

SHEAR BOND STRENGTH OF SURFACE TREATMENTS ON ACRYLIC TEETH REPAIR

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Background

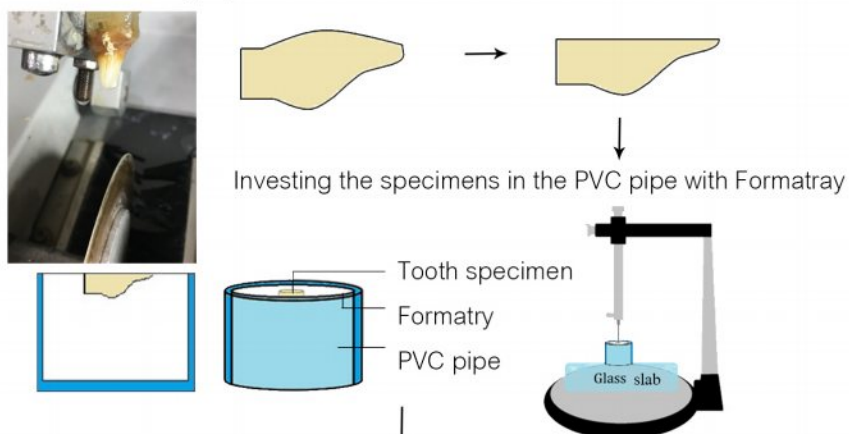
Acrylic resin teeth may fracture or debond due to excessive biting forces in the mouth, fatigue failure, stress concentration, accidental trauma, and in case of mismatched color. These often require the replacement of the acrylic resin denture tooth or rebonding. The immediate in-office repair with autocured acrylic resin has inferior color stability and the use of heat-cured acrylic resins require time-consuming laboratory procedures. In some published studies have suggested to use composite resin for in-office replacement of fractured/debonded denture teeth, eliminates the need for costly, time-consuming procedures and only minimally inconveniences patients.(1) Composite resin also provides more various of shades and esthetic than acrylic which is good for using in tetracycline teeth, enamel-hypoplasia, fluorosis, etc. The success of these procedures also depends on the adhesion of composite resin to acrylic resin.(2)

Objectives

1. To study the shear bond strength between acrylic resin tooth and resin composite in difference methods of treating surface.
2. To study the shear bond strength between acrylic resin denture teeth and veneering resin composite in different resin cements.

Material & Methods

70 maxillary anterior acrylic resin denture teeth specimens
Grinding by Isomet 1000 Precision Saw



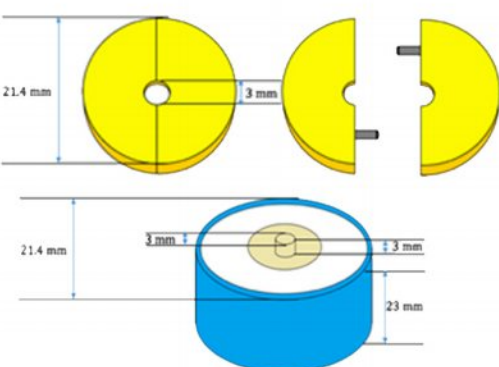
Flat surface using a 600-grit silicon carbide paper by polishing machine IMTECH DPS3200 for 15 seconds then rinsed with water and gently dried with air spray

The 70 specimens were randomly divided into 7 groups according to the types of treatment surface used, containing 10 specimens each

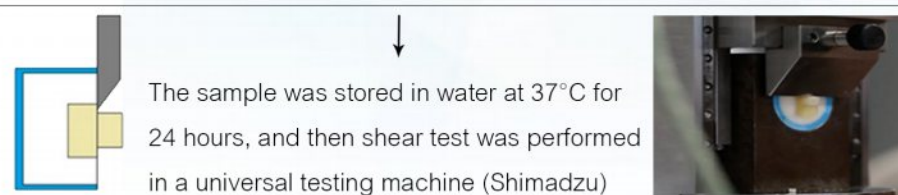
Part I

Part II

Group 1	Group 4	Group 6	Group 7
- MMA 3 mins	- 37.5% phosphoric acid 15 s, rinse 15 s	- MMA 3 mins	- MMA 3 mins
- Bonding agent		- Superbond C&B	- Panavia F2.0
Group 2			
- MMA 3 mins	- MMA 3 mins		
- Silane 3 mins	- Silane 3 mins		
- Bonding agent	- Bonding agent		
Group 3			
- 37.5% phosphoric acid 15 s, rinse 15 s	- Air- abrasion 3 s		
- MMA 3 mins	- 37.5% phosphoric acid 15 s, rinse 15 s		
- Bonding agent	- MMA 3 mins		
	- Silane 3 mins		
	- Bonding agent		



For Group 1-5, the composite resin was condensed against teeth surfaces through this mold in two increments of the composite.(3)

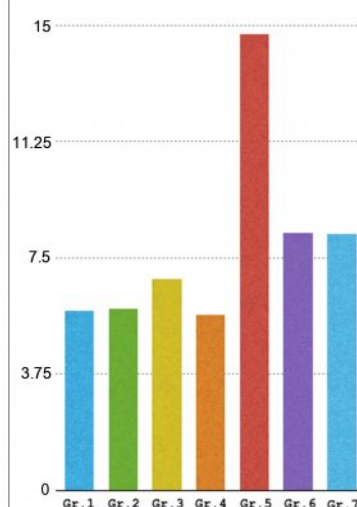


Statistic analysis

The data will be collected and analyzed with SPSS 24 (SPSS, Inc., Chicago, IL, USA) pilot study to calculate sample size. Part I group 1-5; The results were analyzed statistically by One way ANOVA and Tukey's test ($p=0.05$). Part II group 6-7; The results were analyzed statistically by Chi-Square test ($p=0.05$)

Results

Shear bond strength value
Mean (MPa)



Part I Compared Group 1-5

The data were submitted for One-Way ANOVA and the variance of the population are equal (no statistically significant). Therefore, group of the population variance are equal using Tukey's test was carried out. It showed that between Group 1 and Group 2 and Group 3 and Group 4 the shear bond strength are not significantly different. However, Group 1, 2, 3, 4 had an average shear bond strength less than Group 5 with statistically significance.

Part II Compared Group 6-7

The data were submitted for the chi square test ($p < 0.5$) to compare the difference in the shear bond strength among different resin cement. The sig. equals to 0.000 or the sig. < 0.05 , which is below the level of statistical significance, this mean that Group 6 and Group 7 is non-significantly different.

Conclusions

1. Comparing the surface treatment groups, revealed that using air-abrasion to provided the mechanical retention to the surface of acrylic resin teeth enhanced the shear bond strength with composite resin which is significantly different compared to the other groups.
2. The use of two resin cements; Superbond C&B and Panavia F2.0 to bond acrylic resin teeth to composite resin is not significantly different between the two brands.

Keywords

Acrylic denture tooth, Bonding agent, Composite resin, Shear bond strength, Surface treatments

References

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