3 and AIO, with BGNG indirect composite.

MATERIALS

BelleGlass Opaque Dentin A3 Lot 439071
 Silane Primer Lot 449503
 OptiBond All-In-One Lot 450582
 NX3 Dual Cure Cement Lot 470TN35C/D

METHOD

The cementation system consisted of NX3, a dual-cure, auto-mix, color-stable resin cement, and AIO, a high-strength, one-bottle self-etch adhesive. The shear-bond test method has previously been described.¹ For the indirect bonding procedure, BGNG Opaque Dentin cylinders, 3.23 mm diameter, were cured in polyethylene tubing following manufacturer's instructions. The surface was sandblasted with 50 micron alumina at 30 psi, sonicated in deionized water, dried and silanated with Silane Primer. The prepared teeth (n=48) were wet sanded with 600 grit silicon carbide paper, rinsed with water and lightly air dried. AIO was applied to the dentin surface in two coats, thinned uniformly to avoid high spots and light cured for 10 seconds with an Optilux 501 Light (output > 600 mW/cm²). NX3 was dispensed onto the prepared cylinder surface, which was then seated gently onto the dentin surface. Excess cement was cleaned off carefully and the margin was light cured for 40 seconds in 90 degree sections. The samples were stored at 37°C in deionized water. A group (n=8) of random samples were thermocycled 2,500 cycles between 5°C and 55°C prior to shear bond testing at each time interval up to one year. The specimens were subjected to debonding on an Instron mechanical tester (Model 4467, Instron Corporation) in shear mode using a notched (semi-circular) edge at a crosshead speed of 1.0 mm/min. The mean SBS and standard deviations (sd) were calculated and statistical analysis was performed using one-way ANOVA (p < 0.05).



Shear Bond Test Set-Up

RESULTS

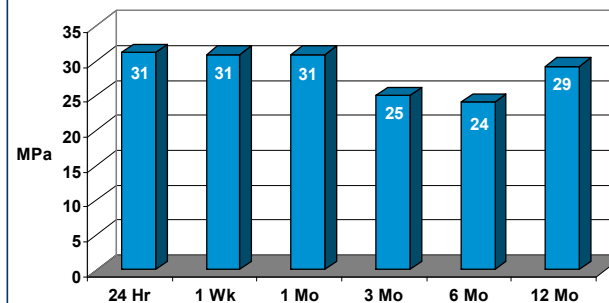
Dentin Shear Bond Strength

Mean SBS, MPa (sd)					
24 Hr	1 Wk	1 Mo	3 Mo	6 Mo	12 Mo
31.2 (4.8)	30.9 (6.1)	31.0 (4.2)	25.0 (6.2)	24.1 (7.8)	29.2 (5.7)

No significant differences between means (p > 0.05)

Dentin Shear Bond Strength

BelleGlass NG bonded with NX3 and OptiBond All-In-One



DISCUSSION

ANOVA analysis revealed there was no statistical difference (p > 0.05) in SBS between the groups at any time interval.

Bond strength remained high, even after the samples were stored in water and subjected to thermocycling.

Aging in 37°C water for 12 months does not negatively affect the bond strength of BGNG cemented with NX3 and AIO to dentin substrate, indicating that the bond is durable.

With NX3, no dual-cure activator is necessary for the bonding agent. By combining NX3 resin cement (containing an acid-tolerant redox initiator system) with AIO self-etch, one bottle adhesive, there are fewer components and fewer steps. This new system provides a simplified cementation process with good bond strength.

CONCLUSION

After one-year, the bond strength of BelleGlass NG with the new resin cementation system remained stable. Aging of bonded specimens for 12 months does not negatively affect the shear bond strength to dentin.

REFERENCES

1. D. Ng et al: "Bond Strength of OptiBond Solo Plus with a New Activator and Core Material". AADR Abst #1272 March 2001.