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Effectiveness of primer application followed by non-thermal plasma treatment on the bond strength of a resin cement to zirconia.

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Abstract

The aim of this study was to evaluate the bond strength (BS) of a resin cement to two zirconia ceramics, after the application of priming agents followed by non-thermal plasma (NTP) treatment. Sixty Lava zirconia and 60 Katana zirconia plates were cut accordingly to the study required dimensions and divided randomly among groups. For every specimen, two resin cylinders were made using a 1,4mm diameter x 1mm height matrix. At 24 hours, one cylinder was tested for shear strength. Data were analyzed by 2-way ANOVA and Tukey's test (5%).

Key words: Zirconia, Argon Plasma, Bond Strength.

Introduction

Among new available treatments for zirconia cementation, NTP modification shows promising results. The success of this technology relies on its non-equilibrium nature, which provides high doses of chemically active species at low temperature, potentially increasing reactivity of surfaces without damaging the bulk properties of the material(1).

Results and Discussion

Sixty Katana zirconia (Kuraray Noritake) and 60 Lava (3M ESPE) plates (9 mm x 7 mm x 1 mm) were prepared and randomly divided into 12 groups (n=10). The zirconia plates were embedded in resin blocks and the exposed surface was submitted to the following treatments: 1) untreated (control); 2) treated with NTP for 60 seconds (model SAP, Surface); 3) MonoBond Plus (MB) (Ivoclar Vivadent); 4) Z-PRIME (Bisco); 5) MB followed by NTP for 60s; 6) Z-PRIME followed by NTP for 60s. The resin cement (Panavia F, Kuraray Noritake) was manipulated and inserted into two prefabricated matrices (1,4 mm diameter X 1 mm height), which were positioned on the zirconia surfaces. Specimens were tested at 24 hours of water storage. A shear load was applied to the base of the resin cement cylinders with a chisel edge plunger at 0.5 mm/min until failure. Data were analyzed by two-way ANOVA and Tukey´s test at α= 5%.

Table 1. Mean bond strength of resin cement to zirconia (in MPa) in 24h test.

Treatment	Zirconia	
	Lava	Katana
No treatment	24,24 (6,30) Aa	16,89 (7,25) Ba
NTP 60s	15,00 (10,28) Ab	16,44 (10,71) Aa
Primer (Monobond Plus)	22,18 (11,94) Aa	20,98 (16,69) Aa
Primer (Z-PRIME)	3,74 (2,39) Ac	9,52 (6,34) Ac
Primer (Monobond Plus) + NTP 60s	6,70 (5,52) Ac	4,93 (4,50) Ac
Primer (Z-PRIME) + NTP 60s	5,19 (4,88) Ac	6,16 (3,19) Ac

Means followed by different letters (capital letters compare different zirconia ceramics and lower case letters compare treatments) differ among them (p≤0, 05).

BS was higher for Lava at the control group. Monobond Plus promoted higher BS for both zirconias when comparing to other primer and the combination between primer and plasma. MB showed no statistical difference from control group. Priming followed by NTP decreased BS for all groups tested.

Conclusions

NTP 60s application does not increase the bond strength of resin cement to zirconia. When preceded by priming, it decreased bond strength for Katana and Lava. In addition, MB was the primer that promoted better adhesion between the resin cement and zirconia.

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1.Duan Y, Huang C, Yu QS. Cold plasma brush generated at atmospheric pressure. Rev Sci Instrum. 2007;78(1):015104.