

# Effect of the different types of ceramic primer on shear bond strength of polymer infiltrated ceramic

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## Introduction

Nowadays, the ceramic has been improved its properties to solve the problem and can be used in many situations. One of those, is polymer-infiltrated ceramics which contain hybrid materials, 86%wt ceramic matrix and 14%wt polymer matrix making them become more flexible, preserve the opposite tooth, and more conservative. Successful in restore the tooth with fixed prosthesis, the key factor is the bond strength between restoration and substrate. Surface treatment of the restoration is required, in both mechanical and chemical approach. Universal ceramic primer which contains both silane coupling agent and MDP to create chemical bond, is claimed to be excellently performance with all types of ceramic restoration.

## Objective

To compare the effect of various ceramic primers on bond strength of polymer-infiltrated ceramic and composite resin.

## Method

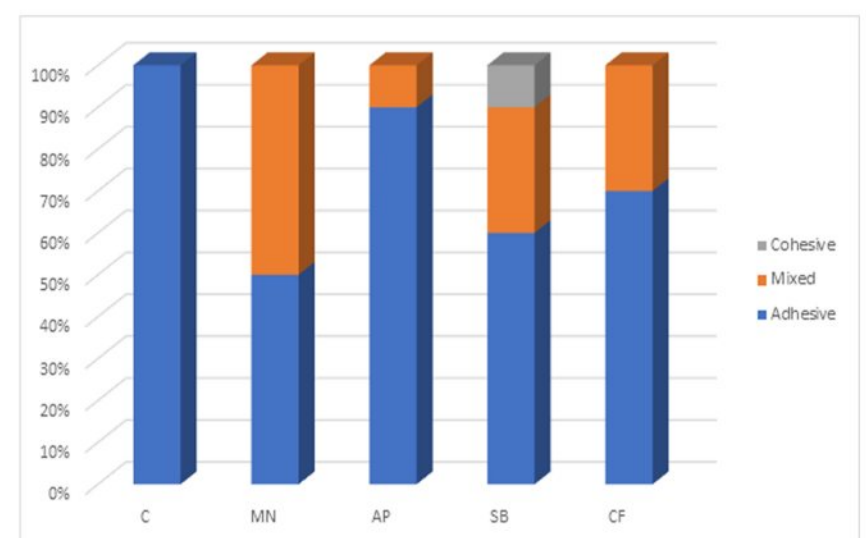
The 50 specimens of polymer infiltrated ceramic CAD/CAM materials (VITA® Enamic) is prepared to size 6x7x3 mm. All specimens are polished with metallographic paper P400 and P600, and randomly divided into five groups (n=15) for Shear bond strength (SBS) test: Group 1 Monobond N, Group 2 Alloy primer Group 3 SuperBond Universal Ceramic Primer Group 4 Clearfil Ceramic Primer and Group 5 no conditioning(control). Then the specimens are bonded to 5 mm diameter cylindrical composite resin blocks with Panavia V5. The specimens were incubated in 37°C water for 24 +/- 2 hours. The SBS test is performed using a universal testing machine (EZ-S 500 N; Shimadzu) with the cross head speed of 0.5 mm/min. Mode of failure is performed with the stereomicroscope at 35x magnificent level and classified into 3 categories: 1. Adhesive failure 2. Cohesive failure 3. Mixed failure

## Statistically analysis

The SBS data were analyzed by Kolmogorov Smirnov test for normal distribution in each group and Levene test for normal variance between groups. One-way ANOVA and post hoc Tamhane's T2 used for parametric analysis.

## Result

	Mean SBS
Control	13.10±0.44 <sup>B</sup>
MN	16.33±0.53 <sup>D</sup>
AP	11.42±0.21 <sup>A</sup>
SB	14.81±0.16 <sup>C</sup>
CF	15.07±0.25 <sup>CD</sup>



Different superscripts mean statistically significant differences between those mean values. ( $p < 0.05$ ) The MN group showed the highest SBS values with no significant different from CF group ( $p > 0.05$ ) but significantly higher than SB group ( $p < 0.05$ ).

The specimens in all groups were mostly found to be adhesive failure, the control group has the highest number of adhesive failures following by the AP group, CF group, SB group and MN group respectively.

**Conclusion:** From the result of this study, it could be concluded as following:

1. Restorative primers that contain Silane coupling agent promote the higher SBS between VITA Enamic and Panavia V5 than without using primer. Due to the chemical reaction with Silica-component in VITA Enamic.
2. Restorative primer that contain VBATDT decreased in SBS between VITA Enamic and Panavia V5 comparing to others.
3. 10-MDP in restorative primers or resin cement may not increase the SBS between VITA Enamic and composite resin.

The restorative primer may affect, both positive and negative, to the bond strength. Thus, dentist should properly selected restorative primer to enhance the bond strength of the restoration.

**Keywords:** Polymer infiltrated ceramic restoration, Surface treatment, Bonding strength, Universal ceramic primer